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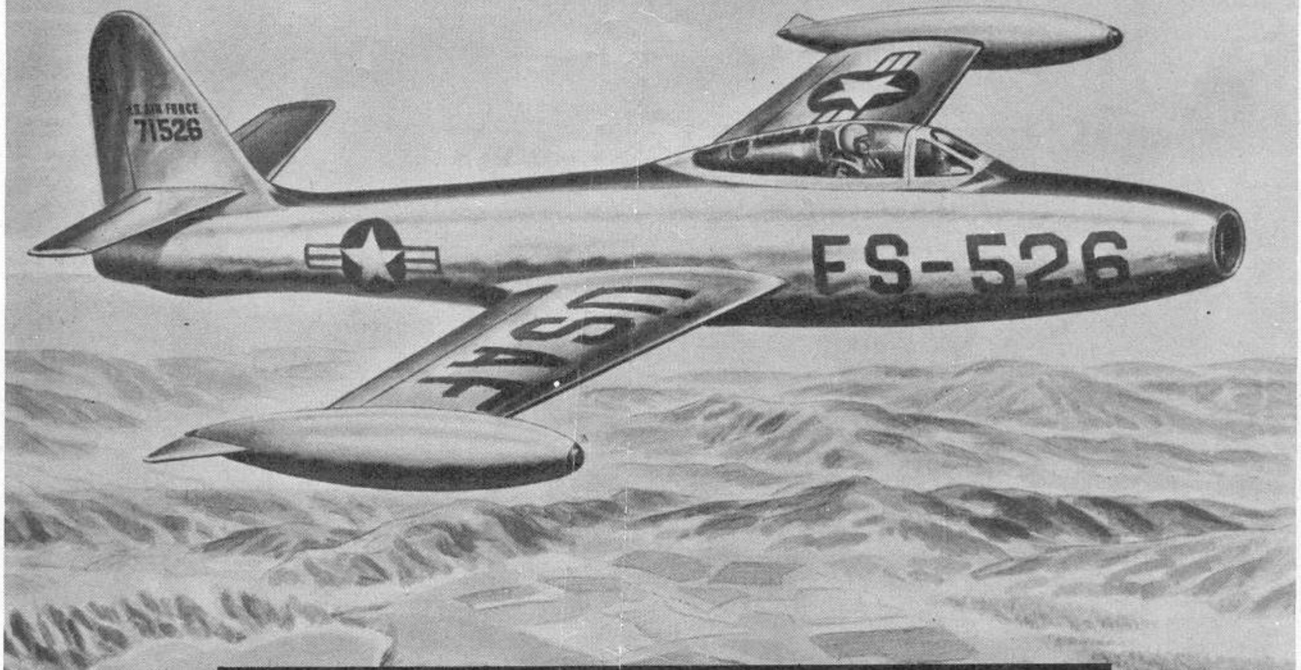
AN01-65BJE-1

# FLIGHT HANDBOOK

# USAF SERIES F-84G AIRCRAFT



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[illegible]ONE CORP,NEW YORK,N.Y.-6200 copies 6/22/53

25 JANUARY 1952

Revised 30 March 1953

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# TABLE OF CONTENTS

# Note

Paragraphs NOT covering all the aircraft series in this handbook are identified by code letters which appear at the top right corner of the paragraph. The code letter assigned to aircraft series are as follows:

**A – G-1RE**

**B – G-2RE**

**C – G-5RE**

**D – G-6RE**

**E – G-10RE**

**F – G-11RE**

*In a few instances reference must be made to aircraft within a series by serial number. This is designated by the code letter followed by a number in parenthesis. The number will designate the specific serial numbers and will be identified at the bottom of each page on which it appears. Paragraphs applicable to all aircraft series in the handbook are not coded.*

# FOREWORD

This handbook contains all the information necessary for the operation of the airplane during normal and emergency flight. These instructions are not intended to teach the basic principals of flight, but are designed to provide the pilot with a general knowledge of the airplane, its flight characteristics, the specific normal and emergency procedures to be used in operating the airplane and its related equipment. The pilot's flying experience is recognized, and elementary instructions have been avoided. The information contained herein is kept current by frequent revisions, but since revisions take time, changes affecting the airplane, flight procedures, or critical flight restrictions are issued immediately as short Technical Orders in the 01-65BJ series. These Technical Orders supersedes the Flight Handbook. Consult your base Technical Order index to be sure you have the latest issue of the Flight Handbook and for the effectivity of short Technical Orders. The handbook is divided into nine sections and an appendix as follows:

**In order that you will gain the maximum benefits from this handbook it is imperative that you read this page *carefully*.**

**Section I. DESCRIPTION.** This section describes the aircraft and all its systems and controls which contribute to the physical act of flying the aircraft. Also included is a description of all emergency equipment which is not part of the auxiliary equipment.

**Section II. NORMAL PROCEDURES.** This section presents the steps of procedure to be accomplished from the time the aircraft is approached by the pilot until it is left parked after accomplishing one complete non-tactical flight under normal conditions.

**Section III. EMERGENCY PROCEDURES.** This section describes the procedure to be followed in meeting any emergency (except those in connection with the auxiliary equipment) that could reasonably be expected.

**Section IV. DESCRIPTION AND OPERATION OF AUXILIARY EQUIPMENT.** This section includes a description, normal operation and emergency operation, of all equipment not directly contributing to flight such as armament equipment, oxygen system, communication equipment, etc. Instructions concerning the operation of auxiliary equipment peculiar to this aircraft have been emphasized.

**Section V. OPERATING LIMITATIONS.** This section lists all operating limitations of the aircraft.

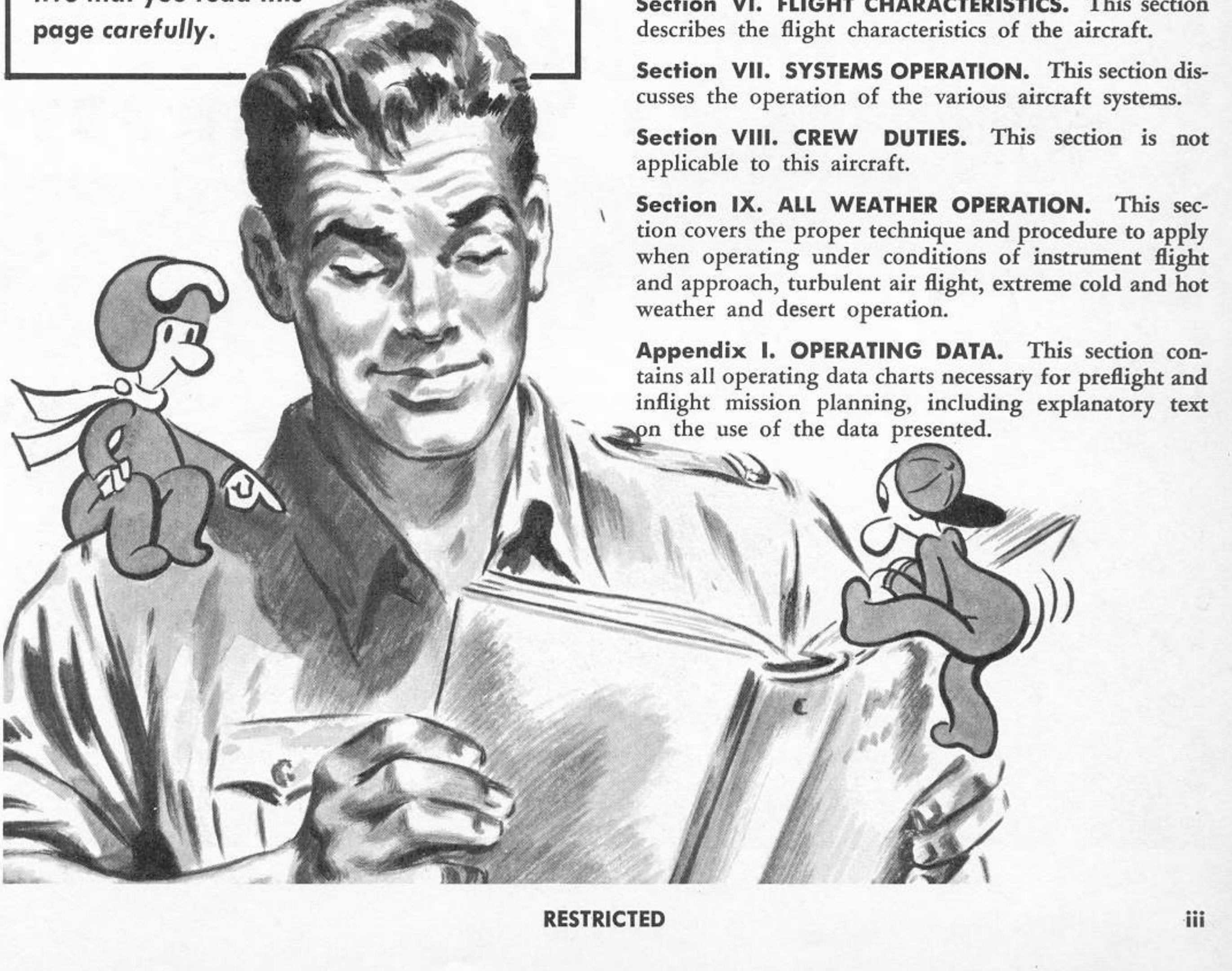
**Section VI. FLIGHT CHARACTERISTICS.** This section describes the flight characteristics of the aircraft.

**Section VII. SYSTEMS OPERATION.** This section discusses the operation of the various aircraft systems.

**Section VIII. CREW DUTIES.** This section is not applicable to this aircraft.

**Section IX. ALL WEATHER OPERATION.** This section covers the proper technique and procedure to apply when operating under conditions of instrument flight and approach, turbulent air flight, extreme cold and hot weather and desert operation.

**Appendix I. OPERATING DATA.** This section contains all operating data charts necessary for preflight and inflight mission planning, including explanatory text on the use of the data presented.



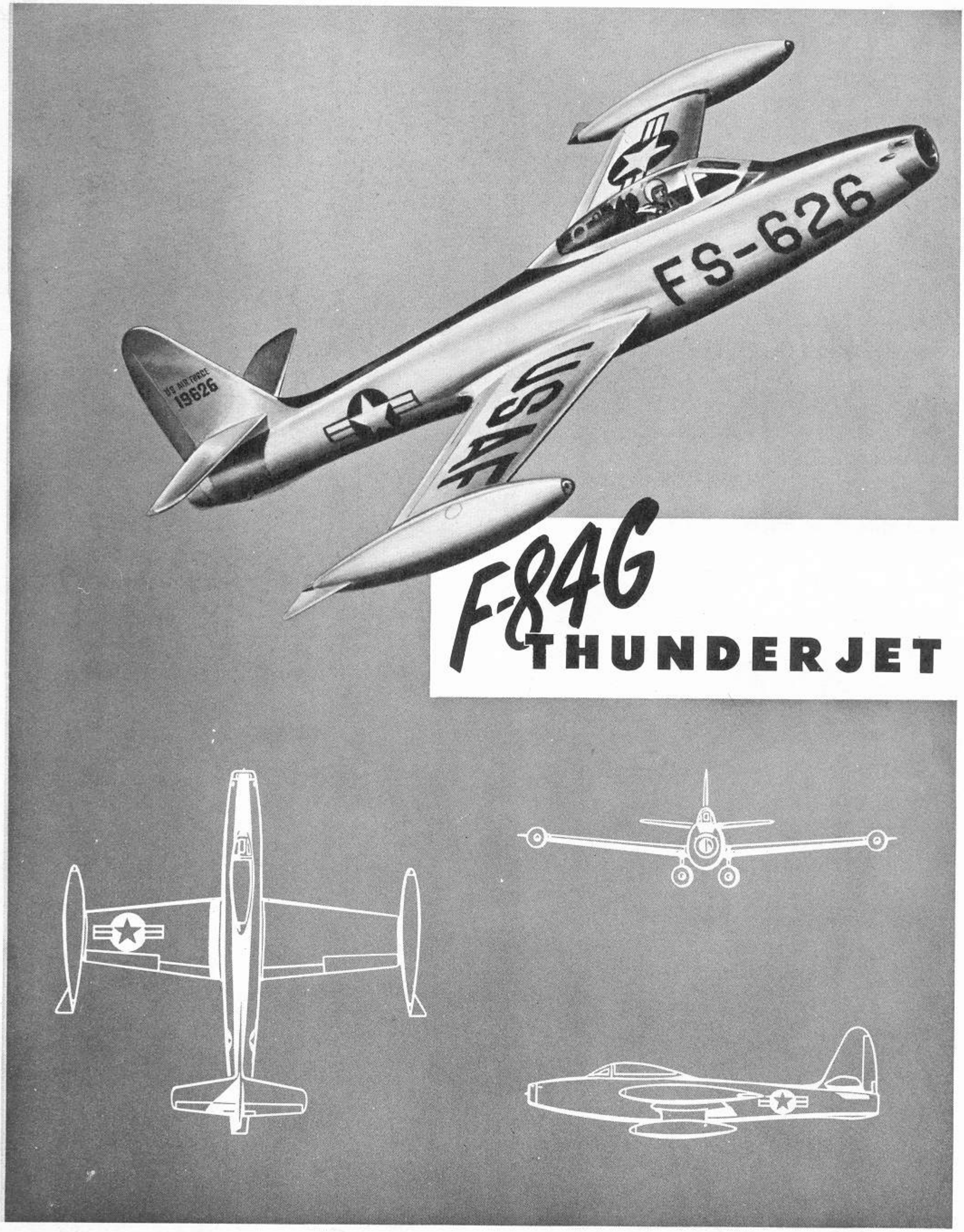
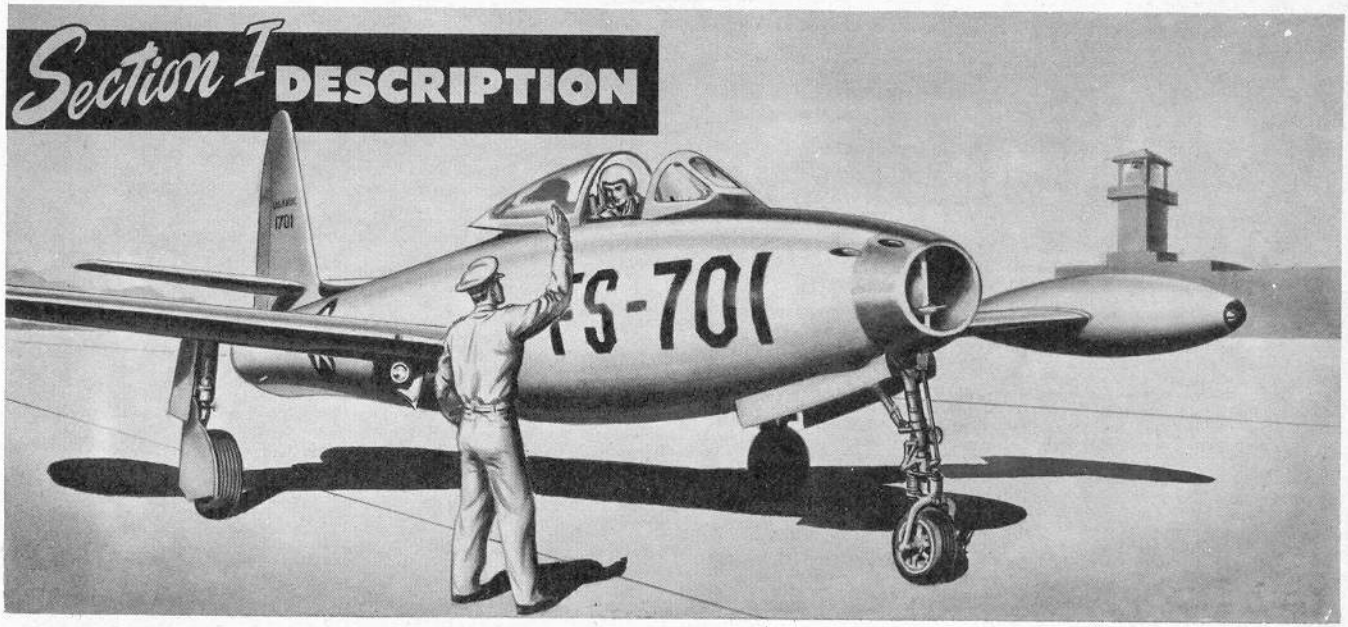


*Figure 1—1. F-84G Airplane*

# Section I DESCRIPTION



## AIRPLANE.

The airplane is a single-place, high speed, jet propelled, mid-wing fighter built by Republic Aviation Corporation. The airplane is semi-monocoque in design and of all-metal stressed skin construction equipped for pressurization at altitudes above 10,000 feet. The pilot's seat is a catapult type, roller mounted in channel rails and attached to an ejection cylinder. The canopy is jettisoned with the aid of pneumatic guns which remove the canopy without danger of injury to the pilot. The canopy and seat jettison controls are interconnected so that the canopy is jettisoned before the seat is ejected. The airplane is equipped with an automatic pilot, inflight refueling system, single point refueling system, and a hydraulic aileron boost with a variable ratio. Armament consists of a gun-bomb-rocket sight with a radar range finder, a gun camera, four .50 caliber fuselage guns, two .50 caliber wing guns and two jettisonable bomb rack adapters.

## ENGINE.

The airplane is powered by an AF Model J35-A-29 jet propulsion engine rated at 5,600 pounds thrust. The engine consists of a multi-stage axial flow compressor, eight combustion chambers, a single stage gas turbine, an exhaust cone and an accessory section. Air enters the compressor through the annular duct in the forward section of the fuselage. The ram air is compressed to approximately five atmospheres at rated power. The compressed air is admitted to combustion chambers where it is mixed and burned with the fuel sprayed from the fuel nozzles. Combustion is continuous once ignition is accomplished. The hot combustion gases are conducted through turbine nozzles to the turbine wheel, through the exhaust cone and tailpipe where the gases are expanded to atmospheric pressure.

### ENGINE FUEL CONTROL SYSTEM.

The engine fuel control system (figure 1—3) is designed to maintain constant rpm during normal operation; however, during emergency operation, the system does not maintain constant rpm for as many variables as it does during normal operation, due to the lack of the many compensatory units provided in the normal operating system. The engine fuel control system consists mainly of an engine driven dual fuel pump, main and

TABLE 1—1. AIRPLANE DIMENSIONS AND GROSS WEIGHT

**AIRPLANE DIMENSIONS**

*Approximate overall dimensions are as follows:*

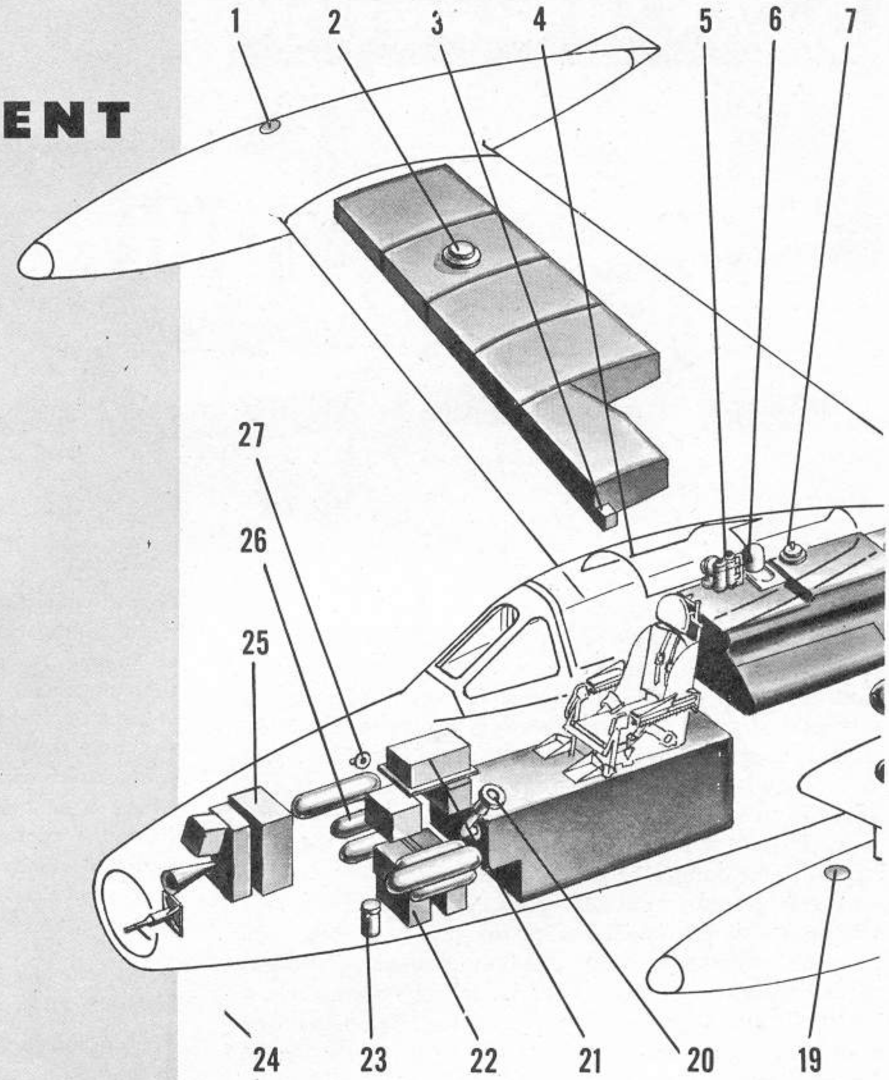
| | |
|---|---|
| LENGTH | 38.1 ft |
| WING SPAN | 36.4 ft |
| WING SPAN (with tip tanks) | 39.6 ft |
| HEIGHT (to top of fin) | 12.6 ft |
| TREAD | 16.6 ft |

**AIRPLANE GROSS WEIGHT**

*Approximate gross weights of the airplane in various configurations are as follows:*

| | |
|---|---|
| NORMAL GROSS WEIGHT | 15,300 |
| SAMPLE CONFIGURATIONS: | |
| Interceptor | 15,300 |
| Escort Fighter | 18,600 |
| Fighter Bomber | 21,900 |
| Penetration Fighter | 22,200 |

*General*
**ARRANGEMENT DIAGRAM**



1. Wing Tip Tank Filler
2. Wing Fuel Tank Filler
3. External Power Receptacle
4. Radio Compass Antenna
5. Cockpit Pressure Regulator
6. Radio Compass Loop Antenna
7. Cockpit Pressure Dump Valve
8. Main Fuel Tank Filler
9. Engine Oil Tank Filler
10. Identification Radio Equipment
11. Radio Compass Equipment
12. Command Radio Equipment
13. Command Radio Antenna
14. Position Light
15. Hydraulic Oil Tank Filler
16. Alcohol Tank Filler
17. Jet Engine
18. High Pressure Oxygen Bottle
19. Pylon Tank Filler
20. Forward Fuel Tank Filler
21. Sight Computer Equipment
22. Batteries
23. Battery Drain Jar
24. Pitot Tube
25. Radar Equipment
26. Low Pressure Oxygen Bottles
27. Oxygen Filler Valve

*Figure 1—2. General Arrangement Diagram*

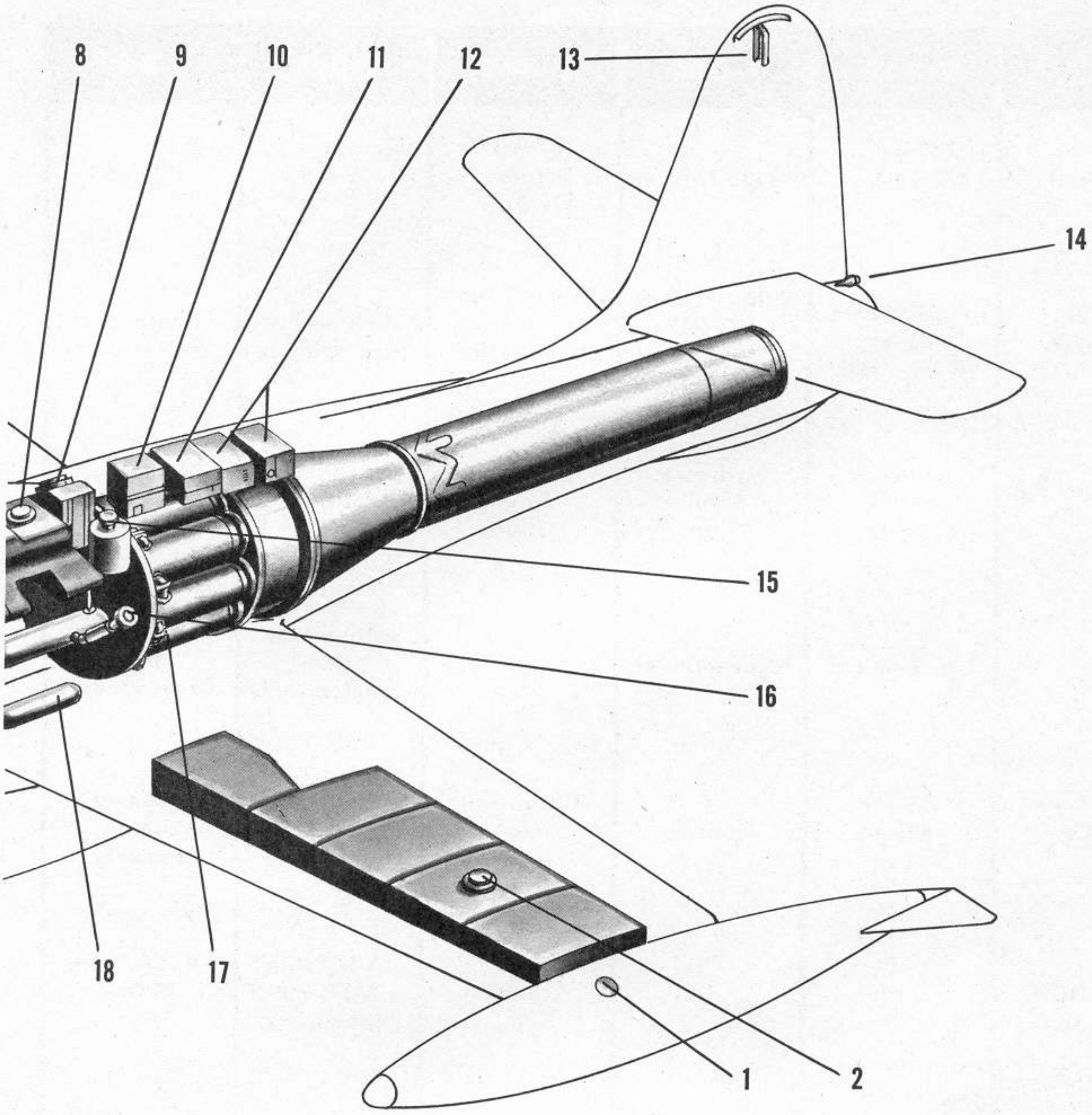
emergency fuel controls, fuel filters, drip valve and nozzles. The dual fuel pump includes two sets of gears, one set comprising the main fuel pump and the other set forming the emergency pump. The two sets of gears are driven by concentric shafts, with the shear section on each shaft located so that failure of the shear section of either pump will not interfere in the operation of the drive shaft of the alternate pump. The emergency system may be selected directly by the pilot or alerted so that if the main pump pressure drops below approximately 80 psi the emergency pump will take over. An indicator is provided to signify which system is operating.

**Note**

Note that emergency operation is possible only when electrical power is available, since it is dependent on solenoid valves.

MAIN FUEL CONTROL.

The main fuel control is designed to adjust fuel flow to the engine so as to prevent overspeeding beyond a

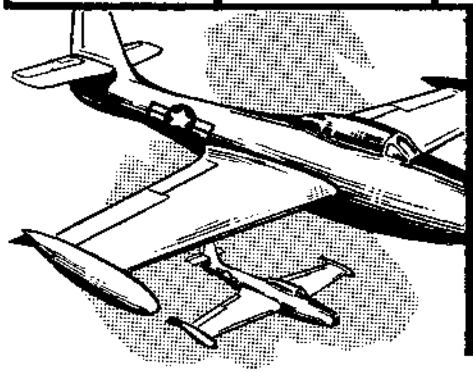


maximum governed speed, to preserve constant engine speed by compensating for changes in air density with changes in altitude, to limit the engine acceleration rate so as to prevent excessive exhaust gas temperature, to limit the engine deceleration rate so that the combustion flames will not be extinguished, and to provide a means of selection of the emergency fuel control system whenever a failure occurs in the main fuel control system. The fuel flow adjustments are made automatically by barometric and governing controls. As engine rpm tends to exceed the prescribed limit, the governor control opens a by-pass valve to permit excess fuel to return to the fuel pump thus preventing engine overspeed and the barometric control provides correct amounts of fuel during changes in altitude by by-passing fuel supply with decreased air density.

## EMERGENCY FUEL CONTROL.

The emergency fuel control adjusts fuel flow in the event of failure of the main fuel pump or the main fuel control system. The emergency fuel control incorporates a barometric device similar to the one in the main fuel control, which insures a constant speed during altitude changes but lacks the governing device of the normal system for preventing engine overspeed and does not prevent rapid engine acceleration and deceleration; therefore, the throttle must be moved with caution to prevent overspeeding, excessive exhaust temperatures or flame-out, when operating on the emergency fuel system. The emergency fuel control is adjusted to provide 100% engine rpm on the ground on a 100°F day; therefore, available full throttle rpm will vary with free air temperature and altitude.

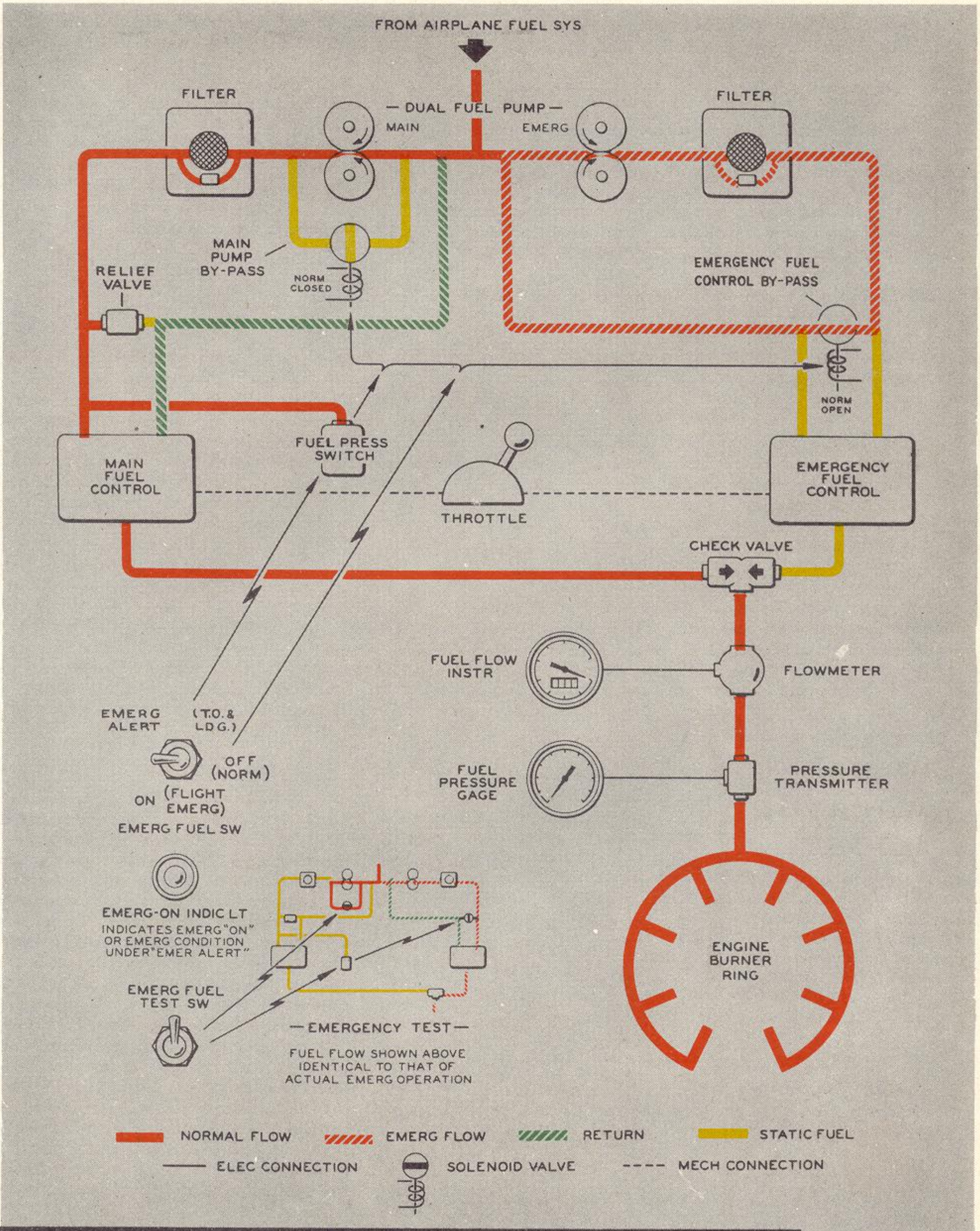
| AIRPLANE MODEL | F-84B | F-84C | F-84D | F-84E | F-84G |
|---|---|---|---|---|---|
| ENGINE | J35-C-3<br>J35-A-5<br>J35-A-15 | J35-A-13 | J35-A-17 Derated<br>J35-A-29 | J35-A-17 | J35-A-29 |
| FUEL SYSTEM CONTROLS | Toggle switches up to F-84B-21RE | Rotary switch F-84B-21RE up to F-84C-11RE | Manual fuel tank selector F-84C-11RE and up | Manual fuel tank selector | Manual fuel tank selector |
| LANDING GEAR | Hydraulic Shrink Struts | Hydraulic Shrink Struts | Mechanical Shrink Struts | Mechanical Shrink Struts | Mechanical Shrink Struts |
| TRIM TABS | Conventional | Conventional | Conventional | Left aileron and elevators only | Left aileron and elevators only |
| CANOPY | Jettison | Jettison | Jettison with canopy remover | Jettison with canopy remover | Jettison with canopy remover |
| GUN SIGHT | K-14B | K-14B | A-1C | A-1C with APG-30 provisions | A-ICM with APG-30 |
| BOMB RACKS | Fixed Pylon | Fixed Pylon | Fixed Pylon | Jettisonable pylon | Jettisonable pylon |



*Airplanes F-84B through F-84G*

**MAIN DIFFERENCES TABLE**

TABLE 1—2. MAIN DIFFERENCES



**ENGINE FUEL CONTROL SYSTEM** *Schematic*

*Figure 1—3. Engine Fuel Control System — Schematic*

### EMERGENCY FUEL SWITCH.

The emergency fuel system is controlled by an emergency fuel switch (18, figure 1—17). The switch has three positions which are: ON (FLIGHT EMERG), OFF (NORM) and EMERG ALERT (T.O. & LDG). The EMERG ALERT position energizes the fuel pressure switch so that a reduction in main fuel pump pressure to approximately 80 psi will open the main pump by-pass valve and close the emergency fuel control by-pass valve, so that output of the emergency fuel pump will be immediately available. The fuel system emergency-on indicator light will illuminate to show that the emergency system is operating. The ON (FLIGHT EMERG) position opens the main fuel pump by-pass valve, closes the emergency fuel control by-pass valve and illuminates the emergency-on indicator light regardless of fuel pressure in the main fuel system or the position of the fuel pressure switch.

**Note**

> Since the fuel pressure switch is set to close at a pressure drop below approximately 80 psi, a partial power failure in the main fuel system may not be great enough to close the fuel pressure switch when operating in the EMERG ALERT position.

### EMERGENCY FUEL TEST SWITCH.

An emergency fuel test switch (17, figure 1—17) is provided to simulate main fuel pump failure and check the operation of the emergency fuel system. The emergency fuel test switch is a spring loaded type switch protected by a red cover guard which is marked EMERG TEST.

**Emergency-on INDICATOR LIGHT**

The emergency-on indicator (37, figure 1-16) located on the instrument panel, is an amber light and when illuminated indicates that the emergency fuel system is operating. The light will go on in any one of the following conditions.

1. Actuation of the fuel pressure switch due to low fuel pressure with the emergency fuel switch in the ALERT (T.O. & LAND) position.
2. If the emergency fuel switch is in the ON (FLIGHT EMERG) position.
3. If the emergency fuel test switch is held in the EMERG TEST position.

*Figure 1—4. Emergency-On Indicator*

Holding the emergency fuel test switch in the EMERG TEST position alerts the fuel pressure switch and opens the main fuel pump by-pass valve which lowers the normal fuel pressure. The fuel pressure switch senses the lowered pressure and closes the emergency fuel control by-pass valve and the fuel system emergency-on indicator light illuminates to show that the engine is operating on the emergency fuel system. When testing the emergency fuel system the emergency fuel switch must be OFF so that the normal fuel system will take over after completion of the test.

### FUEL PRESSURE GAGE.

The fuel pressure gage (21, figure 1—16) indicates fuel pressure at the fuel manifold.

### THROTTLE.

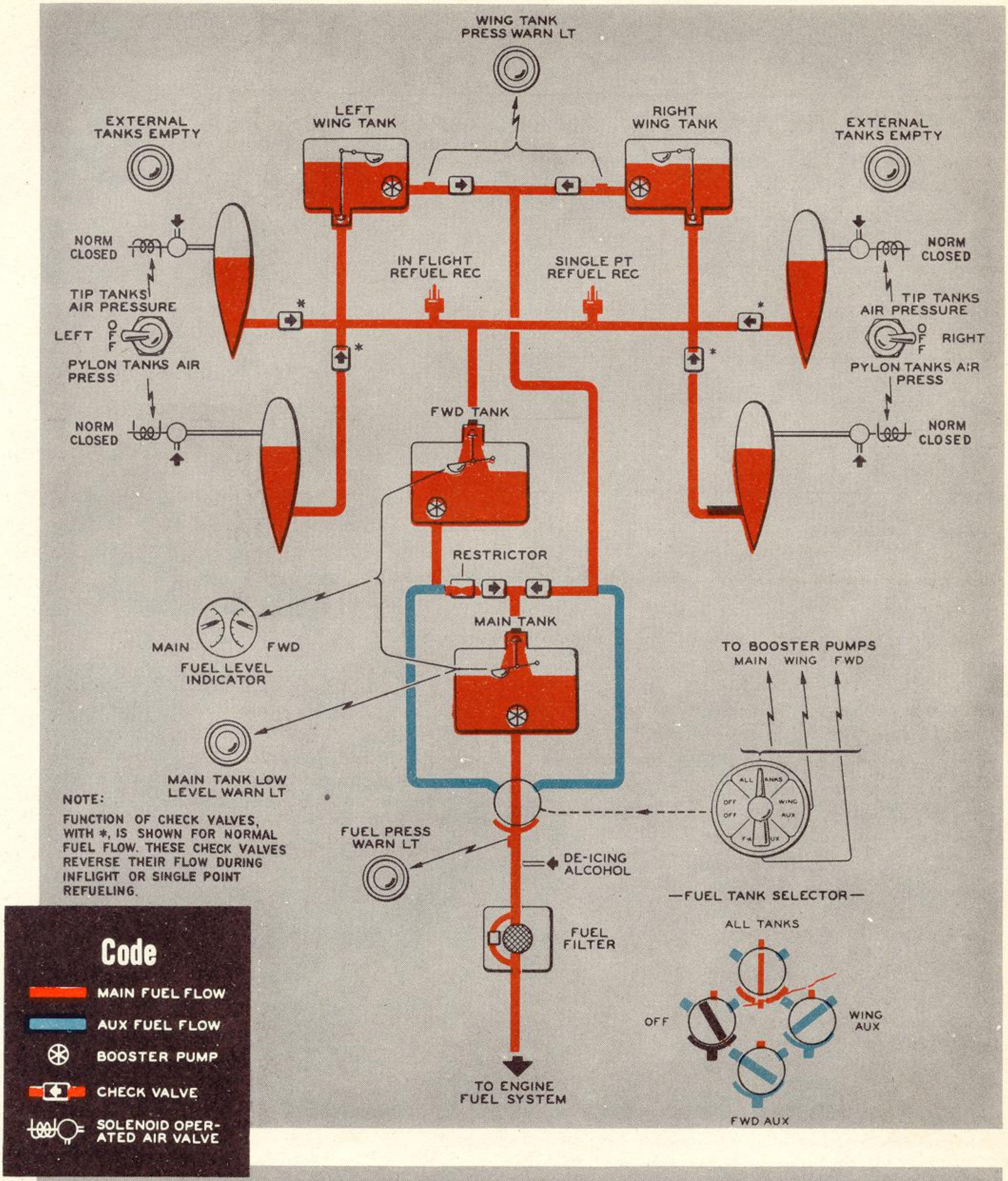
Engine rpm is mechanically controlled by the throttle (37, figure 1—17) which is mounted on the left console. Advancing the throttle from the CLOSED position, open the fuel system stopcock thereby supplying fuel to the engine. Continued movement of the throttle to the OPEN position increases the rpm of the engine until maximum rpm is reached. A gate stop, is provided near the aft end of the throttle travel to prevent inadvertent reduction of the throttle below idle position. The gate stop is marked IDLE STOP and can be by-passed by down thumb pressure when the engine is to be stopped. Throttle creep is prevented by an adjustable friction lock (40, figure 1—17). The throttle incorporates a caging button (red button) for the gun-bomb-rocket sight, a microphone press-to-talk button (black button) and a twist grip for operating the gun-bomb-rocket sight manual range control. A detent at the counter clockwise end of rotation of the twist grip is provided for use with the radar range control.

### IGNITION.

The fuel-air mixture in the engine is ignited by an automatic ignition system which incorporates a spark plug in number 1 and 5 combustion chambers. Once the engine is started, and rpm reaches approximately 22%, the ignition system is no longer used as burning in the combustion chambers is continuous. Power for the ignition system is supplied solely from the main inverter. The main inverter derives its operating power from the primary bus; however, the power to turn the main inverter on is supplied from the secondary bus. Therefore, if ignition is required when secondary bus is not energized (external power from No. 2 receptacle only or generator not operating) the instrument power switch is positioned to the alternate position. This supplies power from the primary bus through an ignition relay to turn the main inverter on and at the same time the alternate inverter is operating to supply power to the instruments. The main inverter will operate only as long as the starting system is energized with the instrument power switch in the alternate position. In the event the main inverter fails it will be impossible to accomplish an air start or a ground start. The ignition system is operated by the ground start or air start switches which are discussed under STARTING SYSTEM.

### STARTING SYSTEM.

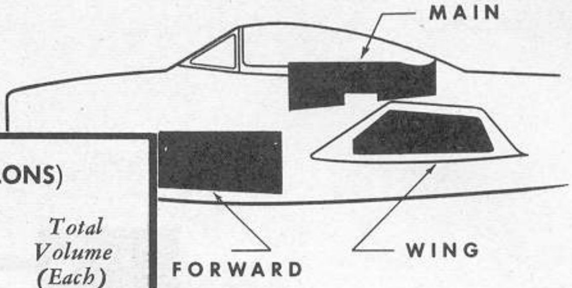
The starter and generator are combined into one unit, mounted on the front of the engine and using a common drive. The starter motor is a 28 volt, d-c type



NOTE:
FUNCTION OF CHECK VALVES, WITH *, IS SHOWN FOR NORMAL FUEL FLOW. THESE CHECK VALVES REVERSE THEIR FLOW DURING INFLIGHT OR SINGLE POINT REFUELING.

**AIRPLANE FUEL SYSTEM *Schematic***

*Figure 1—5. Airplane Fuel System — Schematic*



**FUEL QUANTITY DATA** (GALLONS)

| *Tanks* | *No.* | *Usable Fuel (Each)* | *Fully Serviced Fuel (Each)* | *Expansion Space (Each)* | *Total Volume (Each)* |
|---|---|---|---|---|---|
| MAIN | 1 | 147 | 147.6 | 4.5 | 152 |
| FWD. | 1 | 133 | 134.2 | 5.4 | 140 |
| L. WING | 1 | 81 | 82.2 | 4.7 | 87 |
| R. WING | 1 | 81 | 82.6 | 3.4 | 86 |
| L. WING TIP | 1 | 230 | | | |
| R. WING TIP | 1 | 230 | | | |
| L. PYLON | 1 | 230 | | | |
| R. PYLON | 1 | 230 | | | |

**USABLE FUEL TOTALS**

| | |
|---|---|
| MAXIMUM INTERNAL *(MAIN, FWD. AND WING)* | 442 |
| INTERNAL PLUS WING TIP *(MAIN, FWD. WING & WING TIP)* | 902 |
| MAXIMUM *(MAIN, FWD., WING, WING TIP AND PYLON)* | 1362 |

*Figure 1—6. Fuel Tank Elevation and Capacities*

and is controlled by air start and ground start switches. The starter is energized from the airplane batteries or from the No. 1 or No. 2 external power receptacles. However, as indicated in the IGNITION discussion, ignition is not available for starting if start is from the airplane batteries or No. 2 external power receptacle alone, unless the instrument power switch is in the alternate position (even though the starter is in operation).

GROUND START SWITCH.

The ground start switch (2, figure 1—18) is a three position switch spring-loaded to the OFF position. The switch positions are GROUND START, OFF and STOP STARTING CYCLE. Actuating the ground start switch for two seconds to the GROUND START position engages an automatic starting system which energizes the starter and ignition systems. This system continues to function until the engine has reached approximately 22% rpm, at which time operation of the starter and ignition systems automatically ceases. If the engine fails to reach 22% rpm, the starter and ignition systems will continue to operate until the ground start switch is placed momentarily in the STOP STARTING CYCLE position which will arrest the operation of the starter and ignition systems.

**CAUTION**

To assure operation of the automatic starting system and prevent damage to the starter from prolonged use when starting the engine, the ground start switch must be placed in the STOP STARTING CYCLE position after the engine has reached 22% rpm.

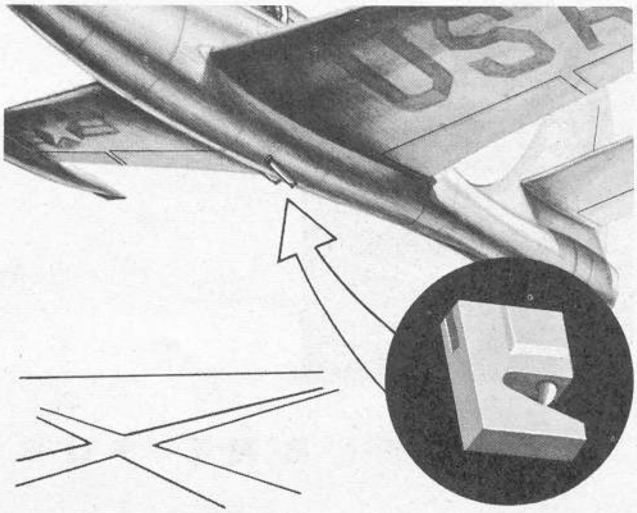


*Figure 1—7. Jato Installation*

### AIR START SWITCH.

The air start switch (1, figure 1—18) is a three-position switch spring-loaded to the OFF position. The switch positions are: AIR START, OFF and STARTER ONLY. Actuating the air start switch momentarily to the AIR START Position, energizes the ignition system for a period of approximately 2 minutes. Placing the air start switch in the STARTER ONLY position energizes the starter which will operate only as long as the switch is held in the STARTER ONLY position. This position is used for ground test of engine rotation.

## ASSIST TAKE-OFF SYSTEM.

Provision is made for the installation of two or four jato units. In the two jato configuration the jato units are installed on electrically retractable hooks on the underside of the fuselage. In the four jato configuration two units are installed on each of two adapters which in turn are attached to the electrically retractable hooks on the underside of the fuselage. The adapters are jettisoned with the jato units. The design of the jato hooks are such that the jato units can not be jettisoned while they are producing thrust.

### JATO READY SWITCH.

The jato ready switch (21, figure 1—17) is a switch-type circuit breaker and has two positions: OFF and JATO READY. The JATO READY position illuminates the jato ready warning light (41, figure 1—17) and supplies power to the jato ignition and jato jettison switches.

### JATO IGNITION SWITCH.

The jato ignition switch (42, figure 1—17) is a push button type switch marked JATO IGNITION, and when pushed in supplies ignition to the jato units. The jato ignition switch is inoperative unless the jato ready switch is in the JATO READY position.

### JATO JETTISON SWITCH.

The jato jettison switch (20, figure 1—17) has two positions: OFF and JATO JETTISON, and is guarded in the OFF position by a red cover guard. The JATO JETTISON position will jettison the jato units and adapters and retract the jato hooks. Approximately 4 seconds are required to complete the hook retracting cycle. The jato jettison switch is inoperative unless the jato ready switch is in the JATO READY position.

**CAUTION**

Recommended jato jettision speed is between 250 and 300 mph IAS. If the jato units are jettisoned at higher speeds they may strike and damage the rear hooks and fuselage.

## OIL SYSTEM.

The engine incorporates a dry sump, full scavenge lubrication system. Oil is supplied from a 65.7 lb (9 U.S. gal) capacity oil tank located aft of the main fuel tank. Scavenged oil is pumped through a heat exchanger, located on the bottom of the compressor casing, and returned to the oil tank. Oil grade and specifications are noted in the servicing diagram figure 1—25.

## FUEL SYSTEM.

The airplane fuel system (figure 1—5) is designed to provide automatic fuel transfer during normal operation without attention from the pilot. Fuel from all tanks, internal and external, is transferred to the main tank simultaneously and in such rate as to maintain a favorable c.g. However, fuel flow may be altered from the normal automatic sequence by the use of a manual selector valve. The airplane is basically equipped with four internal, self-sealing fuel tanks. A main tank is installed behind the pilot, a forward tank under the cockpit floor, and a set of five-celled, interconnected tanks in each wing. In addition four tanks may be carried externally; one on each wing tip and one by each of two pylons. These external tanks may be cleanly jettisoned and, with some modification, are interchangeable. Normal fuel feed order is from the internal wing and forward tanks to the main tank until aggregate fuel drops below float valve levels, then the external fuel transfers to the internal wing and forward tanks maintaining them full. The process continues until all fuel has flowed into the main tank. Fuel flow is effected proportionately to automatically maintain the required c.g. location. Transfer of fuel from external to internal tanks is by means of air pressure, and manually controlled by selector switches. Internal tank fuel is pumped into the main tank by booster pumps which operate automatically, according to the position of the fuel tank selector. Also the pilot may vary the sequence of fuel feed by setting the manual fuel tank selector to allow a direct feed to the engine from either the internal wing tanks or the forward tank. The system is provided with a flowmeter which indicates rate of fuel flow and total remaining. Provisions for ground refueling of the airplane from a single point are made through a receptacle in the right wheel well, and the associated electrical circuits. The equipment is designed to operate in conjunction with the in-flight refueling system. The refueling truck must be equipped with a single-point nozzle and must be capable of delivering fuel at 500 gpm under a pressure of 50 psi. A safety cap fitted with a spring-loaded seal covers the receptacle when the equipment is not in use. The airplane is provided with an inflight refueling system and a fuel filter deicing system which are covered in Section IV.

### FUEL SPECIFICATION AND GRADE.

Recommended and alternate fuel specifications and grade are noted on the servicing diagram, figure 1—25.

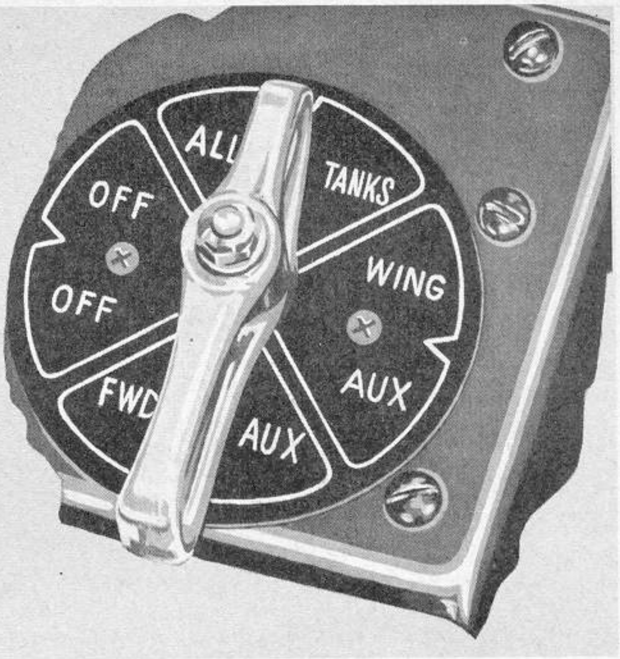
### BOOSTER PUMPS.

A booster pump is provided in the main fuel tank to supply fuel to the engine fuel control system. Booster pumps in the wing and forward tanks normally transfer fuel from these tanks to the main tank but also may be used to supply the engine fuel control system directly by proper positioning of the fuel tank selector. All the booster pumps are electrically operated and are controlled by a rotary switch mechanically connected to the fuel tank selector. At altitudes below 6,000 feet, full engine rpm may be maintained with a failed booster pump under all conditions. Satisfactory reduced power engine operation may result up to 20,000 feet if operating on JP-1 fuel, on cool JP-3 or on cool gasoline. Operation of the engine from a tank containing a failed booster pump may result in vapor lock and damage or complete failure to the engine driven fuel pump if operating above 6,000 feet on hot fuel or above 20,000 on JP-1 or cool fuel. Caution must be observed when switching from a fuel tank without the booster pump operating to a fuel tank with the booster pump operating as the engine rpm may surge enough to cause an acceleration flame-out. Fuel from the wing or forward tanks can not be transferred to the main fuel tank without the aid of the booster pumps in the respective tanks, however fuel may be fed directly to the engine from the forward tank up to 6,000 or 20,000 feet, depending on the fuel, with an inoperative booster pump. It is possible to feed in this manner from the wing tanks but operation under these conditions is prohibited due to the lack of wing fuel tank level indicators. There are no direct indicators to show when a booster pump is not operating, however, booster pump failure may be suspected as noted under fuel system indicators.

**FUEL TANK SELECTOR.**
(See figure 1—8)

**CAUTION**

In auxiliary operation, WING AUX should be used before FWD AUX to maintain favorable c.g. travel.



**ALL TANKS**

The ALL TANKS (normal) position sets all booster pumps in operation and channels all internal fuel into the main tank. The main tank empties through the main feed line until a float valve in the tank opens to receive fuel from the wing and forward tanks. When the fuel level in the wing and forward tanks drop, float valves in the tanks open to receive fuel from the pylon tanks, if installed, and then the wing tip tanks. When external tanks have emptied, fuel from the wing and forward tank enter the main tank simultaneously. These tanks empty at rates which vary to maintain favorable cg travel, so that approximately 0 to 52 gallons will still be in the forward tank after the wing tanks have emptied. The remaining forward and main tank fuel is then used.

**WING AUX.**

The WING AUX position sets the wing tank booster pumps operating and routes wing tank fuel directly to the engine driven fuel pump. No other booster pumps will operate when the control is in this position. Operation in WING AUX will normally be selected if there is a failure of the main tank booster pump. In that case some fuel will transfer into the main tank until the tank is full at which time the float valve in the tank will shut-off the entrance and all fuel will then pass to the engine.

External tank fuel will transfer to the wing and forward tanks if the external tanks air pressure switches are placed in either the TIP TANKS AIR PRESSURE or PYLON TANKS AIR PRESS positions. When the forward tank is full all external tank fuel will then transfer to the wing tanks.

**FWD AUX.**

The FWD AUX position operates the forward tank booster pump only and sends forward tank fuel directly to the engine driven pump. No other booster pumps will operate when the control is in this position. As in the WING AUX position some fuel will transfer into the main tank until the tank is full at which time the float valve in the tank will shut-off the entrance and all fuel will then pass to the engine. External tank fuel will transfer to the wing and forward until the wing is full then all external fuel will transfer to the forward.

*Figure 1—8. Fuel Tank Selector*

One switch is marked LEFT and the other RIGHT. When the switches are in either the TIP TANKS AIR PRESSURE or the PYLON TANKS AIR PRESS position, compressed air from the engine is directed through a pressure regulator to the respective tanks to transfer fuel to the forward and wing fuel tanks.

*Figure 1–9. External Tanks Air Pressure Switches*

### EXTERNAL TANKS AIR PRESSURE SWITCHES

(See figure 1–9)

### FUEL TANK BATTLE DAMAGE SWITCHES.

Fuel tank battle damage switches (10, figure 1–17) are provided to close the fuel shut-off valves in the internal wing and forward tanks; so that fuel will not transfer to these tanks. Refer to Section IV for detailed description.

### TIP TANK JETTISON SWITCH.

The tip tank jettison switch (32, figure 1–17) is a spring loaded switch guarded by a red cover guard which is marked TIP TANK JETTISON. If the jettison switch is held in the TIP TANKS JETTISON position momentarily, electrically actuated solenoids will jettison the wing tip tanks simultaneously.

### MANUAL TIP TANK RELEASE.

The manual tip tank release (33, figure 1–16) is a red handle marked TIP TANKS. This manual release is interconnected wiht a rocket release so that when the manual release is pulled aft the tip tanks and any rockets that are carried will be jettisoned simultaneously. The manual release is mechanically actuated and is used in the event of electrical power failure.

### BOMB RELEASE SWITCH.

The pylon tanks are jettisoned in the same manner as for manually releasing bombs. When the pylon tanks are jettisoned, two compressed air cylinders push the forward and aft ends of the tank down, so that there is a clean break from the airplane. See bomb release switch in Section IV.

### BOMB PYLON JETTISON SWITCH.

The pylon tanks can be jettisoned by actuating the bomb pylon jettison switch, as noted in Section IV. This drops the pylons and pylon tanks as a unit.

### SALVO SWITCH.

The tip tanks and pylon tanks can be jettisoned simultaneously with the salvo switch as noted in Section IV. This will also salvo the rockets, providing the aircraft is airborne.

### EXTERNAL TANKS EMPTY INDICATORS.

Two external tanks empty indicators (15, figure 1–17) are amber colored lights marked EXT TANKS EMPTY. One light is marked LEFT and the other RIGHT. When the light illuminates it indicates that the tank, noted by the position of the external tanks air pressure swiches, is empty. The light will go out if the external tanks air pressure switch is placed in the OFF position.

### WING TANK PRESSURE WARNING LIGHT.

The wing tank pressure warning light (34, figure 1–16) is an amber light marked WING TANK PRESS. WARN and when on indicates the pressure in the fuel lines is below approximately 5 psi and that one or both wing tanks are empty or the booster pump in one or both wing tanks have failed. When operating on WING AUX full rpm of the engine may be maintained with a failed booster pump in the wing up to approximately 6,000 feet altitude, however, there will be no indicator to show when the wing tanks are empty as the wing tank pressure warning light, which would normally indicate empty wing tanks will remain on at all times. In the event of a failed booster pump in one wing, fuel will not be transferred from that wing and the remaining fuel will affect trim only slightly and may even be unnoticeable.

**CAUTION**

In normal operation the flicker or light-on condition of the wing tank pressure warning light is disregarded, since fuel is being fed to the engine from the main tank; however, in WING AUX operation, engine is being fed directly from the wing tanks and at the first flicker or flash of the warning light select the FWD AUX position immediately (if fuel remains in the forward tank) to assure against flame-out. Empty the forward tank first then switch to the ALL TANKS position to maintain a favorable cg location.

### MAIN TANK LOW LEVEL WARNING LIGHT.

The main tank low level warning light (23, figure

1—16) is a red light marked MAIN TANK LOW LEVEL and will illuminate when there are 700 pounds or fuel or less remaining in the main tank.

### FUEL PRESSURE WARNING LIGHT.

The fuel pressure warning light (19, figure 1—16) is a red light marked PRESSURE WARNING and when illuminated indicates the pressure in the fuel feed line to the engine driven fuel pump has dropped to approximately 3 psi.

### FUEL LEVEL INDICATOR.

The fuel level indicator (28, figure 1—16) is a volumetric type instrument controlled by the position of the liquidometer floats in the forward and main tanks. Two pointers on the dial of the instrument indicate the amount of fuel in the forward and main tanks in pounds.

**Note**

> The fuel level indicator is calibrated at 6.41 lbs/gal and will therefore read too high when fuel of a lower density is used, and too low with a higher density fuel.

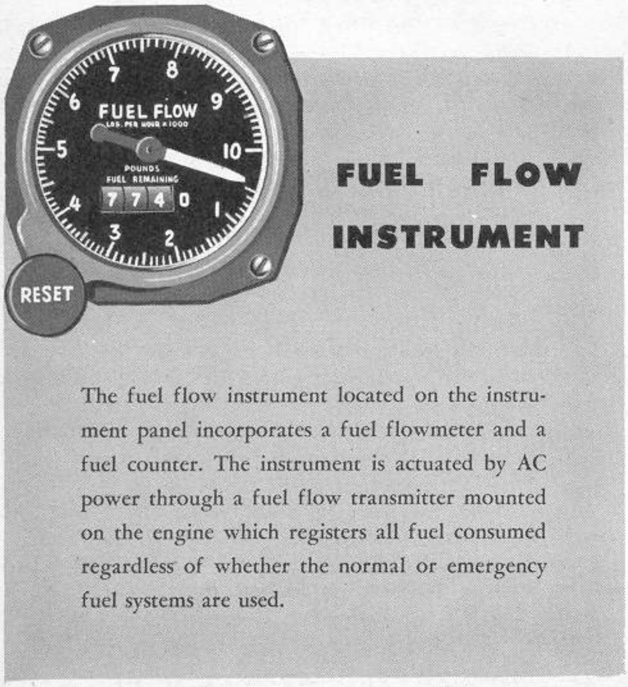
### FUEL FLOW INSTRUMENT.

FUEL FLOWMETER.

The flowmeter indicates the amount of fuel being consumed in lbs per hr. The flowmeter is subject to error depending on fuel grade, fuel density, fuel temperature and the instrument error. The error may amount to more than 20% of the reading.

FUEL COUNTER.

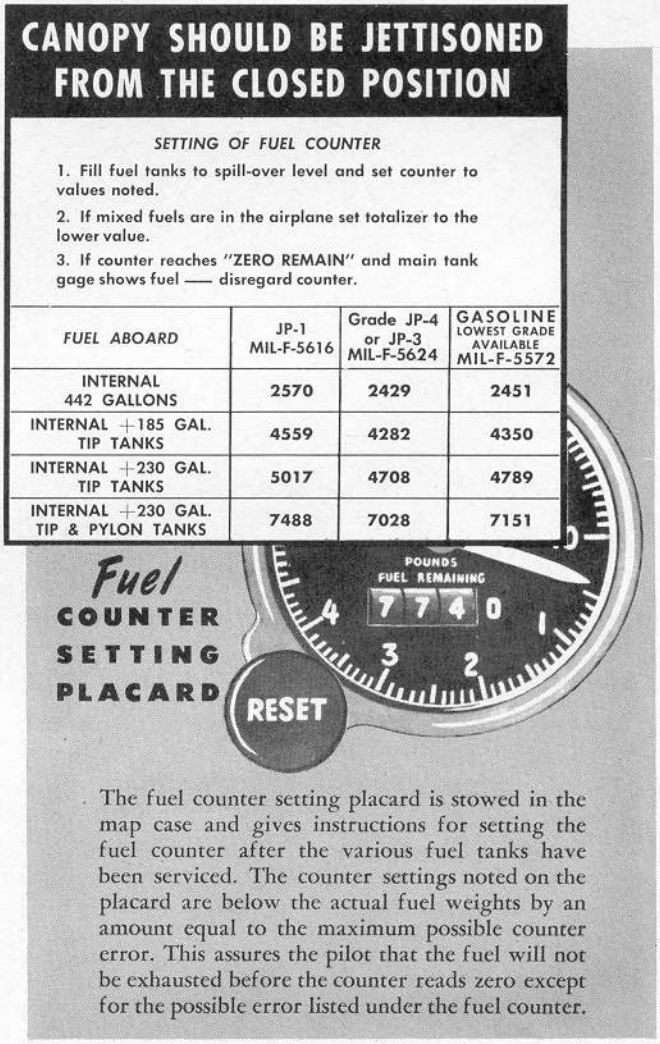
The fuel counter must be set, using the reset knob at the front of the instrument, to read the amount of useable fuel in the aircraft each time the tanks are serviced. As fuel is consumed the fuel counter reading decreases and shows the amount of fuel remaining in the aircraft in pounds. The reading on the counter will be accurate except under the following conditions:



**FUEL FLOW INSTRUMENT**

The fuel flow instrument located on the instrument panel incorporates a fuel flowmeter and a fuel counter. The instrument is actuated by AC power through a fuel flow transmitter mounted on the engine which registers all fuel consumed regardless of whether the normal or emergency fuel systems are used.

*Figure 1—10. Fuel Flow Instrument*



**CANOPY SHOULD BE JETTISONED FROM THE CLOSED POSITION**

*SETTING OF FUEL COUNTER*

1. Fill fuel tanks to spill-over level and set counter to values noted.
2. If mixed fuels are in the airplane set totalizer to the lower value.
3. If counter reaches "ZERO REMAIN" and main tank gage shows fuel — disregard counter.

| *FUEL ABOARD* | JP-1 MIL-F-5616 | Grade JP-4 or JP-3 MIL-F-5624 | GASOLINE LOWEST GRADE AVAILABLE MIL-F-5572 |
|---|---|---|---|
| INTERNAL 442 GALLONS | 2570 | 2429 | 2451 |
| INTERNAL +185 GAL. TIP TANKS | 4559 | 4282 | 4350 |
| INTERNAL +230 GAL. TIP TANKS | 5017 | 4708 | 4789 |
| INTERNAL +230 GAL. TIP & PYLON TANKS | 7488 | 7028 | 7151 |

The fuel counter setting placard is stowed in the map case and gives instructions for setting the fuel counter after the various fuel tanks have been serviced. The counter settings noted on the placard are below the actual fuel weights by an amount equal to the maximum possible counter error. This assures the pilot that the fuel will not be exhausted before the counter reads zero except for the possible error listed under the fuel counter.

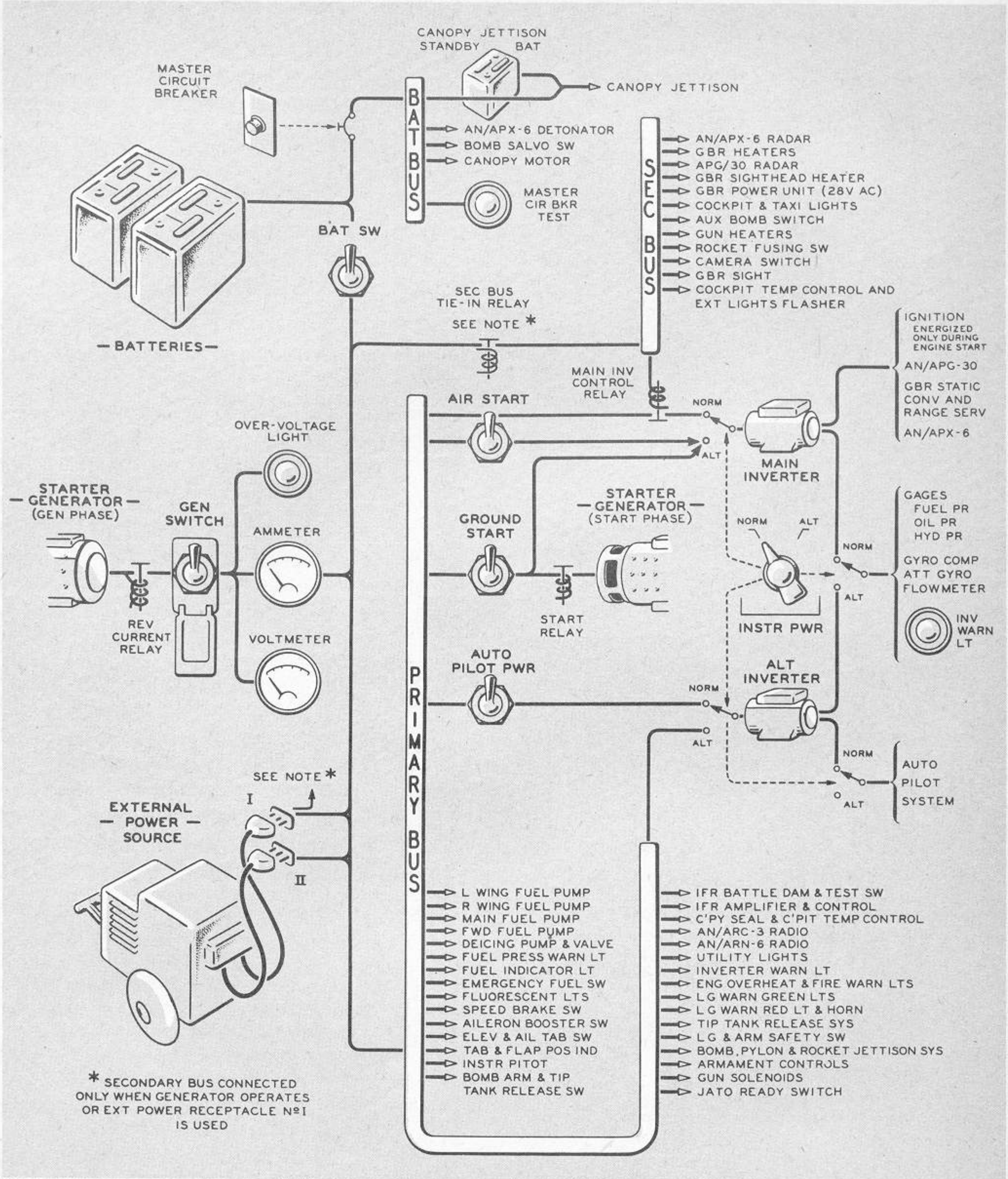
*Figure 1—11. Fuel Counter*

1. Any fuel which is released when the wing tip or pylon tanks are jettisoned will not be recorded.

2. Any fuel leaking from the tank vent or a fuel line upstream of the flow transmitter will not be recorded.

3. Evaporation and/or boiling of fuel in the tanks may result in losses up to 1000 lbs depending on use of warm or hot fuel at the time of take-off, high rate of climb or high cruising at altitude. Loss of fuel from evaporation and/or boiling is more likely with MIL-F-5624, grade JP-3 or MIL-F-5572, lowest grade available than wtih MIL-F-5616, grade JP-1 or MIL-F-5624, grade JP-4 fuel.

Any one, or a combination of these factors may exist; therefore, the main tank fuel level indicator or main tank low level warning light may indicate that the actual fuel load is less, toward the end of a flight, than the indication given by the counter. This must be taken into account in planning a long flight at high altitude when the fuel reserve for landing will be marginal.



# ELECTRICAL SYSTEMS *Schematic*

*Figure 1—12. Electrical Power Supply Systems — Schematic*

## ELECTRICAL POWER SUPPLY SYSTEM.

### D-C SYSTEM.

The 28-volt d-c system is powered from a 400 ampere, engine-driven starter-generator. The system also incorporates two 12-volt batteries connected in series and external power receptacles for the accommodation of an external battery cart. A 4.5-volt canopy jettison battery is provided and is reserved strictly for canopy jettisoning in event of failure of the normal electrical systems. Electrical power is distributed through a three bus system consisting of: a battery bus, a primary bus, and a secondary bus. The battery bus services emergency equipment and remains energized regardless of battery's switch position or generator operation. The primary bus services equipment essential to flight and is energized by the battery, generator and both external power receptacles. The secondary bus services equipment not essential to flight and is energized only by receptical No. 1 and the generator. Therefore, in the event of generator failure in flight, all equipment not essential to flight will be automatically cut out since the secondary bus will cease to be energized. Thus, battery power will be conserved for primary bus equipment, (i.e. equipment essential to flight). A master circuit breaker is provided in the system to de-energize the battery bus when ground personnel are working on the aircraft. The two external power receptacles are marked No. 1 and No. 2. No. 1 energizes the primary and secondary buses and No. 2 energizes the primary bus only. Therefore, No. 1 receptacle must be used for operational check of electrical equipment.

**Note**

Secondary bus is not energized by the aircraft battery.

### A-C SYSTEM.

The a-c system is powered from two single phase, 115-volt, 400 cycle inverters; one known as a main inverter and the other as an alternate. The main inverter requires power from the primary and secondary buses and will therefore not be available if secondary bus (or generator) fails except for ignition during an air start. The alternate inverter is powered from the primary bus and therefore in event of generator failure all a-c energized instruments (which are necessary for flight) will operate. A switch for the selection of the inverters and a light for indication of failure of either inverter are provided in the cabin.

### MASTER CIRCUIT BREAKER INDICATOR LIGHT.

The master circuit breaker indicator light (34, figure 1—19) is marked LIGHT ON INDICATES MASTER CB CLOSED. When the indicator light is pressed, and illuminates, it shows that the master circuit breaker, located adjacent to the battery, is closed.

### BATTERY SWITCH.

The battery switch (3, figure 1—20) is a toggle switch having two positions ON and OFF. It controls power from the battery to the primary bus. Energy to the battery bus is independent of the battery switch positions.

### GENERATOR SWITCH AND OVER-VOLTAGE LIGHT.

The generator is controlled by a generator switch (4, figure 1—20). Generator circuit over-voltage is indicated by the illumination of a generator over-voltage light (8, figure 1—20) which is marked GEN. OUT FROM OVER VOLTAGE. The generator switch positions are ON, OFF and RESET. If the over-voltage light becomes illuminated the generator switch is placed in the RESET position for a few seconds to reset the over-voltage relay. If the generator over-voltage light remains on after reset, the generator switch is placed in the OFF position. The generator over-voltage light will remain on; however, the generator will not be in the electrical circuit. The generator switch is guarded in the ON position by a red cover guard.

### INSTRUMENT POWER SWITCH. (INVERTER SELECTION)

The instrument power switch (6, figure 1—20) has two position; NOR and ALT. The NOR position supplies power from the main inverter to the instruments and ignition circuits if the generator is operating or an external power supply is connected to the No. 1 external power receptacle. The NOR position also supplies power from the alternate inverter to the auto-pilot if the primary bus is energized. The ALT position supplies power from the alternate inverter to the instruments in the event of failure of the main inverter or ignition from the main inverter when making an air start. The ALT position must be used to supply ignition to the engine if the generator is inoperative or external power supply is not connected to the No. 1 external power receptacle.

### CIRCUIT BREAKERS.

Circuit breaker panels are provided to protect the various electrical circuits in the airplane. The circuit breakers are of the push button type and are pushed in to reset.

### AMMETER.

The ammeter (9, figure 1–18) is marked LOAD and indicates the load being drawn from the generator in percent from 0 to 100% with provisions for an additional 25% reading to indicate over-load and a minus 10% reading to indicate discharge.

### VOLTMETER.

A voltmeter (5, figure 1–18) indicates the voltage output of the generator.

### INVERTER FAILURE INDICATOR LIGHT.

Failure of the main or alternate inverter is indicated by illumination of the inverter failure indicator light (7, figure 1–18). If the instrument power switch is in the NOR position and the inverter failure indicator light goes on, the main inverter or generator has failed. Turning the instrument power switch to the ALT position will put the light out in a few seconds. If the inverter failure indicator light goes on with the instrument power switch in the ALT position, it indicates that the alternate inverter has failed.

## HYDRAULIC POWER SUPPLY SYSTEM.

The hydraulic system pressure (figure 1–13) is normally supported by a variable delivery engine driven pump. Since this type pump can deliver a high rate of flow, the hydraulic system is not provided with an accumulator. See figure 1–25 for servicing instructions. A hydraulic hand pump is provided for emergency use. The hydraulic system is automatic with the engine operating and it is only necessary to select a control and move it to the desired position. Hydraulically operated equipment includes: landing gear system, landing flap system, aileron boost, and the speed brake and inflight refueling system doors which are electrically operated hydraulic valves. These controls are described under the applicable system. Hydraulic fluid is supplied from a reservoir which has two standpipes. The upper standpipe supplies the engine driven pump while the lower one supplies the hand pump. In the event of hydraulic failure due to the loss of hydraulic fluid, emergency pressure is obtained with the hydraulic hand pump as an emergency supply of hydraulic fluid is available from the lower standpipe. F-84G-10RE and subsequent aircraft are equipped with a pneumatic system for emergency extension of the nose wheel. Air pressure is maintained by a hydraulically operated compressor.

### HYDRAULIC HAND PUMP.

The hydraulic hand pump (12, figure 1–17) is installed in all airplanes and supplies hydraulic pressure in the event of normal system failure. The hand pump has a telescoping handle that is pulled out, rotated 90 degrees and moved aft about 1/4 inch before using. This provides a longer handle and clearance between the handle and console for greater ease in operation.

**Note**

> In the event of normal hydraulic system failure on airplanes prior to F-84G-10RE and it becomes necessary to use the hydraulic hand pump, the landing gear should be extended first since hydraulic pressure is required to extend the nose wheel.

### HYDRAULIC HAND PUMP SELECTOR. A, B, C, D

The hydraulic hand pump selector (11, figure 1–17) is installed in airplanes prior to F-84G-10RE and is used only if the normal hydraulic system fails and it becomes necessary to use the hydraulic hand pump. The hand pump selector is mechanically operated and has two positions; SYSTEM and NOSE WHEEL. The SYSTEM position allows hydraulic pressure from the hand pump to be transferred to the normal hydraulic system. The NOSE WHEEL position allows the hydraulic pressure from the hand pump to be transferred to the nose wheel actuating cylinder for emergency extension of the nose wheel. On airplanes prior to F-84G-10RE, the hand pump should not be operated after the nose wheel is down and locked as the pressure built up in the hydraulic lines will become excessive and prevent returning the hand pump selector to the SYSTEM position. To assure sufficient supply of hydraulic fluid for nose gear extension it is necessary to drop the main gear by gravity, select the nose wheel position and extend the nose gear, then return the hand pump selector to the SYSTEM position before operating any other system that is necessary.

**Note**

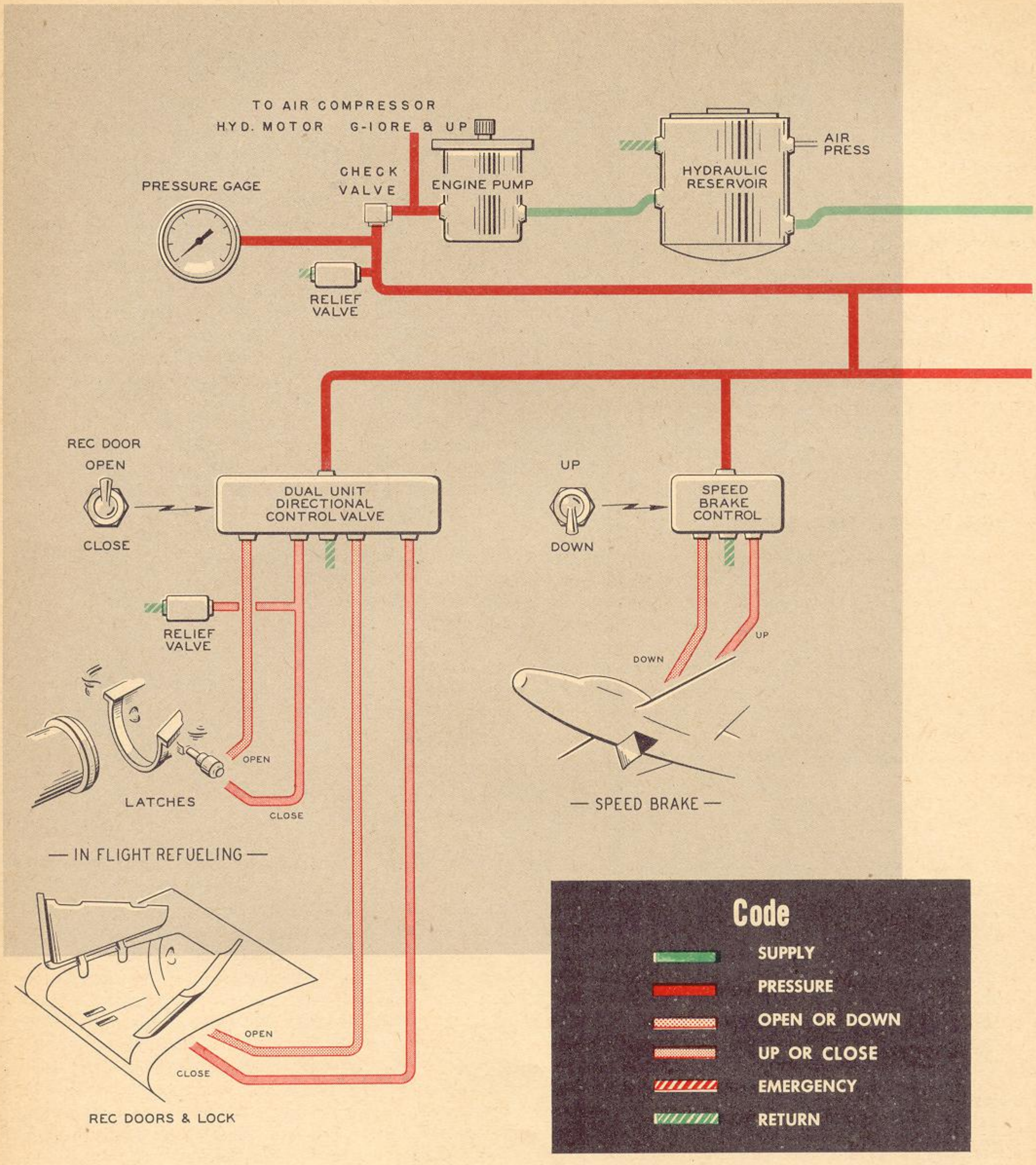
> During normal operation of the hydraulic system, the hand pump selector remains in the SYSTEM position.

### HYDRAULIC PRESSURE GAGE.

The hydraulic pressure gage (35, figure 1–16) indicates system pressure.

## PNEUMATIC POWER SUPPLY SYSTEM. E, F

A pneumatic power supply system (figure 1–13A) is installed in F-84G-10RE and subsequent airplanes and is used to charge the wing and fuselage guns and to extend the nose gear in the event of a hydraulic power supply system failure. The hydraulic hand pump is used in these airplanes for emergency operation of the landing flaps and speed brake. Air pressure is supplied by a hydraulically operated compressor and stored in two storage bottles. Hydraulic pressure is automatically shut-off through an electrical switch when the air pressure in the storage bottles reaches 3000 psi. A manual means of shut-off is also provided. Air from the larger storage bottle is supplied to the gun chargers and is sufficient for two complete charges without being replenished. Air from the smaller bottle is supplied to the nose wheel extension cylinder through a manually operated control valve. The smaller bottle pressure is sufficient for one nose gear extension without being replenished. In the event of failure of the primary bus the shut-off valve will close and the compressor will be inoperative. Emergency hydraulic pressure from the hand pump is prevented from entering the compressor by a check valve.



## HYDRAULIC SYSTEM *Schematic*

*Figure 1–13. Hydraulic Power Supply System – Schematic (Sheet 1 of 2)*

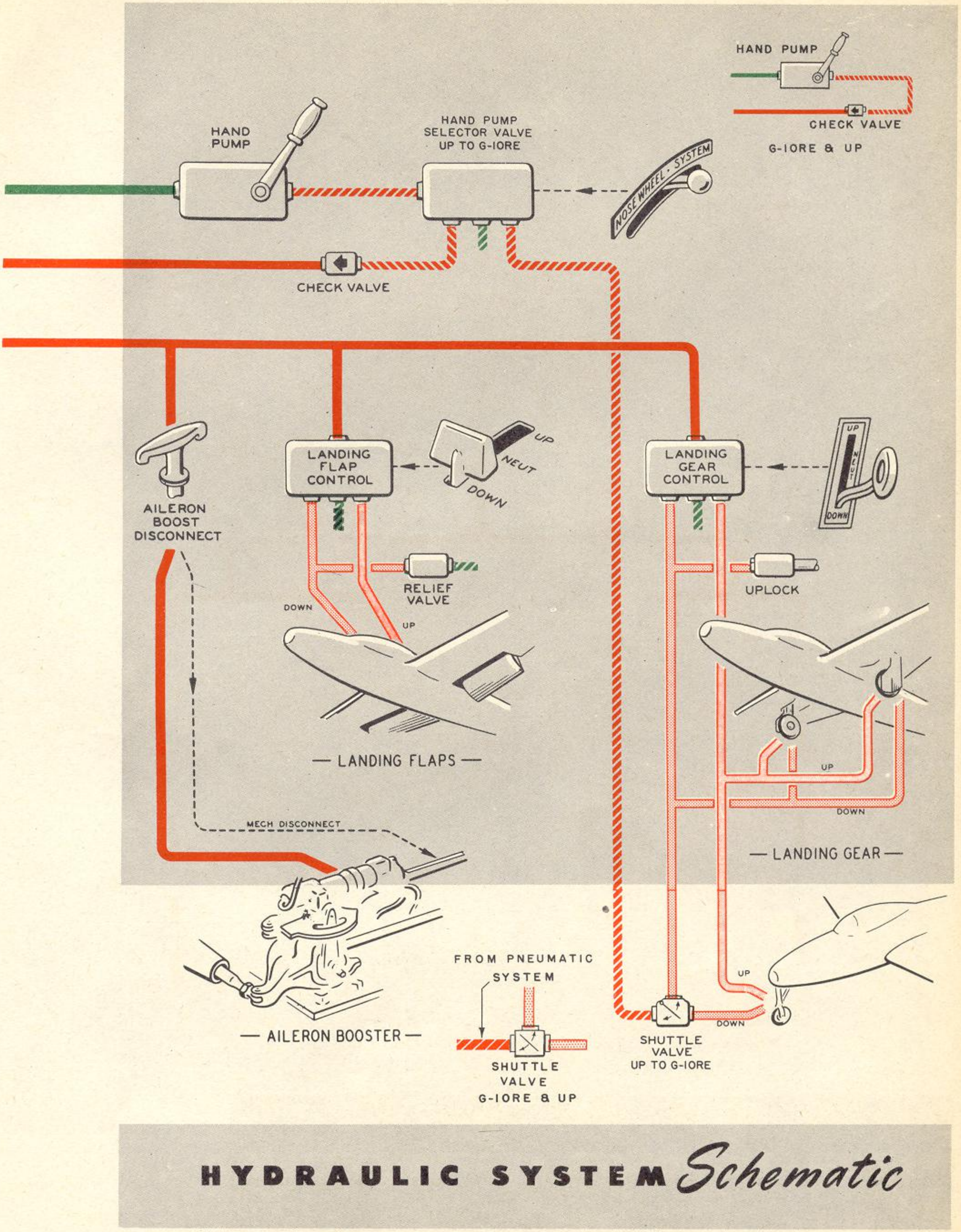
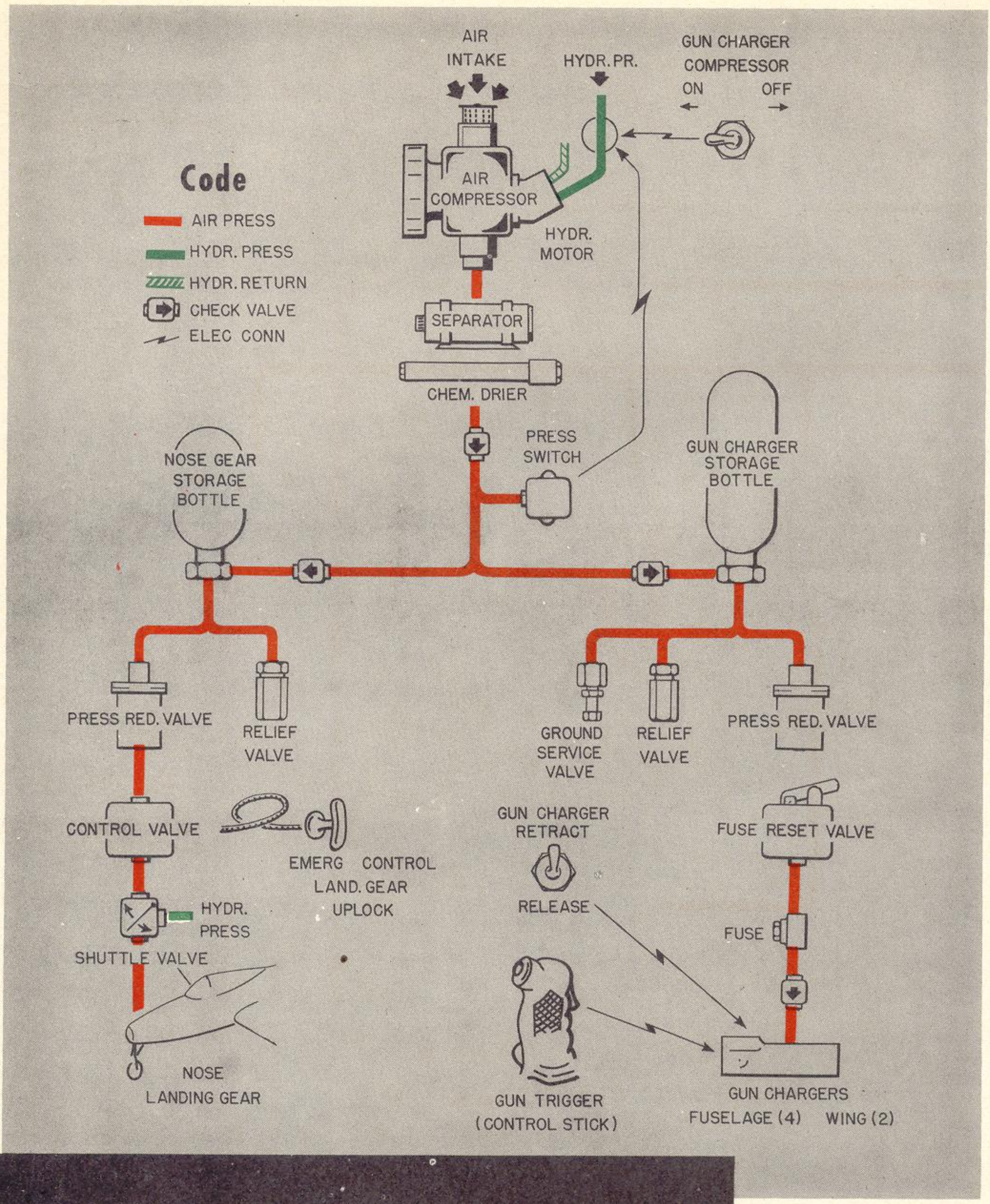


*Figure 1—13. Hydraulic Power Supply System — Schematic (Sheet 2 of 2)*



## PNEUMATIC POWER SUPPLY SYSTEM

*Figure 1—13A. Pneumatic Power Supply System*

### GUN CHARGER COMPRESSOR SWITCH (NOSE GEAR EXTENSION).

The gun charger compressor switch (10A, figure 1–17) is provided so that the pneumatic compressor can be turned on or off at any time. If there is low pressure in the storage bottles and the pneumatic compressor starts to operate during take-off and landing, sluggish operation of the other hydraulic systems may result. Therefore, the gun charger compressor switch is positioned to OFF during take-off and landing and to the ON position after take-off is completed. Control of the pneumatic compressor is then automatic.

### PNEUMATIC PRESSURE GAGES.

Early F-84G-10 and 11RE airplanes have a pneumatic pressure gage for each storage bottle installed in the gun deck. On F-84G-10RE Serial No. 51-1108 and subsequent and F-84G-11RE Serial No. 51-10206 and subsequent, the pneumatic pressure gage for the nose wheel storage bottle is located in the cabin. The gage is red lined at 3400 psi with a green arc ranging from 2500 to 3400 psi.

## FLIGHT CONTROL SYSTEM.

The primary flight control surfaces are conventionally operated by a control stick and rudder pedals which are mechanically connected to the control surfaces. Aileron stick forces are reduced by a hydraulic aileron booster. Trim tabs on the elevators and left aileron are electrically operated. An automatic pilot is inter-connected in the flight control system which can be overpowered by the pilot at any time.

### CONTROL STICK.

The control stick (figure 1–14) is conventional incorporating a hand grip with the following controls; trim tab switch, bomb release switch, stick trigger, radar "out" switch, microphone button and an auto-pilot release switch. These switches are discussed under the applicable systems.

### RUDDER PEDAL ADJUSTMENT.

The rudder pedals are adjusted for leg length by turning the rudder pedal adjusting knob (26, figure 1–16) clockwise to lengthen or counter clockwise to shorten the leg length.

### SURFACE CONTROL LOCK.

A surface control lock (figure 1–14) secures the control stick and rudder pedals in the neutral position when engaged, to prevent damage to the control surfaces when the airplane is parked. To engage, the rudder pedals are positioned to neutral then the surface control lock is raised and hooked over the fitting on the control stick.

### TRIM TABS.

Controllable trim tabs are hinged to the inboard trailing edge of the left aileron and the inboard trailing edge of each elevator. Elevator trim tabs are very effective and a small trim change causes a large variation in stick forces. Structural design limits of the airplane may easily be exceeded if the elevator is trimmed to zero stick force when applying "g" load.

Ground adjustable fixed trim tabs are included on the inboard trailing edge of the right aileron, the center trailing edge of the left aileron, the trailing edge of the left and right elevators and the trailing edge of the rudder.

**WARNING**

Elevator trim tabs should not be used to reduce stick forces in pull outs, turns or during

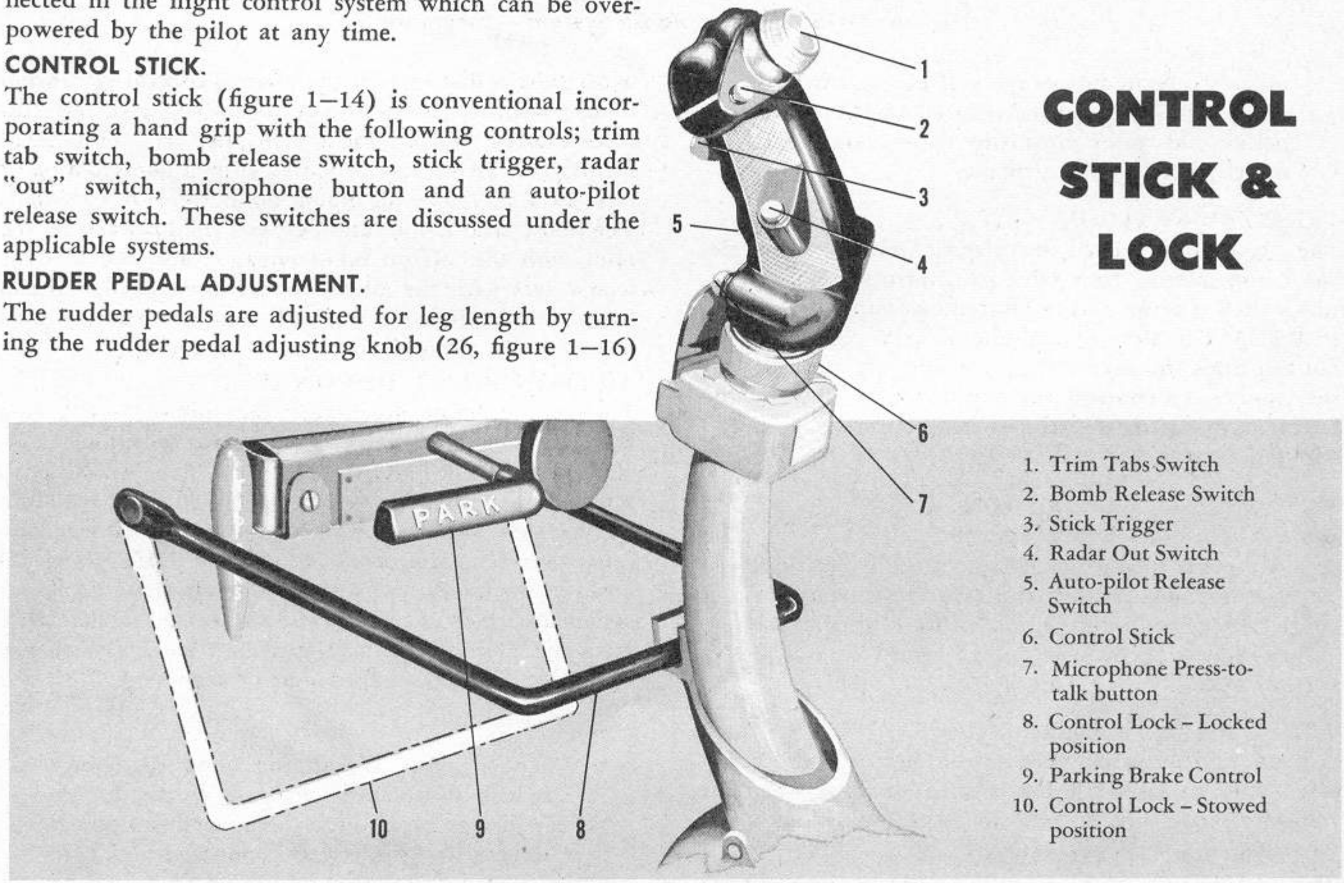


*Figure 1–14. Control Stick and Lock*

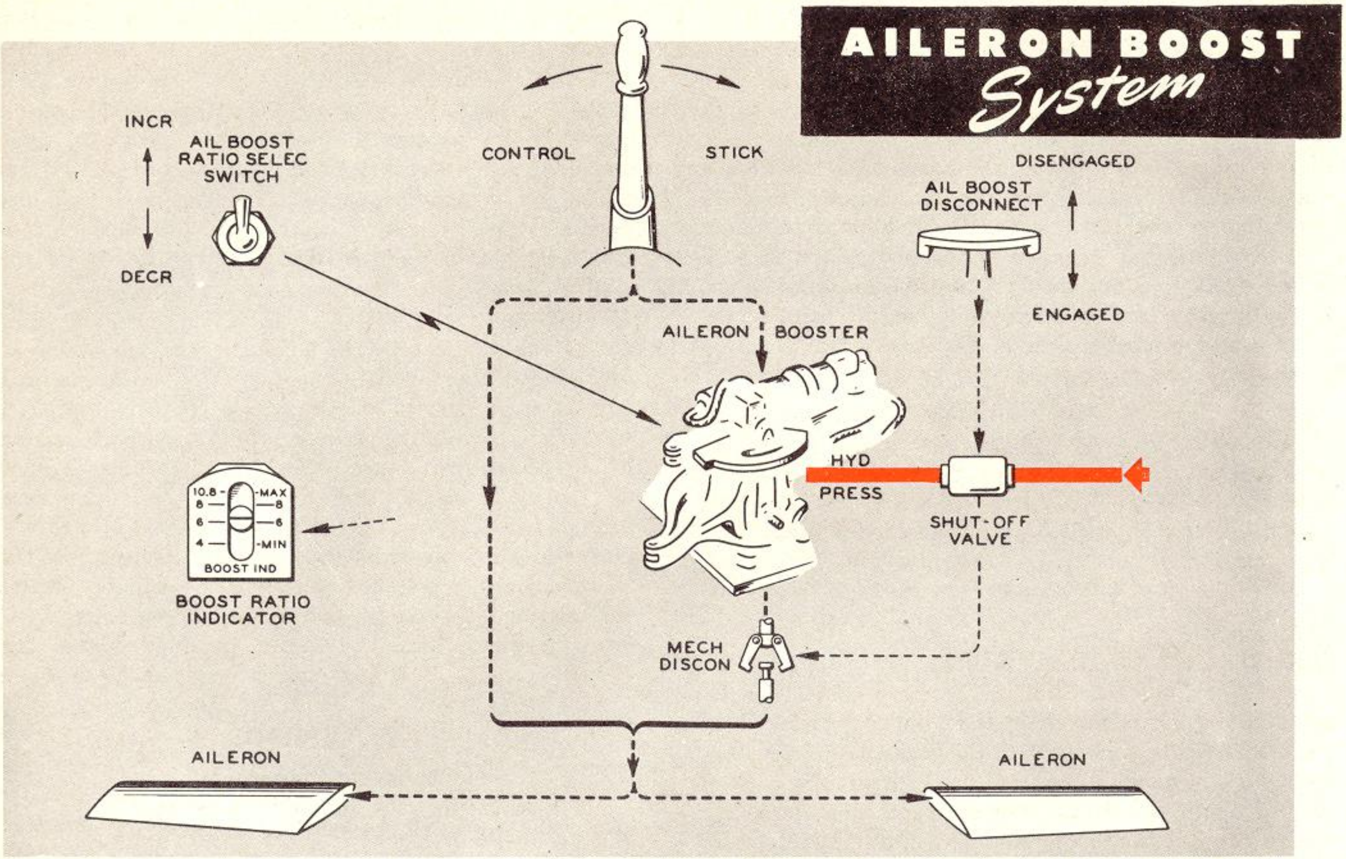


*Figure 1—15. Aileron Boost System — Schematic*

other accelerated maneuvers. If elevator trim is used, stick forces can be reduced sufficiently to permit the pilot to easily exceed structural design limits of the airplane.

TRIM TAB SWITCH.
The trim are actuated by electric motors. The elevator and aileron trim tabs are controlled by a four-way switch, (figure 1—14) located on top of the control stick grip. The elevator and aileron trim tab switch has no markings, however, the fore and aft positions of the trim switch controls the elevator trim tabs and the lateral positions of the trim switch controls the aileron trim tab.

**CAUTION**

Although spring loaded to the OFF position, elevator and aileron trim tabs switch must be actuated and returned to neutral by the use of thumb pressure to insure return of switch to neutral.

TRIM TAB INDICATOR LIGHTS.
Aileron and elevator trim tab indicator lights (figure 1—19) are amber lights which illuminate when the respective trim tabs are in the neutral position.

**AILERON BOOST SYSTEM.**
The aileron boost system (figure 1—15) is supplied with power from the main hydraulic system. With the aileron boost system disengaged, the aileron control is conventional. With the aileron boost system engaged, the stick force exerted by the pilot is multiplied by a preselected factor. This factor may be varied from a minimum boost ratio of 4 to 1 to a maximum boost ratio of 10.8 to 1. The boost ratio is the ratio between the load felt by the pilot with the aileron boost engaged and the load he would feel with the aileron boost disengaged. Aileron boost will be effective with the engine operating at a minimum of approximately 40% rpm (idle).

AILERON BOOST DISCONNECT.
The aileron boost disconnect (22, figure 1—17) is a manually operated valve having two positions: ENGAGED and DISENGAGED. In the ENGAGED position, the hydraulic pressure is supplied to the aileron boost system and the boost system is connected mechanically to the aileron controls. In the DISENGAGED position, hydraulic pressure is shut off from the boost system and the boost system is disconnected mechanically from the aileron control. The aileron boost system may be engaged or disengaged during flight.

**Note**

When engaging the aileron boost disconnect it is held down until engaged. If the disconnect springs back to the disengaged position it is returned to the engaged position and held while the control stick is moved from side to side.

### AILERON BOOST RATIO SELECTOR.

The aileron boost ratio selector (9, figure 1—17) is a spring loaded switch having three positions: INCR, OFF and DECR. The aileron boost ratio is selected electrically by holding the aileron boost ratio selector in the INCR or DECR position until the desired boost ratio is obtained.

**Note**

> In the event of electrical failure, aileron boost ratio will remain at its last setting.

### AILERON BOOST RATIO INDICATOR.

The aileron boost ratio indicator (7, figure 1—17) is a sliding pointer connected mechanically to the aileron boost selector actuator and indicates the aileron boost ratio selected.

## LANDING FLAPS.

Partial span, double-camber, NACA slotted-type flaps are hinged to the inboard trailing edge of the wing. The flaps are actuated hydraulically and are interconnected by a series of balance cables which synchronize their travel. Full travel of the flaps is 40° down. If the flaps are fully down and the airspeed approaches 220 mph IAS, the air loads on the flaps will be great enough to open a relief valve and permit the flaps to retract from 40 to 20 degrees; from 20 to 0 degrees no automatic retraction is possible as the flap linkage is at dead center. It is possible to lower the flaps at airspeeds above the safe limits, therefore airspeed limitations must be observed when operating the flaps. A mechanical uplock is incorporated in the flap actuating cylinder so that the flaps will remain in the up position without the aid of hydraulic pressure.

### LANDING FLAP CONTROL.

The flaps are controlled by a landing flap control (36, figure 1—17) which mechanically positions the valve as follows: DOWN, NEUT and UP. The flaps are placed in the up or down position by placing the landing flap control in the desired position. After the flaps reach the full up position the flap control is returned to the NEUT position. A mechanical lock, in the flap cylinder, keeps the flaps up and a thermal relief incorporated in the selector valve relieves pressure due to thermal expansion. Any intermediate setting of the flaps may be obtained by moving the flap control to the NEUT position when the indicator shows the desired flap position. Flaps are lowered by selecting the DOWN position and leaving the landing flap control at DOWN.

### LANDING FLAP POSITION INDICATOR.

Markings on the landing flap position indicator (44, figure 1—17) show the position of the landing flap from UP to 40 degrees down.

## SPEED BRAKE.

(See figure 1—20)

### SPEED BRAKE SWITCH.

Operation of the speed brake is controlled electrically by a speed brake switch (38, figure 1—17) which actuates a solenoid valve and has two positions: DOWN and UP. When placed in the DOWN position the speed brake extends its full travel of 54½ degrees, and when placed in the UP position the speed brake retracts to its normal position flush with the underside of the fuselage. The speed brake cannot be positioned in any intermediate position.

## LANDING GEAR SYSTEM.

The landing gear is a tricycle gear consisting of two main wheels and a nose wheel. Each wheel is mounted on an air-oil shock strut and all are hydraulically retracted and extended. The main wheels retract inboard into wheel wells in the wing and when retracted are enclosed by fairing doors that are flush with the contour of the underside of the wing. The nose wheel retracts aft into a wheel well in the nose of the fuselage and is enclosed with fairing doors that are flush with the contour of the fuselage. Each strut is mechanically shrunk as it is being retracted and automatically extends to its fully extended position when the gear is let down. A track and roller assembly prevents the landing gear struts from being locked in the wheel wells if the shrink struts should fail when the landing gear is retracted. Mechanical locks secure the three struts in the retracted or extended positions. Inadvertent retraction of the gear when airplane is on the ground is prevented by an electrically actuated lock which automatically prevents moving the landing gear selector. A control is provided to override this safety system in emergencies. The main landing gear is locked down mechanically. The down locks are spring loaded to the locked position and are unlocked by hydraulic pressure when the gear is retracted. In an emergency the main gear extends by gravity and the airplane is yawed to engage the downlocks; nose gear on airplanes prior to F-84G-10RE is extended with hydraulic pressure from the hand pump. On F-84G-10RE and subsequent airplanes the nose wheel is extended by air pressure. Ground safety locks are provided for maintenance purposes only.

**Note**

> Since the only means for extending the nose gear on airplanes prior to F-84G-10RE is by hydraulic pressure, the nose gear must be downlocked with the handpump prior to emergency operation of any other system.

### LANDING GEAR SELECTOR.

The landing gear selector (4, figure 1—17) is a mechanical valve having three positions: UP, NEUT, and DOWN. The handle on the selector has a wheel shaped knob for identification and must be pulled out to move it to a desired position. The landing gear is normally retracted and extended by selecting the UP or DOWN position of the landing gear selector. After the landing gear is fully retracted the landing gear selector is returned to the NEUT position to relieve pressure in the landing gear system as the hydraulic lines are open to return with the selector in the NEUT position. The landing gear is extended by placing the selector in the

DOWN position and leaving it there after the landing gear is extended. The NEUT position of the landing gear selector is selected prior to emergency operation of the hydraulic system to prevent the loss of hydraulic fluid in the event of system leakage downstream of the landing gear selector valve.

### LANDING GEAR EMERGENCY UPLOCK RELEASE.

A landing gear emergency uplock release (5, figure 1—17) is a cable release that permits extension of the landing gear in the event of failure of the normal hydraulic system. When the landing gear emergency uplock release is pulled it releases the uplock on the three landing gear struts and on F-84G-10RE and subsequent airplanes it also opens the pneumatic pressure line to the nose gear extending cylinder. The main gears will extend by gravity but the nose gear on airplanes prior to F-84G-10RE must be extended with the emergency hydraulic system.

**Note**

> If the nose gear is extended by the pneumatic power supply system on F-84G-10RE and subsequent airplanes the control valve for the nose gear must be reset to the closed position manually as the nose gear will not retract until the air pressure in the extending cylinder is relieved.

### LANDING GEAR EMERGENCY GROUND RETRACT SWITCH.

The landing gear emergency ground retract switch (2, figure 1—17) operates a solenoid, so that in the event of an emergency the landing gear may be retracted before the airplane is airborne. The switch is guarded in the OFF position by a red cover guard. Placing the switch ON will enable the pilot to move the landing gear selector valve to UP before the weight of the airplane is off the landing gear.

### LANDING GEAR POSITION INDICATOR LIGHTS. A, B, C, D

Four landing gear position indicator lights (1, figure 1—17) one red marked WARNING GEAR UNSAFE and three marked LEFT SAFE, NOSE SAFE and RIGHT SAFE indicate the position of the landing gear struts. The indications are as follows:

| | | |
|---|---|---|
| UNSAFE red light on | a. With throttle below minimum cruise rpm. | a. Indicates landing gear not locked down. |
| | b. With throttle above minimum cruise rpm. | b. Indicates land ing gear in any unlocked position. |
| green lights on | | Indicates respective landing gear down and locked |

### LANDING GEAR POSITION INDICATOR. E, F

Three landing gear position indicators replace the three green lights installed on previous models. The indicators

## INSTRUMENT *Panel*

1. Engine Overheat Warning Light
2. Canopy Control Switch
3. Gun-Bomb-Rocket Sight
4. Span Adjustment Dial
5. Rear View Mirror
6. Compass Correction Card
7. Slaved Gyro Magnetic Compass Indicator
8. Engine Fire Warning Light
9. Stand-by Compass
10. Mechanical Caging Lever
11. Target Indicator
12. Radar Range Sweep Control
13. Sight Filament-Circle Switch
14. Sight Filament-Dot Switch
15. Reticle Dimmer Control
16. Tachometer
17. Rate of Climb Indicator
18. Exhaust Temperature Indicator
19. Fuel Pressure Warning Light
20. Fuel Flow Instrument
21. Fuel Pressure Gage
22. Attitude Indicator
23. Main Tank Low Level Warning Light
24. Pilot's Relief Tube
25. Engine Oil Pressure Gage
26. Rudder Pedal Adjustment
27. Gun-Bomb-Rocket Sight Test Receptacle
28. Fuel Level Indicator
29. Rocket Indicator and Reset Switch
30. Parking Brake Control
31. Turn and Bank Indicator
32. Clock
33. Manual Tip Tank Release
34. Wing Tank Pressure Warning Light
35. Hydraulic Pressure Gage
36. Accelerometer
37. Fuel System Emergency-On Indicator Light
38. Radio Compass Indicator
39. Slaved Gyro Fast Slaving Switch
40. Slaved Gyro Compass Switch
41. Altimeter
42. Air Speed Indicator
43. Rocket Dive Angle Control
44. Bomb-Target-Wind Control

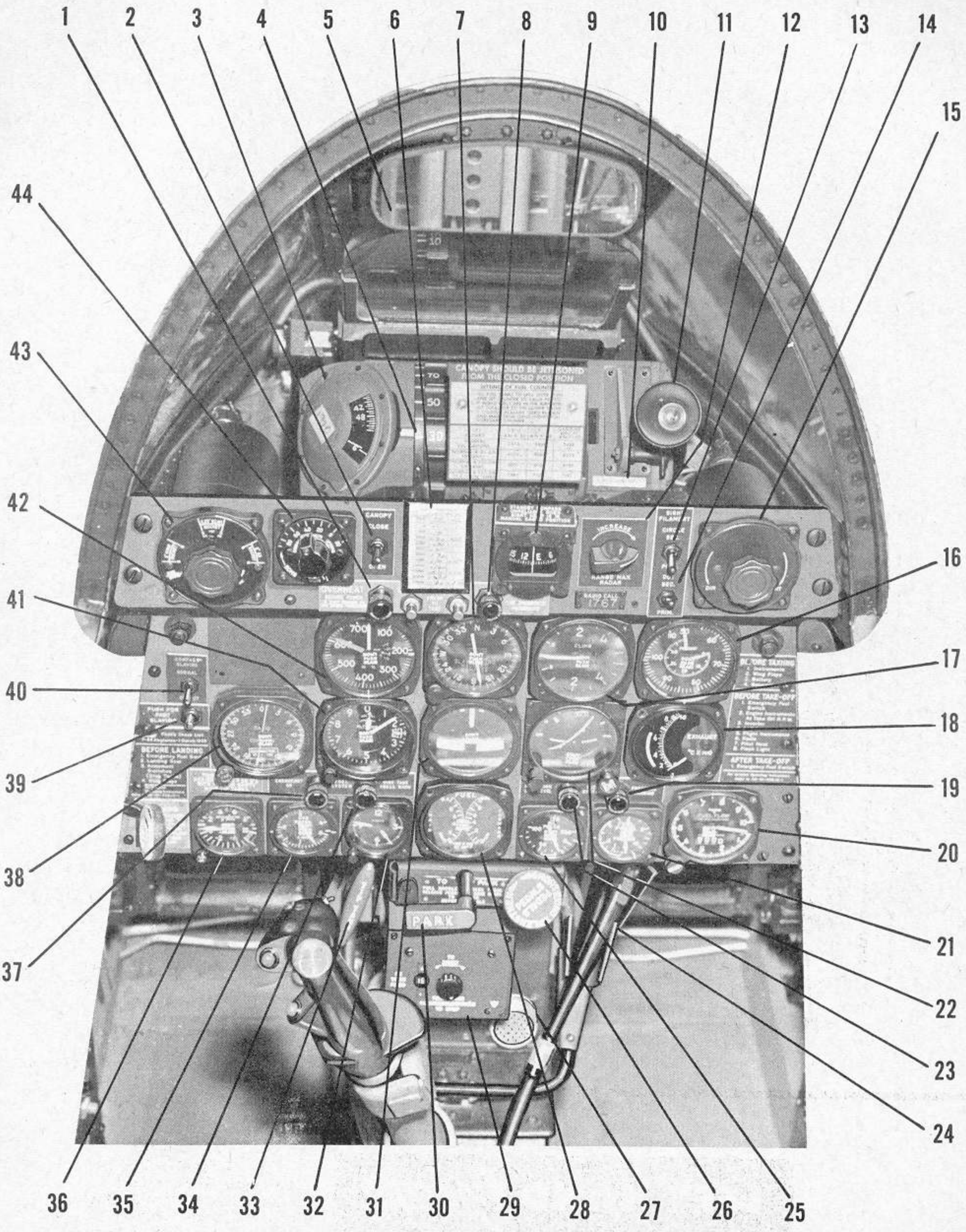
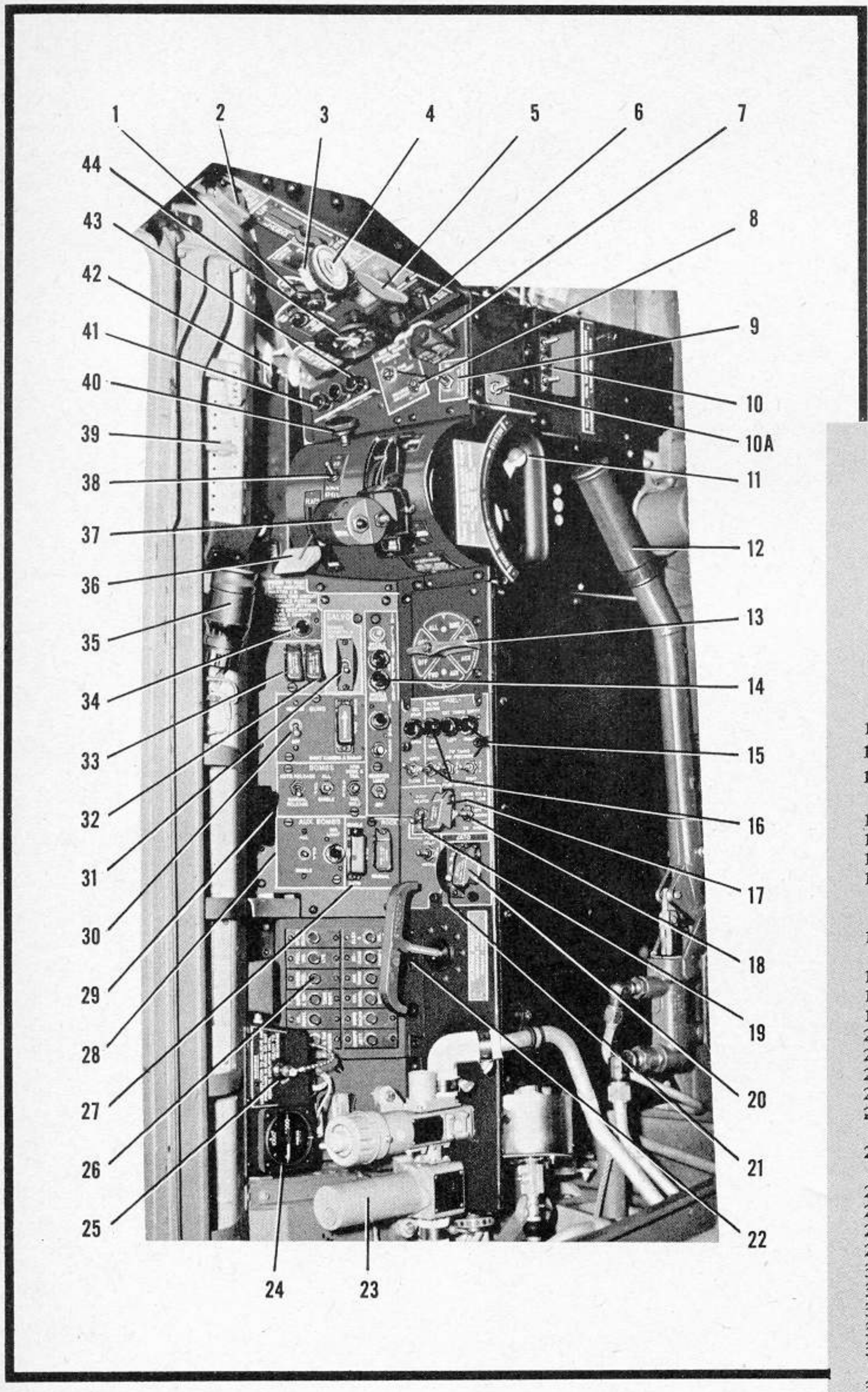
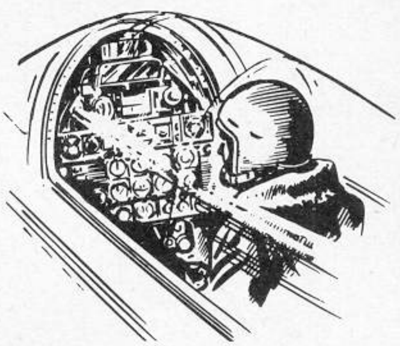


Figure 1—16. Instrument Panel





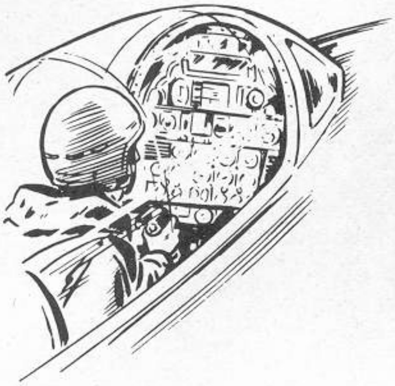
1. Landing Gear Position Indicator Lights
2. Landing Gear Emergency Ground Retract Switch
3. Landing Lights Switch
4. Landing Gear Selector
5. Landing Gear Emergency Uplock Release
6. Landing Gear Warning Horn Release Switch
7. Aileron Boost Ratio Indicator
8. Gun-Bomb-Rocket Sight Manual Range Control Adjustments
9. Aileron Boost Ratio Selector
10. Fuel Tank Battle Damage Switches

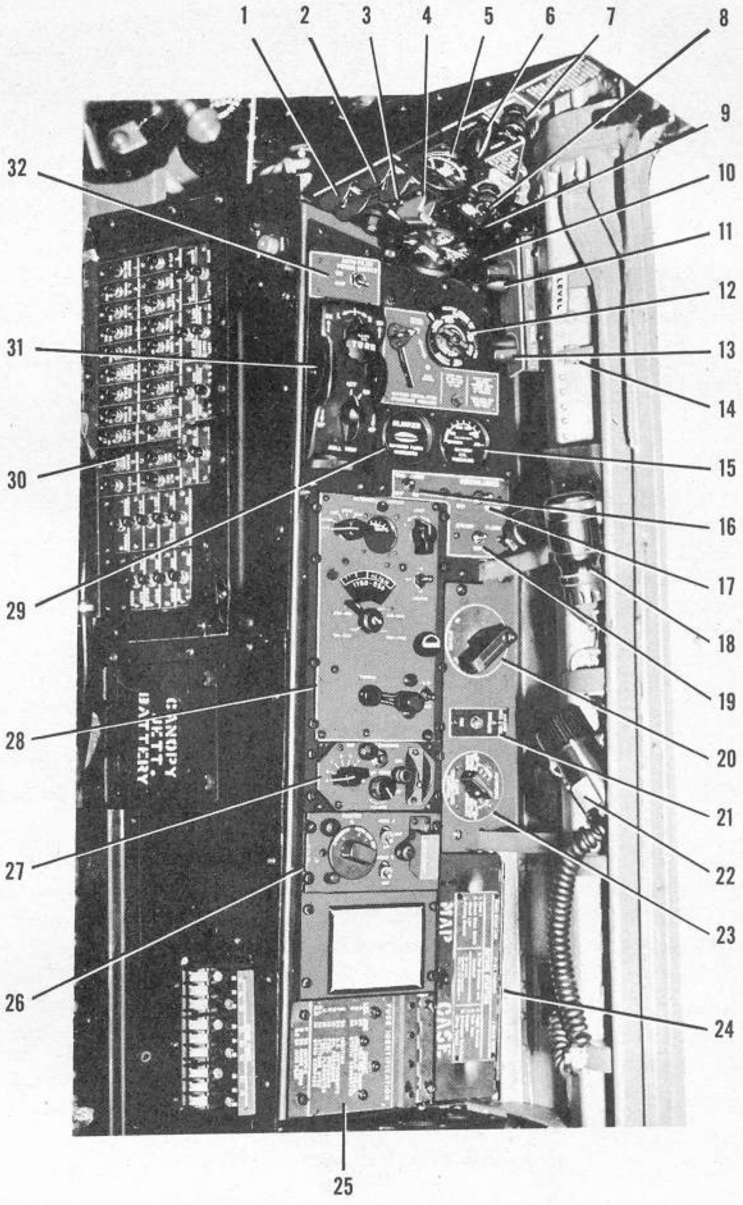
10.A Gun Charger Switch

11. Hydraulic Hand Pump Selector (up to F-84G-10RE)
12. Hydraulic Hand Pump
13. Fuel Tank Selector
14. Inflight Refueling Control Panel
15. External Tanks Air Pressure Switches and Empty Indicator Lights
16. Fuel Filter De-icing Switch and Ice Warning Light
17. Emergency Fuel Test Switch
18. Emergency Fuel Switch
19. Pitot Heater Switch
20. Jato Jettison Switch
21. Jato Ready Switch
22. Aileron Boost Disconnect
23. Anti g Valve
24. Canopy Pneumatic Gun Air Pressure Gage
25. Canopy Pneumatic Gun Air Filler Valve
26. Circuit Breaker Panel
27. Rocket Control Panel
28. Aux Bombs Control Panel
29. Bombs Control Panel
30. Guns Control Panel
31. Salvo Switch
32. Tip Tank Jettison Switch
33. Bomb Pylon Jettison Switch
34. Master Circuit Breaker Indicator Light
35. Instrument Panel Light
36. Landing Flap Control
37. Throttle
38. Speed Brake Switch
39. Side Air Outlet Shut-Off
40. Throttle Friction Lock
41. Jato Ready Warning Light
42. Jato Ignition Switch
43. Trim Tab Indicator Lights
44. Landing Flap Position Indicator

## LEFT HAND *Console*

*Figure 1—17. Left Hand Console*





1. Air Start Switch
2. Ground Start Switch
3. Battery Switch
4. Generator Switch
5. Voltmeter
6. Instrument Power Switch
7. Inverter Failure Indicator Light
8. Generator-over-voltage Light
9. Ammeter
10. Cabin Altimeter
11. Console Lights Rheostat Switch
12. Oxygen Regulator
13. Instrument Panel Lights Rheostat Switch
14. Side Air Outlet Shut-Off
15. Oxygen Low Pressure Gage
16. Taxi Light Switch
17. Position Lights Intensity Switch
18. Instrument Panel Light
19. Position Lights Switch
20. Defroster Control
21. Cockpit Heat & Vent Switch
22. Cockpit Light
23. Cabin Temperature Control
24. Map Case
25. AC Power Fuse Panel
26. IFF Control Panel
27. Command Radio Control Panel
28. Radio Compass Control Panel
29. Oxygen Flow Indicator
30. Circuit Breaker Panel
31. Flight Controller
32. Auto-Pilot Power Supply Switch

**RIGHT HAND *Console***

*Figure 1—18. Right Hand Console*

**WARNING**

Elevator trim tabs will not be used to reduce stick forces in pull outs, turns or during other accelerated maneuvers. If elevator trim is used, stick forces can be reduced sufficiently to permit the pilot to exceed structural design limits of the aircraft.

*Figure 1—19. Trim Tab Indicators*

are marked LEFT, NOSE and RIGHT. When the respective gear is locked down the outline of a wheel appears on the indicator. When the gear is in any position between locked down or up, red diagonal strips appear and when the gear is retracted the word UP appears on the indicator. A red light located in the landing gear selector handle illuminates when the landing gear is in an unsafe condition. The indications are as follows:

| | | |
|---|---|---|
| Red light on | a. With throttle below minimum cruise rpm. | a. Indicates landing gear not locked down. |
| | b. With throttle above minimum cruise rpm. | b. Indicates landing gear in any unlocked position. |

### LANDING GEAR WARNING HORN.

A landing gear warning horn located on the aft wall of the cockpit will sound if the throttle is retarded below the minimum cruise setting and the landing gear is not down and locked.

### LANDING GEAR WARNING HORN RELEASE SWITCH.

A landing gear warning horn release switch (6, figure 1—17) is provided so that the landing gear warning horn may be silenced.

## BRAKES.

The two main landing gear wheels are provided with hydraulically operated disc-type brakes. The brakes are actuated individually by a master brake cylinder operated by toe pressure on each rudder pedal. The brake system has its own hydraulic reservoir and is independent of the main hydraulic system.

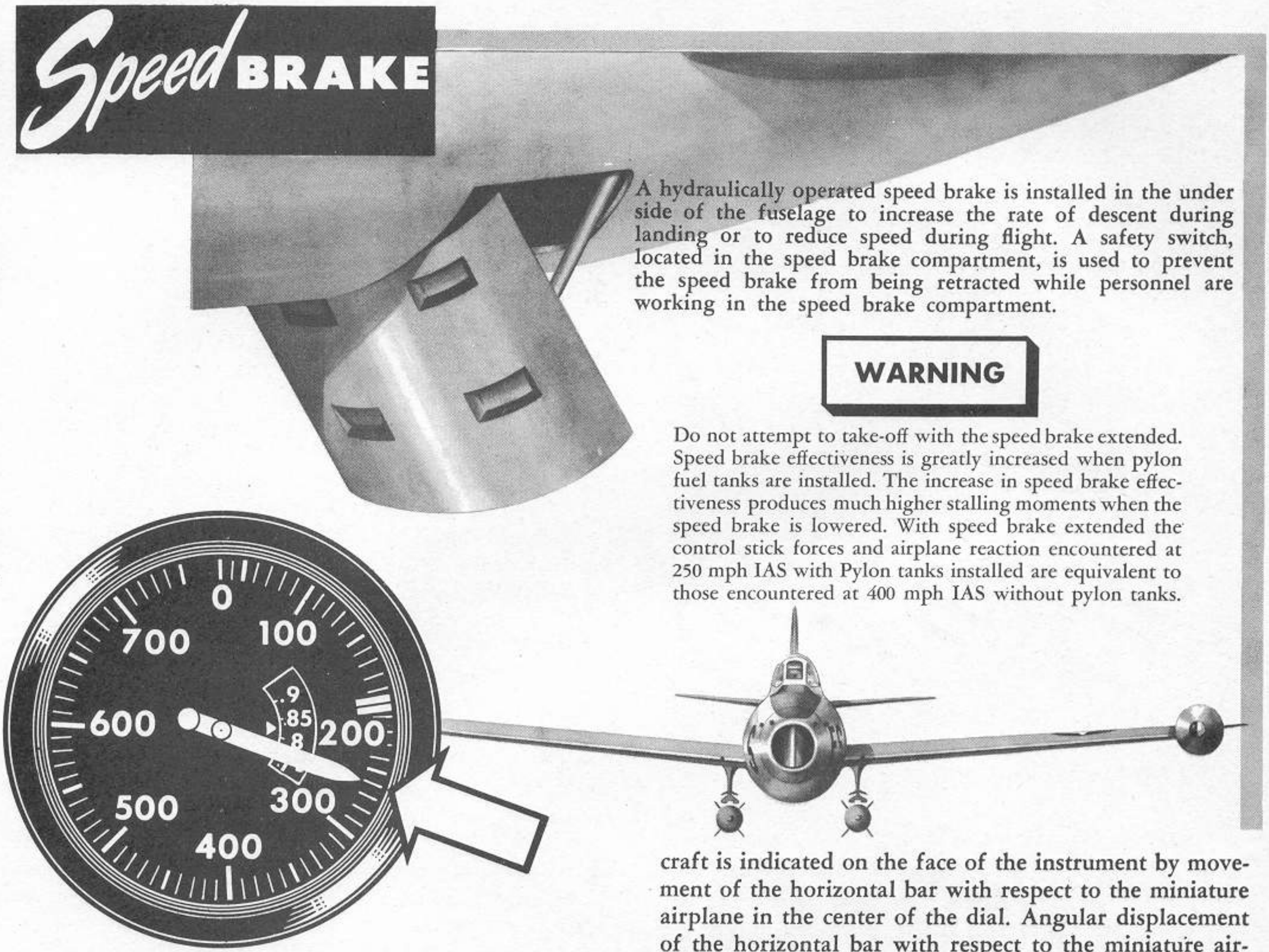
### PARKING BRAKE CONTROL.

A parking brake control (30, figure 1—16) is located below the instrument panel. Parking brakes are applied by depressing the toe of each rudder pedal then pulling the parking brake control aft and releasing the rudder pedals. Parking brakes are released by depressing the toe of the rudder pedals.

## INSTRUMENTS.

The fuel level indicator, the voltmeter, the ammeter, the radio compass indicator, the turn and bank indicator and the pitot heater are operated from the d-c power supply. The engine tachometer and the exhaust temperature indicator are self-generated electrical instruments which do not require power from the airplane's electrical system. The slaved gyro magnetic compass indicator and the attitude indicator are electrically driven gyro instruments powered from the ac power circuit. The hydraulic pressure indicator, fuel pressure indicator, oil pressure indicator and the fuel flow indicator are

## Speed BRAKE



A hydraulically operated speed brake is installed in the under side of the fuselage to increase the rate of descent during landing or to reduce speed during flight. A safety switch, located in the speed brake compartment, is used to prevent the speed brake from being retracted while personnel are working in the speed brake compartment.

**WARNING**

Do not attempt to take-off with the speed brake extended. Speed brake effectiveness is greatly increased when pylon fuel tanks are installed. The increase in speed brake effectiveness produces much higher stalling moments when the speed brake is lowered. With speed brake extended the control stick forces and airplane reaction encountered at 250 mph IAS with Pylon tanks installed are equivalent to those encountered at 400 mph IAS without pylon tanks.

*Figure 1—20. Speed Brake*

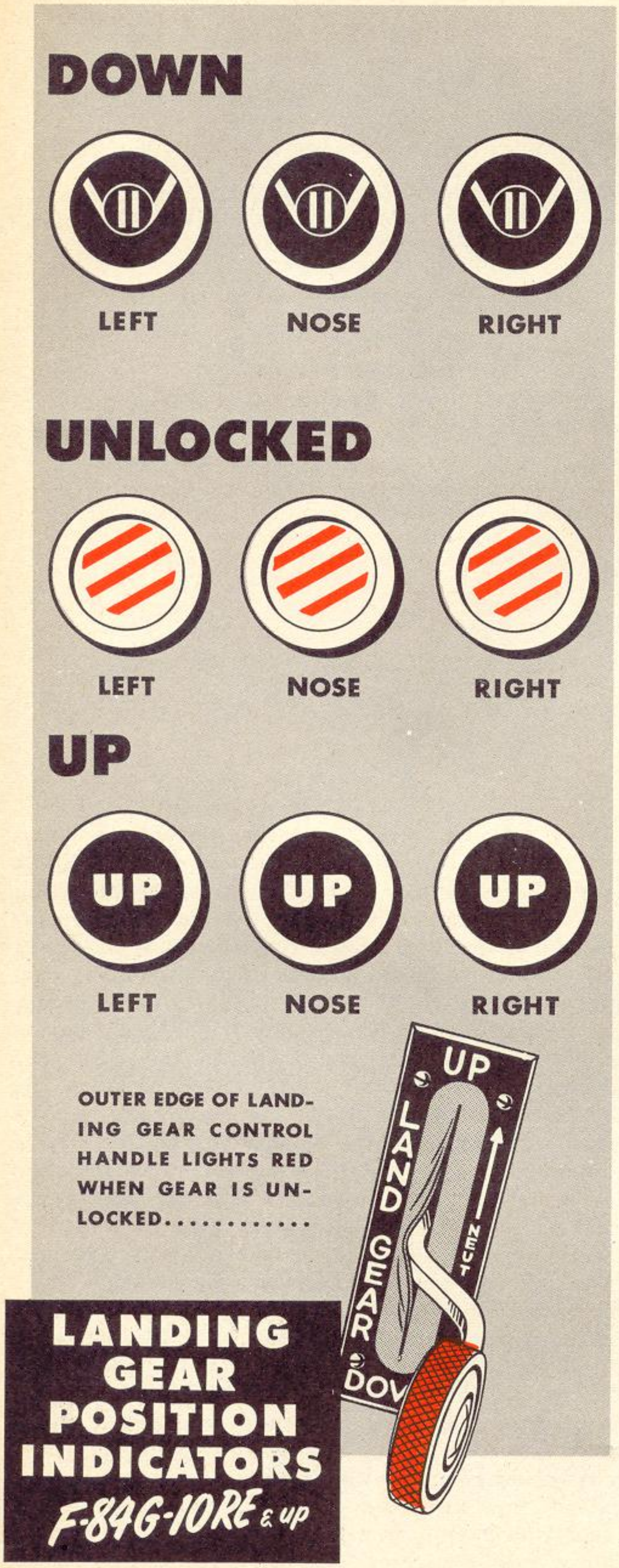
operated from the a-c power supply. The accelerometer, installed on the instrument panel, shows positive accelerations only and does not require any electrical power. The static vent is located on the lower section of the forward fuselage. The pitot pressure head is located in the tunnel division of the nose section and the pitot heater is described in Section IV.

### AIRSPEED INDICATOR.

The airspeed indicator (42, figure 1—16) has a conventional white pointer and a red pointer which indicates maximum allowable indicated airspeed. The position of the red pointer varies with altitude to indicate maximum allowable indicated airspeed corresponding to the limiting Mach No. Therefore, when the two pointers meet, the airplane is moving at the maximum allowable indicated airspeed (the critical Mach No) of the aircraft.

### ATTITUDE INDICATOR.

The attitude indicator, Type J-8 (figure 1—21) shows the attitude of the aircraft in relation to the earth's horizontal plane during any aircraft maneuver, throughout 360 degrees. The portion of the sphere which is visible to the pilot during level flight and in dives or climbs up to 27 degrees, is unmarked. Relative motion of the aircraft is indicated on the face of the instrument by movement of the horizontal bar with respect to the miniature airplane in the center of the dial. Angular displacement of the horizontal bar with respect to the miniature airplane indicates the degree of roll. The actual amount of roll is indicated by the position of the bank index relative to the 10, 20, 30, 60 and 90-degree roll markings on the bezel mask. When the aircraft exceeds 27 degrees of dive the horizontal bar is held in its extreme (27 degree) position. At this point the word DIVE on the upper portion of the sphere becomes visible. As the angle of dive increases, graduations become visible towards the pole of the sphere which indicates the angle of dive as they coincide with the trim indicator on the dial. These graduations are placed at the 70, 75 and 80 degree intervals; the 85 degree dive indication is reached when the trim indicator coincides with the edge of the bulls eye. When the aircraft exceeds 27 degrees of climb the horizon bar is held in its extreme (27 degrees) downward position and any increase in climb is indicated on the sphere. The lower portion of the sphere is marked similarly to the upper with the word CLIMB substituted for DIVE. After a loop or during a turn displacement of the horizon bar in excess of five degrees in pitch and/or bank may result. The J-8 indicator will immediately begin to correct these errors once true gravitational forces are sensed. This characteristic error is commonly called "sluggishness" or "lag" by pilots. In successive loops, the above described error may become increasingly greater and may cause the horizon bar to



OUTER EDGE OF LANDING GEAR CONTROL HANDLE LIGHTS RED WHEN GEAR IS UNLOCKED............

*Figure 1—20A. Landing Gear Position Indicator*

reach the limit of its movement. This is normal in successive loops and is not indicative of a defective instrument. The J-8 attitude indicator may be caged manually by means of a gyro centering device operated by pulling the cage knob. To cage the gyro, the PULL TO CAGE knob is drawn smoothly away from the face of the instrument. A momentary stop will be felt when the bank caging mechanism is engaged; as the cage knob is pulled further out the pitch caging mechanism is engaged. As soon as the caging knob reaches the limit of its travel it should be released quickly.

**CAUTION**

A violent or hard pull on the caging knob when caging the attitude indicator may damage the instrument. Remember that the indicator cages to the attitude of the aircraft and not to the true vertical. Therefore, the instrument should never be caged to correct in-flight errors unless the aircraft is in straight and level flight by visual reference to a true horizon.

## EMERGENCY EQUIPMENT.

### FIRE DETECTION.

The airplane has an engine overheat system and an engine fire warning system. The engine overheat system consists of a set of thermal switches installed in the aft fuselage section and an amber warning light (1, figure 1—16) which is marked OVERHEAT. The engine fire warning system consists of a set of thermal switches in the forward section of the fuselage and a red warning light (8, figure 1—16) which is marked FIRE. Both systems are automatic and each have a test switch adjacent to lights marked PRESS TO TEST. Illumination of the light indicates circuit is complete.

## WINDSHIELD.

The windshield (figure 1—22) consists of three transparent panels, set in rubber and mounted in an aluminum frame. The two side panels are of plexiglass. The center panel is bullet-resistant glass.

## CANOPY.

The canopy is a one piece plexiglass bubble type, attached to the fuselage with three sets of rollers and is sealed to the cockpit structure by rubber tubes that are automatically inflated by air pressure from the engine compressor when the canopy is closed. The canopy (figure 1—23) is normally opened or closed by sliding fore and aft with the aid of an electrical actuator, which is energized directly from the battery bus. Engine rpm should be at least 50% when closing the canopy so that the output of the generator is high enough to close the canopy tight. Manual operation is accomplished by disengaging the actuator and sliding the canopy fore or aft. To jettison canopy, explosive charges in the attachment fittings are exploded electrically simultaneously with two pneumatic guns so that canopy is broken loose and guns rotate the canopy about two aft hinges up and away from the pilot into the airstream. This design eliminates the necessity

*Figure 1—21. Attitude Indicator*

of the pilot ducking when the canopy is jettisoned. The canopy remover guns are interconnected to the ejection seat cylinder by a cable so that the seat cannot be ejected until after the canopy has been jettisoned. An air pressure gage located on the left side of the cabin indicates the air pressure in the canopy remover pneumatic guns. These guns must be charged prior to flight since they are not charged by any airplane system.

**WARNING**

The canopy roller explosive charges and the canopy remover pneumatic guns will fire when canopy is jettisoned whether it is open or closed and regardless of the position of the battery switch and of main battery failure since the jettison circuit is provided with its own 4.5 volt battery. The canopy should be jettisoned from the fully closed position as the canopy remover pneumatic guns contact the bumper on the canopy only when the canopy is in the fully closed position. If the canopy is ejected from any position other than fully closed, these pneumatic gun pistons fire through the canopy glass and are ineffective in forcing the canopy away from the airplane. The canopy should be jettisoned when in straight and level flight if possible so as to avoid any side wind loading which will cause diagonal slueing of the canopy.

### CANOPY CONTROL SWITCH.

Normal canopy operation is accomplished by means of the canopy control switch located on the instrument panel. The canopy control switch has three positions: OPEN, off and CLOSE and is spring-loaded to the off position. The canopy is held in the open, closed, or any intermediate position by a breaking mechanism within the canopy actuator.

**CAUTION**

The canopy should not be opened at taxi speeds above 15 mph so as to avoid high loads and eventual failure of the canopy actuator which results when the canopy is partially opened at high speeds.

### EXTERNAL CANOPY CONTROL SWITCHES.

Two external canopy control switches are located on the left side of the fuselage under the canopy track. These switches make it possible to open or close the canopy while standing on the ground. The switches are of the pushbutton type and are flush with the contour of the fuselage skin. The forward switch is marked CLOSE and the aft one is marked OPEN. The canopy is opened or closed by pressing and holding the respective switch. The canopy may be stopped at any intermediate position by releasing the control switch.

**Note**

The master circuit breaker, located adjacent to the airplanes batteries and the canopy motor circuit breaker, located on the right circuit breaker panel, must be closed before the canopy will operate with the external canopy control switches. The operation of the canopy with the external canopy control switches is independent of the position of the battery switch.

### EXTERNAL CANOPY CONTROL (MANUAL).

An external canopy control, located on the left side of the canopy skirt, marked EXIT RELEASE, is used to open or close the canopy if electrical power is not available. The aft end is marked PUSH and if pushed in the control rotates from its flush position so that handle is available and at the same time disengages the canopy actuator clutch.

### INTERNAL CANOPY CONTROL (MANUAL).

To operate the canopy manually from the inside of the airplane an internal canopy control is provided on each side of the forward end of the canopy. The canopy is moved by rotating the controls inboard and moving the canopy fore or aft.

**CAUTION**

The pilot should grasp these internal controls with the palms of the hands facing aft because when the canopy is raised, the wind stream may force the canopy aft suddenly pinning the pilot's hands on his shoulders if the palms are forward.

### INTERNAL CANOPY JETTISON CONTROL (RIGHT HANDGRIP).

The canopy can be jettisoned by actuating the right-hand grip on the pilot's seat which is guarded with a spring loaded clip. This exposes the handgrip for seat ejection. When the canopy is jettisoned from the cockpit the pneumatic remover guns fire and the ejection seat safety pin is released thus permitting the seat to be ejected.

### EXTERNAL CANOPY JETTISON CONTROL.

The canopy can be jettisoned from outside the airplane by actuating the external canopy jettison control located under a red cover on the left side of the airplane. This switch fires the canopy roller explosive charges without firing the pneumatic guns.

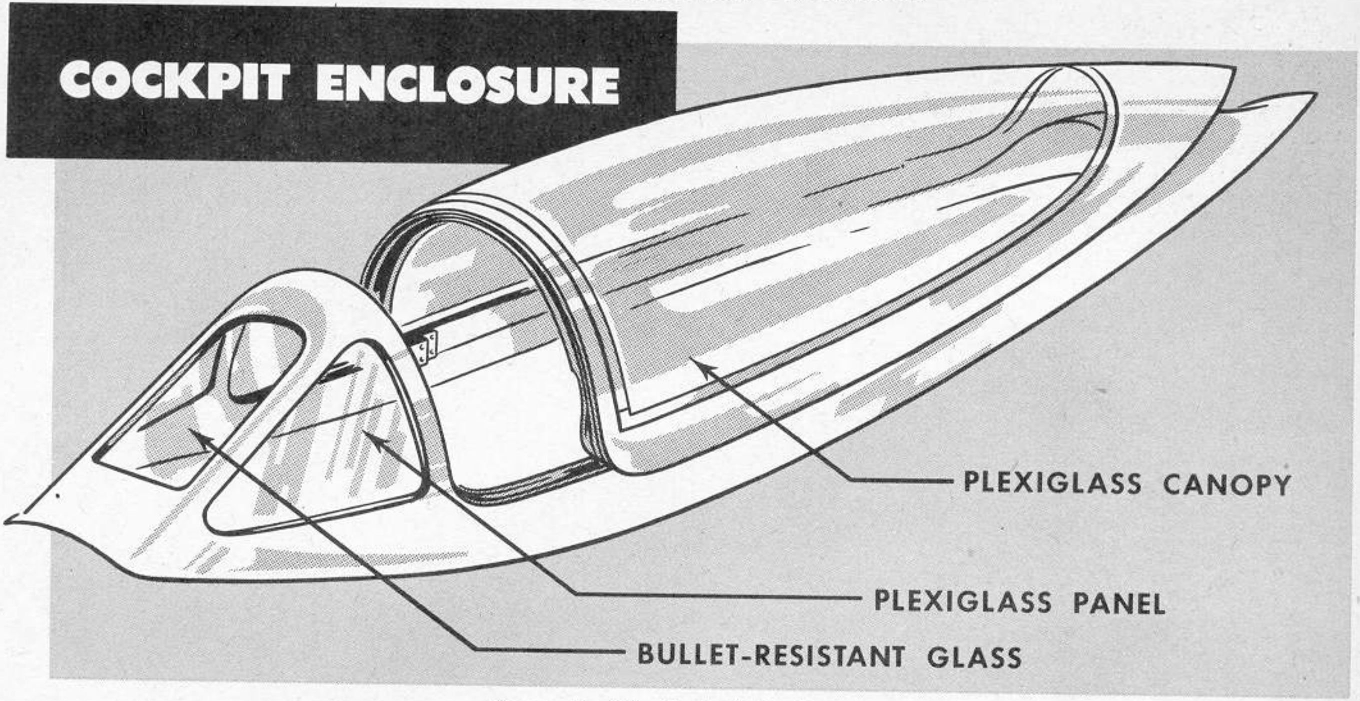


*Figure 1—22. Cockpit Enclosure*

## PILOT'S SEAT.

The pilot's seat (figure 1—24) is the ejection type designed to catapult the seat and the pilot clear of the airplane in an emergency. The seat includes adjustable head rest, adjustable arm rests, and is designed to accommodate a life raft attached to the pilot's parachute harness. A lap type safety belt is attached to the sides of the seat and a shoulder harness is attached to the seat by means of an inertia reel and cable attached to the aft side of the seat. A ground safety cotter pin is inserted near the top of the seat catapult, to prevent inadvertant catapulting when the airplane is on the ground.

### SHOULDER HARNESS LOCK CONTROL.

A two position (locked-unlocked) shoulder harness inertia reel lock control is located on the left side of the pilot's seat. A latch is provided for positively retaining the control handle at either position of the quadrant. By pressing down on the top of the control handle, the latch is released and the control handle may then be moved freely from one position to another. When the control is in the unlocked position (full aft), the reel harness cable will extend to allow the pilot to lean forward in the cockpit; however, the reel harness cable will automatically lock when an impact force of 2 to 3 g's is encountered. When the reel is locked in this manner, it will remain locked until the control handle is moved to the locked and then returned to the unlocked position. When the control is in the locked position (full forward) the reel harness cable is manually locked so that the pilot is prevented from bending forward. The locked position is used when a crash landing is anticipated. This position provides an added safety precaution over and above that of the automatic safey lock.

### VERTICAL SEAT ADJUSTMENT.

A vertical seat adjustment lever is located on the right side of the pilot's seat. Moving the lever aft releases the seat so that it may be raised or lowered to the desired height. At the same time the foot rests are released from the seat so that they remain in contact with the floor at all times. When the seat is at the desired height the vertical seat adjustment is released. The lever is spring-loaded to automatically engage the locking pins. Jiggling the seat is recommended to permit the locking pins to fully seat.

### ARM RESTS.

The pilot's seat has two arm rests that may be moved fore and aft. The forward position must be used when ejecting the seat. The aft position allows for more accessibility to the console controls. When the arm rests move all the way back, locks automatically hold them in that position. The arm rest is released to the forward position by moving the arm rest release aft. The arm rests will automatically move to the forward position when the respective seat hand grips are pulled up.

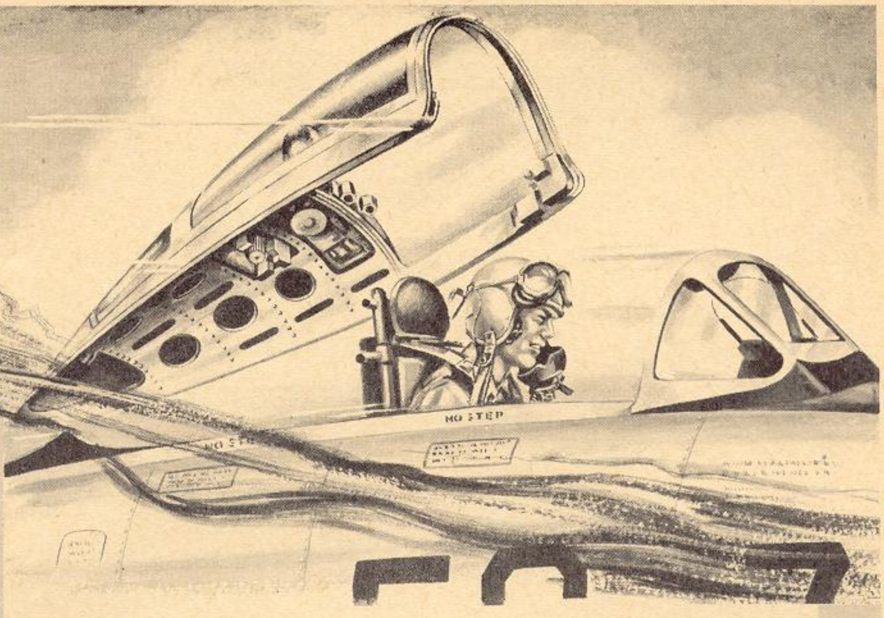
### LEFT HAND GRIP.

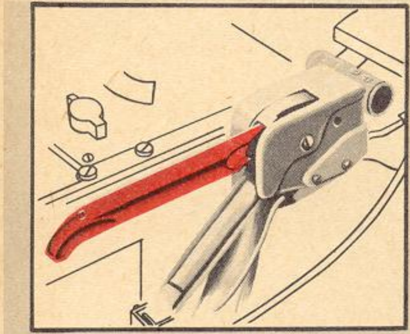
The left hand grip is for emergency use. When the hand grip is pulled up it automatically releases the left arm rest to the forward position and locks the shoulder harness if it has been left unlocked.

### RIGHT HAND GRIP. (CANOPY AND SEAT JETTISON)

The right hand grip is the canopy and seat ejection control. The grip is safetied to the seat with a spring loaded clip. Moving the hand grip up releases the arm rest to the forward position and jettisons the canopy. With the hand grip up the seat trigger is exposed. When the seat trigger is squeezed the pilot's seat is ejected.

# CANOPY CONTROLS



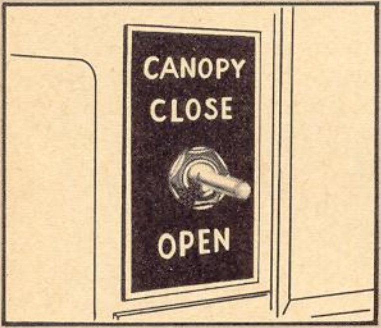


**INTERNAL CANOPY JETTISON CONTROL**
*(RIGHT HAND GRIP)*

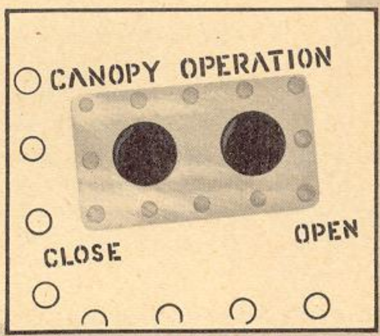
To jettison the canopy, explosive charges in the attachment fittings are exploded electrically simultaneously with two pneumatic guns so that the canopy is broken loose and the guns rotate the canopy about two aft hinges up and away from the pilot into the airstream.

### WARNING

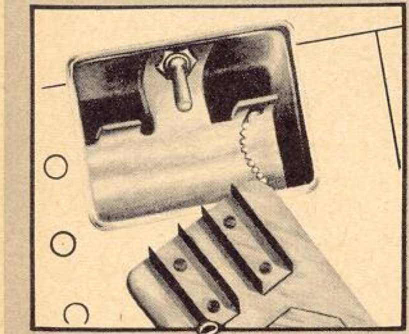
Stand clear when jettisoning canopy on the ground. If either cockpit or external jettison switches are actuated the canopy will be jettisoned whether the battery switch is in the ON or OFF position as a canopy jettison battery supplies current to the circuit.



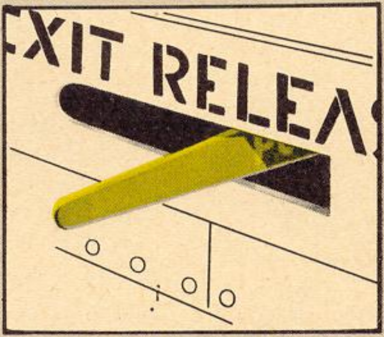
**CANOPY CONTROL SWITCH**



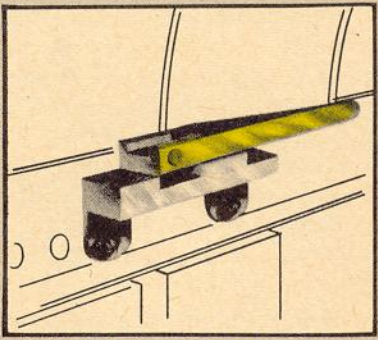
**EXTERNAL CANOPY CONTROL SWITCHES**



**EXTERNAL CANOPY JETTISON CONTROL**



**EXTERNAL CANOPY CONTROL**
*(MANUAL)*



**INTERNAL CANOPY CONTROL**
*(MANUAL)*

*Figure 1—23. Canopy Controls*

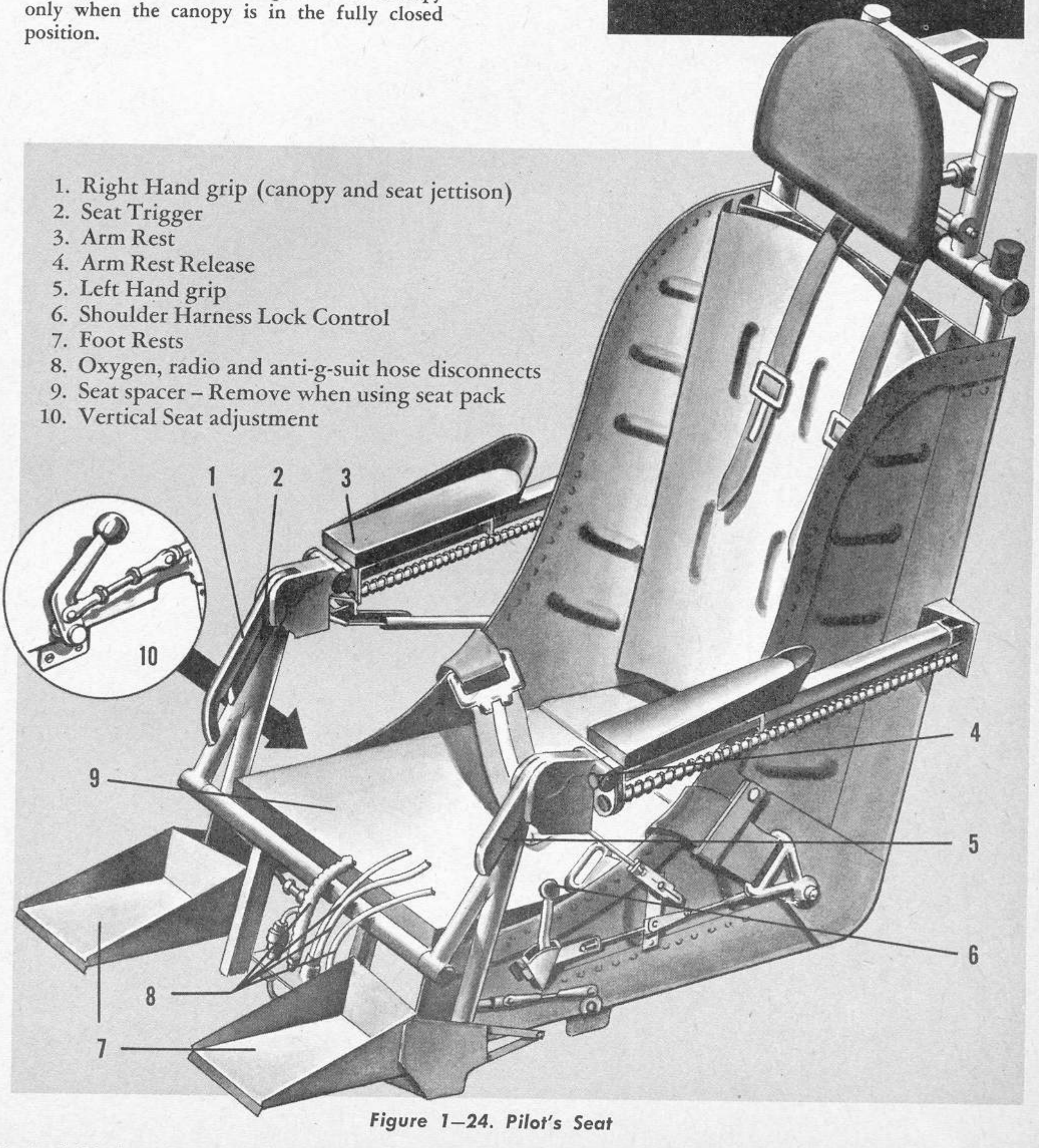
**WARNING**

The canopy roller explosive charges and the canopy remover pneumatic guns will fire when the right handgrip is actuated whether the canopy is open or closed and regardless of the position of the battery switch. However, the canopy should be jettisoned from the fully closed position as the canopy remover pneumatic guns contact the bumpers on the canopy only when the canopy is in the fully closed position.

## AUXILIARY EQUIPMENT.

Section IV of this handbook contains information on the following auxiliary equipment: oxygen, pressurization, heating, ventilating, communications, in-flight refueling, armament, anti-g, de-icing, lighting and auto-pilot.

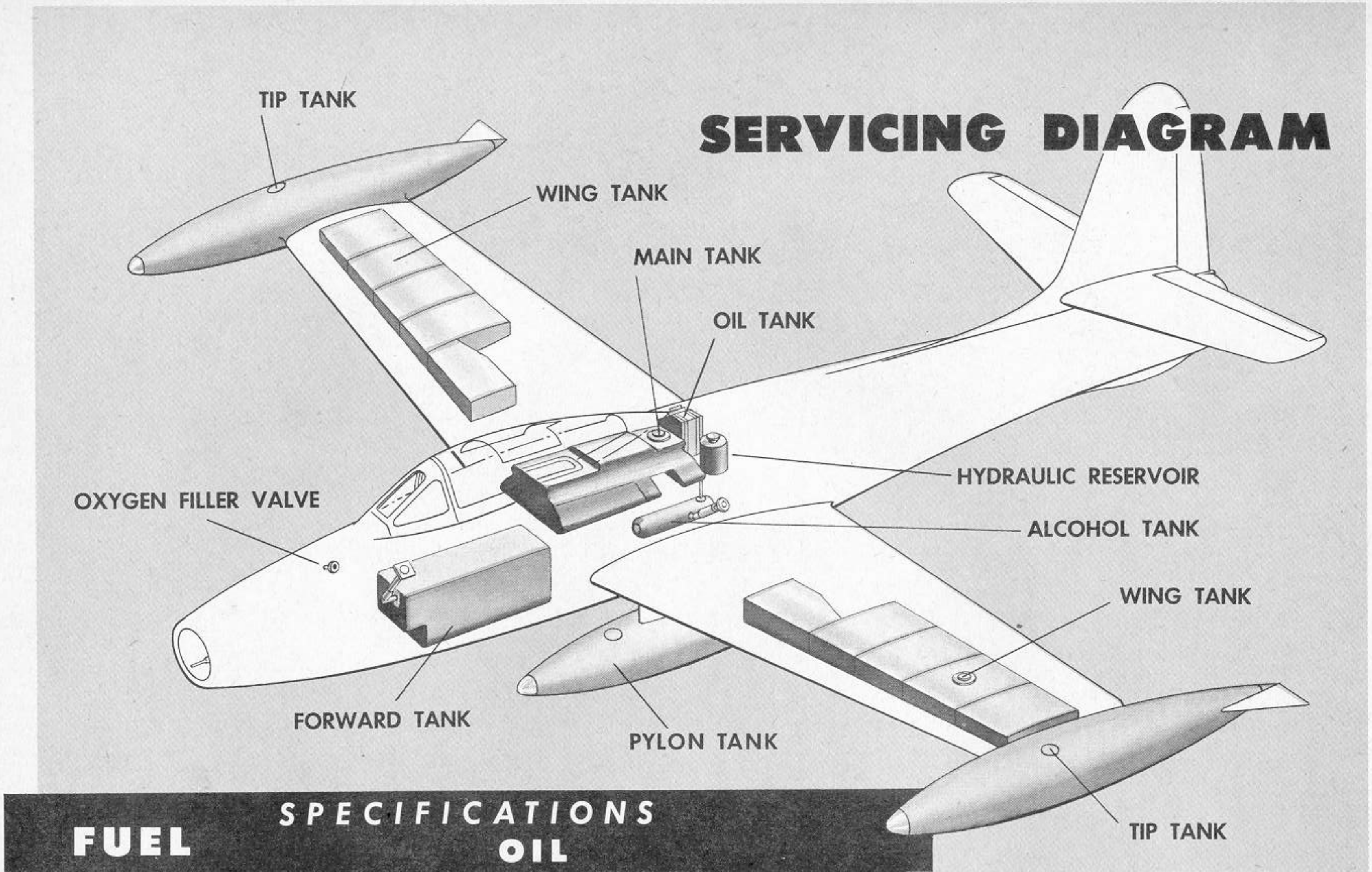
## PILOT'S SEAT



1. Right Hand grip (canopy and seat jettison)
2. Seat Trigger
3. Arm Rest
4. Arm Rest Release
5. Left Hand grip
6. Shoulder Harness Lock Control
7. Foot Rests
8. Oxygen, radio and anti-g-suit hose disconnects
9. Seat spacer – Remove when using seat pack
10. Vertical Seat adjustment

*Figure 1–24. Pilot's Seat*

# SERVICING DIAGRAM



## SPECIFICATIONS

### FUEL

**RECOMMENDED**

Mil-F-5624 grade JP-3 or JP-4

**ALTERNATE**

Mil-F-5616 grade JP-1
Mil-F-5572 lowest grade available

### OIL

Ambient air
above +20°F—Mil -O-6081 grade 1010
Ambient air
below −20°F—AF 3519 grade 1005
(Heat required below −50°F)
Ambient air
between
+20°F and −20°F—Either grade 1010 or 1005

## SPECIFICATIONS

| | |
|---|---|
| **HYDRAULIC FLUID** | Mil-O-5606 |
| **ALCOHOL** | Mil-A-6091 |
| **OXYGEN** | AN-O-1 |

*Figure 1—25. Servicing Diagram*

# Section II NORMAL PROCEDURES

## BEFORE ENTERING THE COCKPIT.

### FLIGHT RESTRICTIONS.

For flight restrictions on the aircraft, refer to Section V of this handbook.

### CRUISE CONTROL.

Determine cruise control data such as power settings, air speeds etc., from data in the Appendix of this handbook.

### WEIGHT AND BALANCE.

Check take-off and anticipated landing gross weight and balance. Consult Handbook of Weight and Balance AN01-1B-40 for loading procedure. Make sure weight and balance clearance (Form F) is satisfactory. Check that total weight of fuel, oil, armament, oxygen, and special equipment carried is suitable to the mission to be performed. Refer to Section V for weight limitations for various configurations.

### EXTERIOR INSPECTION.

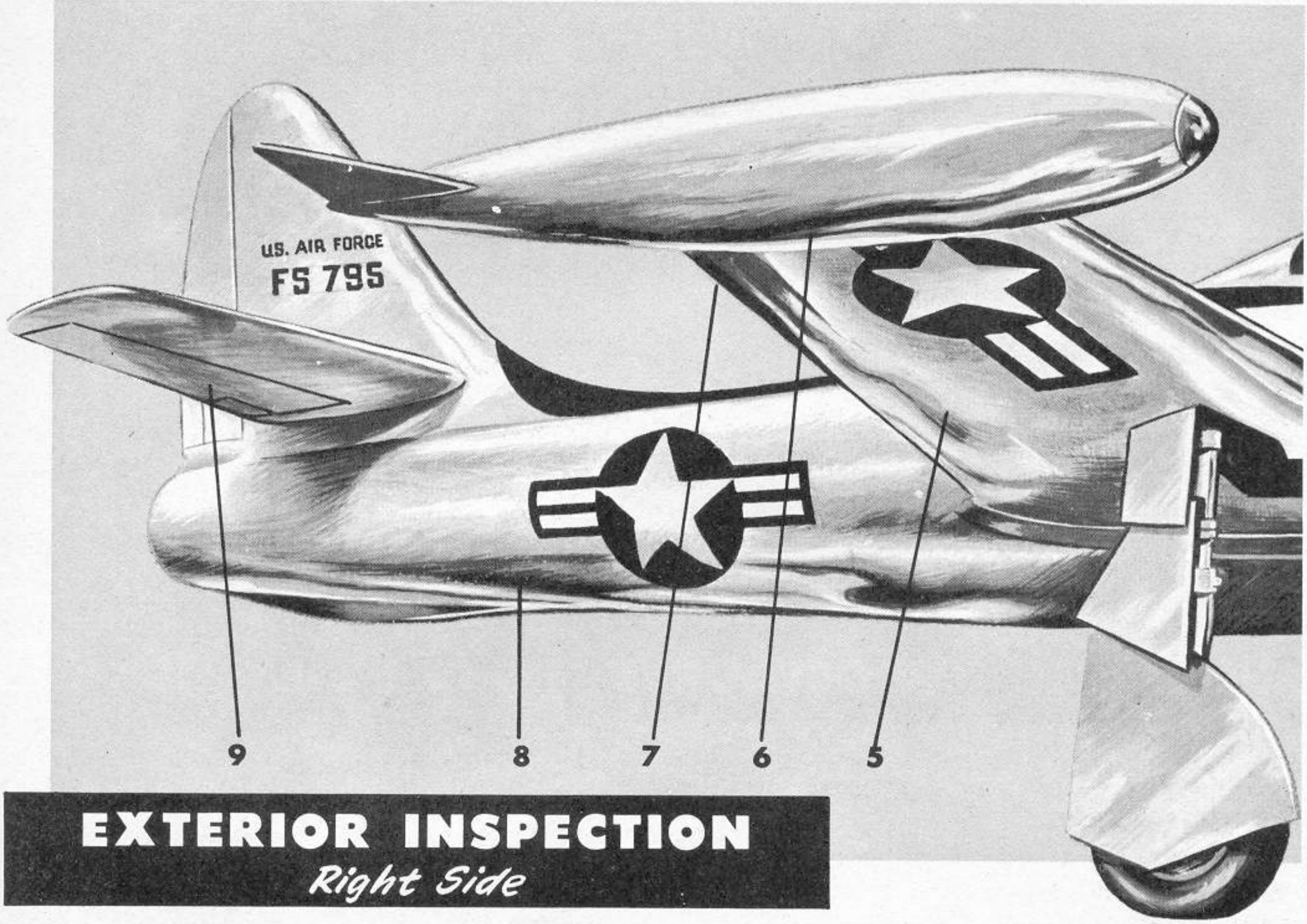
1. Check Forms 1 for status of the airplane.
2. Make a complete pre-flight inspection of the airplane. (See figure 2—1).

### TO GAIN ENTRANCE TO AIRPLANE.

1. Open canopy by actuating the aft external canopy control switch. If electrical power is not available, use the EXIT RELEASE.
2. Place a ladder against the left side of the aircraft at the cockpit. No external grips or steps are provided.

**CAUTION**

Do not use the canopy rail for a step or the gun sight as a hand hold.



# EXTERIOR INSPECTION
## *Right Side*

**1. NOSE SECTION.**

a. Intake dust plug and pitot cover — Removed.

b. Air intake ducts for foreign objects.

c. Nose wheel shock strut — Visible damage and proper inflation. Strut extension 4 to 6 inches depending on weight of airplane.

d. Nose gun blast tubes — plugs installed.

**2. NOSE — RIGHT SIDE.**

a. Nose wheel well — Condition.

b. Nose gear safety pin — Removed.

c. Nose wheel tire — Proper inflation and evidence of slippage.

d. Nose wheel static ground wire — ground contact.

e. Nose wheel door — Condition.

f. Static air vents — Open.

g. All access doors — Installed.

h. Proper ballast in ammunition cans.

j. Gun deck cover — Secured.

k. Oxygen filler — Secured.

**3. FUSELAGE — RIGHT SIDE FORWARD.**

a. Wing gun blast tube — plug installed.

b. Gun camera lense — Clean.

c. Wing leading edge — Condition.

d. Speed Brake — Condition.

e. Pylon tank or bomb — proper installation and pylon tank filler cap secured.

**4. RIGHT WHEEL WELL.**

a. Wheel well for evidence of fuel leakage.

b. Single point refueling filler — Secured.

c. Armament safety over-ride switch — Pin and streamer removed and stowed.

d. External power source — Connected to no. 1 & 2 or No. 1 receptacle.

e. Landing gear strut — Visible damage and proper inflation.

f. Landing gear tire — Blisters, grease or oil, proper inflation and evidence of slippage.

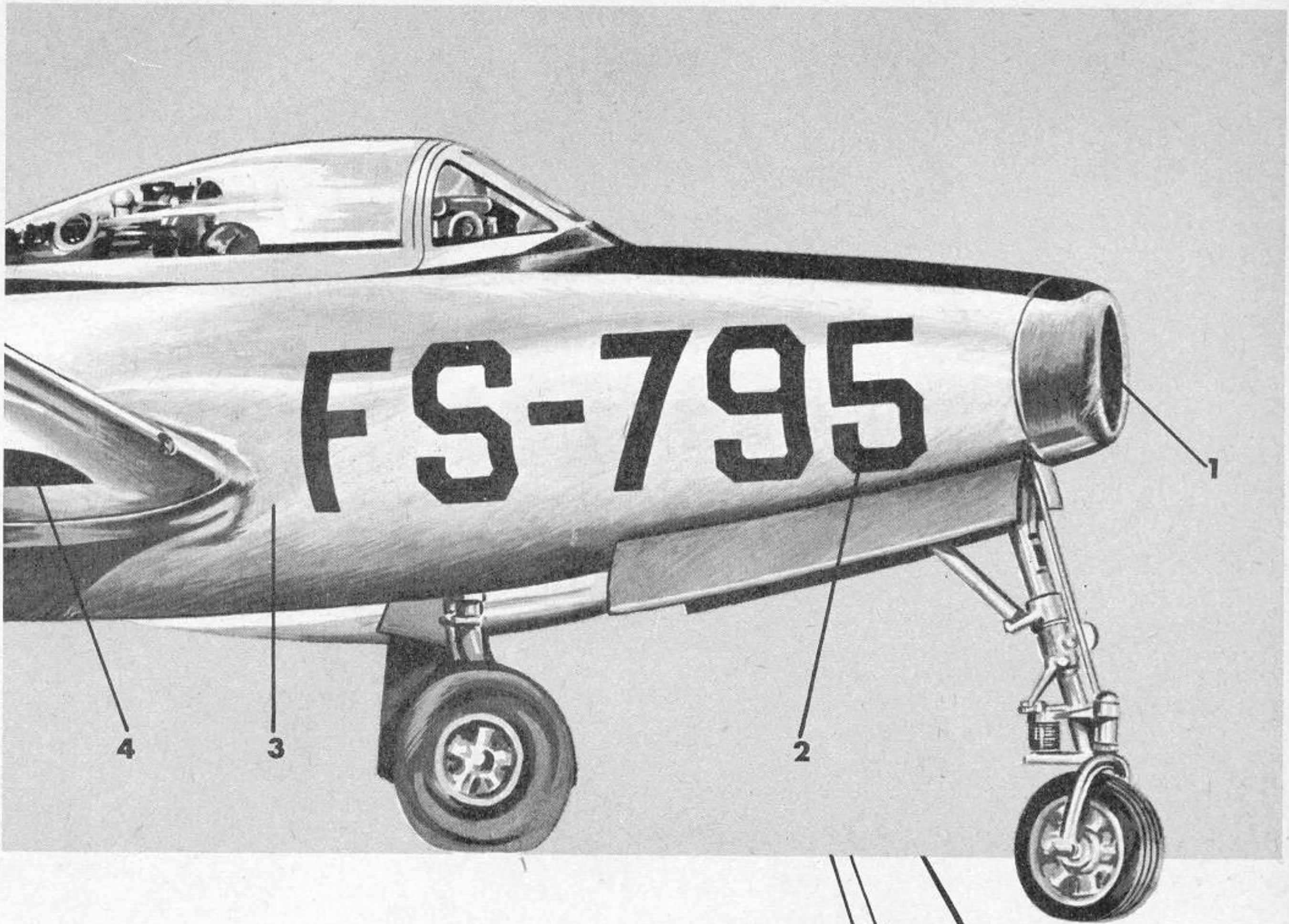
g. Landing gear fairing doors — Secure.

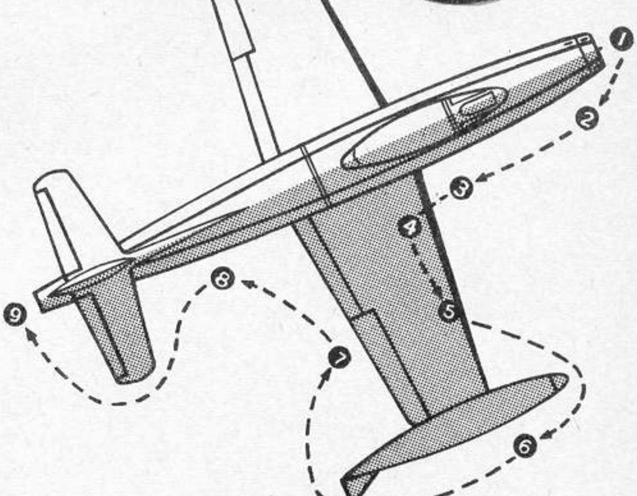
h. Wheel chock — In place.

j. Landing gear safety clip — Removed.

k. Air pressure in bomb pylon pneumatic jettison system — pylon jettison cylinders 800 to 1000 psi; Pylon tank jettison cylinders — 1100 to 1300 psi.

*Figure 2—1. Exterior Inspection (Sheet 1 of 4)*





**5. RIGHT WING OUTBOARD.**

a. Front rocket posts — Properly retracted.

b. Rear rocket doors — Flush fit with underside of wing skin and security of latches.

c. Wing covering — Condition and evidence of fuel leakage.

**6. RIGHT WING TIP.**

a. Wing tip tank and fairing — Secured.

b. Wing tip tank fin — Installed.

c. Filler cap — Installed.

d. Position lights — Condition.

**7. RIGHT WING TRAILING EDGE.**

a. Wing, aileron and flaps — Condition.

b. Wing fuel filler cap — Installed.

**8. AFT FUSELAGE — RIGHT SIDE.**

a. Jato Units — Installed and nozzles clear.

b. Engine access doors — Closed and Secured.

c. Fuselage covering — Condition.

**9. EMPENNAGE.**

a. Tailpipe dust plug — Removed.

b. Tailpipe for accumulation of fuel or oil.

c. Elevator tabs — Condition.

d. Rudder fixed tab — Condition.

e. Empennage for general condition.

f. Tail position lights — Condition.

g. Fuel tank vents — Condition.

*Figure 2–1. Exterior Inspection (Sheet 2 of 4)*

## EXTERIOR INSPECTION
*Left Side*

**10. AFT FUSELAGE — LEFT SIDE.**

a. Jato units — Installed and nozzles clear.
b. Engine access doors — Closed and secured.
c. Fuselage covering — Condition.

**11. LEFT WING TRAILING EDGE.**

a. Wing, aileron and flaps — Condition.
b. Wing fuel filler cap — Installed.

**12. LEFT WING TIP.**

a. Wing tip tank and fairing — Secured.
b. Wing tip tank fin — Installed.
c. Filler cap — Installed.
d. Position lights — Condition.

**13. LEFT WING OUT BOARD.**

a. Front rocket posts — Properly retracted.
b. Rear rocket doors — Flush fit with underside of wing skin and security of latches.
c. Wing covering — Condition and evidence of fuel leakage.

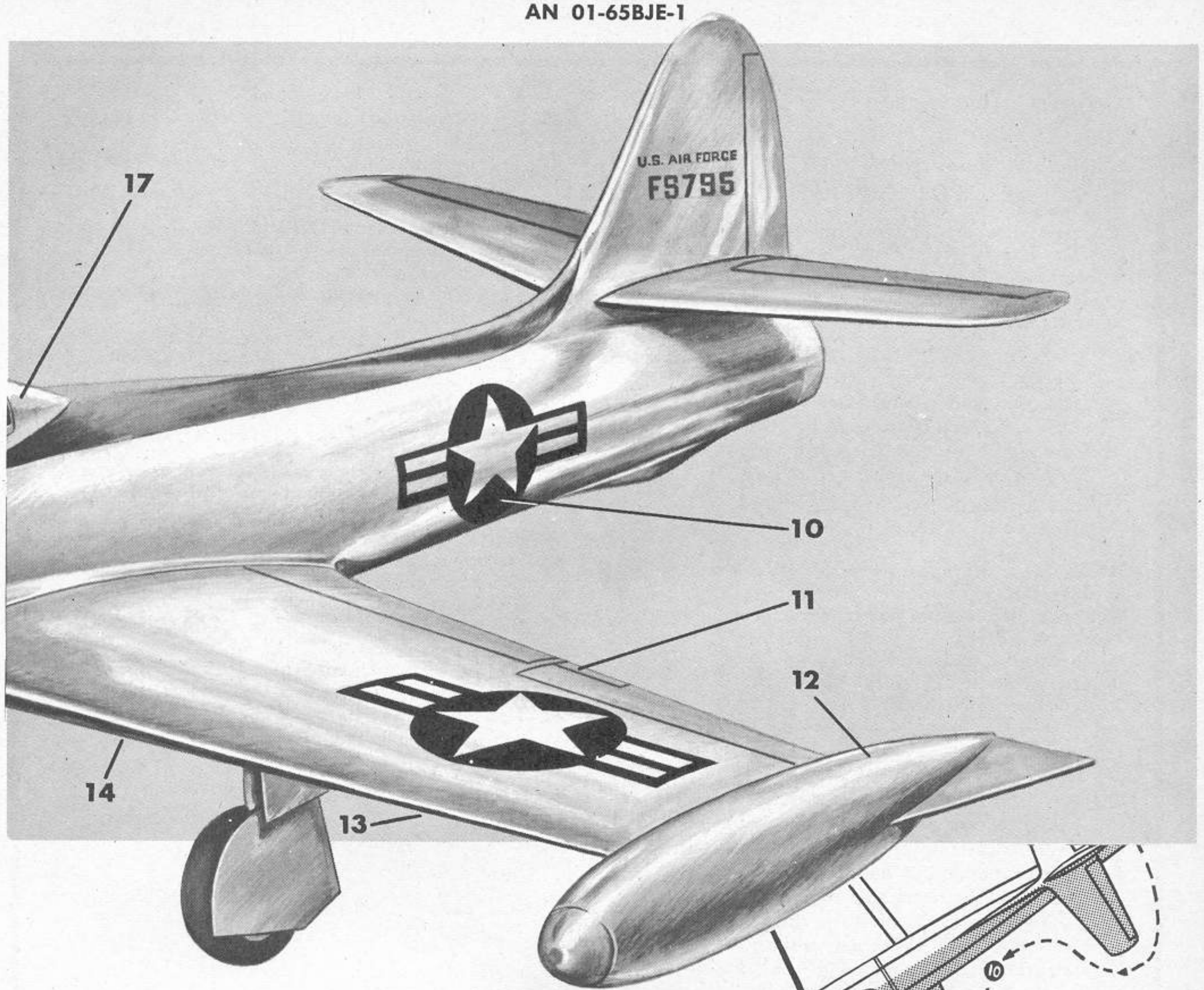
**14. LEFT WHEEL WELL.**

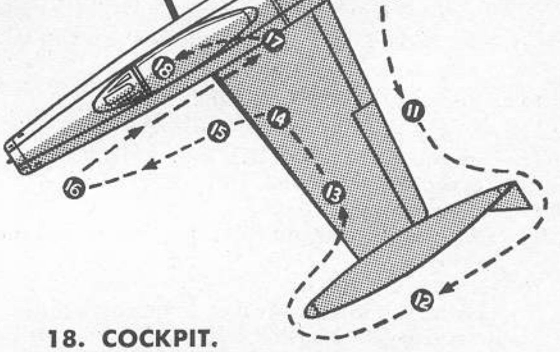
a. Wheel well for evidence of fuel leakage.
b. Landing gear strut — Visible damage and proper inflation.
c. Landing gear tire — Blisters, grease or oil, proper inflation and evidence of slippage.
d. Landing gear fairing doors — Secure.
e. Wheel chock–In place.
f. Landing gear safety clip — Removed.
g. Air pressure in bomb pylon pneumatic jettison system – pylon jettison cylinders 800 to 1000 psi; Pylon tank jettison cylinders – 1100 to 1300 psi.

**15. FUSELAGE — LEFT SIDE FORWARD.**

a. Wing gun blast tube – plug installed.
b. Wing leading edge – Condition.
c. Speed brake – Condition.
d. Pylon tank or bomb – Proper installation and pylon tank filler cap installed.
e. Inflight refueling doors – Evidence of damage.

***Figure 2–1. Exterior Inspection (Sheet 3 of 4)***





**16. NOSE — LEFT SIDE.**

a. Nose wheel well — Condition.
b. Nose wheel door — Condition.
c. Static air vents — Open.
d. All access doors — Installed.
e. Gun deck cover — Secured.
f. Forward fuel tank filler cap — Installed.

**17. AFT CANOPY.**

a. Check oil supply and tank filler cap — Installed.

b. Hydraulic reservoir filler cap — Installed.

c. Main fuel tank filler cap — Installed.

d. Alcohol tank filler cap — Installed.

e. Canopy and canopy frame — Cleanliness and security.

f. Canopy for cracks, nicks, crazing and security.

**18. COCKPIT.**

a. Canopy remover pneumatic guns for proper air pressure — 1000 - 1200 psi.

b. Lead seal affixed to top of seat catapult outer tube.

c. Safety shear wire secured in drilled hole in lower end of catapult arming pin.

d. Catapult free from dents or other visible damage.

e. Seat ejection safety-pin cable — proper installation.

f. Catapult ground safety cotter pin — Removed.

*Figure 2—1. Exterior Inspection (Sheet 4 of 4)*

## ON ENTERING THE PILOT'S COMPARTMENT

1. Check jato ready switch — OFF.
2. Adjust arm rest to desired position and seat for proper height.
3. Check that the internal canopy jettison control safety clip is in position.
4. Examine safety belt and shoulder harness for security of adjustment and proper operation of lock movement and leave unlocked.

**CAUTION**

Exercise caution when fastening or adjusting seat safety belt in order to prevent damage to the seat jettison cable guard, located on the right side of the seat

5. Release control lock and adjust rudder pedals to proper position. Check controls for free and correct movement.
6. Check for firm, positive brake pedal action.
7. Reset parking brake.
8. Check that external power is connected and battery switch is OFF.
9. Check all circuit breakers.
10. Aileron boost disconnect ENGAGE.
11. Armament switches OFF or SAFE.

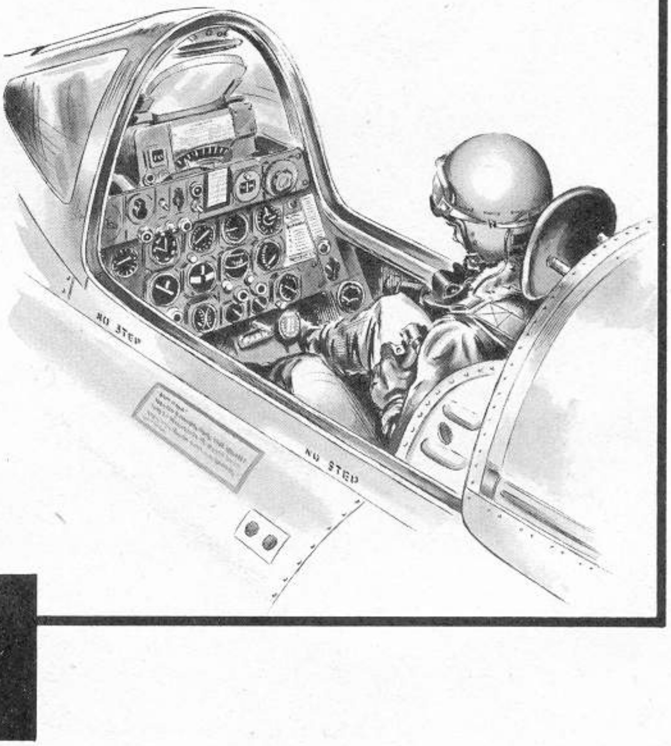
**WARNING**

Since take-off requires a large amount of rearward stick travel there is a good possibility of the bomb release button being inadvertently energized by contacting the pilot's clothing or the parachute harness. In order to preclude this possibility the bomb and rocket selector switches must be placed in the OFF position and the bomb and rocket arming switches must be in the OFF or SAFE position prior to take-off.

11A. Rocket arming switch OFF.
11B. Rocket jettison switch NORMAL.
12. Gun selector switch SIGHT CAMERA & RADAR.
13. Rocket selector switch OFF.
14. Pitot heat switch OFF.
15. Test operate throttle twist grip for gun sight operation.
16. Throttle CLOSED.
17. Test master circuit breaker indicator light.
18. Emergency fuel switch OFF.
19. Receiver door switch CLOSE.
20. Fuel Filter de-icing switch OFF.
21. External tank air pressure switches TIP TANKS AIR PRESSURE (PYLON TANKS AIR PRESS).
22. Fuel tank selector OFF.
23. Check hydraulic hand pump selector SYSTEM. (up to F-84G-10RE)
24. Test operate hydraulic hand pump to insure pressure.
25. Landing flap control NEUT.
26. Speed brake switch DOWN.
27. Landing gear selector DOWN.
28. Aileron boost set at 6 or as desired.
28A Gun charger compressor switch OFF (F-84G-10RE and up).
29. Fuel tank battle damage switches down position.
30. Slaved gyro compass switch NORMAL.
31. Set accelerometer.
32. Set altimeter to correct setting.
33. Check clock for proper setting.
34. Check fuel quantity.
35. Set fuel counter. (See table for proper setting.)
36. Gun-bomb-rocket sight mechanical caging lever CAGE.
37. Reticle dimmer control DIM.
38. Instrument power switch NOR.
39. Check generator switch ON.
40. Check oxygen equipment and low pressure 400 psi and high pressure if installed 1800 psi pressure.
41. Check radio controls.
42. Cockpit heat and vent switch PRESSURE.
43. Cabin temperature control AUTOMATIC.
44. Test all warning lights.
45. Auto pilot power supply OFF.
46. Internal and external lights OFF.

### INTERIOR CHECK (NIGHT FLIGHTS)

1. Test operate all internal and external lights.
2. Check flashlight.



# INTERIOR CHECK

*Figure 2—2. Interior Check*

## BEFORE STARTING ENGINE.

1. Head aircraft into the wind if possible.

**CAUTION**

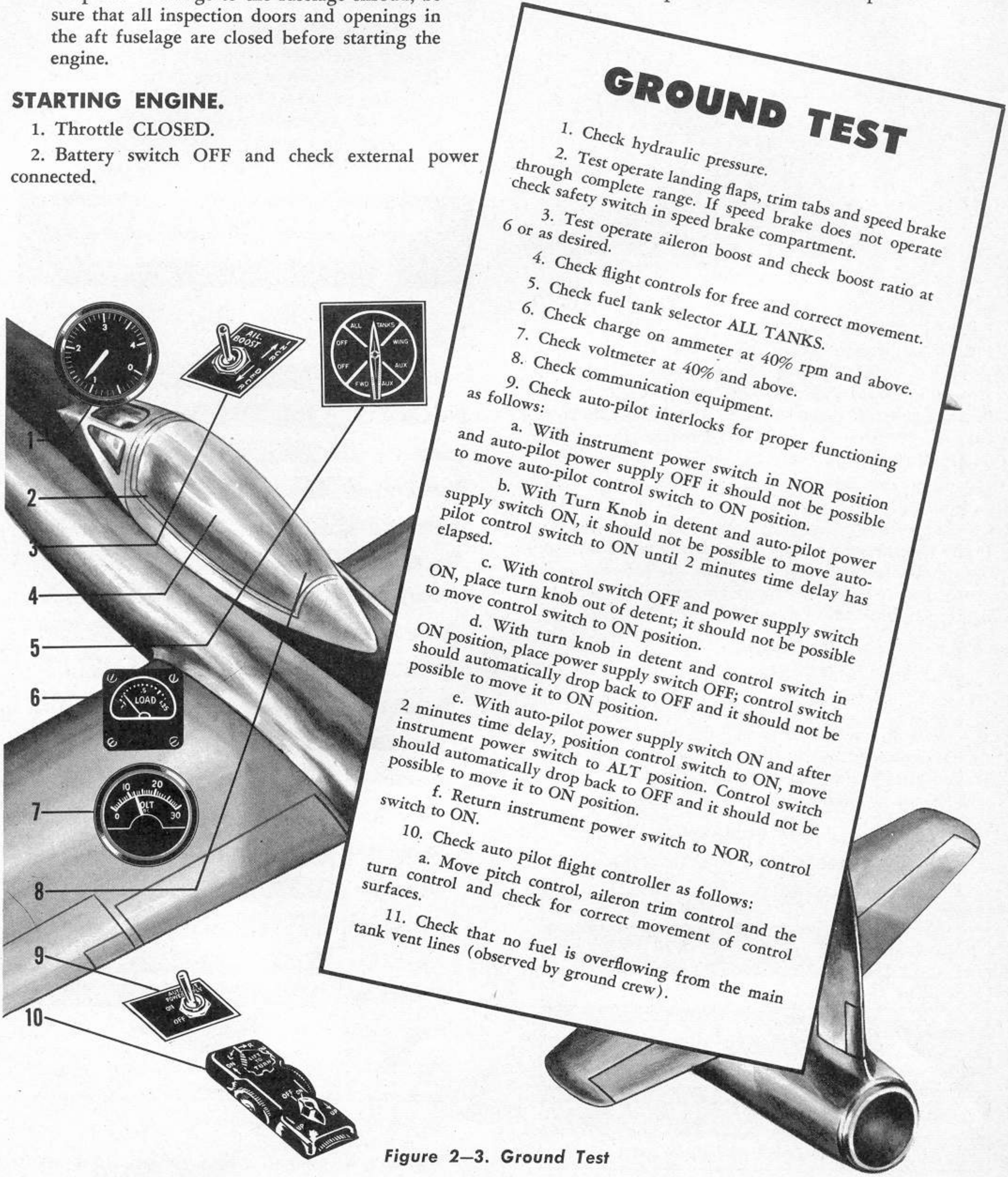
To prevent damage to the fuselage shroud, be sure that all inspection doors and openings in the aft fuselage are closed before starting the engine.

## STARTING ENGINE.

1. Throttle CLOSED.
2. Battery switch OFF and check external power connected.

**Note**

If external power is not available turn battery switch ON and instrument power switch to ALT position, (this is considered an emergency procedure.) After engine has started return instrument power switch to NOR position.



### GROUND TEST

1. Check hydraulic pressure.

2. Test operate landing flaps, trim tabs and speed brake through complete range. If speed brake does not operate check safety switch in speed brake compartment.

3. Test operate aileron boost and check boost ratio at 6 or as desired.

4. Check flight controls for free and correct movement.

5. Check fuel tank selector ALL TANKS.

6. Check charge on ammeter at 40% rpm and above.

7. Check voltmeter at 40% and above.

8. Check communication equipment.

9. Check auto-pilot interlocks for proper functioning as follows:

a. With instrument power switch in NOR position and auto-pilot power supply OFF it should not be possible to move auto-pilot control switch to ON position.

b. With Turn Knob in detent and auto-pilot power supply switch ON, it should not be possible to move auto-pilot control switch to ON until 2 minutes time delay has elapsed.

c. With control switch OFF and power supply switch ON, place turn knob out of detent; it should not be possible to move control switch to ON position.

d. With turn knob in detent and control switch in ON position, place power supply switch OFF; control switch should automatically drop back to OFF and it should not be possible to move it to ON position.

e. With auto-pilot power supply switch ON and after 2 minutes time delay, position control switch to ON, move instrument power switch to ALT position. Control switch should automatically drop back to OFF and it should not be possible to move it to ON position.

f. Return instrument power switch to NOR, control switch to ON.

10. Check auto pilot flight controller as follows:

a. Move pitch control, aileron trim control and the turn control and check for correct movement of control surfaces.

11. Check that no fuel is overflowing from the main tank vent lines (observed by ground crew).

*Figure 2—3. Ground Test*

## CAUTION

After a false start allow combustion chambers to drain for 3 minutes, or longer (if drainage continues) before attempting another start. Do not operate starter continuously for more than one minute. The starting motor provides only three starts, or attempted starts, with a minimum interval of 3 minutes between starts. Each series of three starts must be followed by a 20 minute interval.

3. Fuel tank selector ALL TANKS.

4. Emergency fuel switch OFF.

5. Move ground start switch to GROUND START for two seconds to engage the automatic starting system.

6. When engine speed reaches 7.5% rpm, open throttle to idle or above. After opening the throttle, if ignition, as indicated by rising exhaust temperature, does not occur within 5 seconds, close the throttle, place the ground start switch momentarily in STOP STARTING CYCLE position and investigate.

7. If engine speed does not reach 7.5% rpm in 30 seconds place the ground start switch in STOP STARTING CYCLE position momentarily. Wait for engine to stop. Insure that the source of electrical power is adequate and the connections are good, especially the external power connection. If repeated starting attempts still fail, investigate condition of starter-generator and engine.

### Note

Fire fighting while starting the engine is covered in Section III.

8. At approximately 22% rpm the starter and ignition circuits will cut off. To assure this procedure, place the ground start switch in the STOP STARTING CYCLE position when engine speed reaches 22%.

### TABLE 2–1. RPM REQUIREMENTS FOR EMERGENCY FUEL SYSTEM TEST

| | | | | | | |
|---|---|---|---|---|---|---|
| Ambient Temp. °F | -65 | -60 | -50 | -40 | -30 | -20 |
| Percent RPM | 88.5 | 89.0 | 89.9 | 90.7 | 91.4 | 92.2 |
| Ambient Temp. °F | -10 | 0 | 10 | 20 | 30 | 40 |
| Percent RPM | 92.9 | 93.6 | 94.3 | 95.0 | 95.6 | 96.3 |
| Ambient Temp. °F | 50 | 60 | 70 | 80 | 90 | 100 |
| Percent RPM | 96.9 | 97.6 | 98.2 | 98.8 | 99.4 | 100.0 |

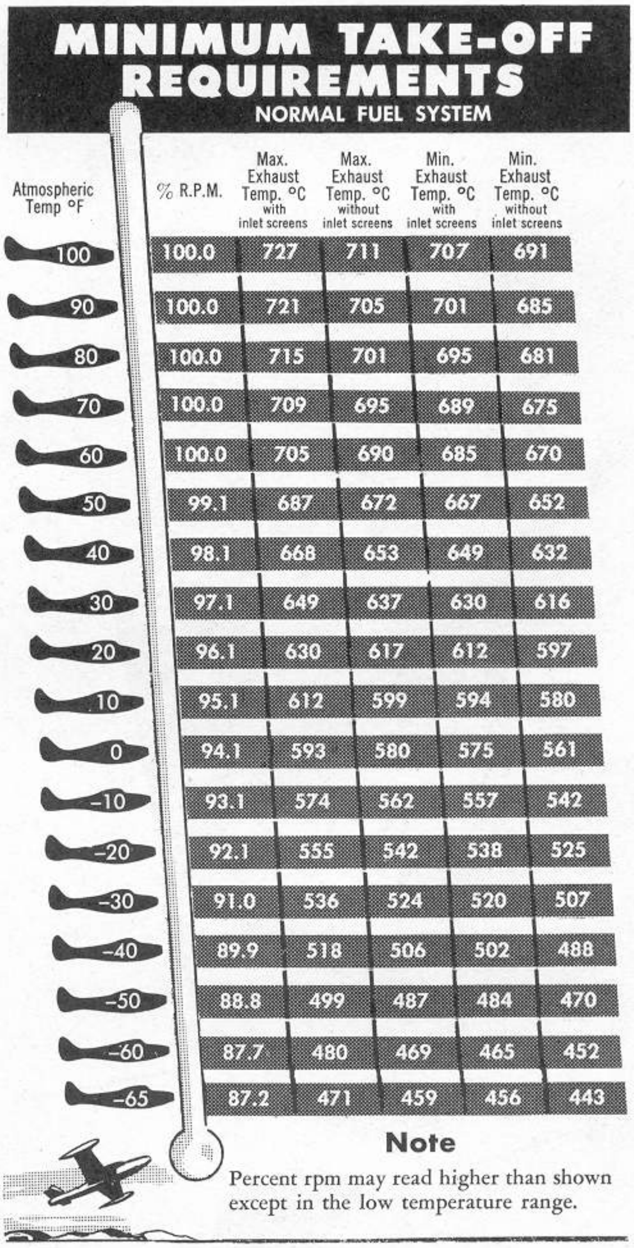
RPM tolerance +0.5, −1.0 percent rpm.

9. When engine speed has stabilized at idle rpm check the oil pressure. The throttle may be advanced to secure any desired rpm, if the engine is running normally. Recommended idle speed is 36-39% rpm.

10. Check that all engine instruments are within range and indicate normal operation.

### Note

In the event of condensation in the form of mist or snow is blown into the cockpit from the side air outlets they should be turned OFF and if it is still found to be objectionable to the pilot, the cockpit heat and vent switch can be positioned to RAM.



## MINIMUM TAKE-OFF REQUIREMENTS

NORMAL FUEL SYSTEM

| Atmospheric Temp °F | % R.P.M. | Max. Exhaust Temp. °C with inlet screens | Max. Exhaust Temp. °C without inlet screens | Min. Exhaust Temp. °C with inlet screens | Min. Exhaust Temp. °C without inlet screens |
|---|---|---|---|---|---|
| 100 | 100.0 | 727 | 711 | 707 | 691 |
| 90 | 100.0 | 721 | 705 | 701 | 685 |
| 80 | 100.0 | 715 | 701 | 695 | 681 |
| 70 | 100.0 | 709 | 695 | 689 | 675 |
| 60 | 100.0 | 705 | 690 | 685 | 670 |
| 50 | 99.1 | 687 | 672 | 667 | 652 |
| 40 | 98.1 | 668 | 653 | 649 | 632 |
| 30 | 97.1 | 649 | 637 | 630 | 616 |
| 20 | 96.1 | 630 | 617 | 612 | 597 |
| 10 | 95.1 | 612 | 599 | 594 | 580 |
| 0 | 94.1 | 593 | 580 | 575 | 561 |
| -10 | 93.1 | 574 | 562 | 557 | 542 |
| -20 | 92.1 | 555 | 542 | 538 | 525 |
| -30 | 91.0 | 536 | 524 | 520 | 507 |
| -40 | 89.9 | 518 | 506 | 502 | 488 |
| -50 | 88.8 | 499 | 487 | 484 | 470 |
| -60 | 87.7 | 480 | 469 | 465 | 452 |
| -65 | 87.2 | 471 | 459 | 456 | 443 |

### Note

Percent rpm may read higher than shown except in the low temperature range.

*Figure 2–4. Minimum Take-off Requirements*

11. Have external power supply disconnected and turn battery switch ON.

**WARNING**

A "hot start" is defined as a start during which the exhaust temperature exceeds 900°C. Record each "hot start" in USAF Form 1. After five starts in which the temperature is between 900 1000°C or one start in which the exhaust temperature reaches 1000°C, accomplish the special inspection outlined in applicable inspection guide. Engine passing this inspection may be returned to service. Record each hot start thereafter in USAF Form 1. When the maximum permissible number of hot starts again has been experienced, reinspect the engine. Engine overspeed limits: Engine speed is limited to 100.5% rpm for take-off. Reset fuel control if stabilized speed exceeds 102% rpm in flight. Remove engine for overhaul if stabilized speed exceeds 103% or if speed momentarily exceeds 104% rpm during ground or flight operation.

## ENGINE GROUND OPERATION.

No warm-up period is necessary. Take-off may be made immediately if the engine tachometer and exhaust temperature indicator show normal readings.

**CAUTION**

Hold ground run-ups to a minimum when using high rpms.

## TAXIING INSTRUCTIONS.

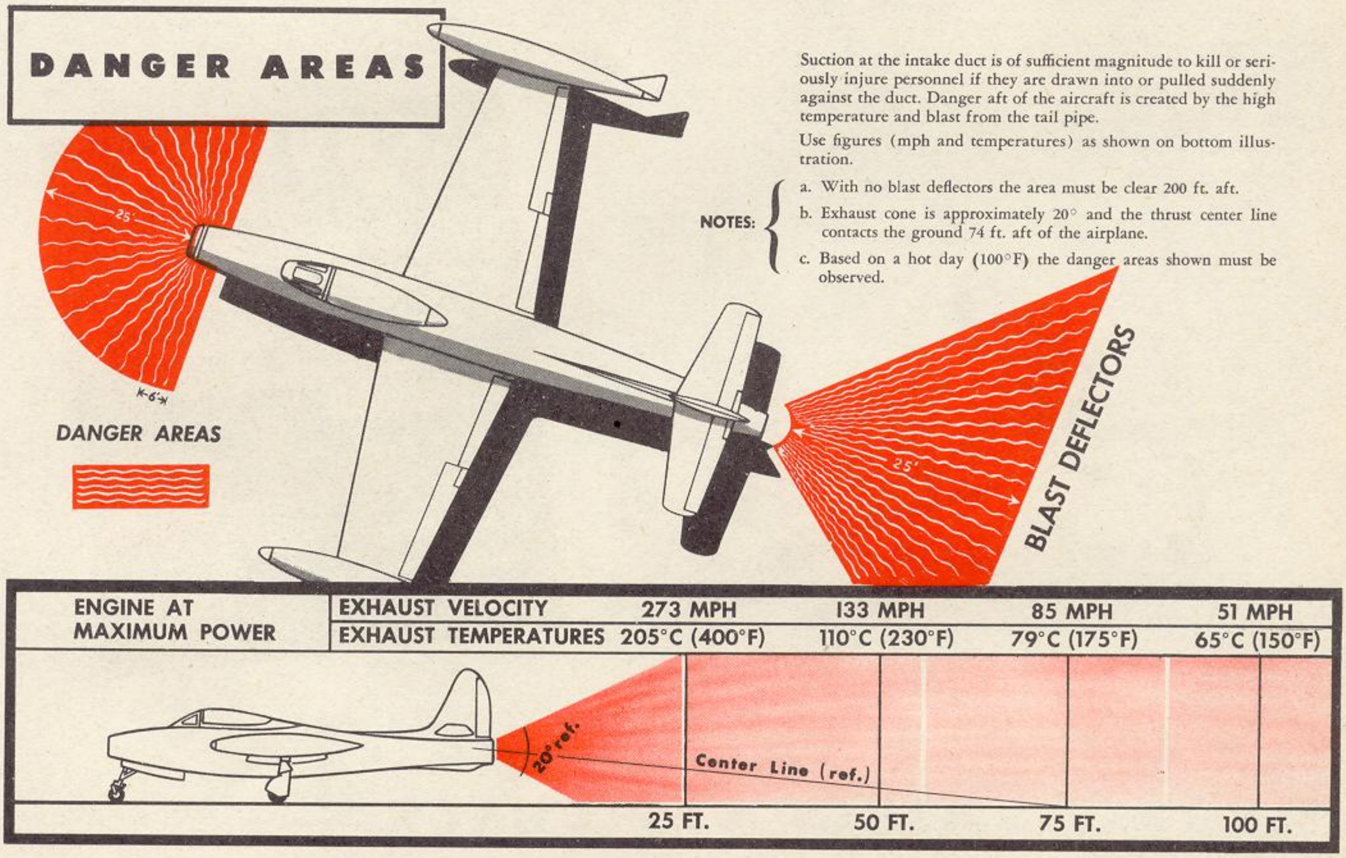
Remove chocks, release brakes and increase power until airplane starts to move. Approximately 45% rpm is necessary. Adjust power for desired taxi speed. Brakes are required for steering as the rudder is ineffective at low speeds. Slightly higher than normal force is required on the brakes for turning, however, the airplane is easy to taxi. When the airplane is fully loaded with external items, a much higher rpm is necessary to get the airplane rolling. When heavily loaded the airplane is easy to steer, but the turning radius must be slightly increased to prevent excessive side loads on struts and tires. Limit taxiing to a minimum as the fuel consumed in taxiing is approximately 19 to 26 pounds per minute.

## BEFORE TAKE-OFF.

### PRE-FLIGHT ENGINE CHECK.

**CAUTION**

Do not operate at 100% rpm any longer than is absolutely necessary. Refrain from rapid manipulations of the throttle whenever possible.



Suction at the intake duct is of sufficient magnitude to kill or seriously injure personnel if they are drawn into or pulled suddenly against the duct. Danger aft of the aircraft is created by the high temperature and blast from the tail pipe.

Use figures (mph and temperatures) as shown on bottom illustration.

**NOTES:**
- a. With no blast deflectors the area must be clear 200 ft. aft.
- b. Exhaust cone is approximately 20° and the thrust center line contacts the ground 74 ft. aft of the airplane.
- c. Based on a hot day (100°F) the danger areas shown must be observed.

| ENGINE AT MAXIMUM POWER | | | | | |
|---|---|---|---|---|---|
| | EXHAUST VELOCITY | 273 MPH | 133 MPH | 85 MPH | 51 MPH |
| | EXHAUST TEMPERATURES | 205°C (400°F) | 110°C (230°F) | 79°C (175°F) | 65°C (150°F) |

Figure 2—5. Danger Areas

**1.** Maintain 50% rpm to generate adequate electrical power and then close canopy.

**2.** Landing flaps down 20°.

**3.** Trim tabs neutral. (check lights)

**4.** Check speed brake switch UP.

**5.** Fuel tank selector ALL TANKS.

**6.** Emergency fuel switch EMERG ALERT.

**7.** External tank air pressure switches – TIP TANKS AIR PRESSURE (PYLON TANKS AIR PRESS.)

**8.** Safety belt and shoulder harness tightened and check inertia reel unlocked.

**9.** Auto-pilot power supply switch OFF.

**10.** Prior to jato take-off, place jato ready switch in JATO READY. Jato ready warning light should go on.

**11.** Oxygen mask adjusted properly and oxygen system operating. Arrange oxygen hose so as not to interfere with full stick movement.

**CAUTION**

**Brakes are adequate at the design gross weight of 14,500 lbs and up to a maximum gross weight of 17,800 lbs. In addition, the brakes will have normal life at these weights. In event of a refused take-off with a configuration of 4-230 gallon tanks (22,200 lbs gross weight), the brakes will be overloaded by 53%.**

PRE-FLIGHT
**AIRCRAFT CHECK**

*Figure 2–6. Preflight Aircraft Check*

1. Check emergency fuel system: With emergency fuel switch OFF and the engine operating at 100% rpm on the main fuel system, hold the emergency fuel test switch in the EMERG TEST position. Engine speed should be consistent with values shown in Table 2–1. The fuel system emergency-on indicator light will illuminate.

**CAUTION**

During operation with ambient temperatures of approximately 102°F and above, it may be necessary to reduce engine speed below 100% to prevent the exhaust temperature from exceeding 712°C on engines without fixed inlet screens and 727°C on engines with fixed inlet screens.

2. Return to normal engine operation by quickly retarding the throttle to a position which will give approximately the same rpm on the normal fuel system as was obtained at full throttle on the emergency fuel system, and at the same time release the emergency test switch.

**Note**

When changing over from the emergency fuel system to the main fuel system during operation at idle speed, accelerate the engine speed to 77% before making the change, otherwise a momentary overtemperature may result.

3. Check engine acceleration time. From 42% rpm to full rpm 20 sec max.

4. Check instruments for desired readings at take-off power.

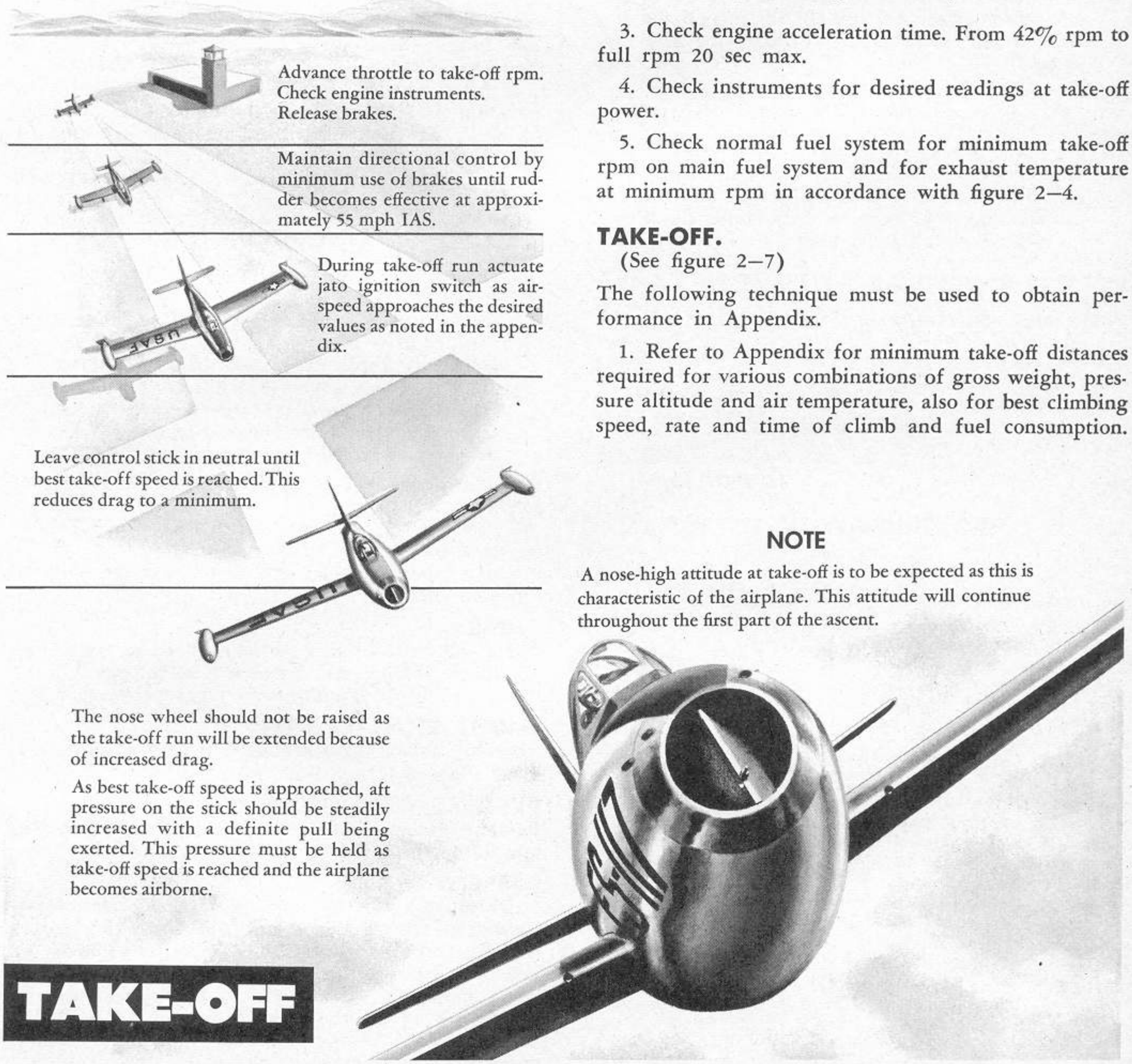
5. Check normal fuel system for minimum take-off rpm on main fuel system and for exhaust temperature at minimum rpm in accordance with figure 2–4.

## TAKE-OFF.

(See figure 2–7)

The following technique must be used to obtain performance in Appendix.

1. Refer to Appendix for minimum take-off distances required for various combinations of gross weight, pressure altitude and air temperature, also for best climbing speed, rate and time of climb and fuel consumption.



Advance throttle to take-off rpm.
Check engine instruments.
Release brakes.

Maintain directional control by minimum use of brakes until rudder becomes effective at approximately 55 mph IAS.

During take-off run actuate jato ignition switch as airspeed approaches the desired values as noted in the appendix.

Leave control stick in neutral until best take-off speed is reached. This reduces drag to a minimum.

**NOTE**

A nose-high attitude at take-off is to be expected as this is characteristic of the airplane. This attitude will continue throughout the first part of the ascent.

The nose wheel should not be raised as the take-off run will be extended because of increased drag.

As best take-off speed is approached, aft pressure on the stick should be steadily increased with a definite pull being exerted. This pressure must be held as take-off speed is reached and the airplane becomes airborne.

**TAKE-OFF**

*Figure 2–7. Take-off*

**Note**

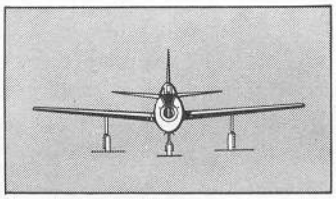
Elevator control is adequate to raise the nose wheel prior to normal take-off speed at the heaviest forward c.g. loading possible with normal use of the airplane. Installation of pylon tanks has the effect of slightly increasing elevator (or speed) required to unstick. At minimum take-off speeds, the control stick travel will be comparatively large and the airplane will be very nose high. As the pull off speed is increased, the control stick travel necessary, and the nose high attitude will diminish. Control stick force necessary to pull the nose wheel off will increase in forward cg loading configurations, however the force is not prohibitive at any time. Use of excessive trim tab to lighten these forces should be avoided, since this trim tab deflection reduces the effectiveness of the elevator and consequently increases the nose wheel lift off speed.

**CAUTION**

Do not use more than one half the available nose-up trim on take-off for a heavily loaded airplane at forward c.g. The tail of the airplane can be dragged by excessive nose high attitude on take-off as well as landing.

## LIFT OFF PROCEDURE-WITHOUT TIP TANKS

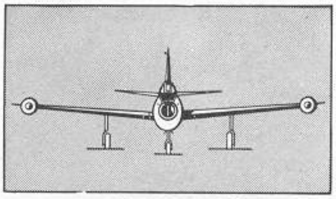
Hold neutral control stick until approximately 125-130 mph IAS is reached, at which time pull the airplane off the ground using the necessary control stick travel. Allow airspeed to increase to 160 mph IAS and hold until all obstacles are cleared.



*15,300 LBS*

## LIFT OFF PROCEDURE-WITH TIP TANKS

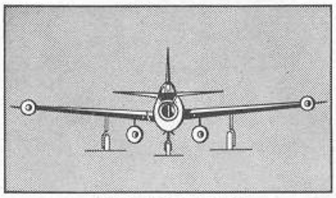
Hold neutral control stick until approximately 135-140 mph IAS is reached, at which time pull the airplane off the ground using the necessary control stick travel. Allow airspeed to increase to 180 mph IAS and hold until all obstacles are cleared.



*18,600 LBS*

## LIFT OFF PROCEDURE - WITH 4 EXTERNAL TANKS

Hold neutral control stick until approximately 150 mph is reached, at which time pull the airplane off the ground using the necessary control stick travel. Allow airspeed to increase to 190 mph IAS and hold until all obstacles are cleared.



*22,200 LBS*

## ASSISTED TAKE-OFF.

The effect of jato on airplane trim is slight as the units are located near the center line of the fuselage. No special technique is required. Take-off performance will depend on the speed at which the jato units are fired during the take-off run. Refer to the Appendix for the jato cut-in speed for either a two or four jato unit take-off.

## AFTER TAKE-OFF.

1. Landing gear selector UP when definitely airborne. Return to NEUT after gear is retracted, as indicated by landing gear lights.

**Note**

If the landing gear selector is moved slowly from the UP or DOWN position to the NEUT position a momentary flashing of the landing gear unsafe warning light may occur due to the construction of the landing gear selector valve. This momentary flashing does not indicate that the landing gear has been unlocked. The landing gear will retract in approximately 6 seconds at normal temperatures.

2. Landing flap control: UP at approximately 170-190 mph IAS. Return to NEUT after flaps are retracted.
3. After take-off, drop jato units when desired by actuating JATO JETTISON switch. Leave switch in JATO JETTISON position for a minimum of 4 seconds.
4. Return jato ready switch to OFF.
5. Climb to safe altitude and adjust speed for best climb.

**CAUTION**

During continuous operation with engine speeds of 95.6% and below, the exhaust gas temperature must not exceed 651°C on engines without fixed inlet screens and 666°C on engines with fixed inlet screens. It may be necessary to reduce engine speed to prevent the exhaust gas temperature from exceeding the maximum values when the compressor inlet temperature exceeds approximately 102°F.

6. Emergency fuel switch OFF (NORM) as soon as practicable.
7. Cockpit heat and vent switch PRESSURE if take-off was made in RAM.
8. Gun charger compressor switch ON (if compressor is installed).

## CLIMB.

The climb characteristics of the airplane permit a high initial rate of climb and sustained climbing speed to the service ceiling. See Appendix for climb performance.

## FLIGHT CHARACTERISTICS.

Refer to Section VI for detailed information on the airplane flight characteristics.

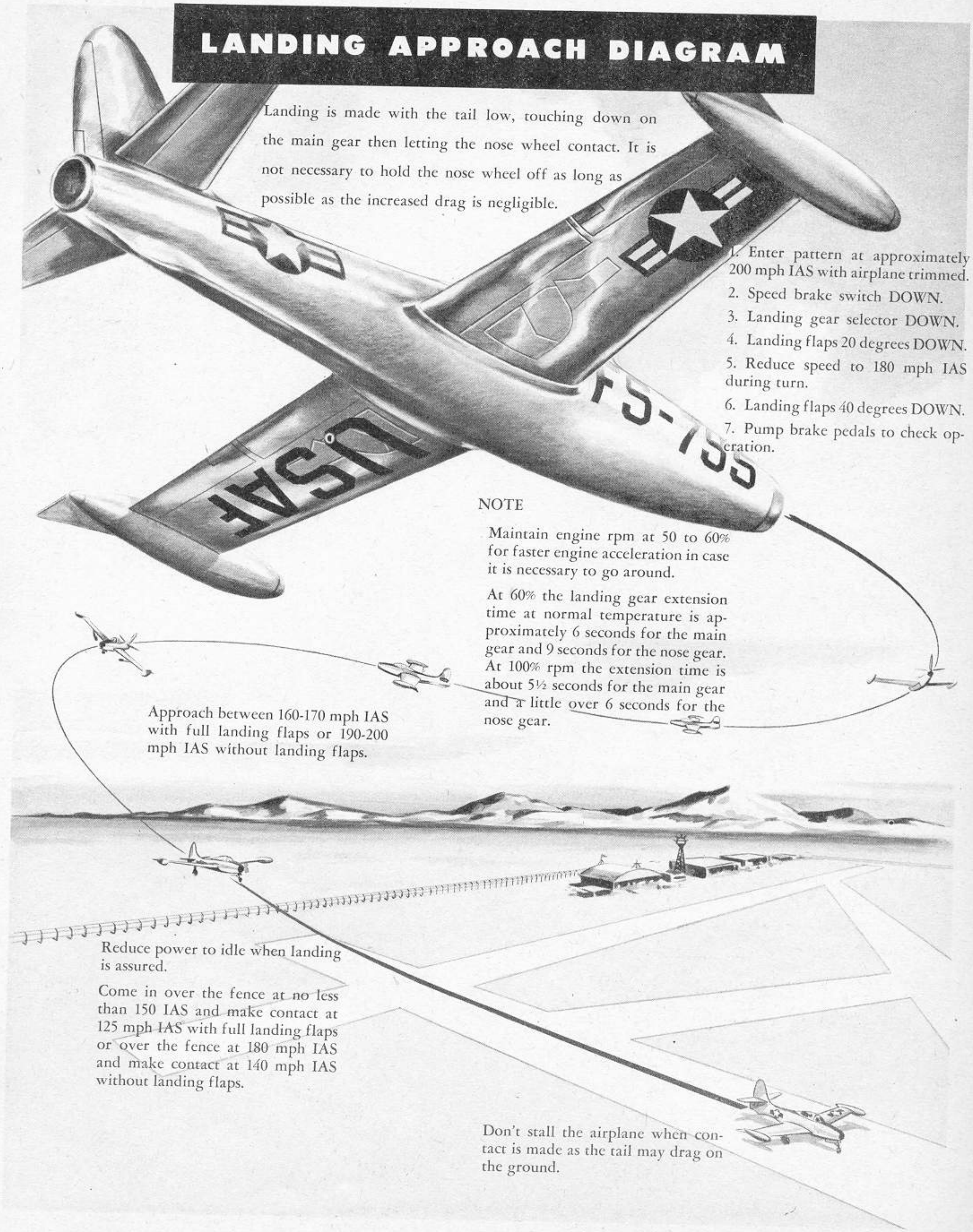
## SYSTEMS OPERATION.

Refer to Section VII for detailed information regarding operation of the various aircraft systems.

## DESCENT.

Refer to appendix for various descent performances. Generally a normal fast descent from high altitude using the least range can be made at 30-50 mph IAS below the maximum speed with the throttle closed and the speed brake open. The airplane will have good stability and control throughout the entire descent in all configurations. A faster descent will result in good control to approximately 25,000 feet, where the dive angle will become much steeper and the increased forces will cause an increase in stick force. The airplane will tend to pitch

# LANDING APPROACH DIAGRAM



Landing is made with the tail low, touching down on the main gear then letting the nose wheel contact. It is not necessary to hold the nose wheel off as long as possible as the increased drag is negligible.

1. Enter pattern at approximately 200 mph IAS with airplane trimmed.
2. Speed brake switch DOWN.
3. Landing gear selector DOWN.
4. Landing flaps 20 degrees DOWN.
5. Reduce speed to 180 mph IAS during turn.
6. Landing flaps 40 degrees DOWN.
7. Pump brake pedals to check operation.

NOTE

Maintain engine rpm at 50 to 60% for faster engine acceleration in case it is necessary to go around.

At 60% the landing gear extension time at normal temperature is approximately 6 seconds for the main gear and 9 seconds for the nose gear. At 100% rpm the extension time is about 5½ seconds for the main gear and a little over 6 seconds for the nose gear.

Approach between 160-170 mph IAS with full landing flaps or 190-200 mph IAS without landing flaps.

Reduce power to idle when landing is assured.

Come in over the fence at no less than 150 IAS and make contact at 125 mph IAS with full landing flaps or over the fence at 180 mph IAS and make contact at 140 mph IAS without landing flaps.

Don't stall the airplane when contact is made as the tail may drag on the ground.

*Figure 2–8. Landing Approach Diagram*

and buffet as the lower altitudes and higher indicated airspeeds are reached.

It is not recommended to exceed 525 mph with the speed brake down because of the high loads imposed. A slow descent for the purpose of stretching range in event of low fuel quantity may be accomplished at 225 mph IAS with the speed brake closed and the engine at idle rpm.

## PRE-TRAFFIC PATTERN CHECK LIST.

1. Armament switches OFF or SAFE.
2. Gun selector switch OFF.
3. Gun-bomb-rocket sight mechanical caging lever — CAGE.

**CAUTION**

If the mechanical caging lever is left in the UNCAGE position during landing or taxiing, the sight mirror or mirror suspension may become damaged due to vibration.

4. Fuel tank selector ALL TANKS unless operation has been necessary in AUX.
5. Emergency fuel switch EMERG ALERT.
6. Auto-pilot control switch OFF.
7. Gun charger compressor switch OFF (F-84G-10RE and up.)

## LANDING.

**CAUTION**

Avoid landing the airplane with fuel in the tip tanks or with bombs. Landing with fuel in the tip tanks or with bombs requires that good landing technique be employed to prevent wrinkling or buckling of the wings during such landings.

### NORMAL LANDING.

Refer to Appendix for landing data. A ten minute interval between landings is necessary to permit the brakes to cool.

1. Landing is made with the tail low, touching down on the main gear then letting the nose wheel contact. It is not necessary to hold the nose wheel off as long as possible as the increased drag is negligible.
2. After touchdown apply brakes momentarily to check if brakes are effective.
3. Allow the airplane to roll approximately 1000 feet, then apply brakes intermittently until airplane speed reduces to taxiing speed.

## GO AROUND OR WAVE-OFF

The time required to regain take-off thrust is longer with jet airplanes than with reciprocating engine aircraft. From 50% rpm reasonable acceleration is possible.

1. Open throttle to full rpm.
2. Retract the landing gear if airborne.
3. Retract landing flaps to 20 degrees immediately and to full up position as conditions dictate. The flaps may be retracted full up at once, if airspeed is available, as they retract slowly from 20° to UP.
4. Speed brake UP.

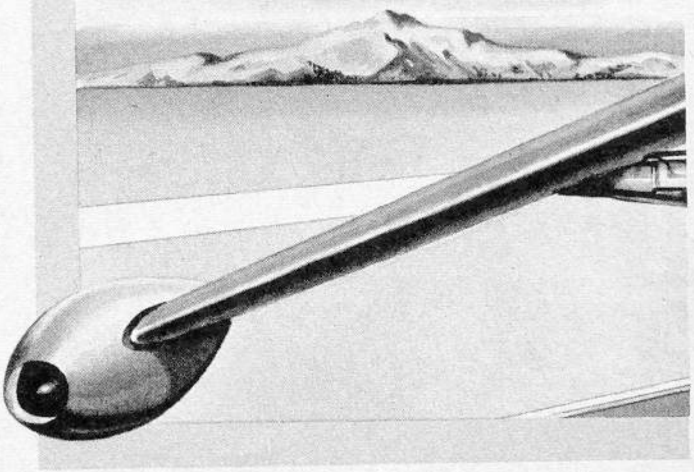


*Figure 2–9. Go Around or Wave-off (Sheet 1 of 2)*

**Note**

Directional control is good throughout the entire landing roll.

**CAUTION**

Do not open the canopy until speed has reduced to 15 mph to avoid high loads and eventual failure of the canopy actuator which results when the canopy is partially opened at high speeds.

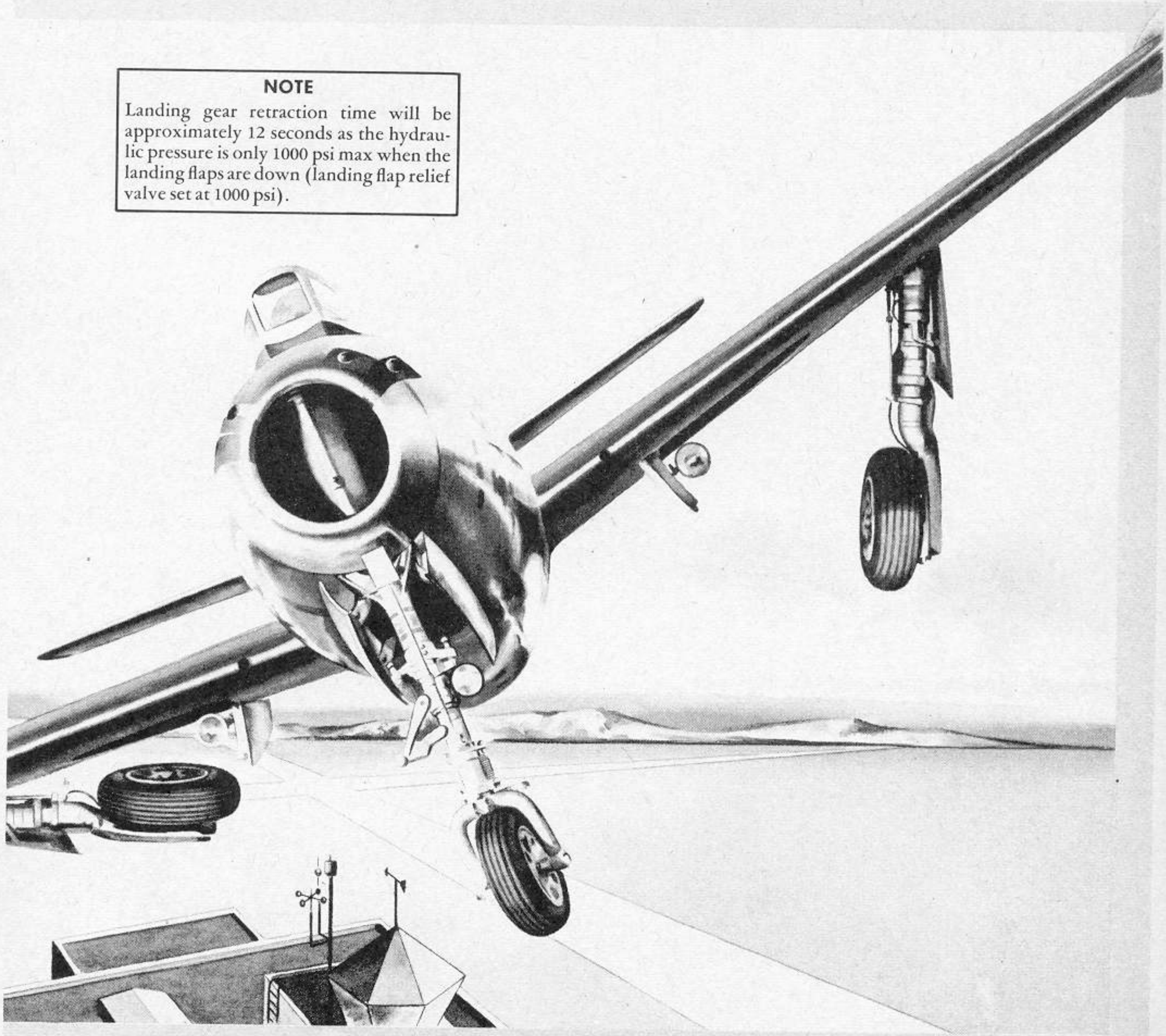
4. Emergency fuel switch OFF.
5. Landing flap control UP before taxiing.
6. Return landing flap control to NEUT after flaps are up.
7. Leave speed brake DOWN for ground maintenance.
8. Refer to Section III for emergency landings.

### LANDING WITH EXTERNAL LOAD.

Landing with external loads such as bombs, pylon tanks, rockets or fuel in the wing tip or pylon tanks should be avoided because the loads applied to the wing structure during such landings will cause wrinkles in the wing unless good smooth landings are made. Landing is made in the normal manner except that the speed will be higher because of the higher stalling speed due to the increased weight.

### CROSS WIND LANDING.

The procedure for cross wind landing is the same as for



**NOTE**

Landing gear retraction time will be approximately 12 seconds as the hydraulic pressure is only 1000 psi max when the landing flaps are down (landing flap relief valve set at 1000 psi).

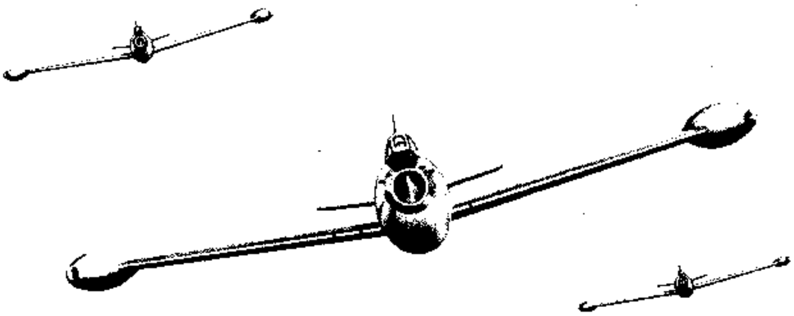
*Figure 2–9. Go Around or Wave-off (Sheet 2 of 2)* normal landing. However, if the drift appears excessive, the upwind wing may be lowered until just before contact.

## STOPPING THE ENGINE.

1. Parking brakes on.
2. If possible head aircraft into the wind so that air circulation after the engine has stopped will clear the engine of fumes.
3. Move throttle lever to CLOSED and hold or lock in this position, until engine stops.
4. Fuel tank selector OFF.
5. Elevator trim tabs neutral.
6. All switches OFF except generator switch.

## BEFORE LEAVING PILOT'S COMPARTMENT.

1. Chocks in place.
2. Parking brakes off.
3. Flight controls locked.
4. Insert the ground safety cotter pin in the ejection seat catapult.
5. Fill out Form 1.
6. Leave canopy open slightly to allow for air circulation.



# Section III
# EMERGENCY PROCEDURES

## ENGINE FAILURE.

### PROCEDURE ON ENCOUNTERING ENGINE FAILURE.

Successful engine operation is primarily dependent upon satisfactory function of the two fuel systems: The engine fuel system, which provides fuel at the required pressure and the airplane fuel system, which maintains the supply of fuel to the engine system. Both systems are provided with emergency change-overs in case of failure. If the supply of fuel from the main fuel system fails, the emergency fuel system is available. If the main fuel tank (the normal source of supply to the engine fuel system) should fail, fuel from the wing and forward tanks can be recovered in WING AUX and FWD AUX operation. Failure of each of these systems is covered in detail in this section. If power does fail, the fuel pressure warning light will isolate the source of trouble. If the fuel pressure warning light is on, the main tank has failed, so that switching to auxiliary operation is necessary to recover fuel. If the fuel pressure warning light is off, the main tank is operating properly and therefore failure must have occurred in the engine fuel system. In this case, fuel for the engine is recovered by turning the emergency fuel switch ON, which sets the emergency fuel system in operation. In any event, the first step on encountering complete engine failure is to close throttle so as to prevent the engine from flooding and then, after proper selection of systems, to attempt a re-start of the engine.

**Note**

Flight characteristics of the aircraft with a dead engine are normal and rapid trim changes are not necessary.

### COMPLETE ENGINE FAILURE DURING TAKE-OFF.

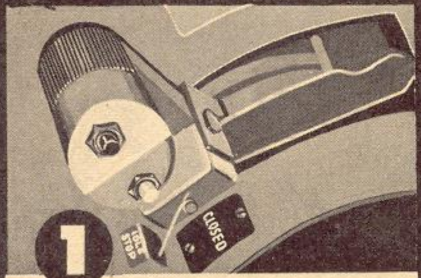
BEFORE FLYING SPEED IS REACHED.

1. Close throttle.
2. Turn fuel tank selector OFF.
3. Open canopy.
4. Turn battery and generator switches OFF.
5. Brake to a stop on runway if possible.
6. Beyond runway: Landing flaps DOWN, leave battery switch ON, operate landing gear emergency ground retract switch, landing gear selector UP and then turn battery switch OFF.

AFTER LEAVING THE GROUND.

1. Close throttle.
2. Turn fuel tank selector OFF.
3. Salvo switch SALVO to jettison external stores.
4. Landing flaps DOWN.
5. Landing gear UP.
6. Turn battery and generator switches OFF.
7. Land straight ahead, changing course only enough to miss obstacles.

# Emergency AIR STARTING OF ENGINE



Close throttle.

Raise nose to drain out unburned fuel through tail pipe.

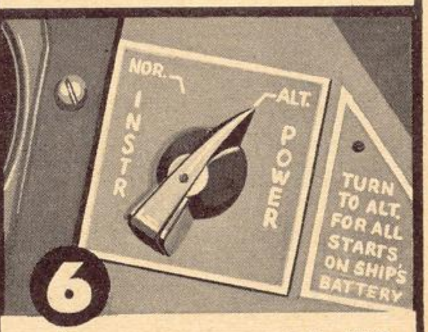
Descend to 20,000 feet or lower. Starts at lower altitudes are more positive.

**4**

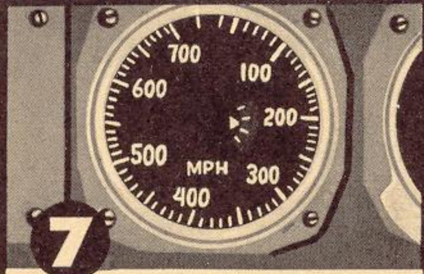
If engine failure occurred with the fuel pressure warning light OFF, indicating a probable engine pump or main fuel control failure, turn the emergency fuel switch ON, fuel tank selector ALL TANKS.

**5**

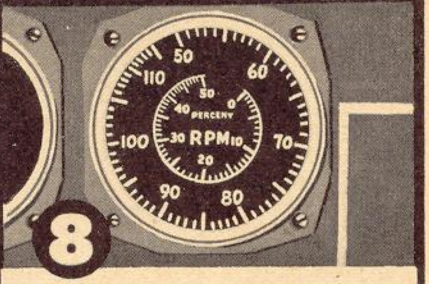
If engine failure occurred with the fuel pressure warning light ON, indicating a failed booster pump in the main tank, leave the emergency fuel switch OFF and turn fuel tank selector to WING AUX. If fuel pressure warning light remains ON, indicating a failed booster pump or empty wing tanks turn fuel tank selector to FWD AUX.



Instrument power switch ALT for ignition during airstart.



Maintain 200 to 250 mph IAS.



Maintain 12.5 to 17.5% rpm by windmilling.

Momentarily depress air start switch to AIR START.

*Figure 3–1. Emergency Air Starting of Engine (Sheet 1 of 2)*

## After Engine Starts

NOTE

If rpm is below 12.5%, depress ground start switch to GROUND START position for two seconds.

**10** Advance throttle to get fuel pressure required for start and observe exhaust gas temperature gage for evidence of firing.

**11** Retard throttle if necessary to prevent excessive exhaust gas temperature after engine fires.

**12** If ground start switch was used for starting, place it momentarily to STOP STARTING CYCLE position when rpm reaches 22%.

**13** Instrument power switch: NOR after engine has started.

**14** When rpm and exhaust gas temperature have stabilized at idle speed, throttle may be advanced as desired.

**15** If engine has not fired within five seconds after opening the throttle, as indicated by rising exhaust temperature, close throttle and repeat the above procedure. If ground start switch was used in attempted start, depress it momentarily to STOP STARTING CYCLE.

*Figure 3—1. Emergency Air Starting of Engine (Sheet 2 of 2)*

### PARTIAL ENGINE FAILURE DURING TAKE-OFF.

1. If not airborne, abort take-off.

2. If airborne and fuel pressure warning light is ON indicating a failed booster pump in the main tank, turn fuel tank selector to WING AUX. Go around to land.

3. If airborne and fuel pressure warning light is OFF indicating a failed engine pump, place emergency fuel switch ON. Go around and land.

**WARNING**

Remember that even though the emergency fuel switch is in EMERG ALERT (T.O. & LDG) position during take-off; partial power failure may not cause a fuel pressure drop sufficient to start the emergency fuel system automatically.

### ENGINE FAILURE DURING FLIGHT.

1. Attempt to restart the engine.

**CAUTION**

If engine restart is unsuccessful and an emergency landing is anticipated, move the aileron boost disconnect to the DISENGAGE position to avoid erratic aileron boost if the engine stops windmilling. Aileron boost will be satisfactory with a windmilling engine.

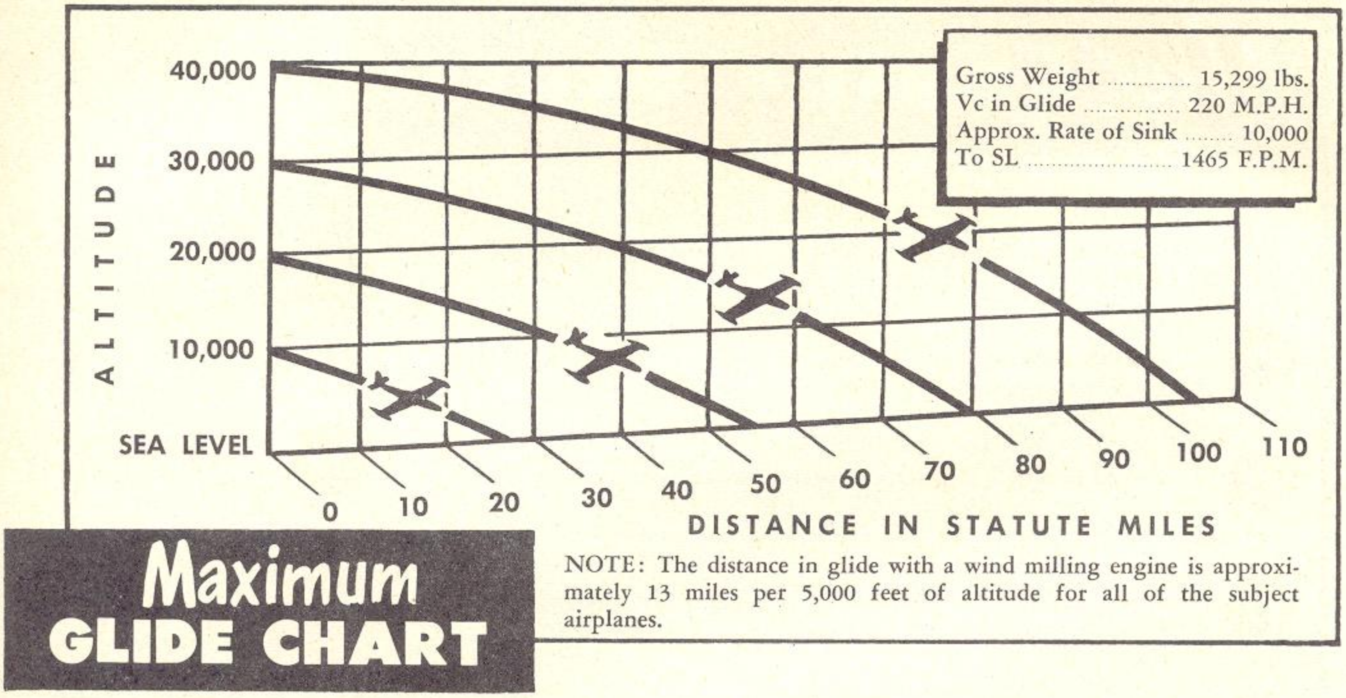
### PARTIAL ENGINE FAILURE DURING FLIGHT.

1. In high altitude operation, partial engine failure may be corrected by leaving the throttle in the open position and descending to a lower altitude rapidly.

### MAXIMUM GLIDE.

If it is desired to obtain the maximum glide of the aircraft to reach a suitable landing area with a dead engine, proceed as follows:

1. Throttle CLOSED.
2. Fuel tank selector OFF.
3. Landing flaps UP.
4. Speed brake UP.
5. Jettison external stores. Do not drop stores over inhabited areas.



NOTE: The distance in glide with a wind milling engine is approximately 13 miles per 5,000 feet of altitude for all of the subject airplanes.

*Figure 3—2. Maximum Glide Chart*

6. Jettison tip tanks if they contain fuel in straight flight above 250 mph IAS.

**Note**

> It is not necessary to jettison empty tip tanks as they contribute to lift and the additional drag is negligible.

7. Trim the aircraft to maintain a recommended glide speed (figure 3—2).

### LANDING WITH DEAD ENGINE.

See figure 3—3.

## FAILURE TO ASSIST TAKE-OFF UNITS.

In the event of failure of one or more of the jato units during take-off, a rapid change of trim will not be necessary as the jato units are close to the center line of the aircraft. Take-off distance will be increased as shown in the appendix.

## FIRE.

### ENGINE FIRE DURING FLIGHT.

1. Engine overheat light ON. Reduce power instantly. If light remains on, follow emergency procedure in following paragraphs.

2. Engine fire warning light ON. Close throttle, turn fuel tank selector OFF, turn battery and generator switch OFF and make emergency landing or abandon airplane, as circumstances dictate.

### FIRE WHILE STARTING THE ENGINE.

1. Close throttle, turn fuel tank selector OFF, and turn battery switch OFF or disconnect external power supply.
2. Leave aircraft as quickly as possible.

### FIRE DURING TAKE-OFF — IF AIRBORNE.

1. Close throttle.
2. Turn fuel tank selector OFF.
3. Turn battery switch OFF.
4. Land straight ahead.
5. Beyond runway: Landing flaps DOWN, landing gear UP.

### FIRE DURING TAKE-OFF — IF NOT AIRBORNE.

1. Close throttle.
2. Turn fuel tank selector OFF.
3. Turn battery switch OFF.
4. Brake to a stop on runway if possible.
5. Beyond runway: Leave battery switch ON, operate landing gear emergency ground retract switch. Landing gear selector UP and then battery switch OFF.

## SMOKE ELIMINATION.

If smoke or fumes enter the cabin, the cause may be a fire or fuel leakage in the engine compartment or a failed turbo-refrigerator.

1. Connect oxygen mask.
2. Set oxygen regulator diluter lever to 100%.
3. Position cabin temperature control to highest point.

## *Landing* WITH DEAD ENGINE

If it is possible to land on a prepared runway of adequate length the landing can be made with the landing gear extended. In case a runway of sufficient length is not available, land with the wheels retracted.

**1.** Throttle CLOSED.

**2.** Fuel tank selector OFF.

**3.** Jettison as required external stores over uninhabited areas. Tip tanks that are not empty must be jettisoned unless the landing is to be made on smooth terrain. This action is necessary in order to minimize the possibility of fire and preclude any additional loss in glide ratio.

**CAUTION**

The decision concerning the retention of tip tanks should be based on a consideration of whether there is fuel in the tip tanks and the type of terrain available for landing. In smooth terrain the retention of the tip tanks will alleviate damage to the aircraft for they act as skids and also tend to preclude cart wheeling due a wing tip digging in.

**4.** Safety belt and shoulder harness tightened and enertia reel lock control locked.

**CAUTION**

The pilot is prevented from bending forward when the enertia reel lock control is in the locked position; therefore all switches not readily accessible should be "cut" before moving the control to the locked position.

**5.** Speed brake UP.

**6.** Landing approach should be made at a higher altitude as the glide path with a dead engine is steeper than with an idling engine.

**7.** Landing gear DOWN. Use emergency procedure.

**8.** Landing flaps 20° DOWN until it is estimated that field will not be undershot. Then lower to 40°. Use emergency procedure.

**9.** Come in over the fence at normal speed but at a higher altitude and make contact in the normal manner.

*Figure 3—3. Landing With Dead Engine*

If smoke or fumes are eliminated the cause is in the turbo-refrigerator if not the cause is in the engine compartment.

4. If smoke is not eliminated, position cockpit heat and vent switch to RAM and defroster control to OFF.

**Note**

The intake distribution valve will close and the ram air and safety relief valves will open. The intake of air through the ram air valve will scavenge the air in the cockpit through the open relief valve and rapidly dissipate the fumes and smoke.

## LANDING EMERGENCIES.

### LANDING WITH WHEELS RETRACTED.

1. Jettison as required external stores over uninhabited areas. Unless the landing is to be made on smooth terrain, tip tanks that are not empty must be jettisoned in order to minimize the possibility of fire.

**CAUTION**

The decision concerning the retention of tip tanks should be based on a consideration of whether there is fuel in the tip tanks and the type of terrain available for landing. In smooth terrain the retention of the tip tanks will alleviate damage to the aircraft for they act as skids and also tend to preclude cart wheeling due to a wing tip digging in.

# EMERGENCY ENTRANCE

IF THE CANOPY CANNOT BE OPENED BY USING THE EXTERNAL CONTROL (EXIT RELEASE) —

**ACTUATE THE EXTERNAL JETTISON SWITCH**

*Figure 3—4. Emergency Entrance*

**WARNING**

In case of electrical failure of the battery bus the tip tanks can be jettisoned together with the rockets by the manual tip tank and rocket release but bombs or pylon tanks cannot be jettisoned. Be certain that the bomb arming switch is SAFE and the rocket arming switch is OFF.

2. Open canopy.

3. Safety belt and shoulder harness tightened and inertia reel lock control locked.

**CAUTION**

The pilot is prevented from bending forward when the control is in the locked position; therefore all switches not readily accessible should be "cut" before moving the control to the locked position.

4. Extend landing flaps as desired.

5. Make normal approach.

6. Before contact with the ground, close throttle and turn battery switch OFF.

### BRAKE FAILURE.

1. If left brake is out make landing on left side of runway.

2. If right brake is out make landing on right side of runway.

3. If both brakes are out, land as short as possible at lowest safe speed. Landing flaps 40 degrees and speed brake DOWN. After touch down, open canopy immediately to help slow down the aircraft and if you are not sure that you can stop, and there is a chance of going off the end of the runway, close the throttle to "cut" the engine. If the engine rotation is stopped or slowed up below normal idling speed, a definite braking action is experienced.

### LANDING WITH FLAT TIRE.

1. With nose wheel tire flat; make normal landing holding nose off as long as possible.

2. With one main wheel tire flat; make normal landing on side of runway nearest inflated tire.

3. If both main wheel tires are flat; make normal landing in center of runway and use brakes sparingly and with caution.

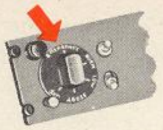
### LANDING WITH UNBALANCED TIP TANK LOAD

If one tip tank contains fuel and the other is empty, extreme caution must be observed before attempting a

# DITCHING

Bail out is preferred to ditching. Until further information is obtained it is recommended that the jet engine be shut off.

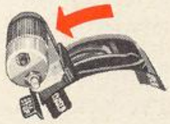
1. Turn IFF to EMERGENCY.



2. Jettison tip tanks, and all external stores including bomb pylons.

**NOTE**

For additional buoyance do not drop the tip tanks if the tanks are empty or nearly empty and the sea surface is calm.

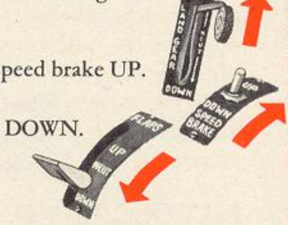


3. Retard throttle beyond gate.

4. Shoulder harness and safety belt secured and inertia reel lock control locked. Unbuckle parachute and disconnect oxygen, anti g suit and electrical connections.

**CAUTION**

The pilot is prevented from bending forward when the inertia reel lock control is in the locked position; therefore, all switches not readily accessible should be "cut" before moving the control to the locked position.



5. Check landing gear and speed brake UP.

6. Set flaps 20 to 30 degrees DOWN.

7. Jettison canopy by pulling up right hand grip.

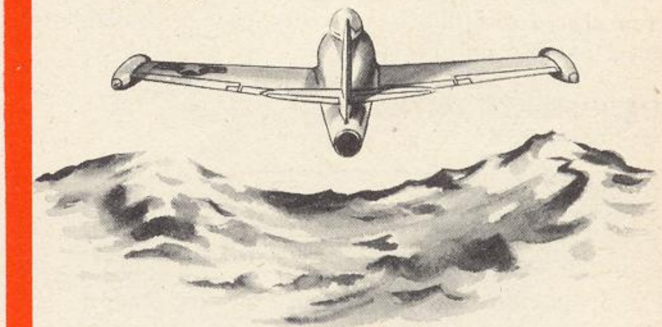
8. Touchdown in a slightly nose high attitude.

9. If a regular wave or swell pattern exists aim the touchdown parallel to the waves and attempt to land on the crest or on the falling side of the wave.

10. More often the sea surface will be irregular with two or more wave or swell patterns intermingled. In this case the best compromise is to head into whatever wind may be blowing. Examine sea to find areas where the intermingling waves cancel out. Aim touchdown for one of these calmer areas.

11. Make actual touchdown in the same attitude as for normal landing. Make the "softest" possible landing. Do not stall airplane at time of contact.

12. After the airplane has slowed down in the water, leave the cabin at once, since fighter aircraft sink very rapidly.



**WARNING**

The canopy roller explosive charges and the canopy remover pneumatic guns will fire when the right handgrip is actuated whether the canopy is open or closed and regardless of the position of the battery switch. The canopy should be jettisoned from the fully closed position as the canopy remover pneumatic guns contact the canopy fittings only when the canopy is in the fully closed position. If the canopy is ejected from any position other than fully closed, these pneumatic gun pistons fire through the canopy glass and are ineffective in forcing the canopy away from the aircraft. The canopy should be jettisoned when in straight and level flight if possible so as to avoid any side wind loading which may cause diagonal slueing of the canopy.

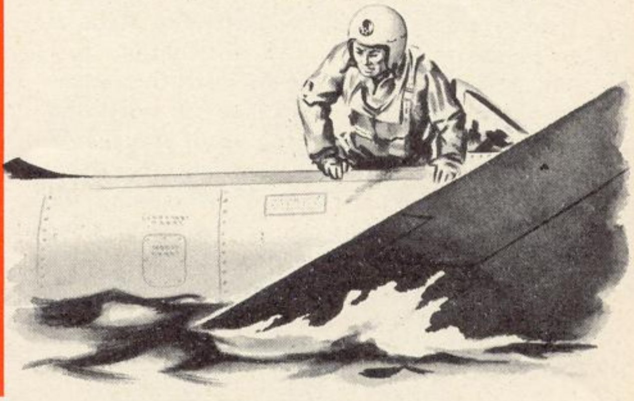


*Figure 3—5. Ditching Procedure*

landing to avoid an unsatisfactory wing heavy condition. The airplane can be trimmed at normal speeds, however as the speed is reduced aileron displacement may not be sufficient to keep the airplane level. If an unbalanced loading condition exists, as indicated by the necessity to trim the airplane laterally as fuel is transferred from only one tip tank, proceed as follows:

1. Jettison tip tanks over uninhabited areas electrically or by means of the manual tip tank release.
2. If the tip tanks cannot be jettisoned due to electrical or mechanical failure, a practice landing should be attempted at a safe altitude to determine the slowest speed where the airplane can be held level with sufficient control remaining to pick up a wing. The speed will vary with the amount of fuel remaining in the tip tank.
3. After the safe speed is determined a landing can be accomplished provided the touch down speed does not go below the safe speed.
4. If the landing is made at a high speed it must be remembered that sufficient runway must be available in order to slow up and stop.

## EMERGENCY ENTRANCE.

See figure 3—4

**WARNING**

Stand clear when jettisoning explosive canopy.

## DITCHING.

See figure 3—5

## BAIL OUT.

See figure 3—6

## FUEL SYSTEM FAILURE.

See figure 3—7

## TIP TANK JETTISON.

**WARNING**

Jettison empty tip tanks in straight flight at speeds above 250 mph IAS if conditions permit. At lower speeds, the air loads that separate the tank from the airplane are small and one or both tanks may hang up. If this should occur, hold the airplane straight then yaw slightly away from the tank by tapping the rudder pedal. Do not roll or yaw the airplane sharply. Do not jettison empty tip tanks in a turn. Jettison full tip tanks in straight flight or shallow turns, if possible at any speed.

### TIP TANK JETTISON SWITCH.

1. External tank air pressure switches OFF.
2. Tip tanks jettison switch JETTISON.

### SALVO SWITCH.

The tip tanks can be jettisoned by operation of the salvo switch to the SALVO position. The rockets and pylon tanks or bombs will also be jettisoned.

### MANUAL TIP TANK RELEASE.

In the event of an electrical failure the tip tanks can be jettisoned by pulling the manual tip tank release aft. This will also jettison the rockets.

## PYLON TANK JETTISON.

**WARNING**

Do not jettison pylon tanks above 325 mph IAS except in emergency. Release tanks in straight and level flight.

Normally the pylon tanks are jettisoned in the same manner as releasing bombs manually.

1. Bomb selector switch, ALL.
2. Bomb release selector switch, MANUAL RELEASE.
3. Bomb release switch, depress.

### SALVO SWITCH.

In an emergency the pylon tanks are jettisoned simultaneously with the rockets and tip tanks by placing the salvo switch in SALVO.

### BOMB PYLON JETTISON SWITCH.

The pylon tanks can be jettisoned together with the bomb pylons by positioning the bomb pylon jettison switch to the JETTISON position.

### COLLAPSED TIP TANKS.

Flight tests indicate that a tip tank with the inboard quadrants collapsed has a tendency to roll to the right. When the outboard quadrants are collapsed the airplane has a greater tendency to roll to the left, especially at low altitudes. The roll off is accompanied by severe tank buffeting and aileron vibration at low altitude and high Mach Nos. In the event of the collapse of a tip tank, slow the airplane down to a speed that will alleviate buffeting of the collapsed tank. Airplane control is not affected at the slower speeds.

## ELECTRICAL POWER SUPPLY SYSTEM FAILURE.

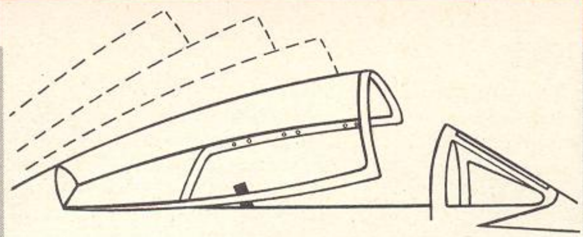
### INVERTER FAILURE.

Inverter failure is indicated if the inverter failure indicator light goes on. Turn the instrument power switch to ALT position. If light does not go out both inverters have failed.

**CAUTION**

In the event of failure of the main inverter the attitude indicator, the slaved gyro magnetic compass indicator, the fuel pressure gage and the oil pressure gage will tend to remain at

# BAIL-OUT PROCEDURE...



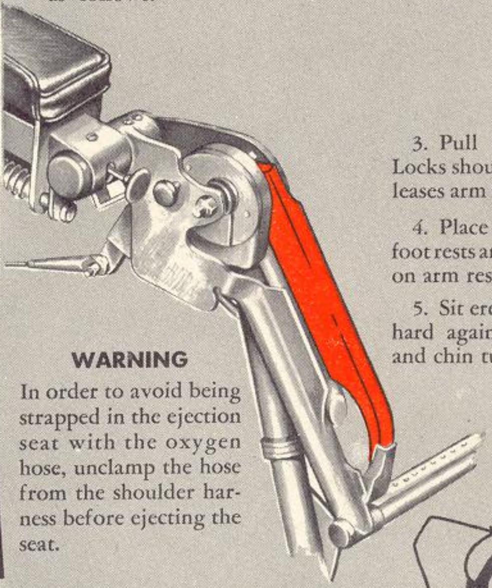
In all cases of emergency exit in flight, it is recommended that escape be accomplished by means of seat ejection. This is the safest method of escape in either high speed or low speed flight since it precludes the possibility of pilot injury through collision with the tail surfaces. In the event bail-out becomes necessary, proceed as follows:

1. At altitude, pull ball handle on bail-out bottle.

2. Jettison canopy by pulling the internal canopy jettison control all the way up until it locks in position.

**WARNING**

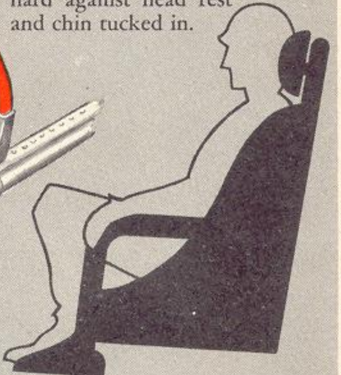
The canopy roller explosive charges and the canopy remover pneumatic guns will fire when the right hand-grip is actuated whether the canopy is open or closed and regardless of the position of the battery switch. The canopy should be jettisoned from the fully closed position as the canopy remover pneumatic guns contact the canopy fittings only when the canopy is in the fully closed position. If the canopy is ejected from any position other than fully closed, these pneumatic gun pistons fire through the canopy glass and are ineffective in forcing the canopy away from the aircraft. The canopy should be jettisoned when in straight and level flight if possible to avoid any side wind loading which will cause diagonal slueing of the canopy.



3. Pull left-hand grip UP. Locks shoulder harness and releases arm rest.

4. Place feet firmly on foot rests and brace arms on arm rests.

5. Sit erect with head hard against head rest and chin tucked in.



**WARNING**

In order to avoid being strapped in the ejection seat with the oxygen hose, unclamp the hose from the shoulder harness before ejecting the seat.

6. Pull the seat trigger up using the internal canopy jettison control as a support.

7. After seat has been ejected, release safety harness and kick away from the seat as soon as possible.

8. Delay opening parachute as long as altitude will permit to allow seat to clear parachute canopy and reduce parachute opening shock.

*Figure 3—6. Bail-out Procedure*

their last reading for a short period of time. The above instruments will return to normal operation when the instrument power switch is placed in the ALT position.

### GENERATOR FAILURE.

If generator fails as indicated by over voltage light check following:

1. Place generator switch in RESET position for a few seconds. Light should go out.

2. If light remains on, position generator switch to OFF .

3. Turn off all electrical equipment possible to conserve battery for necessary electrical operations.

**Note**

See figure 1—12 for equipment that will be inoperative with generator failure.

4. Turn instrument power switch to ALT.

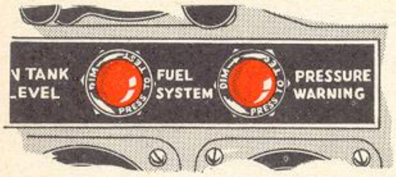
5. Pull the right and left wing tank pump circuit breakers when the wing tank pressure light goes ON.

6. Pull the forward tank pump circuit breaker when the forward fuel level indicator shows EMPTY.

# FUEL SYSTEM

Fuel system failure is indicated by premature illumination of the wing tank pressure warning light, the illumination of the fuel pressure warning light or a low reading on the fuel pressure gage. Refer to paragraph on engine failure for a discussion on these lights.

## MAIN TANK BOOSTER PUMP FAILURE



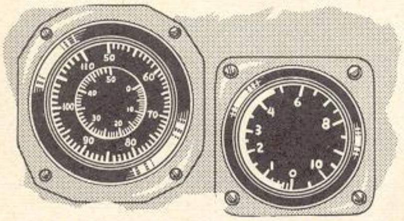
Main tank booster pump failure is indicated by illumination of the fuel pressure warning light.

1. Turn fuel tank selector to WING AUX until the first flicker or flash of the wing tank pressure warning light then turn to FWD AUX immediately to avoid possible flame-out.

NOTE

Main tank booster pump failure may not cause an rpm drop under ordinary conditions below 6,000 feet altitude, as the fuel in the main tank can be recovered by direct suction of the engine driven fuel pump.

## ENGINE DRIVEN FUEL PUMP FAILURE



Engine driven fuel pump failure is indicated by a drop in fuel pressure and loss of power.

1. If fuel pressure warning light is OFF turn emergency fuel switch ON, leave fuel tank selector at ALL TANKS.

CAUTION

The emergency fuel control does not incorporate features of the main fuel control which prevent overspeed and limit acceleration and deceleration to safe rates. Therefore, the throttle must be carefully manipulated so that extreme tail pipe temperatures, flame-outs, or overspeeds do not occur while operating on the emergency fuel system.

## ENGINE DRIVEN FUEL PUMP AND MAIN TANK BOOSTER PUMP FAILURE

If main tank booster pump fails, indicated by illumination of the fuel pressure warning light, and the engine driven fuel pump fails, indicated by a loss of fuel pressure and power, occur simultaneously, continue operation as follows:

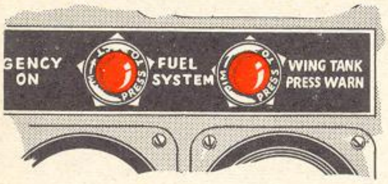
1. Turn emergency fuel switch to ON (FLIGHT EMERG).

2. Turn fuel tank selector to WING AUX until first flicker or flash of the wing pump pressure warning light.

3. Then turn fuel tank selector to FWD AUX.

4. Land as soon as possible.

## WING TANK BOOSTER PUMP FAILURE

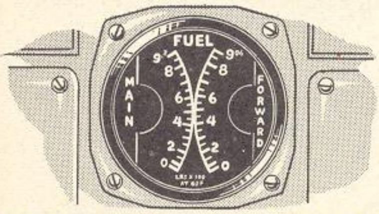


Wing tank booster pump failure in one or both tanks is indicated by a premature light-on condition of the wing pump pressure warning light. Fuel in the wing tank with the inoperative booster pump will not be transferred to the main tank. Although the engine can be operated without booster pump pressure up to an altitude of approximately 6,000 or 20,000 feet depending on the fuel used, fuel remaining in one wing tank cannot be recovered if the other wing tank is empty as the engine driven pump will suck air from the empty tank.

NOTE

To prevent external fuel from transferring to the wing tanks, position the L. WING and R. WING fuel tank battle damage switches to the VALVE CLOSED position.

## FORWARD TANK BOOSTER PUMP FAILURE



Forward tank booster pump failure is indicated if the forward tank fuel level indicator shows that there is no fuel flow from the forward tank. Fuel in the forward tank can be recovered up to an altitude of approximately 6,000 or 20,000 feet depending on the fuel used, by operating with the fuel tank selector in the FWD AUX position until the fuel level indicator shows the forward tank to be empty.

NOTE

To prevent external fuel from transferring to the forward tank, position the FWD fuel tank battle damage switch to the VALVE CLOSED position.

## ELECTRICAL FAILURE COMPLETE FAILURE

If the electrical failure is complete the booster pumps and fuel system indicators will not operate. The wing tip and pylon tank air pressure solenoid valves will assume the closed position making external fuel unavailable. At altitudes below 6,000 feet, full engine rpm may be maintained with a failed booster pump under all conditions. Satisfactory reduced power engine operation may result up to 20,000 feet if operating on JP-1 fuel, on cool JP-3 or cool gasoline. Operate fuel system as follows:

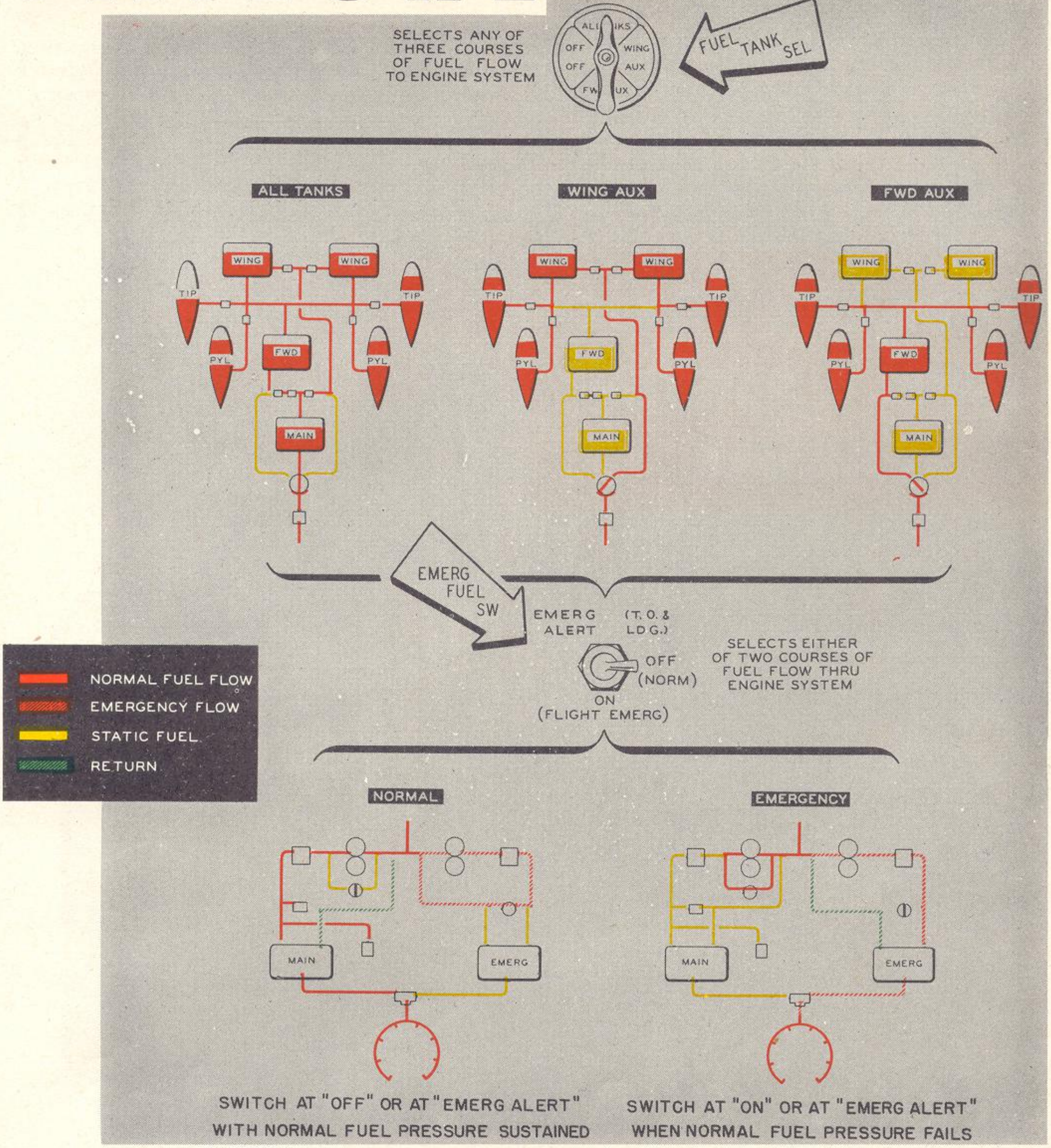
1. Operate with the fuel tank selector on WING AUX until wing tank fuel is used, indicated by a drop in rpm.

2. Turn fuel tank selector to FWD AUX. RPM will return to normal. Continue to operate in FWD AUX until rpm drops.

3. Turn fuel tank selector to ALL TANKS for remainder of fuel in the main tank.

*Figure 3—7. Fuel System Failure (Sheet 1 of 2)*

# FAILURE



### CAUTION

With complete electrical failure, fuel warning lights or indicators are inoperative and fuel consumption from the fuel tanks will have to be estimated. Fuel in the wing tip and pylon tanks cannot be recovered because the solenoid operated air valve will be closed. Land as soon as possible.

### GENERATOR FAILURE

In the event of generator failure only, the booster pumps and indicators will operate and fuel system operation will be normal.

1. Pull circuit breakers in all pumps which are not essential so as to conserve the battery.

*Figure 3—7. Fuel System Failure (Sheet 2 of 2)*

### COMPLETE ELECTRICAL FAILURE.

In the event of complete electrical failure, all indicators and warning systems will be inoperative. Trim tabs and aileron boost ratio will remain at their last setting, the speed brake will not operate, but landing flaps and landing gear will operate normally. Fuel tank booster pumps will not operate, but fuel except from the wing tip and pylon tanks will be recoverable at reduced altitudes. All external stores except the jato units, bombs or pylon tanks can be jettisoned. The canopy can be jettisoned since it has its own 4.5 volt jettison battery.

## FLIGHT CONTROL SYSTEM FAILURE.

### AILERON BOOST SYSTEM FAILURE.

### HYDRAULIC FAILURE.

If hydraulic system fails or if undue binding occurs in stick operation or stick "freezes," disengage the aileron boost system by pulling up the aileron boost disconnect.

**WARNING**

A roll tendency with the landing gear or wing

# HYDRAULIC POWER SUPPLY SYSTEM FAILURE

Hydraulic system failure will be noted by the loss of pressure on the hydraulic pressure gage or by failure of the aileron boost system. If hydraulic failure occurs proceed as follows:

1. Aileron boost disconnect DISENGAGE to prevent pressure achieved from the hydraulic hand pump from leaking back to the reservoir.
2. Extend landing gear (See Landing Gear System Failure) before using any other system so that there will be sufficient hydraulic fluid for nose wheel extension (Airplanes prior to F-84G-10RE).
3. Check landing gear selector NEUT.
4. Check landing flap NEUT.
5. Check hydraulic hand pump selector in SYSTEM (Airplanes prior to F-84G-10RE).
6. Move desired hydraulic selector to desired position.
7. Pull out handle of hydraulic hand pump, rotate it 90 degrees and move aft about ¼ inch, then operate pump.

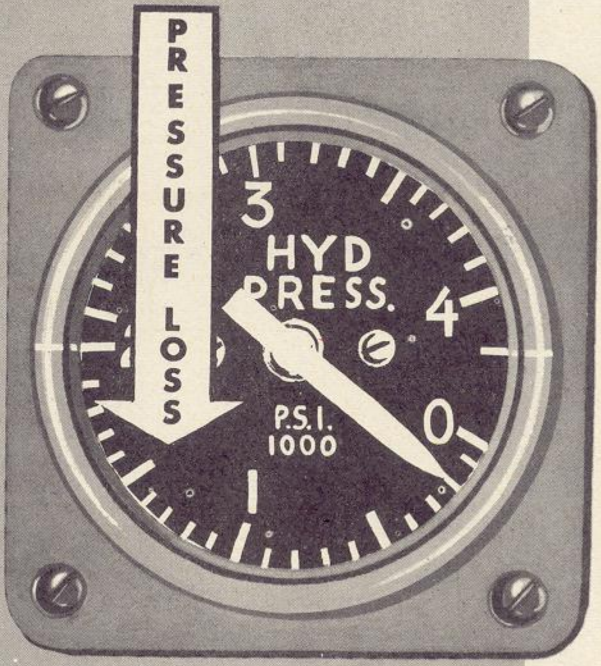


*Figure 3–8. Hydraulic Power Supply System Failure*

# LANDING GEAR SYSTEM FAILURE

**CAUTION**

Do not operate the hydraulic hand pump after the NOSE SAFE green light illuminates, on airplanes prior to F-84G-10RE, with the hydraulic hand pump selector in the NOSE WHEEL position as hydraulic pressure in the system may become high enough to prevent returning the hydraulic hand pump selector to the SYSTEM position and thereby prevent lowering of the flaps or speed brake.

If landing gear will not extend, indicated by position indicator lights, warning horn or low hydraulic pressure proceed as follows:

**1.**

Place the landing gear selector in the DOWN position.

**2.**

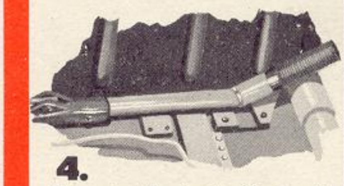
Pull the landing gear emergency uplock release all the way aft, then yaw the airplane to lock main gear as indicated by the landing gear position lights. This also extends the nose wheel on F-84G-10RE and subsequent airplanes.

**3.**

Move the hydraulic hand pump selector to the NOSE WHEEL position (Airplanes prior to F-84G-10RE).

**Note**

If possible, have the tower operator, or your wingman check to see that the nose wheel has extended out of the wheel well before moving the hand pump selector to the NOSE WHEEL position. This will assure you that the uplock has released before applying hydraulic pressure.



**4.**

Operate the hydraulic hand pump until the NOSE SAFE green light illuminates (Airplanes prior to F-84G-10RE).

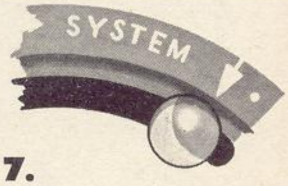
**5.**

Return landing gear selector to NEUT.

**6.**

**CAUTION**

Do not return landing gear selector to NEUT until landing gear position indicator lights show the main and nose gear to be down and locked.



**7.**

Return hydraulic hand pump selector to SYSTEM position (Airplanes prior to F-84G-10RE).

*Figure 3–9. Landing Gear System Failure* flaps extended may not necessarily indicate aileron boost failure, therefore, do not disconnect aileron boost. First, retract gear and flaps. If this does not correct roll, and if there is an indication of an unbalanced fuel load condition, drop all external load. If the roll tendency is still felt, climb to above 12,000 feet, reduce airspeed to approximately 20 percent above stall speed and disconnect aileron boost.

### ELECTRICAL FAILURE.

In cases of electrical failure the aileron boost ratio cannot be changed and will remain at last setting.

### TRIM TABS.

In the event of complete electrical failure the trim tabs will remain at their last setting. In event of generator failure only, trim tabs may be set in the normal manner.

## LANDING FLAPS SYSTEM FAILURE.

### HYDRAULIC FAILURE.

**WARNING**

To insure sufficient supply of hydraulic fluid for nose wheel extension on airplanes prior to F-84G-10RE, extend the landing gear before using any other system.

1. Check landing gear selector in NEUT to avoid pumping fluid into landing gear system.
2. Aileron boost disconnect in DISENGAGE to avoid pumping fluid into aileron boost system.
3. Place landing flap control in DOWN position.
4. Place the hydraulic hand pump selector in SYSTEM position. (on airplanes prior to F-84G-10RE.)
5. Operate the hydraulic hand pump until the flaps are in the desired position as indicated on the landing flap position indicator.

**Note**

Approximately 75 cycles (fore and aft strokes) of the hand pump are required to lower both the landing flaps and the speed brake. To lower either the landing flaps or speed brake separately approximately 38 strokes are required.

6. Return landing flap control to NEUT.

### ELECTRICAL FAILURE.

The landing flap position indicator will be inoperative in cases of electrical failure.

## SPEED BRAKE FAILURE.

### HYDRAULIC FAILURE.

1. Aileron boost disconnect DISENGAGE.
2. Check landing gear selector NEUT.
3. Check landing flap control NEUT.
4. Hydraulic hand pump selector SYSTEM. (Airplanes prior to F-84G-10RE)
5. Speed brake switch to desired position.
6. Operate hydraulic hand pump.

### ELECTRICAL FAILURE.

The speed brake is inoperative in event of complete electrical power failure but may be operated in the normal manner with generator failure only.

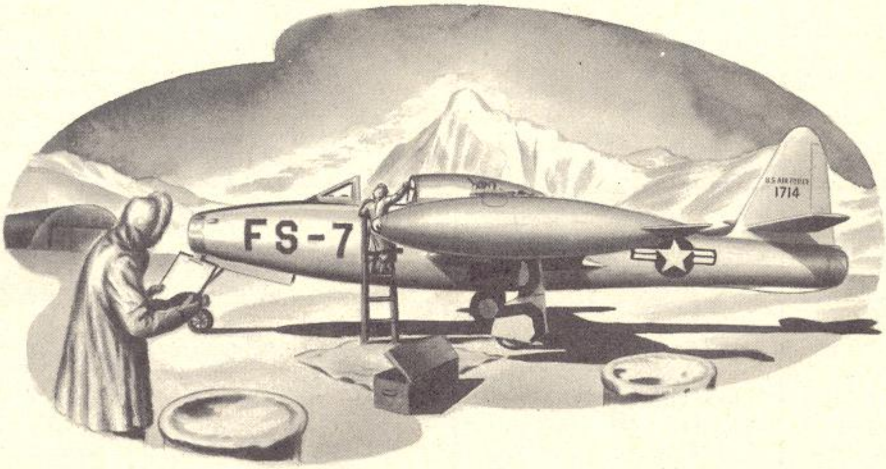
## LANDING GEAR SYSTEM FAILURE.

### HYDRAULIC FAILURE.

See figure 3–9.

### ELECTRICAL FAILURE.

No indicator lights or horn will be available to indicate an unlocked gear.



# Section IV
# DESCRIPTION and OPERATION of AUXILIARY EQUIPMENT

## HEATING, PRESSURIZING AND VENTILATING SYSTEM.

Pressurization, heating and ventilating are combined into an air conditioning system (figure 4–3). When the canopy is closed the cabin is sealed by an automatically inflated rubber seal. Air for pressurization, heating, ventilating and canopy seal inflation is obtained from the engine compressor. Cabin temperature is controlled by diverting a portion of the hot air from the engine compressor through the turbo-refrigerator, for cooling before it enters the cabin. Air enters the cabin through two side air outlets, two foot registers and a register behind the pilot's seat. Pressurization is maintained automatically by the pressure regulator which releases air from the cabin through a variable opening designed to maintain the proper pressure differential and rate of change of cabin air. From sea level to 10,000 feet altitude the cabin is unpressurized; from 10,000 feet to 18,000 feet cabin pressure remains equivalent to atmospheric pressure at 10,000 feet; above 18,000 feet a constant pressure differential of 2.75 psi is maintained between the cabin and outside atmosphere. The cabin altimeter (10, figure 1–18) indicates the equivalent cabin altitude. The pressure relief, vacuum relief and dump valve operates automatically to relieve excessive cabin pressure and can also be opened to dump cabin pressure if necessary. Outside ventilating air is available to the cabin only if pressurization is shut off.

### COCKPIT HEAT AND VENT SWITCH.

The cockpit heat and vent switch (figure 4–1) located on the right console has two positions: RAM and PRESSURE. The RAM position closes the flow mixing valve, shutting off all pressurized air to the cabin (except the defroster line), and opens the ram inlet electrical actuator and dump valves allowing a flow of ram air through the cabin. In the PRESSURE position the ram inlet and dump valves close and the flow mixing valve electrical actuator modulates to maintain the temperature called for by the cabin temperature control. The pressure control switch is normally left in the PRESSURE position.

### CABIN TEMPERATURE CONTROL.

The cabin temperature control (figure 4–1) located on the right console is a rotary switch having three positions: OFF-MANUAL DECREASE, AUTOMATIC and OFF-MANUAL INCREASE. With the control switch in the AUTOMATIC range and the heat and vent switch in the PRESSURE position the cabin heating system will automatically provide temperature controlled air to maintain the selected temperature in the cabin. This automatic range is approximately 40° to 90°F. The OFF-MANUAL DECREASE position or OFF-MANUAL INCREASE position will turn the automatic temperature control off. The MANUAL DECREASE and MANUAL INCREASE positions are spring-loaded and when held on will override the automatic control. If a temperature lower or higher than the automatic range is desired, turn control to either MANUAL DECREASE or MANUAL INCREASE momentarily. The MANUAL DECREASE position will lower the cabin temperature by moving the flow mixing valve to provide colder air, and the MANUAL INCREASE position will increase cabin temperature by moving mixing valve to provide hot air. The flow mixing valve will remain in the last setting until the tem-

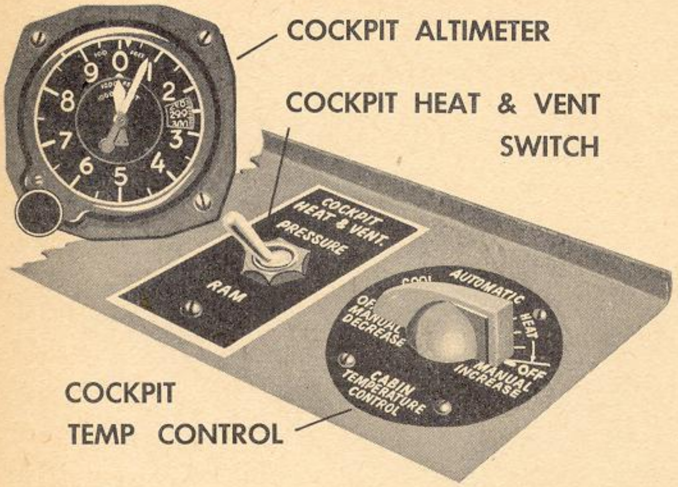


*Figure 4—1. Cabin Heating and Pressurizing Controls*

perature control is returned to AUTOMATIC. Since only 2-1/2 seconds is required to move the flow mixing valve from its full cold setting to its full hot setting the temperature control should be held in the manual positions momentarily.

**Note**

> To prevent temperature surges in the cabin, the temperature control should be moved only 10% of its range at a time, allowing the temperature to stabilize before moving another 10%.

### SIDE AIR OUTLET SHUT-OFF.

A side air outlet shut-off valve (39, figure 1—17 and 14, figure 1—18) is located on each side of the cabin. The quantity of hot air going into the cabin through these outlets may be varied by sliding the shut-off valve over the outlets.

## ANTI-ICING AND DE-ICING SYSTEMS.

### WINDSHIELD DEFROSTING SYSTEM.

Hot air is supplied from the engine compressor to a defroster tubing assembly clamped to the windshield frame. The windshield defroster is available whenever the engine is running regardless of the position of heat and vent switch.

### DEFROSTER CONTROL.

The defroster control (20, figure 1—18) is a manually operated shut-off valve having an ON and OFF position. The ON position supplies hot air to the windshield defroster.

### PITOT HEATER.

The pitot tube, installed in the duct divider in the nose air intake, is electrically heated.

#### PITOT HEATER SWITCH.

The pitot heater switch (19, figure 1—17) has two positions; OFF and PITOT HEATER. The PITOT HEATER position heats the pitot tube to keep it free from ice.

### FUEL FILTER DE-ICING SYSTEM.

A fuel filter de-icing system (figure 4—4) consisting of an alcohol tank, a solenoid shut-off valve, an electrically driven pump, a differential pressure switch and a warning light is installed to remove ice that may collect in the low pressure fuel filter. Automatic or manual operation may be selected. The alcohol supply is sufficient for approximately two minutes and 20 seconds of continuous injection. Specifications of the de-icing fluid is noted in the servicing diagram.

#### FUEL FILTER DE-ICING SWITCH.

The fuel filter de-icing switch (figure 4—2) located on the left console is a toggle switch having three positions: AUTO, OFF and MAN. In the AUTO position the injection of alcohol starts automatically at the predetermined pressure drop across the low pressure fuel filter and ceases as soon as the pressure drop across the fuel filter returns to normal. In the MAN position a continuous flow of alcohol is injected into the fuel filter. The MAN position is used in the event of failure of the AUTO system.

**Note**

> If the fuel filter de-icing switch is turned on with the throttle closed and the fuel tank selector in the OFF position, the alcohol will build up enough pressure in the fuel line to prevent turning the fuel tank selector to any other position.

#### FUEL FILTER ICE WARNING LIGHT.

The fuel filter ice warning light (figure 4—2) located on the left console is a red light marked ICE WARN. The ICE WARN light will illuminate automatically when the fuel pressure drop across the low pressure fuel filter is indicative of icing and go out when the pressure returns to normal.

**CAUTION**

> When the ICE WARN light is out or when the alcohol supply has been depleted the fuel filter de-icing switch should be in the OFF position to prevent damage to the alcohol pump.

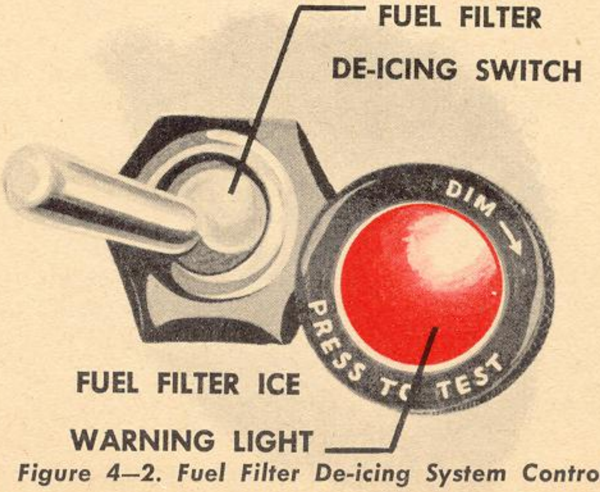
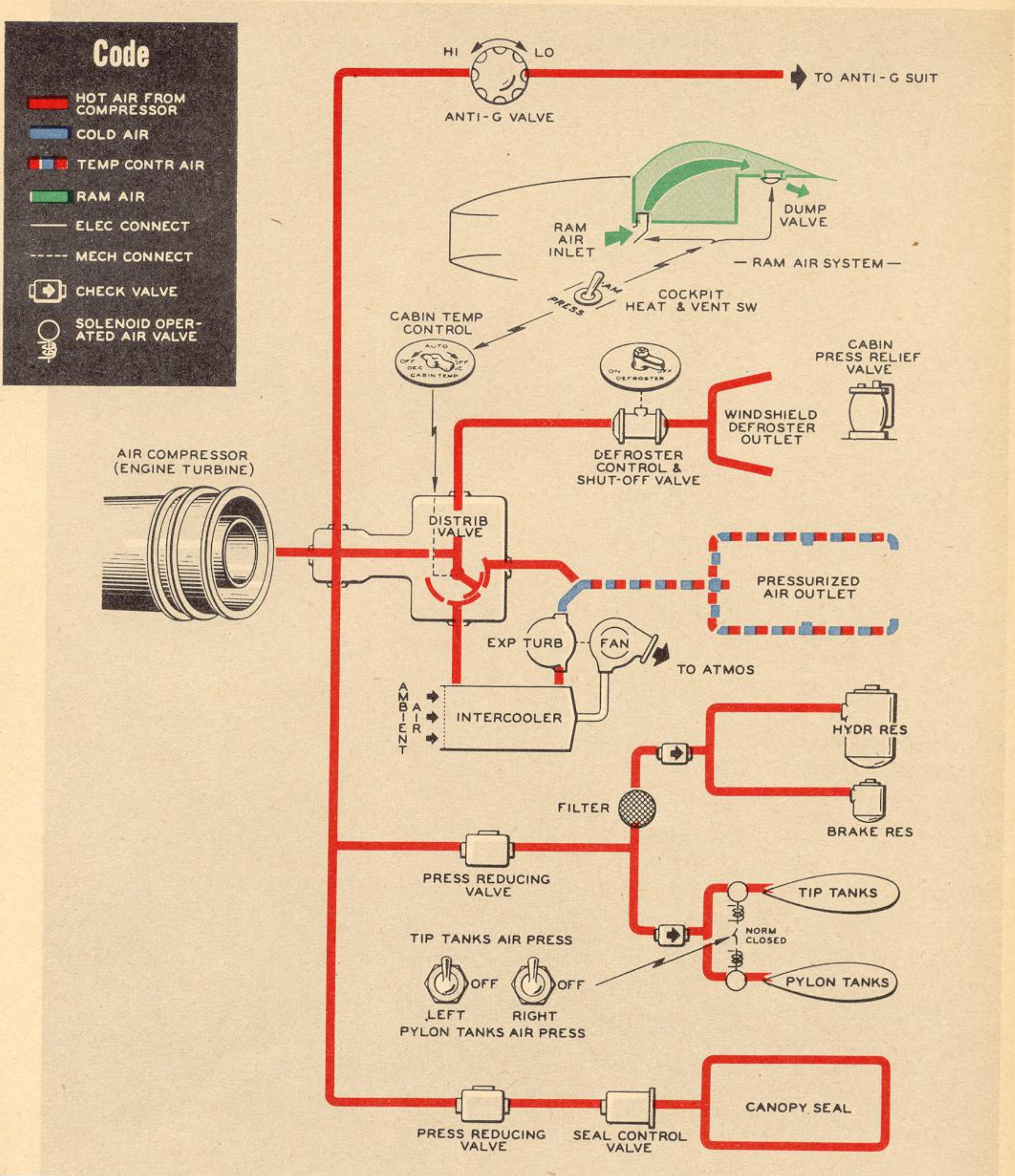


*Figure 4—2. Fuel Filter De-icing System Controls*



# HEATING, PRESSURIZING AND VENTILATING SYSTEM *Schematic*

*Figure 4—3. Heating, Pressurizing and Ventilating System — Schematic*

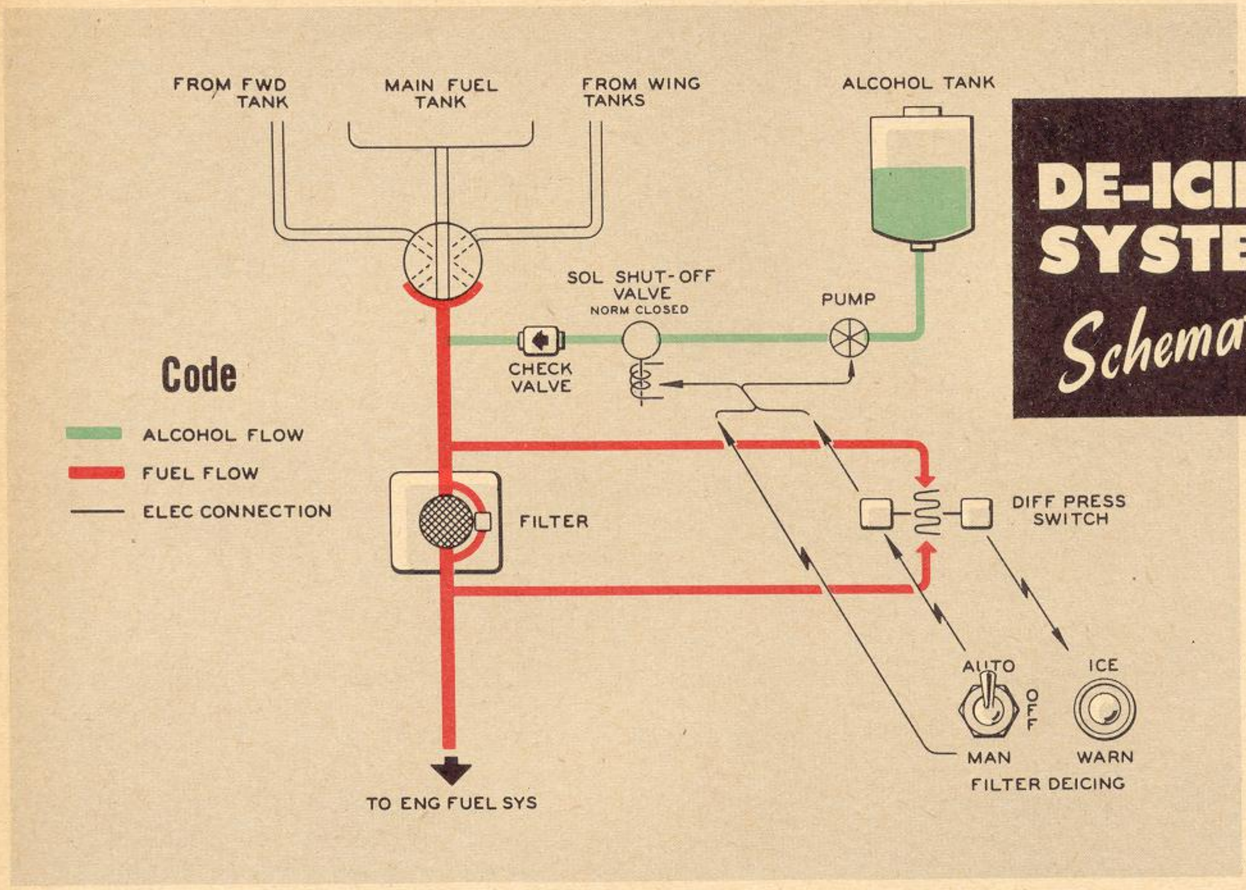


*Figure 4—4. Fuel Filter De-icing System — Schematic*

## COMMUNICATION AND ASSOCIATED ELECTRONIC EQUIPMENT.

Communication equipment includes a command set, an IFF identification set and a radio compass (see figure 4—5). All radios are remotely controlled from the right console. Each set is described individually in the following paragraphs.

**Note**

Provisions are made for the installation of an AN/ARC-33 Command Radio in F-84G-5RE and subsequent airplanes. These radios are not available, therefore, the AN/ARC-3 Command Radio is installed until the AN/ARC-33 becomes available. Due to space limitations the AN/APX-6 IFF set must be removed when the AN/ARC-3 radio is installed but will be reinstalled along with the AN/ARC-33 radio.

### OPERATION OF COMMUNICATION EQUIPMENT.

Insert microphone plug and headset plug into two extensions on the front of the pilot's seat. The airplane's battery switch must be ON or an external power supply connected to the airplane for radio operation.

**Note**

The AN/ARC-3 or AN/ARC-33 Command Set and the AN/ARN-6 radio compass will operate from the airplane's batteries as power is supplied to these sets from the primary bus. The AN/APX-6 IFF Radio Set will not operate unless the generator is operating or an external power supply is connected to the No. 1 external power receptacle, as the power for this set is supplied from the secondary bus.

### COMMAND SET — AN/ARC-3.

Radio Set AN/ARC-3 is an airborne receiving and transmitting equipment designed to provide VOICE and MCW communication from plane to plane or from plane to ground. There are eight channels, "A" to "H" inclusive, for operation in a frequency range of 100 to 156 megacycles. Remote control of the equipment is accomplished with a control panel (figure 4—5) installed on the right console.

STARTING.

1. Place the on-off switch on the control panel ON.
2. Set the channel selector switch on the control panel to the desired channel, "A" through "H".

**CAUTION**

Do not change position of channel selector switch or turn equipment OFF while set is cycling to prevent damage to the cycling mechanism.

## COMMUNICATION AND ASSOCIATED ELECTRONIC EQUIPMENT

| *TYPE* | *DESIGNATION* | *FUNCTION* | *RANGE* | *LOCATION OF CONTROLS* |
|---|---|---|---|---|
| **COMMAND SET** | AN/ARC-3 up to G-5RE. AN/ARC-3 or AN/ARC-33 G-5RE and up. | Two-way voice communication | 30 miles at 1000 ft. altitude to 135 miles at 10,000 ft. altitude | R. H. Console (27, figure 1-18) |
| **IFF SET** | AN/APX-6 | Automatic Identification | 100 miles up to 50,000 ft. altitude | R. H. Console (26, figure 1-18) |
| **RADIO COMPASS** | AN/ARN-6 | Radio Navigation | 250 miles | R. H. Console (28, figure 1-18) |

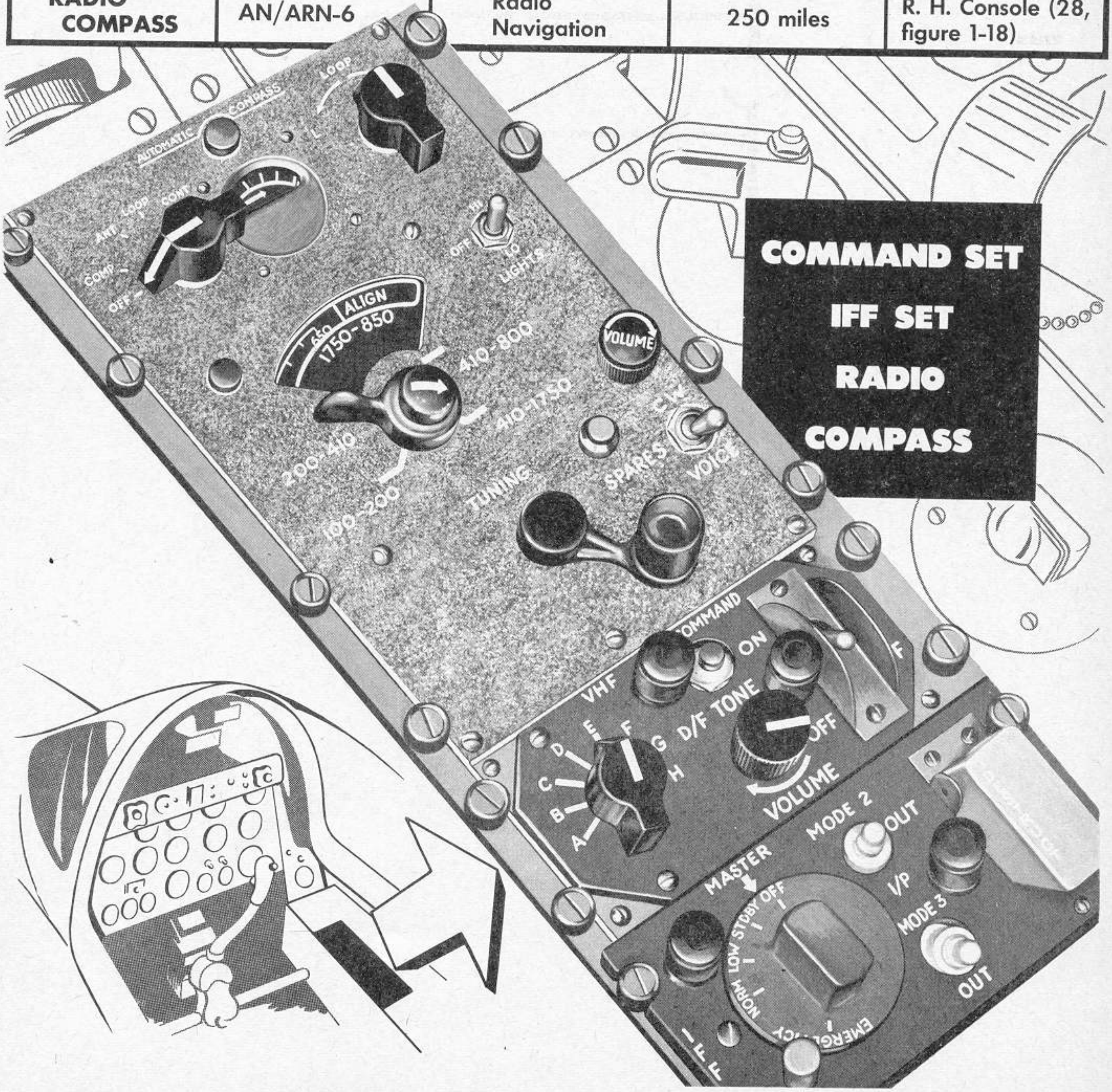


*Figure 4—5. Communications and Associated Equipment Controls*

OPERATION.

1. Allow 30 to 45 seconds for the tubes in the equipment to reach normal operating temperature. During the latter portion of this period an audio tone will be heard in the headset. When this tone stops, the receiver and transmitter have been tuned to the selected channel and reception should then be possible. The receiver will continuously monitor the channel indicated except during periods of transmission.

2. Adjust the audio level fed to the headset by setting the VOLUME control on the control panel.

3. To transmit, press the microphone press-to-talk switch located on top of the throttle control. An additional press-to-talk switch is located on the control stick grip.

4. For "MCW" operaion use the "D/F TONE" button on the control panel.

STOPPING.

1. Place the ON-OFF switch, on the control panel, in the OFF position.

**CAUTION**

When radio set AN/ARC-3 has been turned off, do not turn the set ON for at least one minute in order to allow the tuning motor to stop.

**RADIO SET AN/ARC-33.** **C, D, E, F**

Radio Set AN/ARC-33 is a remote controlled receiver-transmitter designed to operate in the 225 to 399.9 mc band. A total of 1750 crystal controlled receive and transmit channels are provided within tuning range of the set. Any 20 of these channels may be preset at the radio set control unit so as to be quickly available when desired. Because of the nature of the operating frequencies employed, communication is essentially over line-of-sight distances with a practical maximum of approximately 75 miles. The radio set is designed to operate at altitudes as high as 50,000 feet. A guard channel receiver is incorporated which may be placed in operation along with the main channel receiver, thus making it possible to continually monitor an emergency or command channel while still carrying on communication on another channel. During the warm-up period of approximately 30 seconds and for approximately three to six seconds when changing channels a tone is heard in the head set to indicate to the operator that the set is not ready for operation.

STARTING.

1. Place the on-off switch on the control panel in the ON position. Allow approximately 30 seconds for warm-up.

2. Rotate the channel selector control knob until the respective number for the desired channel appears in the window above the knob.

**Note**

The tuning drive motor is protected by a thermal time delay cut-out which opens the motor circuit after approximately one minute of continuous tuning. Therefore, if the tuning motor is unable to come to rest because of some fault in the equipment or because of constant rotation of the channel selector control the tuning motor circuit is automatically broken after approximately 30 seconds. The motor circuit may be reset by selecting a new channel then returning to the original channel.

3. Listen for the tone in the headset. Make no attempt to receive or transmit while the tone is heard.

4. Place the function switch to the MAIN, BOTH or G position depending on the operation desired.

5. Adjust the volume control for a comfortable level in the headset.

STOPPING.

1. Place the on-off switch on the control panel in the OFF position.

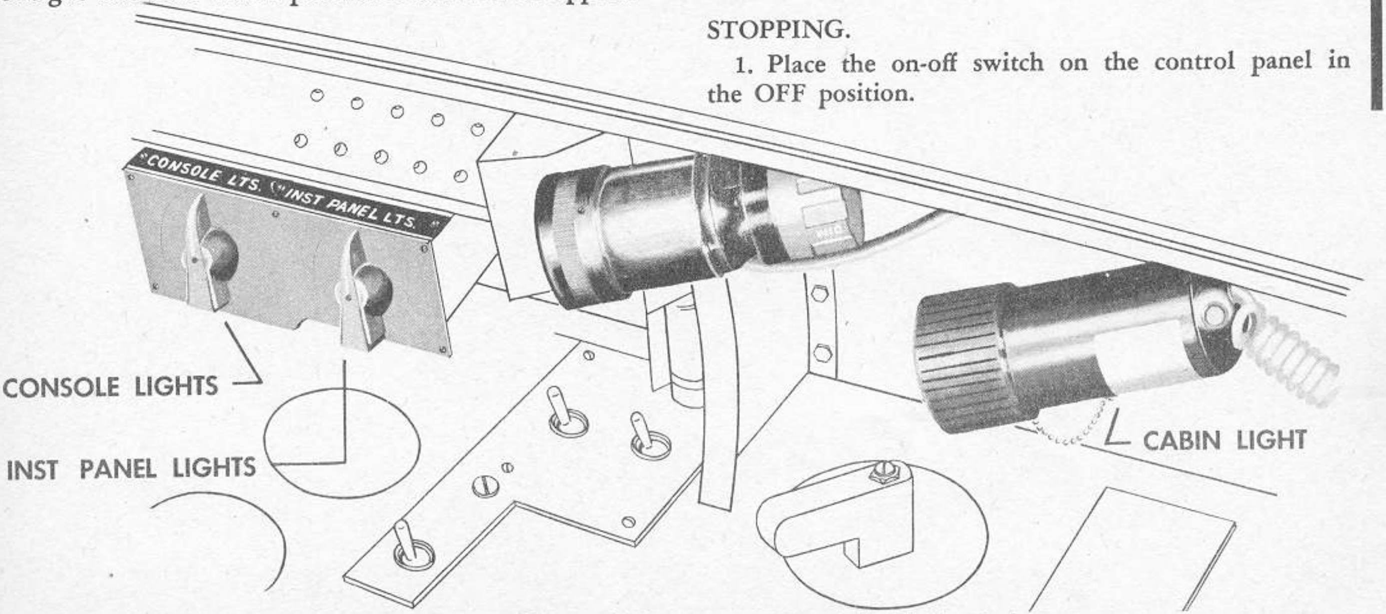


*Figure 4—6. Cabin and Instrument Panel Light Controls*

### RADIO SET AN/APX-6.

The purpose of this set is to enable the aircraft in which it is installed to identify itself, automatically, as friendly, whenever it is properly challenged by suitably equipped friendly surface and airborne radars.

**CAUTION**

> Before take-off make sure that AN/APX-6 IFF frequency counters have been set to the proper frequency channels, and the three destructors have been inserted in the face of the IFF transponder.

STARTING.

1. Rotate the master control to NORM position unless instructed otherwise.

**Note**

> The AN/APX-6 set will be inoperative in the event of generator failure as power is supplied from the secondary bus.

2. Set mode 2 and mode 3 control as instructed.

STOPPING.

1. Rotate the master control to the OFF position.

**Note**

> If the destruct control was operated during the flight, report this fact immediately upon landing so that a new receiver-transmitter may be installed.

### RADIO COMPASS — AN/ARN-6.

The radio compass AN/ARN-6 is an airborne navigational instrument. There are four bands covering a frequency range of 100 to 1750 kilocycles. The radio compass is controlled from a control panel (figure 4—5) located on the right console. The radio compass is capable of providing the following:

1. Automatic visual bearing indication of the direction of arrival of r-f energy and simultaneous aural reception of modulated r-f energy.
2. Aural reception of modulated r-f energy, using a non-directional antenna.
3. Aural-null directional indicators of the arrival of modulated r-f energy using a loop antenna.

**Note**

> Canopy must be closed to complete radio compass circuit.

STARTING.

1. Turn the function switch to COMP, ANT or LOOP position.

**Note**

> The function switch position marked CONT on the control panel is not used on this installation.

STOPPING.

1. Rotate function switch to OFF.

## LIGHTING EQUIPMENT.

### INSTRUMENT PANEL LIGHTS.

The instrument panel lights are of two types, fluorescent for night flying and incandescent for day operation. The two incandescent lights, one on each side of the cabin, are controlled by a rheostat switch (figure 4—6). The two fluorescent lights, (35 figure 1—17 and 18, figure 1—18) are controlled by individual rheostat switches at the rear of each light.

### CONSOLE LIGHTS.

Console lights are mounted on the right and left side of the fuselage and are directed to the respective console. The lights are controlled by a rheostat switch (figure 4—6).

### CABIN LIGHT.

A type C4A cabin light (figure 4—6) is mounted on the right side of the cabin. The light is provided with an extension cord and it may be removed from its mounting bracket to be used as a portable light. The light is controlled by a rheostat switch located on the light. The rheostat switch controls the intensity of the light for continuous illumination. A push-button type switch on the light may be used for intermittent light use. The light is equipped with a red filter which may be removed and the light used as a white spot light.

### LANDING LIGHTS.

One landing light is bracket mounted on each inboard landing gear door. A safety switch, operated by the closing of the landing gear door, will put the lights out after the landing gear has been retracted. The landing lights are controlled by an ON-OFF switch (3, figure 1—17) on the left console.

### TAXI LIGHTS.

A taxi light is a bracket-mounted on the nose wheel strut. The taxi light is controlled by an ON-OFF switch (16, figure 1—18) located on the right console.

### POSITION LIGHTS.

Red and green position lights are installed in the fore and aft corners of the wing tips. A white and yellow position light is installed on aft end of the fuselage, below the rudder. Provision is made for the fore and aft position lights on the wing tip tanks to be interconnected to the wing tip position lights. When the tip tanks are jettisoned the wing tip position lights will be switched on automatically. The position lights are controlled by a position lights switch (19, figure 1—18) having three positions: STEADY, OFF and FLASH. In the STEADY position the wing and tail lights will provide continuous illumination. In the FLASH position the wing and white tail lights will flash alternately with the yellow tail light. The intensity of the position lights is controlled by a DIM-BRIGHT switch (17, figure 1—18) adjacent to the position light switch.

## OXYGEN SYSTEM.

A combination high and low pressure oxygen system (figure 4–7) is installed in the aircraft. The system is supplied with four type A-6 low pressure and two high pressure oxygen cylinders. The four low pressure cylinders are installed above the battery in the battery well and one high pressure cylinder is located in each wing root between the front and rear spars. Aircraft Serial Nos. AF 51-692 through 51-1046 and 51-9623 through 51-9797 are provided with three filler valves, one for the low pressure cylinders and one each for the high pressure cylinders. In this system oxygen from each high pressure cylinder passes through a reducing valve and is then directed to the pressure demand regulator along with the supply from the low pressure cylinders. Aircraft Serial Nos. AF51-1047 through 51-1066 and 51-9798 through 51-9964 are provided with a single filler valve. The filler valve services the high pressure cylinders. Flow from these cylinders passes through a reducing valve and refills the low pressure cylinders. Supply to the demand regulator is taken directly from the low pressure system. A gage is provided in the cockpit to indicate the pressure in the high pressure system. On all aircraft a pressure breathing diluter demand oxygen regulator (figure 4–8) is located on the forward part of the right console. The regulator automatically supplies the proper mixture of cabin air and oxygen to the oxygen mask at all altitudes up to 30,000 feet cabin altitude.

**WARNING**

On aircraft equipped with the three point filler system there is no gage provided to indicate the pressure in the high pressure system. Before take-off be sure that the high pressure system has been refilled so that an adequate supply of oxygen is available in flight.

### REGULATOR DILUTER LEVER.

The diluter lever (figure 4–8) is provided so that the oxygen flow to the oxygen mask may be varied. In the NORMAL OXYGEN position oxygen and cabin air are automatically mixed so as to supply the proper mixture to the pilot. The ratio of oxygen and cabin air is dependent on cabin altitude. In the 100% OXYGEN position the cabin air inlet port is closed and pure oxygen is supplied to the pilot at any altitude.

### REGULATOR PRESSURE CONTROL KNOB.

The pressure control knob (figure 4–8) on the oxygen regulator is provided so that the oxygen pressure delivered to the oxygen mask may be varied. Below 30,000 feet cabin altitude, oxygen and cabin air are automatically mixed to supply the proper mixture to the pilot. Between 30,000 and 40,000 feet cabin altitude, oxygen is supplied at a pressure slightly above that of cabin air as a measure of protection against leakage of air into the oxygen mask. Above 40,000 feet cabin altitude the oxygen pressure supplied to the oxygen mask may be increased for various altitudes to assure against anoxia.

### PRESSURE GAGE.

On aircraft equipped with the three point filler system a pressure gage (figure 4–8) indicates the pressure being supplied to the demand regulator from either the high or low pressure systems. On aircraft equipped with the single point filler system this gage indicates pressure in the low pressure system. An additional gage, located above the right console, shows the pressure in the high pressure system.

### FLOW INDICATOR.

A flow indicator is located on the forward part of the right console (figure 4–8). The indicator will blink when oxygen is flowing through the regulator.

### NORMAL OPERATION.

The regulator diluter lever should be set at the NORMAL OXYGEN position. The pressure dial of the regulator should be set as follows:

1. For cabin altitudes below 30,000 feet, leave dial at NORMAL position.
2. For cabin altitudes between 30,000 and 40,000 feet, set the dial at SAFETY position.
3. For cabin altitudes above 40,000 feet, set the dial to the cabin altitude.

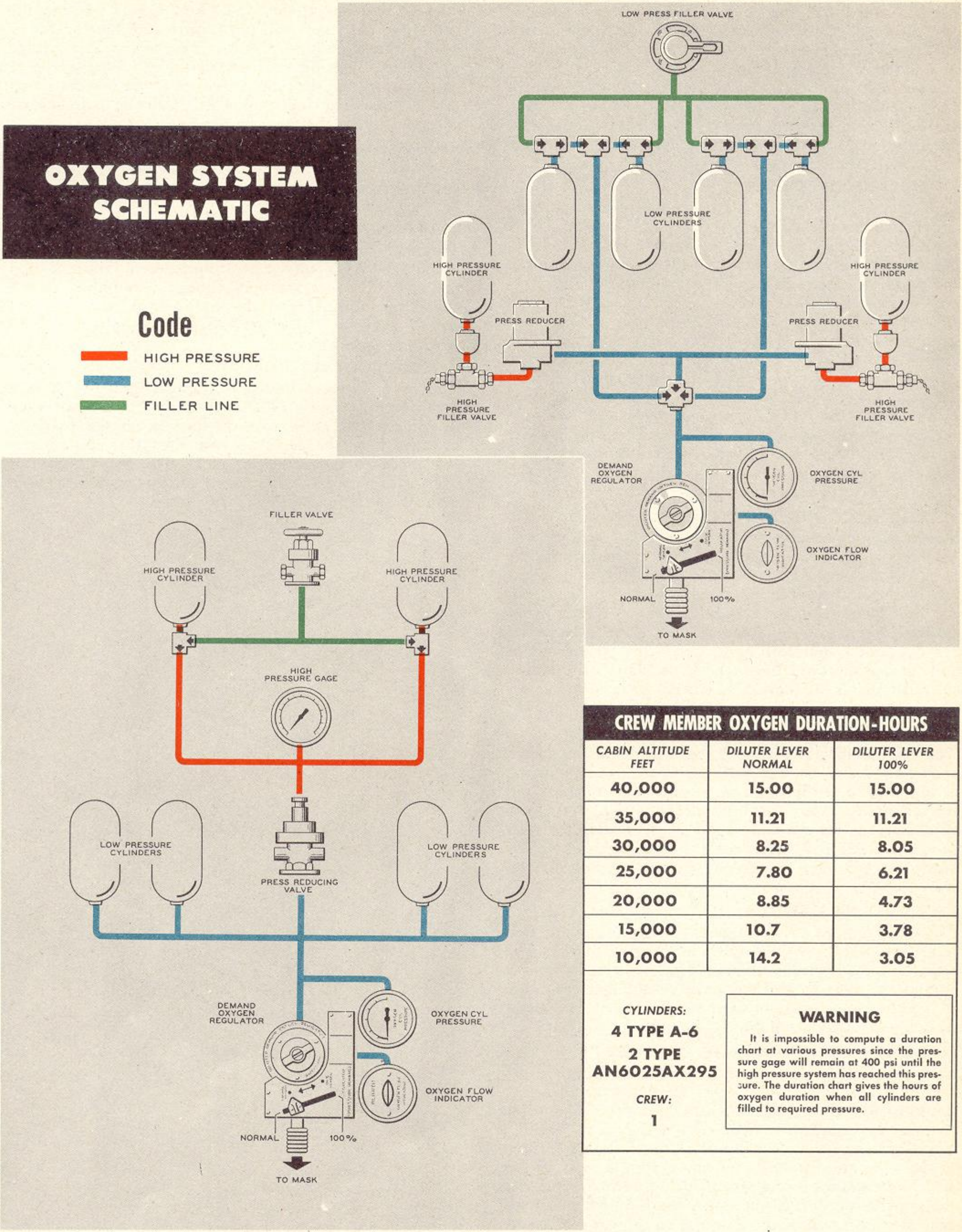
### EMERGENCY OPERATION.

1. With symptoms of the onset of anoxia, set the diluter lever to 100% OXYGEN.
2. In the event of accidental loss of cabin pressure, immediately turn the pressure dial of the regulator to ABOVE 45M position and tighten mask to hold pressure.
3. If the oxygen regulator should become inoperative, pull the cord of the H-2 emergency oxygen cylinder and descent to cabin altitude not requiring oxygen.

## INFLIGHT REFUELING SYSTEM.

The airplane is equipped with an inflight refueling system (figure 4–10) which enables the airplane to be refueled in the air from a tanker using a flying boom. The receiver is located in the left wing leading edge and is concealed by flush type doors which are hydraulically operated. During the refueling operation, the engine is operated with the fuel tank selector in the ALL TANKS position so that the engine is fed from the main tank. The forward, wing, wing tip and pylon tanks are filled during inflight refueling while the main is filled by transfer of fuel from the forward and wing tanks. Once the receiver doors in the wing are opened and the tanker's boom is inserted in the nozzle, refueling sequence is accomplished electrically through an amplifier which is powered from the primary bus. When the tanks are full, the fuel flow in the refueling lines is reduced to an amount equal to the engine consumption and the fuel pressure in the lines increases. These changes are

# OXYGEN SYSTEM SCHEMATIC



## CREW MEMBER OXYGEN DURATION-HOURS

| *CABIN ALTITUDE FEET* | *DILUTER LEVER NORMAL* | *DILUTER LEVER 100%* |
|---|---|---|
| 40,000 | 15.00 | 15.00 |
| 35,000 | 11.21 | 11.21 |
| 30,000 | 8.25 | 8.05 |
| 25,000 | 7.80 | 6.21 |
| 20,000 | 8.85 | 4.73 |
| 15,000 | 10.7 | 3.78 |
| 10,000 | 14.2 | 3.05 |

*CYLINDERS:*

**4 TYPE A-6**

**2 TYPE AN6025AX295**

*CREW:*

**1**

**WARNING**

It is impossible to compute a duration chart at various pressures since the pressure gage will remain at 400 psi until the high pressure system has reached this pressure. The duration chart gives the hours of oxygen duration when all cylinders are filled to required pressure.

*Figure 4—7. Oxygen System — Schematic and Duration Chart* noted in the tanker airplane and a disconnect is effected. An automatic disconnect will be accomplished if the fuel pressure is excessive in the refueling lines, if rough air causes excessive tension on the nozzle or by any uncontrolled or intentional change in flight attitude of the receiver airplane wherein a conical angle of 15° from the normal is exceeded. Provision is made so that the forward or wing tanks can be isolated, if damaged, from the refueling system.

### RECEIVER DOOR SWITCH.

The receiver door switch (figure 4–9) is a two position toggle switch marked OPEN and CLOSE. The OPEN position unlocks and opens the receiver doors hydraulically also supplies d-c power to the refueling amplifier which is an electronic device that sends and receives signals from the tanker to the receiver aircraft through the refueling boom. The OPEN position also repositions the external fuel tank check valves electrically so that they will allow fuel to flow into the tanks. The receiver door indicator light (figure 4–9) marked REC DOOR OPEN will illuminate when the receiver door is unlocked. The CLOSE position closes and locks the receiver doors, disconnects the power supply to the receiver amplifier, positions the external fuel tank check valves to allow fuel to flow from the tanks and extinguishes the receiver door indicator light.

### NOZZLE DISCONNECT SWITCH.

The nozzle disconnect switch (figure 4–9) is a push button switch spring loaded to the off position. The switch is depressed to NOZZLE DISCONN if it is desired to end the refueling cycle before the fuel tanks are full. Depressing the nozzle disconnect switch extinguishes the nozzle contact indicator light, illuminates the disconnect indicator light, causes the tanker pumps to shut down, closes the fuel valves, signals the tanker operator that a disconnect has been made and releases the refueling boom from the receiver nozzle.

### RESET SWITCH.

The reset switch (figure 4–9) is a push button switch spring loaded to the off position. If at any time during a refueling cycle the airplane becomes disconnected and the disconnect indicator light illuminates the airplane is made ready for refueling again by depressing the reset switch to RESET. The refueling system can also be made ready for refueling by closing then reopening the receiver doors.

### RECEIVER LIGHT SWITCH.

The receiver light switch (figure 4–9) is a toggle switch with two positions; OFF and RECEIVER LIGHT. The receiver light position illuminates a flood light on the side of the aircraft which illuminates the receiver doors to aid the boom operator in the tanker to make contact during operation at night.

### FUEL TANK BATTLE DAMAGE SWITCHES.

Three fuel tank battle damage switches (figure 4–9) are two position toggle switches marked with an arrow pointing up to VALVE CLOSED position. The three switches are marked L. WING, FWD and R. WING. These switches provide a means of controlling fuel flow to the wing and forward tanks by closing a valve at the fuel line entrance to the tank. During normal operation the switches are left in the down position, which allows fuel to transfer from the external to the wing and forward tanks and also allows all tanks to be refueled from the refueling receptacle. By placing the fuel tank battle damage switches in the VALVE CLOSED position the respective fuel tank will not receive fuel by transfer or during the refueling operation. This system is provided to isolate the wing or forward tanks in the event of battle damage to the tank or failure of the booster pump in the tank. The fuel tank battle damage switches are energized from the primary bus.

### RECEIVER DOOR INDICATOR.

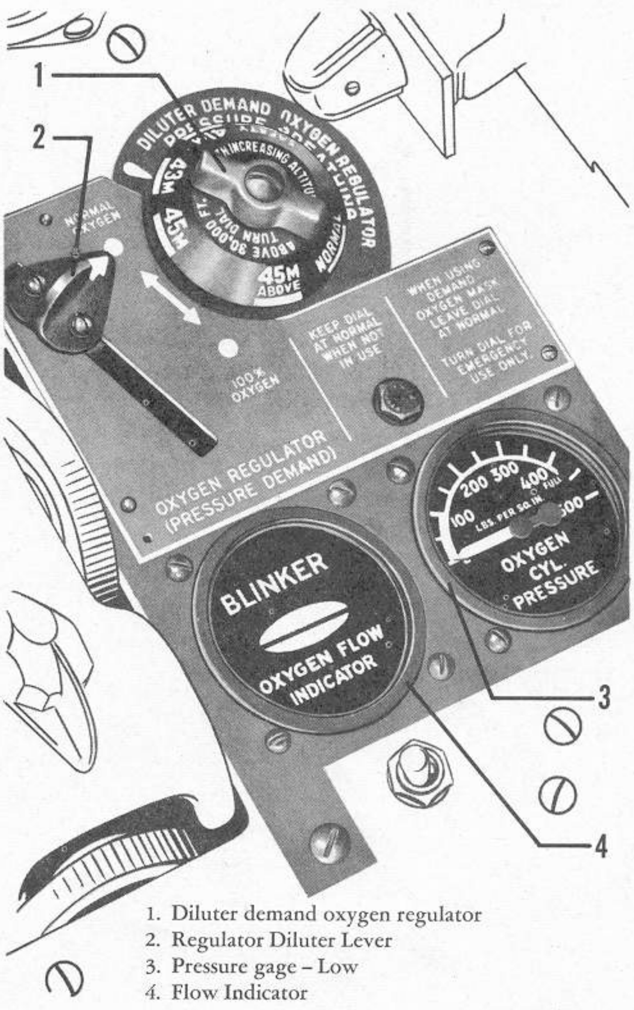
The receiver door indicator light (figure 4–9) illuminates when the receiver door is unlocked and is marked REC DOOR OPEN.

### READY INDICATOR.

The ready indicator light (figure 4–9) is a blue light marked READY and when illuminated indicates that the receiver doors are open, power is supplied to the refueling amplifier and the amplifier is ready for the refueling cycle. The ready indicator light will go out when contact is made.

### NOZZLE CONTACT INDICATOR.

The nozzle contact indicator light (figure 4–9) is a green light marked NOZZLE CONTACT and when illuminated indicates that the nozzle on the boom is inserted into the receiver and that the amplifier is sequenced to the refueling cycle. The ready indicator light will go out and the nozzle disconnect system, both manual and automatic, will be armed.



1. Diluter demand oxygen regulator
2. Regulator Diluter Lever
3. Pressure gage – Low
4. Flow Indicator

*Figure 4–8. Oxygen System Controls*

1. Disconnect Indicator
2. Reset Switch
3. Receiver Light Switch
4. Nozzle Disconnect Switch
5. Ready Indicator
6. Nozzle Contact Indicator
7. Receiver Door Switch
8. Receiver Door Indicator
9. Fuel Tank Battle Damage Switches

*Figure 4—9. Inflight Refueling Controls*

### DISCONNECT INDICATOR.

The disconnect indicator (figure 4—9) is an amber light marked DISCONN. Illumination indicates the tanker's fuel pumps are shut down, the tanker's fuel valves are closed and that the boom nozzle has been disconnected from the receiver. If the disconnect indicator is illuminated the reset switch must be depressed or the receiver doors closed and reopened before the refueling system will be ready to make another refueling cycle.

### INFLIGHT REFUELING SYSTEM OPERATION.

(See figure 4—11).

### BATTLE DAMAGE.

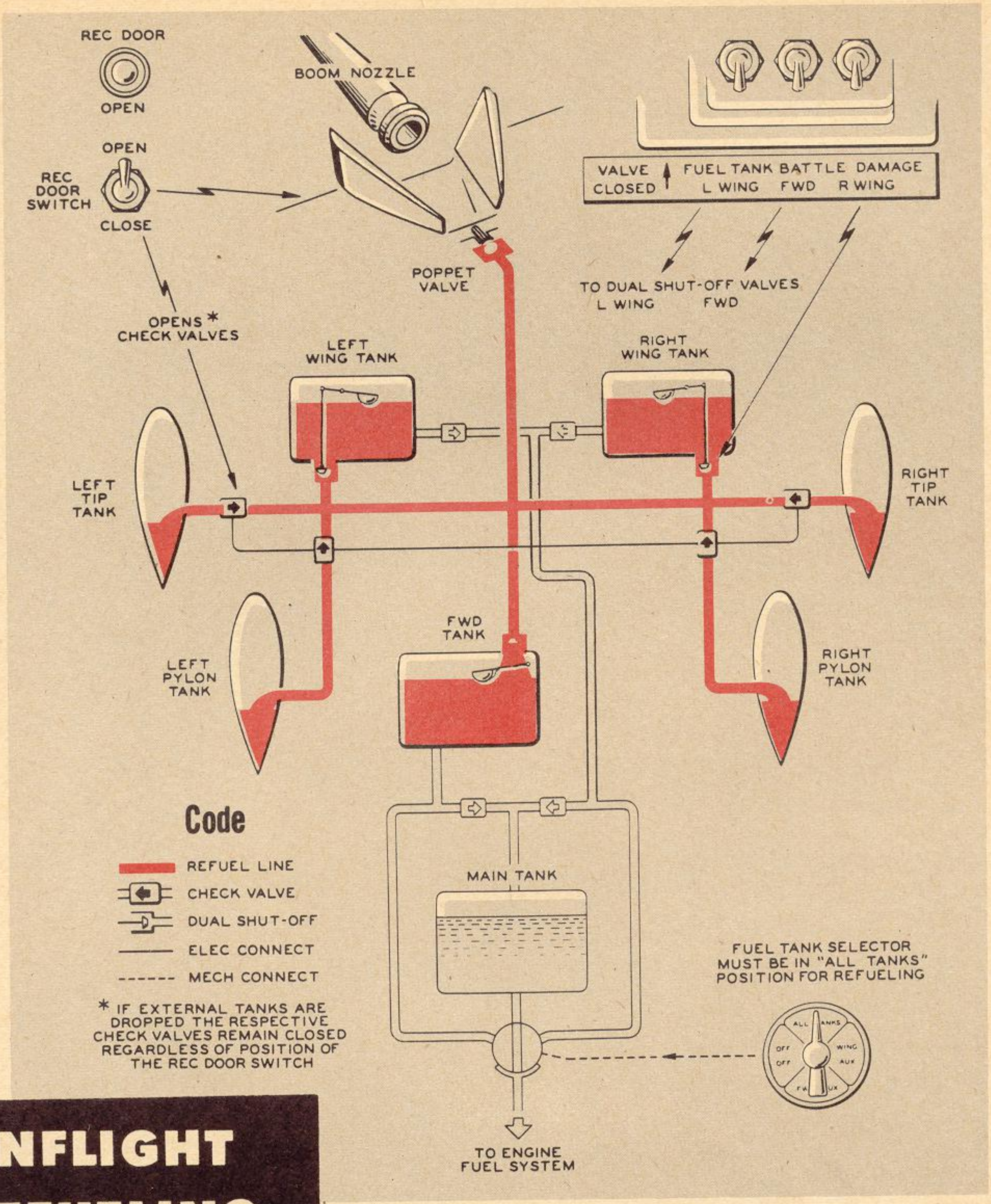
If the forward or wing tanks have been damaged and it is desired to refuel, these tanks may be isolated from the refueling system by placing the desired battle damage switch is the CLOSED position. Refuel as in normal operation.

### EMERGENCY OPERATION.

At any time when in contact made position, the word BREAKAWAY is heard, the receiver pilot will actuate his disconnect switch immediately. The tanker pilot, in such a situation, will pull up abruptly, 50 to 100 feet, and apply power. The receiver pilot shall not dive out of the refueling envelope until separation has been made.

## AUTOMATIC PILOT.

An F-5 automatic pilot unit is installed in the aircraft. This auto-pilot will hold the aircraft on any pre-determined course that may be desired, change this course at will with an exact coordinated turn or maintain the aircraft laterally level and in any desired angle of climb or dive. Automatic control starts in an a-c powered gyro unit which includes vertical and directional gyros as a reference. The directional gyro establishes a reference for the azimuth heading of the aircraft and the vertical gyro establishes a flight reference about the



# INFLIGHT REFUELING SYSTEM
## *Schematic*

*Figure 4—10. Inflight Refueling System — Schematic*

## NORMAL OPERATION

1. Approach tanker at selected altitude and speed.

2. Fuel tank selector ALL TANKS.

3. Receiver door switch OPEN. Receiver door indicator light on and ready indicator light on.

4. Receiver light switch ON if refueling operation is at night.

5. Check nozzle contact indicator light on after contact is made. Ready indicator light out.

6. After refueling check disconnect indicator light on.

7. If the disconnect indicator light illuminates before refueling is completed, depress the reset switch.

**NOTE**

A disconnect may be accomplished at any time by depressing the disconnect switch.

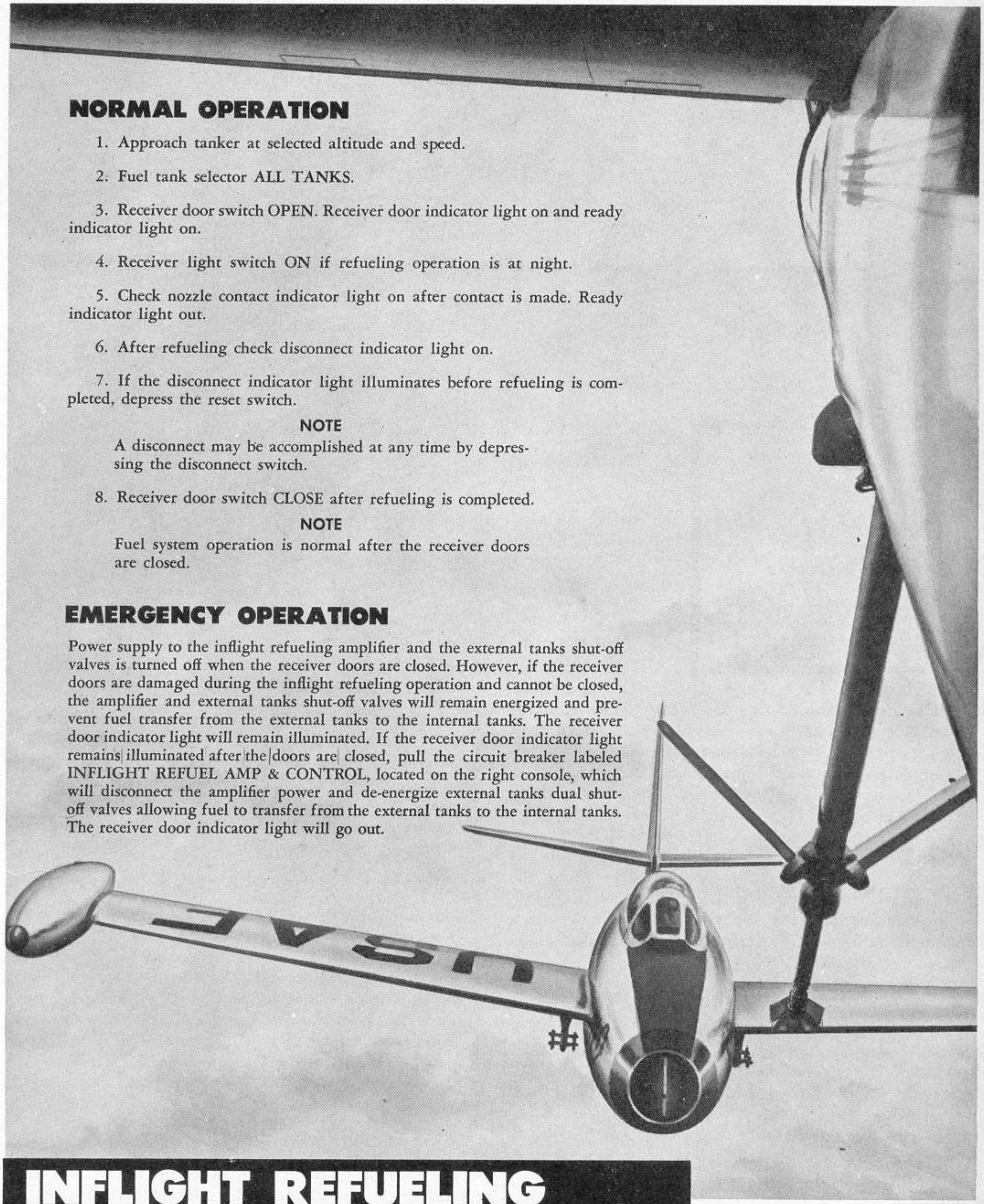
8. Receiver door switch CLOSE after refueling is completed.

**NOTE**

Fuel system operation is normal after the receiver doors are closed.

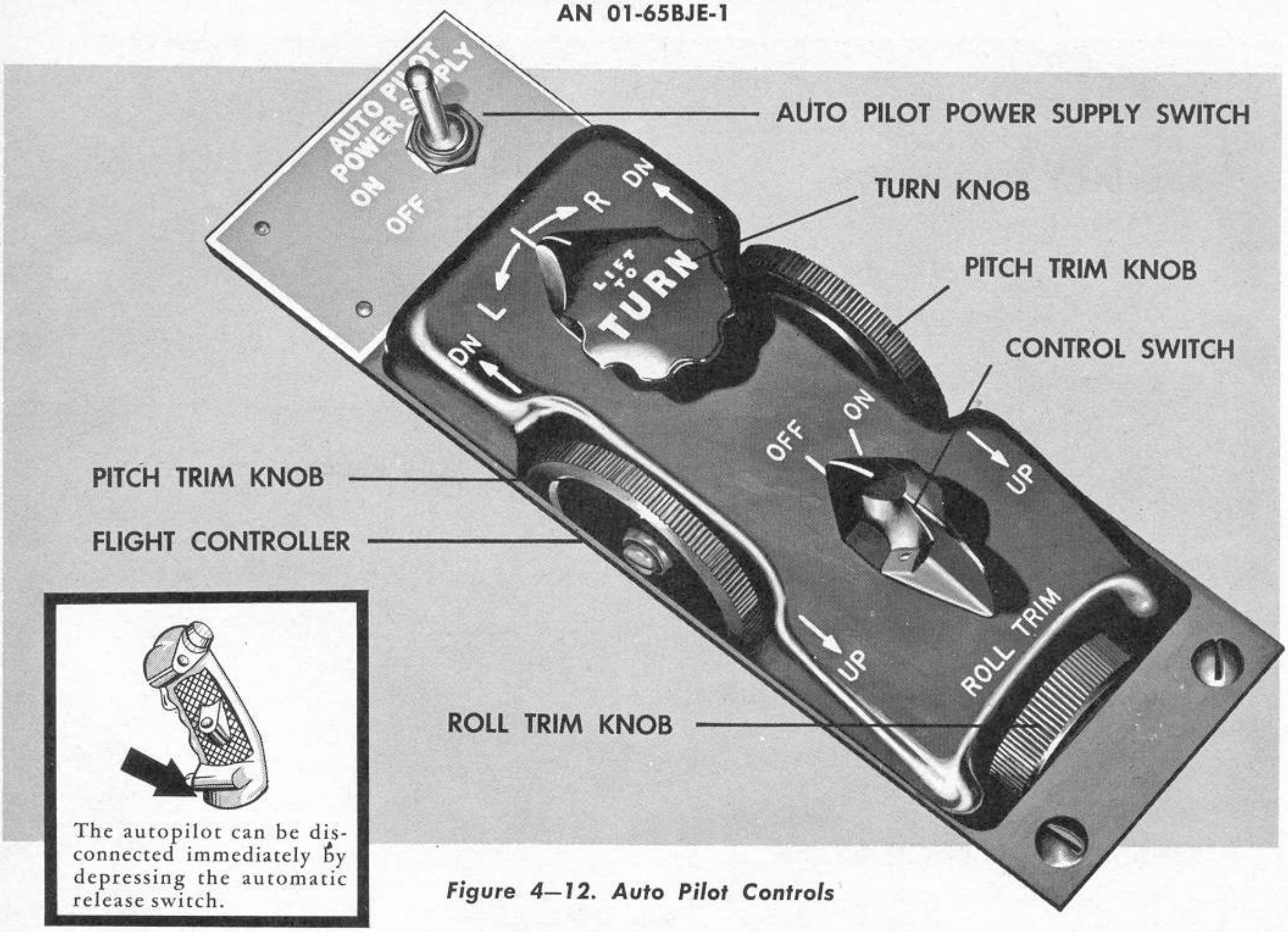
## EMERGENCY OPERATION

Power supply to the inflight refueling amplifier and the external tanks shut-off valves is turned off when the receiver doors are closed. However, if the receiver doors are damaged during the inflight refueling operation and cannot be closed, the amplifier and external tanks shut-off valves will remain energized and prevent fuel transfer from the external tanks to the internal tanks. The receiver door indicator light will remain illuminated. If the receiver door indicator light remains illuminated after the doors are closed, pull the circuit breaker labeled INFLIGHT REFUEL AMP & CONTROL, located on the right console, which will disconnect the amplifier power and de-energize external tanks dual shut-off valves allowing fuel to transfer from the external tanks to the internal tanks. The receiver door indicator light will go out.



**INFLIGHT REFUELING**
***System* OPERATION**

*Figure 4—11. Inflight Refueling System Operation*



The autopilot can be disconnected immediately by depressing the automatic release switch.

*Figure 4—12. Auto Pilot Controls*

lateral and longtitudinal axis of the aircraft with relation to a gravitational reference. The signal from the gyro unit passes through a servo amplifier then to a d-c powered servo which is connected to the surface controls, with a mechanical linkage. The auto-pilot control can be overpowered by the human pilot at any time or can be disconnected immediately by use of the automatic release switch on the control stick. If the aircraft is in a climb or dive and the auto-pilot is turned on, the aircraft will continue on its course. However, if the aircraft is in a climbing or diving turn and the auto-pilot is turned on the flight path will change to a straight climb or dive respectively as there is no follow-up unit on the aileron trim tabs.

### AUTO-PILOT POWER SUPPLY SWITCH.

The auto-pilot power supply switch (figure 4—12) is a two position toggle switch having an ON and OFF position. The ON position supplies power from the primary bus to the alternate inverter through the instrument power switch. After placing the power supply switch in the ON position you should not be able to move the auto-pilot control switch to ON until after a two minute time delay has elapsed. This eliminates the possibility of putting the auto-pilot into the control system until enough time has elapsed for all units to warm up to operating temperatures. With the power supply switch in the OFF position it should not be possible to turn the auto-pilot control switch ON.

### FLIGHT CONTROLLER.

All control functions of the auto-pilot are centered about the flight controller (figure 4—12) which contains the auto-pilot control switch, the roll trim and pitch trim knobs and the turn knob. An automatic interlocking system is provided which prevents the auto-pilot from operating until it is warmed up or if the turn knob is out of the neutral position.

### AUTO-PILOT CONTROL SWITCH.

The auto-pilot control switch is a rotary switch having two positions OFF and ON. The ON position connects the auto-pilot to the control system. It will not be possible to place the control switch in the ON position if the turn knob is out of neutral or a time delay of 2 minutes has not elapsed from the time the power supply switch was turned ON. The control switch will automatically return to the OFF position if the power supply switch is turned OFF or the automatic release switch on the control stick is depressed.

### PITCH TRIM KNOB.

The pitch trim knob controls the nose up or nose down attitude of the aircraft. If the pitch trim knob is rotated aft for nose up or roated forward for nose down trim the aircraft will maintain the selected attitude. The pitch trim is limited to a climb or dive angle of approximately 40 degrees.

ROLL TRIM KNOB.

The roll trim knob controls the lateral trim of the aircraft. If the roll trim knob is rotated clockwise for right wing down or counterclockwise for left wing down the aircraft will maintain the selected trim. The roll trim is limited to approximately 10 degrees left wing or right wing down.

TURN KNOB.

The turn knob is a rotary switch marked LIFT TO TURN and two extreme position L and R. If the turn knob is in the neutral position it must be lifted up before it can be turned to L or R position. When turned to L or R the aircraft will make a coordinated turn to the left or right. The angular rotation of the turn knob will govern the bank angle in the turn up to a maximum of approximately 35 degrees right or left.

### AUTOMATIC RELEASE SWITCH.

An automatic release switch (figure 4—12) is installed on the forward side of the control stick. This is a spring loaded switch and when depressed, automatically disconnects the auto-pilot from the control system. The auto-pilot control switch on the controller will automatically return to the OFF position when the release switch is depressed.

### AUTO-PILOT OPERATION.

LEVEL FLIGHT.

1. Level the airplane at the desired altitude and on the proper directional heading.
2. Trim the airplane.
3. Turn the auto-pilot ON.
4. Adjust the roll trim knob as necessary to level the airplane.

MANEUVERING.

Once the auto-pilot has been engaged, it is possible to perform simple flight maneuvers by means of the flight controller.

## NAVIGATION EQUIPMENT.

### SLAVED GYRO MAGNETIC COMPASS.

A type J-2 slaved gyro magnetic compass is installed in the airplane which provides visual indication of the magnetic heading of the airplane. The indication is read on an indicator (figure 4—13) whose operation is governed by a gyro whose spin axis is stabilized in a horizontal plane by means of a leveling device and whose orientation in azimuth is slaved to the earth's magnetic meridian by a direction-sensing component, located in the left stabilizer. The compass requires both a-c and d-c power. The d-c power is supplied from the primary bus and the a-c power is supplied by the main or alternate inverter, therefore, the compass will operate as long as the engine is operating. The gyro is free to operate within 85 degrees from level flight in dive and climb, and in right and left bank. At the limits, it strikes mechanical stops which render the indications on the directional gyro control and the settable dial indicator inaccurate. After return to level flight errors up to 5 degrees in heading may be introduced; but the gyro will recover its erect and slaved positions automatically in a period of 5 minutes or less and thereafter will again resume correct indications until the limits are again exceeded. The flux valve unit of the remote compass transmitter remains pendulous through 30 degrees on both sides of the vertical in pitch and roll. When these limits are exceeded or a coordinated turn is being executed the vertical components of the earth's field are picked up which results in flash signals. Restoration of the airplane to an attitude within these limits renders the flux valve unit pendulous again, and it automatically resumes correct sensing. A thermal switch in the amplifier provides fast slaving and leveling of the directional gyro during the initial operation of the compass.

SLAVED GYRO COMPASS SWITCH.

The slaved gyro compass switch (40, figure 1—16) has two positions: NORMAL and CUT OUT. The NORMAL position supplies power to the heating, leveling and slaving systems. The CUT OUT position cuts off the power supply to the control field of the slaving torque motor and is used when the horizontal lines of magnetic force dip at 84 degrees or more.

SLAVED GYRO FAST SLAVING SWITCH.

The slaved gyro fast slaving switch (39, figure 1—16) is pushed in momentarily to shorten the time required to restore the gyro to its erect and slaved position, after level flight is resumed, following maneuvers in which the gyro has hit the mechanical stops. Approximately two minutes of fast slaving is obtained by depressing the fast slaving switch.

STARTING.

The compass will operate if the engine is operating and the instrument power switch is in NOR or ALT, if the engine is inoperative and the instrument power switch is in ALT or if external power is connected to No. 1 external power receptacle and the instrument power switch is in NOR. Allow 3 minutes to elapse so that the gyro in the directional gyro control comes up to operating speed, levels and aligns the indication on the settable dial indicator with that sensed by the remote compass transmitter.

**Note**

> It is necessary, for proper operation of the J-2 compass, that the a-c and d-c power supplies to the system be turned on simultaneously. To assure this, depress the fast slaving switch momentarily after the engine is running. This action turns the d-c power (to the compass) off and on again with the inverter running.

OPERATION.

SETTING INDICATOR. By means of the SET COURSE knob on the indicator, set the dial index for the heading it is desired to fly. It is preferable to set the dial index against the zero bezel index of the indicator although any index may be chosen.

USING THE COMPASS – STRAIGHT FLIGHT. After the airplane becomes airborne, the indicator is referred to in the same manner as a magnetic compass.

USING THE COMPASS–IN TURNS. Perfect 45, 90 and 180 degree turns can be executed by setting the dial index, with the overlapping pointer against the zero bezel index, then flying the aircraft to align the pointer with the 45 and 90 degree bezel indices on both sides of the zero index or with the index at 180 degrees. Then final heading may be set against the zero bezel index by means of the SET COURSE knob. Another method is to set the dial index for the new heading against any bezel index, then flying the aircraft to align the pointer with that bezel index.

## ARMAMENT EQUIPMENT.

This aircraft is equipped to carry guns, bombs, rockets and chemical tanks. The guns are installed internally and the bombs, rockets and chemical tanks are installed as external stores. A gun sight or one of two different types of gun-bomb-rocket sights is provided in the aircraft. The gun sight is for firing guns only while the gun-bomb-rocket sight is used in firing the guns and rockets or releasing the bombs at the proper time to be effective on a target. Manual operation is also provided. The pilot is protected from enemy fire by an armor plate installed in the aft end of the canopy. A gun camera in the right wing records results of fixed gun firing.

### GUN SELECTOR SWITCH. See figure 4–16.

The gun selector switch has three position; GUNS, OFF and SIGHT-CAMERA & RADAR. A-C power is supplied to the sight gyros and heaters as soon as the secondary bus is energized if the instrument power switch is in the NOR position. The SIGHT-CAMERA & RADAR or GUNS position supplies d-c power to the sight tube heaters, relays and control units in addition to the gyros and heaters and also energizes the gun camera circuit. The GUNS position also energizes a relay so that the guns will fire when the stick trigger is actuated if the aircraft is airborne. The sight is ready for use with the gun selector switch in either the SIGHT-CAMERA & RADAR or GUNS position.

### GUN-BOMB-ROCKET SIGHT. A

The A-ICM gun-bomb-rocket sight (figure 4–14) automatically computes the fire control problems for gunfire from fixed guns, for bombing and for rocket fire. The sight reticle image, consisting of a circle and a central dot, is reflected on an inclined transparent window. The automatic features of the sight enables the pilot to direct his full attention to the selected target provided he flies the aircraft so that the reticle circle is continuously superimposed on the target. Range data is supplied to the sight, for gunnery operations, by a manual range control or automatically by the AN/APG-30 radar ranging unit. The radar system also provides automatic search within its range. It automatically locks onto, and tracks, a target in range and indicates to the pilot when the equipment is tracking a target. On overland targets below 6,000 feet, radar range distance may be reduced by use of the range maximum radar control to prevent the radar from locking on the ground when target is at lower altitudes. Bombs can be released automatically at the proper release point by a mechanism within the sight. Electrical power (28 volt d-c) is supplied to the sight and sight heaters from the secondary bus. A-C electrical power is supplied from the main inverter and a sight inverter which are both powered from the secondary bus. Manual sight ranging may be used if the a-c power supply fails or when the radar system is inoperative. The sight can be operated as a fixed reticle sight as long as d-c power is available.

### GUN-BOMB-ROCKET SIGHT. C, E

The A-4 gun-bomb-rocket sight (figure 4–14A) is similar to and is used for the same purposes as the A-1CM sight in previous aircraft. This sight is improved and more accurate since the computed range takes into account the speed of the target.

### RETICLE DIMMER CONTROL.

The reticle dimmer control (9, figure 4–14) controls the illumination intensity of the reticle image from DIM to BRIGHT.

### SIGHT FILAMENT SWITCHES. A

The sight filament switches (8, figure 4–14) are marked CIRCLE and DOT. Each switch has two positions PRIM and SEC. The lamps for the sight reticle circle and dot have dual filaments. If either filament goes out the spare filament may be cut-in by changing the switch to the other position.

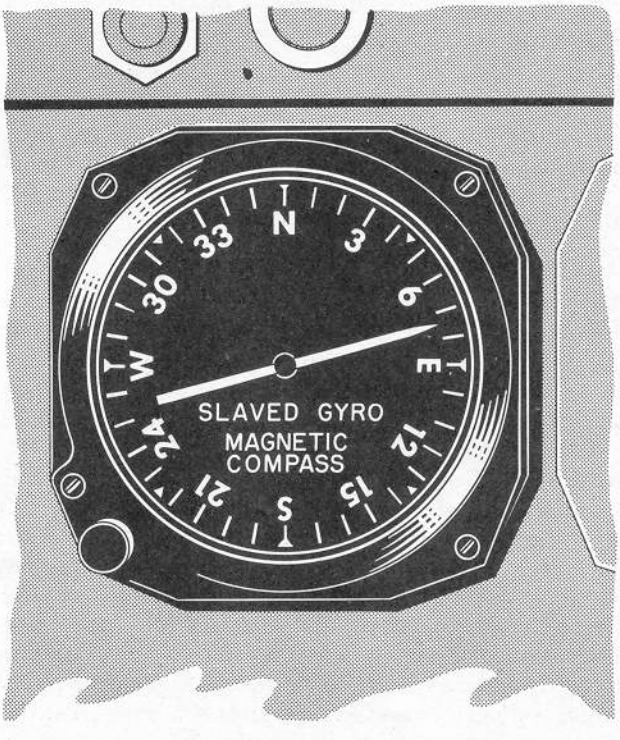


*Figure 4–13. Slaved Gyro Compass Indicator*

GUN BOMB ROCKET SIGHT

1. Rocket Dive Angle Control
2. Bomb-Target-Wind Control
3. Gun-Bomb-Rocket Sight
4. Span Adjustment Dial
5. Mechanical Caging Lever
6. Radar Range Sweep Control
7. Target Indicator
8. Sight Filament Switches
9. Reticle Dimmer Control

*Figure 4—14. A-ICM Gun-Bomb-Rocket Sight Controls*

SIGHT FILAMENT SWITCH. C, E

The sight reticle is illuminated by one double filament bulb instead of the two bulbs as in previous models. The sight filament switch (6, figure 4—14A) has two positions; PRIM and SEC. If the bulb goes out with the switch in either position, the alternate position is selected. The outer limits of the reticle are marked by a series of diamond shaped dots.

ELECTRIC CAGING BUTTON.

The push-button type caging switch, on the throttle control is used to stabilize the reticle image on the target. Depressing the switch, electrically cages the gyros in the computer and brings the sight line to the "no deflection" position, which gives the pilot a fixed sight for placing the reticle image on the target initially.

MECHANICAL CAGING LEVER.

The mechanical caging lever (5, figure 4—14) is moved to the left to CAGE and right to UNCAGE the sight mirror. For firing at ground targets, or in the event of sight failure, the caging lever may be placed at CAGE and the reticle used as a fixed sight.

SPAN ADJUSTMENT DIAL. A

The span adjustment dial (4, figure 4—14) is set to the wingspan of the target, in feet, when the gun-bomb-rocket sight is operated with manual range.

SPAN ADJUSTMENT LEVER. C, E

The wing span of the target aircraft is set into the sight by moving the span adjusting lever (4, figure 4—14A) to the number on the span adjusting dial corresponding to the wing span of the target.

MANUAL RANGE CONTROL.

The manual range control, incorporated in the throttle control provides for manual ranging during gunnery operation when radar ranging is impossible (below 6,000 feet on overland targets). The range control covers a span of 1,500 feet, from approximately 1,200 feet to approximately 2,700 feet. Clockwise rotation of the twist grip reduces the range (increases the reticle size).

GUN BOMB

ROCKET SIGHT

1. Rocket Dive Angle Control
2. Bomb-Target-Wind Control
3. Radar Range Sweep Control
4. Span Adjustment Lever
5. Target Indicator Light
6. Sight Filament Switch
7. A-4 Gun Bomb Rocket Sight
8. Mechanical Caging Lever
9. Reticle Dimmer Control

*Figure 4—14A. A—4 Gun-Bomb-Rocket Sight Controls*

The manual ranging control is spring-loaded to the full counterclockwise (detent) position which is used for operation of the radar ranging system.

RADAR "OUT" SWITCH. A

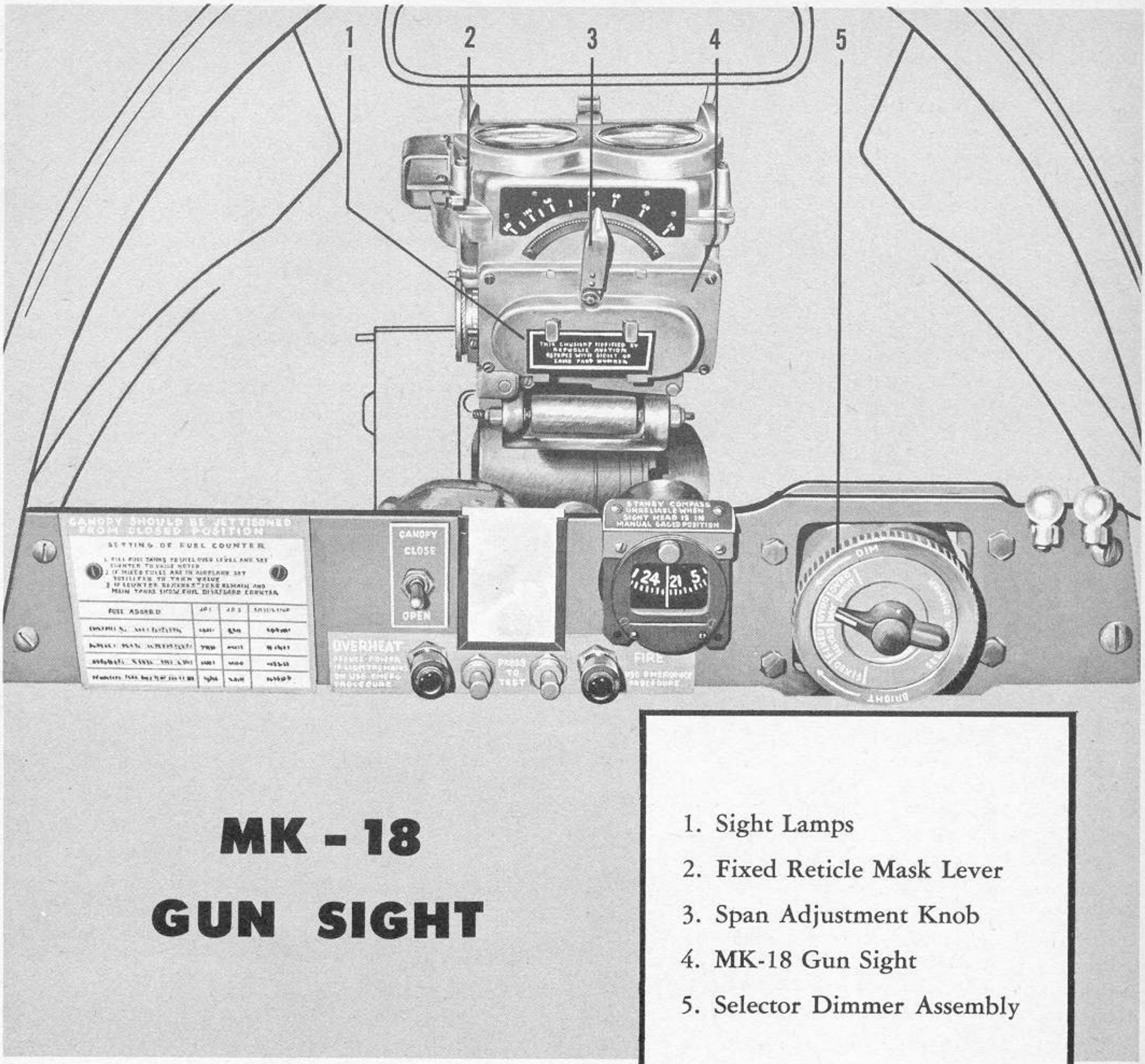
When the radar detects a target, it locks on it and measures its range. The radar may be shifted to another target by means of the radar "out" switch (figure 4—15) located on the left side of the control stick grip. Depressing the "out" switch for several seconds causes the radar to reject the target and drift in or out in range.

RADAR "OUT" SWITCH. C, E

The radar "out" switch (figure 4—15), on these aircraft serves the same purpose as the radar "out" switch on previous aircraft. In addition if the rocket dive angle control is in either the BOMB or ROCKET position, it will automatically return to the GUN position when the radar "out" switch is depressed so that the guns can be fired immediately.

RADAR RANGE SWEEP CONTROL.

The radar range sweep control (6, figure 4—14) is a rheostat marked INCREASE with an arrow showing the



**MK - 18**
**GUN SIGHT**

1. Sight Lamps
2. Fixed Reticle Mask Lever
3. Span Adjustment Knob
4. MK-18 Gun Sight
5. Selector Dimmer Assembly

*Figure 4—14B MK—18 Gun-Sight Controls*

directions. Turning the control in the minimum direction lowers the radar ranging distance to prevent radar from locking on the earth when the aircraft is at low altitudes. Turning the control toward MAXIMUM increases the range. During normal operations control should be at MAXIMUM.

BOMB-TARGET-WIND CONTROL.

The bomb-target-wind control (2, figure 4—14) has a ROCKET GUN position and a BOMB scale indicating downwind and upwind adjustment. Setting the B-T-W control adjusts the sight to compensate for the components of wind velocity and target motion parallel to the direction of the attacking airplane. The ROCKET GUN position is selected when using the sight for gun or rocket firing.

ROCKET DIVE ANGLE CONTROL. A

The rocket dive angle control (1, figure 4—14) has four positions: GUN-BOMB and three rocket positions: 5″ HVAR 2.25″ SCAR and 5″ AR. Each of the rocket positions have an "N" and "S" position. The GUN-BOMB position is selected when using the sight for bombing or gunnery. When firing rockets the rocket dive angle control is turned to "N" for dives up to 40° to "S" for dives greater than 40°, under the type of rocket being fired.

### ROCKET DIVE ANGLE CONTROL. C, E

The rocket dive angle control (1, figure 4—14A) is three separate controls on one dial. One pointer has three positions on the top of the dial; BOMB, GUN and ROCKET. The approximate position is selected for bombing, gunnery or rocket firing. If the pointer is in either the BOMB or ROCKET position and the radar "out" switch on the control stick is depressed the pointer will automatically return to the GUN position. The second pointer is the rocket setting pointer and has three positions; 5″HVAR, 2.25 SCAR and 2.75 FFAR. Each position has an N and S position. When firing rockets the rocket dive angle control is turned to N for dives up to 40 degrees or to S for dives greater than 40 degrees under the type of rocket being fired. The third pointer has three positions; TR, HI and LO and is used for gunnery only. The TR position is used for training when the target speed is approximately 180 mph. The HI position is used for high speed targets where the target speed is over 400 mph and the LO position is for low speed targets up to 400 mph.

### TARGET INDICATOR LIGHT.

The target indicator light (7, figure 4—14) is located on the right side of the A-1CM gun sight. In aircraft equipped with the A-4 sight the target indicator (5, figure 4—14A) is located on the upper instrument panel. Illumination of the light indicates that the radar set is "locked-on" a target.

### OPERATION.

STARTING THE SIGHT. The sight gyros and heaters start to operate as soon as the secondary bus is energized. A period of approximately 20 minutes is necessary for the sight to come up to operating temperatures and stabilize.

1. Position the gun selector switch to either the GUNS or SIGHT CAMERA & RADAR position which supplies power to the amplifier. Allow approximately one minute for the amplifier tubes to warm up.
2. Check to see that the reticle image appears on the reflector glass.
3. Check the reticle image by moving the mechanical caging lever from one position to the other. The dot should flicker as the lever is moved and the circle should change to four circular arcs in the CAGE position.

STOPPING. Position the gun selector switch to the OFF position. This turns off the tube heaters, relays and controls but leaves the sight operating and ready for use within one minute after repositioning the gun selector switch. The gyros and heaters will operate as long as the secondary bus is energized. Position the mechanical caging lever to CAGE.

### GUN SIGHT. B, D

The MK-18 gun sight (figure 4—14B) is a precision gyroscopic sight designed to automatically compute the lead angle required for the firing of calibre .50 fixed guns in order to score a hit on a target. Essentially, the gyro gun sight replaces the complicated and unreliable procedure of using a fixed sight and estimating the lead by the relatively simple operation of ranging and tracking which becomes nearly automatic after a little practice. In addition the computing sight also incorporates a fixed or a non-computing sight. The gyro motor is powered from the secondary bus. Provisions are made for the installation of the A-1CM or A-4 gun-bomb-rocket sight and the APG-30 radar range finder.

### SELECTOR DIMMER ASSEMBLY.

The selector dimmer assembly (5 figure 4—14B) is a dual control. The dimmer ring is marked BRIGHT and DIM and controls the brightness of the fixed and gyro reticle lamps. The selector switch has four positions: FIXED, FIXED & GYRO, GYRO DAY and GYRO NIGHT. When the selector switch is set at FIXED, only the lamp which illuminates the fixed reticle is connected to the current supply. With the selector switch set on FIXED & GYRO both the fixed and gyro reticle lamps are connected to the power supply. Only the gyro reticle lamp is connected to the power supply with the selector switch in the GYRO DAY or GYRO NIGHT position. The GYRO NIGHT position automatically sets the range at 170 yards as at night it is usually impossible to see an airplane outline clearly enough to range accurately.

### SPAN ADJUTMENT KNOB.

The span adjustment knob (3, figure 4—14B) is set to the wing-span of the target, in feet, when the gun sight is operated.

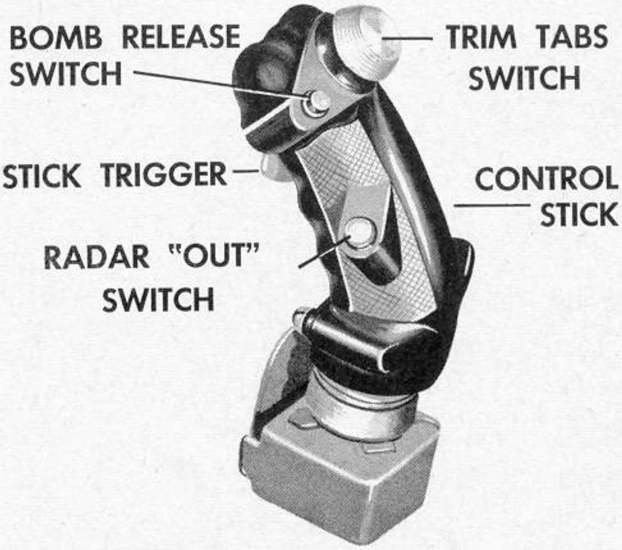


*Figure 4—15. Control Stick Grip*

SIGHT LAMPS.

The fixed and gyro lamps are accessible through a lamp housing access door located under the crash pad on the sight head. Two spare lamps are stowed on the upper right hand corner of the instrument panel.

RANGING CONTROL.

The gun sight ranging control is operated by the throttle twist grip. Clockwise rotation of the twist grip to its extreme position moves the range unit sheave to the 200 YARD or minimum range position. Full counter clockwise rotation of the throttle twist grip moves the range unit sheave to the 800 YARD or maximum range position. The pilot maintains correct range by keeping the target framed within the circle of the diamond-shaped pips. As the range changes, the circle increases or decreases by operation of the twist grip. The range unit is wired so that when the range control system is in the 800 YARD position the sight is electrically caged. The more the twist grip is moved toward the 200 YARD position the less the gyro is permitted to lag behind the pilot's tracking.

FIXED RETICLE MASK LEVER.

A mask, with a small hole in the center, can be placed over the fixed reticle to eliminate all except the cross in the center. The mask is positioned by the fixed reticle mask lever (2, figure 4—14B) on the left side of the sight head.

OPERATION.

STARTING THE SIGHT.

1. Remove the protective cover from gun sight head.

2. Connect external power to the No. 1 power receptacle and check that the gyro motor starts to function.

3. Place the gun selector switch to the SIGHT-CAMERA & RADAR position and the selector dimmer switch to the FIXED & GYRO position. Check to see that both reticle images are visible and that their brilliance can be varied. Move mask lever down and make sure only the cross of the fixed reticle image is visible.

4. Move the selector dimmer to GYRO DAY position and make sure that only the compensating reticle image is visible. The reticle image should settle in a few seconds and should not vibrate afterwards.

5. Make sure that the reticle image is well defined. Should the six diamond-shaped dots continue to be fuzzy or distorted after 10 minute warm-up period, the gyro is probably out of dynamic balance and the sight head should be replaced.

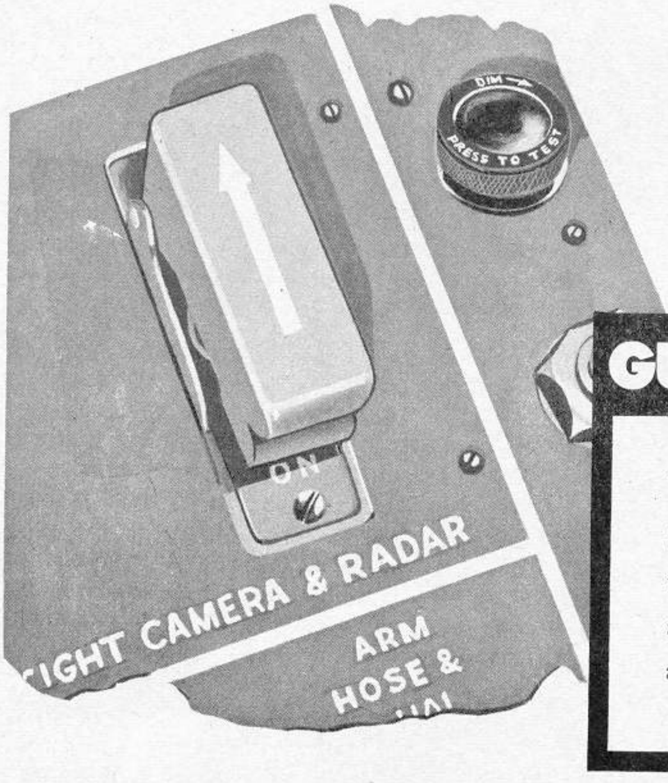
6. Turn throttle twist grip clockwise to stop and check for proper reading, 200 YARDS. Make sure the diameter of the gyro reticle enlarges as twist grip is turned clockwise.

7. Turn twist grip counter-clockwise to stop, and check for proper reading, 800 YARDS. Make sure gyro reticle becomes smaller as the twist grip is rotated counterclockwise. The gun sight ranging system must not bind, or require excessive effort to operate.

8. Move the selector dimmer to FIXED and GYRO and rotate range to 500 YARDS. The reticle image central dot should be superimposed on the cross when aiming at the horizon. The horizon point must be at least 500 feet distant.

STOPPING THE SIGHT.

1. Place the gun selector switch in the SIGHT-CAMERA and RADAR position. The sight will remain

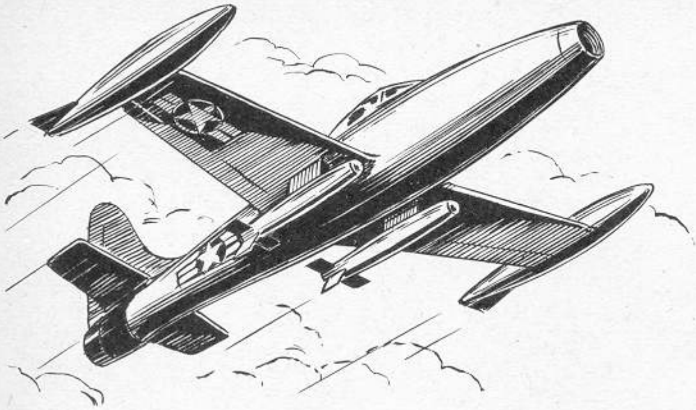


**GUN SELECTOR *Switch***

With the gun selector switch in the GUNS position the guns will fire when the stick trigger is depressed provided the aircraft is airborne. Refer to gun selector switch under armament equipment for complete description.

*Figure 4—16. Gun Selector Switch*

# F-84G BOMBING



A jettisonable bomb pylon can be installed under each wing. The pylons are jettisoned by explosive charges in the attaching bolts and are blown away from the airplane by compressed air cylinders. These cylinders must be charged manually. Each pylon can carry single bombs from 100 up to 1000 pounds, one fragmentation bomb rack assembly, a chemical tank or an external fuel tank. The gun-bomb-rocket-sight is used for bomb sighting and automatic bomb release. Controls are provided for normal or emergency release of any external stores carried on the pylons. Normal release may be accomplished automatically or manually, with bombs released singly or simultaneously. The arming condition of the bomb nose and tail fuses is manually selected.

## BOMB SELECTOR SWITCH

The bomb selector switch has three positions: ALL, OFF and SINGLE. When the switch is in the SINGLE position the left bomb will release when the bomb release switch is depressed. The right bomb will release when the release switch is depressed again. With the switch placed in the ALL position both bombs will release simultaneously when the bomb release switch is depressed. When in the OFF position the bombs will not release even though the bomb release button is depressed.

## BOMB RELEASE SWITCH

The bomb release switch is a spring-loaded, button type switch installed on the top of the control stick. When the switch is depressed the bomb rack electric circuit is energized to release the bombs or pylon tanks in accordance with the setting of the bomb selector switch. The bomb release switch will also fire the rockets, or salvo the rockets, and bombs depending on the position of the rocket selector switch or the bomb selector switch.

## BOMB ARMING SWITCH

The bombs arming switch has three positions: NOSE AND TAIL, SAFE and TAIL ONLY. When the switch is placed in the NOSE AND TAIL position the electric circuit is indexed to arm the bombs for time explosion. When the switch is placed in the TAIL ONLY position the electric circuit is indexed to arm the bombs for impact explosion. In the SAFE position the bombs are unarmed when dropped.

## BOMB RELEASE SELECTOR SWITCH

The bomb release selector switch has two positions which are AUTO RELEASE and MANUAL RELEASE. In the AUTO RELEASE position the bombs will be released automatically by the gun-bomb-rocket sight. In the MANUAL RELEASE position the bombs are released manually by depressing the bomb release switch on the control stick regardless of whether or not the sight is utilized or in operation.

## Auxiliary Bomb Selector Switch

The auxiliary bomb selector switch is used when fragmentation bomb racks or chemical tanks are attached to the bomb racks. The auxiliary bomb selector switch has three positions: ALL, OFF and SINGLE. In the SINGLE position the left rack will release its bombs then transfer the circuit to the right rack. In the ALL position both fragmentation racks will operate simultaneously to drop their bombs or the chemical tanks will fire when the bomb release switch is actuated. The auxiliary bomb release indicator light ( , figure ) illuminates when the fragmentation racks are loaded and remains on until the fragmentation bombs are dropped. The ALL position is used when firing chemical tanks.

## SALVO SWITCH

The salvo switch has two positions which are NORMAL and SALVO. The switch is spring-loaded to the NORMAL position. If held in the SALVO position the bombs, pylon tanks or chemical tanks, rockets and tip tanks will be jettisoned instantly regardless of the position of the respective selector switch on the control stick.

**Note** The rockets will jettison only if the airplane is airborne.

*Figure 4—17. Bombing Equipment (Sheet 1 of 2)*

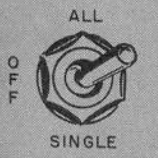
# EQUIPMENT

## BOMB PYLON JETTISON SWITCH

The bomb pylon jettison switch is a spring-loaded switch guarded in the OFF position. When placed in the JETTISON position it completes an electrical circuit to explosive charges in the attaching fittings of the bomb pylon adapters and at the same time releases a charge of compressed air to blow the bomb pylon adapters away from the airplane.

## BOMBING OPERATION

### MANUAL



1. Set bomb selector switch as desired.

2. Set bombs arming switch as desired.

3. Set bomb release selector as desired.

4. Press bomb release switch on control stick.

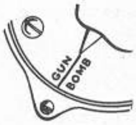
CAUTION

Before depressing the bomb release switch, check to determine that all selector switches are in proper position. This is necessary to determine that only the desired circuits will be energized. It is possible, for example, if both the rocket jettison ready switch and the rocket selector switch are both on, to fire some rockets and drop the others when the bomb release switch is depressed.

## BOMBING OPERATION

### USING

## GUN-BOMB-ROCKET SIGHT

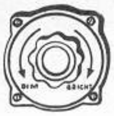


1. Set rocket dive angle control to GUN-BOMB (F-84G-1RE) or to the BOMB position on F-84G-5 and 10RE).

   **Note**

   If the radar "out" switch is depressed with the dive angle control in the BOMB position on F-84G-5 and 10RE aircraft, the sight will automatically return to the GUN position.

2. Set B-T-W control to the known or estimated up or down wind plus or minus the estimated target velocity. The reticle will immediately move down to a position just over the nose.



3. Set the mechanical caging lever on the sight head to UNCAGE.
4. Set reticle dimmer control for desired brilliance.

5. Set the bomb release selector switch in the AUTO RELEASE position.
6. Fly an approach which will give the desired dive angle during the bombing run. The electrical caging button must be depressed during this maneuver.

7. After a smooth dive has been established with the reticle on the target, release the electrical caging button.
8. Depress the bomb release switch at approximately the bomb drop point.
9. Track very smoothly until the image circle becomes extinguished and a red flashing light is reflected on the reflector glass. This indicates an automatic bomb release.

10. If manual release is desired, place the bomb release selector switch in the MANUAL RELEASE position, get on the target and track as above. After the reticle image circle becomes extinguished, press the bomb release button. The manual release is not as accurate as the automatic release because of the time lag due to the pilot's reaction time.
11. Computation accomplished during the above prescribed procedure will be good for only one release, i.e., a single bomb, bombs in train with interval control not exceeding ½ second from the first to the last bomb, a pair of bombs released simultaneously or a salvo.

## EMERGENCY OPERATION

The bombs can be dropped simultaneously unarmed by operating the master salvo switch to the SALVO position.

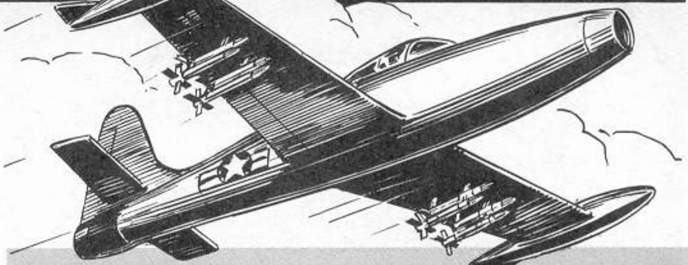
CAUTION

The bombs, pylon tanks or chemical tanks will be dropped if the master salvo switch is actuated with the airplane in the static position.

*Figure 4—17. Bombing Equipment (Sheet 2 of 2)*

# F-84G ROCKET

Rocket firing equipment is provided for launching eight 5" HVAR type rockets. The equipment consists of two forward retractable support posts and four aft retractable support posts under each wing, an electrical control box mounted below the instrument panel and four arming solenoids mounted in the leading edge of each wing to retain the rocket nose-fuse arming wires. Each forward post is equipped with a jettison mechanism for jettisoning the rockets in an emergency. The fore and aft supports retract automatically after the rockets have been fired or jettisoned. The gun-bomb-rocket sight is used for aiming rockets and the rockets are fired by depressing the bomb release switch.



## ROCKET INDICATOR & RESET SWITCH

The rocket indicator is a conventional counter-type labeled: RX TO BE FIRED, with a rotary type reset switch. The indicator informs the pilot, by rocket number, the position and wing location of the next rocket to be fired and enables him to keep check of the number of rockets fired and those remaining on the launchers. The reset knob permits the counter to be re-indexed.

**CAUTION**

The rockets to be fired may be selected by turning the reset switch until the correct rocket number is shown on the indicator dial, but in the two rocket configuration the indicator must be set at "3" and in the four or eight rocket loadings the upper rockets must not be selected until the lower rockets have been fired.

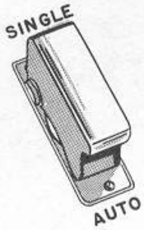
## ROCKET JETTISON READY SWITCH

The rocket jettison ready switch has two positions: NORMAL and JETTISON READY. The normal position is guarded with a red cover guard. The JETTISON READY position indexes the rocket jettison circuit so all rockets will be jettisoned simultaneously when the bomb release switch on the control stick is pressed.

**NOTE**

Rockets can be jettisoned electrically only if the airplane is airborne.

## ROCKET SELECTOR SWITCH



The rocket selector switch has three positions: OFF, SINGLE and AUTO. When the switch is placed in the SINGLE position, the electrical circuit to the rocket shown by number on the indicator will be energized when the bomb release switch is pressed. When the switch is placed in the AUTO position, the firing circuits to each of the rockets is completed in automatic sequence when the bomb release switch is pressed and held.

## ROCKET ARMING SWITCH

The rocket arming switch has three positions: FUSE DELAY, OFF and INSTANT. When the switch is in the INSTANT position the arming wire is clamped between the fixed and spring-loaded jaws of the solenoid which retains the wire when the rocket is fired. This will arm the rocket for contact detonation by releasing the contact fuse pin. When the switch is placed in the FUSE DELAY position, the solenoids are energized to release the arming wires which will remain attached to the rockets. The nose contact fuses will therefore remain in the safe or unarmed position and the rockets will be detonated by the base fuse.

## SALVO SWITCH

The salvo switch has two positions which are NORMAL and SALVO. In the salvo position the bombs, chemical tanks or pylon tanks, rockets (if aircraft is airborne) and tip tanks will be jettisoned instantly regardless of the position of the respective selector switches and without using the bomb release switch on the control stick.

## MANUAL TIP TANK RELEASE

A manual jettison for the rockets is provided. The manual control is interconnected with the manual tip tank release so that when the manual tip tank release is pulled the wing tip tanks and rockets are jettisoned simultaneously.

*Figure 4—18. Rocket Equipment (Sheet 1 of 2)*

# EQUIPMENT...

## ROCKET LOADING

The rocket launcher installation permits loading of two, four or eight rockets. In the two-rocket loading, rocket number 3 is loaded on the outboard launcher of the left wing and number 4 rocket on the outboard launcher on the right wing. In the four rocket configuration, rockets No. 1 and 3 are mounted together (over and under or "double-shot") on the left outboard launcher and Nos. 2 and 4 are similarly mounted on the right outboard launcher. The eight rocket configuration is loaded as indicated in figure

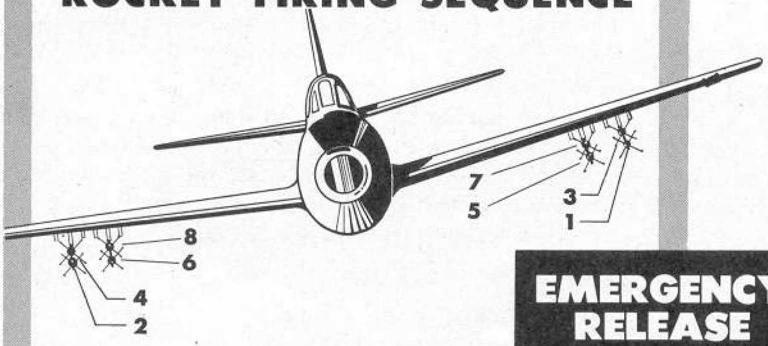
## ROCKET FIRING *(MANUAL)*

1. Set rocket selector switch as desired.
2. Set rocket arming switch as desired.
3. Set rocket indicator as desired.
4. Press bomb release switch on control stick.

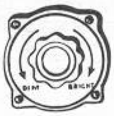
**CAUTION**

The lower rocket must always be fired first. When a misfire occurs in the air during "single" round firing the pilot shall check his intervalometer to ascertain which round has misfired, remembering that the number shown on the intervalometer is the rocket number to be fired. Reference to rocket firing sequence will identify the rocket as an upper rocket or lower rocket. If the rocket is a lower rocket, the rocket firing sequence will reveal from which rocket it is suspended. The upper rocket should not be fired. The intervalometer should be positioned upon the next position when the number of the upper rocket of the misfired pair appears on the intervalometer, thereby bypassing a double rocket release. (During automatic firing, the pilot has little control over the rockets as they fire at 0.1 second intervals while firing button is held down. If a misfire should occur during automatic firing, experience indicates that if the upper rocket is fired with the lower rocket still attached thereto, and provided the fins are secured per instruction, only slight damage will occur to the aircraft consisting of two superficial scratches on the under surface of the wing and scorched paint. The trajectory of the rocket under double release is immediate nose-over).

## ROCKET FIRING SEQUENCE



## ROCKET FIRE OPERATION



1. Set B-T-W control to ROCKET-GUN.
2. Set rocket dive angle control to type rocket being fired and the expected dive condition; set pointer to S for steep dives of more than 40° or N for dives less than 40°.

**Note**

If the radar "out" switch is depressed with the dive angle control in the ROCKET position on F-84G-5 and 10RE aircraft the sight will automatically return to the GUN position.

3. Set mechanical cage lever on sight head to UNCAGE.
4. Set reticle dimmer control for desired brilliance.
5. Depress the electrical caging button.
6. Fly on the desired approach to the target, until the reticle image lies on the target, then track smoothly.
7. Release the electrical caging button between 2,000 and 3,000 yds.
8. Continue tracking smoothly for one solution time (approximately two seconds after releasing the caging button) then fire while holding the reticle on the target.
9. If the caging switch is depressed, or if the reticle slips off the target after releasing the caging button, a new solution time will be required before firing.
10. Rockets may be fired singly, or in train as desired by the pilot and computation will be correct as long as the reticle remains on the target continuously.

## EMERGENCY RELEASE

1. To jettison the rockets position the salvo switch to the SALVO position momentarily. This will also jettison the wing tip tanks and any stores carried on the bomb pylons.
2. The rockets can also be jettisoned by placing the rocket arming switch in the OFF or DELAY position, the rocket jettison ready switch in the JETTISON READY position and then depressing the bomb release switch on the control stick.
3. In event of electrical failure pull the manual tip tank release all the way aft. This will also jettison the wing tip tanks.

*Figure 4—18. Rocket Equipment (Sheet 2 of 2)* ready for operation as long as the generator is operating.

## GUNNERY EQUIPMENT.

Four .50 caliber machine guns are installed in the gun bay of the fuselage and one .50 calibre machine gun is installed in the leading edge of each wing. Electric heaters are provided for the guns. The normal load of ammunition for each gun is 300 rounds.

On aircraft prior to F-84G-10RE all guns are charged manually, prior to flight, by a manual charger stowed in each gun compartment. The guns are charged on F-84G-10RE and subsequent aircraft with a pneumatic gun charger. A gun camera, installed in the leading edge of the right wing operates automatically when the guns are fired or it may be operated separately. A safety circuit, controlled by the extension of the landing gear shock strut prevents the gun from being fired, or the rockets jettisoned if the airplane is in the static position. If for any reason the guns must be fired or the rockets jettisoned while the airplane is on the ground the safety circuit can be by-passed by actuating the armament safety override switch located in the right wheel well.

### GUN CHARGER. E, F

The gun charger, mounted on each gun in F-84G-10RE and subsequent aircraft, is operated by compressed air and controlled electrically. The charger can be used for charging the guns from the cockpit, holding the guns in the retracted position for purposes of safety and to permit cooling of the guns, automatically charging the guns during gunfire when a failure to fire occurs, and for firing the gun by the use of an electro-pneumatic sear actuator contained in the charger.

GUN CHARGER SWITCH. The gun charger switch (10A, figure 1–17) located on the left console, is a three position switch spring loaded to the OFF position. The positions are RETRACT, OFF and RELEASE. The guns are charged by placing the gun charger switch in the RETRACT position. This actuates a solenoid which in turn allows air pressure to draw the bolt to the rear and locks it in that position. The RELEASE position will return the gun bolt to the forward position. The guns will fire, if the gun selector switch is in the GUNS position and the aircraft is airborne, when the stick trigger is depressed regardless of the position of the gun bolt. If the bolt is in the forward position the guns will charge first then fire when the stick trigger is depressed.

### STICK TRIGGER.

The stick trigger (figure 4–5) has two positions. The first position operates the camera and the second position fires the guns, provided the airplane is airborne and the gun selector switch is in the GUNS position.

### GUN HEATER SWITCH.

The gun heater switch located on the left console is a circuit breaker type switch having two positions: OFF and HEATER. The HEATER positions supplies power to the gun heaters from the secondary bus.

## GUNFIRE OPERATION (WITH RADAR RANGE). A, C, E

1. Gun heater switch HEATER.
2. Gun selector switch GUNS. Allow one minute for amplifier to warm up and stabilize.
3. Set rocket dive angle control to GUN-BOMB. (F-84G-1RE)
4. Set rocket dive angle control to GUN (F-84G-5 and 10RE)
5. Set the TR, HI, LO pointer on the rocket dive angle control to suit gunnery target speed (F-84G-5 and 10RE).
6. Set B-T-W control to ROCKET-GUN.
7. Check instrument power switch – NOR.
8. Manual range control on throttle in detent.
9. Set mechanical caging lever on sight head to UNCAGE.
10. Set reticle dimmer control for desired brilliance.
11. When searching for targets, press caging button on throttle control to stabilize the reticle image.
12. When target is located and tracking is started, release caging button. Fly the airplane so that the reticle image is continuously and accurately centered on the target. After the target has been tracked smoothly without slipping or skidding for approximately one second, fire the guns.

## GUNFIRE OPERATION (WITH MANUAL RANGE). A, C, E

1. Gun heater switch HEATER.
2. Gun selector switch GUNS. Allow one minute for amplifier to warm up and stabilize.
3. Set rocket dive angle control to GUN-BOMB (F-84G-1RE).
4. Set rocket dive angle control to GUN (F-84G-5 and 10RE)
5. Set B-T-W- control to ROCKET GUN.
6. Check instrument power switch NOR.
7. Set mechanical caging lever on sight head to UNCAGE.
8. Set reticle dimmer control for desired brilliance.
9. Identify target and set wing span on span adjustment dial which is mounted on the left of the sight head.
10. When searching for targets, press caging button on throttle control to stabilize the reticle image.
11. After the target is close enough for a sphere containing the wing tips to coincide with the framing circle at minimum diameter, release the caging button.
12. Track smoothly, turning manual range control on throttle so that the circle continuously and accurately frames or encloses the target. After the target has been framed and tracked smoothly for approximately one second without slipping or skidding, fire the guns.

## GUNFIRE OPERATION. B, D

1. Gun heater switch HEATER.
2. Gun selector switch GUNS.
3. Set dimmer ring on selector dimmer assembly for desired brilliance.
4. Place selector dimmer assembly switch to desired position.

5. Keep span adjustment knob set at wing span of aircraft most likely to be encountered. As soon as the target is recognized check the setting and alter as necessary.

6. When tracking a target, it is necessary to smoothly maneuver the ship so that the center dot will be on the target at all times.

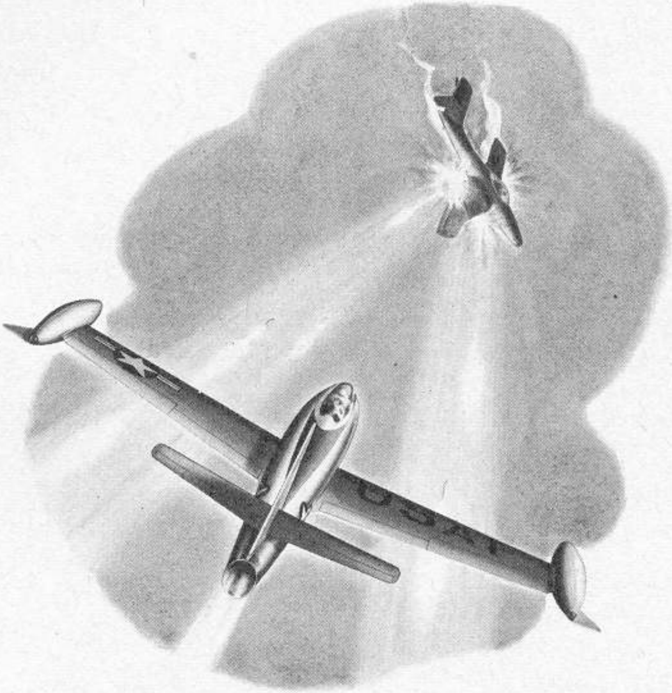
7. Adjust the twist grip so that the moving reticle properly frames the target.

8. Track the target for a minimum of 1 second then fire the guns.

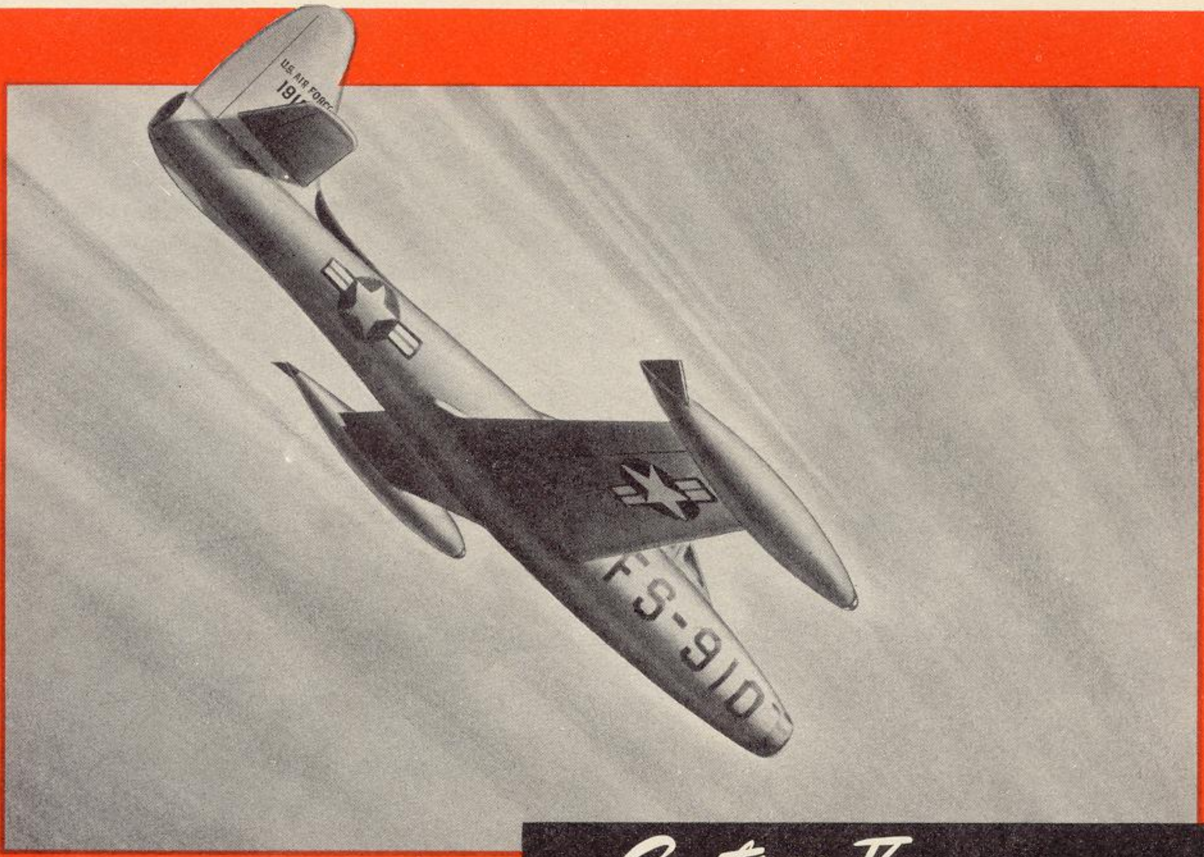
## MISCELLANEOUS EQUIPMENT.

### ANTI-G SUIT PROVISIONS.

An air pressure outlet connection on the front of the pilot's seat (figure 1—24) provides for the attachment of the air pressure intake tube of the pilot's anti-G suit. Air pressure for inflation of the anti-G suit bladder is conducted from the engine compressor through a pressure regulating valve located on the left console (23, figure 1—17) which starts functioning when a force of 1.75 g's is applied to the aircraft. A control marked HI and LO allows for adjustment of the rate of inflation of the anti-G suit. In the LO range the valve opens at 1.75 g and then allows 1 psi of air pressure to pass to the suit for every increase of 1 g force thereafter. In the HI range the valve still opens at 1.75 g but delivers 1.5 psi per g force thereafter. The suit will inflate in 0.2 to 2.0 seconds depending on the input pressure.




FS-1



# *Section V*
# OPERATING LIMITATIONS

## INTRODUCTION.

This section includes the engine and aircraft limitations that must be observed during normal operation. Instrument markings form a part of these limitations; however, these limitations are not repeated in the text and must be referred to on the instrument marking page. For complete restrictions carefully read the instrument marking page.

## ENGINE LIMITATIONS.

### OVERSPEED LIMITS.

The engine is limited to an rpm of 100.5% for take-off. Reset fuel control if stabilized speed exceeds 102% rpm in flight. Remove the engine for overhaul if the stabilized speed exceeds 103% or momentarily speed exceeds 104% during flight or ground operation.

**Note**

The allowable flight variations in rpm from ground setting is minus 1½% rpm.

### OVER TEMPERATURE LIMITS.

After five starts in which exhaust temperature is between 900°C-1000°C or after one start in which the exhaust temperature reaches 1000°C the engine will be removed and the special inspections outlined in applicable inspection guide must be accomplished.

## PROHIBITED MANEUVERS.

1. Inverted flying or any other maneuver resulting in extended negative acceleration may result in engine flame-out since there is no means of insuring flow of fuel in this attitude.

2. Do not accomplish any maneuvers solely by the use of trim tabs as this procedure may result in air loads on the airplane sufficient to cause complete structural failure.

3. Steep angle dives should be avoided at airspeeds closer than 40 mph to red line (.76 Mach No.) at altitudes below 15,000 ft. in order to avoid the application of "g" forces in excess of airplane strength at the time of pull-out.

4. Do not attempt intentional spins below 15,000 feet altitude.

5. Intentional spins are prohibited with fuel in the tip tanks or with external stores installed.

6. All acrobatics except those employed for normal tactical maneuvers are prohibited below 15,000 feet.

7. Avoid landing the airplane with fuel in the tip tanks or with bombs installed. Landing with fuel in the

1. Do not exceed 260 mph IAS with flaps set at 20 degrees. The flaps will automatically retract from 40 to 20 degrees if the airspeed exceeds 220 mph IAS.
2. Do not jettison empty tip tanks in straight flight at speeds below 250 mph IAS. At lower speeds, the air loads that separate the tank from the airplane are small and one or both tanks may hang-up. If this should occur, hold the airplane straight then yaw slightly away from the tank by tapping the rudder pedal. Do not roll or yaw the airplane sharply. Do not jettison tip tanks in a turn. Jettison full tip tanks in straight flight or shallow turns at any speed.
3. Do not jettison pylon tanks above 325 mph IAS except in an emergency.
4. Do not extend the speed brake for recovery from maneuvers at speeds in excess of 500 mph IAS since this aggravates the compressibility pitch-up.
5. Jettison jato units at speeds between 250 and 300 mph IAS. At higher speeds units may strike the rear hooks and fuselage.
6. Do not open inflight refueling doors at speeds above 280 mph IAS.

## 7. AIRSPEED LIMITATIONS—WITHOUT PYLON TANKS INSTALLED.

***NOTE: The aircraft is redlined at .82 Mach No.***

The following indicated airspeeds at the prescribed altitudes and under the prescribed flight conditions shall not be exceeded with any loading configurations except with pylon tanks installed.

| Altitude — ft. | Flight Conditions | Indicated Airspeeds |
|---|---|---|
| Below 15,000 | Diving or maneuvering flight (other than straight and level flight 1g) | 40 mph below Red Line |
| Below 15,000 | Straight and level flight only — (1g) | Red Line |
| Above 15,000 | All | Red Line |

## 8. AIRSPEED LIMITATIONS—WITH 230 GAL PYLON TANKS INSTALLED

The following indicated airspeeds at prescribed altitudes and under prescribed flight conditions will not be exceeded.

| Altitude — ft. | Flight Conditions | Indicated Airspeeds |
|---|---|---|
| Below 15,000 | All | 80 mph below Red Line |
| Above 15,000 | All | 40 mph below Red Line |

# AIRSPEED LIMITATIONS

*Figure 5—1. Airspeed Limitations*

# POWER PLANT and *Instrument Limits*

***FUEL GRADE JP-1, JP-3, JP-4 OR GASOLINE, LOWEST GRADE AVAILABLE***

**AIR SPEED**

🟨 (200 MPH (174 KNOTS) LANDING GEAR DOWN)
(220 MPH (191 KNOTS) FLAPS 20° DOWN)

THE INSTRUMENT SETTING IS SUCH THAT RED POINTER WILL MOVE TO INDICATE LIMITING STRUCTURAL AIR SPEED OF 618 MPH (537 KNOTS) OR AIR SPEED REPRESENTING LIMITING MACH NO OF.82 WHICHEVER IS LESS

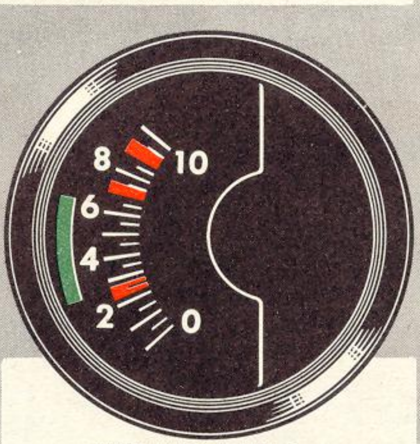
**TACHOMETER**

🟩 88-95% BEST CRUISING
🟥 100.5% MAXIMUM (30 MINUTES)

AFTER APPROXIMATELY 5 MIN AT NORMAL POWER TO REDUCE TEMPERATURE ANOTHER 30 MINUTE PERIOD AT MAXIMUM POWER IS PERMISSIBLE

**ACCELEROMETER**

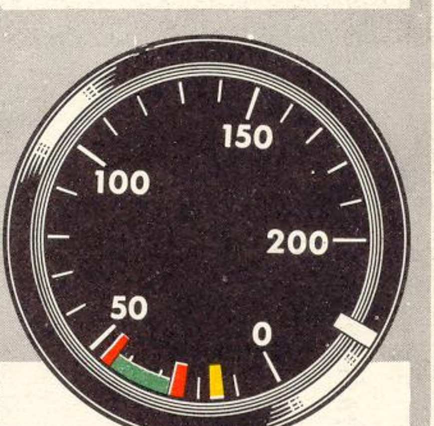
🟥 7.3G MAX AT DESIGN GROSS WEIGHT
🟥 5.0G MAX AT MAX GROSS WEIGHT
(WITH BOMBS OR PYLON TANKS)



**EXHAUST TEMP**

🟥 260°C MIN FOR FLIGHT
🟩 260°-665°C CONTINUOUS OPERATION
🟥 727°C MAX FOR FLIGHT
🟥 900°C MAX DURING STARTING AND ACCELERATION ONLY

NOTE: For engines with air inlet screens removed, reduce exhaust temperature 15°C.

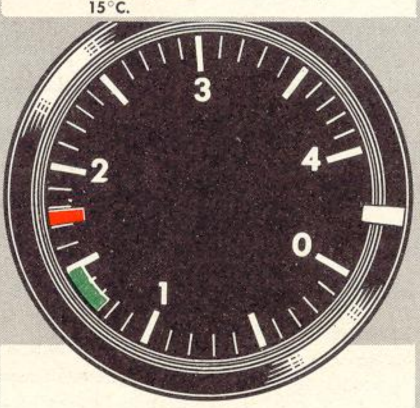


**OIL PRESSURE**

🟨 15 PSI MINIMUM DURING IDLE
🟥 25 PSI MINIMUM FOR FLIGHT
🟩 25-45 PSI CONTINUOUS OPERATION
🟥 45 PSI MAXIMUM (MOMENTARY)

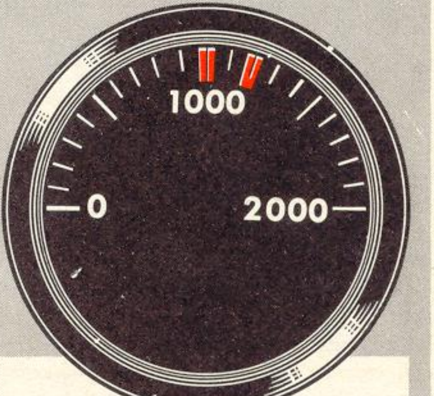
**FUEL PRESSURE**

🟥 40 PSI MINIMUM FOR FLIGHT
🟩 40-450 PSI NORMAL
🟥 520 PSI MAXIMUM



**HYDRAULIC PRESSURE**

🟩 1350-1500 PSI NORMAL
🟥 1750 PSI MAXIMUM



**CANOPY REMOVER**

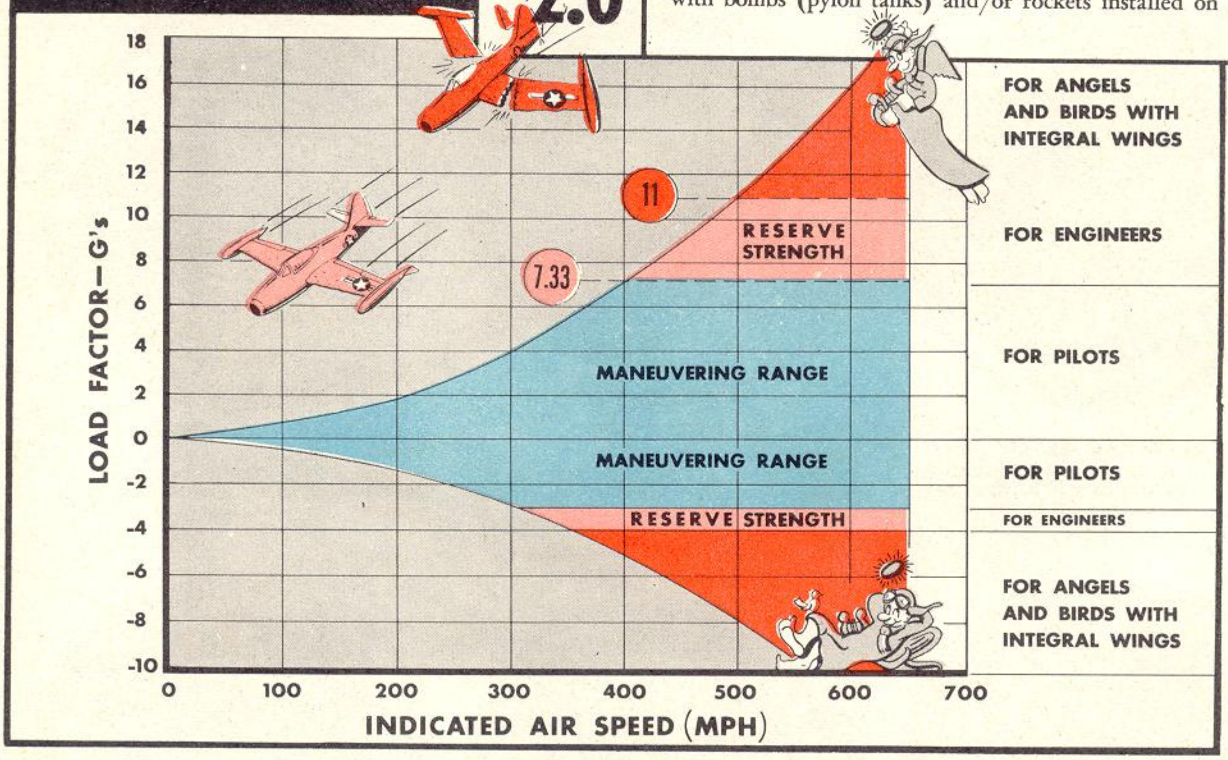
🟥 1200 PSI MAXIMUM
🟥 1000 PSI MINIMUM

*Figure 5—2. Instrument Markings*

# ACCELERATION LIMITATIONS

| | |
|---|---|
| **+7.33** | 1. Do not exceed a positive acceleration of 7.33g limit load with or without tip tanks installed, and/or eight rockets or less installed on launchers. Old style brazed rocket lug bands (without distinctive weld between lug and band) will be installed on bottom tiers only. |
| **-3.0** | 2. Do not exceed a negative acceleration of 3.0g limit load with or without tip tanks installed and without bombs, pylon tanks or rockets installed. |
| **+5.0** | 3. Do not exceed a positive acceleration of 5.0g limit load with bombs or pylon tanks installed |
| **-2.0** | 4. Do not exceed a negative acceleration of 2.0g limit load with bombs (pylon tanks) and/or rockets installed on launchers. |

# VG DIAGRAM



This is a velocity and g load diagram for the F-84 airplane. It shows what speeds and g's are possible and allowable for the airplane. The upper and lower curved lines represent the maximum load that the airplane can sustain before the wing stalls. At 150 mph IAS the upper curved line shows that the load can be 1g. This corresponds to the stalling speed of the airplane with flaps and gear up. At this speed the load cannot be greater than 1g because the wing cannot lift any more than the weight of the airplane at this airspeed. At 300 mph IAS it is possible for the airplane to develop a load of 4g. When the load on the airplane at 300 mph has been increased to 4g the airplane has reached the point where the wings cannot lift any more, and the airplane will stall if the pilot tries to increase the load. Further study of this diagram will show that the pilot cannot exceed the load of 7.33g unless the airplane is indicating a speed which is greater than 400 mph; therefore the pilot cannot overload the airplane unless the indicated airspeed is greater than 400 mph. Above this indicated airspeed of 400 mph it is up to the pilot to be careful to make sure that a load greater than 7.33g is not obtained. It is the high indicated airspeeds which pack the terrific wallop and the high indicated airspeeds are only possible at low altitudes. The blue area represents the area of g loads and airspeeds which may be used by the pilot without damage to the airplane. It should be possible for the airplane to perform all the maneuvers and tactics which are required, within the blue area.

*Figure 5–3. Operating Flight Strength Diagram* tip tanks or with bombs installed requires that good landing technique be employed to prevent wrinkling or buckling the wings during such landings.

8. Do not use tip tanks without fins installed. Under accelerated flight conditions of 4G at .74 Mach No. or higher speeds, with medium to aft center of gravity, airloads on tip tanks without fins produce a nosing-up tendency which can easily result in the application of G forces in excess of the strength of the aircraft.

## WEIGHT LIMITATIONS.

### MAXIMUM GROSS WEIGHT.

The maximum gross weight for take-off is approximately 23,100 lbs and for landing 14,850 lbs.

### BALLAST WEIGHTS.

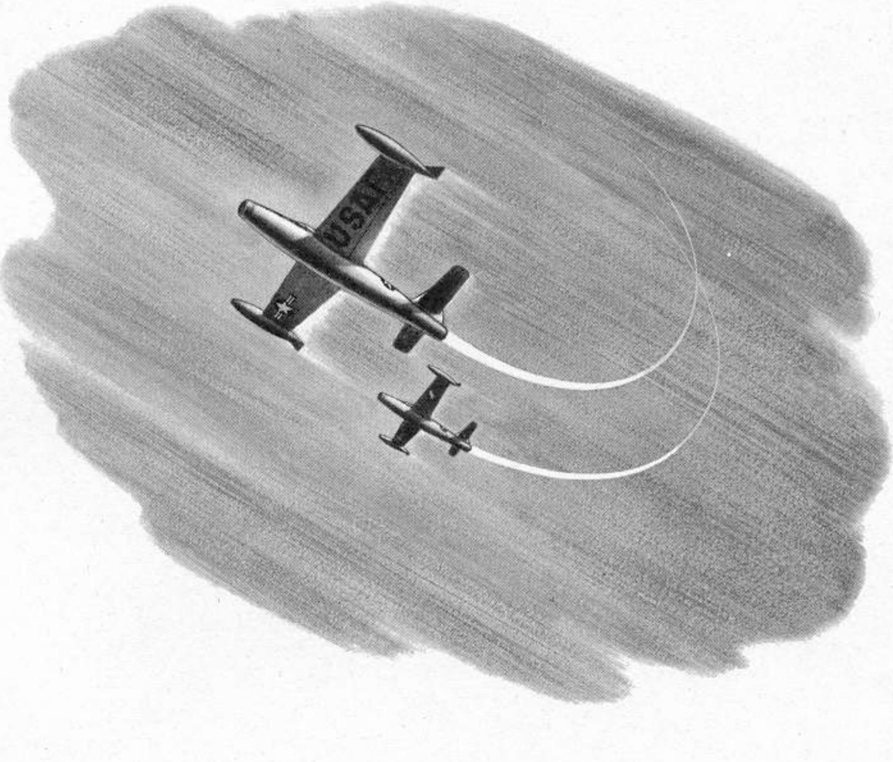
If ammunition is not carried for the fuselage guns, each ammunition can must be ballasted with a minimum of 45 pounds ballast. If the ballast is not carried the cg may move aft enough to make the stick forces light, therefore excessive g may be applied to the aircraft.

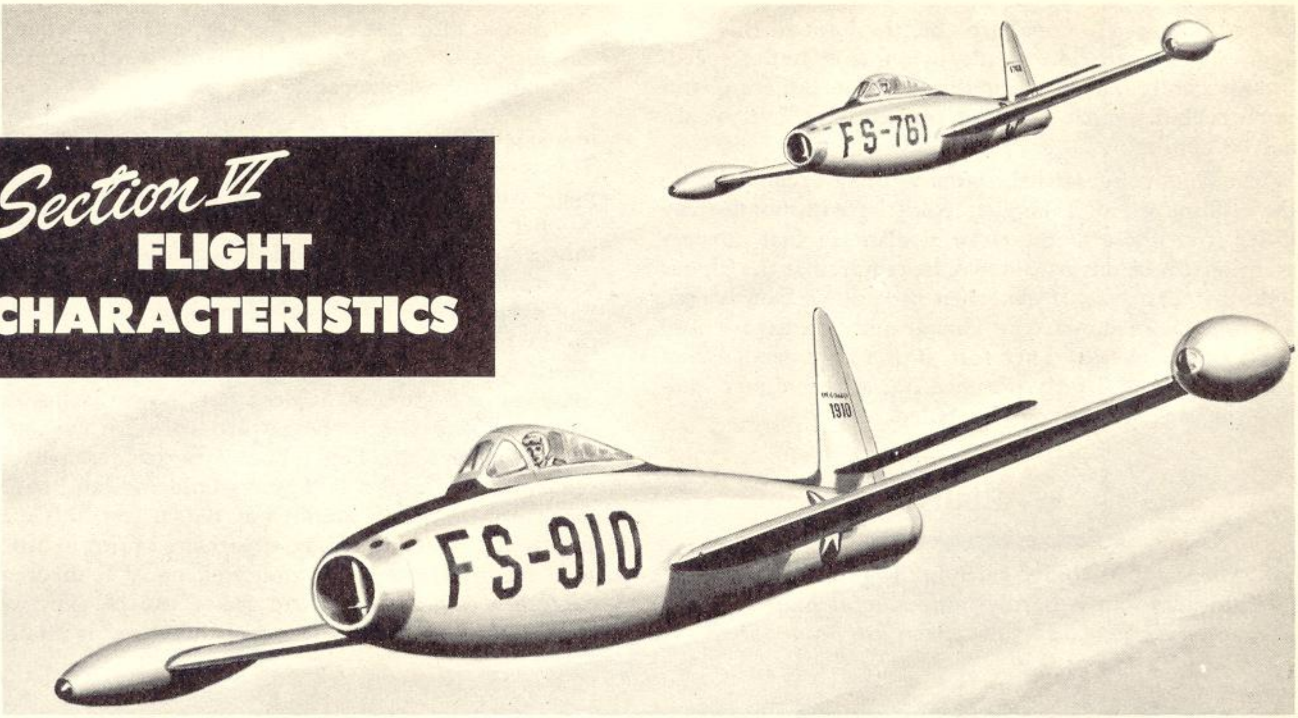
## NOSE WHEEL STRUT EXTENSION.

The nose wheel strut should have the correct extension as noted in figure 2—1. A bottomed or low strut will increase the nose wheel "unsticking speed" to above the take-off speed. Consequently this will increase the take-off speed and ground roll.

## CANOPY JETTISON.

The canopy should be jettisoned from the fully closed position as the canopy remover pneumatic guns contact the bumpers on the canopy only when the canopy is in the fully closed position. If the canopy is jettisoned from any position other than fully closed, these pneumatic gun pistons fire through the canopy glass and are ineffective in forcing the canopy away from the airplane.





# *Section VI* FLIGHT CHARACTERISTICS

## GENERAL FLIGHT CHARACTERISTICS.

The airplane is stable and trims well. For all speeds and altitudes, aileron forces can be set as desired by use of the aileron boost ratio selector switch. Only small amounts of rudder are necessary for coordination with ailerons for turns etc. Maneuvering elevator forces, on the other hand, are heavy at low altitude, but at high altitude, forces become increasingly lighter. The airplane can make good about 2.3g when maneuvering at 40,000 feet depending on load conditions. The rate of roll of the airplane is exceptionally good and aileron feel is excellent. Due to increased thrust, over early models, the acceleration is good for jet aircraft of this type. Flight characteristics of the airplane with tip tanks and rockets remain the same as for the clean airplane; however, with the installation of pylon tanks and bombs, changes in flight characteristics are as follows: When pylon tanks are installed, buffeting occurs before the critical Mach number of the airplane and therefore in this configuration the airplane is restricted to the buffet speed of the pylon tanks. When bombs are carried, buffeting may be noticed at lower Mach numbers depending on the type of bombs carried. This buffeting should define the limit speed for each particular bomb configuration.

### RED-LINE FLIGHT.

The airplane is red-lined at .82 Mach number which is the critical Mach number of the wing. This means that at .82 Mach (or at 82% of the speed of sound) the airflow on some point of the wing of this airplane has reached 1.0 Mach (or 100% of the speed of sound). Airflow at 1.0 Mach or 100% of the speed of sound forms shock waves (or compressibility) which very abruptly affect the trim of the airplane and produce buffet. In short, the red line on the airspeed indicator always indicates the highest airspeed at which the stability and control of the airplane remains normal. The airplane near red-line speed reacts as follows in unaccelerated flight (1g):

In accelerated flight (greater than 1g) the sharp compressibility pitch-up occurs at lower speeds, see figure 6—3. Since the pylon tanks buffet at a speed lower than

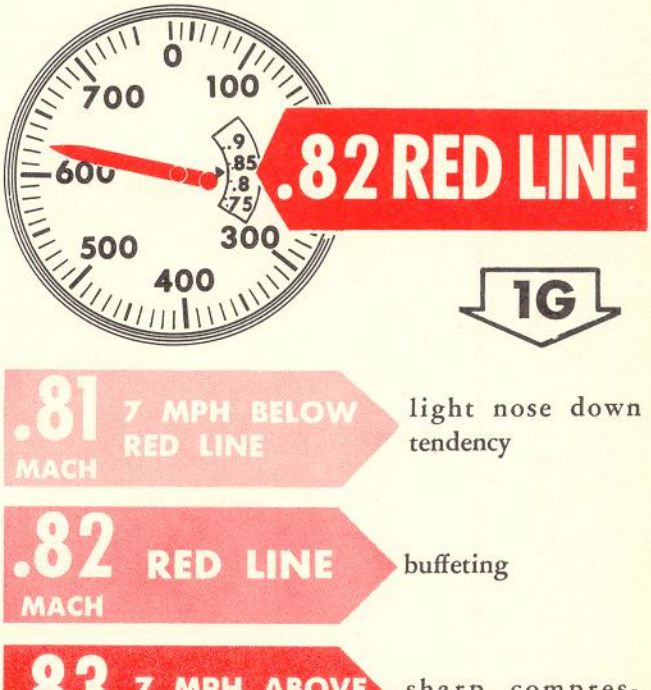


*Figure 6—1. Red-Line Flight*

the red-line speed of the airplane, the limit in this configuration is restricted to the pylon tank buffet speed. In this configuration then, the airplane buffeting and compressibility pitch-up noted for red-line flight would not be applicable.

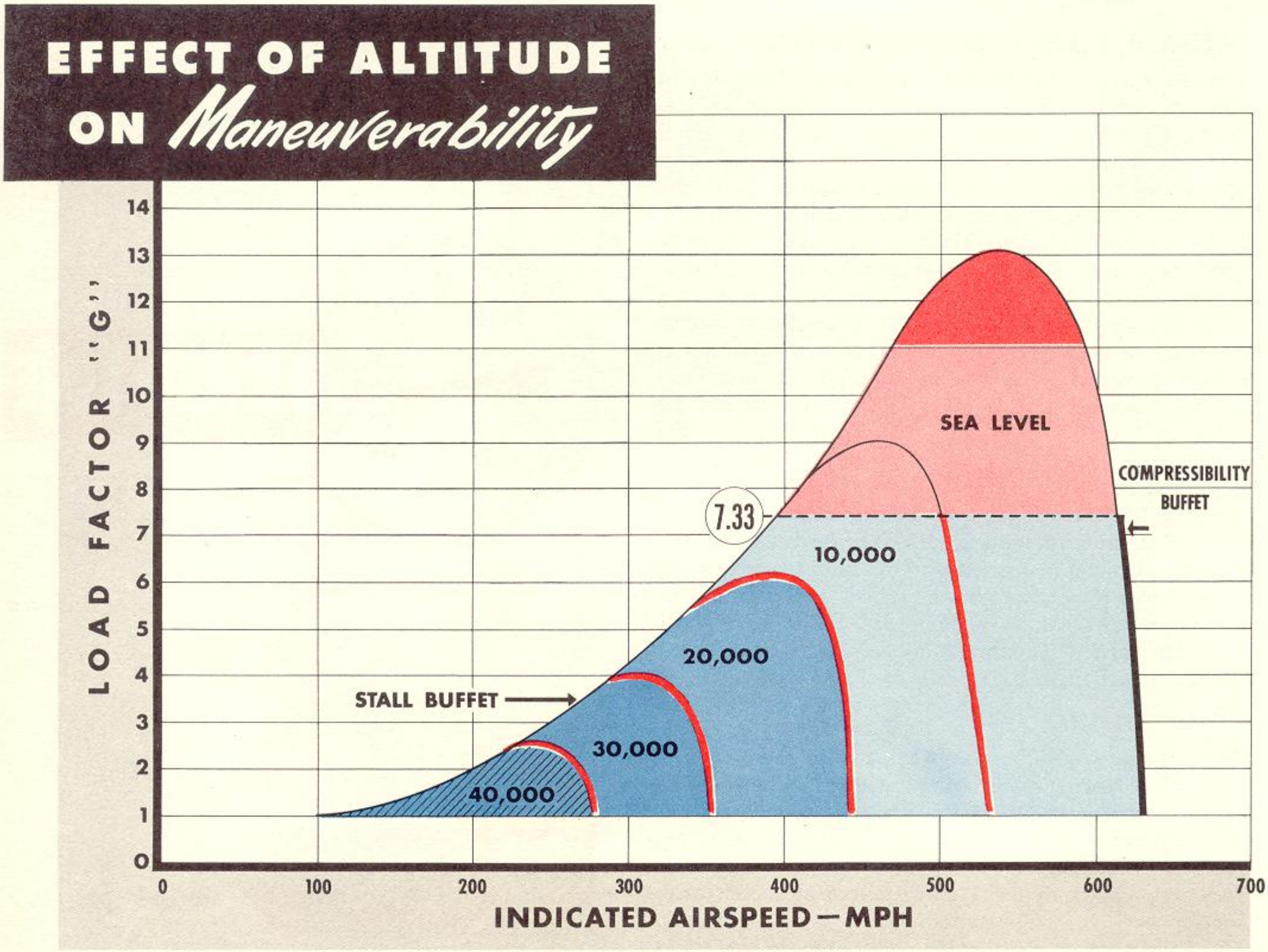
When bombs are carried, buffeting may occur prior to the red-line speed. Trim characteristics with bombs may differ from those of the clean airplane in that possibly additional nose down trim may be required at the higher indicated airspeeds. If abnormal nose down trim is used a sudden nose down trim change may be experienced upon bomb release. Therefore it is recommended that stick force not be fully trimmed out at the higher indicated speeds with bombs installed.

**WARNING**

The compressibility pitch-up is present at all altitudes, but is hardly noticeable at high altitudes. At 15,000 feet the effects are pronounced and at altitudes of 15,000 feet or below when airspeed is increasing, pitch-up is extremely sudden and dangerous.

**MANEUVERING FLIGHT.**

The speed and g's which may be reached on this airplane without exceeding red-line airspeed (critical Mach number of wing) for altitudes up to 40,000 feet are shown in figure 6–2, which is based on results of numerous tests. This figure shows the stall and compressibility buffet boundaries of the airplane and the tops of the curves rounded off to show the performance limits at which compressibility buffet will occur. Unlike the V-G diagram in Section V, it does not show the maximum load factor to which the airplane can be subjected if speeds beyond the buffet boundary are reached. Consequently, although this figure would indicate that ultimate load cannot be attained at 10,000 feet, this merely means that buffeting will be experienced prior to ultimate load factor. However, as indicated on V-G diagram in Section V the ultimate load factor can be experienced at any speed above 500 IAS and this speed is attainable

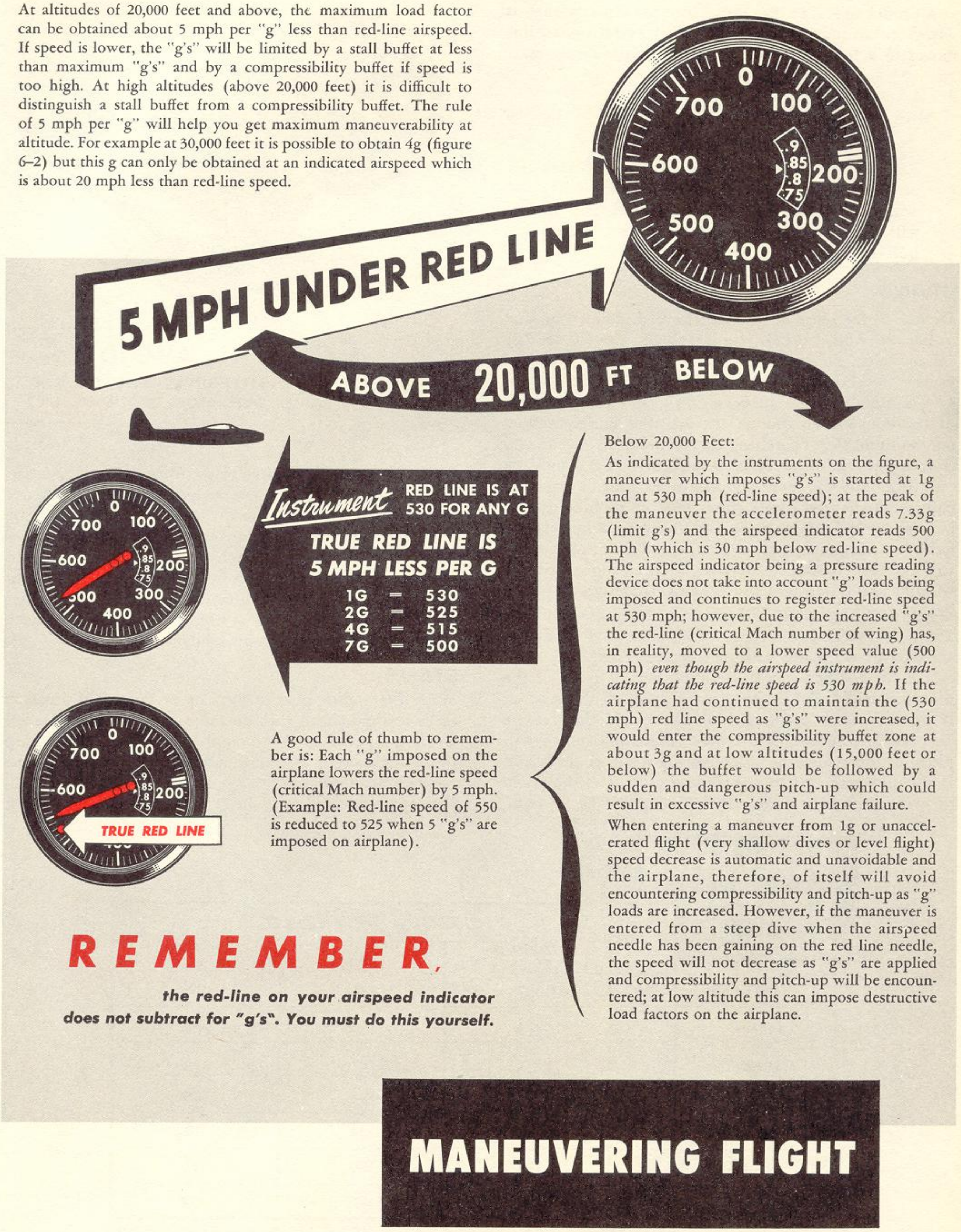


EFFECT OF ALTITUDE ON *Maneuverability*

*Figure 6–2. Effect of Altitude on Maneuverability*

Above 20,000 Feet:

At altitudes of 20,000 feet and above, the maximum load factor can be obtained about 5 mph per "g" less than red-line airspeed. If speed is lower, the "g's" will be limited by a stall buffet at less than maximum "g's" and by a compressibility buffet if speed is too high. At high altitudes (above 20,000 feet) it is difficult to distinguish a stall buffet from a compressibility buffet. The rule of 5 mph per "g" will help you get maximum maneuverability at altitude. For example at 30,000 feet it is possible to obtain 4g (figure 6–2) but this g can only be obtained at an indicated airspeed which is about 20 mph less than red-line speed.



| | | |
|---|---|---|
| 1G | = | 530 |
| 2G | = | 525 |
| 4G | = | 515 |
| 7G | = | 500 |

A good rule of thumb to remember is: Each "g" imposed on the airplane lowers the red-line speed (critical Mach number) by 5 mph. (Example: Red-line speed of 550 is reduced to 525 when 5 "g's" are imposed on airplane).

**REMEMBER,**

**the red-line on your airspeed indicator does not subtract for "g's". You must do this yourself.**

Below 20,000 Feet:

As indicated by the instruments on the figure, a maneuver which imposes "g's" is started at 1g and at 530 mph (red-line speed); at the peak of the maneuver the accelerometer reads 7.33g (limit g's) and the airspeed indicator reads 500 mph (which is 30 mph below red-line speed). The airspeed indicator being a pressure reading device does not take into account "g" loads being imposed and continues to register red-line speed at 530 mph; however, due to the increased "g's" the red-line (critical Mach number of wing) has, in reality, moved to a lower speed value (500 mph) *even though the airspeed instrument is indicating that the red-line speed is 530 mph.* If the airplane had continued to maintain the (530 mph) red line speed as "g's" were increased, it would enter the compressibility buffet zone at about 3g and at low altitudes (15,000 feet or below) the buffet would be followed by a sudden and dangerous pitch-up which could result in excessive "g's" and airplane failure.

When entering a maneuver from 1g or unaccelerated flight (very shallow dives or level flight) speed decrease is automatic and unavoidable and the airplane, therefore, of itself will avoid encountering compressibility and pitch-up as "g" loads are increased. However, if the maneuver is entered from a steep dive when the airspeed needle has been gaining on the red line needle, the speed will not decrease as "g's" are applied and compressibility and pitch-up will be encountered; at low altitude this can impose destructive load factors on the airplane.

*Figure 6–3. Maneuvering Flight*

at altitudes up to 15,000 feet. Note particularly that at any given altitude, the compressibility buffet or red-line moves to a lower speed as the load factor increases.

**WARNING**

> Roll-off may be encountered on some airplanes at high speeds before 15,000 feet, particularly with 230-gal. tip tanks installed. This roll-off will be aggravated by increase G's during pull-out.

## DIVING.

Diving, in the sense mentioned above, is defined by that maneuver which often requires high g's (6 or 7g) for recovery; the imposition of these "g's", as discussed under "MANEUVERING FLIGHT" in this section, lowers the red-line airspeed (critical Mach number of the wing) even though the airspeed indicator does not so indicate. Therefore, at altitudes below 15,000 feet, maneuvers which involve steep dive angles must be completed and the level flight attitude must be regained before the airspeed comes closer than 40 mph below the red-line. If the dive is steep and recovery is not started until the airspeed is close to the red-line airspeed, it will not be possible to recover a level flight attitude without encountering a sudden and dangerous pitch-up. Figure 6–4 illustrates a situation which must be avoided. The dive is steep and the airspeed is close to the red-line. To recover from this attitude requires "g's" and "g's" reduce the red-line speed by 5 mph per "g". Yet, if the pilot does not pull "g's" the airplane will hit the ground. If the dive is steep enough, he will exceed the red-line airspeed by continuing the dive, and the airplane will pitch-up and structural failure of the wings could result. If the pilot attempts to recover and pull "g's" the pitch-up will occur below the red-line airspeed. There is no good, certain and sure way to recover from such a situation. Recommendations for recovery (which have not been flight tested) indicate that the pull up must be the most gentle possible, within space limitations, maintaining a constant alert for pitch-up and keeping prepared for instant corrective action (push force on the stick to prevent excessive acceleration). Speed brake should not be extended for recovery at high indicated speeds since this aggravates the pitch-up tendency.

**AVOID**

STEEP DIVES WITH THE AIR-SPEED CLOSE TO THE RED LINE.

*Figure 6–4. Diving*

## STALLS.

With the landing gear or flaps up or down, the airplane stalls straight ahead with no roll-off tendencies. The stall warning occurs at 5 – 8 mph ahead of the stalling speed with slight airframe buffet increasing to a slight control stick shake at 2 – 4 mph above the stall. During accelerated stalls in 2g turns there is no roll-off.

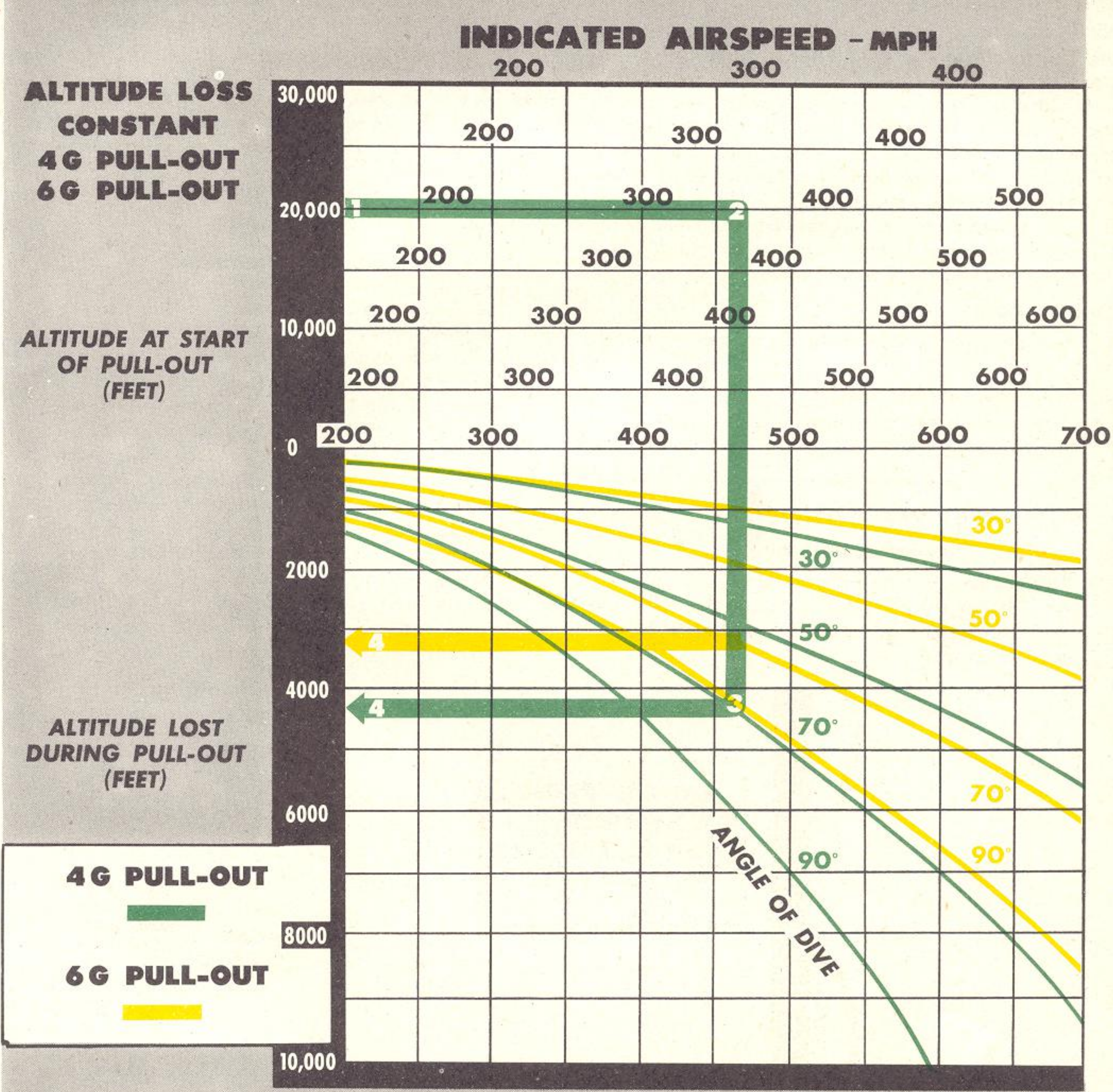
| STALLING SPEEDS MPH I.A.S. | FLAP DEFLECTION DEGREES | GROSS WEIGHT - LB. | | |
|---|---|---|---|---|
| | | MAXIMUM 22,242 | DESIGN 15,299 | MINIMUM 12,359** |
| TAKE-OFF (GEAR DOWN) | 20° | 159 | 131 | 117 |
| CLEAN (GEAR UP) | 0° | 176 | 146 | 132 |
| LANDING | | | | |
| 0° BANK (GEAR DOWN) | 40° | 130 | 124 | 109 |
| 30° BANK (GEAR DOWN) | 40° | 165* | 134 | 118 |
| 45° BANK (GEAR DOWN) | 40° | 185* | 150 | 133 |
| 60° BANK (GEAR DOWN) | 40° | 227* | 182* | 162 |

*INSUFFICIENT POWER FOR LEVEL FLIGHT

**CLEAN AIRPLANE PLUS 10% RESERVE FUEL

*Figure 6–5. Stall Chart*

# DIVE RECOVERY CHART



HOW TO USE CHARTS: Select appropriate chart, depending upon acceleration (4G or 6G) to be held in pull-out; then –

1. Enter chart at altitude line nearest actual altitude at start of pull-out. (For example, 20,000 ft).
2. On scale along altitude line, select point nearest the IAS at which pull-out is started (350 miles IAS).
3. Sight vertically down to point on curve of dive angle (70°) directly below airspeed.
4. Sight back horizontally to scale at left to read altitude lost during pull-out.

(Constant 4G pull-out 4400 ft; Constant 6G pull-out 3100 ft).

Figure 6–6. Dive Recovery Chart

Stall warning in this attitude occurs with a slight buffeting at 25 mph above the stall, increasing to a control stick shake at 10 mph above the stall. Stall recovery is accomplished by conventional methods.

## SPINS.

The spin characteristics of the airplane are good. It must be forced into a spin. The airplane, without tip tanks or with empty tip tanks, will recover from a spin in less than 1 1/2 turns. Intentional spins, with fuel in the tip tanks are prohibited since the added weight at the wing tips will aggravate the spin. Intentional spins, with empty tip tanks, should not be attempted below 15,000 feet. Elevators are to be maintained full up during the spin, to minimize any longitudinal oscillation. With aft cg the spins are slightly more flat but the longitudinal oscillations will be much milder.

### SPIN RECOVERY.

The best technique, indicated by flight tests, is as follows:

a. Apply full opposite rudder.
b. Return elevators to approximately neutral.
c. Ailerons neutral.

**WARNING**

As elevators are very effective, bring stick only partially toward neutral as a full neutral tick tends to over control to a "tuck under" flight path on recovery.

## FLIGHT CONTROLS.

### STICK FORCES.

Figure 6—7 indicates the quantitive values of stick forces at high and low altitudes. Note that stick forces to produce a given "g" decrease as altitude is increased. Note also that at the high altitudes the curves are shorter because the "g" which can be produced before the airplane stalls are less.

### TRIM CHANGES.

An increase in stick force with g's is provided for the pilot's safety. At low altitudes the stick forces are higher and these forces may be safely alleviated by sensible use of the trim tab.

**WARNING**

Trim tabs should not be used as a primary means of control. No maneuvers should be accomplished solely by use of the trim tabs. The use of trim tabs effectively increases your apparent strength by reduction of required stick force. The high stick forces experienced without the use of trim are intended to protect you and the airplane; accordingly, trim tabs when used during a maneuver should only be used to lighten the stick forces to tolerable values and not to zero. Trim may be used with caution, but rapid use of trim, use of trim in anticipation of a maneuver, or use of trim to reduce stick forces to very small values in maneuvers may result in airloads on the airplane sufficient to cause complete structural failure.

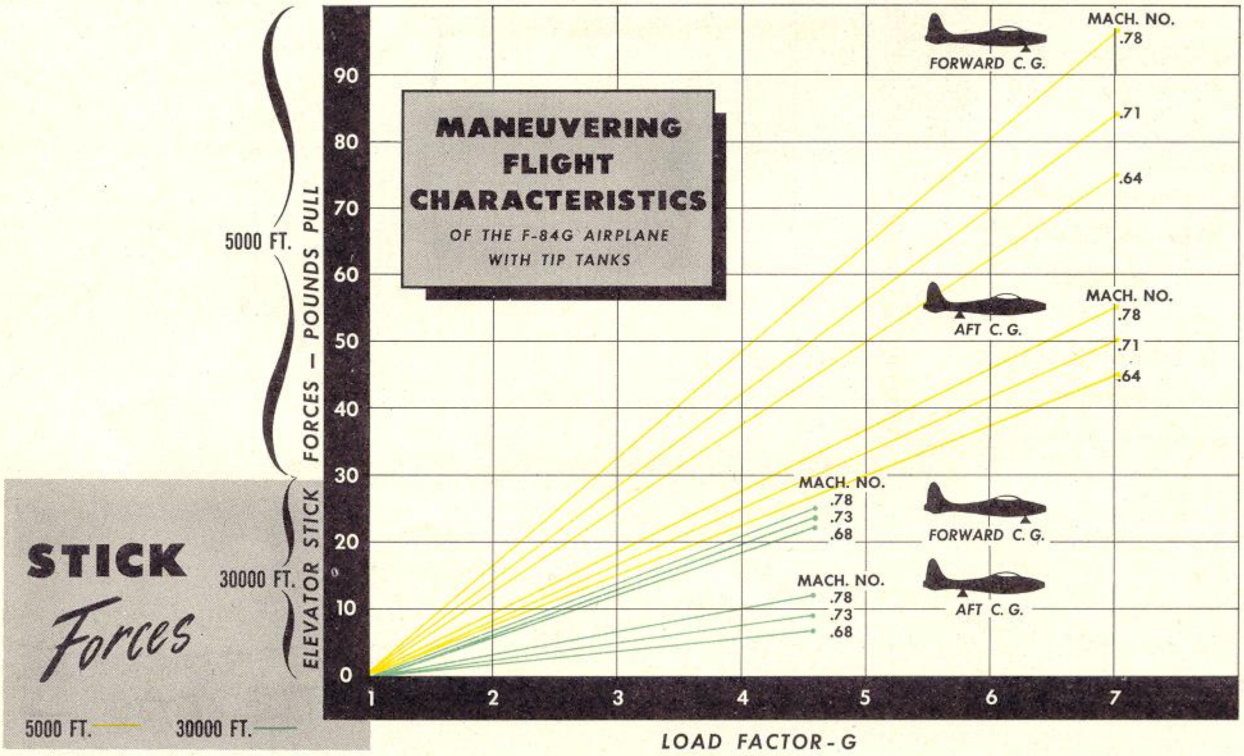


*Figure 6—7. Stick Forces Diagram*

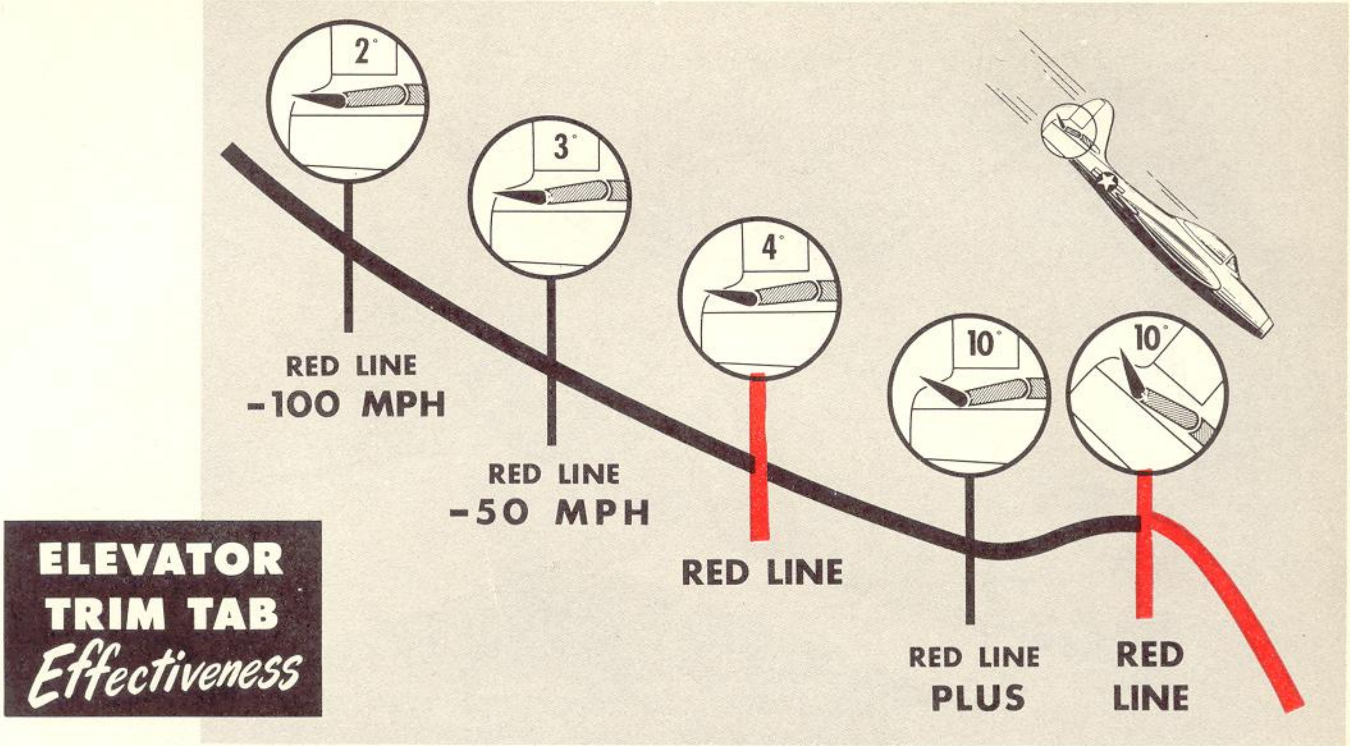


*Figure 6—8. Elevator Trim Tab Effectiveness*

## TRIM EFFECTIVENESS.

When speed is increased more trim is required; the ratio between speed and trim required remains fairly constant until red-line speeds are approached where loss in control effectiveness is experienced. Figure 6—8 depicts loss in trim tab effectiveness at the higher Mach numbers in excess of red-line airspeed. The curved line represents the flight path of an airplane which is diving and as the speed increases, the force on the stick is decreased by trimming the airplane. As the speed increases up to the red-line the action of the trim system is normal in that it takes only a small movement of the trim tab to decrease the stick force to zero or to a small amount. When the speed exceeds the red-line airspeed the stability and control no longer behave in a normal manner. Beyond the red-line airspeed it takes excessive trim tab angles to trim the airplane, and it is possible to use the full trim tab movement and yet not completely trim the airplane. No unusual effects are noticed until the airplane slows down and here lies the danger. As speed is reduced to red-line speed, the trim tab becomes extremely effective abruptly and the airplane can now be out of trim to the extent that it requires excessive pilot effort to control.

## RUDDER TRIM CHANGES.

Since no torque effect is produced by the jet engine, rudder forces are zero if the fixed rudder tab is adjusted properly.

## ELEVATOR TRIM CHANGES AT LOW ALTITUDE — BELOW 25,000 FEET.

The following elevator trim changes apply to unaccelerated flight (lg) only. During maneuvering flight (higher than lg) the flight characteristics specified below occur at a lower Mach number. Diving to these Mach numbers is prohibited below 15,000 feet.

1. At speeds approaching 7 mph below red line (.81 Mach number) nose-down trim required.
2. At just below mph red line (.81 Mach number) a slight nose down tendency is experienced such that if the trim tab setting is maintained at this point, slight back pressure is required as Mach number is slowly increased.

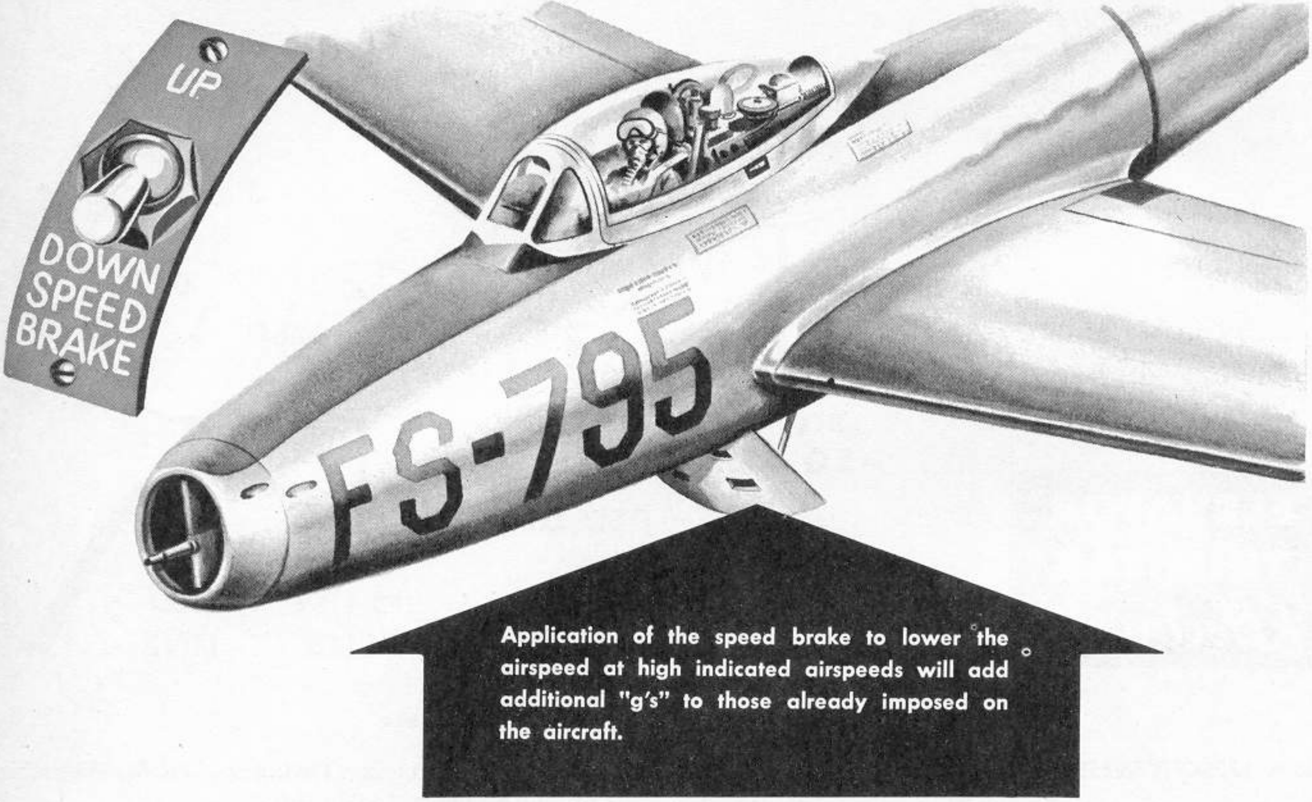
**Note**

> The airplane is restricted to .82 Mach number (red-line) for straight and level flight, however, if speed is inadvertently increased beyond red line (.82 Mach number) trim requirements are listed below.

3. At .82 to .83 Mach number (from red-line to 7 mph above red-line) pull force decreases as speed approaches .83 and at .83 Mach number push force is required.
4. At .835 to .84 Mach number (10 to 13 mph above red-line) a sudden violent pitch-up occurs. This condition even with full nosedown trim will require a push force of 20 to 70 lbs depending on altitude to maintain airplane attitude. Unless you are fully prepared, a violent pitch-up can occur. The airplane should not be trimmed beyond the red-line airspeed because excessive trim tab angles are required. If the airplane is trimmed beyond the red-line the airplane will be excessively nose heavy as soon as the Mach number decreases.

## ELEVATOR TRIM CHANGES AT HIGH ALTITUDE — 25,000 TO 40,000 FEET.

Reduced aerodynamic forces at altitudes over 25,000 feet make it possible to overcome the pitch-up at critical Mach number.



Application of the speed brake to lower the airspeed at high indicated airspeeds will add additional "g's" to those already imposed on the aircraft.

*Figure 6–9. Speed Brake Effect*

**CAUTION**

Speed decreases rapidly after airplane pitch-up at critical Mach number, therefore do not use excessive nose-down trim as violent pitch-down may result.

### AILERON.

Maneuvers at high altitude should be approached with a moderate boost ratio due to lightening of stick forces. The stick forces vary inversely with the boost ratio. Control centering is good without any "hunting" characteristics. With a high aileron boost ratio (10.8:1) and a high airplane speed (300 to 400 mph IAS) the airplane stick forces are light and the stick tends to center after deflection.

### SPEED BRAKE.

When the speed brake is used at high indicated airspeed, there will be a definite nose-up tendency. This nose-up tendency may be counteracted by applying nose-down trim tab at the same time the extension of speed brake is started.

**CAUTION**

Because of the fast acting speed brake it is necessary to start retrim at the same time or slightly before actuating the speed brake switch since the time for the required elevator trim tab change is longer than that for the airplane to attain a new trim due to the speed brake extension at the higher air speeds. This will require some elevator forces to maintain attitude.

Application of the speed brake to lower the airspeed at high indicated airspeeds without compensating trim will add additional g's to those already imposed on the aircraft.

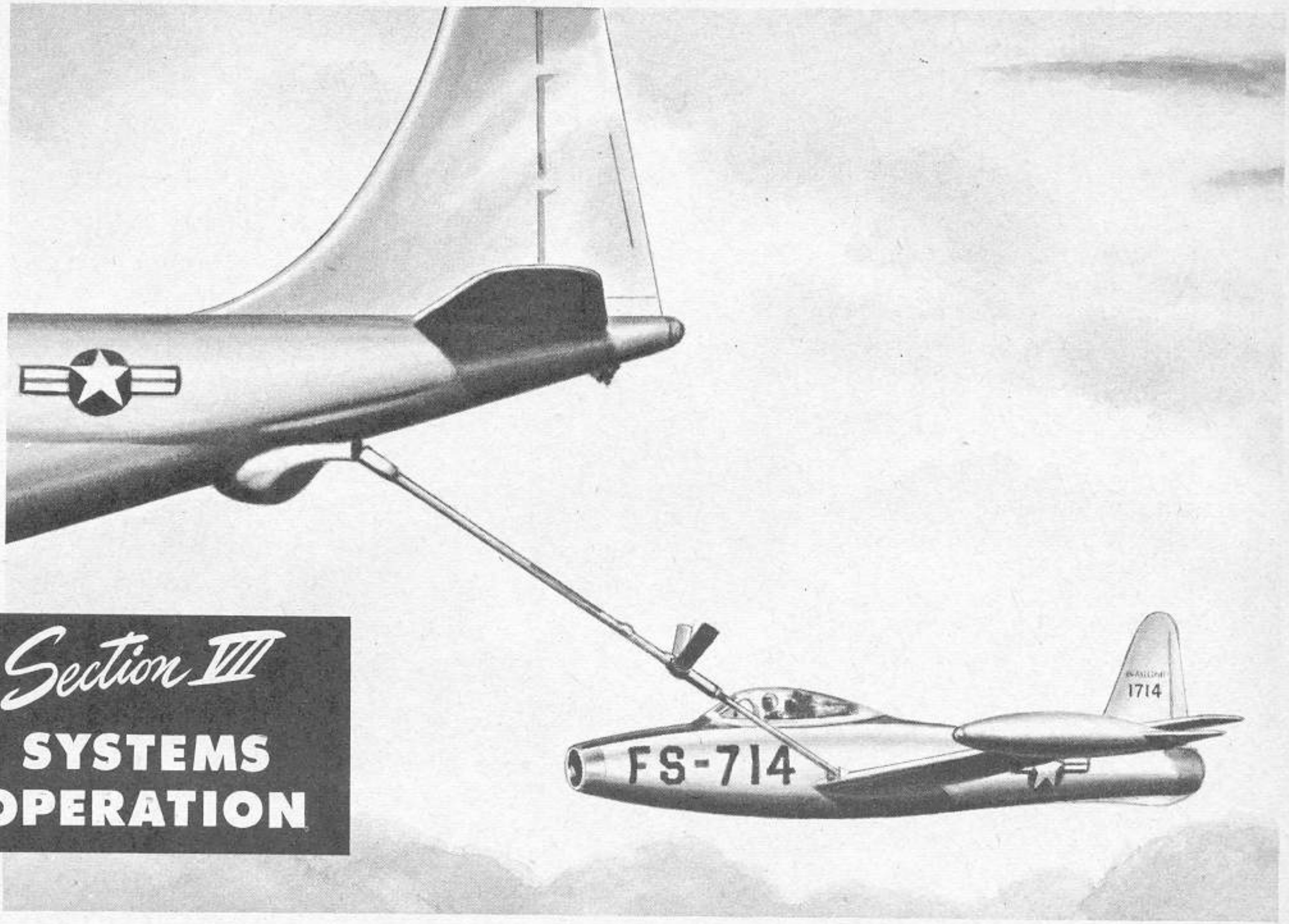
**CAUTION**

The speed brake should not be extended for recovery from maneuvers at speeds in excess of 500 mph IAS due to the large trim change experienced.

The action of the speed brake when pylon tanks are installed is effectively increased and produces much higher stalling moments. The stick forces and airplane reaction encountered at 250 IAS are equivalent to those encountered at 400 IAS without pylon tanks.

**WARNING**

DO NOT attempt take-off with speed brake extended.



# Section VII
# SYSTEMS OPERATION

## ENGINE.

### ENGINE ACCELERATION.

When increasing thrust, move throttle slowly and as rpm increases throttle may be advanced more rapidly. If operating on the normal fuel system on the main fuel control will compensate for rapid movement of the throttle at all altitudes. If operating on the emergency fuel system the throttle must be moved slowly to prevent compressor stall or flame-out at all altitudes.

### COMPRESSOR SURGE AND STALL.

Compressor surge (or pulsation) may result from too rapid engine acceleration, especially at altitudes above 20,000 feet. If acceleration is made with very high tail pipe temperatures the pulsations will be more severe. If the rate of acceleration was a marginal case, surge may be absent and compressor stall will occur. Surge or stall may be recognized in flight by one or more of the following characteristics.

1. Pulsation roaring noise.
2. Loss of thrust.
3. Rapid rise of tail pipe temperature.
4. Loss of acceleration or possibly deceleration.
5. Long flame from tail pipe.
6. Possible flame-out at high altitude.

Whenever such conditions are encountered, immediately retard throttle until tail pipe temperature decreases; then accelerate more slowly to desired rpm.

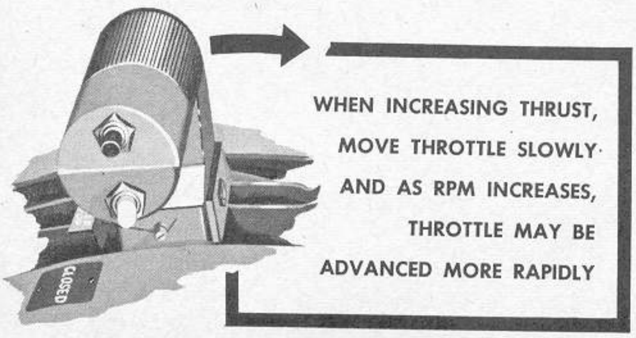


*Figure 7—1. Throttle Movement*

**WARNING**

At altitudes above 15000 feet and at low aircraft speeds, some J35-A-29 engines may develop compressor stall if the throttle is rapidly advanced from idle to full rpm. Compressor stall causes pulsating airflow through the engine, which is easily detected through vibration of the aircraft, and is accomplished by a rapid and continued rise of exhaust gas temperature. There is no evidence that compressor stall results in any engine damage provided it is stopped as soon as possible, and the exhaust gas temperature is not allowed to exceed the maximum allowable temperature during acceleration. If stall is encountered, retard the throttle quickly to the idle stop or until the vibration stops and the gas temperature begins to decrease. As soon as the stall has been stopped, the throttle may be advanced to the desired setting, but this should be done at a slow enough rate to prevent a repetition of the stall. Experience indicates that stall will not be encountered below 15000 feet regardless of aircraft speed or throttle manipulation. It has been found that stall will not occur at any altitude or any aircraft speed if the throttle is advanced normally.

### ACCELERATION FLAME-OUT.

Acceleration flame-out may result from compressor surge and is most likely to be encountered at high altitude. It is indicated by loss of thrust, drop in exhaust temperature and deceleration. If the exhaust temperature does not drop too low it may mean some of the combustion chambers are still ignited. An attempt may be made to relight the other chambers by retarding the throttle to IDLE and then advancing it slowly.

### ENGINE NOISE AND ROUGHNESS.

Engine roughness in flight may occur on some airplanes, especially when operating at high powers above 15,000 feet altitude. Usually this roughness can be eliminated by changing the rpm. However, if engine roughness occurs at all altitudes and engine speeds it may indicate some mechanical failure, and an immediate landing should be made.

### STARTING SYSTEM.

The starting system is automatic so that an engine start is accomplished without holding the starter switch. A holding coil will keep the starter system operating until the combination of the battery current drop, together with the decreased current requirements of the starter reach a predetermined value at which time the starter circuit is deenergized if operating from the airplanes batteries. The current requirements of the starter are such that if operated from an external power source, delivering a constant current, the holding coil may not drop out at the required time. Therefore when the engine is started the ground start switch is actuated to stop the starting cycle when a selected rpm or time limit is reached to ascertain that the starting system is deenergized.

### DIFFERENCES IN FUEL GRADES.

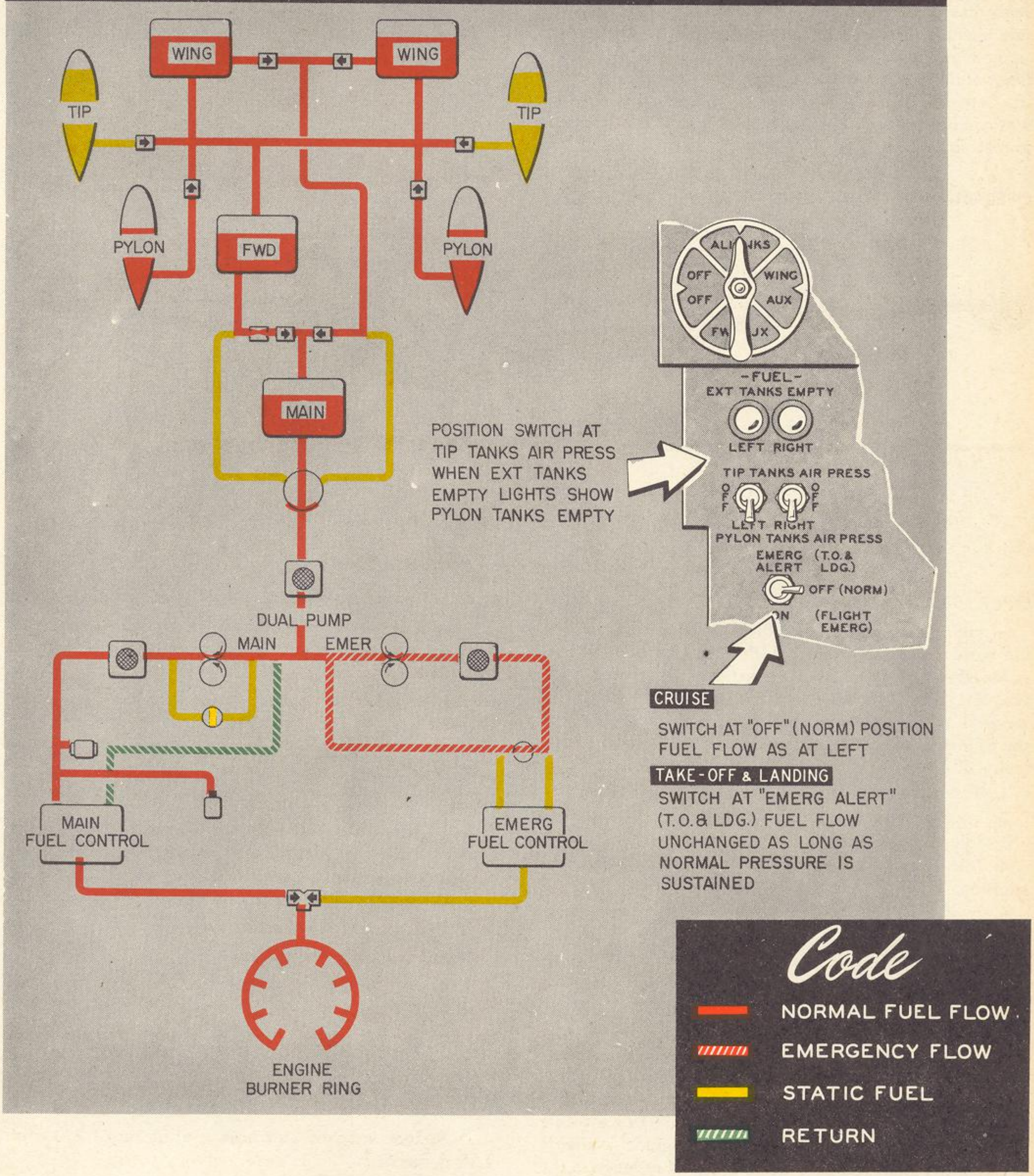
The airplane servicing diagram (figure 1—25) notes four fuels that can be used in the aircraft. There is little difference between JP-3 and gasoline, therefore, they will be discussed as JP-3 fuel. The main advantage of JP-4 fuel is the decreased evaporation losses due to boiling and foaming in the tanks. Although JP-3 and JP-4 fuels have some distinct disadvantages for use in jet aircraft, they are recommended as the availability is much greater from a quantity of crude oil than JP-1.

## FUEL

During normal operation fuel is transferred first from the pylon tanks to the internal tanks so that the pylon tanks may be dropped to reduce drag. Fuel is then transferred from the wing tip tanks to the internal tanks until all external fuel is consumed. The wing tip tanks need not be jettisoned as they contribute to lift and the drag is negligible. Fuel is then transferred simultaneously from the wing and forward tanks to the main tank at varying flows so that the wing tanks will empty while there still remains 0 to 52 gals in the forward tank. The fuel remaining in the main tank is then consumed. Inasmuch as the normal fuel system is fully automatic, with the fuel tank selector in the ALL TANKS position, the pilot does not have to select the various fuel flow patterns except for manual selections of the external tanks air pressure. If it is necessary to operate on either the wing or forward auxiliary fuel flow patterns the fuel tank selector should not be turned through the OFF position as a flame out may occur due to a lack of fuel supply.

*Figure 7—2. Fuel System Management (Sheet 1 of 2)*

# SYSTEM *Management*



POSITION SWITCH AT TIP TANKS AIR PRESS WHEN EXT TANKS EMPTY LIGHTS SHOW PYLON TANKS EMPTY

**CRUISE**

SWITCH AT "OFF" (NORM) POSITION FUEL FLOW AS AT LEFT

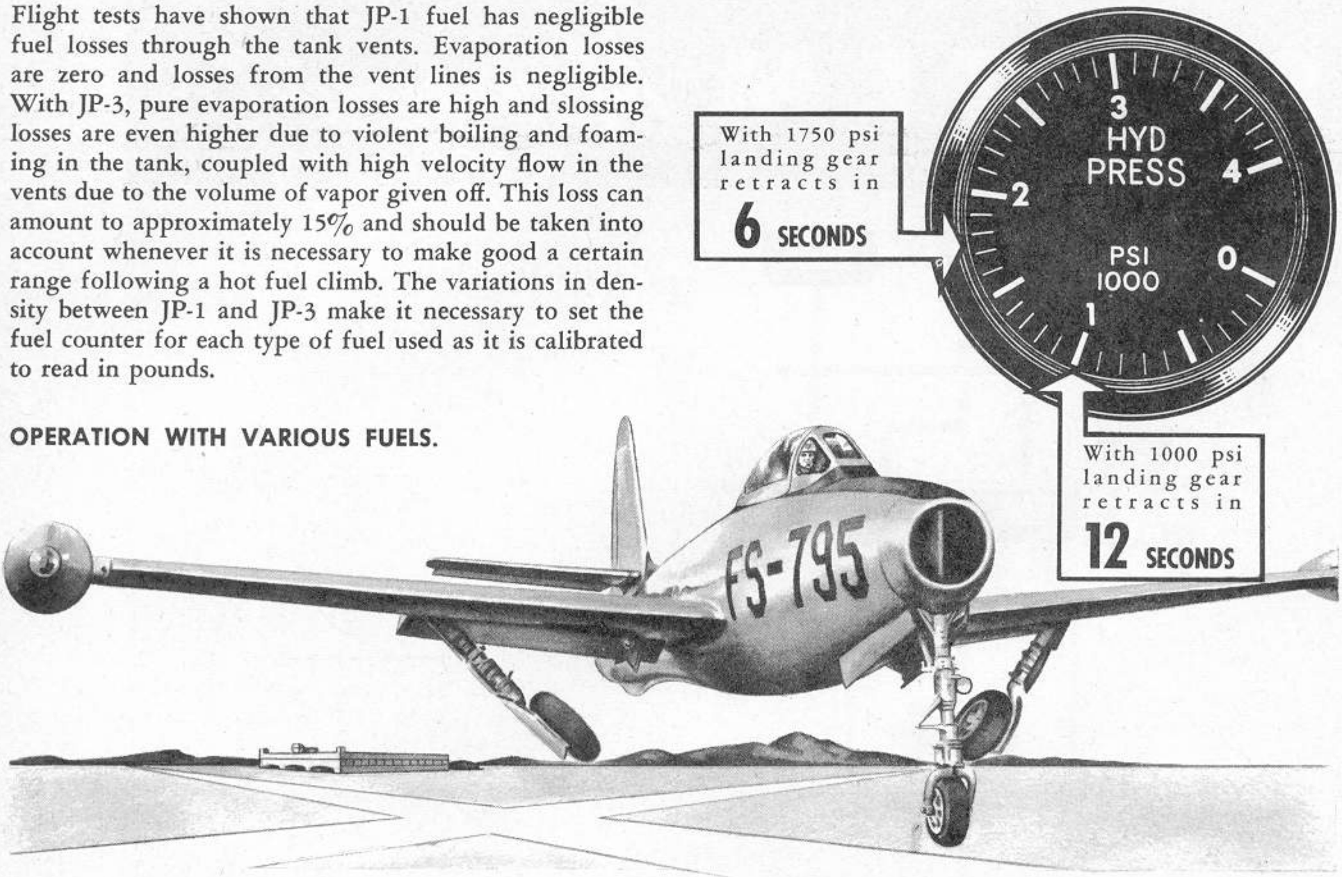
**TAKE-OFF & LANDING**

SWITCH AT "EMERG ALERT" (T.O.& LDG.) FUEL FLOW UNCHANGED AS LONG AS NORMAL PRESSURE IS SUSTAINED

*Figure 7—2. Fuel System Management (Sheet 2 of 2)*

Flight tests have shown that JP-1 fuel has negligible fuel losses through the tank vents. Evaporation losses are zero and losses from the vent lines is negligible. With JP-3, pure evaporation losses are high and slossing losses are even higher due to violent boiling and foaming in the tank, coupled with high velocity flow in the vents due to the volume of vapor given off. This loss can amount to approximately 15% and should be taken into account whenever it is necessary to make good a certain range following a hot fuel climb. The variations in density between JP-1 and JP-3 make it necessary to set the fuel counter for each type of fuel used as it is calibrated to read in pounds.

## OPERATION WITH VARIOUS FUELS.



With 1750 psi landing gear retracts in **6 SECONDS**

With 1000 psi landing gear retracts in **12 SECONDS**

*Figure 7—3. Landing Gear Retraction Time*

### OPERATION WITH JP-1 FUEL.

The engine fuel control is calibrated and adjusted for use with fuel in accordance with Spec No. MIL-F-5624 grade JP-4 (JP-3) or gasoline in accordance with Spec No. MIL-F-5572 lowest grade available. If the aircraft is serviced with fuel Spec. No. MIL-F-5616 grade JP-1 the following changes may occur and the engine fuel control will have to be readjusted.

1. Top rpm on main fuel system will increase.
2. Top rpm on emergency fuel system will increase.
3. Idle rpm on main fuel system will decrease.
4. Idle rpm on emergency fuel system will increase slightly.
5. Engine may not accelerate to idle rpm from cranking speed.
6. Engine may shift to emergency operation during snap decelerations to idle, with the emergency system alerted.

### OPERATION WITH JP-3 OR JP-4 FUEL.

If the engine fuel control has been adjusted for operation with fuel in accordance with Spec No. MIL-F-5616 grade JP-1 and is then serviced with fuel in accordance with Spec No. MIL-F-5624 grade JP-4 (JP-3) or gasoline in accordance with MIL-F-5572 lowest grade available the following changes may occur and will necessitate the readjustment of the engine fuel control system.

1. Full rpm on main fuel system will decrease.
2. Full rpm on emergency fuel system will decrease.
3. Idle rpm will increase or main fuel system and time required for engine to decelerate to idle will be increased.
4. Idle rpm on emergency fuel system may be slightly decreased.
5. Higher starting tail pipe temperatures will be experienced.

### OPERATION WITH JP-4 FUEL.

Due to the wide over-lapping tolerances for specific gravity which are not limited to viscosity, it may be necessary to adjust the main fuel control or the engine and main fuel control combination.

1. Full throttle rpm may increase.
2. Altitude idle rpm may change.
3. If an altitude idle adjustment has been made the following flight check will be necessary.
    a. Climb to 20,000 feet, 300 mph IAS with full throttle.
    b. Snap throttle back to idle and at same time extend speed brake.
    c. Reduce airspeed and hold altitude until 220 mph IAS is reached.
    d. Read idle rpm. If altitude idle rpm of less than 67%, the altitude idle should be adjusted.

**CAUTION**

Burst accelerations from subnormal rpm may result in compressor stall.

## HYDRAULIC POWER-SUPPLY SYSTEM.

The hydraulic power supply system operates with a normal pressure of 1350 to 1500 psi. This pressure is maintained by an engine driven variable displacement pump. A relief valve in the down side of the landing flap system, set to crack at 1000 psi, is employed so that the air loads on the landing flaps will cause the flaps to retract from 40 to 20° if the airspeed is excessive. During normal take-off with the flaps at 20° (landing flap control NEUT) the landing gear is retracted with hydraulic pressure of 1350 to 1500 psi in approximately six seconds. In the approach prior to landing, the flaps are positioned to 40° (landing flap control DOWN) which will cause the hydraulic pressure to relieve at 1000 psi. Therefore in the event of a wave-off or go-around, the landing gear is retracted with hydraulic pressure of 1000 psi which increases the retracting time to approximately 12 seconds. Normal hydraulic pressure (1350 to 1500 psi) may be obtained by returning the landing flap control to the NEUT position with the flaps at 40°. This eliminates the landing flap relief valve from the landing gear system but does not prevent the landing flaps from retracting to 20° due to excessive speeds.

## FLIGHT CONTROL SYSTEM.

During high speed flight a roll to the right or left may be experienced. If the roll is trimmed out and speed is reduced, it may become necessary to retrim to the original condition. If after landing, there is no visible cause for the roll it may have been caused by one of the rear rocket post doors opening. One or more doors may open during high speed flight and close again after the speed is reduced. If a right hand door opens the roll will be to the left and if the left hand door opens the roll will be to the right.

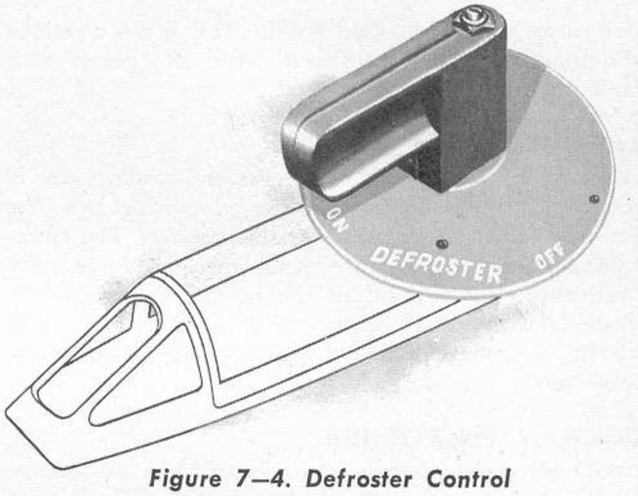
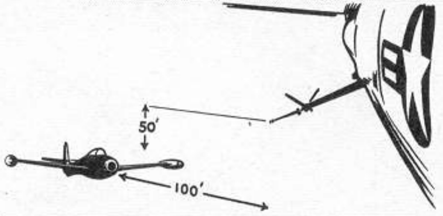


*Figure 7—4. Defroster Control*

## AILERON BOOST SYSTEM.

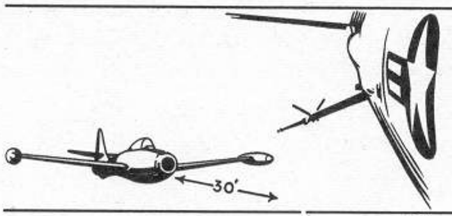
The aileron boost system utilizes hydraulic pressure to actuate the ailerons but electrical power is used to select the aileron boost ratio desired. If a vibration is felt on the control stick when maneuvering it usually will be caused by improperly seated internal valves in the boost

## PILOT TECHNIQUE *Inflight Refueling*

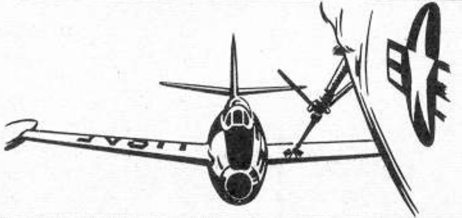


### OBSERVATION POSITION

A position 100 feet directly behind and 50 feet below the tanker airplane is known as the observation position. Upon reaching the observation position, the receiver pilot should trim the airplane, stabilize the throttle setting so as to stay in that position and check the throttle friction lock setting. Elevator trim is not critical as it may require slight retrim as the receiver flies into the tanker downwash.



When going from the observation position to the contact position, the recommended procedure is to move forward and upward simultaneously to a position at the proper elevation but approximately 30 feet aft of the contact position and then move straight forward from that position. It is possible, though somewhat more difficult, to move directly from the observation position to the contact position.



### CONTACT POSITION

While moving into the contact position the receiver pilot will rely primarily upon his visual observations and verbal instructions from the boom operator. The pilot director lights, located on the bottom of the tanker, are actuated by movements of the boom and therefore provide assistance only when in contact. When contact has been established, the receiver pilot's visual observations are confirmed by the pilot director lights and the boom operator's instructions.

*Figure 7—5. Pilot Technique—Inflight Refueling* unit or an improperly bled system. This is not a serious condition and the pilot should enter this observation on Form 1.

## LANDING GEAR SYSTEM.

A vibration, felt after take-off when the landing gear is retracted may be mistaken for engine roughness but could be caused by an unbalanced nose wheel. The vibration caused by an unbalanced nose wheel would be more noticeable after take-off in the heavier configurations as the take-off speed is higher. If the vibration is caused by the nose wheel it will diminish as the wheel coasts to a stop.

## COCKPIT ENCLOSURE.

Under certain flight conditions a whistling noise may be heard that is caused by the air flow around the canopy skirt. At high altitudes the canopy frame and cockpit sides expand because of increased pressure. Either at altitude or after descent the canopy frame may "pop" or snap. This is caused by the canopy frame shifting or snapping back into place over the canopy rails and is no cause for concern.

## HEATING, PRESSURIZING AND VENTILATING SYSTEM.

The cabin pressure dump valve may chatter at some altitudes but does not cause any discomfort due to cabin pressure surges. Under more severe conditions the dump valve may "pop" with a more audible sound. These conditions are not serious and if they occur will disappear without any corrective action.

### DEFROSTER OPERATION.

Because of the large mass of the bullet proof windshield panel, it is essential that the defroster be fully operative one half hour before descent. However, since descent can rarely be anticipated 30 minutes in advance, the defroster should be operated continuously at altitude. On short flights including ascent and descents, the windshield defroster should be operated continuously after take-off at the highest setting consistent with comfort In adverse conditions when progressive frosting of the canopy takes place, use of the side air outlets, particularly at high engine power, is recommended.

## INFLIGHT REFUELING SYSTEM.

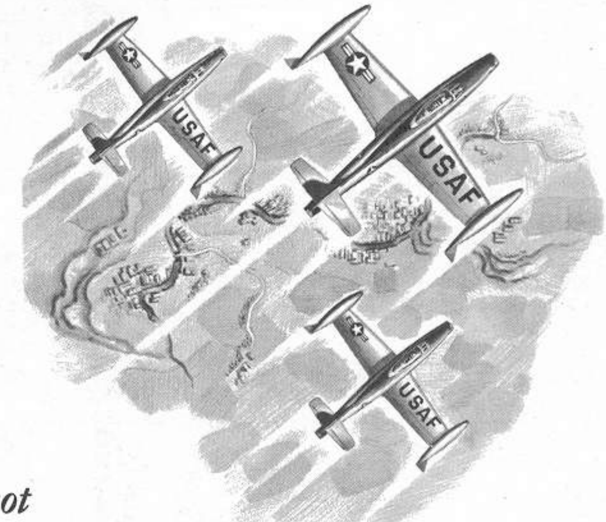
The word "BREAKAWAY" is restricted to use as a code word to denote emergency separation. At any time when in contact made position, any crew member of the tanker or receiver can call the radio signal "BREAKAWAY" when he feels that circumstances are either hazardous to the safety of the aircraft or malfunction of the equipment warrants disconnect. On hearing the work "BREAKAWAY" the receiver pilot will actuate his disconnect switch immediately. The tanker pilot will pull up abruptly 50 or 100 feet and apply power. The receiver pilot shall not dive out of the refueling envelope until separation has been made.

## AUTOMATIC PILOT.

Power requirements for the auto-pilot system are such that the main inverter would be overloaded if it were utilized. Therefore, the alternate inverter is used to supply the auto-pilot. If, however, the main inverter becomes inoperative and the alternate inverter is selected as a power supply for the instruments, the power supply to the auto-pilot is automatically cut off and the auto-pilot becomes inoperative.

# Section VIII

# CREW DUTIES



*Section VIII "Crew Duties" is not applicable to this airplane*

# Section IX
# ALL WEATHER OPERATION

## INTRODUCTION.

This section contains only those procedures that differ or are in addition to the normal operating instructions covered in Section II except where repetition may be necessary.

## OPERATION UNDER INSTRUMENT CONDITIONS.

The airplane handles satisfactorily on instruments. Stability in all axis is satisfactory. It cannot be flown "hands off" for any appreciable time. Takeoff characteristics are unlike those of other jet airplanes in that the aircraft definitely has to be pulled off the runaway. It cannot be trimmed to takeoff by itself. Flyability on GCA is satisfactory. Below 200 mph, in either gear up or down configuration, controls become less positive and the aircraft sluggish at all aileron boost settings.

### INSTRUMENT TAKE-OFF.

The airplane definitely has to be pulled off the runaway. It cannot be trimmed to takeoff by itself. Forward visibility in moderate to heavy precipitation is poor.

1. Visually align aircraft on centerline.
2. Advance throttle to take-off rpm.
3. Release brakes.
4. Use brakes for directional control until rudder becomes effective.
5. Allow aircraft to accelerate to 135 mph, then use back pressure to break nose wheel off ground. It requires noticable amount of stick force to get aircraft airborne.
6. Raise gear and start milking flaps immediately after takeoff.
7. Climb to safe terrain altitude, level out and accelerate to 350 mph and establish climb.

### INSTRUMENT CLIMB.

Climbing airspeed and attitude are easily maintained and the aircraft handles satisfactorily up to the maximum rate of climb. Climbing turns should be limited to 45 degrees.

### CRUISING UNDER INSTRUMENT CONDITIONS.

#### SPEED RANGE.

In moderate to severe turbulence accurate instrument flight above 400 mph is extremely difficult. From 400 to 275 mph control becomes progressively easier. Handling qualities in smooth air are good throughout entire speed range.

#### FLIGHT IN SNOW, ICE AND RAIN.

Only forward visibility in heavy precipitation is through curved side panels of the windshield. Adequate fuel reserve should be allowed for missed GCA approach due to radar controller's difficulty in maintaining contact with the airplane when precipitation echoes clutter GCA scopes. Icing has marked effect on wing of this aircraft, notably in reduced airspeed and rate of climb. Flight should be planned at ice-free altitudes due to absence of wing and tail de-icing. A fuel filter de-icing system is provided.

#### UNUSUAL MANEUVERS.

Unusual maneuvers should be avoided during IFR flight, particularly those which may allow the aircraft to accelerate beyond the critical Mach. Recovery from unusual attitudes or maneuvers can be accomplished by use of the J-8 attitude indicator. However, a cross check of all instruments is recommended and the pilot should be cognizant of the limitations of the J-8.

### DESCENT.

With dive brakes extended aircraft can descend up to

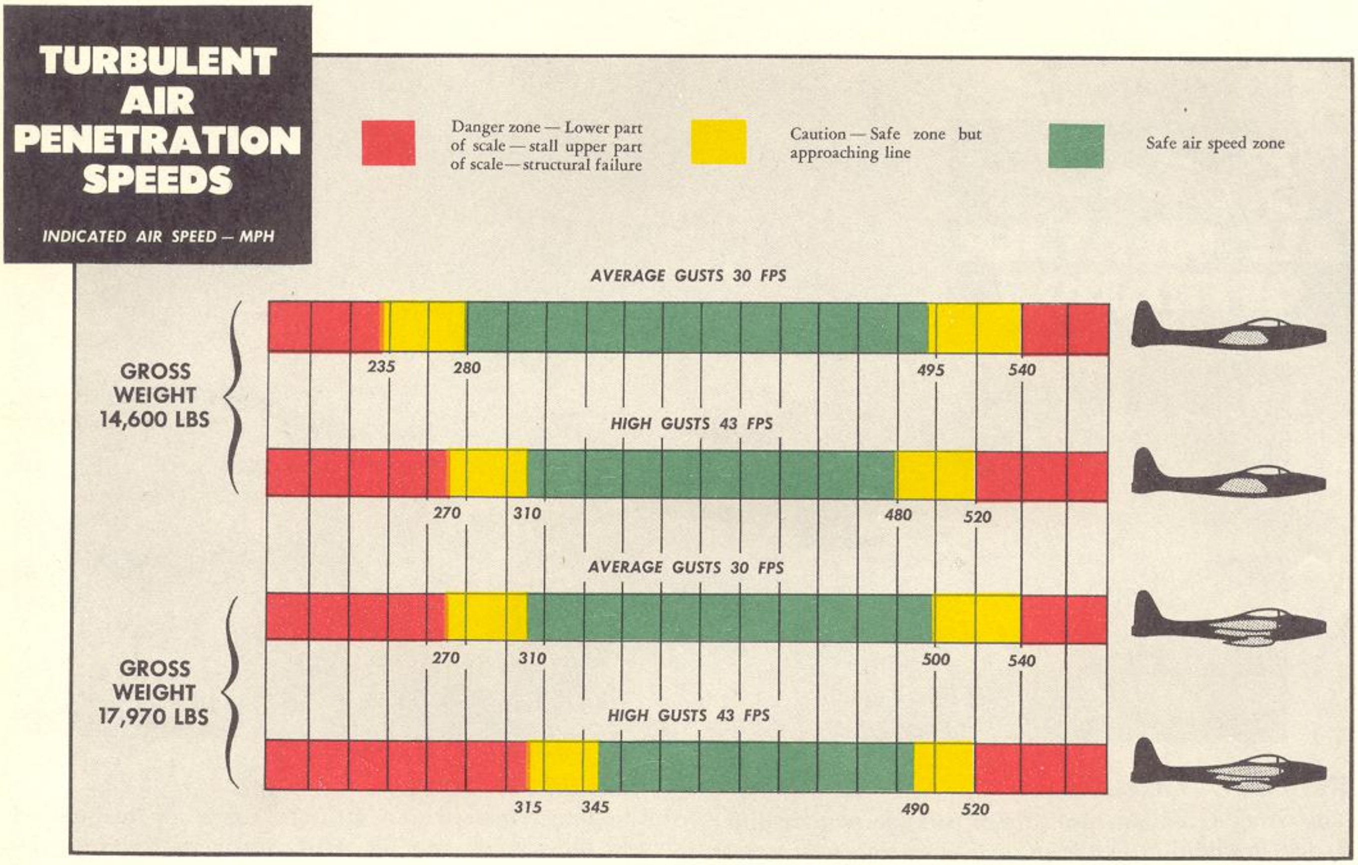


*Figure 9—1. Turbulent Air Penetration Speeds*

6,000 feet a minute without difficulty in smooth air. Most comfortable descent in turbulent air is between 2,000 and 3,000 feet per minute.

### RADIO RANGE LETDOWN.

In all letdowns, particularly on a radio range, the outstanding factor is the time required after reaching low altitude. Before the descent is started the pilot should make his decision to letdown or proceed to his alternate depending on the latest weather and traffic on arrival at his destination. The recommended letdown is made maintaining minimum fuel pressure (50 lbs.), speed brake down, 250 to 275 mph and 2000-3000 fpm. The aircraft is slowed and landing gear dropped when leveled off at initial approach altitude. The average descent from 20,000′ over the station requires 10-12 minutes and requires 35-45 gallons of fuel.

**INSTRUMENT APPROACHES.** See figure 9—2.

## OPERATION UNDER ICING CONDITIONS.

Air intake icing may occur when jet aircraft are operated in areas where atmospheric conditions are such that icing is possible. Air intake icing can occur when no visual evidence of ice can be detected on the aircraft. The effect of air intake icing on jet aircraft at a fixed throttle setting causes a reduction in air flow to the combustion chambers with a corresponding loss in thrust. This condition is not accompanied by any discernable change in fuel flow but results in a rapid increase of indicated exhaust gas temperatures.

### OPERATION.

1. Avoid flying into known icing conditions whenever possible.
2. If tail-pipe temperatures increase, immediately retard throttle to maintain a normal temperature and attempt to leave the icing area.

### WARNING

If the throttle is not immediately retarded to maintain normal tail-pipe temperatures, engine failure may result due to overheating of the turbine and exhaust system. This may occur very rapidly. Do not advance the throttle in an effort to maintain thrust as this will aggravate the overheating condition and accelerate engine failure.

3. If engine overheating with resulting explosions occur, denoting turbine bucket failure, do not attempt an air restart.

# INSTRUMENT *Approaches*

In moderate to heavy rain, control of the airplane by GCA is extremely difficult. The aircraft is frequently lost on the operator's scope under these conditions. An average GCA landing takes nine (9) minutes and consumes seventy (70) gallons. A missed approach go-around takes an additional twenty-eight (28) gallons, or a total of 98 gallons.

| *Landing Gear* | *Wing Flaps* | *Dive Flaps* | *Power* | *IAS* |
|---|---|---|---|---|
| **DOWNWIND** | | | | |
| Up | 20 deg. | Down | 84% plus or minus 3 | 200 |
| **BASE** | | | | |
| Down | 20 deg. | Down | 88% plus or minus 3 | 180 |
| **FINAL** | | | | |
| Down | Full | Down | 88% plus or minus 3 | 180 |
| **GLIDE PATH** | | | | |
| Down | Full | Down | 80% plus or minus 3 | 150 |

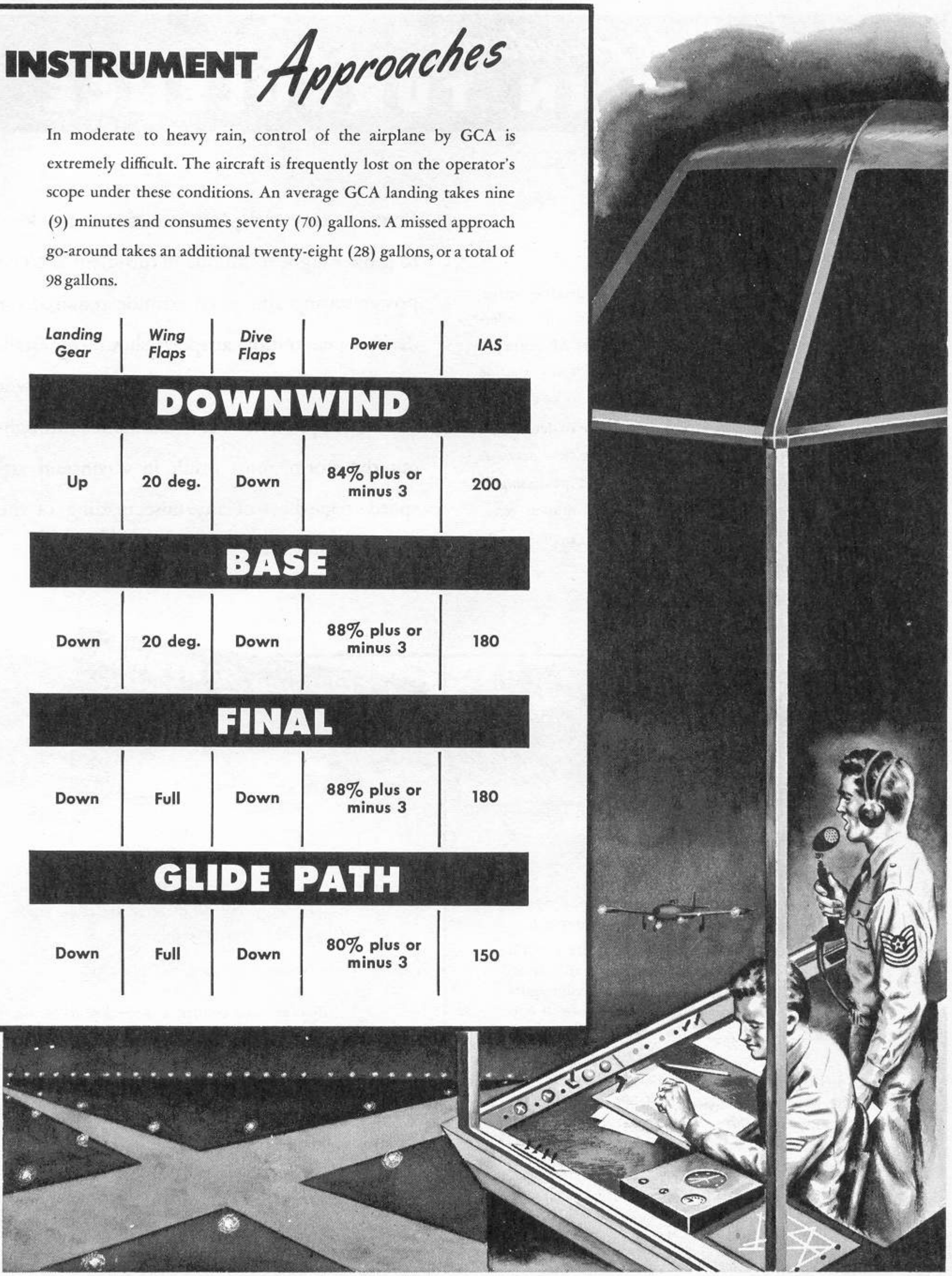


*Figure 9—2. Instrument Approaches*

# *Instrument Flight Procedures*
# FLIGHT IN TURBULENCE

## CAUTION

Thunderstorm flying demands considerable instrument experience and should be intentionally undertaken only by pilots able to qualify for AF Form 8A (Green) instrument card. However, many routine flight operations require a certain amount of thunderstorm flying, since it is often impossible to detect individual storms and find the in-between clear areas. A pilot, using modern equipment and possessing a combination of proper experience, common sense and instrument flying proficiency, can safely fly thunderstorms.

Power setting and pitch attitude are the keys to proper flight technique in turbulent air. The power setting and pitch attitude required for desired penetration airspeed should be established before entering the storm. This power setting and pitch attitude if maintained throughout the storm, must result in a constant airspeed, regardless of any false reading of the airspeed indicator.

## *Before* TAKE-OFF

1. Check Turbulent Air Penetration Speed Chart (figure 9–1) for best penetration speed.

2. Make a thorough analysis of the general weather situation to determine thunderstorm areas and prepare a flight plan which will require least exposure of the airplane to regions of possible thunderstorms.

3. Be sure to check proper operation of all flight instruments, navigation equipment, pitot heaters, instrument panel lights, and anti-icing equipment before undertaking any instrument flight and also before attempting flight into thunderstorm areas.

## *Approaching the* STORM

It is imperative that you prepare the airplane prior to entering a zone of turbulent air. If the storm cannot be seen, its proximity can be detected by radio crash static. Prepare the airplane as follows:

1. Auto-pilot control switch OFF.

2. Adjust throttle control as necessary to obtain safe penetration speed.

3. Trim airplane before entering storm. Speed brake may be opened to reduce speed then returned to UP.

4. Use low aileron boost setting to keep from overcontrolling.

*Figure 9–3. Flight in Turbulence and Thunderstorms (Sheet 1 of 2)*

# and THUNDERSTORMS

## APPROACHING THE STORM

### Note

The most comfortable penetration speed is between 275-300 mph IAS. At higher speeds the turbulence of the storm will cause constant jarring of the airplane.

5. Pitot heater switch ON.
6. Check gyro instruments for proper settings.
7. Safety belt fastened.
8. Turn off any radio equipment rendered useless by static.
9. At night, turn cockpit lights full bright or use dark glasses to minimize effects of lightning.

### CAUTION

Do not lower gear and flaps, as they merely decrease the aerodynamic efficiency of the airplane.

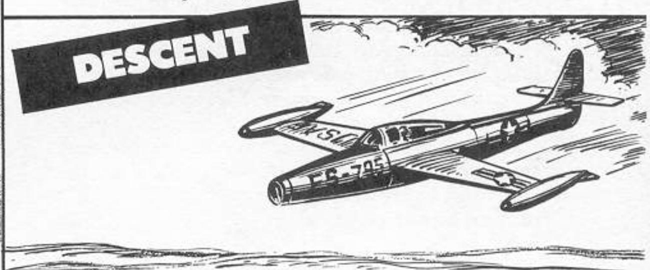
## In the STORM

1. Maintain power setting and pitch attitude (established before entering the storm) throughout the storm. Hold these constant and your airspeed will be constant, regardless of the airspeed indicator.
2. Devote all attention to flying the airplane.
3. Expect turbulence, precipitation and lightning. Don't allow these conditions to cause undue concern.
4. Maintain attitude. Concentrate principally on holding a level attitude by reference to artificial horizon.
5. Maintain original heading. Do not make any turns unless absolutely necessary.
6. Don't chase the airspeed indicator, since doing so will result in extreme airplane attitudes. If a sudden gust should be encountered while airplane is in a nose-high attitude, a stall might easily result. A heavy rain, by partial blocking of the pitot tube pressure head, may decrease the indicated airspeed reading considerably.
7. Use as little elevator control as possible to maintain your attitude in order to minimize the stresses imposed on the airplane.
8. The altimeter may be unreliable in thunderstorms because of differential barometric pressure within the storm. A gain or loss of several thousand feet may be expected. Make allowance for this error in determining minimum safe altitude.

### Note

Altitudes between 10,000 and 20,000 feet are usually the most turbulent areas in a thunderstorm. The least turbulent areas will be below 6,000 feet and above 30,000 feet. Therefore if flying at an altitude near 30,000 feet or if over rugged terrain, altitudes in excess of 30,000 feet are recommended for thunderstorm penetration. However, if flight is at altitudes close to 6,000 feet and over flat terrain, it would be more desirable to let down to 6,000 feet instead of climbing to 30,000 feet.

## DESCENT



A normal fast descent from high altitude using the least range can be made at 30-50 mph IAS below the maximum speed with the throttle closed and the speed brake open. The airplane will have good stability and control throughout the entire descent in all configurations. A faster descent will result in good control to approximately 25,000 feet, where the dive angle will become much steeper and the increased forces will cause a rapid increase in stick force. The airplane will tend to pitch and the aileron control will decrease slightly as the lower altitudes are reached. Because of the location of the trim tab switch on the control stick, it may be necessary to use both hands on the stick to actuate the trim tabs. A slow descent for the purpose of stretching range in event of low fuel quantity may be accomplished at 225 mph IAS with the speed brake closed and the engine at idle rpm.

*Figure 9—3. Flight in Turbulence and Thunderstorms (Sheet 2 of 2)*

# COLD WEATHER

## PRE-FLIGHT

1. When the ambient temperature is 0°C (32°F) or lower, use a portable heater to blow hot air into the airplane air inlet duct for a period of 10-15 minutes. This procedure is necessary to prevent the starter-generator unit from being damaged due to ice seizure of the compressor rotor.

**Note**

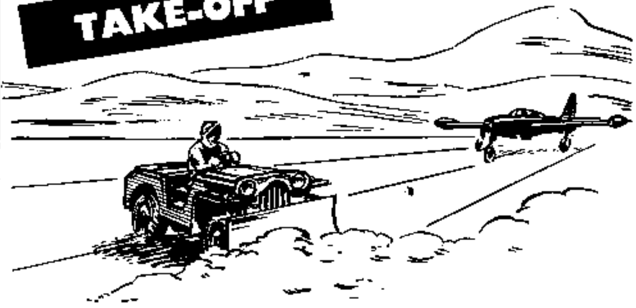
To heat the cockpit, loosen the canopy cover and slide the canopy aft far enough so that the heater hose can be inserted into the cockpit.

2. Inspect fuel tank vents, pitot tubes, fuselage and wing drainage and ventilation holes, and remove ice if present.
3. Clean dirt and ice from shock struts and all exposed actuating cylinder pistons. Check shock struts and tires for proper inflation. Wipe exposed parts of shock struts and pistons with a rag soaked in the same type hydraulic fluid as used in the system.
4. Use external power for operating and ground checking all electrical and radio equipment.
5. Remove wing, empennage and canopy covers, and the dust plugs in the air intake ducts and tail pipe.
6. Remove snow and ice from surfaces, control hinges, fuel tank caps and vents, and inside and outside of wings and fuselage.
7. Check surface controls.

## PRESTARTING

1. Start engine in normal manner.
2. If there is no oil pressure after 30 seconds running, or if pressure drops after a few minutes ground operation, shut down and check for blown lines or for congealed oil.
3. Care should be exercised when using full, or near full engine power when airplane is being run-up on chocks as slippage of chocks occurs frequently.
4. Inspect all instruments for proper operation.
5. Operate wing flaps through several cycles.

## TAKE-OFF



1. Do not taxi through loose snow as it may get into brakes and freeze. Pack or remove loose snow from runway prior to take-off.

2. Never turn on electrical equipment except that absolutely needed, until generator shows CHARGE.

3. Pitot heater ON if icing conditions are anticipated.

4. Heating (pressurizing system), and windshield defroster system ON.

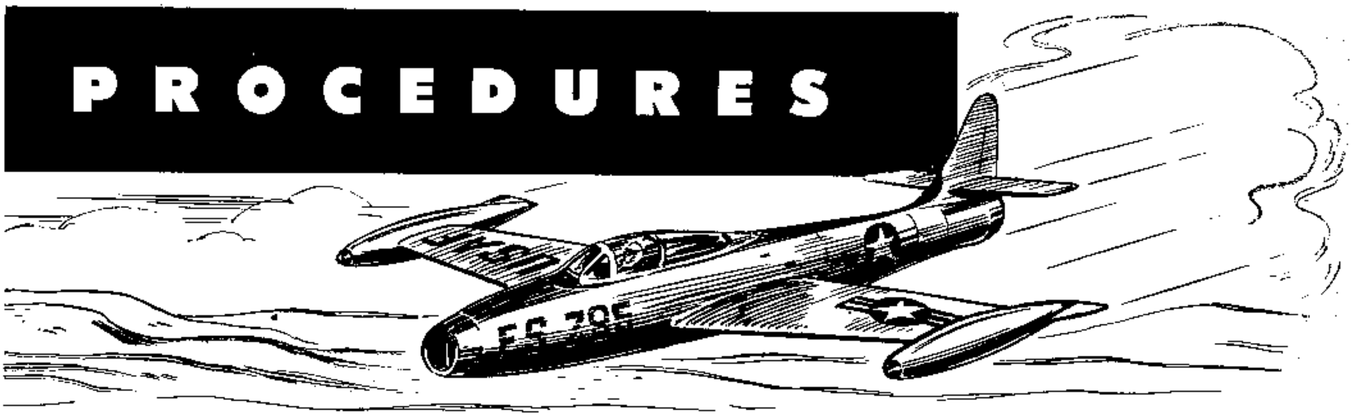
5. Full power check will probably be impossible until airplane is in position for take-off due to slippage on ice or hard packed snow, therefore it will be necessary to make full power check in conjunction with take-off. Power should be applied as rapidly as possible in order to enable use of maximum amount of runway if take-off is discontinued due to engine malfunctioning or failure.

**WARNING**

Never take-off with snow, ice or frost on wings. (Even loose snow may not blow off.) Loss of life and treacherous stalling characteristics will ensue.

*Figure 9—4. Cold Weather Procedures (Sheet 1 of 2)*

# PROCEDURES



## AFTER TAKE-OFF

1. Turn gun heat switch (9, figure 1-5) ON immediately after take-off.

2. After take-off from a snow or slush covered field, operate landing gear and flaps through several complete cycles to preclude their freezing in the UP position.

**Note**

Landing gear retracting time is from 12 seconds at -22°F to 30 seconds at -65°F.

## LANDING

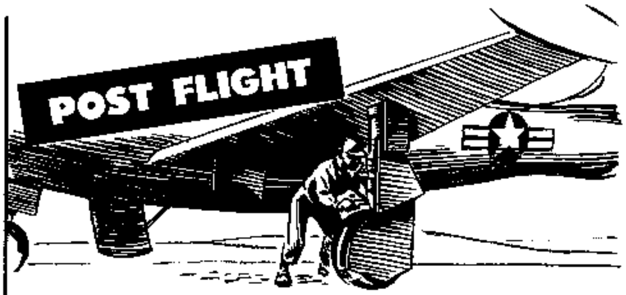
1. Pump brake pedals several times during the approach.
2. Disconnect electrical units not absolutely needed.

**WARNING**

Landing gear extension time is from 13 seconds at -22°F to 30 seconds at -65°F.

3. Use brakes sparingly and not until absolutely necessary after setting the airplane down.
4. Taxi with sufficient rpm to cut-in generator if conditions permit because low temperature decreases battery output.

## POST FLIGHT



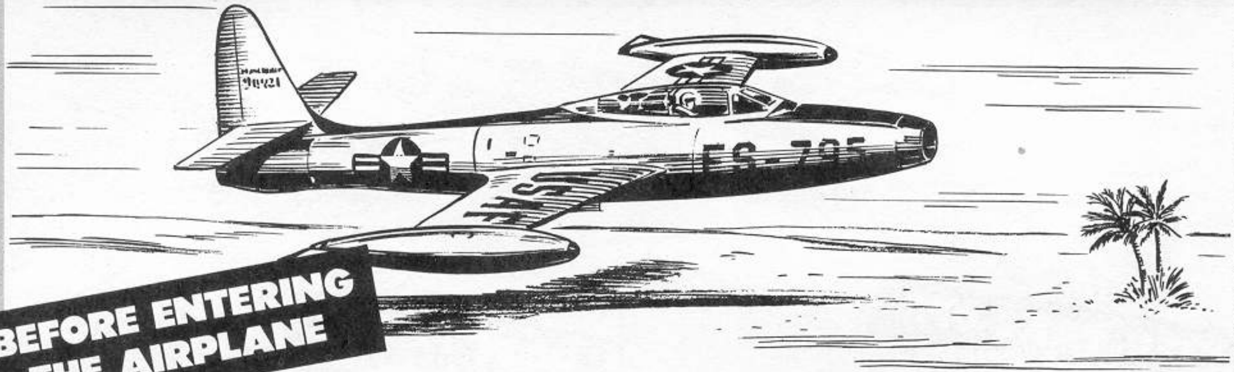
1. Clean dirt and ice from shock struts and all exposed actuating cylinder pistons and wipe with a rag soaked in hydraulic fluid of the same type as used in the system.
2. Leave brakes in OFF position.
3. Leave canopy slightly open to prevent cracking of transparent areas due to differential contraction. Also air circulation retards frost formation in cockpit.
4. Install wing, empennage and canopy covers and install dust plugs in air intake duct and tail pipe.
5. Check specific gravity of battery at least weekly. If less than 1.250 remove battery and service.
6. Moor airplane firmly.
7. If lay-over of several days is expected, remove the battery. Further, at temperatures below -20°C (-20°F), remove the battery if lay-over exceeds four hours.

## SUMP DRAINAGE

Drain fuel tank sump of condensate frequently. Under prolonged freezing conditions a small amount of ice or snow gets into the fuel tanks each time the airplane is serviced. When there is sufficient rise in temperature due to placing the airplane in a hangar or to warmer weather, these crystals melt, resulting in water in the system. Regular and frequent drainage especially under thawing conditions, is the best method of preventing ice in the fuel lines when the airplane is again subjected to freezing weather. Keeping the tanks as full as possible when the airplane is parked will also help to reduce moisture condensation.

*Figure 9—4. Cold Weather Procedures (Sheet 2 of 2)*

# HOT WEATHER AND DESERT PROCEDURES



## BEFORE ENTERING THE AIRPLANE

1. All metal surfaces exposed to the sun are burning hot to touch. Wear gloves to prevent burns.

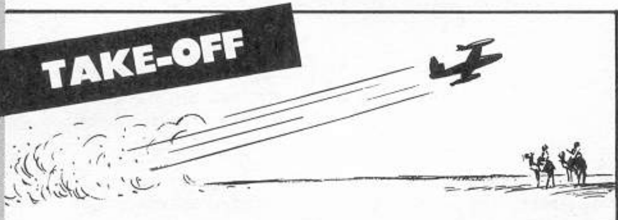
2. Make all possible ground checks before starting the engine.

3. If operating in sandy country, ascertain that air filters, instrument filters, and oil filters have been cleaned for each flight.

4. Check seals and tires to ascertain that they are not blistered or show other evidences of deterioration.

5. Run the engine on the ground only as long as is necessary. Don't run-up engines to windward of other planes, personnel or ground installations.

## TAKE-OFF



1. If ground is sandy or dusty, avoid taking off in the wake of another airplane.

2. Cockpit heat and vent switch; PRESSURE position unless high humidity causes cockpit to fill up with fog. If so take-off with heat and vent switch in RAM.

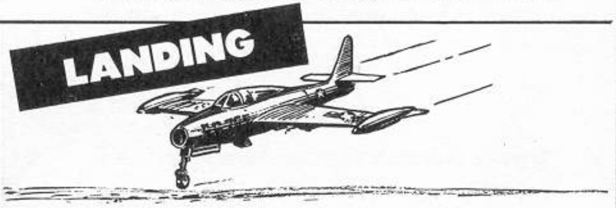
### Note

Take-off distances will be longer because the air is less dense during warm weather.

## AFTER TAKE-OFF

Do not climb the airplane at less than flying speed specified in the climb chart.

## LANDING



Because hot air is less dense than cold air, true stalling speed will be greater and additional distance will be required for landing.

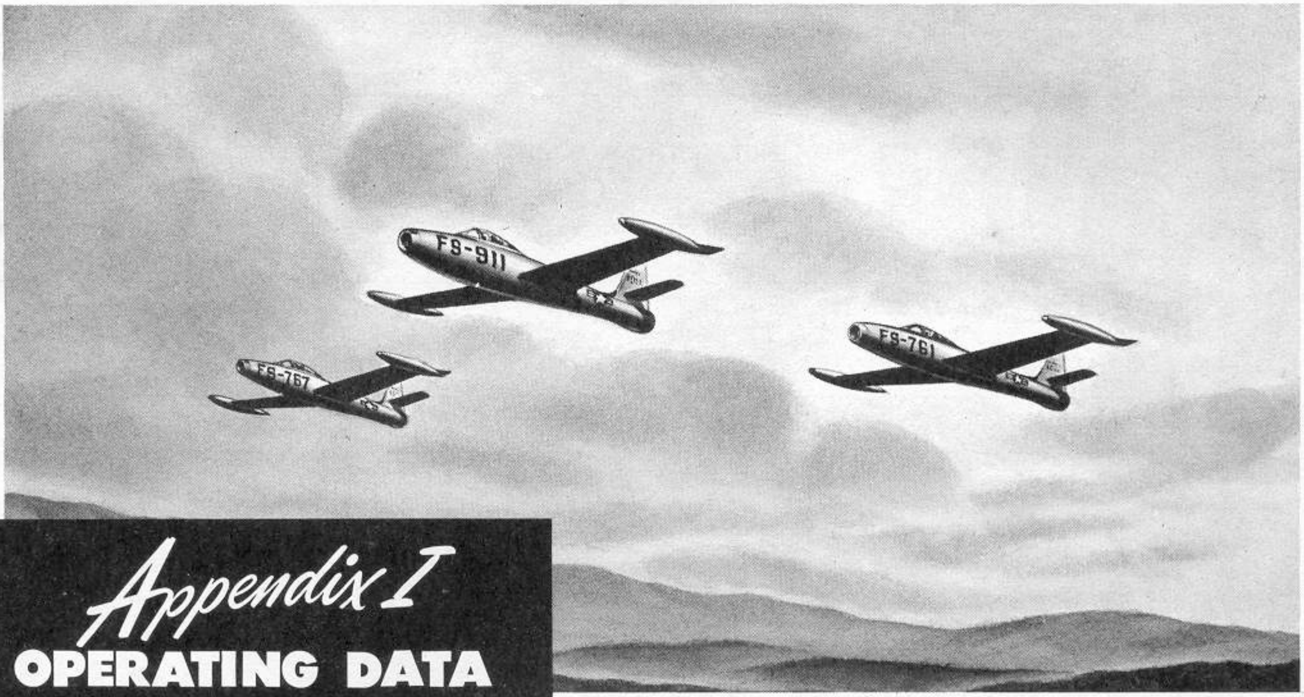
## PARKING

1. If in sandy country, close and cover all openings to keep sand out. Cover windshield and canopy to prevent sand scratches.

2. Keep canvas covers on the windshield and canopy whenever the airplane is parked in the sun. If this is not done, the sun's heat will soften and distort the transparent plastic. Malfunctioning of instruments and communications equipment will also result.

3. If blowing sand is not a hazard, keep canopy and selected access doors open to permit air circulation.

*Figure 9—5. Hot Weather Procedures*



# Appendix I
## OPERATING DATA

## TABLE OF CONTENTS

## TABLE A-1. AIRSPEED INSTALLATION CORRECTION TABLE

### AIRSPEED INSTALLATION CORRECTION TABLE

**Model: F-84G** **Engine(s) J35-A-29**

| *GEAR AND FLAPS UP ADD CORRECTION TO CORRECTED INSTRUMENT READING TO OBTAIN CAS* | | *GEAR AND FLAPS DOWN ADD CORRECTION TO CORRECTED INSTRUMENT READINGS TO OBTAIN CAS* | |
|---|---|---|---|
| *IAS (MPH)* | *Correction (MPH)* | *IAS (MPH)* | *Correction (MPH)* |
| 150 | +4 | 120 | +12 |
| 200 | +2 | 130 | +10 |
| 250 | 0 | 140 | +9 |
| 300 | —1 | 150 | +8 |
| 350 | —3 | 160 | +7 |
| 400 | —5 | 170 | +6 |
| 450 | —6 | 180 | +5 |
| 500 | —8 | | |
| 550 | —10 | | |
| 600 | —12 | | |

Remarks:

Data Based On: Flight Test
Data As Of: 12 June 1951

## INTRODUCTION.

To facilitate preflight and inflight mission planning, two standard types of operating data charts are presented. The first type provides airspeed corrections. The second type shows performance during normal operation, with various weight configurations, and the instructions necessary to attain this performance. All data pertain to NACA standard ambient temperatures unless otherwise indicated. Most of the charts are applicable in non-standard atmosphere if the recommended calibrated airspeed (CAS) values are maintained unless a deviation in calibrated airspeed is necessary to avoid violating engine limits. This rule is necessary because performance is greatly dependent on Mach No, which at each pressure altitude is dependent on CAS alone. Fuel quantities are given in pounds so that the charts can be used when the engine is operated with either JP-1, JP-3 or gasoline lowest grade available.

## AIRSPEED INSTALLATION CORRECTION TABLES.

In order to obtain correct airplane speeds, several corrections must be applied to the airspeed indicator reading. The first correction is made for the error in the individual instrument. This value is noted on the instrument calibration card and when applied to the instrument reading provides indicated airspeed (IAS). The second correction is for airspeed installation error. This correction is taken from table A—1, and when applied to the indicated airspeed (IAS) provides a calibrated airspeed (CAS). The third correction is for compressibility error. This correction is taken from table A—2, and when applied to calibrated airspeed provides true indicated airspeed (TIAS). Mutiplying the true indicated airspeed by the square root of relative density (ratio of ambient to standard sea level density) provides true airspeed (TAS). Vectorially adding wind velocity to true airspeed provides ground speed.

## TABLE A-2. COMPRESSIBILITY CORRECTION TABLE

### COMPRESSIBILITY CORRECTION TABLE

*Add Correction From Calibrated*
*Airspeed To Obtain Equivalent Airspeed*

| *Pressure Altitude* | *CAS – MPH* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *150* | *200* | *250* | *300* | *350* | *400* | *450* | *500* | *550* | *600* |
| 5000 | 0 | 0 | -1 | -1 | -2 | -3 | -4 | -5 | -6 | -8 |
| 10,000 | 0 | -1 | -2 | -3 | -4 | -6 | -8 | -10 | -13 | -17 |
| 15,000 | 0 | -1 | -3 | -4 | -7 | -10 | -13 | -17 | -22 | |
| 20,000 | -1 | -2 | -4 | -6 | -10 | -14 | -19 | -25 | | |
| 25,000 | -1 | -3 | -5 | -9 | -13 | -19 | -26 | | | |
| 30,000 | -2 | -4 | -7 | -12 | -18 | -25 | | | | |
| 35,000 | -2 | -5 | -10 | -16 | -24 | | | | | |
| 40,000 | -3 | -7 | -13 | -20 | | | | | | |

Remarks:

## SAMPLE PROBLEM.

For purposes of explaining the use of the Airspeed Installation Correction Table and the Compressibility Correction Table, consider the airplane flying at 25,000 feet and an airspeed indicator reading of 350 miles per hour. Since the airplane is not equipped with an outside air temperature indicator, determine the ambient temperature at 25,000 ft from the Density Altitude chart which will be −35°C.

| | |
|---|---|
| Airspeed Indicator Reading | 350 mph |
| Correction for Instrument Error (from instrument calibration card) | −2 |
| Indicated Airspeed (IAS) | 348 mph |
| Correction for Installation Error (from Airspeed Installation Correction Table) | −3 |
| Calibrated Airspeed (CAS) | 345 mph |
| Correction for Compressibility Error (from Compressibility Correction Table) | −13 |
| True Indicated Airspeed (TIAS) | 332 mph |
| Correction for Air Density (from Density Altitude Chart) | X1.49 |
| | 495 mph |

The last two steps can be eliminated with the use of an airspeed computer. Use CAS and true free air temperature with a Type D-4 or Type G-1 airspeed computer to determine true airspeed (TAS) of 495 mph. When using the dead-reckoning computer (Type AN 5835-1), the CAS (345 mph) must be corrected for compressibility which gives TIAS (332 mph). Use the dead-reckoning computer and the value of 332 mph and −35°C to determine the true airspeed (TAS) of 495 mph.

## TAKE-OFF CHART.

Ground run distance and total distance to clear a 50-foot obstacle are tabulated for both normal and assisted take-off with two or four 14 second 1000 pound jato units. Jato cut-in speeds are tabulated on separate charts which are to be used in conjunction with the corresponding take-off chart. Data is presented for the maximum fuel weight for several configurations including external stores and at several pressure altitudes and ambient temperatures. Ambient temperature is included among the variables because take-off distance is critically dependent on this quantity. Values on the charts may be interpolated for intermediate altitudes and temperatures. Set airplane altimeter to 29.92 and read pressure altitude. With air temperature in degrees centigrade as obtained from the field weather station and pressure altitude, enter chart and determine take-off distance. In the event of an assisted take-off determine the air speed at which the jato units should be ignited from the jato cut-in speed chart. In order to obtain the distance shown the take-off technique explained in Section II must be employed.

## CLIMB CHART.

From the climb chart can be determined the best climb speed, fuel consumed, time to climb, distance covered and rate of climb for military power. A fuel allowance for start, taxi, take-off and acceleration to climb speed is listed at sea level. Fuel requirements at other altitudes include this allowance plus the fuel needed to climb from sea level. Fuel required for an in-flight climb from one altitude to another is the difference of the tabulated fuel required to climb to each altitude from sea level. Time and distance covered during an in-flight climb may be obtained in the same manner. The recommended climb speeds should be maintained in order to obtain tabulated rates of climb. Higher or lower climb speeds will result in lower rates of climb. Climb data is presented for the highest and lowest fuel weights for several configurations at the altitudes shown. Data for intermediate weights may be interpolated.

## DESCENT CHART.

The descent chart presents rates of descent, distance covered, time required, fuel consumed and airspeed (CAS) for maximum range descents with minimum rpm at which engine operation can be maintained. Data is based on retracted speed brake to provide best economy in the descent. To minimize fuel consumption, the lowest allowable fuel pressure is used. Data is presented for a constant Mach No. descent for several landing configurations at altitudes from normal service ceiling to sea level. Neither the fuel or time tabulated includes any allowance for loitering while awaiting landing clearance, for taxiing after landing, or for any navigational error. Additional allowances for these considerations must be made. The fuel, time, and air-distance values for inflight descents from one altitude to another are merely the differences in values tabulated for the initial and final altitudes concerned.

## LANDING CHART.

Landing distance for several pressure altitudes and gross weights sufficiently bracketing those anticipated for normal service is tabulated in the Landing Distance Chart. Only standard ambient temperatures are represented, since landing distance is not greatly affected by this quantity.

## MAXIMUM ENDURANCE CHART.

The Maximum Endurance Chart presents the airspeeds, fuel flow and percent of maximum rpm for maximum endurance flight. Data is presented at altitudes from sea level to the service ceiling for each configuration and for several weights in each configuration.

## COMBAT ALLOWANCE CHART.

The Combat Allowance Chart presents fuel flow at normal thrust and at maximum thrust from altitudes from sea level to combat ceiling.

## MAXIMUM CONTINUOUS POWER CHART.

The Maximum Continuous Power Chart presents the percent of maximum rpm, calibrated airspeed, true airspeed and fuel flow for maximum continuous power operation at altitudes from sea level to the highest probable flight altitude. Data is presented for several configurations and for various weights in each configuration.

## FLIGHT OPERATION INSTRUCTION CHARTS.

The Flight Operation Instruction Charts are provided to facilitate flight planning. They show the range of the airplane at maximum range airspeeds and the procedure required to obtain this range. The charts contain columns for each 5000 foot increase in altitude up to the maximum altitude at which the rate of climb is 300 fpm with maximum continuous rpm. On line opposite available fuel in the upper half of the chart, ranges are shown for each initial altitude. In general, two range values are quoted for each altitude and fuel quantity. One is for continued flight at the initial altitude and one for the maximum range obtainable by climbing to a higher altitude. The charted ranges do not include fuel consumed and distance covered during warm-up, take-off, and initial climb at the start of a flight. However, fuel used and distance covered during letdown or during in-flight climb to an optimum altitude are taken into account.

The lower half of each chart presents operating procedure to obtain the ranges quoted in the upper half. When altitude is changed, operating instructions in the column according to the new altitude must be used if the ranges listed are to be obtained.

Under different wind conditions, ranges (in ground miles) are varied by the effect of wind on ground speed. Let-down distances are affected for the same reason. Recommended CAS also may change in order to maintain the most favorable ground miles per gallon. To facilitate range computation under wind conditions, the operating procedure in the lower half of each chart contains instructions for various winds at each altitude listed. Ground miles in a wind are obtained by multiplying chart air miles by the range factor found opposite the effective wind at the cruising altitude. Thus, range factors may be used to determine the best altitude for cruising when there is a known wind difference at different altitudes.

Although a wind may be from any direction with respect to the airplane course, it may be expressed as an effective wind. An effective wind has the same effect on the airplane ground speed as if it were a straight head wind or tail wind. In other words, the wind component in the direction of the airplane heading is the effective wind. For example, a 100-mph wind at 45 degrees to the course is an effective head wind of approximately 75 mph. If the airplane true airspeed is 400 mph, the true ground speed is approximately 325 mph.

The approximate rpm values quoted on any one chart are based on the gross weight equal to the high limit of the chart weight band. If the recommended CAS values are maintained, the rpm values will decrease slightly as the gross weight decreases. No allowances are made for navigational errors, combat, formation flight, landing, or other contingencies. Such allowances must be made as required.

### PRE-FLIGHT RANGE PLANNING.

Select the applicable Flight Operation Instruction Chart. Determine the amount of fuel available for flight planning. Available fuel is equal to the total amount in the airplane before starting the engine minus the amount needed for warm-up, taxi, take-off, initial climb, and necessary reserves. Select a figure in the fuel column equal to, or less than, the amount available for flight planning. Interpolate if desired.

To determine maximum range at a given altitude—move horizontally right or left to the desired altitude column. Multiply the range value thus obtained by the correct range factor and add the distance covered in initial climb to obtain total range with a given wind at altitude. Fly according to the instructions in the lower half of the chart, changing charts if external tanks are dropped.

To fly a given distance, determine range factors for the effective winds at altitudes to be considered. From the desired distance subtract the miles covered in climb. Divide the resultant figure by the range factor to obtain miles to be covered in the cruise and descent. Enter the chart as described under preflight range planning. Move horizontally right or left to a range figure which exceeds the calculated air distance to be covered in cruise and descent. Fly according to the instructions for the altitude so obtained, changing charts if external tanks are dropped.

If altitude, wind or external load does not remain reasonably constant, break the flight up into several sections and plan each section separately.

### IN-FLIGHT RANGE PLANNING.

To use the charts in flight, determine altitude, available fuel, and effective wind. Available fuel is equal on board minus necessary reserves. Enter the appropriate Flight Operation Instruction Chart at a fuel quantity equal to or less than the available fuel. Move horizontally right or left to the applicable altitude column. From the ranges and wind factors listed, determine the altitude at which the flight will be continued. For continued cruising at the present altitude, refer to the instructions directly below. When changing charts if external tanks are dropped, refer to cruising instructions on the new chart at the altitude of flight. To obtain the range shown at optimum altitude when flying at a given altitude, climb immediately according to the recommended climb procedure. For cruising instructions at the new altitude refer to the lower half of the chart in the column under the new altitude. When changing charts if external tanks are dropped, refer to cruising instructions on the new chart at the new altitude of flight.

### SAMPLE PROBLEMS BASED ON JP-3 FUEL.

PROBLEM 1.

To illustrate use of the charts for planning a flight, suppose an airplane must be ferried 900 statute miles. For unexpected difficulties, a general reserve of 900 pounds (140 gallons JP-3 fuel) is considered necessary.

From the Flight Operation Instruction Charts, it is apparent that drop tanks must be carried; however, it is desired to keep the tanks. Use of 230-gallon drop tanks will give a maximum fuel capacity of 902 gallons x 6.5 (pounds per gallon JP-3 fuel) or 5860 pounds. The initial, known conditions are as follows:

| | |
|---|---|
| Required range | 900 statute miles |
| Effective winds | 40 mph head wind at 30,000 feet and below<br>80 mph head wind at 35,000 feet |

From the Climb Chart (figure A–8) and the Flight Operation Instruction Chart for 230-gallon Drop Tanks (figure A–29), the following data are obtained:

| | | | |
|---|---|---|---|
| 1. Cruising altitude | 20,000 | 25,000 | 35,000 |
| 2. Fuel capacity, pounds | 5,860 | 5,860 | 5,860 |
| 3. Reserve fuel, pounds | 900 | 900 | 900 |
| 4. Fuel used to altitude, pounds (climb at 100% rpm) | 835 | 960 | 1,295 |
| 5. Available cruise fuel, pounds (2-3-4) | 4,125 | 4,000 | 3,665 |
| 6. Statute miles in climb | 41 | 57 | 113 |
| 7. Cruise and descent distance (Interpolate as necessary) | 1,020 | 1,100 | 1,240 |
| 8. Range, zero wind (6 + 7) | 1,061 | 1,157 | 1,353 |
| 9. Range factor | .90 | .90 | .85 |
| 10. Ground miles (8 x 9) | 955 | 1,040 | 1,150 |

Therefore, the flight can be made at 20,000 feet or higher. The cruise airspeed at 20,000 feet for a 40 mph head wind would be 350 mph. CAS and the letdown would begin at 25 statute miles from destination.

PROBLEM 2.

Suppose that during the descent at the end of this theoretical flight, the pilot has reached 5000 feet when he learns that the field is closed and he must use an alternate airport some 120 statute miles farther on. Fuel remaining is only the 900 pounds originally planned for general reserve. Reference to the Flight Operation Instruction Chart for 230-gallon Drop Tanks (figure A—31) shows that with the existing head wind and the empty tanks still on, available range with 1000 pounds of fuel is approximately 150 (165 x .9) statute miles at 5000 feet or 210 (265 x .80) statute miles at optimum altitude (40,000 feet) with no reserve for landing. It is evident, therefore, that the empty drop tanks should be jettisoned immediately. Reference to the Flight Operation Instruction Chart for No External Load (figure A—35) shows that even without the drop tanks only 155 (170 x .9) miles can be covered at 5000 feet with 1000 pounds of fuel and a 40 mph head wind. However, by climbing immediately to 35000 feet (optimum altitude) at 100% rpm, a range of 285 miles with zero wind or 230 (285 x .8) miles with existing 80 mph head wind can be attained. At 35000 feet the cruise condition will be 295 mph CAS, 1340 pounds per hour fuel flow, 420 mph ground speed, and letdown begun 95 miles from destination. Since the required range is only 120 statute miles, the difference between 230 and 120 miles is the reserve which, expressed in time, is 16 minutes (110 miles ÷ 420 mph G.S. = .26 hours or 16 minutes). The corresponding fuel reserve is 350 pounds (.26 hours x 1340 pounds per hour = 350 pounds). However, this was figured for 1000 pounds of fuel at 5000 feet and only 900 pounds were available, so the landing reserve will be 100 pounds less, or 250 pounds. In other words, judging from this sample problem, when you have to get all you can out of the fuel available, climb immediately to optimum altitude and, if necessary, jettison empty drop tanks.

## MAXIMUM RANGE SUMMARY CHART.

The Maximum Range Summary Charts summarize the operating conditions for no wind flight entered on the Flight Operation Instruction Charts. These charts present calibrated airspeed, Mach No., miles per pound of fuel and approximate percent rpm for each weight and altitude shown in the Flight Operation Instruction Charts.

**AIRPLANE MODEL**
F-84G-1RE and up

# TAKE-OFF DISTANCES

**ENGINE MODEL**
J35-A-29

FEET

## WITHOUT JATO

HARD SURFACE RUNWAY - NO WIND

| CONFIGURATION AND GROSS WEIGHT | PRESS. ALT. FT. | 40°F | | 60°F | | 80°F | | 100°F | | 120°F | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND ROLL | CLEAR 50' | GROUND ROLL | CLEAR 50' | GROUND ROLL | CLEAR 50' | GROUND ROLL | CLEAR 50' | GROUND ROLL | CLEAR 50' |
| CLEAN + four External Tanks 22,242 Lb. | 5000 | 9520 | 14000 | - | - | - | - | - | - | - | - |
| | 4000 | 8610 | 12120 | 9540 | 14180 | - | - | - | - | - | - |
| | 3000 | 7860 | 10800 | 8720 | 12575 | 9780 | 15350 | - | - | - | - |
| | 2000 | 7180 | 9700 | 7965 | 11210 | 8920 | 13560 | 9900 | 17400 | - | - |
| | 1000 | 6530 | 8660 | 7240 | 9960 | 8110 | 11825 | 9075 | 14720 | - | - |
| | S.L. | 5920 | 7670 | 6570 | 8750 | 7330 | 10200 | 8300 | 12100 | 9650 | 14940 |
| GROUND SUPPORT 21,947 Lb. | 5000 | 9550 | 14450 | - | - | - | - | - | - | - | - |
| | 4000 | 8500 | 12425 | 9450 | 14725 | - | - | - | - | - | - |
| | 3000 | 7740 | 11000 | 8600 | 12900 | 9650 | 15950 | - | - | - | - |
| | 2000 | 7080 | 9810 | 7880 | 11400 | 8800 | 13970 | 10015 | 18520 | - | - |
| | 1000 | 6470 | 8720 | 7185 | 10010 | 8000 | 12100 | 9100 | 15400 | - | - |
| | S.L. | 5900 | 7650 | 6540 | 8720 | 7225 | 10300 | 8200 | 12400 | 9585 | 15635 |
| CLEAN + two faired tip tanks 18,645 Lb. | 5000 | 5980 | 7790 | 6620 | 8770 | 7390 | 10010 | 8350 | 11750 | 9640 | 14570 |
| | 4000 | 5420 | 6960 | 5990 | 7810 | 6660 | 8915 | 7550 | 10450 | 8730 | 12275 |
| | 3000 | 4970 | 6325 | 5500 | 7100 | 6110 | 8080 | 6915 | 9330 | 7955 | 11135 |
| | 2000 | 4550 | 5780 | 5035 | 6460 | 5580 | 7340 | 6320 | 8440 | 7285 | 10040 |
| | 1000 | 4150 | 5250 | 4600 | 5865 | 5100 | 6640 | 5750 | 7610 | 6615 | 8990 |
| | S.L. | 3790 | 4760 | 4200 | 5300 | 4640 | 5960 | 5215 | 6815 | 5980 | 7975 |
| CLEAN 15,299 Lb. | 5000 | 3725 | 4620 | 4110 | 5160 | 4550 | 5800 | 5100 | 6610 | 5850 | 7725 |
| | 4000 | 3365 | 4160 | 3720 | 4635 | 4125 | 5150 | 4600 | 5890 | 5250 | 6840 |
| | 3000 | 3100 | 3820 | 3415 | 4225 | 3780 | 4710 | 4210 | 5350 | 4800 | 6200 |
| | 2000 | 2830 | 3490 | 3120 | 3860 | 3460 | 4300 | 3850 | 4885 | 4400 | 5640 |
| | 1000 | 2590 | 3180 | 2850 | 3520 | 3165 | 3935 | 3510 | 4450 | 4025 | 5120 |
| | S.L. | 2380 | 2910 | 2610 | 3220 | 2885 | 3590 | 3200 | 4040 | 3680 | 4650 |

NOTES:
(1) 20° Wing Flaps.
(2) Take-off without assistance.
(3) Gross weights based on JP-3 or JP-4 fuel @ 6.5 lbs/gal.

DATA AS OF: 12 June 1951
BASED ON: Flight Test

**BASED ON** JP-3 or JP-4 **FUEL**
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

MCRE Form
No. 2398
(5 MAY 48)

*Figure A—1. Take-off Chart — F-84G-1RE and up*

**AIRPLANE MODEL**
F-84G-1RE and up

# JATO TAKE-OFF DISTANCES

**ENGINE MODEL**
J35-A-29

FEET

## WITH 2 JATO UNITS

HARD SURFACE RUNWAY - NO WIND

| CONFIGURATION AND GROSS WEIGHT | PRESS. ALT. FT. | 40°F | | 60°F | | 80°F | | 100°F | | 120°F | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND ROLL | CLEAR 50' | GROUND ROLL | CLEAR 50' | GROUND ROLL | CLEAR 50' | GROUND ROLL | CLEAR 50' | GROUND ROLL | CLEAR 50' |
| CLEAN + four External Tanks<br>22,642 Lb. | 5000 | 8185 | 9630 | 9290 | 10920 | - | - | - | - | - | - |
| | 4000 | 7180 | 8490 | 8085 | 9590 | 9250 | 10930 | - | - | - | - |
| | 3000 | 6470 | 7700 | 7260 | 8650 | 8290 | 9820 | 9610 | 11370 | - | - |
| | 2000 | 5920 | 7035 | 6615 | 7880 | 7520 | 8900 | 8685 | 10275 | - | - |
| | 1000 | 5415 | 6440 | 6020 | 7160 | 6800 | 8070 | 7820 | 9250 | 9260 | 10970 |
| | S.L. | 4940 | 5860 | 5450 | 6475 | 6100 | 7260 | 6980 | 8280 | 8175 | 9705 |
| GROUND SUPPORT<br>22,347 Lb. | 5000 | 8110 | 9660 | 9140 | 10870 | - | - | - | - | - | - |
| | 4000 | 7100 | 8490 | 8010 | 9550 | 9150 | 10620 | - | - | - | - |
| | 3000 | 6375 | 7660 | 7200 | 8600 | 8220 | 9480 | 9580 | 11400 | - | - |
| | 2000 | 5790 | 6950 | 6520 | 7800 | 7435 | 8600 | 8600 | 10270 | - | - |
| | 1000 | 5250 | 6280 | 5900 | 7030 | 6700 | 7820 | 7760 | 9180 | 9200 | 10930 |
| | S.L. | 4730 | 5625 | 5300 | 6300 | 6000 | 7100 | 6900 | 8160 | 8080 | 9620 |
| CLEAN + two faired tip tanks<br>19,045 Lb. | 5000 | 4760 | 5570 | 5400 | 6320 | 6080 | 7100 | 6810 | 7970 | 7705 | 9010 |
| | 4000 | 4260 | 4980 | 4760 | 5590 | 5320 | 6250 | 5985 | 7020 | 6850 | 8025 |
| | 3000 | 3880 | 4540 | 4300 | 5070 | 4780 | 5620 | 5370 | 6340 | 6200 | 7300 |
| | 2000 | 3530 | 4160 | 3910 | 4625 | 4340 | 5120 | 4900 | 5780 | 5650 | 6650 |
| | 1000 | 3205 | 3800 | 3550 | 4215 | 3940 | 4660 | 4450 | 5270 | 5125 | 6050 |
| | S.L. | 2900 | 3470 | 3215 | 3840 | 3560 | 4225 | 4015 | 4770 | 4620 | 5470 |
| CLEAN<br>15,699 Lb. | 5000 | 2600 | 3080 | 2900 | 3410 | 3200 | 3775 | 3580 | 4200 | 4080 | 4800 |
| | 4000 | 2380 | 2840 | 2650 | 3150 | 2920 | 3470 | 3230 | 3820 | 3650 | 4325 |
| | 3000 | 2190 | 2620 | 2420 | 2890 | 2680 | 3180 | 2975 | 3510 | 3345 | 3970 |
| | 2000 | 2010 | 2410 | 2220 | 2670 | 2460 | 2940 | 2730 | 3250 | 3065 | 3650 |
| | 1000 | 1860 | 2215 | 2050 | 2450 | 2270 | 2700 | 2500 | 2980 | 2810 | 3350 |
| | S.L. | 1700 | 2040 | 1890 | 2250 | 2090 | 2470 | 2300 | 2760 | 2585 | 3075 |

NOTES:

(1) 20° Wing Flaps.

(2) Take-off with two 14 second-1000 lb. JATO Units.

(3) Gross weights shown for each configuration includes weight of JATO Units.

(4) Gross weight based on JP-3 or JP-4 fuel @ 6.5 lbs/gal.

DATA AS OF: 12 June 1951
BASED ON: Flight Test

**BASED ON** JP-3, JP-4 **FUEL**
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

MCRE Form
No. 2398
(5 MAY 48)

*Figure A—2. Take-off Chart (Sheet 1 of 2) F-84G-1RE and up*

AIRPLANE MODEL
F-84G-1RE and up

# JATO CUT-IN SPEED

MPH

## WITH 2 JATO UNITS

ENGINE MODEL
J35-A-29

HARD SURFACE RUNWAY - NO WIND

| CONFIGURATION AND GROSS WEIGHT | PRESS. ALT. FT. | AMBIENT TEMPERATURE | | | | |
|---|---|---|---|---|---|---|
| | | 40°F | 60°F | 80°F | 100°F | 120°F |
| CLEAN + four External Tanks 22,642 Lb. | 5000 | 153 | 161 | 169 | 178 | 187 |
| | 4000 | 146 | 154 | 162 | 172 | 180 |
| | 3000 | 139 | 147 | 155 | 165 | 173 |
| | 2000 | 132 | 140 | 149 | 158 | 166 |
| | 1000 | 125 | 135 | 143 | 151 | 159 |
| | S.L. | 119 | 127 | 136 | 144 | 152 |
| GROUND SUPPORT 22,347 Lb. | 5000 | 153 | 160 | 168 | 176 | 186 |
| | 4000 | 146 | 154 | 162 | 170 | 180 |
| | 3000 | 139 | 147 | 156 | 164 | 173 |
| | 2000 | 132 | 141 | 150 | 157 | 166 |
| | 1000 | 125 | 134 | 143 | 150 | 159 |
| | S.L. | 119 | 127 | 136 | 143 | 151 |
| CLEAN + two faired tip tanks 19,045 Lb. | 5000 | 114 | 122 | 131 | 137 | 145 |
| | 4000 | 107 | 115 | 123 | 131 | 138 |
| | 3000 | 100 | 108 | 116 | 124 | 131 |
| | 2000 | 93 | 103 | 110 | 117 | 125 |
| | 1000 | 87 | 96 | 104 | 112 | 119 |
| | S.L. | 80 | 89 | 97 | 105 | 112 |
| CLEAN 15,699 Lb. | 5000 | 67 | 75 | 84 | 92 | 100 |
| | 4000 | 61 | 69 | 77 | 86 | 94 |
| | 3000 | 55 | 63 | 72 | 80 | 88 |
| | 2000 | 48 | 56 | 65 | 73 | 82 |
| | 1000 | 40 | 50 | 58 | 67 | 76 |
| | S.L. | 33 | 43 | 51 | 60 | 69 |

NOTES:

(1) 20° Wing Flaps.

(2) Take-off with two 14 second-1000 lb. JATO Units.

(3) Gross weights shown for each configuration includes weight of JATO Unit.

(4) Gross weight based on JP-3, JP-4 fuel @ 6.5 lbs/gal.

DATA AS OF: 12 June 1951

BASED ON: Flight Test

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

*Figure A—2. Take-off Chart (Sheet 2 of 2) F-84G-1RE and up*

**AIRPLANE MODEL**
F-84G-1RE and up

# JATO TAKE-OFF DISTANCES

**ENGINE MODEL**
J35-A-29

FEET

## WITH 4 JATO UNITS

HARD SURFACE RUNWAY - NO WIND

| CONFIGURATION AND GROSS WEIGHT | PRESS. ALT. FT. | 40°F | | 60°F | | 80°F | | 100°F | | 120°F | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND ROLL | CLEAR 50' | GROUND ROLL | CLEAR 50' | GROUND ROLL | CLEAR 50' | GROUND ROLL | CLEAR 50' | GROUND ROLL | CLEAR 50' |
| CLEAN + four External Tanks 23,102 Lb. | 5000 | 6340 | 7250 | 7170 | 8130 | 8190 | 9225 | 9510 | 10680 | - | - |
| | 4000 | 5625 | 6475 | 6350 | 7260 | 7225 | 8200 | 8325 | 9400 | 9970 | 11175 |
| | 3000 | 5080 | 5880 | 5735 | 6600 | 6500 | 7420 | 7450 | 8450 | 8890 | 10030 |
| | 2000 | 4610 | 5365 | 5180 | 5985 | 5850 | 6725 | 6710 | 7650 | 7960 | 9020 |
| | 1000 | 4160 | 4870 | 4670 | 5415 | 5260 | 6065 | 6000 | 6800 | 7070 | 8060 |
| | S.L. | 3750 | 4400 | 4180 | 4885 | 4690 | 5440 | 5335 | 6150 | 6210 | 7130 |
| GROUND SUPPORT 22,807 Lb. | 5000 | 6100 | 7000 | 6875 | 7880 | 7810 | 8900 | 9015 | 10200 | - | - |
| | 4000 | 5460 | 6315 | 6160 | 7090 | 6985 | 7990 | 8020 | 9085 | 9480 | 10690 |
| | 3000 | 4970 | 5765 | 5600 | 6470 | 6335 | 7270 | 7250 | 8250 | 8550 | 9690 |
| | 2000 | 4520 | 5270 | 5090 | 5890 | 5740 | 6615 | 6565 | 7480 | 7690 | 8750 |
| | 1000 | 4100 | 4790 | 4610 | 5350 | 5185 | 5990 | 5915 | 6750 | 6860 | 7860 |
| | S.L. | 3710 | 4330 | 4160 | 4830 | 4660 | 5400 | 5285 | 6070 | 6090 | 7000 |
| CLEAN + two FAIRED TIP TANKS 19,505 Lb. | 5000 | 3470 | 4040 | 3810 | 4425 | 4230 | 4900 | 4790 | 5500 | 5590 | 6375 |
| | 4000 | 3125 | 3640 | 3435 | 3990 | 3810 | 4420 | 4330 | 4985 | 5030 | 5800 |
| | 3000 | 2840 | 3310 | 3110 | 3630 | 3460 | 4030 | 3920 | 4550 | 4550 | 5265 |
| | 2000 | 2590 | 3020 | 2845 | 3310 | 3150 | 3670 | 3575 | 4135 | 4120 | 4800 |
| | 1000 | 2360 | 2770 | 2590 | 3020 | 2850 | 3340 | 3230 | 3750 | 3730 | 4350 |
| | S.L. | 2140 | 2520 | 2335 | 2740 | 2570 | 3015 | 2900 | 3390 | 3345 | 3900 |
| CLEAN 16,159 Lb. | 5000 | 1875 | 2225 | 2035 | 2425 | 2225 | 2640 | 2400 | 2900 | 2790 | 3260 |
| | 4000 | 1725 | 2060 | 1870 | 2235 | 2050 | 2435 | 2240 | 2670 | 2565 | 2985 |
| | 3000 | 1600 | 1915 | 1740 | 2070 | 1900 | 2250 | 2080 | 2475 | 2350 | 2760 |
| | 2000 | 1500 | 1790 | 1630 | 1920 | 1750 | 2080 | 1945 | 2295 | 2165 | 2540 |
| | 1000 | 1400 | 1670 | 1515 | 1790 | 1630 | 1940 | 1800 | 2115 | 2000 | 2350 |
| | S.L. | 1300 | 1550 | 1410 | 1665 | 1515 | 1800 | 1650 | 1950 | 1830 | 2175 |

**NOTES:**

(1) 20° Wing Flaps.

(2) Take-off with four 14 second-1000 Lb. JATO Units.

(3) Gross weights shown for each configuration includes weight of JATO Units.

(4) Gross weight based on JP-3, JP-4 fuel @ 6.5 lbs/gal.

**DATA AS OF:** 12 June 1951
**BASED ON:** Flight Test

**BASED ON** JP-3, JP-4 **FUEL**
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

MCRE Form
No. 239B
(5 MAY 48)

Figure A—3. Take-off Chart (Sheet 1 of 2) F-84G-1RE and up

**AIRPLANE MODEL**
F-84G-1RE and up

**ENGINE MODEL**
J35-A-29

# JATO CUT-IN SPEED

MPH

## WITH 4 JATO UNITS

HARD SURFACE RUNWAY - NO WIND

| CONFIGURATION AND GROSS WEIGHT | PRESS. ALT. FT. | AMBIENT TEMPERATURE | | | | |
|---|---|---|---|---|---|---|
| | | 40 °F | 60 °F | 80 °F | 100 °F | 120 °F |
| CLEAN + four<br>External Tanks<br>23,102 Lb. | 5000 | 124 | 133 | 139 | 147 | 155 |
| | 4000 | 118 | 126 | 133 | 141 | 149 |
| | 3000 | 111 | 119 | 127 | 134 | 143 |
| | 2000 | 104 | 112 | 120 | 128 | 137 |
| | 1000 | 98 | 105 | 113 | 121 | 130 |
| | S.L. | 92 | 99 | 107 | 115 | 124 |
| GROUND<br>SUPPORT<br>22,807 Lb. | 5000 | 123 | 130 | 138 | 145 | 153 |
| | 4000 | 116 | 124 | 131 | 139 | 147 |
| | 3000 | 111 | 119 | 125 | 134 | 141 |
| | 2000 | 104 | 112 | 120 | 128 | 136 |
| | 1000 | 98 | 105 | 113 | 121 | 129 |
| | S.L. | 92 | 99 | 106 | 114 | 122 |
| CLEAN + two<br>faired tip tanks<br>19,505 Lb. | 5000 | 83 | 89 | 97 | 105 | 114 |
| | 4000 | 75 | 82 | 90 | 98 | 108 |
| | 3000 | 68 | 75 | 83 | 91 | 101 |
| | 2000 | 61 | 68 | 76 | 85 | 95 |
| | 1000 | 54 | 62 | 70 | 79 | 88 |
| | S.L. | 47 | 55 | 63 | 72 | 81 |
| CLEAN<br>16,159 Lb. | 5000 | 33 | 40 | 47 | 56 | 65 |
| | 4000 | 27 | 33 | 41 | 50 | 59 |
| | 3000 | 20 | 28 | 35 | 43 | 52 |
| | 2000 | 13 | 21 | 28 | 36 | 45 |
| | 1000 | 7 | 14 | 21 | 29 | 39 |
| | S.L. | 1 | 8 | 15 | 23 | 32 |

NOTES:

(1) $20^{\circ}$ Wing Flaps.

(2) Take-off with four 14 second-1000 lb. JATO UNITS.

(3) Gross weights shown for each configuration includes weight of JATO UNIT.

(4) Gross weight based on JP-3, JP-4 fuel @ 6.5 lbs/gal.

DATA AS OF: 12 June 1951

BASED ON: Flight Test

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

*Figure A—3. Take-off Chart (Sheet 2 of 2) F-84-1RE and up*

**AIRPLANE MODEL**
F-84G-1RE thru 5RE

# CLIMB CHART

STANDARD DAY

FOR MILITARY POWER

**ENGINE MODEL**
J35-A-29

| | APPROXIMATE | | | CAS MPH | PRESSURE ALTITUDE FEET | CAS MPH | APPROXIMATE | | | RATE OF CLIMB |
|---|---|---|---|---|---|---|---|---|---|---|
| RATE OF CLIMB | FROM SEA LEVEL | | | | | | FROM SEA LEVEL | | | |
| | DISTANCE | TIME | FUEL | | | | FUEL | TIME | DISTANCE | |
| Ground support. Clean + 2 tip tanks + 2-1000 Bombs + 8-5" HVARS. Gross Wgt. 21947 lb. | | | | | AIRPLANE CONFIGURATION & GROSS WEIGHT | Ground support. Clean + 2 tip tanks + 2-1000 lb. Bombs + 8-5" HVARS.Gross Wgt.17555 | | | | |
| 2680 | 0 | 0 | 385 (1) | 300 | SEA LEVEL | 300 | 385 (1) | 0 | 0 | 3650 |
| 2180 | 10 | 2 | 580 | 290 | 5000 | 290 | 525 | 1.4 | 6 | 2970 |
| 1705 | 24 | 4.6 | 795 | 280 | 10,000 | 280 | 680 | 3.3 | 17 | 2430 |
| 1280 | 42 | 8.0 | 1045 | 270 | 15,000 | 270 | 845 | 5.5 | 30 | 1980 |
| 870 | 69 | 12.7 | 1345 | 255 | 20,000 | 255 | 1025 | 8.3 | 46 | 1550 |
| 425 | 115 | 20.8 | 1785 | 240 | 25,000 | 240 | 1225 | 12.6 | 68 | 1100 |
| | | | | | 30,000 | 220 | 1445 | 17.7 | 98 | 680 |
| | | | | | 35,000 | 200 | 1825 | 27.2 | 162 | 240 |
| Clean + 4-230 Gal. External Tanks Gross Wgt 22,242 lb. | | | | | AIRPLANE CONFIGURATION & GROSS WEIGHT | Clean + 4-230 Gal. External Tanks Gross Wgt 14,870 lb. | | | | |
| 3400 | 0 | 0 | 385(1) | 375 | SEA LEVEL | 350 | 385 (1) | 0 | 0 | 5680 |
| 2820 | 11 | 1.6 | 545 | 365 | 5,000 | 340 | 480 | 1.0 | 6 | 4710 |
| 2290 | 24 | 3.6 | 715 | 350 | 10,000 | 330 | 575 | 2.1 | 19 | 4000 |
| 1840 | 39 | 6.0 | 895 | 330 | 15,000 | 310 | 675 | 3.4 | 23 | 3420 |
| 1360 | 59 | 8.9 | 1090 | 310 | 20,000 | 295 | 785 | 5.1 | 32 | 2830 |
| 870 | 90 | 13.3 | 1345 | 290 | 25,000 | 275 | 900 | 7.1 | 45 | 2250 |
| 400 | 143 | 21 | 1705 | 270 | 30,000 | 250 | 1020 | 9.5 | 63 | 1650 |
| | | | | | 35,000 | 230 | 1175 | 13.1 | 88 | 1100 |
| | | | | | 40,000 | 205 | 1365 | 19.3 | 126 | 520 |
| | | | | | AIRPLANE CONFIGURATION & GROSS WEIGHT | | | | | |
| | | | | | SEA LEVEL | | | | | |
| | | | | | AIRPLANE CONFIGURATION & GROSS WEIGHT | | | | | |
| | | | | | SEA LEVEL | | | | | |

MULTIPLY STATUTE UNITS BY .87 FOR CONVERSION TO NAUTICAL UNITS

**NOTES:**

(1) Allowance for start, taxi, take-off and acceleration to climb speed.
(2) Climb at recommended CAS.

**LEGEND**

FUEL - POUNDS
DISTANCE - STATUTE MILES
TIME - MINUTES
RATE OF CLIMB - FEET PER MINUTE
CAS - CALIBRATED AIR SPEED
MPH - STATUTE MILES PER HOUR

DATA AS OF: July 1951
BASED ON: Estimates

**BASED ON** JP-3 **FUEL**
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

MCRE Form
No. 239F
(5 May 48)

Figure A—4. Climb Chart—(Sheet 1 of 2) F-84G-1RE thru -5RE

**AIRPLANE MODEL**
F-84G-1RE thru 5RE

# CLIMB CHART

STANDARD DAY

FOR MILITARY POWER

**ENGINE MODEL**
J35-A-29

|  | APPROXIMATE |  |  |  | PRESSURE |  | APPROXIMATE |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
| RATE OF CLIMB | FROM SEA LEVEL |  |  | CAS MPH | ALTITUDE FEET | CAS MPH | FROM SEA LEVEL |  |  | RATE OF CLIMB |
|  | DISTANCE | TIME | FUEL |  |  |  | FUEL | TIME | DISTANCE |  |
| Clean + 2-230 Gal. Tip Tanks<br>Gross Wgt. 18,645 lb. |  |  |  |  | AIRPLANE CONFIGURATION & GROSS WEIGHT | Clean + 2-230 Gal. Tip Tanks<br>Gross Wgt. 14,253 lb. |  |  |  |  |
| 5140 | 0 | 0 | 385(1) | 425 | SEA LEVEL | 425 | 385(1) | 0 | 0 | 7140 |
| 4250 | 7 | 1 | 495 | 405 | 5,000 | 405 | 460 | 0.8 | 6 | 6120 |
| 3600 | 16 | 2.3 | 595 | 385 | 10,000 | 385 | 540 | 1.6 | 13 | 5200 |
| 3050 | 27 | 3.6 | 710 | 360 | 15,000 | 360 | 620 | 2.6 | 20 | 4540 |
| 2420 | 41 | 5.4 | 835 | 335 | 20,000 | 335 | 700 | 3.8 | 29 | 3820 |
| 1950 | 57 | 7.6 | 960 | 315 | 25,000 | 315 | 785 | 5.2 | 40 | 3120 |
| 1380 | 77 | 10.7 | 1115 | 285 | 30,000 | 285 | 880 | 7.0 | 53 | 2430 |
| 770 | 113 | 15 | 1295 | 270 | 35,000 | 270 | 985 | 9.5 | 71 | 1750 |
|  |  |  |  |  | 40,000 | 245 | 1110 | 13.2 | 100 | 1060 |
| Clean<br>Gross Wgt. 15299 lb. |  |  |  |  | AIRPLANE CONFIGURATION & GROSS WEIGHT | Clean<br>Gross Wgt. 13866 lb. |  |  |  |  |
| 7120 | 0 | 0 | 385(1) | 440 | SEA LEVEL | 440 | 385(1) | 0 | 0 | 7960 |
| 6020 | 6 | 0.7 | 465 | 420 | 5,000 | 420 | 455 | 0.7 | 6 | 6770 |
| 5160 | 13 | 1.7 | 540 | 395 | 10,000 | 395 | 525 | 1.5 | 12 | 5850 |
| 4450 | 21 | 2.8 | 625 | 375 | 15,000 | 375 | 600 | 2.4 | 19 | 5070 |
| 3750 | 30 | 3.9 | 710 | 350 | 20,000 | 350 | 675 | 3.5 | 26 | 4300 |
| 3020 | 42 | 5.3 | 800 | 330 | 25,000 | 330 | 765 | 4.8 | 37 | 3550 |
| 2330 | 56 | 7.2 | 895 | 305 | 30,000 | 305 | 830 | 6.3 | 49 | 2780 |
| 1590 | 78 | 9.7 | 1005 | 285 | 35,000 | 285 | 925 | 8.3 | 67 | 2000 |
| 890 | 110 | 13.8 | 1150 | 255 | 40,000 | 255 | 1030 | 11.5 | 92 | 1230 |
|  |  |  |  |  | AIRPLANE CONFIGURATION & GROSS WEIGHT |  |  |  |  |  |
|  |  |  |  |  | SEA LEVEL |  |  |  |  |  |
|  |  |  |  |  | AIRPLANE CONFIGURATION & GROSS WEIGHT |  |  |  |  |  |
|  |  |  |  |  | SEA LEVEL |  |  |  |  |  |

MULTIPLY STATUTE UNITS BY .87 FOR CONVERSION TO NAUTICAL UNITS

**NOTES:**

(1) Allowance for start, taxi, take-off and acceleration to climb speed.
(2) Climb at recommended CAS.

**LEGEND**

FUEL - POUNDS
DISTANCE - STATUTE MILES
TIME - MINUTES
RATE OF CLIMB - FEET PER MINUTE
CAS - CALIBRATED AIR SPEED
MPH - STATUTE MILES PER HOUR

DATA AS OF: July 1951
BASED ON: Estimates

**BASED ON** JP-3 **FUEL**
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED —

MCRE Form No. 239F (5 May 48)

*Figure A-4. Climb Chart — (Sheet 2 of 2) F-84G-1RE thru -5RE*

**AIRPLANE MODEL**

F-84G-1RE thru-5RE

# DESCENT CHART

STANDARD DAY

**ENGINE MODEL**

J35-A-29

NOTES:

(1) Gross weights based on fuel density of 6.5 lbs/gal.

| Airplane configuration & Gross wt<br>Clean+ two-230 gal. tip tanks+ 2-1000 lb.<br>Bombs+ Eight-5" HVA Rockets @ - 16908. | | | | | PRESS. ALT. FT. | Airplane configuration & Gross wt. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | CAS MPH | | CAS MPH | APPROXIMATE | | | |
| RATE OF DESCENT | TO SEA LEVEL | | | | | | TO SEA LEVEL | | | RATE OF DESCENT |
| | DISTANCE | TIME | FUEL | | | | FUEL | TIME | DISTANCE | |
| | | | | | 40000 | | | | | |
| | | | | | 35000 | | | | | |
| | | | | | 30000 | | | | | |
| 5700 | 19 | 2.2 | 37 | 335 | 25000 | | | | | |
| 7500 | 13 | 1.5 | 24 | 370 | 20000 | | | | | |
| 9835 | 9 | .99 | 15 | 410 | 15000 | | | | | |
| 12730 | 5 | .58 | 8 | 450 | 10000 | | | | | |
| 16380 | 2 | .26 | 3 | 490 | 5000 | | | | | |
| 20340 | 0 | 0 | 0 | 535 | SEA LEVEL | | | | | |

MULTIPLY STATUTE UNITS BY .87 FOR CONVERSION TO NAUTICAL UNITS

DATA AS OF: July 1951

BASED ON: Estimates

**BASED ON** JP-3 **FUEL** @ 6.5 lbs/gal.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

LEGEND:
FUEL - POUNDS
DISTANCE - STATUTE MILES
TIME - MINUTES
RATE OF DESCENT - FT. PER MIN.
CAS - CALIBRATED AIRSPEED
MPH - STATUTE MILES PER HOUR

MCRE Form
No. 239E
(5 May 48)

*Figure A—5. Descent Chart (Sheet 1 of 3) F-84G-1RE thru -5RE*

**AIRPLANE MODEL**

F-84G-1RE thru-5RE

# DESCENT CHART

STANDARD DAY

**ENGINE MODEL**

J35-A-29

NOTES:

(1) Gross weights based on fuel density of 6.5 lbs/gal.

| Airplane configuration & Gross wt Clean+two-230 gal. faired tip tanks+two-230 gal. pylon tanks @ 14662. | | | | | PRESS. ALT. FT. | Airplane configuration & Gross wt. Clean+two-230 gal. faired tip tanks @ 13606. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | CAS MPH | | CAS MPH | APPROXIMATE | | | |
| RATE OF DESCENT | TO SEA LEVEL | | | | | | TO SEA LEVEL | | | RATE OF DESCENT |
| | DISTANCE | TIME | FUEL | | | | FUEL | TIME | DISTANCE | |
| | | | | | 40000 | 240 | 303 | 18.1 | 144 | 750 |
| 1800 | 53 | 6.5 | 112 | 270 | 35000 | 270 | 203 | 11.6 | 94 | 750 |
| 2350 | 40 | 4.9 | 83 | 300 | 30000 | 300 | 124 | 7.1 | 58 | 1350 |
| 3500 | 27 | 3.3 | 54 | 335 | 25000 | 335 | 77 | 4.5 | 38 | 2250 |
| 4950 | 18 | 2.2 | 34 | 370 | 20000 | 370 | 47 | 2.8 | 24 | 3450 |
| 6850 | 12 | 1.4 | 19 | 410 | 15000 | 410 | 27 | 1.7 | 15 | 5100 |
| 9200 | 7 | .8 | 10 | 450 | 10000 | 450 | 14 | 1.0 | 9 | 7100 |
| 12200 | 3 | .3 | 4 | 490 | 5000 | 490 | 6 | .4 | 4 | 9750 |
| 15400 | 0 | 0 | 0 | 535 | SEA LEVEL | 535 | 0 | 0 | 0 | 12400 |

MULTIPLY STATUTE UNITS BY .87 FOR CONVERSION TO NAUTICAL UNITS

DATA AS OF: July 1951

BASED ON: Estimates

**BASED ON** JP-3 **FUEL** @ 6.5 lbs/gal.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

LEGEND:
FUEL - ~~GALLONS~~ POUNDS
DISTANCE - STATUTE MILES
TIME - MINUTES
RATE OF DESCENT - FT. PER MIN.
CAS - CALIBRATED AIRSPEED
MPH - STATUTE MILES PER HOUR

MCRE Form
No. 239E
(5 May 48)

*Figure A–5. Descent Chart (Sheet 2 of 3) F-84G-1RE thru -5RE*

**AIRPLANE MODEL**

F-84G-1RE thru-5RE

# DESCENT CHART

STANDARD DAY

**ENGINE MODEL**

J35-A-29

NOTES:

(1) Gross weights based on fuel density of 6.5 lbs/gal.

| Airplane configuration & Gross wt<br>Clean @ 13699 lbs. | | | | | PRESS. ALT. FT. | Airplane configuration & Gross wt.<br>Clean @ 12802 lbs. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE TO SEA LEVEL | | | CAS MPH | | CAS MPH | APPROXIMATE TO SEA LEVEL | | | |
| RATE OF DESCENT | DISTANCE | TIME | FUEL | | | | FUEL | TIME | DISTANCE | RATE OF DESCENT |
| 750 | 164 | 20.6 | 345 | 240 | 40000 | 240 | 371 | 22.1 | 175 | 650 |
| 700 | 110 | 13.6 | 236 | 270 | 35000 | 270 | 245 | 14.0 | 113 | 600 |
| 1150 | 69 | 8.4 | 146 | 300 | 30000 | 300 | 145 | 8.2 | 68 | 1100 |
| 1850 | 44 | 5.2 | 89 | 335 | 25000 | 335 | 86 | 5.0 | 42 | 1850 |
| 2950 | 28 | 3.3 | 53 | 370 | 20000 | 370 | 51 | 3.1 | 26 | 3050 |
| 4450 | 17 | 2.0 | 30 | 410 | 15000 | 410 | 29 | 1.9 | 16 | 4650 |
| 6250 | 10 | 1.1 | 15 | 450 | 10000 | 450 | 15 | 1.0 | 9 | 6650 |
| 8600 | 4 | .5 | 6 | 490 | 5000 | 490 | 6 | .5 | 4 | 9150 |
| 10900 | 0 | 0 | 0 | 535 | SEA LEVEL | 535 | 0 | 0 | 0 | 11600 |

MULTIPLY STATUTE UNITS BY .87 FOR CONVERSION TO NAUTICAL UNITS

DATA AS OF: July 1951

BASED ON: Estimates

**BASED ON** JP-3 **FUEL** @ 6.5 lbs/gal.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

LEGEND:
FUEL - POUNDS
DISTANCE - STATUTE MILES
TIME - MINUTES
RATE OF DESCENT - FT. PER MIN.
CAS - CALIBRATED AIRSPEED
MPH - STATUTE MILES PER HOUR

MCRE Form
No. 239E
(5 May 48)

Figure A—5. Descent Chart (Sheet 3 of 3) F-84G-1RE thru -5RE

**AIRPLANE MODEL**

F-84G-1RE thru-5RE

# LANDING DISTANCE

FEET

**ENGINE MODEL**

J35-A-29

| GROSS WEIGHT LB. | BEST CAS APPROACH | | HARD SURFACE - NO WIND | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | POWER OFF | POWER ON | AT SEA LEVEL | | AT 2000' | | AT 4000' | | AT 6000' | |
| | MPH | MPH | GROUND ROLL | CLEAR 50' | GROUND ROLL | CLEAR 50' | GROUND ROLL | CLEAR 50' | GROUND ROLL | CLEAR 50' |
| 14850 | 147 | 147 | 3040 | 4550 | 3190 | 4800 | 3375 | 5060 | 3580 | 5370 |
| 13000 | 137 | 137 | 2700 | 4030 | 2870 | 4250 | 2980 | 4460 | 3160 | 4740 |
| 11000 | 126 | 126 | 2310 | 3510 | 2410 | 3650 | 2550 | 3810 | 2700 | 4050 |

NOTES:

(1) No Conservatism

(2) Distances based on landing technique shown in section II

LEGEND

CAS - CALIBRATED AIRSPEED
MPH - MILES PER HOUR

DATA AS OF: July 1951

BASED ON: Estimates

**BASED ON** JP-3 **FUEL**

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

MCRE Form
No. 239A
(5 May 48)

*Figure A–6. Landing Chart — F-84G-1RE thru -5RE*

# MAXIMUM ENDURANCE

## STANDARD DAY

**MODEL:** F84G-1RE thru-5RE

**ENGINE(S)** J35-A-29

**CONFIGURATION:** Clean + Tip Tanks + eight - 5" HVAR + two-1000 lb. Bombs.

**WEIGHT:** 21947 lb.

| ALTITUDE | CAS (MPH) | APPROXIMATE | |
|---|---|---|---|
| | | LBS/HR | % RPM |
| SEA LEVEL | 205 | 2845 | 80 |
| 5000 | 230 | 2590 | 83 |
| 10000 | 230 | 2490 | 85 |
| 15000 | 235 | 2480 | 88 |
| 20000 | 240 | 2435 | 92 |
| 25000 | 240 | 2460 | 95 |
| 30000 | | | |
| 35000 | | | |
| 40000 | | | |
| 45000 | | | |
| 50000 | | | |
| 55000 | | | |

**CONFIGURATION:** Clean + Tip Tanks + eight- 5" HVAR + two-1000 lb. Bombs.

**WEIGHT:** 20483 lb.

| ALTITUDE | CAS (MPH) | APPROXIMATE | |
|---|---|---|---|
| | | LBS/HR | % RPM |
| SEA LEVEL | 195 | 2710 | 79 |
| 5000 | 215 | 2470 | 81 |
| 10000 | 215 | 2370 | 84 |
| 15000 | 220 | 2330 | 87 |
| 20000 | 220 | 2270 | 90 |
| 25000 | 220 | 2300 | 93 |
| 30000 | | | |
| 35000 | | | |
| 40000 | | | |
| 45000 | | | |
| 50000 | | | |
| 55000 | | | |

**CONFIGURATION:** Clean + Tip Tanks + eight - 5" HVAR — two-1000 lb. Bombs.

**WEIGHT:** 19019 lb.

| ALTITUDE | CAS (MPH) | APPROXIMATE | |
|---|---|---|---|
| | | LBS/HR | % RPM |
| SEA LEVEL | 185 | 2570 | 77 |
| 5000 | 200 | 2340 | 79 |
| 10000 | 200 | 2240 | 82 |
| 15000 | 205 | 2170 | 85 |
| 20000 | 200 | 2100 | 87 |
| 25000 | 200 | 2140 | 91 |
| 30000 | | | |
| 35000 | | | |
| 40000 | | | |
| 45000 | | | |
| 50000 | | | |
| 55000 | | | |

**CONFIGURATION:** Clean + Tip Tanks + eight- 5" HVAR ÷ two-1000 lb. Bombs.

**WEIGHT:** 17555 lb.

| ALTITUDE | CAS (MPH) | APPROXIMATE | |
|---|---|---|---|
| | | LBS/HR | % RPM |
| SEA LEVEL | 175 | 2415 | 75 |
| 5000 | 185 | 2205 | 77 |
| 10000 | 185 | 2110 | 80 |
| 15000 | 185 | 2005 | 83 |
| 20000 | 185 | 1925 | 85 |
| 25000 | 180 | 1970 | 89 |
| 30000 | | | |
| 35000 | | | |
| 40000 | | | |
| 45000 | | | |
| 50000 | | | |
| 55000 | | | |

**REMARKS:**

1. Multiply statute units by .87 to obtain nautical units.

CAS = CALIBRATED AIRSPEED (MPH)
MPH = STATUTE MILES PER HOUR
TAS = TRUE AIRSPEED (MPH)
LB/HR = FUEL CONSUMPTION

**DATA AS OF:** July 1951
**DATA BASIS:** Estimates

**FUEL GRADE:** JP-3
**FUEL DENSITY:** 6.5 lbs/gal

*Figure A–7. Maximum Endurance Chart (Sheet 1 of 4) F-84G-1RE thru -5RE*

# MAXIMUM ENDURANCE

## STANDARD DAY

**MODEL:** F-84G-1RE thru-5RE

**ENGINE(S)** J35-A-29

**CONFIGURATION:** Clean + four-230 gal Tanks

**WEIGHT:** 22242 lb.

| ALTITUDE | CAS (MPH) | APPROXIMATE | |
|---|---|---|---|
| | | LBS/HR | % RPM |
| SEA LEVEL | 245 | 2600 | 78 |
| 5000 | 245 | 2395 | 80 |
| 10000 | 245 | 2250 | 82 |
| 15000 | 245 | 2140 | 85 |
| 20000 | 245 | 2070 | 87 |
| 25000 | 245 | 2065 | 90 |
| 30000 | | | |
| 35000 | | | |
| 40000 | | | |
| 45000 | | | |
| 50000 | | | |
| 55000 | | | |

**CONFIGURATION:** Clean + four-230 gal. Tanks

**WEIGHT:** 20768 lb.

| ALTITUDE | CAS (MPH) | APPROXIMATE | |
|---|---|---|---|
| | | LBS/HR | % RPM |
| SEA LEVEL | 230 | 2460 | 76 |
| 5000 | 235 | 2280 | 79 |
| 10000 | 235 | 2140 | 81 |
| 15000 | 235 | 2030 | 84 |
| 20000 | 235 | 1950 | 86 |
| 25000 | 240 | 1930 | 89 |
| 30000 | 240 | 1990 | 92 |
| 35000 | | | |
| 40000 | | | |
| 45000 | | | |
| 50000 | | | |
| 55000 | | | |

**CONFIGURATION:** Clean + four-230 gal Tanks

**WEIGHT:** 19294 lb.

| ALTITUDE | CAS (MPH) | APPROXIMATE | |
|---|---|---|---|
| | | LBS/HR | % RPM |
| SEA LEVEL | 220 | 2325 | 75 |
| 5000 | 220 | 2160 | 77 |
| 10000 | 225 | 2025 | 80 |
| 15000 | 225 | 1915 | 82 |
| 20000 | 225 | 1830 | 85 |
| 25000 | 230 | 1795 | 87 |
| 30000 | 230 | 1815 | 90 |
| 35000 | | | |
| 40000 | | | |
| 45000 | | | |
| 50000 | | | |
| 55000 | | | |

**CONFIGURATION:** Clean + four-230 gal tanks

**WEIGHT:** 17820 lb.

| ALTITUDE | CAS (MPH) | APPROXIMATE | |
|---|---|---|---|
| | | LBS/HR | % RPM |
| SEA LEVEL | 210 | 2190 | 72 |
| 5000 | 210 | 2040 | 75 |
| 10000 | 210 | 1910 | 78 |
| 15000 | 215 | 1800 | 80 |
| 20000 | 220 | 1710 | 83 |
| 25000 | 220 | 1655 | 85 |
| 30000 | 220 | 1655 | 88 |
| 35000 | 220 | 1700 | 92 |
| 40000 | | | |
| 45000 | | | |
| 50000 | | | |
| 55000 | | | |

**REMARKS:**

CAS = CALIBRATED AIRSPEED (MPH)
MPH = STATUTE MILES PER HOUR
TAS = TRUE AIRSPEED (MPH)
LB/HR = FUEL CONSUMPTION

**DATA AS OF:** July 1951
**DATA BASIS:** Estimates

**FUEL GRADE:** JP-3
**FUEL DENSITY:** 6.5 lbs/gal

*Figure A–7. Maximum Endurance Chart (Sheet 2 of 4) F-84G-1RE thru -5RE*

# MAXIMUM ENDURANCE

## STANDARD DAY

**MODEL:** F84G-1RE thru-5RE

**ENGINE(S)** J35-A-29

**CONFIGURATION:** Clean + four-230 gal Tanks

**WEIGHT:** 16345 lb.

| ALTITUDE | CAS (MPH) | APPROXIMATE | |
|---|---|---|---|
| | | LBS/HR | % RPM |
| SEA LEVEL | 200 | 2055 | 71 |
| 5000 | 200 | 1920 | 73 |
| 10000 | 205 | 1800 | 76 |
| 15000 | 205 | 1685 | 78 |
| 20000 | 210 | 1590 | 81 |
| 25000 | 210 | 1530 | 83 |
| 30000 | 215 | 1500 | 86 |
| 35000 | 215 | 1525 | 90 |
| 40000 | | | |
| 45000 | | | |
| 50000 | | | |
| 55000 | | | |

**CONFIGURATION:** Clean + four-230 gal tanks

**WEIGHT:** 14870 lb.

| ALTITUDE | CAS (MPH) | APPROXIMATE | |
|---|---|---|---|
| | | LBS/HR | % RPM |
| SEA LEVEL | 185 | 1915 | 70 |
| 5000 | 190 | 1800 | 72 |
| 10000 | 190 | 1685 | 74 |
| 15000 | 195 | 1575 | 77 |
| 20000 | 200 | 1475 | 79 |
| 25000 | 205 | 1395 | 81 |
| 30000 | 205 | 1360 | 84 |
| 35000 | 205 | 1375 | 87 |
| 40000 | 195 | 1445 | 94 |
| 45000 | | | |
| 50000 | | | |
| 55000 | | | |

**CONFIGURATION:** Clean + two-230 gal Tanks

**WEIGHT:** 18645 lb.

| ALTITUDE | CAS (MPH) | APPROXIMATE | |
|---|---|---|---|
| | | LBS/HR | % RPM |
| SEA LEVEL | 215 | 2200 | 72 |
| 5000 | 225 | 1990 | 75 |
| 10000 | 235 | 1845 | 77 |
| 15000 | 240 | 1720 | 80 |
| 20000 | 245 | 1630 | 82 |
| 25000 | 245 | 1550 | 84 |
| 30000 | 245 | 1490 | 87 |
| 35000 | 240 | 1505 | 90 |
| 40000 | | | |
| 45000 | | | |
| 50000 | | | |
| 55000 | | | |

**CONFIGURATION:** Clean + two-230 gal Tanks

**WEIGHT:** 17181 lb.

| ALTITUDE | CAS (MPH) | APPROXIMATE | |
|---|---|---|---|
| | | LBS/HR | % RPM |
| SEA LEVEL | 205 | 2015 | 71 |
| 5000 | 220 | 1870 | 73 |
| 10000 | 225 | 1735 | 75 |
| 15000 | 230 | 1620 | 78 |
| 20000 | 235 | 1530 | 80 |
| 25000 | 235 | 1445 | 82 |
| 30000 | 235 | 1380 | 84 |
| 35000 | 230 | 1385 | 88 |
| 40000 | | | |
| 45000 | | | |
| 50000 | | | |
| 55000 | | | |

**REMARKS:**

(1) Multiply statute units by .87 to obtain nautical units.

CAS = CALIBRATED AIRSPEED (MPH)
MPH = STATUTE MILES PER HOUR
TAS = TRUE AIRSPEED (MPH)
LB/HR = FUEL CONSUMPTION

**DATA AS OF:** July 1951
**DATA BASIS:** Estimates

**FUEL GRADE:** JP-3
**FUEL DENSITY:** 6.5 lbs/gal

*Figure A–7. Maximum Endurance Chart (Sheet 3 of 4) F-84G-1RE thru -5RE*

# MAXIMUM ENDURANCE

## STANDARD DAY

**MODEL:** F-84G-1RE thru-5RE

**ENGINE(S)** J35-A-29

**CONFIGURATION:** Clean+two-230 gal Tanks

**WEIGHT:** 15717 lb.

| ALTITUDE | CAS (MPH) | APPROXIMATE | |
|---|---|---|---|
| | | LBS/HR | % RPM |
| SEA LEVEL | 200 | 1850 | 69 |
| 5000 | 210 | 1740 | 71 |
| 10000 | 215 | 1630 | 73 |
| 15000 | 220 | 1530 | 76 |
| 20000 | 220 | 1440 | 78 |
| 25000 | 220 | 1350 | 80 |
| 30000 | 220 | 1275 | 82 |
| 35000 | 220 | 1270 | 86 |
| 40000 | 215 | 1350 | 91 |
| 45000 | | | |
| 50000 | | | |
| 55000 | | | |

**CONFIGURATION:** Clean+two-230 gal tanks

**WEIGHT:** 14253 lb.

| ALTITUDE | CAS (MPH) | APPROXIMATE | |
|---|---|---|---|
| | | LBS/HR | % RPM |
| SEA LEVEL | 195 | 1680 | 67 |
| 5000 | 200 | 1595 | 69 |
| 10000 | 205 | 1510 | 71 |
| 15000 | 210 | 1430 | 74 |
| 20000 | 210 | 1340 | 76 |
| 25000 | 210 | 1250 | 78 |
| 30000 | 210 | 1165 | 80 |
| 35000 | 210 | 1145 | 84 |
| 40000 | 205 | 1190 | 88 |
| 45000 | | | |
| 50000 | | | |
| 55000 | | | |

**CONFIGURATION:** Clean

**WEIGHT:** 15299 lb.

| ALTITUDE | CAS (MPH) | APPROXIMATE | |
|---|---|---|---|
| | | LBS/HR | % RPM |
| SEA LEVEL | 200 | 1770 | 68 |
| 5000 | 210 | 1675 | 70 |
| 10000 | 215 | 1585 | 73 |
| 15000 | 220 | 1490 | 75 |
| 20000 | 225 | 1400 | 77 |
| 25000 | 225 | 1310 | 79 |
| 30000 | 225 | 1260 | 82 |
| 35000 | 225 | 1255 | 85 |
| 40000 | 255 | 1310 | 90 |
| 45000 | | | |
| 50000 | | | |
| 55000 | | | |

**CONFIGURATION:** Clean

**WEIGHT:** 13866 lb.

| ALTITUDE | CAS (MPH) | APPROXIMATE | |
|---|---|---|---|
| | | LBS/HR | % RPM |
| SEA LEVEL | 190 | 1660 | 67 |
| 5000 | 200 | 1570 | 69 |
| 10000 | 205 | 1485 | 71 |
| 15000 | 210 | 1400 | 73 |
| 20000 | 215 | 1315 | 75 |
| 25000 | 215 | 1235 | 78 |
| 30000 | 215 | 1160 | 80 |
| 35000 | 215 | 1140 | 83 |
| 40000 | 240 | 1170 | 87 |
| 45000 | | | |
| 50000 | | | |
| 55000 | | | |

**REMARKS:**

(1) Multiply statute units by .87 to obtain nautical units.

CAS = CALIBRATED AIRSPEED (MPH)
MPH = STATUTE MILES PER HOUR
TAS = TRUE AIRSPEED (MPH)
LB/HR = FUEL CONSUMPTION

**DATA AS OF:** July 1951
**DATA BASIS:** Estimates

**FUEL GRADE:** JP-3
**FUEL DENSITY:** 6.5 lbs/gal

*Figure A–7. Maximum Endurance Chart (Sheet 4 of 4) F-84G-1RE thru -5RE*

## COMBAT ALLOWANCE CHART

**STANDARD DAY**

**MODEL:** F-84G-1RE thru-5RE **ENGINE(S)** J35-A-29

| AT ALTITUDE FEET | FUEL REQUIRED POUNDS PER MINUTE | |
|---|---|---|
| | 95 % RPM (NORMAL POWER) MAX CONTINUOUS | 100 % RPM (MILITARY POWER) 30 MINUTE LIMIT |
| SEA LEVEL | 91 | 120 |
| 5000 | 82 | 105 |
| 10000 | 73 | 92 |
| 15000 | 64 | 81 |
| 20000 | 57 | 69 |
| 25000 | 49 | 59 |
| 30000 | 42 | 50 |
| 35000 | 35 | 41 |
| 40000 | 28 | 33 |

**REMARKS:**

Clean + two-230 gal. Tip Tanks. Gross Wgt. 16905 lb.

**DATA AS OF:** July 1951 **FUEL GRADE:** JP-3
**DATA BASIS:** Estimates **FUEL DENSITY:** 6.5 lbs/gal

*Figure A–8. Combat Allowance Chart (Sheet 1 of 2) F-84G-1RE thru -5RE*

## COMBAT ALLOWANCE CHART

STANDARD DAY

MODEL: F-84G-1RE thru-5RE ENGINE(S) J35-A-29

| AT ALTITUDE FEET | FUEL REQUIRED POUNDS PER MINUTE | |
|---|---|---|
| | 95 % RPM (NORMAL POWER) MAX CONTINUOUS | 100 % RPM (MILITARY POWER) 30 MINUTE LIMIT |
| SEA LEVEL | 92 | 122 |
| 5000 | 83 | 106 |
| 10000 | 74 | 94 |
| 15000 | 65 | 82 |
| 20000 | 57 | 70 |
| 25000 | 50 | 60 |
| 30000 | 42 | 51 |
| 35000 | 35 | 42 |
| 40000 | 28 | 34 |

REMARKS:

Clean Gross Wgt. 15288 lb.

DATA AS OF: July 1951
DATA BASIS: Estimates

FUEL GRADE: JP-3
FUEL DENSITY: 6.5 lbs/gal

*Figure A—8. Combat Allowance Chart (Sheet 2 of 2) F-84G-1RE thru -5RE*

# MAXIMUM CONTINUOUS POWER

## STANDARD DAY

MODEL: F-84G-1RE thru-5RE

ENGINE(S) J35-A-29

CONFIGURATION: Clean + two-tanks + two-1000 lb. Bombs + eight-5" HVAR
WEIGHT: 21947 lb.

| ALTITUDE | % RPM | APPROXIMATE | | |
|---|---|---|---|---|
| | | CAS | TAS | LB HR |
| SEA LEVEL | 95 | 415 | 415 | 5080 |
| 5000 | 95 | 390 | 420 | 4540 |
| 10000 | 95 | 365 | 420 | 3970 |
| 15000 | 95 | 335 | 415 | 3470 |
| 20000 | 95 | 300 | 400 | 3030 |
| 25000 | | | | |
| 30000 | | | | |
| 35000 | | | | |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |
| 55000 | | | | |

CONFIGURATION: Clean + two-tanks + two-1000 lb. Bombs + eight-5" HVAR
WEIGHT: 20483 lb.

| ALTITUDE | % RPM | APPROXIMATE | | |
|---|---|---|---|---|
| | | CAS | TAS | LB HR |
| SEA LEVEL | 95 | 420 | 420 | 5090 |
| 5000 | 95 | 390 | 420 | 4550 |
| 10000 | 95 | 370 | 420 | 3980 |
| 15000 | 95 | 340 | 420 | 3480 |
| 20000 | 95 | 305 | 410 | 3060 |
| 25000 | | | | |
| 30000 | | | | |
| 35000 | | | | |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |
| 55000 | | | | |

CONFIGURATION: Clean + two tanks + two-1000 lb. Bombs + eight-5" HVAR
WEIGHT: 19019 lb.

| ALTITUDE | % RPM | APPROXIMATE | | |
|---|---|---|---|---|
| | | CAS | TAS | LB HR |
| SEA LEVEL | 95 | 420 | 420 | 5090 |
| 5000 | 95 | 395 | 425 | 4560 |
| 10000 | 95 | 375 | 425 | 3990 |
| 15000 | 95 | 345 | 425 | 3480 |
| 20000 | 95 | 310 | 420 | 3080 |
| 25000 | 95 | 275 | 405 | 2650 |
| 30000 | | | | |
| 35000 | | | | |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |
| 55000 | | | | |

CONFIGURATION: Clean + two tanks + two-1000 lb. Bombs + eight-5" HVAR
WEIGHT: 17555 lb.

| ALTITUDE | % RPM | APPROXIMATE | | |
|---|---|---|---|---|
| | | CAS | TAS | LB HR |
| SEA LEVEL | 95 | 425 | 425 | 5100 |
| 5000 | 95 | 395 | 425 | 4570 |
| 10000 | 95 | 380 | 430 | 3990 |
| 15000 | 95 | 350 | 430 | 3490 |
| 20000 | 95 | 325 | 430 | 3100 |
| 25000 | 95 | 290 | 420 | 2720 |
| 30000 | | | | |
| 35000 | | | | |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |
| 55000 | | | | |

**REMARKS:**

(1) Multiply statute units by .87 to obtain nautical units.

CAS = CALIBRATED AIRSPEED (MPH)
MPH = STATUTE MILES PER HOUR
TAS = TRUE AIRSPEED (MPH)
LB, HR = FUEL CONSUMPTION

DATA AS OF: July 1951
DATA BASIS: Estimates

FUEL GRADE: JP-3
FUEL DENSITY: 6.5 lbs/gal

*Figure A–9. Maximum Continuous Power Chart (Sheet 1 of 4) F-84G-1RE thru -5RE*

# MAXIMUM CONTINUOUS POWER

## STANDARD DAY

**MODEL:** F-84G-1RE thru-5RE

**ENGINE(S)** J35-A-29

**CONFIGURATION:** Clean+four tanks

**WEIGHT:** 22242 lb.

| ALTITUDE | % RPM | APPROXIMATE | | |
|---|---|---|---|---|
| | | CAS | TAS | LB HR |
| SEA LEVEL | 95 | 505 | 505 | 5290 |
| 5000 | 95 | 470 | 505 | 4750 |
| 10000 | 95 | 445 | 505 | 4190 |
| 15000 | 95 | 415 | 505 | 3700 |
| 20000 | 95 | 365 | 495 | 3245 |
| 25000 | 95 | 335 | 485 | 2820 |
| 30000 | | | | |
| 35000 | | | | |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |
| 55000 | | | | |

**CONFIGURATION:** Clean+four tanks

**WEIGHT:** 20768 lb.

| ALTITUDE | % RPM | APPROXIMATE | | |
|---|---|---|---|---|
| | | CAS | TAS | LB HR |
| SEA LEVEL | 95 | 505 | 505 | 5290 |
| 5000 | 95 | 480 | 505 | 4750 |
| 10000 | 95 | 450 | 505 | 4190 |
| 15000 | 95 | 415 | 505 | 3700 |
| 20000 | 95 | 370 | 500 | 3260 |
| 25000 | 95 | 340 | 490 | 2790 |
| 30000 | 95 | 305 | 470 | 2360 |
| 35000 | | | | |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |
| 55000 | | | | |

**CONFIGURATION:** Clean+four tanks

**WEIGHT:** 19294 lb.

| ALTITUDE | % RPM | APPROXIMATE | | |
|---|---|---|---|---|
| | | CAS | TAS | LB HR |
| SEA LEVEL | 95 | 505 | 505 | 5010 |
| 5000 | 95 | 480 | 510 | 4750 |
| 10000 | 95 | 450 | 505 | 4190 |
| 15000 | 95 | 415 | 510 | 3700 |
| 20000 | 95 | 380 | 500 | 3270 |
| 25000 | 95 | 345 | 495 | 2800 |
| 30000 | 95 | 305 | 480 | 2380 |
| 35000 | | | | |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |
| 55000 | | | | |

**CONFIGURATION:** Clean+four tanks

**WEIGHT:** 17820 lb.

| ALTITUDE | % RPM | APPROXIMATE | | |
|---|---|---|---|---|
| | | CAS | TAS | LB HR |
| SEA LEVEL | 95 | 505 | 505 | 5020 |
| 5000 | 95 | 480 | 510 | 4760 |
| 10000 | 95 | 450 | 510 | 4200 |
| 15000 | 95 | 415 | 510 | 3710 |
| 20000 | 95 | 380 | 505 | 3270 |
| 25000 | 95 | 345 | 495 | 2810 |
| 30000 | 95 | 305 | 485 | 2380 |
| 35000 | 95 | 265 | 455 | 1965 |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |
| 55000 | | | | |

**REMARKS:**

(1) Multiply statute units by .87 to obtain nautical units.

CAS = CALIBRATED AIRSPEED (MPH)
MPH = STATUTE MILES PER HOUR
TAS = TRUE AIRSPEED (MPH)
LB, HR = FUEL CONSUMPTION

**DATA AS OF:** July 1951
**DATA BASIS:** Estimates

**FUEL GRADE:** JP-3
**FUEL DENSITY:** 6.5 lbs/gal

*Figure A—9. Maximum Continuous Power Chart (Sheet 2 of 4) F-84G-1RE thru -5RE*

# MAXIMUM CONTINUOUS POWER

## STANDARD DAY

**MODEL:** F-84G-1RE thru-5RE

**ENGINE(S)** J35-A-29

**CONFIGURATION:** Clean+four tanks

**WEIGHT:** 16,345 lb.

| ALTITUDE | % RPM | APPROXIMATE | | |
|---|---|---|---|---|
| | | CAS | TAS | LB HR |
| SEA LEVEL | 95 | 505 | 505 | 5025 |
| 5000 | 95 | 480 | 510 | 4770 |
| 10000 | 95 | 450 | 510 | 4210 |
| 15000 | 95 | 415 | 510 | 3710 |
| 20000 | 95 | 380 | 505 | 3280 |
| 25000 | 95 | 345 | 500 | 2810 |
| 30000 | 95 | 310 | 485 | 2400 |
| 35000 | 95 | 270 | 465 | 1990 |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |
| 55000 | | | | |

**CONFIGURATION:** Clean+four tanks

**WEIGHT:** 14870 lb.

| ALTITUDE | % RPM | APPROXIMATE | | |
|---|---|---|---|---|
| | | CAS | TAS | LB HR |
| SEA LEVEL | 95 | 510 | 510 | 5030 |
| 5000 | 95 | 480 | 510 | 4770 |
| 10000 | 95 | 450 | 510 | 4210 |
| 15000 | 95 | 415 | 510 | 3720 |
| 20000 | 95 | 380 | 505 | 3290 |
| 25000 | 95 | 345 | 500 | 2820 |
| 30000 | 95 | 310 | 490 | 2400 |
| 35000 | 95 | 280 | 480 | 2000 |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |
| 55000 | | | | |

**CONFIGURATION:** Clean+two tanks

**WEIGHT:** 18645 lb.

| ALTITUDE | % RPM | APPROXIMATE | | |
|---|---|---|---|---|
| | | CAS | TAS | LB HR |
| SEA LEVEL | 95 | 570 | 570 | 5400 |
| 5000 | 95 | 540 | 575 | 4900 |
| 10000 | 95 | 495 | 565 | 4350 |
| 15000 | 95 | 460 | 560 | 3850 |
| 20000 | 95 | 420 | 555 | 3380 |
| 25000 | 95 | 380 | 540 | 2920 |
| 30000 | 95 | 340 | 530 | 2490 |
| 35000 | 95 | 305 | 520 | 2100 |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |
| 55000 | | | | |

**CONFIGURATION:** Clean+two tanks

**WEIGHT:** 17181 lb.

| ALTITUDE | % RPM | APPROXIMATE | | |
|---|---|---|---|---|
| | | CAS | TAS | LB HR |
| SEA LEVEL | 95 | 570 | 570 | 5400 |
| 5000 | 95 | 540 | 575 | 4920 |
| 10000 | 95 | 495 | 565 | 4360 |
| 15000 | 95 | 460 | 560 | 3860 |
| 20000 | 95 | 420 | 555 | 3390 |
| 25000 | 95 | 380 | 545 | 2920 |
| 30000 | 95 | 345 | 535 | 2490 |
| 35000 | 95 | 305 | 520 | 2100 |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |
| 55000 | | | | |

**REMARKS:**

(1) Multiply statute units by .87 to obtain nautical units.

CAS = CALIBRATED AIRSPEED (MPH)
MPH = STATUTE MILES PER HOUR
TAS = TRUE AIRSPEED (MPH)
LB HR = FUEL CONSUMPTION

**DATA AS OF:** July 1951
**DATA BASIS:** Estimates

**FUEL GRADE:** JP-3
**FUEL DENSITY:** 6.5 lbs/gal

*Figure A–9. Maximum Continuous Power Chart (Sheet 3 of 4) F-84G-1RE thru -5RE*

# MAXIMUM CONTINUOUS POWER

## STANDARD DAY

MODEL: F-84G-1RE thru-5RE

ENGINE(S) J35-A-29

CONFIGURATION: Clean + two tanks

WEIGHT: 15717 lb.

| ALTITUDE | % RPM | APPROXIMATE | | |
|---|---|---|---|---|
| | | CAS | TAS | LB HR |
| SEA LEVEL | 95 | 570 | 570 | 5420 |
| 5000 | 95 | 540 | 575 | 4930 |
| 10000 | 95 | 495 | 570 | 4370 |
| 15000 | 95 | 460 | 560 | 3860 |
| 20000 | 95 | 420 | 555 | 3400 |
| 25000 | 95 | 380 | 545 | 2920 |
| 30000 | 95 | 345 | 535 | 2500 |
| 35000 | 95 | 305 | 520 | 2100 |
| 40000 | 95 | 265 | 505 | 1670 |
| 45000 | | | | |
| 50000 | | | | |
| 55000 | | | | |

CONFIGURATION: Clean + two tanks

WEIGHT: 14253 lb.

| ALTITUDE | % RPM | APPROXIMATE | | |
|---|---|---|---|---|
| | | CAS | TAS | LB HR |
| SEA LEVEL | 95 | 570 | 570 | 5420 |
| 5000 | 95 | 540 | 575 | 4940 |
| 10000 | 95 | 500 | 570 | 4370 |
| 15000 | 95 | 460 | 565 | 3870 |
| 20000 | 95 | 420 | 560 | 3400 |
| 25000 | 95 | 380 | 545 | 2930 |
| 30000 | 95 | 345 | 540 | 2500 |
| 35000 | 95 | 305 | 520 | 2100 |
| 40000 | 95 | 265 | 510 | 1680 |
| 45000 | | | | |
| 50000 | | | | |
| 55000 | | | | |

CONFIGURATION: Clean

WEIGHT: 15299 lb.

| ALTITUDE | % RPM | APPROXIMATE | | |
|---|---|---|---|---|
| | | CAS | TAS | LB HR |
| SEA LEVEL | 95 | 600 | 600 | 5740 |
| 5000 | 95 | 560 | 595 | 4990 |
| 10000 | 95 | 520 | 585 | 4420 |
| 15000 | 95 | 480 | 580 | 3915 |
| 20000 | 95 | 430 | 570 | 3430 |
| 25000 | 95 | 395 | 565 | 2980 |
| 30000 | 95 | 355 | 555 | 2530 |
| 35000 | 95 | 315 | 535 | 2130 |
| 40000 | 95 | 275 | 525 | 1710 |
| 45000 | | | | |
| 50000 | | | | |
| 55000 | | | | |

CONFIGURATION: Clean

WEIGHT: 13866 lb.

| ALTITUDE | % RPM | APPROXIMATE | | |
|---|---|---|---|---|
| | | CAS | TAS | LB HR |
| SEA LEVEL | 95 | 600 | 600 | 5740 |
| 5000 | 95 | 560 | 595 | 4990 |
| 10000 | 95 | 520 | 585 | 4420 |
| 15000 | 95 | 480 | 585 | 3830 |
| 20000 | 95 | 435 | 575 | 3430 |
| 25000 | 95 | 395 | 570 | 2990 |
| 30000 | 95 | 355 | 555 | 2540 |
| 35000 | 95 | 315 | 535 | 2130 |
| 40000 | 95 | 280 | 530 | 1720 |
| 45000 | | | | |
| 50000 | | | | |
| 55000 | | | | |

REMARKS:

(1) Multiply statute units oy .87 to obtain nautical units.

CAS = CALIBRATED AIRSPEED (MPH)
MPH = STATUTE MILES PER HOUR
TAS = TRUE AIRSPEED (MPH)
LB HR = FUEL CONSUMPTION

DATA AS OF: July 1951
DATA BASIS: Estimates

FUEL GRADE: JP-3
FUEL DENSITY: 6.5 lbs/gal

*Figure A–9. Maximum Continuous Power Chart (Sheet 4 of 4) F-84G-1RE thru -5RE*

MCRE Form No. 239C Sheet 1 of 2 (Rev. 1 May 50)

**AIRPLANE MODEL(S)**
F-84G-1RE thru-5RE
ENGINE(S) J35-A-29

# FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 21947 TO 20483 POUNDS

**EXTERNAL LOAD ITEMS**
Two-230 Gal. Tip Tanks+ 2-1000 LB Bombs+ 8-5" HVA Rockets.
NUMBER OF ENGINES OPERATING: 1

**INSTRUCTIONS FOR USING CHART:** (A) IN FLIGHT – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000' | | | IF YOU ARE AT 10000' | | | IF YOU ARE AT 15000' | | | FUEL | IF YOU ARE AT 20000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| 575 | 20 | 815 | 5857 | (630) | 20 | (835) | (720) | 20 | (850) | (780) | 20 | (865) | 5857 | (860) | 20 | - |
| 565 | 20 | 800 | 5800 | (615) | 20 | (815) | (705) | 20 | (830) | (760) | 20 | (845) | 5800 | (840) | 20 | - |
| 545 | 20 | 775 | 5600 | 595 | 20 | 790 | (685) | 20 | (805) | (740) | 20 | (820) | 5600 | (815) | 20 | - |
| 525 | 20 | 750 | 5400 | 580 | 20 | 765 | 660 | 20 | 780 | (715) | 20 | (795) | 5400 | (790) | 20 | - |
| 510 | 20 | 720 | 5200 | 555 | 20 | 740 | 635 | 20 | 755 | 690 | 20 | 770 | 5200 | (765) | 20 | - |
| 490 | 20 | 695 | 5000 | 535 | 20 | 710 | 615 | 20 | 725 | 665 | 20 | 740 | 5000 | (735) | 20 | - |
| 470 | 20 | 670 | 4800 | 515 | 20 | 685 | 590 | 20 | 700 | 640 | 20 | 715 | 4800 | 710 | 20 | - |
| 450 | 20 | 640 | 4600 | 495 | 20 | 655 | 565 | 20 | 675 | 615 | 20 | 685 | 4600 | 680 | 20 | - |
| 440 | 20 | 620 | 4446 | 480 | 20 | 635 | 550 | 20 | 650 | 595 | 20 | 665 | 4446 | 660 | 20 | - |

| CRUISING AT S. L. | | | | | | EFFEC-TIVE WIND | CRUISING AT 5000' | | | | | | CRUISING AT 10000' | | | | | | CRUISING AT 15000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 20000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 300 | 95 | 2980 | 285 | .7 | 10 |
| | | | | | | 80 HW | | | | | | | 335 | 92 | 3305 | 305 | .8 | 5 | 315 | 93 | 3145 | 310 | .8 | 10 | 80 HW | 295 | 94 | 2900 | 315 | .8 | 10 |
| 340 | 88 | 3635 | 300 | .9 | - | 40 HW | 335 | 89 | 3530 | 320 | .9 | 5 | 325 | 91 | 3220 | 335 | .9 | 5 | 310 | 92 | 3065 | 340 | .9 | 10 | 40 HW | 295 | 94 | 2900 | 355 | .9 | 15 |
| 330 | 87 | 3530 | 330 | 1.0 | - | 0 | 335 | 89 | 3530 | 360 | 1.0 | 5 | 315 | 90 | 3135 | 365 | 1.0 | 5 | 310 | 92 | 3065 | 380 | 1.0 | 10 | 0 | 295 | 94 | 2900 | 395 | 1.0 | 15 |
| 320 | 86 | 3425 | 360 | 1.1 | - | 40 TW | 320 | 88 | 3380 | 385 | 1.1 | 5 | 315 | 90 | 3135 | 405 | 1.1 | 5 | 300 | 91 | 2985 | 410 | 1.1 | 10 | 40 TW | 285 | 93 | 2795 | 420 | 1.1 | 15 |
| | | | | | | 80 TW | | | | | | | 310 | 89 | 3050 | 435 | 1.2 | 5 | 300 | 91 | 2985 | 450 | 1.2 | 10 | 80 TW | 285 | 93 | 2795 | 460 | 1.2 | 15 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 285 | 93 | 2795 | 500 | 1.3 | 20 |

*Figure A—10. Flight Operation Instruction Chart (Sheet 1 of 8) F-84G-1RE thru -5RE*

# HIGH ALTITUDE

Two-230 Gal. Tip Tanks + 2-1000 Lb. Bombs + 8-5" HVA Rockets.

F-84G-1RE thru-5RE

AIRPLANE MOD. ENG. J35-A-29 CHART WT. LIMITS 21947 TO 20483 LB. EXT. LOAD NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000′ | | | FUEL | IF YOU ARE AT 30000′ | | | IF YOU ARE AT 35000′ | | | IF YOU ARE AT 40000′ | | | FUEL | IF YOU ARE AT 45000′ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | | BY CRUISING AT 30000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | | BY CRUISING AT 45000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)

| CRUISING AT 25000′ | | | | | | EFFECTIVE WIND | CRUISING AT 30000′ | | | | | | CRUISING AT 35000′ | | | | | | CRUISING AT 40000′ | | | | | | EFFECTIVE WIND | CRUISING AT 45000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | | | | | | |
| | | | | | | 80 HW | | | | | | | | | | | | | | | | | | | 80 HW | | | | | | |
| | | | | | | 40 HW | | | | | | | | | | | | | | | | | | | 40 HW | | | | | | |
| | | | | | | 0 | | | | | | | | | | | | | | | | | | | 0 | | | | | | |
| | | | | | | 40 TW | | | | | | | | | | | | | | | | | | | 40 TW | | | | | | |
| | | | | | | 80 TW | | | | | | | | | | | | | | | | | | | 80 TW | | | | | | |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | | | | | | |

1 Climb at 100 % RPM
2 Multiply statute units by .87 to obtain nautical units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5 Chart weight limits based on fuel density of 6.5 LBS GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

## EXAMPLE

If you are at 5000 feet with 5000 lbs. of available fuel, you can fly 535 statute airmiles by holding 335 MPH CAS. However, you can fly 710 statute airmiles by immediately climbing to 20000 feet using 100 % RPM At 20000 feet cruise at 295 MPH CAS and start letdown 15 statute airmiles from destination. With a 80 MPH headwind the range at 20000 feet will be 710 x .80 or 570 statute airmiles. Cruise at 295 MPH CAS with this wind and start letdown 10 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED.

## LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

$\text{RANGE FACTOR} = \frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form
No. 239C
Sheet 2 of 2
(Rev. 1 May 50)

Figure A–10. Flight Operation Instruction Chart (Sheet 2 of 8) F-84G-1RE thru -5RE

MCRE Form No. 239C Sheet 1 of 2 (Rev. 1 May 50)

**AIRPLANE MODEL(S)**
F-84G-1RE thru-5RE
ENGINE(S) J35-A-29

# FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 20483 TO 19019 POUNDS

**EXTERNAL LOAD ITEMS**
Two-230 Gal. Tip Tanks+2-1000 Lb. Bombs+8-5" HVA Rockets.
NUMBER OF ENGINES OPERATING: 1

**INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT** – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING – From initial fuel on board subtract fuel required for take-off and cl.mb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000' | | | IF YOU ARE AT 10000' | | | IF YOU ARE AT 15000' | | | FUEL | IF YOU ARE AT 20000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 440 | 20 | 620 | 4446 | 480 | 20 | 635 | 550 | 20 | 650 | 595 | 20 | 665 | 4446 | 660 | 20 | - |
| 415 | 20 | 585 | 4200 | 455 | 20 | 600 | 520 | 20 | 615 | 565 | 20 | 630 | 4200 | 625 | 20 | - |
| 395 | 20 | 555 | 4000 | 435 | 20 | 575 | 495 | 20 | 590 | 540 | 20 | 605 | 4000 | 595 | 20 | - |
| 375 | 20 | 530 | 3800 | 415 | 20 | 545 | 470 | 20 | 560 | 510 | 20 | 575 | 3800 | 570 | 20 | - |
| 355 | 20 | 500 | 3600 | 390 | 20 | 515 | 445 | 20 | 530 | 485 | 20 | 545 | 3600 | 540 | 20 | - |
| 335 | 20 | 470 | 3400 | 370 | 20 | 485 | 425 | 20 | 500 | 460 | 20 | 515 | 3400 | 510 | 20 | - |
| 320 | 20 | 440 | 3200 | 350 | 20 | 455 | 400 | 20 | 470 | 435 | 20 | 485 | 3200 | 480 | 20 | - |
| 300 | 20 | 410 | 3000 | 330 | 20 | 425 | 375 | 20 | 440 | 410 | 20 | 455 | 3000 | 455 | 20 | - |
| 295 | 20 | 405 | 2964 | 325 | 20 | 420 | 370 | 20 | 440 | 405 | 20 | 450 | | 450 | 20 | - |

| CRUISING AT S. L. | | | | | | EFFECTIVE WIND | CRUISING AT 5000' | | | | | | CRUISING AT 10000' | | | | | | CRUISING AT 15000' | | | | | | EFFECTIVE WIND | CRUISING AT 20000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 300 | 94 | 2870 | 285 | .7 | 10 |
| | | | | | | 80 HW | | | | | | | 325 | 91 | 3150 | 295 | .8 | 5 | 315 | 92 | 3020 | 310 | .8 | 10 | 80 HW | 300 | 94 | 2870 | 325 | .8 | 15 |
| 335 | 87 | 3520 | 295 | .9 | - | 40 HW | 330 | 88 | 3380 | 315 | .9 | 5 | 315 | 90 | 3070 | 325 | .9 | 5 | 300 | 91 | 2905 | 335 | .9 | 10 | 40 HW | 285 | 93 | 2730 | 345 | .9 | 15 |
| 320 | 86 | 3365 | 320 | 1.0 | - | 0 | 315 | 87 | 3240 | 340 | 1.0 | 5 | 310 | 89 | 2980 | 355 | 1.0 | 5 | 300 | 91 | 2905 | 375 | 1.0 | 10 | 0 | 285 | 93 | 2730 | 385 | 1.0 | 15 |
| 320 | 86 | 3365 | 360 | 1.1 | - | 40 TW | 315 | 87 | 3240 | 380 | 1.1 | 5 | 300 | 88 | 2900 | 385 | 1.1 | 5 | 290 | 90 | 2790 | 400 | 1.1 | 10 | 40 TW | 275 | 92 | 2625 | 410 | 1.1 | 15 |
| | | | | | | 80 TW | | | | | | | 300 | 88 | 2900 | 425 | 1.2 | 5 | 290 | 90 | 2790 | 440 | 1.2 | 10 | 80 TW | 275 | 92 | 2625 | 450 | 1.2 | 15 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 275 | 92 | 2625 | 490 | 1.3 | 20 |

Figure A–10. Flight Operation Instruction Chart (Sheet 3 of 8) F-84G-1RE thru -5RE

# HIGH ALTITUDE

Two-230 Gal. Tip Tanks+2-1000 Lb. Bombs+8-5" HVA Rockets.

F-84G-1RE thru-5RE
AIRPLANE MOD. ENG. J35-A-29 CHART WT. LIMITS 20483 TO 19019 LB. EXT. LOAD NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000' | | | FUEL | IF YOU ARE AT 30000' | | | IF YOU ARE AT 35000' | | | IF YOU ARE AT 40000' | | | FUEL | IF YOU ARE AT 45000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | | BY CRUISING AT 30000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | | BY CRUISING AT 45000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

| CRUISING AT 25000' | | | | | | EFFECTIVE WIND | CRUISING AT 30000' | | | | | | CRUISING AT 35000' | | | | | | CRUISING AT 40000' | | | | | | EFFECTIVE WIND | CRUISING AT 45000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | | | | | | |
| | | | | | | 80 HW | | | | | | | | | | | | | | | | | | | 80 HW | | | | | | |
| | | | | | | 40 HW | | | | | | | | | | | | | | | | | | | 40 HW | | | | | | |
| | | | | | | 0 | | | | | | | | | | | | | | | | | | | 0 | | | | | | |
| | | | | | | 40 TW | | | | | | | | | | | | | | | | | | | 40 TW | | | | | | |
| | | | | | | 80 TW | | | | | | | | | | | | | | | | | | | 80 TW | | | | | | |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | | | | | | |

1 Climb at 100 % RPM
2 Multiply statute units by .87 to obtain nautical units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5 Chart weight limits based on fuel density of 6.5 LBS/GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

## EXAMPLE

If you are at 5000 feet with 4000 lbs. of available fuel, you can fly 435 statute airmiles by holding 315 MPH CAS. However, you can fly 575 statute airmiles by immediately climbing to 20000 feet using 100 % RPM At 20000 feet cruise at 285 MPH CAS and start letdown 15 statute airmiles from destination. With a 40 MPH headwind the range at 20000 feet will be 575 x .90 or 520 statute airmiles. Cruise at 285 MPH CAS with this wind and start letdown 15 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED:

## LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

$$\text{RANGE FACTOR} = \frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form No. 239C Sheet 2 of 2 (Rev. 1 May 50)

Figure A–10. Flight Operation Instruction Chart (Sheet 4 of 8) F-84G-1RE thru -5RE

MCRE Form
No. 239C
Sheet 1 of 2
(Rev. 1 May 50)

## AIRPLANE MODEL(S)

F-84G-1RE thru-5RE
ENGINE(S) J35-A-29

## FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 19019 TO 17555 POUNDS

## EXTERNAL LOAD ITEMS

Two-230 Gal. Tip Tanks+2-1000 LB. Bombs+8-5" HVA Rockets.
NUMBER OF ENGINES OPERATING: 1

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING – From initial fuel on board subtract fuel required for take-off and cl.mb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000' | | | IF YOU ARE AT 10000' | | | IF YOU ARE AT 15000' | | | FUEL | IF YOU ARE AT 20000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 295 | 25 | 405 | 2964 | 325 | 25 | 420 | 370 | 25 | 440 | 405 | 25 | 450 | 2964 | 450 | 25 | 465 |
| 280 | 25 | 380 | 2800 | 310 | 25 | 395 | 350 | 25 | 410 | 380 | 25 | 425 | 2800 | 425 | 25 | 440 |
| 260 | 25 | 350 | 2600 | 290 | 25 | 365 | 325 | 25 | 380 | 355 | 25 | 395 | 2600 | 395 | 25 | 410 |
| 240 | 25 | 320 | 2400 | 265 | 25 | 335 | 300 | 25 | 350 | 330 | 25 | 365 | 2400 | 365 | 25 | 380 |
| 220 | 25 | 285 | 2200 | 245 | 25 | 305 | 275 | 25 | 320 | 300 | 25 | 335 | 2200 | 335 | 25 | 350 |
| 200 | 25 | 255 | 2000 | 220 | 25 | 270 | 250 | 25 | 285 | 275 | 25 | 305 | 2000 | 305 | 25 | 320 |
| 180 | 25 | 225 | 1800 | 200 | 25 | 240 | 225 | 25 | 255 | 250 | 25 | 270 | 1800 | 275 | 25 | 285 |
| 160 | 25 | 195 | 1600 | 180 | 25 | 210 | 200 | 25 | 225 | 220 | 25 | 240 | 1600 | 245 | 25 | 255 |
| 150 | 25 | 175 | 1482 | 165 | 25 | 190 | 190 | 25 | 205 | 205 | 25 | 220 | 1482 | 230 | 25 | 235 |

| CRUISING AT S. L. | | | | | | EFFEC-TIVE WIND | CRUISING AT 5000' | | | | | | CRUISING AT 10000' | | | | | | CRUISING AT 15000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 20000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 305 | 94 | 2770 | 290 | .7 | 10 |
| | | | | | | 80 HW | | | | | | | 330 | 90 | 3090 | 300 | .8 | 5 | 315 | 92 | 2910 | 310 | .8 | 10 | 80 HW | 300 | 93 | 2700 | 320 | .8 | 15 |
| 325 | 86 | 3320 | 285 | .9 | - | 40 HW | 325 | 88 | 3240 | 310 | .9 | 5 | 315 | 89 | 2965 | 325 | .9 | 5 | 305 | 91 | 2800 | 335 | .9 | 10 | 40 HW | 285 | 92 | 2600 | 345 | .9 | 15 |
| 315 | 85 | 3215 | 315 | 1.0 | - | 0 | 315 | 87 | 3145 | 340 | 1.0 | 5 | 310 | 88 | 2885 | 355 | 1.0 | 5 | 295 | 90 | 2725 | 365 | 1.0 | 10 | 0 | 280 | 91 | 2535 | 375 | 1.0 | 15 |
| 315 | 85 | 3215 | 355 | 1.1 | - | 40 TW | 305 | 86 | 3010 | 365 | 1.1 | 5 | 295 | 87 | 2765 | 380 | 1.1 | 5 | 285 | 89 | 2650 | 395 | 1.1 | 10 | 40 TW | 280 | 91 | 2535 | 415 | 1.1 | 15 |
| | | | | | | 80 TW | | | | | | | 285 | 86 | 2685 | 410 | 1.2 | 5 | 275 | 88 | 2575 | 425 | 1.3 | 10 | 80 TW | 270 | 90 | 2430 | 440 | 1.2 | 15 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 270 | 90 | 2430 | 480 | 1.4 | 20 |

*Figure A–10. Flight Operation Instruction Chart (Sheet 5 of 8) F-84G-1RE thru -5RE*

# HIGH ALTITUDE

F-84G-1RE thru-5RE

Two-230 Gal. Tip Tanks+2-1000 lb. Bombs+8-5" HVA Rockets.

AIRPLANE MOD. ENG. J35-A-29 CHART WT. LIMITS 19019 TO 17555 LB. EXT. LOAD NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000' | | | FUEL | IF YOU ARE AT 30000' | | | IF YOU ARE AT 35000' | | | IF YOU ARE AT 40000' | | | FUEL | IF YOU ARE AT 45000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 480 | 25 | - | 2964 | | | | | | | | | | | | | |
| 455 | 25 | - | 2800 | | | | | | | | | | | | | |
| 420 | 25 | - | 2600 | | | | | | | | | | | | | |
| 390 | 25 | - | 2400 | | | | | | | | | | | | | |
| 360 | 25 | - | 2200 | | | | | | | | | | | | | |
| 325 | 25 | - | 2000 | | | | | | | | | | | | | |
| 295 | 25 | - | 1800 | | | | | | | | | | | | | |
| 265 | 25 | - | 1600 | | | | | | | | | | | | | |
| 245 | 25 | - | 1482 | | | | | | | | | | | | | |

| CRUISING AT 25000' | | | | | | EFFECTIVE WIND | CRUISING AT 30000' | | | | | | CRUISING AT 35000' | | | | | | CRUISING AT 40000' | | | | | | EFFECTIVE WIND | CRUISING AT 45000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| 285 | 95 | 2645 | 295 | .7 | 15 | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | | | | | | |
| 280 | 94 | 2610 | 330 | .8 | 15 | 80 HW | | | | | | | | | | | | | | | | | | | 80 HW | | | | | | |
| 270 | 93 | 2485 | 350 | .9 | 20 | 40 HW | | | | | | | | | | | | | | | | | | | 40 HW | | | | | | |
| 270 | 93 | 2485 | 390 | 1.0 | 20 | 0 | | | | | | | | | | | | | | | | | | | 0 | | | | | | |
| 270 | 93 | 2485 | 430 | 1.1 | 20 | 40 TW | | | | | | | | | | | | | | | | | | | 40 TW | | | | | | |
| 260 | 92 | 2420 | 460 | 1.2 | 25 | 80 TW | | | | | | | | | | | | | | | | | | | 80 TW | | | | | | |
| 260 | 92 | 2420 | 500 | 1.4 | 25 | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | | | | | | |

1. Climb at 100 % RPM
2. Multiply statute units by .87 to obtain nautical units.
3. Read lower half of chart opposite effective wind only.
4. Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5. Chart weight limits based on fuel density of 6.5 LBS GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

## EXAMPLE

If you are at 10000 feet with 2000 lbs. of available fuel, you can fly 250 statute airmiles by holding 310 MPH CAS. However, you can fly 285 statute airmiles by immediately climbing to 25000 feet using 100 % RPM At 25000 feet cruise at 270 MPH CAS and start letdown 20 statute airmiles from destination. With a 40 MPH headwind the range at 25000 feet will be 285 x .90 or 255 statute airmiles. Cruise at 270 MPH CAS with this wind and start letdown 20 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED:

## LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

RANGE FACTOR = $\frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form No. 239C Sheet 2 of 2 (Rev. 1 May 50)

Figure A—10. Flight Operation Instruction Chart (Sheet 6 of 8) F-84G-1RE thru -5RE

MCRE Form No. 239C Sheet 1 of 2 (Rev. 1 May 50)

## AIRPLANE MODEL(S)

F-84G-1RE thru-5RE
ENGINE(S) J35-A-29

## FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 17555 TO 16090 POUNDS

## EXTERNAL LOAD ITEMS

Two-230 Gal. Tip Tanks+2-1000 Lb. Bombs+8-5" HVA Rockets.
NUMBER OF ENGINES OPERATING: 1

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000' | | | IF YOU ARE AT 10000' | | | IF YOU ARE AT 15000' | | | FUEL | IF YOU ARE AT 20000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| 150 | 25 | 175 | 1482 | 165 | 25 | 190 | 190 | 25 | 205 | 205 | 25 | 220 | 1482 | 230 | 25 | 235 |
| 120 | 25 | 130 | 1200 | 135 | 25 | 145 | 155 | 25 | 160 | 165 | 25 | 170 | 1200 | 185 | 25 | 190 |
| 80 | - | - | 800 | 90 | - | - | 100 | - | - | 110 | - | - | 800 | 125 | - | - |
| 40 | - | - | 400 | 45 | - | - | 50 | - | - | 55 | - | - | 400 | 60 | - | - |

| CRUISING AT S. L. | | | | | | EFFECTIVE WIND | CRUISING AT 5000' | | | | | | CRUISING AT 10000' | | | | | | CRUISING AT 15000' | | | | | | EFFECTIVE WIND | CRUISING AT 20000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 300 | 93 | 2610 | 285 | .7 | 10 |
| | | | | | | 80 HW | | | | | | | 325 | 89 | 2975 | 295 | .8 | 5 | 310 | 90 | 2780 | 305 | .8 | 10 | 80 HW | 295 | 92 | 2545 | 315 | .8 | 15 |
| 320 | 85 | 3200 | 280 | .9 | - | 40 HW | 320 | 87 | 3110 | 305 | .9 | 5 | 315 | 88 | 2850 | 320 | .9 | 5 | 300 | 89 | 2670 | 330 | .9 | 10 | 40 HW | 285 | 91 | 2450 | 340 | .9 | 15 |
| 320 | 85 | 3200 | 320 | 1.0 | - | 0 | 310 | 86 | 3020 | 335 | 1.0 | 5 | 300 | 87 | 2730 | 345 | 1.0 | 5 | 285 | 88 | 2560 | 355 | 1.0 | 10 | 0 | 275 | 90 | 2390 | 370 | 1.0 | 15 |
| 315 | 84 | 3150 | 355 | 1.1 | - | 40 TW | 300 | 85 | 2930 | 365 | 1.1 | 5 | 290 | 86 | 2650 | 375 | 1.1 | 5 | 285 | 88 | 2560 | 395 | 1.1 | 10 | 40 TW | 265 | 89 | 2290 | 395 | 1.1 | 15 |
| | | | | | | 80 TW | | | | | | | 280 | 85 | 2570 | 405 | 1.3 | 5 | 270 | 87 | 2415 | 415 | 1.3 | 10 | 80 TW | 265 | 89 | 2290 | 435 | 1.2 | 20 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 255 | 88 | 2225 | 465 | 1.4 | 20 |

Figure A–10. Flight Operation Instruction Chart (Sheet 7 of 8) F-84G-1RE thru -5RE

# HIGH ALTITUDE

F-84G-1RE thru-5RE
AIRPLANE MOD.

Two-230 Gal. Tip Tanks+2-1000 lbs. Bombs+8-5" HVA Rockets.
EXT. LOAD

ENG. J35-A-29 CHART WT. LIMITS 17555 TO 16090 LB. NO. OF ENGINES OPERATING: 1

(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)

| IF YOU ARE AT 25000' | | | FUEL | IF YOU ARE AT 30000' | | | IF YOU ARE AT 35000' | | | IF YOU ARE AT 40000' | | | FUEL | IF YOU ARE AT 45000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| 245 | - | - | 1482 | | | | | | | | | | | | | |
| 200 | - | - | 1200 | | | | | | | | | | | | | |
| 135 | - | - | 800 | | | | | | | | | | | | | |
| 65 | - | - | 400 | | | | | | | | | | | | | |

| CRUISING AT 25000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 30000' | | | | | | CRUISING AT 35000' | | | | | | CRUISING AT 40000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 45000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| 280 | 94 | 2470 | 290 | .7 | 15 | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | | | | | | |
| 275 | 93 | 2410 | 320 | .8 | 15 | 80 HW | | | | | | | | | | | | | | | | | | | 80 HW | | | | | | |
| 265 | 92 | 2320 | 345 | .9 | 20 | 40 HW | | | | | | | | | | | | | | | | | | | 40 HW | | | | | | |
| 265 | 92 | 2320 | 385 | 1.0 | 20 | 0 | | | | | | | | | | | | | | | | | | | 0 | | | | | | |
| 250 | 91 | 2200 | 405 | 1.1 | 20 | 40 TW | | | | | | | | | | | | | | | | | | | 40 TW | | | | | | |
| 250 | 91 | 2200 | 445 | 1.2 | 25 | 80 TW | | | | | | | | | | | | | | | | | | | 80 TW | | | | | | |
| 210 | 90 | 2140 | 475 | 1.4 | 25 | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | | | | | | |

1 Climb at 100% RPM
2 Multiply statute units by .87 to obtain nautical units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5 Chart weight limits based on fuel density of 6.5 LBS/GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

## EXAMPLE

If you are at 5000 feet with 1200 lbs. of available fuel, you can fly 135 statute airmiles by holding 310 MPH CAS. However, you can fly 145 statute airmiles by immediately climbing to 25000 feet using 100% RPM At 25000 feet cruise at 265 MPH CAS and start letdown 20 statute airmiles from destination. With a 40 MPH headwind the range at 25000 feet will be 145 x .90 or 130 statute airmiles. Cruise at 265 MPH CAS with this wind and start letdown 20 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED.

## LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

$$\text{RANGE FACTOR} = \frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form
No. 239C
Sheet 2 of 2
(Rev. 1 May 30)

Figure A—10. Flight Operation Instruction Chart (Sheet 8 of 8) F-84G-1RE thru -5RE

MCRE Form No. 239C Sheet 1 of 2 (Rev. 1 May 50)

**AIRPLANE MODEL(S)**
F-84G-1RE thru-5RE
ENGINE(S) J35-A-29

# FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 22242 TO 20768 POUNDS

**EXTERNAL LOAD ITEMS**
Four-230 Gal. Tanks carried entire distance.
NUMBER OF ENGINES OPERATING: 1

**INSTRUCTIONS FOR USING CHART:** (A) IN FLIGHT – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000' | | | IF YOU ARE AT 10000' | | | IF YOU ARE AT 15000' | | | FUEL | IF YOU ARE AT 20000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 1055 | 25 | 1970 | 8847 | (1190) | 25 | (1990) | (1380) | 25 | (2005) | (1525) | 25 | (2025) | 8847 | (1745) | 25 | (2045) |
| 1040 | 25 | 1950 | 8800 | (1175) | 25 | (1970) | (1365) | 25 | (1990) | (1510) | 25 | (2005) | 8800 | (1720) | 25 | (2025) |
| 1020 | 25 | 1915 | 8600 | 1150 | 25 | 1935 | 1335 | 25 | 1955 | 1480 | 25 | 1970 | 8600 | (1690) | 25 | (1990) |
| 995 | 25 | 1875 | 8400 | 1120 | 25 | 1895 | 1305 | 25 | 1915 | 1445 | 25 | 1935 | 8400 | (1655) | 25 | (1950) |
| 975 | 25 | 1835 | 8200 | 1095 | 25 | 1860 | 1275 | 25 | 1875 | 1415 | 25 | 1895 | 8200 | 1620 | 25 | 1915 |
| 950 | 25 | 1800 | 8000 | 1070 | 25 | 1820 | 1245 | 25 | 1830 | 1385 | 25 | 1855 | 8000 | 1585 | 25 | 1875 |
| 930 | 25 | 1760 | 7800 | 1045 | 25 | 1780 | 1215 | 25 | 1800 | 1350 | 25 | 1815 | 7800 | 1550 | 25 | 1840 |
| 905 | 25 | 1720 | 7600 | 1010 | 25 | 1740 | 1185 | 25 | 1760 | 1320 | 25 | 1775 | 7600 | 1515 | 25 | 1800 |
| 885 | 25 | 1680 | 7431 | 1005 | 25 | 1705 | 1165 | 25 | 1730 | 1290 | 25 | 1750 | 7431 | 1485 | 25 | 1765 |

| CRUISING AT S. L. | | | | | | EFFEC-TIVE WIND | CRUISING AT 5000' | | | | | | CRUISING AT 10000' | | | | | | CRUISING AT 15000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 20000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 345 | 91 | 2640 | 340 | .7 | 15 |
| | | | | | | 80 HW | | | | | | | 370 | 89 | 2950 | 345 | .8 | 10 | 355 | 90 | 2745 | 355 | .8 | 10 | 80 HW | 345 | 91 | 2640 | 380 | .8 | 15 |
| 390 | 87 | 3450 | 350 | .9 | - | 40 HW | 380 | 88 | 3200 | 365 | .9 | 5 | 360 | 88 | 2850 | 370 | .9 | 10 | 355 | 90 | 2745 | 395 | .9 | 15 | 40 HW | 330 | 90 | 2525 | 400 | .9 | 20 |
| 380 | 86 | 3360 | 380 | 1.0 | - | 0 | 365 | 87 | 3085 | 390 | 1.0 | 5 | 360 | 88 | 2850 | 410 | 1.0 | 10 | 340 | 89 | 2650 | 420 | 1.0 | 15 | 0 | 330 | 90 | 2525 | 440 | 1.0 | 20 |
| 370 | 85 | 3270 | 410 | 1.1 | - | 40 TW | 355 | 86 | 3005 | 420 | 1.1 | 5 | 350 | 87 | 2780 | 440 | 1.1 | 10 | 340 | 89 | 2650 | 460 | 1.1 | 15 | 40 TW | 330 | 90 | 2525 | 480 | 1.1 | 20 |
| | | | | | | 80 TW | | | | | | | 350 | 87 | 2780 | 480 | 1.2 | 10 | 330 | 88 | 2590 | 490 | 1.2 | 20 | 80 TW | 320 | 89 | 2440 | 505 | 1.2 | 25 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 320 | 89 | 2440 | 545 | 1.3 | 25 |

*Figure A—11. Flight Operation Instruction Chart (Sheet 1 of 12) F-84G-1RE thru -5RE*

F-84G-1RE thru-5RE

## HIGH ALTITUDE

Four-230 Gal. Tanks carried entire distance.

AIRPLANE MOD. ENG. J35-A-29 CHART WT. LIMITS 22242 TO 20768 LB. EXT. LOAD NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000′ | | | FUEL | IF YOU ARE AT 30000′ | | | IF YOU ARE AT 35000′ | | | IF YOU ARE AT 40000′ | | | FUEL | IF YOU ARE AT 45000′ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| (1885) | 25 | | 8847 | | | | | | | | | | | | | |
| (1865) | 25 | | 8800 | | | | | | | | | | | | | |
| (1830) | 25 | | 8600 | | | | | | | | | | | | | |
| (1795) | 25 | | 8400 | | | | | | | | | | | | | |
| (1760) | 25 | | 8200 | | | | | | | | | | | | | |
| 1720 | 25 | | 8000 | | | | | | | | | | | | | |
| 1685 | 25 | | 7800 | | | | | | | | | | | | | |
| 1645 | 25 | | 7600 | | | | | | | | | | | | | |
| 1610 | 25 | | 7431 | | | | | | | | | | | | | |

(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)

| CRUISING AT 25000′ | | | | | | EFFECTIVE WIND | CRUISING AT 30000′ | | | | | | CRUISING AT 35000′ | | | | | | CRUISING AT 40000′ | | | | | | EFFECTIVE WIND | CRUISING AT 45000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| 335 | 93 | 2620 | 365 | .7 | 25 | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | | | | | | |
| 325 | 92 | 2540 | 390 | .8 | 25 | 80 HW | | | | | | | | | | | | | | | | | | | 80 HW | | | | | | |
| 325 | 92 | 2540 | 430 | .9 | 25 | 40 HW | | | | | | | | | | | | | | | | | | | 40 HW | | | | | | |
| 325 | 92 | 2540 | 470 | 1.0 | 30 | 0 | | | | | | | | | | | | | | | | | | | 0 | | | | | | |
| 310 | 91 | 2430 | 490 | 1.1 | 30 | 40 TW | | | | | | | | | | | | | | | | | | | 40 TW | | | | | | |
| 310 | 91 | 2430 | 530 | 1.2 | 35 | 80 TW | | | | | | | | | | | | | | | | | | | 80 TW | | | | | | |
| 310 | 91 | 2430 | 570 | 1.3 | 35 | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | | | | | | |

1. Climb at 100 % RPM
2. Multiply statute units by .87 to obtain nautical units.
3. Read lower half of chart opposite effective wind only.
4. Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5. Chart weight limits based on fuel density of 6.5 LBS/GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

### EXAMPLE

If you are at 15000 feet with 8400 lbs. of available fuel, you can fly 1445 statute airmiles by holding 340 MPH CAS. However, you can fly 1935 statute airmiles by immediately climbing to 25000 feet using 100 % RPM At 25000 feet cruise at 325 MPH CAS and start letdown 30 statute airmiles from destination. With a 80 MPH headwind the range at 25000 feet will be 1935 x .8 or 1550 statute airmiles. Cruise at 325 MPH CAS with this wind and start letdown 25 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED:

### LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

RANGE FACTOR = $\frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form No. 239C
Sheet 2 of 2
(Rev. 1 May 50)

Figure A—11. Flight Operation Instruction Chart (Sheet 2 of 12) F-84G-1RE thru -5RE

MCRE Form No. 239C
Sheet 1 of 2
(Rev. 1 May 50)

## AIRPLANE MODEL(S)

F-84G-1RE thru-5RE
ENGINE(S) J35-A-29

# FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 20768 TO 19294 POUNDS

## EXTERNAL LOAD ITEMS

Four-230 Gal. Tanks carried all the way.
NUMBER OF ENGINES OPERATING: 1

**INSTRUCTIONS FOR USING CHART:** (A) IN FLIGHT – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000′ | | | IF YOU ARE AT 10000′ | | | IF YOU ARE AT 15000′ | | | FUEL | IF YOU ARE AT 20000′ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 885 | 30 | 1680 | 7431 | 1005 | 30 | 1705 | 1165 | 30 | 1730 | 1290 | 30 | 1750 | 7431 | 1485 | 30 | 1765 |
| 860 | 30 | 1640 | 7200 | 965 | 30 | 1660 | 1125 | 30 | 1680 | 1255 | 30 | 1700 | 7200 | 1440 | 30 | 1715 |
| 835 | 30 | 1600 | 7000 | 940 | 30 | 1620 | 1095 | 30 | 1640 | 1220 | 30 | 1660 | 7000 | 1405 | 30 | 1675 |
| 810 | 30 | 1560 | 6800 | 915 | 30 | 1580 | 1065 | 30 | 1600 | 1190 | 30 | 1620 | 6800 | 1370 | 30 | 1635 |
| 785 | 30 | 1515 | 6600 | 890 | 30 | 1535 | 1035 | 30 | 1560 | 1155 | 30 | 1580 | 6600 | 1330 | 30 | 1595 |
| 765 | 30 | 1475 | 6400 | 865 | 30 | 1495 | 1005 | 30 | 1515 | 1125 | 30 | 1535 | 6400 | 1295 | 30 | 1550 |
| 740 | 30 | 1435 | 6200 | 840 | 30 | 1455 | 975 | 30 | 1475 | 1090 | 30 | 1495 | 6200 | 1260 | 30 | 1510 |
| 715 | 30 | 1390 | 6000 | 815 | 30 | 1410 | 950 | 30 | 1430 | 1055 | 30 | 1450 | 6000 | 1220 | 30 | 1470 |
| 710 | 30 | 1375 | 5944 | 810 | 30 | 1400 | 940 | 30 | 1420 | 1050 | 30 | 1440 | 5944 | 1215 | 30 | 1460 |

| CRUISING AT S. L. | | | | | | EFFECTIVE WIND | CRUISING AT 5000′ | | | | | | CRUISING AT 10000′ | | | | | | CRUISING AT 15000′ | | | | | | EFFECTIVE WIND | CRUISING AT 20000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 335 | 90 | 2430 | 325 | .7 | 15 |
| | | | | | | 80 HW | | | | | | | 370 | 88 | 2870 | 345 | .8 | 10 | 355 | 89 | 2670 | 355 | .8 | 15 | 80 HW | 335 | 90 | 2430 | 365 | .8 | 15 |
| 390 | 87 | 3360 | 350 | .9 | - | 40 HW | 380 | 87 | 3140 | 365 | .9 | 5 | 370 | 88 | 2870 | 385 | .9 | 10 | 345 | 88 | 2610 | 385 | .9 | 15 | 40 HW | 325 | 89 | 2380 | 395 | .9 | 20 |
| 380 | 86 | 3275 | 380 | 1.0 | - | 0 | 370 | 86 | 3060 | 395 | 1.0 | 5 | 350 | 87 | 2700 | 400 | 1.0 | 10 | 345 | 88 | 2610 | 425 | 1.0 | 15 | 0 | 325 | 89 | 2380 | 435 | 1.0 | 20 |
| 370 | 85 | 3190 | 410 | 1.1 | - | 40 TW | 355 | 85 | 2945 | 420 | 1.1 | 5 | 350 | 87 | 2700 | 440 | 1.1 | 10 | 330 | 87 | 2515 | 450 | 1.1 | 15 | 40 TW | 325 | 89 | 2380 | 475 | 1.1 | 20 |
| | | | | | | 80 TW | | | | | | | 335 | 86 | 2600 | 465 | 1.2 | 10 | 330 | 87 | 2515 | 490 | 1.2 | 15 | 80 TW | 315 | 88 | 2295 | 500 | 1.2 | 25 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 315 | 88 | 2295 | 540 | 1.3 | 25 |

*Figure A–11. Flight Operation Instruction Chart (Sheet 3 of 12) F-84G-1RE thru -5RE*

F-84G-1RE thru-5RE

## HIGH ALTITUDE

Four-230 Gal. tanks carried all the way.

AIRPLANE MOD. ENG. J35-A-29 CHART WT. LIMITS 20768 TO 19294 LB. EXT. LOAD NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000′ | | | FUEL | IF YOU ARE AT 30000′ | | | IF YOU ARE AT 35000′ | | | IF YOU ARE AT 40000′ | | | FUEL | IF YOU ARE AT 45000′ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 1610 | 30 | 1780 | 7431 | 1745 | 30 | | | | | | | | 7431 | | | |
| 1570 | 30 | 1740 | 7200 | 1710 | 30 | | | | | | | | 7200 | | | |
| 1530 | 30 | 1695 | 7000 | 1665 | 30 | | | | | | | | 7000 | | | |
| 1490 | 30 | 1655 | 6800 | 1625 | 30 | | | | | | | | 6800 | | | |
| 1450 | 30 | 1615 | 6600 | 1585 | 30 | | | | | | | | 6600 | | | |
| 1410 | 30 | 1570 | 6400 | 1540 | 30 | | | | | | | | 6400 | | | |
| 1370 | 30 | 1530 | 6200 | 1495 | 30 | | | | | | | | 6200 | | | |
| 1330 | 30 | 1490 | 6000 | 1450 | 30 | | | | | | | | 6000 | | | |
| 1320 | 30 | 1475 | 5944 | 1440 | 30 | | | | | | | | 5944 | | | |

| CRUISING AT 25000′ | | | | | | EFFEC-TIVE WIND | CRUISING AT 30000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| 320 | 92 | 2365 | 340 | .7 | 25 | 120 HW | 290 | 94 | 2210 | 340 | .7 | 30 |
| 310 | 91 | 2310 | 370 | .8 | 25 | 80 HW | 290 | 94 | 2210 | 380 | .8 | 35 |
| 310 | 91 | 2310 | 410 | .9 | 25 | 40 HW | 290 | 94 | 2210 | 420 | .9 | 35 |
| 310 | 91 | 2310 | 450 | 1.0 | 30 | 0 | 290 | 94 | 2210 | 460 | 1.0 | 40 |
| 310 | 91 | 2310 | 490 | 1.1 | 30 | 40 TW | 285 | 93 | 2190 | 495 | 1.1 | 45 |
| 300 | 90 | 2235 | 515 | 1.2 | 35 | 80 TW | 285 | 93 | 2190 | 535 | 1.2 | 45 |
| 300 | 90 | 2235 | 555 | 1.3 | 35 | 120 TW | 285 | 93 | 2190 | 575 | 1.3 | 50 |

| CRUISING AT 35000′ | | | | | | CRUISING AT 40000′ | | | | | | EFFEC-TIVE WIND | CRUISING AT 45000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | | | | | | | 120 HW | | | | | | |
| | | | | | | | | | | | | 80 HW | | | | | | |
| | | | | | | | | | | | | 40 HW | | | | | | |
| | | | | | | | | | | | | 0 | | | | | | |
| | | | | | | | | | | | | 40 TW | | | | | | |
| | | | | | | | | | | | | 80 TW | | | | | | |
| | | | | | | | | | | | | 120 TW | | | | | | |

1 Climb at 100 % RPM
2 Multiply statute units by .87 to obtain nautical units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5 Chart weight limits based on fuel density of 6.5 LBS GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

### EXAMPLE

If you are at 15000 feet with 6800 lbs. of available fuel, you can fly 1190 statute airmiles by holding 345 MPH CAS. However, you can fly 1620 statute airmiles by immediately climbing to 30000 feet using 100 % RPM At 30000 feet cruise at 290 MPH CAS and start letdown 40 statute airmiles from destination. With a 80 MPH headwind the range at 30000 feet will be 1620 x .8 or 1295 statute airmiles. Cruise at 290 MPH CAS with this wind and start letdown 35 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED:

### LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

RANGE FACTOR = $\frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form
No. 239C
Sheet 2 of 2
(Rev. 1 May 50)

Figure A—11. Flight Operation Instruction Chart (Sheet 4 of 12) F-84G-1RE thru -5RE

MCRE Form
No. 239C
Sheet 1 of 2
(Rev. 1 May 50)

## AIRPLANE MODEL(S)

F-84G-1RE thru-5RE
ENGINE(S) J35-A-29

## FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 19294 TO 17820 POUNDS

## EXTERNAL LOAD ITEMS

Four-230 Gal. Tanks carried all the way.

NUMBER OF ENGINES OPERATING: 1

**INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT** – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. **(B) FLIGHT PLANNING** – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

# LOW ALTITUDE

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000′ | | | IF YOU ARE AT 10000′ | | | IF YOU ARE AT 15000′ | | | FUEL | IF YOU ARE AT 20000′ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 710 | 30 | 1375 | 5944 | 810 | 30 | 1400 | 940 | 30 | 1420 | 1050 | 30 | 1440 | 5944 | 1215 | 30 | 1460 |
| 690 | 30 | 1350 | 5800 | 790 | 30 | 1370 | 920 | 30 | 1390 | 1025 | 30 | 1410 | 5800 | 1185 | 30 | 1425 |
| 670 | 30 | 1310 | 5600 | 760 | 30 | 1330 | 890 | 30 | 1350 | 990 | 30 | 1370 | 5600 | 1145 | 30 | 1385 |
| 645 | 30 | 1265 | 5400 | 735 | 30 | 1285 | 860 | 30 | 1305 | 960 | 30 | 1325 | 5400 | 1110 | 30 | 1340 |
| 620 | 30 | 1220 | 5200 | 710 | 30 | 1240 | 830 | 30 | 1260 | 925 | 30 | 1280 | 5200 | 1070 | 30 | 1300 |
| 600 | 30 | 1180 | 5000 | 680 | 30 | 1200 | 800 | 30 | 1220 | 890 | 30 | 1235 | 5000 | 1030 | 30 | 1250 |
| 575 | 30 | 1130 | 4800 | 655 | 30 | 1150 | 770 | 30 | 1175 | 855 | 30 | 1190 | 4800 | 990 | 30 | 1210 |
| 550 | 30 | 1085 | 4600 | 630 | 30 | 1110 | 740 | 30 | 1130 | 820 | 30 | 1150 | 4600 | 955 | 30 | 1170 |
| 535 | 30 | 1050 | 4458 | 615 | 30 | 1075 | 715 | 30 | 1095 | 800 | 30 | 1115 | 4458 | 930 | 30 | 1135 |

| CRUISING AT S. L. | | | | | | EFFECTIVE WIND | CRUISING AT 5000′ | | | | | | CRUISING AT 10000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | |
| | | | | | | 80 HW | | | | | | | 365 | 88 | 2760 | 340 | .8 | 10 |
| 385 | 86 | 3260 | 345 | .9 | - | 40 HW | 370 | 86 | 2995 | 355 | .9 | 5 | 360 | 87 | 2700 | 370 | .9 | 10 |
| 375 | 85 | 3180 | 375 | 1.0 | - | 0 | 370 | 86 | 2995 | 395 | 1.0 | 5 | 350 | 86 | 2630 | 400 | 1.0 | 10 |
| 375 | 85 | 3180 | 415 | 1.1 | - | 40 TW | 360 | 85 | 2920 | 425 | 1.1 | 5 | 350 | 86 | 2630 | 440 | 1.1 | 10 |
| | | | | | | 80 TW | | | | | | | 340 | 85 | 2565 | 470 | 1.2 | 10 |
| | | | | | | 120 TW | | | | | | | | | | | | |

| CRUISING AT 15000′ | | | | | | EFFECTIVE WIND | CRUISING AT 20000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | 335 | 89 | 2340 | 330 | .7 | 15 |
| 345 | 88 | 2530 | 345 | .8 | 15 | 80 HW | 335 | 89 | 2340 | 370 | .8 | 15 |
| 345 | 88 | 2530 | 385 | .9 | 15 | 40 HW | 320 | 88 | 2240 | 390 | .9 | 20 |
| 330 | 87 | 2440 | 410 | 1.0 | 15 | 0 | 320 | 88 | 2240 | 430 | 1.0 | 20 |
| 330 | 87 | 2440 | 450 | 1.1 | 15 | 40 TW | 310 | 87 | 2160 | 455 | 1.1 | 20 |
| 325 | 86 | 2380 | 480 | 1.2 | 15 | 80 TW | 310 | 87 | 2160 | 495 | 1.2 | 25 |
| | | | | | | 120 TW | 310 | 87 | 2160 | 535 | 1.3 | 25 |

*Figure A—11. Flight Operation Instruction Chart (Sheet 5 of 12) F-84G-1RE thru -5RE*

# HIGH ALTITUDE

Four-230 Gal. Tanks carried all the way.

AIRPLANE MOD. F-84G-1RE thru-5RE  ENG. J35-A-29  CHART WT. LIMITS 19294 TO 17820 LB.  EXT. LOAD  NO. OF ENGINES OPERATING: 1

(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)

| IF YOU ARE AT 25000′ | | | FUEL | IF YOU ARE AT 30000′ | | | IF YOU ARE AT 35000′ | | | IF YOU ARE AT 40000′ | | | FUEL | IF YOU ARE AT 45000′ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| 1320 | 30 | 1475 | 5944 | 1440 | | | | | | | | | 5944 | | | |
| 1290 | 30 | 1445 | 5800 | 1410 | | | | | | | | | 5800 | | | |
| 1250 | 30 | 1400 | 5600 | 1360 | | | | | | | | | 5600 | | | |
| 1210 | 30 | 1360 | 5400 | 1320 | | | | | | | | | 5400 | | | |
| 1170 | 30 | 1320 | 5200 | 1275 | | | | | | | | | 5200 | | | |
| 1130 | 30 | 1270 | 5000 | 1230 | | | | | | | | | 5000 | | | |
| 1085 | 30 | 1230 | 4800 | 1185 | | | | | | | | | 4800 | | | |
| 1040 | 30 | 1185 | 4600 | 1140 | | | | | | | | | 4600 | | | |
| 1015 | 30 | 1150 | 4458 | 1110 | | | | | | | | | 4458 | | | |

| CRUISING AT 25000′ | | | | | | EFFECTIVE WIND | CRUISING AT 30000′ | | | | | | CRUISING AT 35000′ | | | | | | CRUISING AT 40000′ | | | | | | EFFECTIVE WIND | CRUISING AT 45000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| 320 | 91 | 2245 | 340 | .7 | 25 | 120 HW | 295 | 93 | 2125 | 345 | .7 | 30 | | | | | | | | | | | | | 120 HW | | | | | | |
| 310 | 90 | 2195 | 370 | .8 | 25 | 80 HW | 295 | 93 | 2125 | 385 | .8 | 35 | | | | | | | | | | | | | 80 HW | | | | | | |
| 310 | 90 | 2195 | 410 | .9 | 25 | 40 HW | 290 | 92 | 2060 | 415 | .9 | 35 | | | | | | | | | | | | | 40 HW | | | | | | |
| 310 | 90 | 2195 | 450 | 1.0 | 30 | 0 | 290 | 92 | 2060 | 455 | 1.0 | 40 | | | | | | | | | | | | | 0 | | | | | | |
| 295 | 89 | 2100 | 470 | 1.1 | 30 | 40 TW | 290 | 92 | 2060 | 495 | 1.1 | 45 | | | | | | | | | | | | | 40 TW | | | | | | |
| 295 | 89 | 2100 | 510 | 1.2 | 35 | 80 TW | 290 | 92 | 2060 | 535 | 1.2 | 45 | | | | | | | | | | | | | 80 TW | | | | | | |
| 295 | 89 | 2100 | 550 | 1.3 | 35 | 120 TW | 290 | 92 | 2060 | 575 | 1.3 | 50 | | | | | | | | | | | | | 120 TW | | | | | | |

1 Climb at 100 % RPM
2 Multiply statute units by .87 to obtain nautical units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5 Chart weight limits based on fuel density of 6.5 LBS/GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951  BASED ON: Estimates

## EXAMPLE

If you are at 15000 feet with 5400 lbs. of available fuel, you can fly 960 statute airmiles by holding 330 MPH CAS. However, you can fly 1325 statute airmiles by immediately climbing to 30000 feet using 100 % RPM At 30000 feet cruise at 290 MPH CAS and start letdown 40 statute airmiles from destination. With a 80 MPH headwind the range at 30000 feet will be 1325 x .8 or 1060 statute airmiles. Cruise at 295 MPH CAS with this wind and start letdown 35 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED.

## LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

RANGE FACTOR = $\frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form No. 239C Sheet 2 of 2 (Rev. 1 May 50)

Figure A—11. Flight Operation Instruction Chart (Sheet 6 of 12) F-84G-1RE thru -5RE

MCRE Form
No. 239C
Sheet 1 of 2
(Rev. 1 May 50)

## AIRPLANE MODEL(S)

F-84G-1RE thru-5RE
ENGINE(S) J35-A-29

## FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 17820 TO 16345 POUNDS

## EXTERNAL LOAD ITEMS

Four-230 Gal. Tanks carried all the way.
NUMBER OF ENGINES OPERATING: 1

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000′ | | | IF YOU ARE AT 10000′ | | | IF YOU ARE AT 15000′ | | | FUEL | IF YOU ARE AT 20000′ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 535 | 30 | 1050 | 4458 | 615 | 30 | 1075 | 715 | 30 | 1095 | 800 | 30 | 1115 | 4458 | 930 | 30 | 1135 |
| 505 | 30 | 995 | 4200 | 575 | 30 | 1020 | 675 | 30 | 1040 | 750 | 30 | 1055 | 4200 | 875 | 30 | 1075 |
| 480 | 30 | 950 | 4000 | 550 | 30 | 970 | 645 | 30 | 990 | 715 | 30 | 1010 | 4000 | 840 | 30 | 1030 |
| 455 | 30 | 905 | 3800 | 520 | 30 | 925 | 615 | 30 | 945 | 680 | 30 | 965 | 3800 | 800 | 30 | 985 |
| 430 | 30 | 855 | 3600 | 495 | 30 | 875 | 585 | 30 | 900 | 645 | 30 | 915 | 3600 | 760 | 30 | 935 |
| 410 | 30 | 810 | 3400 | 465 | 30 | 830 | 550 | 30 | 850 | 615 | 30 | 870 | 3400 | 725 | 30 | 885 |
| 385 | 30 | 760 | 3200 | 440 | 30 | 780 | 520 | 30 | 800 | 580 | 30 | 820 | 3200 | 685 | 30 | 840 |
| 360 | 30 | 710 | 3000 | 415 | 30 | 730 | 490 | 30 | 750 | 545 | 30 | 770 | 3000 | 645 | 30 | 790 |
| 360 | 30 | 700 | 2972 | 415 | 30 | 720 | 485 | 30 | 740 | 540 | 30 | 760 | 2972 | 635 | 30 | 785 |

| CRUISING AT S. L. | | | | | | EFFECTIVE WIND | CRUISING AT 5000′ | | | | | | CRUISING AT 10000′ | | | | | | CRUISING AT 15000′ | | | | | | EFFECTIVE WIND | CRUISING AT 20000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 325 | 88 | 2185 | 315 | .7 | 15 |
| | | | | | | 80 HW | | | | | | | 355 | 88 | 2590 | 325 | .8 | 10 | 335 | 87 | 2405 | 335 | .8 | 15 | 80 HW | 325 | 88 | 2185 | 355 | .8 | 15 |
| 375 | 85 | 3125 | 355 | .9 | - | 40 HW | 355 | 85 | 2815 | 340 | .9 | 5 | 350 | 87 | 2560 | 360 | .9 | 10 | 325 | 86 | 2350 | 365 | .9 | 15 | 40 HW | 315 | 87 | 2110 | 380 | .9 | 20 |
| 375 | 85 | 3125 | 375 | 1.0 | - | 0 | 355 | 85 | 2815 | 380 | 1.0 | 5 | 345 | 86 | 2525 | 395 | 1.0 | 10 | 325 | 86 | 2350 | 405 | 1.0 | 15 | 0 | 315 | 87 | 2110 | 420 | 1.0 | 20 |
| 370 | 84 | 3085 | 410 | 1.1 | - | 40 TW | 355 | 85 | 2815 | 420 | 1.1 | 5 | 335 | 85 | 2400 | 425 | 1.1 | 10 | 320 | 85 | 2290 | 435 | 1.1 | 15 | 40 TW | 305 | 86 | 2035 | 445 | 1.1 | 20 |
| | | | | | | 80 TW | | | | | | | 335 | 85 | 2400 | 465 | 1.2 | 10 | 320 | 85 | 2290 | 475 | 1.2 | 15 | 80 TW | 305 | 86 | 2035 | 485 | 1.2 | 25 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 305 | 86 | 2035 | 525 | 1.3 | 25 |

Figure A—11. Flight Operation Instruction Chart (Sheet 7 of 12) F-84G-1RE thru -5RE

F-84G-1RE thru-5RE

# HIGH ALTITUDE

Four-230 Gal. Tanks carried all the way.

AIRPLANE MOD. ENG. J35-A-29 CHART WT. LIMITS 17820 TO 16345 LB. EXT. LOAD NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000' | | | FUEL | IF YOU ARE AT 30000' | | | IF YOU ARE AT 35000' | | | IF YOU ARE AT 40000' | | | FUEL | IF YOU ARE AT 45000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 1015 | 30 | 1150 | 4458 | 1110 | 30 | | | | | | | | 4458 | | | |
| 960 | 30 | 1095 | 4200 | 1050 | 30 | | | | | | | | 4200 | | | |
| 915 | 30 | 1045 | 4000 | 1000 | 30 | | | | | | | | 4000 | | | |
| 875 | 30 | 1000 | 3800 | 960 | 30 | | | | | | | | 3800 | | | |
| 830 | 30 | 955 | 3600 | 910 | 30 | | | | | | | | 3600 | | | |
| 790 | 30 | 905 | 3400 | 865 | 30 | | | | | | | | 3400 | | | |
| 745 | 30 | 855 | 3200 | 820 | 30 | | | | | | | | 3200 | | | |
| 705 | 30 | 810 | 3000 | 775 | 30 | | | | | | | | 3000 | | | |
| 695 | 30 | 805 | 2972 | 765 | 30 | | | | | | | | 2972 | | | |

| CRUISING AT 25000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 30000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| 310 | 90 | 2100 | 330 | .7 | 25 | 120 HW | 295 | 92 | 2750 | 345 | .7 | 30 |
| 305 | 89 | 2075 | 365 | .8 | 25 | 80 HW | 295 | 92 | 2450 | 385 | .8 | 35 |
| 305 | 89 | 2075 | 405 | .9 | 30 | 40 HW | 290 | 91 | 2160 | 415 | .9 | 35 |
| 295 | 88 | 2005 | 430 | 1.0 | 30 | 0 | 290 | 91 | 1960 | 455 | 1.0 | 40 |
| 295 | 88 | 2005 | 470 | 1.1 | 35 | 40 TW | 280 | 90 | 1750 | 485 | 1.1 | 45 |
| 295 | 88 | 2005 | 510 | 1.2 | 35 | 80 TW | 280 | 90 | 1610 | 525 | 1.2 | 45 |
| 290 | 87 | 1959 | 540 | 1.3 | 40 | 120 TW | 275 | 89 | 1460 | 555 | 1.3 | 50 |

| CRUISING AT 35000' | | | | | | CRUISING AT 40000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 45000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | | | | | | | 120 HW | | | | | | |
| | | | | | | | | | | | | 80 HW | | | | | | |
| | | | | | | | | | | | | 40 HW | | | | | | |
| | | | | | | | | | | | | 0 | | | | | | |
| | | | | | | | | | | | | 40 TW | | | | | | |
| | | | | | | | | | | | | 80 TW | | | | | | |
| | | | | | | | | | | | | 120 TW | | | | | | |

1 Climb at 100 % RPM
2 Multiply statute units by .87 to obtain nautical units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5 Chart weight limits based on fuel density of 6.5 LBS GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimate

## EXAMPLE

If you are at 15000 feet with 3800 lbs. of available fuel, you can fly 680 statute airmiles by holding 325 MPH CAS. However, you can fly 965 statute airmiles by immediately climbing to 30000 feet using 100% RPM At 30000 feet cruise at 290 MPH CAS and start letdown 40 statute airmiles from destination. With a 80 MPH headwind the range at 30000 feet will be 965 x .80 or 770 statute airmiles. Cruise at 295 MPH CAS with this wind and start letdown 35 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED:

## LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

$$\text{RANGE FACTOR} = \frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form No. 239C Sheet 2 of 2 (Rev. 1 May 50)

Figure A—11. Flight Operation Instruction Chart (Sheet 8 of 12) F-84G-1RE thru -5RE

MCRE Form
No. 239C
Sheet 1 of 2
(Rev. 1 May 50)

## AIRPLANE MODEL(S)

F-84G-1RE thru-5RE
ENGINE(S) J35-A-29

## FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 16345 TO 14870 POUNDS

## EXTERNAL LOAD ITEMS

Four-230 Gal Tanks carried all the way.

NUMBER OF ENGINES OPERATING: 1

**INSTRUCTIONS FOR USING CHART:** (A) IN FLIGHT – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000' | | | IF YOU ARE AT 10000' | | | IF YOU ARE AT 15000' | | | FUEL | IF YOU ARE AT 20000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| 360 | 35 | 700 | 2972 | 415 | 35 | 720 | 485 | 35 | 740 | 540 | 35 | 760 | 2972 | 635 | 35 | 785 |
| 340 | 35 | 660 | 2800 | 385 | 35 | 680 | 460 | 35 | 700 | 510 | 35 | 715 | 2800 | 600 | 35 | 740 |
| 310 | 35 | 610 | 2600 | 360 | 35 | 630 | 425 | 35 | 650 | 475 | 35 | 665 | 2600 | 565 | 35 | 690 |
| 290 | 35 | 560 | 2400 | 330 | 35 | 580 | 395 | 35 | 595 | 440 | 35 | 610 | 2400 | 520 | 35 | 640 |
| 265 | 35 | 500 | 2200 | 305 | 35 | 525 | 360 | 35 | 540 | 400 | 35 | 560 | 2200 | 480 | 35 | 580 |
| 240 | 35 | 450 | 2000 | 280 | 35 | 470 | 330 | 35 | 490 | 370 | 35 | 510 | 2000 | 440 | 35 | 530 |
| 220 | 35 | 440 | 1800 | 250 | 35 | 420 | 300 | 35 | 435 | 330 | 35 | 455 | 1800 | 400 | 35 | 475 |
| 190 | 35 | 340 | 1600 | 225 | 35 | 360 | 265 | 35 | 380 | 295 | 35 | 400 | 1600 | 360 | 35 | 420 |
| 180 | 35 | 310 | 1486 | 210 | 35 | 330 | 250 | 35 | 350 | 280 | 35 | 370 | 1486 | 330 | 35 | 390 |

| CRUISING AT S. L. | | | | | | EFFECTIVE WIND | CRUISING AT 5000' | | | | | | CRUISING AT 10000' | | | | | | CRUISING AT 15000' | | | | | | EFFECTIVE WIND | CRUISING AT 20000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 335 | 88 | 2175 | 330 | .7 | 15 |
| | | | | | | 80 HW | | | | | | | 365 | 87 | 2620 | 335 | .8 | 10 | 350 | 87 | 2430 | 350 | .8 | 15 | 80 HW | 320 | 87 | 2080 | 350 | .8 | 15 |
| 385 | 85 | 3180 | 345 | .9 | - | 40 HW | 370 | 86 | 2875 | 355 | .9 | 5 | 355 | 86 | 2555 | 365 | .9 | 10 | 330 | 86 | 2315 | 370 | .9 | 15 | 40 HW | 320 | 87 | 2080 | 390 | .9 | 20 |
| 370 | 84 | 3060 | 370 | 1.0 | - | 0 | 360 | 85 | 2800 | 385 | 1.0 | 5 | 340 | 85 | 2460 | 390 | 1.0 | 10 | 330 | 86 | 2315 | 410 | 1.0 | 15 | | 305 | 86 | 1980 | 410 | 1.0 | 20 |
| 370 | 84 | 3060 | 410 | 1.1 | - | 40 TW | 355 | 84 | 2765 | 420 | 1.1 | 5 | 340 | 85 | 2460 | 430 | 1.1 | 10 | 315 | 85 | 2200 | 430 | 1.1 | 15 | 40 TW | 305 | 86 | 1980 | 450 | 1.1 | 20 |
| | | | | | | 80 TW | | | | | | | 330 | 84 | 2400 | 460 | 1.2 | 10 | 315 | 85 | 2200 | 470 | 1.2 | 15 | 80 TW | 295 | 85 | 1910 | 475 | 1.2 | 25 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 295 | 85 | 1910 | 515 | 1.3 | 25 |

Figure A–11. Flight Operation Instruction Chart (Sheet 9 of 12) F-84G-1RE thru -5RE

# HIGH ALTITUDE

Four-230 Gal. Tanks carried all the way.

AIRPLANE MOD. F-84G-1RE thru-5RE ENG. J35-A-29 CHART WT. LIMITS 16345 TO 14870 LB. EXT. LOAD NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000' | | | FUEL | IF YOU ARE AT 30000' | | | IF YOU ARE AT 35000' | | | IF YOU ARE AT 40000' | | | FUEL | IF YOU ARE AT 45000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | | | | | |
| 695 | 35 | 805 | 2972 | 765 | 35 | 820 | 835 | 35 | | | | | 2972 | | | |
| 660 | 35 | 760 | 2800 | 725 | 35 | 775 | 790 | 35 | | | | | 2800 | | | |
| 615 | 35 | 705 | 2600 | 675 | 35 | 725 | 740 | 35 | | | | | 2600 | | | |
| 570 | 35 | 655 | 2400 | 630 | 35 | 675 | 685 | 35 | | | | | 2400 | | | |
| 520 | 35 | 600 | 2200 | 580 | 35 | 620 | 635 | 35 | | | | | 2200 | | | |
| 475 | 35 | 550 | 2000 | 530 | 35 | 570 | 585 | 35 | | | | | 2000 | | | |
| 430 | 35 | 495 | 1800 | 480 | 35 | 515 | 530 | 35 | | | | | 1800 | | | |
| 385 | 35 | 440 | 1600 | 430 | 35 | 460 | 475 | 35 | | | | | 1600 | | | |
| 360 | 35 | 410 | 1486 | 400 | 35 | 425 | 440 | 35 | | | | | 1486 | | | |

| CRUISING AT 25000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 30000' | | | | | | CRUISING AT 35000' | | | | | | CRUISING AT 40000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 45000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| 310 | 89 | 2005 | 330 | .7 | 25 | 120 HW | 290 | 90 | 1850 | 335 | .7 | 30 | 265 | 91 | 1750 | 340 | .7 | 40 | | | | | | | 120 HW | | | | | | |
| 305 | 88 | 1960 | 360 | .8 | 25 | 80 HW | 280 | 89 | 1810 | 365 | .8 | 35 | 260 | 90 | 1710 | 370 | .8 | 45 | | | | | | | 80 HW | | | | | | |
| 305 | 88 | 1960 | 400 | .9 | 30 | 40 HW | 280 | 89 | 1810 | 405 | .9 | 40 | 260 | 90 | 1710 | 410 | .9 | 50 | | | | | | | 40 HW | | | | | | |
| 295 | 87 | 1892 | 425 | 1.0 | 30 | 0 | 270 | 88 | 1750 | 430 | 1.0 | 40 | 260 | 90 | 1710 | 450 | 1.0 | 55 | | | | | | | 0 | | | | | | |
| 295 | 87 | 1892 | 465 | 1.1 | 35 | 40 TW | 270 | 88 | 1750 | 470 | 1.1 | 45 | 260 | 90 | 1710 | 490 | 1.1 | 60 | | | | | | | 40 TW | | | | | | |
| 280 | 86 | 1825 | 490 | 1.2 | 35 | 80 TW | 270 | 88 | 1750 | 510 | 1.2 | 45 | 255 | 89 | 1670 | 520 | 1.2 | 65 | | | | | | | 80 TW | | | | | | |
| 280 | 86 | 1825 | 530 | 1.3 | 35 | 120 TW | 270 | 88 | 1750 | 550 | 1.3 | 50 | 255 | 89 | 1670 | 560 | 1.3 | 70 | | | | | | | 120 TW | | | | | | |

1. Climb at 100 % RPM
2. Multiply statute units by .87 to obtain nautical units.
3. Read lower half of chart opposite effective wind only.
4. Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5. Chart weight limits based on fuel density of 6.5 LBS GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

## EXAMPLE

If you are at 15000 feet with 2400 lbs. of available fuel, you can fly 440 statute airmiles by holding 330 MPH CAS. However, you can fly 610 statute airmiles by immediately climbing to 35000 feet using 100 % RPM At 35000 feet cruise at 260 MPH CAS and start letdown 15 statute airmiles from destination. With a 80 MPH headwind the range at 35000 feet will be 610 x .8 or 490 statute airmiles. Cruise at 260 MPH CAS with this wind and start letdown 45 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED:

## LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

$$\text{RANGE FACTOR} = \frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form No. 239C Sheet 2 of 2 (Rev. 1 May 50)

Figure A—11. Flight Operation Instruction Chart (Sheet 10 of 12) F-84G-1RE thru -5RE

MCRE Form
No. 239C
Sheet 1 of 2
(Rev. 1 May 50)

## AIRPLANE MODEL(S)

F-84G-1RE thru-5RE

ENGINE(S) J35-A-29

## FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 14870 TO 13395 POUNDS

## EXTERNAL LOAD ITEMS

Four-230 Gal. Tanks carried all the way.

NUMBER OF ENGINES OPERATING: 1

**INSTRUCTIONS FOR USING CHART:** (A) IN FLIGHT – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000′ | | | IF YOU ARE AT 10000′ | | | IF YOU ARE AT 15000′ | | | FUEL | IF YOU ARE AT 20000′ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| 180 | 35 | 310 | 1486 | 210 | 35 | 330 | 250 | 35 | 350 | 280 | 35 | 370 | 1486 | 330 | 35 | 390 |
| 145 | 35 | 235 | 1200 | 170 | 35 | 250 | 200 | 35 | 270 | 230 | 35 | 290 | 1200 | 270 | 35 | 310 |
| 100 | 30 | 135 | 800 | 115 | 35 | 145 | 135 | 35 | 165 | 155 | 35 | 180 | 800 | 185 | 35 | 200 |
| 50 | 15 | 55 | 400 | 60 | 20 | 60 | 70 | 20 | 70 | 80 | 20 | 85 | 400 | 100 | 20 | |

| CRUISING AT S. L. | | | | | | EFFECTIVE WIND | CRUISING AT 5000′ | | | | | | CRUISING AT 10000′ | | | | | | CRUISING AT 15000′ | | | | | | EFFECTIVE WIND | CRUISING AT 20000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 330 | 87 | 2045 | 320 | .7 | 15 |
| | | | | | | 80 HW | | | | | | | 365 | 86 | 2600 | 340 | .8 | 10 | 345 | 86 | 2600 | 345 | .8 | 15 | 80 HW | 315 | 86 | 1975 | 345 | .8 | 15 |
| 380 | 85 | 3105 | 340 | .9 | - | 40 HW | 365 | 85 | 2785 | 350 | .9 | 5 | 350 | 85 | 2475 | 360 | .9 | 10 | 330 | 85 | 2475 | 370 | .9 | 15 | 40 HW | 315 | 86 | 1975 | 385 | .9 | 20 |
| 380 | 85 | 3105 | 380 | 1.0 | - | 0 | 365 | 85 | 2785 | 390 | 1.0 | 5 | 350 | 85 | 2475 | 400 | 1.0 | 10 | 330 | 85 | 2475 | 410 | 1.0 | 15 | 0 | 305 | 85 | 1905 | 410 | 1.0 | 20 |
| 370 | 84 | 3020 | 410 | 1.1 | - | 40 TW | 355 | 84 | 2715 | 420 | 1.1 | 5 | 340 | 84 | 2415 | 430 | 1.1 | 10 | 315 | 84 | 2415 | 430 | 1.1 | 15 | 40 TW | 305 | 85 | 1905 | 450 | 1.1 | 20 |
| | | | | | | 80 TW | | | | | | | 325 | 83 | 2320 | 455 | 1.2 | 10 | 315 | 84 | 2415 | 455 | 1.2 | 15 | 80 TW | 290 | 84 | 1810 | 470 | 1.2 | 25 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 290 | 84 | 1810 | 510 | 1.3 | 25 |

*Figure A–11. Flight Operation Instruction Chart (Sheet 11 of 12) F-84G-1RE thru -5RE*

## HIGH ALTITUDE

F-84G-1RE thru-5RE

Four-230 Gal. Tanks carried all the way.

AIRPLANE MOD. ENG. J35-A-29 CHART WT. LIMITS 14870 TO 13395 LB. EXT. LOAD NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000' | | | FUEL | IF YOU ARE AT 30000' | | | IF YOU ARE AT 35000' | | | IF YOU ARE AT 40000' | | | FUEL | IF YOU ARE AT 45000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 360 | 35 | 410 | 1486 | 400 | 35 | 425 | 440 | 35 | | | | | 1486 | | | |
| 295 | 35 | 330 | 1200 | 330 | 35 | 345 | 360 | 35 | | | | | 1200 | | | |
| 200 | 35 | 220 | 800 | 225 | 35 | 235 | 250 | 35 | | | | | 800 | | | |
| 110 | 25 | | 400 | 125 | 30 | | 135 | 35 | | | | | 400 | | | |

| CRUISING AT 25000' | | | | | | EFFECTIVE WIND | CRUISING AT 30000' | | | | | | CRUISING AT 35000' | | | | | | CRUISING AT 40000' | | | | | | EFFECTIVE WIND | CRUISING AT 45000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| 305 | 87 | 1880 | 320 | .7 | 25 | 120 HW | 285 | 88 | 1720 | 330 | .7 | 30 | 260 | 91 | 1590 | 330 | .7 | 45 | | | | | | | 120 HW | | | | | | |
| 305 | 87 | 1880 | 360 | .8 | 25 | 80 HW | 270 | 87 | 1645 | 350 | .8 | 35 | 260 | 91 | 1590 | 370 | .8 | 50 | | | | | | | 80 HW | | | | | | |
| 290 | 86 | 1795 | 380 | .9 | 25 | 40 HW | 270 | 87 | 1645 | 390 | .9 | 35 | 245 | 90 | 1502 | 385 | .9 | 50 | | | | | | | 40 HW | | | | | | |
| 290 | 86 | 1795 | 420 | 1.0 | 30 | 0 | 270 | 87 | 1645 | 430 | 1.0 | 40 | 245 | 90 | 1502 | 425 | 1.0 | 55 | | | | | | | 0 | | | | | | |
| 280 | 85 | 1730 | 445 | 1.1 | 30 | 40 TW | 260 | 86 | 1585 | 455 | 1.1 | 40 | 245 | 90 | 1502 | 465 | 1.1 | 60 | | | | | | | 40 TW | | | | | | |
| 280 | 85 | 1730 | 485 | 1.2 | 35 | 80 TW | 260 | 86 | 1585 | 495 | 1.2 | 45 | 240 | 89 | 1485 | 500 | 1.2 | 65 | | | | | | | 80 TW | | | | | | |
| 280 | 85 | 1730 | 525 | 1.3 | 35 | 120 TW | 260 | 86 | 1585 | 535 | 1.3 | 50 | 240 | 89 | 1485 | 540 | 1.3 | 70 | | | | | | | 120 TW | | | | | | |

1 Climb at 100 % RPM
2 Multiply statute units by .87 to obtain nautical units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5 Chart weight limits based on fuel density of 6.5 LBS GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

### EXAMPLE

If you are at 15000 feet with 1200 lbs. of available fuel, you can fly 230 statute airmiles by holding 330 MPH CAS. However, you can fly 290 statute airmiles by immediately climbing to 35000 feet using 100% RPM At 35000 feet cruise at 245 MPH CAS and start letdown 55 statute airmiles from destination. With a 80 MPH headwind the range at 35000 feet will be 290 x .8 or 230 statute airmiles. Cruise at 260 MPH CAS with this wind and start letdown 50 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED.

### LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

$$\text{RANGE FACTOR} = \frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form No. 239C Sheet 2 of 2 (Rev. 1 May 50)

Figure A–11. Flight Operation Instruction Chart (Sheet 12 of 12) F-84G-1RE thru -5RE

MCRE Form
No. 239C
Sheet 1 of 2
(Rev. 1 May 50)

## AIRPLANE MODEL(S)

F-84G-1RE thru-5RE
ENGINE(S) J35-A-29

## FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 22242 TO 20768 POUNDS

## EXTERNAL LOAD ITEMS

Four-230 Gal. Tanks-Pylon tanks dropped & Tip Tanks carried entire distance.
NUMBER OF ENGINES OPERATING: 1

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude. operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

# LOW ALTITUDE

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000' | | | IF YOU ARE AT 10000' | | | IF YOU ARE AT 15000' | | | FUEL | IF YOU ARE AT 20000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 1165 | 25 | 2370 | 8847 | (1315) | 25 | (2390) | (1525) | 25 | (2405) | (1730) | 25 | (2425) | 8847 | (1980) | 25 | (2445) |
| 1150 | 25 | 2350 | 8800 | (1300) | 25 | (2370) | (1510) | 25 | (2390) | (1715) | 25 | (2405) | 8800 | (1955) | 25 | (2425) |
| 1130 | 25 | 2315 | 8600 | 1275 | 25 | 2335 | (1480) | 25 | (2355) | (1685) | 25 | (2370) | 8600 | (1925) | 25 | (2390) |
| 1105 | 25 | 2275 | 8400 | 1245 | 25 | 2300 | 1455 | 25 | 2315 | 1650 | 25 | 2330 | 8400 | (1890) | 25 | (2350) |
| 1085 | 25 | 2240 | 8200 | 1220 | 25 | 2260 | 1420 | 25 | 2280 | 1620 | 25 | 2295 | 8200 | 1855 | 25 | 2315 |
| 1060 | 25 | 2200 | 8000 | 1195 | 25 | 2220 | 1390 | 25 | 2240 | 1590 | 25 | 2255 | 8000 | 1820 | 25 | 2275 |
| 1040 | 25 | 2160 | 7800 | 1170 | 25 | 2180 | 1360 | 25 | 2200 | 1555 | 25 | 2215 | 7800 | 1785 | 25 | 2240 |
| 1015 | 25 | 2120 | 7600 | 1145 | 25 | 2140 | 1330 | 25 | 2160 | 1525 | 25 | 2175 | 7600 | 1750 | 25 | 2200 |
| 995 | 25 | 2085 | 7431 | 1120 | 25 | 2105 | 1305 | 25 | 2125 | 1495 | 25 | 2145 | 7431 | 1720 | 25 | 2165 |

| CRUISING AT S. L. | | | | | | EFFECTIVE WIND | CRUISING AT 5000' | | | | | | CRUISING AT 10000' | | | | | | CRUISING AT 15000' | | | | | | EFFECTIVE WIND | CRUISING AT 20000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 345 | 91 | 2640 | 340 | .7 | 15 |
| | | | | | | 80 HW | | | | | | | 370 | 89 | 2950 | 345 | .8 | 10 | 355 | 90 | 2745 | 355 | .8 | 10 | 80 HW | 345 | 91 | 2640 | 380 | .8 | 15 |
| 390 | 87 | 3450 | 350 | .9 | - | 40 HW | 380 | 88 | 3200 | 365 | .9 | 5 | 360 | 88 | 2850 | 370 | .9 | 10 | 355 | 90 | 2745 | 395 | .9 | 15 | 40 HW | 330 | 90 | 2525 | 400 | .9 | 20 |
| 380 | 86 | 3360 | 380 | 1.0 | - | 0 | 365 | 87 | 3085 | 390 | 1.0 | 5 | 360 | 88 | 2850 | 410 | 1.0 | 10 | 340 | 89 | 2650 | 420 | 1.0 | 15 | 0 | 330 | 90 | 2525 | 440 | 1.0 | 20 |
| 370 | 85 | 3270 | 410 | 1.1 | - | 40 TW | 355 | 86 | 3005 | 420 | 1.1 | 5 | 350 | 87 | 2780 | 440 | 1.1 | 10 | 340 | 89 | 2650 | 460 | 1.1 | 15 | 40 TW | 330 | 90 | 2525 | 480 | 1.1 | 20 |
| | | | | | | 80 TW | | | | | | | 350 | 87 | 2780 | 480 | 1.2 | 10 | 330 | 88 | 2590 | 490 | 1.2 | 20 | 80 TW | 320 | 89 | 2440 | 505 | 1.2 | 25 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 320 | 89 | 2440 | 545 | 1.3 | 25 |

Figure A–12. Flight Operation Instruction Chart (Sheet 1 of 4) F-84G-1RE thru -5RE

F-84G-1RE thru-5RE

# HIGH ALTITUDE

Four-230 Gal. Tanks-Pylon tanks dropped & Tip Tanks carried entire distance.

AIRPLANE MOD. ENG. J35-A-29 CHART WT. LIMITS 22242 TO 20768 LB. EXT. LOAD NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000' | | | FUEL | IF YOU ARE AT 30000' | | | IF YOU ARE AT 35000' | | | IF YOU ARE AT 40000' | | | FUEL | IF YOU ARE AT 45000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| (2145) | 25 | - | 8847 | | | | | | | | | | 8847 | | | |
| (2125 | 25 | - | 8800 | | | | | | | | | | 8800 | | | |
| (2090) | 25 | - | 8600 | | | | | | | | | | 8600 | | | |
| (2055) | 25 | - | 8400 | | | | | | | | | | 8400 | | | |
| (2020) | 25 | - | 8200 | | | | | | | | | | 8200 | | | |
| 1985 | 25 | - | 8000 | | | | | | | | | | 8000 | | | |
| 1945 | 25 | - | 7800 | | | | | | | | | | 7800 | | | |
| 1905 | 25 | - | 7600 | | | | | | | | | | 7600 | | | |
| 1870 | 25 | - | 7431 | | | | | | | | | | 7431 | | | |

| CRUISING AT 25000' | | | | | | EFFECTIVE WIND | CRUISING AT 30000' | | | | | | CRUISING AT 35000' | | | | | | CRUISING AT 40000' | | | | | | EFFECTIVE WIND | CRUISING AT 45000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| 335 | 93 | 2620 | 365 | .7 | 25 | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | | | | | | |
| 325 | 92 | 2540 | 390 | .8 | 25 | 80 HW | | | | | | | | | | | | | | | | | | | 80 HW | | | | | | |
| 325 | 92 | 2540 | 430 | .9 | 25 | 40 HW | | | | | | | | | | | | | | | | | | | 40 HW | | | | | | |
| 325 | 92 | 2540 | 470 | 1.0 | 30 | 0 | | | | | | | | | | | | | | | | | | | 0 | | | | | | |
| 310 | 91 | 2430 | 490 | 1.1 | 30 | 40 TW | | | | | | | | | | | | | | | | | | | 40 TW | | | | | | |
| 310 | 91 | 2430 | 530 | 1.2 | 35 | 80 TW | | | | | | | | | | | | | | | | | | | 80 TW | | | | | | |
| 310 | 91 | 2430 | 570 | 1.3 | 35 | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | | | | | | |

1. Climb at 100 % RPM
2. Multiply statute units by .87 to obtain nautical units.
3. Read lower half of chart opposite effective wind only.
4. Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5. Chart weight limits based on fuel density of 6.5 LBS/GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

### EXAMPLE

If you are at 15000 feet with 8400 lbs. of available fuel, you can fly 1650 statute airmiles by holding 340 MPH CAS. However, you can fly 2330 statute airmiles by immediately climbing to 25000 feet using 100 % RPM At 25000 feet cruise at 325 MPH CAS and start letdown 30 statute airmiles from destination. With a 80 MPH headwind the range at 25000 feet will be 2330 x .8 or 1865 statute airmiles. Cruise at 325 MPH CAS with this wind and start letdown 25 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED:

### LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

$$\text{RANGE FACTOR} = \frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form
No. 239C
Sheet 2 of 2
(Rev. 1 May 50)

Figure A–12. Flight Operation Instruction Chart (Sheet 2 of 4) F-84G-1RE thru -5RE

MCRE Form
No. 139C
Sheet 1 of 2
(Rev. 1 May 50)

**AIRPLANE MODEL(S)**

F-84G-1RE thru-5RE
ENGINE(S) J35-A-29

# FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 20768 TO 19294 POUNDS

**EXTERNAL LOAD ITEMS**

Four-230 Gal Tanks. Pylon tanks dropped & Tip Tanks carried entire distance.
NUMBER OF ENGINES OPERATING: 1

**INSTRUCTIONS FOR USING CHART:** (A) IN FLIGHT – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000′ | | | IF YOU ARE AT 10000′ | | | IF YOU ARE AT 15000′ | | | FUEL | IF YOU ARE AT 20000′ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| 995 | 30 | 2085 | 7431 | 1120 | 30 | 2105 | 1305 | 30 | 2125 | 1495 | 30 | 2145 | 7431 | 1720 | 30 | 2165 |
| 970 | 30 | 2040 | 7200 | 1095 | 30 | 2060 | 1275 | 30 | 2080 | 1460 | 30 | 2100 | 7200 | 1675 | 30 | 2115 |
| 945 | 30 | 2000 | 7000 | 1065 | 30 | 2020 | 1240 | 30 | 2040 | 1425 | 30 | 2060 | 7000 | 1640 | 30 | 2075 |
| 930 | 30 | 1960 | 6800 | 1040 | 30 | 1980 | 1210 | 30 | 2000 | 1390 | 30 | 2020 | 6800 | 1605 | 30 | 2035 |
| 900 | 20 | 1910 | 6600 | 1015 | 30 | 1935 | 1185 | 30 | 1960 | 1360 | 30 | 1980 | 6600 | 1570 | 30 | 1995 |
| 850 | 10 | 1820 | 6200 | 965 | 15 | 1845 | 1125 | 20 | 1865 | 1295 | 25 | 1885 | 6200 | 1495 | 25 | 1905 |
| 820 | - | - | 5944 | 930 | - | - | 1080 | - | - | 1250 | - | - | 5944 | 1445 | - | - |

| CRUISING AT S. L. | | | | | | EFFEC-TIVE WIND | CRUISING AT 5000′ | | | | | | CRUISING AT 10000′ | | | | | | CRUISING AT 15000′ | | | | | | EFFEC-TIVE WIND | CRUISING AT 20000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 335 | 90 | 2430 | 325 | .7 | 15 |
| | | | | | | 80 HW | | | | | | | 370 | 88 | 2870 | 345 | .8 | 10 | 355 | 89 | 2670 | 355 | .8 | 15 | 80 HW | 335 | 90 | 2430 | 365 | .8 | 15 |
| 390 | 87 | 3360 | 350 | .9 | - | 40 HW | 380 | 87 | 3140 | 365 | .9 | 5 | 370 | 88 | 2870 | 385 | .9 | 10 | 345 | 88 | 2610 | 385 | .9 | 15 | 40 HW | 325 | 89 | 2380 | 395 | .9 | 20 |
| 380 | 86 | 3275 | 380 | 1.0 | - | 0 | 370 | 86 | 3060 | 395 | 1.0 | 5 | 350 | 87 | 2700 | 400 | 1.0 | 10 | 345 | 88 | 2610 | 425 | 1.0 | 15 | 0 | 325 | 89 | 2380 | 435 | 1.0 | 20 |
| 370 | 85 | 3190 | 410 | 1.1 | - | 40 TW | 355 | 85 | 2945 | 420 | 1.1 | 5 | 350 | 87 | 2700 | 440 | 1.1 | 10 | 330 | 87 | 2515 | 450 | 1.1 | 15 | 40 TW | 325 | 89 | 2380 | 475 | 1.1 | 20 |
| | | | | | | 80 TW | | | | | | | 335 | 86 | 2600 | 465 | 1.2 | 10 | 330 | 87 | 2515 | 490 | 1.2 | 15 | 80 TW | 315 | 88 | 2295 | 500 | 1.2 | 25 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 315 | 88 | 2295 | 540 | 1.3 | 25 |

Figure A–12. Flight Operation Instruction Chart (Sheet 3 of 4) F-84G-1RE thru -5RE

# HIGH ALTITUDE

F-84G-1RE thru-5RE
AIRPLANE MOD.

Four-230 Gal. Tanks. Pylon tanks dropped & Tip tanks carried entire distance.

ENG. J35-A-29 CHART WT. LIMITS 20768 TO 19294 LB. EXT. LOAD

NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000′ | | | FUEL | IF YOU ARE AT 30000′ | | | IF YOU ARE AT 35000′ | | | IF YOU ARE AT 40000′ | | | FUEL | IF YOU ARE AT 45000′ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 1870 | 30 | 2185 | 7431 | 2095 | 30 | - | | | | | | | 7431 | | | |
| 1830 | 30 | 2140 | 7200 | 2055 | 30 | - | | | | | | | 7200 | | | |
| 1790 | 30 | 2095 | 7000 | 2015 | 30 | - | | | | | | | 7000 | | | |
| 1750 | 30 | 2055 | 6800 | 1970 | 30 | - | | | | | | | 6800 | | | |
| 1710 | 30 | 2015 | 6600 | 1930 | 30 | - | | | | | | | 6600 | | | |
| 1630 | 30 | 1930 | 6200 | 1840 | 30 | - | | | | | | | 6200 | | | |
| 1580 | - | - | 5944 | 1780 | - | - | | | | | | | 5944 | | | |

| CRUISING AT 25000′ | | | | | | EFFECTIVE WIND | CRUISING AT 30000′ | | | | | | CRUISING AT 35000′ | | | | | | CRUISING AT 40000′ | | | | | | EFFECTIVE WIND | CRUISING AT 45000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| 320 | 92 | 2365 | 340 | .7 | 25 | 120 HW | 290 | 94 | 2210 | 340 | .7 | 30 | | | | | | | | | | | | | 120 HW | | | | | | |
| 310 | 91 | 2310 | 370 | .8 | 25 | 80 HW | 290 | 94 | 2210 | 380 | .8 | 35 | | | | | | | | | | | | | 80 HW | | | | | | |
| 310 | 91 | 2310 | 410 | .9 | 25 | 40 HW | 290 | 94 | 2210 | 420 | .9 | 35 | | | | | | | | | | | | | 40 HW | | | | | | |
| 310 | 91 | 2310 | 450 | 1.0 | 30 | 0 | 290 | 94 | 2210 | 460 | 1.0 | 40 | | | | | | | | | | | | | 0 | | | | | | |
| 310 | 91 | 2310 | 490 | 1.1 | 30 | 40 TW | 285 | 93 | 2190 | 495 | 1.1 | 45 | | | | | | | | | | | | | 40 TW | | | | | | |
| 300 | 90 | 2235 | 515 | 1.2 | 35 | 80 TW | 285 | 93 | 2190 | 535 | 1.2 | 45 | | | | | | | | | | | | | 80 TW | | | | | | |
| 300 | 90 | 2235 | 555 | 1.3 | 35 | 120 TW | 285 | 93 | 2190 | 575 | 1.3 | 50 | | | | | | | | | | | | | 120 TW | | | | | | |

1 Climb at 100 % RPM
2 Multiply statute units by .87 to obtain nautical units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5 Chart weight limits based on fuel density of 6.5 LBS/GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

### EXAMPLE

If you are at 10000 feet with 7000 lbs. of available fuel, you can fly 1240 statute airmiles by holding 350 MPH CAS. However, you can fly 2040 statute airmiles by immediately climbing to 30000 feet using 100% RPM At 30000 feet cruise at 290 MPH CAS and start letdown 40 statute airmiles from destination. With a 80 MPH headwind the range at 30000 feet will be 2040 x .80 or 1630 statute airmiles. Cruise at 290 MPHCAS with this wind and start letdown 35 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED:

### LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

$$\text{RANGE FACTOR} = \frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form No. 239C
Sheet 2 of 2
(Rev. 1 May 50)

Figure A–12. Flight Operation Instruction Chart (Sheet 4 of 4) F-84G-1RE thru -5RE

MCRE Form
No. 239C
Sheet 1 of 2
(Rev. 1 May 50)

## AIRPLANE MODEL(S)

F-84G-1RE thru-5RE
ENGINE(S) J35-A-29

## FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 22242 TO 20768 POUNDS

## EXTERNAL LOAD ITEMS

Four-230 Gal. Tanks - Pylon & Tip Tanks dropped when empty.
NUMBER OF ENGINES OPERATING: 1

**INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT** – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. **(B) FLIGHT PLANNING** – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000' | | | IF YOU ARE AT 10000' | | | IF YOU ARE AT 15000' | | | FUEL | IF YOU ARE AT 20000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | | | | | |
| 1190 | 25 | 2415 | 8847 | (1340) | 25 | (2435) | (1555) | 25 | 2450 | (1760) | 25 | (2470) | 8847 | (2030) | 25 | (2490) |
| 1175 | 25 | 2395 | 8800 | (1325) | 25 | (2415) | (1540) | 25 | 2435 | (1745) | 25 | (2450) | 8800 | (2005) | 25 | (2470) |
| 1155 | 25 | 2360 | 8600 | 1300 | 25 | 2380 | (1510) | 25 | 2400 | (1715) | 25 | (2415) | 8600 | (1975) | 25 | (2435) |
| 1130 | 25 | 2320 | 8400 | 1270 | 25 | 2345 | 1485 | 25 | 2360 | 1680 | 25 | 2375 | 8400 | (1940) | 25 | (2395) |
| 1110 | 25 | 2285 | 8200 | 1245 | 25 | 2305 | 1450 | 25 | 2325 | 1650 | 25 | 2340 | 8200 | 1905 | 25 | 2360 |
| 1085 | 25 | 2245 | 8000 | 1220 | 25 | 2265 | 1420 | 25 | 2285 | 1620 | 25 | 2300 | 8000 | 1870 | 25 | 2320 |
| 1065 | 25 | 2205 | 7800 | 1195 | 25 | 2225 | 1390 | 25 | 2245 | 1585 | 25 | 2260 | 7800 | 1835 | 25 | 2285 |
| 1040 | 25 | 2165 | 7600 | 1170 | 25 | 2185 | 1360 | 25 | 2205 | 1555 | 25 | 2220 | 7600 | 1800 | 25 | 2245 |
| 1020 | 25 | 2130 | 7431 | 1145 | 25 | 2150 | 1335 | 25 | 2170 | 1525 | 25 | 2190 | 7431 | 1770 | 25 | 2210 |

| CRUISING AT S. L. | | | | | | EFFECTIVE WIND | CRUISING AT 5000' | | | | | | CRUISING AT 10000' | | | | | | CRUISING AT 15000' | | | | | | EFFECTIVE WIND | CRUISING AT 20000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 345 | 91 | 2640 | 340 | .7 | 15 |
| | | | | | | 80 HW | | | | | | | 370 | 89 | 2950 | 345 | .8 | 10 | 355 | 90 | 2745 | 355 | .8 | 10 | 80 HW | 345 | 91 | 2640 | 380 | .8 | 15 |
| 390 | 87 | 3450 | 350 | .9 | - | 40 HW | 380 | 88 | 3200 | 365 | .9 | 5 | 360 | 88 | 2850 | 370 | .9 | 10 | 355 | 90 | 2745 | 395 | .9 | 15 | 40 HW | 330 | 90 | 2525 | 400 | .9 | 20 |
| 380 | 86 | 3360 | 380 | 1.0 | - | 0 | 365 | 87 | 3085 | 390 | 1.0 | 5 | 360 | 88 | 2850 | 410 | 1.0 | 10 | 340 | 89 | 2650 | 420 | 1.0 | 15 | 0 | 330 | 90 | 2525 | 440 | 1.0 | 20 |
| 370 | 85 | 3270 | 410 | 1.1 | - | 40 TW | 355 | 86 | 3005 | 420 | 1.1 | 5 | 350 | 87 | 2780 | 440 | 1.1 | 10 | 340 | 89 | 2650 | 460 | 1.1 | 15 | 40 TW | 330 | 90 | 2525 | 480 | 1.1 | 20 |
| | | | | | | 80 TW | | | | | | | 350 | 87 | 2780 | 480 | 1.2 | 10 | 330 | 88 | 2590 | 490 | 1.2 | 20 | 80 TW | 320 | 89 | 2440 | 505 | 1.2 | 25 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 320 | 89 | 2440 | 545 | 1.3 | 25 |

*Figure A–13. Flight Operation Instruction Chart (Sheet 1 of 4) F-84G-1RE thru -5RE*

# HIGH ALTITUDE

Four-230 Gal. Tanks Pylon and Tip Tanks dropped when empty.

F-84G-1RE thru-5RE

AIRPLANE MOD. ENG. J35-A-29 CHART WT. LIMITS 22242 TO 20768 LB. EXT. LOAD NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000′ | | | FUEL | IF YOU ARE AT 30000′ | | | IF YOU ARE AT 35000′ | | | IF YOU ARE AT 40000′ | | | FUEL | IF YOU ARE AT 45000′ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| (2195) | 25 | - | 8847 | | | | | | | | | | 8847 | | | |
| (2175) | 25 | - | 8800 | | | | | | | | | | 8800 | | | |
| (2140) | 25 | - | 8600 | | | | | | | | | | 8600 | | | |
| (2105) | 25 | - | 8400 | | | | | | | | | | 8400 | | | |
| (2070) | 25 | - | 8200 | | | | | | | | | | 8200 | | | |
| 2035 | 25 | - | 8000 | | | | | | | | | | 8000 | | | |
| 1995 | 25 | - | 7800 | | | | | | | | | | 7800 | | | |
| 1955 | 25 | - | 7600 | | | | | | | | | | 7600 | | | |
| 1920 | 25 | - | 7431 | | | | | | | | | | 7431 | | | |

(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)

| CRUISING AT 25000′ | | | | | | EFFECTIVE WIND | CRUISING AT 30000′ | | | | | | CRUISING AT 35000′ | | | | | | CRUISING AT 40000′ | | | | | | EFFECTIVE WIND | CRUISING AT 45000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| 335 | 93 | 2620 | 365 | .7 | 25 | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | | | | | | |
| 325 | 92 | 2540 | 390 | .8 | 25 | 80 HW | | | | | | | | | | | | | | | | | | | 80 HW | | | | | | |
| 325 | 92 | 2540 | 430 | .9 | 25 | 40 HW | | | | | | | | | | | | | | | | | | | 40 HW | | | | | | |
| 325 | 92 | 2540 | 470 | 1.0 | 30 | 0 | | | | | | | | | | | | | | | | | | | 0 | | | | | | |
| 310 | 91 | 2430 | 490 | 1.1 | 30 | 40 TW | | | | | | | | | | | | | | | | | | | 40 TW | | | | | | |
| 310 | 91 | 2430 | 530 | 1.2 | 35 | 80 TW | | | | | | | | | | | | | | | | | | | 80 TW | | | | | | |
| 310 | 91 | 2430 | 570 | 1.3 | 35 | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | | | | | | |

1 Climb at 100 % RPM
2 Multiply statute units by .87 to obtain nautical units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5 Chart weight limits based on fuel density of 6.5 LBS/GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

## EXAMPLE

If you are at 10000 feet with 8000 lbs. of available fuel, you can fly 1420 statute airmiles by holding 360 MPH CAS. However, you can fly 2285 statute airmiles by immediately climbing to 25000 feet using 100 % RPM At 25000 feet cruise at 325 MPH CAS and start letdown 30 statute airmiles from destination. With a 80 MPH headwind the range at 25000 feet will be 2285 x .80 or 1830 statute airmiles. Cruise at 325 MPH CAS with this wind and start letdown 25 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED.

## LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

$$\text{RANGE FACTOR} = \frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form No. 239C Sheet 2 of 2 (Rev. 1 May 50)

Figure A—13. Flight Operation Instruction Chart (Sheet 2 of 4) F-84G-1RE thru -5RE

MCRE Form
No. 239C
Sheet 1 of 2
(Rev. 1 May 50)

**AIRPLANE MODEL(S)**
F-84G-1RE thru-5RE
ENGINE(S) J35-A-29

# FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 20768 TO 19294 POUNDS

**EXTERNAL LOAD ITEMS**
Four-230 Gal. Tanks - Pylon & Tip Tanks dropped when empty.
NUMBER OF ENGINES OPERATING: 1

**INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT** – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) **FLIGHT PLANNING** – From initial fuel on board subtract fuel required for take-off and cl.mb to desired cruising altitude and all other necessary allowances. Then use chart as for **IN FLIGHT** above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000′ | | | IF YOU ARE AT 10000′ | | | IF YOU ARE AT 15000′ | | | FUEL | IF YOU ARE AT 20000′ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 1020 | 30 | 2130 | 7431 | 1145 | 30 | 2150 | 1335 | 30 | 2170 | 1525 | 30 | 2190 | 7431 | 1770 | 30 | 2210 |
| 995 | 30 | 2085 | 7200 | 1120 | 30 | 2105 | 1305 | 30 | 2125 | 1490 | 30 | 2145 | 7200 | 1725 | 30 | 2160 |
| 970 | 30 | 2045 | 7000 | 1090 | 30 | 2065 | 1270 | 30 | 2085 | 1455 | 30 | 2105 | 7000 | 1690 | 30 | 2120 |
| 955 | 30 | 2005 | 6800 | 1065 | 30 | 2025 | 1240 | 30 | 2045 | 1425 | 30 | 2065 | 6800 | 1655 | 30 | 2080 |
| 925 | 20 | 1955 | 6600 | 1040 | 30 | 1980 | 1215 | 30 | 2005 | 1390 | 30 | 2025 | 6600 | 1620 | 30 | 2040 |
| 875 | 10 | 1865 | 6200 | 990 | 15 | 1890 | 1155 | 20 | 1910 | 1325 | 25 | 1935 | 6200 | 1545 | 25 | 1950 |
| 850 | - | - | 5944 | 955 | - | - | 1110 | - | - | 1280 | - | - | 5944 | 1490 | - | - |

| CRUISING AT S. L. | | | | | | EFFEC-TIVE WIND | CRUISING AT 5000′ | | | | | | CRUISING AT 10000′ | | | | | | CRUISING AT 15000′ | | | | | | EFFEC-TIVE WIND | CRUISING AT 20000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 335 | 90 | 2430 | 325 | .7 | 15 |
| | | | | | | 80 HW | | | | | | | 370 | 88 | 2870 | 345 | .8 | 10 | 355 | 89 | 2670 | 355 | .8 | 15 | 80 HW | 335 | 90 | 2430 | 365 | .8 | 15 |
| 390 | 87 | 3360 | 350 | .9 | - | 40 HW | 380 | 87 | 3140 | 365 | .9 | 5 | 370 | 88 | 2870 | 385 | .9 | 10 | 345 | 88 | 2610 | 385 | .9 | 15 | 40 HW | 325 | 89 | 2380 | 395 | .9 | 20 |
| 380 | 86 | 3275 | 380 | 1.0 | - | 0 | 370 | 86 | 3060 | 395 | 1.0 | 5 | 350 | 87 | 2700 | 400 | 1.0 | 10 | 345 | 88 | 2610 | 425 | 1.0 | 15 | 0 | 325 | 89 | 2380 | 435 | 1.0 | 20 |
| 370 | 85 | 3190 | 410 | 1.1 | - | 40 TW | 355 | 85 | 2945 | 420 | 1.1 | 5 | 350 | 87 | 2700 | 440 | 1.1 | 10 | 330 | 87 | 2515 | 450 | 1.1 | 15 | 40 TW | 325 | 89 | 2380 | 475 | 1.1 | 20 |
| | | | | | | 80 TW | | | | | | | 335 | 86 | 2600 | 465 | 1.2 | 10 | 330 | 87 | 2515 | 490 | 1.2 | 15 | 80 TW | 315 | 88 | 2295 | 500 | 1.2 | 25 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 315 | 88 | 2295 | 540 | 1.3 | 25 |

Figure A—13. Flight Operation Instruction Chart (Sheet 3 of 4) F-84G-1RE thru -5RE

F-84G-1RE thru-5RE

# HIGH ALTITUDE

Four-230 Gal Tanks Pylon tanks and Tip Tanks dropped when empty.

AIRPLANE MOD. ENG. J35-A-29 CHART WT. LIMITS 20768 TO 19294 LB. EXT. LOAD NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000' | | | FUEL | IF YOU ARE AT 30000' | | | IF YOU ARE AT 35000' | | | IF YOU ARE AT 40000' | | | FUEL | IF YOU ARE AT 45000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 1920 | 30 | 2230 | 7431 | 2145 | 30 | | | | | | | | 7431 | | | |
| 1880 | 30 | 2185 | 7200 | 2105 | 30 | | | | | | | | 7200 | | | |
| 1840 | 30 | 2140 | 7000 | 2065 | 30 | | | | | | | | 7000 | | | |
| 1800 | 30 | 2100 | 6800 | 2020 | 30 | | | | | | | | 6800 | | | |
| 1760 | 30 | 2060 | 6600 | 1980 | 30 | | | | | | | | 6600 | | | |
| 1680 | 30 | 1975 | 6200 | 1890 | 30 | | | | | | | | 6200 | | | |
| 1630 | - | - | 5944 | 1830 | 30 | | | | | | | | 5944 | | | |

| CRUISING AT 25000' | | | | | | EFFECTIVE WIND | CRUISING AT 30000' | | | | | | CRUISING AT 35000' | | | | | | CRUISING AT 40000' | | | | | | EFFECTIVE WIND | CRUISING AT 45000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| 320 | 92 | 2365 | 340 | .7 | 25 | 120 HW | 290 | 94 | 2210 | 340 | .7 | 30 | | | | | | | | | | | | | 120 HW | | | | | | |
| 310 | 91 | 2310 | 370 | .8 | 25 | 80 HW | 290 | 94 | 2210 | 380 | .8 | 35 | | | | | | | | | | | | | 80 HW | | | | | | |
| 310 | 91 | 2310 | 410 | .9 | 25 | 40 HW | 290 | 94 | 2210 | 420 | .9 | 35 | | | | | | | | | | | | | 40 HW | | | | | | |
| 310 | 91 | 2310 | 450 | 1.0 | 30 | 0 | 290 | 94 | 2210 | 460 | 1.0 | 40 | | | | | | | | | | | | | 0 | | | | | | |
| 310 | 91 | 2310 | 490 | 1.1 | 30 | 40 TW | 285 | 93 | 2190 | 495 | 1.1 | 45 | | | | | | | | | | | | | 40 TW | | | | | | |
| 300 | 90 | 2235 | 515 | 1.2 | 35 | 80 TW | 285 | 93 | 2190 | 535 | 1.2 | 45 | | | | | | | | | | | | | 80 TW | | | | | | |
| 300 | 90 | 2235 | 555 | 1.3 | 35 | 120 TW | 285 | 93 | 2190 | 575 | 1.3 | 50 | | | | | | | | | | | | | 120 TW | | | | | | |

1. Climb at 100 % RPM
2. Multiply statute units by .87 to obtain nautical units.
3. Read lower half of chart opposite effective wind only.
4. Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5. Chart weight limits based on fuel density of 6.5 LBS GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

EXAMPLE

If you are at 10000 feet with 7000 lbs. of available fuel, you can fly 1270 statute airmiles by holding 350 MPH CAS. However, you can fly 2085 statute airmiles by immediately climbing to 30000 feet using 100 % RPM At 30000 feet cruise at 290 MPH CAS and start letdown 40 statute airmiles from destination. With a 80 MPH headwind the range at 30000 feet will be 2085 x .80 or 1670 statute airmiles. Cruise at 290 MPH CAS with this wind and start letdown 35 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED.

LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

RANGE FACTOR = $\frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form No. 239C Sheet 2 of 2 (Rev. 1 May 50)

Figure A–13. Flight Operation Instruction Chart (Sheet 4 of 4) F-84G-1RE thru -5RE

MCRE Form
No. 239C
Sheet 1 of 2
(Rev. 1 May 50)

## AIRPLANE MODEL(S)

F-84G-1RE thru -5RE
ENGINE(S) J35-A-29

## FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 18645 TO 17181 POUNDS

## EXTERNAL LOAD ITEMS

Two-230 Gal. Tiptanks Carried Entire Distance
NUMBER OF ENGINES OPERATING: 1

**INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT** – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. **(B) FLIGHT PLANNING** – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for **IN FLIGHT** above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000' | | | IF YOU ARE AT 10000' | | | IF YOU ARE AT 15000' | | | FUEL | IF YOU ARE AT 20000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 820 | 35 | 1760 | 5857 | (930) | 35 | (1775) | (1080) | 35 | (1800) | (1250) | 35 | (1835) | 5857 | (1445) | 35 | (1845) |
| 805 | 35 | 1725 | 5800 | 910 | 35 | 1740 | (1060) | 35 | (1765) | (1225) | 35 | (1800) | 5800 | (1410) | 35 | (1810) |
| 780 | 35 | 1675 | 5600 | 880 | 35 | 1690 | 1030 | 35 | 1715 | 1185 | 35 | 1745 | 5600 | (1365) | 35 | (1760) |
| 750 | 35 | 1620 | 5400 | 850 | 35 | 1635 | 990 | 35 | 1660 | 1145 | 35 | 1690 | 5400 | 1320 | 35 | 1705 |
| 720 | 35 | 1565 | 5200 | 820 | 35 | 1580 | 960 | 35 | 1610 | 1105 | 35 | 1635 | 5200 | 1285 | 35 | 1660 |
| 690 | 35 | 1510 | 5000 | 790 | 35 | 1525 | 920 | 35 | 1555 | 1065 | 35 | 1575 | 5000 | 1230 | 35 | 1595 |
| 670 | 35 | 1455 | 4800 | 760 | 35 | 1470 | 885 | 35 | 1500 | 1020 | 35 | 1520 | 4800 | 1180 | 35 | 1540 |
| 640 | 35 | 1340 | 4600 | 730 | 35 | 1415 | 850 | 35 | 1440 | 980 | 35 | 1460 | 4600 | 1130 | 35 | 1480 |
| 620 | 35 | 1350 | 4446 | 705 | 35 | 1370 | 820 | 35 | 1395 | 950 | 35 | 1415 | 4446 | 1095 | 35 | 1435 |

| CRUISING AT S. L. | | | | | | EFFECTIVE WIND | CRUISING AT 5000' | | | | | | CRUISING AT 10000' | | | | | | CRUISING AT 15000' | | | | | | EFFECTIVE WIND | CRUISING AT 20000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 360 | 87 | 2050 | 360 | .70 | 20 |
| | | | | | | 80 HW | | | | | | | 410 | 87 | 2655 | 390 | .80 | 10 | 375 | 86 | 2315 | 385 | .80 | 15 | 80 HW | 350 | 86 | 1985 | 385 | .80 | 20 |
| 455 | 87 | 3345 | 415 | .90 | - | 40 HW | 425 | 86 | 2995 | 415 | .90 | 5 | 375 | 86 | 2600 | 425 | .90 | 10 | 375 | 86 | 2315 | 425 | .90 | 15 | 40 HW | 350 | 86 | 1985 | 425 | .90 | 25 |
| 430 | 85 | 3160 | 430 | 1.00 | - | 0 | 405 | 85 | 2860 | 435 | 1.00 | 5 | 385 | 85 | 2485 | 440 | 1.00 | 10 | 365 | 85 | 2240 | 450 | 1.00 | 15 | 0 | 350 | 86 | 1985 | 465 | 1.00 | 25 |
| 420 | 84 | 3085 | 460 | 1.10 | - | 40 TW | 400 | 84 | 2795 | 465 | 1.10 | 5 | 385 | 85 | 2485 | 480 | 1.10 | 10 | 365 | 85 | 2240 | 490 | 1.10 | 15 | 40 TW | 335 | 85 | 1900 | 485 | 1.10 | 25 |
| | | | | | | 80 TW | | | | | | | 370 | 84 | 2400 | 505 | 1.20 | 10 | 355 | 84 | 2165 | 515 | 1.20 | 15 | 80 TW | 335 | 85 | 1900 | 525 | 1.20 | 30 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 335 | 85 | 1900 | 565 | 1.30 | 30 |

*Figure A–14. Flight Operation Instruction Chart (Sheet 1 of 8) F-84G-1RE thru -5RE*

F-84G-1RE thru -5RE

## HIGH ALTITUDE

2-230 Gal. Tip Tanks Carried Entire Distance

AIRPLANE MOD. ENG. J35-A-29 CHART WT. LIMITS 18645 TO 17181 LB. EXT. LOAD NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000' | | | FUEL | IF YOU ARE AT 30000' | | | IF YOU ARE AT 35000' | | | IF YOU ARE AT 40000' | | | FUEL | IF YOU ARE AT 45000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| (1580) | 35 | (1860) | 5857 | (1780) | 35 | (1885) | (1890) | | | | | | 5857 | | | |
| (1550)<br>(1500)<br>(1450) | 35<br>35<br>35 | (1830)<br>(1780)<br>(1725) | 5800<br>5600<br>5400 | (1740)<br>(1690)<br>(1635) | 35<br>35<br>35 | (1850)<br>(1800)<br>(1750) | (1855)<br>(1800)<br>(1745) | | | | | | 5800<br>5600<br>5400 | | | |
| 1400<br>1350<br>1300 | 35<br>35<br>35 | 1670<br>1615<br>1560 | 5200<br>5000<br>4800 | 1580<br>1525<br>1470 | 35<br>35<br>35 | 1690<br>1640<br>1580 | (1690)<br>1635<br>1580 | | | | | | 5200<br>5000<br>4800 | | | |
| 1250<br>1210 | 35<br>35 | 1505<br>1460 | 4600<br>4446 | 1410<br>1370 | 35<br>35 | 1520<br>1475 | 1520<br>1470 | | | | | | 4600<br>4446 | | | |

| CRUISING AT 25000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 30000' | | | | | | CRUISING AT 35000' | | | | | | CRUISING AT 40000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 45000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| 335 | 88 | 1955 | 365 | .70 | 30 | 120 HW | 310 | 89 | 1770 | 365 | .75 | 45 | 290 | 92 | 1760 | 375 | .75 | 75 | | | | | | | 120 HW | | | | | | |
| 330 | 87 | 1915 | 395 | .80 | 35 | 80 HW | 310 | 89 | 1770 | 405 | .85 | 50 | 285 | 91 | 1725 | 405 | .85 | 80 | | | | | | | 80 HW | | | | | | |
| 330 | 87 | 1915 | 435 | .90 | 35 | 40 HW | 300 | 88 | 1735 | 435 | .90 | 55 | 285 | 91 | 1725 | 445 | .90 | 85 | | | | | | | 40 HW | | | | | | |
| 330 | 87 | 1915 | 475 | 1.00 | 40 | 0 | 300 | 88 | 1735 | 475 | 1.00 | 60 | 285 | 91 | 1725 | 485 | 1.00 | 95 | | | | | | | 0 | | | | | | |
| 315 | 86 | 1835 | 495 | 1.10 | 45 | 40 TW | 300 | 88 | 1735 | 515 | 1.10 | 65 | 285 | 91 | 1725 | 525 | 1.10 | 105 | | | | | | | 40 TW | | | | | | |
| 315 | 86 | 1835 | 535 | 1.20 | 45 | 80 TW | 300 | 88 | 1735 | 555 | 1.20 | 70 | 275 | 90 | 1690 | 555 | 1.20 | 110 | | | | | | | 80 TW | | | | | | |
| 315 | 86 | 1835 | 575 | 1.30 | 50 | 120 TW | 295 | 87 | 1695 | 585 | 1.25 | 75 | 275 | 90 | 1690 | 595 | 1.25 | 120 | | | | | | | 120 TW | | | | | | |

1 Climb at 100 % RPM
2 Multiply statute units by .87 to obtain nautical units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5 Chart weight limits based on fuel density of 6.5 LBS/GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

### EXAMPLE

If you are at 10000 feet with 5000 lbs of available fuel, you can fly 920 statute airmiles by holding 385 MPH CAS. However, you can fly 1595 statute airmiles by immediately climbing to 35000 feet using 100% RPM At 35000 feet cruise at 285 MPH CAS and start letdown 95 statute airmiles from destination. With a 80 MPH headwind the range at 35000 feet will be 1555 x .85 or 1320 statute airmiles. Cruise at 285 MPH CAS with this wind and start letdown 80 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED:

### LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

$$\text{RANGE FACTOR} = \frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form No. 239C Sheet 2 of 2 (Rev. 1 May 50)

Figure A–14. Flight Operation Instruction Chart (Sheet 2 of 8) F-84G-1RE thru -5RE

MCRE Form No. 239C Sheet 1 of 2 (Rev. 1 May 50)

## AIRPLANE MODEL(S)

F-84G-1RE thru -5RE

ENGINE(S) J35-A-29

## FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 17181 TO 15717 POUNDS

## EXTERNAL LOAD ITEMS

Two - 230 Gal. Tip Tanks Carried Entire Distance

NUMBER OF ENGINES OPERATING: 1

**INSTRUCTIONS FOR USING CHART:** (A) IN FLIGHT – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000′ | | | IF YOU ARE AT 10000′ | | | IF YOU ARE AT 15000′ | | | FUEL | IF YOU ARE AT 20000′ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 620 | 35 | 1350 | 4446 | 705 | 35 | 1370 | 820 | 35 | 1395 | 950 | 35 | 1415 | 4446 | 1095 | 35 | 1435 |
| 580 | 35 | 1275 | 4200 | 665 | 35 | 1300 | 780 | 35 | 1320 | 900 | 35 | 1340 | 4200 | 1040 | 35 | 1360 |
| 560 | 35 | 1220 | 4000 | 640 | 35 | 1220 | 740 | 35 | 1240 | 860 | 35 | 1280 | 4000 | 990 | 35 | 1300 |
| 530 | 35 | 1175 | 3800 | 605 | 35 | 1155 | 705 | 35 | 1200 | 815 | 35 | 1225 | 3800 | 940 | 35 | 1240 |
| 500 | 35 | 1095 | 3600 | 575 | 35 | 1120 | 670 | 35 | 1140 | 775 | 35 | 1165 | 3600 | 895 | 35 | 1180 |
| 475 | 35 | 1035 | 3400 | 545 | 35 | 1035 | 635 | 35 | 1080 | 735 | 35 | 1100 | 3400 | 850 | 35 | 1120 |
| 450 | 35 | 970 | 3200 | 515 | 35 | 995 | 600 | 35 | 1020 | 690 | 35 | 1040 | 3200 | 800 | 35 | 1060 |
| 415 | 35 | 900 | 2964 | 480 | 35 | 925 | 555 | 35 | 940 | 640 | 35 | 960 | 2964 | 745 | 35 | 985 |

| CRUISING AT S. L. | | | | | | EFFEC-TIVE WIND | CRUISING AT 5000′ | | | | | | CRUISING AT 10000′ | | | | | | CRUISING AT 15000′ | | | | | | EFFEC-TIVE WIND | CRUISING AT 20000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 355 | 86 | 1975 | 355 | .70 | 20 |
| | | | | | | 80 HW | | | | | | | 400 | 86 | 2550 | 380 | .80 | 10 | 375 | 86 | 2260 | 385 | .80 | 15 | 80 HW | 355 | 86 | 1975 | 395 | .80 | 20 |
| 430 | 87 | 3120 | 390 | .90 | - | 40 HW | 410 | 86 | 2830 | 400 | .90 | 5 | 390 | 85 | 2465 | 405 | .90 | 10 | 370 | 85 | 2210 | 415 | .90 | 15 | 40 HW | 340 | 85 | 1890 | 415 | .90 | 25 |
| 415 | 86 | 3005 | 415 | 1.00 | - | 0 | 400 | 85 | 2765 | 430 | 1.00 | 5 | 390 | 85 | 2465 | 445 | 1.00 | 10 | 370 | 85 | 2210 | 455 | 1.00 | 15 | 0 | 340 | 85 | 1890 | 455 | 1.00 | 25 |
| 395 | 84 | 2860 | 435 | 1.10 | - | 40 TW | 385 | 84 | 2640 | 450 | 1.10 | 5 | 370 | 84 | 2355 | 465 | 1.10 | 10 | 355 | 84 | 2135 | 480 | 1.10 | 15 | 40 TW | 340 | 85 | 1890 | 495 | 1.10 | 25 |
| | | | | | | 80 TW | | | | | | | 365 | 83 | 2325 | 500 | 1.20 | 10 | 355 | 84 | 2135 | 520 | 1.20 | 15 | 80 TW | 340 | 85 | 1890 | 535 | 1.20 | 30 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 330 | 84 | 1830 | 560 | 1.30 | 30 |

*Figure A—14. Flight Operation Instruction Chart (Sheet 3 of 8) F-84G-1RE thru -5RE*

F-84G-1RE thru -5RE

# HIGH ALTITUDE

Two- 230 Gal. Tip Tanks Carried Entire Distance

AIRPLANE MOD. ENG. J35-A-29 CHART WT. LIMITS 17181 TO 15717 LB. EXT. LOAD NO. OF ENGINES OPERATING: 1

(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)

| IF YOU ARE AT 25000' | | | FUEL | IF YOU ARE AT 30000' | | | IF YOU ARE AT 35000' | | | IF YOU ARE AT 40000' | | | FUEL | IF YOU ARE AT 45000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| 1210 | 35 | 1460 | 4446 | 1370 | 35 | 1475 | 1470 | | | | | | 4446 | | | |
| 1150 | 35 | 1385 | 4200 | 1300 | 35 | 1400 | 1400 | | | | | | 4200 | | | |
| 1100 | 35 | 1325 | 4000 | 1240 | 35 | 1340 | 1340 | | | | | | 4000 | | | |
| 1050 | 35 | 1265 | 3800 | 1185 | 35 | 1280 | 1280 | | | | | | 3800 | | | |
| 995 | 35 | 1205 | 3600 | 1130 | 35 | 1220 | 1220 | | | | | | 3600 | | | |
| 940 | 35 | 1140 | 3400 | 1070 | 35 | 1160 | 1160 | | | | | | 3400 | | | |
| 890 | 35 | 1080 | 3200 | 1010 | 35 | 1095 | 1100 | | | | | | 3200 | | | |
| 830 | 35 | 1005 | 2964 | 940 | 35 | 1020 | 1030 | | | | | | 2964 | | | |

| CRUISING AT 25000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 30000' | | | | | | CRUISING AT 35000' | | | | | | CRUISING AT 40000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 45000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| 330 | 87 | 1855 | 360 | .70 | 30 | 120 HW | 305 | 88 | 1665 | 360 | .70 | 45 | 280 | 89 | 1590 | 360 | .70 | 75 | | | | | | | 120 HW | | | | | | |
| 330 | 87 | 1855 | 400 | .80 | 35 | 80 HW | 305 | 88 | 1665 | 400 | .80 | 50 | 280 | 89 | 1590 | 400 | .80 | 80 | | | | | | | 80 HW | | | | | | |
| 320 | 86 | 1795 | 425 | .90 | 35 | 40 HW | 300 | 87 | 1630 | 430 | .90 | 55 | 280 | 89 | 1590 | 440 | .90 | 85 | | | | | | | 40 HW | | | | | | |
| 320 | 86 | 1795 | 465 | 1.00 | 40 | 0 | 300 | 87 | 1630 | 470 | 1.00 | 60 | 280 | 89 | 1590 | 480 | 1.00 | 95 | | | | | | | 0 | | | | | | |
| 320 | 86 | 1795 | 505 | 1.10 | 45 | 40 TW | 300 | 87 | 1630 | 510 | 1.10 | 65 | 275 | 88 | 1555 | 510 | 1.10 | 105 | | | | | | | 40 TW | | | | | | |
| 320 | 86 | 1795 | 545 | 1.20 | 45 | 80 TW | 300 | 87 | 1630 | 550 | 1.20 | 70 | 275 | 88 | 1555 | 550 | 1.20 | 110 | | | | | | | 80 TW | | | | | | |
| 310 | 85 | 1738 | 570 | 1.30 | 50 | 120 TW | 290 | 86 | 1595 | 580 | 1.30 | 75 | 275 | 88 | 1555 | 590 | 1.30 | 120 | | | | | | | 120 TW | | | | | | |

1 Climb at 100 % RPM
2 Multiply statute units by .87 to obtain nautical units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5 Chart weight limits based on fuel density of 6.5 LBS/GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

## EXAMPLE

If you are at 10000 feet with 4000 lbs of available fuel, you can fly 740 statute airmiles by holding 390 MPH CAS. However, you can fly 1240 statute airmiles by immediately climbing to 35000 feet using 100% RPM At 35000 feet cruise at 280 MPH CAS and start letdown 95 statute airmiles from destination. With a 80 MPH headwind the range at 35000 feet will be 1240 x .80 or 1000 statuteairmiles. Cruise at 280 MPH CAS with this wind and start letdown 80 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED:

## LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

RANGE FACTOR = $\frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form No. 239C
Sheet 2 of 2
(Rev. 1 May 50)

Figure A–14. Flight Operation Instruction Chart (Sheet 4 of 8) F-84G-1RE thru -5RE

MCRE Form
No. 239C
Sheet 1 of 2
(Rev. 1 May 50)

## AIRPLANE MODEL(S)

F-84G-1RE thru-5RE
ENGINE(S) J35-A-29

## FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 15717 TO 14253 POUNDS

## EXTERNAL LOAD ITEMS

Two-230 Gal. Tip Tanks Carried Entire Distance.
NUMBER OF ENGINES OPERATING: 1

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000′ | | | IF YOU ARE AT 10000′ | | | IF YOU ARE AT 15000′ | | | FUEL | IF YOU ARE AT 20000′ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 415 | 40 | 900 | 2964 | 480 | 40 | 920 | 555 | 40 | 940 | 645 | 40 | 960 | 2964 | 745 | 40 | 980 |
| 390 | 40 | 845 | 2800 | 450 | 40 | 850 | 525 | 40 | 890 | 610 | 40 | 910 | 2800 | 705 | 40 | 930 |
| 365 | 40 | 785 | 2600 | 420 | 40 | 785 | 490 | 40 | 820 | 570 | 40 | 840 | 2600 | 655 | 40 | 870 |
| 340 | 40 | 720 | 2400 | 390 | 40 | 740 | 450 | 40 | 760 | 530 | 40 | 780 | 2400 | 610 | 40 | 800 |
| 310 | 40 | 650 | 2200 | 360 | 40 | 680 | 410 | 40 | 690 | 485 | 40 | 720 | 2200 | 560 | 40 | 740 |
| 280 | 40 | 585 | 2000 | 325 | 40 | 610 | 375 | 40 | 630 | 445 | 40 | 650 | 2000 | 505 | 40 | 670 |
| 250 | 40 | 520 | 1800 | 295 | 40 | 550 | 340 | 40 | 560 | 400 | 40 | 580 | 1800 | 455 | 40 | 600 |
| 225 | 40 | 450 | 1600 | 265 | 40 | 480 | 305 | 40 | 490 | 360 | 40 | 510 | 1600 | 405 | 40 | 535 |
| 205 | 40 | 410 | 1482 | 245 | 40 | 440 | 285 | 40 | 450 | 335 | 40 | 470 | 1482 | 380 | 40 | 490 |

| CRUISING AT S. L. | | | | | | EFFEC-TIVE WIND | CRUISING AT 5000′ | | | | | | CRUISING AT 10000′ | | | | | | CRUISING AT 15000′ | | | | | | EFFEC-TIVE WIND | CRUISING AT 20000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 355 | 86 | 1929 | 355 | .70 | 20 |
| | | | | | | 80 HW | | | | | | | 395 | 85 | 2445 | 370 | .80 | 10 | 375 | 85 | 2180 | 380 | .80 | 15 | 80 HW | 350 | 85 | 1888 | 385 | .80 | 20 |
| 440 | 86 | 3150 | 400 | .90 | - | 40 HW | 410 | 85 | 2785 | 400 | .90 | 5 | 395 | 85 | 2445 | 410 | .90 | 10 | 360 | 84 | 2110 | 405 | .90 | 15 | 40 HW | 335 | 84 | 1825 | 410 | .90 | 25 |
| 430 | 85 | 3080 | 430 | 1.00 | - | 0 | 400 | 84 | 2690 | 425 | 1.00 | 5 | 375 | 84 | 2335 | 430 | 1.00 | 10 | 360 | 84 | 2110 | 445 | 1.00 | 15 | 0 | 335 | 84 | 1825 | 450 | 1.00 | 25 |
| 420 | 84 | 3010 | 460 | 1.10 | - | 40 TW | 400 | 84 | 2690 | 465 | 1.10 | 5 | 375 | 84 | 2335 | 470 | 1.10 | 10 | 345 | 83 | 2015 | 465 | 1.10 | 15 | 40 TW | 325 | 83 | 1765 | 475 | 1.10 | 25 |
| | | | | | | 80 TW | | | | | | | 360 | 83 | 2230 | 490 | 1.20 | 10 | 345 | 83 | 2015 | 505 | 1.20 | 15 | 80 TW | 325 | 83 | 1765 | 515 | 1.20 | 30 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 315 | 82 | 1705 | 540 | 1.30 | 30 |

Figure A—14. Flight Operation Instruction Chart (Sheet 5 of 8) F-84G-1RE thru -5RE

F-84G-1RE thru-5RE

# HIGH ALTITUDE

Two-230 Gal. Tip Tanks Carried Entire Distance.

AIRPLANE MOD. ENG. J35-A-29 CHART WT. LIMITS 15717 TO 14253 LB. EXT. LOAD. NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000' | | | FUEL | IF YOU ARE AT 30000' | | | IF YOU ARE AT 35000' | | | IF YOU ARE AT 40000' | | | FUEL | IF YOU ARE AT 45000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 830 | 40 | 1010 | 2964 | 945 | 40 | 1020 | 1030 | 40 | 1040 | 1060 | 40 | | 2964 | | | |
| 785 | 40 | 950 | 2800 | 895 | 40 | 970 | 975 | 40 | 990 | 1005 | 40 | | 2800 | | | |
| 735 | 40 | 890 | 2600 | 835 | 40 | 900 | 910 | 40 | 925 | 940 | 40 | | 2600 | | | |
| 680 | 40 | 820 | 2400 | 775 | 40 | 840 | 845 | 40 | 860 | 875 | 40 | | 2400 | | | |
| 630 | 40 | 760 | 2200 | 710 | 40 | 770 | 780 | 40 | 795 | 810 | 40 | | 2200 | | | |
| 570 | 40 | 690 | 2000 | 650 | 40 | 710 | 720 | 40 | 730 | 745 | 40 | | 2000 | | | |
| 520 | 40 | 620 | 1800 | 590 | 40 | 640 | 650 | 40 | 660 | 680 | 40 | | 1800 | | | |
| 460 | 40 | 550 | 1600 | 530 | 40 | 580 | 585 | 40 | 600 | 610 | 40 | | 1600 | | | |
| 430 | 40 | 515 | 1482 | 495 | 40 | 535 | 545 | 40 | 550 | 570 | 40 | | 1482 | | | |

| CRUISING AT 25000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 30000' | | | | | | CRUISING AT 35000' | | | | | | CRUISING AT 40000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 45000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| 330 | 87 | 1765 | 355 | .70 | 30 | 120 HW | 300 | 87 | 1562 | 355 | .75 | 45 | 280 | 88 | 1471 | 360 | .75 | 70 | 255 | 89 | 1485 | 370 | .75 | 110 | 120 HW | | | | | | |
| 320 | 86 | 1728 | 385 | .80 | 35 | 80 HW | 300 | 87 | 1562 | 395 | .80 | 50 | 280 | 88 | 1471 | 400 | .80 | 85 | 255 | 89 | 1485 | 410 | .80 | 120 | 80 HW | | | | | | |
| 320 | 86 | 1728 | 425 | .90 | 40 | 40 HW | 295 | 86 | 1530 | 425 | .90 | 55 | 275 | 87 | 1459 | 435 | .90 | 85 | 255 | 89 | 1485 | 450 | .90 | 135 | 40 HW | | | | | | |
| 310 | 85 | 1655 | 445 | 1.0 | 40 | 0 | 295 | 86 | 1530 | 465 | 1.0 | 60 | 275 | 87 | 1459 | 475 | 1.00 | 95 | 255 | 89 | 1485 | 490 | 1.00 | 145 | 0 | | | | | | |
| 305 | 84 | 1635 | 480 | 1.10 | 45 | 40 TW | 285 | 85 | 1480 | 490 | 1.1 | 65 | 275 | 87 | 1459 | 515 | 1.10 | 105 | 255 | 89 | 1485 | 530 | 1.10 | 155 | 40 TW | | | | | | |
| 305 | 84 | 1635 | 520 | 1.20 | 45 | 80 TW | 285 | 85 | 1480 | 530 | 1.2 | 70 | 270 | 86 | 1428 | 545 | 1.20 | 110 | 250 | 88 | 1455 | 560 | 1.20 | 165 | 80 TW | | | | | | |
| 295 | 83 | 1600 | 550 | 1.30 | 50 | 120 TW | 280 | 84 | 1462 | 565 | 1.3 | 75 | 270 | 86 | 1428 | 585 | 1.25 | 115 | 250 | 88 | 1455 | 600 | 1.25 | 180 | 120 TW | | | | | | |

1. Climb at 100 % RPM
2. Multiply statute units by .87 to obtain nautical units.
3. Read lower half of chart opposite effective wind only.
4. Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5. Chart weight limits based on fuel density of 6.5 LBS/GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

## EXAMPLE

If you are at 10000 feet with 2000 lbs. of available fuel, you can fly 375 statute airmiles by holding 375 MPH CAS. However, you can fly 630 statute airmiles by immediately climbing to 40000 feet using 100 % RPM At 40000 feet cruise at 255 MPH CAS and start letdown 145 statute airmiles from destination. With a 80 MPH headwind the range at 40000 feet will be 630 x .80 or 505 statute airmiles. Cruise at 255 MPH CAS with this wind and start letdown 120 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED:

## LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

RANGE FACTOR = $\frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form No. 239C Sheet 2 of 2 (Rev. 1 May 50)

Figure A–14. Flight Operation Instruction Chart (Sheet 6 of 8) F-84G-1RE thru -5RE

MCRE Form
No. 239C
Sheet 1 of 2
(Rev. 1 May 50)

## AIRPLANE MODEL(S)

F-84G-1RE thru-5RE
ENGINE(S) J35-A-29

## FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 14253 TO 12788 POUNDS

## EXTERNAL LOAD ITEMS

Two-230 Gal Tanks - Carried all the way.

NUMBER OF ENGINES OPERATING: 1

**INSTRUCTIONS FOR USING CHART:** (A) IN FLIGHT – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000′ | | | IF YOU ARE AT 10000′ | | | IF YOU ARE AT 15000′ | | | FUEL | IF YOU ARE AT 20000′ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 205<br>195 | 40<br>40 | 410<br>380 | 1482<br>1400 | 245<br>235 | 40<br>40 | 430<br>400 | 285<br>270 | 40<br>40 | 450<br>425 | 335<br>320 | 40<br>40 | 475<br>445 | 1482<br>1400 | 375<br>360 | 40<br>40 | 495<br>465 |
| 145 | 40 | 240 | 1000 | 165 | 40 | 265 | 195 | 40 | 285 | 235 | 40 | 305 | 1000 | 255 | 40 | 325 |
| 85 | 30 | 115 | 600 | 100 | 30 | 130 | 120 | 30 | 150 | 140 | 30 | 165 | 600 | 160 | 35 | 185 |
| 30 | 5 | 30 | 200 | 35 | 10 | 35 | 45 | 10 | 50 | 50 | 20 | 55 | 200 | 60 | 20 | |

| CRUISING AT S. L. | | | | | | EFFEC-TIVE WIND | CRUISING AT 5000′ | | | | | | CRUISING AT 10000′ | | | | | | CRUISING AT 15000′ | | | | | | EFFEC-TIVE WIND | CRUISING AT 20000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 365 | 86 | 1915 | 365 | .70 | 20 |
| | | | | | | 80 HW | | | | | | | 395 | 85 | 2380 | 370 | .80 | 10 | 375 | 85 | 2150 | 385 | .80 | 15 | 80 HW | 355 | 85 | 1880 | 395 | .80 | 25 |
| 415 | 84 | 2940 | 375 | .90 | 0 | 40 HW | 400 | 84 | 2635 | 385 | .90 | 5 | 385 | 84 | 2330 | 400 | .90 | 10 | 365 | 84 | 2080 | 410 | .90 | 15 | 40 HW | 340 | 84 | 1800 | 415 | .90 | 25 |
| 400 | 83 | 2840 | 400 | 1.00 | 0 | 0 | 385 | 83 | 2540 | 410 | 1.00 | 5 | 370 | 83 | 2250 | 425 | 1.00 | 10 | 355 | 83 | 2015 | 435 | 1.00 | 15 | 0 | 325 | 83 | 1720 | 435 | 1.00 | 25 |
| 400 | 83 | 2840 | 440 | 1.10 | 0 | 40 TW | 385 | 83 | 2540 | 450 | 1.10 | 5 | 355 | 82 | 2140 | 445 | 1.10 | 10 | 330 | 82 | 1898 | 450 | 1.10 | 15 | 40 TW | 325 | 83 | 1720 | 475 | 1.10 | 25 |
| | | | | | | 80 TW | | | | | | | 355 | 82 | 2140 | 485 | 1.20 | 10 | 330 | 82 | 1898 | 490 | 1.20 | 15 | 80 TW | 305 | 82 | 1620 | 490 | 1.20 | 30 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 305 | 82 | 1620 | 530 | 1.30 | 30 |

*Figure A–14. Flight Operation Instruction Chart (Sheet 7 of 8) F-84G-1RE thru -5RE*

# HIGH ALTITUDE

F-84G-1RE thru-5RE

Two-230 Gal. Tanks - all the way.

AIRPLANE MOD. ENG. J35-A-29 CHART WT. LIMITS 14253 TO 12788 LB. EXT. LOAD NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000′ | | | FUEL | IF YOU ARE AT 30000′ | | | IF YOU ARE AT 35000′ | | | IF YOU ARE AT 40000′ | | | FUEL | IF YOU ARE AT 45000′ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 430 | 40 | 515 | 1482 | 490 | 40 | 535 | 545 | 40 | 555 | 570 | 40 | | 1482 | | | |
| 410 | 40 | 485 | 1400 | 465 | 40 | 505 | 515 | 40 | 525 | 545 | 40 | | 1400 | | | |
| 295 | 40 | 345 | 1000 | 340 | 40 | 365 | 375 | 40 | 380 | 395 | 40 | | 1000 | | | |
| 185 | 40 | 200 | 600 | 210 | 40 | 220 | 235 | 40 | 235 | 255 | 40 | | 600 | | | |
| 70 | 25 | | 200 | 80 | 30 | | 95 | 35 | | | | | 200 | | | |

| CRUISING AT 25000′ | | | | | | EFFEC-TIVE WIND | CRUISING AT 30000′ | | | | | | CRUISING AT 35000′ | | | | | | CRUISING AT 40000′ | | | | | | EFFEC-TIVE WIND | CRUISING AT 45000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| 335 | 85 | 1715 | 360 | .70 | 30 | 120 HW | 300 | 85 | 1480 | 355 | .75 | 45 | 270 | 85 | 1320 | 345 | .75 | 70 | 245 | 86 | 1295 | 350 | .75 | 110 | 120 HW | | | | | | |
| 335 | 85 | 1715 | 400 | .80 | 35 | 80 HW | 300 | 85 | 1480 | 395 | .80 | 50 | 270 | 85 | 1320 | 385 | .80 | 80 | 245 | 86 | 1295 | 390 | .80 | 120 | 80 HW | | | | | | |
| 315 | 84 | 1645 | 415 | .90 | 35 | 40 HW | 290 | 84 | 1480 | 420 | .90 | 55 | 270 | 85 | 1320 | 425 | .90 | 85 | 245 | 86 | 1295 | 430 | .90 | 135 | 40 HW | | | | | | |
| 315 | 84 | 1645 | 455 | 1.00 | 40 | 0 | 290 | 84 | 1400 | 460 | 1.00 | 60 | 270 | 85 | 1320 | 465 | 1.00 | 95 | 245 | 86 | 1295 | 470 | 1.00 | 145 | 0 | | | | | | |
| 295 | 83 | 1540 | 470 | 1.10 | 40 | 40 TW | 290 | 84 | 1400 | 500 | 1.10 | 65 | 270 | 85 | 1320 | 505 | 1.10 | 105 | 245 | 86 | 1295 | 510 | 1.10 | 155 | 40 TW | | | | | | |
| 295 | 83 | 1540 | 510 | 1.20 | 45 | 80 TW | 280 | 83 | 1400 | 520 | 1.20 | 70 | 270 | 85 | 1320 | 545 | 1.20 | 110 | 245 | 86 | 1295 | 550 | 1.20 | 170 | 80 TW | | | | | | |
| 290 | 82 | 1520 | 545 | 1.30 | 50 | 120 TW | 280 | 83 | 1370 | 560 | 1.30 | 75 | 270 | 85 | 1320 | 585 | 1.30 | 120 | 245 | 86 | 1295 | 590 | 1.30 | 180 | 120 TW | | | | | | |

1 Climb at 100 % RPM
2 Multiply statute units by .87 to obtain nautical units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5 Chart weight limits based on fuel density of 6.5 LBS GAL. Fuel flow based on fuel density of 6.5 LBS GAL.

DATA AS OF: July 1951 BASED ON: Estimates

## EXAMPLE

If you are at 15000 feet with 1000 lbs. of available fuel, you can fly 235 statute airmiles by holding 355 MPH CAS. However, you can fly 305 statute airmiles by immediately climbing to 40000 feet using 100 % RPM At 40000 feet cruise at 245 MPH CAS and start letdown 145 statute airmiles from destination. With a 80 MPH headwind the range at 40000 feet will be 305 x .80 or 245 statute airmiles. Cruise at 245 MPH CAS with this wind and start letdown 120 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED.

## LEGEND

EFFECTIVE WIND -- HW. HEADWIND, TW, TAILWIND –

$$\text{RANGE FACTOR} = \frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form No. 239C Sheet 2 of 2 (Rev. 1 May 50)

Figure A—14. Flight Operation Instruction Chart (Sheet 8 of 8) F-84G-1RE thru -5RE

MCRE Form No. 239C Sheet 1 of 2 (Rev. 1 May 50)

**AIRPLANE MODEL(S)**

F-84G-1RE thru-5RE
ENGINE(S) J35-A-29

# FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 18645 TO 17181 POUNDS

**EXTERNAL LOAD ITEMS**

Two-230 Gal. Tip Tanks - Tip Tanks dropped when empty
NUMBER OF ENGINES OPERATING: 1

**INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT** – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. **(B) FLIGHT PLANNING** – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for **IN FLIGHT** above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000' | | | IF YOU ARE AT 10000' | | | IF YOU ARE AT 15000' | | | FUEL | IF YOU ARE AT 20000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 845 | 35 | 1805 | 5857 | (955) | 35 | (1820) | (1110) | 35 | (1845) | (1280) | 35 | (1880) | 5857 | (1490) | 35 | (1890) |
| 835 | 35 | 1770 | 5800 | 935 | 35 | 1785 | (1090) | 35 | (1805) | (1255) | 35 | (1845) | 5800 | (1460) | 35 | (1855) |
| 810 | 35 | 1720 | 5600 | 905 | 35 | 1735 | 1060 | 35 | 1755 | 1215 | 35 | 1795 | 5600 | (1415) | 35 | (1805) |
| 780 | 35 | 1665 | 5400 | 875 | 35 | 1675 | 1020 | 35 | 1705 | 1175 | 35 | 1735 | 5400 | 1365 | 35 | 1755 |
| 750 | 35 | 1615 | 5200 | 845 | 35 | 1625 | 990 | 35 | 1655 | 1135 | 35 | 1675 | 5200 | 1320 | 35 | 1695 |
| 725 | 35 | 1555 | 5000 | 815 | 35 | 1575 | 950 | 35 | 1595 | 1095 | 35 | 1625 | 5000 | 1275 | 35 | 1645 |
| 695 | 35 | 1495 | 4800 | 785 | 35 | 1515 | 915 | 35 | 1545 | 1055 | 35 | 1565 | 4800 | 1225 | 35 | 1585 |
| 670 | 35 | 1445 | 4600 | 755 | 35 | 1465 | 880 | 35 | 1485 | 1010 | 35 | 1505 | 4600 | 1175 | 35 | 1525 |
| 645 | 35 | 1400 | 4446 | 730 | 35 | 1420 | 850 | 35 | 1440 | 980 | 35 | 1460 | 4446 | 1140 | 35 | 1480 |

| CRUISING AT S. L. | | | | | | EFFECTIVE WIND | CRUISING AT 5000' | | | | | | CRUISING AT 10000' | | | | | | CRUISING AT 15000' | | | | | | EFFECTIVE WIND | CRUISING AT 20000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 360 | 87 | 2050 | 360 | .7 | 20 |
| | | | | – | | 80 HW | | | | | | | 410 | 87 | 2655 | 390 | .8 | 10 | 375 | 86 | 2315 | 385 | .8 | 15 | 80 HW | 350 | 86 | 1985 | 385 | .8 | 20 |
| 455 | 87 | 3345 | 415 | .9 | – | 40 HW | 425 | 86 | 2995 | 415 | .9 | 5 | 375 | 86 | 2600 | 425 | .9 | 10 | 375 | 86 | 2315 | 425 | .9 | 15 | 40 HW | 350 | 86 | 1985 | 425 | .9 | 25 |
| 430 | 85 | 3160 | 430 | 1.0 | – | 0 | 405 | 85 | 2860 | 435 | 1.0 | 5 | 385 | 85 | 2485 | 440 | 1.0 | 10 | 365 | 85 | 2240 | 450 | 1.0 | 15 | 0 | 350 | 86 | 1985 | 465 | 1.0 | 25 |
| 420 | 84 | 3085 | 460 | 1.1 | – | 40 TW | 400 | 84 | 2795 | 465 | 1.1 | 5 | 385 | 85 | 2485 | 480 | 1.1 | 10 | 365 | 85 | 2240 | 490 | 1.1 | 15 | 40 TW | 335 | 85 | 1900 | 485 | 1.1 | 25 |
| | | | | | | 80 TW | | | | | | | 370 | 84 | 2400 | 505 | 1.2 | 10 | 355 | 84 | 2165 | 515 | 1.2 | 15 | 80 TW | 335 | 85 | 1900 | 525 | 1.2 | 30 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 335 | 85 | 1900 | 565 | 1.3 | 30 |

*Figure A–15. Flight Operation Instruction Chart (Sheet 1 of 4) F-84G-1RE thru -5RE*

# HIGH ALTITUDE

Two-230 Gal. Tip Tanks - Tip Tanks dropped when empty.

AIRPLANE MOD. F-84G-1RE thru-5RE ENG. J35-A-29 CHART WT. LIMITS 18645 TO 17181 LB. EXT. LOAD NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000' | | | FUEL | IF YOU ARE AT 30000' | | | IF YOU ARE AT 35000' | | | IF YOU ARE AT 40000' | | | FUEL | IF YOU ARE AT 45000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| (1630) | 35 | (1905) | 5857 | (1830) | 35 | (1930) | (1940) | 35 | - | | | | 5857 | | | |
| (1600) | 35 | (1875) | 5800 | (1795) | 35 | (1895) | (1905) | 35 | - | | | | 5800 | | | |
| (1550) | 35 | (1825) | 5600 | (1740) | 35 | (1845) | (1850) | 35 | - | | | | 5600 | | | |
| (1500) | 35 | (1775) | 5400 | (1685) | 35 | (1795) | (1795) | 35 | - | | | | 5400 | | | |
| 1450 | 35 | 1715 | 5200 | 1630 | 35 | 1735 | (1740) | 35 | - | | | | 5200 | | | |
| 1400 | 35 | 1665 | 5000 | 1575 | 35 | 1685 | 1685 | 35 | - | | | | 5000 | | | |
| 1350 | 35 | 1605 | 4800 | 1520 | 35 | 1625 | 1630 | 35 | - | | | | 4800 | | | |
| 1300 | 35 | 1545 | 4600 | 1460 | 35 | 1565 | 1570 | 35 | - | | | | 4600 | | | |
| 1265 | 35 | 1500 | 4446 | 1420 | 35 | 1520 | 1525 | 35 | - | | | | 4446 | | | |

| CRUISING AT 25000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 30000' | | | | | | CRUISING AT 35000' | | | | | | CRUISING AT 40000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 45000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| 335 | 88 | 1955 | 365 | .7 | 30 | 120 HW | 310 | 89 | 1770 | 365 | .75 | 45 | 290 | 92 | 1760 | 375 | .75 | 75 | | | | | | | 120 HW | | | | | | |
| 330 | 87 | 1915 | 395 | .8 | 35 | 80 HW | 310 | 89 | 1770 | 405 | .85 | 50 | 285 | 91 | 1725 | 405 | .85 | 80 | | | | | | | 80 HW | | | | | | |
| 330 | 87 | 1915 | 435 | .9 | 35 | 40 HW | 300 | 88 | 1735 | 435 | .90 | 55 | 285 | 91 | 1725 | 445 | .90 | 85 | | | | | | | 40 HW | | | | | | |
| 330 | 87 | 1915 | 475 | 1.0 | 40 | 0 | 300 | 88 | 1735 | 475 | 1.00 | 60 | 285 | 91 | 1725 | 485 | 1.00 | 95 | | | | | | | 0 | | | | | | |
| 315 | 86 | 1835 | 495 | 1.1 | 45 | 40 TW | 300 | 88 | 1735 | 515 | 1.10 | 65 | 285 | 91 | 1725 | 525 | 1.10 | 105 | | | | | | | 40 TW | | | | | | |
| 315 | 86 | 1835 | 535 | 1.2 | 45 | 80 TW | 300 | 88 | 1735 | 555 | 1.20 | 70 | 275 | 90 | 1690 | 555 | 1.20 | 110 | | | | | | | 80 TW | | | | | | |
| 315 | 86 | 1835 | 575 | 1.3 | 50 | 120 TW | 295 | 87 | 1695 | 585 | 1.25 | 75 | 275 | 90 | 1690 | 595 | 1.25 | 120 | | | | | | | 120 TW | | | | | | |

1 Climb at 100 % RPM
2 Multiply statute units by .87 to obtain nautical units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5 Chart weight limits based on fuel density of 6.5 LBS GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

## EXAMPLE

If you are at 10000 feet with 5000 lbs. of available fuel, you can fly 950 statute airmiles by holding 385 MPH CAS. However, you can fly 1595 statute airmiles by immediately climbing to 35000 feet using 100 % RPM At 35000 feet cruise at 285 MPH CAS and start letdown 95 statute airmiles from destination. With a 80 MPH headwind the range at 35000 feet will be 1595 x .80 or 1280 statute airmiles. Cruise at 285 MPH CAS with this wind and start letdown 80 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED:

## LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND →

$$\text{RANGE FACTOR} = \frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form No. 239C Sheet 2 of 2 (Rev. 1 May 50)

Figure A–15. Flight Operation Instruction Chart (Sheet 2 of 4) F-84G-1RE thru -5RE

MCRE Form
No. 239C
Sheet 1 of 2
(Rev. 1 May 50)

## AIRPLANE MODEL(S)

F-84G-1RE thru-5RE
ENGINE(S) J35-A-29

## FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 17181 TO 15717 POUNDS

## EXTERNAL LOAD ITEMS

Two-230 Gal. Tip Tanks - Tip Tanks dropped when empty.

NUMBER OF ENGINES OPERATING: 1

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000′ | | | IF YOU ARE AT 10000′ | | | IF YOU ARE AT 15000′ | | | FUEL | IF YOU ARE AT 20000′ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 645 | 35 | 1400 | 4446 | 730 | 35 | 1420 | 850 | 35 | 1440 | 980 | 35 | 1460 | 4446 | 1140 | 35 | 1480 |
| 640 | 35 | 1385 | 4400 | 720 | 35 | 1405 | 845 | 35 | 1425 | 970 | 35 | 1445 | 4400 | 1130 | 35 | 1465 |
| 610 | 35 | 1325 | 4200 | 690 | 35 | 1345 | 810 | 35 | 1365 | 930 | 35 | 1385 | 4200 | 1085 | 35 | 1405 |
| 585 | 35 | 1265 | 4000 | 665 | 35 | 1285 | 770 | 35 | 1305 | 885 | 35 | 1325 | 4000 | 1035 | 35 | 1345 |
| 560 | 35 | 1200 | 3800 | 630 | 35 | 1225 | 735 | 35 | 1240 | 845 | 35 | 1265 | 3800 | 985 | 35 | 1285 |
| 530 | 30 | 1140 | 3600 | 600 | 35 | 1160 | 700 | 35 | 1180 | 805 | 35 | 1200 | 3600 | 940 | 35 | 1225 |
| 475 | 15 | 1025 | 3200 | 540 | 20 | 1045 | 630 | 25 | 1065 | 720 | 30 | 1085 | 3200 | 845 | 30 | 1105 |
| 435 | SL | - | 2938 | 500 | 5 | - | 580 | 10 | - | 665 | 15 | - | 2938 | 785 | 20 | - |

| CRUISING AT S. L. | | | | | | EFFECTIVE WIND | CRUISING AT 5000′ | | | | | | CRUISING AT 10000′ | | | | | | CRUISING AT 15000′ | | | | | | EFFECTIVE WIND | CRUISING AT 20000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 355 | 86 | 1975 | 355 | .7 | 20 |
| | | | | | | 80 HW | | | | | | | 400 | 86 | 2550 | 380 | .8 | 10 | 375 | 86 | 2260 | 385 | .8 | 15 | 80 HW | 355 | 86 | 1975 | 395 | .8 | 20 |
| 430 | 87 | 3120 | 390 | .9 | - | 40 HW | 410 | 86 | 2830 | 400 | .9 | 5 | 390 | 85 | 2465 | 405 | .9 | 10 | 370 | 85 | 2210 | 415 | .9 | 15 | 40 HW | 340 | 85 | 1890 | 415 | .9 | 25 |
| 415 | 86 | 3005 | 415 | 1.0 | - | 0 | 400 | 85 | 2765 | 430 | 1.0 | 5 | 390 | 85 | 2465 | 445 | 1.0 | 10 | 370 | 85 | 2210 | 455 | 1.0 | 15 | 0 | 340 | 85 | 1890 | 455 | 1.0 | 25 |
| 395 | 85 | 2860 | 435 | 1.1 | - | 40 TW | 385 | 84 | 2640 | 450 | 1.1 | 5 | 370 | 84 | 2355 | 465 | 1.1 | 10 | 355 | 84 | 2135 | 480 | 1.1 | 15 | 40 TW | 340 | 85 | 1890 | 495 | 1.1 | 25 |
| | | | | | | 80 TW | | | | | | | 365 | 83 | 2325 | 500 | 1.2 | 10 | 355 | 84 | 2135 | 520 | 1.2 | 15 | 80 TW | 340 | 85 | 1890 | 535 | 1.2 | 30 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 330 | 84 | 1830 | 560 | 1.3 | 30 |

Figure A—15. Flight Operation Instruction Chart (Sheet 3 of 4) F-84G-1RE thru -5RE

# HIGH ALTITUDE

Two-230 Gal Tip Tanks dropped when empty.

AIRPLANE MOD. F-84G-1RE thru-5RE ENG. J35-A-29 CHART WT. LIMITS 17181 TO 15717 LB. EXT. LOAD NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000' | | | FUEL | IF YOU ARE AT 30000' | | | IF YOU ARE AT 35000' | | | IF YOU ARE AT 40000' | | | FUEL | IF YOU ARE AT 45000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 1265 | 35 | 1500 | 4446 | 1420 | 35 | 1520 | 1525 | 35 | - | | | | 4446 | | | |
| 1250 | 35 | 1485 | 4400 | 1410 | 35 | 1505 | 1510 | 35 | - | | | | 4400 | | | |
| 1200 | 35 | 1435 | 4200 | 1350 | 35 | 1445 | 1450 | 35 | - | | | | 4200 | | | |
| 1150 | 35 | 1365 | 4000 | 1290 | 35 | 1385 | 1390 | 35 | - | | | | 4000 | | | |
| 1100 | 35 | 1305 | 3800 | 1235 | 35 | 1325 | 1330 | 35 | - | | | | 3800 | | | |
| 1045 | 35 | 1250 | 3600 | 1185 | 35 | 1270 | 1270 | 35 | - | | | | 3600 | | | |
| 940 | 35 | 1125 | 3200 | 1060 | 35 | 1145 | 1150 | 35 | - | | | | 3200 | | | |
| 870 | 25 | - | 2938 | 985 | 30 | - | 1070 | 35 | - | | | | 2938 | | | |

| CRUISING AT 25000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 30000' | | | | | | CRUISING AT 35000' | | | | | | CRUISING AT 40000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 45000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| 330 | 87 | 1855 | 360 | .7 | 30 | 120 HW | 305 | 88 | 1665 | 360 | .7 | 45 | 280 | 89 | 1590 | 360 | .7 | 75 | | | | | | | 120 HW | | | | | | |
| 330 | 87 | 1855 | 400 | .8 | 35 | 80 HW | 305 | 88 | 1665 | 400 | .8 | 50 | 280 | 89 | 1590 | 400 | .8 | 80 | | | | | | | 80 HW | | | | | | |
| 320 | 86 | 1795 | 425 | .9 | 35 | 40 HW | 300 | 87 | 1630 | 430 | .9 | 55 | 280 | 89 | 1590 | 440 | .9 | 85 | | | | | | | 40 HW | | | | | | |
| 320 | 86 | 1795 | 465 | 1.0 | 40 | 0 | 300 | 87 | 1630 | 470 | 1.0 | 60 | 280 | 89 | 1590 | 480 | 1.0 | 95 | | | | | | | 0 | | | | | | |
| 320 | 86 | 1795 | 505 | 1.1 | 45 | 40 TW | 300 | 87 | 1630 | 510 | 1.1 | 65 | 275 | 88 | 1555 | 510 | 1.1 | 105 | | | | | | | 40 TW | | | | | | |
| 320 | 86 | 1795 | 545 | 1.2 | 45 | 80 TW | 300 | 87 | 1630 | 550 | 1.2 | 70 | 275 | 88 | 1555 | 550 | 1.2 | 110 | | | | | | | 80 TW | | | | | | |
| 310 | 85 | 1738 | 570 | 1.3 | 50 | 120 TW | 290 | 86 | 1595 | 580 | 1.3 | 75 | 275 | 88 | 1555 | 590 | 1.3 | 120 | | | | | | | 120 TW | | | | | | |

1. Climb at 100 % RPM
2. Multiply statute units by .87 to obtain nautical units.
3. Read lower half of chart opposite effective wind only.
4. Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5. Chart weight limits based on fuel density of 6.5 LBS/GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

## EXAMPLE

If you are at 10000 feet with 4000 lbs. of available fuel, you can fly 770 statute airmiles by holding 390 MPH CAS. Howeve., you can fly 1305 statute airmiles by immediately climbing to 35000 feet using 100 % RPM At 35000 feet cruise at 280 MPH CAS and start letdown 95 statute airmiles from destination. With a 80 MPH headwind the range at 35000 feet will be 1305 x .80 or 1045 statute airmiles. Cruise at 280 MPH CAS with this wind and start letdown 80 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED:

## LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

$$\text{RANGE FACTOR} = \frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form No. 239C Sheet 2 of 2 (Rev. 1 May 50)

Figure A–15. Flight Operation Instruction Chart (Sheet 4 of 4) F-84G-1RE thru -5RE

MCRE Form
No. 239C
Sheet 1 of 2
(Rev. 1 May 50)

## AIRPLANE MODEL(S)

F-84G-1RE thru -5RE

ENGINE(S) J35-A-29

## FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 15299 TO 13866 POUNDS

## EXTERNAL LOAD ITEMS

None

NUMBER OF ENGINES OPERATING: 1

**INSTRUCTIONS FOR USING CHART:** (A) IN FLIGHT – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

**NOTES:** Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000' | | | IF YOU ARE AT 10000' | | | IF YOU ARE AT 15000' | | | FUEL | IF YOU ARE AT 20000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 435 | 40 | 945 | 2867 | (500) | 40 | (965) | (580) | 40 | (990) | (665) | 40 | (1005) | 2867 | (785) | 40 | (1025) |
| 420 | 40 | 905 | 2800 | 480 | 40 | 920 | (555) | 40 | (945) | (635) | 40 | (965) | 2800 | (750) | 40 | (980) |
| 390 | 40 | 835 | 2600 | 445 | 40 | 855 | 515 | 40 | 875 | 590 | 40 | 895 | 2600 | 695 | 40 | 915 |
| 360 | 40 | 770 | 2400 | 410 | 40 | 790 | 475 | 40 | 810 | 545 | 40 | 830 | 2400 | 645 | 40 | 850 |
| 330 | 40 | 705 | 2200 | 375 | 40 | 720 | 435 | 40 | 740 | 500 | 40 | 760 | 2200 | 590 | 40 | 780 |
| 300 | 40 | 635 | 2000 | 340 | 40 | 655 | 400 | 40 | 675 | 455 | 40 | 690 | 2000 | 540 | 40 | 710 |
| 270 | 40 | 560 | 1800 | 310 | 40 | 580 | 360 | 40 | 600 | 410 | 40 | 620 | 1800 | 485 | 40 | 640 |
| 240 | 40 | 490 | 1600 | 275 | 40 | 510 | 320 | 40 | 530 | 370 | 40 | 550 | 1600 | 435 | 40 | 570 |
| 220 | 40 | 440 | 1469 | 255 | 40 | 460 | 295 | 40 | 480 | 340 | 40 | 500 | 1469 | 400 | 40 | 520 |

| CRUISING AT S. L. | | | | | | EFFEC-TIVE WIND | CRUISING AT 5000' | | | | | | CRUISING AT 10000' | | | | | | CRUISING AT 15000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 20000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 380 | 86 | 1950 | 385 | .75 | 20 |
| | | | | | | 80 HW | | | | | | | 445 | 86 | 2620 | 425 | .8 | 10 | 400 | 85 | 2245 | 415 | .8 | 15 | 80 HW | 370 | 85 | 1890 | 410 | .85 | 20 |
| 450 | 85 | 3060 | 410 | .9 | - | 40 HW | 435 | 85 | 2785 | 425 | .9 | 5 | 425 | 85 | 2510 | 445 | .9 | 10 | 390 | 84 | 2180 | 440 | .9 | 15 | 40 HW | 370 | 85 | 1890 | 450 | .9 | 25 |
| 435 | 84 | 2960 | 435 | 1.0 | - | 0 | 420 | 84 | 2965 | 450 | 1.0 | 5 | 405 | 84 | 2410 | 465 | 1.0 | 10 | 390 | 84 | 2180 | 480 | 1.0 | 15 | 0 | 370 | 85 | 1890 | 490 | 1.0 | 25 |
| 420 | 83 | 2860 | 460 | 1.1 | | 40 TW | 410 | 83 | 2605 | 475 | 1.1 | 5 | 390 | 83 | 2305 | 485 | 1.1 | 10 | 380 | 83 | 2110 | 505 | 1.1 | 15 | 40 TW | 355 | 84 | 1835 | 515 | 1.1 | 25 |
| | | | | | | 80 TW | | | | | | | 365 | 81 | 2150 | 495 | 1.2 | 10 | 365 | 82 | 2040 | 530 | 1.2 | 15 | 80 TW | 345 | 83 | 1775 | 540 | 1.2 | 30 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 340 | 82 | 1760 | 575 | 1.3 | 30 |

Figure A–16. Flight Operation Instruction Chart (Sheet 1 of 4) F-84G-1RE thru -5RE

F-84G-1RE thru 5RE

# HIGH ALTITUDE

AIRPLANE MOD. ENG. J35-A-29 CHART WT. LIMITS 15299 TO 13866 LB. EXT. LOAD None NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000' | | | FUEL | IF YOU ARE AT 30000' | | | IF YOU ARE AT 35000' | | | IF YOU ARE AT 40000' | | | FUEL | IF YOU ARE AT 45000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| (870) | 40 | (1045) | 2867 | (985) | 40 | (1065) | (1070) | 40 | (1080) | (1095) | 40 | - | 2867 | | | |
| (830) | 40 | (1000) | 2800 | (940) | 40 | (1015) | (1020) | 40 | (1030) | (1050) | 40 | - | 2800 | | | |
| (770) | 40 | (935) | 2600 | (870) | 40 | (950) | (950) | 40 | (965) | (980) | 40 | - | 2600 | | | |
| 715 | 40 | 865 | 2400 | 810 | 40 | 880 | (880) | 40 | (895) | (910) | 40 | - | 2400 | | | |
| 660 | 40 | 795 | 2200 | 750 | 40 | 815 | 820 | 40 | 825 | (845) | 40 | - | 2200 | | | |
| 600 | 40 | 725 | 2000 | 685 | 40 | 745 | 750 | 40 | 760 | 780 | 40 | - | 2000 | | | |
| 545 | 40 | 655 | 1800 | 620 | 40 | 675 | 685 | 40 | 690 | 715 | 40 | - | 1800 | | | |
| 485 | 40 | 585 | 1600 | 560 | 40 | 605 | 615 | 40 | 620 | 645 | 40 | - | 1600 | | | |
| 450 | 40 | 540 | 1469 | 515 | 40 | 560 | 570 | 40 | 575 | 595 | 40 | - | 1469 | | | |

| CRUISING AT 25000' | | | | | | EFFECTIVE WIND | CRUISING AT 30000' | | | | | | CRUISING AT 35000' | | | | | | CRUISING AT 40000' | | | | | | EFFECTIVE WIND | CRUISING AT 45000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| 350 | 86 | 1775 | 385 | .75 | 30 | 120 HW | 325 | 88 | 1585 | 385 | .75 | 55 | 295 | 89 | 1460 | 380 | .75 | 90 | 270 | 92 | 1485 | 390 | .75 | 135 | 120 HW | | | | | | |
| 350 | 86 | 1775 | 425 | .85 | 35 | 80 HW | 320 | 87 | 1570 | 420 | .85 | 60 | 295 | 89 | 1460 | 420 | .85 | 95 | 270 | 92 | 1485 | 430 | .85 | 150 | 80 HW | | | | | | |
| 345 | 85 | 1740 | 455 | .9 | 35 | 40 HW | 320 | 87 | 1570 | 460 | .9 | 65 | 295 | 89 | 1460 | 460 | .9 | 105 | 265 | 91 | 1470 | 465 | .90 | 160 | 40 HW | | | | | | |
| 345 | 85 | 1740 | 495 | 1.0 | 40 | 0 | 320 | 87 | 1570 | 500 | 1.0 | 70 | 295 | 89 | 1460 | 500 | 1.0 | 115 | 265 | 91 | 1470 | 505 | 1.0 | 175 | 0 | | | | | | |
| 340 | 84 | 1705 | 525 | 1.1 | 40 | 40 TW | 315 | 86 | 1540 | 530 | 1.1 | 75 | 290 | 88 | 1450 | 535 | 1.1 | 125 | 265 | 91 | 1470 | 545 | 1.1 | 190 | 40 TW | | | | | | |
| 325 | 83 | 1650 | 550 | 1.2 | 45 | 80 TW | 310 | 86 | 1540 | 570 | 1.2 | 80 | 290 | 88 | 1450 | 575 | 1.15 | 130 | 265 | 91 | 1470 | 585 | 1.15 | 200 | 80 TW | | | | | | |
| 325 | 83 | 1650 | 590 | 1.3 | 50 | 120 TW | 305 | 85 | 1510 | 600 | 1.3 | 85 | 290 | 88 | 1450 | 615 | 1.25 | 140 | 260 | 90 | 1455 | 620 | 1.25 | 215 | 120 TW | | | | | | |

1 Climb at 100 % RPM
2 Multiply statute units by .87 to obtain nautical units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5 Chart weight limits based on fuel density of 6.5 LBS/GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

### EXAMPLE

If you are at 10000 feet with 2000 lbs of available fuel, you can fly 400 statute airmiles by holding 405 MPH CAS. However, you can fly 675 statute airmiles by immediately climbing to 40000 feet using 100 % RPM At 40000 feet cruise at 265 MPH CAS and start letdown 175 statute airmiles from destination. With a 80 MPH headwind the range at 40000 feet will be 675 x .80 or 540 statute airmiles. Cruise at 270 MPH CAS with this wind and start letdown 150 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED.

### LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

RANGE FACTOR = $\frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form
No. 239C
Sheet 2 of 2
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Figure A–16. Flight Operation Instruction Chart (Sheet 2 of 4) F-84G-1RE thru -5RE

MCRE Form
No. 239C
Sheet 1 of 2
(Rev. 1 May 50)

**AIRPLANE MODEL(S)**
F-84G-1RE thru -5RE
ENGINE(S) J35-A-29

# FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS 13866 TO 12432 POUNDS

**EXTERNAL LOAD ITEMS**
None
NUMBER OF ENGINES OPERATING: 1

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT – Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowances for reserve, combat, navigational errors, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING – From initial fuel on board subtract fuel required for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight change), it is necessary to observe the optimum cruising altitude on each chart, i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAINS NO FUEL RESERVE FOR LANDING

## LOW ALTITUDE

(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)

| IF YOU ARE AT S. L. | | | FUEL | IF YOU ARE AT 5000′ | | | IF YOU ARE AT 10000′ | | | IF YOU ARE AT 15000′ | | | FUEL | IF YOU ARE AT 20000′ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT S. L. | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 5000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 10000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 15000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 20000′ | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| 220 | 40 | 440 | 1469 | 255 | 40 | 460 | 295 | 40 | 480 | 340 | 40 | 500 | 1469 | 400 | 40 | 520 |
| 180 | 40 | 340 | 1200 | 210 | 40 | 360 | 245 | 40 | 385 | 280 | 40 | 405 | 1200 | 330 | 40 | 420 |
| 120 | 35 | 195 | 800 | 140 | 35 | 215 | 165 | 35 | 235 | 190 | 40 | 255 | 800 | 225 | 40 | 275 |
| 60 | 20 | 75 | 400 | 70 | 25 | 85 | 85 | 25 | 100 | 100 | 30 | 115 | 400 | 120 | 30 | 125 |

| CRUISING AT S. L. | | | | | | EFFECTIVE WIND | CRUISING AT 5000′ | | | | | | CRUISING AT 10000′ | | | | | | CRUISING AT 15000′ | | | | | | EFFECTIVE WIND | CRUISING AT 20000′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G. S. | RANGE FACTOR | LET DOWN DIST. |
| | | | | | | 120 HW | | | | | | | | | | | | | | | | | | | 120 HW | 375 | 85 | 1885 | 380 | .75 | 20 |
| | | | | | | 80 HW | | | | | | | 425 | 84 | 2460 | 405 | .80 | 10 | 400 | 84 | 2175 | 410 | .80 | 15 | 80 HW | 365 | 84 | 1825 | 405 | .80 | 20 |
| 430 | 83 | 2885 | 390 | .90 | - | 40 HW | 425 | 84 | 2660 | 415 | .90 | 5 | 425 | 84 | 2460 | 445 | .90 | 10 | 400 | 84 | 2175 | 450 | .90 | 15 | 40 HW | 365 | 84 | 1825 | 445 | .90 | 25 |
| 415 | 82 | 2785 | 415 | 1.00 | - | 0 | 415 | 83 | 2570 | 440 | 1.00 | 5 | 395 | 83 | 2310 | 455 | 1.00 | 10 | 375 | 83 | 2060 | 465 | 1.00 | 15 | 0 | 365 | 84 | 1825 | 485 | 1.0 | 25 |
| 415 | 82 | 2785 | 450 | 1.10 | - | 40 TW | 400 | 82 | 2485 | 465 | 1.10 | 5 | 380 | 82 | 2210 | 475 | 1.10 | 10 | 375 | 83 | 2060 | 505 | 1.10 | 15 | 40 TW | 350 | 83 | 1750 | 505 | 1.1 | 25 |
| | | | | | | 80 TW | | | | | | | 365 | 81 | 2105 | 495 | 1.20 | 10 | 360 | 82 | 1975 | 525 | 1.20 | 15 | 80 TW | 350 | 83 | 1750 | 545 | 1.2 | 30 |
| | | | | | | 120 TW | | | | | | | | | | | | | | | | | | | 120 TW | 340 | 82 | 1715 | 575 | 1.3 | 30 |

Figure A–16. Flight Operation Instruction Chart (Sheet 3 of 4) F-84G-1RE thru -5RE

F-84G-1RE thru -5RE

# HIGH ALTITUDE

AIRPLANE MOD. ENG. J35-A-29 CHART WT. LIMITS 13866 TO 12432 LB. EXT. LOAD None NO. OF ENGINES OPERATING: 1

| IF YOU ARE AT 25000' | | | FUEL | IF YOU ARE AT 30000' | | | IF YOU ARE AT 35000' | | | IF YOU ARE AT 40000' | | | FUEL | IF YOU ARE AT 45000' | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | RANGE IN AIRMILES | | | | RANGE IN AIRMILES | | |
| BY CRUISING AT 25000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 30000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 35000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | BY CRUISING AT 40000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. | LBS. | BY CRUISING AT 45000' | OPT. ALT. 1000 FT. | BY CRUISING AT OPT. ALT. |
| | | | | (RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL) | | | | | | | | | | | | |
| 450<br>370 | 40<br>40 | 540<br>440 | 1469<br>1200 | 515<br>425 | 40<br>40 | 560<br>455 | 570<br>470 | 40<br>40 | 575<br>475 | 595<br>490 | | | 1469<br>1200 | | | |
| 255<br>135 | 40<br>35 | 290<br>140 | 800<br>400 | 290<br>155 | 40<br>35 | 305<br>155 | 320<br>170 | 40 | 325 | 340<br>185 | | | 800<br>400 | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

| CRUISING AT 25000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 30000' | | | | | | CRUISING AT 35000' | | | | | | CRUISING AT 40000' | | | | | | EFFEC-TIVE WIND | CRUISING AT 45000' | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APPROXIMATE | | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | APPROXIMATE | | | | | | | APPROXIMATE | | | | |
| C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. | | C.A.S. | % RPM | LB/HR | G.S. | RANGE FACTOR | LET DOWN DIST. |
| 350 | 85 | 1690 | 380 | .75 | 30 | 120 HW | 320 | 86 | 1475 | 380 | .75 | 55 | 295 | 87 | 1340 | 380 | .75 | 85 | 260 | 89 | 1310 | 380 | .75 | 135 | 120 HW | | | | | | |
| 350 | 85 | 1690 | 420 | .8 | 35 | 80 HW | 320 | 86 | 1475 | 420 | .8 | 60 | 295 | 87 | 1340 | 420 | .8 | 95 | 260 | 89 | 1310 | 420 | .8 | 145 | 80 HW | | | | | | |
| 350 | 85 | 1690 | 460 | .9 | 40 | 40 HW | 320 | 86 | 1475 | 460 | .9 | 65 | 295 | 87 | 1340 | 460 | .9 | 105 | 260 | 89 | 1310 | 460 | .9 | 160 | 40 HW | | | | | | |
| 335 | 84 | 1625 | 480 | 1.0 | 40 | 0 | 310 | 85 | 1430 | 485 | 1.0 | 70 | 295 | 87 | 1340 | 500 | 1.0 | 115 | 260 | 89 | 1310 | 500 | 1.0 | 175 | 0 | | | | | | |
| 335 | 84 | 1625 | 520 | 1.1 | 45 | 40 TW | 310 | 85 | 1430 | 525 | 1.1 | 75 | 295 | 87 | 1340 | 540 | 1.1 | 125 | 260 | 89 | 1310 | 540 | 1.1 | 185 | 40 TW | | | | | | |
| 335 | 84 | 1625 | 560 | 1.2 | 45 | 80 TW | 310 | 85 | 1430 | 565 | 1.2 | 80 | 285 | 86 | 1315 | 570 | 1.2 | 130 | 260 | 89 | 1310 | 580 | 1.2 | 205 | 80 TW | | | | | | |
| 320 | 83 | 1575 | 585 | 1.3 | 50 | 120 TW | 310 | 85 | 1430 | 605 | 1.3 | 85 | 285 | 86 | 1315 | 610 | 1.25 | 140 | 260 | 89 | 1310 | 620 | 1.25 | 215 | 120 TW | | | | | | |

1 Climb at 100 % RPM
2 Multiply statute units by .87 to obtain nautical units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.
5 Chart weight limits based on fuel density of 6.5 LBS/GAL. Fuel flow based on fuel density of 6.5 LBS/GAL.

DATA AS OF: July 1951 BASED ON: Estimates

## EXAMPLE

If you are at 10000 feet with 800 lbs of available fuel, you can fly 165 statute airmiles by holding 395 MPH CAS. However, you can fly 235 statute airmiles by immediately climbing to 35000 feet using 100 % RPM At 35000 feet cruise at 295 MPH CAS and start letdown 115 statute airmiles from destination. With a 80 MPH headwind the range at 35000 feet will be 235 x .80 or 190 statute airmiles. Cruise at 295 MPH CAS with this wind and start letdown 95 statute airmiles from destination.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED:

## LEGEND

EFFECTIVE WIND – HW, HEADWIND, TW, TAILWIND –

$$\text{RANGE FACTOR} = \frac{\text{GROUND DISTANCE (Effective Wind)}}{\text{RANGE IN AIRMILES (Zero Wind)}}$$

G.S. – GROUND SPEED IN STATUTE MILES PER HR
CAS – CALIBRATED AIRSPEED IN STATUTE MILES PER HR
LB/HR – TOTAL FUEL CONSUMPTION – POUNDS PER HR
( ) – RANGE IN PARENTHESIS AVAILABLE ONLY WITH FUEL FROM EXTERNAL SOURCE.

BASED ON JP-3 FUEL

MCRE Form No. 239C Sheet 2 of 2 (Rev. 1 May 50)

Figure A–16. Flight Operation Instruction Chart (Sheet 4 of 4) F-84G-1RE thru -5RE

# MAXIMUM RANGE SUMMARY CHART

STANDARD DAY

MODEL: F-84G-1RE thru-5RE

ENGINE(S) J35-A-29

CONFIGURATION: Two tanks + two-1000 lb. Bombs + eight-5" HVAR

GROSS WEIGHT: 21947 lb.

| ALTITUDE | CAS (MPH) | MACH NO. | MI/LB | APPROX % RPM |
|---|---|---|---|---|
| SEA LEVEL | 330 | .43 | .0935 | 87 |
| 5000 | 335 | .48 | .1020 | 89 |
| 10000 | 315 | .50 | .1165 | 90 |
| 15000 | 310 | .53 | .1240 | 92 |
| 20000 | 295 | .56 | .1360 | 94 |
| 25000 | | | | |
| 30000 | | | | |
| 35000 | | | | |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |

CONFIGURATION: Two tanks + two-1000 lb. Bombs + eight-5" HVAR

GROSS WEIGHT: 20483 lb.

| ALTITUDE | CAS (MPH) | MACH NO. | MI/LB | APPROX % RPM |
|---|---|---|---|---|
| SEA LEVEL | 320 | .42 | .0952 | 86 |
| 5000 | 315 | .46 | .1050 | 87 |
| 10000 | 310 | .48 | .1190 | 89 |
| 15000 | 300 | .52 | .1290 | 91 |
| 20000 | 285 | .54 | .1410 | 93 |
| 25000 | | | | |
| 30000 | | | | |
| 35000 | | | | |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |

CONFIGURATION: Two tanks + two-1000 lb. Bombs + eight-5" HVAR

GROSS WEIGHT: 19019 lb.

| ALTITUDE | CAS (MPH) | MACH NO. | MI/LB | APPROX % RPM |
|---|---|---|---|---|
| SEA LEVEL | 315 | .41 | .0980 | 85 |
| 5000 | 315 | .46 | .1080 | 87 |
| 10000 | 310 | .48 | .1230 | 88 |
| 15000 | 295 | .51 | .1340 | 90 |
| 20000 | 280 | .53 | .1480 | 91 |
| 25000 | 270 | .58 | .1570 | 93 |
| 30000 | | | | |
| 35000 | | | | |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |

CONFIGURATION: Two tanks + two-1000 lb. Bombs + eight-5" HVAR

GROSS WEIGHT: 17555 lb.

| ALTITUDE | CAS (MPH) | MACH NO. | MI/LB | APPROX % RPM |
|---|---|---|---|---|
| SEA LEVEL | 320 | .42 | .1000 | 85 |
| 5000 | 310 | .45 | .1110 | 86 |
| 10000 | 300 | .47 | .1265 | 87 |
| 15000 | 285 | .49 | .1387 | 88 |
| 20000 | 275 | .52 | .1550 | 90 |
| 25000 | 265 | .57 | .1660 | 92 |
| 30000 | | | | |
| 35000 | | | | |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |

**REMARKS:**

(1) Multiply statute units by .87 to obtain nautical units.

CAS = CALIBRATED AIRSPEED (MPH)
MPH = STATUTE MILES PER HOUR
MI/LB = STATUTE MILES PER POUND

DATA AS OF: July 1951
DATA BASIS: Estimates

FUEL GRADE: JP-3
FUEL DENSITY: 6.5 lb/gal

*Figure A–17. Maximum Range Summary Chart (Sheet 1 of 4) F-84G-1RE thru -5RE*

# MAXIMUM RANGE SUMMARY CHART

STANDARD DAY

**MODEL:** F-84G-1RE thru-5RE

**ENGINE(S)** J35-A-29

**CONFIGURATION:** Clean + four-230 gal. tanks

**GROSS WEIGHT:** 22242 lb.

| ALTITUDE | CAS (MPH) | MACH NO. | MI/LB | APPROX % RPM |
|---|---|---|---|---|
| SEA LEVEL | 380 | .50 | .1010 | 86 |
| 5000 | 365 | .52 | .1265 | 87 |
| 10000 | 360 | .56 | .1440 | 88 |
| 15000 | 340 | .58 | .1585 | 89 |
| 20000 | 330 | .62 | .1742 | 90 |
| 25000 | 320 | .68 | .1850 | 92 |
| 30000 | - | - | - | - |
| 35000 | | | | |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |

**CONFIGURATION:** Clean + four-230 gal tanks

**GROSS WEIGHT:** 20768 lb.

| ALTITUDE | CAS (MPH) | MACH NO. | MI/LB | APPROX % RPM |
|---|---|---|---|---|
| SEA LEVEL | 380 | .50 | .1160 | 86 |
| 5000 | 370 | .53 | .1290 | 86 |
| 10000 | 350 | .54 | .1480 | 87 |
| 15000 | 345 | .59 | .1630 | 88 |
| 20000 | 325 | .62 | .1830 | 89 |
| 25000 | 310 | .65 | .1945 | 91 |
| 30000 | 290 | .68 | .2080 | 94 |
| 35000 | | | | |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |

**CONFIGURATION:** Clean + four-230 Gal. tanks

**GROSS WEIGHT:** 19294 lb.

| ALTITUDE | CAS (MPH) | MACH NO. | MI/LB | APPROX % RPM |
|---|---|---|---|---|
| SEA LEVEL | 375 | .50 | .1180 | 85 |
| 5000 | 370 | .53 | .1320 | 86 |
| 10000 | 350 | .54 | .1520 | 86 |
| 15000 | 330 | .57 | .1680 | 87 |
| 20000 | 320 | .61 | .1920 | 88 |
| 25000 | 310 | .65 | .2050 | 90 |
| 30000 | 290 | .67 | .2190 | 92 |
| 35000 | | | | |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |

**CONFIGURATION:** Clean + four-230 tanks

**GROSS WEIGHT:** 17820 lb.

| ALTITUDE | CAS (MPH) | MACH NO. | MI/LB | APPROX % RPM |
|---|---|---|---|---|
| SEA LEVEL | 375 | .50 | .1200 | 85 |
| 5000 | 355 | .51 | .1350 | 85 |
| 10000 | 345 | .54 | .1565 | 86 |
| 15000 | 325 | .56 | .1725 | 86 |
| 20000 | 315 | .59 | .1990 | 87 |
| 25000 | 295 | .62 | .2145 | 88 |
| 30000 | 290 | .67 | .2320 | 91 |
| 35000 | | | | |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |

**REMARKS:**

(1) Multiply statute units by .87 to obtain nautical units.

CAS = CALIBRATED AIRSPEED (MPH)
MPH = STATUTE MILES PER HOUR
MI/LB = STATUTE MILES PER POUND

**DATA AS OF:** July 1951
**DATA BASIS:** Estimates

**FUEL GRADE:** JP-3
**FUEL DENSITY:** 6.5 lb/gal.

*Figure A–17. Maximum Range Summary Chart (Sheet 2 of 4) F-84G-1RE thru -5RE*

# MAXIMUM RANGE SUMMARY CHART

STANDARD DAY

**MODEL:** F-84G-1RE thru-5RE

**ENGINE(S)** J35-A-29

**CONFIGURATION:** Clean + four-230 gal tanks

**GROSS WEIGHT:** 16345 lb.

| ALTITUDE | CAS (MPH) | MACH NO. | MI/LB | APPROX % RPM |
|---|---|---|---|---|
| SEA LEVEL | 370 | .49 | .1210 | 84 |
| 5000 | 360 | .51 | .1375 | 85 |
| 10000 | 340 | .53 | .1585 | 85 |
| 15000 | 330 | .57 | .1770 | 86 |
| 20000 | 305 | .58 | .2070 | 86 |
| 25000 | 295 | .61 | .2245 | 87 |
| 30000 | 270 | .63 | .2460 | 88 |
| 35000 | 260 | .68 | .2630 | 90 |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |

**CONFIGURATION:** Clean + four-230 gal tanks

**GROSS WEIGHT:** 14870 lb.

| ALTITUDE | CAS (MPH) | MACH NO. | MI/LB | APPROX % RPM |
|---|---|---|---|---|
| SEA LEVEL | 380 | .50 | .1225 | 85 |
| 5000 | 365 | .52 | .1400 | 85 |
| 10000 | 350 | .54 | .1615 | 85 |
| 15000 | 330 | .57 | .1817 | 85 |
| 20000 | 305 | .58 | .2152 | 85 |
| 25000 | 290 | .61 | .2340 | 86 |
| 30000 | 270 | .63 | .2615 | 87 |
| 35000 | 245 | .64 | .2830 | 90 |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |

**CONFIGURATION:** Two-230 gal. Tip Tanks

**GROSS WEIGHT:** 18645 lb.

| ALTITUDE | CAS (MPH) | MACH NO. | MI/LB | APPROX % RPM |
|---|---|---|---|---|
| SEA LEVEL | 430 | .57 | .136 | 85 |
| 5000 | 405 | .57 | .152 | 85 |
| 10000 | 385 | .60 | .177 | 85 |
| 15000 | 365 | .63 | .201 | 85 |
| 20000 | 350 | .66 | .234 | 86 |
| 25000 | 330 | .69 | .248 | 87 |
| 30000 | 300 | .70 | .274 | 88 |
| 35000 | 285 | .73 | .282 | 91 |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |

**CONFIGURATION:** Two-230 gal. Tip Tanks

**GROSS WEIGHT:** 17181 lb.

| ALTITUDE | CAS (MPH) | MACH NO. | MI/LB | APPROX % RPM |
|---|---|---|---|---|
| SEA LEVEL | 415 | .55 | .138 | 86 |
| 5000 | 400 | .57 | .156 | 85 |
| 10000 | 390 | .61 | .181 | 85 |
| 15000 | 370 | .63 | .206 | 85 |
| 20000 | 340 | .64 | .241 | 85 |
| 25000 | 320 | .67 | .259 | 86 |
| 30000 | 300 | .69 | .289 | 87 |
| 35000 | 280 | .73 | .302 | 89 |
| 40000 | | | | |
| 45000 | | | | |
| 50000 | | | | |

**REMARKS:**

(1) Multiply statute units by .87 to obtain nautical units.

CAS = CALIBRATED AIRSPEED (MPH)
MPH = STATUTE MILES PER HOUR
MI/LB = STATUTE MILES PER POUND

**DATA AS OF:** July 1951
**DATA BASIS:** Estimates

**FUEL GRADE:** JP-3
**FUEL DENSITY:** 6.5 lb/gal

*Figure A—17. Maximum Range Summary Chart (Sheet 3 of 4) F-84G-1RE thru -5RE*

# MAXIMUM RANGE SUMMARY CHART

STANDARD DAY

MODEL: F-84G-1RE thru-5RE

ENGINE(S) J35-A-29

CONFIGURATION: Two-230 Gal Tip Tanks

GROSS WEIGHT: 15717 lb.

| ALTITUDE | CAS (MPH) | MACH NO. | MI/LB | APPROX % RPM |
|---|---|---|---|---|
| SEA LEVEL | 430 | .57 | .140 | 85 |
| 5000 | 400 | .57 | .158 | 84 |
| 10000 | 375 | .59 | .184 | 84 |
| 15000 | 360 | .62 | .211 | 84 |
| 20000 | 335 | .64 | .247 | 84 |
| 25000 | 310 | .64 | .269 | 85 |
| 30000 | 295 | .69 | .304 | 86 |
| 35000 | 275 | .72 | .326 | 87 |
| 40000 | 255 | .74 | .330 | 89 |
| 45000 | | | | |
| 50000 | | | | |

CONFIGURATION: Two-230 Gal Tip Tanks

GROSS WEIGHT: 14253 lb.

| ALTITUDE | CAS (MPH) | MACH NO. | MI/LB | APPROX % RPM |
|---|---|---|---|---|
| SEA LEVEL | 400 | .53 | .141 | 83 |
| 5000 | 385 | .55 | .162 | 83 |
| 10000 | 370 | .58 | .189 | 83 |
| 15000 | 355 | .60 | .216 | 83 |
| 20000 | 325 | .62 | .253 | 83 |
| 25000 | 315 | .66 | .280 | 84 |
| 30000 | 290 | .68 | .321 | 84 |
| 35000 | 270 | .70 | .352 | 85 |
| 40000 | 245 | .71 | .363 | 86 |
| 45000 | | | | |
| 50000 | | | | |

CONFIGURATION: Clean

GROSS WEIGHT: 15299 lb.

| ALTITUDE | CAS (MPH) | MACH NO. | MI/LB | APPROX % RPM |
|---|---|---|---|---|
| SEA LEVEL | 435 | .57 | .147 | 84 |
| 5000 | 420 | .61 | .167 | 84 |
| 10000 | 405 | .63 | .193 | 84 |
| 15000 | 390 | .67 | .221 | 84 |
| 20000 | 370 | .69 | .259 | 85 |
| 25000 | 345 | .72 | .285 | 85 |
| 30000 | 320 | .74 | .319 | 87 |
| 35000 | 295 | .75 | .342 | 89 |
| 40000 | 265 | .76 | .344 | 91 |
| 45000 | | | | |
| 50000 | | | | |

CONFIGURATION: Clean

GROSS WEIGHT: 13866 lb.

| ALTITUDE | CAS (MPH) | MACH NO. | MI LB | APPROX % RPM |
|---|---|---|---|---|
| SEA LEVEL | 415 | .55 | .149 | 82 |
| 5000 | 415 | .59 | .171 | 83 |
| 10000 | 395 | .63 | .197 | 83 |
| 15000 | 375 | .65 | .226 | 83 |
| 20000 | 365 | .69 | .266 | 84 |
| 25000 | 335 | .70 | .296 | 84 |
| 30000 | 310 | .72 | .339 | 85 |
| 35000 | 295 | .75 | .373 | 87 |
| 40000 | 260 | .76 | .381 | 89 |
| 45000 | | | | |
| 50000 | | | | |

**REMARKS:**

(1) Multiply statute units by .87 to obtain nautical units.

CAS = CALIBRATED AIRSPEED (MPH)
MPH = STATUTE MILES PER HOUR
MI LB = STATUTE MILES PER POUND

DATA AS OF: July 1951
DATA BASIS: Estimates

FUEL GRADE: JP-3
FUEL DENSITY: 6.5 lb/gal

*Figure A—17. Maximum Range Summary Chart (Sheet 4 of 4) F-84G-1RE thru -5RE*

# ALPHABETICAL INDEX