

PILOT'S MANUAL



BOEING
XF8B-1
RESTRICTED

B.H. BATCHELOR

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PILOT'S MANUAL

BOEING

XF8B-1

NAVY FIGHTER

D-5850

R E S T R I C T E D

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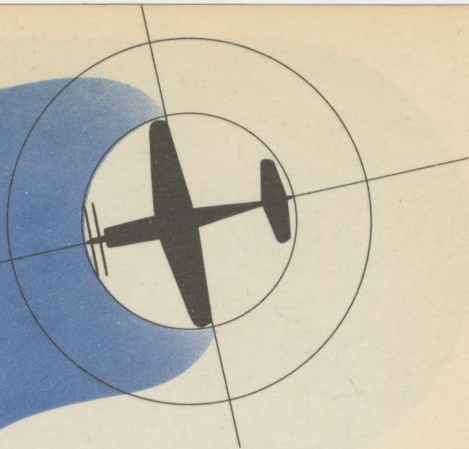
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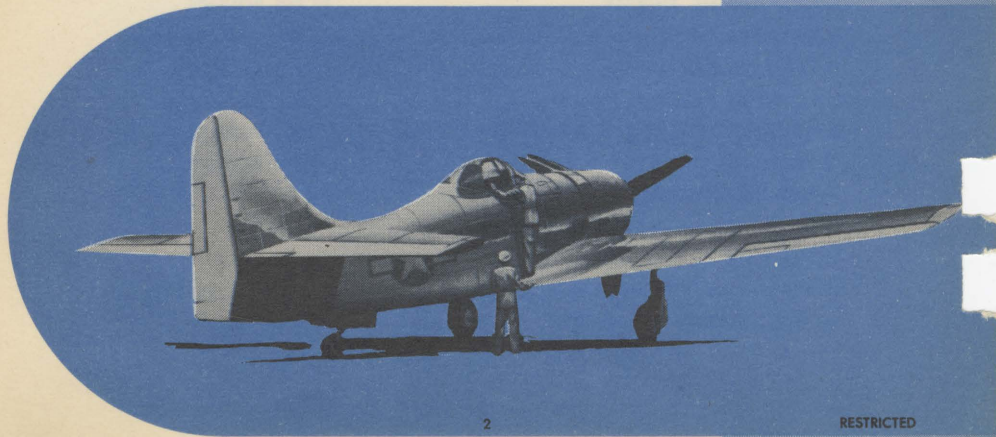
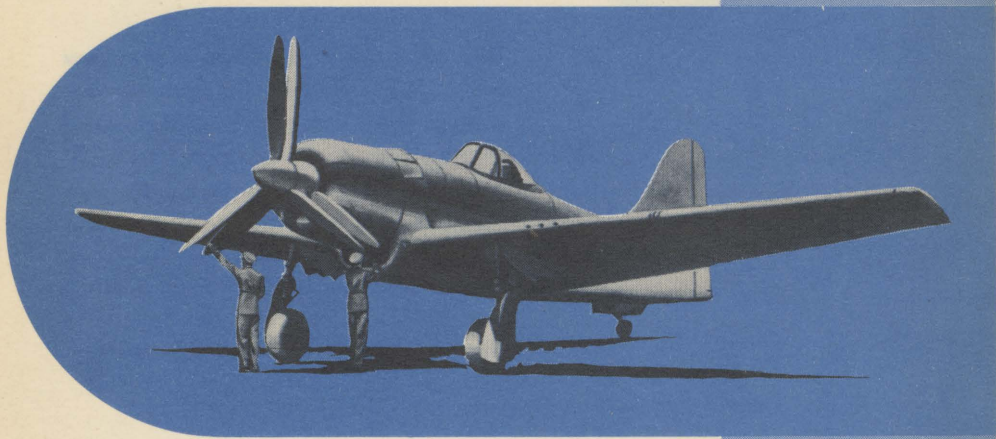
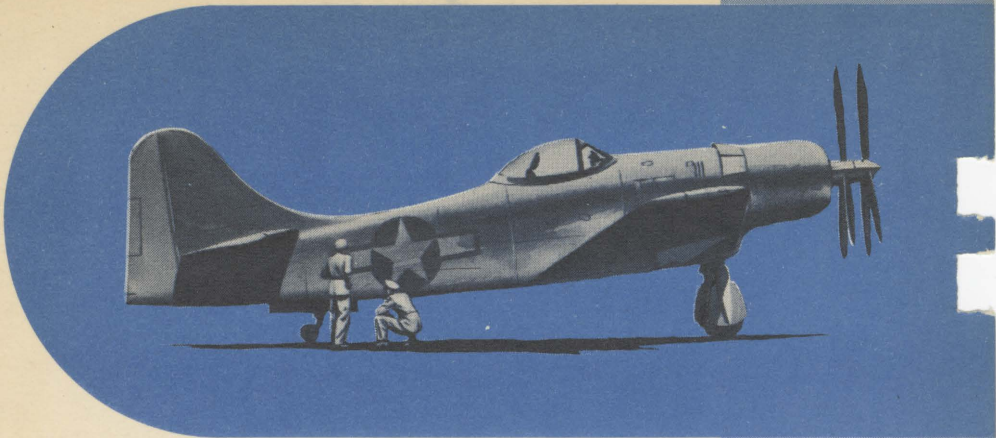
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Navy Fighter

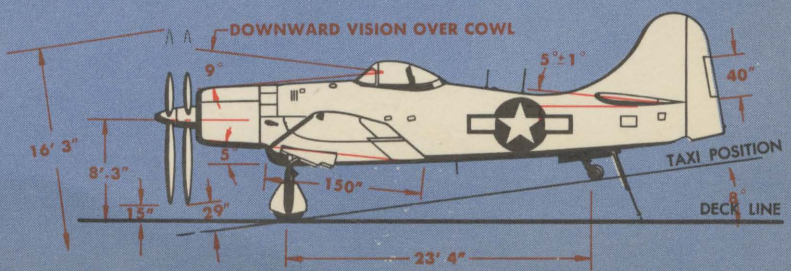
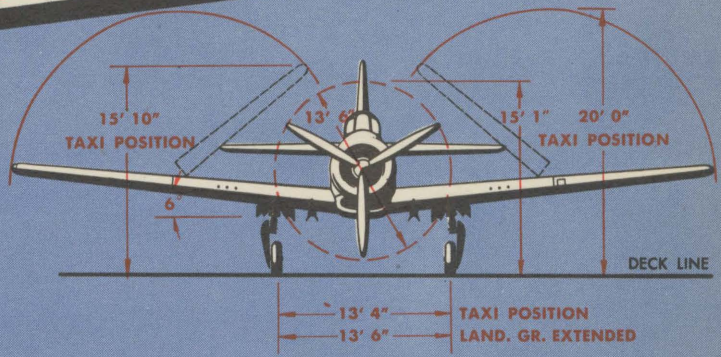
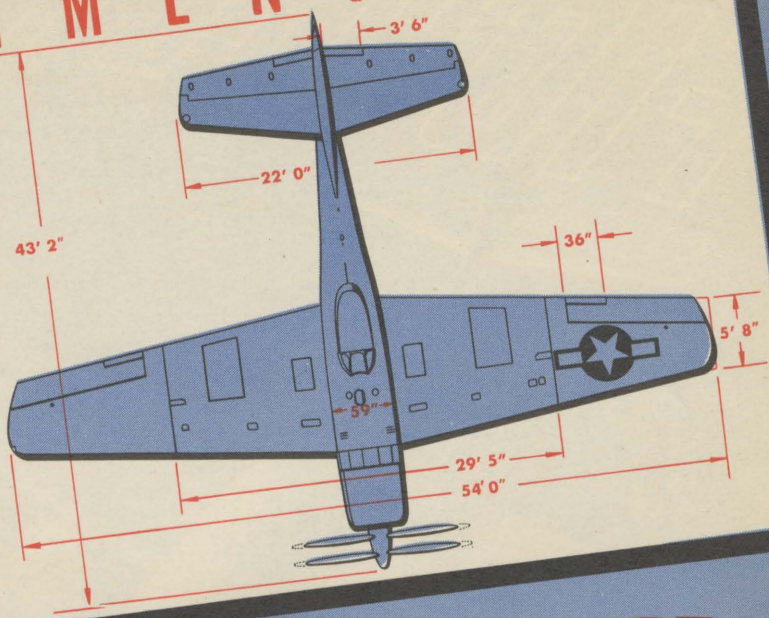


This airplane is a single place, low wing, Navy fighter. Its features are range, speed, maneuverability, and striking power. In addition to six .50 caliber machine guns or six 20 MM cannons or a combination of the two, the airplane is designed to carry bombs. It uses a 3000 HP Pratt & Whitney R4360-10 engine. The following chart gives some interesting statistics.

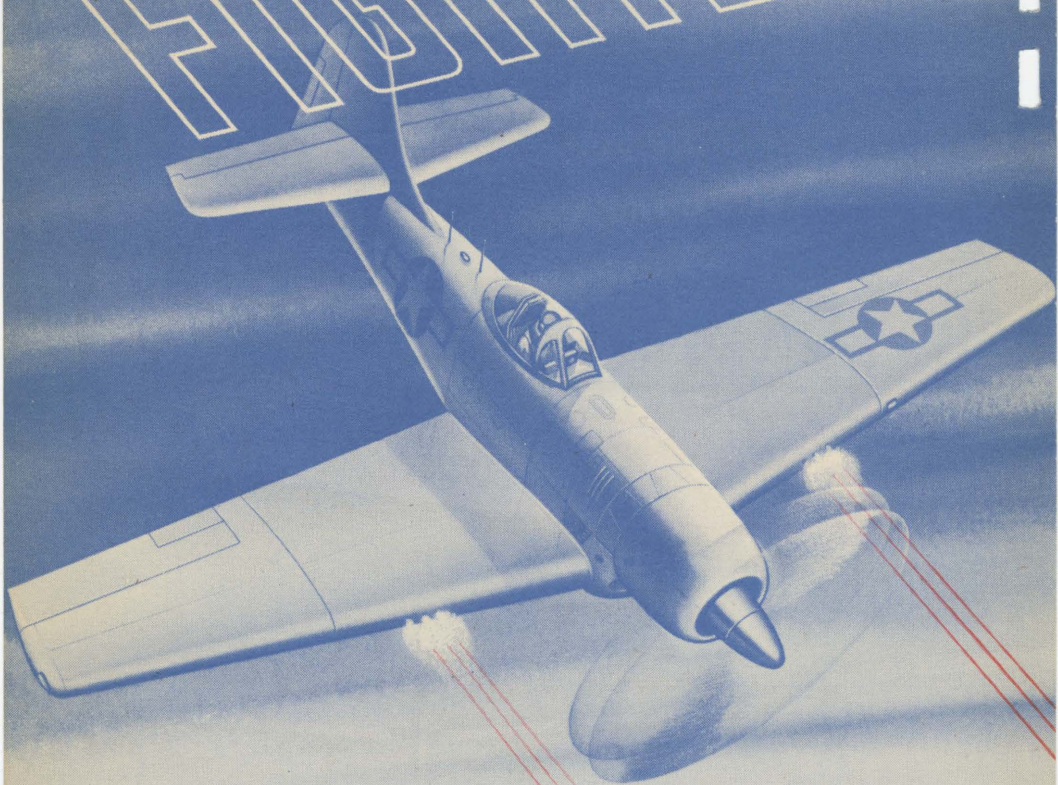
EMPTY WEIGHT	13,693 POUNDS
GROSS WEIGHT, FIGHTER	17,752 POUNDS
FUEL—WING TANK	395 GALLONS
FUEL—BOMB BAY TANK	270 GALLONS
FUEL—WING EXTERNAL TANKS	300 GALLONS
BOMBS—INTERNAL AND EXTERNAL—MAX. EACH	2000 POUNDS
TORPEDO—BELOW BODY	2000 POUNDS
HORSEPOWER—MAXIMUM CONTINUOUS	2500 HP
HORSEPOWER—TAKE-OFF AND MILITARY	3000 HP
WING AREA	490 SQ FT
WING LOADING—17,752/490	36.3 LB/SQ FT
POWER LOADING—17,752/3000	5.9 LB/HP



D I M E N S I O N S



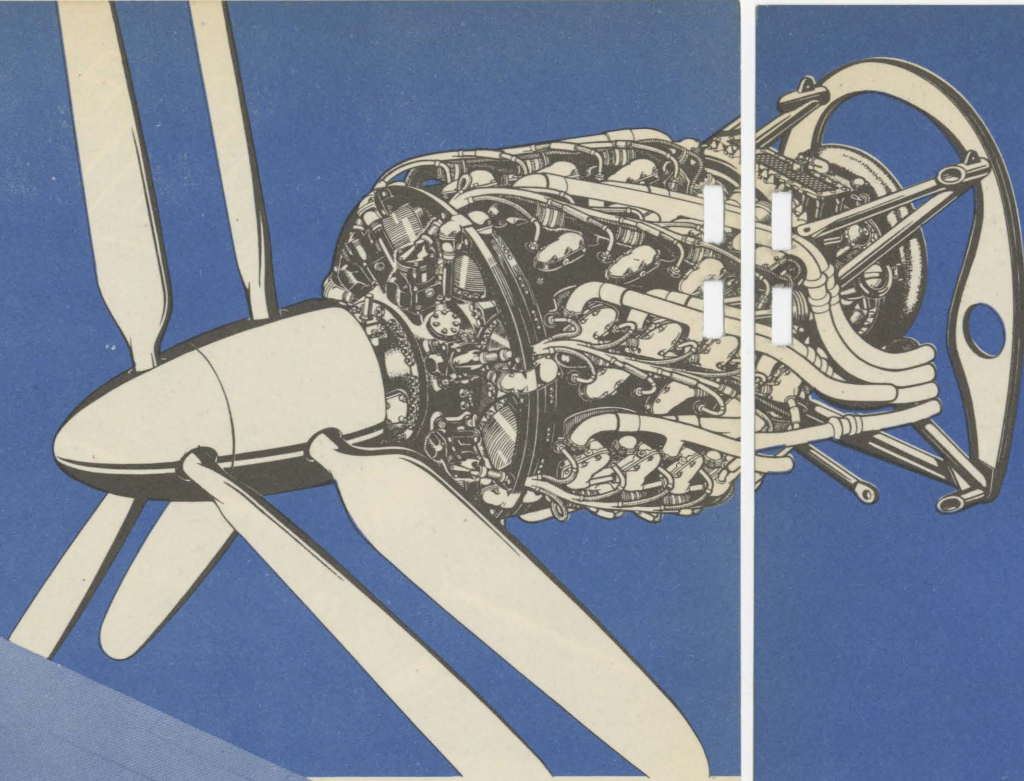
FIGHTER



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BOMBER





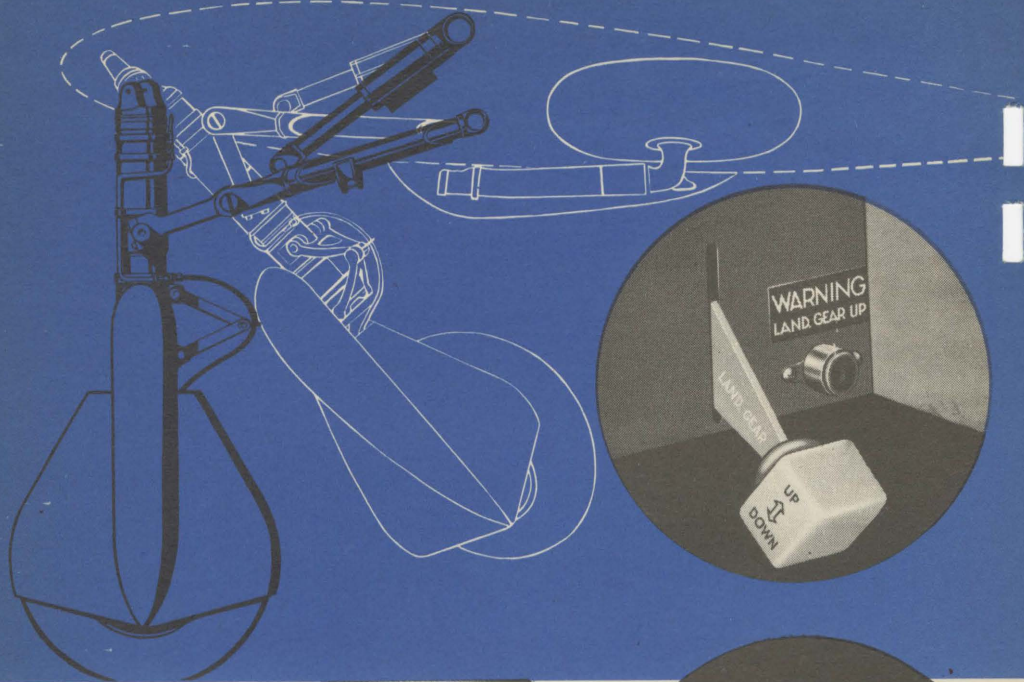
← 3000 HORSEPOWER ENGINE

← DUAL ROTATION PROPELLER

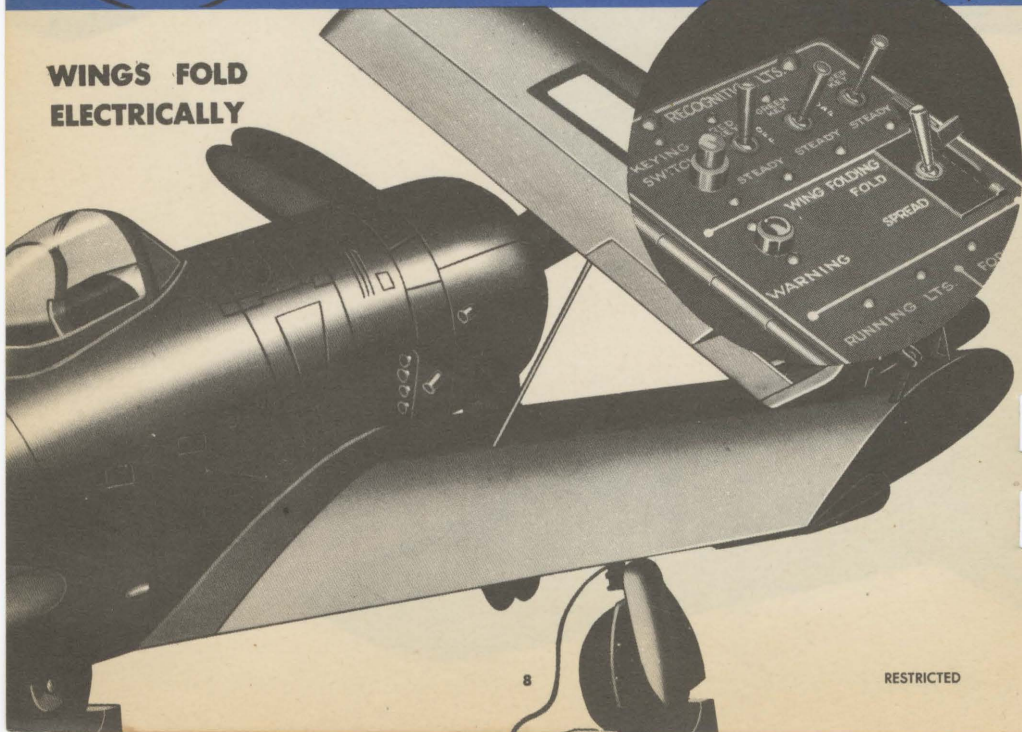
FUEL CAPACITY: 965 GALLONS



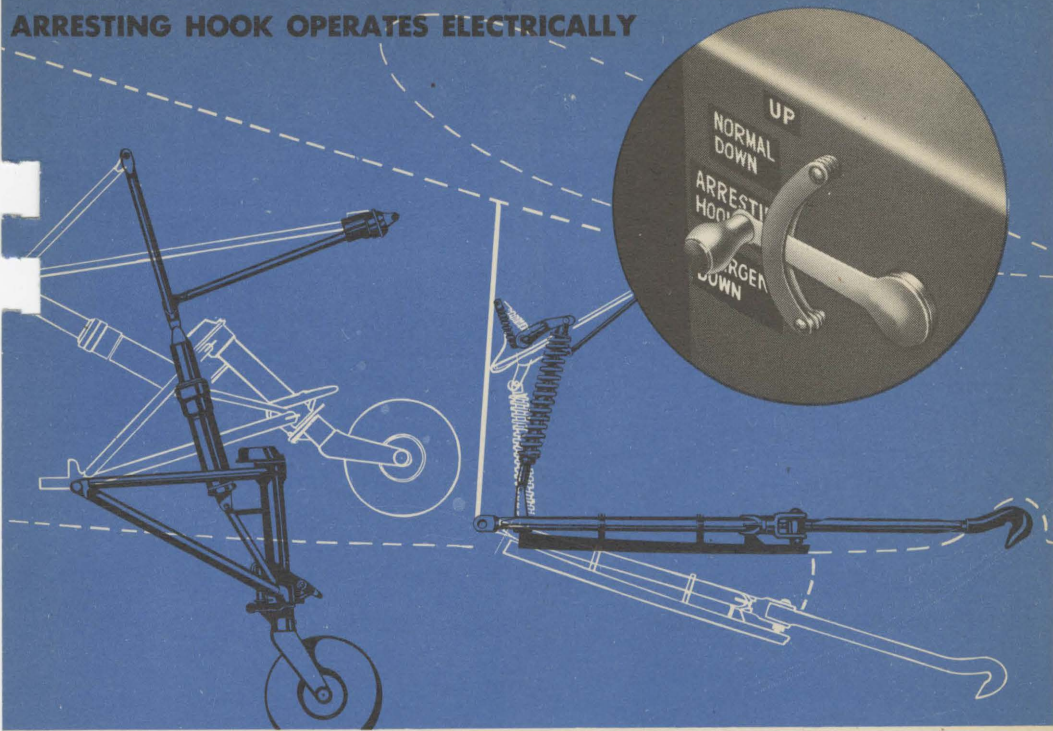
LANDING GEAR OPERATES ELECTRICALLY



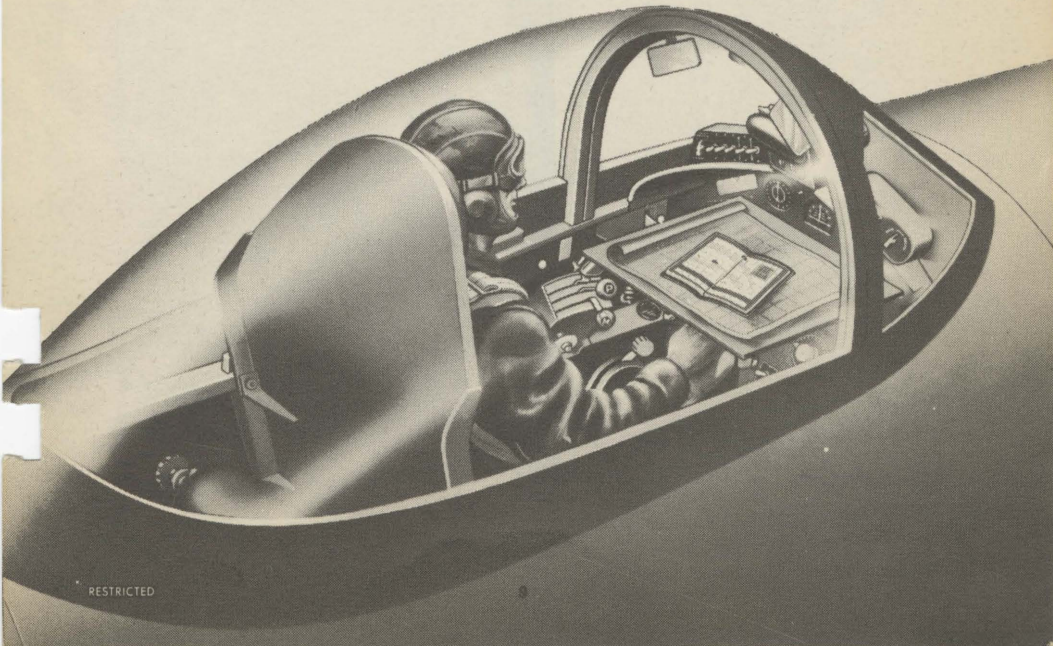
WINGS FOLD ELECTRICALLY



ARRESTING HOOK OPERATES ELECTRICALLY

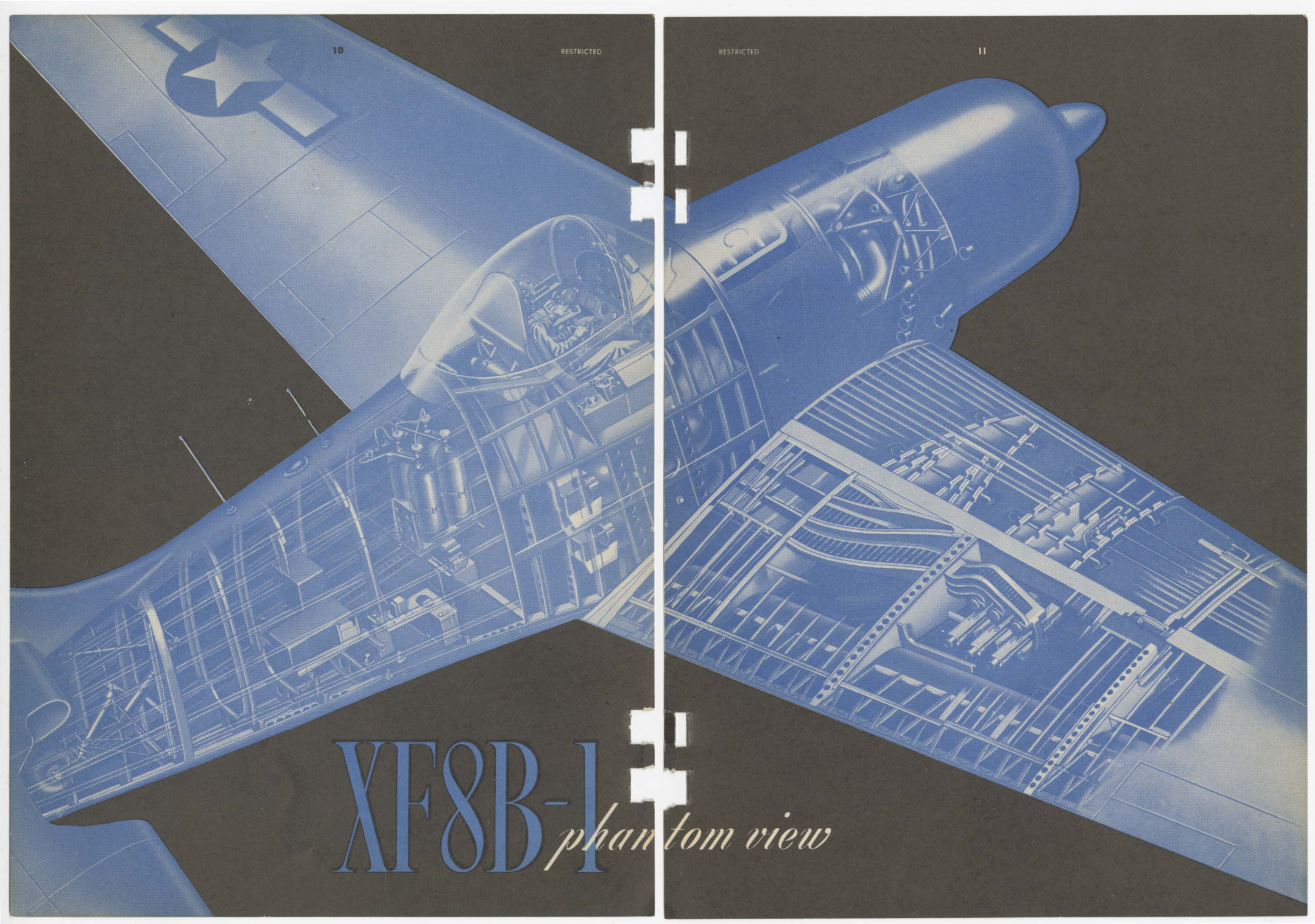


GOOD VISIBILITY AND ACCESSIBILITY



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XF8B-1 *phantom view*



INSTRUMENT PANEL AND FRONT CONTROLS

CANOPY JETTISON HANDLE

REAR VIEW MIRROR

GUN SIGHT

GUN SIGHT GYRO SWITCH

RATE OF CLIMB INDICATOR

ALTITUDE GYRO INDICATOR

DIRECTIONAL GYRO INDICATOR

CHARTBOARD LIGHTS & SWITCHES

AIRSPEED INDICATOR

GUN SWITCHES

AIRSPEED CORRECTION CARD

CHARTBOARD SUPPORT

ALTIMETER

REMOTE COMPASS

AIR POSITION INDICATOR

WHEEL POSITION INDICATOR

CLOCK

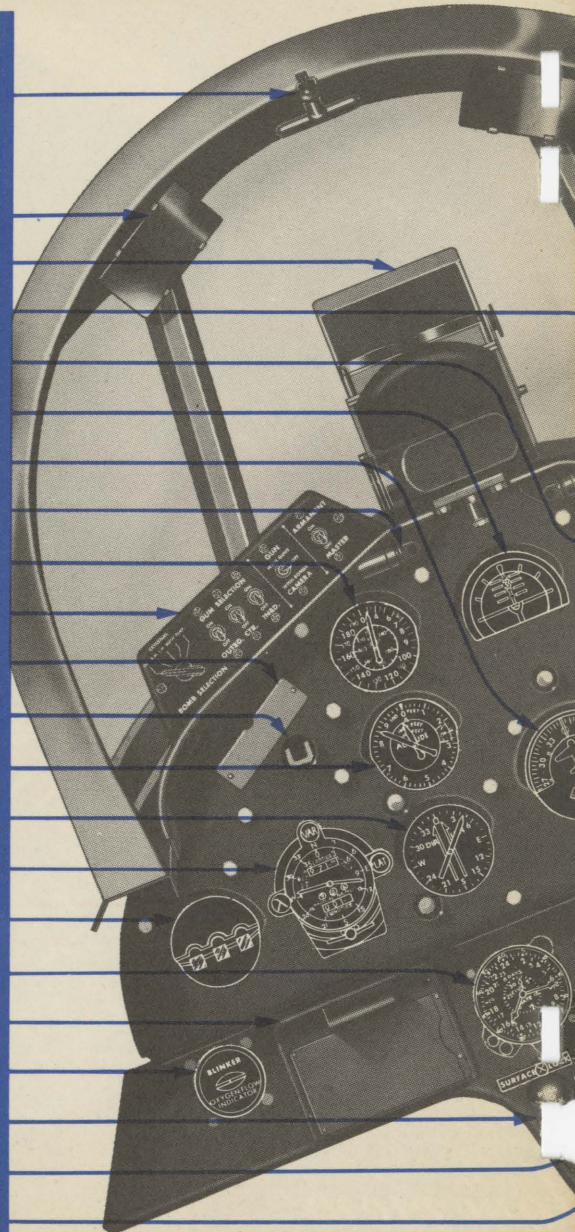
DATA CASE & CHECK LIST

OXYGEN FLOW INDICATOR

SURFACE LOCK CONTROL

COWL FLAP SWITCH

ENGINE LIMITATIONS CHART



12

RESTRICTED

REAR VIEW MIRROR

GUN SIGHT LIGHT SWITCH

GUN SIGHT LIGHT RHEOSTAT

REMOTE COMPASS CORRECTION CARD

BANK & TURN INDICATOR

CHARTBOARD SUPPORT

MANIFOLD PRESSURE GAGE

CARBURETOR AIR THERMOMETER

FUEL LEVEL WARNING LIGHT

TACHOMETER

MAIN FUEL LEVEL GAGE

FUEL LEVEL CHART

IGNITION SWITCH

ENGINE STARTER AND PRIMER SWITCHES

CYLINDER HEAD TEMPERATURE GAGE

OIL & FUEL PRESSURE & OIL TEMP. GAGE

OIL DILUTION SWITCH

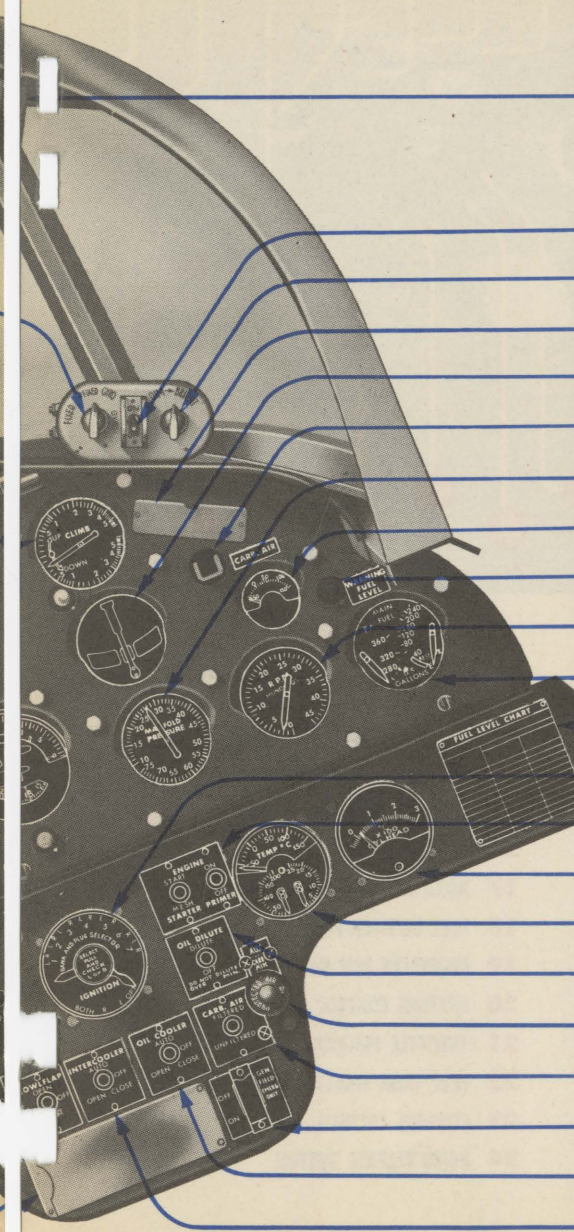
AUXILIARY CARBURETOR AIR KNOB

CARBURETOR AIR FILTER SWITCH

GENERATOR FIELD SWITCH

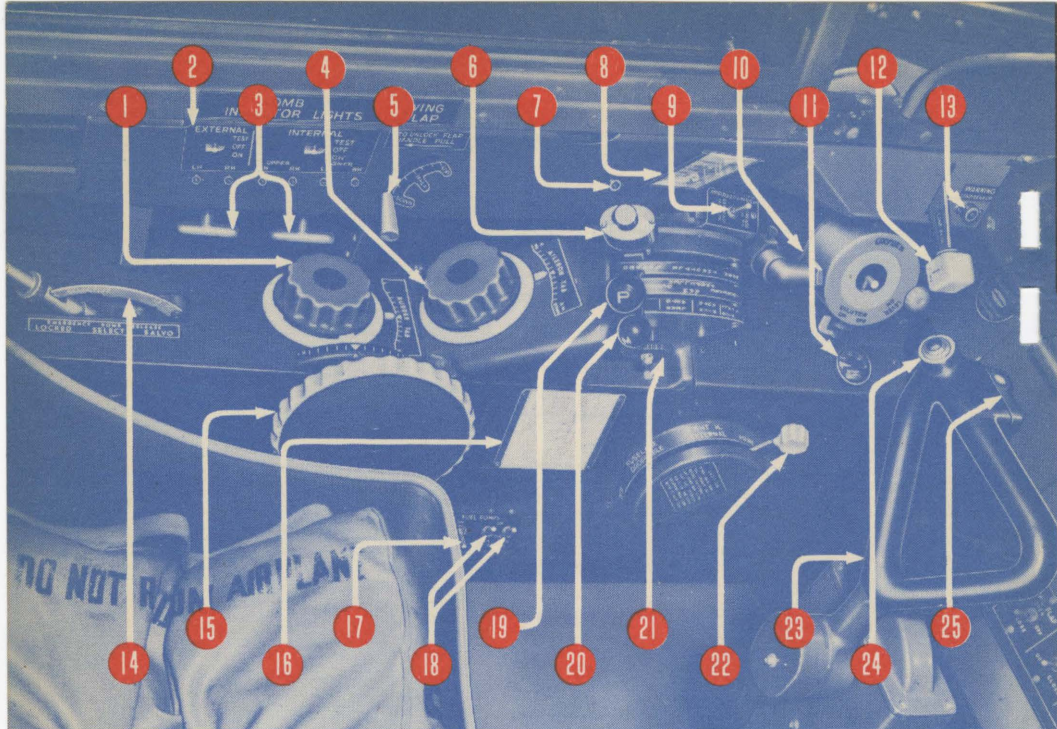
OIL COOLER SWITCH

INTERCOOLER SWITCH



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13

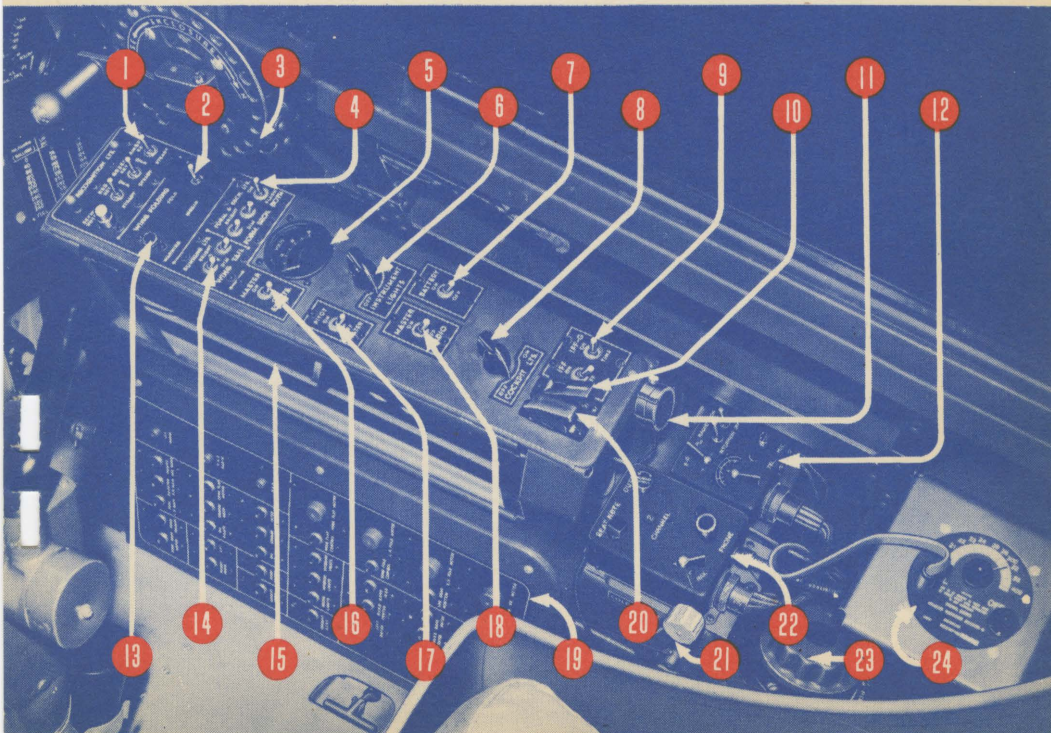


LEFT SIDEWALL CONTROLS

- | | |
|--|--------------------------------------|
| 1 RUDDER TRIM TAB KNOB | 13 LANDING GEAR WARNING LIGHT |
| 2 BOMB INDICATOR LIGHT PANEL | 14 BOMB RELEASE HANDLE |
| 3 EXTERNAL BOMB RELEASE HANDLES | 15 ELEVATOR TRIM TAB WHEEL |
| 4 AILERON TRIM TAB KNOB | 16 FUEL SYSTEM DIAGRAM |
| 5 WING FLAP TOGGLE | 17 AUXILIARY FUEL PUMP SWITCH |
| 6 THROTTLE | 18 FUEL BOOSTER PUMP SWITCHES |
| 7 SUPERCHARGER INDICATOR LIGHT | 19 PROPELLER RPM HANDLE |
| 8 ALTIMETER CORRECTION CARD | 20 MIXTURE CONTROL HANDLE |
| 9 SUPERCHARGER SWITCH | 21 THROTTLE FRICTION KNOB |
| 10 OXYGEN REGULATOR | 22 FUEL TANK SELECTOR HANDLE |
| 11 OXYGEN PRESSURE GAGE | 23 CONTROL COLUMN |
| 12 LANDING GEAR TOGGLE | 24 BOMB RELEASE BUTTON |

RIGHT SIDEWALL CONTROLS

- | | |
|---|---|
| 1 RECOGNITION LIGHT SWITCHES | 13 WING FOLDING WARNING LIGHT |
| 2 WING FOLDING SWITCH | 14 RUNNING LIGHTS SWITCHES |
| 3 CANOPY CRANK | 15 CHARTBOARD STOWAGE |
| 4 FORMATION AND SECTION LIGHT SWITCHES | 16 MASTER EXTERIOR LIGHTS SWITCHES |
| 5 VOLTMETER | 17 PITOT HEATER SWITCH |
| 6 INSTRUMENT LIGHTS RHEOSTAT | 18 MASTER RADIO SWITCH |
| 7 BATTERY SWITCH | 19 CIRCUIT BREAKER PANEL |
| 8 COCKPIT LIGHTS RHEOSTAT | 20 IFF DESTRUCTOR SWITCH |
| 9 IFF RADIO SWITCHES | 21 COCKPIT COLD AIR HANDLE |
| 10 IFF EMERGENCY SWITCH | 22 HOMING RECEIVER CONTROL BOX |
| 11 HAND MICROPHONE | 23 COCKPIT AND WINDSHIELD HOT AIR KNOB |
| 12 RADIO TELEPHONE CONTROL BOX | 24 RANGE RECEIVER |

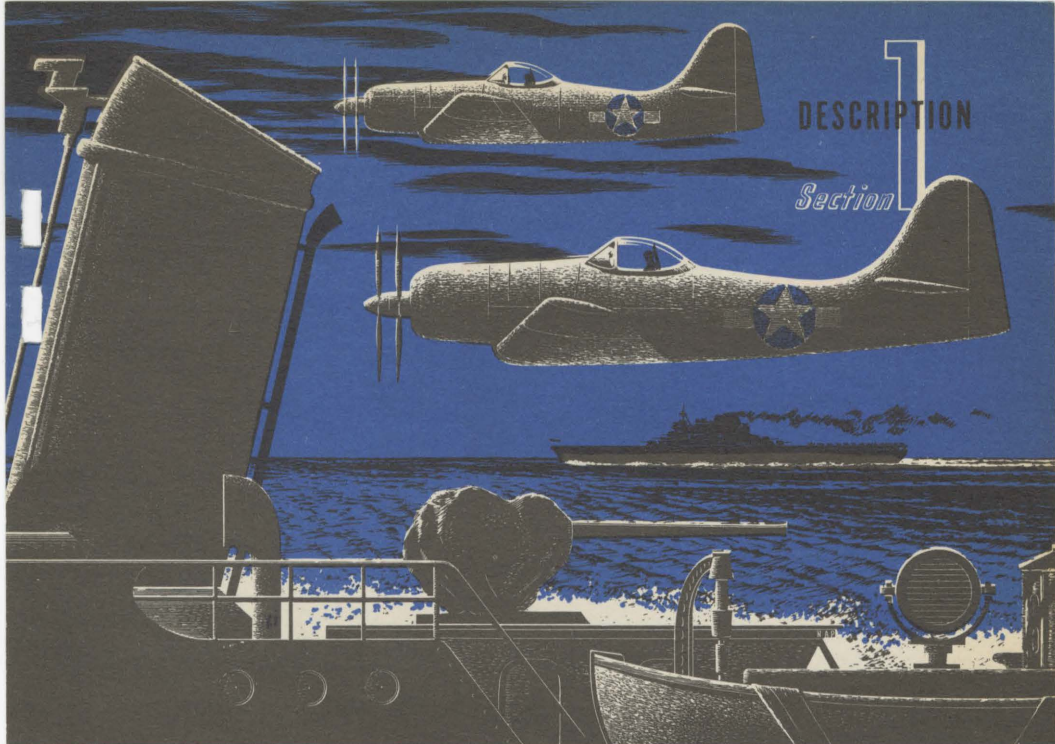




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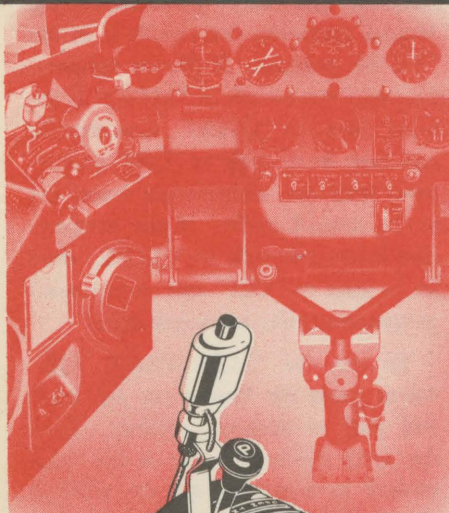
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DESCRIPTION

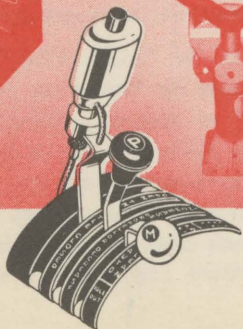
Section

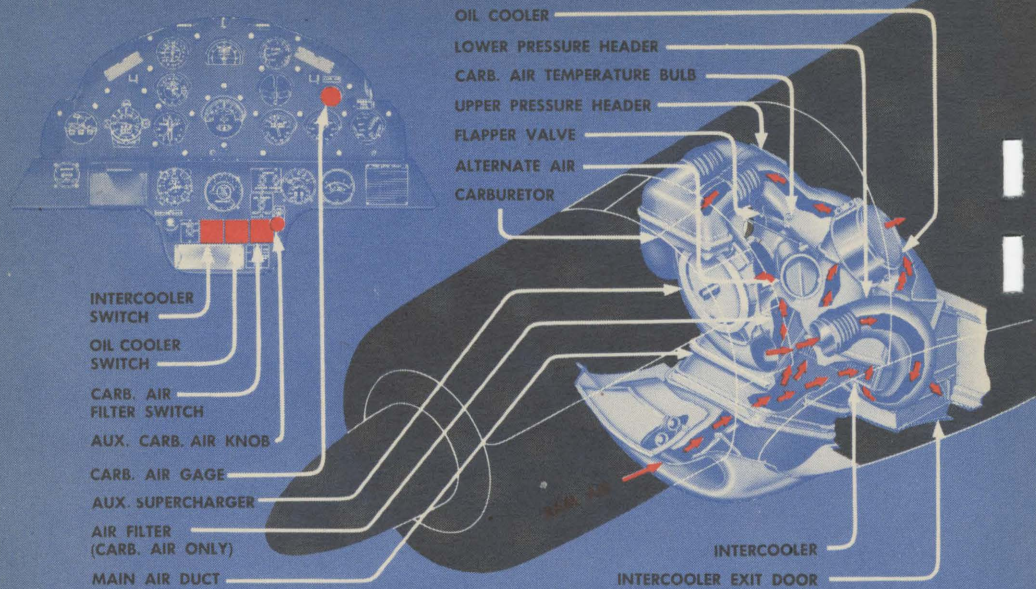


POWER PLANT

Engine—A 3000 HP (military rating), 28 cylinder, Pratt & Whitney Wasp Major R-4360-10 engine powers the XF8B-1.

Propeller—The six bladed dual rotation Aeroproducts propeller has one control, the "PROPELLER RPM" handle on the left control stand. Propeller torque is neutralized by opposite rotation of the blades and RPM hunting is eliminated by the high pressure hydraulic system. The propeller clears the deck by 15 inches during the take-off runs.





AIR INDUCTION SYSTEM

The air scoop supplies air (ram or supercharged) to the carburetor, to the intercooler (for cooling carburetor air) and to the oil coolers.

The supercharger is used to increase manifold pressure only when the throttle is wide open. To increase power, hold the "SUPERCHARGER" switch at "INCREASE MAN PR" until the desired pressure is obtained. To decrease the pressure the switch is pushed to "DECREASE MAN PR" and held until the desired pressure is reached or until the amber light goes out. After that manifold pressure is decreased by closing the throttle.

The intercooler switch, on the instrument panel has "AUTO," "OPEN,"

"CLOSE" and "OFF" position. During normal operation the switch is in the "AUTO" position. If the air temperature with the switch in "AUTO" is too high, turn to "OPEN" momentarily and then let it snap to "OFF" and repeat until the temperature levels off at the desired point. If the temperature is too low, turn to "CLOSE," then let it snap to "OFF" and repeat until temperature rises to proper level.

To use the "AUX. CARB. AIR" valves press the button on the knob and pull to desired position. Turn the knob clockwise after it has been pushed in to make sure the valve is closed. If it has been screwed out, the valve won't close, and a loss in manifold pressure and power will result.

FUEL SYSTEM

The XF8B-1 uses fuel, Spec. AN-F-28, Grade 100/130, which is carried in a main tank (6 wing cells), a drop-pable body tank, and two droppable external tanks.

A red light shows on the instrument panel when the main tank fuel supply is below 40 gallons. This is enough for 30 minutes flight at 40% power.

The tank selector handle on the left console can be set to "OFF," "FUSE-LAGE DROPPABLE," "RIGHT H. EXTERNAL," "LEFT H. EXTERNAL," or "MAIN." To change from one tank to another move this handle. The tank

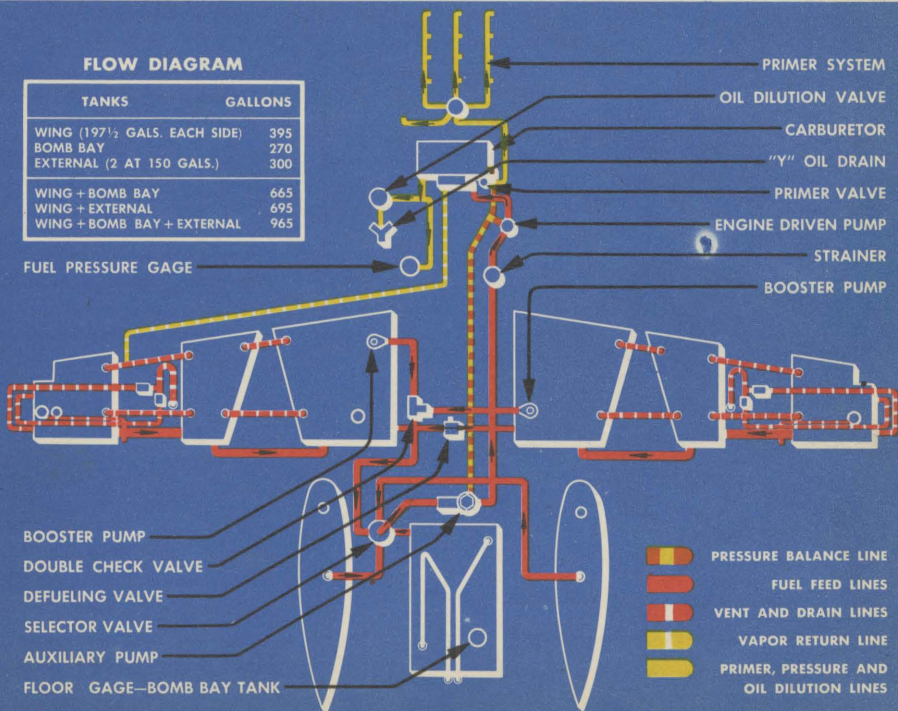
selector handles also turns on the booster pumps when set at "MAIN" or the auxiliary fuel pump if any other tank is selected.

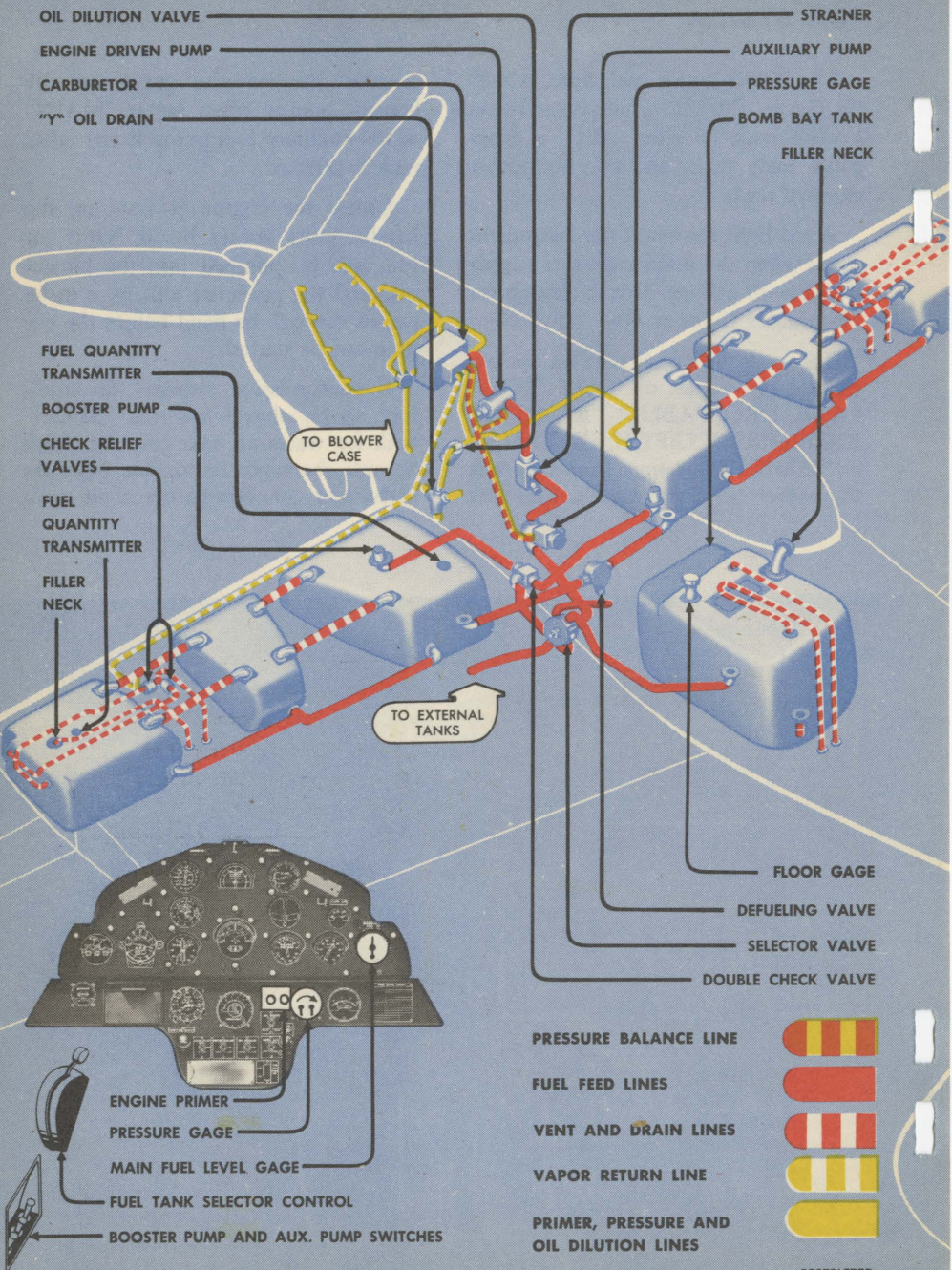
Unless the engine is running, the handle must always be at "OFF" or fuel will be pumped into the blower case and the propeller will have to be pulled through by hand before the engine can be started.

If your mission requires the auxiliary tanks, always use the "MAIN" tank for warm-up, take-off, and climb because the vapor return line from the carburetor connects to the main tank.

FLOW DIAGRAM

TANKS	GALLONS
WING (197½ GALS. EACH SIDE)	395
BOMB BAY	270
EXTERNAL (2 AT 150 GALS.)	300
WING + BOMB BAY	665
WING + EXTERNAL	695
WING + BOMB BAY + EXTERNAL	965





FUEL SYSTEM Continued

The return flow is from 8 to 15 GPH and so if the "MAIN" tank fuel gage reads "FULL" the returning fuel will run overboard.

The "OFF"—"ON" booster pump switches, just aft of the tank selector handle, are spring loaded to the "ON" position (must be held "OFF" to save battery power in an emergency.)

The auxiliary fuel pump "OFF"—"ON" switch is next to the booster pump switches. It is unnecessary to turn this switch "ON" unless the fuel pressure drops below 16 PSI when the selector handle is set to "MAIN."

Priming—To prime the engine, move the tank selector handle to "MAIN" and press the primer switch on the instrument panel. It is well to remember when priming that most of the difficulties encountered in starting this engine are the result of giving it too much fuel.

Oil Dilution—Push the dilution switch on the instrument panel:

1. To dilute the oil before stopping the engine to prepare for an anticipated cold weather start.

2. To dilute the oil for an emergency take-off without warm-up only if the oil has been diluted at shutdown.

Mixture Control—There are "IDLE CUTOFF," "AUTO LEAN," "AUTO RICH," and "FULL RICH" settings. Intermediate settings are not effective and should not be attempted.

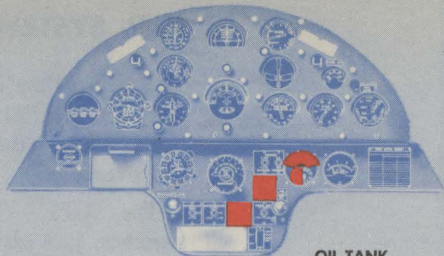
FUEL LEVEL CHART		
GAGE CORRECT AT 140 KNOTS AND THRUST LINE LEVEL (0")		
GAGE READING (GALLONS)	TANK CONTAINS GALLONS	
	THRUST LINE - 4 1/2" 245 KNOTS	THRUST LINE + 8" 3 PT. POS.
0	0	0
40	56	28
80	101	56
120	142	87
160	179	124
200	216	164
240	253	209
280	292	241
320	331	293
360	368	346
FULL	400	406

OIL SYSTEM

OIL PRESSURE AND
TEMPERATURE GAGE

OIL DILUTION SWITCH

OIL COOLER SWITCH



OIL TANK

OIL COOLER FLAP ACTUATOR

OIL COOLER FLAP

OIL COOLER

OIL COOLER VALVE

FILLER NECK

QUANTITY GAGE

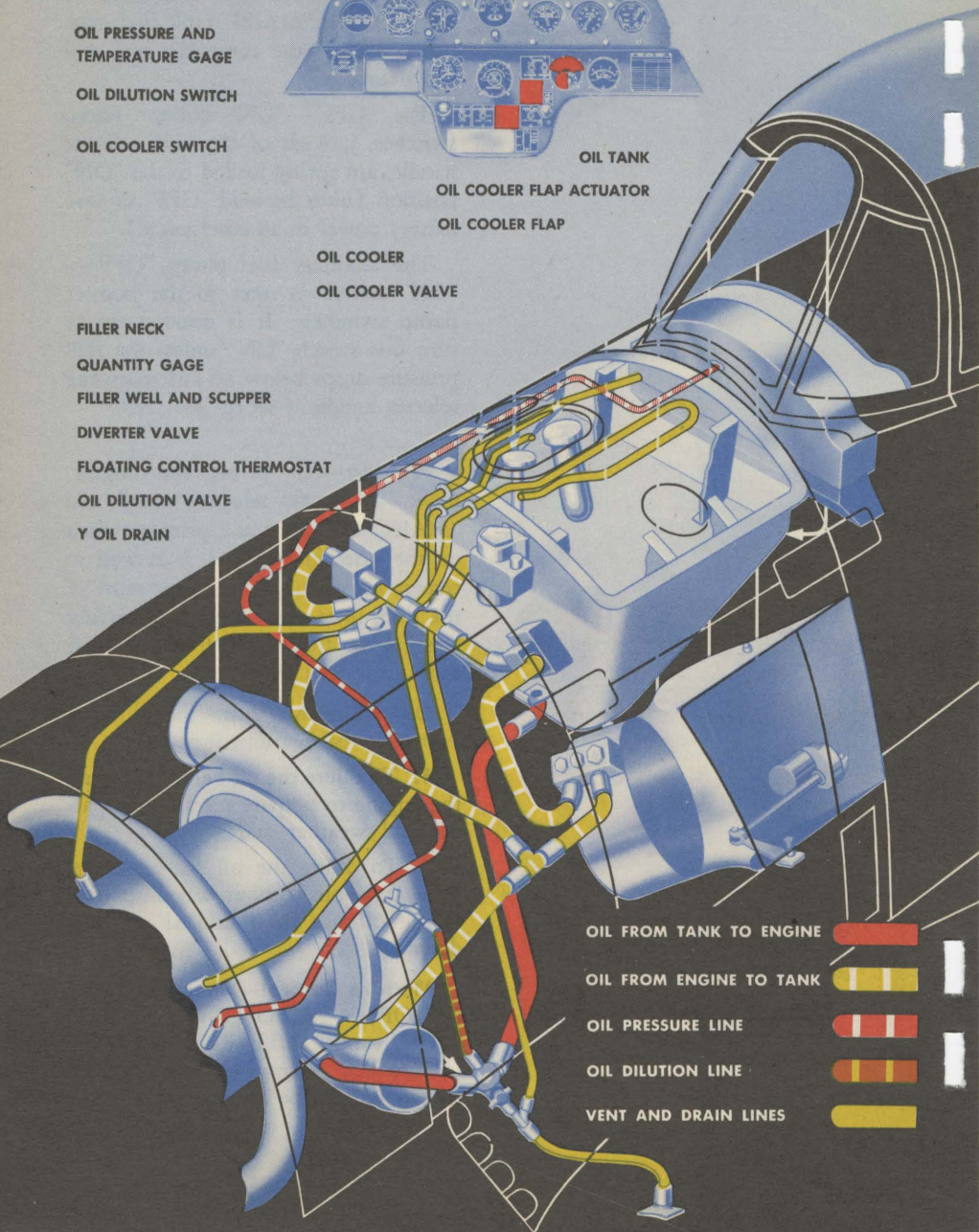
FILLER WELL AND SCUPPER

DIVERTER VALVE

FLOATING CONTROL THERMOSTAT

OIL DILUTION VALVE

Y OIL DRAIN



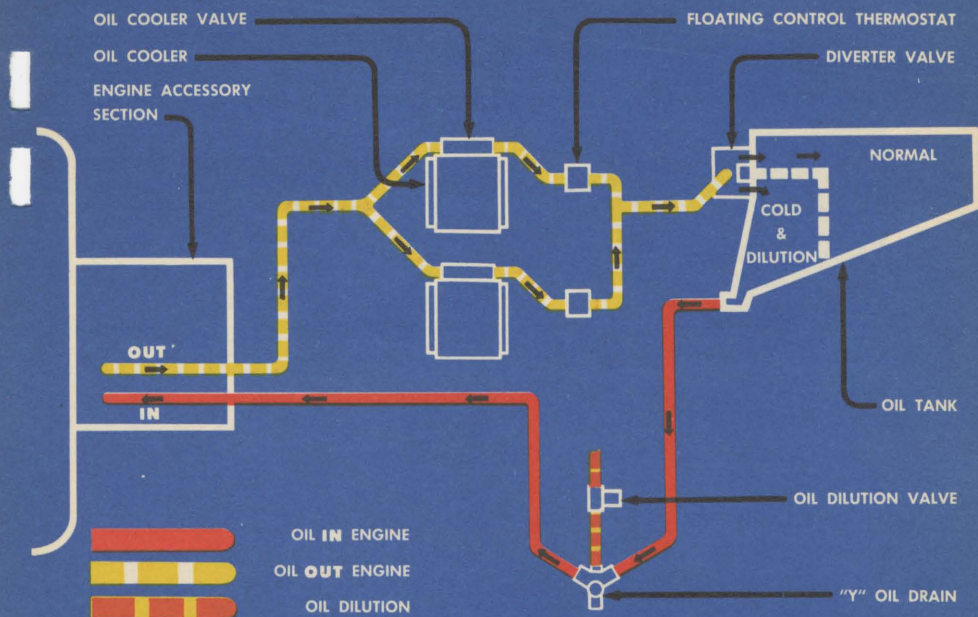
OIL FROM TANK TO ENGINE

OIL FROM ENGINE TO TANK

OIL PRESSURE LINE

OIL DILUTION LINE

VENT AND DRAIN LINES



Oil System—The oil tank forms the top section of the cowling just in front of the windshield and has a capacity of 40 gallons. The oil cooler switch, on the instrument panel, has four positions: "AUTO," "OPEN," "CLOSE," and "OFF." When the switch is in the "AUTO" position a thermostat opens and closes the oil cooler doors to maintain a normal operating temperature. If, with the switch at "AUTO," the temperature exceeds the safe operating range, push the oil cooler switch to the "OPEN" position, hold the switch in

that position for a moment, then let it snap to "OFF." Let the temperature level off and repeat if necessary until the temperature is in the proper range. If the temperature is below the safe operating range push the switch to "CLOSE" and use the same procedure as above until the temperature comes up to the proper level.

A single gage on the instrument panel shows both the oil pressure and oil temperature. The oil quantity gage is in the filler well under the cowling and cannot be seen from the cockpit.

STARTING SYSTEM

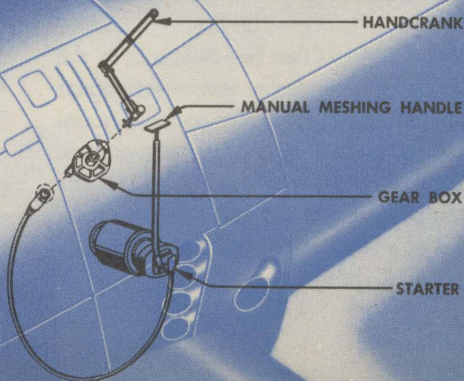
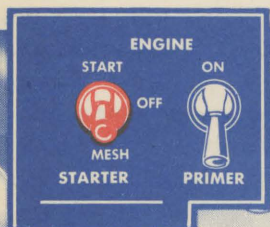


Ignition—The seven dual magnetos are controlled by a four position (“OFF”—“L”—“R”—“BOTH”) master lever switch, and a knob switch used for testing. Set the knob switch to each magneto number, pull it out, and turn it to “R” or “L” to test the plugs in that bank of cylinders. For normal operation return the knob switch to “O” and the lever switch to the “BOTH” position.

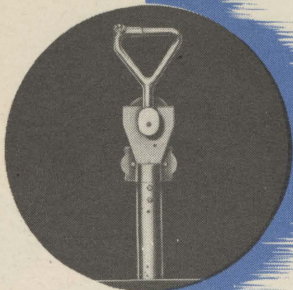
Starting System—The XF8B-1 has an electric and handcranking, inertia

and direct cranking starter with both electric and manual meshing. It connects to the airplane circuit, but external power should be used if available. The starter switch has “OFF,” “START,” and “MESH” positions. In “START” the motor turns on; in “MESH” the starter and engine jaws engage, the motor keeps cranking, and ignition boost is sent to the three top cylinder banks. In “MESH” the starter brushes are also lowered if they had previously been lifted off the commutator by manual meshing.

If electric power is not available, a hand crank and a gear box (not stowed in the airplane) can be plugged into the right side of the engine. The hand crank must be accelerated to 96 RPM before meshing. Pushing the meshing handle engages the jaws, lifts the motor brushes to make hand cranking easier, but does not give ignition boost.

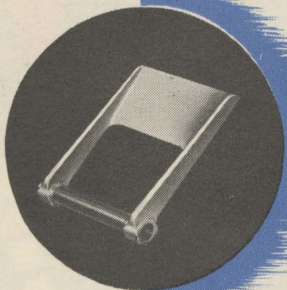


FLIGHT CONTROLS



Ailerons—The pivoted spade grip at the top of the stick controls aileron movement. Only the grip (not the control column) moves in aileron control.

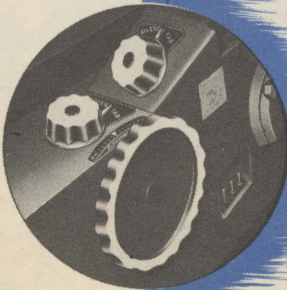
Elevators—The control column and grip move together for elevator control.



Rudder—The rudder pedals are adjustable both for leg length and for the amount of toe in and toe out. Toe pressure on the pedals applies the brakes.



Surface Lock—The ailerons, elevators, and rudder, are locked by pulling out and turning the "SURFACE LOCK" knob on the instrument panel, and moving the controls to neutral. The ailerons, though locked, will move because of spring action in the tab torque tubes. The knob also moves the throttle back and locks it in the closed position.



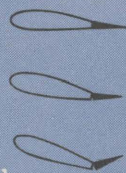
Tabs—The aileron, elevator, and rudder trim tab control wheels are on the left console in the cockpit. These tabs can be preset to balance the airplane for varying load conditions.

FLIGHT CONTROLS Continued

During maneuvers the rudder and elevator tabs act as balance tabs. Thus, as the pilot moves the control surface the tab automatically deflects into the air stream to keep the amount of force the pilot exerts on the controls constant.

The left aileron tab is a trim tab and both aileron tabs are booster tabs. In the case of booster tabs the control action moves the tab and the tab moves the control surface. Thus the pilot exerts enough force to move the small tab rather than the whole aileron.

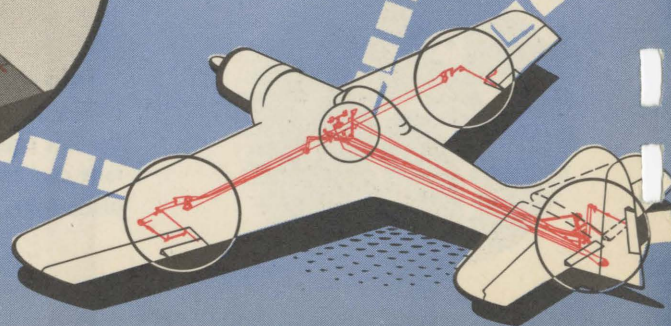
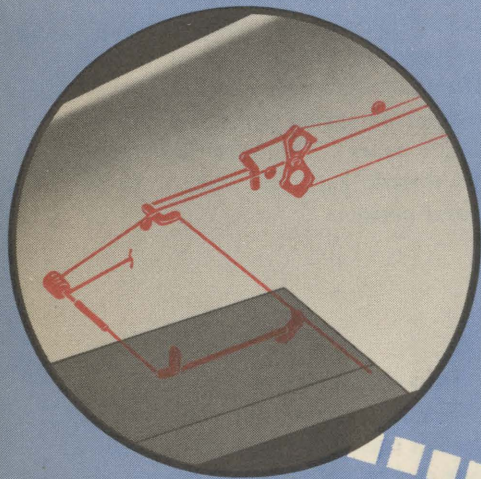
BALANCE TAB—Rudder and Elevators



Neutral

As elevator moves down, tab moves out into wind and helps pilot move surface.

The more the deflection of the surface, the more the tab projects into wind, tending to make force on control stick uniform at all deflections.



TRIM TAB—Rudder, Elevators and left Ailerons



Tab is trimmed to make airplane fly straight and level for any load.

As control surface is moved, angle α° between surface and tab remains constant.

BOOSTER TAB—Aileron

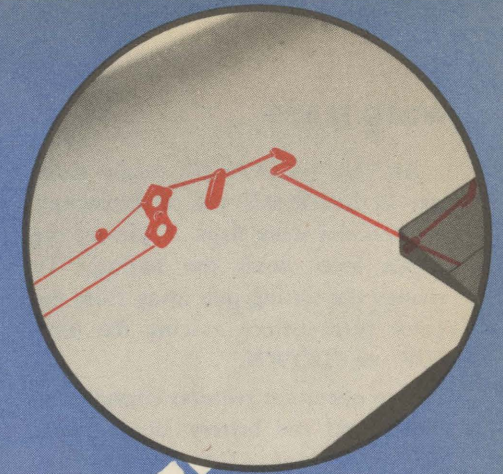
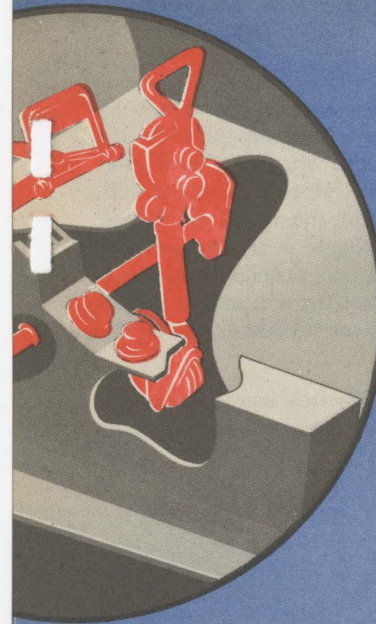


Neutral

Spade grip pushed to right—tab moves up.

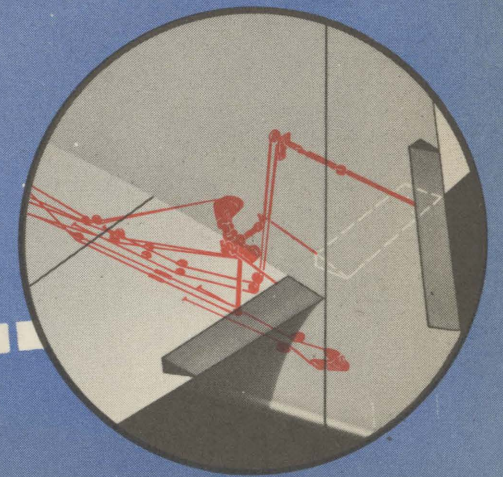
Wind load on tab pushes aileron down, raising left wing for bank.

When load on tab equals load on aileron plus twist in spring tube, aileron stops in down position.



COMBINED FUNCTIONS OF TABS

	RUDDER	ELEVATOR	AILERONS	
			LEFT	RIGHT
BALANCE	✓	✓		
TRIM	✓	✓	✓	
BOOSTER			✓	✓



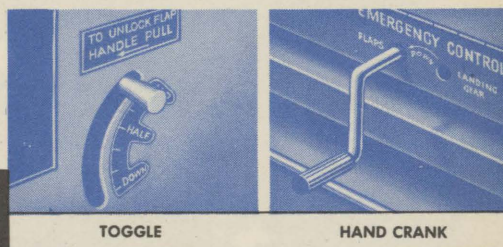
WING FLAPS

An "UP"—"DOWN" toggle rheostat on the left side wall of the cockpit controls the wing flaps. A pin on the toggle lever holds the setting. To change the setting pull away from the pivot point before moving the lever "UP" or "DOWN."

Flap operation requires considerable power and the battery alone cannot handle the load. The generator does not deliver sufficient power until the engine is turning up 1000 RPM or better, so if it is necessary to raise or lower the flaps when the engine is not running or turning over less than 1000 RPM you must use external power.

There is a switch in the right wing fold which automatically prevents the wing flaps from operating until after the wings are completely spread. If, during the time the wings are folded, the rheostat toggle is set for positioning the flaps, then, as soon as the wings are spread, the flaps will assume the set position without further action by the pilot.

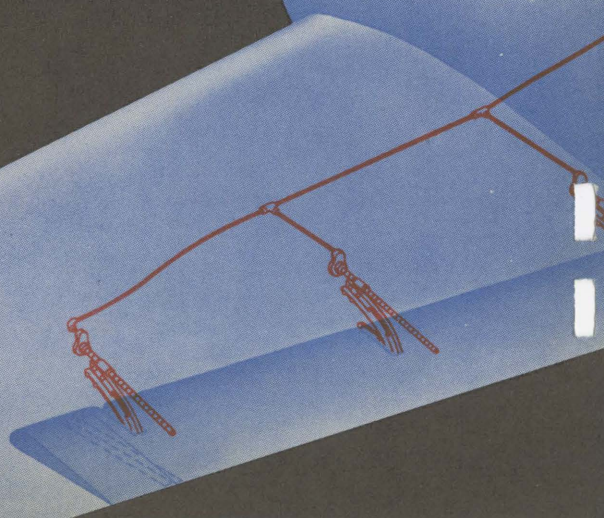
A pressure switch connected to the pitot pressure system will raise the flaps



TOGGLE

HAND CRANK

FOLLOW-UP RHEOSTAT AND LIMIT SWITCH



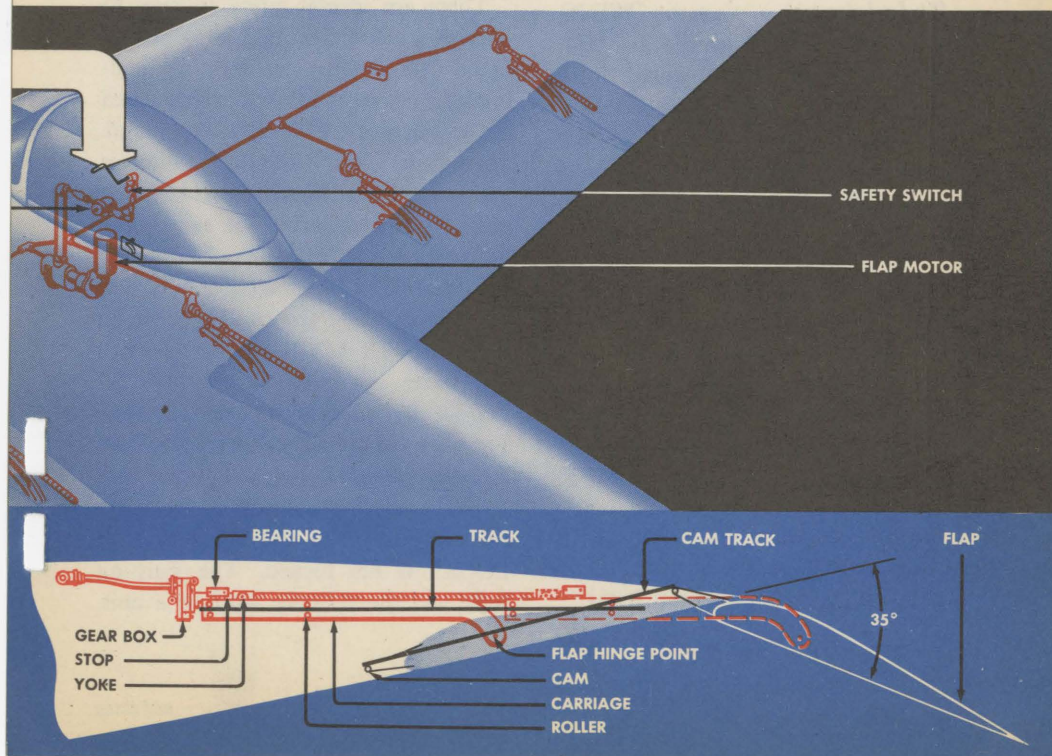
whenever the air speed exceeds 130 knots (150 MPH). If the speed later drops below 120 knots (138 MPH) the flaps will return to whatever position is set on the toggle rheostat.

A hand crank attachment on the right console allows hand operation of the flaps in case of electrical failure. When the crank is in the attachment (crank is stowed in the right console) a safety switch prevents electrical operation. It takes about five minutes (360 turns of the crank) to lower the flaps by hand.

A twenty inch section of the flaps extends over the wing fold. This must

be folded back by hand when the airplane is stowed and extended by hand before take-off is made.

Wing Flap Motor Failure—Check the circuit breaker (must be in) if the flaps don't work when you move the control toggle. In emergency it may be possible to keep the motor running by holding the circuit breaker in even though it is trying to pop out from overload. If the flaps don't move (always check flap position and movement by looking over the side of the cockpit) release the circuit breaker to keep from discharging the battery.



SAFETY SWITCH

FLAP MOTOR

BEARING

TRACK

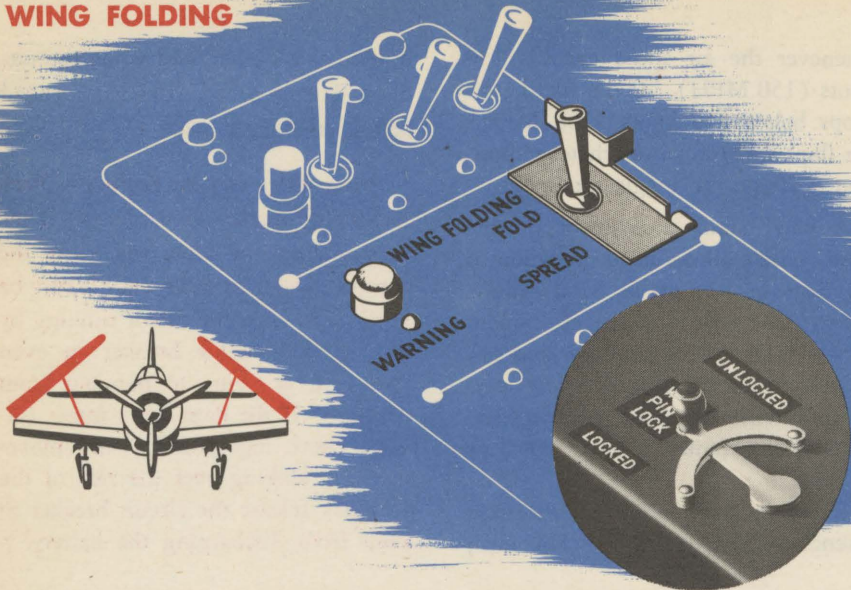
CAM TRACK

FLAP

GEAR BOX
STOP
YOKEFLAP HINGE POINT
CAM
CARRIAGE
ROLLER

35°

WING FOLDING

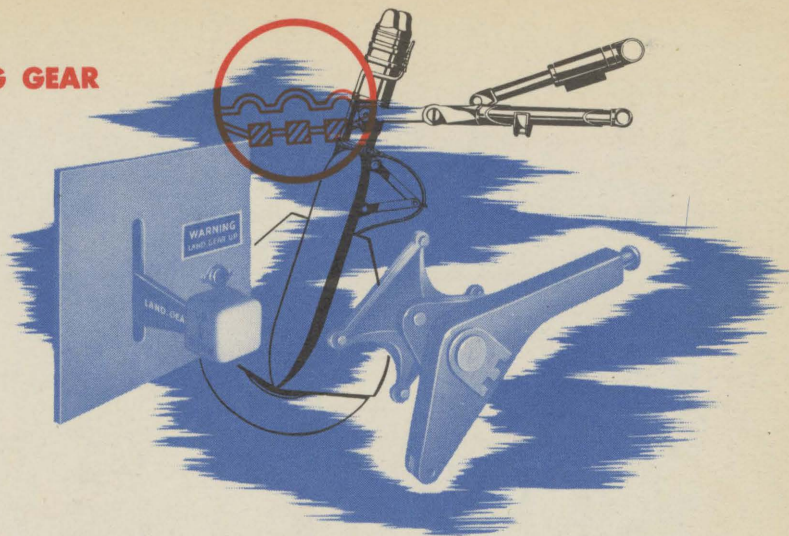


To fold the wings, place the "WING PIN LOCK" control handle at "UNLOCKED," raise hinged guard from the "WING FOLDING" toggle switch, check throttle position with power source (see following paragraph), and flip the "WING FOLD" toggle switch to "FOLD."

The XF8B-1 wings are electrically folded. External power or generator power must be used because the battery can't handle wing folding. If the engine is running, the throttle setting must be above 1000 RPM to use generator power and below 1000 RPM to use external power. If the engine is stopped the external power will not cut in to fold or unfold the wings when the throttle is set above 1000 RPM.

There are several safety features to prevent accidental wing folding during flight. First, a squat switch on the landing gear prevents folding except when the airplane is on the deck or ground. Second, the "WING FOLD" switch is protected by a hinged guard which must be moved before the switch can be pushed to "FOLD." Third, the "WING PIN LOCK" control handle at the rear of the right console must be moved to "UNLOCK" or the pin will not come out even if the "WING FOLD" switch is pushed to "FOLD." Fourth, a red cylinder extends from the top of the wing and a red warning light on the right console in the cockpit remains on if the "WING PIN LOCK" is not locked. The warning light and the cylinder work as a unit.

LANDING GEAR



The XF8B-1 landing gear is electrically operated. A control handle at the upper left corner of the instrument panel operates up-locks which prevent the wheels from vibrating down, and the switch which turns on the retracting motor. Limit switches shut off the landing gear motor when the gear is fully retracted or extended. The landing gear position indicator, on the instrument panel, shows whether the wheels are up or down. If the throttle is closed below about 1000 RPM before all the wheels are down, a red warning light next to the control handle lights up.

Don't attempt to raise or lower the gear above 152 knots (175 MPH).

A squat switch on the right wheel prevents retraction of the landing gear when the airplane is on the deck.

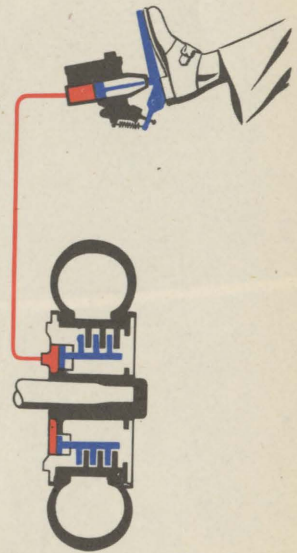
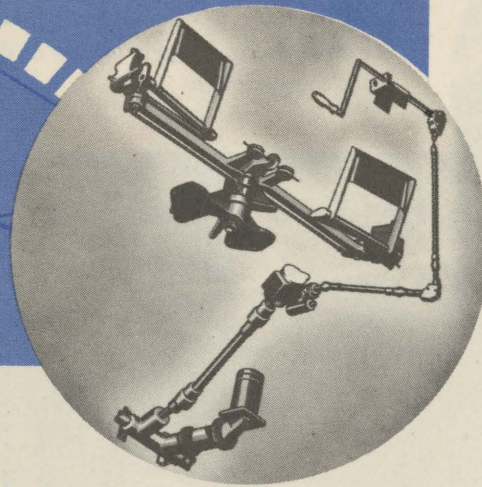
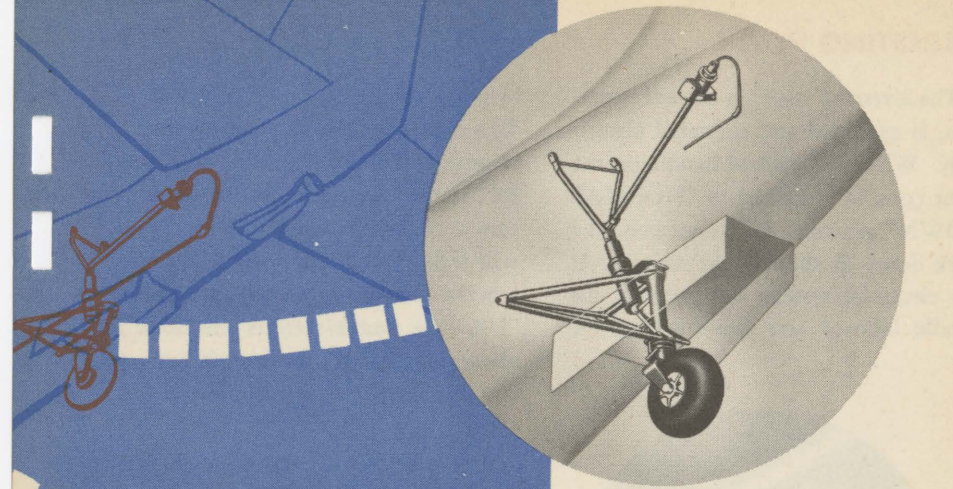
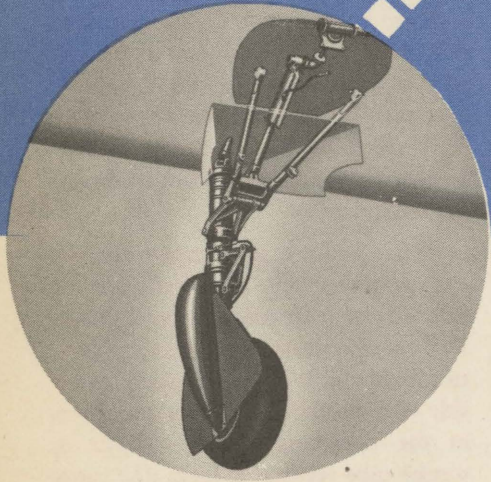
Landing Gear Emergency Operation—If the landing gear doesn't come

down when the lever is pushed to "DOWN," check the circuit breaker. If it is popped out and if it is necessary to get the wheels down in a hurry, push it in and hold it there. The motor may still work even though the circuit breaker is trying to pop out from the overload. If, however, the wheels still don't come down, release the circuit breaker at once to keep from discharging the battery.

If the landing gear motor or the electric power fails, the wheels can be extended or retracted by a hand crank. The crank is stowed on the right control stand and is inserted for use in the side of the stand in a socket connected to the retracting screws through a torque tube system. It takes 230 turns of the crank (about 3½ minutes) to raise or lower the landing gear. A safety switch prevents electrical operation when the crank is in the socket.

LANDING GEAR

Tail Wheel Lock—The landing gear cannot be retracted electrically (can be manually) unless the tail wheel is centered. In order to center the tail wheel, taxi forward in a straight line and push down on the tail wheel lock lever on the left console. The tail wheel must always be locked except when taking-off or landing on a carrier, or when taxiing under 30 knots (35 MPH).



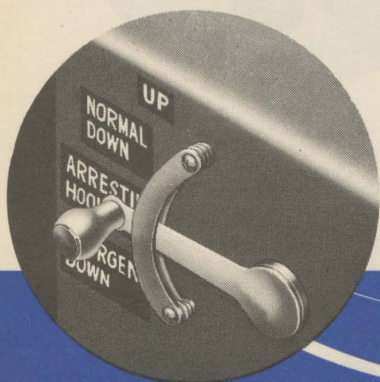
Brakes—To apply the hydraulic disc type brakes, push on the rudder toe pedals. The brakes are direct acting. There is no hydraulic pump or accumulator. There is no parking brake.

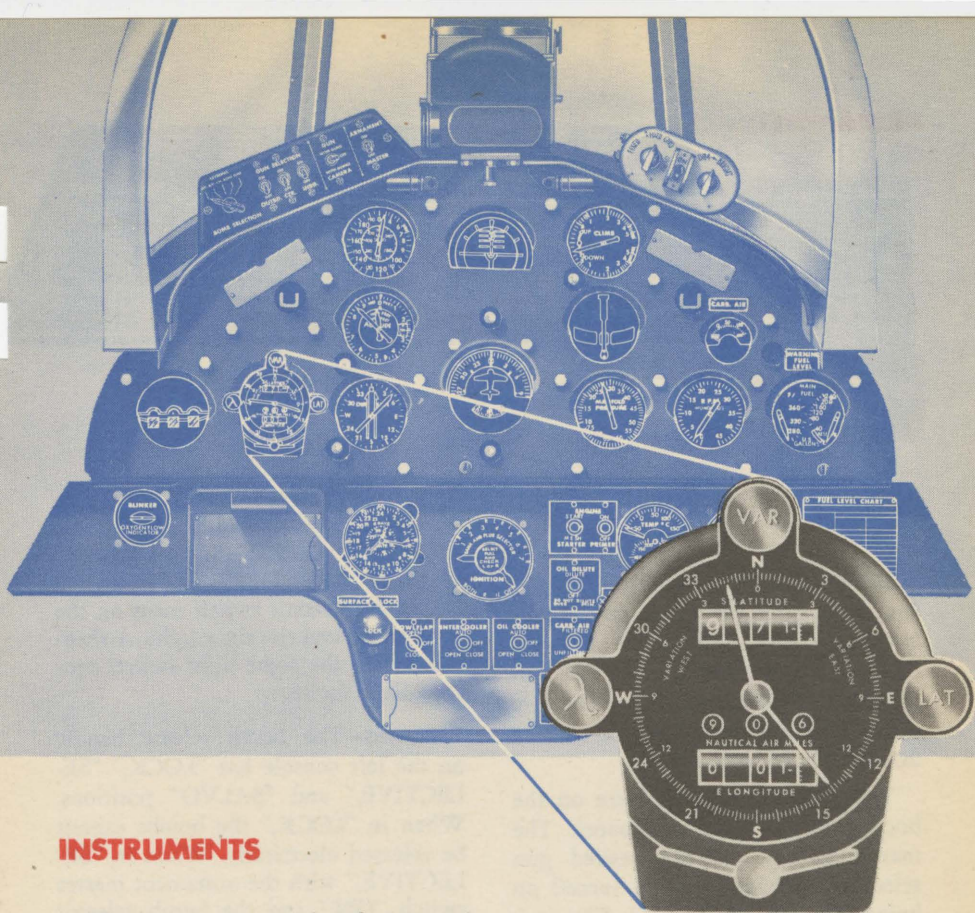
ARRESTING HOOK

The arresting hook, in normal operation, is extended and retracted electrically. When the control handle on the right console is moved to "NORMAL DOWN" position, the motor runs the hook down in about eight seconds. If the electrical system fails, spring the handle inboard and move it past the

stop lug to "EMERGENCY DOWN." This unlatches the hook and allows it to swing free, but it cannot be retracted. If the electrical system again becomes operative, the retracting screw will follow the hook down and relatch with it. When the handle is returned to "UP," the motor retracts the hook in about 11 seconds. Limit switches stop the motor in the up and down positions.

Lowering the arresting hook turns on the approach light. The light may be turned on for practice landings with the hook up by a toggle switch in the radio compartment.





INSTRUMENTS

The instrument panel and right and left consoles have the usual primary and secondary flight and engine instruments. They are conventional and the arrangement is shown by the photographs in the front of the book.

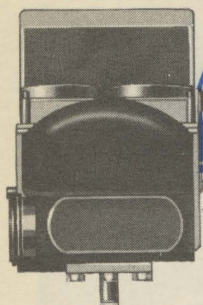
The A. P. I. (Air Position Indicator), when set for longitude, latitude, and magnetic variation at the point of take-off, will show the airplane's air position at all times during the mission and show the air miles covered. Three knobs on the face of the dial are used to make the original settings, and two

levers at the bottom are used to set for north or south latitude and east or west longitude. AN 05-35-34 describes the instrument and its use.

The fuel quantity gage indicates the fuel in the main tank only. The bomb bay tank gage is visible through a hole in the floor. The external tanks do not have fuel quantity gages.

The oil quantity gage is not visible from the cockpit.

ARMAMENT



Guns and Cannon—The XF8B-1 has, mounted in the wings, six .50 caliber machine guns, or six 20 MM cannon or a combination of both. The ammunition boxes hold approximately 400 rounds for each machine gun or 200 rounds for each cannon.

The armament switches are on the hood over the instrument panel. The master switch and the desired gun selection switches must be turned on before the guns can be fired. The guns are charged by running down the wing flaps, inserting a charging rod through the flap opening, and pulling back on the charging lug.

The Mark 23 gun sight computes lead and elevation when range and wingspread are set up. A pointer above the crashpad sets up wingspread. Range is set by twisting the throttle handle. A handle on the right side of the sight masks all the fixed reticle image except the center cross. The image selector switch, to the right, has "FIXED" (for rocket sighting bore-

sighted with the guns), "GYRO" (center dot and six-diamond circle), and "FIXED & GYRO" (both images) positions. An "OFF"—"ON" switch beside the selector switch turns on the gyro motor and the sight light. A rheostat beside the sight light switch controls light intensity.

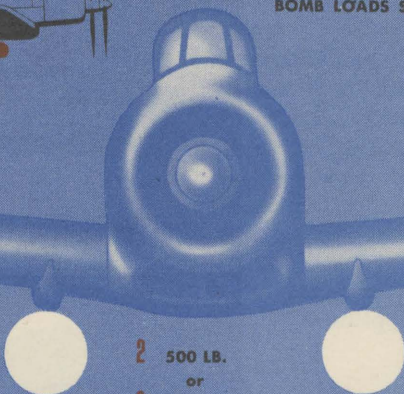
Bombs—The bomb release handle on the left console has "LOCK," "SELECTIVE," and "SALVO" positions. When in "LOCK," the bombs cannot be released electrically. When in "SELECTIVE," with the armament master switch "ON," and the bomb selector switch set to any rack, the bombs can be released from that rack one at a time by pressing the button on the left top of the spade grip.

When pushed to "SALVO," all internal bombs are released unarmed. Two red pull handles above the bomb release handle drop the external bombs unarmed.

The gun camera in the air scoop is operated by setting the gun camera switch to "WITH GUNS" or "WITH BOMBS" and pressing the trigger or bomb release button respectively.

BOMB LOADS

BOMB LOADS SHOWN ARE FRONT VIEW



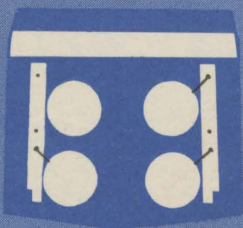
2 500 LB.

or

2 1000 LB.

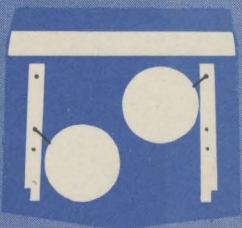
or

2 1600 LB.

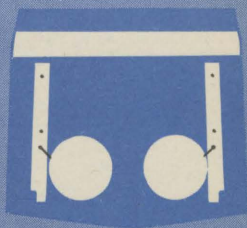


4 AN-M43 500 LB. G.P.
or

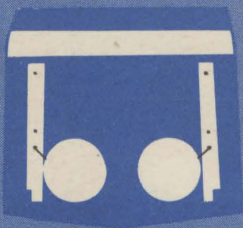
4 AN-M58A1 500 LB. S.A.P.



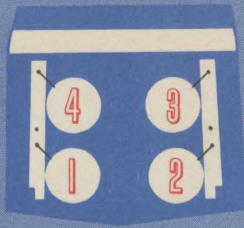
2 AN-M44 1000 LB. G.P.



2 AN-M59 1000 LB. S.A.P.



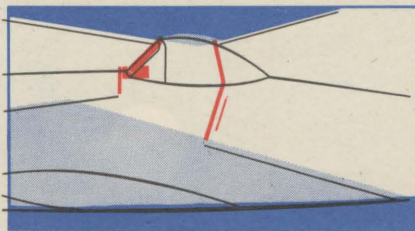
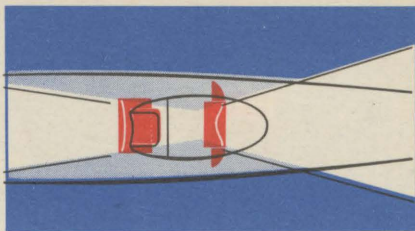
2 AN-MK33 1000 LB. A.P.



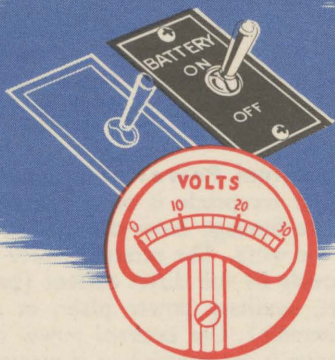
BOMB RELEASE ORDER

PILOT'S ARMOR PROTECTION

The airplane's armor plate protects the pilot from enemy gun fire (up to .50 caliber) originating in a 30 degree cone from the rear and a 15 degree cone from the front. Half inch steel plate protects the pilot's head and $\frac{3}{8}$ inch plate protects his back below the structure line. Three-eighths inch plate and 1.50 inch armor glass protects him from the front. Quarter inch duraluminum at the sides of the seat and over the instrument panel, as well as the engine, oil tank, structure, and other equipment provide supplementary protection.



ELECTRICAL POWER



Battery—The XF8B-1 has a 17 ampere-hour 24 volt battery. It is designed to carry light loads when the generator is not running or when external power is not available, and to aid the generator during peak load periods. It should be used alone only for such light loads as instruments, lights, priming, opening the cowl flaps, etc. Do not use the battery alone to operate the radios, shut the bomb doors, retract or extend the landing gear or wing flaps, fold or spread the wings, or to fire more than two guns at a time.

The battery "OFF"—"ON" switch on the right console cuts the battery in and out of the electrical system. The recognition lights, IFF radio destructor, and the cockpit receptacle are connected directly to the battery and not

the power bus so are not affected by the position of the switch.

Battery Failure — The battery discharges rapidly during peak electrical loads such as occur during taxiing, combat, or landing, but recovers during take-off, climb, level flight, etc. If, however, the discharge was too rapid, part of the electrolyte may have boiled away. This prevents complete recharging.

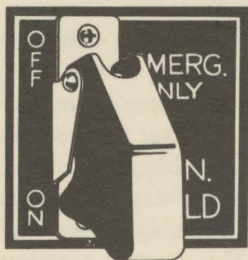
If the battery is discharged before starting the engine and when external power is not available, it may be impossible to get the necessary power for fuel and ignition boost, and engine priming.

Use the voltmeter to check the battery charge during flight. If the engine is above 1000 RPM and the system is carrying a heavy load, a voltmeter reading below 20 for more than 5 seconds indicates a low battery charge.

Generator—A 200 ampere 28 volt direct current engine driven generator carries the electrical load and recharges the battery. It is driven at three times engine speed and is cut into the electrical system automatically when the engine speed passes 700 RPM. Turn the switch on the instrument panel under the red guard to "OFF" to cut out the generator if attempting a crash landing.

The voltmeter, on the right console, shows when the generator is operating.

ELECTRICAL POWER Continued



Generator Failure—If the engine RPM is above 700 and the voltmeter reads "0," some part of the generator circuit has failed.

Battery Use After Generator Fails

1. Turn off all but essential equipment. To get the greatest possible service out of the battery charge, turn the battery switch to "OFF," except for necessary instrument or radio use.

2. If the battery switch only is "ON" (instruments and electric fuel pumps using power) the battery lasts about 15 minutes.

3. With continuous use of above equipment plus one radio, the battery lasts 12 or 13 minutes. If all radios are used with above equipment it will last 9 minutes.

4. If the instruments only are used (booster pumps may be held "OFF" if the engine fuel pump maintains 16 PSI) the battery lasts about 30 minutes.

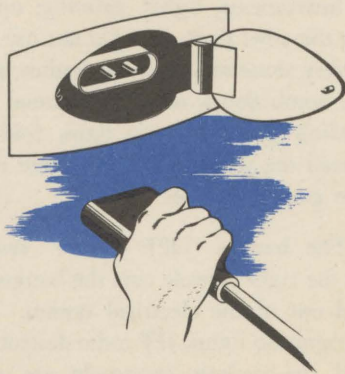
5. If operating on auxiliary tanks, the auxiliary fuel pump can only be

turned off with the battery switch. If on Main tank, turn "OFF" the auxiliary fuel pump switch.

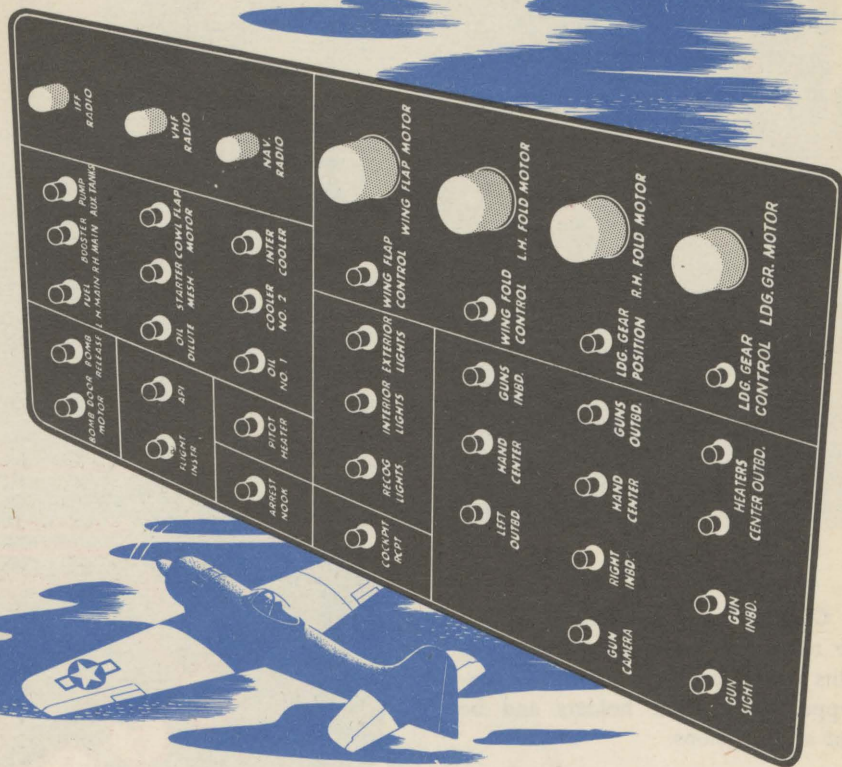
Note: The above figures are based on a battery with full charge (17 ampere hour).

External Power—The external power receptacle is on the right side of the fuselage above the trailing edge of the wing. The external source must provide 24 volt direct current (battery cart, auxiliary power plant, or ships generator). Use external power if the engine is not running or is turning up less than 700 RPM. (Generator doesn't cut in unless the engine is turning over 700 RPM or better.)

External power should be used for electrical starting except in emergency, since the starter motor will drain the battery rapidly. Use external power for wing folding unless the engine is turning over at more than 1000 RPM.



CIRCUIT BREAKERS

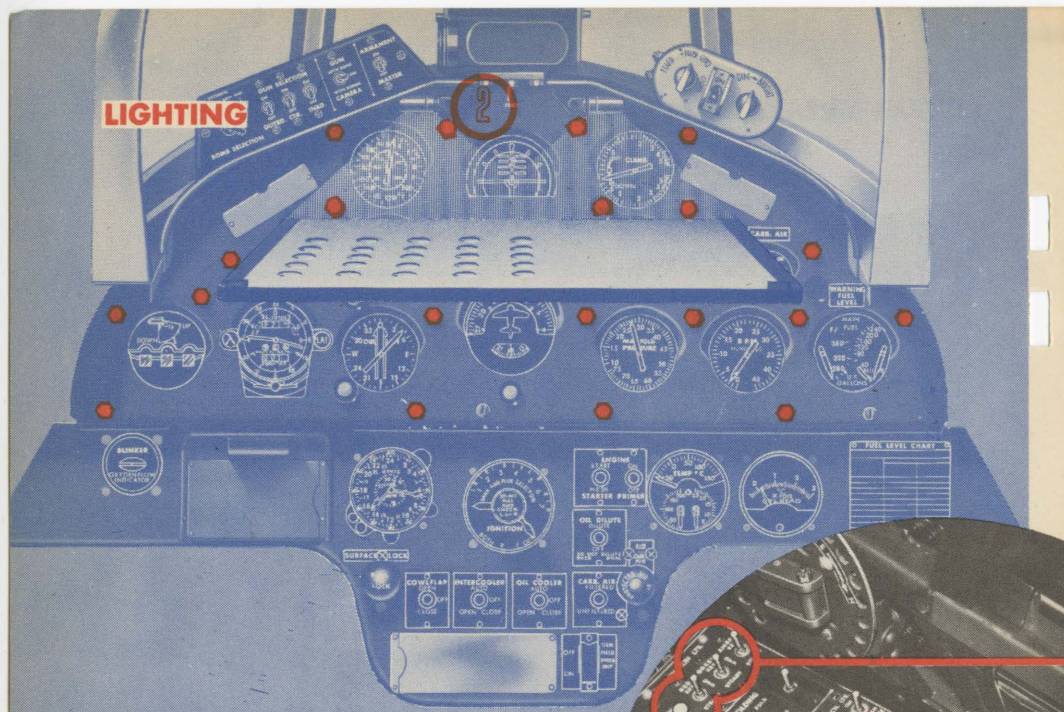


All XF8B-1 circuits except the IFF radio destructor, starter motor, battery, generator, tachometer, and thermocouple circuits are protected by thermal pushbutton type circuit breakers. The circuit breaker panel, pictured above, is on the right console. A luminous wing and a red area around the circuit breaker (except for the seven in the top row) shows if the circuit breaker pops out. The radio circuit breakers

(in the top row) must cool before they can be reset but all others may be held in to operate the equipment in these circuits during an emergency.

The homing receiver has, in addition to the circuit breaker protecting its wiring, a 10 ampere fuse on its mounting rack which protects the equipment. This, by the way, is the only fuse in the XF8B-1.

LIGHTING



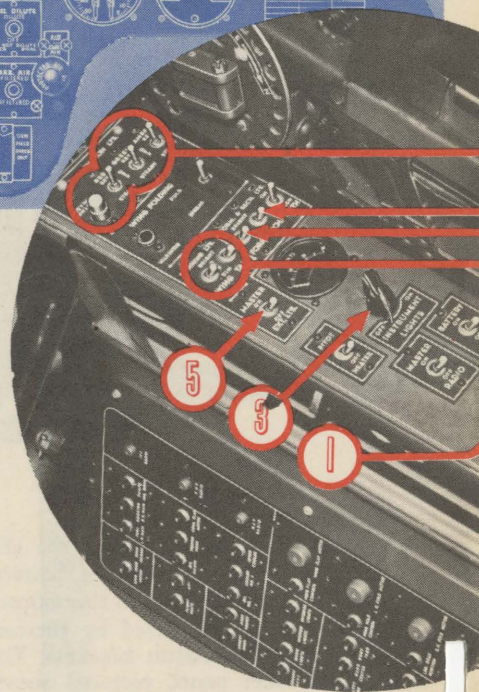
1 Cockpit Light Rheostat—Controls five red lights under sills. The three lights under the right sill can be un-snapped from their holders and be used as extensions.

2 Chartboard Light Switches—These switches are on the red lights.

3 Instrument Panel Light Rheostat—Controls red light intensity. The bulbs can be replaced in flight through snap covers on the rear of the lights.

4 Recognition Light Switches—Have "OFF" — "STEADY" — "KEY" positions. When this switch is in "KEY," use the "KEYING SWITCH" to blink code. These lights operate independently of the battery switch.

5 Master Exterior Light Switch—This switch turns off running, formation and section lights.



6 Running Light Switches — One controls the wing lights, the other the tail light. Each switch has "OFF," "BRIGHT," and "DIM" positions. Colored resin lenses, interchangeable with the tail light lens, are used for recognition and signals during tactical operations.

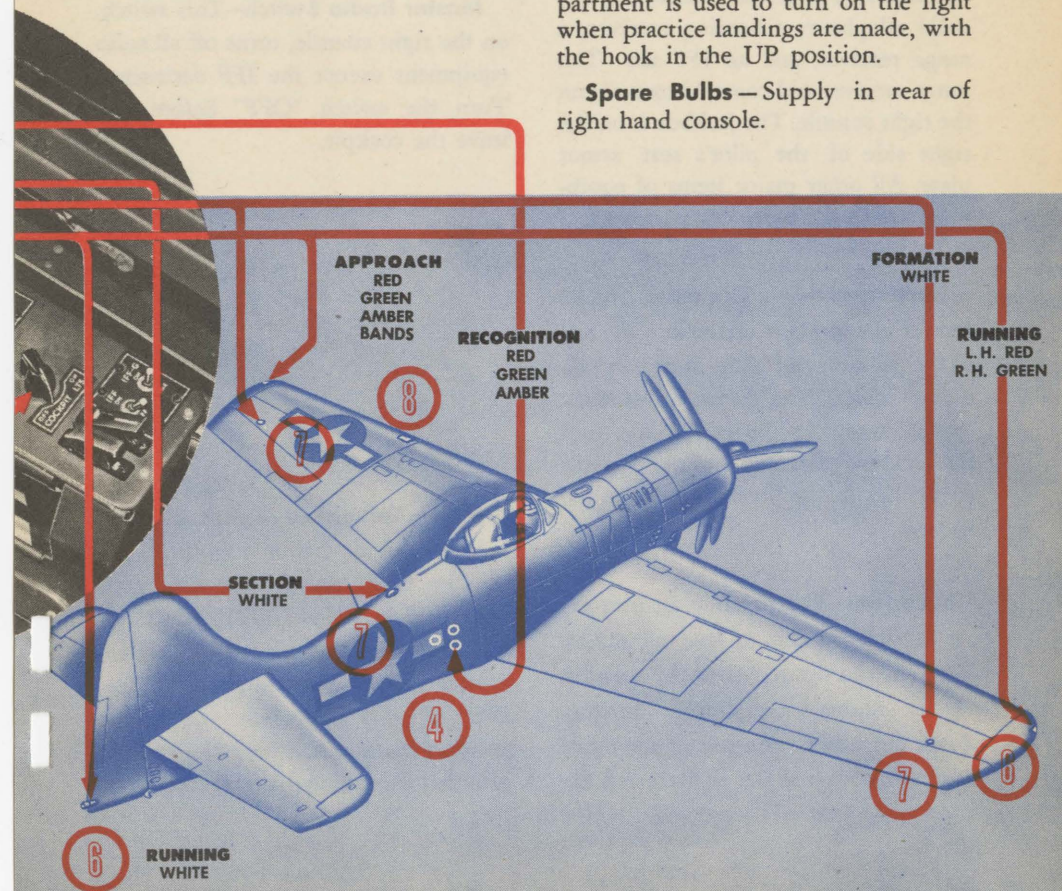
7 Formation and Section Light Switches—Both formation and section

lights have "BRIGHT" — "DIM" switches. A third switch, controlling both, has "ON," "OFF," and "FLASH" positions.

8 Approach Light—This light turns on when the arresting hook is lowered. The light has three color bands. For the carrier officer to see the yellow band, the hook must be down, the airplane 100 feet astern, 25 feet above the deck and traveling 10 to 12 knots above stalling speed.

A toggle switch in the radio compartment is used to turn on the light when practice landings are made, with the hook in the UP position.

Spare Bulbs—Supply in rear of right hand console.



6 RUNNING WHITE

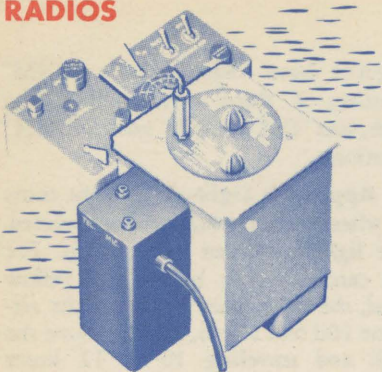
APPROACH
RED
GREEN
AMBER
BANDS

RECOGNITION
RED
GREEN
AMBER

FORMATION
WHITE

RUNNING
L. H. RED
R. H. GREEN

RADIOS



Radios—The XF8B-1 has a two way radio telephone, a homing receiver, a range receiver, and an IFF set. The range receiver and control boxes are on the right console. The jackbox is on the right side of the pilot's seat armor plate. All other major items of equipment are in the radio compartment.

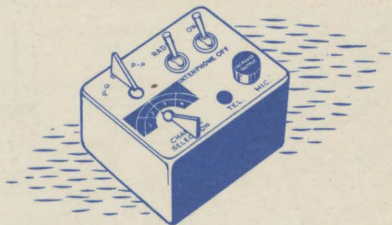
Microphones — The hand "mike" stays in the airplane, plugs into the top of the jackbox, and is cut in by a switch on the "mike." The throat, lip, or mask "mike" issued to the pilot plugs into the jackbox extension cord, and is cut in by the microphone button on the throttle.

Headset—Plug the headset into the top of the jackbox to hear all radios. Tune in the desired radio by turning up its volume control and turning down the volume controls of the other radios. Always use the jackbox and ex-

tension cord, never plugging the headset or "mike" into a control box; the cords might not pull free if you have to bail out.

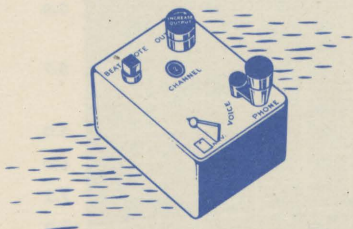


Master Radio Switch—This switch, on the right console, turns off all radio equipment except the IFF destructor. Turn the switch "OFF" before you leave the cockpit.



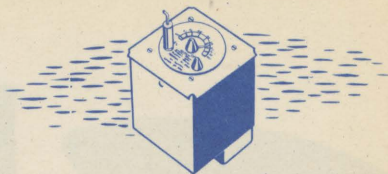
Radio Telephone Controls — The radio telephone has five controls: an "ON"—"OFF" switch, a volume control, a "RADIO"—"INTERPHONE" switch which must be left on "RADIO" to receive and transmit, a "P-G" — "BOTH"—"P-P" switch, and a four position channel selector switch which provides the following connections:

SWITCH POS.	TRANS. CHANNEL	RECEIVER CHANNEL
1	P-P	P-P & P-G No. 1
2	P-G No. 1	P-P & P-G No. 1
3	P-G No. 2	P-P & P-G No. 2
4	P-G No. 3	P-P & P-G No. 3



Homing Receiver Controls — The homing receiver control box has four controls: a channel selector crank (the channel number appears in a cutout on the face of the control box) to tune in any one of six transmitters, a volume control, a switch labeled "OFF"—"NAV"—"VOICE" to separate the voice and CW signals. (The "OFF" position is blocked and covered by a metal tab and the set can be turned on and off only by the master radio switch), and a "BEAT NOTE" knob for varying the pitch of CW signals.

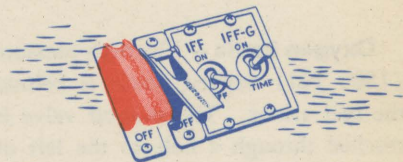
Don't use the "PHONE" jack in the homing receiver control box as the cord may not pull free if you have to bail out.



Range Receiver Controls — The range receiver has two controls: an "OFF"—"ON"—"VOLUME" control knob, and a tuning knob and dial.

There is a phone jack connected to the jackbox on the seat armor.

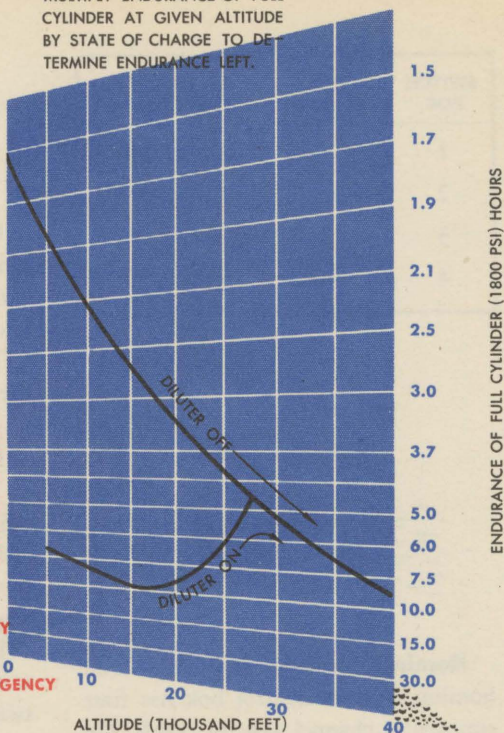
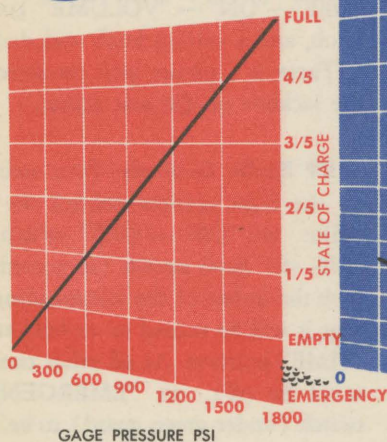
IFF Radio Controls—Four switches on the right console control the IFF radio: an "ON"—"OFF" switch, an "IFF—G" band switch (in accordance with the orders of the commanding officer it will be turned on or held at the "TIME" position. At all other times it will be off), an "EMERGENCY" switch (under green guard) to be used



if the pilot is in trouble, requires assistance or the airplane is damaged, and a "DESTRUCTOR" switch (under red guard) to destroy the set if a forced landing is to be made in enemy territory. A hard shock parallel to the thrust line of the airplane also will set off the destructors.

OXYGEN

MULTIPLY ENDURANCE OF FULL CYLINDER AT GIVEN ALTITUDE BY STATE OF CHARGE TO DETERMINE ENDURANCE LEFT.



Oxygen Bottle — The high pressure (1800 PSI) oxygen bottle is behind the seat armor. The shut-off valve is reached through a hole to the left of the seat. The filler valve is on the left console near the bottle.

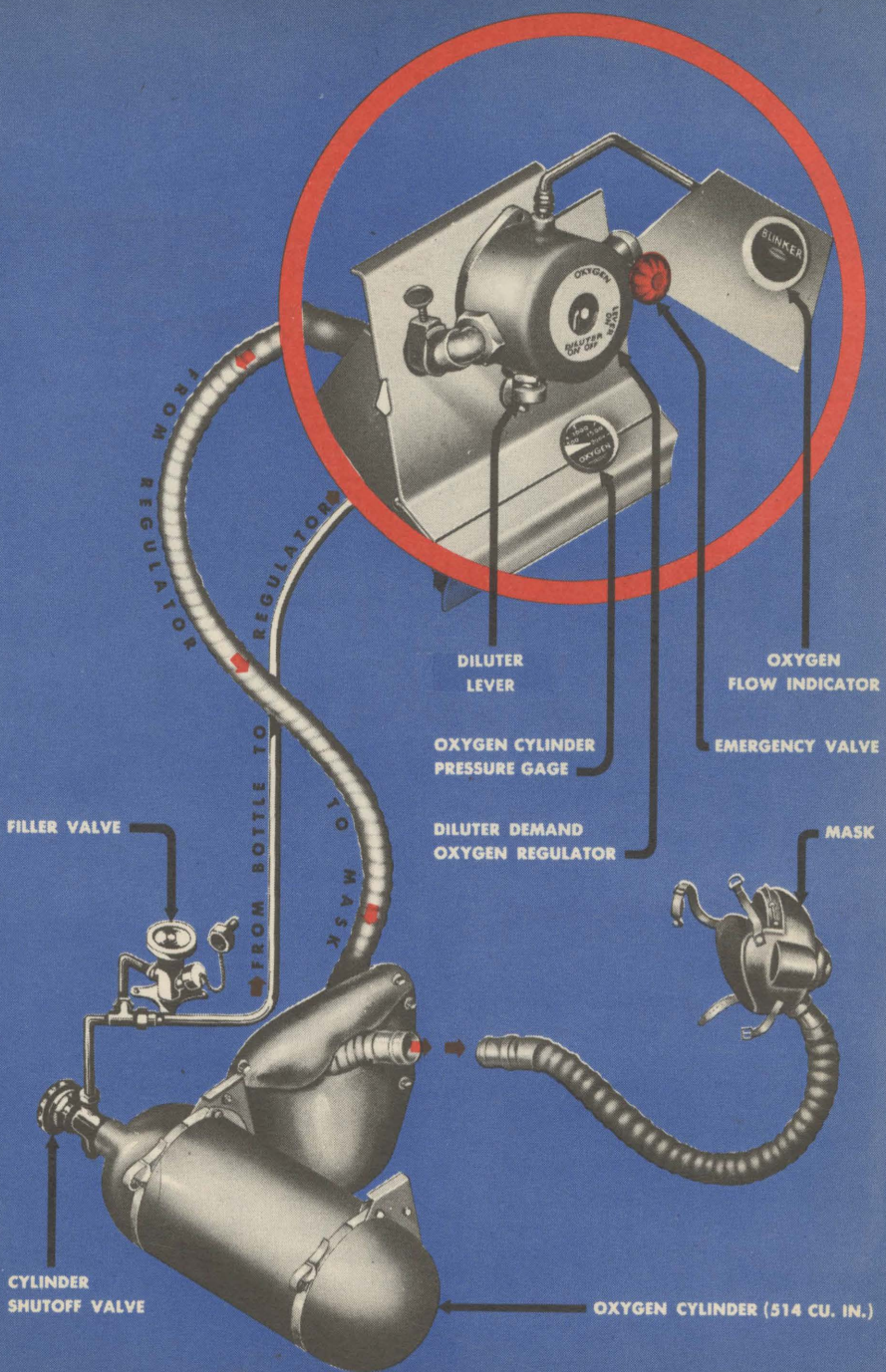
Mask—When not in use, the oxygen mask is stowed in a pocket on the left console. The mask is connected to the oxygen regulator by a flexible hose, with a disconnect joint near the mask.

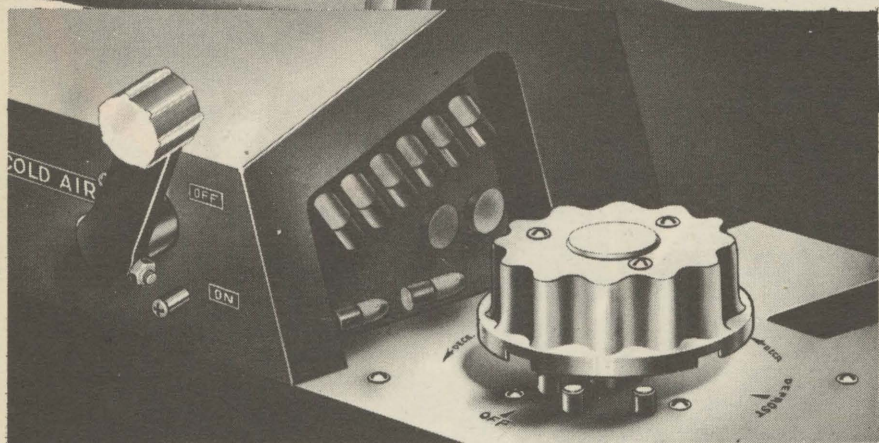
Regulator — The diluter demand regulator at the forward end of the left

console automatically regulates the proportion of air and oxygen sent to the mask at all altitudes. Oxygen is admitted only when the wearer inhales. If pure oxygen is needed, turn off the diluter lever. If a steady flow is needed, turn on the red "EMERG." knob.

Pressure Gauge—The pressure gauge, just below the regulator, indicates the amount of oxygen left in the bottle.

Flow Indicator—The blinker type flow indicator shows that the demand valve is working properly and that oxygen is flowing to the mask.





HEATING & VENTILATING

The heating and ventilating controls on top of the right console consist of a knob and pointer set on a calibrated dial having three stated conditions "OFF" — "CABIN HEAT MAX." — "DEFROST MAX." In the "OFF" position the warm air is spilled overboard through the engine accessory section. In the "CABIN HEAT MAX." position the hot air is directed into the cockpit, and in the "DEFROST MAX." posi-

tion it is directed against the inside of the windshield. When the pointer is moved between the positions the air is split between the cockpit and windshield or overboard.

A cold air "ON" — "OFF" control lever on the right console below the radio controls allows mixing cold air with the hot air entering the cockpit or the use of cold air alone if it is too hot.

EMERGENCY EQUIPMENT

Emergency Canopy Release—In emergency, jettison by pulling T handle above the windshield.

Normal Canopy Release—If inside, crank at forward right corner. If outside, press rubber patch below windshield on the right side, and push canopy back.

Backpad Kit—Forms seat pad, has separate harness and contains:

Rations (3 Cans)	Sunburn Ointment
Water (2 Cans)	Compass & Matches
First Aid Kit	Jungle Machete
Salt Tablets	Pocket Knife
Safety Pins	Sharpening Stone
Fishing Kit	Corrosive Preventive
Whistle	Cotton Line (25 Ft.)
Magnifying Glass	Canvas Gloves
Signaling Mirror	Poncho
Adhesive Tape	Mosquito Headnet

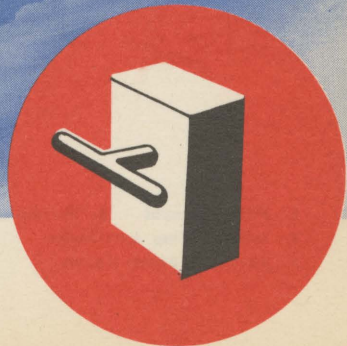
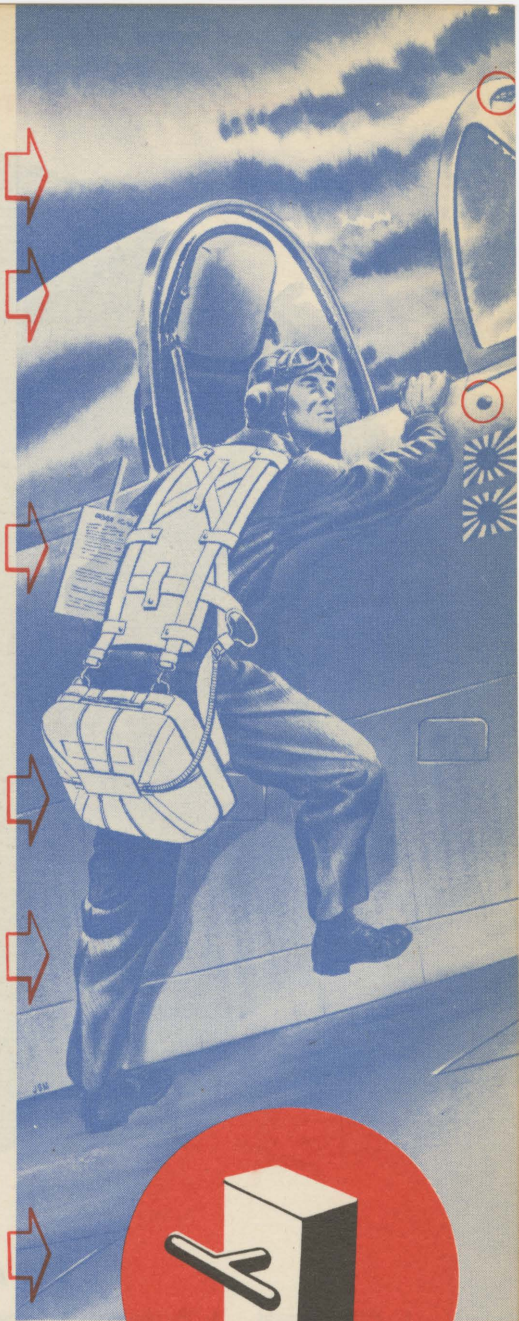
Very Pistol and Six Red Cartridges

Parachute Life Raft—Attach to chute—holds:

Bullet Hole Plugs	Bailing Cup
Co ₂ Inflation Bottle	Sea Anchor
Can of Water	Oral Inflation Tube
First Aid Kit	Sea Marker Dye
Hand Paddles (2)	Repair Kit

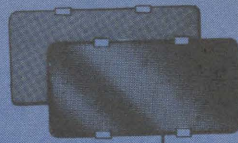
Seat Parachute—A standard issue seat parachute will be worn by the pilot.

Engine Fire Extinguisher—To operate the engine CO₂ fire extinguisher system pull the release handle at the rear of the right hand console. Flames blowing out of the cowl flaps indicate fire around the cylinders. Open the cowl flaps wide to limit trapped heat damage and pull extinguisher handle. If the fire is in the accessory section the flames will come out of the ventilating slots on the sides of the nacelle.

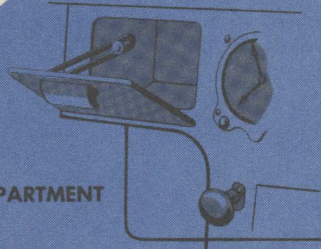


MISCELLANEOUS EQUIPMENT

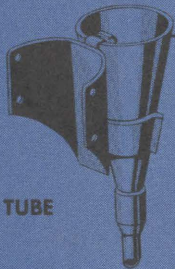
REAR VIEW MIRRORS



DATA COMPARTMENT



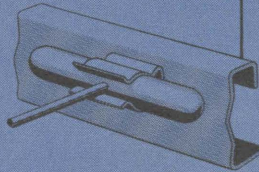
RELIEF TUBE



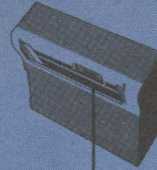
PILOT'S SEAT



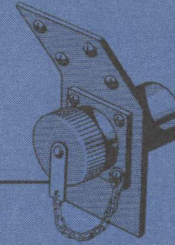
GUN CHARGER HANDLE



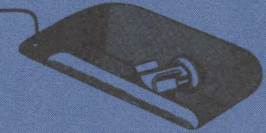
CHARTBOARD STOWAGE



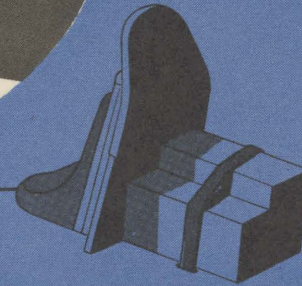
COCKPIT RECEPTACLE



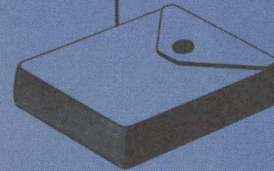
TOW TARGET HANDLE



BAGGAGE COMPARTMENT



HANDBOOK STOWAGE



EQUIPMENT FURNISHED WITH

1. Pilot's Manual
2. Service and Maintenance Manual
3. Aircraft and Engine Log Books
4. Folding Wing Jury Struts
5. Catapult Hooks
6. External Bomb and Tank Supports
7. External Bomb Hoists
8. Droppable Fuel Tanks—Bomb Bay and External

BUT NOT CARRIED IN AIRPLANE

9. Tow Target Container and Release Hook
10. Tow Bar and Tool Kit
11. Hoisting Slings—Airplane and Engine
12. 20 MM Cannon Alternate Parts
13. Resin (Tail) Light Lenses—Red, Green, and White
14. Alternate Radio Parts



SEC-2
NORMAL FLIGHT
OPERATIONS

NORMAL FLIGHT OPERATIONS

Section 2



The XF8B-1 Navy fighter is designed for high speed and maneuverability at low and medium altitudes. The comments of two test pilots are summarized in the following paragraphs.

The airplane has very good ground handling characteristics. The rudder is very light and is effective above 25 knots (29 MPH). The brakes hold the airplane at military power, but there is some tendency for the tail to rise.

Shortest take-off is made with full flaps from a 3-point attitude. The dual rotation propeller eliminates fighting the rudder.

In the air, the airplane has good stability about all axes down to very low speeds. Longitudinal trim is moderately affected by changes in speed,

and only slightly by power changes, landing gear position, or flap position. Changes in directional trim with speed and power changes are negligible, due to the dual rotation propeller.

The airplane has good stall characteristics with power on and off. Warning occurs several knots prior to stall with buffeting and increased elevator forces. Both the rudder and the ailerons are effective in checking rolling tendencies.

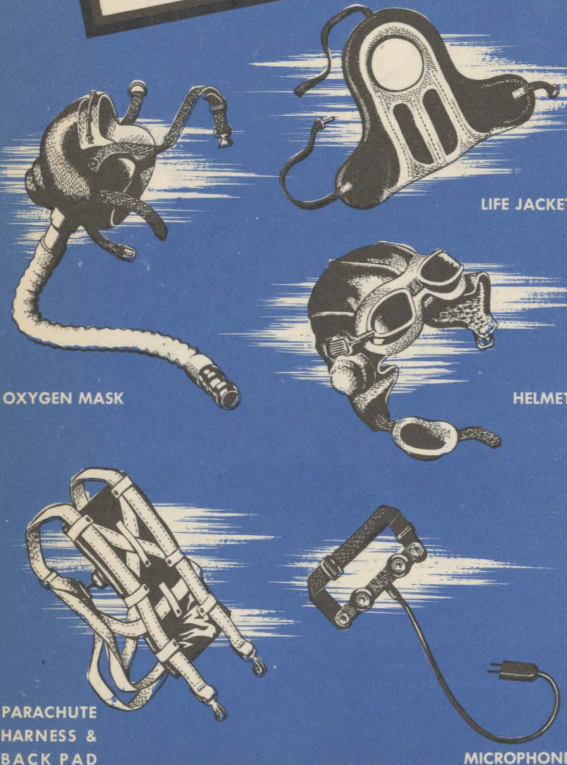
In a wave-off there is no tendency to roll, and only slight stick force is required to correct longitudinal trim.

For a flaps up landing, the best trim speed is 105 knots (121 MPH). Elevator control is ample and the forces are moderate. For a partial or full flaps landing, best trim speed is 85 to 95 knots (98 to 109 MPH). Full up elevator should be used for landing flare.

BEFORE ENTERING COCKPIT

Don't Forget

- Gross weight
- CG location
- Latitude
- Longitude
- IFF instructions
- Fuel quantity
- Oil quantity
- Ammunition load
- Bomb load
- Baggage load
- Barometric Pressure
- Homing radio instructions
- Recognition and Resin lights code



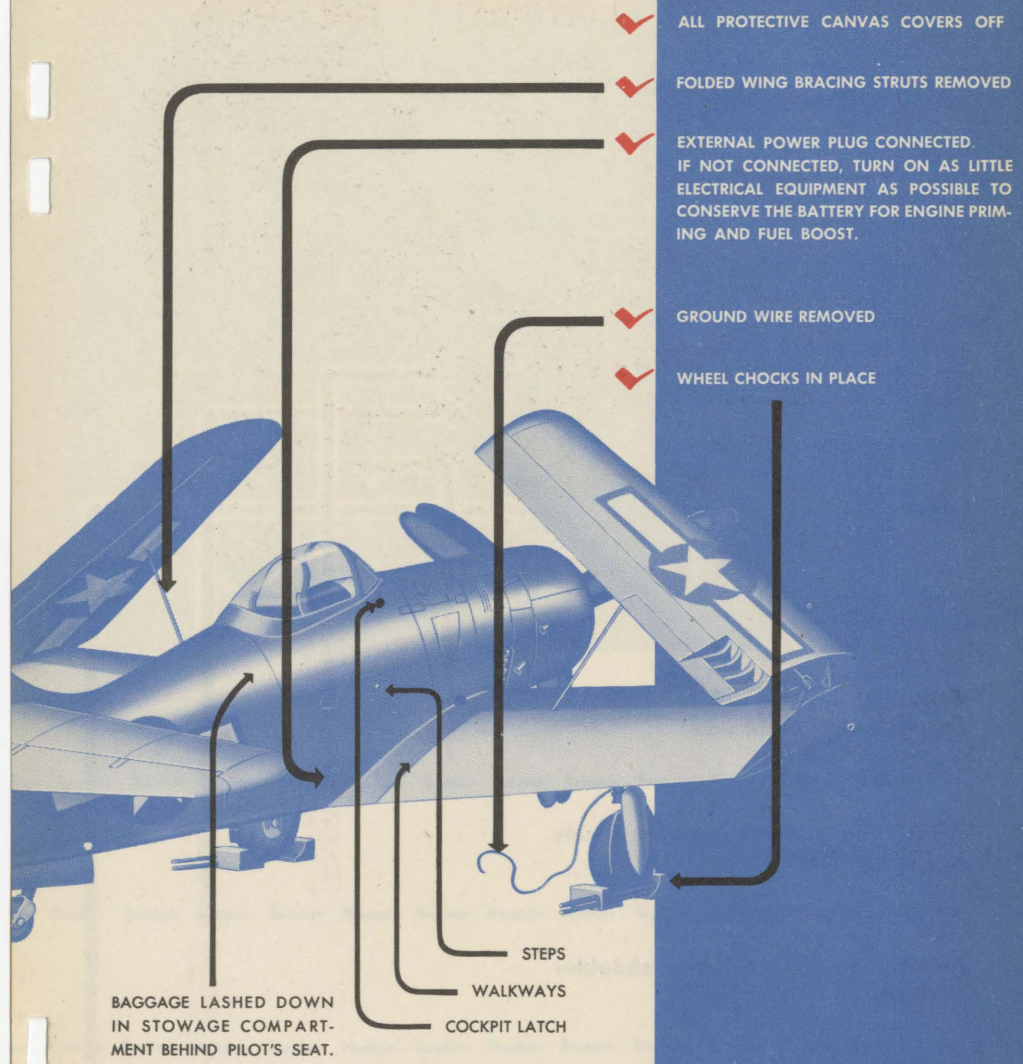
OXYGEN MASK

LIFE JACKET

HELMET

PARACHUTE HARNESS & BACK PAD

MICROPHONE

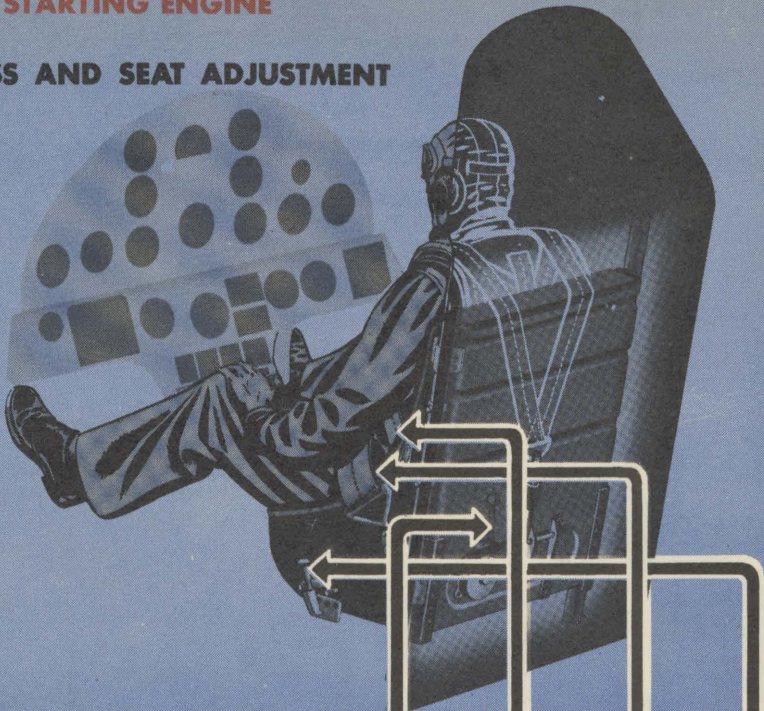


ENTERING COCKPIT

WALK ON WING ONLY NEXT TO BODY AND FORWARD OF THE WING SPAR. PRESS THE CANOPY RELEASE BUTTON ON THE RIGHT SIDE OF THE BODY BY THE WINDSHIELD AND PUSH CANOPY BACK.

BEFORE STARTING ENGINE

HARNESS AND SEAT ADJUSTMENT



Adjust the seat height with the handle on the right side.

Attach the life raft and parachute to the harness.

Fasten the safety belt and shoulder harness.

To adjust shoulder harness, depress and move left handle aft. Lean forward to unwind cable. Return handle forward.

LEFT SIDEWALL CONTROLS

If oxygen will be used, open the oxygen bottle (knob counterclockwise).

See that the oxygen filler is closed.

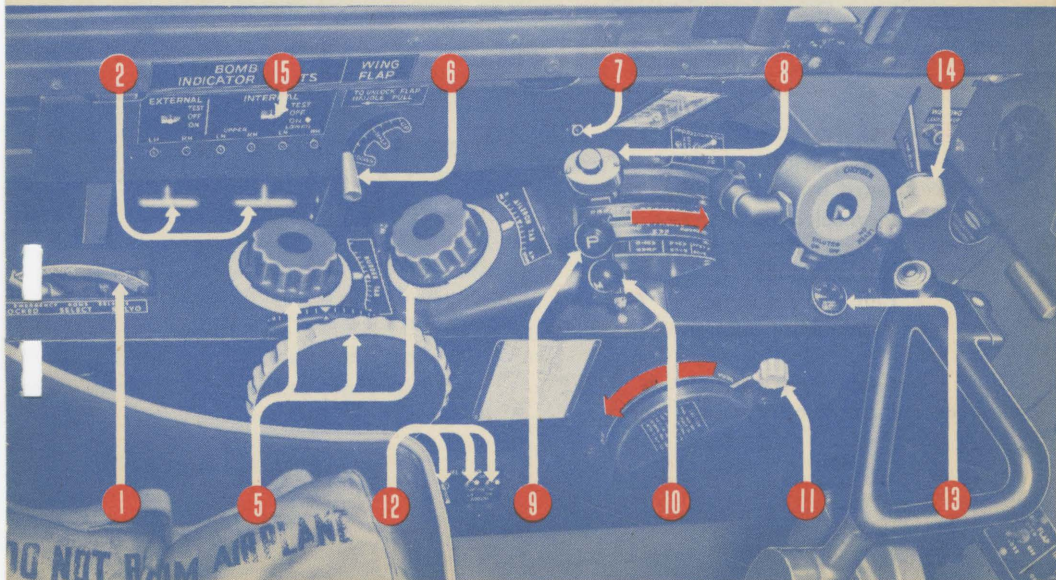
Put on the oxygen mask. Be sure the flexible tube quick disconnect fitting is fully engaged.

With the red EMERGENCY knob on the regulator "OFF" (clockwise), pinch the mask tube and inhale lightly. If the mask leaks, tighten the suspension straps. Adjust the nose wire.

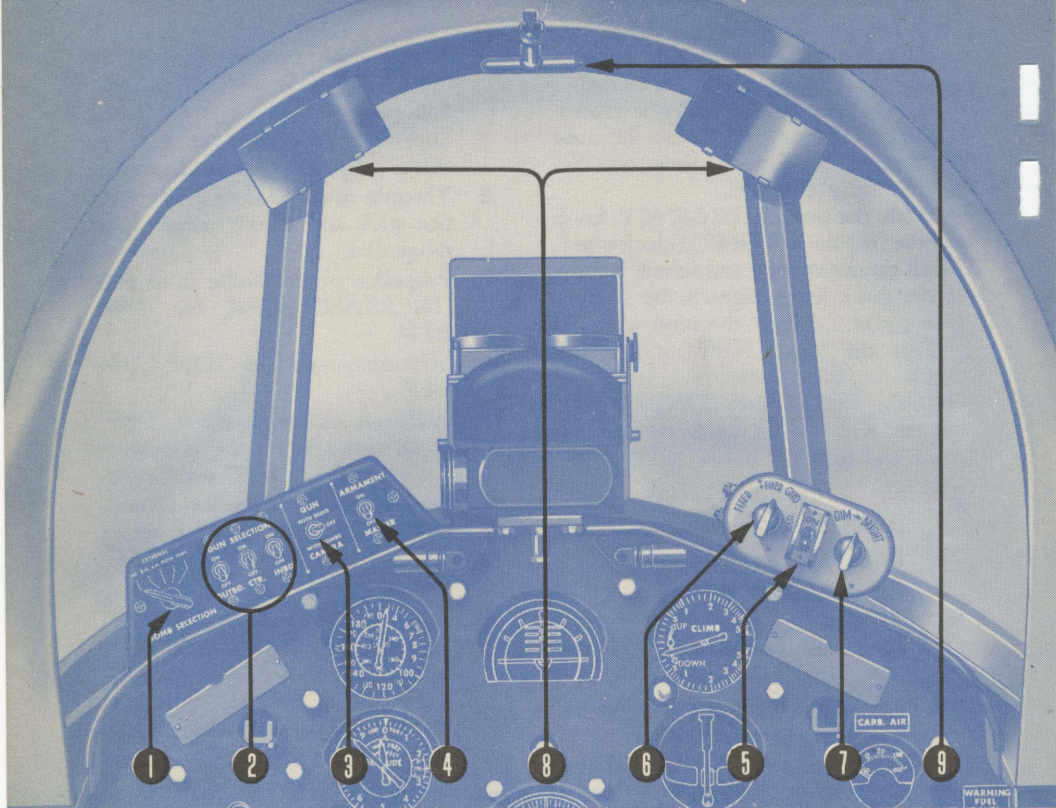
Turn the diluter "OFF", inhale, and check the flow indicator. It should "blink". Turn diluter "ON" again. If oxygen will not be used, remove the mask and turn the bottle "OFF".

See that the . . .

1. Bomb release lever is at "LOCK".
2. Wing tank release handles seat.
3. Tail wheel handle is at "LOCKED".
4. Bomb bay fuel tank gage is visible if tank is installed.
5. Elevator, rudder and aileron tab wheels are centered.
6. Wing flap control handle is "DOWN" (visually check the flap position).
7. Supercharger amber light is "OFF", supercharger not running.
8. Throttle microphone switch does not stick and handle turns sight range dial.
9. Propeller pitch handle is at full "INCREASE" RPM for 2700 RPM.
10. Mixture handle is at "IDLE CUT-OFF".
11. Fuel tank selector handle is "OFF" at all times when the engine is not running. *This is mandatory.*
12. Fuel pump switches are: Auxiliary—"OFF", L. H. booster—"ON", R. H. booster—"ON".
13. Oxygen pressure is $1800 \pm$ PSI.
14. Landing gear handle is "DOWN".
15. Put the bomb indicator light switches momentarily on "TEST". All bulbs must light. Switch to "ON". Indicates bombs loaded.



BEFORE STARTING ENGINE Continued



See that the . . .

1. Bomb selection switch is set as determined by the mission.

2. Gun selection switches are "ON" except when firing on battery alone or for special missions.

3. Gun camera switch is "OFF".

4. Armament master switch is "OFF".

5. Gun sight switch is "OFF" except for selector switch check.

Selector switch is turned to "FIXED", "FIXED & GYRO", and "GYRO" to check sight lights and motor (turn sight switch "OFF").

7. Gun sight light rheostat is between "DIM" and "BRIGHT". To prevent confusion do not turn the light off with the rheostat.

8. Rear view mirrors are adjusted.

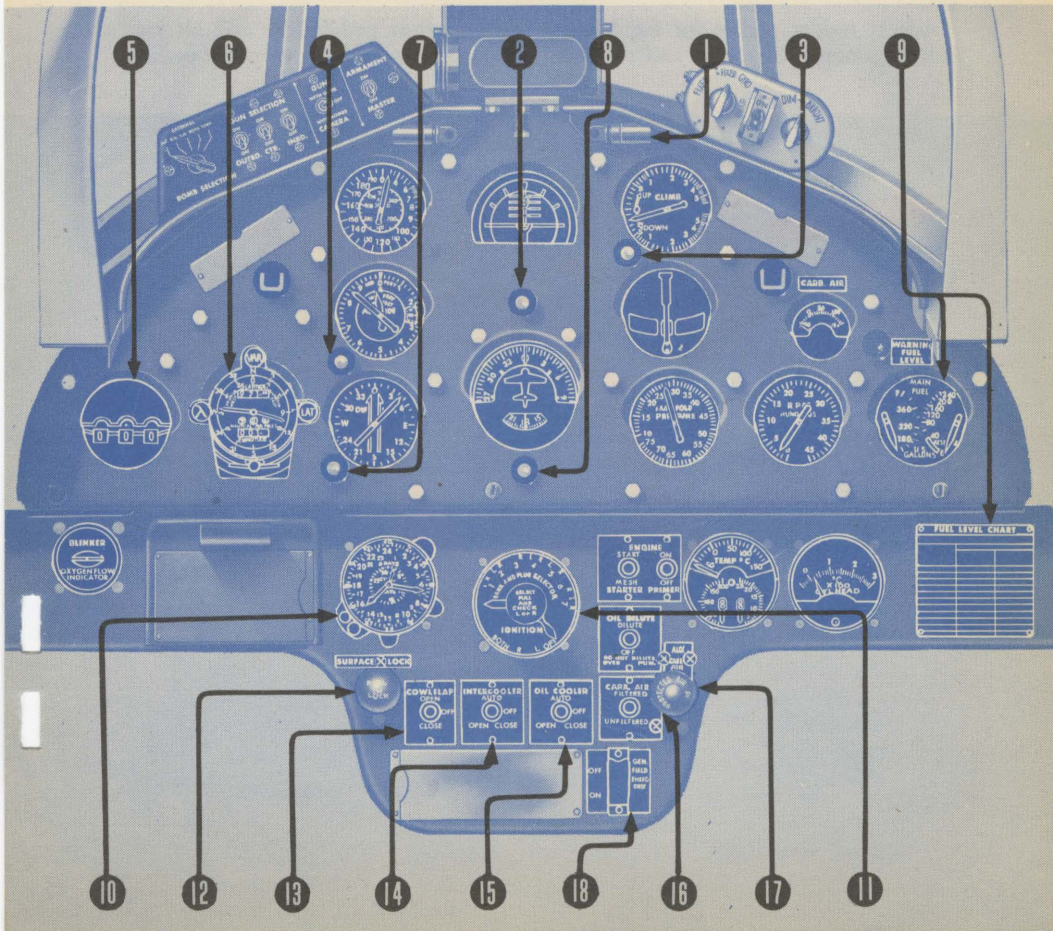
9. Emergency canopy release handle is seated.

INSTRUMENT PANEL CONTROLS

See that the . . .

1. Chartboard light switches are "OFF".
2. Attitude gyro knob is "OFF".
3. Rate-of-climb pointer is "ZERO".
4. Altimeter is set to field altitude or barometric pressure.
5. Landing gear position indicator shows all wheels down.
6. Air position indicator is set for latitude, longitude, and magnetic variation of starting point.

7. Remote compass course marker is set.
8. Directional gyro course is set, gyro is caged.
9. Fuel gage is showing fuel quantity in taxi position. Check calibration card for quantity in flight position.
10. Clock is wound and set (pull out knob to set). Set civil date by pushing in red dimple with pencil point.
11. Ignition switch lever is "OFF"; knob at "ZERO".



BEFORE STARTING ENGINE Continued

12. Surface lock knob is pushed in. Push throttle handle forward and return to $1/8$ to $1/4$ open for 1000 RPM. Operate control column and rudder pedal. Visually check elevator, rudder and aileron movement.

13. Cowl flaps operate by flipping switch to "CLOSE" till flaps are fully closed, and then back to "OPEN".

14. Intercooler switch is "AUTO".

15. Oil cooler door operates when switch is moved to "CLOSE", "OPEN" and "AUTO".

16. Carburetor air filter switch is at "UNFILTERED" except when filter is installed and dust or icing conditions are present.

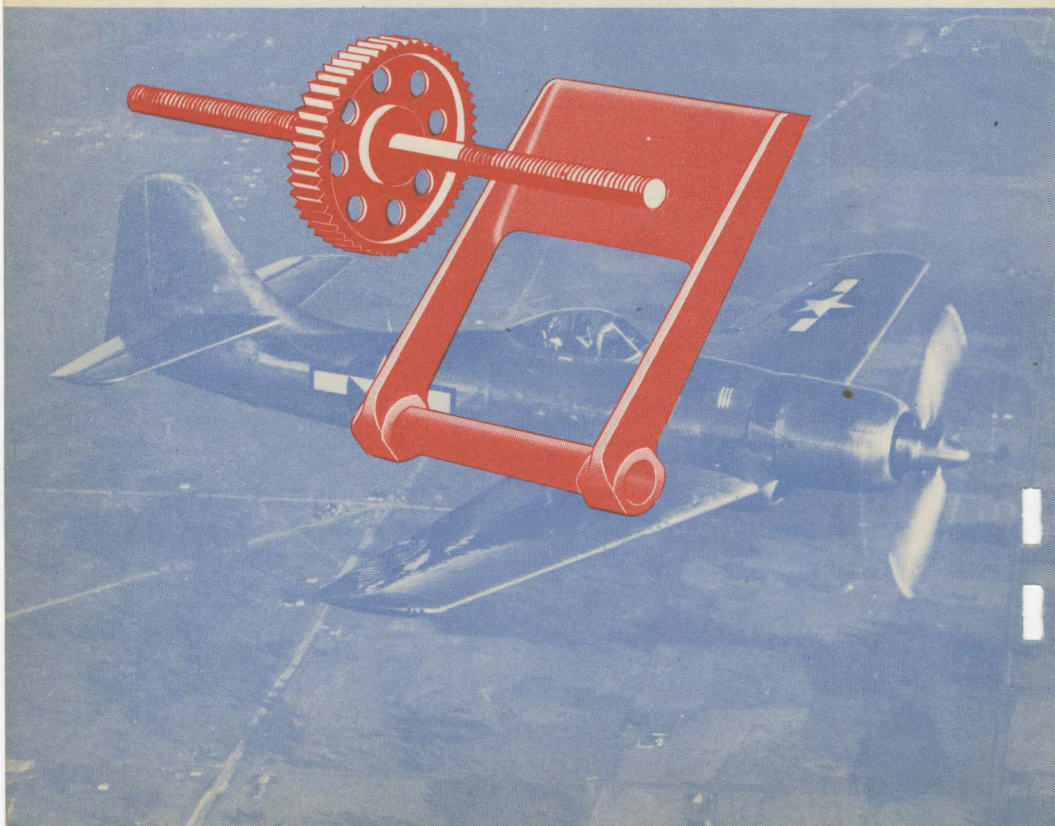
17. Auxiliary air knob is pushed in except in icing conditions.

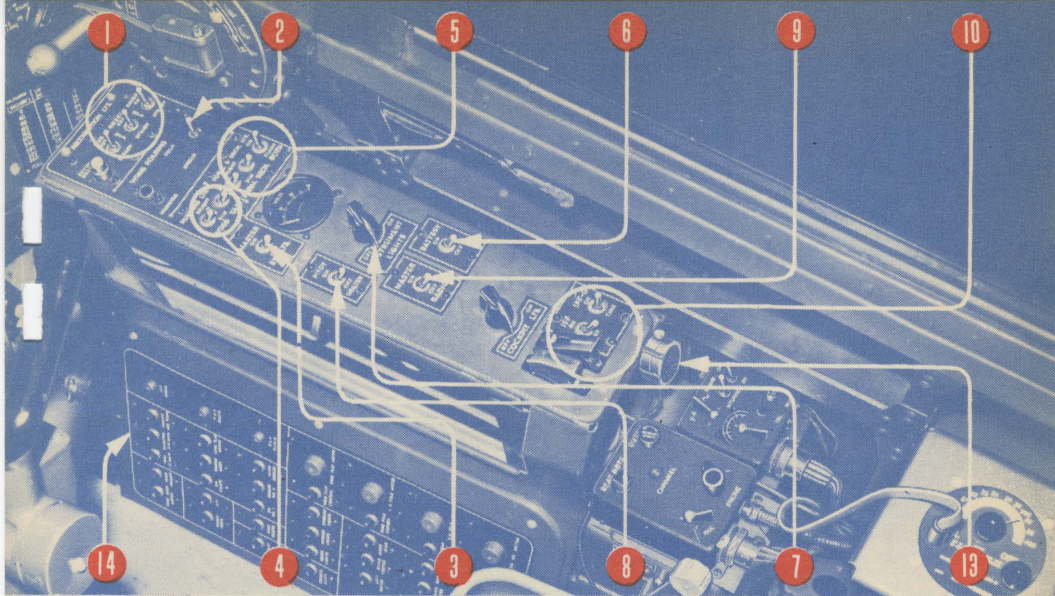
18. Generator field emergency switch is "ON" (guard closed).

RUDDER PEDAL ADJUSTMENT

Adjust rudder pedals for leg length and the amount of toe in and toe out.

To adjust pedals fore and aft turn the knurled wheel between the pedals.





RIGHT SIDEWALL CONTROLS

See that the . . .

1. Recognition light switches are "OFF".

2. Wing "FOLD-SPREAD" switch is "OFF".

3. Master exterior lights switch is "OFF" unless running, formation, or section lights are to be turned on.

4. Wing and tail running lights switches are "OFF" unless night flight or for check of "BRIGHT" and "DIM" setting (lights visible from cockpit when wings folded and rudder swung either way).

5. Formation and section light switches are "OFF" unless checking formation and section lights.

6. Battery switch is "ON".

7. Instrument lights rheostat "OFF" during daytime unless checking bulbs; turn "OFF" or "DIM" if three or more

lights are out. (Spares in console.)

8. Pitot heater switch is "OFF" unless icing is expected.

9. Master radio switch is "ON". (For radio operation see page 96.)

10. IFF radio destructor, emergency, "ON"- "OFF", and "G"-band switches "OFF" unless C.O. says otherwise.

11. Screw cap is on the cockpit receptacle unless electrical equipment is attached.

12. Tow target handle is recessed.

13. Microphones are plugged in. (Hand mike" on top of jackbox; lip, throat or mask "mike" to extension cord from side of jackbox.)

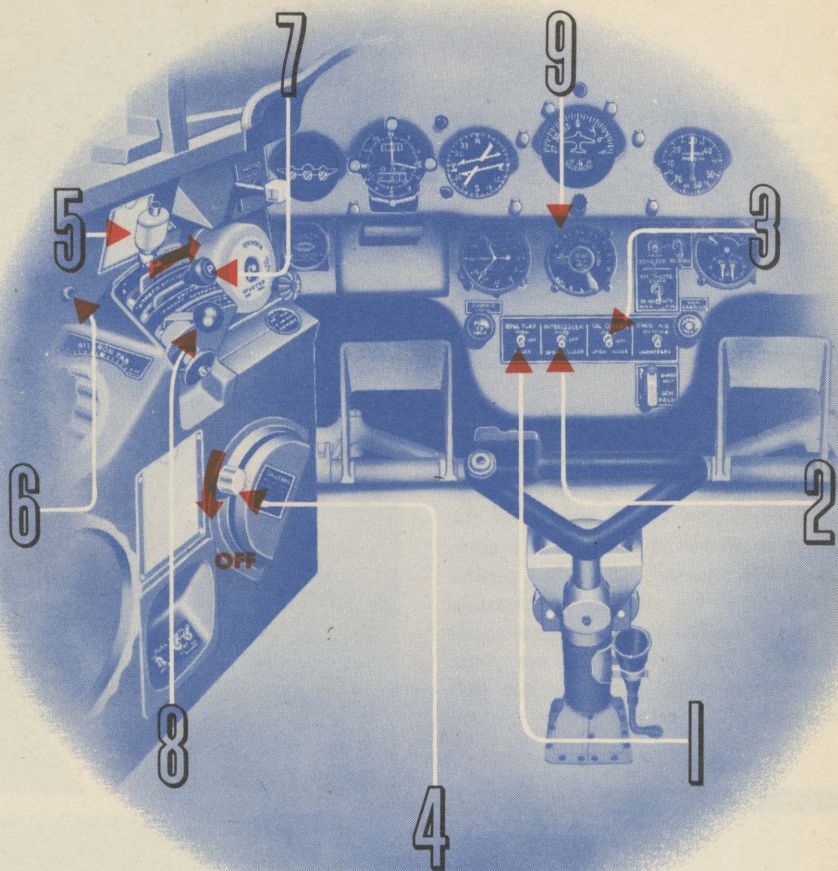
14. Circuit breakers are pushed in.

15. Fire extinguisher handle beside seat is in the clips.

16. Fireman with extinguisher is standing by.



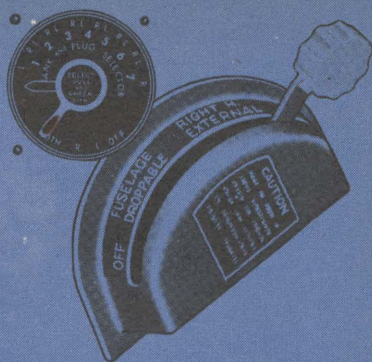
STARTING ENGINE



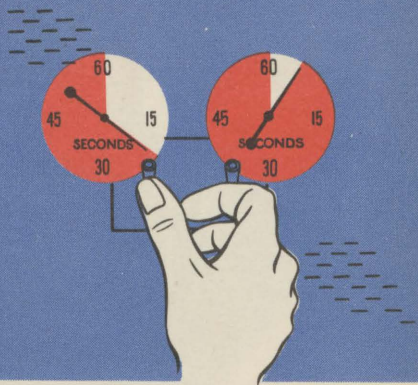
1. Cowl flaps full "OPEN".
2. Intercooler switch "AUTO".
3. Oil cooler switch "AUTO".
4. Tank selector "OFF" (mandatory).
5. Throttle $1/8$ to $1/4$ open for 1000 RPM.
6. Supercharger amber light off.
7. Propeller handle full "INCREASE RPM" for 2700 RPM.
8. Mixture handle "IDLE CUTOFF" (mandatory).
9. With ignition switch "OFF", have propeller pulled through by hand, nine or ten blades to clear the cylinders if the engine has not been run for one or more hours.

ENGINE STARTING Continued

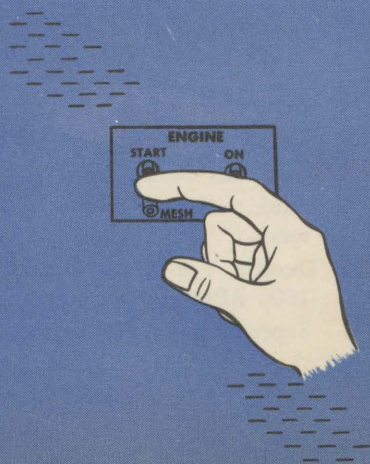
1. Turn the ignition switch lever to "BOTH." Turn the fuel tank selector to "MAIN."



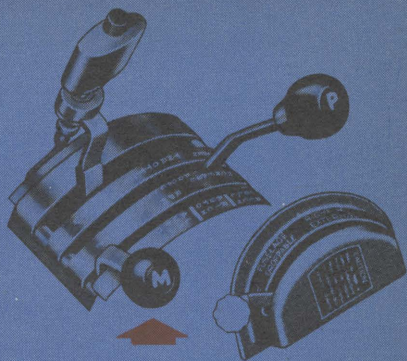
2. Hold the starter switch to "START" for no longer than 20 seconds as there is no overspeed governor, and a maximum of 10 seconds if the voltage is above 24 volts. While energizing the starter hold the primer switch "ON" for two to six seconds. If the engine has been run previously during the day, prime for not more than two seconds; if during the previous two hours, do not prime.



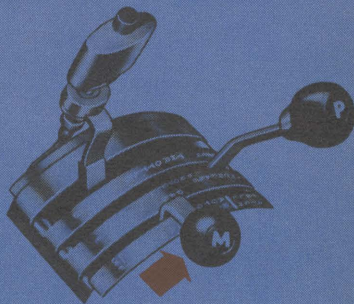
3. Push the starter switch to "MESH" and hold until the engine is running or until the starter slows down to its constant slow speed. Allow one or two minutes cooling time before a new start.



4. If the engine does not start in 10 to 15 seconds after meshing, make another attempt. Be sure to return the tank selector handle to "OFF" and the mixture handle to "IDLE CUTOFF."



5. After the first few pops when the engine starts, move the mixture handle steadily and evenly to "AUTO RICH."



IMPORTANT

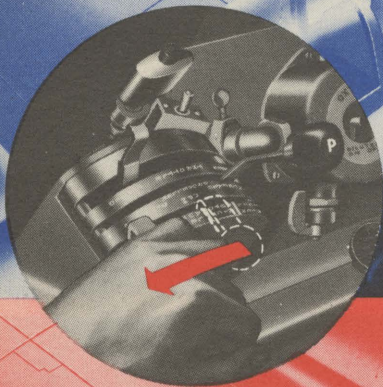
Do not move tank selector to "MAIN" until ready to energize starter, nor move mixture handle to "AUTO RICH" too rapidly, or engine will flood and must be pulled through.

If propeller kicks when starter switch is flipped to "START," propeller must be pulled forward by hand a half turn to disengage starter and engine jaws.

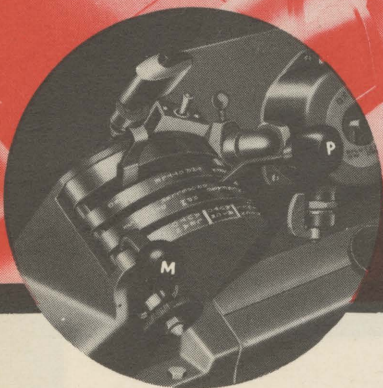
If starter does not run when switch is flipped to "START," flip it to "MESH" momentarily to lower brushes in starter.

ENGINE STARTING Continued

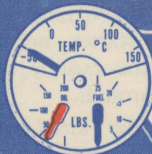
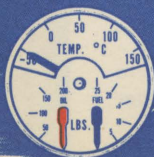
IF the engine starts to die and black fuel smoke comes out of the exhausts, jerk the mixture handle to "IDLE CUTOFF".



IF the heavy black smoke is exhausted even after the mixture handle is at "IDLE CUTOFF"...

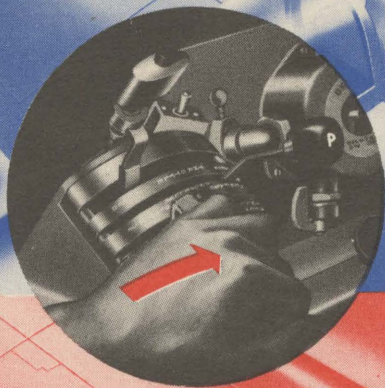


Adjust throttle to hold the engine below 1000 RPM for the first 30 seconds after starting. Watch for indication of oil pressure on the gage.

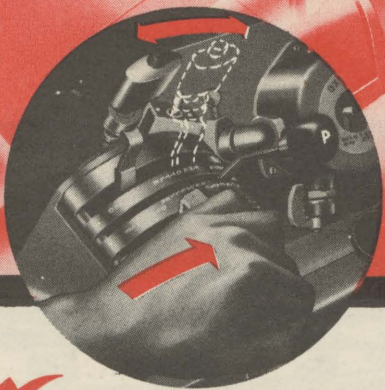


If oil pressure does not register almost immediately, move mixture handle to "IDLE CUTOFF" and turn off ignition switch.

As the engine slows and suddenly speeds up when the excess fuel is burned, move mixture handle to "AUTO RICH".



open throttle half way until engine speeds up. Close throttle to 1000 RPM. Move mixture handle to "AUTO RICH". Do not pump throttle.



Check the oil supply.



Check the oil lines for leaks or congealed oil.



Check the filter to see if it is clogged.



ENGINE FIRE

Fire in the engine will come out the cowl flaps. Fire in the accessory section will come out the ventilating slots on the side. Fire in the air ducts will come out the oil cooler and intercooler doors.

If fire breaks out while starting the engine hold the starter switch on "MESH" until you have the mixture at "IDLE CUTOFF," the tank selector at "OFF," and the ignition switch "OFF." Pull the fire extinguisher handle and, if on the ground, have the portable extinguishers directed at the cowling, air scoop, or exhaust stacks.

MANUAL STARTING

1. Push and release meshing handle under spring loaded access door between cowl flaps and ventilating slots on right side of cowling, to lift and hold starter brushes off the commutator and eliminate friction.

2. Put starter gear box in hand crank socket just aft of meshing handle access door and insert crank in gear box.

3. Turn crank slowly counterclockwise and accelerate to 96 RPM.

4. Not more than 20 seconds before meshing, switch ignition to "BOTH," set fuel tank selector to "MAIN," and prime.

5. Push meshing handle till engine starts, then release. If you need ignition boost, turn starter switch to "MESH" instead of using handle.

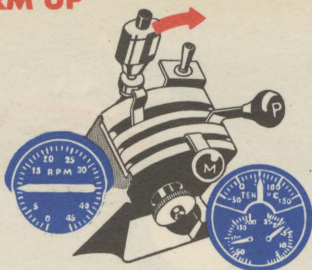


Open the intercooler, oil cooler, and cowl flaps to reduce trapped heat damage.

Do not start the engine until the cause of the fire has been corrected.

WARM UP

1



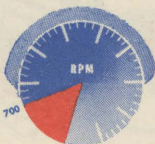
Adjust throttle to about 1000 RPM (after 30 seconds run) with propeller control at full "INCREASE RPM." The engine should be held on or below 1000 RPM until oil temperature reaches 40°C (104°F). Normal oil pressure is 80 to 90 PSI. The initial oil pressure may exceed 400 PSI.

2



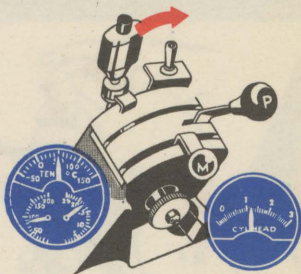
Open cowl flaps wide even in cold weather to prevent burning the ignition wire insulation.

3



Engine is factory set for 450 RPM minimum idling speed. Run below 700 RPM as little as possible, and run up occasionally to clean the plugs if idling below 800 RPM.

4



With oil-in temperature above 40°C (104°F), cylinder temperature at 120°C (248°F), and PROPELLER RPM handle at full INCREASE RPM, advance throttle to the power needed for ground test, emergency take-off, or taxiing.

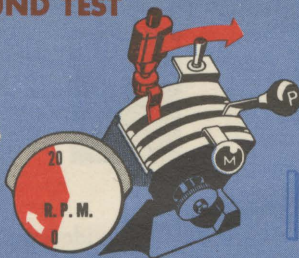
5



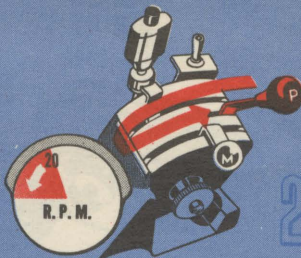
Disconnect external power after starting; the generator cuts in at about 700 RPM. Increase the RPM before applying any heavy electrical loads such as folding wing, operating flaps, bomb doors, or radios.

GROUND TEST

PROPELLER GOVERNOR CHECK

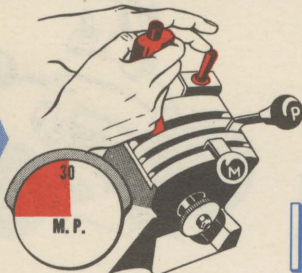


With propeller RPM handle at full "INCREASE RPM," advance throttle to obtain 2000 RPM.

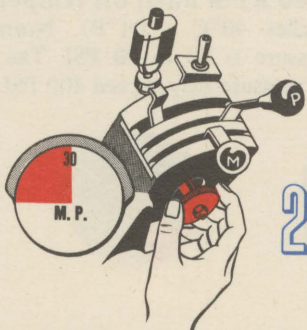


Pull propeller RPM handle back to decrease RPM to 1400. Return to full "INCREASE RPM".

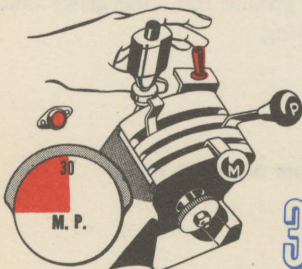
SUPER CHARGER CHECK



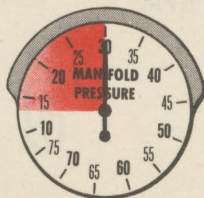
Hold the supercharger switch at "INCREASE MAN. PR." and pull back throttle to keep manifold pressure at 30 inches of mercury.



Release supercharger switch and tighten the friction knob below the throttle.



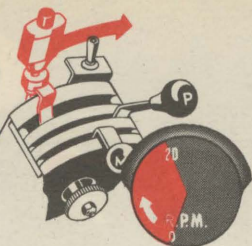
Hold the supercharger switch at "DECREASE MAN. PR." until the amber light goes off and the manifold pressure ceases to drop.



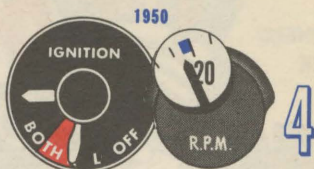
Note the manifold pressure drop for reference in future operation.

WARNING—Remove all boost before continuing with test to prevent detonation and temperature damage.

IGNITION
CHECK



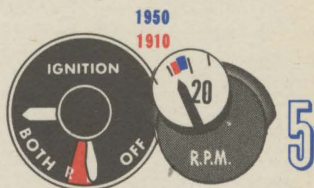
Advance throttle for 2000 RPM (approximately 30 inches Hg. MP).



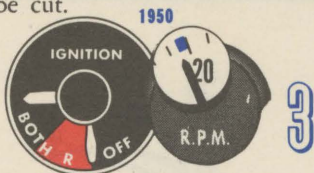
Switch from "BOTH" to "R" and note a drop of 25 to 50 RPM.



Switch the ignition "OFF" and immediately back to "BOTH." Engine must be cut.



Before switching back to "BOTH," switch from "R" to "L" and note that the dip in RPM does not exceed 30 to 40 RPM.



Move the ignition switch lever from "BOTH" to "L." As the left spark plug on each of the 28 cylinders cuts out, the normal drop-off should be 25 to 50 RPM and should not exceed 100 RPM. Return lever to "BOTH" after a stable reading is obtained.



Switch the lever back to "BOTH."

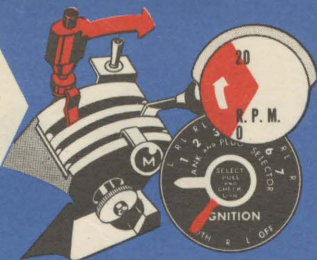
The ignition check should be made in as short a time as possible. Continued running with the switch in "L" or "R" positions with manifold pressure as high as 25 to 30 inches Hg. may cause serious detonation.

Excessive RPM drop and engine

vibration indicate that one or more cylinders are misfiring. In such a case, it may be advisable, after running the engine long enough to clean the spark plugs, to advance the throttle to 33 inches Hg. manifold pressure and make a very quick check as above.

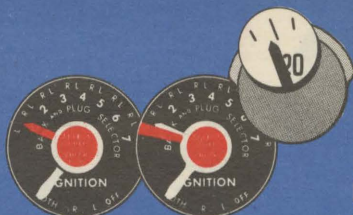
GROUND TEST Continued

MAGNETO CHECK



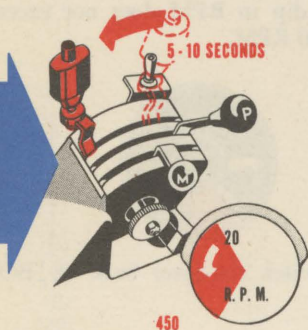
To check each of the seven magnetos in case you suspect trouble, set the throttle to obtain 2000 RPM (approximately 30 in. Hg MP). Set the ignition switch lever at "BOTH."

Repeat the check for "1R" and for the "L" and "R" positions of banks "2" through "7." Make each check as brief as possible and allow the RPM to return to normal before starting next check. Return the knob to "0" when check is completed.

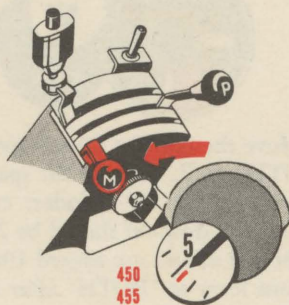


Rotate the ignition switch knob pointer from "0" to "1". Pull out the knob and rotate to "L". If the drop is more than 20 RPM, one or more spark plugs of the four cylinders in that bank is misfiring.

IDLE CHECK



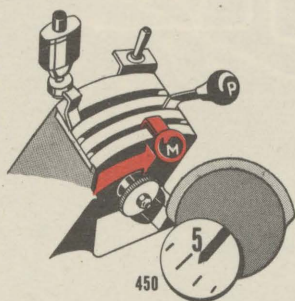
Clear the engine at 2000 RPM from five to ten seconds. Close the throttle. The engine should idle at 450 RPM.



When stabilized, move mixture handle momentarily, slowly and steadily, to "IDLE CUTOFF." Watch RPM.

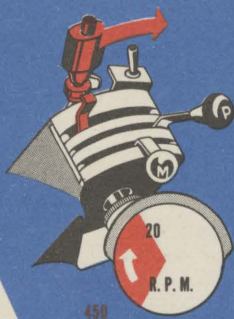
If the idle mixture valve is properly adjusted, the RPM should increase momentarily about 5 RPM. An increase of more than 10 RPM indicates that the setting is too rich and carbon may form causing trouble during ignition check and take-off.

An immediate decrease in RPM, not preceded by a momentary increase, indicates that the idle adjustment is too lean, and the engine may cut out in a glide or upon advancing the throttle. If either too rich or too lean, have the mixture readjusted immediately or at the first opportunity not interfering with combat operations.



3

Return the mixture handle to "AUTO RICH" before the RPM can drop to the point where the engine cuts out, but not before a definite drop in RPM is observed.



**PRESSURE
TEMPER-
ATURE
CHECK**

Advance the throttle to give 2000 RPM with propeller pitch handle at full "INCREASE RPM" and check the following:

OIL TEMPERATURES 60°C (140°F)

OIL PRESSURE (AT 60°C) 85-90 PSI

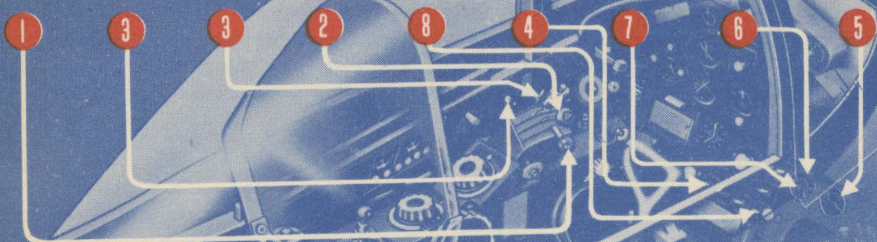
FUEL PRESSURE 16-18 PSI

MANIFOL PRESSURE 29 IN. Hg.



DO NOT EXCEED 204 °C (400 F) CYLINDER HEAD TEMPERATURE DURING GROUND OPERATIONS

TAXI

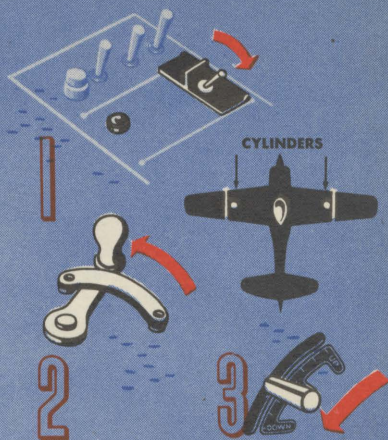


1. Mixture handle "AUTO RICH."
2. Propeller pitch handle "INCREASE RPM."
3. Auxiliary supercharger not running (warning light off). To check, hold switch at "DECREASE MAN. PR." Manifold pressure indication must not drop.
4. Cowl flaps full "OPEN."
5. Cylinder temperature max. 204°C (400°F).
6. Oil temperature at least 40°C (104°F) preferably 60°C (140°F).
7. Oil pressure 80 to 100 PSI.
8. If icing conditions are present, hold air filter switch to "FILTER" for five seconds and pull "AUXILIARY AIR" knob during taxi to prevent icing. *Push knob in before take-off.*



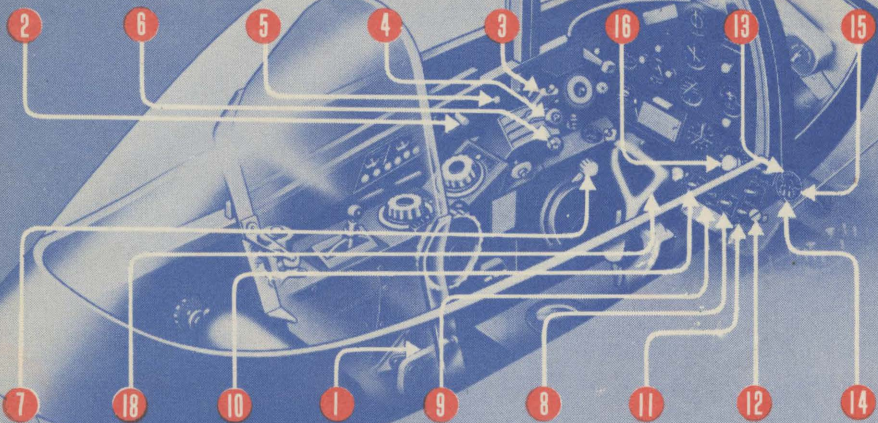


1. Use throttle to regulate power.
2. With tail wheel locked, taxi "off the spot" until tail surfaces clear other airplanes. Unlock tail wheel by raising tail wheel lock handle.
3. Steer with rudder and brakes.

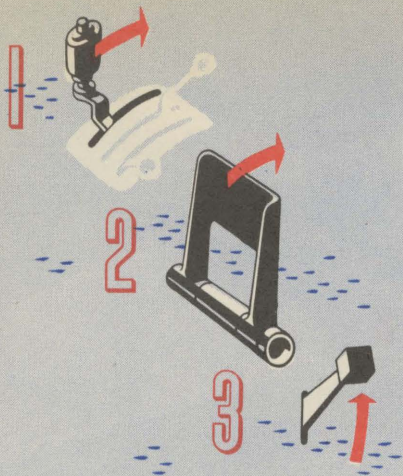


1. Spread wings while taxiing to employ full generator power, by holding wing folding switch to "SPREAD."
2. At the same time pull the wing pin lock handle toward "LOCK." Handle will not go to "LOCK" until wing pin is fully inserted. Red warning light goes off and red cylinders at wing folds disappear into wings when the pins are locked.
3. The wing flaps will automatically move to the position set on the control rheostat when wings are fully spread.

TAKEOFF



1. Tail wheel handle unlocked (carrier), locked (land).
2. Wing flap switch "DOWN" Visually check positioning marks on flaps aft of wing trailing edge.
3. Throttle set for 2000 RPM ignition check.
4. Propeller pitch handle at "INCREASE RPM."
5. Supercharger amber light off.
6. Mixture handle "AUTO RICH."
7. Fuel tank selector handle on "MAIN."
8. Oil cooler switch "AUTO."
9. Intercooler switch "AUTO."
10. Cowl flaps as required to maintain take-off cylinder temperature between 120°C (250°F) and 232°C (450°F).
11. Carburetor air filter switch "UNFILTERED" unless dusty or icing. (Hold five seconds for full travel).
12. Alternate air knob pushed in unless icing conditions are present.
13. Oil temperature at least 40°C (104°F), preferably 60°C (140°F).
14. Oil pressure 80 to 90 PSI.
15. Fuel pressure 16 to 18 PSI.
16. Check ignition. Switch lever "BOTH" to "R," "BOTH" to "L" (drop 25 to 50 RPM, Max. 100 RPM), "L" to "R" (drop 30 to 40 RPM).
17. Obtain radio or visual clearance for take-off.
18. Controls free.
19. Safety belt fastened and shoulder harness latched against forward pull.



1. Advance throttle to 52 in. mercury manifold pressure and take off at 2700 RPM (five minutes maximum).
2. Touch the brakes to stop the wheel rotation.
3. Landing gear switch "UP." Tail wheel must be centered before wheels will retract.



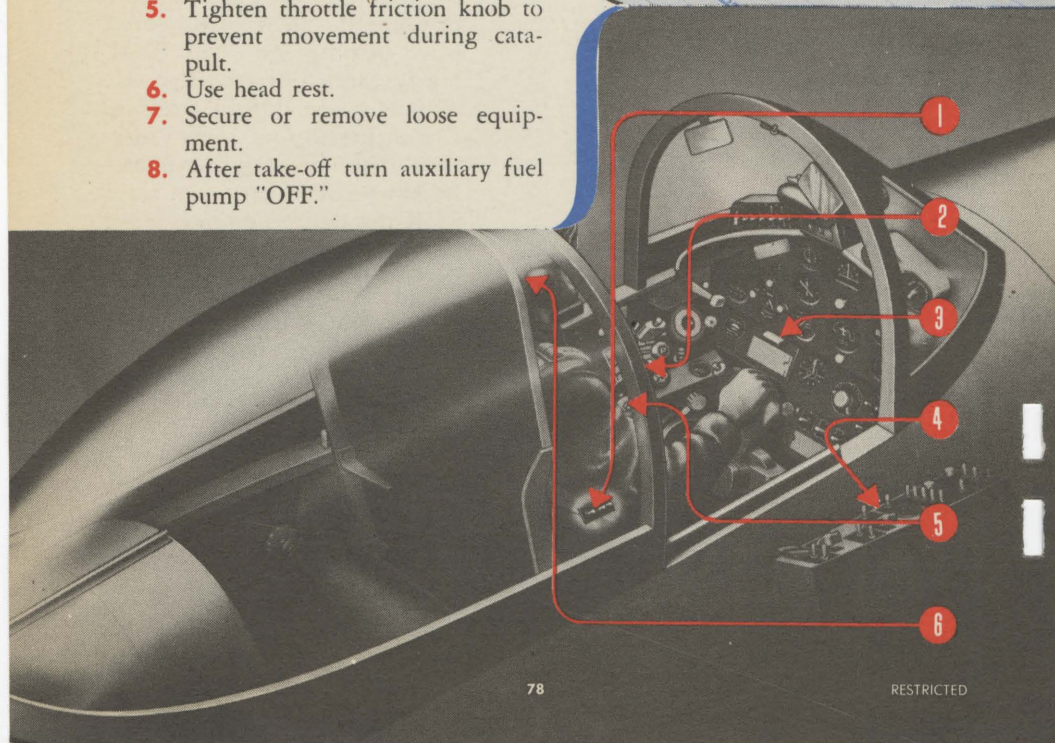
1. Wing flap switch "UP" after clearing all obstacles.
2. Before five minutes operation at take-off power, first throttle back to 43.5 in. Hg. manifold pressure and then set propeller pitch handle for 2550 RPM. For further reduction of power, reduce the manifold pressure two inches to four inches mercury, then reduce approximately 200 RPM in alternate steps until the desired engine speed is obtained, and finally, adjust the manifold pressure as desired.



CATAPULTING

Controls same as TAKE-OFF except:

1. Turn "ON" auxiliary fuel pump switch.
2. Open canopy.
3. Snap data case closed.
4. Stow chartboard.
5. Tighten throttle friction knob to prevent movement during catapult.
6. Use head rest.
7. Secure or remove loose equipment.
8. After take-off turn auxiliary fuel pump "OFF."

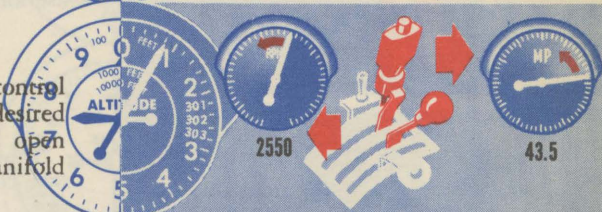


CLIMB AND LEVEL FLIGHT

1. The propeller control handle sets RPM, and the governor maintains, constant engine RPM.



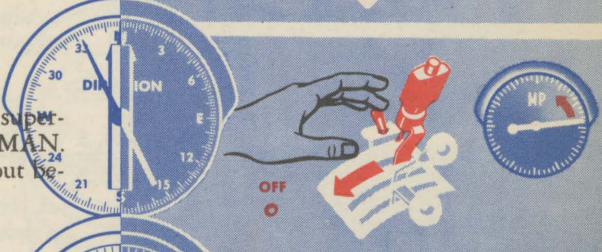
2. To climb: Set propeller control handle to proper RPM for desired power; as altitude increases open throttle to maintain constant manifold pressure.



3. When the throttle is full open, hold supercharger switch to "INCREASE MAN. PR." to keep constant pressure.



4. To reduce power, hold supercharger switch to "DECREASE MAN. PR." until the amber light goes out before closing throttle.



5. The mixture control handle has four positions. Use: "AUTO LEAN" during cruise below 75% rated power to conserve fuel if cooling is adequate; "AUTO RICH" during normal flight, take-off, and before advancing throttle to increase engine power; "FULL RICH" only if the altitude compensation fails; "IDLE CUTOFF" to stop fuel flow to engine. Manual leaning is not possible.



FULL RICH
AUTO RICH
AUTO LEAN
IDLE CUTOFF

IF ALTITUDE COMPENSATION FAILS

INCREASE ENGINE POWER

CONSERVE FUEL

STOP FUEL FLOW

CLIMB AND LEVEL FLIGHT **Continued**



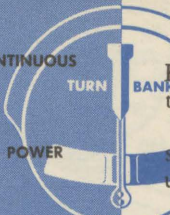
RATED POWER FOR CONTINUOUS OPERATION



MILITARY OR TAKE OFF POWER

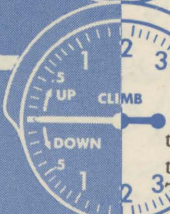


5 MINUTE LIMIT



Rated power (2550 RPM—43.5 in. Hg.) is the maximum power for continuous operation.

Military and take-off power are the same (2700 RPM—52 in. Hg.) Don't use longer than five minutes.



To increase power adjust (1) mixture control, (2) propeller RPM control, (3) throttle, (4) supercharger. To decrease, reverse order.

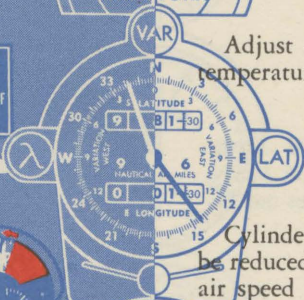


CYL. HEAD



COWL FLAP
ON OFF
CLOSE

Adjust cowl flaps to keep cylinder temperatures below 232°C (450°F).



Cylinder and oil temperatures can be reduced by climbing at an indicated air speed 10 to 20 MPH higher than speed for best climb. It will not cause much loss in rate of climb.



CYL. HEAD



CLIMB



TEMP



CLOCK



CARB. AIR



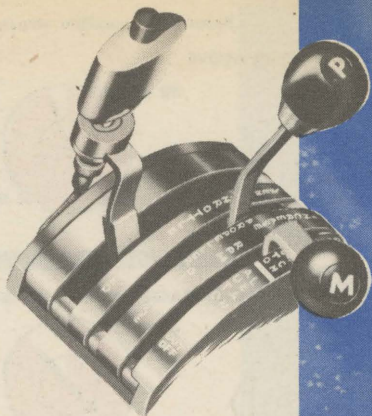
INTERCOOLER
OPEN



TEMP

Check oil overheating by reducing RPM. Open intercooler or reduce RPM to keep carburetor air temperature below 32°C (90°F).

DIVING



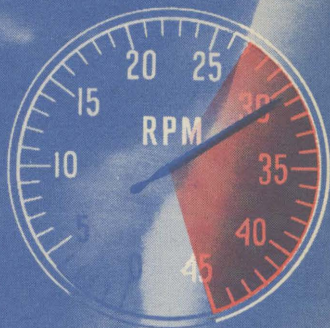
Keep the manifold pressure above 15 in. Hg. and the RPM between 2130 and 2330 during steep prolonged dives. Any manifold pressure above 15 inches within the engine limits for the RPM, mixture, and altitude can be used except that higher manifold pressures increase diving speed. Pressures below 15 inches cool and foul up the engine.

Do not exceed the maximum safe overspeed of 3060 RPM for 30 seconds. If, however, the maximum is exceeded: close the throttle immediately; move propeller RPM control to "DECREASE RPM" to increase propeller pitch, and reduce air speed to the minimum for safe glide.

During a dive from high altitude always remember manifold pressure will build up rapidly at a constant throttle setting.

Open the throttle slowly at the end of a dive so the partly cooled engine won't cut out.

The mixture handle must always be at "AUTO RICH."



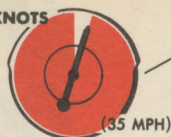
AIRSPED LIMITATIONS

Because of possible structural failures . . .

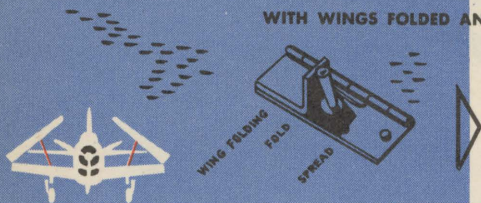
DO NOT FOLD WINGS ABOVE



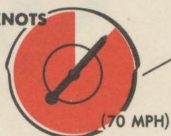
30 KNOTS



WITH WINGS FOLDED AND BRACED, DO NOT TRAVEL ABOVE



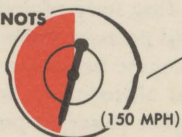
60 KNOTS



DO NOT LOWER WING FLAPS ABOVE



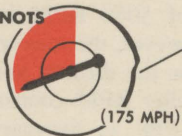
130 KNOTS



DO NOT OPEN CANOPY ABOVE



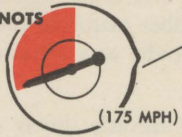
152 KNOTS



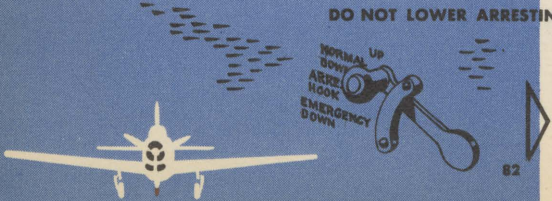
DO NOT OPERATE LANDING GEAR ABOVE



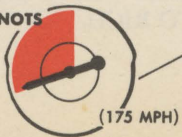
152 KNOTS



DO NOT LOWER ARRESTING HOOK ABOVE



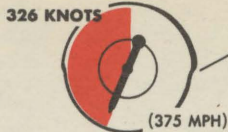
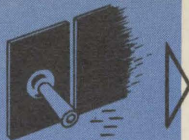
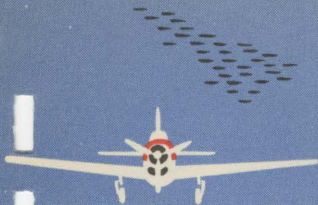
152 KNOTS



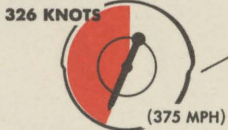
RESTRICTED

AIRSPPEED LIMITATIONS

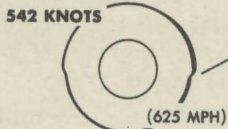
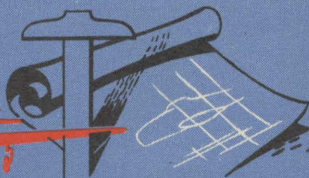
DO NOT OPEN COWL FLAPS ABOVE



DO NOT OPEN BOMB DOORS ABOVE



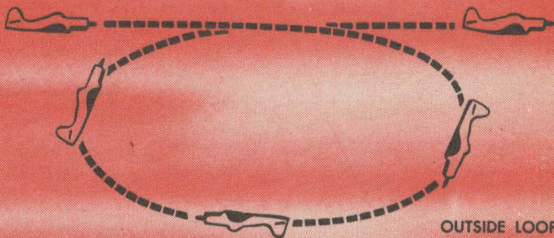
DO NOT FLY THE AIRPLANE ABOVE



PROHIBITED FLIGHT MANEUVERS



INVERTED FLIGHT



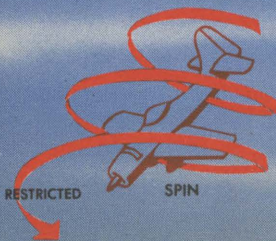
OUTSIDE LOOP

Maximum dive angle is 100 degrees between thrust line and horizontal

Maximum overspeed for engine is 3060 RPM for 30 seconds

PROHIBITED FLIGHT MANEUVERS

when carrying bombs or droppable fuel tanks



RESTRICTED

SPIN



SNAP ROLL

DESCENT

1. Set the propeller governor control for 2230 RPM or less while the airplane's speed is being reduced in a glide to prevent high speed windmilling of the engine.

2. Close the throttle as desired.

HOOK DOWN, WHEELS DOWN
SHIFT GAS, SET PROPELLER

ADJUST SPEED AND ALTITUDE

90° TURN WHEN OPPOSITE
STERN END OF CARRIER

WINGS LEVEL, ADJUST
SPEED, POWER AND ALTITUDE

STRAIGHT APPROACH
OR WAVE OFF

SMOOTH TURN

1000 TO 2000 YDS

WHEELS UP

100'

APPROACH FOR LANDING

1. Turn "OFF" armament master switch. (So guns can't be fired.)

2. Put landing gear "DOWN" when speed is below 152 knots (175 MPH).

3. Move arresting hook control handle to "DOWN" (carrier), "UP" (land).

4. Lower the wing flaps.

5. Unlock the tail wheel (carrier), lock (land).

6. Open canopy (carrier).

7. Turn fuel tank selector to full-est tank.

8. Partly open cowl flaps.

9. Check that amber supercharger light is off.

10. Set propeller governor control handle between 2230 and 2550 RPM.

11. Close throttle during descent; cut at carrier signal.

12. Open cowl flaps completely before taxiing.

13. Raise flaps and fold wings while taxiing to make use of full generator power.

WING FLAPS DOWN, COWL
FLAPS OPENED PART WAY

WAVE-OFF

1. Open throttle to 52 inches Hg. manifold pressure and use supercharger, if necessary.

2. Set landing gear control handle to "UP".

3. Set wing flap toggle rheostat to "UP".

4. Adjust cowl flaps to keep cylinder temperature between 190 and 232°C (374 to 450°F).

5. Close throttle to 43.5 in. Hg. manifold pressure within five minutes.

6. Reset propeller control to 2550 RPM.

7. To reduce power further, close throttle enough to get 2 to 4 in. Hg. less manifold pressure and lower RPM about 200 RPM in alternate steps.

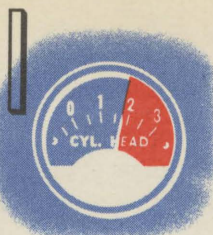
3°

ABOUT 2 MILES

WIND DIRECTION

WAVE OFF PATTERN

STOPPING ENGINE



If circumstances permit, check idle mixture adjustment as in GROUND TEST.

1. Idle engine until cylinder temperature is below 204°C (400°F).
2. Propeller control at full "INCREASE RPM".
3. Cowl flaps full open.
4. Open throttle to 1200 RPM for 30 seconds.

5. Mixture handle to "IDLE CUT-OFF" and open throttle.
6. When engine stops, turn ignition "OFF".
7. If engine doesn't stop, close throttle, turn ignition "OFF", and slowly open throttle wide. Have idle cutoff valve adjusted.
8. Turn fuel tank selector "OFF".
9. Leave cowl flaps open.
10. Mixture at IDLE CUTOFF".

OIL DILUTION



When you anticipate a cold start with outside air temperature below 0°C (32°F), dilute oil with fuel as follows:



Idle or stop the engine to allow the cylinder temperature to fall below 148°C (300°F) and the oil temperature below 50°C (120°F). If the engine is stopped the oil tank should be refilled after cooling to dilute all of the starting oil. Restart the engine and run at 800 RPM.

Watch the oil pressure gage.

Press the oil dilution switch

IF THE OUTSIDE TEMPERATURE IS ... DILUTE UNTIL PRESSURE DROPS ...

0° to -12°C , (32° to 10°F)



10 PSI

-10° to -18°C , (15° to 0°F)



15 PSI

-18° to -23°C , (0° to -10°F)



20 PSI

When the oil pressure drop is complete, advance the throttle to 1200 RPM for 30 seconds, move mixture to "IDLE CUTOFF", open throttle, turn ignition switch "OFF" and turn fuel tank selector switch to "OFF".

If the engine is run again after dilution before the cold start, redilute as above to the final oil pressure obtained during the first dilution.

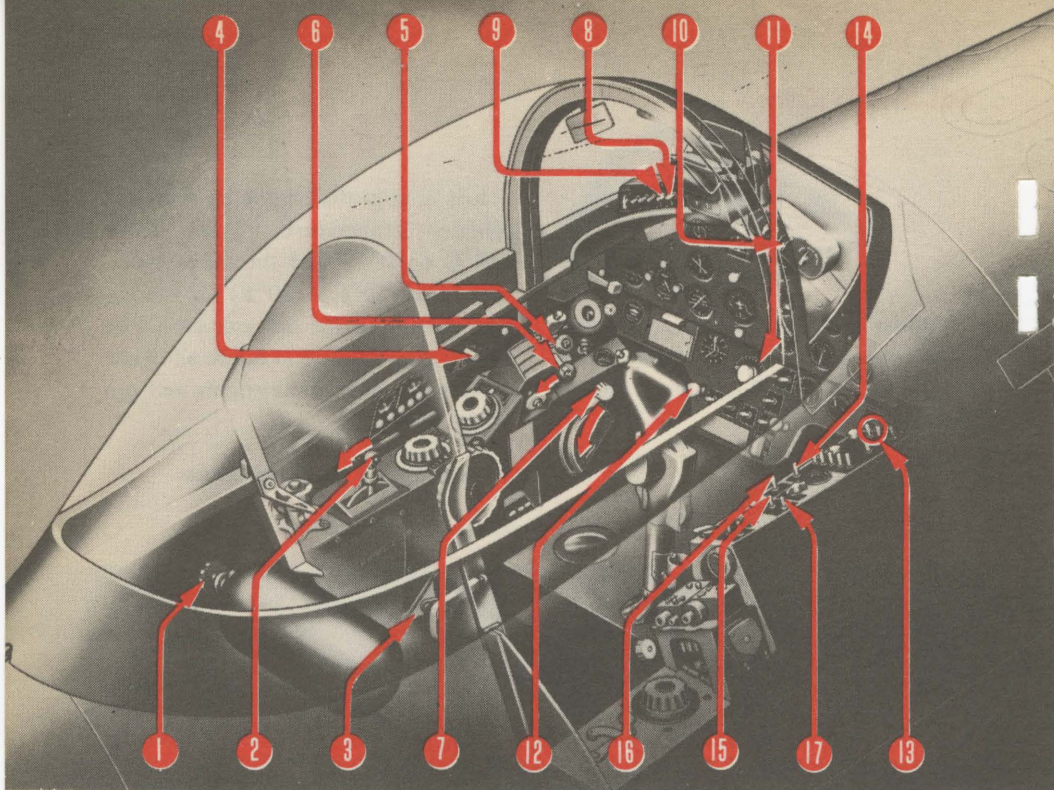
If the oil has not been diluted before a cold start, do not dilute before

the start. It will not aid in starting and may cause trouble.

When the dilution valve is opened, the indicated fuel pressure will drop sharply, and should return to normal immediately after releasing the switch. If it does not, stop the engine immediately and check for a leaking valve.

Allow adequate warm up.

Guard against fire and over dilution.



BEFORE LEAVING AIRPLANE

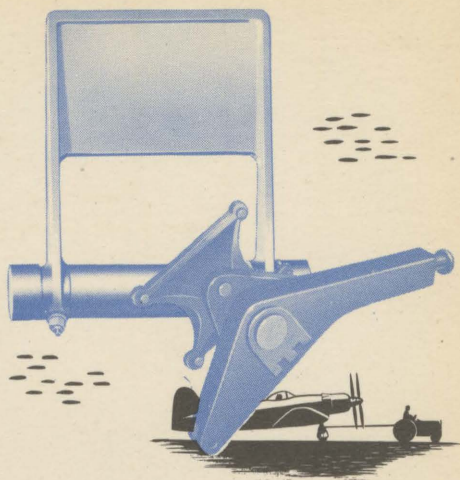
See that the . . .

1. Oxygen bottle is off (knob clockwise).
2. Bomb release handle is at "LOCK".
3. Tail wheel is "UNLOCKED".
4. Wing flap toggle is "UP".
5. Propeller RPM control is at full "INCREASE RPM".
6. Mixture control is at "IDLE CUTOFF".
7. Fuel tank selector handle is "OFF".
8. Armament master switch is "OFF".
9. Gun camera switch is "OFF".
10. Guns sight switch is "OFF".
11. Ignition is "OFF", knob at zero.
12. Surface lock knob is pulled out. Move surface controls to neutral to engage locks. Throttle automatically closed.
13. Recognition light switches are "OFF".
14. Master exterior light switch is "OFF".
15. Master radio switch is "OFF".
16. Pitot heater switch is "OFF".
17. Battery switch is "OFF".
18. Wheel chocks are in place before releasing brake. There is no parking brake.

TOWING

Always keep a man in the cockpit during towing to unlock the tail wheel, and apply the brakes. Unlock the tail wheel by raising the lever on the side of the left console. If the tail wheel is not unlocked, a shear bolt in the tail wheel treadle will fail when the airplane turns, and must be replaced.

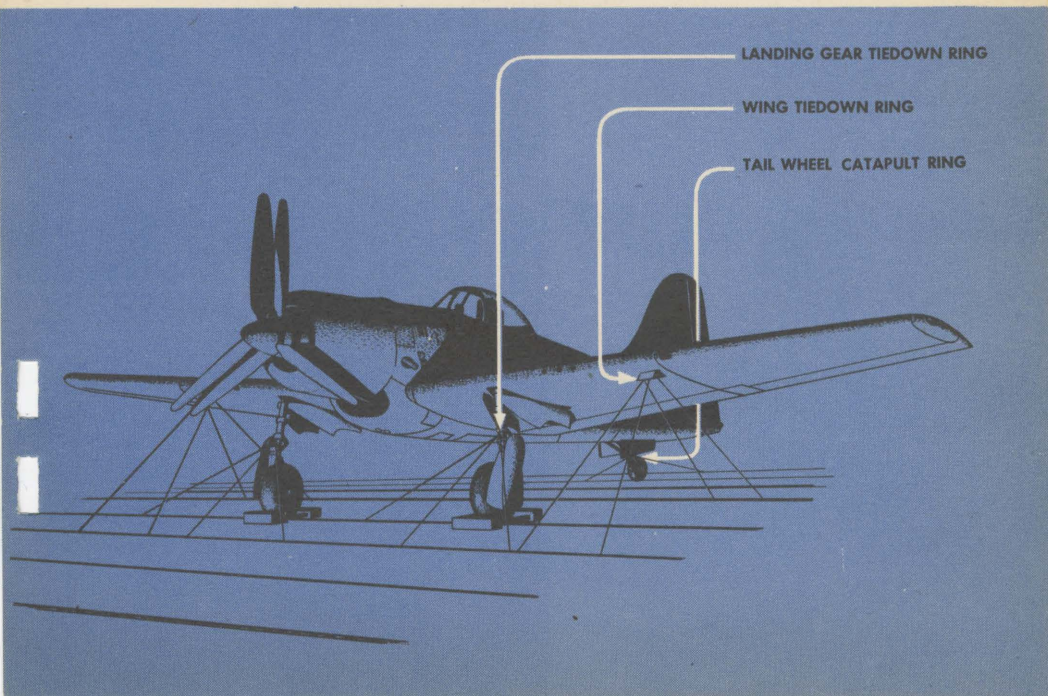
If using tow cables, do not try to turn the airplane by the cables alone. As the tractor starts to turn, apply the brake in the direction of the turn. Always keep *both* cables taut.

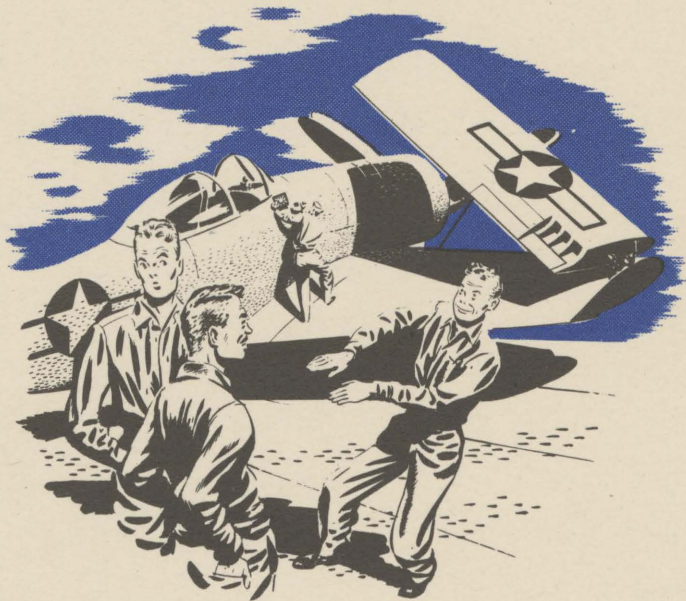


TIEDOWN

Tie down rings are located in the nose of each wing inboard of the fold. The catapult ring on the tail wheel can

be used for the tail tie down. Other tie down points are the wheel axles and struts.





SEC-3
TACTICAL
OPERATIONS



FIRING GUNS

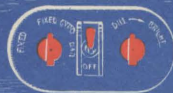
1. Before entering cockpit, check ammunition and gun charging.

2. After take-off, turn on desired gun selector switches. Circuit breakers should be in. Turn on armament master switch.

3. Turn on gun sight switch. Adjust "BRIGHT"—"DIM" rheostat for desired brilliance of reticle image. Set selector switch for "FIXED", "GYRO", or "FIXED & GYRO". Lever on left side of sight masks all of fixed reticle image except center cross. Set wing span of target by pointer above crashpad on sight. Get range by twisting throttle handle to keep circle of diamonds on wing tips of target.

4. To fire guns, press trigger on control column grip. Jammed guns cannot be cleared in flight.

5. To shut down guns, turn off armament master switch.



BOMBING

1. Before entering cockpit, obtain bomb loading, see that bomb doors are closed and check camera installation.

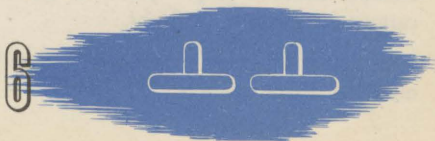
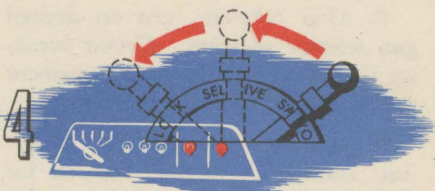
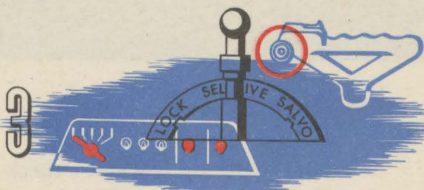
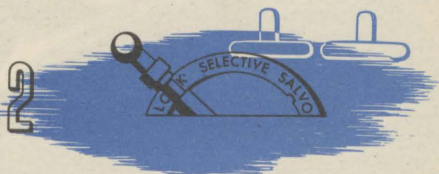
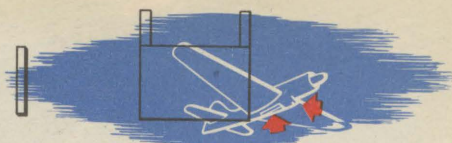
2. Before starting engine, see that the bomb release lever is on "LOCK" and that the external bomb emergency release handles are seated. Test bomb indicator light bulbs and turn lights off. You cannot release bombs from both internal and external racks at one time even in unarmed salvo. Internal bombs must be dropped armed one at a time. External bombs can be dropped armed either separately or together, but must be separately jettisoned unarmed.

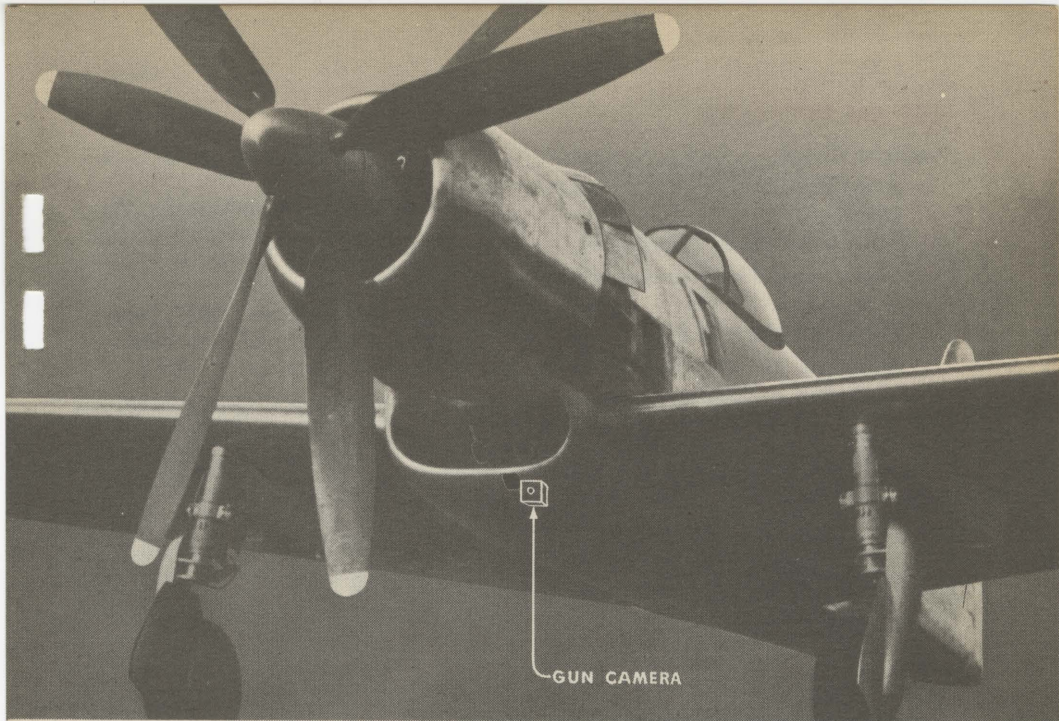
3. To release internal bombs armed, move bomb release handle to "SELECTIVE", turn bomb selector switch to "INTERNAL", set camera switch to "BOMBS" if desired, turn on armament master switch, and press bomb release button for each bomb (3/10th second minimum between bombs).

4. To release internal bombs unarmed at any time, move bomb release handle to "SALVO". To close doors again, turn armament master switch "ON", move release handle to "SELECTIVE" for ten seconds; then to "LOCK".

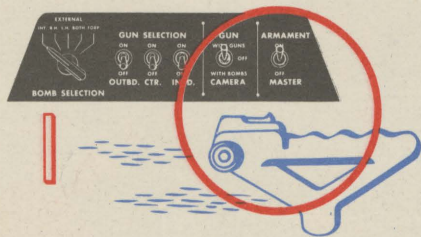
5. To release external bombs armed, separately or together, set bomb selector switch to "EXT. LEFT", "EXT. RIGHT" or "EXT. BOTH" as desired. Move bomb release handle to "SELECTIVE", set camera switch if desired, turn on armament master switch. Press bomb release button.

6. To release external bombs unarmed, pull the red T-handles.

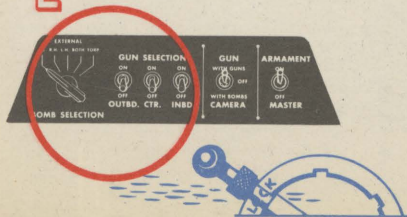




USE OF GUN CAMERA



1



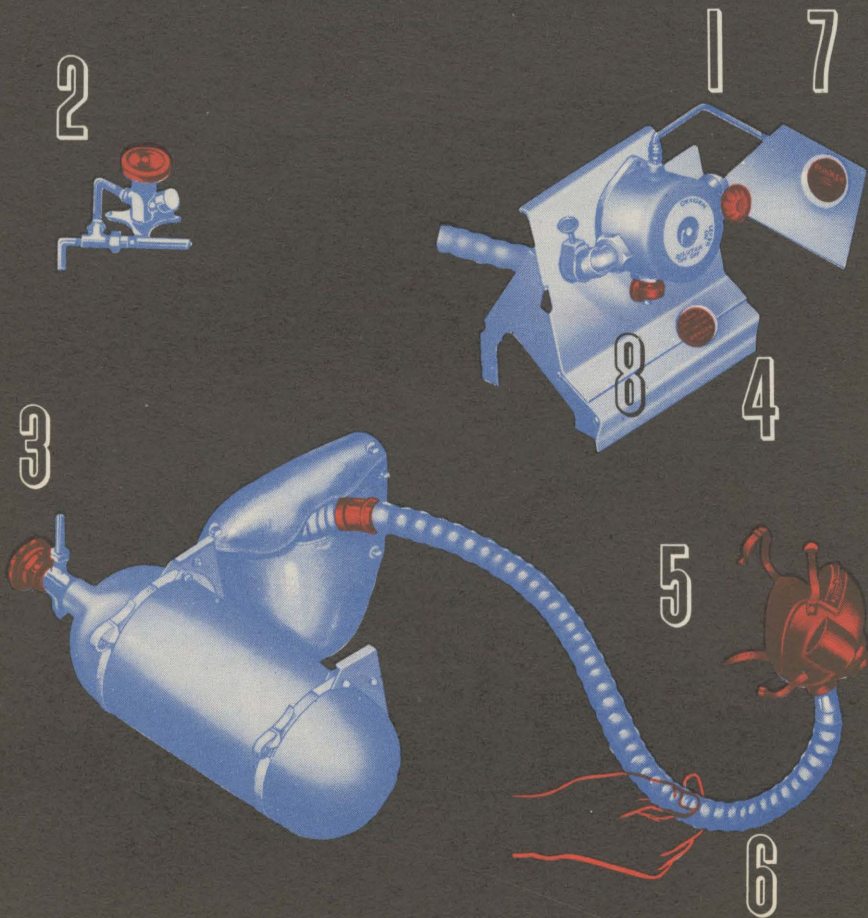
1. To operate the gun camera, turn on the armament master switch, set the camera switch to "WITH BOMBS" or "WITH GUNS" and press the bomb release button or the gun trigger. The camera alone may be operated in practice but the gun selection switches must be "OFF" and the bomb release handle at "LOCK" to prevent firing the guns or dropping bombs accidentally.

2. The camera is parallel to the gun sight. To record the results of a bombing, return the bomb release handle to "LOCK", swing the airplane around to sight the target through the gun sight, and press the bomb release button as long as you desire.

USE OF OXYGEN

Preflight Check

1. Red "EMERGENCY" valve closed.
2. Filler valve closed (clockwise).
3. Bottle open (knob counterclockwise).
4. Pressure 1800 ± 50 PSI.
5. Mask on. Be sure flexible tube quick disconnect coupling is secure.
6. Pinch mask tube and inhale lightly. If mask leaks, tighten or adjust suspension straps and nose wire.
7. Turn diluter lever "OFF", inhale and check flow (indicator blinks).
8. Turn the diluter lever "ON".



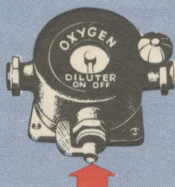
OPERATING INSTRUCTIONS

Always use oxygen above 10,000 feet and above 5000 feet for combat or tactical night flights.



Keep diluter lever "ON" except when:

1. On long flight above 30,000 feet.
2. Flight Surgeon orders pure oxygen or it is needed to treat injury or shock.
3. Poison gas in cockpit is suspected. If carbon monoxide is suspected in the cockpit reduce throttle to normal cruise, and set mixture to "AUTO LEAN" if possible.



Keep regulator red "EMERGENCY" knob "OFF" except:

1. To revive pilot if fainting.
2. To give positive oxygen flow if mask leaks excessively.
3. If pilot has to remove mask temporarily (loosen on one side and hold as near nose as possible).
4. When flow indicator doesn't blink.



Turn off emergency valve as soon as possible or descend to a safe altitude. Watch blinker to check oxygen flow. Check pressure gage for endurance.



For endurance of a bottle that is not full, see diagram on page 46.



ALTITUDE (Feet)	DILUTER ON (Hours)	DILUTER OFF (Hours)
5,000	7.3	1.8
10,000	8.7	2.1
15,000	11.0	2.6
20,000	9.3	3.3
25,000	6.3	4.1
30,000	5.2	5.2
35,000	6.5	6.5
40,000	8.3	8.3

RADIO OPERATION

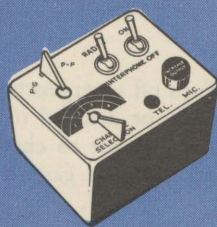
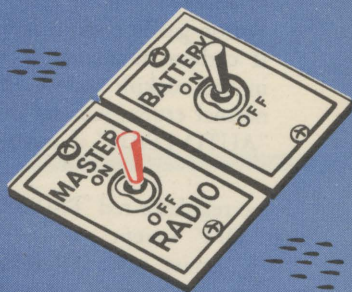
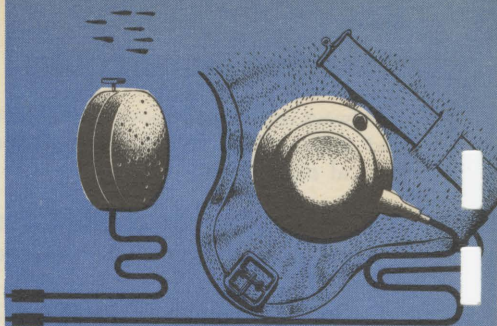
Headset and Microphones—Plug headset and hand "mike" into jacks on top of jack box on seat armor. Plug throat, lip, or mask "mike" into extension cord.

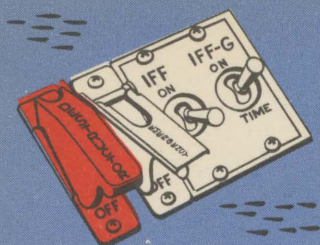
Master Radio Switch—Turn on the switch 30 seconds before using the radio. Do not run the radios on the battery only (with no generator or external power), or limit the number of radios operating. Turn off after parking airplane.

Voice Communication—Master radio switch "ON". Radio telephone "ON-OFF" switch "ON". "RADIO-INTERPHONE" switch on "RADIO". "P-G", "BOTH", "P-P" as desired. Channel selector switch set to desired channel as follows:

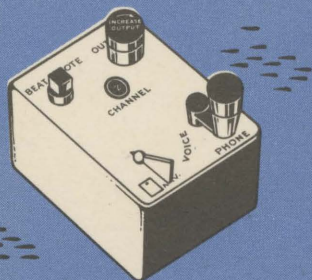
SW. POS.	TRANS. CHANNEL	REC. CHANNEL
1	P-P	P-P & P-G No. 1
2	P-G No. 1	P-P & P-G No. 1
3	P-G No. 2	P-P & P-G No. 2
4	P-G No. 3	P-P & P-G No. 3

"INCREASE OUTPUT" knob set for desired volume. Depress "mike" button on throttle or switch on hand "mike" to talk over radio telephone, and release to receive.

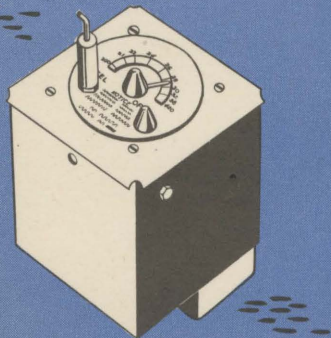




Identification—Master radio switch "ON". IFF "ON-OFF" switch "ON" before take-off. IFF-"G" switch at "OFF" unless commanding officer instructs otherwise. Do not use the "EMERGENCY" switch under the green guard unless you are in trouble or need assistance. "DESTRUCTOR" switch "OFF" unless a forced landing in enemy territory is to be made.



Homing—Turn master radio switch "ON". Turn the "OFF"- "NAV"- "VOICE" switch to "NAV" for code signals. Turn channel selector crank until correct number appears in dial window. Adjust "OUTPUT" knob for volume control. Set "BEAT NOTE" knob for the desired pitch of code signals.



Range Signal Reception—Turn master switch "ON". Turn "OFF"- "ON"- "VOLUME" knob "ON." Use knob and dial to tune in desired range station. Adjust the volume.

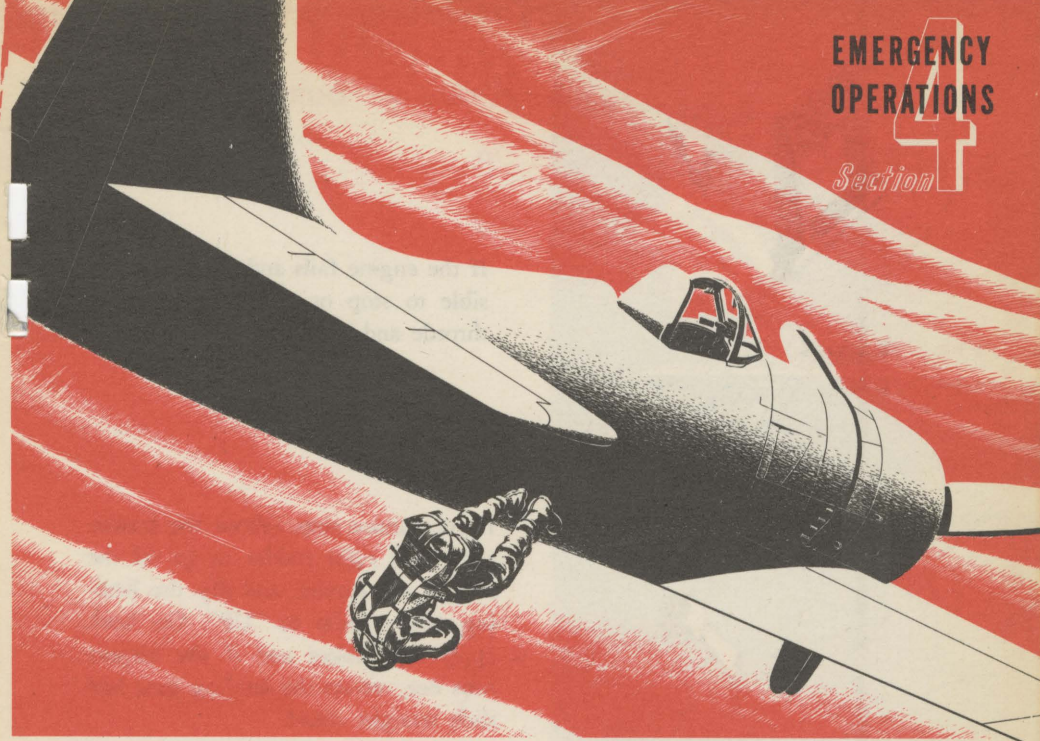


EMERGENCY
OPERATIONS

SEC-4

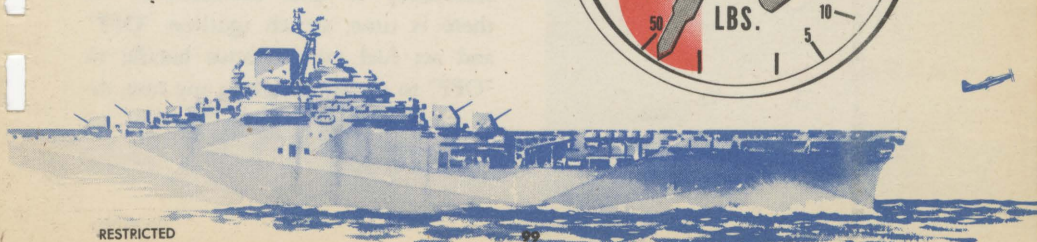
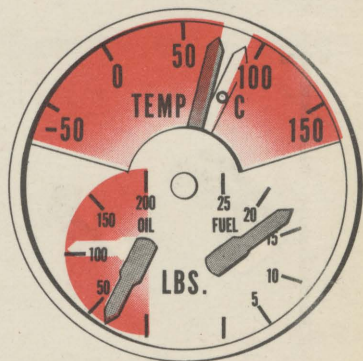
EMERGENCY OPERATIONS

Section 4



EMERGENCY TAKE-OFF

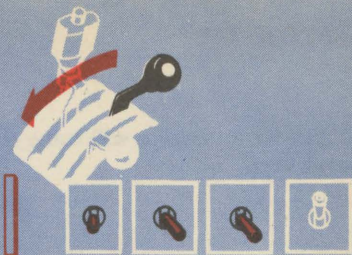
In an emergency, you can take off without an engine warm up or ground test providing that the oil temperature has shown a definite increase (at least 10°C — 18°F) since starting and that the oil pressure is steady below 100 PSI. Use the oil dilution system, carefully, to reduce the oil pressure if necessary, but only if the oil has been diluted when the engine was last shut down.



ENGINE FAILURE DURING FLIGHT

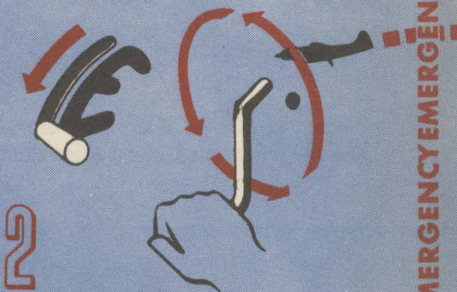
1

If you are within gliding distance of a landing area, immediately move the prop-pitch handle to "DECREASE RPM". Close cowl flaps, oil cooler and intercooler doors.



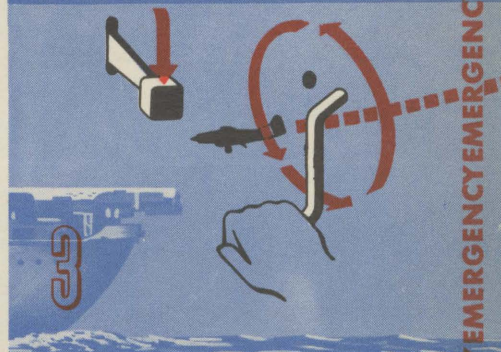
2

Switch off all electrical equipment possible (radios, electric fuel pumps, pitot heater, lights) to conserve battery charge. Flip wing flap control switch to full "DOWN", and if the flaps do not reach limit of travel before battery fails, crank them down, with the hand crank. It takes about 25 seconds to lower the flaps electrically, and about 5 minutes with the crank (360 turns).



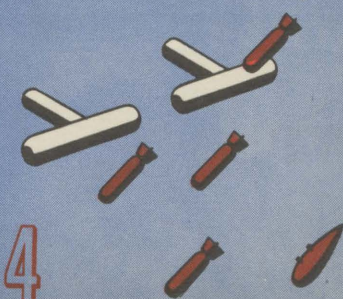
3

If it is possible to land on a deck or an airport, lower the landing gear electrically (8 seconds) if battery power is available, or with the hand crank (3 1/2 minutes—230 turns).



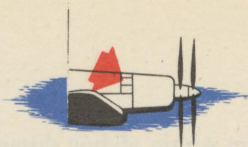
4

If you have to land on water or rough ground, leave the landing gear retracted. Jettison all bombs and extra fuel tanks.

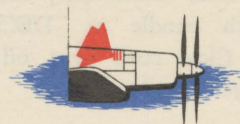


ENGINE FIRE

Fire in the engine will come out the cowl flaps.



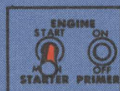
Fire in the accessory section will come out the ventilating slots on the sides.



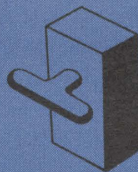
Fire in the air ducts will come out the oil cooler and intercooler doors.



If fire breaks out while starting the engine hold the starter switch on "MESH" until you have the mixture at "IDLE CUTOFF", the tank selector at "OFF", and the ignition switch "OFF".



Pull the fire extinguisher handle and, if on the ground, have the portable extinguishers directed at the cowling, air scoop, or exhaust stacks.



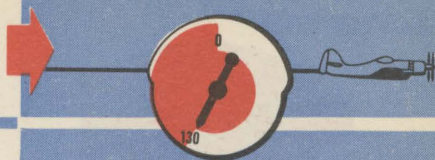
Open the intercooler, oil cooler, and cowl flaps to reduce trapped heat damage.



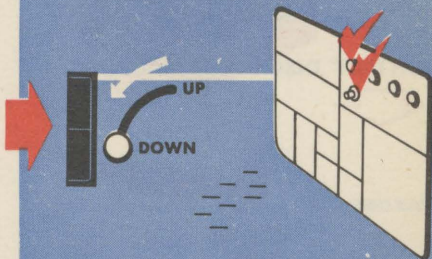
Do not start the engine until the cause of the fire has been corrected.

WING FLAP MOTOR FAILURE

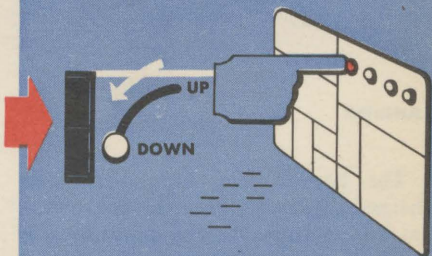
Do not lower the flaps above 130 knots (150 MPH) indicated air speed.



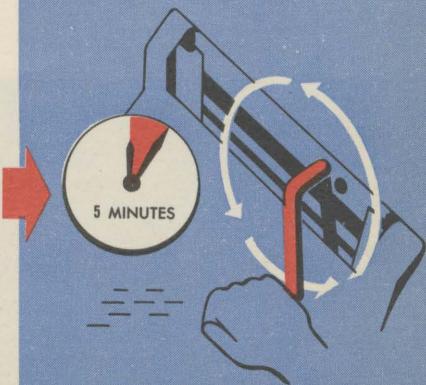
The wings must be spread before the flaps will operate electrically. The air speed must be under 130 knots (150 MPH) when you are increasing speed or 117 knots (135 MPH) when decreasing speed or the air speed switch will not let the flaps operate. If the wing flaps do not move when you throw the switch, see if a circuit breaker has popped out.

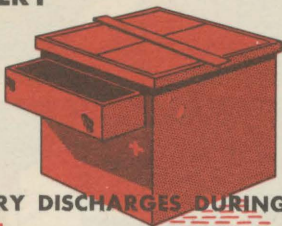
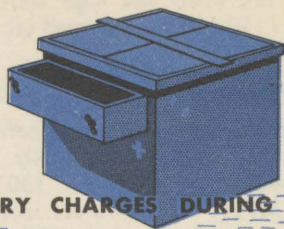


In an emergency when you have to get the flaps down in a few seconds, you may be able to keep the flap motor running by holding the circuit breaker in even though it is trying to pop out from overload. If the flaps still fail to move however, release the circuit breaker to keep from discharging the battery.



If the electrical system fails, operate the flaps with the handcrank stowed to the right of the pilot's seat. Insert the crank in the front crank socket. It takes about five minutes (360 turns) to lower the flaps.



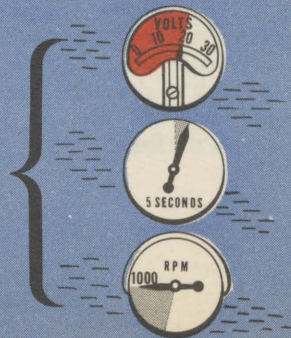
ELECTRICAL POWER FAILURE**BATTERY****BATTERY DISCHARGES DURING****TAXIING****COMBAT****LANDING****BATTERY CHARGES DURING****TAKE-OFF****CLIMB****LEVEL FLIGHT**

The battery may have been discharged so rapidly that the electrolyte has boiled away, thereby preventing a full recharge. It may also be discharged a second time before complete recharge, and make the recharging time even longer.

If the battery is discharged before starting engine when external power isn't available, it may be impossible to get the necessary fuel boost, ignition boost, and fuel priming. Turn on as little electrical equipment as possible until the engine is running.

LOW BATTERY

The battery is low when the voltage is below 20 for more than five seconds when the engine is run above 1000 RPM and a heavy system load is applied.



BATTERY USE AFTER GENERATOR FAILS

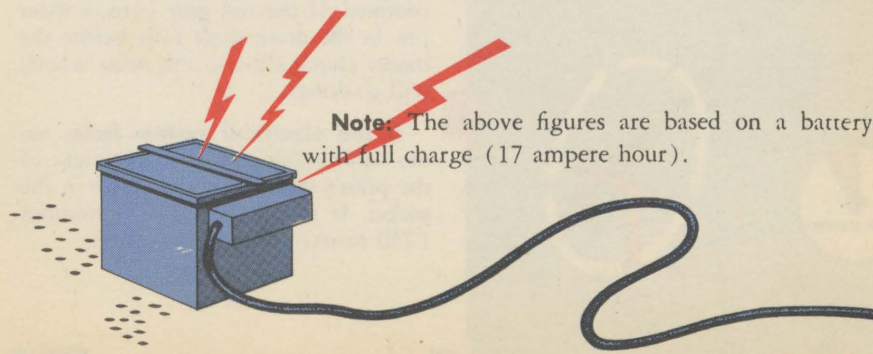
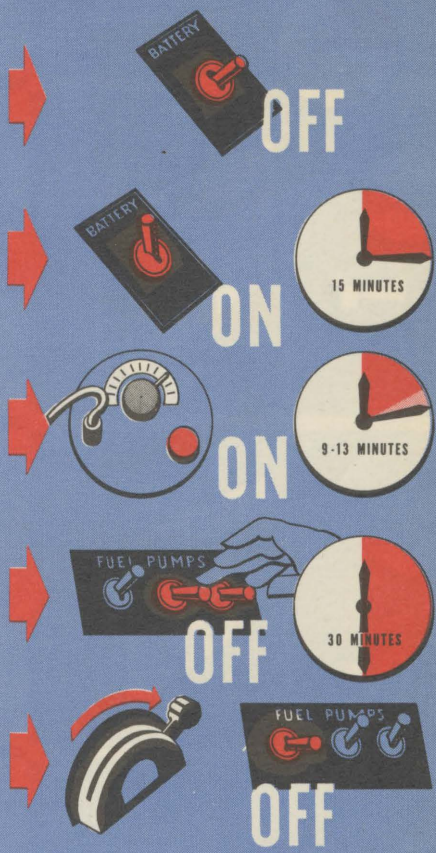
Turn off all but essential equipment. To get the greatest possible service out of the battery charge, turn the battery switch to "OFF," except for necessary instrument or radio use.

If the battery switch only is "ON" (instruments and electric fuel pumps using power) the battery lasts about 15 minutes.

With continuous use of above equipment plus one radio the battery lasts 12 or 13 minutes. If all radios are used with above equipment it will last 9 minutes.

If operating on auxiliary tanks, the auxiliary fuel pump can only be turned off with the battery switch. If on main tank, turn "OFF" the auxiliary fuel pump switch.

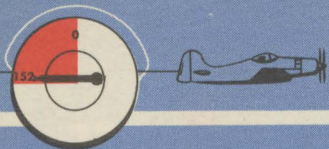
If the instruments only are used (booster pumps may be held "OFF" if the engine fuel pump maintains 16 PSI) the battery lasts about 30 minutes.



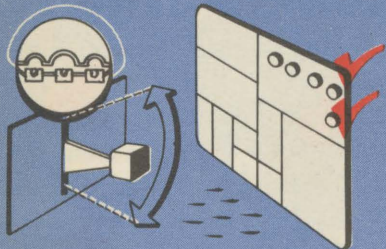
Note: The above figures are based on a battery with full charge (17 ampere hour).

EMERGENCY EMERGENCY EMERGENCY EMERGENCY EMERGENCY EMERGENCY

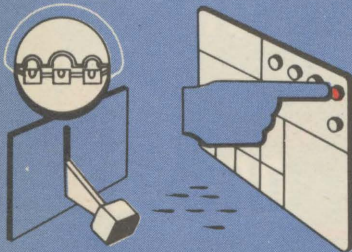
LANDING GEAR FAILURE



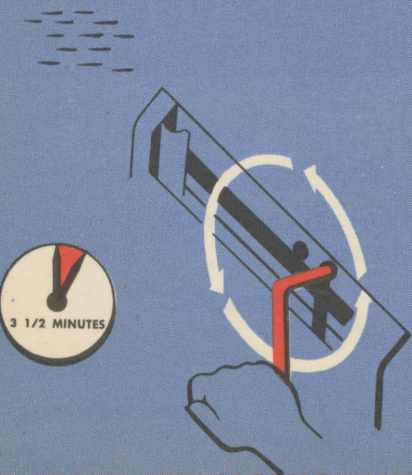
Do not raise or lower the landing gear over 152 knots (175 MPH) indicated air speed.



If the landing gear doesn't operate when you move the handle, see if the circuit breaker has popped out.



In an emergency when you have to get the wheels down quickly, try to keep the retracting motor running by holding the circuit breaker in even though it is trying to pop out from overload. If the landing gear still doesn't move however, release circuit breaker to keep from discharging the battery.

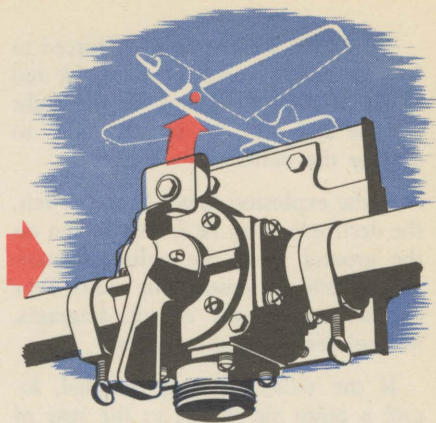


The landing gear cannot be retracted if the weight of the airplane is on the wheels or if the tail wheel is not centered. If the tail gear jams, a shear pin in the drive shaft fails before the motor clutch slips so the main wheels will go down.

If the electrical system fails, use the hand crank stowed to the right of the pilot's seat. Insert the crank in the socket. It takes about 3 1/2 minutes (230 turns) to lower the wheels.

AIRPLANE DESTRUCTION

The best way to destroy the airplane is by burning gasoline. You can release fuel from the main tanks by opening the defueling valve in the inter-cooler air exit door just forward of the bomb bay doors.

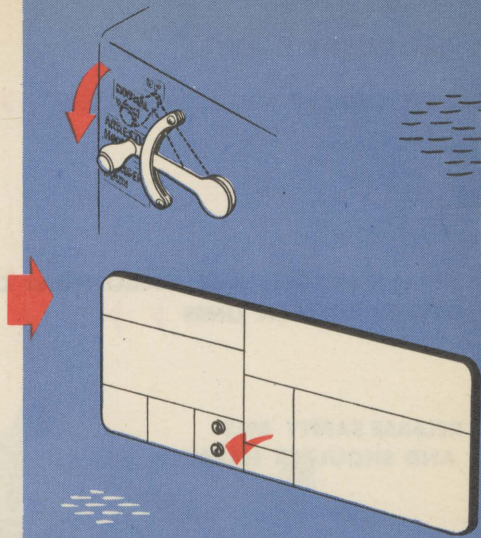


If you can part the fuel lines in the nacelle, set the fuel tank selector handle to a full tank and turn the battery switch "ON." Fuel will spray into the nacelle.

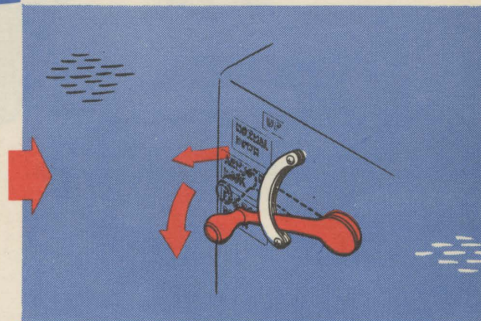


ARRESTING HOOK FAILURE

If the arresting hook motor will not run the hook down when the control handle is set to "NORMAL DOWN," see if the circuit breaker is in. If it has popped out and will not stay in, lower the hook as follows:

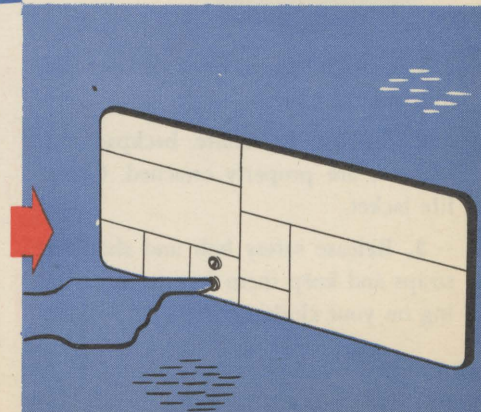


Spring the control handle inboard and move it past the stop lug to "EMERGENCY DOWN," then release it.



If the hook still will not come down, it may be possible to lower it by holding the circuit breaker in even though it is trying to pop out. However, if the hook does not come down within 10 to 15 seconds, release the circuit breaker to prevent discharging the battery.

The hook may be raised the same way if the circuit breaker pops out when the handle is returned to up.





POWER PLANT CHART

AIRCRAFT MODEL
BOEING XF8B-1

PROPELLER
AEROPRODUCTS
6 BLADED, DUAL ROTATION

ENGINE MODEL
PRATT & WHITNEY
R-4360-10

GAGE READING	FUEL PRESS.	OIL PRESS.	OIL TEMP.	CARB. AIR TEMP.	OIL ⁽¹⁾ CONS.	MAX. PERMISSABLE DIVING RPM: 3060 (30 SECONDS) MIN. RECOMMENDED CRUISE RPM: 1400 OIL GRADE: (S) 1120 (W) 1120 FUEL GRADE: 100/130 SPEC. AN-F-28														
DESIRED	17	80-90	70° C	30° C	40															
MAXIMUM	18	90	85° C	38° C	QT./HR.															
MINIMUM IDLING	16	50	40° C																	
8	25					WAR EMERGENCY (COMBAT EMERGENCY)			MILITARY POWER (NON-COMBAT EMERG.)			OPERATING CONDITION			MAX. CONTINUOUS (NORMAL RATED)			MAX. CRUISE (NORMAL OPERATION)		
						5 MINUTES 232° C			TIME LIMIT MAX. CYL. HEAD TEMP.			UNLIMITED 232° C			UNLIMITED 204° C					
						AUTO RICH 2700			MIXTURE RPM			AUTO RICH 2550			AUTO-LEAN 2150					
MANIF. PRESS.	SUPER CHARGER	FUEL GAL./MIN. ⁽²⁾	MANIF. PRESS.	SUPER CHARGER	FUEL GAL./MIN. ⁽²⁾	STD. TEMP. °C.	PRESSURE ALTITUDE	STD. TEMP. °F.	MANIF. PRESS.	SUPER CHARGER	FUEL G.P.H. ⁽³⁾	MANIF. PRESS.	SUPER CHARGER	FUEL G.P.H. ⁽³⁾						
						-55.0	40,000 Ft.	-67.0												
						-55.0	38,000 Ft.	-67.0												
						-55.0	36,000 Ft.	-67.0												
	TO BE FURNISHED BY NAVY DEPARTMENT BUREAU OF AERONAUTICS					-52.4	34,000 Ft.	-62.3												
						-48.4	32,000 Ft.	-55.1												
						-44.4	30,000 Ft.	-48.0												
			46.0	ON*	6	-40.5	28,000 Ft.	-40.9	39	ON*	282	28	ON*	—						
			50.0	ON*	6	-36.5	26,000 Ft.	-33.7	44	ON*	282	31	ON*	—						
			53.0	ON*	6	-32.5	24,000 Ft.	-26.5	47	ON*	282	33	ON*	124						
			53.5	ON*	6	-28.6	22,000 Ft.	-19.4	47	ON*	282	35	ON*	124						
			53.5	ON*	6	-24.6	20,000 Ft.	-12.3	47	ON*	282	35	ON*	124						
			53.5	ON*	6	-20.7	18,000 Ft.	-5.2	47	ON*	282	35	ON*	124						
			53.5	ON*	6	-16.7	16,000 Ft.	2.0	47	ON*	282	35	ON*	124						
			53.5	ON*	6	-12.7	14,000 Ft.	9.1	47	ON*	282	35	ON*	124						
			53.5	ON*	6	-8.8	12,000 Ft.	16.2	47	ON*	282	35	ON*	124						
		53.5	ON*	6	-4.8	10,000 Ft.	23.4	47	ON*	282	35	ON*	124							
		53.5	ON*	6	-0.8	8,000 Ft.	30.5	47	ON*	282	33	OFF	124							
		53.5	ON*	6	3.1	6,000 Ft.	37.6	41	OFF	282	33	OFF	124							
		48.0	OFF	6	7.1	4,000 Ft.	44.7	41	OFF	282	33	OFF	124							
		48.0	OFF	6	11.0	2,000 Ft.	51.8	41	OFF	282	33	OFF	124							
		48.0	OFF	6	15.0	SEA LEVEL	59.0	41	OFF	282	33	OFF	124							

NOTES

- (1) OIL CONSUMPTION; MAX. U.S. QUART PER HR. PER ENGINE.
 (2) GAL./MIN. APPROX. U.S. GAL. PER MINUTE PER ENGINE.
 (3) GHP; APPROX. U.S. GALLON PER HOUR PER ENGINE.
 VALUES ARE FOR LEVEL FLIGHT WITHOUT RAM.

TO DETERMINE CONSUMPTION IN BRITISH IMPERIAL UNITS
MULTIPLY BY 10, THEN DIVIDE BY 12.

RED FIGURES ARE PRELIMINARY SUBJECT TO REVISION AFTER
FLIGHT CHECK.

Fuel Flows in Red are Estimated Maximum

*After Throttle is Full Open, use Supercharger to obtain desired Man. Press.

TAKEOFF CONDITIONS

NORMAL: 2700 RPM, 52 MP, AUTO RICH, CYL 232° C MAX.
EMERGENCY: 2700 RPM, 52 MP, AUTO RICH, OIL BELOW
 100 PSI, 10°-18° C RISE

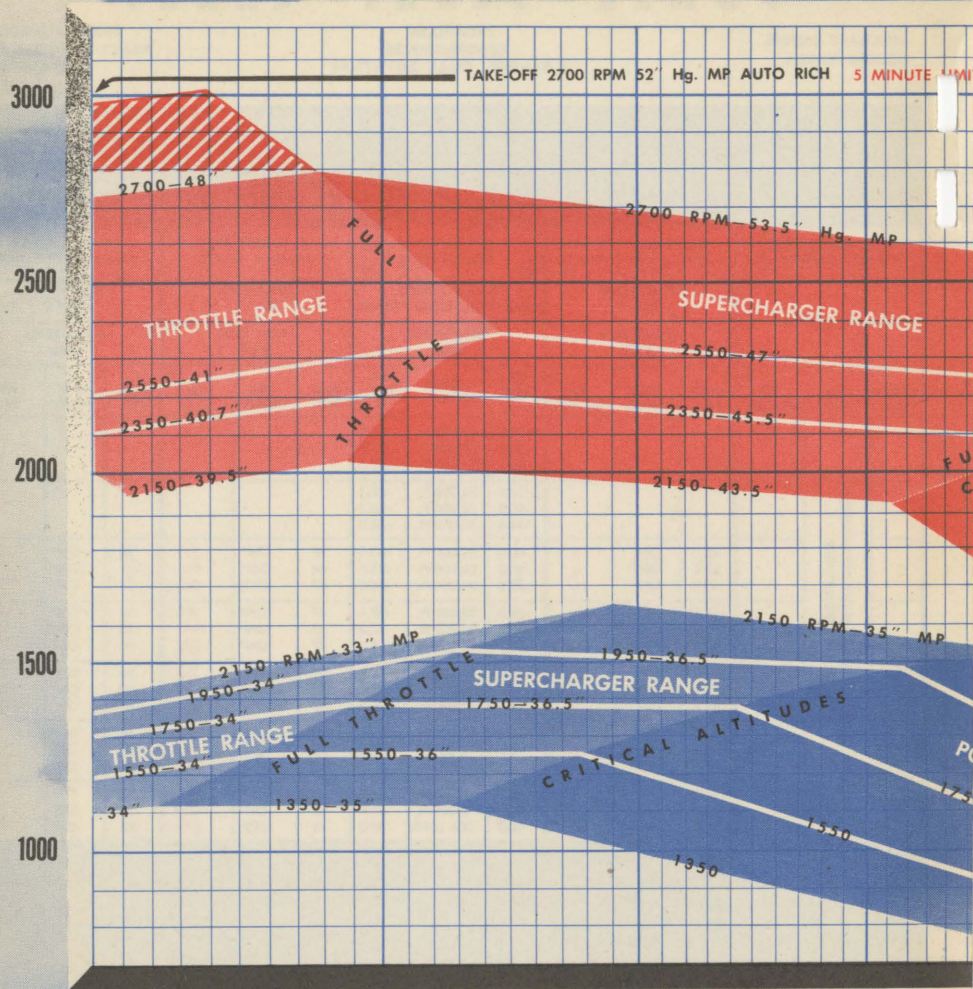
CONDITIONS TO AVOID

INVERTED FLIGHT
 OUTSIDE LOOPS

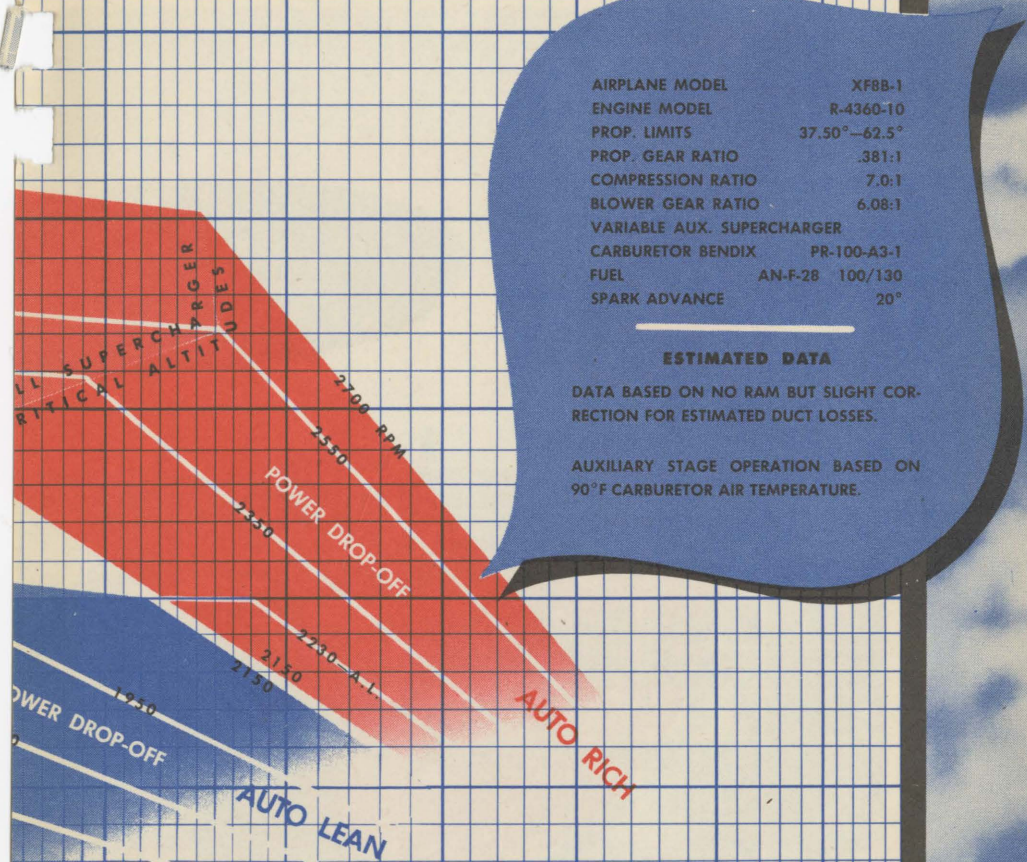
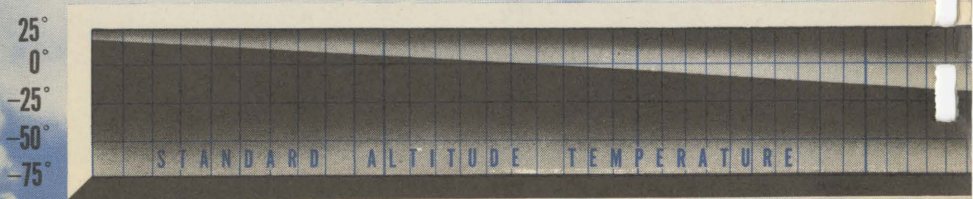
DATA AS OF 11-20-44, BASED ON PRATT AND WHITNEY CURVES, NO. 1721 -5, -6, AND -16.

PRELIMINARY ENGINE FLIGHT CALIBRATION CURVE ESTIMATED

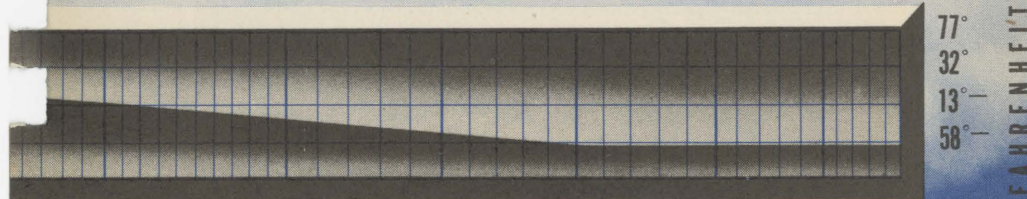
B R A K E H O R S E P O W E R



C E N T I G R A D E



20000 25000 30000 35000 40000 45000 50000 FT. ALT.



AIRPLANE MODEL	XF8B-1
ENGINE MODEL	R-4360-10
PROP. LIMITS	37.50°-62.5°
PROP. GEAR RATIO	.381:1
COMPRESSION RATIO	7.0:1
BLOWER GEAR RATIO	6.08:1
VARIABLE AUX. SUPERCHARGER	
CARBURETOR BENDIX	PR-100-A3-1
FUEL	AN-F-28 100/130
SPARK ADVANCE	20°

ESTIMATED DATA

DATA BASED ON NO RAM BUT SLIGHT CORRECTION FOR ESTIMATED DUCT LOSSES.

AUXILIARY STAGE OPERATION BASED ON 90°F CARBURETOR AIR TEMPERATURE.

PRELIMINARY AIRSPEED

VS.

ANGLE OF ATTACK

ESTIMATED

ESTIMATED

ANGLE OF ATTACK THRUST LINE

15° 14° 13° 12° 11° 10° 9° 8° 7° 6° 5° 4° 3° 2° 1° 0° -1° -2° -3° -4° -5° -6° -7° -8°

KNOTS

40 100 160 220 280 340 400

MPH

100 160 220 280 340 400 460 520

INDICATED

GROSS WEIGHTS

16,567 LBS.=COMBAT WT.

21,336 LBS.=MAX. GR. WT.

GR. WT. 16,567 LBS. @ 4G.
GR. WT. 16,567 LBS. @ 3G.
GR. WT. 16,567 LBS. @ 2G.
GR. WT. 21,336 LBS. @ 1G.
GR. WT. 16,567 LBS. @ 1G.

FLAPS UP

LESS 1/2 FUEL

LESS 1/4 FUEL

GR. WT. 16,567 LBS. @ 3G.
GR. WT. 16,567 LBS. @ 2G.
GR. WT. 21,336 LBS. @ 1G.
GR. WT. 16,567 LBS. @ 1G.

FLAPS FULL DOWN

WING
20° 19° 18° 17° 16° 15° 14° 13° 12° 11° 10° 9° 8° 7° 6° 5° 4° 3° 2° 1° 0° -1° -2° -3°

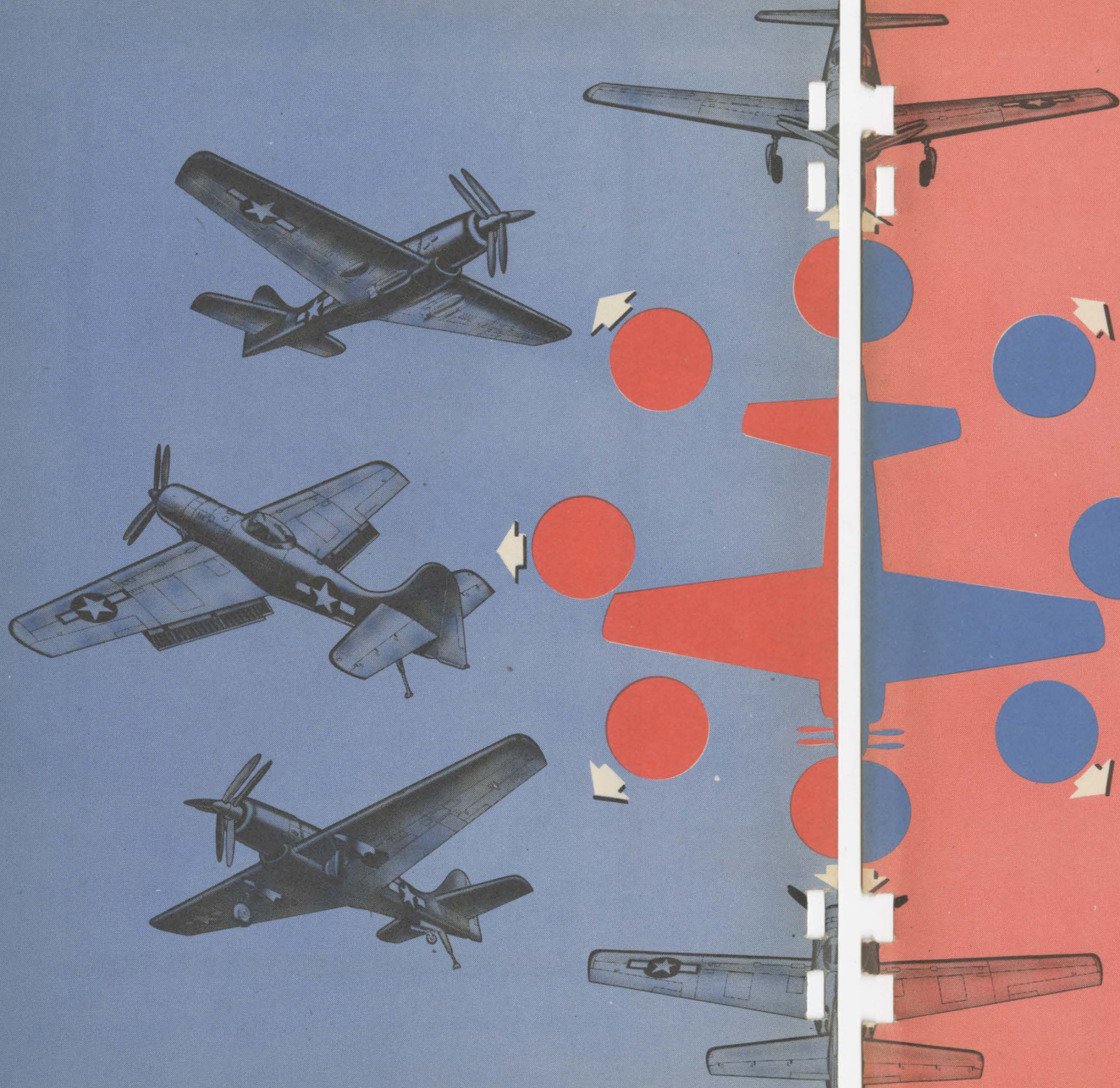
KNOTS

60 70 80 90 100 110 120 130

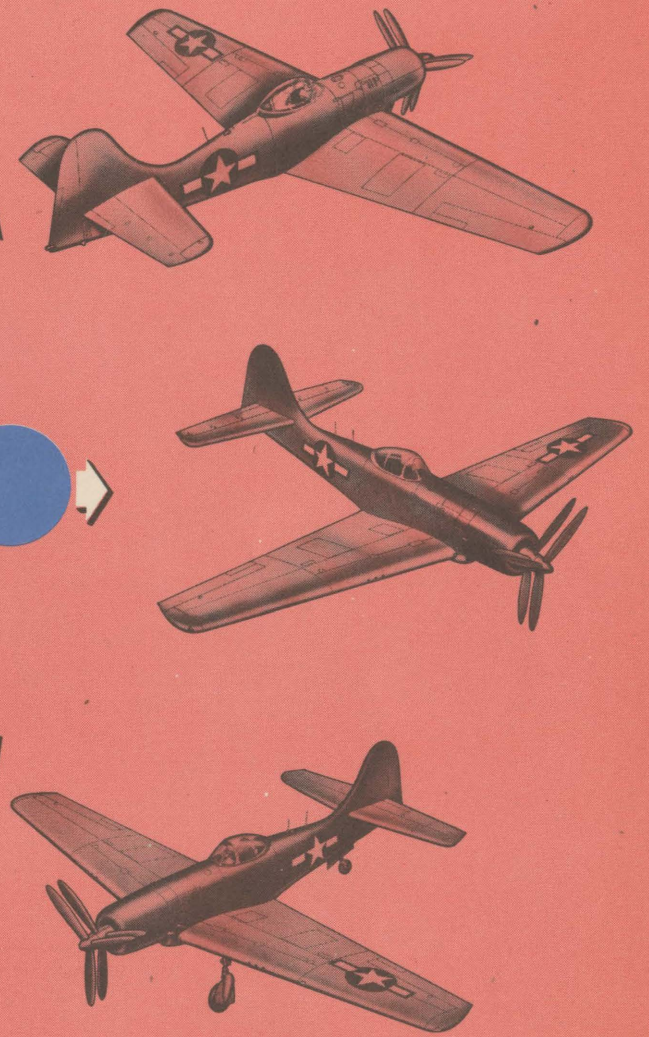
MPH

70 80 90 100 110 120 130 140

AIRSPEED



RESTRICTED



RESTRICTED

