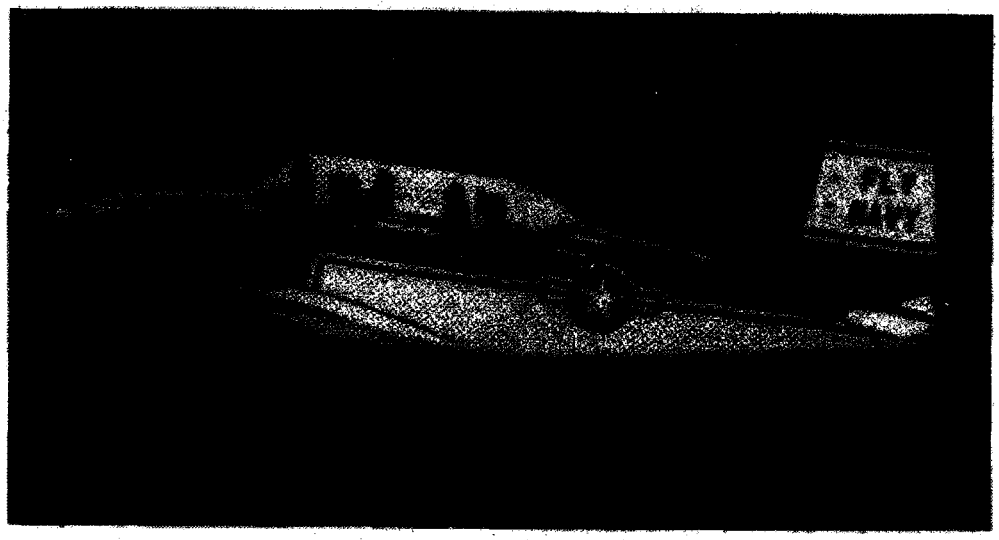
NATOPS FLIGHT MANUAL

NAVY MODEL

T-34B
AIRCRAFT

THIS MANUAL SUPERSEDES NAVAIR 01-90KDB-1 DATED 1 MAY 1967, CHANGED 1 DECEMBER 1978.



ISSUED BY AUTHORITY OF THE CHIEF OF NAVAL OPERATIONS AND UNDER THE DIRECTION OF THE COMMANDER, NAVAL AIR SYSTEMS COMMAND

Change Notice 2 March 1981

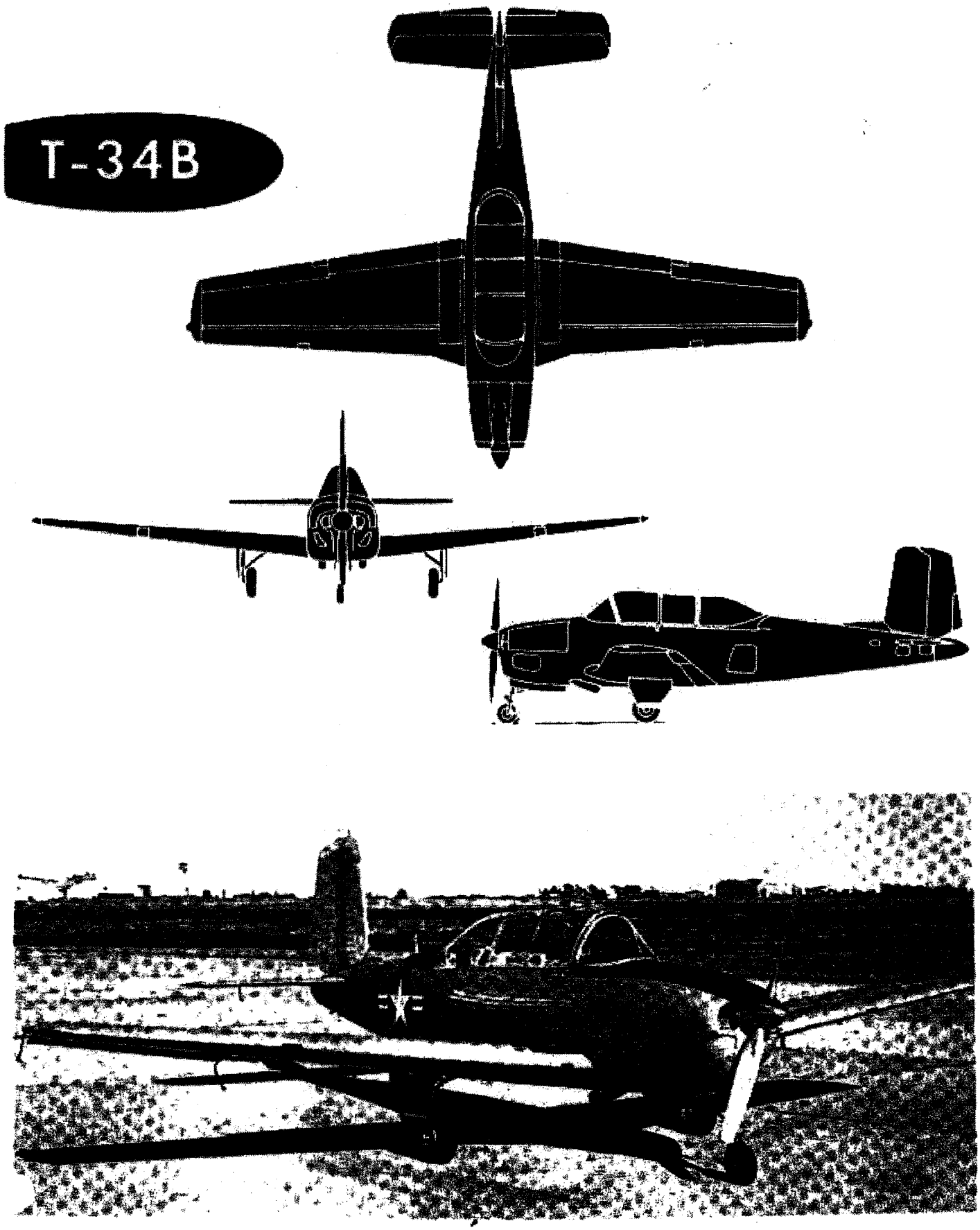


Figure 1-1. T-34B Aircraft

14. Radios — SET

15. AIMS — ON.

TAKEOFF.

Upon completion of the takeoff checklist and after takeoff clearance is obtained, align the aircraft on the runway. Apply full throttle to commence the takeoff run, and at 50-55 knots place the nose slightly above the taxi attitude. Fly the aircraft smoothly off the ground. When positively airborne and a safe landing can no longer be made on the runway, raise the gear. Maintain takeoff attitude until the airspeed reaches 100 knots and establish the 100-knot normal climb.

AFTER TAKEOFF CHECKLIST.

1. Landing gear — UP.

2. Flaps — UP.

3. Fuel caps — SECURE. (Visually check)

MINIMUM RUN TAKEOFF.

For a minimum run takeoff (figure 3-2) use 75 percent flaps, line up on the end of the runway, apply brakes, and smoothly apply full power. With full power applied, release the brakes but do not assume a nose high attitude until reaching approximately 50 knots. At this time pull back on the stick rapidly but smoothly to assume nose high (takeoff) attitude so the runway may be cleared as soon as minimum flying airspeed (approximately 55 knots) is reached. When clear of the ground, retract the gear and accelerate to climb speed. Continue with the normal takeoff and climb procedure.

OBSTACLE CLEARANCE TAKEOFF.

Use the same procedures as for a minimum run takeoff (figure 3-2) to the point of assuming a nose high attitude. Do not assume the nose high takeoff attitude until reaching approximately 55 knots. When clear of the ground, retract the gear. Accelerate to, and maintain, 70 knots IAS for maximum angle of climb until obstacle is cleared. Accelerate to 100 knots IAS, retract flaps, and continue normal climb.

Note

With normal speeds and the engine developing full power, no particular caution need be exercised in retracting the flaps since acceleration will be sufficient to offset any tendency for the aircraft to sink. Under conditions of minimum airspeed and/or less than full power, caution should be exercised and the flaps raised in increments of 25 to 30 percent.

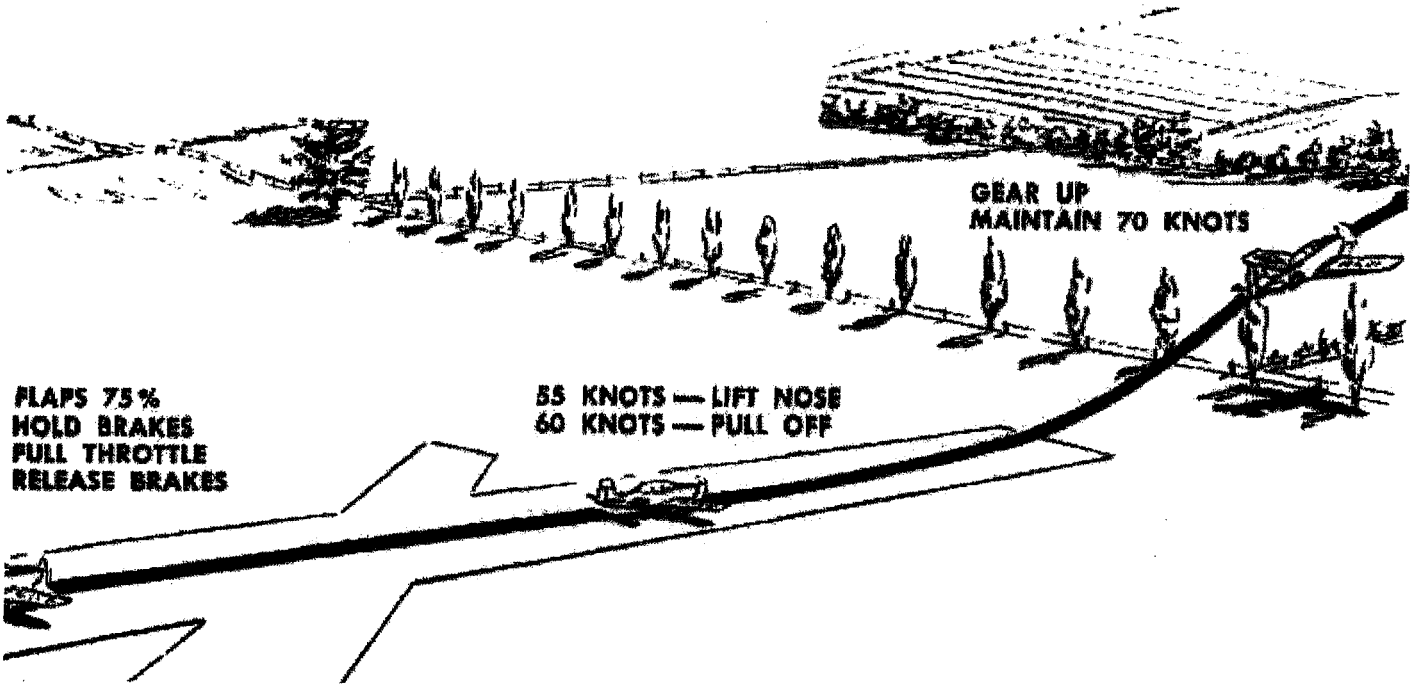


Figure 3-2. Obstacle Clearance Takeoff (Sheet 1 of 2)

CROSSWIND TAKEOFF.

In a crosswind takeoff, directional control may be more difficult to maintain; therefore, the following procedure should be used. See figure 3-3 for finding recommended takeoff speeds.

1. Advance throttle to takeoff power setting and maintain directional control with rudder. Continue as in a normal takeoff, applying sufficient aileron pressure to maintain level attitude. If unable to maintain directional control at start of takeoff roll, some use of brakes may be necessary. If possible, use of brakes should be avoided after takeoff roll is underway since every application of brakes will lengthen the takeoff run.

2. Hold nose wheel on ground longer than in a normal takeoff and use aileron to hold wings level.

3. Make the pulloff definite, as flying speed is reached, to avoid sideskipping as the aircraft starts to become airborne.

4. When definitely airborne, correct for drift by making a coordinated turn into the wind.

NORMAL CLIMB.

Climb is don at 100 knots, full increase (2,600) rpm, an full throttle.

NORMAL CRUISE.

The aircraft is flown at 120 knots and 2,000 rpm (20 t 23 inches MAP).

SLOW FLIGHT

1. From normal cruise, close throttle, advanc propeller control to full-low pitch, and maintai altitude and heading.

2. At 110 knots, lower landing gear. When ge indicates down, advance throttle to 15 inches MAP an lower flaps.

3. At 70 knots, advance throttle to approximately 19 t 21 inches MAP to maintain altitude and 70 knots.

4. To return to normal cruise, apply full throttle an raise gear. When gear indicates up, raise flaps. At 1 knots, reduce power to normal cruise settings.

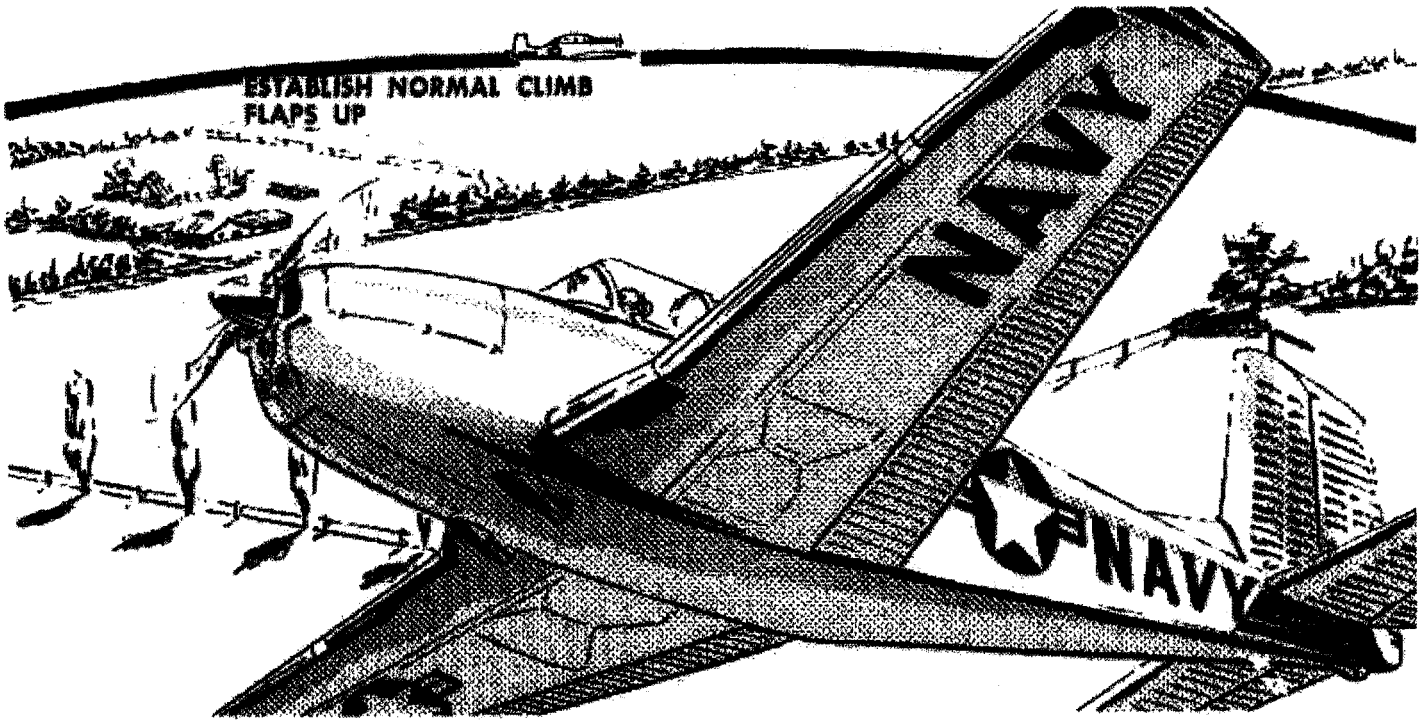


Figure 3-2. Obstacle Clearance Takeoff (Sheet 2 of 2)

SECTION IV — FLIGHT CHARACTERISTICS

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GENERAL FLIGHT CHARACTERISTICS.

The aircraft has excellent stability and handling characteristics and high maneuverability. When properly trimmed, it tends to maintain straight and level flight. Controls are effective throughout the speed range from stall to maximum diving speed.

STALL CHARACTERISTICS.

Stalls in this aircraft (figure 4-1) are characterized by an exceptionally clean break and extremely rapid recovery. It is difficult to stall the aircraft accidentally, except as the result of acceleration, since the stall attitude is very steep. Very little aerodynamic warning precedes the stall and the best indications of an approaching stall condition are attitude, airspeed, and rapid increase in control sloppiness. The stall itself is characterized by an immediate pitch-down. If the aircraft is allowed to yaw, a roll will develop which may continue up to 30 to 40 degrees and then stop. This roll is easily corrected with coordinated control during recovery. Position of the landing gear has little or no effect on stall characteristics.

PRACTICE STALL MANEUVERS.

The stall checklist will be performed prior to any practice stall maneuver, as follows:

1. Fuel boost pump — ON.
2. Harness — TIGHT AND LOCKED.
3. Propeller — FULL INCREASE.
4. Canopy — CLOSED AND LOCKED.
5. Directional indicator — CAGED.
6. Loose gear — STOWED.

Clearing turns will be performed prior to any stall, spin, or acrobatic maneuver. Clearing turns shall consist of at least two 90-degree turns or one 180-degree turn using a 45-degree angle of bank clean or 30-degree angle of bank dirty. The last turn should be made in the same direction in which the maneuver is to be performed. Minimum altitude for recovery from any stall maneuver is 3,000 feet AGL.

POWER-ON STALLS.

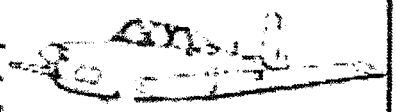
As the aircraft decelerates, right rudder must be added to counteract torque and maintain straight flight. Yaw present at the break of the stall will cause the aircraft to roll. This roll is most pronounced with flaps down. After the nose drops through the horizon, rudder and aileron are both effective in returning the wings to level.

POWER-OFF STALLS.

With power off, the stall occurs at slightly higher airspeed than with power on. Stall characteristics are not materially affected, except there is less tendency for a roll to develop should the aircraft be allowed to yaw. With gear and flaps down (landing configuration), buffet occurs at 2 or 3 knots above stalling speed.

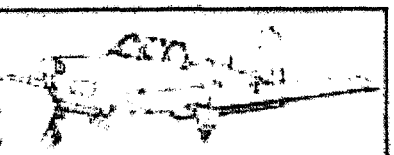
KNOTS

GROSS WEIGHT LB.	POWER ON (MAX. CONTINUOUS POWER) LEVEL	DEGREE OF BANK 15°	30°	45°	POWER OFF (WINDMILLING PROP) LEVEL	DEGREE OF BANK 15°	30°	45°
2775	52	53	56	62	56	57	60	67
2900	53	54	57	63	57	58	61	68
2975	54	55	58	64	58	59	62	69
3050	55	56	59	65	59	60	63	70



GEAR & FLAPS UP

GROSS WEIGHT LB.	POWER ON (APPROACH POWER) LEVEL	DEGREE OF BANK 15°	30°	45°	POWER OFF (WINDMILLING PROP) LEVEL	DEGREE OF BANK 15°	30°	45°
2775	44	45	47	52	47	48	51	56
2900	45	46	48	54	48	49	52	57
2975	46	47	49	55	49	50	53	58
3050	47	48	50	56	50	51	54	59



GEAR & FLAPS DOWN
100% FLAPS

30-DEGREE FLAPS

Figure 4-1. Indicated Stalling Speeds

STALL RECOVERY (NORMAL).

Altitude permitting, stall recovery will normally be made as follows:

Release back pressure on stick immediately and smoothly advance throttle.

2. Roll wings level and return to level flight. Avoid pulling back too severely, as a secondary stall or excessive g-loads may result.

3. When level flight is resumed, reduce throttle to cruising power.

STALL RECOVERY (LOW ALTITUDE).

Low altitude stall recovery differs from normal recovery as follows:

1. Use power to hold the altitude loss to a minimum. The nose of the aircraft should be allowed to drop only slightly below the horizon.

2. Use coordinated aileron and rudder to roll the wings level and return to level flight as rapidly as possible.

3. When control is regained, establish climb.

SKIDDED TURN STALL.

A skidded turn stall (right or left) in this aircraft is characterized by an extremely fast stall unaccompanied by the usual prestall indications. The post stall characteristics generally carry the aircraft through 90 to 360 degrees of roll depending on entry configuration, air speed, and the amount of control pressure applied. The high rate of roll is also accompanied by an extreme loss of altitude with the possibility of disorientation. An immediate execution of recovery procedures is necessary due to the rapidity of the stall/post stall sequence and the potential for an extreme loss of altitude. Stall recovery will be made as follows:

1. Immediately apply full throttle while neutralizing the controls.

2. Roll the aircraft in the shortest direction to the level flight altitude.

3. Raise the nose to stop the loss of altitude.

WARNING

Failure to neutralize the controls prior to an attempt to stop the roll may result in a secondary stall and roll in the opposite direction.

SPINS.

The spin characteristics of the aircraft depend largely on the abruptness of entry, attitude, speed, and power at the moment of entry. In general, normal spins are characterized by a very definite forward force on the stick with some stick buffet and moderate rudder buffet after

three turns. The aircraft completes one full turn in approximately three seconds and loses approximately 440 feet per turn. During one-half of the turn, the nose-down attitude steepens and the turn rate speeds up to one-and-one-half the average rate of turn. During the next half of the turn, the nose rises to approximately 25 degrees below the horizon and the turn rate slows down to half the average rate. This cycle increases in intensity during the first three or four turns and continues throughout the spin. Recovery can be effected at any point in the cycle. Spins with gear and flaps down are considerably milder, with a slower rotation rate, however, altitude loss is approximately 560 feet per turn.

Spins can be initiated out of any stall by holding full back stick and full rudder in the desired direction of rotation. If the spin is entered from a power-on stall condition, close the throttle immediately on entering the spin. Spin characteristics are not greatly aggravated by power, but airspeed during the spin and recovery will be considerably higher with excessive loss of altitude. All practice spins should be started at altitudes which will permit recovery 3,000 feet above the ground. During a two-turn spin and recovery, using a constant 4g pullout, altitude loss will be approximately 1,000 to 1,500 feet. Allow 500 feet more altitude for each additional turn.

WARNING

Do not enter a spin below 4,500 feet AGL. Recover after a maximum of two turns in any spin.

SPIN RECOVERY.

Recovery from normal spins is effected most rapidly if started at the beginning of the steep half of the turn. Recovery is equally positive in the shallow portion, but is somewhat slower. All that is necessary in a spin recovery is to release the flight controls, and the aircraft immediately recovers in a nose-down attitude at normal CG loadings. Normal spin recovery should be practiced as follows:

1. Apply opposite rudder to the neutral position followed by forward stick to the neutral position.

2. When the rotation stops, level the wings. The aircraft will be in a 60 to 80 degree dive. Start a pullout immediately to keep the altitude loss to a minimum, but avoid entering an accelerated stall.

3. With gear and flaps down, make pullout tight enough to keep from exceeding 100 knots IAS.

INVERTED SPINS.

No adverse characteristics are encountered in inverte spins. The aircraft must be held in the spin with fu forward stick and full rudder into the spin. Acceleratio during the spin varies between 2.1g's negative and 3.8g positive. The spin will not normally continue more tha 1 to 1-1/2 turns, after which it tends to deteriorate into high-speed spiral. Recovery can be made from either th spin or the spiral by neutralizing the controls and rollin out the resulting inverted dive.

Note

The oil pressure gage should always be checked before adding power when recovering from a spin or an inverted maneuver.

FLIGHT CONTROL.

Control forces are moderate to light and response i positive. Elevator and rudder control forces are very ligh and the aircraft is very sensitive to movement of thes controls. Rudder feel is enhanced by the use of an ant servo trim tab, which increases rudder pedal force proportionate to the displacement of the rudder fror neutral. Elevator tabs are conventional, their positio being determined only by adjustment from the cockpi Aileron forces are reduced by servo trim tabs anc although the aircraft is sensitive to aileron deflection an has a very high rate of roll, aileron stick forces remai high to provide excellent feel. Only very slight trim ta adjustment is needed for changes caused by landing gea position, fuel quantity, or canopy position in the norma operating speed range, and the aircraft can be trimme for "hands-off" flight down to 70 knots IAS.

MANEUVERING FLIGHT.

The relatively light elevator and rudder forces and rapi response of the aircraft to control movement provid excellent acrobatic characteristics. Due to the ligh elevator forces, it is not recommended that the elevator be trimmed to reduce stick forces during maneuvers, a only slight additional stick forces would then be require to exceed the acceleration limits. The aircraft is relativel clean and picks up speed rapidly with the nose down Light rudder forces permit holding the aircraft straight i a dive without rudder trim.

ACROBATICS.

Acrobatics are basically the same for all aircraft with th exception of power settings and airspeeds; therefore they are not discussed in detail. Power settings an airspeed are contained in figure 4-2.