Virtavia

North American T-6 Texan™

USER MANUAL



Virtavia T-6 Texan™ – DTG Steam Edition Manual Version 1.0

Introduction

The North American T-6 Texan[™] was an excellent design that served as a basic transitional combat trainer in all branches of U.S. service as well as in countries worldwide. U.S. Navy pilots utilised the type under the SNJ[™] designation, the most common versions being the SNJ-4[™], SNJ-5[™] and SNJ-6[™]. The RAF was very taken with the design and adopted it as the Harvard[™]. Later versions were manufactured in Canada and the type saw service in countries worldwide. An excellent all-round trainer, the type was quite good at teaching new pilots to avoid the accelerated stall, as a wing would snap round quite unexpectedly if the pilot was unwary. Approximately 17,000 of the type were built and some 350 are still airworthy.



Support

Should you experience difficulties or require extra information about the Virtavia T-6 Texan[™], please e-mail our technical support on <u>tech.support@virtavia.com</u>

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North American T-6 Texan™

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Package Contents

The Virtavia T-6 Texan package contains four model variants:

SNJ-5™



Harvard Mk IIb™



T-6G™



Harvard Mk IV™



Exterior Model

The exterior model has all the usual animations such as ailerons, elevators and flaps. There are some additional animations on the model:

Crew Access

Shift-E:	front canopy
2nd Exit (Shift-E then 2):	rear canopy
Ctrl-W:	toggle crew figures

Exterior Lighting

Pressing the L key will turn on all lights. You may however wish to turn them on using the appropriate switches in the cockpit, as the L key also turns the on navigation and landing lights, which should ideally be switched separately.

Shift-L will toggle the nav lights and the cockpit lights.

Crtl-L will toggle the landing light.

Please refer to the cockpit section of this manual for information regarding light switch location.

Alternative Viewpoints in FSX

There are several different ways of looking at the aircraft and the cockpit, select these alternative views by right-clicking in an empty area and picking the 'Aircraft' menu for external views and the 'Cockpit' menu for views inside the cabin. It is possible to zoom and pan as normal in these alternative views. Cycle though the available ones by pressing the A key.

External View Options

It is possible to pan and zoom as normal in all external views.

Rear View



Front View



Right side view



Left side view



Interior Views

It is possible to pan and zoom as normal in all interior views.

Virtual Cockpit View



Rear Cockpit View



Moving Around the Cabin

Shift-Enter and Shift-Backspace: moves up and down Ctrl-Shift-Enter and Ctrl-Shift-Backspace: moves side to side Ctrl-Enter and Ctrl-Backspace: moves back and forwards

Virtavia T-6 Texan Procedures

Your Virtavia T-6 Texan/SNJ/Harvard[™] has been carefully designed to match the actual aircraft in every measurable dimension of flight performance. The following procedures are taken directly from the SNJ/Texan manual. You will find that takeoff, climb, cruise, top speed, stall, and acrobatic handling performance match the flight manual for this aircraft. Certain pages from the manual have been scanned and are included here for reference. Compare this information to the information in the tables and charts for your T-6[™], which is the actual, in-game performance of the aircraft you are about to fly.

Performance and Dimensions

- Crew: two (student and instructor)
- Length: 29 ft (8.84 m)
- Wingspan: 42 ft (12.81 m)
- Height: 11 ft 8 in (3.57 m)
- Wing area: 253.7 ft² (23.6 m²)
- Empty weight: 4,158 lb (1,886 kg)
- Loaded weight (civilian): 5,325 lb (2,419 kg)
- Loaded weight (military): 5,617 lb (2,552 kg)
- Maximum weight: 6,000 lb (2,726 kg)
- Powerplant: 1x Pratt & Whitney R-1340-AN-1 Wasp radial engine, 600 hp (450 kW) for takeoff
- Maximum speed: 208 mph at 5,000 ft (335 km/h at 1,500 m)
- Cruise speed: 145 mph (233 km/h)
- Range: 730 miles (1,175 km)
- Service ceiling: 24,200 ft (7,400 m)
- Rate of climb: 1150 ft/min (6 m/s)
- Armament: Provision for 1× 0.30 in (7.62 mm) machine gun, bombs

Fuel and Payloads

Adjust using the fuel and payloads menu. There is a single central payload which reflects any added weight. Adjust to add weight up to the maximum indicated, not to exceed the maximum gross weight. The loaded weight of this aircraft represents a civilian version from which certain military equipment has been removed. To duplicate the normal gross takeoff weight of a military trainer, add 300 lbs. to the payload to set the gross weight at 5,625 lbs. For maximum load set the gross weight to 6,000 lbs. Gross weights over maximum are allowable but not approved. For example, with guns and two 250-lb. bombs, the gross

Virtavia T-6 Texan™ – DTG Steam Edition Manual Version 1.0 weight may reach 6,200 lbs. This is acceptable for takeoff but the load must be dropped before landing and only normal flight manoeuvres (no acrobatics) are approved with loads over maximum.

SECTION III

FLIGHT OPERATING DATA

1. POWER PLANT CHART.

a. Operating limitations and characteristics of the R-1340-AN-1 engine are summarized on the "Power Plant Chart". The pilot should be thoroughly familiar with this information.

b. Engine operating conditions shown on the chart are defined as follows:

(1) WAR EMERGENCY .- Not applicable.

(2) MILITARY POWER. — Maximum recommended for operation for periods not exceeding 5 minutes.

(3) NORMAL RATED.—Maximum recommended for operation with rich mixture in climb and level flight.

(4) MAXIMUM CRUISE. — Maximum recommended with lean mixture. (5) TAKE - OFF CONDITIONS. — Maximum recommended for take-off under the specified time limit of 5 minutes.

2. AIR SPEED LIMITATIONS.

Refer to section II, paragraph 1.

3. AIR SPEED CORRECTION TABLE.

IAS NPR	CALIBRATED AIR-SPEED (NPH)	ALTIMETER ADD TO INSTRUME	ERROR ENT READING
		S. L.	15,000
80	80	0	0
100	101	10	10
120	122-5	20	30
140	144	40	60
160	165.5	60	100
180	187	90	140
200	208-5	120	190
220	230		
240	251		



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Aircraft Limitations

(1) MANEUVERS PROHIBITED.
Outside loop.
Inverted flight in excess of ten seconds.
Snap rolls in excess of 130 mph IAS.
Slow rolls in excess of 190 mph IAS.
Spins and stalls when normal gross weight is exceeded.

Warning: Solo flights should never be made from the rear cockpit.

(2) AIR SPEED LIMITATIONS
Maximum permissible diving speed is 240 mph IAS.
With wing flaps set at 45 degrees, do not exceed 125 mph IAS.
In a sideslip, stay above 90 mph IAS.
Do not lower landing gear above 150 mph IAS.

Engine Limitations and Operation Chart

Review the image below for power plant limitations and operational ranges. The mixture control on this aircraft is not automatic and must be carefully adjusted for proper performance. Use the fuel flow gage to set best power and range with the mixture control.

AIR	RCRAF	Т НО 4т-8 5нј	DE	L (S)			1.1		PROPELLER (S)			ŵŧ.	a _m	ENGINE R-13	NODEL (S) 40-AH-I	ĵ.
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						R ICH 2250			MIXTURE R. P. M.			R ICH 2200	wire!	21.197	LEAN 2000	
PRESS.	SUPE	R- GER G	FUE 201/	L ¹⁷¹ Fin	MARIF. PRESS.	SUPER- CHARGER	FUEL ⁴⁰³ Gal/#In	STD. TEMP.	PRESSURE	STD. TONP, "F	MANIF. PRESS.	SUPER- CHARGER	FUEL GPN 150	HANIF. PRESS.	SUPER- CHARGER	FUEL GPB 4
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								-52.4 -48.4 -44.5	34,000 FT. 32,000 FT. 30,000 FT.	-62.3 -55.1 -48.0	9 - 7	1				
								-40.5 -36.5 -32.5	20,000 FT. 20,000 FT. 24,000 FT.	-40.9 -33.7 -26.5						
					F.T. F.T.		.5	-28.6 -24.6 -20.7	22.000 FT. 20.000 FT. 18.000 FT.	-19.4 -12.3 - 5.2	F.T. F.T.		33 35	F.T. F.T.		25 27
					F.T. F.T. F.T.		.5 .5 1.0	-16.7 -12.7 - 8.8	16,000 FT. 14,000 FT. 12,000 FT.	2.0 9.1 16.2	F.T. F.T. F.T.		37 40 43	F.T. F.T. F.T.		29 31 33
					F.T. F.T. F.T.		1.0 1.0 1.0	- 4.8 - 0.8 3.1	10,000 FT. 8.000 FT. 6.000 FT.	23.4 30.5 37.6	F.T. F.T. F.T.		46 49 53	26.0 25.5 27.5		35 35 34
					F.T. 35.0 36.0		1.0 1.0 1.0	7.1	4.000 FT. 2.000 FT. SEA LEVEL	44.7 51.8 59.0	32.5 32.5 32.5		54 52 49	28.5 29.0 30.0		34 34 34
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Cockpit Orientation



Switches and Controls

The fuel selector, throttle, mixture, and propeller controls, as well as your trim control and landing gear handle, are located at the left side of the cockpit.



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Electrical Switches



The panel has a popup viewable by clicking the appropriate icon. This subpanel has an ammeter as well as a starter switch, light switches, and various electrical switches. There are also four switches for turning on the smoke in various colours. Some of these switches are duplicated in the virtual cockpit.



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Flight Characteristics

STALLS (5,300 lbs.)

Stalling speed, gear and flaps up: 72 mph IAS

Stalling speed, gear and flaps down: 64 mph IAS

a. When the stalling incidence is reached with gear and flaps up, a wing will drop. If the backward movement on the stick continues when the wing drops, the airplane will fall into a deep spiral. The stalling incidence is reached with the stick only a short distance back when the airplane nears stalling speed, because of sensitive elevators.

b. Decrease the whip when stalling by putting the stick forward at the start and applying opposite rudder. If putting the stick forward is delayed until the airplane is on its back, and inverted spin may result.

c. No warning of a stall should be relied on, although buffeting and pitching usually precedes a stall.

d. During a practice stall, do not pull the nose up in order to stall; instead, counteract its tendency to sink by easing back the stick. When a wing drops, put the stick forward at once and apply opposite rudder.

e. With flaps and landing gear down, stalling incidence is reached about 64 mph IAS. As speed is reduced, the right wing drops quickly and, unless recovery is effected immediately, the airplane may whip into a half-roll and attempt to spin.

Spins

Spin recovery is normal in this aircraft; apply rudder opposite the spin, neutralize the controls, and apply forward stick.

STALLING SPEED CHART

. GROSS	GEAR AND	GEAR AND
WEIGHT	FLAPS UP	FLAP\$ DOWN
5300 Pounds	72 mph (IAS)	64 mph (1AS)
6000 Pounds	77 mph (IAS)	69 mph (1AS)

a. When the stalling incidence is reached with landing gear and flaps up, a wing will drop. If the backward movement on the stick continues when the wing drops, the airplane will fall into a steep spiral. The stalling incidence is reached with the control stick only a short distance back when the airplane nears stalling speed, because of sensitive elevators.

b. Decrease the whip when stalling by putting the stick forward at the start and applying opposite rudder. If putting the stick forward is delayed until the airplane is on its back, an inverted spin may result.

c. No warning of a stall should be relied on, although buffeting and pitching usually precede a stall.

d. During a practice stall, do not pull the nose up in order to stall; instead, counteract its tendency to sink by easing back the stick. When a wing drops, put the stick forward at once and apply opposite rudder.

e. With flaps and landing gear down, stalling incidence is reached about 64 mphIAS. As speed is reduced, the right wing drops quickly and; unless recovery is effected immediately, the airplane may whip into a half roll and attempt to spin.

13. SPINS.

Spins should not be made intentionally with flaps and landing gear down. Should an inadvertant spin occur, recovery can be effected after 1-1/2 or 2 turns by first applying full opposite rudder and then pushing the control stick forward to neutral. The ailerons are held in the neutral position. Centralize the rudder as soon as the airplane is in a straight dive to prevent a spin in the opposite direction. Bring the airplane out of the dive and return the control stick to neutral.

Engine Start

Use the popup electrical panel in conjunction with the magneto switch on the main panel to start the aircraft.

Use Ctrl-E (autostart) to start the aircraft, or:

- 1. Turn airplane into the wind.
- 2. Set or hold brakes.
- 3. Make sure the rear stick is stowed if flying solo.
- 4. Turn OFF all electrical equipment.
- 5. Set carb heat to COLD.
- 6. Set oil cooler shutters to fully OPEN.
- 7. Set prop pitch control to LOW RPM (Ctrl-F4).
- 8. Set the mixture control to RICH.
- 9. Set throttles to 1/8 OPEN.
- 10.Select "Reserve" tank.
- 11.Turn ON master battery and generator switches.
- 12.Prime engine 4-6 strokes if cold.
- 13.Start engine using the engine start switch.
- 14. Adjust the throttle to 500-600 RPM when engine fires.
- 15. Monitor oil pressure and temperature and check fuel pressure.

Warm-up and Ground Test

- 1. When oil pressure reaches 70 psi, increase throttle to 1,000 RPM.
- 2. Set propeller control to fully forward ("INCREASE RPM").
- 3. Check instruments oil pressure 70-90 psi, oil temperature 60-80 deg C, fuel pressure 3-4 psi.
- 4. Increase engine RPM to 2200 and check magnetos (max cylinder temperature 232 deg C).
- 5. At 1000 RPM, check the ammeter, hydraulic pressure, and suction gages.
- 6. At 1600 RPM, pull prop control back to 200 RPM maximum drop, then move fully forward.
- 7. Check operation of the wing flaps.
- 8. Set all trim controls to neutral.

Takeoff

- 1. Generator switch "ON".
- 2. Mixture control "RICH".
- 3. Fuel selector on 'RESERVE" (check fuel levels).
- 4. Check fuel pressure 3-4 psi.

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- 5. Set propeller control to fully forward ("INCREASE RPM").
- 6. Recheck cockpit controls.
- 7. Set carburettor air to fully "COLD".
- 8. Set flaps UP.
- 9. Uncage gyro instruments (rear cockpit caged for solo flight).
- 10.Recheck engine instruments. Minimum cylinder temperature 150 deg C.
- 11.Line up on the runway and lock the tailwheel.
- 12. Open throttle gradually to 36" and take off at 2250 RPM.
- 13.Don't attempt to lift the tail too soon as this increases the torque action. Maintain a constant attitude until sufficient speed is attained.
- 14.Raise the tail slowly after reaching sufficient airspeed for rudder control and fly the aircraft off the runway at 85 mph IAS.
- 15.Don't force the tail up; it will want to come up on its own at about 75 mph and the aircraft will fly off the runway naturally with little elevator input.

Takeoff Performance (5,500 lbs.)

Ground run, hard surface runway: 900 feet. Soft surface runway: 1100 feet.

Climb

- 1. Retract the landing gear.
- 2. Set climb power to 32.5" Hg and 2200 RPM.
- 3. Set oil cooler flaps as required to regulate cylinder temperature (maximum 260 deg C 5 minutes).
- 4. Climb at 115 mph IAS, decreasing speed according to the climbing schedule below.
- 5. Select the "LEFT" tank.
- 6. Adjust trim so the airplane flies "hands-off" in the proper climbing attitude.
- 7. Advance throttles as needed above 5,000 feet to maintain power (full throttle height for climb power is about 7,400 feet).
- FS tip: Reduce RPM gradually when manifold pressure falls to 23" Hg to maintain thrust, progressively decreasing to 2,050 RPM at 20,000 feet.

Climb Performance (5,300 lbs. takeoff weight, measured in-game)

MP, in. Hg.	RPM	ROC, fpm	IAS, mph	Time, min	Altitude, ft	Distance, nm
32.5"	2200	1200	115	2.5	2,000	3
32.5"	2200	1280	115	4.5	5,000	8
F.T.	2200	1060	115	8.5	10,000	10
F.T. (24.2")	2200	530	110	15.2	15,000	34
F.T. (22")	2150	360	107	20.1	17,500	39
F.T. (20")	2050	265	105	29.5	20,000	59

F.T. = Full Throttle

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5500	0 17 34 51	0 15 30 45	900 500 300 100	1500 1000 700 100	1000 700 400 200	1800 1200 800 500	1300 800 500 300	2000 1400 900 600	900 600 300 200	1600 1100 700 400	1100 700 400 200	1800 1300 800 500	1400 900 500 300	2100 1500 1000 600	1100 700 400 200	1700 1200 700 400	1400 900 500 200	2100 1400 900 500	1700 1100 700 300	2500 1700 1100 700
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	OSS AT SEA LEVEL AT 5000 FEET										AT	10,000	FEET			AT	15,000	FEET	i		AT :	0,000	FEE	Т		T		FEE	T
GROSS	REST	I.A. S.	BATE	GAL.	REST	1. 4. 5	MTE	FROM SE	LEVEL	HEST	I. A. S.	RATE	FROM SE	A LEVEL	MEST		MATE	FROM SE	LEVEL	MIT	1.1.3.	INTE	FROM SE	A LEVEL	MEST	I. A. 1	ANTE	FROM SE	LEVE
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PONER PLANT SETTINGS: (DETAILS ON FIG. 26 SECTION III); DATA 43 OF 8-10-44 RASED DN: FLIGHT TESTS

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L8.	MPR	ETS	HPR	RT3	ROLL	TO CLEAN 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	ROLL	TO CLEAR SO' ON.	SROUED ROLL	TO CLEAR	GROUND ROLL	TO CLEAR	GROUM D ROLL	TO CLEAR	ROLL	TO CLEAR	GROUND ROLL	TO CLEAR	GROUNT	TO CLEAN
5500 5000	100	87	100	87	700 700	1600	800 700	1700	900 800	1500	800 700	1700	900	1800	1000	1900	1800	2700	2000	2900	2200	3100
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FUEL USED (U.S.GAL.) INCLUDES WARM-UP & TAXE-OFF ALLOWANCE

Cruising (5,200 lbs., measured in-game)

Your Virtavia T-6 Texan has been carefully calibrated to match the real T-6 in cruise performance. The following charts match the actual aircraft manual performance specifications. Use the mixture control to adjust the fuel flow to match that specified in the chart to achieve the same performance. Use of automixture will degrade performance. For reference purposes, the actual T-6 figures from the performance chart, which spans a range of 5000-6000 lbs, are provided in red. The slight deviation from the actual aircraft reflect a flight sim test aircraft weight of 5,200 lbs. and are also well within the range of expected deviation for individual aircraft.

Altitude	MP, in. Hg.	RPM	IAS, mph	TAS, mph	Fuel Flow	Nautical MPG
10,000	23"	1600	133	149 (155)	23 GPH	5.5
5,000	24"	1 <mark>600</mark>	137	146 (<mark>145</mark>)	22 GPH	5.8
10,000	F.T. (30")	2050	174	200 (195)	42 GPH	4.1
5,000	30"	1950	180	192 (190)	42 GPH	3.9
5,000	26"	1850	159	170	30 GPH	4.9
1,000	22"	1600	130	132	17 GPH	6.9

Maximum Cruise

Recommended Cruise

Maximum Economy

11-1-1	ENGI	NE (S)	AIR	CRAF	-AN-1	EL (S)				FL	IGH	T 0	PER	ATIO	N IN	IST	RUC	CTIC 450	0 N C	HAR	e T os	,	UHBE	R OF	EXTERN	AL LO. NON	AD ITE E Erati	EMS NG:			
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	RARGE		IRMI	LES		U.S.		RANGE	18 4	IRMI	LES			RANGE	-	-	LES			RANGE	18 1	IRM	LES		U.S.		RANGE	-	IRMI	LES	
5	TATUTA	F	RA	UTICA	L	GAL.	5	TATUTE		HAU	TICAL		\$1	ATUTE		KA	TICA	0.3	S	TATUTE		MAL	TICA	L	GAL.	5	ATUTE		MAU	TICA	
	350			300		111		460		3.	SUBTA 90	ACT	FUEL A	520	CES NO	1 444	ILABL	E FOR	CRUIS	590			510		111	al.	670		8	580	
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	210 170 140			180 150 120		60 50 40		270 230 180		2	30 00 80			310 260 210			70 20 80			350 290 230			300 250 200		60 50 40		400 330 270			350 290 230	
	100 70 30		1	90 60 30		30 20 10		130 90 40		1	20 80 40			150 100 50		1	30 90 40	222		170 120 60			150 100 50		30 20 10		200 130 80			170 110 80	200
	-		TINU	0U 3		-	4.55	STAT. E	3.9514	ut.)	#1./G	AL.)	6.2	STAT. (4.5 ##	UT.)	×1./6	AL.)	(5.9	STAT.[5.15 x1	uT.)	H1./	GAL.)	*****		MATIN	UN AL		0E	
	H. P.	NIX-	TOT.	PPACE.	A.S.	ALT.	4.P.N.	H.P.	HIR-	TOT.	T.A		R. P. M.	H.P.	NIX- TURE	101.	T.A		LP.K	H.P.	HII-	rot.	t.	A.S.	ALT.	RP.R	H.P.	MIX-	tot.	T.	A. S.
		(1)	CA.	NPN.	KTS.	FEET			(2)	CM.	127.	s75.			(2)	CPN.	12.	¥T5.			(2)	ch.	HPH.	ets.	.1661	-		(2)	C.M.	NA	175.
						\$0000 35000 30000																			40000 35000 30000						
2200	F.T.	PICH	41	190	165	25000 20000 15000				1			2000	F.T.	RICH	36	185	160	2000	F.T.	LEAR	32	185	160	25000 20000 15000	1700	F.T.	LEAN	25	165	145
2200 2200 2200	F.T. F.T. F.T.	RICH	48 58 51	200 205 190	175 180 165	10000 5000 5.L.	2050 1950 1950	f.T. 30 31	RICH	42 42 40	195 190 180	170 165 155	2000 2000 2000	F.T. 28 30	LEAN LEAN LEAN	37 36 34	190 185 175	165 160 150	[800 [600 [600	F.T. 29 30	LEAN LEAN LEAN	30 29 27	180 170 155	155 145 135	10000 5000 3. L.	1600 1600 1600	23 24 25	LEAN LEAN LEAN	23 22 20	155 145 130	135 125 115
SPECIAL NOTES (1) MART SULCOMMET FOR WARM-UP, TARE-OF & CLIME (SEE FIC. 42) FUTS SULCOMMET FOR WHEN, TARE-OF & CLIME (SEE FIC. 42) (2) THE MINITURE CONTROL IN THIS AIRPLANT IS NOT AUTOMATIC AND MUST BE ADJUSTED MANUALLY TO OBTAIN SMOOTH ENGINE OPERATION AND REST RANGE.									EXAMPLE 1 AT \$500 L6.GROSS without with 76 caller full 1. (ATTER ODDOCTING TOTAL ALLOWANCES OF 35 Call) 1. TO FLY #30 STAT.AIDWILES AT 15,000 T.AITTUDE. AND MAINTAIN 2000 APA and T.T. IN.MANFOLD PRISSURE MATO MAINTAIN 2000 APA and T.T. IN.MANFOLD PRISSURE WITH MIXTURE SET: LEAR. WITH MIXTURE SET: LEAR.											4LF. : N.P. I GPN I FAS I 6TS. I S.L. I	MESSURE MATHOLD U.S.GAL,P TRUE ALAS RECTS SEA LEVEL	LEO ALTITUGE PRESSURE ER HOW PEED	(HD F.P. A.R. A.L. C.L. H.L. J.T.	: FULL : AUTO- : AUTO- : CRUIS : RUNDI : FULL	ALCH ALCH LEAK ING LEAN THEOTT	LA ILE					

Landing (5,200 lbs.)

- 1. Perform cockpit and equipment check.
- 2. Select "RESERVE" tank.
- 3. Set mixture to fully "RICH".
- 4. Set propeller to 2000 RPM and adjust throttle as required.
- 5. Reduce speed to less than 150 mph IAS.
- 6. Lower the landing gear and trim aircraft as required.
- 7. Reduce speed to less than 126 mph IAS.
- 8. Lower flaps at 95 mph IAS on final as needed and trim aircraft.
- 9. Control descent with throttle and pitch, trimming as needed.
- 10.Speed over the fence should be about 80 mph IAS.
- 11. Touch down at about 70 mph IAS, mains first.