Tornado Alley Turbo, Inc.
300 Airport Road
Ada, OK 74820

AFMS-550, Rev. K for:
Bonanza _____

FAA Approved

Airplane Flight Manual Supplement – 550

Aircraft with Turbonormalizer Systems Installed After August 1, 2000
And
Aircraft With Earlier Turbonormalizer System Installations, but Modified to Conform to Systems Installed After August 1, 2000

For

Bonanza Model _____

Registration No. _____

Serial No. _____

This Supplement must be attached to the FAA Approved Airplane Flight Manual when Tornado Alley Turbo Whirlwind™ Turbonormalizing System is installed in accordance with STC No. SA5223NM.

The information contained herein supplements the information of the FAA Approved Airplane Flight Manual only in those areas listed herein. For limitations, procedures, and performance information not contained in this supplement, consult the basic Airplane Flight Manual.

FAA APPROVED: Charles Wilcox for Monica Merritt,
Manager, Flight Test Section, AIR-713
Federal Aviation Administration
Fort Worth, TX 76177

Charles Melvin Wilcox Jr
Digitally signed by Charles Melvin Wilcox Jr
Date: 2022.08.11 14:23:42 -05'00'

Date: 08-11-2022

LOG OF PAGES (INCLUDING REVISIONS)

(Newest Revisions in ***Italics***)

Revision	Pages	Date	Description	FAA Approved
Original	1-12	08/22/1991	Complete Supplement.	RONALD F. MAY Denver ACO
A	1-12	03/11/1992	Change "Bonanza Model A36" to "Bonanza Model_." Add log of pages. Change engine handling recommendation.	RICHARD D. JENNINGS Denver ACO
B	All	12/12/1996	Re-format. Add propeller high-pitch settings.	RONALD F. MAY Denver ACO
C	All	10/15/2002	Change Flite-Craft Turbo & Turbo-Flite to Tornado Alley Turbo Whirlwind™. Add Emerg. procedures, Oxygen system, Hartzell prop, lean of peak ops.	S. Frances Cox ASW-190
D	All	05/26/2004	Change max. gross wt. category, some flap speeds and altitude limitations on Vne, add performance notes.	S. Frances Cox ASW-190
E	All	08/27/2004	Corrections to placards	S. Frances Cox ASW-190
F	All	06/20/2005	Add McCauley 3A32C406/82NDB propeller Add propeller limitations for 3A32C406/82NDB and D3A32C409/82NDB propellers	S. Frances Cox ASW-190
G	All	02/03/2006	Add G36	S. Frances Cox ASW-190
H	7, 10, 22, 26	09/25/2009	Revise F33A W&B Add autopilot limitations to G36 Revise cruise RPM settings Revise O2 duration chart	S. Frances Cox Manager, Fort Worth Special Certification Office
J	*3, 5, 7, 15, 16, 17, 18, 22, 24, 25, 26, 27, 28, 29, 31, 32, 33*	*11/01/2019*	*Correct F33A W&B* *Add mixture operation data* *Add Utility Category placard* *Revise O2 bottle test intervals* *Add power plant instrument markings. Add McCauley D3A37C3401/C80MNF-1*	*CMW for Monica Merritt* *Manager, Fort Worth AIR-713*
K	*16, 18*	*12/02/2021*	*Add procedures for Inadvertent Icing Encounter and alternate air light procedures*	*CMW for MM, Manager, Fort Worth AIR-713*

Section 1. GENERAL

DESCRIPTIVE DATA

This AFMS Revision applies to aircraft that have the turbonormalizing systems configured at installation or later upgraded with the current, as of August 1, 2000 or later, intercooler, induction, baffling, and fuel injector configuration. Aircraft with the earlier intercooler, induction, baffling, and fuel injector configuration will require the use of different fuel flow values than are set forth in this AFMS revision. This AFMS should not be used for aircraft with earlier configurations of this STC that have not been upgraded to the configuration available on or after August 31, 2000. *Only aircraft that have been configured to conform to this latest revision are eligible for the gross weight increases described below.*

ENGINE

Your Bonanza is powered by one Continental Motors engine model IO-550-B, fuel-injected, direct-drive, air-cooled, horizontally-opposed, 6-cylinder, 550- cubic inch displacement, rated at 300 horsepower. This engine has been modified by the addition of an intercooled turbonormalizing system with an automatic wastegate control.

The Tornado Alley Turbo Whirlwind™ system provides a stable environment for the engine to operate within. The Tornado Alley Turbo Whirlwind™ system will provide 29.6 inches of manifold pressure to 20,000 feet or higher.

PROPELLER

The following propellers are approved for installation with the Tornado Alley TurboWhirlwind™ system with the IO-550 series engines:

Propeller	High pitch at 30-inch blade station	Minimum diameter	Maximum diameter	Note
McCauley D3A32C409/82NDB	34.5º ± 1º	78.5	80	(2)
McCauley 3A32C406/82NDB	34.5º ± 1º	78.5	80	(2)
McCauley 3A32C76/8NB	34.5º ± 1º	78.5	80	(1)
McCauley D3A37C3401/C80MNF-1	36.5º ± .5º	76	79	(3)
Hartzell PHC-C3YF-1RF/F8468A(K)-6R	37º ± 1°	78	80	(2)
Hartzell PHC-C3YF-1RF/F8068(K)	37º ± 1º	78	82	(2)

Note (1): Provided the IO-550-B engine is derated from 300 HP at 2700 RPM to 285 HP at 2700 RPM and 27.7" Hg of manifold pressure having 2-6th, 1-5th and 1-4th order crankshaft dampers installed.
Note (2): Propeller high pitch settings may be changed to those listed.
Note (3): McCauley D3A37C3401/C80MNF-1 high pitch setting does not need to be changed.

Other STC's which approve installation of IO-550-B engines in models of aircraft approved for this STC may authorize other propeller installations, and those propellers may be used when installed pursuant to those STCs.

Section 2. OPERATING LIMITATIONS

A. The Tornado Alley Turbo Whirlwind™ 550 is certified as flat-rated (maintains sea level manifold pressure) to an operating altitude of 20,000 feet when installed on this aircraft. Above 20,000 feet available power is reduced as altitude increases.

B. Propeller high pitch setting may be changed (except D3A37C3401/C80MNF-1):
McCauley propellers…….34.5 ± 1° at 30 inch station
Hartzell PHC-CYF-1RF propellers……...37.0 ± 1° at 30 inch station

C. When 3A32C76/82NB propeller is installed the following operating limitation shall be affixed near the manifold pressure gage: "DO NOT EXCEED 27.7" MANIFOLD PRESSURE AT SEA LEVEL". Aircraft with this limitation are not eligible for the described gross weight increases.

D. Maneuvers – NORMAL CATEGORY:
Your aircraft, unless it is equipped with a McCauley 3A32C76/82NB propeller, has been approved for increased maximum takeoff weights and landing weights in accordance with the following chart. All operations above the original maximum weight listed in the Aircraft Flight Manual are to be NORMAL CATEGORY operations. Spins and acrobatic maneuvers are not permitted in NORMAL CATEGORY operations.

Utility Category operations may continue to be performed in accordance with weight and balance limitations listed in the OEM Airplane Flight Manual for your airplane.

FLIGHT LOAD FACTOR LIMITS

Beech Model 35-C33A, E33A, F33A, G33

	FLAPS UP	FLAPS DOWN
UTILITY CATEGORY	4.4 positive g's 1.76 negative g's	2.0 positive g's 0 g's
NORMAL CATEGORY	3.8 positive g's 1.52 negative g's	2.0 positive g's 0 g's

Beech Model 36, A36, A36TC, and G36

	FLAPS UP	FLAPS DOWN
UTILITY CATEGORY	4.4 positive g's 1.76 negative g's	3.0 positive g's 0 g's
NORMAL CATEGORY	3.8 positive g's 1.52 negative g's	2.7 positive g's 0 g's

Section 2. OPERATING LIMITATIONS (continued)

Weight and Balance Envelopes (C.G. Range) for Beech Aircraft with Maximum Weight Increase unless equipped with a McCauley 3A32C76/82NB propeller:

Beech 36, A36 S/N E-1 through E-2110 except E-1946 and E-2104

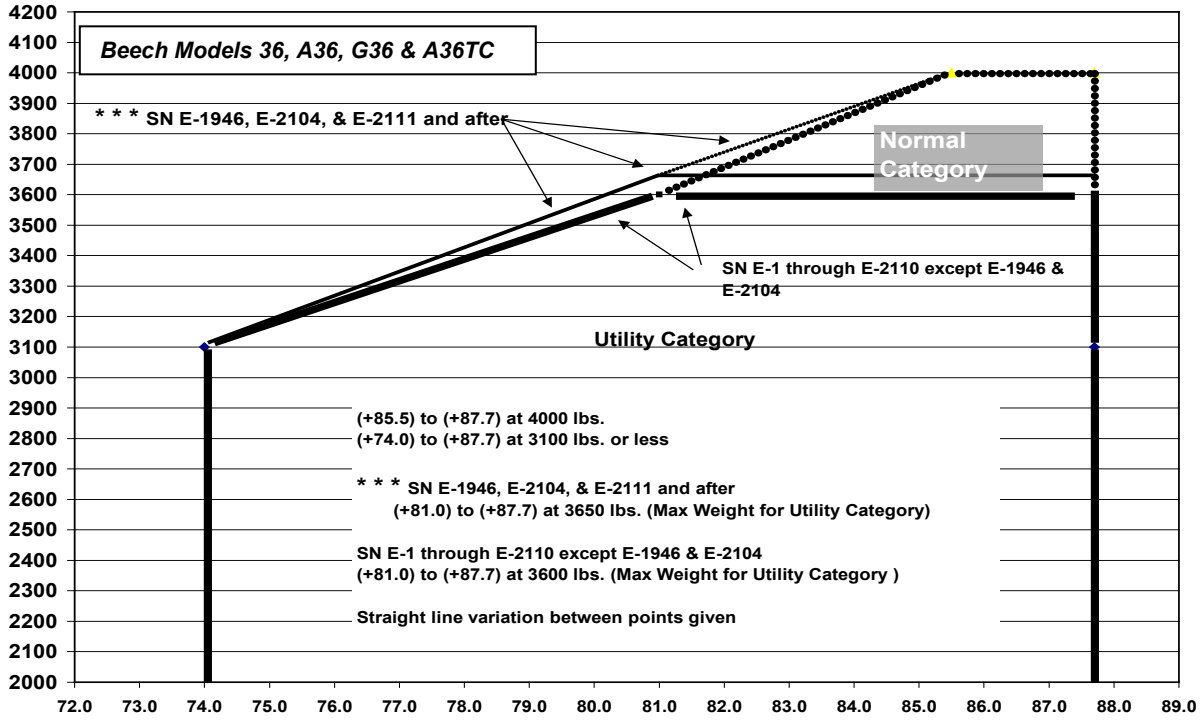
(+85.5) to (+87.7) at 4000 lbs. (NORMAL CATEGORY ONLY above 3600 lbs.)
(+81.0) to (+87.7) at 3600 lbs. (Max Weight for Utility Category)
(+74.0) to (+87.7) at 3100 lbs. or less
Straight line variation between points given

Beech A36, and G36 S/N E-1946, E-2104, E-2111 and after

(+85.5) to (+87.7) at 4000 lbs. (NORMAL CATEGORY ONLY above 3650 lbs.)
(+81.0) to (+87.7) at 3650 lbs. (Max Weight for Utility Category)
(+74.0) to (+87.7) at 3100 lbs. or less
Straight line variation between points given

Beech A36TC

(+85.5) to (+87.7) at 4000 lbs. (NORMAL CATEGORY ONLY above 3650 lbs.)
(+81.0) to (+87.7) at 3650 lbs. (Max Weight for Utility Category)
(+74.0) to (+87.7) at 3100 lbs. or less
Straight line variation between points given

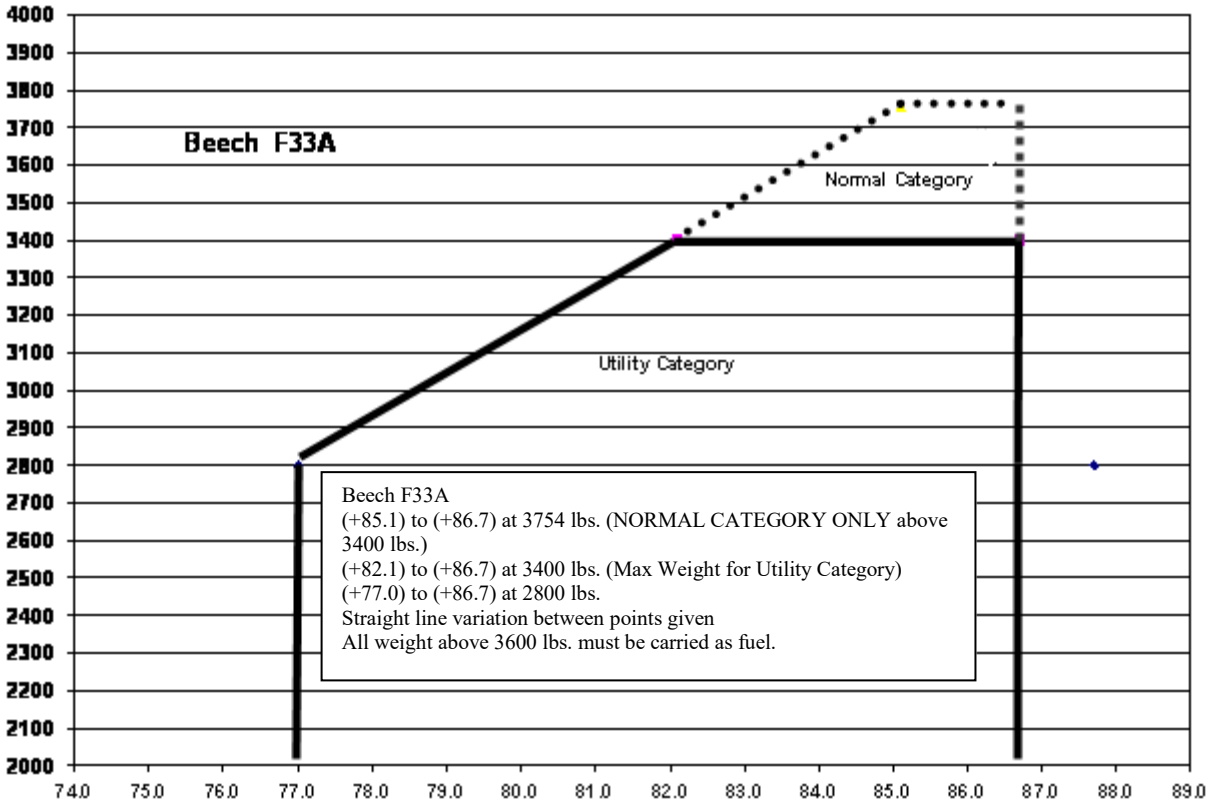


Section 2. OPERATING LIMITATIONS (continued)

Weight and Balance Envelopes (C.G. Range) for Beech Aircraft with Maximum Weight Increase unless equipped with a McCauley 3A32C76/82NB propeller:

Beech F33A

(+85.1) to (+86.7) at 3754 lbs. (NORMAL CATEGORY ONLY above 3400 lbs.)
(+82.1) to (+86.7) at 3400 lbs. (Max Weight for Utility Category)
(+77.0) to (+86.7) at 2800 lbs.
Straight line variation between points given
All weight above 3600 lbs must be carried as fuel.

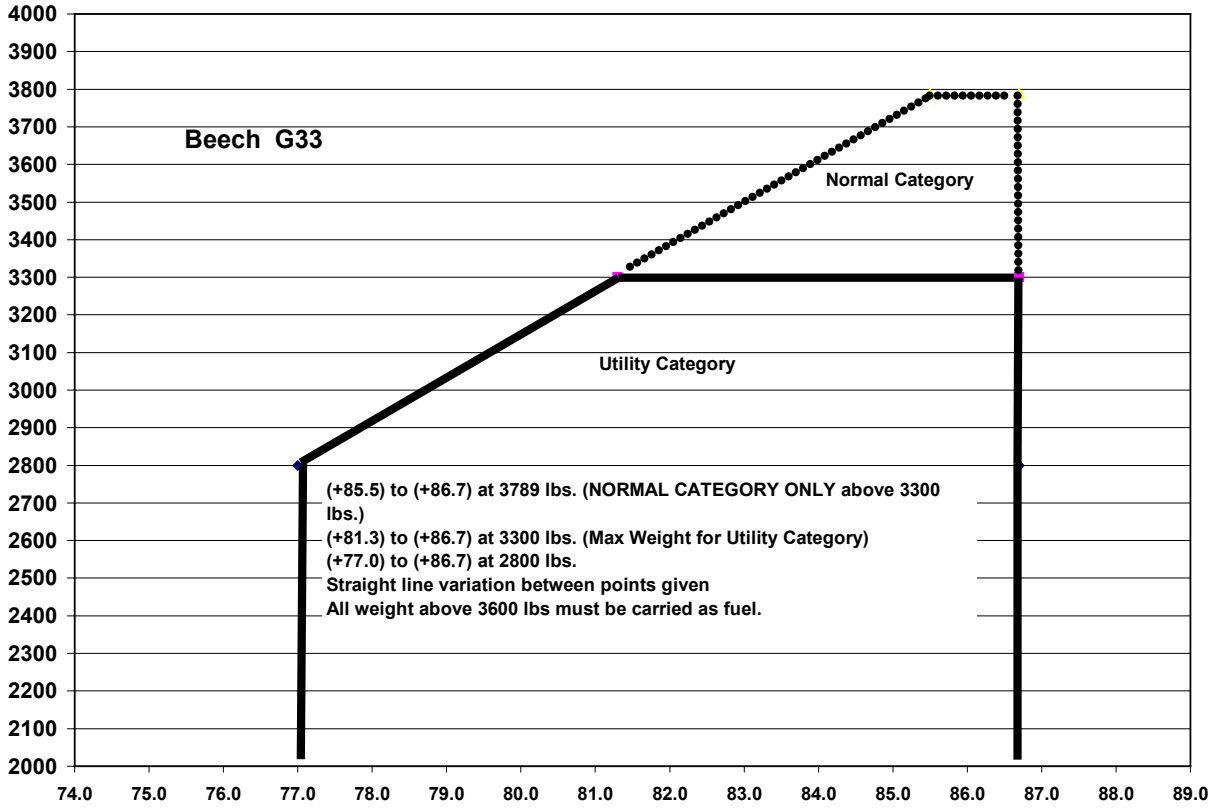


Section 2. OPERATING LIMITATIONS (continued)

Weight and Balance Envelopes (C.G. Range) for Beech Aircraft with Maximum Weight Increase unless equipped with a McCauley 3A32C76/82NB propeller:

Beech G33

(+85.5) to (+86.7) at 3789 lbs. (NORMAL CATEGORY ONLY above 3300 lbs.)
(+81.3) to (+86.7) at 3300 lbs. (Max Weight for Utility Category)
(+77.0) to (+86.7) at 2800 lbs.
Straight line variation between points given
All weight above 3600 lbs must be carried as fuel.

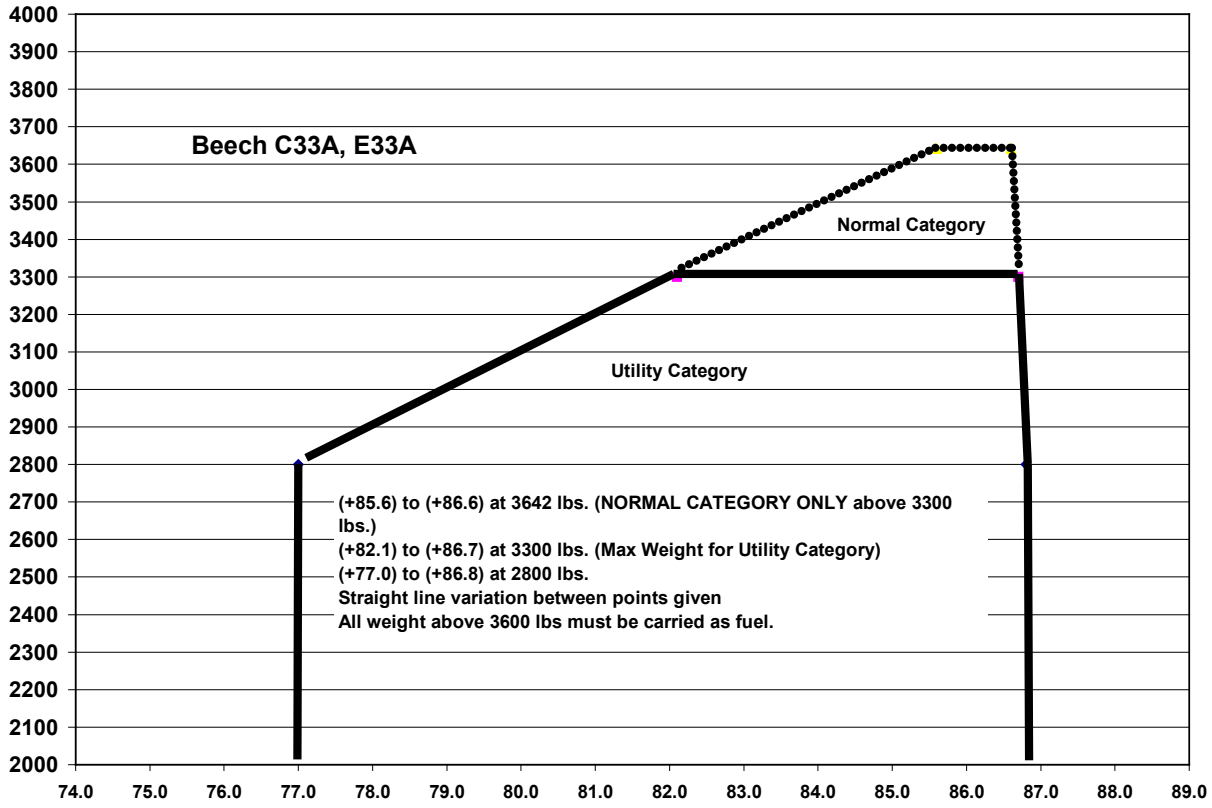


Section 2. OPERATING LIMITATIONS (continued)

Weight and Balance Envelopes (C.G. Range) for Beech Aircraft with Maximum Weight Increase unless equipped with a McCauley 3A32C76/82NB propeller:

Beech 35-C33A, E33A

(+85.6) to (+86.6) at 3642 lbs. (NORMAL CATEGORY ONLY above 3300 lbs.)
(+82.1) to (+86.7) at 3300 lbs. (Max Weight for Utility Category)
(+77.0) to (+86.8) at 2800 lbs.
Straight line variation between points given
All weight above 3600 lbs must be carried as fuel.



Section 2. OPERATING LIMITATIONS (continued)

E. ***AVIONICS –*** For aircraft equipped with GARMIN G1000 Integrated Avionics System

Above 16,000 ft, airspeed tape marking will not correctly identify V_{NE}

For aircraft equipped with Garmin GFC 700 Autopilot System

1. Minimum autopilot engage speed at 18,000 ft and above = 100 KIAS
2. Minimum autopilot engage speed at 20,000 ft and above = 120 KIAS
3. Above 16,000 ft, autopilot overspeed protection [MAXSPD] may not function to prevent airspeed increase over V_{NE}

PLACARDS

A. NORMAL CATEGORY PLACARD

The appropriate placard (below) to be installed in addition to existing UTILITY CATEGORY limitations placard, In Full View of Pilot:

Beech 35-C33A, E33A (S/N CE-1 thru CE-248) *unless equipped with a McCauley 3A32C76/82NB propeller:*

NORMAL CATEGORY AIRPLANE

* WHEN LOADED TO WEIGHTS ABOVE UTILITY CATEGORY LIMITATIONS. [SEE FAA APPROVED TORNADO ALLEY TURBO AIRPLANE FLIGHT MANUAL SUPPLEMENT, AFMS-550 FOR LOADING LIMITS]
* NO ACROBATIC MANEUVERS OR SPINS WHEN IN NORMAL CATEGORY. [FLIGHT MANEUVER LOAD FACTOR: FLAPS UP 3.8 G, FLAPS DOWN 2.0 G]

NORMAL CATEGORY AIRSPEED LIMITATIONS:

MANEUVERING ……132 KTS (152 MPH)
MAX. FLAPS DOWN SPEED …… 102 KTS (117 MPH)
MAX. STRUCTURAL CRUISE ……..165 KTS (190 MPH)
- DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. -
NEVER EXCEED ……195 KTS (225 MPH)
DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. –
MAX. LANDING GEAR OPERATION:
- BELOW 20,000 FT ……143 KTS (165 MPH)
- ABOVE 20,000 FT ……129 KTS (148 MPH)

Section 2. OPERATING LIMITATIONS (continued)

PLACARDS (continued)

Beech 35-C33A, E33A (S/N CE-249 and up) *unless equipped with a McCauley 3A32C76/82NB propeller:*

NORMAL CATEGORY AIRPLANE

* WHEN LOADED TO WEIGHTS ABOVE UTILITY CATEGORY LIMITATIONS. [SEE FAA APPROVED TORNADO ALLEY TURBO AIRPLANE FLIGHT MANUAL SUPPLEMENT, AFMS-550 FOR LOADING LIMITS]
* NO ACROBATIC MANEUVERS OR SPINS WHEN IN NORMAL CATEGORY. [FLIGHT MANEUVER LOAD FACTOR: FLAPS UP 3.8 G, FLAPS DOWN 2.0 G]

NORMAL CATEGORY AIRSPEED LIMITATIONS:

MANEUVERING..... 132 KTS (152 MPH)
MAX. FLAPS DOWN SPEED..... 111 KTS (127 MPH)
MAX. STRUCTURAL CRUISE..... 165 KTS (190 MPH)
- DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. -
NEVER EXCEED ..... 195 KTS (225 MPH)
DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. –
MAX. LANDING GEAR OPERATION:
- BELOW 20,000 FT. ..... 152 KTS (175 MPH)
- ABOVE 20,000 FT. ..... 137 KTS (158 MPH)

Beech G33) *unless equipped with a McCauley 3A32C76/82NB propeller*

NORMAL CATEGORY AIRPLANE

* WHEN LOADED TO WEIGHTS ABOVE UTILITY CATEGORY LIMITATIONS. [SEE FAA APPROVED TORNADO ALLEY TURBO AIRPLANE FLIGHT MANUAL SUPPLEMENT, AFMS-550 FOR LOADING LIMITS]
* NO ACROBATIC MANEUVERS OR SPINS WHEN IN NORMAL CATEGORY. [FLIGHT MANEUVER LOAD FACTOR: FLAPS UP 3.8 G, FLAPS DOWN 2.0 G]

NORMAL CATEGORY AIRSPEED LIMITATIONS:

MANEUVERING..... 132 KTS (152 MPH)
MAX. FLAPS DOWN SPEED..... 106 KTS (122 MPH)
MAX. STRUCTURAL CRUISE..... 165 KTS (190 MPH)
- DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. -
NEVER EXCEED ..... 195 KTS (225 MPH)
DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. –
MAX. LANDING GEAR OPERATION:
- BELOW 20,000 FT. ..... 152 KTS (175 MPH)
- ABOVE 20,000 FT..... 137 KTS (158 MPH)

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Section 2. OPERATING LIMITATIONS (continued)

PLACARDS (continued)

Beech F33A (S/N CE-290 thru CE815) *unless equipped with a McCauley 3A32C76/82NB propeller*

NORMAL CATEGORY AIRPLANE

* WHEN LOADED TO WEIGHTS ABOVE UTILITY CATEGORY LIMITATIONS. [SEE FAA APPROVED TORNADO ALLEY TURBO AIRPLANE FLIGHT MANUAL SUPPLEMENT, AFMS-550 FOR LOADING LIMITS]
* NO ACROBATIC MANEUVERS OR SPINS WHEN IN NORMAL CATEGORY. [FLIGHT MANEUVER LOAD FACTOR: FLAPS UP 3.8 G, FLAPS DOWN 2.0 G]

NORMAL CATEGORY AIRSPEED LIMITATIONS:

MANEUVERING..... 132 KTS (152 MPH)
MAX. FLAPS DOWN SPEED..... 110 KTS (127 MPH)
MAX. STRUCTURAL CRUISE..... 165 KTS (190 MPH)
- DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. -
NEVER EXCEED ..... 195 KTS (225 MPH)
DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. –
MAX. LANDING GEAR OPERATION:
- BELOW 20,000 FT. ..... 152 KTS (175 MPH)
- ABOVE 20,000 FT. ..... 137 KTS (158 MPH)

Beech F33A S/N CE816 and up: *unless equipped with a McCauley 3A32C76/82NB propeller*

NORMAL CATEGORY AIRPLANE

* WHEN LOADED TO WEIGHTS ABOVE UTILITY CATEGORY LIMITATIONS. [SEE FAA APPROVED TORNADO ALLEY TURBO AIRPLANE FLIGHT MANUAL SUPPLEMENT, AFMS-550 FOR LOADING LIMITS]
* NO ACROBATIC MANEUVERS OR SPINS WHEN IN NORMAL CATEGORY. [FLIGHT MANEUVER LOAD FACTOR: FLAPS UP 3.8 G, FLAPS DOWN 2.0 G]

NORMAL CATEGORY AIRSPEED LIMITATIONS:

MANEUVERING..... 132 KTS (152 MPH)
MAX. APPROACH FLAPS - 15º ..... 137 KTS (158 MPH)
- DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. -
MAX. FULL DOWN FLAPS..... 110 KTS (127 MPH)
MAX. STRUCTURAL CRUISE..... 165 KTS (190 MPH)
- DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. -
NEVER EXCEED ..... 195 KTS (225 MPH)
DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. –
MAX. LANDING GEAR OPERATION:
- BELOW 20,000 FT. ..... 152 KTS (175 MPH)
- ABOVE 20,000 FT. ..... 137 KTS (158 MPH)

Section 2. OPERATING LIMITATIONS (continued)

PLACARDS (continued)

Beech 36, A36 S/N E-1 thru E2110 except E-1946 and E2104 *unless equipped with a McCauley 3A32C76/82NB propeller**:***

NORMAL CATEGORY AIRPLANE

* WHEN LOADED TO WEIGHTS ABOVE UTILITY CATEGORY LIMITATIONS. [SEE FAA APPROVED TORNADO ALLEY TURBO AIRPLANE FLIGHT MANUAL SUPPLEMENT, AFMS-550 FOR LOADING LIMITS]
* NO ACROBATIC MANEUVERS OR SPINS WHEN IN NORMAL CATEGORY. [FLIGHT MANEUVER LOAD FACTOR: FLAPS UP 3.8 G, FLAPS DOWN 2.0 G]

NORMAL CATEGORY AIRSPEED LIMITATIONS:

MANEUVERING..... 139 KTS (160 MPH)
MAX. APPROACH FLAPS - 15º ..... 137 KTS (158 MPH)
- DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. -
MAX. FULL DOWN FLAPS..... 110 KTS (127 MPH)
MAX. STRUCTURAL CRUISE..... 165 KTS (190 MPH)
- DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. -
NEVER EXCEED ..... 203 KTS (234 MPH)
- DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. –
MAX. LANDING GEAR OPERATION:
- BELOW 20,000 FT. ..... 152 KTS (175 MPH)
- ABOVE 20,000 FT. ..... 137 KTS (158 MPH)

Beech 36, A36, G36 S/N E-1946, E2104, E2110 and up *unless equipped with a McCauley 3A32C76/82NB propeller**:***

NORMAL CATEGORY AIRPLANE

* WHEN LOADED TO WEIGHTS ABOVE UTILITY CATEGORY LIMITATIONS. [SEE FAA APPROVED TORNADO ALLEY TURBO AIRPLANE FLIGHT MANUAL SUPPLEMENT, AFMS-550 FOR LOADING LIMITS]
* NO ACROBATIC MANEUVERS OR SPINS WHEN IN NORMAL CATEGORY. [FLIGHT MANEUVER LOAD FACTOR: FLAPS UP 3.8 G, FLAPS DOWN 2.0 G]

NORMAL CATEGORY AIRSPEED LIMITATIONS:

MANEUVERING..... 139 KTS (160 MPH)
MAX. APPROACH FLAPS - 12º ..... 137 KTS (158 MPH)
- DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. -
MAX. FULL DOWN FLAPS..... 110 KTS (127 MPH)
MAX. STRUCTURAL CRUISE..... 165 KTS (190 MPH)
- DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. -
NEVER EXCEED ..... 203 KTS (234 MPH)
- DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. –
MAX. LANDING GEAR OPERATION:
- BELOW 20,000 FT. ..... 152 KTS (175 MPH)
- ABOVE 20,000 FT. ..... 137 KTS (158 MPH)

Section 2. OPERATING LIMITATIONS (continued)
PLACARDS (continued)

Beech A36TC) *unless equipped with a McCauley 3A32C76/82NB propeller**:***

NORMAL CATEGORY AIRPLANE

* WHEN LOADED TO WEIGHTS ABOVE UTILITY CATEGORY LIMITATIONS. [SEE FAA APPROVED TORNADO ALLEY TURBO AIRPLANE FLIGHT MANUAL SUPPLEMENT, AFMS-550 FOR LOADING LIMITS]
* NO ACROBATIC MANEUVERS OR SPINS WHEN IN NORMAL CATEGORY.
[FLIGHT MANEUVER LOAD FACTOR: FLAPS UP 3.8 G, FLAPS DOWN 2.0 G]

NORMAL CATEGORY AIRSPEED LIMITATIONS:

MANEUVERING	139 KTS (160 MPH)
MAX. APPROACH FLAPS - 15º	137 KTS (158 MPH)
- ABOVE 20000 FT.	125 KTS (144 MPH)
MAX. FULL DOWN FLAPS - 30º	112 KTS (129 MPH)
MAX. STRUCTURAL CRUISE	165 KTS (190 MPH)
- DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. -	
NEVER EXCEED	203 KTS (234 MPH)
- DECREASE 3 KNOTS (3.5 MPH) PER 1000 FT. ABOVE 16000 FT. –	
MAX. LANDING GEAR OPERATION:	
- BELOW 20,000 FT.	152 KTS (175 MPH)
- ABOVE 20,000 FT.	137 KTS (158 MPH)

B. INSTRUMENT PANEL PLACARD

Per the below applicable airplanes, place the following placard on the instrument panel below the airspeed indicator.

Beech 35-C33A, E33A, F33A, G33, 36, A36, G36 and A36TC

AIRSPEED INDICATOR MARKINGS FOR UTILITY CATEGORY OPERATIONS ONLY. SEE NORMAL CATEGORY LIMITATIONS PLACARD FOR NORMAL CATEGORY AIRSPEED LIMITATIONS.

Section 2. OPERATING LIMITATIONS (continued)

PLACARDS (continued)

C. NORMAL CATEGORY PLACARD

For 35-C33A, E33A, F33A, G33, 36, A36, G36 and A36TC, place the following placard in the baggage compartment, or on the inside of the baggage compartment door, in full view:

NORMAL CATEGORY: WHEN LOADED TO WEIGHTS ABOVE UTILITY CATEGORY LIMITATIONS LISTED IN FAA APPROVED AIRPLANE FLIGHT MANUAL, THE WEIGHT AND BALANCE SHOULD BE CAREFULLY EVALUATED BY THE PILOT AS LOADING MAY BE MORE CRITICAL [THE PERMISSIBLE CENTER-OF-GRAVITY ENVELOPE AT THE HIGHER GROSS WEIGHT IS NARROW AND SHOULD BE CHECKED.] VERIFY LOADING WITH FULL TANKS, AND AFTER PLANNED FUEL BURN. SEE FAA APPROVED TORNADO ALLEY TURBO AIRPLANE FLIGHT MANUAL SUPPLEMENT, AFMS-550 FOR WEIGHT AND BALANCE LIMITATIONS FOR **NORMAL CATEGORY** LIMITATIONS.

D. PROPELLER LIMITATION PLACARD

When McCauley 3A32C406/82NDB or D3A32C409/82NDB propeller is installed the following operating limitation shall be affixed near the tachometer, in full view:

CONTINUOUS PROPELLER OPERATION BETWEEN 2350 AND 2450 RPM AT 24 INCHES HG AND HIGHER MANIFOLD PRESSURE IS PROHIBITED

E. FUEL FLOW PLACARD

For G36 only, place the following placard next to the analog fuel flow indicator when analog fuel flow indicator is installed:

USE THIS INSTRUMENT FOR PRIMARY FUEL FLOW INDICATION

Powerplant Instrument Markings

For aircraft with 3-1/8 inch manifold pressure/fuel flow gage:

Instrument	Red Line Minimum	Green Arc Normal	Yellow Arc Caution	Red Line Maximum
Fuel Flow (gph)	---	10.0 to 35.0	---	35.0
Manifold Pressure (in Hg)	---	15.0 to 29.6	---	29.6

For G33:

Instrument	Yellow Arc Caution	Green Arc Normal	Yellow Arc Caution	Red Line Maximum
Oil Temp	75°F to 100°F	100°F to 240°F	---	240°F

For aircraft with 2 inch power plant gages:

Instrument	Red Line Minimum	Green Arc Normal	Yellow Arc Caution	Red Line Maximum
Fuel Flow (gph)	---	---	---	35.0

For aircraft with aftermarket electronic engine monitor FAA/STC approved as primary instrument:

Parameter	Red Line Minimum	Yellow Arc Caution	Green Arc Normal	Yellow Arc Caution	Red Line Maximum
Fuel Flow (gph)	---	---	10.0 to 35.0	---	35.0
Manifold Pressure (in Hg)	---	---	15.0 to 29.6	29.6 to 32.0	32.0
CHT (°F or °C)	---	---	200°F to 380°F or 93°C to 193°C	380°F to 460°F or 193°C to 238°C	460°F or 238°C
Tachometer (rpm)	---	---	1800 to 2700	---	2700
Oil Temperature (°F or °C)	---	75°F to 100°F or 24°C to 38°C	100°F to 240°F or 38°C to 116°C	---	240°F or 116°C
Oil Pressure (psi)	10	10 to 30	30 to 60	---	100
TIT (°F or °C)	---	---	---	---	1650°F or 899°C

Section 3. EMERGENCY PROCEDURES

ENGINE RESTART (STOPPAGE AFTER RETARDING THROTTLE TO IDLE)

Retarding the throttle to idle at or near full rich mixture setting may cause engine combustion to cease, depending on auxiliary fuel pump operation and altitude. At altitudes below 18,000 feet, merely advancing the throttle should cause resumption of normal engine operation. Above 18,000 feet, if the windmilling engine does not restart, the following procedure should be used:

1. Advance throttle. If engine does not restart, then:
2. Auxiliary Fuel Pump – OFF
3. Throttle – 1/2 OPEN
4. Propeller – HIGH RPM
5. Mixture Control – LEAN until engine starts, then slowly advance to FULL RICH
6. Throttle, Mixture and Auxiliary Fuel Pump – RESET for desired operation

Retarding the throttle to idle at or near very lean mixture setting may cause engine combustion to cease. This problem is most likely to occur when the pilot fails to enrichen the mixture before landing.

UNEXPECTED LOSS OF MANIFOLD PRESSURE

IMMEDIATE ACTION

Regardless of the cause, in the event (see "FURTHER INFORMATION", below) of an unexpected loss of manifold pressure the pilot should immediately:

1. Reduce power to the minimum power setting required for continued flight to a suitable landing.
2. Pull the Vent Shutoff/Firewall Air Control, to the closed position.
3. Adjust mixture so that EGT's are between 1300 and 1400°F. Depending on the circumstances, this may require substantial readjustment (either richer or leaner) of the mixture after loss of manifold pressure.
4. Open the cowl flaps.
5. Declare an emergency when time and workload permit.
6. Descend to the minimum safe altitude from which a landing may be most safely and expeditiously accomplished, but leaving adequate altitude for a possible forced landing in the event of fire or complete loss of engine power.
7. Remain alert for the possibility of a fire in the engine compartment. In the event of a fire in the engine compartment, shut off the fuel at the fuel valve and follow the Beech emergency procedure for an inflight fire as described in the AFM.

FURTHER INFORMATION

If, for any reason, the aircraft experiences an unexpected loss of normal manifold pressure, the aircraft will, typically, revert to operation similar to, but at reduced available power, compared to a normally aspirated aircraft at approximately the same altitude and fuel flow. However, in this situation, continued flight should

only be conducted to the nearest suitable landing place in order to investigate the cause of the unexpected loss of normal manifold pressure.
The four most likely causes of a loss of manifold pressure are:

1. A leak or rupture at an induction system coupling or a loose or failed induction coupling hose clamp. This condition does not usually present a significant hazard and can usually be repaired promptly at most repair facilities. While this first condition is, by far, the most common cause of unexpected loss of manifold pressure, **any of the next three conditions may present an immediate hazard to continued safe flight.**

   Because it is difficult for the pilot to distinguish between a simple induction system leak and any of the following three possible causes of an unexpected loss of manifold pressure, all unexpected losses of manifold pressure should be assumed to be one of the three following causes until proven otherwise.

2. A significant leak in the exhaust system. An exhaust leak may present a possible fire hazard. Reducing power and adjusting the mixture as described reduces the possibility of an engine compartment fire.

3. A loss of oil pressure to the wastegate actuator due to a general loss of engine oil pressure. Typically, this is caused by a failed oil line, oil line fitting, or oil pump. It takes 15 PSI of oil pressure to begin to close the wastegate and the wastegate will not be capable of fully closing and making rated manifold pressure at altitude unless there is approximately 45 PSI of engine oil pressure. Unexpected loss of manifold pressure or failure to maintain normal full manifold pressure at altitude may be due to an oil leak and impending further loss of oil pressure. Monitor oil pressure closely. Oil can be lost with stable oil temperature in flight until nearly all of the oil in the system is vented. The pilot should not assume that a stable oil temperature is an indication that oil is not being lost out of the engine lubrication system.

4. A failure of an internal component in the turbocharger. If the pilot experiences a sudden loss of manifold pressure and later observes declining oil pressure, it is most likely due to a failure of an internal turbocharger component. If there is a loss of oil pressure due to a failure of the turbocharger, engine oil may be vented through the tail pipe overboard. Over a period of a few minutes, the pilot may then see a reduction in oil pressure with the oil pressure eventually dropping into the 10 to 15 PSI range. There is a check valve at the oil flow inlet to the turbocharger set at approximately 10 PSI. Thus, if engine oil pressure drops into this range, the oil flow overboard through the turbocharger should, normally, cease and the engine should be able to maintain minimal oil pressure which will allow the engine to operate as a normally aspirated engine for a limited period of time. Keep in mind that check valves sometimes fail to function properly due to mechanical reasons or due to contamination of the oil system with debris.

INADVERTENT ICING ENCOUNTER

Aircraft not equipped with Anti-Ice System (FIKI):

Flight into known icing conditions is prohibited. However, If icing is inadvertently encountered:

1. Pitot Heat - ON
2. Exit icing conditions - Turn back or change altitude.
3. Cabin Heat - MAXIMUM
4. Windshield Defrost - FULL OPEN

• Note •

Alternate induction air door will automatically open if air filter becomes blocked with ice (indicated by alternate air light).

FURTHER INFORMATION

The system is equipped with a magnet latched ALTERNATE AIR DOOR on the left side of the induction system. When any restriction of the air filter is encountered, such as from ice or ice crystal formation, this door will open automatically. The alternate air light will provide an indication alerting the pilot that the door is open. The door provides an alternate path for warm air from the lower side of the engine compartment to go to the turbocharger when the air filter becomes blocked. After the air filter blockage is removed, the alternate air door may be closed by simply retarding the throttle momentarily and the door will re-latch automatically. In some instances, if there is an unusual surge in engine power, especially at high altitude, the alternate air door may become unlatched. In that event, again, simply retarding the throttle momentarily will re-latch the alternate air door.

Section 4. NORMAL PROCEDURES

PREFLIGHT

Per Pilots Operating Handbook. In addition, prior to the first flight of the day, while the engine is cold, grasp the end of the tailpipe where it exits the lower left cowl area and firmly attempt to wiggle the tailpipe. If there is any indication that the tailpipe is not fully secure, it must be repaired before further flight. **DO NOT FLY THE AIRCRAFT WITH A LOOSE TAILPIPE.**

Also, if flight above 12,500 feet MSL is anticipated, be sure supplemental oxygen requirements per FAR 91.211(a) can be met by checking oxygen quantity and verifying masks and/or cannulas as required are available for all occupants.

BEFORE STARTING

(See aircraft POH)

STARTING

CAUTION

Do not engage starter for more than 30 seconds in any 4 – MINUTE time period.

COLD STARTS

1. Mixture – FULL RICH
2. Propeller – HIGH RPM
3. Throttle – FULL OPEN
4. Auxiliary Fuel Pump Switch – HI to prime engine. Operate just until fuel flow peaks (about 3 seconds)
5. Auxiliary Fuel Pump – OFF
6. Throttle – CLOSED, THEN OPEN APPROXIMATELY ½ INCH
7. Magneto/Start Switch – START position; release to BOTH position when engine starts
8. Throttle – ADVANCE while cranking until engine starts, then promptly retard the throttle to idle (1000 to 1200 rpm) after start

FLOODED ENGINE

If the engine has not started by the time the throttle has been advanced to full open, it may be flooded. Proceed as follows:

1. Mixture – IDLE CUT-OFF
2. Propeller – HIGH RPM
3. Throttle – ½ OPEN
4. Magneto/Start Switch – START position; release to BOTH position when engine starts
5. Throttle – REDUCE TO IDLE as engine starts and ADVANCE MIXTURE to FULL RICH

HOT STARTS

1. Mixture – IDLE CUT-OFF
2. Propeller – HIGH RPM
3. Throttle – CLOSE
4. Auxiliary Fuel Pump Switch – HI for 60 – 90 seconds, then OFF
5. Mixture – FULL RICH
6. Throttle – WIDE OPEN
7. Auxiliary Fuel Pump – HI 1 – 2 seconds after fuel flow has peaked, then OFF
8. Throttle – CLOSE, then OPEN approximately ½ inch.
9. Magneto/Start Switch – START position; and slowly advance the throttle as if making a normal cold start. Release to BOTH position when engine starts.
10. Retard throttle to idle.
11. Auxiliary Fuel Pump – HI may be used momentarily after starting to assist in obtaining normal fuel flow, then OFF

AFTER STARTING

1. Throttle – 1000 to 1200 rpm
2. Oil Pressure – ABOVE the lower red radial (10 psi) within 30 seconds
3. Mixture – Lean until RPM rises to a maximum value. Leave the mixture in this position during taxi and until runup
4. START Annunciator (if installed) – CHECK; should be illuminated during start and extinguished after start

Section 4. NORMAL PROCEDURES (continued)

5. LOW BUS VOLTS Annunciator – CHECK; should be illuminated during start and extinguished after start
6. ALT LOAD – CHECK; load should decrease below 25 amps (at 1000 – 1200 rpm) after two (2) minutes with no additional electrical equipment turned on
7. BUS VOLTMETER – Indicated voltage should be 24 volts before start and 28.5 volts after start (24 volt systems). Indicated voltage should be 12 volts before start and 14.2 volts after start (12 volt systems).
8. All Engine Instruments – CHECK

CAUTION

Engine oil temperature should be 24°C (75ºF) or above and oil pressure in the green arc prior to engine run-up above 1200 rpm.

9. Lights – AS REQUIRED
10. Avionics Equipment – ON, AS REQUIRED
11. Brakes – RELEASE AND CHECK

CAUTION

Never taxi with a flat shock strut.

BEFORE TAKEOFF

1. Brakes - HOLD
2. Seat Belts and Shoulder Harnesses – CHECK
3. Avionics – CHECK AND SET
4. Engine Instruments – CHECK (within operating range)
5. Flight Instruments – CHECK AND SET

NOTE

To ensure proper gyro operation maintain engine RPM sufficient to maintain a value of 4.3 in. Hg. on the instrument air gauge.

6. ANNUNciator TEST Push-button – PRESS (All annunciators, landing gear position lights, and flap position lights should illuminate). ALT AIR Annunciator light – CHECK by pressing light and verify it illuminates.
7. Mixture – FULL RICH
8. Throttle – 1700 RPM
9. Propeller – EXERCISE to obtain 300 to 400 rpm drop, then return to high rpm
10. Magnetos – CHECK at 1700 rpm on each magneto (variances between individual magnetos should not exceed 50 rpm; maximum drop should not exceed 150 rpm)
11. Instrument Air Gauge – CHECK
12. Standby Generator (if installed) – CHECK
13. Throttle – IDLE
14. Autopilot and Electric Trim (if installed) – CHECK

Section 4. NORMAL PROCEDURES (continued)

15. Trim – SET
    a. Aileron – NEUTRAL
    b. Elevator – 3° NOSE UP (6° nose up if only front seats are occupied)
16. Flaps – CHECK OPERATION, SET FOR TAKEOFF
17. Windows – SECURE
18. Doors – SECURE (on later model aircraft check cabin door lock indicator – CLOSED)
19. Flight Controls – CHECK FREEDOM OF MOVEMENT AND PROPER DIRECTION OF TRAVEL
20. Mixture – AS REQUIRED (Lean as for taxi, unless expecting immediate takeoff)
21. Auxiliary Fuel Pump – OFF
22. Instruments – CHECK (Make final check of manifold pressure, fuel flow, oil pressure, and rpm at the start of the takeoff)
23. Parking Brake – RELEASE

TAKEOFF

Take-Off Power……FULL THROTTLE at 2700 rpm
Minimum Recommended Take-Off Oil Temperature……...24°C (75°F)

NOTE

Because this aircraft has a turbonormalizing system that maintains near sea level manifold pressure for all takeoffs, the mixture should normally be full rich for takeoff, even at high elevation airports. Other than as described in paragraph 4, below, any leaning for takeoff and during maximum performance climbs will cause excessive cylinder head temperatures.

1. Auxiliary Fuel Pump - OFF Below 5,000' Density Altitude (D.A.)
   - ON LO above 5,000' D.A.

WARNING

Use of the auxiliary fuel pump in the HI position may cause an excessively rich mixture and severely reduce available engine power or even cause the engine to cease combustion completely. The HI position should not be used during take-off or low altitude operation unless there is a failure of the engine driven fuel pump.

2. Brakes – HOLD
3. Manifold Pressure – 29.6 IN. Hg. at Wide Open Throttle (WOT) for aircraft with McCauley 3A32C76/8NB propeller max MAP – 27.7 in. Hg.

Section 4. NORMAL PROCEDURES (continued)

NOTE

WOT MP may increase to 30 – 32 in. Hg. on first flight of the day due to colder oil temperatures. This is acceptable under these conditions but normal full throttle should be 29.6 in. Hg. at normal oil temperature. DO NOT EXCEED 32.0 in. Hg. MAP.

4. Mixture – Full Rich then Manually Set Fuel Flow Per Fuel Schedule Below:

Outside Air Temperature (°F)	Maximum Power Takeoff Fuel Flow (gallons per hour)	Notes
Less than 80	35	
81 to 90	34	Return to 35 gph as soon as clear of obstacles
Greater than 90	33	

5. Propeller – Check HIGH RPM
6. Oil Pressure – CHECK – within operating range
7. Brakes – RELEASE to begin takeoff roll
8. Airspeed – ACCELERATE TO AND MAINTAIN TAKEOFF SPEEDS
9. Landing Gear – RETRACT (after positive rate of climb is established)
10. Airspeed – ESTABLISH 115 – 120 KTS CLIMB SPEED (when clear of obstacles)
11. *Rpm – Reduce to 2650 RPM for noise abatement as soon as climb airspeed and terrain clearance allow.*

CRUISE CLIMB

1. Power – SET 29.6 in Hg Manifold Pressure (For aircraft with 3A32C76/8NB propeller – 27.7 in. Hg. Manifold Pressure)
2. RPM - 2700
3. Mixture - FULL RICH (35 GPH)
4. Airspeed – 115-120 KTS
5. Auxiliary Fuel Pump – Use LO above 5,000' D.A.
   Use HI above 10,000' D.A.
   If fuel flow exceeds 35 GPH, then lean as required to obtain 35 GPH.
6. Monitor Turbine Inlet Temperature if installed. A normal climb TIT should be 682°C - 715°C (1260°F - 1310°F). TIT should not exceed 715ºC (1310ºF). If TIT exceeds this value, and to avoid an excessive rise in CHTs, Auxiliary Fuel Pump set LO or set HI if above 10,000' D.A. If the problem persists, and CHTs increase from normal climb values, lower the nose and increase indicated air speed as required.
7. Monitor Cylinder Head Temperature. If any CHT exceeds 193ºC (380ºF) verify full rich fuel flow, using the boost pump as described in 6 above. If fuel flow is inadequate to

8. keep all CHT's below 193ºC (380ºF), use HI Auxiliary Fuel Pump (regardless of D.A.) and lean mixture (if required) to 35.0 gph for the duration of the climb. Verify cowl flaps are full open. Lower the nose and increase airspeed as required to maintain the hottest CHT at or below 193ºC (380ºF).
9. Oxygen – ON as required (above 12,500' daytime, above 5000' night time recommended). CHECK masks for proper flow.

MAX PERFORMANCE CLIMB

Same as the CRUISE CLIMB procedure, above, except use Vy for airspeed and monitor cylinder head temperatures closely – return to CRUISE CLIMB as soon as practical.

CRUISE

WARNING

Retarding the throttle to idle at or near full rich mixture setting may cause engine combustion to cease, depending on auxiliary fuel pump operation and altitude. At altitudes below 18,000 feet, merely advancing the throttle should cause resumption of normal engine operation. Above 18,000 feet, if the windmilling engine does not restart, follow the procedures entitled "ENGINE RESTART (STOPPAGE AFTER RETARDING THROTTLE TO IDLE)" in the Emergency procedures section.

OPERATIONS AT CRUISE POWER WITH THE MIXTURE SET <u>RICH</u> OF PEAK TIT OR PEAK EGT:

Continental Motors Critical Service Bulletin CSB09-11A (supersedes CSB09-11, SB07-8 and SB07-8A) strongly recommends that engine cruise power settings should be no lower than 2300 RPM.
(Normal long term cruise at 2300 RPM is acceptable, no need to be cautious about 2300 RPM. Reducing power and using lower RPM for descents is also acceptable.)

Maximum Recommended Cruise Power……...25.0 in. Hg at 2500 rpm
Economy Cruise Power……..……23.0 in. Hg at 2300 rpm

1. Power –SET AS DESIRED
2. Aux Pump OFF If fuel flow fluctuates, select LO.
3. Mixture – Use the TIT (preferred) or EGT system to lean the fuel/air mixture when cruising at 75% power setting or less in the following manner:
   Slowly lean the mixture and note the point on the indicator where the TIT or EGT temperature peaks and starts to fall.
4. Increase the mixture until the TIT (or EGT if no TIT is installed) reaches its maximum value and begins to decline. Note the maximum value of the TIT or EGT. Slowly enrichen the mixture until the TIT or EGT is a least 52ºC (125ºF) below the noted maximum value.

Section 4. NORMAL PROCEDURES (continued)

NOTE

Changes in altitude and power settings may require the peak TIT or EGT to be rechecked and the mixture reset to the appropriate fuel flow.

OPERATIONS AT CRUISE POWER WITH THE MIXTURE SET LEAN OF PEAK TIT OR PEAK EGT (PREFERRED):

Continental Motors Critical Service Bulletin CSB09-11A (supersedes CSB09-11, SB07-8 and SB07-8A) strongly recommends that engine cruise power settings should be no lower than 2300 RPM.
(Normal long term cruise at 2300 RPM is acceptable, no need to be cautious about 2300 RPM. Reducing power and using lower RPM for descents is also acceptable. FOR AIRCRAFT WITH 3A32C406/82NDB OR D3A32C409/82NDB PROPELLER CONTINUOUS PROPELLER OPERATION BETWEEN 2350 AND 2450 RPM AT 24 INCHES HG AND HIGHER MANIFOLD PRESSURE IS PROHIBITED.

Maximum Cruise Power……Wide Open Throttle (WOT) at 2500 rpm
Normal Economy Cruise Power…….Wide Open Throttle (WOT) at 2300 rpm

1. Power – WOT at 2700 RPM and FULL RICH Mixture for one to two minutes in level flight at desired altitude. Verify the hottest CHT is less than 193ºC (380ºF)
2. Cowl Flaps – CLOSED or in trail on hot days.
3. Power – Reduce RPM to 2500 or as desired
4. Auxiliary Fuel Pump – OFF if fuel flow is stable or LO if fuel flow is unstable
5. Mixture – Initially RICH, then:
6. Mixture – Smoothly REDUCE in a period of 4 to 6 seconds, to a fuel flow of approximately:
   14.0 to 16.0 gph at 2300 RPM
   15.5 to 17.5 gph at 2500 RPM

NOTE

When this reduction in fuel flow is performed as described, the pilot will notice a slight deceleration of the aircraft as the mixture passes from rich of peak TIT (EGT) to lean of peak TIT (EGT).

7. Cylinder Head Temperature – CHECK If any CHT exceeds 193ºC (380ºF), LEAN mixture further in 0.25 gph increments. If all CHT's are under 193ºC (380ºF), mixture may be increased in 0.1 to 0.2 gph increments.
8. Auxiliary Fuel Pump – after one half hour cruise, OFF. If fuel flow fluctuates, return to LO. Mixture may need to be reset as in 1-7 above.

Section 4. NORMAL PROCEDURES (continued)

NOTE

2600 RPM may be used for cruise, although there will normally be elevated noise levels. Using 2600 RPM for cruise is sometimes useful during hot weather, as it tends to compensate for the reduced mass airflow through the engine cylinder combustion chambers.

DESCENT

1. Altimeter – SET
2. Auxiliary Fuel Pump - OFF
3. Mixture – AS REQUIRED FOR ALTITUDE
4. Cowl Flaps – CLOSED
5. Flaps – AS APPROPRIATE
6. Power – AS APPROPRIATE (Avoid prolonged idle settings. Maintain a Cylinder Head Temperature of 116°C (240°F) or greater.) FOR AIRCRAFT WITH 3A32C406/82NDB OR D3A32C409/82NDB PROPELLER CONTINUOUS PROPELLER OPERATION BETWEEN 2350 AND 2450 RPM AT 24 INCHES HG AND HIGHER MANIFOLD PRESSURE IS PROHIBITED.
   Optional procedure is to retard the throttle (less than 24 in. Hg) as the airplane descends to maintain a desired manifold pressure and adjust the mixture control to maintain peak TIT (EGT).
7. Windshield Defroster – AS REQUIRED (ON before descent into warm, moist air)

RAPID DESCENT

1. Altimeter – SET
2. Throttle – Smoothly REDUCE Manifold Pressure to 17 to 20 in. Hg
3. Propeller – Smoothly REDUCE RPM to 1800 to 2100 RPM
4. Mixture – RESET to obtain peak TIT or EGT
5. Cowl Flaps – VERIFY CLOSED
6. Airspeed – as appropriate within green arc. Use maneuvering speed in rough air.
7. Throttle – Maintain MAP in 17 to 20 in. Hg range during descent
8. Windshield Defroster – AS REQUIRED (ON before descent into warm, moist air)

BEFORE LANDING

1. Seat Belts & Shoulder Harnesses – FASTENED; Seat Backs – POSITION FOR LANDING
2. Fuel Selector Valve – SELECT FULLER MAIN TANK (feel for detent and visually check)
3. Fuel Boost Pump - OFF
4. Cowl Flaps – AS REQUIRED
5. Mixture – AS REQUIRED FOR ALTITUDE AND THROTTLE SETTING.

Section 4. NORMAL PROCEDURES (continued)

6. Landing Gear – DOWN and CHECKED (Check AFM for correct Landing Gear extension airspeed.)
7. Landing Lights – AS REQUIRED
8. Flaps – DOWN (Observe maximum extension airspeeds)
9. Airspeed – ESTABLISH NORMAL APPROACH SPEED
10. Propeller – HIGH RPM. Optional, 2300 to 2500 RPM for noise abatement in the traffic pattern. FOR AIRCRAFT WITH 3A32C406/82NDB OR D3A32C409/82NDB PROPELLER PROLONGED PROPELLER OPERATION BETWEEN 2350 AND 2450 RPM AT 24 INCHES HG AND HIGHER MANIFOLD PRESSURE IS PROHIBITED.

    Balked landing and go around require proper sequence in application of full power. See below.

BALKED LANDING

1. Power
    a. Mixture – FULL RICH. Max 35 GPH at 29.6 in Hg MAP
    b. Propeller – HIGH RPM
    c. Throttle – FULL OPEN – DO NOT EXCEED 32.0 in. Hg.
2. Airspeed – Vx until clear of obstacles, then trim to normal climb speed
3. Flaps – UP (0°) after positive rate of climb established
4. Landing Gear – RETRACT after positive rate of climb established
5. TRIM – RESET as required
6. Cowl flaps – OPEN

AFTER LANDING

1. Clear the active runway and hold short line
2. BRAKES – STOP the aircraft
3. Cowl Flaps – OPEN
4. Flaps – UP (0°)
5. Landing, Taxi, and Strobe Lights – AS REQUIRED
6. Trim Tabs – RESET for normal takeoff
7. Mixture – LEAN to obtain maximum idle RPM

SHUTDOWN

1. Parking Brake – AS APPROPRIATE
2. Electrical Switches and Avionics Equipment – OFF
3. Throttle – 1000 rpm
4. Mixture – IDLE CUT-OFF
5. Magneto/Start Switch – OFF after engine stops
6. Battery and Alternator Switches – OFF
7. Control Locks – INSTALL
8. Wheel Chocks – INSTALL; Parking Brake – RELEASE

Section 4. NORMAL PROCEDURES (continued)

OXYGEN SYSTEM (Optional)

PREFLIGHT

1. Check Oxygen Pressure Gage for pressure reading. Panel gage requires electrical power.
2. Determine if oxygen cylinder has enough capacity for the intended flight. (See Oxygen Duration Table.)
3. Plug in all masks or cannulas that will be used during flight. Turn the oxygen system ON and CHECK the flow indicator of each mask/cannula.
4. Shut oxygen OFF until inflight use is required.

WARNING
NO SMOKING when using oxygen.

IN FLIGHT

The use of oxygen is recommended to be in accordance with current FAR operating rules or sooner (see ADDITIONAL OXYGEN USE INFORMATION below).

1. Oxygen valve or switch – ON
2. Mask or cannula – INSERT FITTING, DON MASK OR CANNULA (adjust mask or cannula for proper fit)
3. Oxygen – CHECK EACH INDICATOR FOR FLOW

AFTER USING

1. Discontinue use by unplugging mask/cannula from outlet.
2. Oxygen valve or switch – OFF

Section 4. NORMAL PROCEDURES (continued)

OXYGEN DURATION TABLE

Duration in hours with full bottle at the following altitudes:

Cyl Vol	No. of Persons Using	10,000 Feet		15,000 Feet		20,000 Feet	25,000 Feet
		mask	Cannula	mask	cannula	Mask	mask
45.6 Cubic Feet	1	18.2	44.6	12.6	25.7	9.1	7.3
	2	9.1	22.3	6.3	12.8	4.5	3.6
	3	6.0	14.8	4.2	8.5	3.0	2.4
	4	4.5	11.1	3.1	6.4	2.2	1.8
	5	3.6	8.9	2.5	5.1	1.8	1.4
	6	3.0	7.4	2.1	4.2	1.5	1.2
77 Cubic Feet	1	30.5	90.6	21.1	49.8	15.4	12.3
	2	15.2	45.3	10.5	24.9	7.7	6.1
	3	10.1	30.2	7.0	16.6	5.1	4.1
	4	7.6	22.6	5.2	12.4	3.8	3.0
	5	6.1	18.1	4.2	9.9	3.0	2.4
	6	5.1	15.1	3.5	8.3	2.5	2.0
115 Cubic Feet	1	45.6	135.4	31.6	74.5	23.0	18.4
	2	22.8	67.7	15.8	37.2	11.5	9.2
	3	15.2	45.1	10.5	24.8	7.6	6.1
	4	11.4	33.8	7.9	18.6	5.7	4.6
	5	9.1	27.0	6.3	14.9	4.6	3.6
	6	7.6	22.5	5.2	12.4	3.8	3.0

Duration times are based upon flows of standard 1.0 liters/minute per 10,000 feet for masks.
Duration times for cannulas are based upon the use of Mountain High MH-3 or MH-4 flowmeters using the scale calibrated for Oxymizer cannulas. Duration times using other flowmeters may vary (consult flowmeter manufacturer's data for flow rates). Duration times listed are based upon all occupants using either masks or cannulas, but not a mixture of the two devices.

1. Always abide by the oxygen-use requirements of the FARs but treat them as minimum requirements that may often be inadequate to prevent hypoxic impairment.
2. Always use supplemental oxygen at the first sign of hypoxic symptoms (visual impairment, headache, dizziness, nausea, anxiety, panic, confusion, etc.), and adjust the oxygen flow to alleviate those symptoms.
3. If a pulse oximeter is available, the pilot and passengers should note their oxygen saturation levels at their home airport. ("Home" is the elevation at which you have lived for the majority of time during the past 180 days.). Monitor oxygen saturation levels while in flight. It is recommended that a person use oxygen if their saturation drops five points below their home airport saturation level. Therefore, some people will require oxygen at 8,000 feet and others might not need it before reaching higher altitude. Once the decision to use oxygen is made, the level should be titrated by adjusting the oxygen flow to bring the saturation close to the home field levels.
4. If operating at night, use of O2 may improve your night vision and should be considered, especially after longer flights at higher elevations.

Section 4. NORMAL PROCEDURES (continued)

EXPANDED NORMAL PROCEDURES

OPERATIONS AT CRUISE POWER WITH THE MIXTURE SET LEAN OF PEAK TIT OR PEAK EGT:

When the engine is operating in a stable condition, and as a check on the mixture setting, the pilot may verify that the engine is operating lean of peak as follows:

Cowl Flaps – OPEN
Verify no CHT exceeds 193ºC (380ºF)
Mixture – Slowly increase mixture while observing the TIT or EGT increase in value towards peak TIT (EGT).

NOTE

When operating lean of peak TIT or EGT, increasing fuel flow will cause the TIT or EGT to rise towards its maximum or peak value. This is the opposite effect than when operating rich of peak TIT (EGT).

When the TIT (EGT) reaches its maximum value, note that value (typically between 860ºC and 888ºC (1580ºF and 1630ºF) and then promptly lean the mixture so that the TIT (EGT) is at least 33ºC (60ºF) below the observed maximum (peak) value.

CAUTION

This procedure should not take more than 2 minutes to complete. Operations at high power near peak EGT or TIT for extended periods will cause excessively high CHT's.

Cowl Flaps – After the CHT's have returned below 193ºC (380ºF) then CLOSE the cowl flaps.

NOTE

In warm or hot weather, the fuel flow at 33ºC (60ºF) lean of peak will be as much as 0.5 to 0.75 gph less than it will be at the same 33ºC (60ºF) lean of peak during cold weather.

If any CHT consistently operates in climb or cruise at temperatures in excess of 193ºC (380ºF) then the aircraft engine and baffling should be inspected for discrepancies by a competent mechanic knowledgeable of the system.

When operating the engine lean of peak TIT (EGT) the horsepower may be estimated by the following simple formula:

HP = fuel flow (gph) x 14.9
Example: Fuel flow = 15 gph. HP = 15 x 14.9 = 223 horsepower

This formula is not valid for mixture settings rich of peak TIT (EGT). This formula is not valid for other than the Continental IO-520/IO-550.

Section 5. PERFORMANCE (Performance Section is not FAA Approved)

The performance of this airplane equipped with the Tornado Alley Turbo Whirlwind™ Turbonormalizing System is equal to or better than the performance as listed in the original Flight Manual *when operated in the Utility Category*.

When using noise abatement procedures for climb (rpm reduced to 2650), climb rate is not appreciably affected.

However, when operating at the increased weights authorized when operations are conducted in the NORMAL CATEGORY expect:

A. Increased Takeoff Distance of up to: 30%

B. Decreased Rate-of-Climb of up to: 13%

C. Increased Stall Speed of up to: 7%

D. Increased Landing Distance of up to: 15%

E. Increased Takeoff and Approach Speeds: Increase 2 Kts.

F. Increased Vx and Vy speeds: Increase 2 Kts.

CAUTION
OPERATIONS DURING VERY HOT WEATHER:
Temperature Effects on Engine, Fuel Flow, and Aircraft Performance.

While turbocharged and turbonormalized engines will fully compensate for high altitude loss of ambient pressure, they do not normally provide any compensation for changes in air density due to elevated non-standard ambient temperatures.

Maximum power at 29.6 In. Hg. and 2700 RPM will be reduced by approximately 1% for each six (6) degrees F that the ambient temperature exceeds the ISA temperature for the altitude at which the aircraft is operating. This adverse effect on performance due to elevated ambient temperatures should be given careful consideration, especially when operating at higher aircraft gross weights (> 3,600 lbs). Pilots unfamiliar with the effects of reduced power and higher gross weights should be particularly careful to ensure adequate runway distance and initial climb rate in order to clear obstructions.

Section 5. PERFORMANCE (continued)

During extremely hot weather (> ISA + 30 degrees F) and with hot fuel in the fuel tanks, the boost pump may need to be used in the LOW position in order to obtain stable fuel flow for takeoff and initial climb.

CAUTION
Be careful not to use the HIGH BOOST position as that can flood the engine and cause a loss of power, including a loss of all power until the BOOST PUMP is returned from HIGH to OFF or LOW.

For maximum power operations (wide open throttle, 29.6 in Hg MAP, 2700 RPM) fuel flow should be 35 GPH. On hot days, takeoff performance will be improved slightly with the fuel flow at the values listed below until clear of obstructions. Then the fuel flow should be returned to 35 GPH.

Outside Air Temperature (°F)	Maximum Power Takeoff Fuel Flow (gallons per hour)	Notes
Less than 80	35	
81 to 90	34	Return to 35 gph as soon as clear of obstacles
Greater than 90	33	

CAUTION

WEIGHT AND BALANCE
Adverse Effects of Operation at Forward C.G. in A36 and G36 Model Aircraft

While most pilots are familiar with the adverse effects of operating with aft loading, care should be given to A36 and G36 aircraft as they can be easily loaded with the C.G. forward of the approved forward c.g. limit. This condition is more likely with aircraft equipped with tip tanks and full or nearly full loads of fuel.

Operation with the aircraft forward of the approved c.g. limit is not approved and attempted operation in that condition will result in significantly decreased takeoff and climb performance due to the increased downward aerodynamic loading of the horizontal stabilizer.

Pilots are obligated to ensure that the loading of the aircraft will result in flight operations within the approved weight and balance envelope.

Section 8. HANDLING, SERVICING AND MAINTENANCE (Handling, Servicing and Maintenance Section is not FAA Approved)

OXYGEN SYSTEM (This section only applies to oxygen system with light-weight oxygen bottles installed per STC SA5223NM. For standard oxygen systems installed by Beech or oxygen systems per other STC use instructions of Beech Airplane Flight Manual or STC's AFMS as appropriate.)

To service the oxygen system, use the following procedures:

NOTE

When filling the oxygen system, only use 99.99% pure oxygen to be sure that it does not contain moisture which can cause the oxygen valve to freeze.

WARNING

Keep hands, tools, clothing, and oxygen equipment clean and free from grease and oil. KEEP FIRE AND SPARKS AWAY FROM OXYGEN. Use only recommended leak testing soaps (i.e. castile soap and water solution).

1. Read the pressure gage for the oxygen system.
2. Gain access to the filler port for the oxygen system. Remove the cap from the filler valve and attach the recharging outlet. (On aircraft with the oxygen cylinder located ahead of the front spar, the cylinder may be removed for recharging if desired. Carefully disconnect the electrical connector and low pressure oxygen line from the valve on the end of the cylinder before removing cylinder from the aircraft.)
3. Slowly fill the cylinder to 1850 ± 50 psi at a temperature of 70ºF. This pressure may be increased an additional 3.5 psi for each degree of increase in temperature. Similarly, for each degree of drop in temperature, reduce the cylinder pressure 3.5 psi.
4. Remove the recharging outlet, and replace the filler valve cap.
5. Reinstall components removed to gain access to the filler valve. (Place oxygen cylinder in holder and reconnect electrical connector and low pressure oxygen line if cylinder was removed for servicing. Close cover.)

OXYGEN CYLINDER RETESTING

The 77 cubic foot and 115 cubic foot oxygen cylinders are Kevlar® wrapped aluminum specifically designed for aviation use. They must be removed and sent to a facility authorized by DOT to hydrostatically test them in accordance with 49 CFR part 180 §§ 180.205 and 180.209 as prescribed for DOT 3HT cylinders every 5 years and must be retired from service after 15 years. For aircraft stationed outside the United States have the O2 bottle requalified in accordance with equivalent requirements of your country. The Aluminum 22.8 cubic foot oxygen cylinders must be hydrostatic tested every 5 years.

Keep oxygen cylinder manufacturer's instructions with this AFMS for future reference.