AMERICAN CHAMPION AIRCRAFT
CORPORATION

"Dedicated to Preserving a Classic"

PILOT'S OPERATING MANUAL

SUPER DECATHLON (8KCAB)

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Model year is indicated by serial number suffix.

LOG OF REVISIONS

Revision	Pages Affected	Description Change	Date

FOREWORD

This manual has been prepared to inform the pilot of features and systems incorporated into the Super Decathlon.

Super Decathlon	Lycoming AEIO-360-180 HP	Constant Speed Propeller

The Super Decathlon has been given the FAA Civil Aircraft Type Designator BL30.

Recommended operating procedures and performance data are provided so that maximum utilization can be obtained with the utmost of safety, economy and serviceability.

It is strongly recommended that the pilot be familiar with the aircraft and this manual prior to flight. It is considered mandatory that the pilot familiarize himself with the Emergency Procedures Section prior to flight.

This manual applies only to the aircraft as indicated on the cover page. Use of this manual with other aircraft is not recommended.

This manual does not replace the FAA Approved Airplane Flight Manual. If an inconsistency exists between the manuals, the FAA Approved Airplane Flight Manual is to be the authority.

The words "WARNING," "CAUTION," and "NOTE" are used throughout the manual with the following definitions:

WARNING

An operating procedure, practice or condition, etc. which may result in injury or fatality, if not carefully observed or followed.

CAUTION

An operating procedure, practice or condition, etc. which if not strictly observed, may damage the aircraft or equipment.

NOTE

An operating procedure, practice or condition, etc. which is essential to emphasize.

TABLE OF CONTENTS

This manual is current as of its issue date and will be revised as necessary by Service Letters published by American Champion Aircraft Corporation. Service Letters are distributed to American Champion Aircraft owners by request. If you do not receive these Service Letters, you must consult with American Champion Aircraft Corporation for information concerning the revision status of this manual. Changes to the manual should be installed and the Log Of Revisions updated immediately after receipt of such revisions. The manual should not be used for operational purposes unless it is maintained in a current status.

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SECTION I

OPERATING LIMITATIONS

INDEX

GENERAL

This section lists all powerplant and airframe operating limitations for the Super Decathlon. These limitations are also indicated in the aircraft in the form of placards, instrument color markings and in the FAA Approved Airplane Flight Manual.

AIRSPEED LIMITATIONS

NOTE

Limitations are applicable to both Normal and Acrobatic Category except where designated as applying to only one category.

Airspeed Designation	Super Decathlon CAS MPH	Airspeed Indicator Marking
Never Exceed (V_{NE})	200	Red Line
Caution Range	160 - 200	Yellow Arc
Maximum Structural Cruise (V_{NO})	160	End of Green Arc
Normal Operating Range	54 - 160	Green Arc
Maneuvering (V_A) at Gross Weight:		
Normal Category	121	None
Acrobatic Category	132	None

NOTE

CAS - Calibrated Airspeed: This is indicated airspeed corrected for position and instrument error.

IAS - Indicated airspeed assumes zero instrument error.

V_{NE} - Maximum safe airspeed which is not to be exceeded at any time.

V_{NO} - Not to be exceeded except in smooth air only and then with caution.

V_A - No full or abrupt longitudinal control movements allowed above this airspeed.

POWERPLANT LIMITATIONS AND INSTRUMENT MARKINGS

Model	Super Decathlon
Engine, Lycoming	AEIO-360-H1A and AEIO-360-H1B
Propeller	Constant Speed HC-C2YR-4CF/FC7666A-2
Fuel, Minimum Octane Rating (Approved For Continuous Use)	100 / 130
Tachometer (rpm)	
Normal Range (green arc)	500 - 2000 2250 - 2700
Avoid Continuous Operation (red arc)	2000 - 2250
Avoid Aerobatic Operation (red arc)	2600 - 2700
Maximum (red radial)	2700
Cylinder Head Temperature (°F)	
Normal Range (green arc)	90 - 500
Maximum (red radial)	500
Oil Temperature (°F)	
Normal Range (green arc)	100 - 245
Maximum (red radial)	245
Oil Pressure (psi)	
Normal Range (green arc)	60 - 100
Caution Range (yellow arc)	25 - 60
Maximum (red radial)	100
Minimum (red radial)	25
Fuel Pressure (psi)	
Normal Range (green arc)	14 - 45
Maximum (red radial)	45
Minimum (red radial)	14

WEIGHT AND BALANCE LIMITS

	Super Decathlon
Maximum Gross Weight	1800 Lbs.
Center of Gravity Range	
Normal Category	+13.5 to +18.5 at 1800 Lbs. +11.5 to +18.5 at 1550 Lbs. or Less Straight Line Variation Between Points Given.
Aerobatic Category	+13.5 to +18.5 at 1800 Lbs. +11.5 to +18.5 at 1550 Lbs. or Less Straight Line Variation Between Points Given.
DATUM	Wing Leading Edge

FLIGHT LOAD FACTORS (1800 Lbs. Gross Weight)

Category	Load Factor Limits	Accelerometer Marking
Normal	Positive + 5G Negative - 3G	Green Arc Green Arc
Acrobatic	Positive + 6G Negative - 5G	Red Line Red Line

NOTE

Maximum load factors for Normal Category operations are shown by the ends of the green arc on the accelerometer. Load factors within the yellow arc up to the red radial lines are permitted only in the Acrobatic Category.

KINDS OF OPERATION

Only VFR, day or night operations are approved with all required equipment operating as specified in FAR Part 91.

Flight into known icing conditions is prohibited.

Crosswind landings have been demonstrated in 90° crosswinds up to 17 kts (20 mph).

UNUSABLE FUEL

Any fuel remaining in the tanks when fuel gauge reads "O" or "E" (empty) cannot safely be used in flight.

Acrobatic Category -- The inverted fuel header tank provides fuel for approximately 2.0 minutes of continuous inverted flight. The header tank will automatically refill after approximately one minute of upright, straight and level flight.

INVERTED FLIGHT

Acrobatic Category -- The header tank provides fuel for approximately two minutes of continuous inverted flight. Monitor oil pressure while inverted. Minimum oil pressure is 60 psi.

WARNING

Fuel starvation may occur after a series of inverted maneuvers since the header tank may have had insufficient time to refill.

MANEUVERS (Refer to Section III Before Attempting Maneuvers)

Maneuvers	Recommended Entry Speed (IAS MPH)
	Super Decathlon
Loop (Normal or Inverted)	140
Immelmann	145
Hammerhead Turn	140
Hammerhead Turn (Inverted Entry & Exit)	140
Snap Roll (Normal or Inverted)	90
English Bunt	70
Vertical 1/2 Slow Roll Up	160
Vertical Slow Roll Up	180
Vertical Slow Roll Down	60
Slow or Barrel Roll	130
Outside Loop (Enter From the Top)	70
Horizontal Eight (Inside - Outside)	140
Spin (Normal or Inverted)	Stall

NOTE

Variations or combinations of the above maneuvers are approved provided that the speed or load factor limitations are not exceeded.

WARNING

Tail slides and Lomcevaks (tumbling maneuvers) are not approved.

No full or abrupt use of flight controls is permitted above maneuvering speed.

EQUIRED PLACARDS

See FAA Approved Airplane Flight Manual for placards required in a specific aircraft. The following placards represent a typical airplane.

In Full View Of Pilot

Normal Category Airspeed Limits Maneuvering Speed 121 MPH (105 Knots) CAS Demonstrated Crosswing Velocity -- 20 MPH (17 Knots)

Solo From Front Seat Only. No Acrobatic Maneuvers, Including Spins, Approved In Normal Category. Day Or Night VFR Operation Only. Flight Into Known Icing Prohibited. To Recover From Normal Or Inverted Spin, Use Full Opposite Rudder and Neutralize Elevator.

This Airplane Must Be Operated As a Normal Or Acrobatic Category Airplane In Compliance With The Operating Limitations Stated In The Form Of Placards, Markings, And Manuals. Markings And Placards (Except Accelerometer Markings) Refer To Normal Category Only. See Airplane Flight Manual For Acrobatic Category Information, Weight and Balance Information, And Other Operating Limitations.

NO SMOKING

(when ashtrays not installed)

On Tachometer Face

Avoid 2000 - 2250 Continuous Oper.

In Baggage Compartment

Maximum BAGGAGE 100 Lbs.

REQUIRED PLACARDS (cont'd)

On Forward Left Side Window

Do Not Open Above 130 MPH

Alternate Emergency Exit Unlatch - Force Forward Portion Past Stop

On Fuel Valve Control

Fuel 40 Gal Useable Down "ON"

On Emergency Door Release Handle

EMERGENCY DOOR RELEASE PULL PIN --------PULL HANDLE

Adjacent To Fuel Gauge

Fuel In Tank When Gauge Reads "E" (Empty) Cannot Be Safely Used In Flight

Adjacent To Strobe Light Switch

WARNING Turn Off Strobe Lights When Taxiing In Vicinity Of Other Aircraft, Or During Flight Through Cloud, Fog or Haze. Standard Position Lights To Be On For All Night Operations.

EQUIRED PLACARDS (cont'd)

On Front Seat Rear Leg (Adjustable Front Seat)

Rear Seat P/N 7-1500 Or 7-1501 And Rear Control Stick P/N 4-1711 Req'd. With This Seat Install.

On Rear Control Stick

Rear Stick P/N 4-1711

On Rear Seat Front Leg

Rear Seat P/N 7-1500

or

Rear Seat P/N 7-1501

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SECTION II

EMERGENCY PROCEDURE

INDEX

GENERAL

This section covers the recommended procedures to follow during emergency and adverse flight conditions. As it is not possible to define every type of emergency that may occur, it is the pilot's responsibility to use sound judgement based on experience and knowledge of the aircraft to determine the best course of action.

NOTE

All airspeeds in this section are indicated airspeeds (IAS), unless stated otherwise.

Familiarization and practice of any emergency procedure must be done under the supervision of a qualified flight instructor under carefully controlled conditions. Refer to Section III prior to performing any maneuvers.

ENGINE FIRE DURING START

If the fire is believed to be confined to intake or exhaust system (result of flooding engine):

1) Continue cranking engine with starter.
2) Mixture Control - IDLE CUT-OFF.
3) Throttle - FULL OPEN.
4) Inspect aircraft thoroughly for damage and cause prior to restart.

If fire persists or is not limited to intake or exhaust system:

1) Mixture Control - IDLE CUT-OFF.
2) Fuel Shut-Off Valve - OFF.
3) Electrical and Magneto Switches - ALL OFF.
4) Exit Aircraft.
5) Direct fire extinguisher through the bottom of the nose cowl or through the cowl access door.

ENGINE FIRE IN FLIGHT

1) Mixture Control - IDLE CUT-OFF.
2) Fuel Shut-Off Valve - OFF.
3) Electrical and Magneto Switches - ALL OFF.
4) Cabin Heat - OFF Front and Rear.
5) Use hand fire extinguisher if available.
6) Land immediately using "Forced Landing Procedures".

ELECTRICAL FIRE

An electrical fire is usually indicated by an odor of hot or burning insulation and wisps of smoke.

1) Electrical Switches - ALL OFF (leave magneto switches ON).
2) Air Vents/Windows - OPEN only if absolutely necessary for smoke removal and ventilation.
3) Use hand fire extinguisher if available and necessary.
4) If fire continues, land immediately.

If fire/smoke stops and electrical power is required for the remainder of the flight, turn the master switch ON, followed by the desired circuit switch. Allow a minute between turning on each switch in order that the faulty circuit may be located and switched OFF.

LTERNATOR / ELECTRICAL FAILURE

An alternator failure is indicated by a steady discharge on the ammeter.

1) Master Switch - CYCLE in attempt to reset the overvoltage relay.
2) If excessive battery discharge continues, turn OFF all nonessential electrical equipment to conserve battery power.
3) Land as soon as practical as the battery will furnish electrical power for a limited time only.

If only one circuit (e.g. Radio) appears to be inoperative, reset circuit breaker.

NOTE

Engine operation is unaffected by a complete electrical system failure with the exception of the engine starter.

ENGINE FAILURE ON TAKEOFF

If sufficient runway remains:

1) Throttle - CLOSED.
2) Land using brakes as required.

If airborne and insufficient runway remains for landing, select the most favorable landing area ahead. Attempt an engine restart if altitude permits using ENGINE AIR RESTART procedures.

If no restart is possible, land in preselected area using FORCED LANDING procedures.

WARNING

Maintain flying speed at all times and do not attempt to turn back towards the runway unless sufficient altitude has been achieved.

ENGINE AIR RESTART

1) Maintain Airspeed - 80 MPH minimum recommended.
2) Emergency Fuel Pump - ON.
3) Alternate Air - FULL HOT.
4) Mixture - FULL RICH or LEANED as required at high altitude.
5) Fuel Shut-Off Valve - CHECK ON.
6) Magneto Switches - BOTH ON (Up).
7) Propeller Control - FULL INCREASE.
8) If restart not possible, change throttle, mixture, primer settings in attempt to restart.
9) Follow "Forced Landing Procedure" if unable to restart.

NOTE

The engine starter may be engaged in flight if the engine has stopped windmilling.

PARTIAL POWER LOSS / ROUGH RUNNING

1) Follow the engine air restart procedures.
2) Land as soon as practical using "Precautionary Landing Approach" procedures.

Obstruction of the engine intake air may be indicated by a gradual power loss. Alternate air should be applied to the hot position and left in that position as long as the obstructed condition exists.

ABNORMAL OIL PRESSURE / TEMPERATURE INDICATIONS

Oil pressure and temperature problems are usually related with on affecting the other. Before any drastic action is taken, cross check other engine instruments and control settings in attempt to determine the source of the problem.

High oil temperature is generally a result of loss of oil, overheating (note CHT if available) or a malfunctioning oil cooler by-pass valve. If the situation remains unchecked, oil pressure usually drops resulting in possible engine damage. Power should be reduced while maintaining cruise airspeed; place mixture in FULL RICH position and land as soon as practical.

Little or no oil pressure is usually caused by a failed pressure relief valve, pump, loss of oil, clogged oil line, high oil temperature or a defective gauge. A landing should be made as soon as practical using a minimum power. Plan a "Precautionary Landing Approach" as complete engine failure is possible at any time.

)SS OF PROPELLER CONTROL

In the event of loss of oil pressure to the propeller and/or propeller governor, the propeller will automatically go to the LOW RPM position. The throttle may be used with caution as necessary to climb or maintain level flight. A precautionary landing should be made as soon as practical.

PRECAUTIONARY LANDING APPROACH

A precautionary landing approach should be used whenever power is still available, but a complete power failure is considered imminent. Maintain a higher and closer pattern than normal to remain well within gliding distance of the intended touch down point. Use the normal landing procedures in addition:

1) Airspeed - 75 MPH recommended (70 MPH minimum).
2) Throttle - CLOSED when in gliding distance to runway.
3) Propeller Control - FULL INCREASE.
4) Slip the Aircraft to Increase Rate of Descent as Required.

FORCED LANDING (Complete Power Failure)

If the engine cannot be restarted in flight, trim the aircraft to the recommended glide speed. Remain within gliding distance of the intended point of landing. Maintain a higher and closer pattern than normal making allowance for wind.

Additional altitude can be lost by slipping the aircraft. Diving the aircraft in attempt to lose altitude will only increase the required landing distance.

1) Airspeed - Maintain 75MPH.
2) Mixture - IDLE CUT-OFF.
3) Fuel Shut-Off Valve - OFF.
4) Master Switch - ON.
5) Radio - MAYDAY 121.5 MHZ.
6) Attempt to position the aircraft approximately 1000 feet above ground level (AGL) over the intended point of landing or 500 feet when downwing and abeam the intended point of landing.
7) Electrical Switches - ALL OFF.
8) On Final Approach - Airspeed 75 MPH (70 MPH minimum).
9) Touchdown with minimum airspeed (three point full stall) if landing on rough terrain.

NOTE

If necessary, after aircraft has come to a complete stop, remove and activate the emergency locator transmitter from the aircraft for increased transmitting range.

DITCHING

Should it become necessary to make a forced landing over water, follow the "Forced Landing Procedures" in addition to the following:

1) Cabin Side Door - JETTISON.
2) Land into wind if high winds are evident or parallel to swells with calm winds.
3) Contact the water with a nose high attitude.
4) DO NOT STALL prior to touchdown.
5) After coming to complete stop - EXIT AIRCRAFT.

NOTE

Aircraft cannot be depended on to provide floatation after contacting the water.

ATIC SYSTEM FAILURE

A malfunction in the static system will affect the airspeed, altimeter and vertical speed indicator and may be a result of an obstructed static opening. An alternate static source can be provided from within the cabin by breaking the glass in the airspeed, altimeter or rate of climb instrument face.

WARNING

With an alternate static source provided from within the cabin, subtract approximately 65 feet from indicated altitude and 10 MPH from indicated airspeed.

SEVERE TURBULENCE

In severe turbulence do not exceed 121 mph IAS. Maintain a constant nose attitude rather than flying by reference to the altimeter and airspeed indicator.

STALLS

The Super Decathlon stall characteristics are conventional. The stall warning horn will precede the stall by 5 - 10 MPH depending on the amount of power used. There is very little aerodynamic buffeting preceding the stall.

eron control in a power on stall is marginal. Large aileron deflections will aggravate a near stalled condition and the use is not recommended to maintain lateral control. The rudder is very effective for maintaining lateral control in a stalled condition with the ailerons placed in the neutral position. To recover from a stall, proceed as follows:

1) LOWER NOSE and add FULL POWER simultaneously.
2) Use the rudder to maintain lateral control.

WARNING

Do not allow aircraft to stall unless sufficient altitude exists for safe recovery.

SPINS

Normal or inverted spins are approved in this aircraft when flown in the acrobatic category. Spins are prohibited in the normal category. Use the following recovery procedure for a normal spin.

WARNING

Do not allow aircraft to spin unless sufficient altitude exists for safe recovery.

1) Throttle - CLOSED.
2) Ailerons - NEUTRAL POSITION.
3) Elevator - POSITIVE FORWARD TO NEUTRAL (free release of elevator control is not adequate for recovery).
4) Rudder - FULL DEFLECTION in the opposite direction to the rotation.
5) Rudder - NEUTRALIZE when rotation stops and positive control and flying speed is restored.
6) Nose Attitude - RAISE smoothly to level flight altitude.
7) Throttle - only after recovery from diving altitude, then as required.

Use the following procedures for inverted spins.

1) Throttle - CLOSED.
2) Ailerons - NEUTRAL POSITION.
3) Elevator - POSITIVE REARWARD TO NEUTRAL (free release of elevator control is not adequate for recovery).
4) Rudder - FULL DEFLECTION in the opposite direction to the rotation.
5) Rudder - NEUTRALIZE when rotation stops and positive control and flying speed is restored.
6) Nose Attitude - RAISE smoothly to normal upright level flight altitude.
7) Throttle - only after recovery from diving altitude, then as required.

WARNING

During the spin recovery, the airspeed will build very rapidly with a nose low altitude. Smooth but positive recovery from the dive is important to avoid an overspeed condition. Do not use full or abrupt elevator control movements after recovery to avoid secondary stall-spin.

INFLIGHT OVERSTRESS

An inflight overstress can occur if either airspeed and/or load factor limits are exceeded or if controls are misused. Aerobatics should be terminated immediately. Fly at a reduced airspeed (70-80 MPH) to a suitable landing point. DO NOT under any circumstances, make large control movements or subject the aircraft to additional "g" loadings above that required for straight and level flight, and gentle turns. After landing, the aircraft should be inspected for damage by a qualified mechanic prior to the next flight.

EMERGENCY EXIT / BAIL OUT

1) Throttle - CLOSED.
2) Jettison the Door.
3) Use the cabin door frame for support. Dive straight out and slightly aft of the wing struts.
4) Use left side window as alternate exit if you are unable to exit through the door. Force forward portion of window past stop to open as alternate exit window.
5) Parachute - Open immediately when clear of aircraft (preflight and familiarize yourself with operating procedures of the parachute before the flight).

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SECTION III

NORMAL OPERATING PROCEDURES

INDEX

GENERAL

This section covers all recommended normal operating procedures using a checklist format whenever possible with additional information if further explanation is required.

NOTE

All airspeeds in this section are indicated airspeeds (IAS), unless stated otherwise.

PREFLIGHT INSPECTION

The following inspection should be conducted prior to each flight. The inspection is broken down by area; the following circled numbers correlate with those presented in Figure 3-1.

This checklist emphasizes areas of importance. However, the preflight inspection should also consist of a thorough look at the aircraft for general condition and airworthiness.

① Cabin

a) Cabin Door and Release Mechanism - CHECK condition, security.
b) Flight Controls - CHECK freedom of movement.
c) Magneto and Electrical Switches - OFF (check operation of lights if required and stall warning system with respective switches ON).
d) Fuel Quantity Gauge - CHECK quantity.
e) Fuel Shut-Off Valve - ON.
f) Seat Belts - CHECK CONDITION, SECURE rear belt and harness if not in use.
g) Emergency Locator Transmitter - ARMED.
h) Before Aerobatic Flights, Remove Loose Articles and Equipment - insure the cabin is clean.

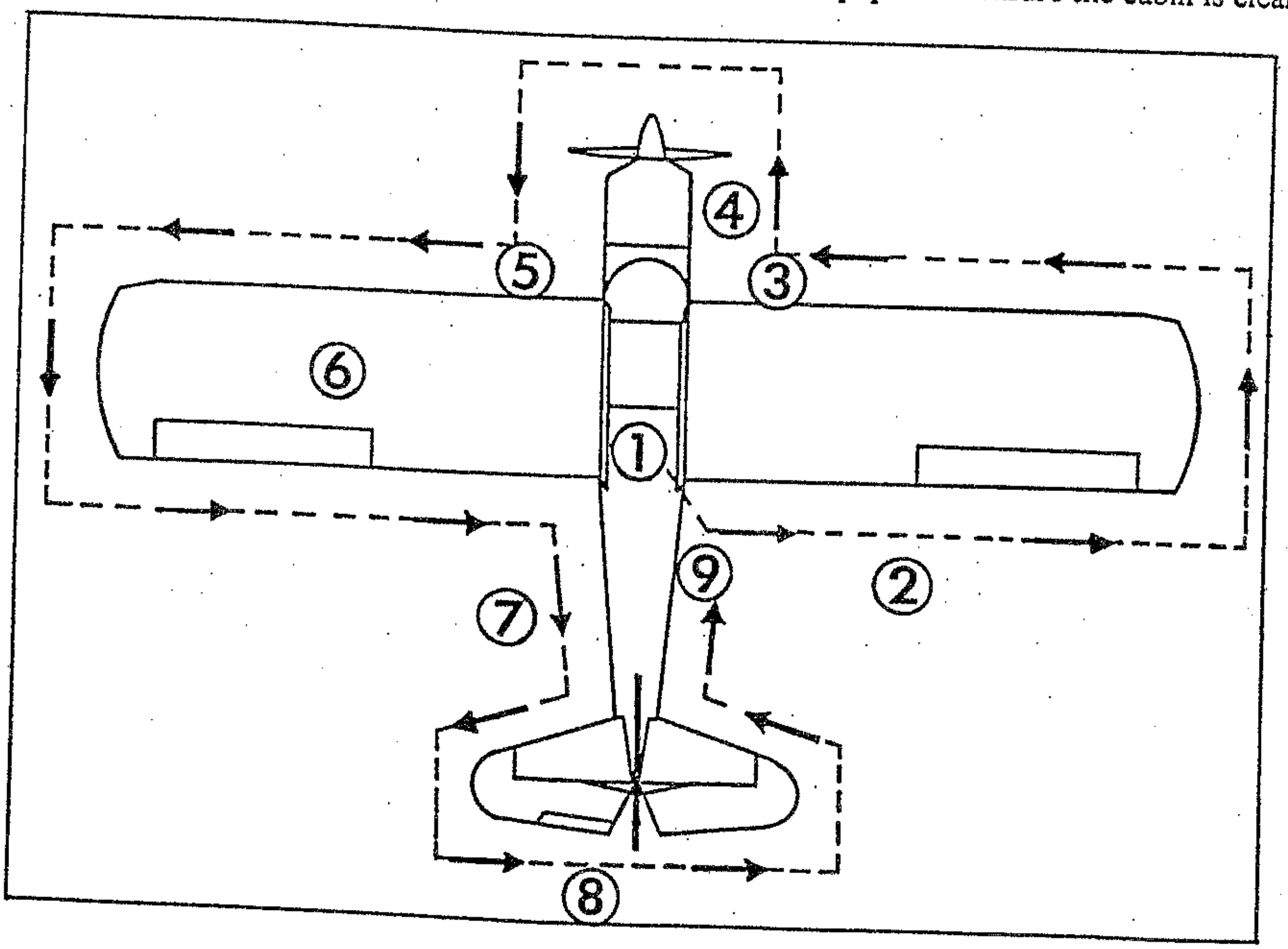

FIGURE 3 - 1 PREFLIGHT INSPECTION

PREFLIGHT INSPECTION (cont'd)

② Right Wing

a) Wing Root Fairing and Greenhouse Roof - CHECK secure.
b) Aileron - CHECK condition, freedom of movement, security.
c) Wing Tip and Light - CHECK condition.
d) During preflight inspection performed by pilot

1) Inspect the front and rear lift struts for straightness, dents and other damage.
2) Check strut drain holes to insure that they are not plugged and the struts do not contain water.
3) If either of the above conditions is found, contact an authorized aircraft mechanic to determine aircraft airworthiness.

e) Tie-Down - REMOVE.
f) Fuel - CHECK quantity, cap secure.

③ Right Main Gear

a) Chocks - REMOVE.
b) Tires - CHECK condition, inflation.
c) Brakes - CHECK condition, leakage.
d) Wheel Fairing - CHECK condition, security.

④ Nose Section

a) Windshield - CHECK condition, cleanliness.
b) Oil - CHECK quantity, dip stick secure.
c) Fuel - DRAIN gascolator and sample fuel for contamination and color, CHECK leakage.
d) Engine Compartment - CHECK condition, leakage, etc.
e) Cowling and Inspection Door - CHECK condition, security.
f) Propeller and Spinner - CHECK condition, security.
g) Air Filter - CHECK condition.
h) Landing Light - CHECK condition.

⑤ Left Main Gear: Same as right main gear.

⑥ Left Wing

a) Same as right wing, in addition.
b) Fuel Vent - CHECK unobstructed.
c) Stall Warning Vane - CHECK freedom of movement.
d) Pitot Tube - CHECK to insure it is unobstructed.

PREFLIGHT INSPECTION (cont'd)

⑦ Fuselage (Left Side)

a) Fabric - CHECK condition, oil, battery acid leakage, etc.
b) Windows - CHECK condition, cleanliness, condition and security.
c) Fuel Belly Drain - DRAIN, CHECK and sample fuel for contamination and color.
d) Radio Antenna(s) - CHECK secure.

⑧ Empennage

a) Horizontal Stabilizer and Brace Wires - CHECK condition, security.
b) Vertical Stabilizer and Tail Light - CHECK condition.
c) Elevator, Trim Tab and Rudder - CHECK condition.
d) Tail Wheel - CHECK condition, inflation, security.
e) Tie-Down - REMOVE.

⑨ Fuselage (Right Side)

a) Same as fuselage left side (no fuel drain on right side).

COLD WEATHER OPERATIONS

The following operating practices are recommended for cold weather operations (below 20° F).

Engine preheat (if aircraft is not kept in a heated hangar): Prior to starting, the engine compartment should be thoroughly preheated. Should moisture be present in the oil or breather system, preheating will assure that ice is not blocking passages or lines. The preheat is best accomplished with a large volume of warm air (200° F maximum) directed into the engine compartment through the oil access door. This preheat should be continued long enough to assure that the oil and breather system components have been thoroughly heated. This preheat time will be dependent upon the volume and temperature of the preheat air.

Care should be taken during preheating that the preheat air is not above 200° F as many components in the engine compartment or the cowling may be damaged or scorched.

It is important to use the proper viscosity engine oil and run the engine sufficiently long to bring the engine oil temperature and pressure to the normal operating range. Under some extreme winter conditions, oil temperature may not indicate on the oil temperature gauge until airborne; it is very important that oil pressure be within the green arc prior to run-up and takeoff regardless of oil temperature. This is particularly important as the Decathlon utilizes the Christen inverted oil system. This system has external oil supply lines. Cold oil will not circulate well in cold lines and other engine parts, so the flow of oil from the engine sump through the external hoses, and components of the Christen System will be severely impeded until the oil, the engine and all external system parts are warmed up.

COLD WEATHER OPERATION (cont'd)

It is recommended that the 25-hour oil change interval be observed and that the oil and breather lines be checked for moisture accumulation during the oil change. It is also recommended that an inspection be made for moisture accumulation at five to ten operating hour intervals. See Section VII for maintenance details.

BEFORE STARTING

1) Seat Belts / Shoulder Harness - FASTENED and adjusted.

2) Fuel Shut-Off Valve - ON.

3) Brakes - SET.

4) Electrical Switches - OFF.

5) Cabin Door - CLOSED (windows as desired).

6) Flight Controls - CHECK for free and correct movement.

7) Radios - OFF.

Set the parking brake by depressing the brake pedals and pulling the park brake knob located under the far right side of the instrument panel.

STARTING

1) Airplane Preflight Inspection - COMPLETE.
2) Cabin Door - SECURED.
3) Seat Belts and Shoulder Harnesses - FASTENED and adjusted or STOWED.
4) Fuel Shut-Off Valve - ON.
5) Brakes - SET.
6) Propeller Control - FULL INCREASE.
7) Alternate Air - Cold.
8) Electrical and Radio Switches - OFF.
9) Master Switch - ON.
10) Engine Prime (as required)
    a) Mixture - FULL RICH.
    b) Throttle - 1/4 to 1/2 inch OPEN.
    c) Electrical Fuel Pump - ON until fuel pressure is indicated, then OFF.
11) Mixture - IDLE CUT-OFF.
12) Throttle - 1/2 to 1 inch OPEN.
13) Magneto Switches - BOTH ON.
14) Insure Propeller and Propeller Blast Area is CLEAR.
15) Starter - ENGAGE, release after engine fires.
16) Mixture - FULL RICH after engine fires.
17) Throttle - 1000 to 1200 RPM.
18) Oil Pressure - CHECK, must indicate pressure within 30 seconds maximum.
19) Electrical and Radio Switches - AS DESIRED.

The amount of fuel priming will vary with each engine and temperature condition. If the engine is warm, littel or no prime is required.

CAUTION

Do not overprime due to the resulting fire hazard.

To clear an engine that has been flooded due to excessive priming, proceed as follows:

1) Electrical Fuel Pump - OFF.
2) Mixture - IDLE CUT-OFF.
3) Throttle - FULL OPEN.
4) Magneto Switches - OFF.
5) Starter - ENGAGE for several propeller revolutions.
6) Repeat normal starting procedures using no prime.

CAUTION

Limit the use of the starter to 30 seconds duration maximum
with a two minute cooling off period between each starter engagement.

STARTING (cont'd)

During ground operation, the mixture should be FULL RICH and the carburetor/alternate air COLD to insure good engine cooling and filtered air. Prolonged idle below 1000 RPM is not recommended due to plug fouling and insufficient cooling air when the aircraft is not in motion.

WARNING

Do not attempt to turn over and/or start the engine by hand unless you have had proper instruction and experience. If pulling the propeller through by hand is necessary, be sure the master and magnetos are in the OFF position and the throttle closed. Have a pilot at the controls and chock/tie down the aircraft. When pulling the propeller through by hand, treat it as if the ignition switch is turned on. A loose or broken ground wire on either magneto could cause the engine to fire.

TAXI

Taxi operations during high winds requires the conventional use of the flight controls. With a head wind or quartering head wind, place the control stick full aft and into the wind. With a tail wind or quartering tail wind, the opposite procedures. The use of the wheel brakes in conjunction with the rudder will assist the pilot in maintaining directional control.

BEFORE TAKEOFF

1) Brakes - SET.
2) Flight Controls - CHECK freedom of movement, proper operation.
3) Elevator Trim - SET takeoff position.
4) Flight Instruments/Radio(s) - CHECK and SET.
5) Check Master Switch - ON.
6) Fuel Shut-Off Valve - ON.
7) Mixture - FULL RICH (lean as required for high altitude).
8) Engine Instruments - CHECK normal indications.
9) Engine Run-Up - 1800 RPM (Elevator Control - FULL BACK)
    a) Magnetos - CHECK (175 RPM maximum drop, 50 RPM maximum differential) return both switches to ON.
    b) Propeller - CHECK operation (full decrease until RPM drop of 300 to 500), return to high RPM position.
    c) Alternate Air - CHECK operation then return to COLD position
    d) Engine Instruments - within green arc
    e) Throttle - 1000 RPM
10) Electrical Fuel Pump - ON.
11) Cabin Door and Windows - CLOSED and LATCHED.
12) Seat Belts / Shoulder Harness - FASTENED and adjusted.

Engine warm-up should be conducted to 1000 to 1200 RPM. High power operation (above 2200 RPM) and engine run-up should be made into the wind and kept to a minimum especially during high temperature conditions. The stick should also be held full aft to prevent the possibility of the aircraft nosing over. The magneto check is run at 1800 RPM using the BOTH-LEFT-BOTH-RIGHT-BOTH sequence. Maximum RPM drop on each magneto is not to exceed 175 RPM and the differential between mags should not exceed 50 RPM. The alternate air and propeller control should be checked for operation at this time. To check prop control, pull vernier control from full increase RPM to full decrease until a 300 to 500 RPM drop is noted, then return to full increase. Avoid using alternate air on the ground. With the alternate air selected, induction air is not filtered and abrasive dirt particles can enter the engine.

TAKEOFF - NORMAL

1) Throttle - FULL OPEN applying smoothly.
2) Engine Instruments - CHECK normal indications and satisfactory takeoff power.
3) Attitude - RAISE TAIL.
4) Lift-Off - 55 - 60 MPH.
5) Climb - 75 - 80 MPH.

Takeoff characteristics are conventional for tail-wheel aircraft. It is recommended to raise the tail with the elevator during the takeoff roll for better forward visibility and directional control. Transition into flight with a smooth but positive rotation. After lift-off, allow aircraft to accelerate to desires climb speed.

CAUTION

On the ground in the level flight attitude, the wheel brakes are very sensitive. It is recommended that directional control be maintained with the use of the rudder only.

Check full-throttle engine operation early in the takeoff run. The takeoff should be discontinued if there are any signs of rough engine operation or sluggish engine acceleration.

During crosswind conditions, place the control stick into the wind (up wind aileron UP) and assume a tail high attitude with the elevator to prevent drifting or premature lift-off.

High altitude takeoffs are accomplished by using the normal takeoff procedures with the addition of leaning the mixture control for smooth engine operation and allowing for the effects of density altitude.

KEOFF - OBSTACLE

During an obstacle takeoff, use the Normal Takeoff procedures with the following exceptions (refer to Section IV for appropriate distances):

1) Apply full power rapidly but smoothly.
2) Accelerate in three-point (tail down) attitude.
3) Maintain the following speed until clear of 50 ft. obstacle.

Super Decathlon------------58 mph IAS

WARNING

The aircraft must be pitched forward to a safe power-off speed should a power failure occur during climb-out; failure to respond immediately may result in a stall at low altitude.

TAKEOFF - SOFT FIELD

For soft field takeoff, use the Normal Takeoff procedures with the following exceptions:

) Attitude - TAIL LOW but clear of ground.
2) Lift-Off - as soon as possible.
3) After Lift-Off - LEVEL FLIGHT to obtain safe margin of airspeed prior to climb.

WARNING

Good pilot judgement and experience are required to determine suitability of a soft field for safe takeoff operation.

The aircraft will lift-off at very low IAS, however, continued climb-out below takeoff-obstacle speed is not recommended.

Be sure to account for the additional takeoff roll and distance to clear an obstacle resulting from the added drag of a soft field. Good pilot judgement is required to make these allowances as it is not possible to tabulate such corrections due to their large variability.

CLIMB

1) Throttle - FULL OPEN.
2) Propeller Control - FULL INCREASE.
3) Mixture - lean only as required to maintain smooth engine operation.
4) Airspeed - 75 - 80 MPH.
5) Electric Fuel Pump - OFF after safe altitude has been obtained.

For maximum performance climbs, use full throttle and the following speeds.

Model	Super Decathlon (mph IAS)
Best Rate of Climb (V_Y)	80
Best Angle of Climb (V_X)	58

If best rate of climb (or best angle of climb) is not required, a climb speed between 80 and 90 MPH will provide good forward visibility (and engine cooling in a warm climate). The mixture should be full rich; lean only as requi to maintain smooth engine operation.

NOTE

Monitor fuel pressure gauge when switching electric fuel pump off to insure continuous fuel pressure "in the green" with electric fuel pump off.

CRUISE

1) Level-Off - TRIM.
2) Airspeed - ACCELERATE to desired cruise airspeed.
3) Power - SET to cruise power.
4) Mixture - LEAN when below 75% power.

The fuel mixture should be leaned at any altitude when below 75% of maximum power. Lean to peak EGT if equipped. If no EGT is installed, lean until engine roughness or loss of power is noted then enrich until smooth.

WARNING

Range and endurance information is based on a properly leaned fuel mixture. Failure to lean the fuel mixture will increase fuel consumption appreciably.

Continuous use of alternate air during cruising flight decreases engine efficiency. Unless conditions are severe, do not cruise with alternate air on. When selecting alternate air, do so slowly to the full-on position and only for a few seconds at intervals to determine if ice may have developed on the air intake filter. The Decathlon is not approved for flight into known icing conditions.

STALLS

The stall characteristics of the Decathlon are conventional. For stall speeds at various angles of bank, refer to stall speed table in Section IV.

WARNING

Stall aircraft only if sufficient altitude exists for safe recovery.

AEROBATICS

The Super Decathlon is certified in the Aerobatic Category. Flying aerobatics places a much greater demand on the pilot's ability, knowledge of the aircraft and current regulations. The following information is provided to make aerobatic flying enjoyable, with the utmost emphasis on safety. However, the pilot should not attempt aerobatics unless he has received training by an instructor qualified for aerobatic instruction.

Federal Aviation Regulations (FARs) Part 91.71 specify the airspace and altitudes required for aerobatic flight. Altitude may be the pilot's greatest safety factor and should not be compromised. The wearing of approved parachutes is specified in Part 91.15. It is strongly recommended that parachutes always be worn during aerobatic flight.

American Champion Aircraft Corporation also recommends that pilots utilizing aircraft for aerobatics read the Advisory Circular 91-48: Acrobatics - Precision Flying With A Purpose. This advisory circluar provides information to persons who are interested in aerobaitcs to improve their piloting skills as recreation, sport, or as a competitive activity. It also discusses Federal Aviation Regulations pertaining to aerobatic aircraft aiworthiness considerations, aerobatic instruction, operations and aerobatic flight safety.

Know and respect your airplane's structural limitations. The Super Decathlon structure is designed to withstand a maximum load factor of +6 G's and -5 G's at a maximum gross weight of 1800 lbs.

WARNING

> Do not exceed +6.0 "g" positive load factor or -5.0 "g" negative load factor. Do not perform aerobatics in turbulent air.

Never exceed the above load factors regardless of weight. Flying at reduced weights improves performance. Flying above 1800 lbs. is not only prohibited but also greatly increases the changes of a serious overstressing resulting in damage or possible structural failure.

The rear center of gravity (C.G.) limit is critical for aerobatic flight. This limit is specified in Section I. The flight envelope in Section V also reflects this change. For this reason, baggage is NOT allowed during aerobatic flight. Also, all personal equipment (charts, flight computer, etc.) should be properly secured.

A person learning to fly must be taught how to do so safely. The same holds true for a pilot learning aerobatics. To attempt an aerobatic maneuver with no prior aerobatic instruction is extremely dangerous and NOT recommended.

Aerobatic flight places a greater demand on both the pilot and aircraft. A thorough preflight inspection/evaluation for both is considered essential. The pilot must know and abide by the limitations of the aircraft and his own personal limitations as well. Do not do aerobatics unless you are in good physical condition -- not when you have a hangover, a cold or any other illness. If you are not in good condition, your reaction time is increased and your tolerance to G-loading is decreased. The FAA Approved Airplane Flight Manual has information concerning aerobatic limits and maneuvers and should be consulted.

EROBATICS (cont'd)

Watch for other traffic while doing aerobatics. Perform a 90 degree clearing turn in each direction before beginning, checking for traffic all around the airplane. See Part 91 of the Federal Air Regulations for airspace in which aerobatics are prohibited.

At the completion of the flight, a post-flight inspection of the aircraft should also be conducted. If any discrepancies or doubts exist that concern airworthiness, consult a mechanic prior to the next flight.

Oil pressure during inverted flight may normally be 5 to 10 lbs. less than the oil pressure during normal flight. During the transition from normal to inverted flight and from inverted to normal flight, an oil pressure fluctuation may be indicated on the oil pressure gauge. This fluctuation is normally 20-40 psi and lasts about one second after which the normal oil pressure should be maintained.

Oil quantities in excess of normal oil level may be lost during the aerobatic sequence, but once the normal level is reached, oil losses should be small. The oil capacity is 8 quarts, but normal oil level is between 6 and 7 quarts. Oil should be added when the level falls below 6 quarts. Steep climbing-diving vertical attitudes or knife-edge flight may cause interruption of the oil pressure and/or loss of oil through the breather.

It is important to monitor the oil pressure during aerobatic flight. This is especially important when operating in extremely cold weather. Inadequate warm-up of the oil system components could cause impeded operation and inadequate oil pressure in the inverted position.

Extended inverted flight or a sequence of maneuvers involving a large percent of negative "g" maneuvers may exhaust the inverted fuel supply, causing loss of fuel pressure and power. At the first signs of fuel pressure loss or engine roughness, assume normal flight which will assure normal fuel flow and will automatically refill the inverted fuel supply.

NOTE

Continuous inverted flight at full power will exhaust inverted fuel supply in approximately two minutes. Approximately one minute of positive "g" conditions is required to completely refill the inverted fuel supply.

AEROBATICS (cont'd)

VERTICAL SLOW ROLL UP

Enter the maneuver at 180 mph, using a +4.5 "g" * pull up. CAUTION: Flight above V_{NO} (160 mph CAS) in smooth air only. Exit with pushover to level flight.

VERTICAL SLOW ROLL DOWN

Enter the maneuver at approximately 60 mph and push-over to vertical down. Exit with approximately 4.5 "g" * and 150 mph.

SLOW OR BARREL ROLL

Enter the maneuver at 120 to 130 mph. Do not use full or abrupt use of flight controls above maneuvering speed.

OUTSIDE LOOP (ENTER FROM THE TOP)

Enter the maneuver at 60-70 mph with steadily increasing push-over to -3.5 to -4.0 "g" * at the bottom of the loop. Speed at the bottom should be approximately 140 mph. Continue -3.5 to -4.0 "g" * push through the bottom of the loop. Steadily decrease negative load factor to 1 "g" at the top of the loop.

HORIZONTAL EIGHT INSIDE-OUTSIDE

Enter the first half of the maneuver at 140 mph with about +4.0 "g" * pull up. Enter the second half of the maneuver from about 140 mph with a -3.5 to -4.0 "g" * negative load factor.

HAMMERHEAD TURN (INVERTED ENTRY AND EXIT)

Enter the maneuver at about 140 mph with a -3.5 to -4.0 "g" push. The speed at the top before the turn (or pivot) is approximately 40-50 mph. Exit from vertical down with -3.5 to -4.0 "g" * push to level flight inverted.

* See WARNING Page 3 - 19.

ROBATICS (cont'd)

NORMAL SPINS

Enter from normal stall, power off with full aft stick and full rudder in desired direction of spin. Maintain spin with full pro spin control until 1/4 to 1/2/ spin prior to recovery heading. Recover with positive movement of stick to neutral position and full opposite rudder. Hold pro recovery control until rotation stops and positive control and flying speed is restored. Then neutralize rudder and smoothly recover from the dive* to level flight. Free release of controls is not adequate for spin recovery. Positive movement of the controls by the pilot is required.

WARNING

Spin aircraft only if sufficient altitude exists for safe recovery.

INVERTED SPINS

Enter from inverted stall power off with full forward stick and full rudder in the direction of desired spin. Maintain with full pro spin controls until 1/4 to 1/2 turn prior to recovery heading. Recover with positive movement of stick neutral position and full opposite rudder. Hold pro-recovery controls until rotation stops and positive control and flying speed is restored. Then neutralize rudder and smoothly recover from dive* to level flight. Free release of controls is not adequate for spin recovery. Positive movement of the controls by the pilot is required.

***WARNING**

Do not apply full or abrupt use of flight controls above maneuvering speed. Proper use and application of controls and maneuvering load factors are essential to speed control. Improper and/or inadequate application of maneuvering load factors may result in rapid speed buildup resulting in unsafe flight situations.

DESCENT

1) Mixture - FULL RICH.
2) Throttle - REDUCE as desired.
3) Airspeed - AS DESIRED.

The descent should be made with enough power to maintain cylinder head oil temperatures in green arc. If possible, avoid windmilling the engine with the propeller by reducing airspeed or increasing power.

LANDING - NORMAL

1) Seat and Shoulder Harness - FASTENED.
2) Propeller - FULL increase.
3) Mixture - RICH.
4) Electric Fuel Pump - ON.
5) Brakes - CHECK FIRM (Park Brake - OFF).
6) Approach Airspeed - 70-75 MPH.
7) Throttle - as necessary for desired glide path.
8) After Touchdown - Power Off, brake as required.
9) Electric Fuel Pump - OFF.

Aircraft landing characteristics are conventional for a tail-wheel airplane. Either wheel landings or full stalls (3 point) are permissible. During gusty wind conditions, increase airspeed approximately 5 mph above normal.

As a general rule, it is good practice to contact the ground at a minimum safe speed consistent with existing conditions. In calm or light wind conditions and in short and/or soft field conditions, a full stall landing is recommended. In a full stall landing, the flare or round-out should be made with power off. A three-point landing attitude should be held just above the ground while increasing the back pressure on the stick as airspeed drops until the stick is in the full aft position at the time of touchdown. Brake as necessary.

In high gusty wind or when a crosswind exists, a wheel landing is recommended, preceded by an approach of about 75 to 80 mph. The flare is made with slight power (900-1200 RPM) to a level flight attitude just above the ground. Contact with the ground is made on the main landing gear. At the time of contact, the stick is brought slightly forward of neutral to hold the airplane firmly on the ground in a tail up attitude. As speed decreases, lower the tail slowly to the ground and then hold full aft stick. Brake as necessary. During crosswind conditions, maintain cross-control corrections by using the rudder to maintain runway heading and the ailerons to correct for wind drift throughout the landing flare and roll-out.

CAUTION

The use of wheel brakes is not recommended until after the tail wheel is in contact with the ground. For maximum braking, the control stick should be FULL AFT.

NDING - OBSTACLE / SHORT FIELD

Use Normal Landing procedures with the following additions:

1) Approach Airspeed - 60 MPH Super Decathlon
2) Throttle - AS DESIRED to control rate of descent.

WARNING

A relatively high rate of descent is possible in this configuration when at full gross weight and the throttle closed. If airspeed is allowed to decrease below the approach speeds shown, landing flare can only be assured with an application of power.

3) Slip aircraft as necessary to increase rate of descent.
4) Touchdown in full stall three-point attitude with stick full back.
5) Brake as required.

WARNING

As speed decreases, braking must be moderated to prevent possible nose-over.

LANDING - SOFT FIELD

Use Normal Landing procedure with the following additions:

1) Approach - Use Normal or Obstacle Landing procedure.
2) Flare to three-point landing attitude and add small amount of power.
3) Touchdown in full stall three-point attitude with stick full back.
4) Use power to assist in maintaining tail - low attitude.

WARNING

Good pilot judgement and experience are required to determine suitability of a soft field for safe landing operation.

SHUTDOWN

1) Brakes - SET.
2) Electrical Equipment - OFF.
3) Mixture - IDLE CUT-OFF.
4) Magnetos/Master Switch - OFF after propeller stops.
5) Controls - SECURE with lap belt around forward control stick only.
6) Wheels - CHOCKED.
7) Wing/Tail Tie Downs - SECURE.

Before engine shutdown, turn off all radio equipment and other electrical equipment. The engine is shut down by closing the throttle and pulling the mixture control full aft to the idle cut-off. After the engine stops, turn off the master switch and both magnetos.

NOTE

If high winds are anticipated, the aircraft should be hangared. If the aircraft must be left out, park into the wind and use additional tie down ropes for security. Secure the forward control stick with the lap belt.

GROUND HANDLING

The Super Decathlon is easily handled on the ground by using the handle on the lower right side of the fuselage just forward of the tail section. The tail can be lifted and the airplane can be pushed, pulled and turned from this position. Tie-down rings are provided under each wing on the main wing strut. The tial is secured by tieing the rope or chain through the tail wheel unit. The aileron and elevators can be locked by securing the seat belt around the front control stick in a full aft position. Ground handlers should specifically avoid pushing or pulling on propeller spinner, propeller tips, wing struts, fuselage stringers or tail surfaces.

WARNING

DO NOT push or pull on wing struts to move aircraft. Struts can be damaged by improper handling.

SECTION IV

FLIGHT PERFORMANCE

INDEX

GENERAL

s data is to inform the pilot what he can expect from the aircraft in the way of performance and to assist in preflight planning.

Flight performance data is included for the Super Decathlon (8KCAB). The data has been compiled from both estimated calculations and actual flight test using average piloting techniques, with an aircraft and engine in good operating conditions. All information is corrected for standard atmospheric conditions.

Performance may vary from the given data due to the many possible variables present with a specific aircraft and flight condition. The pilot is therfore encouraged to maintain a personal flight log for his aircraft. This will not only provide more accurate preflight planning information for future flights, but also can be used as an indicator in determining the general condition of a particular aircraft.

WARNING

This manual includes the performance data for the Super Decathlon. It is the pilot's responsibility to insure that the correct performance chart is used.

AIRSPEED CALIBRATION

CAS (mph)	IAS (mph)
60	60
70	70
80	80
90	90
100	100
120	120
140	141
160	163
180	184
200	206

NOTES

1. Assumes zero instrument error.
2. Maximum gross weight of 1800 lbs. at the forward C.G. limit.

STALL SPEEDS

Model	CAS (mph)			
	Angle of Bank			
	0°	20°	30°	40°
Super Decathlon	53	55	61	75

NOTES

1. Gross weight of 1800 lbs.
2. Power off.

TAKEOFF DISTANCE

CONDITIONS

1. Level, Hard Surface, Dry Runway.
2. Zero Wind.
3. Aircraft Loaded to 1800 Lbs.

PILOT TECHNIQUE: Refer to "TAKEOFF - OBSTACLE" in Section III.

1. Speed at Lift-Off - 50 mph IAS.
2. Speed at 50 Feet - 58 mph IAS.

WARNING

The aircraft must be pitched forward to a safe power off speed should a power failure occur during climb-out; failure to respond immediately may result in a stall at low altitude.

	Distance (Ft.)									
Pressure Altitude Ft.	0° C		10° C		20° C		30° C		40° C	
	Ground Run	Total To Clear 50'	Ground Run	Total To Clear 50'	Ground Run	Total To Clear 50'	Ground Run	Total To Clear 50'	Ground Run	Total To Clear 50'
0	456	833	481	879	508	928	533	975	559	1021
1000	485	886	512	935	540	987	567	1036	594	1087
2000	520	951	550	1005	578	1057	608	1112	639	1169
3000	561	1026	591	1081	624	1141	657	1201	688	1258
4000	602	1101	635	1161	670	1224	704	1287	740	1354
5000	652	1192	690	1261	725	1326	762	1394	802	1466
6000	708	1294	746	1363	781	1438	828	1514	669	1588

NOTES

1. Data presented in this table represents maximum airplane capability at speeds shown and requires aircraft in good operating condition and a proficient pilot.
2. Decrease distance 20% for each 10 mph of head wind.
3. This data does not consider the effects of takeoff from soft and/or grass fields and takeoff with tail wind. Takeoff performance under these conditions vary substantially. Good pilot judgement must be used under all conditions to insure safe operation.

TIME, FUEL AND DISTANCE TO CLIMB

CONDITIONS

1. Standard Temperature.
2. Aircraft Loaded to Gross Weight of 1800 Lbs.
3. Full Throttle, 2700 RPM.

PILOT TECHNIQUE: Refer to "CLIMB" in Section III.

1. Maximum Rate of Climb.
2. Lean Only as Required to Maintain Smooth Engine Operation.

Pressure Altitude (ft)	Standard Temp (° C)	Climb Speed (mph-IAS)	Rate of Climb (fpm)	From Sea Level		
				Time (min)	Fuel (gal)	Distance (sm)
0	15	80	1230	0	1.0	0
1000	13	80	1160	1	1.2	1
2000	11	79	1090	2	1.4	2
3000	9	79	1020	3	1.7	4
4000	7	78	940	4	1.9	5
5000	5	78	880	5	2.2	7
6000	3	77	790	6	2.4	8
7000	1	77	730	7	2.7	10
8000	-1	76	660	9	3.0	12
9000	-3	75	590	10	3.3	14
10000	-5	75	520	12	3.7	17
11000	-7	74	440	14	4.0	20
12000	-9	74	370	17	4.5	24
13000	-11	73	300	20	5.0	28
14000	-13	73	230	23	5.6	34
15000	-15	72	160	29	6.4	42

NOTES

1. Data presented in this table represents maximum airplane capability at speeds shown and requires aircraft in good operating condition and a proficient pilot.
2. Distances shown are based on zero wind.
3. Allow one gallon fuel for engine start, taxi and takeoff.
4. Decrease distance for head wind or increase distance for tail wind with the following increment: Time(min)/60 x wind component in the direction of flight (mph).

CRUISE PERFORMANCE

CONDITIONS

1. Standard Temperature.
2. All figures based on gross weight of 1800 lbs.
3. Maximum cruise is normally limited to 75% power.
4. All fuel consumption estimates are based on the recommend lean mixture (see Section III) when at or below 75% power and full rich above 75% power.

% POWER	RPM	M.P.	TAS MPH	GPH
2500 Ft.				
85	2600	25.3	151	12.5
80		24.1	147	12.0
75		23.0	144	9.7
70		21.8	139	9.3
65		20.6	136	8.8
60		19.5	131	8.3
85	2500	25.9	151	12.3
80		24.7	147	11.8
75		23.5	144	9.6
70		22.3	139	9.1
65		21.1	136	8.7
60		19.9	131	8.1
85	2400	26.5	151	12.2
80		25.2	147	11.5
75		24.0	144	9.5
70		22.8	139	8.9
65		21.5	136	8.5
60		20.3	131	8.0
5000 Ft.				
80	2600	23.6	151	12.0
75		22.4	147	9.7
70		21.3	143	9.3
65		20.1	139	8.8
60		18.9	134	8.3
55		17.7	128	7.9
80	2500	24.1	151	11.8
75		22.9	147	9.6
70		21.7	143	9.1
65		20.5	139	8.7
60		19.3	134	8.1
55		18.1	128	7.7
80	2400	24.9	151	11.5
75		23.6	147	9.5
70		22.3	143	8.9
65		21.0	139	8.5
60		19.8	134	8.0
55		18.5	128	7.6

NOTE

Speeds shown based on aircraft with optional strut fairings and streamlined tail wires. Reduce figures shown by 2% for aircraft not so equipped.

CRUISE PERFORMANCE (cont'd)

% POWER	RPM	M.P.	TAS MPH	GPH
7500 Ft.				
80	2600	23.0	154	12.0
75		21.8	151	9.7
70		20.6	146	9.3
65		19.5	141	8.8
60		18.4	136	8.3
55		17.2	131	7.9
80	2500	23.6	154	11.8
75		22.4	151	9.6
70		21.2	146	9.1
65		20.0	141	8.7
60		18.7	136	8.1
55		17.5	131	7.7
80	2400	24.3	154	11.5
75		23.0	151	9.5
70		21.8	146	8.9
65		20.5	141	8.5
60		19.2	136	8.0
55		18.0	131	7.6
10,000 Ft.				
70	2600	20.2	150	9.3
65		19.0	145	8.8
60		17.8	139	8.3
55		16.7	133	7.9
50		15.5	125	7.4
70	2500	20.6	150	9.1
65		19.4	145	8.7
60		18.2	139	8.1
55		17.0	133	7.7
50		15.8	125	7.2
70	2400	21.2	150	8.9
65		20.0	145	8.5
60		18.7	139	8.0
55		17.4	133	7.6
50		16.2	125	7.1

NOTE

Speeds shown bases on aircraft with optional strut fairings and streamlines tail wires. Redeuce figures shown by 2% for aircraft not so equipped.

LANDING DISTANCE

CONDITIONS

1. Level, Hard surface, dry runway.
2. Zero wind.
3. Aircraft loaded to 1800 lbs.

PILOT TECHNIQUE: Refer to "LANDING-OBSTACLE/SHORT FIELD" in Section III.

1. Approach Speed - 60 mph-IAS Super Decathlon
2. Throttle - as required to control descent rate.
3. Maximum braking.

WARNING

A relatively high rate of descent is possible in this configuration when at full gross weight and the throttle closed. If airspeed is allowed to decrease below the approach speeds shown, landing flare can only be assured with an application of power.

Pressure Altitude Ft.	Distance (° F)									
	0° C		10° C		20° C		30° C		40° C	
	Ground Roll	Total To Clear 50'	Ground Roll	Total To Clear 50'	Ground Roll	Total To Clear 50'	Ground Roll	Total To Clear 50'	Ground Roll	Total To Clear 50'
0	413	1023	421	1042	428	1060	435	1078	442	1095
1000	421	1042	428	1060	436	1080	443	1097	450	1114
2000	429	1062	437	1081	444	1099	452	1118	459	1137
3000	437	1081	445	1100	453	1120	460	1140	468	1157
4000	445	1102	453	1120	461	1141	469	1160	476	1179
5000	453	1122	462	1143	470	1162	478	1182	486	1202
6000	462	1143	470	1164	479	1185	487	1205	495	1225

NOTES

1. Data presented in this table represents maximum airplane capability at speeds shown and requires aircraft in good operating condition and a proficient pilot.
2. Decrease the distance shown by 20% for each 10 mph of head wind.

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SECTION V

WEIGHT AND BALANCE

INDEX

GENERAL

It is the pilot's responsibility to insure that the aircraft is loaded properly and within the weight and balance limitations.. All flight performance, procedures and characteristics are based on this prerequisite.

If the aircraft is to be used for aerobatic flight; it must be loaded within the approved flight envelope. The rear center-of-gravity limit is considered critical. In addition, no baggage is allowed.

The gross weight limit is the same for both normal and acrobatic category. The importance of this limit cannot be over emphasized especially when performing aerobatics. Subjecting the aircraft to the maximum approved load factor limits in an overgross condition may result in damage or complete structural failure of the airframe.

The actual licensed empty weight and center of gravity (C.G.) of a specifice aircraft can be found in Section 4 of the FAA Approved Airplane Flight Manual. All additional changes to the aircraft empty weight and C.G. after the time of manufacture must also be attached to Section 4 of the flight manual. From this information and the following instructions, the pilot can easily determine the "Useful Load" and proper loading distribution for the aircraft.

A loading graph and flight envelope is given in this section and in Section 4 of the FAA Approved Flight Manual as an aid to weight and balance calculation.

LOADING PROCEDURE

1. Determine from the Weight and Balance Sheet, in the aircraft file, the "Licensed Empty Weight and Moment" (in lbs.). Enter these figures under "Your Airplane" of the Sample Loading Problem, Figure 5-1.

2. Full oil capacity can be assumed for all flights. For ease of future loading computations, the new "Empty Weight and Moment With Oil" should be determined and entered in the Sample Loading Problem under "Your Airplane".

3. Using the Loading Graph, Figure 5-2, determine the weight and the moment of the following items and enter these figures on the Sample Loading Problem.
   a) Pilot
   b) Rear Passenger
   c) Wing Fuel - 40 Gals. Maximum Useable @ 6 Lbs./Gal.
   d) Baggage - 100 Lbs. Maximum (Normal Category Only).

4. Add the "Aircraft Empty Weight and Moment with Oil" and all the items in Step 3 to determine the "Gross Takeoff Weight and Moment".

5. Using the Flight Envelope, Figures 5-3, determine that the gross takeoff weight and moment are within limits.

WARNING

If the aircraft is not within the approved flight envelope limits, it must be reloaded. Under no circumstances should the aircraft be flown with an out of limits condition, particularly if aerobatic flight is contemplated.

SAMPLE LOADING PROBLEM				
ITEM	SAMPLE AIRPLANE		YOUR AIRPLANE	
	WEIGHT (lbs)	MOMENT (in-lbs)	WEIGHT (lbs)	MOMENT (in-lbs)
1) Licensed Empty Weight	1270	17851		
Oil-8qts @ 7.5 lbs/gals	+15	-543		
2) Licensed Empty Weight & Moment with Oil	1285	17308		
3) Pilot	190	3025		
Rear Passenger	190	8500		
Wing Fuel 40 Gals Max @ 6 lbs/gal	120 (20 gal)	3125		
Baggage-100 lbs Max (Normal Category Only)	-0-	-0-		
4) Gross Takeoff Weight & Moment	1785	31958		

NOTE:

1) Use Figure 5-2 loading graph to etermine moment.
2) To determine Takeoff Center of Gravity (inches aft of datum), divide the Gross Takeoff Moment by the Gross Takeoff Weight. Center of Gravity Limits are listed in Section I.
3) The above sample problem is loaded for aerobatic flight conditions and assumes a 170 pound pilot and passenger with parachutes.

FIGURE 5-1 SAMPLE LOADING PROBLEM

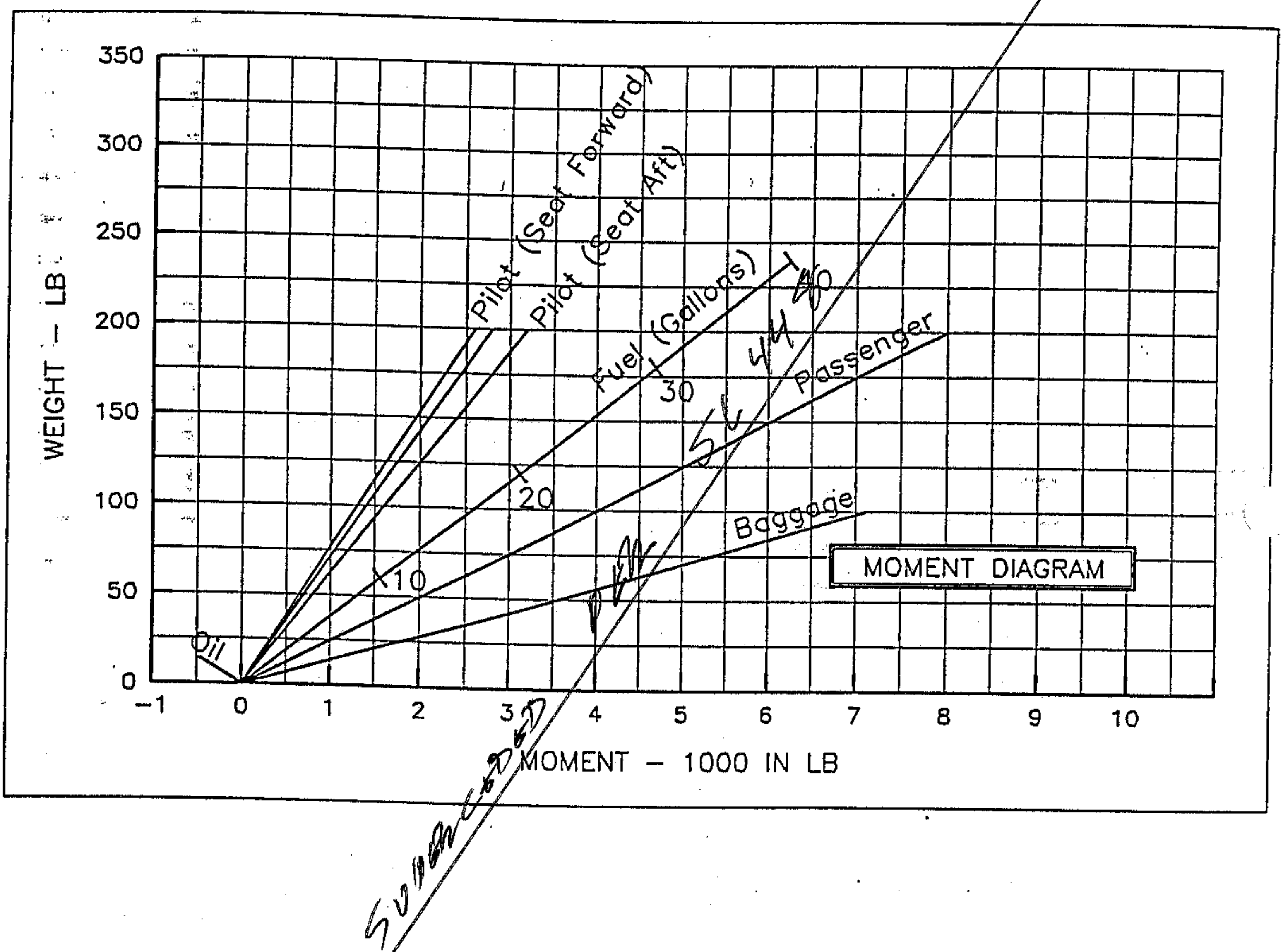

FIGURE 5-2 LOADING GRAPH

Service Letter 448, Initial Revision, May 21, 2018

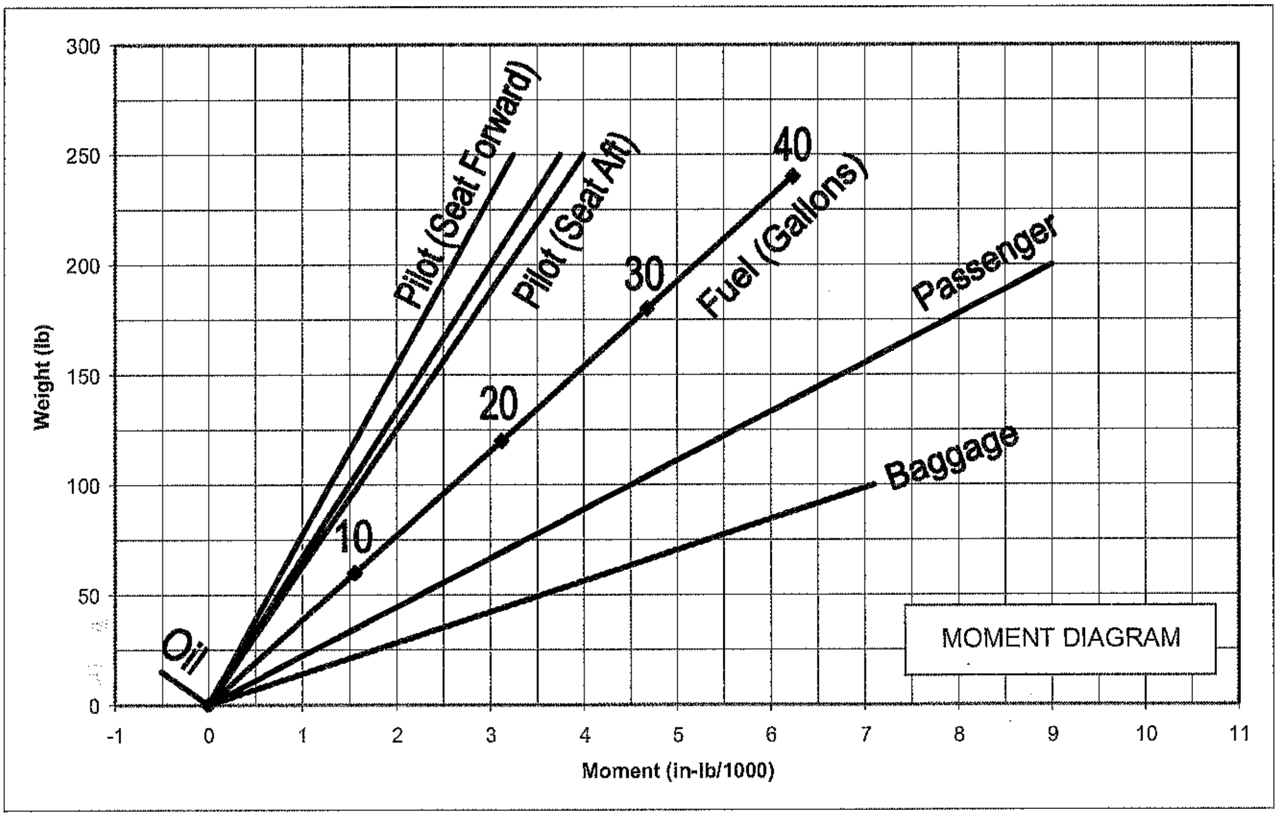

Figure 2, Revised Loading Chart

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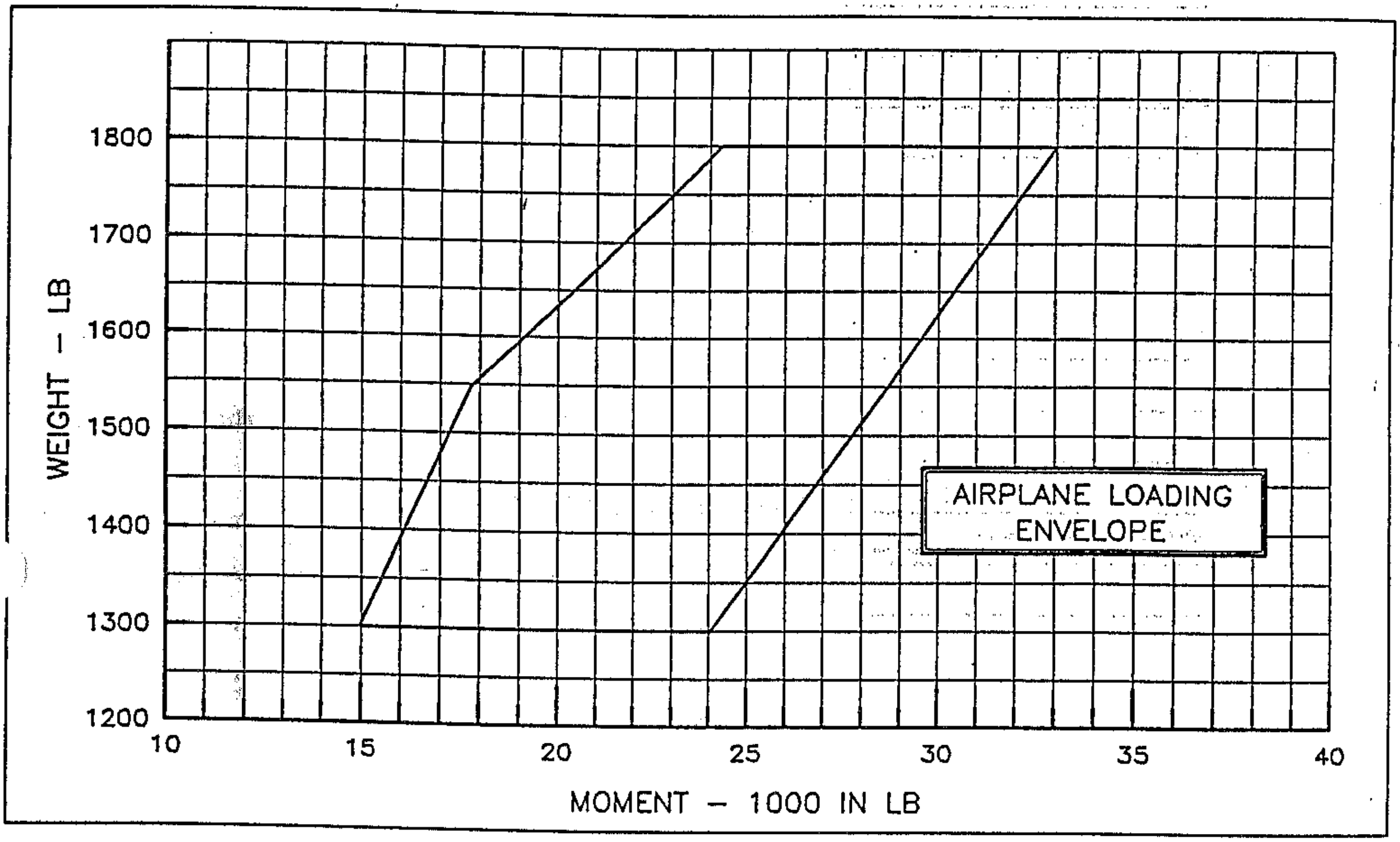

FIGURE 5-3 SUPER DECATHLON WEIGHT and BALANCE FLIGHT ENVELOPE

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N814AC

4.6 EQUIPMENT LIST

Suffix Letters on Item Numbers:

R: Required for FAA Certification
S: Standard Equipment
A: Optional Equipment Not Required
O: Optional Equipment Replacing Standard or Required Item

ITEM NO.	X	DESCRIPTION	DWG.	WT, LB.	ARM, IN
1R	X	Engine, Lycoming AEIO-360-H1B	7-1502	301.00	-38.36
2R	X	Propeller, Hartzell HC-C2YR-4CF/FC7666A-2	7-1509-1	53.50	-57.50
3R	X	Spinner, Hartzell 836-52	7-1509-1	4.63	-58.83
4R	X	Propeller Governor	7-1509-1	2.50	-22.00
5R	X	Control, Propeller Governor	7-1509-1	1.00	-5.00
6R	X	Pump, Emergency Fuel	7-1502	3.18	-23.40
7R	X	Oil Cooler	7-1502	2.95	-27.18
8R		Starter - Lycoming	7-1502	10.00	-44.44
9R	X	Starter - Sky-Tec	STCSE00218NY	8.00	-44.44
10R	X	Alternator	7-1502	10.63	-48.36
11R	X	Voltage Regulator	7-1502	0.65	-22.40
12R	X	Battery, 31 AMP Gell Cell	4-1782	30.81	88.47
13R	X	Relay, Battery	4-1782	0.70	84.00
14R	X	Tachometer, Recording	7-1524	0.66	-3.40
15R	X	Gauge - Combination Manifold/Fuel Pressure	7-1524	1.19	-6.69
16R	X	Gauge - Oil Pressure	7-1524	0.35	-2.80
17R	X	Gauge - Oil Temperature	7-1524	0.57	-13.00
18R	X	Gauge - Ammeter	7-1524	0.26	-2.80
19R	X	Altimeter, Sensitive	7-1524	1.40	-3.30

N814AC

ITEM NO.	X	DESCRIPTION	DWG.	WT, LB.	ARM, IN
20R	X	Indicator, Airspeed	7-1524	0.58	-3.00
21R	X	Accelerometer	7-1524	0.40	-3.00
22R	X	Compass, Airpath	7-1524	0.77	-4.00
23R	X	Stall Warning System	4-1401	0.85	0.00
24A		Turn & Bank, Electric	7-1524	2.00	-3.00
25A	X	Turn Coordinator	7-1524	2.00	-3.00
26A	X	Rate of Climb	7-1524	1.00	-3.00
27A		Cylinder Head Temperature	7-1524	1.00	-3.00
28A		Engine Hour Meter	3-1354	0.80	-3.00
29A		Gauge, Outside Air Temperature	7-1415	0.17	8.00
30A		Quartz Clock	7-1524	0.25	-2.00
31A		Mixture Monitor	3-1412	0.80	-3.00
32R	X	Tailwheel, Scott 3200	4-1080	7.80	193.33
33R	X	Brake Cylinder, Cleveland 10-54 (Toe)	4-1624	1.00	-19.63
34R	X	Tire and Tube, 6.00 x 6 x 4 Ply Type III (Both Sides)	7-1307	18.50	1.75
35R	X	Wheel and Brake, Cleveland, 40-28-30-19 (Both Sides)	7-1307	13.94	2.44
36A		Glider Tow, Schweitzer	7-1143-3	3.94	113.00
37S	X	Wheel Pants (Cleveland Wheels)	4-1474	10.00	2.00
38S		Landing Gear Steps L/R	3-1559	2.00	2.00
39R	X	Position Lights - Wing	3-1512	0.38	17.62
40R	X	Tail Light Rudder	4-1548	0.14	202.80
41R	X	Wing Tip Strobe Light Installation	3-1517	4.25	-2.00
42S	X	Landing Light Cowling	7-1517	0.47	-52.32

N814AC

ITEM NO.	X	DESCRIPTION	DWG.	WT, LB.	ARM, IN
43R	X	Filter, Injector Air	7-1517	0.50	-43.00
44R	X	Seat Inst. Front Adjustable	7-1499	15.63	17.25
45R	X	Seat Installation Rear	4-1708	13.63	48.63
46O		Seat Installation Rear Wide	4-1709	18.44	48.63
47R		Seat Belts, American Safety 500668-5	7-1499 or 4-1708	2.00	24.31
48O	X	Hooker Harness, Front	3-1660	4.50	17.25
49O	X	Hooker Harness, Rear	3-1660	4.50	47.63
50R		Vertical Restraint Harness Front	3-1598	2.13	17.25
51O		Vertical Restraint Harness Rear	3-1598	2.13	47.63
52A		Shoulder Harness Front	3-1660	0.50	44.00
53O		Shoulder Harness Rear	3-1660	0.50	74.00
54A		Shoulder Harness Front (Inertia)	3-1557	1.00	44.00
55R		Shoulder Harness Rear (Inertia)	3-1557	1.00	74.00
56R	X	Cargo Net	3-1475	1.00	62.00
57A		Emergency Locator Trans. Ameriking AK45	3-1590	3.00	68.38
58A		Fire Extinguisher	7-1415	5.38	-7.30
59A	X	Rear Seat Heater	7-1478	2.25	-6.55
60S	X	Cabin Light	7-1524	0.57	24.00
61A	X	Cabin Speaker	7-1415	1.36	35.00
62A	X	Microphone Telex Tel-66T Front	2-2078	0.38	11.00
63A		Microphone Telex Tel-66T Rear	2-2078	0.38	45.00
64A		Microphone Electro Voice 602T Front	2-2078	0.05	11.00
65A		Microphone Electro Voice 602T Rear	2-2078	0.05	45.00
66A		Headset Telex A610-1 Front	2-2078	0.05	11.00

N814AC

ITEM NO.	X	DESCRIPTION	DWG.	WT, LB.	ARM, IN
67A		Headset Telex A610-1 Rear	2-2078	0.50	45.00
68A		Headset Flightcom, Blackhawk 5DX Front	2-2078	1.00	11.00
69A		Headset Flightcom, Blackhawk 5DX Rear	2-2078	1.00	45.00
70A		Antenna, Nav. Meriden BB-16	3-1542	1.19	103.00
71A	X	Antenna, Broadband (Spike Type)	4-1631	0.50	94.00
72A		Antenna, Loran C		1.50	9.50
~~73A~~	~~X~~	~~Antenna, GPS~~ Feb 07 2020		~~0.50~~	~~9.50~~
74A		King KX155 Nav Com		5.30	-3.00
75A		King KX165 Nav Com		5.65	-3.00
76A		King KY97A Com		2.82	-3.00
~~77A~~	~~X~~	~~King KT76A Transponder~~ Feb 07 2020		~~3.25~~	~~-3.84~~
78A		King KI208 Indicator		1.00	-3.00
79A		King KI209 Indicator		1.00	-3.00
80A		Narco MK12E Nav Com		5.00	-3.00
81A		Narco MK12D Nav Com		5.00	-3.00
82A		Narco 810 Com		3.60	-3.00
83A		Narco AT150 Transponder		3.25	-3.00
84A		Narco ID825 Indicator		1.00	-3.00
85A		Narco ID824 Indicator		1.00	-3.00
86A		Narco AR850 Blind Encoder		0.80	-9.00
87A		Apollo Flybuddy 800 Loran		2.75	-3.00
88A		Garmin GPS/COM 250XL		2.56	-3.80
89A		ARNAV Model R-50, Loran		2.75	-3.00
90A	X	Ameriking AK350 Encoder			

N814AC

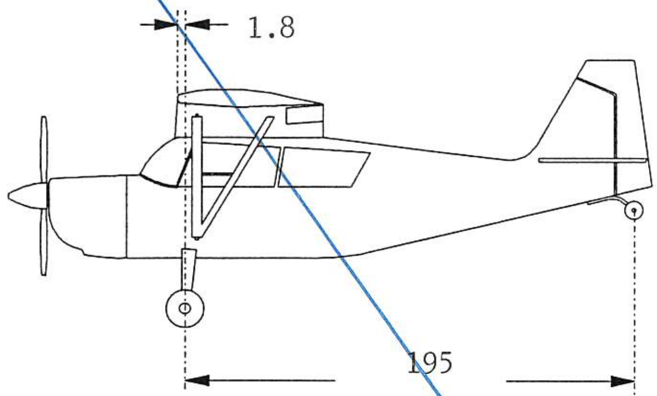
ITEM NO.	X	DESCRIPTION	DWG.	WT, LB.	ARM, IN
91A		Flightcom 403 Intercom		1.90	-3.00
92A		Smartscan SR-8		1.20	-3.00
93A		Corrosion Proofing	CFP-2	5.00	49.4
94A		Speedkit - Strut & Gear Fairings, Steamline Tail Wires	4-1746	1.50	8.00
95A	X	Aileron Spades	3-1669	2.25	46.00
96A		Directional Gyro		3.00	-3.00
97A		Artificial Horizon		2.50	-3.00
98A		Northstar MI Loran C		4.90	-3.00
99A		Apollo SL60 GPS/COM with Antenna		2.80	-3.00
100A	X	Transponder Antenna		1 oz.	-3.00
101A		Electronics International EGT		7 oz.	-3.00
102A		Troll Avionics FN 200 Cooling Fan		1.2	-3.00
103A		Terra TRT 250D Transponder		1.84	-3.00
104A		Terra TN200D Nav		1.43	-3.00
105A		Terra TX760D Com Racks - 2			-3.00
106A		King KLN90 GPS			-3.00
107A		Terra 350D Audio Panel		1.7	-3.00
108A		Bose Interface (2 each)		4 oz.	24.50
109A		Bose Headphone System		22 oz.	45.00
110A		Astrotech CC-2 Clock		4 oz.	-3.00
111A		Terra Tri Nav C CDI		1.25	-3.00
112A		Terra 760 Com		1.5	-3.00
113A		King KX125 Nav/Com		4.63	-3.00

N814AC

ITEM NO.	X	DESCRIPTION	DWG.	WT, LB.	ARM, IN
114A		Vertical Card Compass - Precision Aviation Inc.		0.52	-3.00
115A		Magellan GPS5000		3.0	-3.00
116A		Suction Gauge		0.22	-3.00
117A		Vacuum Pump		3.0	-27.00
118A		KA25A Amp		1.3	-3.00
119A		Power Receptical with Bracket		0.25	-3.00
120A		Magellan Blind Encoder		0.80	-3.00
121A		Apollo 360 Map		1.72	-3.00
122A		Sigtronics SPA 400 Intercom		0.45	-3.00
~~123A~~	~~X~~	~~King KLX 135 GPS/COM~~ Feb 07 2020		~~5.00~~	~~-3.00~~
~~124A~~	~~X~~	~~PSE PM1000II~~ Feb 07 2020		~~.80~~	~~-3.00~~
125A		External Battery Charger Plug		0.25	23.40
126A		Flightcom 4DX Headsets (2 each)		2.18	45.00
127A		KR-22 Marker Beacon Receiver		0.40	-3.00
128A		ELT, Ameriking AK-450		3.30	68.38
129A		KA 26 Marker Beacon Antenna		0.50	-3.00
130A		Internal Tail Com Antenna		2.3 oz.	93.19
131A		Apollo Round GPS Model 360		1.72	-3.00
132A		AK-350 Altitude Encoder		0.40	-9.00
133A		Garmin GTX 320 Transponder		2.24	-3.00

AMERICAN CHAMPION AIRCRAFT CORPORATION
ROCHESTER, WISCONSIN 53167

WEIGHT AND BALANCE WORKSHEET



MODEL NUMBER 8KCAB (180 HP/CS PROP)
SERIAL NUMBER 814-98
IDENTIFICATION NUMBER N814AC
DATE AUGUST 26, 1998
SIGNED M. Read

Aircraft Leveling Means: Drop plumb line from wing leading edge so that it is 12.18 inches forward of front face fuselage wing strut fitting.

Weight Actual 1350.5

1. Left Wheel Weight: 649.5 lbs. Right Wheel Weight: 634.5 lbs.
2. Tail Wheel Weight 66.5 lbs.
3. Total Aircraft Weight (Full Oil): 1350.5 lbs.

C.G. = $\dfrac{(195 \text{ in.}) \times (66.5 \text{ lbs.})}{(1350.5 \text{ lbs.})} + (1.8 \text{ in.}) = 11.402$ in Aft L.E.

Superceded 02/07/2020

	WEIGHT (lbs.)	ARM (in.)	MOMENT (in. lbs.)
Aircraft Weight With Full Oil	1350.5	11.402	15398.4
Subtract Drainable Oil (of 19 lbs, 5 lbs is undrainable)	-14	-34	+476
Add 0.75 Gallons Unuseable Fuel (Header Tank)	+4.5	-13	-58.5
Add 2.25 Gallons Unuseable Fuel (Wing Fuel Tanks)	+13.5	+26	+351
TOTALS	1354.5	XXXXXXXX	16166.9

Aircraft Empty C.G. 11.94 in. aft datum

Useful Load 445.5 lbs.

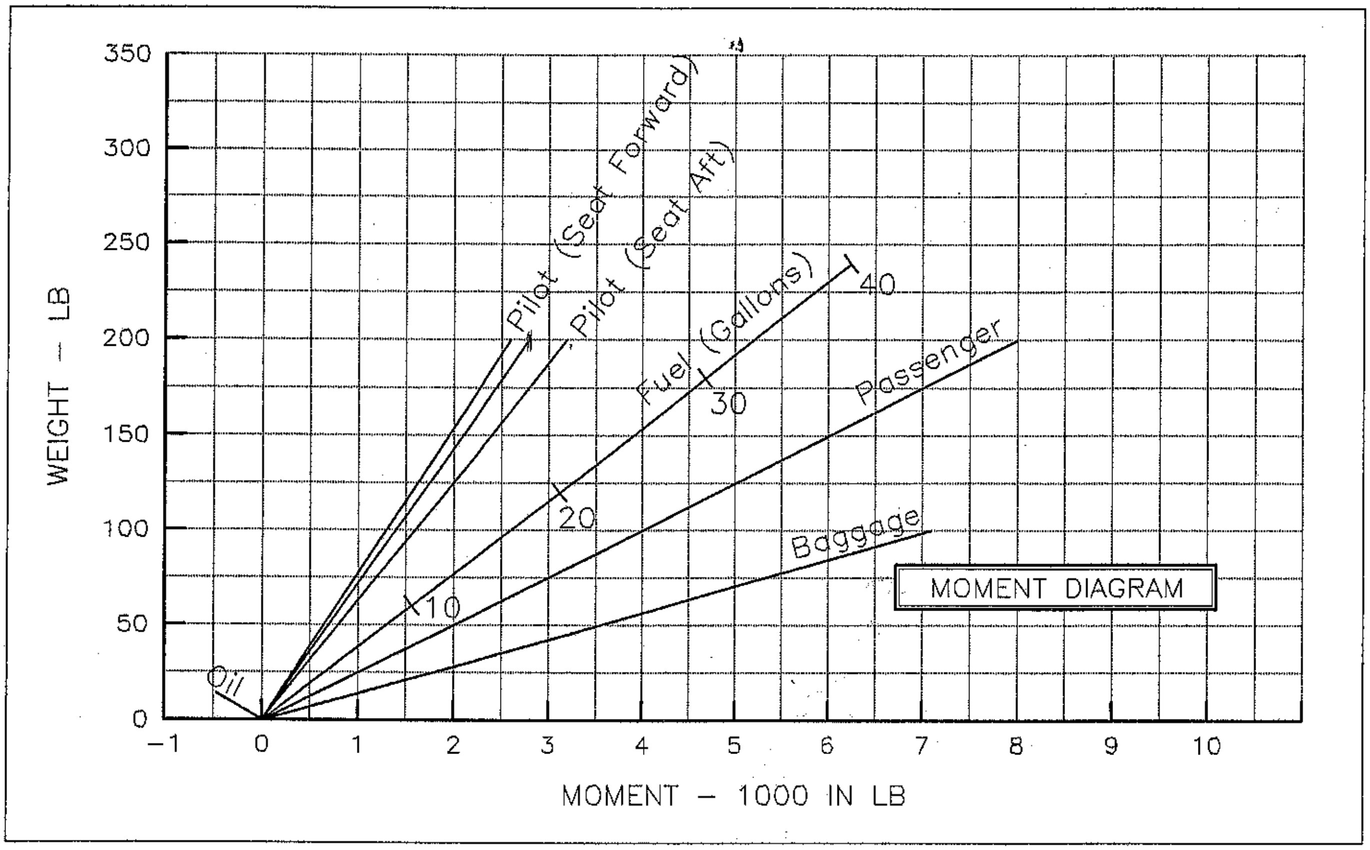
Datum: Wing Leading Edge

CENTER OF GRAVITY LIMITS:

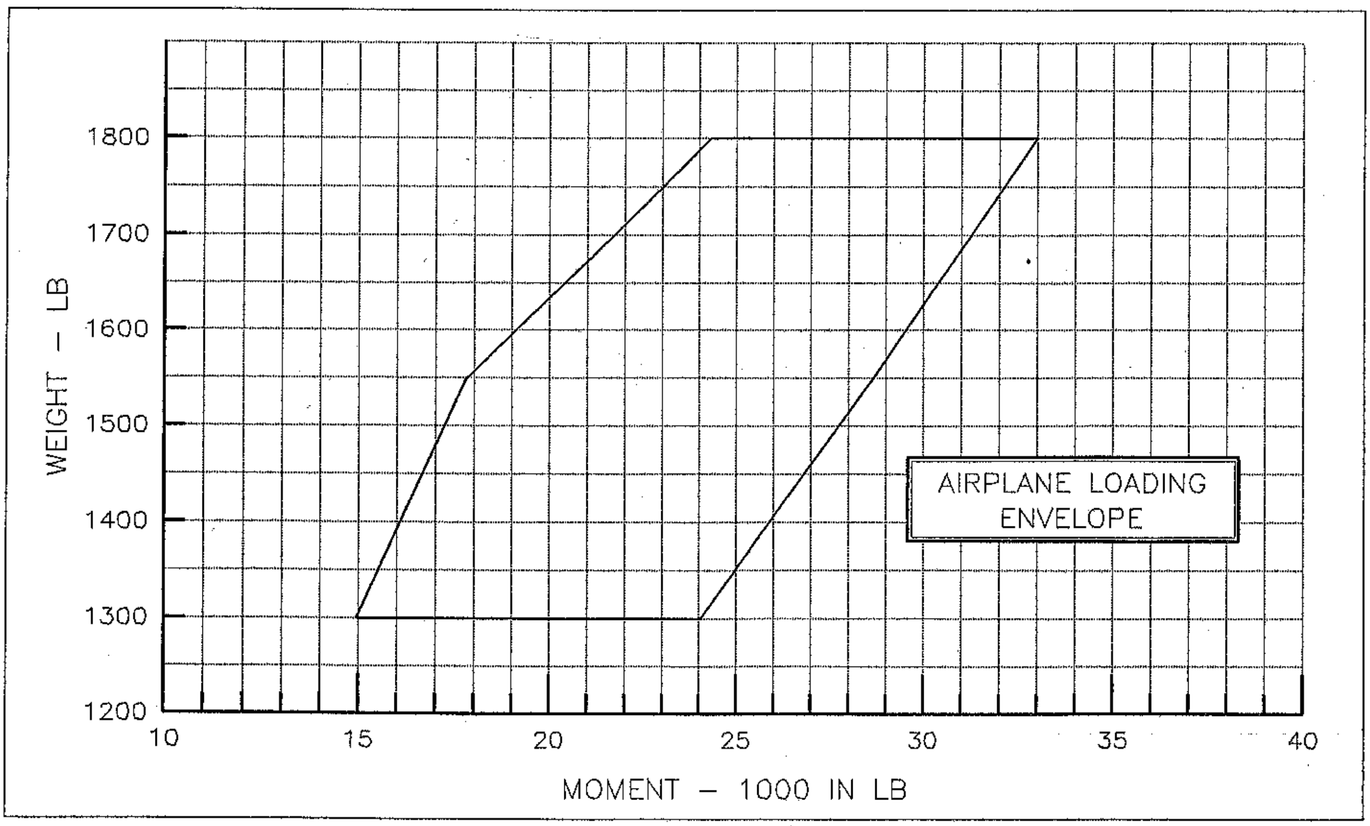
NORMAL OR ACROBATIC	(+ 13.5 in.)	To	(+18.5 in.)	At 1800 lbs.
CATEGORY	(+ 11.5 in.)	To	(+18.5 in.)	At 1550 lbs or less

Straight line variation between points given

FORM ACAC-78-2



Add weights and moments of items in MOMENT DIAGRAM to airplane empty weight and moment. (negative oil moment) Locate intersection of total weight and moment on AIRPLANE LOADING ENVELOPE. Any point falling within the envelope meets all balance requirements.



13310 Nevada City Ave.
Grass Valley, CA 95945
tel: 530-477-7701
fax: 530-477-7764

ALPINE AVIATION

Aircraft Weight & Balance Report

REGISTRATION:	N814AC	DATE:	February 7, 2020
MAKE & MODEL:	American Champion Corp. 8KCAB	SERIAL #:	814-98
INVOICE #:	27476	TACH:	1563.2

Previous Weight & Balance record:	
Date:	
EW:	1350.50
EWCG:	11.40
EW Moment:	15398.40
Useful load:	449.50

Max Takeoff Weight	
1800	lbs

ITEM	WEIGHT	ARM	MOMENT
Removed:			
Intercom PM1000II s/n 11922	-0.80	-3.00	2.40
Bendix/King KLX 135A Com/GPS s/n 80527	-5.00	-3.00	15.00
Bendix/King KA92 GPS Antenna s/n 23998	-0.50	9.50	-4.75
Bendix/King KT76A Transponder s/n 118226	-3.25	-3.84	12.48
R.C. Allen attitude indicator s/n 17A0046	-2.30	-3.00	6.90
BF Goodrich directional gyro s/n 25067	-3.00	-3.00	9.00
Ameri-king Altitude Encoder s/n 3525349	-0.50	-6.00	3.00
Comm #1 antenna	-0.50	101.00	-50.50
Oil pressure screen housing p/n 69510	-0.78	-23.00	17.94
Installed:			
Aspen E5 EFD1000 s/n 27974	2.90	-3.00	-8.70
Aspen RSM w/o GPS s/n 650379	0.50	101.00	50.50
Comm #1 antenna	0.50	6.00	3.00
PMA 200B Intercom s/n BPRB1006	1.50	-3.00	-4.50
Trig Remote VHF Comm s/n 03262	1.10	-6.00	-6.60
Avidyne IFD 440 s/n M19315428	6.78	-3.00	-20.34
Rami WAAS GPS antenna s/n 180768	0.31	6.00	1.86
Harris Corp Comm #2 antenna s/n 26928	0.50	32.00	16.00
Commant Industrie Nav antenna s/n 617613	0.50	166.00	83.00
GPS networking passive GPS splitter s/n 122216	0.68	-8.00	-5.44
Lynx L3 NGT 9000 Transponder s/n LXE 14491	2.96	-3.00	-8.88
B&C Oil filter kit, spcer and filter s/n 1P0H3X90	2.65	-23.00	-60.95
TOTAL	4.25		50.42

Aircraft empty weight	1354.75		
Aircraft empty weight CG		11.40	
Aircraft moment			15448.82
Max takeoff weight	1800.00		
Useful load	445.25		

May 30th 2020

Superseded

Weight & Balance computed by:
Travis Mills CRS# XGKR718T
February 7, 2020

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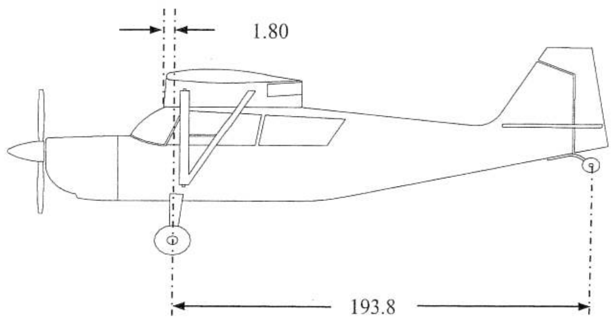
AMERICAN CHAMPION AIRCRAFT CORPORATION
ROCHESTER, WISCONSIN 53167

WEIGHT AND BALANCE WORKSHEET



Model Number **8KCAB (180 HP/CS Prop)**

Serial Number: 814-98
Identification Number: N814AC
Date: 05/30/2025
Signed: [signature]

Aircraft Leveling Means: Drop plumb line from wing leading edge so that it is 12.18 inches forward of front face fuselage wing strut fitting.

Weight Actual: 1366

1. Left Wheel Weight:	649 lbs.	Right Wheel Weight:	652 lbs.
2. Tail Wheel Weight	65 lbs.		
3. Total Aircraft Weight (Full Oil):	1366 lbs.		

C.G. = (193.8 in. x 65 lbs.) / 1366 lbs. + 1.80 in. = 11.02 in Aft L.E.

	WEIGHT (lbs.)	ARM (in.)	MOMENT (in. lbs.)
Aircraft Weight with Full Oil	1366	11.02	15053
Subtract Drainable Oil (of 19 lbs, 5 lbs. is undrainable)	-14	-34	+476
Add 0.75 Gallons Unuseable Fuel (Header Tank)	+4.5	-13	-58.5
Add 2.25 Gallons Unuseable Fuel (Wing Fuel Tanks)	+13.5	+26	+351
TOTALS	1370	XXXXX	15822

Aircraft Empty C.G. 11.55 in. aft datum
Normal Category Useful Load 580 lbs.
Acrobatic Category Useful Load 430 lbs.

Datum: Wing Leading Edge

CENTER OF GRAVITY LIMITS:

NORMAL CATEGORY	(+ 14.7 in.)	To	(+ 18.5 in.)	At 1950 lbs.
ACROBATIC CATEGORY	(+ 13.5 in.)	To	(+ 18.5 in.)	At 1800 lbs.
	(+ 11.5 in.)	To	(+ 18.5 in.)	At 1550 lbs. or less

Straight line variation between points given.

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SECTION VI

AIRCRAFT AND SYSTEM DESCRIPTION

INDEX

GENERAL

The Super Decathlon is a single engine tandem two place, strut braced high wing airplane. The fuselage is a welded steel tube frame and the wing is constructed from formed aluminum ribs and spars. The airframe is covered with Dacron.

ENGINE/PROPELLER

The engine is a Lycoming normally aspirated, direct drive, air cooled, horizontally opposed, four-cylinder engine. The engine oil system differs from a conventional wet sump type in that its design provides for both normal and inverted operations. See Figure 6-1 for the system schematic and detailed operational information.

The Hartzell propeller on the Super Decathlon is a counterweighted constant speed propeller. The counterweights provide a fail safe feature causing the propeller to go to low RPM if oil pressure is lost. This protects against a possible overspeed condition. A venier propeller control is located at the left side of the instrument panel.

THROTTLE CONTROL

The throttle control is in a quadrant on the left side of the cabin with front and rear throttles interconnected.

ALTERNATE AIR CONTROL

This control is located directly below the throttle. Alternate hot air is provided by pulling the control knob to the rear. Extended use of alternate air is not recommended as this air is not filtered.

MIXTURE CONTROL

This control is located on the left side of the instrument panel. To lean the mixture (at 75% power or below), pull the control away from the panel as required. Pulling the mixture control all the way out, provides the fuel cutoff to the engine.

ELECTRIC FUEL PUMP CONTROL

The switch for the electric fuel pump is located on the control panel next to the mixture control.

ATTERY

The Super Decathlon has a
The battery is located behind the baggage compartment.

The battery must be inspected frequently when the aircraft is being used for aerobatics and serviced in accordance with instructions in Section VII of this manual.

ALTERNATOR

The 60 amp alternator provides charging current and has sufficient capacity to operate all electrical equipment without battery drain. During inverted flight, the charging circuit is disconnected by a mercury switch.

OVER VOLTAGE CONTROL

The airplane electrical system is protected from surge by an over voltage control which is mounted on the top right side of the firewall.

OLTAGE REGULATOR

Alternator output is controlled by the voltage regulator. This regulator also protects the alternator circuit against overload and should be adjusted only by a qualified mechanic.

ELECTRICAL PANEL

All electrical switches (except the starter and the electric fuel pump switch), are on the electrical panel located on the upper left side of the cabin.

MASTER SWITCH

The master switch is on the electrical panel and activates the master switch solenoid which connects the battery and alternator to the rest of the electrical system. Electrical equipment will not operate with the master switch off; however, the engine will run with the master switch off since ignition is provided by the magnetos.

IGNITION SWITCHES

Ignition switches for the left and right magnetos are to the right of the master switch. Since ignition is provided by the magnetos, the ignition switches must be on to operate the engine.

EQUIPMENT SWITCHES

Switches for operation of standard electrical equipment -- navigational lights, landing light and optional equipment are to the left of the master switch.

STARTER SWITCH

A push button switch, located on the control panel, operates the electrical starter. The master switch must be on to operate the starter.

AMMETER

The ammeter measures current to or from the battery. A normal condition is indicated by a zero reading or a plus reading on the ammeter. A negative reading indicates a current draw from the battery which can result from overloaded system or a faulty charging system.

SEATS

Front and rear seats are welded steel tube construction with removeable cushions to permit the use of parachutes. The front seat is adjustable fore and aft. The adjustment control knob is located on the right underside of the seat. Adjustments should be made before taxi or takeoff as necessary to insure full and comfortable access to all required controls.

AKES

Hydraulic brakes are provided for both front and rear seats. A parking brake control is also provided. To operate the parking brake, depress the brake pedals and pull out the control located under the far right side of the instrument panel. To release the parking brake, push the control all the way in.

CABIN DOOR

The Super Decathlon is equipped with a cabin door which can be jettisoned if necessary. The door is secured by a lock-equipped latch at the rear edge and a latch on the top and forward edge.

The emergency door release handle is near the forward edge of the door.

To jettison the cabin door:

1. To operate the door jettison handle, pull the red ring firmly to remove the safety locking pin, then pull the red handle aft and up as possible. This removes the door hinge pins.

2. Push or kick the door free of the aircraft.

NOTE

If necessary, emergency exit may be made from the left side of the aircraft by opening the left side window and forcing it past its hinge strap by pushing hard on forward window frame.

INSTRUMENTS

All instruments except the fuel gauge are on the instrument panel directly in front of the pilot. Basic instruments are marked with a green arc for the normal operating range, a yellow arc for the caution range and red radial lines for maximum or minimum permissible values. Specific markings for each instrument are given in the FAA Approved Airplane Flight Manual.

SEAT BELTS AND HARNESSES

All Super Decathlons are equipped with lap belts and shoulder harnesses in both front and rear seats. A secondary inverted harness is available as optional equipment.

The secondary inverted flight harness consists of a double strap shoulder harness, a lap belt and a crotch strap. A five point rotary buckle connects the strap and will release the shoulder harness and lap belt with one movement.

The primary harness may be used alone; however, the inverted harness should not be used without the primary shoulder harness. The inverted harness does not restrain the pilot from forward movement.

PITOT STATIC SYSTEM

The pitot tube is located on the bottom side of the left wing. The static ports are located on the side of the aircraft just aft of the cabin section (one port on each side of the aircraft).

ELEVATOR TRIM TAB

The trim tab control is mounted on the left side of the cabin. This type of trim control permits very rapid trim in[illegible] if necessary. Rudder trim is provided by a ground adjustable tab.

CABIN HEATER

Cabin heat is provided by an exhaust shroud heater. An optional rear seat heater provides additional heat to the rear of the cabin whenever alternate air is not in use.

Push-pull heater control is located on the left side of the cabin under the instrument panel. The optional rear heater control is located on the right side of the cabin under the instrument panel.

BAGGAGE COMPARTMENT

The baggage compartment behind the rear seat accomodates 100 lbs. of baggage or cargo. The back of the seat folds for access.

No baggage or loose articles are to be carried during aerobatic flight.

'GINE OIL SYSTEM

Figure 6-1 presents the oil system schematic and detailed operational information. Components related to propeller control system are not shown.

NOTE

Oil pressure during inverted flight may normally be five to ten pounds less than oil pressure during normal flight.

Figure 6-1 shows the basic operating principles involved in the oil system. For more detailed information concerning a particular engine model, see the Lycoming Engine Operator's Manual.

INDUCTION AIR FILTER

An induction air filter is located in the cowling and filters all air entering the engine. Alternate (hot) air is not filtered and continuous use is not recommended.

TIRES

.ne Super Decathlon is fitted with conventional aircraft type 6.00 x 6, 4 or 6 ply tires.

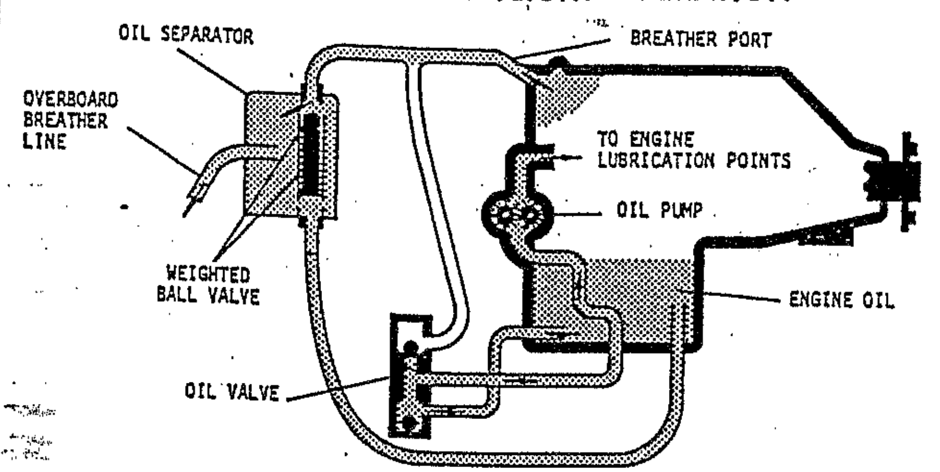
FUEL SYSTEM

The fuel system is shown in Figure 6-2. Welded aluminum fuel tanks are located in the inboard section of the wing. Two 20 gallon tanks are standard. Wing tanks proper can be drained by removeing a 1/4" pipe plug from the inboard corner of the tank. Fuel lines between the tanks and the rear sump are drained from a quick drain on the belly of the aircraft.

The gascolator is mounted on the firewall in the engine compartment. The sediment bowl is removeable for cleaning and replacement of the fuel filter. The fuel shut-off valve is located on the left side of the cabin. The Super Decathlon fuel system is an "ON - OFF" system.

Fuel quantity is read from mechanical float type gauge(s) located in the fuel tank(s). These gauges are only accurate in the level flight attitude.

NORMAL FLIGHT OPERATION

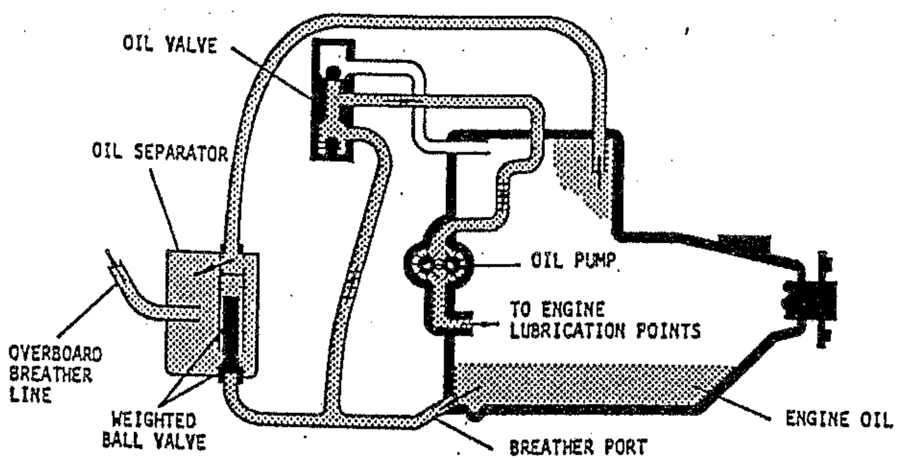


During normal flight, the weighted ball valve at the top of the oil separator is open allowing blowby gases from the engine crankcase to be vented from the breather port, to the oil separator and out through the overboard breather line. The top port of the oil valve is closed and the bottom port is open allowing oil to flow from the sump out through the oil valve, up to the pump and out to the engine lubrication points.

NOTE

Momentary oil pressure interruptions (up to a maximum of 15 seconds) is normal when the system is initially returned to normal operation from inverted flight.

INVERTED FLIGHT OPERATION



When the aircraft is inverted, engine oil falls to the top of the crankcase. The weighted ball valve in the oil separator closes permitting the engine oil pump to draw oil through the oil valve from the crankcase and preventing overboard loss of oil through the oil separator. Blow-by gases from the engine crankcase are vented from the sump to the oil separator and out through the overboard breather line. The top port of the oil valve is open and the bottom port is closed allowing oil to flow out from the breather port, to the oil valve, to the oil pump and out to the engine lubrication points. Any oil in the lines which fails to return to the sump during the transition between normal and inverted flight drains into the oil separator. This oil then returns to the sump from the bottom of the oil separator during periods of normal flight.

NOTE

Momentary oil pressure interruptions (up to a maximum of 15 seconds) is normal when the system is initially inverted.

FIGURE 6-1 OIL SYSTEM SCHEMATIC

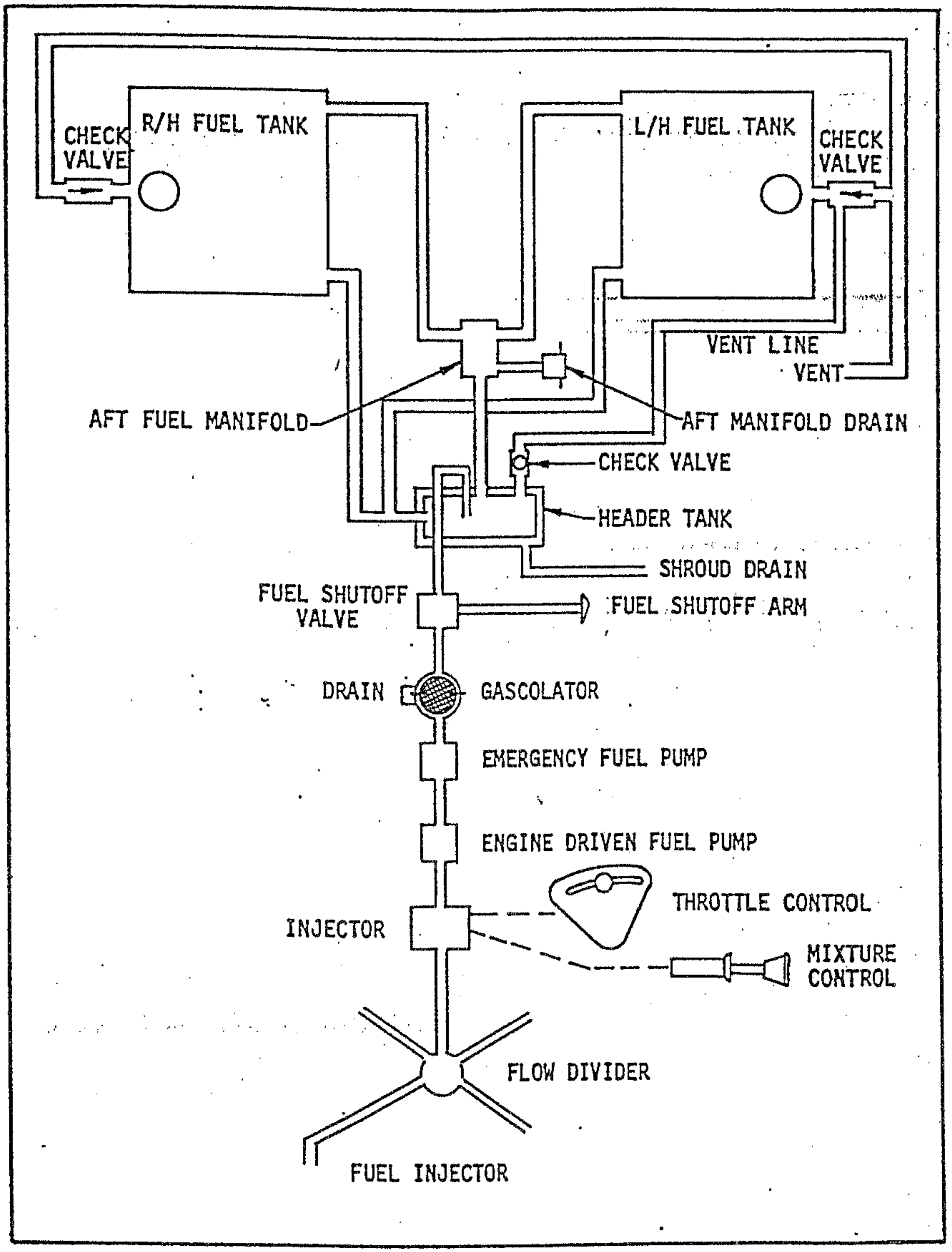


FIGURE 6-2 FUEL SYSTEM SCHEMATIC

VENT SYSTEM

Fuel tank air spaces are interconnected and positive venting is provided through a tube which protrudes from the bottom of the left wing just outboard of the tank. A check valve is provided at the vent outlet of each tank to minimize inverted fuel loss.

SYSTEM OPERATION

Fuel is gravity fed from the tanks to the engine.

FUEL PUMPS

The Super Decathlon engine is fuel injected and two fuel pumps are required.

1. An engine-driven, cam-operated pump which operates whenever the engine is running to supply fuel at proper pressure to the fuel injector.

2. An emergency electric pump on the firewall in the engine compartment. The control switch for the electr fuel pump is located on the control panel next to the mixture control.

PRIMER

To prime the engine, turn on the master switch and the electric fuel pump with throttle closed and mixture in idle cut-off. To provide one stroke of prime, move mixture control to full rich and back to idle cut-off. This injects fuel directly into the cylinders. Return electric fuel pump to "OFF" after priming.

FUEL PRESSURE GAUGE

The fuel pressure gauge on the right side of the instrument panel indicates the fuel pressure at the injector inlet.

EADER TANK

To provide limited fuel in the inverted position, a shrouded 1.5 gallon header tank is located in the forward cabin under the instrument panel. The outlet from the header tank consists of a standpipe located at the center of the tank. Thus half of the tank capacity can be used in the inverted position. Even though the inverted fuel supply has not been exhausted, inverted flight must be terminated immediately if oil pressure should drop below acceptable limits.

NOTE

The fuel filler cap used on the Super Decathlon is a nonventing type. A loose cap, or one that is not sealing properly, may cause a fuel unbalance from one tank to another. If an excessive fuel unbalance exists, check the caps for security and the filler cap gasket for condition. Flying the aircraft in an uncoordinated manner or parking the aircraft on a slope may also cause fuel unbalance. Do not assume fuel in left tank is identical to that shown on right tank fuel gauge.

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SECTION VII

SERVICING REQUIREMENTS

INDEX

GENERAL

Certain maintenance and general attention items will assure a long life and maximum reliability for any aircaft. General procedures and care hints for the Super Decathlon are covered in this section.

EXTERIOR CARE

Your Super Decathlon has a long-lasting, all weather finish and should require very little maintenance. However, it may be desirable to wax and polish the airplane. It is recommended that this work be delayed until at least 90 days after date of manufacture so that the paint may cure completely.

The finish can be kept bright simply by washing with water and mild soap. Avoid abrasive soaps or harsh detergents. Rinse with clear water and dry with terry cloth towels or chamois.

If you choose to wax your airplane, use a good aircaft type wax and apply wax liberally to areas subject to high abrasion such as leading edges and tail surfaces.

WINDSHIELD AND WINDOW CARE

A certain amount of care is required to keep the plexiglass in the windshield and cabin windows clean and unscratched. The following cleaning procedure is recommended:

1. If large deposits of mud and dirt have accumulated on the plexiglass, flush with clean water and dislodge excess dirt and mud.

2. Wash with soap and water. Use a sponge or heavy wadding of soft cloth. Do not rub as the abrasive in the dirt and mud residue will cause fine scratches in the surface.

3. Grease and oil spots may be removed with a soft cloth soaked in kerosene.

4. After cleaning, wax the surface with a thin coat of hard polishing wax or a commercial brand of plexiglass polish. Buff with a soft cloth.

5. If a severe scratch or marring should occur, use jeweler's rouge to rub out the scratch. Smooth it and apply wax.

NOTE

Never use gasoline, benezine, alcohol, acetone, carbon tetrachloride, anti-ice fluid, lacquer thinner or glass cleaner to clean the plexiglass. These materials will attack the plastic and may cause severe crazing.

FUEL AND OIL

The Super Decathlon must use 100 octane minimum. Do not use any lower grade as it can cause serious engine damage in a very short time as well as engine failure.

Oil sump capacity is eight quarts and aerobatic minimum safe quantity is six quarts. Recommended time between change is 25 hours, or sooner, as conditions dictate. The following grades should be used for the specific temperatures.

AVERAGE TEMPERATURE	SINGLE VISCOSITY GRADES	MULTI-VISCOSITY GRADES
Above 60° F	SAE 50	SAE 40 or SAE 50
30° to 90° F	SAE 40	SAE 40
0° to 70° F	SAE 30	SAE 40 or 20W-30
Below 10° F	SAE 20	SAE 20W-30

All oils used must conform to Lycoming Spec. No. 301E.

QUIREMENTS FOR NEW ENGINES

Your engine is filled at the factory with the proper grade of straight mineral oil. Only straight mineral oil (not additive oil) should be used for the first 50 hours or until oil consumption stabilizes.

CHANGING ENGINE OIL

It is recommended that engine oil be changed approximately every 25 hours. Depending on operating conditions, a longer or shorter period may be used at the discretion of the owner. To change the oil, first fly the airplane for a short period to allow oil to reach normal operation temperatures. If you engine is not equipped with a Handi-Drain (optional), oil is drained by first removing the bottom engine cowling then unsafetying and removing the pipe plug on the right side of the oil sump bottom. After draining, reinstall plug, secure with safety wire and replace cowling.

NOTE

> Total capacity of oil sump, oil cooler and propeller control system equals ten quarts; however, only the eight quarts in the sump is represented on the dipstick calibration. Maintain your oil level in accordance with this calibration (eight quarts maximum, six quarts aerobatic minimum). Approximately eight of the ten total quarts is drainable.

It is recommended that the 25-hour oil change interval be observed for winter operations and that the oil and breather lines be checked for moisture accumulation during the oil change. It should be noted that draining the oil through the oil sump or quick-drain does not remove all of the oil from the system. For complete oil drainage, the oil should be drained through the sump plug and then the oil drained in lines A, B, C and D as shown in Figure 7-1. It is also recommended that an inspection be made for moisture accumulation at five to ten operating hour intervals at the locations shown in Figure 7-1. This inspection interval will be dependent upon the type of aircraft operation and the operational environment. All moisture and sludge should be drained from these loations during the inspections.

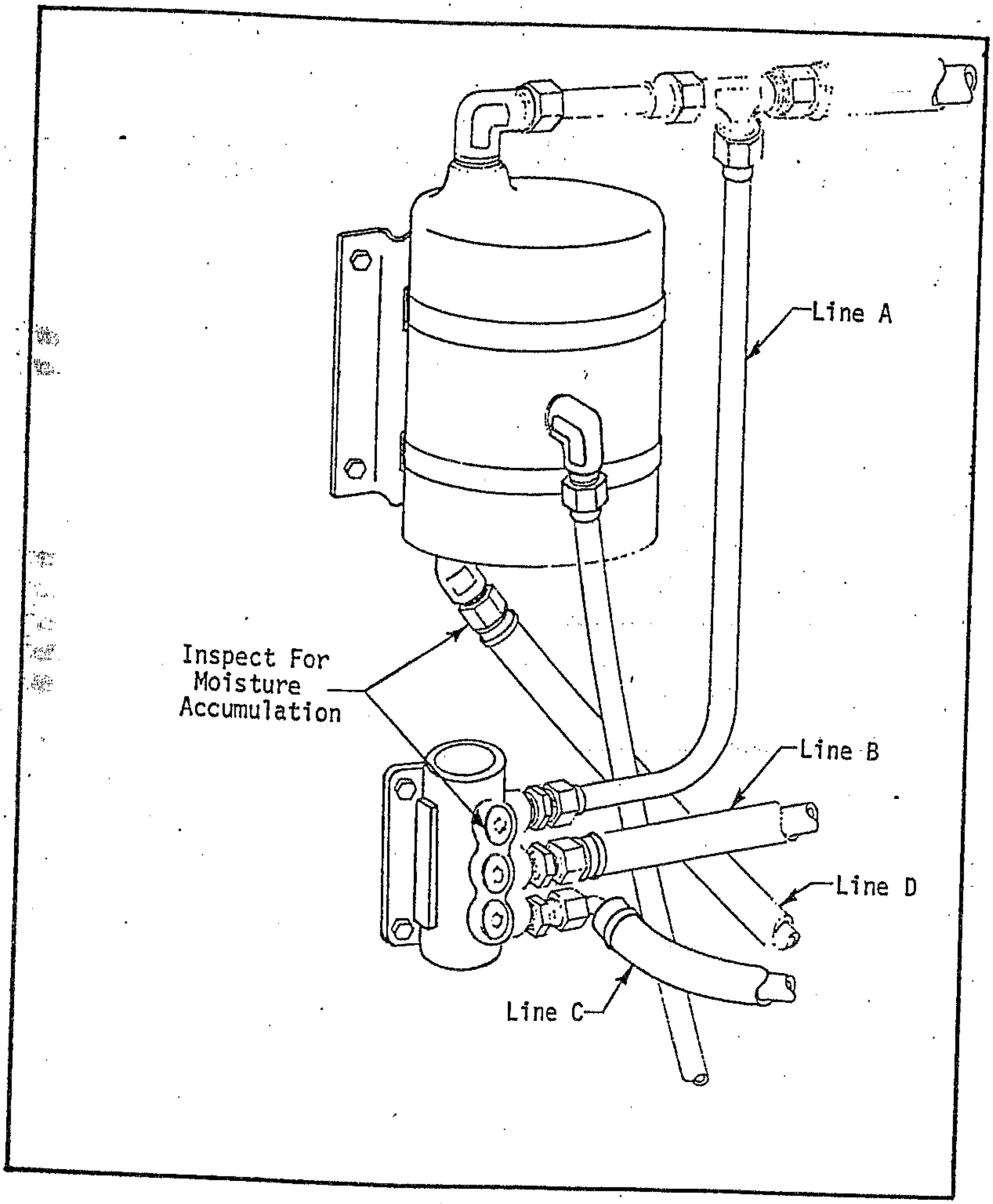

FIGURE 7-1 CHRISTEN OIL SYSTEM LINES AND INSPECTION POINTS

[GINE COWLING

The top half of the cowling can be quickly removed for inspection or maintenance by simply removing screws from the lower cowling and lifting the top cowl free. To remove the lower cowl once the top is removed:

1. Disconnect landing light wires at the right side of the cowl from the firewall.
2. Remove screws (10) from rear edge of cowl.
3. Pull cowl slightly forward and down.

Installation of cowl is in reverse order of removal. However, when installing lower cowl, insure that the rubber duct which connects the air filter to air intake manifold is installed <u>over</u> the connecting flange. When installing upper cowl, be certain rubberized cloth is in correct position to seal engine baffles to the cowl.

BRAKE SERVICING

To fill and/or bleed the brake system, remove the rubber cap from the bleeder valve on the bottom of the brake assembly located on the gear leg at the axle attachment. Turn the valve open and connect a pressure brake bleeder to the valve. Fill brake until fluid runs out of the over flow tubes located on the underside of the fuselage cabin tion. Continue to fill until the brake pedal pressure is firm. Close bleeder valve on the brake assembly before connecting the hose of th pressure pot. Each brake is filled separately. Use only MIL-H-5606 hydraulic fluid.

For complete servicing instructions, refer to the Decathlon Service Manual.

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Section 8

SUPPLEMENTS

(Optional System Description & Operating Procedures)

TABLE OF CONTENTS

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AMERICAN CHAMPION AIRCRAFT CORPORATION
ROCHESTER, WISCONSIN 53167

FAA APPROVED

AIRPLANE FLIGHT MANUAL

CHAMPION MODEL 8KCAB

WITH LYCOMING ENGINE AEI0-360-H1B (180 HP)

APPLIES TO SERIAL NUMBERS 762-95, 767-96, 770-96 AND UP

REGISTRATION NUMBER N814AC

SERIAL NUMBER 814-98

THIS MANUAL IS PART OF THE REQUIRED EQUIPMENT AND MUST REMAIN IN THE AIRPLANE AT ALL TIMES.

This AFM distinguishes FAA approved data from unapproved data by noting "FAA APPROVED" in the upper right corner of each page containing such FAA approved data. Other information is provided by American Champion Aircraft Corporation as an addendum to the manual and is included in the unapproved portion of the manual.

RECORD OF REVISIONS

REV. LET.	PAGES AFFECTED	DESCRIPTION	DATE	APPROVED BY
A	Title, All Pages	Add title page paragraph identifying FAA APPROVED portion and BAC ADENDUM. Identify beginning and eligible S/N, standardize upper right information block including FAA APPROVED or BAC ADDENDUM, page numbering and revision block.	2-15-78	
B	Title 6 7 9 12 15	Added beginning S/N and 79 was 78. Section 1.1.6 "E" was "O". Section 1.1.7 Adjacent of fuel gauge "E" was "O". Section 1.2.5 "E" was "O". Section 2.1.5 right and left gauges was right gauge, "E" was "O" for unusable. Section 2.1.10 1.c. gauges was gauge.	8-8-78	
C	Title, 2 7	Added beginning S/N and 80 was 79. Added the work Unlatch to Forward Left Side Window Placard.	9-24-79	
D	18, Title	Revised Section 2.1.22 Revised beginning S/N.	1-1-80	
E	Title	Revised Beginning S/N from 605-80 to 644-91.	1-1-91	
F	Title, 5	Switched to AEI0-360-H1B, Revised beginning S/N	2-12-96	

Revised material is indicated on the applicable page by a black vertical line.

* For Chief, Engineering and Manufacturing Branch, Great Lakes Region, FAA

Include revisions for FAA approved portion only.

TABLE OF CONTENTS

Table of Contents (Continued)

1. LIMITATIONS: COMPLIANCE WITH THIS SECTION IS MANDATORY

1.1 NORMAL CATEGORY LIMITATIONS

1.1.1 AIRSPEED LIMITATIONS

Speed Designation	Calibrated Airspeed MPH	Calibrated Airspeed Knots	Airspeed Indicator Marking
Maneuvering (V_A) (Gross Weight)	121	105	None
Normal Operating Range	54-160	47-139	Green Arc
Maximum Structural Cruising (V_{NO})	160	139	-----
Caution Range	160-200	139-174	Yellow Arc
Never Exceed (V_{NE})	200	174	Red Radial Line

GREEN ARC extends from power-off stall speed (V_{S1}) to maximum structural cruising speed (V_{NO}).

YELLOW ARC extends from maximum structural cruising speed to never-exceed speed (V_{NE}). Operate in this range with caution and only in smooth air.

RED RADIAL LINE marks the never-exceed speed, which is the maximum safe airspeed.

1.1.2 POWERPLANT LIMITATIONS

ENGINE: Lycoming AEIO-360-H1B

ENGINE LIMITS: For all operations, 2700 RPM (180 HP)

FUEL: 91/96 Minimum Grade Aviation Gasoline
100/130 May be Used 100% Of The Time

PROPELLER: Hartzell Constant-Speed Model HC-C2YR-4CF/FC7666A-2
CAUTION: "AVOID CONT. RPM 2000-2250 ALL OPER.

POWERPLANT INSTRUMENT MARKINGS

Instrument	Markings
Cylinder Head Temperature	Green Arc 90-500° F Red Radial 500° F
Fuel Pressure	Green Arc 14-45 psi Red Radial 14 and 45 psi

POWERPLANT INSTRUMENT MARKINGS (Continued)

Instrument	Markings
Oil Temperature	Green Arc 100-245° F Red Radial 245° F
Oil Pressure	Green Arc 60-100 psi Yellow Arc 25-60 psi Red Radial 25 psi & 100 psi
Tachometer	Green Arc 500-2000 RPM Red Arc 2000-2250 RPM Green Arc 2250-2700 RPM Red Arc 2600-2700 RPM Red Radial 2700 RPM

1.1.3 WEIGHT AND BALANCE

Maximum Gross Weight: 1800 Lbs.

Center-Of-Gravity Limits: (+13.5) to (+18.5) at 1800 Lbs.
(+11.5) to +18.5) at 1550 Lbs. or
Straight line variation between p
given.

DATUM: Wing Leading Edge

Each operator must assure that the airplane is properly loaded. See Section 4.0, Weight and Balance Procedures.

1.1.4 FLIGHT LOAD FACTORS

Maneuvering Load Factors

Positive: +5 G
Negative: -3 G

Gust load factors are less than maneuvering load factors. Maximum load factors for Normal Category operation are shown by the ends of the green arc on the accelerometer. Load factors within the yellow arc range are permitted only in Acrobatic Category.

1.1.5 KINDS OF OPERATION

Only VFR, day or night, operations are approved. Flight into knov icing conditions is prohibited.

1.1.6 UNUSEABLE FUEL

Any fuel remaining in the tanks when fuel gauge reads "E" (Empty) cannot safely be used in flight

1.1.7 PLACARDS

In Full View of Pilot

"Normal Category Airspeed Limits

Maneuvering Speed 121 MPH (105 Knots) CAS
Demonstrated Crosswing Velocity 20 MPH (17 Knots)

Solo from front seat only. No acrobatic maneuvers, including spins, approved in normal category. Day or night VFR operation only. Flight into known icing prohibited. To recover from normal or inverted spin, use full opposite rudder and neutralize elevator.

This airplane must be operated as a normal or acrobatic category airplane in compliance with the operating limitations stated in the form of placards, markings and manuals. Markings and placards (except accelerometer markings) refer to normal category only. See airplane flight manual for acrobatic category information weight and balance information and other operating limitations."

"No Smoking" (when ashtrays not installed)

On Tachometer Face

"Avoid Cont. RPM
2000-2250 All Oper.
2600-2700 Acro Only"

In Baggage Compartment

"Maximum Baggage 100 Lbs."

On Forward Left Side Window

"Do not Open Above 130 MPH"

"Alternate Emergency Exit Unlatch - Push Out"

On Fuel Valve Control

FUEL
40 GAL USEABLE
DOWN "ON"

On Emergency Door Release Handle

"Emergency Door Release
Pull Pin --- Pull Handle"

Adjacent To Fuel Gauge

"Fuel In Tank When Gauge Reads "E" (Empty)
Cannot Be Safely Used In Flight"

Adjacent To Strobe Light Switch

"Turn Strobe Lights Off When Taxiing In Vicinity Of Other Aircraft Or When Flying in Fog or Clouds. Standard Position Lights To Be Used For All Night Operations."

On Front Seat Rear Leg (Adjustable Front Seat Only)

"Rear Seat P/N 7-1500 or 7-1501 and Rear Control Stick P/N 4-1711 Req'd With This Seat Installation"

On Rear Control Stick (With Adjustable Front Seat Only)

"Rear Stick P/N 4-1711"

On Rear Seat Front Leg (With Adjustable Front Seat Only)

"Rear Seat P/N 7-1500" or "Rear Seat P/N 7-1501"

1.2 ACROBATIC CATEGORY LIMITATIONS

1.2.1 AIRSPEED LIMITATIONS

With the exception of the maneuvering speed (V_A), all airsp limitations given in Section 1.1.1 are applicable to the Acroba Category. For the Acrobatic Category, the maneuvering speed is 132 MPH (CAS) at maximum gross weight (1800 lbs.). Since V_A decreases as operating weight decreases, subtract 3 MPH for each 100 lbs. decrease in operating weight below 1800 lbs. (See Section 2.1.8).

1.2.2 POWERPLANT LIMITATIONS

All powerplant limitations given in Section 1.1.2 are applicable to the Acrobatic Category. In addition, the following limitations apply to the Acrobatic Category:

1. Minimum Acrobatic Oil: 6 Qts.
2. Avoid Extended Right Knife Edge Flight.
3. Avoid 2600-2700 RPM Acrobatic Flight.

1.2.3 WEIGHT AND BALANCE

Maximum Gross Weight: 1800 Lbs.

Center-Of-Gravity Limits: (+13.5) to (+18.5) at 1800 Lbs.
(+11.5) to (+18.5) at 1550 Lbs. or Less

Straight line variation between poi given.

DATUM: Wing Leading Edge

Carrying of baggage during acrobatics is prohibited.

Each operator must assure that the airplane is properly loaded. See Section 4.0 for weight and balance procedures.

1.2.4 FLIGHT LOAD FACTOR

Maneuvering Load Factors

Positive: +6 G
Negative: -5 G

Gust load factors are less than maneuvering load factors. Maximum load factors for Acrobatic Category operation are shown by red radial lines on the accelerometer. The accelerometer is required for Acrobatic Category operations.

1.2.5 UNUSEABLE FUEL

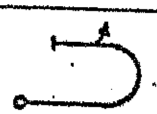
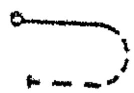
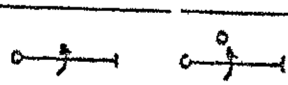
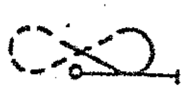
Any fuel remaining in the tanks when fuel gauge reads "E" (Empty) cannot safely be used in flight (see Section 1.2.6).

2.6 INVERTED FLIGHT

The inverted-fuel header tank provides fuel for at least 2.0 minutes of continuous inverted flight. As much as one minute of positive "g" flight may be required to completely refill an exhausted header tank.

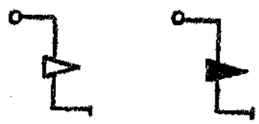
1.2.7 MANEUVERS

BASIC APPROVED ACROBATIC MANEUVERS AND RECOMMENDED ENTRY SPEEDS

MANEUVER	ARESTI SYMBOL	ENTRY SPEED IAS MPH	REMARKS-AIRSPEEDS I.A.S. MPH
Loop Normal - Inverted		140*	Enter 3.5 to 4 G's--Speed At Top Approx. 40 MPH. Exit 3.5 to 4 G's**--Speed 140-150 MPH
Immelman		145*	Enter +4 G's--Speed at Top Approx. 50 MPH. Exit + 1 G
Hammer Head Turn		140*	Enter +4.5 G's--Speed at Top Before Turn 40 MPH. Exit +4.5 G's ** 140 MPH.
Snap Roll Normal & Inverted		90	Enter with Power-Exit with Power No Full or Abrupt use of Flight Controls above V_A
English Bunt		70	Enter with or without Power -3.5 to -4.0 G's** when Pushing Thru From Vertical To Inverted. Exit Inverted 140-150 MPH*
Vertical Slow Roll Up		180*	Enter 180 MPH Level Flight +4.5 Pull Up. Exit 40 MPH- Up Push Over To Level Flight. Caution-Flight Above Vc (160 MPH-CAS) in Smooth Air Only.
Vertical Slow Roll Down		60	Enter 60 MPH Push Over to Vertical Down. Exit 150* MPH Pull Out 4.5 G's** to level flight
Slow or Barrel Roll		130	Use Smooth Application of Controls No Full or Abrupt Use of Controls Above V_A
Outside Loop (Enter from The Top)		70	Enter 70 MPH or Slower With or With-Out Power. Push 3.5 to 4 G's** to Inverted-Speed at the Bottom 140-150 MPH* add Full Power Push Up 3.5 to 4 G's**. Exit Straight & Level 40-50 MPH
Horizontal Eight Inside-Outside		140*	Enter +4 G's Pull Up, Hold 45° Down Inverted, Enter Outside Loop 140 MPH* -3.5 +4 G's**. Exit From 45° Down Normal Flight -- 140 MPH*
Hammer Head Turn (Inverted Entry & Exit)		140*	Enter -3.5 to -4 G's--Speed at Top Before Turn 40 MPH. Exit From Vertical Down -3.5 to -4 G's** to Level Flight Inverted.

1.2.7 MANEUVERS (Cont.)

BASIC APPROVED ACROBATIC MANEUVERS AND RECOMMENDED ENTRY SPEEDS

MANEUVER	ARESTI SYMBOL	ENTRY SPEED IAS MPH	REMARKS-AIRSPEEDS I.A.S. MPH
Spin Normal or Inverted		Stall	Recover with Positive Movement of stick to Neutral Position & Opposite Rubber Until Rotations Stops--Then Neutral Rudders & Smooth Recovery from Dive to Level Flight. Free Release at Controls is Not Adequate For Recovery. Positive Movement of Controls by the Pilot is Required For Spin Recovery.

NOTE: Refer to Section 2.1.8 for acrobatic operation procedures that apply to all approved maneuvers.

NOTE: Variations or combinations of the above maneuvers are approved, provided that the speed and load factor limitations are not exceeded.

NOTE: The following maneuvers are not approved: (1) Tail Slide and (2) Lomcevak.

*No full or abrupt use of flight controls above V_A (Maneuvering Speed).

**Proper use and application of controls and maneuvering load factors are essential to speed control. Improper and/or inadequate application of maneuvering load factors may result in rapid acceleration resulting in unsafe flight situations.

2. PROCEDURES

2.1 NORMAL PROCEDURES

2.1.1 EMERGENCY FUEL PUMP

The emergency electric fuel pump is used only to (1) provide fuel pressure for priming prior to starting engine and (2) provide fuel pressure in case the engine-driven pump fails. The emergency pump should be off during normal flight.

2.1.2 PARACHUTES

Back parachutes may be used by removing back seat cushions.

2.1.3 INVERTED FUEL AND OIL SYSTEMS

The inverted fuel system consists of a 1.5 gal. header tank in the forward cabin with a standpipe to draw fuel from the center of the tank. One-half (0.75 gals.) of the tank capacity is useable in inverted flight. The system is completely automatic; however, sufficient time (see Section 1.2.6) must be allowed between periods of continuous inverted flight to allow the header tank to refil

The inverted oil system consists of an inverted/upright shuttle valve, an oil/air separator canister and a system of interconnecting lines. This system is completely automatic (see also Section 2.1.7).

Oil pressure may be interrupted momentarily in certain aircraft attitudes or during certain combinations of maneuvers. These interruptions are normal but should not be allowed to extend beyound 15 seconds (avoid extended right knife edge flight).

2.1.4 ROTATING BEACONS AND STROBE LIGHTS

Particularly at night, reflections from clouds, haze or dust can produce optical illusion and intense vertigo. Under these conditions, rotating beacons and strobe lights should be turned off prior to entering.

2.1.5 FUEL SYSTEM

The total useable fuel capacity is 40 gallons, of which approximately 20 gallons is carried in each wing tank. The wing tanks are interconnected both in the vent system and the fuel feed system, and may be considered as one tank. Fuel feeds simultaneously from both tanks and the total fuel quantity in each tank is shown by a right and left tank gauge. The gauges are marked in fractions the total fuel (E, 1/4, 1/2, 3/4, F) and reads "E" (Empty) w. unuseable fuel in the tanks. Fuel tank caps are not vented and must seal completely to prevent a difference in fuel level between the two tanks.

2.1.6 ALTERNATE AIR

Avoid using alternate air on the ground. With alternate air on, induction air is not filtered and abrasive dirt particles may enter the engine. In flight, use alternate air only when icing is suspected, i.e. since heat causes partial loss of power, do not use when landing unless atmospheric conditions indicate that icing is probable, because full power may be needed on a go-around.

2.1.7 COLD WEATHER OPERATION

For operational procedures related to cold weather operation consult the Lycoming Operators Manual. Due to the length of oil lines, special care should be exercised during starting to assure that engine oil pressure is obtained within 30 seconds after start.

It is recommended that the engine compartment be preheated prior to start if the ambient temperature is below 20° F.

2.1.8 ACROBATIC OPERATION

Maneuvering speed (V_A) is maximum speed (for an established operating wt.) at which full and/or abrupt use of the elevator control will not cause load factors in excess of the +6 G's in Normal Operations or -5 G's in Inverted or Outside Operations.

Full and/or abrupt movement of ailerons may be used at speed up to V_A provided that the load factor does not exceed a +4 G's or a -3.2 G's. Use of ailerons above V_A or above +4 G's or -3.2 G's should be smooth and limited to deflections which will cause a roll rate not exceeding that roll rate achieved with full aileron at V_A.

CAUTION: Full abrupt use of the ailerons with simultaneous use of full abrupt elevator at V_A may produce loads in excess of design limits.

Propeller RPM is limited to 2600 RPM maximum during acrobatic maneuvers.

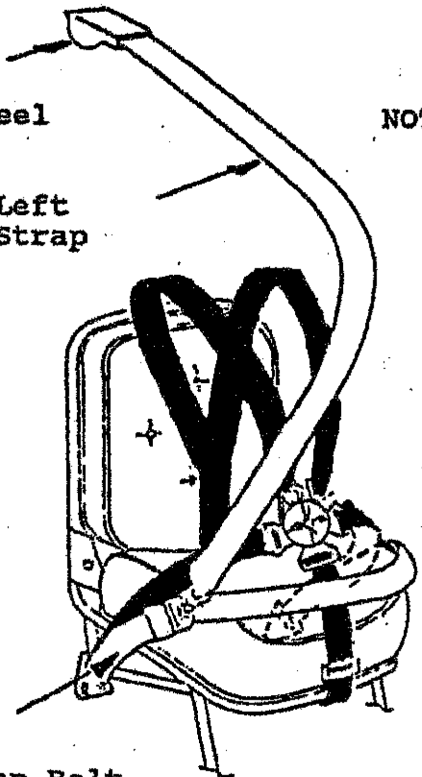
For solo acrobatic operations, determine that the rear seat folding back has restrainer cables to prevent back from folding completely forward and interferring with rear stick movement. Ascertain that all loose or hanging objects are removed from the aircraft or are secured to prevent movement in flight.

2.1.9 OCCUPANT RESTRAINT SYSTEMS
NORMAL CATEGORY OPERATIONS

A standard seat belt and a diagonal shoulder strap is provided for each seat. When rear seat is not occupied, stow shoulder strap by connecting it to seat belt, tightening both the seat belt and strap securely to seat or use Velcro fastener provided on left side panel to secure shoulder strap. When the acrobatic harness is not in use, stow the harness portions as shown in Figure 1.

ACROBATIC CATEGORY OPERATIONS

On aircraft provided with acrobatic harnesses, route the front seat



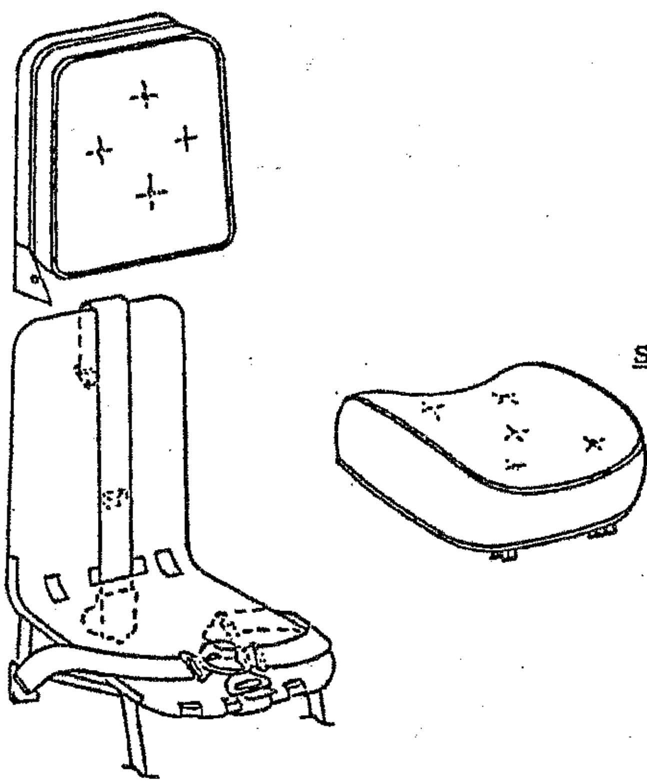


Figure 1

NOTE: Acro harness does not provide for forward restraint crash protection and therefore should always be used with primary lap belt and shoulder strap.

<u>WEARING FRONT SEAT ACRO HARNESS</u>

<u>ACRO HARNESS ASSEMBLY INCLUDES</u>:

- Double Shoulder Harness with retractor reel.
- Lap belt (L & R portions).
- Groin strap.
- Five point buckle.

Installation:

- Extend shoulder harness from reel.
- Adjust over shoulders and couple to buckle.
- Allow shoulder harness reel to retract and adjust harness placing the buckle above the waist but below the chest.
- Attach both lap belt portions to buckle and tighten.

CAUTION

<u>DO NOT ALLOW SHOULDER HARNESS TO RUN UP BEHIND THE FRONT SEAT BACK WHERE IT MAY POSSIBLY INTERFERE WITH REAR STICK MOVEMENT</u>.

<u>STOWING FRONT SEAT ACRO HARNESS</u>

- Remove back cushion.
- Lay shoulder harness over seat back frame.
- Replace back cushion.
- Lift forward edge of bottom cushion.
- Attach lap belts to buckle and adjust and tighten with buckle at forward edge of seat frame.
- Insure that belts do not interfere with rudder pedal operation.
- Replace forward edge of cushion.

2.1.10 PREFLIGHT CHECK (See Page 16)

1. a. Release controls.
   b. Check ignition switches "OFF".
   c. Check fuel quantity on fuel gauges.
   d. Fuel valve "ON".
   e. Inspect seat belts for condition.
   f. Secure rear seat belt, shoulder harness and all other loose or hanging objects if not in use.
   g. Emergency locator transmitter--armed.

2. a. Check right wing root cover for security.
   b. Check aileron for freedom of movement and security.
   c. Check wing and struts for general condition.

3. a. Check right main wheel for proper inflation.
   b. Visually check fuel quantity, then check filler cap security.

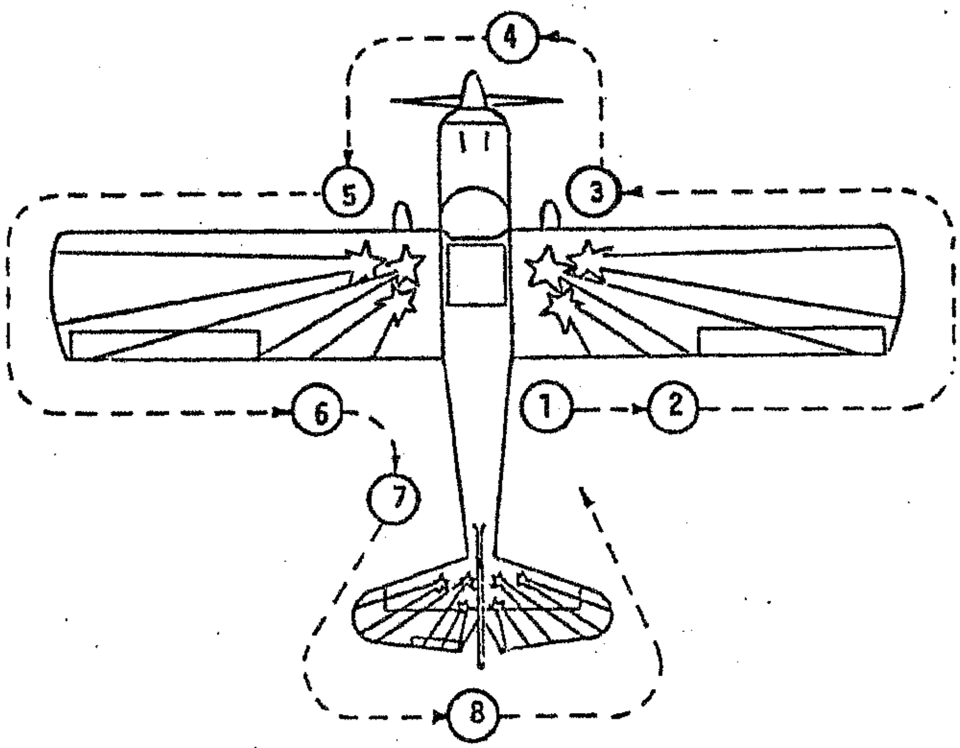
4. a. Check oil level and secure dip stick. Inspect engine compartment for general condition, fuel leaks, oil leaks, etc.
   b. On first flight each day, drain fuel from gascolator.
   c. Check that the oil dip stick access door is properly latched.
   d. Check windshield for cleanness.
   e. Check prop for nicks, and prop spinner for security.
   f. Check prop blade shanks for evidence of excessive bearing grease leakage.
   g. Check air filter for cleanliness and security.

5. a. Check left main wheel for proper inflation.
   b. Visually check left fuel tank quantity, then check filler cap security.
   c. Inspect stall warning vane for freedom.
   d. Inspect fuel vent for stoppage.
   e. Inspect pitot tube for stoppage.

6. a. Check wing root cover for security.
   b. Check aileron for freedom of movement and security.
   c. Check wing and struts for general condition.

7. a. On first flight each day, drain fuel from aft fuselage drain.
   b. Inspect bottom of aircraft for general condition.
   c. Inspect right static port for stoppage.

8. a. Check tail surfaces and brace wires for general condition.
   b. Check control surfaces for freedom of movement and security.
   c. Check tailwheel security and proper inflation.
   d. Inspect left static port for stoppage.



PREFLIGHT INSPECTION
(See Page 15)

2.1.11 PRE-START CHECK

1. Front Seat--Adjust and Secure
2. Seat Belts--Adjust and Secure
3. Fuel Valve Handle--"ON"
4. Brakes--Test and Set
5. Radios and Electrical Equipment--"OFF"

2.1.12 ENGINE START

1. Mixture--"Rich"
2. Alternate Air--Cold
3. Throttle Cracked Open
4. Prime--As Required
5. Propeller Area--Clear
6. Master Switch--"ON"
7. Ignition Switches--"ON"
8. Starter Button--"Start" (Release When Engine Starts)
9. Oil Pressure--Check

2.1.13 COCKPIT PREFLIGHT

1. Cabin Door--Latched
2. Flight Controls--Check For Freedom and Operation
3. Trim Tab--Takeoff Setting
4. Flight Instruments and Radios--Set

2.1.14 ENGINE RUN-UP

1. Throttle Setting-2000 RPM
2. Magnetos--50 RPM differential between Mags, 175 RPM maximum drop
3. Propeller--Check Operation--Full Decrease but not to Exceed 300 RPM drop
4. Alternate Air--Check Operation
5. Engine Instruments--Within Green Arc

2.1.15 TAKEOFF

1. Alternate Air--Cold
2. Mixture--Full Rich
3. Propeller--Full Increase
4. Throttle--Full Open
5. Engine Instruments Within Green Arc

2.1.16 CLIMB - (NORMAL)

1. Throttle--Full Open
2. Propeller--2700 RPM
3. Mixture--Rich or Leaned As Required
4. Engine Instruments--Within Green Arc

2.1.17 CRUISING

1. Power--As Desired (2700 RPM Max.)
2. Elevator Trim--Adjust
3. Mixture--Lean To Best Power With 75% Power or Less
4. Engine Instruments--Within Green Arc
5. Alternate Air--As Required

2.1.18 LANDING CHECKLIST

1. Mixture--Rich
2. Alternate Air--Check Operation and Return to Cold (Unless Icing Conditions Exist)
3. Airspeed--75-80 MPH IAS
4. Prop--Full Increase

2.1.19 BALKED LANDING (GO AROUND)

1. Throttle--Full Open
2. Prop Setting--Full Increase
3. Alternate Air--Cold
4. Airspeed--80 MPH
5. Trim--Reset

2.1.20 AFTER LANDING

1. Alternate Air--Cold

2.1.21 SHUTDOWN AND SECURING AIRCRAFT

1. Parking--Into The Wind If Possible
2. Park Brake--Set
3. Radios and Electrical Equipment--"OFF"
4. Mixture--Idle Cut-Off (Pulled Full Out)
5. Ignition and Master Switches--"OFF"
6. Control Lock-Secure Seat Belt Around Front Control Stick

2.1.22 NOISE CHARACTERISTICS

The noise level for this airplane measured in accordance with FAR 36, Appendix F, is 67.2 dB (A) at full throttle, 2700 RPM.

No determination has been made by the Federal Aviation Administration that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, into, or out of, ar airport.

2.2 EMERGENCY PROCEDURES

2.2.1 ENGINE RESTART

CAUTION: If propeller ceases to turn, diving will not cause windmilling.

Fuel starvation may occur after a series of inverted maneuvers since the header tank may have had insufficient time to refill. (See Section 1.2.6)

CHECK:

1. Assume ERECT Flight Attitude
2. Throttle--3/4 FORWARD
3. Mixture--FULL FORWARD
4. Propeller--FULL FORWARD
5. Fuel Valve--ON
6. Emergency Fuel Pump--ON
7. Magnetos--ON
8. Master--ON
9. Starter--ENGAGE if Windmill RPM is Insufficient

2.2.2 ALTERNATE AIR

If induction ice is indicated (gradual decrease in manifold pressure), use full alternate air until all ice is dissipated.

2.2.3 FUEL PRESSURE LOSS

For fuel pressure loss or fluctuation turn "ON" the emergency Fuel Pump.

2.2.4 ENGINE FIRE (GROUND)

1. Mixture--Idle Cut-Off
2. Fuel Valve Off
3. Master and Magneto Switches--OFF
4. Cabin Heater Off
5. Evacuate Aircraft
6. Extinguish With Fire Extinguisher

2.2.5 ENGINE FIRE (FLIGHT)

1. Fuel Valve-Off
2. Master Switch-Off
3. Cabin Heaters--Off
4. Accomplish Emergency Landing and Evacuate Aircraft

2.2.6 ELECTRICAL SYSTEM MALFUNCTION/FIRE

The ammeter indicates current to or from the battery.

A steady discharge on the ammeter indicates an inoperative alternator system. Turn off unnecessary electrical equipment to reduce battery drain. Master switch may be turned off to conserve battery power if necessary.

Indication of electrical fire(s) may be wisps of smoke or the smell of hot or burning insulation. Should an electrical fire develop, the following procedures are recommended.

a. Master Switch "OFF"
b. All Electrical Switches "OFF"
c. Open Air Vents or Windows ONLY if Absolutely Necessary For Ventilation

If electrical power is necessary for safety of flight under the above conditions, the following procedures are recommended.

a. Disengage and isolate Each Power Circuit
b. Engage Each Circuit Separately. Allow Sufficient Time to Analyze For Faulty Operation
c. When Faulty Circuit is Identified, Disengage Faulty Circuit
d. Properly Functioning Circuits May Be Re-Engaged
e. Land as Soon as Practicable For Repairs

2.2.7 EMERGENCY EXITS

The right cabin door can be removed by releasing the upper window latches and pulling the safety pin and then pulling up on the red emergency door release handle and pushing door away from aircraft. If necessary, emergency exit may be made from left side of aircraft by opening left window. Force forward portion of window past its hinge stop by pushing hard on forward window frame.

American Champion Aircraft Corp.
Rochester, Wisconsin

FAA Approved

Airplane Flight Manual Supplement

Front Seat Lap Belts

This Flight Manual Supplement applies to 7ECA, 7GCAA, 7GCBC, 7KCAB, 8KCAB, and 8GCBC models.

Registration Number: N814AC

Serial Number: 814-98

This manual is part of the required equipment and must remain in the airplane at all times.

Approved: [signature] Date: JUN 2 8 2010
For: Charles Smalley
Manager: Chicago Aircraft Certification Office

Revisions:

Letter	By	Date	Revisions	Pages Affected
Original	JJB	6-17-10	Add Lap Belt Normal Procedures	All

NORMAL PROCEDURES

Additional information has been added to the normal procedures requiring pilot inspection of the front seat lap belt prior to engine start and prior to flight.

Pre-Start Check

Seat belts - Adjust and secure

Lap belts must be taut; verify slack is not present in lap belts. Verify interference is not present between front lap belts and rear rudder pedals.

Cockpit Pre-Flight

Flight controls - Check for freedom and operation

Verify lap belts are taut. Verify interference is not present between front lap belts and rear rudder pedals.

JUN 2 8 2010

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Avidyne Corporation
4 Middlesex Green - Suite 221
561 Virginia Road
Concord MA 01742

FAA Approved

Airplane Flight Manual Supplement

For

ACA 8KCAB
Make and Model Airplane

with

Avidyne Integrated Flight Displays 700-00182-XXX (IFD5XX), 700-00179-XXX (IFD4XX) and 700-00194-XXX (Atlas)

Registration No. 814AC

Serial No. 814-98

This supplement must be attached to the applicable FAA Approved Airplane Flight Manual when Avidyne 700-00182-XXX Integrated Flight Display (IFD), 700-00179-XXX and/or 700-00194-XXX Integrated Flight Display(s) installed in accordance with STC SA00343BO. The information contained herein supplements or supersedes the basic manual only in those areas listed. For limitations and procedures not contained in this supplement consult the basic Airplane Flight Manual.

FAA Approved WILLIAM P WITZIG Digitally signed by WILLIAM P WITZIG Date: 2022.08.26 14:12:32 -04'00'

William Witzig, Manager
Northeast Flight Test Section
Federal Aviation Administration
Burlington, MA

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LOG OF REVISIONS

Revision Number	*Revised Pages*	*Description of Revisions*	*FAA Approval*	*Date*
00	ALL	Initial Release	Robert Mann	Jul 24 2014
01	Pages 1,2, 3, 4, 5, 6, 7, 8, 9, 11, 15, 16, 17, 18, 21	Add IFD440 and Software Release 10.1.0.0	-	-
02	Pages 13, 14, 19	AEG comments	Robert Mann	Jun 18 2015
03	Pages 2, 3, 4, 7, 8. 9, 10, 11, 12, 13, 18, 19, 20, 21, 24	Add models IFD410, IFD510, IFD545, IFD550 and software version 10.2	-	-
04	Pages 4 - 24	Added 91.227 compliance statement	-	-
05	Pages 11, 13, 22	Added limitation regarding use of radar display, added EmProc for disabling wireless connectivity.ACO comments incorporated	Anthony Pigott	Mar 06 2017
06	Pages 13	Added note regarding IFD4XX FLTA aural alert conflicts with other sensors	Anthony Pigott	Mar 20 2017
07	Pages 4, 5, 8, 26	Added TDR ADS-B out compliance statement, BK pilot guide references, ADS-B in only limitations	W. Witzig	May 03 2019
08	Pages 4, 8, 26	Add ADS-B out configurations. Revise normal operations description	W. Witzig	Oct 01, 2019
09	Page 4	Add additional Transponders to ADS-B Out Compliance	W. Witzig	Feb 17, 2021
10	all	Added Rel 10.3 w/ TAWS-B and ADS-B in TSO C-157b	WILLIAM P WITZIG Digitally signed by WILLIAM P WITZIG Date: 2022.08.26 14:12:14 -04'00'	Aug 26, 2022

A vertical black line in the margin shows revised portions of affected pages.

Section 1 – General

This airplane is equipped with Avidyne p/n 700-00182-XXX (IFD5XX), p/n 700-00179-XXX (IFD4XX) and/or p/n 700-00194-XXX (Atlas) Integrated Flight Display(s). These part numbers may be referred to in this document as simply IFD.

The IFD contains a GPS (SBAS) receiver (all IFD models), VHF Nav/Com transceiver (IFD440, IFD540, IFD550 and Atlas) and processing to accomplish control, display, navigation and input/output to other avionic systems. The IFD 545 and IFD550 include an internal ARS and are capable of displaying attitude information and ego-centric synthetic vision (SVS). The IFD 545 and IFD550 include an internal ARS and are capable of displaying attitude information on ego-centric synthetic vision (SVS) display formats. All IFD models can be configured for Bluetooth and WiFi in/out communication (optional).

GPS/SBAS TSO-C146c Class 3 Operation

The IFD4XX, IFD5XX and Atlas are approved for navigation using GPS and SBAS (Satellite Based Augmentation System complying with ICAO Annex 10) for IFR en route, terminal area, and non-precision approach operations ("GPS", "or GPS", and "RNAV (GPS)" approaches). The IFD4XX, IFD5XX and Atlas are approved for approach procedures with vertical guidance including LPV and LNAV/VNAV and approaches without vertical guidance including LP and LNAV.

The IFD4XX, IFD5XX and Atlas comply with the requirements for GPS Class II oceanic and remote navigation (RNP-10) and (RNP-4) without time limitations. A second navigation source may be required for these operations to meet availability requirements.

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Avidyne IFD Navigation Capabilities

	Note 5						Note 3	Note 4	Note 2	Note 1		
Spec	**RNP 10**	**RNAV 5 GNSS**	**RNAV5 DME/DME**	**RNAV 5 VOR/DME**	**RNAV 2 GNSS (note 1)**	**RNAV 1 GNSS**	**RNP 4**	**RNP 1 GNSS**	**RNP APCH**	**RNP APCH w/ Baro VNAV**	**RNP AR APCH w/ RF (note3)**	**RNP AR APCH w/o RF (note3)**
IFD4XX/5XX/	Oceanic	Enroute			Enroute	Terminal	Oceanic	Terminal	Approach			
Procedure type	N/A	N/A			Arrivals, Departures	Arrivals, Departures, Approaches	N/A	Arrival, Departures, Approaches	LNAV, LNAV/VNAV, LP, LPV			
ICAO Flight Plan Code	A1	B2	B3	B4	C2	D2	L1	O2	S1	S2	T1	T2
IFD4XX/5XX/Atlas Capability	**Yes**	**Yes**	No	No	**Yes**	**Yes**	**Yes**	**Yes**	**Yes** (Note 5)	No	No	No

Note 1 RNAV1 requires total system error of not more than 1NM for 95% of the total flight time
Note 2 RNAV2 requires total system error of not more than 2NM for 95% of the total flight time
Note 3 GNSS sensor complies with AC 20-138. GNSS accuracy better than 36m 95%, SBAS GNSS accuracy is better than 2m 95%
Note 4 This table is intended to show certifications of avionics equipment. Capabilities shown do not constitute operational approval.
Note 5 LP and LPV guidance require SBAS, IFD4XX/5XX/Atlas must be connected to an approved SBAS (e.g. WAAS) antenna.

FAA Approved: August 26, 2022

ADS-B OUT TSO C-195b Operation

The IFD4XX, IFD5XX and Atlas installed per this STC in conjunction with the following transponders/ UAT transceivers have been shown to meet the equipment requirements of 14 CFR 91.227 for ADS-B OUT:

ACSS NXT-700
Avidyne AXP340, AXP322
Becker BXT6553
Bendix King KT74
Bendix King MST 70B
Collins TDR94(D)
Garmin GTX330ES
Garmin GTX335/345
Garmin GTX3000
L3Harris NGT9000
Trig TT31, TT22
Bendix King KXP80

IFD4XX, IFD5XX and/or Atlas have been approved for ADS-B Out compliance with other transponders under separate installation approvals (STCs). Check the aircraft's transponder or UAT transceiver AFMS for the statement above indicating ADS-B out compliance for the navigator and transmitter combination.

ADS-B In TSO-C157c Class 1 Operation

The IFD4XX, IFD5XX and/or Atlas IFD installed per this STC may be interfaced with an ADS-B UAT or 1090MHz (ADS-B In) TSO C-157b, Class 1 receiver to display ADS-B traffic and FIS-B weather products.

If no ADS-B out system is installed, this installation will not be able to receive TIS-B client status, and will not receive ADS-R or TIS-B broadcasts from ATC unless the aircraft is in the same area as a valid TIS-B client broadcasting that it has ADS-B In capability.

FIS-B information may be used for pilot planning decisions focused on updating the pilot's awareness of the dynamic flight environment; including avoiding areas of inclement weather that are beyond visual range and near-term decisions where poor visibility precludes visual acquisition of inclement weather.

FIS-B weather and NAS status information may be used as follows:

(a) To promote pilot awareness of ownship location with respect to reported weather, including hazardous meteorological conditions; NAS status indicators to enhance pilot planning decisions; and pilot near-term decision-making.

(b) To cue the pilot to communicate with Air Traffic Control, Flight Service Station specialist, operator dispatch, or airline operations control center for general and mission critical meteorological information, NAS status conditions, or both. FIS-B information, including weather information, NOTAMs, and TFR areas, are intended for the sole purpose of assisting in long-/near-term planning and decision making.
The system lacks sufficient resolution and updating capability necessary for aerial maneuvering associated with immediate decisions. In particular, in extreme scenarios, the oldest weather radar data on the display can be up to 15 to 20 minutes older than the display's age indication for that weather radar data. Therefore, do not attempt to use FIS-B weather information to maneuver the aircraft at minimum safe distances from hazardous weather. FIS-B information must not be used in lieu of a standard preflight briefing.

(c) FIS-B uplink is an FAA approved source for METAR , TAF, WINDS, PIREPs, NEXRAD, AIRMET, SIGMET, and TFR information subject to the range limits for the broadcast of these products. FIS-B uplink is not an FAA approved source for NOTAMs.

NOTE

When no traffic or datalink receiver is interfaced with the installed IFD series GPS/Nav/Com, a portable (unapproved) ADS-B receiver may be interfaced via WiFi and/or Bluetooth to provide traffic and FIS-B weather products for display on the IFD. Traffic aurals and TAs will not be issued when configured this way.

TAWS-B TSO C-151d Operation

The IFD4XX, IFD5XX and/or Atlas IFD installed per this STC meets the minimum requirements of TSO-C151d when IFD software release 10.3 or later approved release is installed.

Database Accuracy and Completeness

The operator is responsible to ensure that the navigation data used in the unit has the accuracy, resolution, and timeliness appropriate for the purpose of the flight operation being conducted. Using navigation data from an Avidyne authorized supplier will ensure that the navigation data has the same accuracy and resolution provided by official sources, in a format compatible with the intended function of the unit.

Avidyne requests that any observed database discrepancies are reported. These discrepancies may be in the form of an incorrect procedure, incorrectly identified terrain, obstacles, navigation fixes, or any other displayed item used for navigation or communication in the air or on the ground. Use the Service Hotline listed on the back cover of the IFD4XX, IFD5XX and/or Atlas IFD Pilot Guides.

Avidyne accurately processes and validates the database data, but cannot guarantee the accuracy and completeness of the data provided by various state sources and their suppliers.

Avidyne Corporation holds a FAA Type 2 Letter of Acceptance (LOA) in accordance with AC 20-153 for database integrity, quality, and database management practices for the navigation database. Flight crew and operators can view the LOA at www.avidyne.com.

Section 2 – Limitations

1. The appropriate IFD4XX, IFD5XX and/or Atlas Integrated Flight Display Pilot Guides must be available to the pilot during all flight operations:

   P/N 600-00300-001 for the IFD5XX Series
   P/N 600-00304-000 for the IFD4XX Series
   P/N 600-00300-002 for the Atlas Series
   P/N 890-00039-010 Bendix King AeroNav 900 and 910
   P/N 890-00041-008 Bendix King AeroNav 800

2. For Class I airplanes (single engine, piston, under 6,000# GTOW), a single IFD4XX, IFD5XX and/or Atlas is sufficient for flight under instrument flight rules (IFR). IFR is prohibited when the GPS or VHF navigation receiver is inoperable unless the airplane has an additional approved GPS and/or VHF receiver.

   For all other Airplanes (Class II, III and IV), dual VHF communications transceivers and dual GPS or VHF Navigation receivers are required for flight under instrument flight rules (IFR). One communication transceiver, or one GPS receiver, or one VHF navigation receiver may be inoperable for IFR flight.

   In all airplanes, an approved navigation display (external CDI, HSI, or EHSI) is required for flight under instrument flight rules (IFR).

3. The IFD4XX, IFD5XX and/or Atlas IFD installed with an SBAS approved antenna, provides pilot and automatic flight control guidance for the following operations conducted under instrument flight rules (IFR):

   Note: That models IFD410, IFD510 and IFD545 do not include VHF capabilities and VHF navigation and approaches are not applicable to these models.

   - VOR, LOC, ILS instrument approach procedures (procedures using VHF radio guidance)

- RNP instrument approach procedures using the following lines of minima:
    - LNAV minima (including when using advisory vertical guidance from the system);
    - LNAV/VNAV minima;
    - LPV minima; and
    - LP minima.

  Note: The U.S. titles RNP instrument approach procedures "RNAV (GPS) Rwy XX". Other States may use similar titling or may title these procedures "RNAV (GNSS) Rwy XX".
- RNP terminal procedures, including RNP arrival procedures and RNP departure procedures.
- RNAV terminal procedures, including RNAV arrival procedures and RNAV departure procedures.

The IFD4XX, IFD5XX and Atlas when installed with a non-SBAS antenna, provide pilot and automatic flight control guidance for the following operations conducted under instrument flight rules (IFR):

- VOR, LOC, ILS procedures (procedures using VHF radio guidance) – IFD440, IFD540, IFD550 only;
- RNP instrument approach procedures using the following lines of minima:
    - LNAV minima.
- RNP terminal procedures, including RNP arrival procedures and RNP departure procedures.
- RNAV terminal procedures, including RNAV arrival procedures and RNAV departure procedures.

4. When GPS is available, the, IFD5XX and/or Atlas IFD, may serve as an RNAV alternate or substitute means of navigation for ground-based navigation aids that are out-of-service or unavailable.

5. GPS/SBAS based IFR enroute, oceanic, and terminal navigation is prohibited unless current Navigation and Procedure databases are installed.

6. In areas where SBAS coverage is not available, the pilot must check RAIM availability.

7. The Avidyne moving map display provides visual depiction of the aircraft's own-ship, GPS position on a moving map for situational awareness (SA) purposes only. The pilot shall not use the moving map display as a sole means of navigation. The external CDI, HSI, or EHSI display must be used as the primary navigation instrument.

8. The Avidyne electronic checklists display supplements the Pilot Operating Handbook checklists and are advisory only. The pilot shall not use the electronic checklists as the primary set of on-board aircraft checklists. FAA Approved Flight Manual paper checklist must be available to the pilot as the primary reference.

9. The IFD integrates with separately approved system installations such navigation indicators, remote annunciators. Adherence to limitations in installation AFM supplements for those systems is mandatory.

10. The use of datalink, traffic and lightning sensor information displayed on the IFD4XX, IFD5XX and Atlas must be in compliance with the approved AFM supplements for those systems.

11. Gloves may not be used to operate the IFD5XX and/or Atlas IFD touch functions unless the Glove Qualification Procedure located in the IFD4XX/IFD5XX/Atlas Pilot's Guides has been successfully completed.

12. The IFD545 and/or IFD550 may not be used for primary attitude information or standby attitude information (If required by type design). The IFD545 and/or IFD550 may only be used as a secondary (non-required) source for attitude information.

NOTE

The IFD545 and/or IFD550 may be used in conjunction with air data and turn rate indicators in determining if a primary or standby attitude source has failed e.g. in the case of primary/standby attitude indicator mis-compare. The IFD545 and/or IFD550 may not be used for primary navigation deviation information (horizontal of vertical). The IFD545 and/or IFD550 may only be used as a secondary (non-required) source for this information.

13. The Avidyne IFD4XX, IFD5XX and/or Atlas may only be operated in IMC conditions as a radar display when used in conjunction with an independent lightning detection and display system (Approved Thunderstorm Detection Equipment).

CAUTION

Terrain information shown on the MAP page display is provided to the pilot as an aid to situational awareness. The MAP page terrain color representations should not be used as a sole basis for terrain avoidance.

CAUTION

Traffic information shown on the Map page display is provided to the pilot as an aid to visually acquiring traffic. Pilots should maneuver their aircraft based only on ATC guidance or positive visual acquisition of the conflicting traffic. Avoidance maneuvers should not be made based only on a Traffic Advisory.

CAUTION

In IFD545 and IFD550 units the inertial reference accelerometers may be irreparably damaged by exposure to temperatures below -40°C. The units are capable of operating at -40°C, but exposure to temperatures below this, even when powered off, can stress the parts internally causing a detectable and annunciated failure of the sensors.

Section 3 – Emergency Procedures

Loss of GPS

In the event of the loss of the IFD4XX, IFD5XX and/or Atlas GPS receiver, the FMS will enter dead reckoning mode for 5 minutes, after that, all FMS functions are lost and the ownship is removed from map depictions. The pilot should revert to remaining navigation receiver (required for IFR operations).

Loss of VHF Nav/Com

In the event of the loss of IFD440, IFD540 or IFD550 VHF navigation, the pilot should revert to remaining navigation receiver (required for IFR operations).

Warning Messages

Caution and warning messages provided by the IFD4XX, IFD5XX and/or Atlas are related to functions performed by the IFDs and are additional to the caution and warning annunciation system provided by the aircraft.

NOTE

The original caution and warning annunciator panel remains as the primary indication. POH/AFM Emergency procedures are not affected by this installation.

CAUTION

IFD4XX units lack an audio inhibit output to preclude other sensors aural alerts from sounding while IFD4XX forward looking terrain awareness (FLTA) aural alerts are issued. Simultaneous alerts are possible. Example; a TIS-B aural traffic alert could be issued at the same time as an FLTA terrain or obstacle aural caution or warning.

To Disable WiFi/Bluetooth Connectivity on IFD4XX/IFD5XX:

1. Press and hold the IFD4XX, IFD5XX and/or Atlas power button/knob for 1 second (upper left bezel)
2. ALLOW/IGNORE WiFi Bluetooth dropdown is presented. Press IGNORE Dropdown is removed
3. Verify the WiFi and Bluetooth icons on the upper right of the display are removed.

Caution Messages

The Caution and Warning panel is not altered as part of this modification and remains the primary means of providing Caution and Warning messages.

Caution and Warning messages are provided in the following table:

EXCEEDANCES | WARNINGS RED

Short Text	Long Text	Comments
Pull Up	Excessive Descent Rate	The TAWS Excessive Descent Rate algorithm has detected a CFIT potential – initiate an immediate recovery maneuver.
Terrain Pull-Up*	Terrain Pull-Up	The FLTA algorithm has detected an imminent ground collision - Initiate an immediate recovery maneuver.
Warning Obstacle*	Warning Obstacle	The FLTA algorithm has detected an imminent obstacle collision. Initiate an immediate recovery maneuver.
Unit Overtemp – Unit Unreliable	Unit Overtemp: <internal component name> Unit reliability in question – Get IFD serviced	One or more of the internal components has exceeded its maximum design temperature and reliability cannot be ensured until the unit is tested by the Avidyne Service Center. Contact the Avidyne Service Center or a local dealer for service. This message will be present on every subsequent power cycle until reset by the Avidyne Service Center.
Low Volts – off in <countdown from 60> sec	Low Volts – IFD powers down in <countdown from 60> sec	Main supply voltage has fallen below 9 VDC. Contact a local dealer for service.

EXCEEDANCES | CAUTIONS YELLOW

Short Text	Long Text	Comments
ADS-B Traffic Sensor Fault	No communication with traffic sensor	The IFD is not receiving messages from the ADS-B traffic sensor. Contact a local dealer for service. This message is local if independent traffic sensors are installed.
ADS-B Traffic Sensor Fault	Traffic sensor has failed	The ADS-B traffic sensor is reporting a failure or the IFD is receiving invalid messages from the sensor. Contact a local dealer for service. This message is local if independent traffic sensors are installed.
No ADS-B Position	AXP322 Lost GPS Position Data	ADS-B position data had previously been valid and then transitions to invalid. Check the ADS-B position source device.
Caution Terrain*	Caution Terrain	The FLTA algorithm is predicting a likely ground collision within approximately 60 seconds – initiate a proper recovery maneuver.
Caution Obstacle*	Caution Obstacle	The FLTA algorithm is predicting a likely obstacle collision with approximately 60 seconds – initiate a proper recovery maneuver.
No Position	No position available	The IFD cannot compute a navigation solution. IFD operation will be degraded (e.g. no map, no FMS guidance, etc.) Transition to alternative navigation sources.
GPS Integrity Lost	GPS Integrity Lost – Crosscheck Nav	This is alerting about imminent exceedence of horizontal fault detection limits or protection levels. Crosscheck the nav solution and determine the best course of action. If on a GPS based approach, Missed Approach is required.

Short Text	Long Text	Comments
GPS Fault	Position updated via dead reckoning	The GPS has stopped providing a navigation solution. If GPS is the only navigation solution source available, then expect degraded IFD operation (e.g. no map, no FMS guidance, etc.)
GPS Fault	No position available	The navigation solution cannot compute a position, typically after dead reckoning has expired. Execute a missed approach if this occurs while performing a GPS based approach. Use an alternate GPS or VHF navigation receiver.
Configuration Error	Configuration Error – IFD Requires Service	The configuration of the IFD or the devices to which it is communicating with has changed or experienced an error. Contact the Avidyne Service Center or a local dealer for service.
LPV Unavailable Use L/VNAV DA	GPS integrity is insufficient for LPV Approach	Transition to a non-LPV approach and the appropriate minima if possible. Otherwise execute a missed approach.
LPV Unavailable Use LNAV MDA	GPS integrity is insufficient for LPV Approach	Transition to a non-LPV approach and the appropriate minima if possible. Otherwise execute a missed approach.
LP Unavailable Use LNAV MDA	GPS integrity is insufficient for LP Approach	Transition to a non-LP approach and the appropriate minima.
L/VNAV Unavail. Use LNAV MDA	GPS integrity is insufficient for L/VNAV Approach	Transition to a non-L/VNAV approach and the appropriate minima.

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Short Text	Long Text	Comments
Check Altitude Too Low	Aircraft is below the glide slope altitude at FAF	Correct aircraft altitude as required to safely conduct the approach or initiate a climb to a published safe altitude and abort the approach.
Traffic Sensor Fault*	No communication with traffic sensor (local) OR Traffic sensor has failed (global)	Contact a local dealer for service.
Traffic <Low | High> <Bearing in clock direction> <Distance in NM>*	Traffic [Brg (e.g. 1:00)] [dist (e.g. 2 NM)] [alt (e.g. 200 ft)]	Traffic advisories - Alert to be used to facilitate visual acquisition of traffic. Pilots should maneuver their aircraft based only on ATC guidance or positive visual acquisition of the conflicting traffic.
Traffic <Low | High> <Distance in NM>*	Traffic <Distance in NM> <Signed relative altitude in feet> FT	Traffic advisories with no bearing information – Alert to be used to facilitate visual acquisition of traffic. Pilots should maneuver their aircraft based only on ATC guidance or positive visual acquisition of the conflicting traffic.
Traffic <Bearing in clock direction> <distance in NM>*	Traffic <bearing in clock direction> <distance in NM>	Traffic advisories with no relative altitude information – Alert to be used to facilitate visual acquisition of traffic. Pilots should maneuver their aircraft based only on ATC guidance or positive visual acquisition of the conflicting traffic.
Traffic <distance in NM>*	Traffic <distance in NM>	Traffic advisories with no relative altitude information and no bearing – Alert to be used to facilitate visual acquisition of traffic. Pilots should maneuver their aircraft based only on ATC guidance or positive visual acquisition of the conflicting traffic.

FAA Approved: August 26, 2022

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Short Text	Long Text	Comments
COM TX Fault	Transmitter Fault, No TX Ability	Transition to a backup VHF com radio (if available) or initiate lost communication procedures. Contact the Avidyne Service Center or a dealer for service.
COM Stuck TX	Stuck Mic Timeout, Transmitter Disabled	Requires 35 seconds of continuous transmission. Verify the PTT is stuck and contact a dealer for service as required.
No Comm with VHF	No communication with the VHF radio	Transition to a backup VHF com radio (if available) or initiate lost communication procedures. Contact the Avidyne Service Center or a dealer for service.
Unit Overtemp – Check cooling	Unit Overtemp: <internal component identification>	One or more of the internal components has exceeded 80°C. Contact the Avidyne Service Center or a dealer for service – consider adding a source of cooling and/or improving air flow in/around the IFD.
Low Volts	Backlight reduced to 25%	Main supply voltage has fallen to approximately 11VDC. Check the aircraft alternators are on and functional. Consider load shedding the power bus that is powering the IFD.
Manual Sequence Req'd	Altitude invalid – leg will not auto sequence	In basic E-M aircraft where the IFD does not have altitude input, this message will appear when the FMS active leg is a Heading→Altitude leg. In this case, the FMS flight plan will need to be manually sequenced to the next leg. Failure to do so will keep the FMS flying the heading indefinitely.

Short Text	Long Text	Comments
Heading Lost	Using ground track for SVS	Indicates loss of the TVV and the aircraft reference symbol ("wedge") now points at ground track, not aircraft heading. "TRK" will also be displayed below the digital compass on the SVS page.
Xpdr Fault	Transponder Fault	Any fault other than loss of ADS-B GPS position. Contact the Avidyne Service Center if this persists across power cycles.
No Comm With Xpdr	No Communication with Remote Transponder	No data has been received from the remote transponder for greater than 2 seconds. Contact the Avidyne Service Center if this persists across power cycles.
Radar: Echoes Ahead	Radar: Heavy Echoes Ahead	Generated when a number of red and/or magenta echoes are present within the area ±22° off the nose of the aircraft at the current displayed radar range.
Radar: Target Alert	Radar: Target Alert Detected	Alerts the pilot to the presence of a significant weather cell that exists beyond the currently Selected display range.
Radar Sensor Fault	No Communication with Radar Sensor, or; Radar Data is Invalid, or; Sensor mode is [selected] Selected mode is [reported], or; Radar fault code: any active fault codes.	No data is received from the sensor for at least 2 seconds, or; The data stream from the radar contains information that the data stream should not be used, or; If the requested mode and the reported mode do not match, or; Any specific fault code is active from the sensor.

Short Text	Long Text	Comments
TIS Removed	TIS Traffic Removed	TIS traffic communications have ceased for >12 seconds
TIS Unavailable	TIS Traffic Unavailable	No TIS ground station is available or communications have ceased for >60 seconds
Too Low, Terrain	Premature Descent, below glide path	TAWS PDA algorithm has determined the aircraft is below glide path.
Sink Rate	Excessive Descent Rate	TAWS EDR algorithm has determined a potential CFIT scenario is developing – recover the aircraft
Don't Sink	Negative climb rate or altitude loss	TAWS NCR algorithm has determined corrective action should be taken immediately.
TAWS Fail	Invalid GPS Position/Velocity	The GPS solution is lost or the GPS velocity quality parameters drop below required accuracy limits. A "bing-bong" chime is played if this condition occurs. Contact the Avidyne Service Center if this persists across power cycles.
TAWS System Failure	TAWS Failed Self-Test [reason why]	TAWS failed self-test for the reason provided and TAWS will be degraded or not available for the power cycle. Contact the Avidyne Service Center if this persists across power cycles.

The pilot should utilize available instruments/data displays to verify message(s) and take appropriate action(s) (ref POH/AFM) by selection of alternate systems or settings. Invalid messages generally indicate a failed sensor and that other messages associated with that system will be unavailable. Caution messages indicate the possibility of a pilot action.

Section 4 – Normal Procedures

To Activate the IFD4XX/IFD5XX/Atlas:

1. Verify IFD circuit breakers (2) ------------------------------ IN
2. Verify Battery Master Switch --------------------------------ON
3. Avionics or Radio Master (if equipped) ------------------ ON

To Deactivate the IFD4XX/IFD5XX/Atlas:

4. Avionics or Radio Master (if equipped) ------------------ OFF

   or

5. Press and hold the Power Knob------------------------------ OFF

IMC Operations with Weather Radar

1. While operating in IMC conditions with weather radar active, activate lightning detection system and monitor. Correlate lightning strike information with painted radar information to confirm proper system operation.
2. In the event that radar data and lightning do not coincide, contact ATC for the latest severe weather information.

Autopilots
Reference autopilot Pilots Guide and AFMS.

The IFD4XX/IFD5XX/Atlas may be coupled to an autopilot. Autopilots coupled to the IFD in (NAV) mode will follow GPS or VHF navigation guidance as they would with any VOR/LOC receiver. Autopilots providing GPSS (GPS Roll Steering) course guidance will lead course changes (curved transition), fly arcs, holds and procedure turn/reversals.

Also see Avidyne IFD4XX/IFD5XX/Atlas Pilot's Guides for Normal operation procedures.

Section 5 – Performance

No change from basic Handbook.

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Section 6 – Weight and Balance

No change from basic Handbook. See AFM/POH for current weight and balance for this aircraft.

Section 7 – Systems Description

See Avidyne IFD4XX and IFD5XX FMS/GPS/Nav/Com Pilot Guides:

P/N 600-00300-001 for the IFD5XX Series
P/N 600-00304-000 for the IFD4XX Series
P/N 600-00300-002 for the Atlas Series
P/N 890-00039-010 Bendix King AeroNav 900 and 910
P/N 890-00041-008 Bendix King AeroNav 800

ASPEN AVIONICS

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Albuquerque, NM 87110 USA

FAA APPROVED
AIRPLANE FLIGHT MANUAL SUPPLEMENT
or
SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
for the
ASPEN AVIONICS
EFD1000 E5

The information contained in this Supplement must be attached to the FAA Approved Airplane Flight Manual or placed with the Pilot's Operating Handbook or other operating information when the Aspen Avionics EFD1000 E5 is installed in accordance with AML STC SA10822SC. This document must be carried in the aircraft at all times.

The information in this Supplement supplements or supersedes the information in the FAA Approved Airplane Flight Manual or other operating information only as set forth herein.

For limitations, procedures, and performance data not contained in this Supplement, consult the Airplane Flight Manual or other operating information.

Airplane Make: AMERICAN CHAMPION

Airplane Model: 8KCAB

Airplane Registration Number: N814AC

Airplane Serial Number: 814-98

FAA APPROVED for MONICA MERRITT

Manager, Southwest Flight Test Section, AIR 713
Federal Aviation Administration
Fort Worth, TX

Date 12/18/19

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LOG OF REVISIONS

Revision No.	Pages Affected	Description	FAA-Approved	Date	Aspen ECO
C	All	Initial Release	Not released		5523
D	All	Updated Section 3.2.8	Charles Wilcox	10 DEC 2018	5590
E	All	Added information for airplanes limited to VFR	Charles Wilcox	6 JUNE 2019	5720
F	All	Revision F supports upgrade to E5 2.11 Software that changes the NAV display from CDI to HSI format, adds BC function, and an optional GPS annunciations and Data Bar that includes True Airspeed, Wind Direction and Speed, and OAT. Updated Table 1 to specify the software version. Updated Table 5 to add the GPS and back course annunciations. Modified Sections 4.5 and 7.4 to describe back course logic. Added Section 7.9 for Data Bar system description.	Not released		5859
G	All	Added a note to the Attitude Degraded Abnormal Procedure. Updated Acronyms. Clarified Table 1. Added sentence in sections 3.2.2, 3.2.3, 3.3, 7.2.1 and 7.2 and 7.9 linking potential airspeed anomalies to TAS and Winds anomalies. Change marks are shown for Revisions F and G.	CWW	18 DEC 2019	5896

Prepared By:	Penny Heinz	Reviewed By:	David Bibby	See ECO Record For Release Authorization

TABLE OF CONTENTS

TABLE OF TABLES

1 General

1.1 System Overview

The EFD1000 E5 is a flat-panel LCD that provides display of attitude, airspeed, altitude, vertical speed, turn rate, slip/skid and direction of flight. Depending on the optional navigation equipment connected, the EFD1000 E5 can also provide display of lateral and vertical navigation deviations. The internal battery provides 30 minutes of operation of the EFD1000 E5 in the event of loss of power to the system.

When interfaced with a compatible autopilot, the EFD1000 E5 provides heading and course information to the autopilot, which enables the autopilot to follow the Course and GPSS values set by the pilot on the display. When interfaced with an EA100 A/P AHRS, the EFD1000 E5 is the source for attitude input to the autopilot.

1.2 Installed Equipment List

Table 1 shows the list of Aspen Equipment installed in this aircraft. Use the table to determine the parts of the AFMS that are applicable to this aircraft.
This table is to be completed during installation by the installation facility.

Table 1 - Installed Equipment List

Available Equipment	Installed Equipment ✓	Remarks
EFD1000 E5 with Internal Battery	✓	
MAP Software E5 2.11 or subsequent. The E5 with software version E5 2.11 features an HSI.		When this row is unchecked, the MAP Software version is E5 2.10. The E5 with software version E5 2.10 features a CDI.
GPS annunciations and optional Data Bar features enabled.		This row applies to Software Version E5 2.11 only.
EA100 A/P AHRS		
VLOC1 integrated with the EFD1000 E5 System		
GPS1 integrated with the EFD1000 E5 System		This must be an authorized GPS integration.

Table 2 is used to identify the backup instruments.
This table is to be completed during installation by the installation facility.

Table 2 - Backup Instruments Configuration for the EFD1000 E5

Standby Equipment	Installed Equipment ✓	Remarks
Electric Turn and Slip Indicator or Turn Coordinator		Not required for airplanes limited to VFR. See the placard installed in the Cockpit
Standby Attitude Indicator		Not required for airplanes limited to VFR. See the placard installed in the Cockpit
Standby Altimeter	✓	This instrument is always required.
Standby Airspeed Indicator	✓	This instrument is always required.
Magnetic Compass	✓	This instrument is always required.

1.3 List of Acronyms and Abbreviations

A ....Auto
A/P ....Autopilot
ACU ....Analog Converter Unit
ADAHRS ....Air Data Attitude Heading Reference System
AHRS ....Attitude Heading Reference System
AFM ....Airplane Flight Manual
AFMS ....Airplane Flight Manual Supplement
APPR ....GPS Approach Mode
ALT ....Altitude
AML ....Approved Model List
ATC ....Air Traffic Control
BARO ....Barometric Pressure Setting
BAT ....Battery
BC1 ....Back Course
C ....Celsius or Centigrade
CDI ....Course Deviation Indicator
CM ....Configuration Module
Config. ....Configuration
CRS ....Course
ECO ....Engineering Change Order
EFD ....Evolution Flight Display
EXT PWR ....External Power
FAA ....Federal Aviation Administration
GPS ....Global Positioning System
GPSS ....GPS Steering
GS ....Groundspeed
HDG ....Heading
Hot Key ....Any one of the five diagonal-marked buttons arranged on the right side of the E5
HSI ....Horizontal Situation Indicator
IAS ....Indicated Airspeed
IFR ....Instrument Flight Rules
IMC ....Instrument Meteorological Conditions
In ....Inches
Inc. ....Incorporated
INIT ....Initialization
INTEG ....GPS Integrity Indication
IOP ....Input-Output Processor
KIAS ....Knots Indicated Airspeed
KOEL ....Kinds of Operations Equipment List
KT ....Knots
LCD ....Liquid Crystal Display
LDI ....Lateral Deviation Indicator
LOC ....Localizer
MAP ....Main Application Processor
MSG ....GPS Message
N/A ....Not Applicable
NAV ....Navigation
NM ....New Mexico
OAT ....Outside Air Temperature
OPS ....Operations
REM ....Remaining
REV ....Reversion
RSM ....Remote Sensor Module
SAFM ....Supplemental Airplane Flight Manual
STC ....Supplemental Type Certificate
SW ....Software
TAS ....True Airspeed
UNAV ....Unavailable
V ....Volts
VDI ....Vertical Deviation Indicator
VFR ....Visual Flight Rules
VHF ....Very High Frequency
VMC ....Visual Meteorological Conditions
VOR ....VHF Omni-directional Radio Range
VLOC1 ....VOR / Localizer
WPT ....GPS Waypoint

2 Limitations

The following limitations pertain to the installed equipment in the aircraft. See Table 1 and Table 2 for the lists of installed equipment in this aircraft.

2.1 Kinds of Operation for the EFD1000 E5

The Aspen EFD1000 E5 may replace (or supplement, depending on installation) the attitude and heading/navigational instruments. Refer to the basic airplane KOEL for the required equipment for the planned flight operation. If the basic airplane does not have a KOEL, refer to the applicable flight regulations for the appropriate equipment requirements.

Use of the EFD1000 E5 display as required equipment is predicated on having all the operational equipment in column 1 or 2 of Table 3 for IFR flight, if the airplane is approved for IFR Flight. See the placard in the cockpit to determine if this airplane is approved for IFR flight.

Table 3 - Minimum Operational Equipment Required for IFR Flight

Equipment	Column 1 IFR* Minimum Equipment		Column 2 IFR* Minimum Equipment
EFD1000 E5 with Internal Battery	✓	Or	✓
Magnetic Compass	✓		✓
Electric Turn and Slip indicator or Turn Coordinator			✓
Standby Attitude Indicator	✓		
Standby Airspeed Indicator	✓		✓
Standby Altimeter	✓		✓
GPS1 integrated with the EFD1000 E5 System	✓		✓

For VFR, the minimum operational equipment for flight (in addition to the basic required equipment) is shown in column 1 of Table 4.

Table 4- Minimum Operational Equipment Required for VFR Flight

Equipment	Column 1 VFR* Minimum Equipment
EFD1000 E5 with Internal Battery	Optional
Magnetic Compass	✓
Electric Turn and Slip indicator or Turn Coordinator	
Standby Attitude Indicator	
Standby Airspeed Indicator	✓
Standby Altimeter	✓
GPS1 integrated with the EFD1000 E5 System	

* See the cockpit placard to determine if this aircraft is approved for IFR flight or is restricted to VFR.

2.2 EFD1000 E5 System Limitations

1. Use of the EFD1000 E5 for IFR flight in the region within 750 nautical miles of the magnetic North or South Pole, based solely upon the attitude and heading data provided by the EFD1000 E5, is NOT AUTHORIZED.
2. For seaplane operation, if the ADAHRS is unable to align due to wave action, departure under IMC or IFR is PROHIBITED.
3. Takeoff for IFR flight with aircraft voltage (as indicated on the EFD1000 E5) below 12.3V (14V electrical system) or 24.6V (28V electrical system) is NOT AUTHORIZED.

4. When the battery charge status on the EFD1000 E5 is less than 80% or has failed, takeoff for IFR flight is NOT AUTHORIZED.
5. When the cabin temperature is below -20C, takeoff for IFR flight is NOT AUTHORIZED.
6. When the "ON BAT" annunciation is shown on the EFD1000 E5 takeoff for IFR flight is NOT AUTHORIZED.
7. IFR flight is not authorized if the GPS that is integrated with the EFD1000 E5 is invalid as shown by an amber GPS1 indication and/or no groundspeed indication on the EFD1000 E5.
8. When IFR, do not power-cycle the EFD1000 E5 in flight.
9. For **ATTITUDE DEGRADED** mode operations in IMC, do not exceed a half standard rate turn or pitch more than ±5° relative to level flight.
10. For airplanes limited to VFR without GPS Integration: If airspeed fails to zero in flight the attitude and heading indications are unreliable.

2.3 Placard

1. The following placard is installed when IFR operation is authorized:

ON BAT Dispatch Limit is 80%
See EFD1000 E5 AFMS

2. The following placard is installed if this airplane is limited to VFR:

Operation of This Aircraft is
Limited to VFR Only

3 Emergency/Abnormal Procedures

3.1 Emergency Procedures: Electrical Fire or Smoke in the Cockpit

3.1.1 The EFD1000 E5 *IS* the Source of Electrical Fire or Smoke in the Cockpit (i.e. the EFD1000 is not operating)

1. EFD1000 E5 on/off Switch.........OFF

3.1.2 The EFD1000 E5 *IS NOT* the Source of Electrical Fire or Smoke in the Cockpit (i.e. the EFD1000 is operating)

1. Aircraft Electrical Power........Follow the AFM or Standard Operating Procedures.
2. The EFD1000.......................Automatically presents the "ON BAT" annunciation when the Master switch is turned off. See paragraph 3.2.5 below.

3.2 Abnormal Procedures

3.2.1 EFD1000 E5 Failure, IFR operation in IMC

1. ATTITUDE ....Fly by reference to turn and slip, altimeter and airspeed (partial panel techniques) or backup attitude indicator (if available).
2. GPS and Compass ....Refer to the GPS for positional awareness and the compass for navigation heading information.

3. AUTOPILOT.................. If the airplane is equipped with the EA100 A/P AHRS (see Table 1) the autopilot will automatically disconnect. If not equipped with an EA100, verify proper autopilot operation and cross-check against available attitude and navigation information.

4. Exit IMC

3.2.2 ATTITUDE DEGRADED Mode - Pitot Tube Blockage resulting in Erroneous Airspeed Indication (GPS Operational)

1. PITOT HEAT..............ON, in the event that the cause is Pitot Icing.
2. AUTOPILOT...............If the airplane is equipped with the EA100 A/P AHRS (see Table 1) the autopilot will automatically disconnect. If not equipped with an EA100, verify proper autopilot operation and cross-check against available attitude and navigation information.
3. ATTITUDE..................EFD1000 E5 attitude is presented. Follow the limitations for ATTITUDE DEGRADED mode operations. See Section 2.2 item 9.
4. Exit IMC unless the condition is corrected.

NOTE: When flying an instrument approach in Degraded Mode it is recommended to advise ATC that you are operating with limited bank and pitch capabilities. ATC coordination along with planning and anticipation can lessen rates of turn and intercept angles to comply with operational limitations. See Section 2.2 item 9.

CAUTION: If airspeed is in error due to, for example, a pitot or static system anomaly, then TAS and Wind data are unreliable and should not be used.

3.2.3 Pitot Tube Blockage resulting in Erroneous Airspeed Indication (Integrated GPS not Operational)

1. PITOT HEAT..............ON, in the event that the cause is Pitot Icing.
2. AUTOPILOT...............If the airplane is equipped with the EA100 A/P AHRS (see Table 1) the autopilot will automatically disconnect. If not equipped with an EA100, verify proper autopilot operation and cross-check against available attitude and navigation information.
3. ATTITUDE..................EFD1000 E5 presents a Red X. Fly by reference to turn and slip, altimeter and airspeed (partial panel techniques) or backup attitude indicator if available.
4. Exit IMC.

Operation under IFR without an operational GPS is not authorized. See Section 2.1. When the airspeed function is restored, the EFD1000 E5 will return to normal operation, but without the ATTITUDE DEGRADED Mode availability.

CAUTION: If airspeed is in error due to, for example, a pitot or static system anomaly, then TAS and Wind data are unreliable and should not be used.

3.2.4 Invalid GPS as shown by an amber "GPS1" indication and/or no groundspeed indication on the EFD1000 E5

1. Exit IMC.

Operation under IFR with an invalid GPS is not authorized. See Section 2.1.

3.2.5 Airplane Electrical Failure: "ON BAT" Annunciation

The "ON BAT annunciation is an indication that the airplane alternator or generator has failed and the E5 is operating on internal battery power.

1. Aircraft Electrical Power .... Follow AFM Procedures to restore power. If unable to restore power, proceed as follows:
2. EFD1000 E5 on/off Switch .... Turn Off to isolate the EFD1000 E5 from the rest of the electrical system.
3. MENU .... Press, then press and turn the left knob to manually reduce the Display brightness to 40 or less.
4. Exit IMC.

The EFD1000 E5 is designed to remain operational for at least 30 minutes when the battery level shows 80% remaining. If the battery level shows less than 80% then the remaining operational time may be less. Change the flight plan accordingly.

The Battery level indication decreases in increments of 5%.

3.2.6 Attitude and Heading Reference System (AHRS) Reset

1. AUTOPILOT .... MANUALLY DISCONNECT
2. MENU .... Select the first page, titled "GENERAL SETTINGS"
3. "AHRS: RESET?" LINE SELECT KEY .... Press
4. "AHRS: RESET?" LINE SELECT KEY .... Press again to confirm reset
5. MENU .... Press to return to normal operation

3.2.7 Turn Off the EFD1000 E5 in Flight

1. EFD1000 E5 on/off Switch .... OFF
2. REV Button .... Push and hold until the display turns off

3.2.8 Turn On the EFD1000 E5 in Flight (only permitted if airspeed and/or the integrated GPS is operational)

1. Verify that airspeed and/or the GPS that is integrated with the EFD1000 E5 is operational (See Table 1).
2. EFD1000 E5 on/off Switch .... ON
6. REV Button .... Push and hold for several seconds until the Aspen Avionics logo display appears, then release the button.

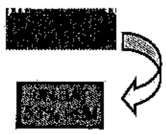
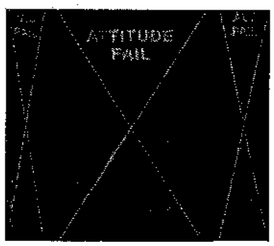
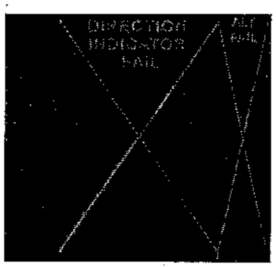
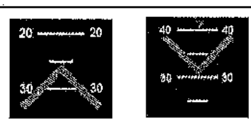
Turning on the EFD1000 E5 in flight with both a Pitot blockage and an invalid integrated GPS system will result in unannunciated erroneous attitude information.

3.3 Warnings, Cautions and Advisories

The following table shows the Warning, Caution and Advisory indications on the EFD1000 E5 and identifies the appropriate pilot action. Several Warning, Caution and Advisory messages are dependent on the options and equipment installed in the airplane. Refer to Table 1 to determine the options and equipment installed in this airplane.

Table 5 - Warning, Caution and Advisory Annunciations

Warning	W	Caution	C	Advisory	A

	Annunciation	Description	Pilot Action
		Presented when the EFD1000 E5 is operating on the internal battery. The countdown timer appears first and is then replaced by the ON BAT and % charge remaining annunciation.	Reduce the screen brightness to maximize battery duration. See Section 3.2.5 Airplane Electrical Failure: "ON BAT" Annunciation.
	 	The EFD1000 E5 is inoperative.	Use the standby instruments. Perform an AHRS Reset if practical.
		Red chevrons displayed on the Attitude Indicator's pitch scale to indicate extreme pitch up and down attitudes.	Pitch the aircraft in the direction of the chevrons to restore level flight.
		A red slash through any navigation source means the source is not available.	Activate a flight plan or tune an appropriate VOR.

	Annunciation	Description	Pilot Action
C	**Panel Mounted Indicator Lamp** **A/P AHRS Fail** or **A/P AHRS FAIL**	The attitude input provided to the autopilot is inoperative. This is a function of the EA100. See Table 1 to determine if this airplane has an EA100.	Fly manually. The autopilot will disconnect and cannot be re-engaged until the fault is cleared.
C	ATTITUDE DEGRADED	ATTITUDE DEGRADED mode. The Pitot input has failed (perhaps due to icing), and GPS aiding is used for the attitude indication. The attitude indication can be in error and maneuvering limitations are to be followed. This function is only available if an authorized GPS is integrated with the EFD1000 E5. See Table 1.	The autopilot will automatically disconnect. If IMC, fly within the limitations in Section 0 item 5. Turn on the Pitot Heat to clear the condition if icing is the cause.
C	CROSS CHECK ATTITUDE	The attitude indication could be in error. This function is only available if an authorized GPS is integrated with the EFD1000 E5. See Table 1.	Cross check attitude and heading indications against alternate sources.
C	CHECK PITOT HEAT	Possible Pitot Obstruction. The annunciation appears when the integrated GPS is invalid and the Pitot input has failed. Accompanied by Red X attitude and heading. This function is only available if an authorized GPS is integrated with the EFD1000 E5. See Table 1.	Use an alternate attitude and heading source. Turn on Pitot Heat to clear the condition if icing is the cause. If airspeed is in error due to, for example, a pitot or static system anomaly, then TAS and Wind data are unreliable and should not be used.
C	GPS1	GPS Invalid indications. This function is only available if an authorized GPS is integrated with the EFD1000 E5. See Table 1.	Select alternate navigation. Operation is not authorized with an invalid integrated GPS.
C	HDG GPSS1 GPSS	Indicates the GPSS source is invalid (e.g. the flight plan was deleted). The autopilot will fly wings-level until valid GPSS signal is available and GPSS is re-engaged. This function is only available if an authorized GPS is integrated with the EFD1000 E5. See Table 1.	No immediate action. Activate a new flight plan to permit GPSS re-engagement. After activating a new flight plan, press the hotkey labeled GPSS to re-engage GPSS.
C	FREE GYRO MODE FMG	Annunciation presented on the HSI when the magnetic heading cannot be resolved. After 4 minutes of free gyro operation the attitude and heading indications will be removed.	Cross check attitude and heading indications against alternate sources. Expect attitude and heading loss after six minutes.
C	BAT: FAILED	Annunciation presented in the menus when the EFD1000 E5 internal battery is inoperative.	Takeoff is not authorized when the EFD1000 E5 is required. See Section 2.2.

	Annunciation	Description	Pilot Action
C	MAP Software E5 2.11 and subsequent: 	GPS Integrity indication. This indication is only available if an authorized GPS is integrated with the EFD1000 E5, the MAP software version is E5 2.11 or subsequent and the feature is enabled. See Table 1.	The GPS in use is degraded. See the applicable GPS AFMS for more information.
A		GPSS is operational. This function is only available if an authorized GPS is integrated with the EFD1000 E5. See Table 1.	No action. GPSS can be used if desired.
A	MAP Software E5 2.11 and subsequent: 	GPS annunciations that are provided by the GPS source. TERM can also be displayed in the same location as APPR. This indication is only available if an authorized GPS is integrated with the EFD1000 E5, the MAP software version is E5 2.11 or subsequent and the feature is enabled. See Table 1.	No action. See the GPS AFMS for additional information on the meaning of these annunciations.
A	MAP Software E5 2.11 and subsequent: 	"BC1" is presented as the nav annunciation when the airplane is established on the localizer back course and the HSI course needle is properly set to the front course. This indication is only available if the MAP software version is E5 2.11 or subsequent. See Table 1.	The LDI indications are normal and match the HSI left/right deviations. Fly the approach.

4 Normal Procedures

4.1 Exterior Inspection

1. RSM (when mounted externally) Check for condition and security, and the Vent Hole is clear of obstructions.
2. RSM Lightning Tape on the front of the RSM (when mounted on top of the airplane) .. Check for condition and security.

4.2 Taxi Checks Before IFR Departure

1. Electric Turn and Slip indicator or Turn Coordinator
   a. During taxi turns .... The slip ball must move freely to the outside of the turn and the turn indicator must show a smooth turn in the proper direction.
2. GPS1 Annunciation.................... Verify that groundspeed is displayed on the EFD1000 E5 when taxiing, and there is no Amber GPS1 Invalid indication.

4.3 Before Take-Off Checks Before IFR Departure

4.3.1 Check the Internal Battery Level Before Departure

1. MENU...Turn the right knob to select the POWER SETTINGS page.
2. Observe the "EXT PWR" line item ....Check that the input voltage is greater than 13 Volts and less than 14.6 volts for 14-volt airplane electrical systems, or greater than 26 Volts and less than 30 volts for 28-volt airplane electrical systems.
3. Observe the BAT line item ....Verify battery status is "CHARGING" or "READY"
4. Select "Battery" ....After a few seconds, verify the red "ON BAT indication is more than 80% REM.

   If the EFD1000 E5 internal temperature is low, the battery percentage may initially go below 80% and then increase and stabilize within approximately five minutes.
5. Select EXT PWR..................................To return the system to normal power.
6. MENU...Press to return to normal operation.
7. Verify..The red "ON BAT" indication is not displayed.

Any condition other than that described above indicates an internal battery failure and dispatch is not authorized.

8. Heading..Compare against a known heading (runway heading).

4.4 Adjusting Screen Brightness

1. Press MENU .... To enable the left knob to control the display brightness
2. Push then twist the left knob .... To brighten or darken the display.
3. MENU.. Press to return to normal operation

4.5 Localizer Back Course Operation

For MAP software E5 2.10:
When operating on a Localizer Back Course approach, the Lateral Deviation Indicator (LDI) presents Back Course deviations (reverse sensing).

For MAP software E5 2.11 and subsequent:
When operating on a Localizer Back Course approach, the HSI course needle arrow must be set to the inbound localizer course (opposite the back course). "BC1" is presented adjacent to the LDI. When "BC1" is shown, the LDI presents deviations that are corrected for reverse sensing and match the left/right deviations on the HSI.

See Table 1 to determine the MAP software version in this airplane.

The LDI is the left/right deviation indicator that is presented on the PFD when inbound on most approaches. It is located below the attitude indicator and above the Data Bar.

4.6 Shutdown Checks

After conducting normal Shutdown checklist items, ensure the following:

1. EFD1000 E5 Switch................................OFF

5 Performance

NO CHANGE

6 Loading Information

NO CHANGE

7 Systems Description

The following paragraphs describe the EFD1000 E5 System.

7.1 EFD1000 E5 Supporting Documentation

The EFD1000 E5 Pilot's Guide, Aspen document 091-00086-001 Revision ( ) or subsequent revision, contains detailed information on the operation of the EFD1000 E5. The EFD1000 E5 Pilot's Guide should be carried in the aircraft and available to the pilot.

Go to aspenavionics.com/support for current Pilot Guides and Pilot Guides Errata and Addenda.

7.2 EFD1000 E5

7.2.1 ATTITUDE DEGRADED Mode

The attitude system in the EFD1000 E5 uses MEMS gyro technology. Airspeed aiding is used to support the attitude solution. If the airspeed fails from a blocked pitot tube (from icing, for example), the EFD1000 E5 will detect the condition by comparing the airspeed to the GPS groundspeed. In this condition, the EFD1000 E5 will automatically substitute GPS groundspeed aiding for the attitude solution, and the attitude indicator will be presented and can be used. The message, "ATTITUDE DEGRADED mode" will be displayed (see Section 3.3). Groundspeed is presented from the GPS.

CAUTION: If airspeed is in error due to, for example, a pitot or static system anomaly, then TAS and Wind data are unreliable and should not be used.

Errors in pitch and roll on the attitude indicator can be expected. Keeping the pitch and roll excursions from level flight to a minimum will keep the pitch and roll errors to a minimum. There are limits to the angle of pitch and bank that are permitted during the ATTITUDE DEGRADED Mode. See Section 2.2 item 9.

Limiting bank angle may reduce the aircraft's ability to maintain its desired track and could affect the ability to satisfy ATC path expectations, especially when executing large angle turns. If operating in degraded mode, advising ATC of the reduced turn capability is recommended.

This function is only available if an authorized GPS is integrated with the EFD1000 E5. See Table 1.

7.2.2 Internal Battery

The EFD1000 E5 contains an internal battery which can provide continued operation of the EFD1000 E5 for 30 minutes. The red "ON BAT" indication (XX% REM) presents an estimate of the amount of battery charge remaining. As the battery depletes, this percentage will decrease.

Minimizing the brightness of the display will extend the time available on battery.

At a charge of 80% or more, the battery is designed to provide sufficient power for operation of the EFD1000 E5 for 30 minutes in the event of a complete loss of electrical power to the system.

In the event of loss of power generation or an overvoltage condition on the airplane, the EFD1000 E5 will revert to internal battery power. This will be indicated by a red "BAT LEVEL" indication followed by a % REM, or % remaining. To complete the isolation of the EFD1000 E5, it is necessary to use the EFD1000 E5 power switch as indicated in the "Abnormal Procedures" Section.

It is important to assure that the battery is operating, charging, and is at sufficient charge level before IFR flight. The Normal Procedures" section describes the appropriate procedure.

7.2.3 Remote Sensor Module (RSM)

The RSM provides magnetic heading information to the EFD1000 E5 and is powered by the EFD1000 E5.

7.2.4 Airplanes Limited to VFR without GPS Integration

An airplane limited to VFR without GPS integration is dependent on airspeed aiding for proper attitude performance. If the airspeed indication fails to zero in flight (such as due to a pitot tube blockage) the attitude and heading indications are unreliable. A "Crosscheck Attitude" indication may be presented momentarily.

7.3 EA100 A/P AHRS

The EA100 accepts input from the EFD1000 E5 and outputs pitch and roll signals to the autopilot.

7.4 VHF Interface

When installed and configured, VLOC 1 can be selected by pressing the lower center button on the EFD1000 E5. With MAP software E5 2.10, the EFD1000 E5 heading indicator is presented with a CDI. With MAP software E5 2.11 and subsequent, an HSI is presented. See Table 1 to determine the MAP software version in this airplane.

7.4.1 Localizer Back Course

For MAP software E5 2.10:
When operating on a Localizer Back Course approach, the LDI presents Back Course deviations (reverse sensing).

For MAP software E5 2.11 and subsequent:
When flying the final approach course of a Localizer Back Course approach, use the normal HSI back course procedure by setting the HSI course needle to the front (inbound localizer) course (opposite the back course). When on the back course, the airplane heading is opposite the front course, and "BC1" is presented adjacent to the Lateral Deviation Indicator. When "BC1" is shown, the LDI presents deviations that are corrected for reverse sensing and match the HSI left/right deviations.

See Table 1 to determine the MAP software version in this airplane.

The LDI is the left/right deviation indicator that is presented when inbound on most approaches. It is located below the attitude indicator and above the Data Bar.

7.5 GPS Interface

GPS1 can be selected using the lower center button on the EFD1000 E5. The GPS interface supports the Attitude Degraded Mode. This function is only available if an authorized GPS is integrated with the EFD1000 E5. See Table 1.

7.6 Altitude Bug

The altitude bug can be used as an altitude reminder. The control is accessed by pressing the right knob twice. No visual or aural alerting function is provided.

7.7 Magnetometer

Very strong magnetic disturbances can affect the Magnetometer and thus the heading and attitude of the EFD1000 E5. The EFD1000 E5 is designed to provide a Cross Check Attitude annunciation when a condition like this occurs. See Table 5 - Warning, Caution and Advisory Annunciations.

7.8 Heading, Course and Barometric Pressure Adjustment

When Heading, Course or Barometric Pressure is adjusted, the adjustment value is enlarged for quick view and will return to the normal size after ten seconds. Pressing the adjustment knob will immediately return the adjustment value to the original size.

7.9 Data Bar

The Data Bar presents True Airspeed (TAS), GPS Ground Speed (GS), Outside Air Temperature (OAT), Wind Direction and Speed, and Barometric Pressure Setting. OAT is obtained from the temperature sensor located in the RSM. The optional Data Bar features are only available when enabled during installation.

CAUTION: If airspeed is in error due to, for example, a pitot or static system anomaly, then TAS and Wind data are unreliable and should not be used.

See Table 1 to determine if the Data Bar is enabled on this airplane.

7.10 Hotkeys and Buttons

Hotkeys with no label are non-functional.

ADS-B Technologies, LLC
900 Merrill Field Drive
Anchorage, Alaska 99501, U.S.A

FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT

or

SUPPLEMENTAL FLIGHT MANUAL

For The

L-3 Aviation Products
Lynx Multilink Surveillance System
Model NGT-9000
L-3 Part Number 9029000-20000

This Airplane Flight Manual Supplement or Supplemental Flight Manual must be carried on board the aircraft when the NGT-9000 Multilink Surveillance System is installed in accordance with the AML Supplemental Type Certificate SA02444AK.

The information contained herein supplements the FAA approved Airplane Flight Manual or the type design data only in those areas listed herein. For limitations, procedures and performance information not contained in this document, refer to the FAA approved Airplane Flight Manual, manual material, markings, placards, or other information that was required by the applicable regulations under which the aircraft was type certificated.

Make and Model Airplane: ACA 8KCAB

Airplane Serial Number: 814-98

Airplane Registration Number: N814AC

FAA Approved:

August A. Asay
Manager, Anchorage Aircraft Certification Office
Federal Aviation Administration
Anchorage, Alaska

Date: MAY - 4 2016

FAA APPROVED
AIRPLANE FLIGHT MANUAL SUPPLEMENT
or
SUPPLEMENTAL FLIGHT MANUAL
For The

L-3 Aviation Products
Lynx Multilink Surveillance System
Models NGT-9000
L-3 Part Number 9029000-20000

RECORD OF REVISIONS

Revision	Date of Revision	Description
Original	3/31/2015	Original Issue
1	6/19/2015	Typographical error corrections Corrections to Table 3-1 in section 3.2.1
2	3/27/2016	Incorporation of s/w Revision 2: ATAS and TAWS

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TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

SECTION 1. GENERAL

1.1 Functional Description

The Lynx MultiLink Surveillance System (also referred to in this manual as the Lynx NGT-9000) is a Mode S Level 2 dens Class 1 Transponder with an integrated GPS receiver providing Automatic Dependent Surveillance-Broadcast (ADS-B) output using a 1090ES (Extended Squitter). The unit also receives ADS-B data via 1090ES and UAT (978 MHz Universal Access Transceiver). Figure 1-1 is a depiction of the NGT-9000.

The unit replies to Mode A, Mode C and Mode S interrogations receiving interrogations at 1030 MHz and transmitting responses at 1090 MHz. The unit is equipped with IDENT capability that activates the Special Identification (SPI) pulse for 18 seconds.

Ground stations can interrogate Mode S Transponders individually using a 24-bit ICAO Mode S address, which is unique to the particular aircraft. In addition, ground stations may interrogate the unit for its transponder data capability and the aircraft's Flight ID.

The ADS-B provides own aircraft data with Enhanced Visual Acquisition (EVAcq) traffic information that improves situational awareness and flight safety by providing aircraft position, velocity, and heading information that is automatically transmitted from other aircraft and ground stations providing immediate surveillance of air-to-air traffic.

In addition to ADS-B surveillance, the installed NGT-9000 includes an Active Traffic Awareness System (TAS), ADS-B Traffic Advisory System (ATAS) and Terrain Awareness and Warning System (TAWS), as well as support for both top and bottom antenna diversity.

The 1090ES and UAT ADS-B data link have the following capabilities:

- 1030MHz/1090 MHz In - Receive ADS-R and TIS-B
- 1090ES OUT - Transmits 1090 MHz Extended Squitter ADS-B
- UAT IN - Receives 978 MHz ADS-B, ADS-R and TIS-B, FIS-B, NOTAMS, and TFR's

Figure 1-1: Lynx NGT-9000

1.2 NGT-9000 ADS-B Traffic Advisory System (ATAS)

The ADS-B Traffic Advisory System (ATAS) is a passive system that monitors ADS-B, ADS-R and TIS-B ADS-B IN data and alerts the flight crew via on-screen alerts aural traffic calls and an optional Traffic Alert lamp to nearby aircraft and assists the pilot in the visual acquisition of aircraft that may represent a danger. Refer to the Pilots Guide, L-3 p/n 0040-17000-01 Revision G, or later, for examples of on-screen symbology and aural alerts.

- The tracking of other aircraft is in a cylindrical volume centered on own aircraft with a maximum radius of 20 nmi and extending 10,000 ft above and 10,000 ft below ownship.

- ATAS will track up to 60 intruders simultaneously.

- A Traffic Advisory (TA) is displayed when other aircraft are a potential threat.

- When ownship is in the airport environment, a Traffic Advisory (TA) is displayed 12.5 to 35 seconds prior to the CPA with another aircraft when the CPA is within 750 ft horizontally and 300 ft vertically.

- A TA symbol remains on the screen for at least 8 seconds unless the respective track is terminated.

- When the aircraft is outside the airport environment, aircraft that are within a range of 6 nmi of ownship with a vertical distance of +/- 1200 ft (if altitude is reporting) are classified as a Proximate Advisory (PA). A PA is displayed only for aircraft that are in air.

- ATAS and TAS may operate at the same time with traffic information being correlated by the unit

When ATAS is installed, an Audio Acknowledge button will cancel the current aural announcement.

1.3 NGT-9000 Terrain Awareness and Warning System (TAWS) [Optional]

The Terrain Awareness and Warning System (TAWS) is an optional function that is set up during installation. The TAWS function continuously monitors the aircraft's position, altitude, speed, track, and phase of flight and compares the information to the terrain database loaded during installation. Terrain and obstacle hazards are indicated by cautions and warnings using screen annunciators, aural terrain alerts, and Terrain Caution and Warning alert lamps. Refer to the Pilots Guide, L-3 p/n 0040-17000-01 Revision G, or later, for examples of on-screen symbology and aural alerts.

The TAWS function uses Forward Looking Terrain Avoidance (FLTA) and Ground Proximity Warning System (GPWS) functionality to determine when a terrain alert or altitude callout is triggered due based on the following conditions:

- Reduced required terrain or obstacle clearance (FLTA)
- Imminent terrain impact (FLTA)
- Premature descent
- Excessive descent rate (GPWS)
- Negative climb rate or altitude loss after takeoff (GPWS)

- Passing an altitude of 500 ft (GPWS)

When TAWS is installed, an Audio Acknowledge button will cancel the current aural announcement.

1.4 NGT-9000+ Traffic Awareness Overview [Optional]

The NGT-9000+ ("9000 Plus") supports optional active Traffic Awareness System (TAS).

The TAS option is an active system that operates as an aircraft-to-aircraft interrogation device. The unit interrogates transponders in the surrounding airspace similar to ground based radar. When replies to these active interrogations are received, the responding aircraft's range, altitude, and closure rates are computed to plot traffic location and predict collision threats. The unit alerts the flight crew to nearby transponder equipped aircraft and assists the pilot in the visual acquisition of aircraft that may represent a danger. Traffic information, out to a selected range, is graphically displayed on the unit or alternate display. Refer to the Pilots Guide, L-3 p/n 0040-17000-01 Revision G, or later, for examples of on-screen symbology and aural alerts.

- The system display shows the relative position of traffic using text, shapes (i.e., Traffic Advisory = solid circle; Other Traffic = open diamond) and colors.
- The effective active-mode surveillance range is 35 nm and the system is capable of tracking 35 Intruders simultaneously with the target bearing relative to the nose of own aircraft.
- The tracking of targets is in a cylindrical volume centered on own aircraft that has, at a minimum, a radius of 35 nm and extends 10,000 ft above and 10,000 ft below own aircraft.
- The system uses a voice audio output that announces Traffic Advisory and relative altitude.

1.5 NGT-9000D Antenna Diversity Overview [Optional]

The NGT-9000D has the same hardware and firmware/software as the basic NGT-9000, but is capable of supporting dual L-band antennas (one bottom and one top) to enhance system performance and prevent fuselage blanking of a single bottom antenna in tight turns into a ground station or UAT target. The upper L-band antenna may be a single blade antenna or the optional Directional Antenna.

1.6 Capabilities

The NGT-9000 transceiver can be software configured as either an NGT-9000, 9000+, or 9000D. It can also be installed with, or without TAWS and peripheral ARINC-429 or RS-422 panel mounted traffic and weather displays.

1.7 L-Band UAT Antenna

The L-Band antenna is used by the Lynx NGT-9000 to transmit and receive 1090 MHz ADS-B and receive 978MHz ADS-B (UAT). At least one L-band antenna must be located on the bottom of the aircraft.

1.8 GPS Antenna and the MSS Internal GPS Receiver

The GPS utilizes signals from Global Positioning System (GPS) satellite constellation and Satellite-Based Augmentation Systems (SBAS). The MSS has an internal GPS function that provides position, velocity, time and Integrity (NIC, NAC, etc.) information to the ADS-B functions. It is located on the top of the aircraft.

NOTE

The NGT-9000's built-in GPS does not provide Ownship position for external moving map displays

1.9 Configuring the NGT-9000

The unit's configuration is preserved within the Data Configuration Module (DCM), which is permanently attached to the aircraft and communicates with the NGT-9000 via a serial connection. The configuration options are set up during installation and cannot be changed except by a licensed installer.

NOTE

The NGT-9000's configuration parameters can only be changed by a licensed installer

1.10 Personal Electronic Devices

The Lynx NGT-9000 supports the use of personal electronic devices (e.g., iPad) via a Wi-Fi connection. The PED must use approved applications that support the ADS-B broadcast services (i.e., ADS-B In, TIS-B, ADS-R, and FIS-B). Check with an L-3 approved avionics dealer or contact L-3 Avionics Systems for a current list of approved applications.

1.11 Weather Displays

NEXRAD, METARS, TAFS, PIREPS, NOTAMS and temperatures and winds aloft are displayed on the NGT-9000 provided that the aircraft is within the service volume of a ground station. Additionally, the same information can be displayed on approved weather displays can interface with the NGT-9000 to provide FIS-B weather information using the ADS-B IN link. Screen information and controls may be different for each of the approved displays.

Refer to your Installed Display operations manual for details on operation and a description of how the weather is depicted. Check with an L-3 approved avionics dealer or contact L-3 Avionics Systems for a current list of approved weather displays.

1.12 Traffic Displays

The NGT-9000 will provide, at a minimum, UAT, TIS-B and ADS-R traffic on the unit's built-in display and can repeat this traffic information on any approved ARINC-429 or RS-422 display. The NGT-9000+ can also display active Traffic Awareness System (TAS) targets on the unit's built-in display and can repeat this traffic information on any approved ARINC-429 or RS-422 display. Figure 1-1 Illustrates a typical traffic display on the NGT-9000 screen. Table 1-1 illustrates typical target symbology.

Refer to the Pilots Guide, L-3 p/n 0040-17000-01 Revision G, or later, for details on operation and a description of how the information is depicted. Check with an L-3 approves avionics dealer or contact L-3 Avionics Systems for a current list of approved traffic displays.

SYMBOL	DESCRIPTION - EXAMPLE
	Airborne Directional Traffic Advisory (TA) (TAS or ATAS option only)
	Airborne Directional Proximity Advisory (PA) *
	Airborne Directional Other Traffic (OT) * (Panel mount only)
	Airborne Non-directional (TA) (TAS or ATAS option only)
	Airborne Non-directional (PA) *
	Airborne Non-directional (OT) *
	On Ground Directional (OT)
	Ground Vehicle Directional
	On Ground Non-directional (OT)
	Ground Vehicle Non-directional
	Airborne Directional TA Traffic symbol with a data tag indicating a relative altitude of 100ft below with a horizontal velocity vector. (Panel mount only)
	Airborne Directional Other Traffic symbol with a data tag indicating a relative altitude of 800ft below own aircraft descending with a horizontal velocity vector. (Panel mount only)

Table 1-1: Typical Symbology

1.13 Interaction of Major Components

Figure 1-3 shows how the major components of the NGT-9000 connect to other aircraft systems.

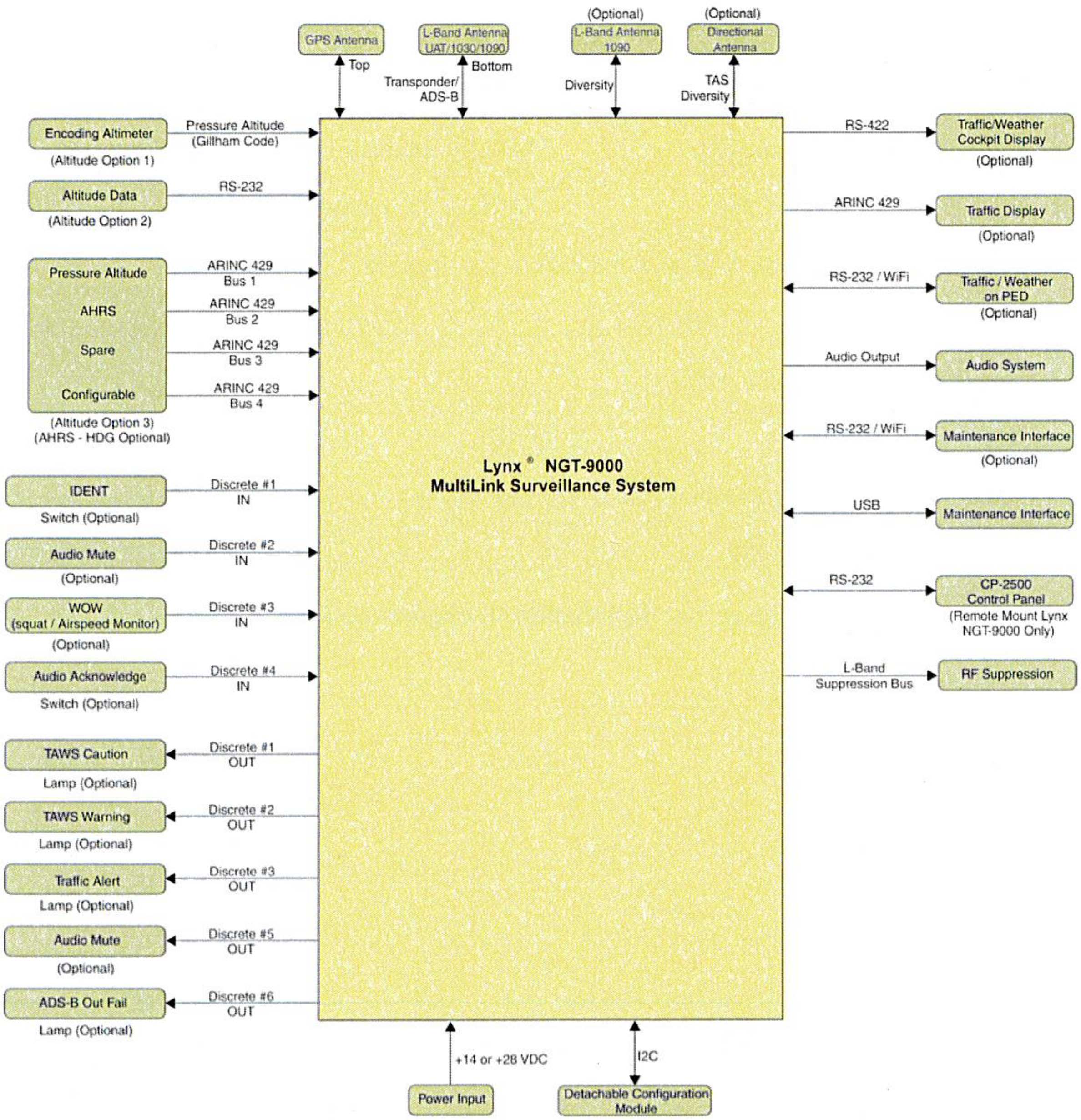

Figure 1-3: NGT-9000 Connections and Functions

1.14 Installation Configuration for This Aircraft

Figure 1-4 should be completed by a licensed installer.

This aircraft has been configured as a: ☐ NGT-9000 ☐ NGT-9000D ☐ NGT-9000+

ADS-B Identifier: ____________________ Aircraft N-Number: ____________________

FIS-B: ☐ Enabled ☐ Disabled TAS: ☐ Enabled ☐ Disabled

ATAS: ☐ Enabled ☐ Disabled TAWS: ☐ Enabled ☐ Disabled

Extended Callout Enabled for TAS and/or ATAS: ☐ Enabled ☐ Disabled

Interfaced Traffic Display: ☐ RS-422: ____________ ☐ ARINC-429: ____________

Interfaced WX Display: ☐ RS-422: ____________

Heading Source: ☐ YES ______________ ☐ NO

Weight On Wheels (WOW) Switch Installed: ☐ YES ☐ NO

Wi-Fi Enabled: ☐ YES ☐ NO

Figure 1-4: Installation Configuration Data

SECTION 2. LIMITATIONS

2.1 Minimum Documentation

The L-3 Pilot's Guide for the NGT-9000 Part Number 0040-17000-01 (Rev G, or later revision) must be carried on board the aircraft at all times.

2.2 Minimum Equipment

The NGT-9000 must have the following system interfaces in Table 2-1 fully functional in order to be compliant with the requirements for 14 CFR 91.225 and 91.227 ADS-B OUT operations:

Table 2-1: Required Equipment

Interfaced Equipment		Number Required	Number Installed
NGT-9000, NGT-9000D, or NGT-9000+ With operable SBAS position source		1	1
"ADS-B Fail" Indication	Lamp or panel	0	1 panel

2.3 ADS-B OUT Compliance

The NGT-9000 only complies with 14 CFR 91.227 when all its required functions are operational as indicated by external annunciators not being illuminated and/or interfaced display ADS-B messages not being present.

2.4 Anonymous Mode

Anonymous Mode must only be operated while operating under VFR and while Squawking a VFR code. Anonymous Mode must be turned off when requested by Air Traffic Control.

2.5 IDENT Function

The system must be capable of squawking IDENT when requested by Air Traffic Control.

2.6 ALT Function

While operating within airspace requiring an ADS-B OUT compliant transmitter, Pressure Altitude Broadcast Inhibit (PABI), or "No ALT" shall only be enabled when requested by Air Traffic Control.

2.7 Traffic Awareness

Traffic Awareness and Traffic Alerting are intended as an aid to visual acquisition of conflicting traffic and may not be used as the sole basis for aircraft maneuvering.

NOTE

Information shown on the display is provided to the pilot as an aid to visually acquiring traffic. Pilots should maneuver their aircraft based only on ATC guidance or positive visual acquisition of the conflicting traffic. Maneuver should be consistent with ATC instructions. ATC should be contacted for resolution of the traffic conflict.

2.8 Terrain Awareness

a. Navigation must not be predicated on the use of TAWS;
b. To avoid giving unwanted alerts, the TAWS must be inhibited when landing at an airport that is not included in the airport database;
c. The use of the TAWS terrain warning and Terrain Display functions if prohibited during QFE operations.
d. TAWS must meet the requirements of TSO-151c for Class B.

2.9 Applicable System Software

This AFMS/SFM is applicable to the software versions shown in Table 2-2.

Table 2-2: Software Version

Software	Part No.	Version
NGT-9000 Ops s/w	9020010-004	Rev 2.0
68DC Navigational Database North America (68.bin)	8010-22310-0201	Most current cycle*
72DC Cultural Features Database North American Extended (72.bin)	8010-12004-0001	Most current cycle*
71DC World Terrain Database	8010-23010-0001	Most current cycle*

* *There is no requirement to update this database because it is used only for informational purposes.*

SECTION 3. EMERGENCY PROCEDURES

3.1 Emergency Procedures

3.1.1 Terrain Warning Alert (Display Alert, Audio Alert, or Terrain Warning (Red) Lamp

TAWS Display **PULL UP**, Audio Alert of "***Terrain, Terrain; Pull Up, Pull UP"*** or ***"Obstacle, Obstacle; Pull Up, Pull Up***" and/or Red Terrain Warning Lamp................ IMMEDIATELY STOP DESCENT AND BEGIN MAXIMUM PERFORMANCE RATE OF CLIMB CONSISTENT WITH PHASE OF FLIGHT.

CHECK TERRAIN CLEARANCE, OR ATTEMPT TO VISUALLY ACQUIRE OBSTACLE.

CONTINUE CLIMB UNTIL CLEAR OF TERRAIN OR OBSTACLE

3.1.2 Terrain Caution Alert (CP-2500 Display Alert, Audio Alert, and/or Terrain Caution (Amber) Lamp)

TAWS Display **TERRAIN**, Audio Alert of "**Caution *Terrain, Caution Terrain"*** or ***"*Caution *Obstacle,* Caution *Obstacle***" and/or Amber Terrain Warning Lamp.......... IMMEDIATELY STOP DESCENT AND BEGIN A SAFE RATE OF CLIMB CONSISTENT WITH PHASE OF FLIGHT.

CHECK TERRAIN CLEARANCE, OR ATTEMPT TO VISUALLY ACQUIRE OBSTACLE.

CONTINUE CLIMB UNTIL CLEAR OF TERRAIN OR OBSTACLE

3.1.3 Loss Of Aircraft Electrical Power Generation (Loss of Generator)

Loss of electrical power generation ....REMOVE POWER FROM NGT-9000

If the NGT-9000 is shut down in order to shed load from the aircraft's electrical system, ADS-B OUT and ADS-B IN will no longer be available. If under ATC control, notify your Controller of loss of ADS-B OUT.

> **NOTE**
>
> This guidance is supplementary to any procedure provided in the AFM or POH for the aircraft in Loss of Power situations

3.1.4 Loss of GPS/SBAS Position Data

Loss of GPS/SBAS indicated by a SLOW blinking ADS-B FAIL light............................PULL NGT CIRCUIT BREAKER.

WAIT 5 SECONDS AND RESET. IF FAST BLINKING ADS-B FAIL LIGHT CONTINUES, OR BECOMES STEADY, ASSUME AN ADS-B OUT FAILURE.

If under ATC control, notify your Controller of loss of ADS-B OUT.

3.1.5 Visual/Aural Traffic Alert

Traffic Alert ....VISUALLY ACQUIRE TRAFFIC

3.2 Abnormal Procedures

3.2.1 Abnormal Indications

Table 3-1: Troubleshooting for the Panel Mount NGT-9000

Indications	Cause/Corrective Actions
The unit has manual brightness adjustment only.	Loss of light sensor data. 1. Try clearing the failure by tapping the Restart button. 2. Check light sensor (upper left corner of bezel) for dirt or obstructions. 3. If the problem continues, replacement of the Lynx NGT- 9000 may be required. Contact L- 3 Field Service before removal.
• Blank display. • If installed, ADS-B Fail lamp is OFF.	Loss of power or damaged unit. 1. Check breakers and main avionics switch. 2. Verify Battery (BAT) Master switch is on. 3. Replacement of unit may be required. Contact L-3 Field Service before removal.
When touching the screen the command function seems to be slightly off from the center of the screen symbol or area.	The screen calibration is out of tolerance. 1. A Screen Calibration may need to be performed. See Maintenance Mode. 2. If problem continues contact L-3 Field Service before removal.
Unit does not operate in normal mode and starts in Bootloader or maintenance mode.	Internal hardware test failures cause the unit to automatically reset. This happens without cycling power to the unit. If the hardware failure being detected does not clear a system fail message is sent. 1. Cycle power to the unit to clear the failure. 2. Replacement of unit may be required. Contact L-3 Field Service before removal.
Message page contains messages that do not indicate a functional failure.	Although no immediate loss of function is occurring, an undesired condition is taking place. At the earliest convenience, perform the following action: 1. Try clearing the failure by tapping the Restart button. 2. If the problem continues, replacement of the Lynx NGT- 9000 may be required. Contact L- 3 Field Service before removal.

Indications	Cause/Corrective Actions
• No data showing. • If installed, ADS-B Fail lamp is ON. • A compatible traffic display may have the message "NO DATA" showing.	A hardware failure has been detected within the NGT-9000. • At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.
• Compatible displays may indicate "STANDBY" or "DATA-FAIL" and Wi-Fi information is not available. • If installed, ADS-B Fail lamp begins to flash and continues to flash until GPS is acquired.	GPS-Acquiring (On Ground – no previous position fix). 1. The GPS may need up to 4 minutes to provide a position after power is applied to the Lynx NGT- 9000. 2. The GPS signal may be weak. Move the aircraft into an area where the unit can acquire the GPS signal. Make sure nothing is covering or blocking the GPS antenna. 3. At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.
• Compatible displays may indicate "STANDBY" or "DATA-FAIL" and Wi-Fi information is not available. • If installed, ADS-B Out Fail lamp flashes (1 second On/Off) for 2 minutes, and then remains ON indefinitely until a GPS position is acquired.	GPS is Acquiring (In Air – no previous position fix). 1. The GPS may need up to 4 minutes to provide a position after power is applied to the unit. 2. The GPS signal may be weak. Move the aircraft into an area where the unit can acquire the GPS signal. 3. Cycle power to the unit. 4. Contact L-3 Field Service before removal of unit.
• Display indicator MAP FAIL (red text) showing on FIS-B application screen. • Compatible displays may indicate "STANDBY" or "DATA-FAIL" and Wi-Fi information is not available. • If installed, ADS-B Fail lamp flashes for 2 minutes. After 2 minutes the lamp stays ON.	GPS-Acquiring (On Ground or In Air– previous position fix). 1. The GPS signal may be weak. Move the aircraft into an area where the unit can reacquire the GPS signal. 2. At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.
• No targets are shown on the traffic screen. • Ownship data is displayed. • A "Traffic Unavailable" or "Traffic Failed" indication is being displayed. • If installed, ADS-B Fail lamp is OFF.	The aircraft is not in an ADS-B (UAT / 1090ES) coverage area, or the tar- gets are not transmitting ADS-B data, or the ground station is not transmit- ting ADS-B data. 1. The symptoms are expected if the target or ground station are not transmitting ADS-B. 2. The target or ground station needs to be within line-of-site range. 3. At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.

Indications	Cause/Corrective Actions
• No targets are shown on the traffic display. • Ownship data may or may not be displayed on the weather display. • The MSG window is showing and functions are showing as failed or degraded.	Possible hardware problem with the Lynx NGT-9000. • At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.
• No data on the weather display. • If installed, ADS-B Fail lamp is OFF.	The FIS-B data is not being transmit- ted to the weather display. 1. No ground station is in range. 2. The ground station may not provide FIS-B service. 3. At next power cycle if symptoms persist within a known FIS-B service area, then contact L-3 Field Service before removal of the unit or other equipment.
The traffic symbols on the traffic display are non-directional (diamond shape)	Non-directional traffic symbols on the traffic display is due to one of the following reasons: 1. The directional information that is being received by the MSS does not have directional data. The MSS continues to transmit non-directional data to the traffic display. 2. An alternate traffic display (if installed) does not support the DTIF data format necessary to show directional data provided by ADS-B.
Traffic display is working correctly, but aircraft are not showing up on the display.	Lack of data as described below: 1. The ADS-B In requires other aircraft to be equipped with ADS-B Out. 2. The TIS-B and ADS-R services are supported when in range of ground stations providing the service. 3. If receiving the TIS-B service, Mode C and Mode S transponder equipped aircraft that do not provide altitude information are not seen on the traffic display. If receiving the TIS-B service, but aircraft not equipped with a transponder, or equipped with a Mode A transponder are not part of the TIS-B data and will not be seen on the traffic display.
No TIS-B or FIS-B Coverage Indicator is showing, but the aircraft is in coverage area. 	The Lynx NGT-9000 or a system component may have failed or de- graded. • At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.
Display indicator TAWS UNAVAILABLE (White text) showing on TAWS screen.	Displayed when TAWS is not available • At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.
Display indicator TAWS FAILED (Amber text) showing on TAWS screen.	Displayed when TAWS is not available • At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.
Display indicator TERRAIN DISPLAY FAILED (Amber text) showing on TAWS screen.	Displayed when an alert fault causing loss of terrain display. Alerting is still operational. • At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.

SECTION 4. NORMAL PROCEDURES
The procedures described below are specific only to the NGT-9000. Reference the Pilot Operating Handbooks and AFM Supplements for operating instructions specific to any installed displays or peripheral devices.

4.1 Normal Power ON
The NGT-9000 is self-starting and self-tests once avionics power has been applied to the system

NGT Power...ON

SELF TEST ....PASS. Audio "Self Test Pass"

> **NOTE**
>
> GPS alignment may take 2 – 3 minutes depending on the aircraft location and distance the aircraft has been moved since the last alignment. An ADS-B OUT OF RANGE icon is normal until the aircraft is airborne and within the service volume of an ADS-B Ground Station (GBT).

SECTION 5. PERFORMANCE
No change

SECTION 6. WEIGHT AND BALANCE
See current weight and balance data

SECTION 7. SYSTEM DESCRIPTIONS

7.1 Pilot's Guide
THE L-3 LYNX, Models NGT-9000, NGT-9000D and NGT-9000+ Pilot's Guide, Document Part Number 0040-17000-01, contains additional information regarding the system's description, function and control. The Pilot should become familiar with the contents of this Guide and keep it available for reference.

7.2 Traffic Sources
The NGT-9000 is capable of receiving ADS-B IN traffic advisories and displaying them on the Main Display, PED's such as the Apple iPad and on panel mounted RS-422 capable display such as the Garmin GMX 200. Refer to the appropriate installed display manual for information on target symbology and optional alerting functions.

7.3 Weather Sources
The NGT-9000 is capable of receiving ADS-B IN Flight Information System (FIS) weather and airspace information on the Main Display, PED's such as the Apple iPad, and on panel mounted RS-422 capable display such as the Garmin GMX 200.

METAR, TAF, SIGMET and PIREP data is normally displayed in text format, while NEXRAD weather radar images are available graphically. Refer to the appropriate installed display manual for information on the type of information available and display options.

7.4 Power
Power for the NGT-9000 is provided through a circuit breaker labeled "NGT".

7.5 External Switches, Lights and Controls
The following external lights listed in Table 7-1 are required for the NGT-9000.

Table 7-1: Light and Switch Functions

Switch or Light	Function
ADS-B FAIL lamp [optional] (amber)	Out – Normal operation
	Steady – ADS-B Failure
	Slow Flashing – GPS aligning
TRAFFIC Caution lamp (amber)	Out – No traffic of concern detected
	Steady – Traffic detected
TERRAIN Caution lamp (amber) [TAWS installed]	Out – No terrain of concern
	Steady – Terrain hazard detected
TERRAIN Warning lamp (red) [TAWS installed]	Out – No immediate terrain avoidance required
	Steady – Immediate terrain avoidance required

rev 11/14/16

GT-50 Installation/Operation Manual

WARNING!!! Do not connect this GT-50 to a Connector wired for the older style GT-50 without temperature capability. Damage will result. WARNING!!!

Installation:

Mechanical

Mount the GT-50 in any 2-1/4" instrument hole using four 6-32 screws. If you are mounting the GT-50 in an instrument panel with a thirty degree panel tilt, be sure to set your unit as described in the Voltmeter section below.

Electrical

1) **Black** (Ground)
2) **Yellow** (Backlight Power) When power is applied to this wire the flight timer runs and the backlight is illuminated. Connect this wire to your instrument power source so it is powered when your master switch is turned on.
3) **Red** (Always on Power) Connect this wire directly to your battery to power all functions except the backlight. This wire should remain powered at all times including when the yellow wire is powered.
4) **Green** (Optional Temperature Probe) **DO NOT** connect the green wire to 12-28 Volts. Use single conductor shielded wire (22,24 or 26 gauge). Connect the center conductor from the green wire to one of the probe wires. Connect the shield from the other probe wire to ground at the GT-50. See OAT Probe Instructions for additional details.

Notes: 1) Both the red and yellow wires should be on fuse or breaker protected circuits. The fuses/breakers may be shared with other equipment. The value of the fuses/breakers can be as little as 0.5 Amp.

Operation:

Modes: The GT-50 has six modes.

PRESS the (Left) **Mode** button the switch between modes.

PRESS and HOLD the (Left) **Mode** button to display the Firmware Version number.

Accelerometer PRESS the (Right) **Action** button to display the MAX and MIN G readings. PRESS the (Center) **Reset** button to clear the MAX and MIN G readings. Occasionally the GT-50 must be recalibrated if it is not reading one G when in level flight. Level the instrument then PRESS and HOLD the (Center) **Reset** button to calibrate the accelerometer to one G unit. The button must be held until four dashes "----" appear on the display then released to complete the calibration.	**Voltmeter** The instrument panel tilt angle is set from the Voltmeter mode. This step is only required if you have a panel angle of 30 degrees (SONEX aircraft). Panel tilt of less than fifteen degrees has a negligible effect on the G reading. If power is removed from the GT-50 the panel tilt will revert to the vertical panel setting of zero degrees when the power is restored. PRESS and HOLD the (Center) **Reset** button to switch between zero and thirty degrees panel angle. Once the Panel tilt angle is displayed, release the button to save the value that was displayed. The angle can be either zero degrees or thirty degrees.
Manual Timer The manual timer counts up from one second to a maximum value of nine hours fifty nine minutes (09:59) PRESS the (Right) **Action** button to start and stop the timer. PRESS the (Center) **Reset** button to reset the timer to zero.	**Automatic Flight Timer** The flight timer automatically runs when power is applied to connector pin 2. This mode is designated by a "|- " symbol in the left most digit location. The Flight Timer counts up from one minute (0:01) to a maximum value of nine hours fifty nine minutes (9:59) PRESS the (Center) **Reset** button to reset the flight timer to zero.
Clock PRESS the (Center) **Reset** button to set the clock. PRESS and HOLD the (Center) **Reset** button until the colon ":" begins flashing to switch between 12 and 24 hour clock modes. PRESS the (Right) **Action** button to adjust the hours or minutes when they are flashing.	**Temperature** (displayed only when optional OAT probe is installed) PRESS the (Right) **Action** button to display the MAX and MIN Temperature readings. PRESS the (Center) **Reset** button to clear the MAX and MIN Temperature readings. PRESS and HOLD the (Center) **Reset** button to change temperature units between Fahrenheit and Celsius.

Specifications:

Input Voltage: 9-28 Volts DC
Power Consumption: at 14V -
Backlight on: 0.025 Amps, Backlight Off: 0.0008 Amps – It wont run down your Plane's Battery
Dimensions: Fits a Standard 2-1/4" instrument hole.
Overall Width and Height 2.375", Depth behind panel .75 " to back of connector
Weight: 3.0 oz.

Need Help?
support@fdatasystems.com
or call (831) 325-3131

N814AC @1901.9 20 June 2022

U.S. Department
of Transportation
Federal Aviation
Administration

Transport Airplane Directorate
Aircraft Certification Service

1601 Lind Avenue Southwest
Renton, Washington 98057-3356

NOV – 6 2013

In Reply
Refer To: 100S-13-31

Mr. Charles W. Newman
Co-Owner
Flight Data Systems
224 7th Street
Petaluma, CA 94952

Dear Mr. Newman:

This letter is in response to your inquiry dated September 26, 2013, which was received by our office on October 17, 2013 (delayed by the government shutdown and associated furlough of employees in this office). We apologize for the length of time that it has taken to respond to your questions.

In your inquiry, you requested a clarification to our earlier letter (Reference No. 100S-GA-10-53) sent to Daytron, Inc. in which the Federal Aviation Administration (FAA) stated the installation of a replacement clock in a non-transport category airplane is considered a minor change. You also requested that we specifically authorize the installation of the Flight Data Systems Model GT-50 as minor.

As stated in our earlier letter, we consider the installation of replacement clocks (including timers and stopwatches) in non-transport category airplanes to be minor changes in accordance with Federal Aviation Regulation (FAR) 21.93(a). This policy is applicable to all makes and models of *simple replacement clocks*. Accordingly, the FAA has concluded the Model GT-50 falls into this category as long as the optional volt meter and outside air temperature functions are not replacing previously installed equipment. The accelerometer function is considered a minor change in this device, since it is incidental to the clock installation and does not interface with other aircraft systems.

Per FAR 21.95 copies of this letter may be given to installing mechanics as evidence that this installation of the GT-50 may be considered minor. Installation as a minor change should be documented using a maintenance log book entry referencing this letter. Installations on general aviation (GA) airplanes where outside air temperature (OAT) and voltage are already present can be done as a minor change as well, if the mechanic deems the Model GT-50 a suitable replacement part according to part 43 guidance and regulations. This determination should also be documented in a maintenance log book entry.

Installations on GA airplanes where OAT/Voltage are present and the GT-50 is not easily determined to be suitable replacements by the mechanic, or where the installation would alter the basic system design, the applicant would need additional approved data via an supplemental type certificate (STC) or coordinated field approval. You also may apply to your local aircraft certification office for a STC for installation approval of the GT-50. The FAA recognizes this type of instrument lends itself to the streamlined process for gaining installation approval on a number of similar installations in different airplane models using an approved model list as part of the STC process, per Advisory Circular AC 23-22.
If you have questions regarding any of the above issues, please contact me by phone at (425) 917-6405, or by electronic mail at jeff.morfitt@faa.gov.

Sincerely,

Jeffrey A. Morfitt
Small Airplane Program Manager
Seattle Aircraft Certification Office