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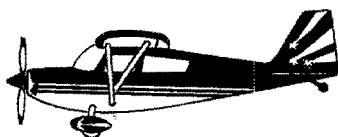


OWNER
MANUAL

DECATHLON

OWNER MANUAL

BELLANCA



1975-1977 SERIES*

DECATHLON MODEL 8KCAB

BELLANCA AIRCRAFT CORPORATION
Alexandria, Minnesota 56308
Osceola, Wisconsin 54020

* Model year is indicated by serial number suffix.

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OWNER MANUAL
BELLANCA DECATHLON MODEL 8KCAB

1975-1977 Series

LOG OF REVISIONS

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MODEL 8KCAB

FOREWORD

This manual has been prepared to inform the pilot of the features and systems incorporated in the Bellanca Model 8KCAB Decathlon. 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.

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.

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SECTION I

OPERATING LIMITATIONS

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SECTION I

OPERATING LIMITATIONS-NORMAL AND ACROBATIC

GENERAL

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

AIRSPPEED LIMITATIONS

NOTE

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

<u>AIRSPPEED DESIGNATION</u>	<u>CAS MPH</u>	<u>AIRSPPEED INDICATOR MARKING</u>
Never Exceed (V_{NE})	180	Red Line
Caution Range	160-180	Yellow Arc
Maximum Structural Cruise (V_{NO})	160	End of Green Arc
Normal Operating Range	54-160	Green Arc
Manuvering (V_A) at Gross Weight:		
Normal Category	121	None
Acrobatic Category	130	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.

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POWERPLANT LIMITATIONS AND INSTRUMENT MARKINGS

Engine

Lycoming AEIO-320-E1B

Propeller

Hartzell Constant Speed Model HC-C2YL-4BF/FC7663-4

Fuel, Minimum Octane Rating, Aviation Grade--80/87

Approved for Continuous Use--100/130

Tachometer

Normal Range (Green Arc) 1800-2700 RPM

Maximum (Red Line) 2700 RPM

Cylinder Head Temperature

Normal Range (Green Arc) 90°-500° F

Maximum (Red Line) 500° F

Oil Temperature

Normal Range (Green Arc) 100°-245° F

Maximum (Red Line) 245° F

Oil Pressure

Normal Range (Green Arc) 60-100 psi

Caution Range (Yellow Arc) 25-60 psi

Maximum (Red Line) 100 psi

Minimum (Red Line) 25 psi

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WEIGHT AND BALANCE LIMITS

Maximum Gross Weight--1800 lbs.

Center of Gravity Range

Normal Category

(+13.5) to (+21.0) @ 1800 lbs.

(+11.5) to (+21.0) @ 1550 lbs. or less

Straight line variation between the points given.

Acrobatic Category

(+13.5) to (+18.5) @ 1800 lbs.

(+11.5) to (+18.5) @ 1550 lbs. or less

Straight line variation between the points given.

DATUM: Wing leading edge.

FLIGHT LOAD FACTORS (1800 LBS. GROSS WEIGHT)

<u>CATEGORY</u>	<u>LOAD FACTOR LIMITS</u>	<u>ACCELEROMETER MARKING</u>
Normal	Positive + 5G	Green Arc
	Negative - 3G	Green Arc
Acrobatic	Positive + 6G	Red Line
	Negative - 5G	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.

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KINDS OF OPERATION

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

Flight into known icing conditions is prohibited.

Crosswind landings have been demonstrated at 17 KTS (20 MPH).

UNUSEABLE FUEL

Any fuel remaining in the tanks when fuel gauge reads "0" (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 three minutes 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

Acrobatic Category-- See FAA Approved Airplane Flight Manual for basic approved aerobatic maneuvers. Section 1.2.7.

REQUIRED PLACARDS

See FAA Approved Airplane Flight Manual for required placards. Section 1.1.7.

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SECTION II
EMERGENCY PROCEDURES

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SECTION II
EMERGENCY PROCEDURES

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 judgment based on experience and knowledge of the aircraft to determine the best course of action. It is considered mandatory that the pilot familiarize himself with the entire manual, especially, this section prior to flight.

NOTE

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

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.

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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".

WARNING

Do not attempt to restart engine.

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.

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ALTERNATOR/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 non-essential electrical equipment to conserve battery power.
- (3) Land as soon as practical.

NOTE

If only one circuit appears to be inoperative, remove and replace the suspected fuse with a spare of the same amperage rating. These spare fuses are located above the regular fuses in use.

ENGINE FAILURE ON TAKE-OFF

If sufficient runway remains:

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

If airborne and insufficient runway remains for landing, attempt an engine restart if altitude permits:

- (1) Emergency Fuel Pump--ON.
- (2) Alternate Air--FULL HOT.
- (3) Mixture Control--FULL RICH.
- (4) Fuel Shut-Off Valve--CHECK ON.
- (5) Magneto Switches--BOTH ON (UP).
- (6) Propeller Control--FULL INCREASE.

If no restart is possible:

- (1) Select most favorable landing area ahead.

WARNING

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

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ENGINE AIR RESTART

- (1) Maintain Airspeed--80 MPH minimum recommended.
- (2) Magneto Switches--BOTH ON (UP).
- (3) Mixture--FULL RICH or LEANED as required at high altitude.
- (4) Fuel Shut-Off Valve--CHECK ON.
- (5) Alternate Air--FULL HOT.
- (6) Emergency Fuel Pump--ON.
- (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.

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ABNORMAL OIL PRESSURE/TEMPERATURE INDICATORS

Oil pressure and temperature problems are usually related with one affecting the other.

Before any action is taken, cross check the other engine instruments and control settings for possible clues.

High oil temperature is generally a result of loss of oil, engine 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 failed pressure regulator 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 minimum RPM changes. Plan a "Precautionary Landing Approach" as engine failure may be imminent.

LOSS 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.

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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 in 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.

NOTE

Slipping the aircraft by cross controlling the rudder and ailerons will increase the rate of descent.

FORCED LANDING (COMPLETE POWER FAILURE)

- (1) Airspeed--Maintain 75 MPH.
- (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 1000 ft. above ground level (AGL) over the intended point of landing or 500 ft. when downwind and abeam the intended point of landing.
- (7) All Electrical Switches--OFF.
- (8) On Final Approach--Airspeed--75 MPH, (70 MPH minimum).
- (9) Touchdown with minimum airspeed (three point full stall).

NOTE

If possible or 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.

PITOT--STATIC SYSTEM FAILURE

A malfunction in the static system will affect the airspeed, altimeter and vertical speed indicator and is usually a result of an obstructed static opening. Use the alternate static source.

WARNING

With alternate static source ON, subtract 65 ft. from indicated altitude and 10 MPH from indicated airspeed.

SEVERE TURBULENCE

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

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STALLS

The 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.

Aileron 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.

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:

- (1) Throttle--CLOSED.
- (2) Ailerons--NEUTRAL POSITION.
- (3) Elevator--NEUTRAL POSITION.
- (4) Rudder--FULL DEFLECTION in the opposite direction to the rotation.

When rotation stops ($\frac{1}{2}$ to 1 turn after recovery initiated).

- (1) Rudder--NEUTRALIZE.
- (2) Nose attitude--RAISE smoothly to level flight attitude.

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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.

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SECTION III

NORMAL OPERATING PROCEDURES

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PRE-FLIGHT INSPECTION (See Page 21)

- (1) a. Release control stick from seat belt, check freedom of movement.
b. Check ignition switch "OFF".
c. Check fuel quantity on fuel gauge.
d. Fuel valve "ON".
e. Inspect seat belt for condition.
f. Secure rear seat belt and shoulder harness if not in use.
g. Before aerobatic flights, remove loose articles and equipment.
- (2) a. Check wing root covers and greenhouse for security.
b. Check aileron for freedom of movement and security.
c. Check condition and security wing, wing tip and lights.
d. Check condition and security struts and strut fittings.
- (3) a. Check right main wheel for proper inflation.
b. Check brakes and lines for leakage and security.
c. Inspect wheel fairing for security.
d. Check right fuel quantity and filler cap security.
e. Check condition door jettison mechanism.
- (4) a. Check oil level and secure dip stick. Inspect engine compartment for general condition, gas leaks, oil leaks, etc.
b. On first flight each day, drain gas from gascolator and check for leakage.
c. Check windshield for cleanness.
d. Check prop for nicks and prop spinner for security.
e. Check air filter for cleanliness and security.

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PRE-FLIGHT INSPECTION (cont.)

- (5) a. Check left main wheel for proper inflation.
- b. Check brakes and lines for leakage and security.
- c. Inspect wheel fairing for security.
- d. Check left fuel quantity and filler cap security.
- e. Inspect stall warning switch for freedom.
- f. Check pitot-static tube for stoppage.

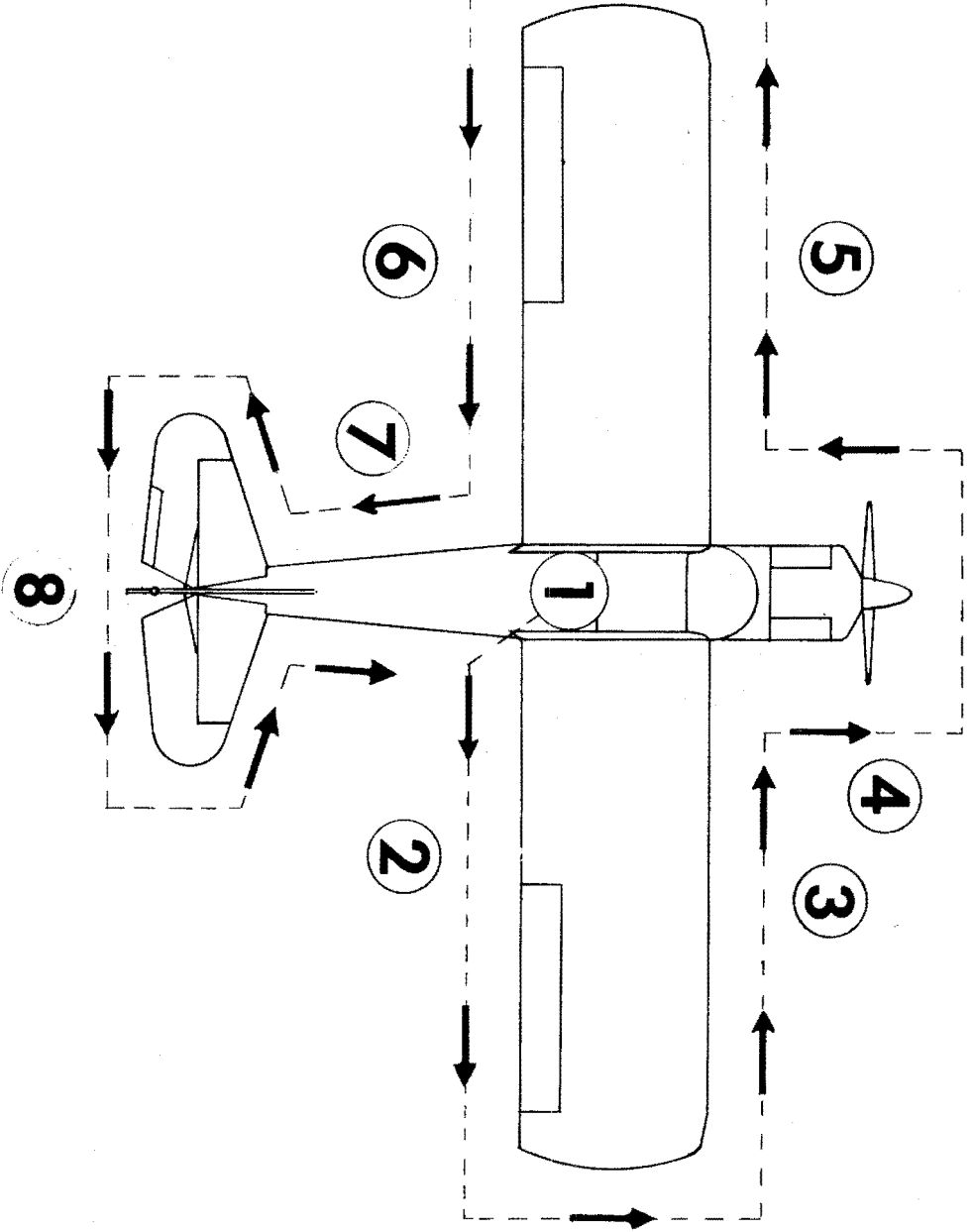
- (6) a. Check condition and security wing, wing tip and lights.
- b. Check condition and security struts and strut fittings.
- c. Check aileron for freedom of movement and security.
- d. Check wing root cover for security.

- (7) a. First flight each day, drain gas from aft fuselage drain.
- b. Inspect bottom of aircraft for general condition.

- (8) a. Check control surfaces for freedom of movement and security.
- b. Check tailwheel security and proper inflation.
- c. Check condition and security of tail and tail brace wires.

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PRE-FLIGHT INSPECTION (See Page 19)



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PRE-START CHECK

- (1) Seat Belts--Adjust and Lock.
- (2) Fuel Valve Handle--"ON".
- (3) Brakes--Test and Set.
- (4) Radio and Electrical Equipment--"OFF".

ENGINE START

- (1) Mixture--Idle Cut-Off.
- (2) Alternate Air--Cold.
- (3) Throttle Cracked Open.
- (4) Master Switch--"ON".
- (5) Prime--As Required. (See Primer, Section VI, Page 42.)
- (6) Propeller Control--Full Increase.
- (7) Propeller Area--Clear.
- (8) Magnetos--"BOTH ON".
- (9) Ignition Button--"START". (Release when engine starts.)
- (10) Mixture--Full rich as engine starts.
- (11) Oil Pressure--Check For Rise.
- (12) Warm-Up at 1000-1200 RPM.

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COCKPIT PRE-FLIGHT

- (1) Cabin Door and Left Window--Latched.
- (2) Flight Controls--Check for free and correct movement.
- (3) Trim Tab--"TAKE-OFF" setting.
- (4) Flight Instruments and Radios--Set.
- (5) Accessories--"ON" as required.

ENGINE RUN-UP

- (1) Throttle Setting--1800 RPM.
- (2) Magnetos--Check (50 RPM maximum differential between mags,
175 RPM maximum drop).
- (3) Propeller--Check Operation (full decrease until RPM drop of 300, cycle
three times before flight).
- (4) Alternate Air--Check operation and return to cold.
- (5) Engine Instruments--Within green arc.
- (6) At high density altitude, lean for best power before take-off.

TAKE-OFF

- (1) Alternate Air--Cold.
- (2) Propeller Control--Full Increase.
- (3) Throttle--Full Open.
- (4) Check for satisfactory take-off RPM (2700 ± 50).

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CLIMB

- (1) Airspeed as Required. (At S.L. Best R/C 76 MPH CAS--Best Angle-of-Climb 64 MPH CAS.)
- (2) Throttle--Full Open.
- (3) Mixture--Full rich or leaned as required at high altitude.
- (4) Propeller Control--Full Increase (Check).

LANDING CHECK-LIST

- (1) Propeller--After power reduction, full increase.
- (2) Mixture--Rich.
- (3) Alternate Air--Check operation and return to cold.
- (4) Airspeed--70-80 MPH for Normal Landing, 65 MPH for Short Field landing.

BALKED LANDING (GO AROUND)

- (1) Throttle--Full open with smooth application.
- (2) Alternate Air--Cold.
- (3) Establish climb.
- (4) Airspeed as required for best R/C or best angle (see above).
- (5) Trim--Re-Set.

NOTE

All airspeeds are given in I.A.S. unless otherwise noted.

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ENGINE STARTING

Before starting, 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.

To prime for a cold start, turn the electric fuel pump on and push mixture control to full rich. Hold for two to three seconds and return to idle cut-off. For a hot start, prime should not be necessary.

With brakes set, mixture at idle cut-off, throttle slightly open, master switch on, magneto switches both "ON", engage the starter. Release starter as the engine starts and push mixture control to full rich.

If the engine fails to start on the first attempt, another attempt should be made without additional priming. If this fails, it is possible that the engine is over-primed. In this case turn the magnetos off, open the throttle and turn the engine over approximately ten revolutions with the starter. Prime the engine again with half the amount of the original prime and repeat the starting procedure.

Check the oil pressure gauge for an indication as the engine starts. If no pressure is indicated within 30 seconds, stop the engine to determine the trouble, even in cold climates.

COLD WEATHER OPERATION

It is important to use the proper viscosity engine oil and run the engine sufficiently long to bring the engine oil to the normal operating temperature before takeoff. During cold weather, very cold oil will not circulate properly from the engine sump through the external hoses and components of the system. Circulation can be severely impeded until the oil, engine and all external system parts are warmed up; therefore, in very cold weather (20° F and lower) the use of

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an external preheater is recommended to minimize wear to the engine and electrical system and to obtain oil pressure within the required 30 seconds.

- A. In starting, if the engine does not start during the first few attempts, or if the engine firing diminishes in strength, it is probable that the spark plugs have been frosted over. In this case, preheat must be used before another start is attempted.
- B. In temperatures below 40^o F some extra priming may be necessary. Starting will be aided by pulling the propeller through four or five revolutions by hand to "break loose" or "limber" the oil thus conserving battery energy.

WARNING

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. Be sure the master and magnetos are in the OFF position and the throttle closed. If possible, have a pilot at the controls and chock/tiedown the aircraft.

WARM UP AND GROUND CHECK

Engine warm-up should be conducted at 1000 to 1200 RPM. 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--cycle the prop through this procedure three times to assure positive control. The engine is ready for takeoff when the oil pressure is steady and in the green and when the engine will accept full throttle without hesitating or faltering. 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.

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TAKE-OFF POWER CHECK

It is important to check full-throttle engine operation early in the take-off run. The take-off should be discontinued if there are any signs of rough engine operation or sluggish engine acceleration.

NORMAL TAKE-OFF

Align the airplane with runway centerline. Assure that the tail wheel is tracking straight. Keeping the stick aft of neutral, smoothly open the throttle all the way with the prop control full forward. As the speed increases, use sufficient forward stick pressure to raise the tail to approximately level flight position using the rudder to maintain directional control. Use a tail-low technique for takeoff from a short or soft field.

CLIMB

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 when the power is greater than 75%. At 75% power or below, the mixture may be leaned.

CRUISE

The maximum recommended cruise power setting for the Decathlon is 75%. Fuel consumption can be reduced significantly at high altitudes by leaning the mixture. For optimum fuel consumption in cruise at 75% power or less, lean the mixture to peak EGT (if an exhaust monitor is installed).

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.

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STALLS

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

APPROACH AND LANDING

The airplane should be trimmed to an approach speed of approximately 70-80 MPH for normal landing, 65 MPH for short field landing.

- A. 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 flair 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 air speed drops until the stick is in the full aft position at the time of touch-down. Brake as necessary.
- B. In high gusty wind or when a cross wind exist, a wheel landing is recommended preceded by an approach of about 75 to 80 MPH. The flair 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 near level attitude. As speed decreases, lower the tail slowly to the ground and then hold full aft stick. Brake as necessary. Maintain cross-control corrections for cross-wind conditions throughout the landing flair and roll out as necessary to maintain directional control.

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ENGINE SHUTDOWN

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

GROUND HANDLING

The 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 tail is secured by tying 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.

MODEL 8KCAB

AEROBATICS IN YOUR DECATHLON

Although your Decathlon is certificated as an aerobatic airplane, this in itself does not mean that the airplane can "take anything you can give it". The limits must be observed and the following suggestions will make aerobatics in your Decathlon (or any other airplane) safer and more enjoyable.

- (1) Never attempt any aerobatic maneuver without first receiving dual instruction from a qualified flight instructor. Although aerobatics are very safe when correctly done, a pilot without training or experience can get into trouble doing aerobatics.
- (2) Remember, altitude is your best insurance when doing aerobatics. According to Federal Air Regulations, the minimum legal altitude for aerobatics is 1500 feet AGL. Keep in mind that 1500 feet is therefore the minimum recovery altitude from any inadvertent maneuver and that 1000 feet of altitude can often be lost in a three-turn spin.
- (3) Always inspect your airplane before flying aerobatics. This should include a thorough pre-flight inspection and inspection of the cabin to insure that no loose articles are present. The rear seat belt should be fastened around the seat when doing solo aerobatics to prevent its catching on the rear stick.
- (4) 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.
- (5) Check your airplane weight and balance. The rear c.g. limit for aerobatics must be respected. To exceed any limits is to invite trouble.
- (6) 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.
- (7) Know and respect your airplane's structural limitations.

MODEL 8KCAB

ENGINE OPERATING NOTES FOR AEROBATIC FLIGHT

Inverted Oil Pressure

Oil pressure during inverted flight may regularly be 5 to 10 lbs. less than the oil pressure during normal flight.

Oil Pressure Flicker

During the transition from normal to inverted flight and from inverted to normal flight, an oil pressure flicker is indicated on the oil pressure gauge. This flicker is normally 20-40 psi and lasts about one second after which the regular oil pressure should be maintained.

Normal Aerobatic Oil Level

Oil quantities in excess of normal oil level may be lost during an aerobatic sequence, but once the normal level is reached, oil losses are extremely low. 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.

Oil Level Interruption

Steep climbing-diving or vertical attitudes or knife-edge flight may cause interruption of the oil pressure and/or loss of oil through the breather.

Cold Weather Consideration

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.

MODEL 8KCAB

Inverted Fuel Supply

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 2 minutes. Approximately 3.5 minutes of positive G conditions is required to completely refill the inverted fuel supply.

WARNING

Complete loss of fuel flow and power, caused by depletion of inverted fuel supply, may result in an interruption of power for up to 10 seconds after return to normal flight. AVOID THIS CONDITION UNLESS SUFFICIENT ALTITUDE INSURES SAFE RESTART.

LYCOMING OPERATOR'S MANUAL

Consult your Lycoming Operator's Manual for detailed information concerning engine specifications, operation instructions, periodic inspections, maintenance, and trouble-shooting.

MODEL 8KCAB

LOAD FACTOR

In straight and level unaccelerated flight, the airplane is said to be at 1 g. In this flight condition, the sum of the wing and horizontal tail loads equals the weight of the airplane in pounds.

In accelerated maneuvers, the wing lift can be considerably greater than the gross weight of the airplane. This ratio of lift/weight is called load factor and is indicated in flight by the accelerometer.

For aerobatics, the maximum allowable positive load factor for the Decathlon is 6 g and this is indicated by a red radial on the accelerometer.

MANEUVERING SPEED

The Decathlon is designed so that its longitudinal control surfaces may be fully deflected at speeds up to maneuvering speed for an airplane loaded at gross weight. The airplane can generate load factors in excess of its maximum allowable load factors when it is loaded below gross weight; control inputs and/or maneuvering speed must therefore be reduced to avoid exceeding allowable load factors.

NEVER EXCEED SPEED

The never exceed speed (V_{NE}) is the maximum safe airspeed and is indicated by a red radial on the airspeed indicator.

PARACHUTES

Federal Regulations require that an approved parachute be worn by both occupants of the airplane when a passenger is carried during aerobatics. The exception to this is for flight tests made for pilot certification with an instructor.

MODEL 8KCAB

SECTION IV

PERFORMANCE

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MODEL 8KCAB

SECTION IV

PERFORMANCE SUMMARY

1800# Gross Weight

Stall Speed, MPH CAS	53
Maximum Speed @ S.L. MPH CAS	138
Best R/C Speed @ S.L. MPH CAS	76
Best Angle-Of-Climb Speed @ S.L. MPH CAS	64
Never Exceed Speed MPH CAS	180
Entry Speeds For Aerobatic Maneuvers	See FAA Approved AFM

AIRSPEED CALIBRATION

<u>CAS</u>	<u>IAS</u>
55	46
60	52
70	65
80	77
90	88
100	99
120	120
140	140

MODEL 8KCAB
TAKEOFF DISTANCE

CONDITIONS:

Full Throttle, 2700 RPM
Level, Hard Surface, Dry Runway
Zero Wind

NOTES:

1. Lift Off in Three-Point Attitude
2. Decrease Distances by 20% for each 10 MPH of Headwind

WEIGHT LBS	TAKEOFF SPEED		PRESS ALT FT	0°C		10°C		20°C		30°C		40°C	
	IAS-MPH	AT 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'	GROUND RUN	TOTAL TO CLEAR 50'
1800	50	65	0	630	1180	670	1250	710	1320	740	1390	780	1450
			1000	690	1280	730	1360	770	1430	810	1500	850	1570
			2000	740	1370	780	1450	820	1530	860	1610	900	1690
			3000	800	1490	850	1570	890	1650	930	1740	980	1830
			4000	850	1600	900	1680	950	1780	1000	1870	1050	1960
			5000	920	1730	980	1830	1030	1930	1080	2020	1130	2120
			6000	990	1850	1050	1960	1110	2070	1160	2170	1220	2280

MODEL 8KCAB

TIME, FUEL AND DISTANCE TO CLIMB

CONDITIONS:

1800 Lbs., Maximum Rate Of Climb
 Full Throttle, 2700 RPM
 Standard Temperature
 Zero Wind

NOTES:

- 1.0 gallon allowance for engine start, taxi and takeoff.
- Decrease distance for headwind or increase distance for tailwind by following correction: Distance wind correction = (Time/60) x wind.

PRESS ALT FT	STD TEMP °C	CLIMB SPEED IAS	RATE OF CLIMB FPM	FROM SEA LEVEL		
				TIME MIN	FUEL GAL	DISTANCE SM
0	15	74	880	0	1.0	0
1000	13	74	840	1	1.3	1
2000	11	73	800	2	1.5	3
3000	9	73	760	4	1.8	5
4000	7	72	715	5	2.0	6
5000	5	72	673	6	2.3	8
6000	3	71	630	8	2.6	10
7000	1	71	585	9	2.9	12
8000	-1	70	540	11	3.1	15
9000	-3	70	495	13	3.4	17
10000	-5	70	450	15	3.7	20
11000	-7	69	400	17	4.0	23
12000	-9	68	350	20	4.4	27
13000	-11	68	300	21	4.7	31
14000	-13	68	240	26	5.2	36
15000	-15	67	175	30	5.7	42

MODEL 8KCAB
CRUISE PERFORMANCE

CONDITIONS:

Standard Temperature
Mixture Setting
Above 75% Power - Best Power Mixture
Below 75% Power - Best Economy Mixture

% POWER	RPM	M.P.	TAS MPH	GPH
---------	-----	------	---------	-----

2500 FT

85	2600	24.9	138	10.9
80		23.9	134	10.2
75		22.9	131	8.8
70		21.9	127	8.4
65		20.9	123	7.9
60		19.9	119	7.3
85	2500	25.4	138	10.8
80		24.4	134	10.1
75		23.3	131	8.7
70		22.3	127	8.3
65		21.3	123	7.8
60		20.2	119	7.3
85	2400	26.0	138	10.7
80		24.9	134	10.0
75		23.9	131	8.6
70		22.8	127	8.2
65		21.8	123	7.7
60		20.7	119	7.2

5000 FT

80	2600	23.2	137	10.2
75		22.2	134	8.8
70		21.2	129	8.4
65		20.2	125	7.9
60		19.2	121	7.3
55		18.2	116	6.8
80	2500	23.6	137	10.1
75		22.5	134	8.7
70		21.5	129	8.3
65		20.5	125	7.8
60		19.5	121	7.3
55		18.4	116	6.7
80	2400	24.1	137	10.0
75		23.0	134	8.6
70		22.0	129	8.2
65		21.0	125	7.7
60		19.9	121	7.2
55		18.9	116	6.6

% POWER	RPM	M.P.	TAS MPH	GPH
---------	-----	------	---------	-----

7500 FT

80	2600	22.5	140	10.2
75		21.5	137	8.8
70		20.5	132	8.4
65		19.5	128	7.9
60		18.5	123	7.4
55		17.5	118	7.0
80	2500	22.8	140	10.1
75		21.8	137	8.7
70		20.8	132	8.3
65		19.8	128	7.8
60		18.8	123	7.3
55		17.8	118	6.9
80	2400	23.3	140	10.0
75		22.3	137	8.6
70		21.3	132	8.2
65		20.2	128	7.7
60		19.2	123	7.2
55		18.2	118	6.8

10,000 FT

70	2600	19.8	135	8.4
65		18.9	130	7.9
60		17.9	126	7.4
55		16.9	121	7.0
50		15.9	115	6.5
70		2500	20.2	135
65	19.2		130	7.8
60	18.2		126	7.3
55	17.2		121	6.9
50	16.2		115	6.4
70	2400		20.5	135
65		19.5	130	7.7
60		18.5	126	7.2
55		17.5	121	6.8
50		16.5	115	6.3

MODEL 8KCAB
LANDING DISTANCE

CONDITIONS:

Idle Power
Maximum Braking
Hard Surface, Level, Dry Runway
Zero Wind

NOTES:

1. Decrease Distance by 20% for each 10 MPH of Headwind

SPEED AT 50' IAS-MPH	PRESS ALT FT	0°C		10°C		20°C		30°C		40°C	
		GROUND ROLL	TOTAL TO CLEAR 50' OBS	GROUND ROLL	TOTAL TO CLEAR 50' OBS	GROUND ROLL	TOTAL TO CLEAR 50' OBS	GROUND ROLL	TOTAL TO CLEAR 50' OBS	GROUND ROLL	TOTAL TO CLEAR 50' OBS
65	0	622	1416	645	1439	668	1462	691	1485	714	1508
	1000	645	1439	669	1463	692	1486	716	1510	739	1533
	2000	669	1463	693	1487	719	1513	743	1537	767	1561
	3000	695	1489	720	1514	745	1539	771	1565	796	1590
	4000	721	1515	748	1542	774	1568	800	1594	827	1621
	5000	749	1543	775	1569	803	1597	830	1624	858	1652
	6000	776	1570	805	1599	834	1628	863	1657	890	1684

MODEL 8KCAB

SECTION V

WEIGHT AND BALANCE

The Decathlon weight and center-of-gravity limits are as follows:

NORMAL CATEGORY OPERATION

Center-of-Gravity Limits	(+13.5) to (+21.0) @ 1800 lbs.
	(+11.5) to (+21.0) @ 1550 lbs. or less
	Straight line variation between the points given.

AEROBATIC CATEGORY

Center-of-Gravity Limits	(+13.5) to (+18.5) @ 1800 lbs.
	(+11.5) to (+18.5) @ 1550 lbs. or less
	Straight line variation between the points given.

DATUM: Wing leading edge.

For additional information on loading, see Section 4 of the FAA Approved Airplane Flight Manual.

MODEL 8KCAB

SECTION VI

DESCRIPTION OF THE AIRPLANE

The Decathlon is a tandem two place with a strut braced high wing. The fuselage is a welded steel tube frame Dacron covered. The wing is Dacron covered with formed aluminum ribs and Sitka spruce spars.

ENGINE/PROPELLER

The engine is a Lycoming AEIO-320-E1B normally aspirated, direct drive, air cooled, horizontally opposed, four-cylinder engine with 319.8 cu.in. displacement. 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 is a counter weighted constant speed prop. The counter weights provide a fail safe feature causing the prop to go to low RPM if oil pressure is lost. This protects against a possible overspeed condition.

ENGINE CONTROLS

Throttle

The throttle control is in a quadrant on the left side of the cabin with front and rear throttles interconnected. An adjustable friction nut is provided at the quadrant to prevent throttle creep.

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.

MODEL 8KCAB

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 cut-off to the engine.

Battery

The Decathlon has a conventional lead-acid storage battery. The battery is located behind the baggage compartment and is equipped with special non-spill caps and vent system. The battery and vent manifold is enclosed in a leak proof case with a see-through removable cover.

The battery should 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.

Voltage 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.

MODEL 8KCAB

Electrical Panel

All electrical switches (except the starter), fuses, and fuse spares 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, emergency fuel pump and optional equipment such as radios, electric turn and bank, etc., are to the left of the master switch.

Fuses

Each electrical accessory is protected by a separate fuse directly above the electrical switch. Spare fuses are also provided on the electrical panel. To check fuse, push in and twist fuse cap counter-clockwise to release cap from electrical panel. If the wire strand inside the fuse is loose or broken, either the fuse is defective or the circuit load has exceeded the fuse rating. To avoid circuit damage, always use a correctly-rated fuse for replacement.

MODEL 8KCAB

Starter Switch

A push button switch in the center of the instrument 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 an overloaded system or a faulty charging system.

Seats

Front and rear seats are welded steel tube construction with removable 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.

Brakes

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.

MODEL 8KCAB

Cabin Door

The 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 an aerobatic safety 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) Unlatch the aerobatic safety latch on the top and forward edge of the door.
- (2) To operate the door release handle, pull firmly to remove the safety locking pin, then pull the red handle aft and up as far as possible. This removes the door hinge pins.
- (3) Push or kick the door free of the aircraft.

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. Electrical instruments are controlled by switches on the electrical panel.

MODEL 8KCAB

Seat Belts and Harnesses

The Decathlon is equipped with two harness systems for the front seat. A lap belt and single strap shoulder harness make up the primary harness.

This shoulder harness has an inertia reel.

The secondary system is an inverted flight harness which 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 double strap shoulder harness has a self-adjusting, self-locking retractor.

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 and static tubes are clamped to the left front jury strut. These tubes should be checked frequently for alignment and to ensure that holes are not plugged. An alternate static source is provided and should be used if the primary static source becomes inoperative. Both airspeed and altimeter readings must be corrected when the alternate static source is in use (see Page 15).

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 inputs if necessary. Rudder trim is provided by a ground adjustable tab.

MODEL 8KCAB

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 controls are on the left side of 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.

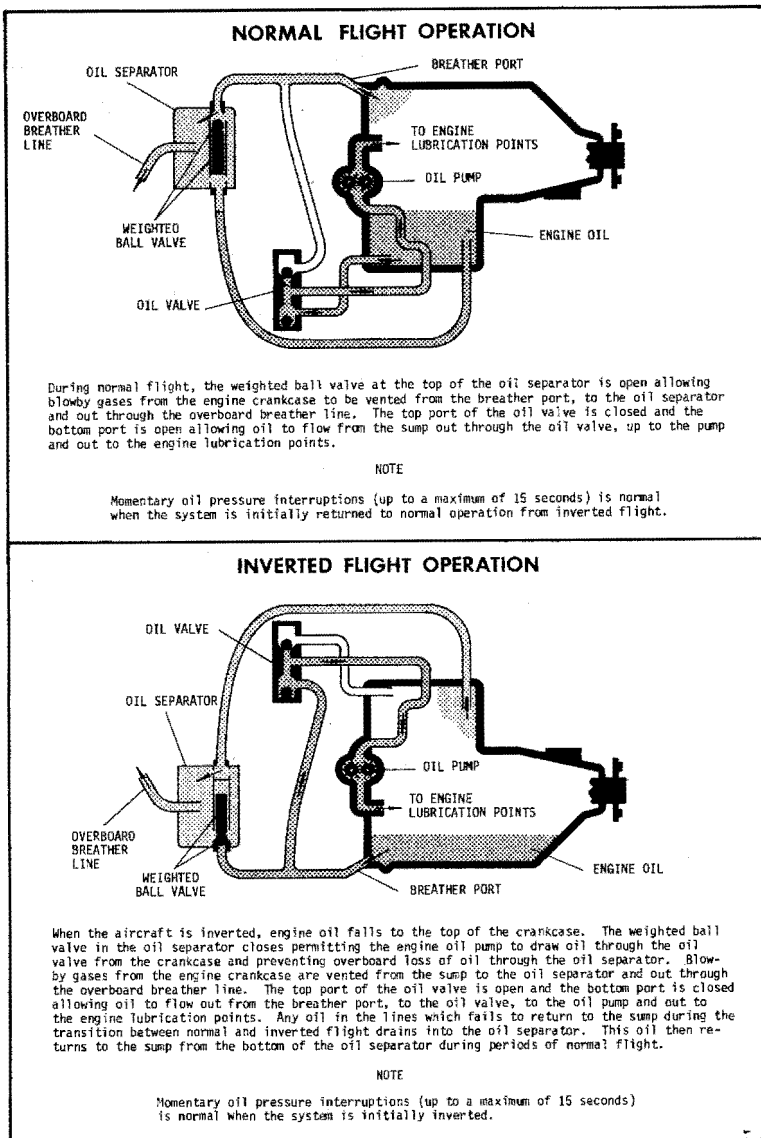
Engine Oil System

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 regularly be 5 to 10 pounds less than oil pressure during normal flight.

MODEL 8KCAB



OIL SYSTEM SCHEMATIC

FIGURE 6-1

MODEL 8K CAB

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

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

Fuel System

Welded aluminum fuel tanks are located in the inboard section of the wing.

Two 20 gallon tanks are standard.

Fuel lines between the tanks and the gascolator are drained from a quick drain on the belly of the aircraft.

The gascolator is drained by a remote actuated quick drain control which can be reached through the oil dipstick access door in the cowl.

Wing tanks proper can be drained by removing a $\frac{1}{4}$ " pipe plug from the inboard corner of the tank.

The gascolator is mounted on the firewall in the engine compartment. The sediment bowl is removable for cleaning and replacement of the fuel filter.

The fuel shut-off valve is located on the left side of the cabin. The Decathlon fuel system is an "ON - OFF" system.

Fuel quantity is read from a mechanical float type gauge located in the right side fuel tank. This gauge is only accurate in the level flight attitude.

Since both tanks are interconnected, only one tank gauge is necessary.

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.

MODEL 8KCAB

System Operation

Fuel is gravity fed from the tanks to the engine.

Fuel Pumps

The Decathlon 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.

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.

Header 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.

MODEL 8KCAB

NOTE

The fuel filler cap used on the Decathlon is a non-venting 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 may also cause fuel unbalance. Do not assume fuel in left tank is identical to that shown on right tank fuel gauge.

MODEL 8KCAB

SECTION VII

SERVICING REQUIREMENTS

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MODEL 8KCAB

SECTION VII

SERVICING REQUIREMENTS

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

EXTERIOR CARE

Your 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 30 to 60 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 automotive type wax and apply wax liberally to areas subject to high abrasion such as leading edges of the wings 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.

MODEL 8KCAB

- (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, benzene, 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.

BATTERY BOX

The battery should be checked frequently for proper acid level, cleanliness of battery and security of cables and caps. The following special precautions must be followed to prevent leakage of acid:

- (1) Maintain acid level only 1/16" above top of the plates.
- (2) When servicing or installing battery, make a final acid level check after the airplane is flown long enough to completely charge the battery. Charging may cause acid level to rise, thus forcing acid into the battery caps. If battery is inverted with acid inside the caps, acid will run out.
- (3) Check frequently to insure that caps are tight.

NOTE

If signs of acid spillage exists inside the case or battery box, neutralize all the spilled acid with soda and clean battery, battery box and other affected parts. Inspect the battery, battery caps and vent manifold and fix leak before next flight.

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FUEL AND OIL REQUIREMENTS

Aviation Grade 80/87 octane fuel is the standard fuel for the Decathlon. Do not use any lower grade as it can cause serious engine damage in a very short time.

Oil sump capacity is eight quarts and aerobatic minimum safe quantity is seven quarts. Recommended time between change is 30 hours, or sooner, as conditions dictate.

The following grades should be used for the specific temperatures: (See note on Page 47.)

<u>AVERAGE TEMPERATURE</u>	<u>SINGLE VISCOSITY GRADES</u>	<u>MULTI-VISCOSITY GRADES</u>
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 confirm to Lycoming Spec. No. 301E.

REQUIREMENTS 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 30 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 operating temperature. If your 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.

MODEL 8KCAB

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.

ENGINE COWLING

The top half of the cowling can be quickly removed for inspection or maintenance by simply disconnecting the $\frac{1}{2}$ -turn cam-lock fastener 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.

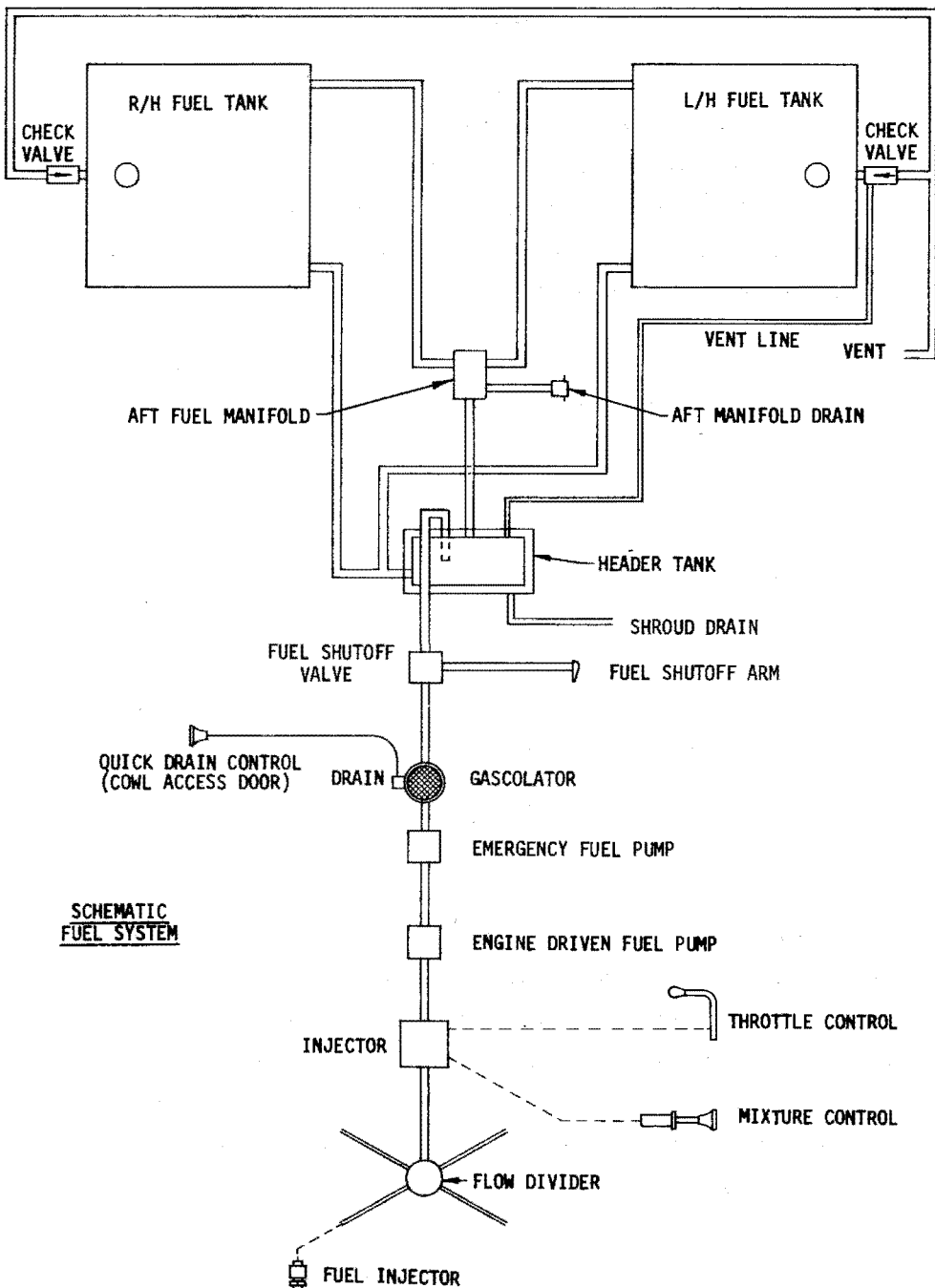
Installation of cowl is in reverse order of removal. However, when installing lower cowl, insure that the rubber duct which connects the air filter to air intake manifold is installed over the connecting flange. When installing upper cowl, be certain bomber cloth is in correct position to seal engine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

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 section. Continue to fill until the brake pedal pressure is firm. Close bleeder valve on the brake assembly before disconnecting the hose of the pressure pot. Each brake is filled separately. Use only MIL-H-5605 Hydraulic Fluid.

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

MODEL 8KCB



SCHEMATIC FUEL SYSTEM

