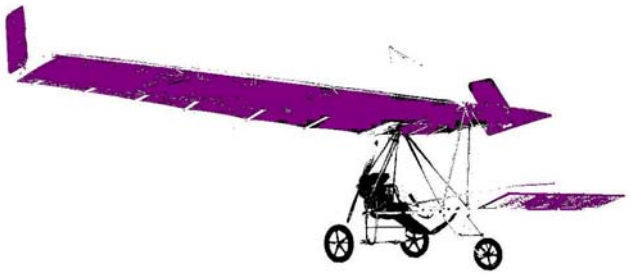
DFE Ultralights

Ascender III-C



Pilot's Operating Handbook

Applicable to:
Serial Number: *ARZ01*
Registration: *C-IZZZ*

Version 1.27 – August 2004

FOREWORD

This handbook describes the features and systems of the DFE Ultralights Ascender III-C ultralight airplane. Operational procedures and performance data are provided so that the aircraft can be operated as safely as possible.

It is strongly recommended that the pilot be familiar with the aircraft and this handbook prior to flight.

This handbook applies specifically to 2001 model DFE Ascender III-C, Serial Number ARZ01, registered *C-IZZZ* equipped with a Rotax 503 DCDI engine.

All placards and operating limitations **MUST** be adhered to.

INTERPRETATION

The words “WARNING”, “CAUTION”, and “NOTE” are used throughout the handbook with the following definitions:

WARNING

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

CAUTION

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

NOTE

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

DFE Ascender III-C

General Arrangement Photos

TABLE OF CONTENTS

SECTION VII SERVICING

GENERAL
SERVICING SPECIFICATIONS
FUEL
OIL
TIRES
LUBRICATION
SERVICING PROCEDURES
GROUND HANDLING
JACKING
MOORING
INSPECTION & SERVICING ACCESS
FUEL SYSTEM
BATTERY
BRAKES
TIRES
ENGINE LUBRICATION
GEARBOX LUBRICATION
ENGINE AIR FILTER
CLEANING
EXTERIOR SURFACE
WINDSHIELD
ENGINE
SEATS
STORAGE

This Handbook will be revised as necessary based on service information published by DFE Ultralights and by operational test data collected. Changes to the Handbook will be published as a new version number. The Handbook should not be used for operational purposes unless it is the current version.

SECTION I

OPERATING LIMITATIONS

GENERAL

This section lists all powerplant and airframe operating limitations. These limitations are also indicated in the aircraft in the form of instrument markings.

WARNING

All operating limitations must be strictly adhered to for reasons of safety.

FLIGHT OPERATIONS

All Canadian Ascender models are operated in the Canadian Basic Ultralight Category.

Day VFR flight only is approved in accordance with:

1) CAR 602.29 Hang Glider and Ultra-light Aeroplane Operation;
2) The Transport Canada Ultra-light Transition Strategy

Future regulatory requirements will be contained in:

1) CAR 603.78 Basic Ultra-light Aeroplane Operations,
2) CAR 605.111 Placard Requirements – Basic Ultra-light Aeroplane,
3) CAR 605.115 Basic Ultra-light Aeroplane Equipment Requirements and
4) CAR 605.117 Restraint System Requirements.

NOTE

CAR 602.29(1)(f)(ii) [now in effect] and CAR 603.78(6)(b)
require that all persons flying a Basic Ultralight
Aircraft wear a protective helmet

Eye protection is required while flying this aircraft.

Flight in Instrument Meteorological Conditions (IMC) is prohibited.

Flight at night is prohibited.

Flight into known icing conditions is prohibited.

POWERPLANT LIMITATIONS

Engine Type	Rotax 503 DCDI two-stroke aircraft engine equipped with dual carburetors and 2.58:1 "B" type gearbox, 50 hp (37 kW) at 6500 rpm
Fuel	Minimum AKI 87 Mogas or 100LL aviation fuel

Tachometer

Maximum (red line) (rpm)	6800 for 5 minutes
Maximum continuous (rpm)	6500

Cylinder Head Temperature

Normal Range (green arc)	350 – 430 ^{0}F
Maximum (red line)	480 ^{0}F
Maximum difference allowed between cylinders	34 F ^{0}

Exhaust Gas Temperatures

Normal Range (green arc) (^{0}F)	860 – 1000 ^{0}F
Maximum (red line) (^{0}F)	1200 ^{0}F
Maximum difference allowed between cylinders (^{0}F)	43 F^0

Fuel Pressure

Maximum	6 psi
Minimum	3 psi

Engine start and operating outside air temperature

Maximum	+50^{0}C
Minimum	-25^0 C

WARNING

Never fly aircraft equipped with this engine at locations, airspeeds, altitudes, or other circumstances from which a successful

landing cannot be made after sudden engine stoppage.

AIRSPEED LIMITATIONS

V_{NE} - Never Exceed Speed (red line on airspeed indicator) 55 mph

As this aircraft is capable of exceeding V_{NE} in level flight, a serviceable airspeed indicator is required for all flights.

Flying without a serviceable airspeed indicator is prohibited.

WEIGHT AND BALANCE LIMITS

Aircraft Weight and Center of Gravity Range

Maximum weight:	750 lbs	
Centre of Gravity Limits:	Maximum Rearward	98.0 inches
	Maximum Forward	95.6 inches

NOTE

All measurements are aft of the datum line, which is the canard boom tube leading edge. See *SECTION V WEIGHT AND BALANCE* for the flight envelope and loading instructions.

MANEUVERS

Aerobatics prohibited

REQUIRED PLACARDS

CAR 602.29 – "*This aeroplane is operating without a certificate of airworthiness / Cet avion est utilise sans certificat de navigabilitie*"

CAR 605.111 (not yet in effect) "*Notice: This basic ultralight aeroplane is not required to conform to government safety standards for design, construction and maintenance. Fly in this aircraft at your own risk.*"
And in the area designated for the carriage of another person: "*Passenger Warning: unless authorized, the carriage of passengers is prohibited*"

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 personal experience, training and knowledge of the aircraft, to determine the best course of action.

It is considered mandatory that the pilot be familiar with this entire handbook, in particular this section prior to flight.

NOTE

All airspeeds in this handbook are indicated airspeeds (IAS).

FIRE

ENGINE FIRE DURING START

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

1) Continue cranking engine with starter
2) Throttle - FULL OPEN
3) Inspect aircraft thoroughly for damage and cause prior to restart

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

1) Throttle - IDLE
2) Ignition Switches - OFF
3). Exit Aircraft
4) Direct fire extinguisher at engine

ENGINE FIRE IN FLIGHT

1) Ignition Switches - OFF
2) Land immediately using Forced Landing Procedures

WARNING

Do not attempt to restart engine.

ENGINE MALFUNCTIONS

ENGINE FAILURE ON TAKE-OFF

If sufficient runway remains:

1) Throttle – CLOSED
2) Land using remaining runway.

If sufficient altitude permits:

1) Ignition Switches - BOTH ON

If a restart is not achieved:

1) Select most favorable landing area straight ahead

WARNING

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

PARTIAL POWER LOSS/ROUGH RUNNING

1) Land as soon as practical using "Precautionary Landing Approach" procedures

Carburetor icing is indicated if a gradual RPM loss is noticed. The Rotax 503 is generally resistant to carburetor ice so there is no in-flight rectification for this problem.

LANDING EMERGENCIES

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 within gliding distance of the intended touchdown point. Use the normal landing procedures. In addition:

1) Airspeed - 40 MPH recommended depending on surface wind (35 MPH minimum)
2) Throttle - CLOSED when within gliding distance of runway

FORCED LANDING (Complete Power Failure)

If the engine cannot be restarted in flight, maintain the aircraft at 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.

1) Airspeed - Maintain 40 - 45 MPH
2) Radio - MAYDAY 121.5 MHz or current ATC frequency
3) Attempt to position the aircraft approximately 1000 feet above ground level (AGL) over the intended point of landing or 500 feet when downwind and abeam the intended point of landing.
4) On Final Approach - Airspeed - 40 MPH (35 MPH minimum)
5) Touchdown with minimum airspeed if landing on rough terrain.

DITCHING

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

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

NOTE

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

UNUSUAL FLIGHT CONDITIONS

SEVERE TURBULENCE

To prevent overstressing the aircraft do not exceed 55 MPH in rough air. To minimize personal discomfort, decrease the IAS to 45 MPH. Maintain a level flight attitude rather than flying by reference to the altimeter and airspeed indicator as the pitot-static instruments may become very erratic.

STALLS

The Ascender III-C stall characteristics are conventional with the canard elevator normally stalling first while flying dual, preventing main wing stall in most conditions of flight. There is sufficient aerodynamic buffeting from the canard elevator preceding the stall to provide the pilot with an adequate warning. When solo the main wing will stall first resulting in a pitch-down moment.

Tip rudder roll control response in a fully stalled condition is maintained. Large tip rudder deflections will aggravate a near stalled condition and their use is not recommended while stalled.

To recover from a stall, proceed as follows:

1) Nose Attitude - LOWER with forward movement of control stick
2) Throttle - FULL OPEN simultaneously with control stick movement

SPINS

The Ascender is designed to be spin resistant.

STRUCTURAL FAILURE OR MID-AIR COLLISION

In the event of a structural failure or mid-air collision the BRS parachute recovery system should be deployed. Proceed as follows:

1) Throttle – CLOSED
2) Ignition switches – OFF
3) Propeller – STOPPED (if altitude permits)
4) BRS handle – PULL
5) Parachute – CHECK OPEN
6) Prepare for vertical landing

SECTION III

NORMAL OPERATING PROCEDURES

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 recommended airspeeds in this Handbook are indicated airspeeds (IAS).

PREFLIGHT BRIEFING

Canadian Aviation Regulation 602.89 *Passenger Briefings* requires that any passenger be briefed by the pilot-in-command on the following items before take-off prior to a flight, where applicable:

1. The location and means of operation of emergency and normal exits
2. The location and means of operation of safety belts, shoulder harnesses and restraint devices
3. The stowage of carry-on baggage
4. Prohibition against smoking
5. First aid kits and survival equipment
6. Any ELT that is required to be carried on board pursuant to CAR 605.38

Additionally the following Ascender type-specific information should be briefed:

Pusher propeller safety – including clearances and loose objects:

1. Long hair should be properly secured to prevent contact with the propeller. A hairnet is recommended for long hair.
2. Scarves must be secured.
3. Pocket contents must be secured.

LIST OF WINGNUTS AND SAFETY RINGS

This is a complete list of wingnuts and safety rings installed on the aircraft. It is also incorporated in the preflight inspection.

There are 29 wingnuts with safety rings

1. Noseboom rigging bolt left wingnut
2. Noseboom rigging bolt right wingnut
3. Front strut, top left wingnut
4. Front strut, top right wingnut
5. Main strut bottom left wingnut
6. Main strut bottom right wingnut
7. Canard pushrod/control stick wingnut
8. Engine mount forward brace left wingnut
9. Engine mount forward brace right wingnut
10. Engine mount front left wingnut
11. Engine mount front right wingnut
12. Engine mount rear left wingnut
13. Engine mount rear right wingnut
14. Fuel tank carrier wingnut
15. Rear carry through left wingnut
16. Rear carry through right wingnut
17. Tip rib left front wingnut
18. Tip rib left rear wingnut
19. Tip rib right front wingnut
20. Tip rib right rear wingnut
21. Side car – top of front strut wingnut
22. Side car - top of diagonal brace wingnut
23. Side car – bottom of diagonal brace wingnut
24. Side car – joiner plug front wingnut
25. Side car – joiner plug rear wingnut
26. Side car - copilot backrest inboard wingnut
27. Side car –bottom of rear brace wingnut
28. Side car – pilot seat backrest inboard wingnut
29. Side car – pilot seat backrest outboard wingnut

<u>There are 30 clevis pins with safety rings:</u>

1. Canard pushrod front end clevis pin
2. Canard eye bolt left clevis pin
3. Canard eye bolt right clevis pin
4. Noseboom attachment left clevis pin
5. Noseboom attachment right clevis pin
6. Control stick cross tube left clevis pin
7. Control stick cross tube right clevis pin
8. Winglet mounting left clevis pin
9. Winglet mounting right clevis pin
10. Winglet lateral brace left top clevis pin
11. Winglet lateral brace left bottom clevis pin
12. Winglet longitudinal brace left top clevis pin
13. Winglet longitudinal brace left bottom clevis pin

14. Winglet lateral brace right top clevis pin
15. Winglet lateral brace right bottom clevis pin
16. Winglet longitudinal brace right top clevis pin
17. Winglet longitudinal brace right bottom clevis pin
18. Control cable to winglet left clevis pin
19. Control cable to winglet right clevis pin
20. Upper pullstart keel clevis pin
21. Lower pullstart clevis block pin
22. Copilot's throttle quadrant clevis pin
23. Pilot's throttle quadrant clevis pin
24. Spar outboard attachment right front clevis pin
25. Spar outboard attachment right rear clevis pin
26. Spar outboard attachment left front clevis pin
27. Spar outboard attachment left rear clevis pin
28. Keel front section clevis pin
29. Inboard sweep wires to nose plate left clevis pin
30. Inboard sweep wires to nose plate right clevis pin

PREFLIGHT INSPECTION

1) Documents

a) Journey Logbook -CHECK for outstanding snags
b) Maintenance Schedule -CHECK for time until maintenance required

2) Cockpit area

a) Ignition Switches - OFF (Guards up)
b) Seats - CHECK condition, security
c) Seat pockets - SECURITY and contents
d) Rear carry through left wingnut - CHECK condition, security
e) Rear carry through right wingnut - CHECK condition, security
f) Side car – top of front strut wingnut - CHECK condition, security
g) Side car - top of diagonal brace wingnut - CHECK condition, security
h) Side car – bottom of diagonal brace wingnut - CHECK condition, security
i) Side car – joiner plug front wingnut - CHECK condition, security
j) Side car – joiner plug rear wingnut - CHECK condition, security
k) Side car - copilot backrest inboard wingnut - CHECK condition, security
l) Side car –bottom of rear brace wingnut - CHECK condition, security
m) Pilot seat backrest inboard wingnut - CHECK condition, security
n) Pilot seat backrest outboard wingnut - CHECK condition, security
o) Trim system - CHECK condition, trim disengaged
p) Flight Controls - CHECK freedom of movement
q) Control stick cross tube left clevis pin - CHECK condition, security
r) Control stick cross tube right clevis pin - CHECK condition, security
s) Canard pushrod/control stick wingnut - CHECK condition, security

t) Copilot's throttle quadrant clevis pin - CHECK condition, security
u) Pilot's throttle quadrant clevis pin - CHECK condition, security
v) Low oil warning power switch - ON
w) Seat Belts/Shoulder Harness - CHECK condition
x) Co-pilot's Seat Belt/Shoulder Harness - SECURE if flying solo
y) Radio, GPS, Intercom – INSTALLED and operating
z) Ballast tube - CHECK contents and position
- forward for solo
- aft for dual

aa) Helmets – READY for use
bb) Loose objects - STOWED
cc) Keel - CHECK condition, security
dd) Keel front section clevis pin - CHECK condition, security
ee) Front strut, top left wingnut - CHECK condition, security
ff) Front strut, top right wingnut - CHECK condition, security
gg) Main strut bottom left wingnut - CHECK condition, security
hh) Main strut bottom right wingnut - CHECK condition, security
ii) Inboard sweep wires to nose plate left clevis pin - CHECK condition, security
jj) Inboard sweep wires to nose plate right clevis pin - CHECK condition, security
kk) Nose Plate Pip Pin - CHECK condition, security

3) Right Wing

a) Cables - CHECK secure
b) King Post - CHECK condition, security
c) Zippers – OPEN
d) Compression struts - CHECK condition, security
e) Spar outboard attachment right front clevis pin - CHECK condition, security
f) Spar outboard attachment right rear clevis pin - CHECK condition, security
g) Zippers – CLOSE
h) Top and bottom rigging cables - CHECK
i) Wing ribs - CHECK condition, Velcro closures
j) Winglet mounting right clevis pin - CHECK condition, security
k) Winglet lateral brace right top clevis pin - CHECK condition, security
l) Winglet lateral brace right bottom clevis pin - CHECK condition, security
m) Winglet longitudinal brace right top clevis pin - CHECK condition, security
n) Winglet longitudinal brace right bottom clevis pin - CHECK condition, security
o) Control cable to winglet right clevis pin - CHECK condition, security
p) Tip Rudder - CHECK condition, freedom of movement, security of control cable
q) Wing Tip - CHECK condition
r) Tip rib right front wingnut - CHECK condition, security
s) Tip rib right rear wingnut - CHECK condition, security
t) Front and Rear Wing Spars - INSPECT for straightness, dents and other damage
u) Dacron wing covering - CHECK for condition, security

and damage

v) Tie-Down - REMOVE

4) Right Main Gear

a) Chocks - REMOVE
b) Tire - CHECK condition, inflation.
c) Spring rod - CHECK condition and damage
d) Bungee - CHECK condition and security

5) Engine

a) Engine bungs & covers - REMOVE
b) Engine case - CHECK condition, security
c) Engine mount forward brace right wingnut - CHECK condition, security
d) Engine mount front right wingnut - CHECK condition, security
e) Engine mount rear right wingnut - CHECK condition, security
f) "B" Gearbox - CHECK condition, security of safety wiring
g) Engine mount & plate - CHECK condition, security
h) Carburetors - CHECK rubber mounting sockets for cracks
i) Air filter & silencer - CHECK condition, security
j) Throttle, choke, oil pump - CHECK condition, security
k) Oil supply lines - CHECK condition, security
l) Fuel pump - CHECK condition, security
m) Fuel pump impulse hose - CHECK condition, security
n) Fuel lines - CHECK condition, security
o) Ignition boxes - CHECK condition, security
p) Ignition system wires - CHECK condition, security
q) Engine - ROTATE by hand – listen for unusual noises
r) Propeller and bolts - CHECK condition, security
s) Propeller shaft bearing - CHECK clearance by rocking propeller
t) Exhaust system - CHECK condition, security, springs, safety wiring
u) Fuel tanks - CHECK quantity, tank interiors and caps secure
v) Fuel tank carrier wingnut - CHECK condition, security
w) Oil tank - CHECK oil quantity, tank condition, security
x) Cooling fan - CHECK condition, security and rotation
y) Primer - CHECK condition, security
z) Starter - CHECK rope condition, security
aa) Upper pullstart keel clevis pin - CHECK condition, security
bb) Lower pullstart clevis block pin - CHECK condition, security
cc) Engine mount forward brace left wingnut - CHECK condition, security
dd) Engine mount rear left wingnut - CHECK condition, security
ee) Engine mount front left wingnut - CHECK condition, security

6) Left Main Gear

a) Chocks - REMOVE
b) Tires - CHECK condition, inflation.
c) Spring rods - CHECK condition and damage
d) Bungee - CHECK condition and security
e) BRS system – CHECK condition and security

7) Left Wing

a) Cables - CHECK secure
b) Zippers – OPEN
c) Compression struts - CHECK condition, security
d) Spar outboard attachment left front clevis pin - CHECK condition, security
e) Spar outboard attachment left rear clevis pin - CHECK condition, security
f) Zippers – CLOSE
g) Top and bottom rigging cables - CHECK
h) Wing ribs - CHECK condition, Velcro closures
i) Winglet mounting left clevis pin - CHECK for condition, security
j) Winglet lateral brace left top clevis pin - CHECK condition, security
k) Winglet lateral brace left bottom clevis pin - CHECK condition, security
l) Winglet longitudinal brace left top clevis pin - CHECK condition, security
m) Winglet longitudinal brace left bottom clevis pin- CHECK condition, security
n) Control cable to winglet left clevis pin clevis pin- CHECK condition, security
o) Tip Rudder - CHECK condition, freedom of movement, security of control cable
p) Wing Tip - CHECK condition
q) Tip rib left front wingnut - CHECK for condition, security
r) Tip rib left rear wingnut - CHECK for condition, security
s) Front and Rear Wing Spars - INSPECT for straightness, dents and other damage
t) Dacron wing covering - CHECK for condition, security and damage
u) Tie-Down - REMOVE

8) Nose booms and canard elevator

a) Nose boom tubes - CHECK condition, security
b) Noseboom rigging bolt left wingnut - CHECK condition, security
c) Noseboom rigging bolt right wingnut - CHECK condition, security
d) Canard eye bolt left clevis pin - CHECK condition, security
e) Canard eye bolt right clevis pin - CHECK condition, security
f) Noseboom attachment left clevis pin - CHECK condition, security
g) Noseboom attachment right clevis pin - CHECK condition, security
h) Pitot Tube - CHECK unobstructed and cover removed
i) Canard pushrod front end clevis pin - CHECK condition, security
j) Canard Elevator - CHECK condition, security and freedom of movement
k) Canard Elevator Push Rod – CHECK freedom of movement and security

9) Nose Landing Gear

a) Nose gear fork - CHECK condition, security
b) Nose gear wheel - CHECK condition, security
c) Tire - CHECK condition, inflation
d) Brake system - CHECK condition, security, operation, wear

BEFORE STARTING

1) Loose objects - SECURED

STARTING

1) Low oil warning press-to-test switch - TEST
2) Ignition Switches – BOTH ON
3) Throttle - CLOSED
4) Prime - AS REQUIRED
5) Choke – ON
6) Propeller - CLEAR, front and rear
7) Starter – PULL
8) Choke - OFF
9) Throttle - 2000 RPM – 2 minutes
10) Throttle – 2500 rpm until operating temps reached
11) Harness – FASTENED
12) Radio, Intercom, GPS - ON
13) Eye protection – ON
14) Helmets – ON, chinstraps fastened
15) Gloves – ON

The use of the engine fuel primer will vary with each engine and temperature condition. If the engine is warm, little or no prime is required. During cold weather conditions, 4 - 6 priming strokes may be required.

The Rotax 503 engine starting system requires that the throttle be closed for the engine to started.

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

1) Throttle - FULL OPEN
2) Choke - OFF
3) Ignition Switches - OFF
4) Starter - ENGAGE for several propeller revolutions
5) Repeat normal starting procedures using no prime

TAXI

Taxi operations during high winds are not recommended.

BEFORE TAKEOFF

1)	Flight Controls	- CHECK freedom of movement, proper operation
2)	Trim system	- DISENGAGED
3)	Flight instruments, GPS and Radio	- CHECK and SET
4)	Engine Instruments	- CHECK within operational ranges
5)	Engine Run-Up	– 3000 – 3500 rpm
6)	Throttle response	- CHECK
7)	Ignition switches	- CHECK one at a time (300 RPM maximum drop)
8)	Engine Instruments	- CHECK normal indications
9)	Throttle	– IDLE - 2000 RPM
10)	Harness	- FASTENED
11)	BRS Safety Pin	- REMOVED and stowed

High power operation (above 3500 RPM) and engine run-up should be made into the wind if possible.

TAKEOFF-NORMAL

1)	Throttle	- FULL OPEN applying smoothly
2)	Engine Instruments	- CHECK normal indications
3)	Attitude	- Hold slight back elevator
4)	Lift-Off	- 35 – 40 MPH
5)	Climb	- 40 - 50 MPH

Takeoff characteristics are conventional. It is recommended that the nose be raised with the elevator slightly during the takeoff roll. Transition into flight with a minimum of control input.

During crosswind conditions, place the control stick into the wind and assume a level attitude with the elevator to prevent drifting or premature lift-off. The Ascender will turn into wind during the take-off roll, so commencing the take-off at the down wind side of the runway is recommended.

TAKEOFF OVER OBSTACLE

During an obstacle takeoff, use the normal takeoff procedures with the following exceptions:

1)	Lift-Off	- 30 MPH
2)	Climb	- 35 MPH (best angle of climb, for prolonged climb to obstacle)

TAKEOFF ON SOFT FIELD

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

1) Attitude – Nose high to lift nose wheel 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

The aircraft will lift-off at very low IAS but continued climb-out below 35 MPH immediately after takeoff is not recommended.

CLIMB

1) Throttle - FULL OPEN
2) Airspeed - 35-50 MPH

For maximum performance climb, use full throttle and the following conditions:

BEST RATE OF CLIMB/BEST ANGLE OF CLIMB

1) Airspeed – 35 MPH

CRUISE

1) Level-Off - TRIM
2) Airspeed - ACCELERATE to desired cruise airspeed
3) Throttle - SET RPM to cruise power

DESCENT

1) Throttle - REDUCE as desired
2) Airspeed - AS DESIRED

Descent should be made with a minimum of 3000 rpm to maintain cylinder head and exhaust gas temperatures in green arc.

NOTE

The Ascender's thrust line is located above the aircraft's C of G which results in a mild increase in pitch attitude when power is reduced. The effect is easily controllable and results in a loss of about 4 mph in airspeed when power is reduced from cruise to descent settings. Pilots should be

aware of this effect and maintain airspeed when reducing throttle.

LANDING - NORMAL

1) Approach Airspeed	- 45 MPH
2) Throttle	- AS DESIRED to control rate of descent

Aircraft landing characteristics are conventional. Due to the canard elevator stalling first and dropping the nose, full-stall landings are not recommended. During gusty wind conditions, increase airspeed approximately 5 MPH above normal, followed by flying the aircraft onto the ground at higher than normal airspeed.

LANDING - CROSSWIND

Crosswind landings should be avoided whenever possible. Into wind landings are possible at most airfields as winds will reduce landing distances considerably. If landing crosswind is unavoidable, steering into the wind at touchdown may be accomplished, provided sufficient runway width is available.

CAUTION

Crosswind landings in the Ascender require a high level of pilot skill and practice.

LANDING - OBSTACLE

Use of normal landing procedures in addition:

1) Approach Airspeed	- 40 MPH
2) Throttle	- AS DESIRED to control rate of descent

AFTER LANDING

1) BRS Safety Pin	- REPLACED

SHUTDOWN

1) RPM	- 3000 for two minutes
2) Radio, Intercom, GPS	- OFF
3) Choke	- ACTIVATE momentarily
4) Ignition switches	- OFF
5) Propeller	- STOPPED
6) Controls	- SECURE
7) Wheels	- CHOCKED
8) Wing/Nose boom Tie Downs	- SECURE

9) Engine bungs - INSTALL

NOTE

If high winds are anticipated, the aircraft should be hangared or folded up.
If the aircraft must be left outside, park into the wind and use tie-downs for security.
Secure the canard elevator and tip rudders against movement.

SECTION IV

FLIGHT PERFORMANCE

GENERAL

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

Fight performance data is included for the Ascender III-C model equipped with the Rotax 503 DCDI engine and dual carburetors. The data has been compiled from actual flight-testing using average piloting techniques, with an aircraft and engine in good operating condition. All information is corrected for standard atmospheric conditions.

AIRSPEED CORRECTION

The Hall, tube-type airspeed indicator, when installed at the end of the canard elevator push rod, is accurate in all flight attitudes and speeds. There is no position error in this installation. CAS and IAS are equal.

STALL SPEED / MINIMUM FLYING SPEED

The DFE Ascender main wing does not usually stall in 1 “g” flight when flown dual as the canard elevator stalls first. The minimum controllable airspeed is 32 MPH IAS.

TAKEOFF PERFORMANCE

Density Altitude	Distance
1000 feet	240 feet

CLIMB PERFORMANCE

Density Altitude	Rate of Climb
1000 feet	1000 fpm

CRUISE PERFORMANCE

Density Altitude	Cruise Speed	RPM	Power	Fuel Flow	Endurance (1/2 hour reserve)	Range (1/2 hour reserve)
Solo						
1000 feet	40 mph	4500	55%	9.5 litres/hr	3.1 hrs	124 sm
1000 feet	45 mph	5000	70%	10 litres/hr	3.0 hrs	133 sm
Two-place						
1000 feet	50 mph	5200	74%	11 litres/hr	2.5 hrs	129 sm

RPM	HP	% Power	Torque (ft.lb)	% Torque
3000	7	14%	11	27%
3250	9	18%	15	37%
3500	12	24%	18	44%
3750	15	30%	20	49%
4000	19	38%	24	59%
4250	23	46%	28	68%
4500	27	54%	32	78%
4750	30	60%	34	83%
5000	35	70%	37	90%
5250	40	80%	38	93%
5500	42	84%	40	98%
5750	45	90%	41	100%
6000	47	94%	41	100%
6250	49	98%	41	100%
6500	50	100%	39	95%

LANDING PERFORMANCE

Density Altitude	Distance
1000 feet	240 feet

SECTION V

WEIGHT AND BALANCE

GENERAL

The pilot must 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.

All measurements are aft of the datum line, which is the canard boom tube leading edge

The actual empty weight and center of gravity (C of G) of the specific aircraft can be found on the Weight and Balance Form. All additional changes to the aircraft's empty weight and C of G after the time of construction must also be entered in the Weight and Balance Form. From this information and the following instructions, the pilot can easily determine the “Useful Load” and proper loading distribution for the aircraft.

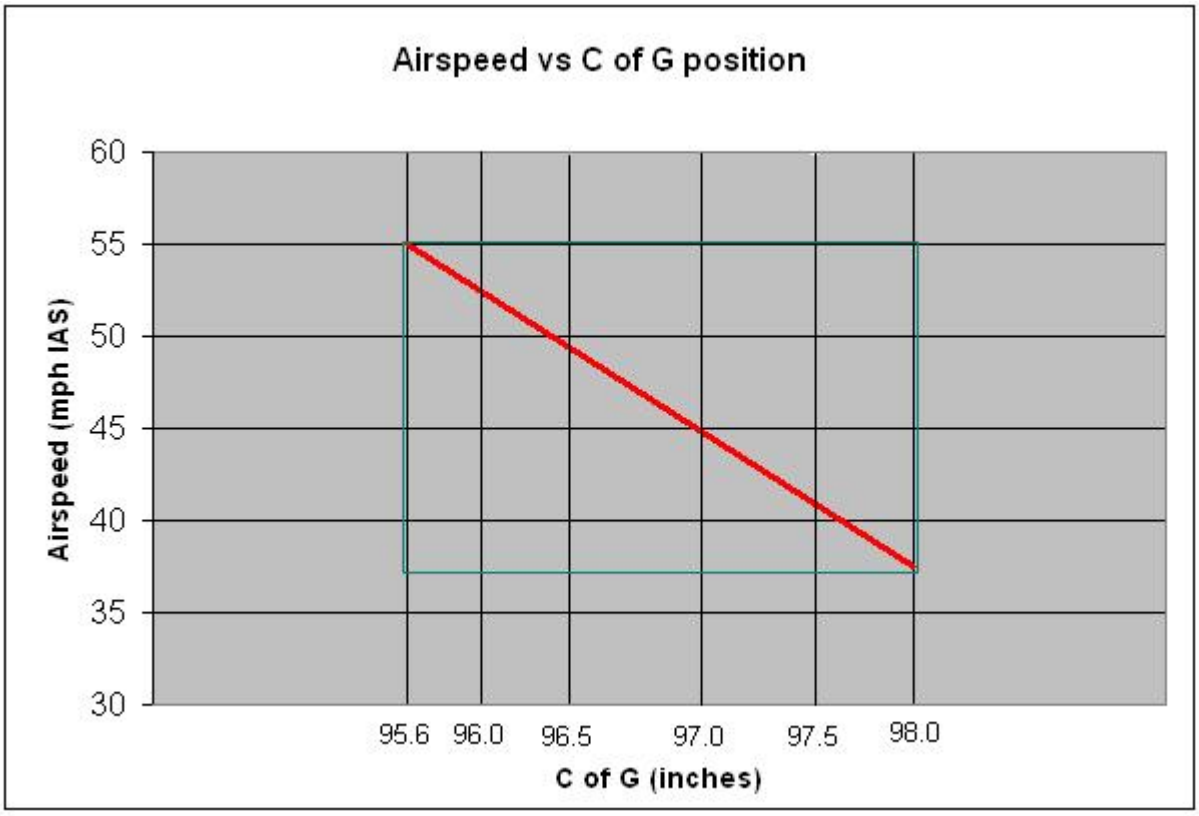
The DFE Ascender cruise speed will depend on the C of G. Flight testing has shown that the C of G versus cruise speeds are as given below.

FLIGHT ENVELOPE

Maximum gross weight 750 lbs

C of G range Maximum Rearward 98.0 inches Maximum Forward 95.6 inches

Cruise Speed	C of G
35 MPH	98.0 inches
40 MPH	97.6 inches
45 MPH	97.0 inches
50 MPH	96.3 inches
55 MPH	95.6 inches



LOADING PROCEDURES

1. Determine from the Weight and Balance Form the "Empty Weight and Moment" (in-lbs). Enter these figures into the Sample Loading Problem.

2. Full oil capacity of 2 litres (5 lbs) can be assumed for all flights. This quantity is included in the empty weight of the aircraft.

3. Using the Weight and Balance Form, determine the weight and the moment of the following items and enter these figures on the Sample Loading Problem.

a) Pilot
b) Co-Pilot or Student
c) Fuel - 9 US Gals (54 lbs) Useable
d) Baggage in seat pockets and in-wing storage
e) Ballast weight installed – forward for solo or aft for dual, the ballast weight should be 17.5 lbs including the large ballast tube.

4. Add the "Aircraft Empty Weight and Moment" and all the items in Step 3 to determine the "Gross Takeoff Weight and Moment". Divide the Moment by the weight to determine the Centre of Gravity (C of G).

5. Using the Flight Envelope for the Ascender III-C, determine that the gross takeoff weight and C of G 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 in an out of limits condition.

SAMPLE LOADING PROBLEM

Item	Weight	Arm	Moment	
Aircraft - empty	306	105.1	32169.0	
Fuel 9 US Gal	54	107.0	5778.0	
Pilot	185	86.5	16002.5	
Co-pilot	130	90.0	11700.0	
Baggage in wing	0	83.8	0.0	
Seat pocket pilot	0	93.8	0.0	
Seat pocket co-pilot	0	97.0	0.0	
Ballast wt forward	0.0	59.0	0.0	
Ballast wt aft	17.5	107.0	1872.5	
	Aircraft Weight	**C of G**		**Trim Speed**
Totals take-off fuel	**693**	**97.5**	67522.0	41
Totals no fuel	**639**	**96.7**	61744.0	47

Amount below gross 57.5lbs at take-off

SECTION VI

AIRCRAFT AND SYSTEMS DESCRIPTION

GENERAL

This section describes the aircraft, systems and equipment.

Item	Units	
Engine	type	Rotax 503 DC
Engine power	hp	50
Build Time	hours	310

DIMENSIONS

Length - fuselage	feet	11' 2.5"
Length - overall	feet	15' 6"
Height - overall	feet	10' 6"
Wing Span	feet	32' 9.75"
Wing chord - tip	inches	53.5"
Wing chord - root	inches	67"
Wing chord - mean	inches	60.25"
Wing height - tip	feet	6' 9.5"
Wing Sweep	degrees	18
Wing Dihedral	degrees	6
Wing Root Incidence	degrees	7.5
Canard height	feet	3.7
Canard span	feet	8
Canard chord	inches	16.5"
Canard Area	square feet	11
Wing Area	square feet	164.75
Total area wing+canard	square feet	175.75
Wing Loading	lb/sq ft	4.55
Winglet height	inches	36
Winglet chord	inches	22
Winglet Sweep Angle	degrees	22
Wheel base	inches	72
Wheel track	inches	62
Crew elbow room	inches	38
Power loading	lb/hp	15.00
Wing aspect ratio		6.5
Canard aspect ratio		5.80

PERFORMANCE

Cruise speed dual	mph	50
Stall speed	mph	35
Vne	mph	55
Maneuvering speed	mph	40
Rate of Climb	fpm	1000
Fuel	US gal	9
	lbs	54
	litres	34
Fuel flow	US gal/hr	3
	lbs/hr	18
Endur	hrs	3.0
Range (half hr reserve)	sm	125
Take off Dist	feet	200
Landing Dist	feet	250
Service ceiling	feet	18000
Roll rate 45-45 degrees	seconds	4
Max crosswind	mph	10
Load factors	g	+4.6/-2.6
Glide ratio		7.5
Minimum sink rate	fpm	550

WEIGHTS

Empty Wt	lbs	310
Gross weight	lbs	750
Useful load	lbs	440
Payload	lbs	386

AIRCRAFT FILE

The aircraft file includes the required documents that must be in the aircraft or available upon request. These items will reference the aircraft by serial number, model designation and registration. The aircraft identification plate, which also contains this information, is located on the bottom aft section of the wing keel tube. The file consists of the following:

These items must be available in the aircraft.

1) Aircraft Registration
2) Proof of Insurance

These items need not be carried in the aircraft, but should be available.

1) Weight and Balance Sheet
2) Journey Logbook
3) Technical Record
4) Pilot’s Operating Handbook

AIRFRAME STRUCTURE

The Ascender III-C is a two place, side-by-side seat, high wing aircraft with tricycle landing gear. The second seat and supporting structure is quickly removable, configuring the aircraft as a single seat airplane.

The aircraft structure is constructed of 6061 T6 aluminum tube. The wing assembly and tip rudders are covered with Dacron fabric. The wing structure includes two 1.75" diameter 0.049" thickness 6061 T6 aluminum tubular spars, each supported by cables, providing a high strength to weight ratio. The wing ribs are 6061 T6 aluminum and are supported in pockets in the Dacron wing covering. The canard elevator is 6061 T6 aluminum covered in clear Mylar material.

MODIFICATIONS

List of Specific Changes to DFE Ultralights Ascender III-C *C-IZZZ* S/N ARZ01 compared to the DFE Builder's Manual:

Ignition Switches – The plastic, throttle mounted P123-360 Ignition Toggle Switch was replaced with two AN3021-2 Switches with two MS25224-1 Switch Guards from *Aircraft Spruce & Specialty Company*, mounted in a custom-made aluminum bracket. The bracket was fabricated from 3030 aluminum and mounted with two AN3-22A bolts on the centre hang tube within reach of both pilots' seats.

Seat Security – The P112-310 cross-country seats were modified by adding six brass grommets to the outside surfaces to facilitate securing with four wraps of 175 lb test cord to prevent in-flight separation of the Velcro. The supplied thin steel buckles on the inside straps were replaced with Fastex "triglide" buckles and the strap ends modified with extra pieces of seat belt material to prevent belt "pull-through".

Nose Wheel Brake – a bicycle cable-actuated caliper brake system was installed on the nose wheel. The controller is located on the sidecar diagonal brace. The brake caliper was mounted with a bracket made from 6061-T6 0.125" bar and 6061-T6 1" square tube of 0.125" thickness.

Powerplant – The standard Ascender powerplant of a 2SI (Cuyuna) 430R belt reduction drive engine with a single carburetor producing 34 hp was replaced with a Rotax 503 DCDI with dual carburetors, intake silencer and after muffler, producing 50 hp. This installation increased power available by 32% at a cost of approximately 28 lbs of weight.

Change in Bolt – The assembly manual-specified P132-150 AN4-15A bolt and AN 365 full nylock ¼" nut at the junction of the sidecar front strut and the flat-bottom bracket on the sidecar hang tube was replaced with an P132-155 AN4-15 bolt, P132-560 wing nut and P139-010 safety ring to facilitate removal of the entire sidecar front strut/diagonal brace assembly, due to the instruments and the nose wheel brake installed on it.

Trim System – A bungee trim system is installed for use while flying solo. This system consists of a single ¼" bungee looped around the forward main strut and the lower control stick. By slipping the bungee upwards on the stick various speeds may be trimmed for.

ENGINE

The Ascender III-C is powered by a dual-carbureted Rotax 503 DCDI two cylinder, upright mounted, reduction geared, two-stroke engine. The engine is equipped with a muffler, after-muffler and intake silencer systems.

Engine displacement	496.7 cc (30.31 cu in)
Bore	72 mm
Stroke	61 mm
Compression ratio	10.8:1
Engine weight	92 lbs
Gearbox	"B" type gearbox 2.58:1 reduction ratio
Maximum engine speed	6800 rpm for 5 minutes (2636 propeller rpm)
Maximum Continuous	6500 rpm (2519 propeller rpm)

The engine is cowled with a simple integral cowling for weight savings and ease of servicing.

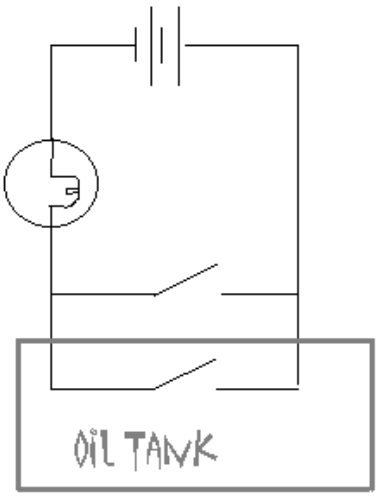
The Tennessee Propeller is of all wood construction and fixed pitch design. It has a diameter of 66 inches and a pitch of 32 inches and is designed to give good takeoff and cruise performance.

The two-stroke injection oil system controls the oil quantity automatically by an internal engine driven gear pump and cable that senses throttle position. The oil pump has a maximum capacity of 0.192 litres per hour at 1500 pump rpm.

Engine injection oil is contained in a 2 litre Rotax tank that is mounted on the engine cowling. The tank capacity is sufficient for approximately ten hours flying. Oil quantity is determined by a translucent tank design allowing direct viewing of the amount of oil in the tank.

The oil tank is also equipped with a low oil warning system that illuminates the flashing low oil warning light on the instrument panel when approximately 3 hours of oil remains. The low oil warning light will flash when the oil tank float switch drops to a low level and closes the circuit, illuminating the light. The low oil warning system incorporates a battery pack On/Off switch and a Press-to-Test switch mounted on the instrument panel that confirms correct functioning of the light. The Press-to-Test switch will only check the battery pack and light serviceability and does not confirm the operation of the float switch inside the tank. The system is powered by two "AA" batteries providing 3v DC.

PTERODACTYL ASCENDER IIIC OIL TANK ELECTRICAL SCHEMATIC



A single engine magneto and lighting coil provides ignition with dual Ducati capacitor discharge ignition (DCDI) units driving a dual ignition system. Separate ignition switches are located on the main structure between the seats.

Starting is accomplished by a manual “pull-type” recoil starter with the handle routed to the wing keel overhead of the pilot’s seat.

Dual throttle controls are located on the left and right hangtubes for each seat.

The choke control is located on the left main strut and is used for engine starting.

Stopping the engine is accomplished by momentarily engaging the choke and then turning off both ignition switches.

The air induction system is equipped with a large heavy-duty air K&N SP-2707 filter mounted at front of the engine intake silencer. Carburetor heat is not required or installed on this type of aircraft engine.

Engine RPM is indicated by an electrical tachometer mounted on the main instrument panel. An hour meter is fitted on the bottom position of the instrument panel. The electrical hour meter (Hobbs meter) indicates the actual running time of the engine and is activated by the engine lighting coil current.

FLIGHT CONTROLS

A control stick, shared by both the pilot and copilot, is provided for the tip rudders and canard elevator. The tip rudders are connected to the stick by a single control cable for each tip rudder. The canard elevator is connected to the control stick by a control rod.

Aircraft C of G location determines trimmed cruising airspeed. A bungee trim system is installed for use while flying solo. This system consists of a single ¼" bungee looped around the forward main strut and the lower control stick. By slipping the bungee upwards on the stick various speeds may be trimmed for. When not required the trim bungee may be stored on the stick pivot point

The operation of the canard elevator for pitch control is similar to a conventional aircraft. Pitch control is linear and control forces are light at all airspeeds.

Roll control in the Ascender is unconventional compared to a conventional three-axis aircraft. When the stick is moved laterally the tip rudder on that same side is deployed. The opposite tip rudder remains in a neutral position. The drag created by the deployed tip rudder induces a yawing motion. Due to the Ascender's dihedral of 6^0 and wing sweep angle of 18^0, this yaw results in a coupled rolling motion. In flight the two motions happen simultaneously resulting in a coordinated turn and little sensation of yaw leading roll. Roll control forces are light at all airspeeds.

The lack of direct control of yaw alone does mean that special crosswind landing techniques must be used. See *SECTION III NORMAL OPERATING PROCEDURES* for more information.

LANDING GEAR

The heavy-duty fibreglass rod main landing gear and bungee suspended nose wheel allows routine operations on rough landing strips and unprepared surfaces. The nose gear is steerable through pedals available to the pilot's seat position only. The steerable nose gear allows directional control during taxi operations.

The aircraft is equipped with a single nose wheel brake. This brake is effective for controlling taxi speed on hard surfaces, but should not be relied upon for short stops on landing.

The pilot's feet on the ground to prevent forward movement of the aircraft provides a "parking brake" function.

CAUTION

The technique of using the pilot's feet for brakes while the aircraft is moving is not recommended while the aircraft propeller is turning as rocks may be

kicked up into the propeller, damaging it.

ELECTRICAL SYSTEM

The aircraft is not equipped with an electrical system.

Engine starting is by use of the “Pull-type” recoil starter. The low oil warning system, radio, GPS and intercom all have their own independent battery packs.

FUEL SYSTEM

The Ascender III-C fuel system is completely independent of the other aircraft systems.

Fuel is supplied from two independent fuselage-mounted tanks located beneath the engine. Each tank holds 4.5 US gallons (17 litres) useable fuel or 27 lbs for a total of 9 US Gallons (34 litres) or 54 lbs useable.

Fuel is fed to the engine by the crankcase-pulse powered Minuki diaphragm fuel pump mounted on the right side of the engine mount plate.

Fuel quantity is registered by observing the fuel level in the translucent tanks. Calibration markings are provided on the rear of the right tank in litres.

NOTE

Correct fuel indication is only provided with
the aircraft in a level ground attitude.

There is no fuel shut-off valve. Fuel filtration is provided by an in line Bosch fuel filter and two pick-up fuel filters inside the individual fuel tanks. There are no provisions for fuel draining other than by pumping out or removing the tanks.

The fuel tanks are vented by independent fuel cap vents.

An engine plunger-type fuel primer is located on the fuel line behind the pilot’s seat to facilitate starting.

HEATING AND VENTILATION

There are no provisions for cockpit heating and therefore flying clothing appropriate to the season and altitude is imperative. Flying in temperatures below 10^0C is not recommended.

More than adequate ventilation is provided.

AIRCRAFT LIGHTING

The Ascender III-C is restricted to day VFR flight; therefore no aircraft lighting is required or provided.

FLIGHT INSTRUMENTS

The flight instruments are mounted in several places, depending on function.

The Hall tube-type airspeed indicator is mounted on the forward end of the canard elevator actuating tube to ensure that the short pitot tube operates in undisturbed airflow. The airspeed indicator is required for flight as airspeed is difficult to judge and the aircraft is capable of easily exceeding V_{NE} in level flight.

The AIRCOTEC Piccolo variometer-altimeter instrument is mounted on the sidecar diagonal brace. This instrument is a single, combination electronic variometer and altimeter hang glider type instrument powered by a 9v DC battery. A stopwatch is co-mounted.

The engine instruments are mounted in an instrument panel located on the sidecar diagonal brace. The installed instruments include a tachometer, dual cylinder head temperature (CHT) gauge, dual exhaust gas temperature (EGT) gauge and a Hobbs-type hour meter. The dual CHT and EGT are wired so that the left side of the gauge indicates data from the front cylinder and the right gauge from the rear cylinder.

The magnetic compass is mounted to the sidecar diagonal brace.

No stall warning device is installed or required.

AVIONICS

The Ascender III-C is equipped with equipment for navigation and communication. An ICOM A-2 VHF comm radio is mounted on a RAM mount on the centre hang cage tube. A FlightTech intercom is also fitted to allow intercommunication between the pilot and co-pilot or student. The intercom is powered by one 9v DC battery. A Magellan 310 GPS is mounted on a RAM mount on the left hang cage tube to aid navigation. The GPS is powered by two “AA” batteries providing 3v DC.

An emergency locator transmitter (ELT) is not required and is not fitted.

PARACHUTE RECOVERY SYSTEM

The aircraft is equipped with a BRS-5 750 canister-mounted, rocket-deployed parachute recovery system manufactured by Ballistic Recovery Systems of St Paul, Minnesota.

When the deployment handle is pulled the solid fuel rocket will deploy the recovery parachute to full line extension in 0.94 seconds. The parachute is a 28-foot diameter, 28-gore model of 615 sq ft area. It is capable of being successfully deployed at airspeeds of 0 to 100 MPH.

The BRS system weighs 22.7 lbs and is mounted on the main landing gear with the rocket deployed straight down. It is designed for a maximum load of 750 lbs.

The BRS system is designed to save the lives of the crew in the event of a structural failure or mid-air collision. Its use under other circumstances, such as engine failure over inhospitable terrain, is at the discretion of the pilot.

The BRS system has been demonstrated to be effective at altitudes as low as 150 feet and is designed to produce descent rates of 15 – 30 fps (22 – 44 MPH).

For the BRS system to operate, the safety pin must be removed prior to flight. It is recommended that the pin be replaced immediately after landing to preclude inadvertent ground firing.

CABIN FEATURES

The seats are equipped with zippered pockets for personal items. Both seats are equipped with seat harnesses.

The copilot's seat and supporting structure is quickly removable for single-seat operations.

A ballast weight tube is fitted to the front carry-through for solo flight, or the rear carry-through for dual flight can be used for storing the aircraft tie-down kit and other supplies. The main baggage area is located inside the wing and is accessed by the installed zippers.

CAUTION

Soft items only should be stored inside the wing
storage area to preclude damage to the Dacron fabric.

No fire extinguisher is required or installed.

No first aid kit is required but one may be carried in one of the stowage areas.

SECTION VII

SERVICING

GENERAL

This section describes ground handling, routine servicing, cleaning and storage procedures. No information is provided for making mechanical adjustments, repairs or replacement of components. Consult the DFE Ultralights and Rotax service manuals for details.

The aircraft is subject to regular maintenance as described in the aircraft maintenance schedule in the Technical Record.

SERVICING SPECIFICATIONS

FUEL

Type – Mogas minimum AKI 87 (Regular Grade) or Aviation Grade 100/130 Octane

Total Fuel Tank Capacity - 9 US Gallons 34 litres (4.5 US gallons, 17 litres, in each tank)

OIL

Type – Super Two stroke oil ASTM/CEC standards API-TC automatically injected at 2% (50:1) above 3000 rpm and 1.4% (70:1) below 3000 rpm, via the integral oil injection pump.

Oil tank capacity - 2 litres

TIRES

Type - Main – 20 inch BMX Bicycle tires
Nose – 16 inch BMX Bicycle tire

Pressure - 40 - 65 psi

AIR FILTER

Air Filter - K&N SP-2707 Rotax P/N 825 766

LUBRICATION

Type - General Purpose Grease (nose wheel bearing and steering assembly)

SERVICING PROCEDURES

GROUND HANDLING

The Ascender III-C can be easily maneuvered by one person when on firm level ground. The nose boom tubes may be grasped and lifted to bring the nose wheel off the ground, making maneuvering easy.

JACKING

The nose wheel can be lifted by hand and a suitable support placed under the hang tubes.

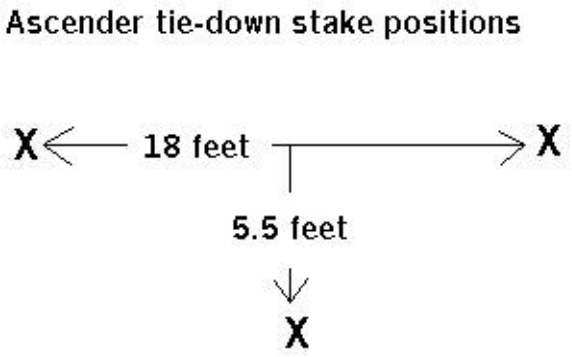
The main wheels can be raised by jacking at the axle. Place a suitable support under the main gear axle.

MOORING

In the event of high winds, the aircraft should be properly secured.

1) Head aircraft into the wind if possible.
2) Attach tie-down ropes to the nose boom and tie down fittings to the two wing tie-downs on each wing.
3) Install control surface locks for the tips rudders and canard elevator.
4) Install pitot tube cover

Note that tie-down stakes can be pre-positioned for the aircraft in the following pattern, speeding tying down:



INSPECTION & SERVICING ACCESS

The Ascender III-C is designed to simplify maintenance and inspection requirements.

The Rotax 503 engine has a single integral cooling cowling fastened with eight screws that are safety-taped in place. Remove the spark plug wires and disconnect the low oil warning system quick-disconnects before removing the cowling. Replace the cowl in the reverse order. Do not tighten fasteners until the cowl is completely in place.

Four inspection zippers are provided on the wings to gain access to the compression struts and wing structure.

FUEL SYSTEM

Use Mogas AKI 87 minimum octane regular auto fuel or l00LL low lead octane aviation fuel. Observe all required precautions when fueling the aircraft. Fill each tank through the respective filler neck. The fuel caps must be properly secured when fueling is completed.

TIRES

Tire condition should be checked during preflight. If the tire tread is no longer visible, it should be replaced. Inflate tires with compressed air.

All Tires – 40 – 65 psi

ENGINE LUBRICATION

Access to the oil tank is through the vented cap on the engine-mounted oil tank. The oil level should be checked prior to flight and oil added if not full.

Under normal operating conditions, the oil supply should last for 10 hours of flight. Keep the oil tank full to avoid running out of oil before fuel.

WARNING

Running out of oil will result in a lack of lubrication,
the engine seizing and a forced landing.

GEARBOX LUBRICATION

The reduction gearbox requires 330 ml of SAE 85W-140 gear oil to operate. It is filled through the vented filler cap located on top of the gearbox and the levels are checked with an overflow hole on the side of the gearbox. Do not overfill the gearbox or venting will occur. A drain plug is also fitted.

ENGINE AIR FILTER

The K&N SP-2707 engine intake air filter should be inspected during every pre-flight inspection.

WING SAIL

The Dacron Wing sail is treated with 303 Protectrant for UV resistance every 25 hours.

CLEANING

EXTERIOR SURFACE

The aluminum tubing and Dacron wing covering may be washed with mild soap and water. Avoid the use of harsh abrasives or detergents. Remove grease and oil with mild cleaners. The aluminum tubes may be waxed with a good quality automotive wax.

WINDSHIELD

The aircraft is not fitted with a windshield.

ENGINE

The engine can be washed down with a commercial engine solvent or degreaser. Avoid excessive contact of solvents on the electrical components such as the magneto and ignition system.

SEATS

The seats can be washed with mild soap and water. The seats are treated with 303 Protectrant for UV resistance every 25 hours

STORAGE

Aircraft placed in non-operational storage for long periods of time should be given a thorough cleaning. The engine should be preserved as described in the engine service manual to prevent deterioration.

To insure long engine life, the aircraft should be flown at least once a month to reduce excessive moisture buildup. Excessive ground running to bring engine to operating temperature is not recommended. Consult the engine manual for further recommendations if this is not possible.

ABBREVIATED CHECKLIST

(A complete checklist including the preflight inspection can be found in *SECTION III*.)

BEFORE STARTING

1) Loose objects	- SECURED

STARTING

1) Low oil warning press-to-test switch	- TEST
2) Ignition Switches	– BOTH ON
3) Throttle	- CLOSED
4) Prime	- AS REQUIRED
5) Choke	– ON
6) Propeller	- CLEAR, front and rear
7) Starter	– PULL
8) Choke	- OFF
9) Throttle	- 2000 RPM – 2 minutes
10) Throttle	– 2500 rpm until operating temps reached
11) Seat Belts/Shoulder Harness	– FASTENED
12) Radio, Intercom, GPS	- ON
13) Eye protection	– ON
14) Helmets	– ON, chinstraps fastened
15) Gloves	– ON

BEFORE TAKEOFF

1) Flight Controls	- CHECK freedom of movement, proper operation
2) Trim system	- DISENGAGED
3) Flight instruments, GPS and Radio	- CHECK and SET
4) Engine Instruments	- CHECK within operational ranges
5) Engine Run-Up	– 3000 – 3500 rpm
6) Throttle response	- CHECK
7) Ignition switches	- CHECK one at a time (300 RPM maximum drop)
8) Engine Instruments	- CHECK normal indications
9) Throttle	– IDLE - 2000 RPM
10) Seat Belts/Shoulder Harness	- FASTENED
11) BRS Safety Pin	- REMOVED and stowed

AFTER LANDING

1) BRS Safety Pin	- REPLACED

SHUTDOWN

1) RPM - 3000 for two minutes
2) Radio, Intercom, GPS - OFF
3) Choke - ACTIVATE momentarily
4) Ignition switches - OFF
5) Propeller - STOPPED
6) Controls - SECURE
7) Wheels - CHOCKED
8) Wing/Nose boom Tie Downs - SECURE
9) Engine bungs - INSTALL