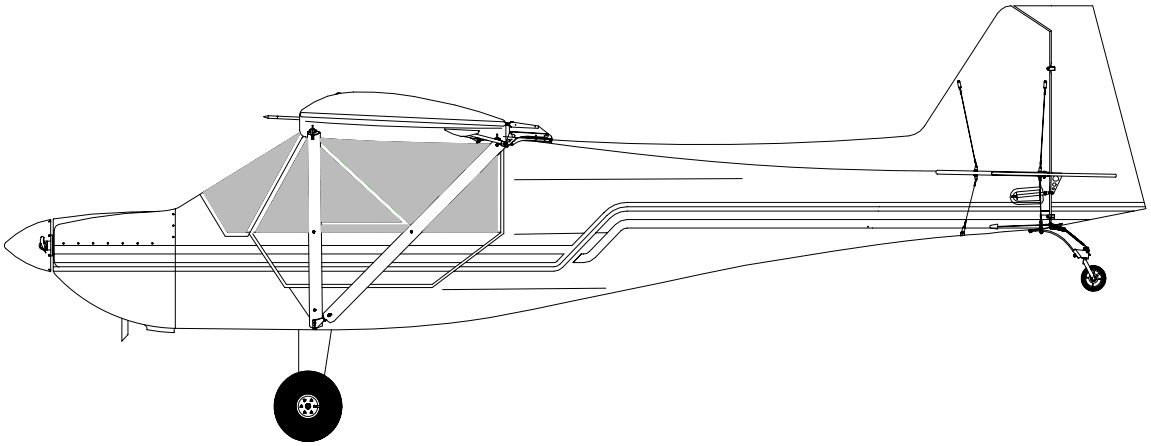
S-7LS COURIER

LIGHT SPORT AIRCRAFT

PILOT OPERATING HANDBOOK



Serial Number:

Registration Number:

March 3, 2005

COPYRIGHT © 2005
RANS DESIGNS
KANSAS, USA

Downloaded from www.Manualslib.com manuals search engine

TABLE OF CONTENTS

SECTION

GENERAL INFORMATION 1

OPERATING LIMITATIONS..... 2

WEIGHT AND BALANCE INFORMATION 3

PERFORMANCE 4

EMERGENCY PROCEDURES 5

NORMAL PROCEDURES 6

AIRCRAFT GROUND HANDLING AND SERVICING ... 7

REQUIRED PLACARDS AND MARKINGS 8

SUPPLEMENTARY INFORMATION..... 9

Downloaded from www.Manualslib.com manuals search engine

SECTION 1
GENERAL INFORMATION

TABLE OF CONTENTS

Page

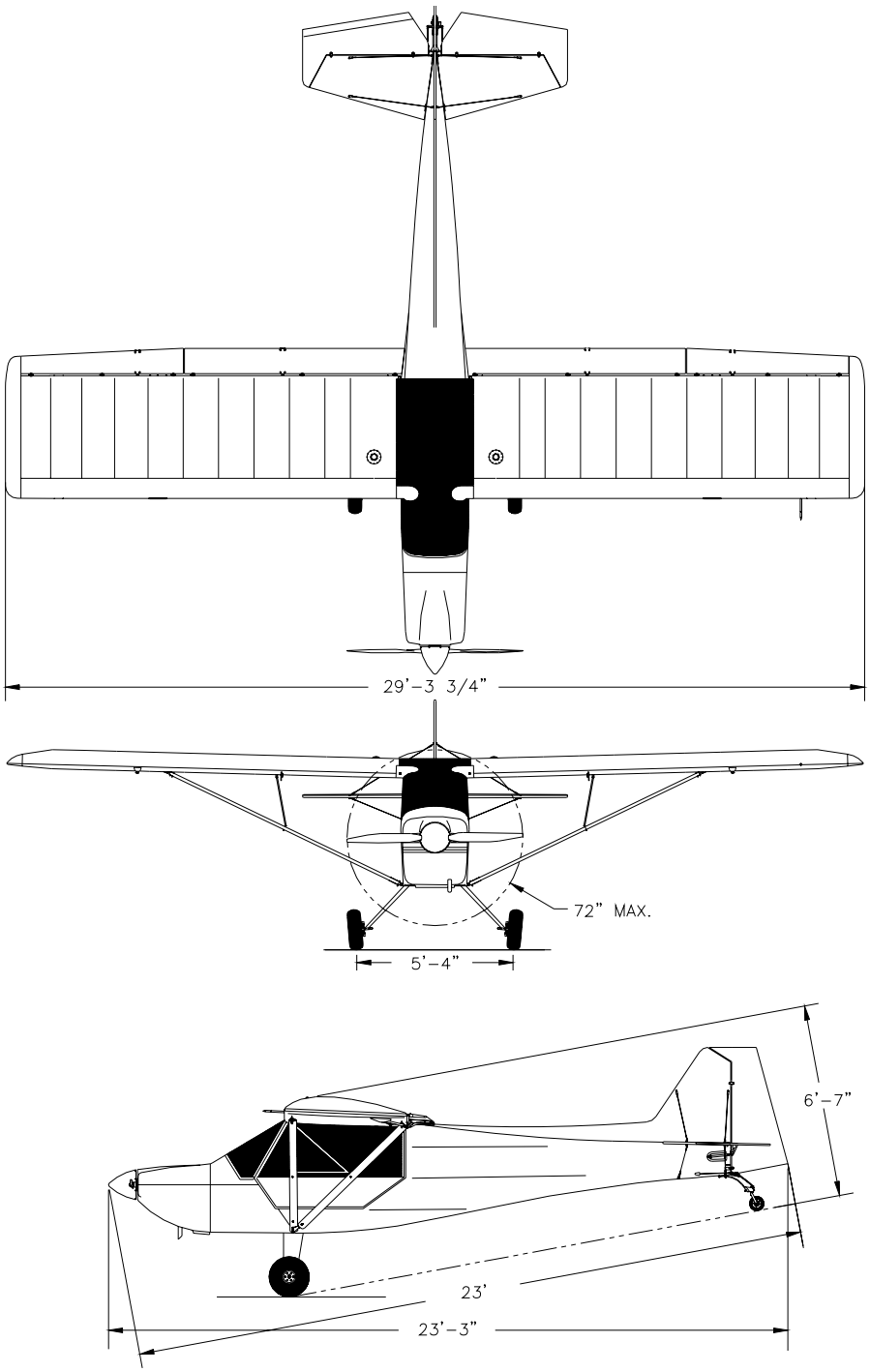
Three View..... 1-3
Introduction..... 1-4
Airplane and Systems Descriptions..... 1-4
Airframe..... 1-4
Flight Controls..... 1-4
Trim Control System..... 1-5
Wing Flap System..... 1-5
Landing Gear..... 1-5
Seats..... 1-5
Seat Belts and Shoulder Harness..... 1-6
Powerplant..... 1-6
Carburetors and Fuel Pumps..... 1-6
Exhaust System..... 1-6
Oil System..... 1-7
Liquid Cooling System..... 1-7
Carburetor Heat..... 1-7
Propeller..... 1-9
Fuel System..... 1-10
Brake System..... 1-13
Doors..... 1-13
Electrical System..... 1-13
Pitot and Static System..... 1-14
Instrument Panel..... 1-14
Engine Instruments..... 1-14
Flight Instruments..... 1-14

Downloaded from www.Manualslib.com manuals search engine

Operating Weights and Loadings 1-16
Maximum Airplane Weights 1-16
Standard Airplane Weights 1-16
Cabin and Entry Dimensions 1-16
Specific Loadings..... 1-16
Symbols, Abbreviations and Terminology 1-16
General Airspeed Terminology and Symbols 1-17
Meteorological Terminology 1-17
Engine Power Terminology 1-18
Airplane Performance and Flight Planning Terminology 1-18
Weight and Balance Terminology 1-18

Downloaded from www.Manualslib.com manuals search engine

THREE VIEW



Downloaded from www.Manualslib.com manuals search engine

INTRODUCTION

This handbook contains 8 sections.

The pilot should study the entire handbook to familiarize himself with the limitations, performance and procedures applicable for this aircraft.

Section 1 provides general information and system descriptions.

AIRPLANE AND SYSTEMS DESCRIPTIONS

AIRFRAME

The primary airframe construction material is tubular aircraft grade aluminum and steel. Primary items of the structure are the fuselage and tail structure. The fuselage and tail structure are of steel truss construction. The flight controls, main wheels, and seats are attached to the forward part of the fuselage. The empennage (tail assembly) is attached to the aft section of the tail structure. The fuselage and tail structure are covered with polyester fabric type covering.

The externally braced wings are comprised of a tubular leading edge and trailing edge spar joined by compression and diagonal struts. Formed ribs maintain the airfoil shape. The leading edge and trailing edge spars are equipped with strut attachment fittings. Conventional hinged ailerons are attached to the outboard section of the trailing edge spar of the wings. Conventional flaps are attached to the inboard section of the trailing edge spar of the wings. The wing, ailerons and flaps are covered with polyester fabric type covering.

The tail assembly consists of a conventional vertical stabilizer, horizontal stabilizer, rudder, and elevator. The stabilizers are braced with stainless steel rods. The right elevator carries a servo- adjustable trim tab. The left elevator has a fixed stability tab (do not adjust). The tail assembly is covered with polyester fabric type covering.

FLIGHT CONTROLS

The aircraft's flight control system consists of conventional aileron, rudder, and elevator control surfaces.
The ailerons are manually operated through cables to bell cranks in each wing and short push pull tubes from bell crank to aileron.

The elevators are operated through push pull tubes via a bell crank.
The forward and rear rudder pedals are connected through link tubes and the rear pedals via cables to the rudder. By pushing the left rudder pedal the aircraft yaws to the left and the right pedal yaws the aircraft to the right. All flight control surfaces are of tubular construction with fabric covering.
The aircraft has the following controls at both seats.

- Control sticks

Downloaded from www.Manualslib.com manuals search engine

- Rudder pedals
- Brake pedals
- Throttle lever

TRIM CONTROL SYSTEM

The AC has an in flight elevator trim system.
The movable trim tab is operated through a servomotor installed in the right elevator via a short pushrod.
The trim switch for nose up and nose down trim are located at the top of the forward control stick. An Indicator installed in the instrument panel provides information about the position of the trim tab.

WING FLAP SYSTEM

The flaps are conventional plain flaps and are extended or retracted by positioning the flap selector lever (located on the left side of the forward control stick) to the desired flap deflection position. The spring loaded flap lever moves up or down parallel to metal plates that provide indentations creating mechanical stops at the desired flap position.
The flap lever has a button on the top. This button must be pushed slightly before moving the flap lever into a new position. The Lever has a “flaps retracted”, “flaps half”, and “flaps full” position. The flaps are retracted when the lever is all the way down and the flaps are full down when the flap lever is all the way up. When the new flap position is reached, ensure that the lever is securely seated in the new position.
The flaps are actuated through Teleflex- cables (push pull cable). A slight play on the trailing edge (up and down) is normal.

LANDING GEAR

The landing gear is of the tail dragger type, having a steerable tail wheel and two main wheels. Shock absorption is provided by the tapered, heat- treated, alloy steel main landing gear legs and a steel heat- treated flat spring for the tail wheel. The tail wheel is connected via springs to the rudder and is steerable through the rudder pedals.
The full swivel tail wheel can be made to swivel by using full rudder pedal and brakes in the desired direction to turn. The steer-cam disengages once the rudder and brakes have turned the tail wheel to almost max travel left or right. To re-engage steering use brakes and rudder to taxi a few feet straight.

SEATS

The AC is flown from the front seat if solo.
Both seats are attached to the forward fuselage tube frame by adjustable seat rails. They are adjustable fore and aft. Each seat is adjusted through removing of the locking pins, readjusting the seat position as desired and re installation of the locking pins (2 per seat). **The seats can only get adjusted if not occupied. Do not attempt in flight.**

Downloaded from www.Manualslib.com manuals search engine

SEAT BELTS AND SHOULDER HARNESSES

The aircraft is equipped with a four-point pilot restraint system. At any time the pilot is seated in the aircraft with the intent of moving it, the pilot restraint system must be securely fastened. Always ensure the buckle is snapped into its locking position and the belt tension is snug and the shoulder harness are placed over the shoulders and properly adjusted. **The empty seat restraint system must be secured even when not in use**. **NOTE:** Always ensure the pilot restraint systems are not restricting any control system movement.

POWERPLANT

The S-7LS is powered by a Rotax four stroke, four cylinder horizontally opposed engine. The cylinders are ram air-cooled and the cylinder heads are water- cooled. The ignition is of the electronic type.
The propeller is driven via a reduction gear. The RPM indicated is engine- RPM. The engine is started through an electrical starter.

Number of Engines:	1
Engine Manufacturer:	Rotax
Engine Model Number:	912 ULS
Engine type:	Normally aspirated, four stroke, horizontal opposed, gear drive, liquid cooled cyl.- heads, air cooled cyl., carburetor equipped four cylinder engine with 1352 cm³(82.5in³) displacement.
Horsepower rating and Engine speed:	
Maximum Takeoff (max off 5 min):	98.5 HP at 5800 RPM
Max. Continuous :	92.5 HP at 5500 RPM
Idle (aprox.):	1400 RPM

CARBURETORS AND FUEL PUMPS

Two Bing carburetors with float chambers are used on the Rotax engine.
An engine driven fuel pump supplies fuel to both carburetors. A electrical back up fuel pump (fire wall mounted) is used during take off, climb out, landing and in case of engine pump failure.
A separate air filter is attached to each carburetor.

EXHAUST SYSTEM

The exhaust system consists of an after muffler and four pipes made from stainless steel. A stainless steel wrap around the muffler provides cabin heat and heat cups attached to both sides of the muffler canister provide heated air for the carburetor heat.

Downloaded from www.Manualslib.com manuals search engine

OIL SYSTEM

The engine is equipped with a dry sump forced lubrication system with a main oil pump with integrated pressure regulator and oil pressure sensor. The oil pump sucks the oil from the oil tank via the oil cooler and forces it through the oil filter to the points of lubrication of the engine.

Oil Grade:	SAE Motorcycle oil of registered brand with gear additives. Use only oil with API classification “SF” or “SG”. Minimum recommended viscosity 10W-40. For additional information refer to ROTAX Operators - and Maintenance Manual.
	►CAUTION: Do not use aircraft engine oil
Total Oil Capacity:	6.4 liq pt ; minimum 4.2 liq pt.

LIQUID COOLING SYSTEM

The cooling system of the cylinder heads is a closed circuit with an expansion tank. The coolant flow is forced by a water pump from the radiator to the cylinder heads and to an expansion tank on top of the engine. The expansion tank is closed by pressure cap. An overflow bottle receives coolant by temperature rise. The radiator is located at the bottom of the cowling inside the engine compartment.

Coolant capacity:	2.5 qt.

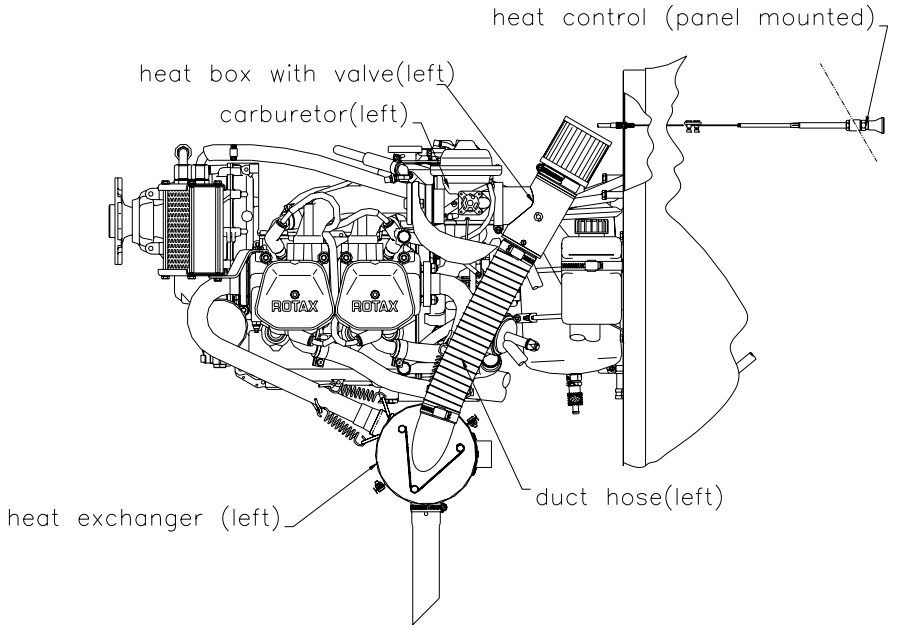
For additional information refer to ROTAX- Operators and Maintenance Manual.

Downloaded from www.Manualslib.com manuals search engine

CARBURATOR HEAT

Each one of the two carburetors of the Rotax 912S engine has a separate pre heating system consisting of a heat exchanger, heat control unit and connecting duct hose. One control knob operates both systems. Figure 1- 1 shows the general layout of the design (only the left side is shown).

Figure 1-1. Carburetor Heat



A heat exchanger is mounted to both sides of the exhaust muffler. The air entering the carburetor (heat on selected) is downstream cooling air, which is further heated on the sides of the exhaust muffler when passing through the heat exchanger.
The sides of the exhaust muffler provide sufficient area for heat transfer. Figure 1- 2 shows the muffler mounted heat exchanger.

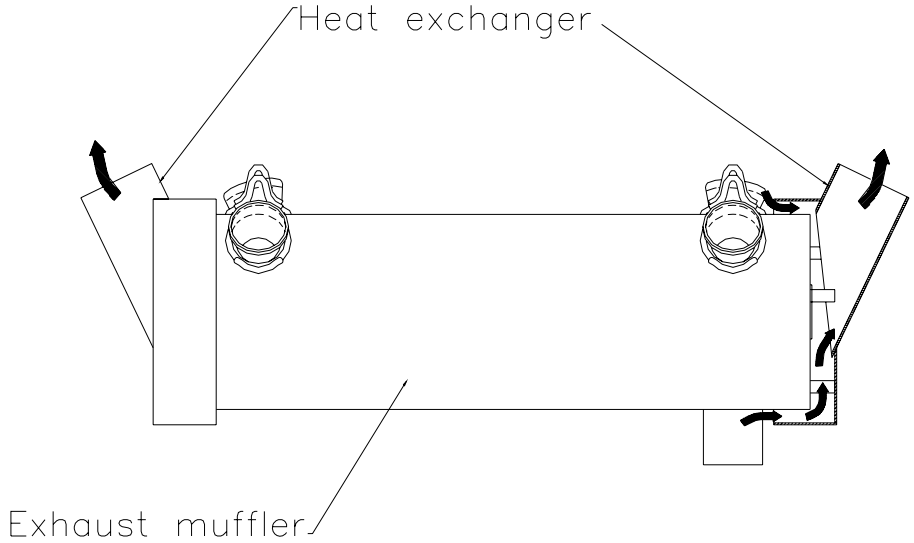


Figure 1-2. Carburetor Heat Exchanger

Downloaded from www.Manualslib.com manuals search engine

The instrument panel mounted control knob opens or closes the valves in both heat control units with a simple mixer simultaneously. The position of the valve determines if the engine runs on “cool” air coming through the air filter or on “hot” unfiltered air coming from the heat exchanger.
A spring mounted to each control unit supports the closing of the heat control valve and assures a fully closed valve when carburetor heat “off “is selected and therefore cool air supply and maximum engine performance. Reference also Figure 1-3.

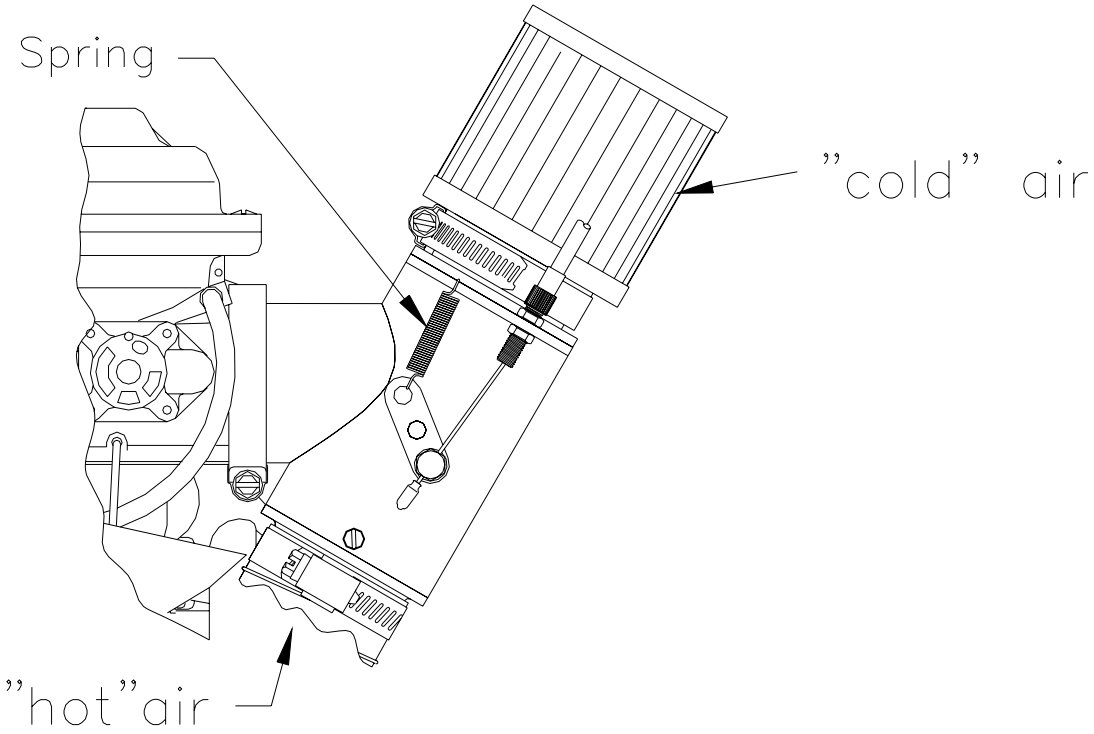


Figure 1-3. Carburetor Heat Valve

Downloaded from www.Manualslib.com manuals search engine

PROPELLER

The propeller is a fixed pitch Sensenich wood propeller. The maximum diameter is 72".
The propeller has a polyurethane leading edge for protection and better service life. Always park the aircraft with propeller blades horizontal to preserve balance.

Propeller Manufacturer:	Sensenich wood propeller Inc.
Propeller Model Number:	W72RR
Number of Blades:	2
Propeller Diameter:	72”
Propeller Type:	2 blade, fixed pitch

Optional a 2 blade ground adjustable carbon propeller is installed (Sensenich).

Propeller Manufacturer:	Sensenich wood propeller Inc.
Propeller Model Number:	R70D
Number of Blades:	2
Propeller Diameter:	70”
Propeller Type:	2 blade, ground adjustable

FUEL SYSTEM

The S-7LS fuel system is a pump fed carbureted system incorporating two wing tanks (9 gallons each) interconnected at one fuel valve accessible to the primary occupant (front seat).
Fuel quantity indication is provided through a fuel side gauge (clear plastic fuel line) at each fuel tank.
The indicator is calibrated to read zero, when the unusable fuel amount of 1.25 gall total or 0.625 gall each tank **is reached in horizontal level flight at maximum continuous RPM.**
The ¼; ½; and ¾ marks are also with reference to level flight.

The 1 or full mark indicates a recommended refuel level, if the aircraft is to be parked (sufficient expansion space) and is with reference to the ground attitude.

Downloaded from www.Manualslib.com manuals search engine

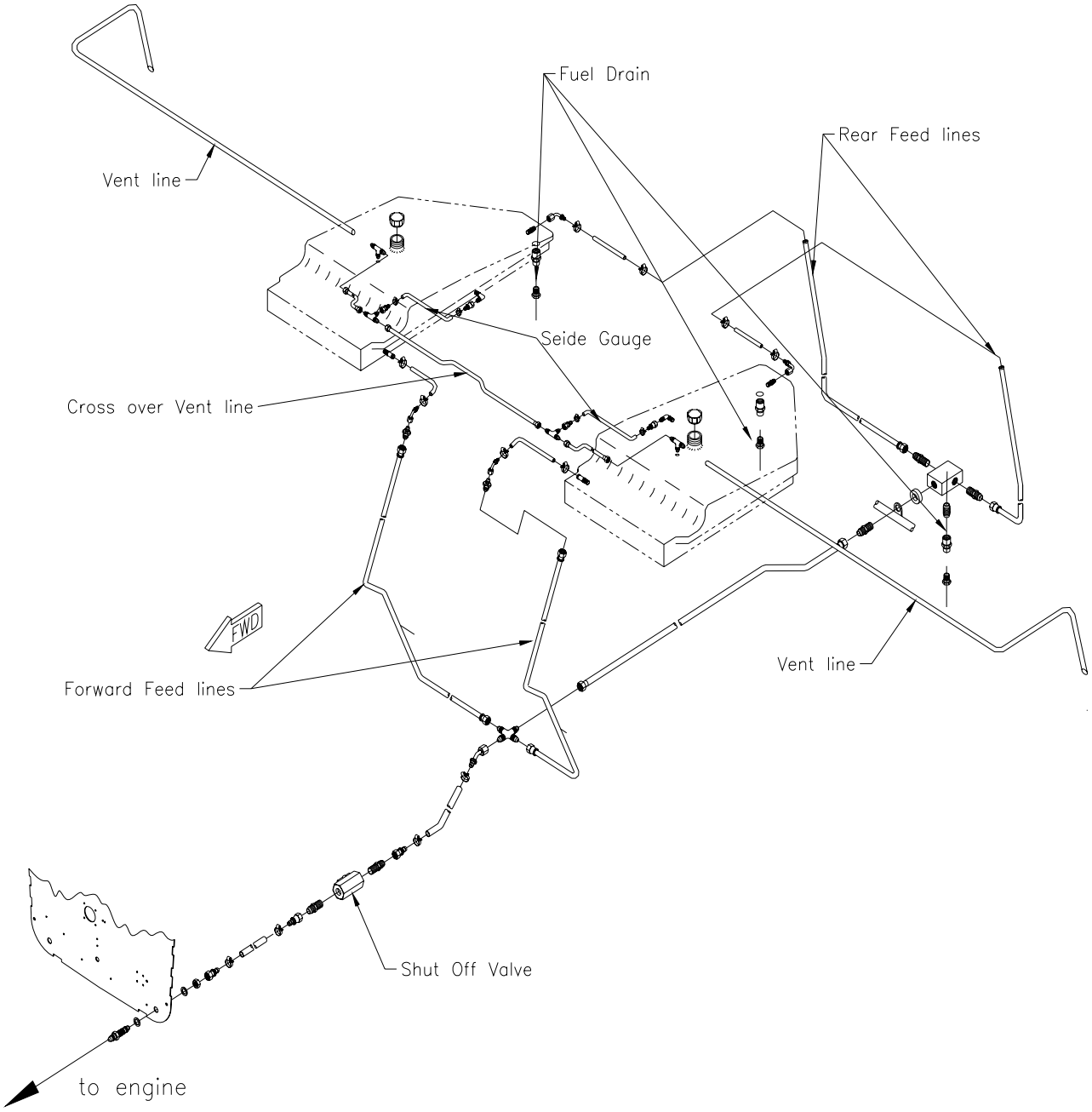


Figure 1-4.Fuel system Airframe

Downloaded from www.Manualslib.com manuals search engine

In addition to the engine mounted (mechanical) fuel pump, there is an electric (back up) fuel pump mounted to the aft engine mount. These pumps are fed from a gascolator mounted on the firewall. This system incorporates an anti vapor lock feature at the fuel tee between the carburetors that feeds the vapor back to the gascolator at the firewall.

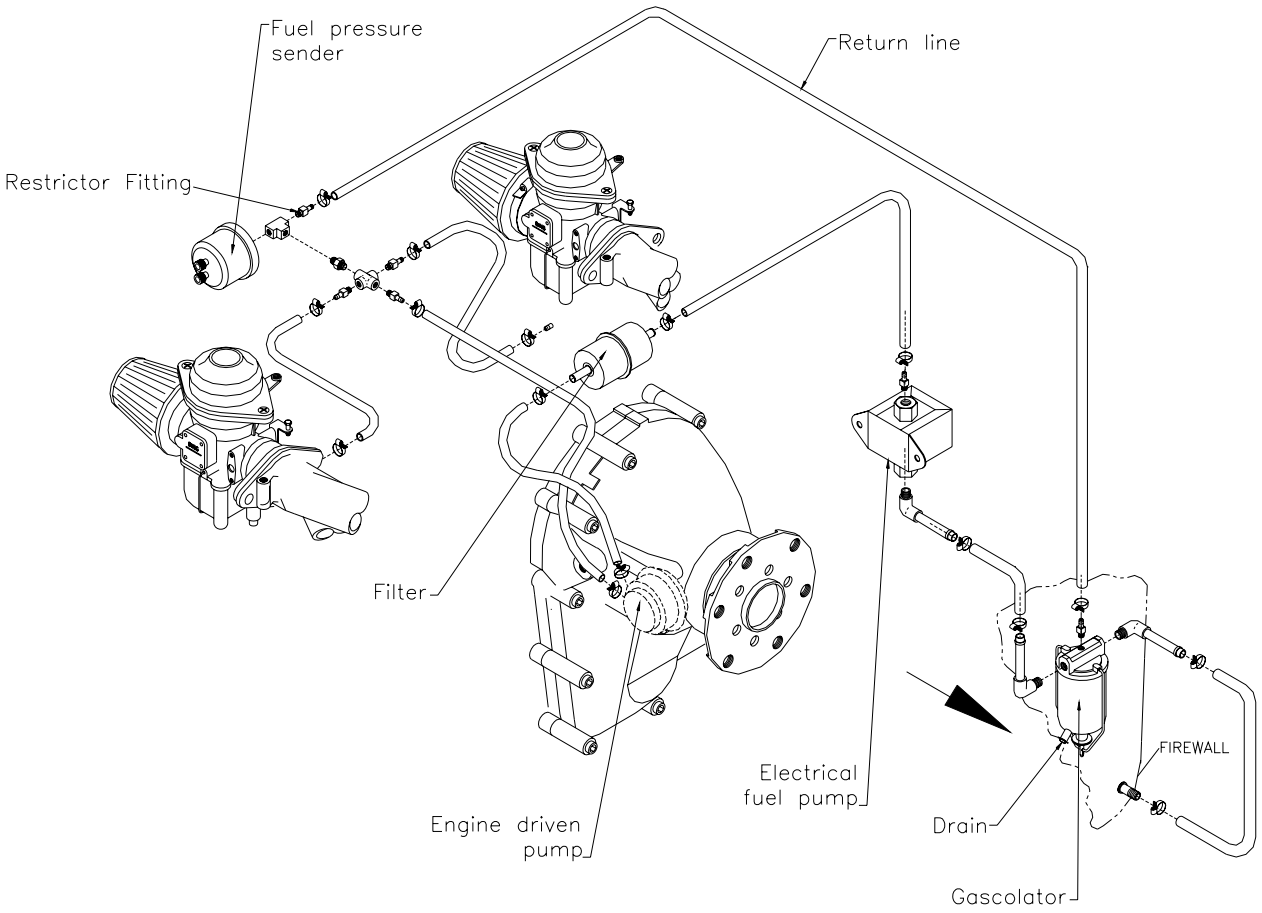


Figure 1-5 Fuel System Engine

The system also incorporates a panel mounted fuel pressure gauge

Downloaded from www.Manualslib.com manuals search engine

Fuel Grade: unleaded automotive (ASTM D 4814) gasoline with minimum AKI (Anti Knock Index) of 91 (R+M)/2 – No alcohol permitted.
Or AVGAS 100 LL
For additional information refer to ROTAX Operators - and Maintenance Manual

►**ATTENTION:** If engine is mainly run on AVGAS more frequent oil changes will be required.
For additional information refer to ROTAX Operators - and Maintenance Manual

Fuel Capacity:

Total Capacity:	18 US Gal.
Total Capacity each tank:	9 US Gal.
Total Usable:	16.75 US Gal.

►**NOTE:** Due to cross feeding between fuel tanks, the tanks should be re- topped after each refueling to assure maximum capacity.

BRAKE SYSTEM

The S-7LS is equipped with a main wheel hydraulic braking system. The brake pedals are mounted on top of the forward and rear rudder pedals. The individual brake pedals allow differential braking of left or right wheel. Pushing both pedals will result in braking on both wheels.
The braking system is equipped with a hydraulic fluid reservoir located firewall forward. Check the fluid level frequently.
To activate the park brake, push both brake pedals and pull the park brake knob on the left side of the instrument panel. To deactivate the park brake, push the park brake knob in. Always make sure, that the park brake is off, before adding power for taxiing or at landing.

DOORS

The S-7LS is equipped with two doors, one on each side of the AC. Always secure the doors before flight. Only 1 door may be open in flight. Open at or below 60 mph. Do not exceed 100 mph.
If a door comes open in flight, fly the AC before you attempt to close it. The AC will fly with open doors. The door will float in a position pending on the speed of the AC. To close an open door in flight, slow to 60 mph, push the opposite rudder pedal. This will make the AC yaw and help to get the door closed.

Downloaded from www.Manualslib.com manuals search engine

ELECTRICAL SYSTEM

The S-7LS electrical system is a 12-volt negative ground system. An integral AC generator mounted in the aft end of the engine powers it. It stores energy in a sealed maintenance free battery, located in the tail cone. Power is regulated by a solid-state regulator-rectifier located on the firewall.
Charge or discharge of the battery is indicated at a panel -mounted voltmeter.

PITOT AND STATIC SYSTEM

The S-7LS incorporates both pitot and static sources on the same probe. The probe extends forward of the left wing. The probe is attached to the instruments with plastic line joined with quick connectors.

INSTRUMENT PANEL

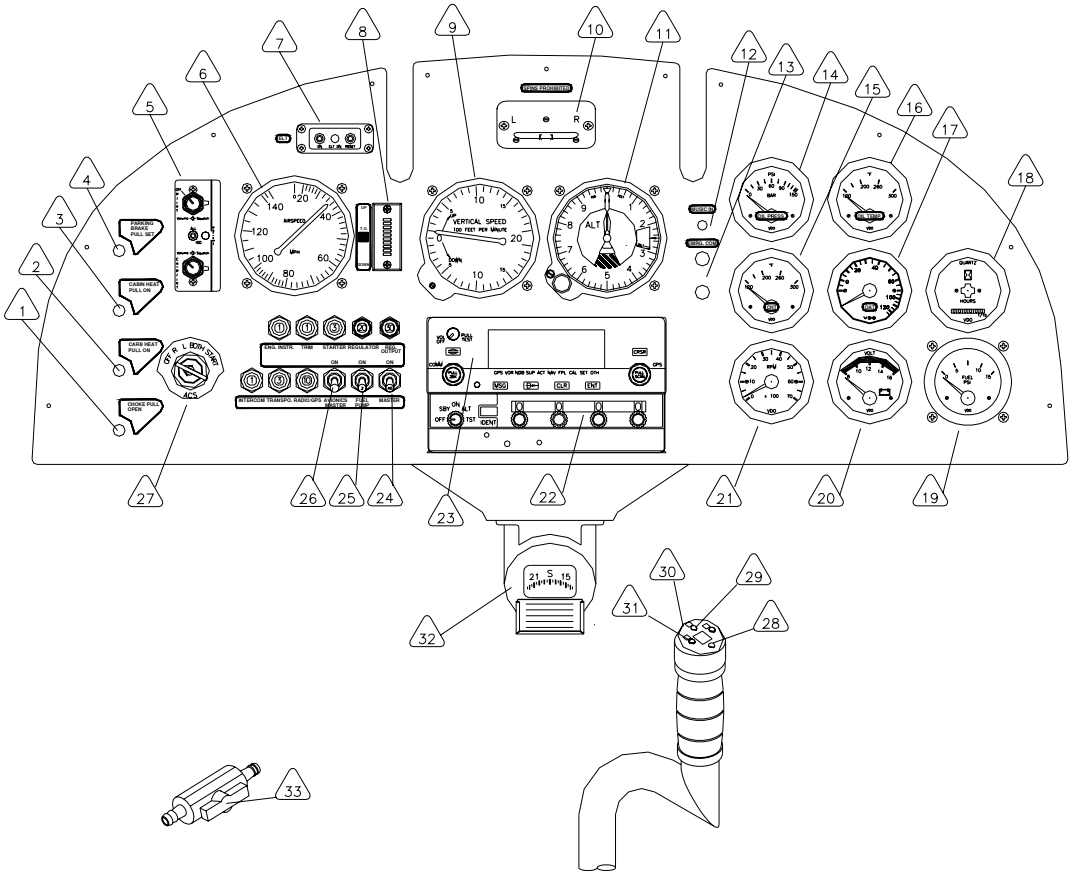
Engine Instruments

The aircraft is equipped with a tachometer, engine oil temperature gauge, engine oil pressure gauge, cylinder head temperature gauge, fuel pressure gauge, voltmeter and an hour meter. The cylinder head temperature gauge is used to monitor the coolant temperature also.

Flight Instruments

The AC is equipped with airspeed indicator, vertical speed indicator, altimeter, slip indicator, and compass.

Downloaded from www.Manualslib.com manuals search engine



1	Engine Choke Control	17	Outside Air Temperature Gauge
2	Carburetor Heat Control	18	Hour Meter
3	Cabin Heat Control	19	Fuel Pressure Gauge
4	Park Brake Control	20	Voltmeter
5	Intercom	21	Tachometer RPM- Gauge
6	Air Speed Indicator	22	Transponder
7	ELT Remote Control	23	Radio/ GPS Combination
8	Trim Position Indicator	24	Master Switch
9	Vertical Speed Indicator	25	Fuel Pump Switch
10	Slip Indicator	26	Avionics Master Switch
11	Altimeter	27	Ignition Key Switch
12	Music In (Plug)	28	Trim Switch Elevator Trim “Nose UP”
13	Emergency Head Set Plug In	29	Trim Switch Elevator Trim “Nose Down”
14	Oil Pressure Gauge	30	Push to Talk Switch (Radio)
15	Cylinder Head Temperature Gauge	31	Remote Frequency Select Switch
16	Oil Temperature Gauge	32	Compass
		33	Fuel Main Shut Off Valve (Floor Board)

Figure 1- 6 Instrument Panel

Downloaded from www.Manualslib.com manuals search engine

OPERATING WEIGHTS AND LOADINGS

MAXIMUM AIRPLANE WEIGHTS

Ramp:	1235 lb.
Takeoff:	1235 lb.
Landing:	1235 lb.
Weight in Baggage Compartment:	50 lb.

STANDARD AIRPLANE WEIGHTS

Standard Empty eight:	740 lb.
Maximum Useful load:	495 lb.

CABIN AND ENTRY DIMENSIONS

Cabin width (Maximum)	27 “

SPECIFIC LOADINGS

At Maximum Takeoff weight:

Wing Loading:	8.16 lb./ft²
Power Loading:	12.18 lb./ HP

Downloaded from www.Manualslib.com manuals search engine

SYMBOLS, ABBREVIATIONS AND TERMINOLOGY

The following definitions are of symbols, abbreviations and terminology used in this handbook and which may be of operational significance to the pilot.

GENERAL AIRSPEED TERMINOLOGY AND SYMBOLS

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

IAS Indicated Airspeed is the speed shown on the airspeed indicator.

TAS True Airspeed is the airspeed relative to undisturbed air which is CAS corrected for altitude and temperature.

VA Maneuvering Speed is the maximum speed at which full or abrupt control movements may be used.

VFE Maximum Flap Extended Speed is the highest speed permissible with wing flaps in a prescribed extended position.

VNO Maximum Structural Cruising speed is the speed that should not be exceeded except in smooth air and then only with caution.

VNE Never Exceed Speed is the speed limit that may not be exceeded at any time.

VS Stalling Speed or the minimum steady flight speed at which the airplane is controllable.

VSO Stalling Speed or the minimum steady flight speed at which the airplane is controllable in the landing configuration.

VX Best Angle off Climb Speed is the airspeed, which delivers the greatest gain of altitude in a given horizontal distance.

VY Best Rate off Climb Speed is the airspeed, which results in the greatest gain of altitude in a given time.

Downloaded from www.Manualslib.com manuals search engine

METEOROLOGICAL TERMINOLOGY

OAT — Outside Air Temperature is the free air static temperature

STANDARD TEMPERATURE — Standard Temperature is 15 ° C at sea level and decreases approximately 2° C for each 1000 ft of altitude.

PRESSURE ALTITUDE — Pressure Altitude is the altitude read from an altimeter when the barometric scale has been set to 29.92 inches of mercury (1013 mb).

ENGINE POWER TERMINOLOGY

BHP — Brake Horsepower is the power developed by the engine.

RPM — Revolutions per Minute is the engine speed

STATIC RPM — Static RPM is engine speed attained during a full throttle engine run up with the airplane on the ground and stationary.

MAXIMUM CONTINUOUS POWER — Maximum power permissible continuously during flight.

AIRPLANE PERFORMANCE AND FLIGHT PLANNING TERMINOLOGY

DEMONSTRATED CROSSWIND VELOCITY — The Demonstrated Crosswind Velocity is the velocity of the crosswind component for which adequate control of the airplane during takeoff and landing was actually demonstrated during certification flight test.

USABLE FUEL — Usable Fuel is the fuel available for flight planning

UNUSABLE FUEL — Unusable Fuel is the quantity of fuel that can not be safely used during flight.

GPH — Gallons per Hour is the amount of fuel consumed per hour.

Downloaded from www.Manualslib.com manuals search engine

WEIGHT AND BALANCE TERMINOLOGY

REFERENCE DATUM	Reference Datum is an imaginary vertical plane from which all horizontal distances are measured.
STATION	A location along the airplane fuselage given in terms of distance from the reference datum.
ARM	The horizontal distance from the reference datum to the center of gravity of an item.
MOMENT	The product of the weight of an item multiplied by its arm. (Moment divided by the constant 1000 is used in this handbook to simplify calculations by reducing the number of digits.)
CENTER OF GRAVITY	The point at which an airplane would balance if suspended. Its distance from the reference datum is found by dividing the total moment by the total weight of the airplane.
STANDARD EMPTY WEIGHT	Weight of a standard airplane including unusable fuel, full operating fluids and full engine oil.
BASIC EMPTY WEIGHT	Standard empty weight plus optional equipment.
USEFUL LOAD	Difference between takeoff weight and basic empty weight.
MAXIMUM TAKEOFF WEIGHT	Maximum weight approved for the start of the takeoff run.
MAXIMUM LANDING WEIGHT	Maximum weight approved for the landing touchdown.

Downloaded from www.Manualslib.com manuals search engine

SECTION 2
OPERATING LIMITATIONS

TABLE OF CONTENTS

Page

Introduction 2-2
Airspeed Limitations 2-2
Powerplant Limitations 2-3
Weight Limits 2-4
Center of Gravity Limits 2-4
Maneuver Limits 2-4
Flight Load Factor Limits 2-4
Kinds of Operation Limits 2-5
Fuel Limitations 2-5
Other Limitations 2-5

Downloaded from www.Manualslib.com manuals search engine

INTRODUCTION

Section 2 includes operating limitations, instrument markings, and basic placards necessary for the safe operation of the airplane, power plant and standard equipment.

The Rotax 912 Operators Manual must be on board of the airplane.

AIRSPEED LIMITATIONS

Airspeed limitations and their operational significance are shown in Table 2-1.
All speeds are given for maximum takeoff weight.

	Airspeed	CAS(mph)	IAS (mph)	Remarks
VNE	Never Exceed Speed	130	128	**Do not** exceed this speed in any operation
VA	Maneuvering Speed at maximum gross weight	97	97*	**Do not** make full or abrupt control movements above this speed.
VFE	Maximum Flap Extended Speed	69	69	**Do not** exceed this speed with flaps extended.
VSO	Stall speed	45	45**	Flaps full down
VS1	Stall speed	50	50**	Flaps up
VS1	Stall speed	48	48**	Flaps half

Table 2-1: Airspeed Limitations

***** At weights below maximum gross weight, maneuvering speed should be reduced 3 mph for each 50 lb. the aircraft weighs below maximum gross weight.
****** Power- off configuration

Downloaded from www.Manualslib.com manuals search engine

POWER PLANT LIMITATIONS

Number of Engines:	1
Engine Manufacturer:	Rotax
Engine Model Number:	912 UL/S
Horsepower rating and Engine speed (ISA):	
Maximum Takeoff (max off 5 min):	98.5 HP at 5800 RPM
Max. Continuous :	92.5 HP at 5500 RPM
Idle (aprox.):	1400 RPM

►The engine allows operation with fully open throttle valve over the whole RPM range without limitation. But full throttle performance above 5500 RPM is limited to 5 minutes.

Minimum Oil Pressure :	12 PSI
Normal Operating Oil Pressure :	29 to 73 PSI
Maximum Oil Pressure:	100 PSI
Minimum Oil Temperature:	120° F
Normal Operating Oil Temperature:	190° to 230° F
Maximum Oil Temperature:	266° F
Maximum Cylinder Head Temperature:	275° F
Engine Start, Operating Temperature:	
Maximum:	120° F
Minimum:	- 13° F
Fuel Pressure	
Minimum:	2.2 PSI
Maximum:	5.8 PSI
Acceleration:	
Limit of engine operation at zero gravity and in negative g conditions:	5 seconds at max. –0.5 g
Fuel Grade:	See fuel limitations
Oil Grade:	SAE Motorcycle oil of registered brand with gear additives. Use only oil with API classification “SF” or “SG”. Minimum recommended viscosity 10W-40. For additional information refer to ROTAX Operators - and Maintenance Manual. **►CAUTION: Do not use aircraft engine oil**
Propeller Manufacturer:	Sensenich wood propeller Inc.
Propeller Model Number:	W72RR

Downloaded from www.Manualslib.com manuals search engine

Number of Blades:	2
Propeller Diameter:	72”
Propeller Type:	2 blade, fixed pitch

Optional a 2 blade ground adjustable carbon propeller is installed (Sensenich).

Propeller Manufacturer:	Sensenich wood propeller Inc.
Propeller Model Number:	R70D
Number of Blades:	2
Propeller Diameter:	70”
Propeller Type:	2 blade, ground adjustable

WEIGHT LIMITS

Maximum Ramp weight:	1235 lb.
Maximum Takeoff weight:	1235 lb.
Maximum Landing weight:	1235 lb.
Maximum weight in Baggage compartment:	50 lb.

CENTER OF GRAVITY LIMITS

Forward:	46.1 inches aft of datum at 950 lb. or less with a linear variation to 48 at 1235 lb.
Aft:	50.5 inches aft of datum at all weights
Reference Datum:	Front face off firewall

MANEUVER LIMITS

This aircraft is intended for non – acrobatic operations.
The angle of bank should not exceed 60 ° and the pitch attitude may not exceed 30 °.
Stalls except whip stalls are approved with slow deceleration.

► Acrobatic maneuvers, including spins are not approved in the RANS S-7LS aircraft.

FLIGHT LOAD FACTOR LIMITS

Flight Load Factors:

Flaps Up:	+ 4.0 g, - 2.0g
Flaps Down:	+ 2.0 g, 0 g

Downloaded from www.Manualslib.com manuals search engine

KINDS OF OPERATION LIMITS

The RANS S-7LS is limited to **Day and Night VFR** operations.
Flight into known icing conditions is prohibited.
This aircraft is limited to two occupants only.
During solo flights the pilot must sit in the front seat.

Night flights according to VFR, flights according to IFR (by instruments) are approved only when instrumentation required for such flights is installed and maintained according to applicable F.A.R.S. and flight performed by a pilot with applicable rating and currency!
Intentional flights into known icing conditions are prohibited.

FUEL LIMITATIONS

Approved Fuel Grades:	unleaded automotive (ASTM D 4814) gasoline with minimum AKI (Anti Knock Index) of 91 (R+M)/2 – No alcohol permitted. Or Avgas 100 LL Grade Aviation Fuel (blue) ► for other fuel see ROTAX Operators Manual supplied with your AC engine.
Fuel Capacity:	
Total Capacity:	18 US GAL
Total Capacity each Tank:	9 US GAL
Total Usable:	16.75 US GAL
Total Unusable:	1.25 US GAL
	►**NOTE:** Due to cross feeding between fuel tanks, the tanks should be re- topped after each refueling to assure maximum capacity.

Takeoffs have not been demonstrated with less than 2 gallons of total fuel (1 gallon per tank).
The fuel quantity indicator is calibrated to read correct in horizontal level flight (cruise) only.
The readings given by the fuel quantity indicator in 3-wheel ground attitude are therefore not correct.
The fuel remaining in the tanks after the fuel quantity indicator reads zero (in level flight attitude in cruise condition) cannot be safely used in flight.

OTHER LIMITATIONS

Flap Limitations:

Approved Takeoff Range:	retracted, half or full flaps (0° to 34°)
Approved Landing Range:	retracted, half or full flaps (0° to 34°)

Downloaded from www.Manualslib.com manuals search engine

SECTION 3
WEIGHT AND BALANCE INFORMATION

TABLE OF CONTENTS

Page

Introduction…… 3-2
Installed Equipment List …… 3-2
Airplane Weighing Procedures …… 3-4
Weight and Balance…… 3-7

Downloaded from www.Manualslib.com manuals search engine

INTRODUCTION

This Section lists standard equipment installed, describes the procedures for establishing of basic empty weight and moment of the airplane.

Procedures for calculating the weight and moment for various loadings are also provided. Sample forms are provided for reference.

It should be noted that specific information about weight, arm, moment and installed equipment of this airplane as delivered from the factory can only be found in the plastic envelope carried in the back of this manual.

Always check your weight and balance during your preflight planning. It is required to check the data for landing and take off (fuel weight change).

It is the responsibility of the pilot to ensure that the airplane is loaded properly.

INSTALLED EQUIPMENT LIST

ENGINE:

Engine Supplier:	Rotax
Engine Part Number:	912 ULS2

PROPELLER:

Propeller Supplier:	Sensenich Wood Propeller Inc.
Propeller Part Number:	W72RR (2blade wood) or 2A1R5R70D(N)* (Composite) * An (N) will be at the end of the part number if the propeller has a nickel leading edge

WHEELS AND BRAKES:

Main Wheels and Brakes Supplier:	Cleveland, Grove or MATCO
Main Wheels and Brakes Part Number:	199-104, 61-1 or MHMHE6B1.25-SC
Tail Wheel Supplier:	RANS Inc.
Tail Wheel Part Number:	KATG0002
Parking Brake Valve Supplier:	Matco
Parking Brake Valve Part Number:	PV-1
Master Cylinder Supplier:	Cleveland, or Grove
Master Cylinder Part Number:	10-54, or 670-1

Downloaded from www.Manualslib.com manuals search engine

Tire Supplier:	Specialty Tires of America Inc.
Tire Part number:	Aero Trainer 6.00x6; 6 Ply ; Type 3; AD4E4 or Air Trac 8.00 X 6; 6 Ply; Type 3; AA1J4

INSTRUMENTS AND ELECTRICAL:

Altimeter Supplier:	Falcon Gauge
Altimeter Part number:	ALT20INF-3
Airspeed Indicator Supplier:	United Instruments
Airspeed Indicator Part Number:	8000 (TSO C2b)
Vertical Speed Indicator Supplier:	Falcon Gauge
Vertical Speed Indicator Part Number:	VSI2FM-3
Fuel Pressure Gauge Supplier:	Mitchell
Fuel Pressure Gauge Part Number:	D1-211-5062
Tachometer Supplier:	VDO
Tachometer Part Number:	333 015 041D
Cylinder Temp Supplier:	VDO
Cylinder Temp Part Number:	310 030 007C
Oil Temperature Supplier:	VDO
Oil Temperature Part Number:	310 030 007C
Oil Pressure Supplier:	VDO
Oil Pressure Part Number:	350 909
Hour Meter Supplier:	VDO
Hour Meter Part Number:	331 810 012 001C
Hour Meter Pressure Switch Supplier:	Borg Warner
Hour Meter Pressure Switch Part Number:	S383
Volt Meter Supplier:	VDO
Volt Meter Part Number	332 041
Trim System Supplier:	Ray Allen Company
Trim System Part Number:	T3-12A-TS
Trim Switch Supplier:	Ray Allen Company
Trim Switch Part Number:	G205
Breaker Switch Supplier:	Potter & Brumfield
Breaker Switch Part Number:	W31-X2M1G-(X) X=amperage

Downloaded from www.Manualslib.com manuals search engine

Regulator Rectifier Supplier:	Rotax
Regulator Rectifier Part Number:	965 347
Starter Relay Supplier:	Rotax
Starter Relay Part Number:	992 819

FUEL SYSTEM:

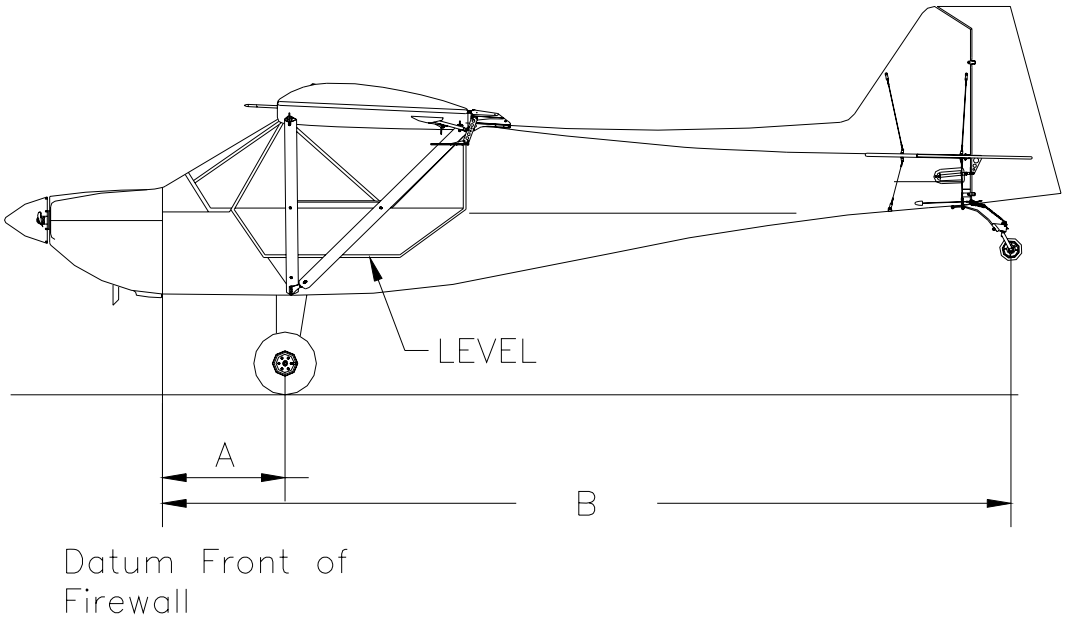
Gascolator Supplier:	Aircraft Spruce
Gascolator Part Number:	10560
Fuel Pump Supplier:	Aircraft Spruce
Fuel Pump Part Number:	40105
Fuel Filter Supplier:	Wix Dixon
Fuel Filter Part Number:	33031
Air Filter Supplier:	K&N
Air Filter Part Number:	RC-1894

AIRPLANE WEIGHING PROCEDURES

1. Preparation:
   - Inflate tires to recommended operating pressure
   - Drain all fuel
   - Service engine oil as required to obtain a normal indication
   - Move seats to the most aft position
   - Retract flaps
   - Place all control surfaces in neutral position
2. Leveling:
   - Raise tail to level upper cabin longeron. (Stand between tail wheel and scale required).
   - Place scales under each wheel (360 lb. minimum capacity)
3. Weighing:
   - With the airplane level, record the weight shown on each scale and subtract the weight of the leveling device from the weight indicated at the tail wheel.
4. Measuring:
   - Obtain measurement A by measuring horizontally from a plumb bob dropped from the firewall to the center of the main wheels.
   - Obtain measurement B by measuring horizontally from a plumb bob dropped from the firewall to a plum bob dropped from the center of the tail wheel.
   - Enter measurements A and B in column “arm” of table 3.1.

Downloaded from www.Manualslib.com manuals search engine

5. Using weights from item 3 and measurements from item 4, the airplane basic empty weight and moment can be determined by completing Figure 3-1. (The airplane basic empty weight includes the unusable fuel amount of 1.25 gall.)



- Moment = weight x Arm

Line	Item	Weight (lb.)	Arm (in)	Moment (in lb.)
1	Main wheel RH		(A)	
2	Main wheel LH		(A)	
3	Tail wheel		(B)	
4	Unusable fuel (1.25 gallons)	7.5	52.2	391.5
	Total		**Total**	

Arm		**(= total moment / total weight)**

Table 3-1. Airplane basic empty weight

Downloaded from www.Manualslib.com manuals search engine

Downloaded from www.Manualslib.com manuals search engine

SAMPLE WEIGHT AND BALANCE RECORD

(Continuous history of changes in structure or equipment affecting weight and balance)

Serial Number:									Page Number:
Date	Description of article or Modification	Weight Change						Running Basic Empty Weight	
		ADDED (+)			REMOVED (-)				
		Wt (lb.)	Arm (in)	Moment (lb.-in)	Wt (lb.)	Arm (in)	Moment (lb.-in)	Wt (lb.)	Moment (lb.-in)
	As Delivered								

Figure 3-2. Sample weight and balance record

Weight and Balance

The following will enable you to determine the weight and balance of your AC and to operate it within the prescribed center of gravity limitations.

The S-7LS is a simple AC and so are the weight and balance calculations.
The AC is limited to two occupants. For solo flight the pilot has to occupy the front seat.
For baggage storage a baggage compartment behind the rear seat is available. The compartment is rated for 50 lb. The baggage compartment should be closed securely in flight.
To figure the weight and balance use the Sample Loading Problem and Center of Gravity Envelope as follows:

Enter the following data in the column “Your Airplane” on the Sample Loading

- Basic Empty Weight and moment from your AC weight and balance records.
- Weight of Front Seat Occupant and arm pending on seat position. Refer to Figure 3-3.
- Weight of Rear Seat Occupant and arm pending on seat position. Refer to Figure 3-3.
- Usable Fuel (at 6 lb./ gall).
- Weight of Baggage.

Calculate the moments and total moment of your loading problem.
Calculate the total Take off Weight, total Moment and Center of gravity.
Check that the Center of Gravity calculated for take off falls inside of the Center of Gravity Envelope. **(CG = Total Moment / Total Weight).**
Repeat for Landing.

Note: You can also read the moments from the Loading Graph in Figure 3-6, calculate the total moment and check if it falls in the Center of Gravity Moment Envelope in Figure 3-7.

Item	**Arm**
Center of Gravity of Front Seat Occupant	37.4***** (35.15 to 37.4)
Center of Gravity of Rear Seat Occupant	65.4***** (63.15 to 65.4)
Center of Gravity of Baggage in Baggage compartment	92.5 ******

***** Pilot and Passenger center of gravity on adjustable seats positioned for an average occupant (seat in rear most position).
** Measured to the center of the baggage area.

Figure 3-3. Loading Arrangements

Downloaded from www.Manualslib.com manuals search engine

Downloaded from www.Manualslib.com manuals search engine

Sample Loading Problem	Sample Airplane			Your Airplane			Your Airplane			Your Airplane		
Item	**Weight (lb.)**	**Arm (in)**	**Moment (lb.- in)**	**Weight (lb.)**	**Arm (in)**	**Moment (lb.- in)**	**Weight (lb.)**	**Arm (in)**	**Moment (lb.- in)**	**Weight (lb.)**	**Arm (in)**	**Moment (lb.- in)**
Basic Empty Weight (use data of your AC; includes unusable fuel and oil)	751	47.7	35822									
Usable Fuel (at 6 lb./ gall)	72	52.20	3758		52.20			52.20			52.20	
Front Seat Occupant (35.15 to 37.4)* (use arm corresponding to your seat pos.)	170	37.40	6358									
Rear Seat Occupant (63.15 to 65.4)* (use arm corresponding to your seat pos.)	170	65.4	11118									
Baggage in Baggage Compartment*	20	92.50	1850									
	Total Weight		**Total Moment**	**Total Weight**		**Total Moment**	**Total Weight**		**Total Moment**	**Total Weight**		**Total Moment**
	1183		**58906**									
Center of Gravity (total Moment/ total weight)	**49.79**				**CG**			**CG**			**CG**	

* Reference Figure 3-3 Loading Arrangements

Check that obtained CG position falls within the Center of Gravity Envelope (Figure 3-5)

Figure 3-4. Sample Loading Problem (Sheet 1 of 2)

Downloaded from www.Manualslib.com manuals search engine

Sample Loading Problem	Sample Airplane			Your Airplane			Your Airplane			Your Airplane		
Item	**Weight (lb.)**	**Arm (in)**	**Moment (lb.- in)**	**Weight (lb.)**	**Arm (in)**	**Moment (lb.- in)**	**Weight (lb.)**	**Arm (in)**	**Moment (lb.- in)**	**Weight (lb.)**	**Arm (in)**	**Moment (lb.- in)**
Basic Empty Weight (use data of your AC; includes unusable fuel and oil)	751	47.7	35822									
Usable Fuel (at 6 lb./ gall)	72	52.20	3758		52.20			52.20			52.20	
Front Seat Occupant (35.15 to 37.4)* (use arm corresponding to your seat pos.)	170	37.40	6358									
Rear Seat Occupant (63.15 to 65.4)* (use arm corresponding to your seat pos.)	170	65.4	11118									
Baggage in Baggage Compartment*	20	92.50	1850									
	Total Weight		**Total Moment**	**Total Weight**		**Total Moment**	**Total Weight**		**Total Moment**	**Total Weight**		**Total Moment**
	1183		**58906**									
Center of Gravity (total Moment/ total weight)	**49.79**				**CG**			**CG**			**CG**	

* Reference Figure 3-3 Loading Arrangements

Check that obtained CG position falls within the Center of Gravity Envelope (Figure 3-5)

Figure 3-4. Sample Loading Problem (Sheet 2 of 2)

Downloaded from www.Manualslib.com manuals search engine

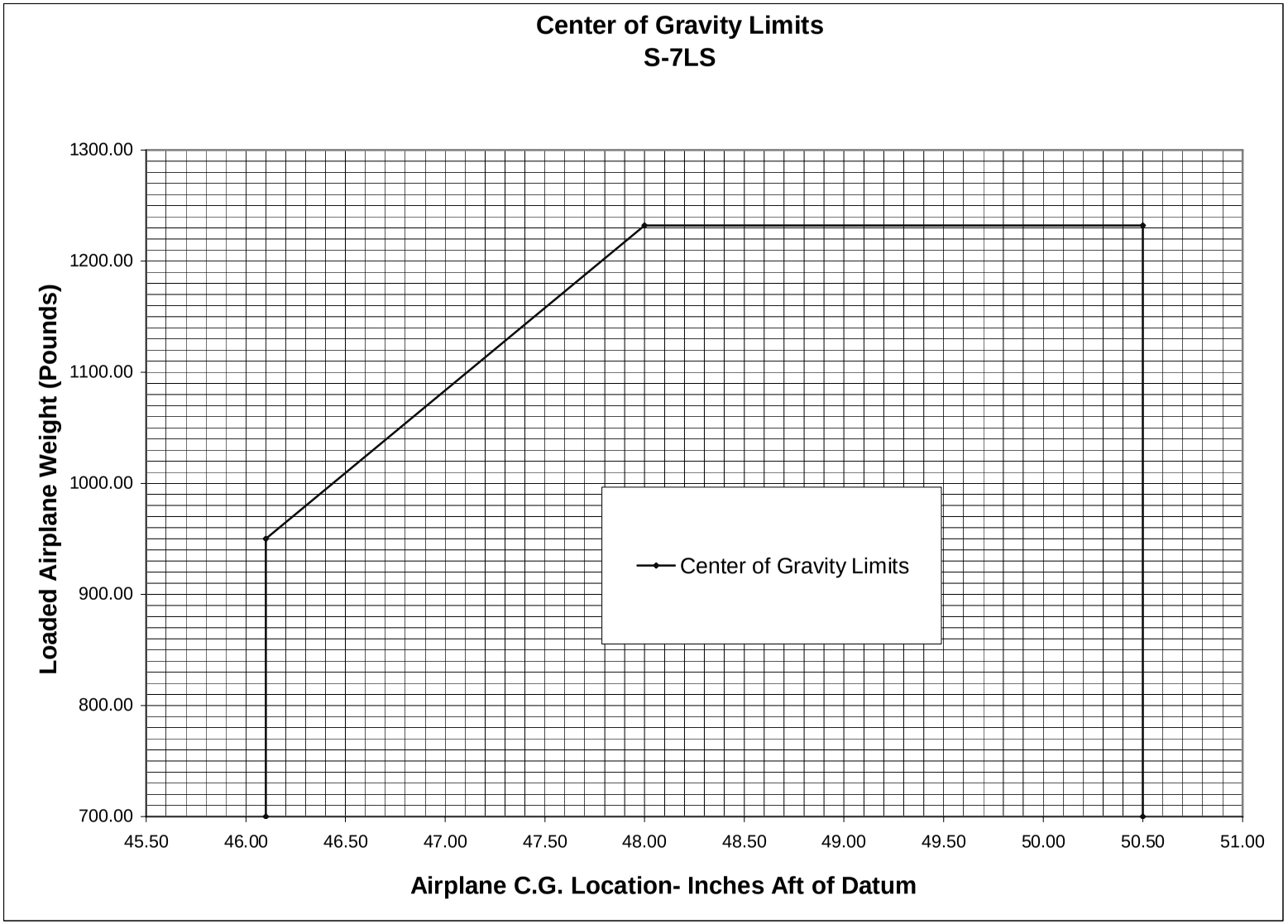
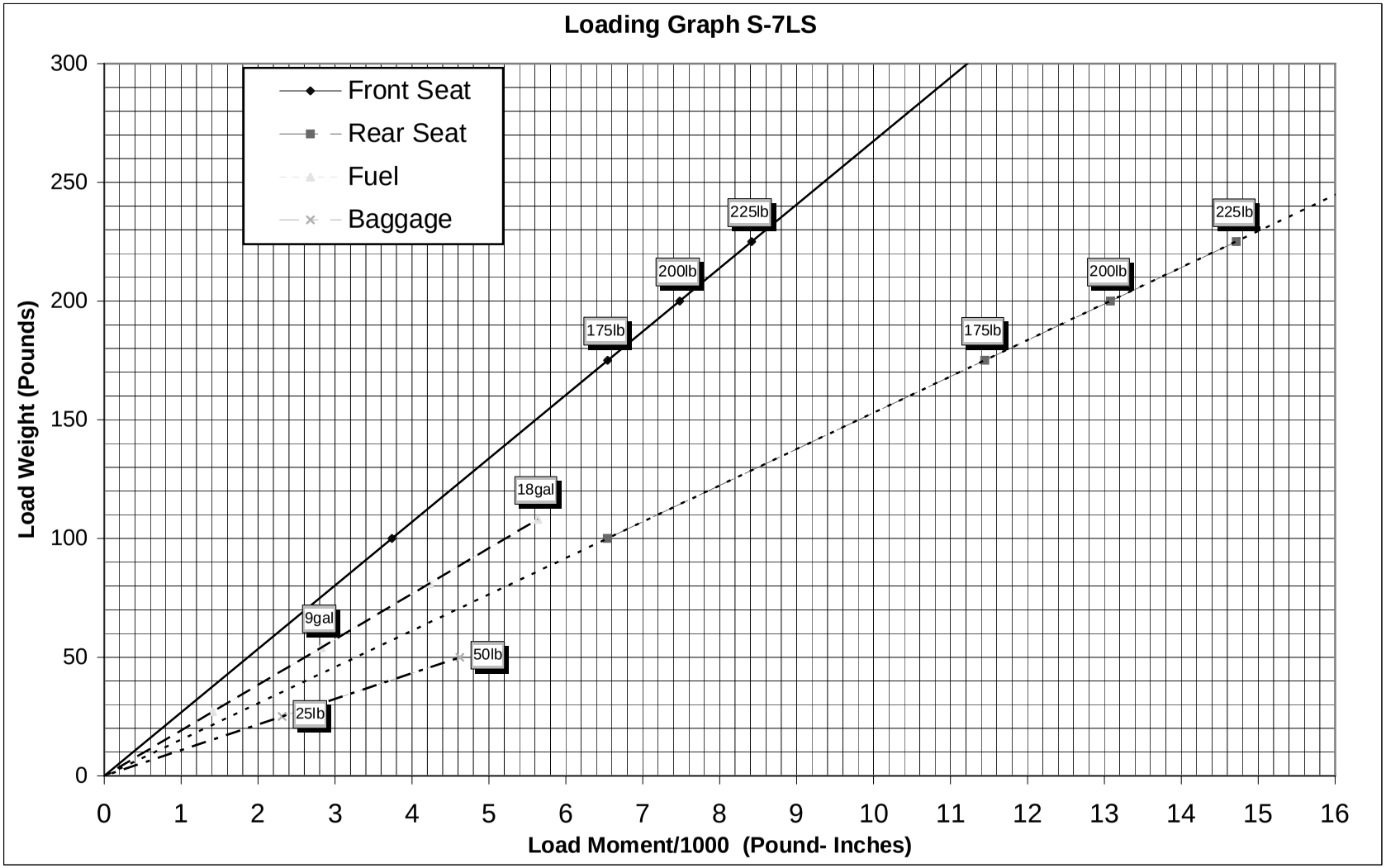


Figure 3-5. Center of Gravity Envelope (Limits)

Downloaded from www.Manualslib.com manuals search engine



Occupant moments for rear ward seat position (average occupant)

Figure 3-6. Loading Graph

Downloaded from www.Manualslib.com manuals search engine

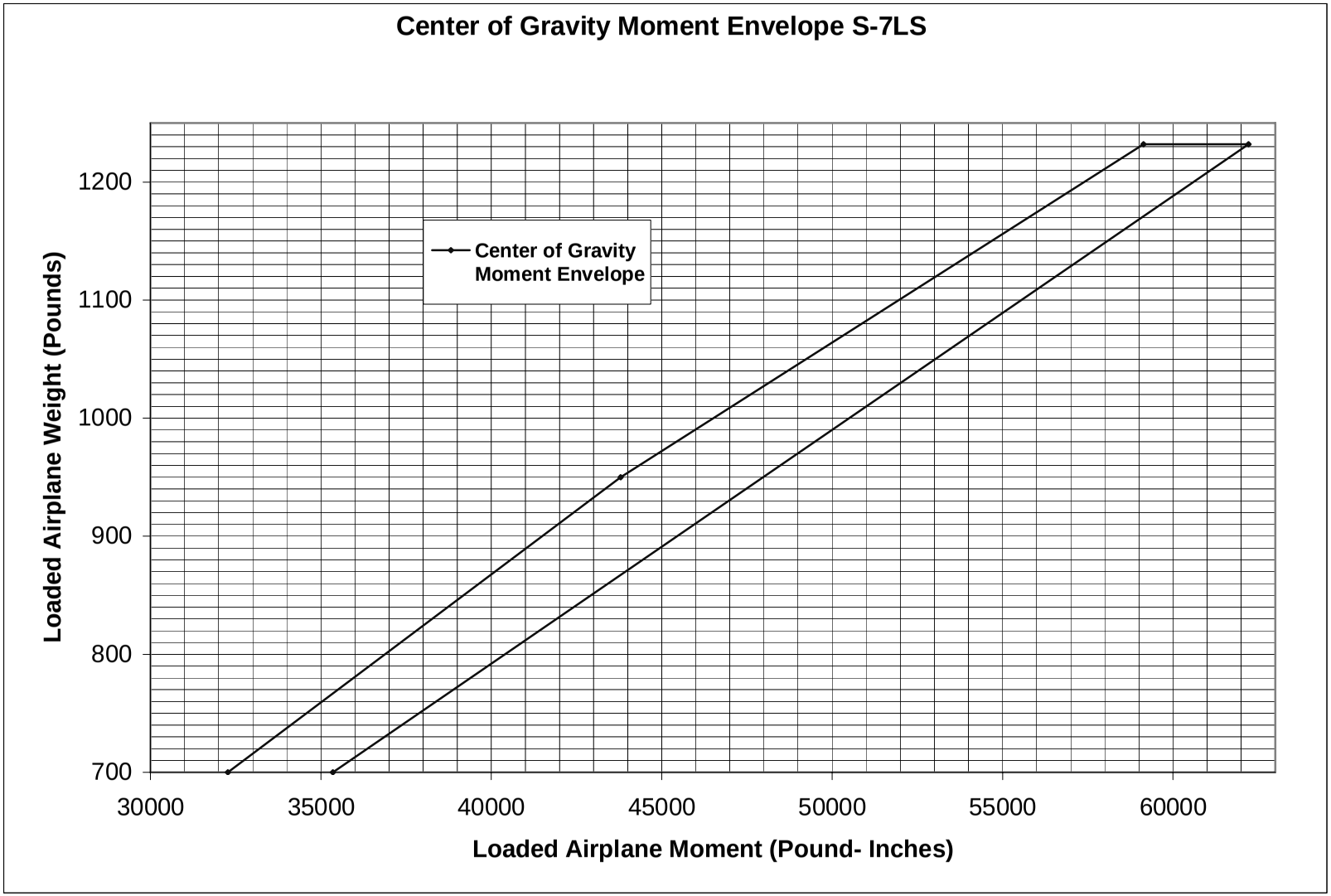


Figure 3-7. Center of Gravity Moment Envelope

SECTION 4
PERFORMANCE

TABLE OF CONTENTS

Page

Introduction…….. 4-2
Airspeed Indicator Calibration…… 4-2
Temperature Conversion Chart…… 4-3
Wind Components…… 4-4
Stall Speeds…….. 4-5
Takeoff Distance Short Field …… 4-6
Maximum Rate of Climb…….. 4-7
Cruise Performance…….. 4-7
Landing Distance Short Field …… 4-8
Maximum Demonstrated Crosswind Velocity…… 4-9
Demonstrated Operating Temperature…… 4-9

Downloaded from www.Manualslib.com manuals search engine

INTRODUCTION

SECTION 4 provides performance Information.
The data assumes that the aircraft and engine are in good condition and that average piloting techniques are used.
All performance data are given at forward CG- limit and gross weight if not stated otherwise.
This is considered the most critical.

AIRSPEED INDICATOR CALIBRATION

The table below shows the relationship between Indicated Airspeed and Calibrated Airspeed in MPH.

Flaps up									
MPH CAS	50	60	70	80	90	100	110	120	130
MPH IAS	50	60	70	80	90	100	110	119	128
Flaps half									
MPH CAS	45	55	65	69					
MPH IAS	45	54	63	67					
Flaps full									
MPH CAS	45	55	65	69					
MPH IAS	45	55	64	68					

Table 4-1. Airspeed Indicator Calibration

Downloaded from www.Manualslib.com manuals search engine

TEMPERATURE CONVERSION CHART

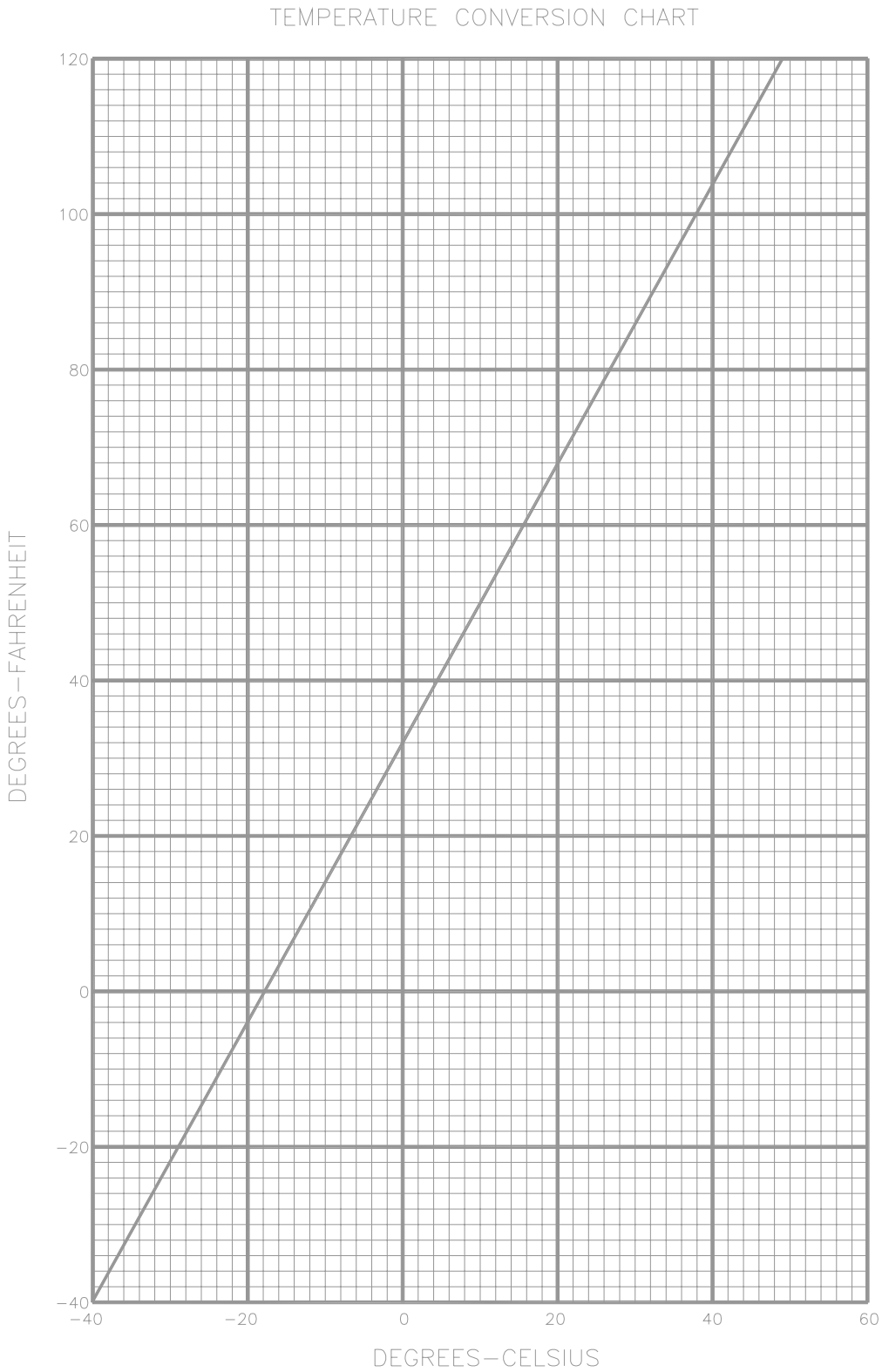


Figure 4-2. Temperature Conversion Chart

Downloaded from www.Manualslib.com manuals search engine

WIND COMPONENTS

Note:
Maximum demonstrated crosswind velocity (90 degree) is 12 knots.

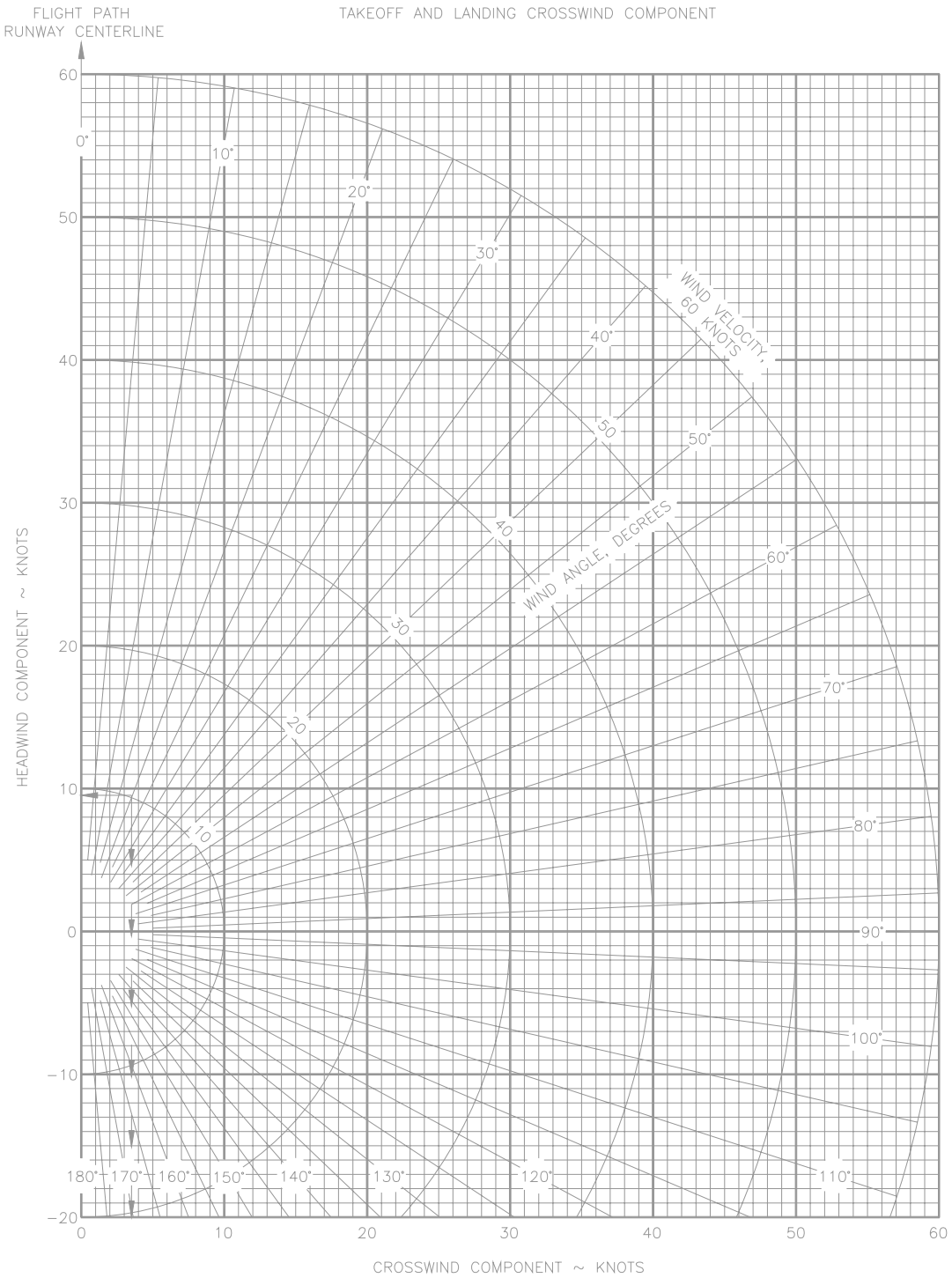


Figure 4-3. Cross Wind Component Chart

Downloaded from www.Manualslib.com manuals search engine

STALL SPEEDS

CONDITIONS:

Power Off

NOTES
1. Maximum altitude loss during a stall recovery may be as much as 160 feet.
2. IAS (MPH) Values are approximate.
3. All values are in MPH
4. Most forward center of gravity

Flap deflection	At 1235 lb.		At 1000 lb.	
	MPH IAS	MPH CAS	MPH IAS	MPH CAS
UP	50	50	46	46
HALF	48	48	44	44
FULL	45	45	41	42

Table 4-4. Aircraft Stall speeds

Downloaded from www.Manualslib.com manuals search engine

Downloaded from www.Manualslib.com manuals search engine

TAKEOFF DISTANCE
SHORT FIELD

CONDITIONS:
Flaps Half
Full Throttle Prior to Brake Release
Paved, Level, Dry, Runway
Zero Wind
NOTES:
1. Short field technique as described in Section 6.
2. If brakes are not held, distances are from point where full throttle is reached.
3. Decrease distances 10% for each 13 knots headwind. For operation in tailwinds up to 10 knots, increase distances by 10% for each 2 knots.
4. For operation in air colder than this table provides, use the coldest (leftmost) data for takeoff distances.

WEIGHT LBS	TAKEOFF SPEED (IAS) MPH		PRESS ALTITUDE FT	0°C		10°C		20°C		30°C		40°C	
	LIFT OFF	AT 50 FT		GND ROLL FT	TOTAL TO CLEAR 50 FT OBSTACLE	GND ROLL FT	TOTAL TO CLEAR 50 FT OBSTACLE	GND ROLL FT	TOTAL TO CLEAR 50 FT OBSTACLE	GND ROLL FT	TOTAL TO CLEAR 50 FT OBSTACLE	GND ROLL FT	TOTAL TO CLEAR 50 FT OBSTACLE
1235	45	55	0	305	788	329	843	355	901	381	961	409	1022
			1000	338	869	365	931	394	994	423	1060	454	1128
			2000	376	960	406	1029	437	1099	470	1172	504	1247
			3000	419	1066	453	1142	488	1220	525	1301	562	1384
			4000	470	1190	508	1275	547	1362	588	1452		
			5000	527	1330	570	1424	614	1522	660	1623		
			6000	592	1488	640	1593	690	1703	741	1815		
			7000	666	1666	720	1784	776	1907				
			8000	750	1868	810	2001	873	2138				
1000	45	55	0	190	507	205	543	221	580	237	618	255	658
			1000	211	560	227	599	245	640	263	682	282	726
			2000	234	618	253	662	272	707	293	754	314	802
			3000	261	686	282	735	304	785	326	837	350	890
			4000	292	766	316	820	340	876	366	934		
			5000	328	856	355	916	382	979	411	1043		
			6000	369	958	399	1026	429	1096	462	1168		
			7000	415	1071	448	1147	483	1226				
			8000	467	1202	505	1288	544	1376				

Table 4-5. Takeoff Distance

MAXIMUM RATE OF CLIMB

CONDITIONS:

Full Throttle
Flaps Up
Gross weight (1235 lb.)
Forward CG

NOTES:
1. Airspeeds are indicated airspeeds (IAS).
2. Service ceiling 12,500 ft. (MSL)

Pressure Altitude Ft	Climb Speed MPH	Standard Temperature ISA (°C)	R/C for STD Temperature ft/min	R/C for STD Temp+20°C ft/min	R/C for STD Temp-20°C ft/min
0	67	15	824	744	864
2000	66	11	727	647	769
4000	66	7.1	630	550	673
6000	65	3.1	533	453	577
8000	65	-0.9	436	356	481
10000	64	-4.8	339	259	385
12000	64	-8.8	241	162	

Table 4-6. Max. Rate of Climb

CRUISE PERFORMANCE

CONDITIONS:

Gross weight (1235 lb.)

Engine at maximum continuous RPM (5500) or the RPM achieved with full throttle.

Pressure altitude	Temperature	TAS in mph	Fuel burn in GPH
2000 ft	11 C	110	5.5
5000 ft	5.1 C	111	5.3
8000 ft	-0.9 C	112	5.0

Table 4-7. Cruise Performance

Downloaded from www.Manualslib.com manuals search engine

Downloaded from www.Manualslib.com manuals search engine

LANDING DISTANCE
SHORT FIELD

CONDITIONS:
Flaps Full
Power Off
Maximum Braking
Paved, Level, Dry, Runway
Zero Wind

NOTES:
1. Short field technique as described in Section 6.
2. Decrease distances 10% for each 13 knots headwind. For operation in tailwinds up to 10 knots, increase distances by 10% for each 2 knots.

WEIGHT LBS	SPEED AT 50 FT MPH (IAS)	PRESS ALTITUDE FT	0°C		10°C		20°C		30°C		40°C	
			GND ROLL FT	TOTAL TO CLEAR 50 FT OBSTACLE	GND ROLL FT	TOTAL TO CLEAR 50 FT OBSTACLE	GND ROLL FT	TOTAL TO CLEAR 50 FT OBSTACLE	GND ROLL FT	TOTAL TO CLEAR 50 FT OBSTACLE	GND ROLL FT	TOTAL TO CLEAR 50 FT OBSTACLE
1235	59	0	321	1263	341	1325	361	1387	383	1451	404	1515
		1000	341	1325	362	1390	384	1456	407	1523	430	1590
		2000	363	1391	386	1459	409	1529	433	1599	458	1669
		3000	386	1461	410	1533	435	1605	461	1679	487	1754
		4000	411	1535	437	1610	464	1687	491	1764		
		5000	438	1613	466	1693	494	1773	523	1855		
		6000	467	1696	496	1780	527	1865	558	1951		
		7000	498	1785	529	1873	562	1962				
		8000	531	1878	565	1971	599	2065				

Table 4-8. Landing Distance

MAXIMUM DEMONSTRATED CROSSWIND VELOCITY

Takeoff	12 Knots (90 degree)
Landing	12 Knots (90 degree)

This is not considered limiting.

DEMONSTRATED OPERATING TEMPERATURE

Satisfactory engine cooling has been demonstrated for this airplane with an outside air temperature 23 º C above standard.
This is not to be considered an operating limitation.

Downloaded from www.Manualslib.com manuals search engine

SECTION 5
EMERGENCY PROCEDURES

TABLE OF CONTENTS

Page

Introduction…….. 5-2

Airspeeds for Emergency Operation…… 5-2
Engine Failure After Takeof…….. 5-2
Maneuvering Speed…… 5-2
Maximum Glide……... 5-2
Precautionary Landing with Engine Power…… 5-2
Landing without Engine Power…… 5-2

Operational Checklists…… 5-2

Engine Failure…… 5-2
Engine Failure During Takeoff Run…… 5-2
Engine Failure Immediately After Takeoff…… 5-2
Engine Failure During Flight…….. 5-3

Forced Landings…… 5-3
Emergency Landing without Engine Power…… 5-3
Precautionary Landing with Engine Power…….. 5-3
Ditching…….. 5-3

Landing with a Defective Main Wheel Tire…… 5-4

Fires…… 5-4
During Start On Ground…….. 5-4
Engine Fire In Flight…… 5-4
Electrical Fire In Flight…… 5-4

Amplified Procedures…… 5-5

Engine Failure…… 5-5
Forced Landings…… 5-6
Recovery From A Spiral Dive…….. 5-6
Spins…… 5-6
Rough Engine Operation…… 5-6
Ignition Malfunction…… 5-6
Carburetor Ice……... 5-7

Downloaded from www.Manualslib.com manuals search engine

INTRODUCTION

SECTION 5 provides checklists and amplified procedures for coping with emergencies that may occur. Emergencies caused by aircraft or powerplant malfunctions are rare if proper preflight inspections and maintenance are performed. Emergencies caused by extreme weather situations can be minimized or eliminated by good judgment and proper preflight planning. However, should an emergency arise the basic guidelines described in this section should be considered and applied as necessary to resolve the problem.

In any emergency – fly the airplane first- maintain control.

AIRSPEEDS FOR EMERGENCY OPERATION (IAS)

Engine Failure After Takeoff	Flaps UP	66 MPH
	Flaps DOWN	59 MPH
Maneuvering Speed		97 MPH
Maximum Glide	Flaps UP	64 MPH
Precautionary Landing with Engine Power	Flaps UP	59 MPH
	Flaps DOWN	55 MPH
Landing without Engine Power	Flaps UP	70 MPH
	Flaps Down	65 MPH

OPERATIONAL CHECKLISTS

ENGINE FAILURE

Engine Failure During Takeoff Run:

Fly the Airplane!

(1) Throttle - IDLE.
(2) Brakes - APPLY as needed.
(3) Ignition switch - OFF.
(4) Master switch - OFF.

Engine Failure Immediately After Takeoff

Fly the Airplane!

(1) Airspeed - 66 MPH (Flaps up).
59 MPH (Flaps down).
(2) Brakes - APPLY As Needed.
(3) Ignition Switch - OFF.
(4) Master Switch - OFF.

Downloaded from www.Manualslib.com manuals search engine

Engine Failure During Flight

Fly the Airplane!

(1) Airspeed - 64 MPH for best glide
(2) Select Emergency Landing Area - PROCEED To It.
(3) Attempt Engine RESTART.
(4) Ignition - Check ON.
(5) Choke - Check OFF.
(6) Throttle Lever - CRACKED (approximately 1/4" forward).
(7) Turn Switch to START
(8) If Engine **DOES NOT** Start - Follow Emergency Landing Procedure Without Engine Power.

FORCED LANDINGS

Emergency Landing Without Engine Power

Fly the Airplane!

(1) Flaps - As REQUIRED for Landing Site.
Airspeed - 70 MPH (Flaps up).
65 MPH (Flaps down).
(2) Fuel Selector Valve - OFF.
(3) All Switches - OFF.
(4) Unlatch cabin doors prior final approach
(5) Touchdown - MINIMUM FLIGHT SPEED.
(6) Brakes - APPLY As Needed.

Precautionary Landing With Engine Power

Fly the airplane!

(1) Select Field - FLY OVER, noting terrain, obstructions and wind direction.
(2) Flaps - AS REQUIRED (for landing site).
(3) Airspeed 59 MPH (Flaps UP).
55 MPH (Flaps full DOWN) (Use flaps as required for landing site).
(4) Master Switch - OFF.
(5) Doors - OPEN.
(6) Touchdown - MINIMUM FLIGHT SPEED.
(7) Ignition - OFF.
(8) Brakes - APPLY As Needed.

Ditching

Fly the airplane!

(1) Flaps - FULL.
Airspeed - 55 MPH.
(2) Power - RATE OF DESCENT - 200 ft/min or less (adjust with power).
(3) Approach - High Winds - INTO THE WIND. Light Winds - PARALLEL TO SWELLS.
(4) Tighten seat belts
(5) Unlatch cabin doors
(6) Touchdown - LEVEL ATTITUDE AT ESTABLISHED DESCENT RATE.

Downloaded from www.Manualslib.com manuals search engine

(7) Place folded coat or cushion over face at touch down
(8) Airplane - Unlatch Seat Belts and EVACUATE through doors.
(9) Life Raft and Vests - INFLATE (If onboard).

LANDING WITH A DEFECTIVE MAIN WHEEL TIRE

Fly the Airplane

(1) Approach - NORMAL
(2) Flaps – as desired
(3) Touchdown - GOOD TIRE FIRST. Hold the aircraft off of the defective tire as long as possible with aileron control.

FIRES

During Start On Ground

(1) Cranking - CONTINUE, to get a start which would suck the flames and accumulated fuel through the carburetor and into the engine.
If Engine Starts:
(2) Power – 4500 -5000 RPM for a few minutes.
(3) Engine - SHUTDOWN and inspect for damage.
If Engine fails to Start:
(4) Continue cranking with throttle full open while ground attendants obtain fire extinguisher; when ready to extinguish fire -
(5) Ignition - OFF.
(6) Master Switch - OFF.
(7) Fuel Selector Valve - OFF.
(8) Fire Damage - INSPECT, repair damage or replace damaged components or wiring before conducting another flight.

Engine Fire In Flight

Fly the airplane!

(1) Fuel Selector Valve - OFF.
(2) Ignition switch- OFF.
(3) Master switch - OFF.
(4) Cabin heat - OFF.
(5) Airspeed - 95 MPH (If fire is not extinguished, increase glide speed to find an airspeed which will provide an incombustible mixture (CAUTION DO NOT EXCEED VNE).
(6) Forced Landing - EXECUTE (as described in Emergency Landing Without Engine Power).

Electrical Fire In Flight

Fly the airplane!

(1) Master Switch - OFF .
(2) All Other Switchs (except Ignition switch) OFF.

Downloaded from www.Manualslib.com manuals search engine

If fire appears out and electrical power is necessary for continuance of flight:

(3) Circuit Breakers - CHECK for faulty circuit, do not reset faulty circuit
Master Switch - ON.

(4) Radio/Electrical Switches - ON one at a time, with delay after each until short circuit is localized.

AMPLIFIED PROCEDURES

ENGINE FAILURE

If an engine failure occurs during the takeoff run, the most important thing to do is to stop the aircraft on the remaining runway. Those extra items on the checklist will provide added safety during a failure of this type.

The first response to an engine failure after takeoff is to promptly LOWER the nose and establishes a glide attitude (check and maintain speed). In most cases, the landing should be planned straight ahead with only small heading corrections to avoid obstructions. Of course, the number one priority is to land the aircraft as smoothly and accurately as possible. **Altitude and airspeed are seldom sufficient to execute a 180 degree gliding turn back to the runway.**

After an engine failure in flight, the best glide speed (64 mph) should be established as quickly as possible. While gliding toward a suitable landing site, an effort should be made to identify the cause of the failure. If time permits, an engine restart should be attempted as shown on the checklist. If the engine cannot be restarted, a forced landing without power must be completed.

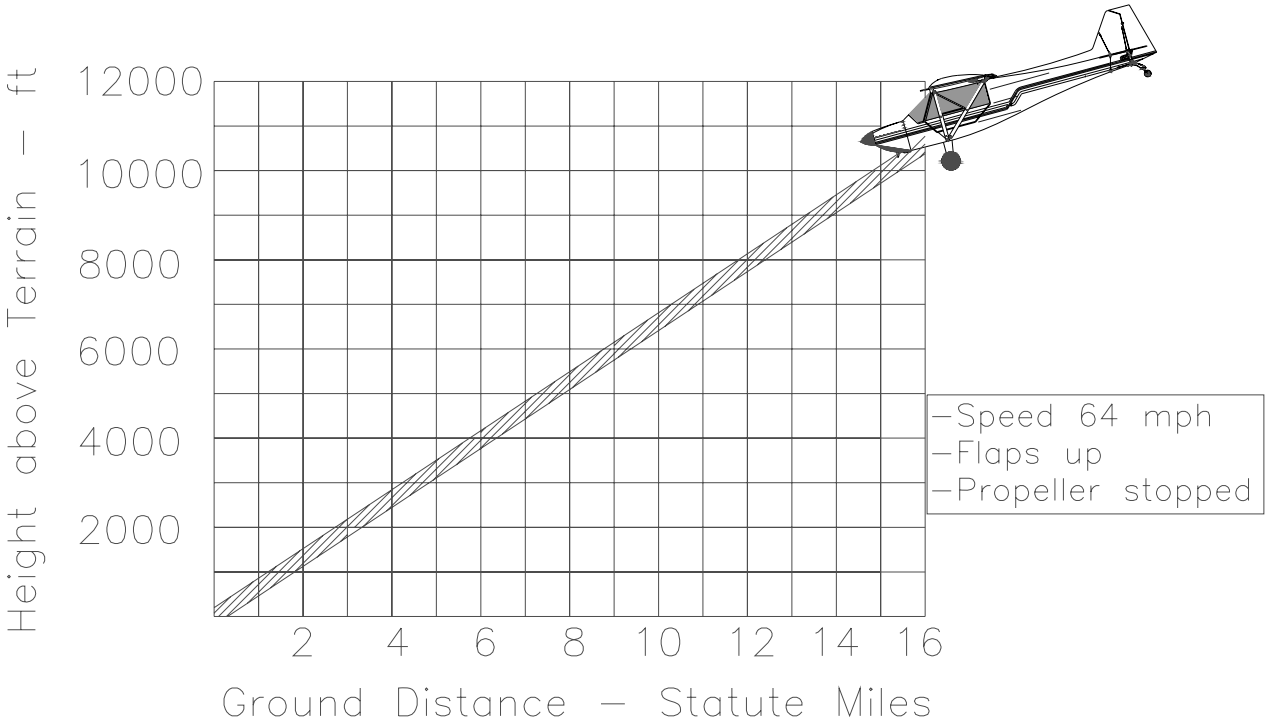


Figure 5-1. Maximum Glide

Downloaded from www.Manualslib.com manuals search engine

FORCED LANDINGS

Select a suitable landing site and proceed to it. If all attempts to restart the engine fail and a forced landing is imminent, follow the checklist for Emergency Landing Without Power.
Before attempting an off airport landing with engine power available, fly over the landing site at a safe but low altitude to inspect the terrain. Check for obstructions and surface conditions. Plan your approach and touch down.

When preparing to ditch, it is advisable to jettison any heavy objects from around the Pilot, including heavy clothing. Of course, if time permits, ditch as close to land or a water vessel as possible.
Transmit Mayday message on 121.5 MHz giving location and intentions.

RECOVERY FROM A SPIRAL DIVE

If a spiral dive is encountered, proceed as follows:

(1) Retard Throttle to **IDLE.**
(2) Stop the turn by using coordinated aileron and rudder in opposite direction of spiral dive.
(3) Cautiously apply elevator back pressure to slowly reduce the airspeed to below maneuvering speed .

SPINS

Intentional spins in the S-7LS aircraft are **PROHIBITED**. Should an inadvertent spin occur, the following recovery procedure should be used:

(1) Retard the throttle to **IDLE.**
(2) Place the ailerons in the **NEUTRAL** position.
(3) Apply and **HOLD** full rudder opposite to the direction of rotation.
(4) Just after the rudder pedal reaches the stop, move the control stick (yoke) forward far enough to "break" the stall.
(5) Hold these control inputs until rotation stops.
(6) As rotation stops, neutralize rudder and apply back pressure on the control stick to slowly reduce airspeed to normal cruise speed.

ROUGH ENGINE OPERATION

IGNITION MALFUNCTION

A sudden engine roughness or misfiring is usually evidence of ignition problems. Switching form BOTH to either L or R ignition switch position will identify which circuit is malfunctioning. Select different power settings if continued operations on BOTH circuits is practicable. If not, switch to the good circuit and proceed to the nearest airport for repairs.

Downloaded from www.Manualslib.com manuals search engine

CARBURETOR ICE

A sudden engine roughness or loss of rpm could be Carburetor Ice problems. Actuate the Carburetor Ice by pulling on the Carburetor Ice Control Knob.
As soon as the engine roughness or suspected carburetor ice is gone turn off the Carburetor Heat. Repeat as necessary.

Downloaded from www.Manualslib.com manuals search engine

SECTION 6
NORMAL PROCEDURES

TABLE OF CONTENTS

Page

Introduction..... 6-3

Airspeeds For Normal Operations..... 6-3

Operational Checklists..... 6-3

Preflight Inspection..... 6-3
- Cabin..... 6-5
- Empennage..... 6-5
- Left Wing – Trailing Edge..... 6-5
- Left Wing..... 6-6
- Nose 6-6
- Right Wing..... 6-6
- Right Wing – Trailing Edge..... 6-7

Before starting the Powerplant..... 6-7
Starting the Powerplant..... 6-7
- Cold Start..... 6-7
- Hot Start..... 6-7

Taxiing 6-8
Before Takeoff..... 6-8
Takeoff..... 6-8
- Normal Takeoff..... 6-8
- Short Field Takeoff..... 6-8

Enroute Climb..... 6-9
- Normal Climb..... 6-9

Cruise..... 6-9
Approach..... 6-9
Before Landing..... 6-9
Landing..... 6-9
- Normal Landing..... 6-9
- Short Field Landing..... 6-10
- Balked Landing..... 6-10

After Landing..... 6-10
Securing the Aircraft..... 6-10

Amplified Procedures..... 6-11

- Preflight Inspection..... 6-11
- Before Starting the Powerplant..... 6-11
- Starting the Powerplant..... 6-11
- Taxiing..... 6-12
- Before Takeoff..... 6-13

Downloaded from www.Manualslib.com manuals search engine

Takeoff..... 6-13
Power Check and Takeoff Roll..... 6-13
Flap Settings..... 6-14
Short Field Takeoff..... 6-14
Crosswind Takeoff..... 6-14

Enroute Climb..... 6-14
Cruise..... 6-14
Stalls..... 6-15
Approach..... 6-15
Landing..... 6-15
Normal Landing..... 6-15
Short Field Landing..... 6-15
Crosswind Landing..... 6-15
Securing the AC..... 6-16
Hot Weather Operation..... 6-16
Noise Characteristics and Noise Reduction 6-16

Downloaded from www.Manualslib.com manuals search engine

INTRODUCTION

SECTION 6 provides checklists and amplified (detailed) procedures for the conduct of normal operations.

AIRSPEEDS FOR NORMAL OPERATION

The following airspeeds are based on operations at a Maximum Gross Weight of 1235 lb.

NOTE: ALL SPEEDS ARE INDICATED AIRSPEEDS (IAS)

Takeoff:	
Normal Climb out	65-70 MPH
Short Field Takeoff, flaps HALF, speed at 50 ft	55 MPH
Enroute Climb, Flaps UP:	
Normal	70-80 MPH
Best Rate of Climb, Vy, Sea Level	67 MPH
Best Angle of Climb, Vx Sea Level	55 MPH
Landing Approach:	
Normal Approach, Flaps UP	66-70 MPH
Normal Approach , Flaps FULL	64 MPH
Short Field Approach, Flaps FULL	59 MPH
Balked Landing (Missed Approach):	
Maximum Power, Flaps half	55 MPH
Maximum Recommended Rough Air Penetration Speed:	90 MPH
Maximum Demonstrated Crosswind Velocity:	
Takeoff	12 kts
Landing	12 kts

OPERATIONAL CHECKLISTS

PREFLIGHT INSPECTION

Visually inspect the aircraft for its general condition during the walk around.
In addition to the items listed on the preflight checklist, look for signs of visible ice if applicable. The presence of ice on the aircraft wings and tail will adversely affect the aircraft's performance. In all cases, remove the ice BEFORE beginning any flight

Downloaded from www.Manualslib.com manuals search engine

operations. Always exercise due care and good judgment. It is also recommended to remove visible moisture (water) from at least wings and tail surfaces because of its negative effects on performance of the aircraft.

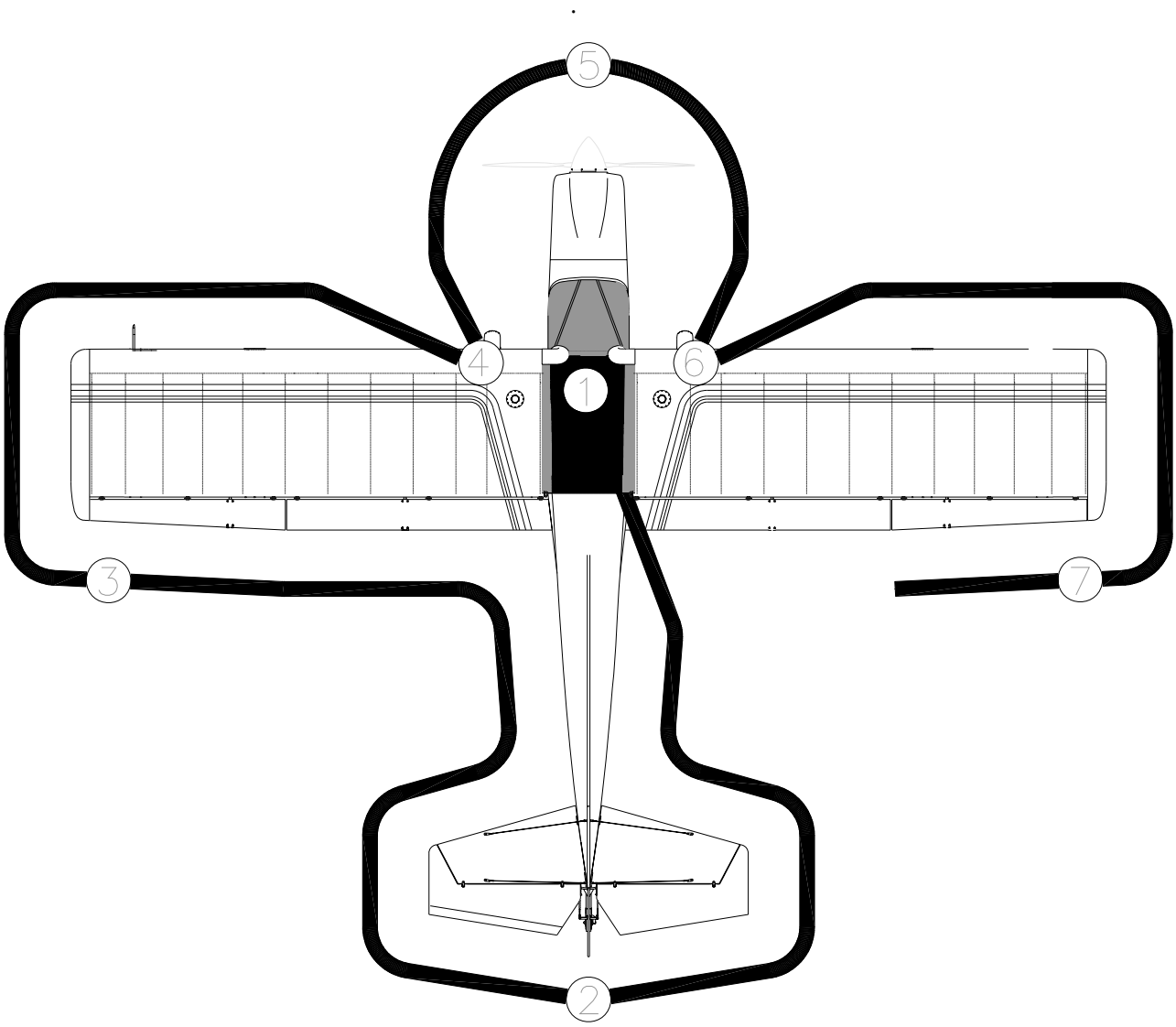


Figure 6-1: Preflight Inspection Sequence

The entire outer surface of the AC should be inspected for damage of any kind during the preflight inspection. This is especially important due the fact that the AC is fabric covered.

Downloaded from www.Manualslib.com manuals search engine

1 Cabin

(1) Airplane Flight Manual – AVAILABLE IN CABIN
(2) Parking brake – SET
(3) Ignition switch -OFF
(4) Master switch -OFF
(5) Avionics Master - OFF
(6) Circuit Breakers - CHECK IN
(7) Fuel Selector Valve - ON
(8) Fuel Quantity Indicator –CHECK QUANTITY
(9) Throttle Lever – MOVEMENT- free
(10) Seats – ADJUST POSTION – CHECK PINS
(11) Cabin –CHECK FOR FOREIGN ARTICLES
(12) For Solo flight – SECURE rear seat belts

Check fuselage.

2 Empenage

(1) Tail brace wires and attach hardware - CHECK
(2) Horizontal stabilizer and vertical fin - CHECK
(3) Control surfaces – CHECK freedom of movement and security
(4) Tail gear and attach, cable and springs – CHECK freedom of movement
(5) Tail Tie Down – DISCONNECT
(6) Fabric(Surface)- CHECK- for rips, tears, damage

Check fuselage.

3 Left Wing- Trailing Edge

(1) Fuel quick drain valve on bottom of fuselage (behind rear seat); - DRAIN at least a cupful of fuel (using sampler cup) to check for water, sediment and proper fuel grade before first flight of day and after each refueling. If water is observed, take further samples until clear, and than gently rock the wings to move any additional contaminants to the sampling points. Take repeated sampling from all points until no contamination is found.
(2) Fuel quick drain valve on bottom of wing; - DRAIN at least a cupful of fuel (using sampler cup) to check for water, sediment and proper fuel grade before first flight of day and after each refueling. If water is observed, take further samples until clear, and than gently rock the wings to move any additional contaminants to the sampling points. Take repeated sampling from all points until no contamination is found
(3) Flap – CHECK security
(4) Aileron – CHECK freedom of movement and security
(5) Rear strut and jury strut attach – CHECK security, dents, nicks
(6) Fabric(Surface)- CHECK- for rips, tears, damage

Downloaded from www.Manualslib.com manuals search engine

4 Left Wing

(1) Wing tip – CHECK security
(2) Pitot tube – CHECK security
(3) Leading edge – CHECK condition, dents, nicks
(4) Wing Tie Down - DISCONNECT
(5) Forward lift strut and jury strut- CHECK security, dents, nicks
(6) Fuel quantity – CHECK visual for desired level
(7) Fuel filler cap – CHECK secure
(8) Main wheel tire – CHECK for proper inflation
(9) Main Wheel – CHECK security, brake
(10) Fabric(Surface)- CHECK- for rips, tears, damage

5 Nose

(1) Fuel quick drain valve on bottom of cowling (left side); - DRAIN at least a cupful of fuel (using sampler cup) to check for water, sediment and proper fuel grade before first flight of day and after each refueling. If water is observed, take further samples until clear, and than gently rock the wings to move any additional contaminants to the sampling points. Take repeated sampling from all points until no contamination is found
(2) Engine oil dipstick/ filler cap- CHECK oil level, than check filler cap secure. Prior to oil check turn the propeller several times by hand to pump oil from the engine into the oil tank, or let the engine idle for 1 min. This process is finished when air is returning back to the oil tank and can be noticed by a murmur from the open oil tank.
WARNING –Do not stand within the arc of the propeller, check ignition off, throttle closed and park brake set before rotating the propeller by hand.
(3) Carburetor and air filter – CHECK security
(4) Radiator fluid over -flow bottle – CHECK fluid level
(5) Propeller and spinner – CHECK for nicks, dents and security
(6) Engine cooling air inlets and oil cooler – CHECK of obstructions
(7) Engine cooling air outlet, radiator – CHECK of obstructions
(8) Exhaust – CHECK –loose damage

6 Right Wing

(1) Main wheel tire – CHECK for proper inflation
(2) Main Wheel – CHECK security, brake
(3) Fuel quantity – CHECK visual for desired level
(4) Fuel filler cap – CHECK secure
(5) Forward lift strut and jury strut- CHECK security, dents, nicks
(6) Wing Tie Down - DISCONNECT
(7) Leading edge – CHECK condition, dents, nicks
(7) Wing tip – CHECK security
(8) Fabric (Surface)- CHECK- for rips, tears, damage

Downloaded from www.Manualslib.com manuals search engine

7 Right wing- Trailing Edge

(1) Aileron – CHECK freedom of movement and security
(2) Flap – CHECK security
(3) Rear strut and jury strut attach – CHECK security, dents, nicks
(4) Fuel quick drain valve on bottom of wing; - DRAIN at least a cupful of fuel (using sampler cup) to check for water, sediment and proper fuel grade before first flight of day and after each refueling. If water is observed, take further samples until clear, and than gently rock the wings to move any additional contaminants to the sampling points. Take repeated sampling from all points until no contamination is found
(5) Fabric(Surface)- CHECK- for rips, tears, damage

BEFORE STARTING THE POWERPLANT

(1) Preflight Inspection - COMPLETE.
(2) Passenger Briefing - COMPLETE.
(3) Seat, seat belts - ADJUST and LOCK.
(4) Brakes - TEST and SET
(5) Radio, Electrical Equipment - OFF
(6) Circuit Breakers - CHECK IN
(7) Fuel Selector Valve - ON.

STARTING THE POWERPLANT

COLD START

(1) Throttle - CLOSED.
(2) Choke - ON.
(3) Master Switch - ON.
(4) Propeller Area - CLEAR
(5) Ignition Switch - START (release when engine starts).
(6) Throttle adjust – IDLE smooth – up to 2000 RPM
(7) Oil pressure - CHECK
(8) Choke – OFF
(9) Avionics master- ON.

HOT START

(1) Throttle - CLOSED.
(2) Choke - OFF.
(3) Master Switch - ON.
(4) Propeller Area - CLEAR.
(5) Ignition Switch - START (release when engine starts)
(6) Throttle adjust – IDLE smooth – up to 2500 RPM
(7) Oil pressure - CHECK
(8) Avionics master- ON.

Downloaded from www.Manualslib.com manuals search engine

TAXIING

(1) Brakes - CHECK.
(2) Control deflection as required for wind

BEFORE TAKEOFF

(1) Cabin Doors - CLOSED OR SECURED.
(2) Parking Brake - SET.
(3) Flight Controls - FREE and Correct.
(4) Flight Instruments - SET.
(5) Elevator Trim - SET FOR TAKEOFF (center of indicator)
(6) Fuel Selector Valve - ON
(7) Fuel Quantity - CHECK
(8) Throttle – 4000 RPM
    a. Magneto - CHECK (Magneto drop should not exceed 300 RPM on either Magneto and the differential between magneto's should not be more than 120 RPM).
    b. Engine Instruments and Voltmeter- CHECK
    c. Carburetor heat – CHECK – RPM drop
(9) Throttle – IDLE – adjust friction lock
(10) Choke - OFF.
(11) Radios - SET.
(12) Fuel pump - ON
(13) Wing flaps – SET for take off
(14) Brakes - RELEASE

TAKEOFF

NORMAL TAKEOFF

(1) Flaps – UP or HALF.
(2) Carburetor heat – COLD
(3) Fuel pump - ON
(4) Throttle – SLOWLY FULL OPEN.
(5) Elevator Control - LIFT TAIL WHEEL
(6) Climb Speed – 65 - 70 MPH

SHORT FIELD TAKEOFF

(1) Flaps - HALF.
(2) Carburetor heat - COLD
(3) Fuel pump - ON
(4) Brake - APPLY.
(5) Elevator Control- FULL BACK
(6) Throttle – FULL OPEN.
(7) Brake - RELEASE.
(8) Elevator Control – LIFT TAIL WHEEL
(9) Climb Speed - 55 MPH until all obstacles are cleared.

Downloaded from www.Manualslib.com manuals search engine

(10) Flaps - RETRACT slowly after reaching 60 MPH.

ENROUTE CLIMB

NORMAL CLIMB

(1) Airspeed – 70-80 MPH.
NOTE:
If a maximum performance climb is necessary, use speeds shown in the maximum rate of climb table in Section 5.
(2) Fuel pump - ON
(3) Throttle - 5800 RPM for 5 minutes, 5500 RPM continuous

CRUISE

(1) Throttle - 4500 to 5500 RPM (Maximum continuous setting).
(2) Elevator Trim - adjust.
(3) Fuel pump – OFF- monitor fuel pressure gauge

APPROACH

(1) Throttle - AS DESIRED.
(2) Engine temperatures – MONITOR
(3) Carburetor heat – FULL HEAT AS REQUIRED

BEFORE LANDING

(1) Seat, Belts, Shoulder Harness - ADJUST.
(2) Fuel pump – ON
(3) Carburetor heat – FULL HEAT AS REQUIRED

LANDING

NORMAL LANDING

(1) Airspeed (on approach) – 66-70 MPH (flaps UP).
(2) Flaps (on final) - AS REQUIRED (below 69 MPH)
(3) Airspeed (on final) - 64 MPH (with full flaps)
(4) Touchdown - MAIN WHEELS FIRST OR THREE WHEEL
(5) Landing Roll - LOWER TAIL WHEEL GENTLY (AFTER MAIN WHEEL TOUCH DOWN).
(6) Brake - MINIMUM REQUIRED

Downloaded from www.Manualslib.com manuals search engine

SHORT FIELD LANDING

(1) Airspeed (approach) – 66-70 MPH (flaps UP).
(2) Flaps (on final) – FULL (below 69 MPH)
(3) Airspeed - MAINTAIN 59 MPH .
(4) Power - REDUCE to idle as obstacle is cleared
(5) Touchdown - THREE WHEEL
(6) Brake - APPLY as required
(7) Wing Flaps - RETRACT for maximum brake effectiveness

BALKED LANDING

(1) Throttle – FULL OPEN
(2) Carburetor heat – COLD
(3) Airspeed – 55 MPH
(4) Wing Flaps – RETRACT TO HALF, Slowly
(5) Airspeed – 60 MPH
(6) Wing flaps – RETRACT, Slowly

AFTER LANDING

(1) Wing Flaps - UP.
(2) Taxi - SLOWLY.
(3) Control deflections as required for wind.
(4) Carburetor Heat- OFF.
(5) Fuel pump - OFF

SECURING THE AIRCRAFT

(1) Parking Brake - SET
(2) Throttle - IDLE.
(3) Radio and Electrical Equipment - OFF
(4) Master Switch - OFF
(5) Ignition - OFF.
(6) Control Stick - SECURED
(7) Aircraft - SECURELY TIED DOWN

Downloaded from www.Manualslib.com manuals search engine

AMPLIFIED-PROCEDURES

PREFLIGHT INSPECTION

The importance of thorough preflight cannot be over-emphasized. Follow the recommended preflight procedure and develop a systematic, habitual approach. The use of good, sound, reasonable judgment in tandem with the preflight checklist is essential. Ensure "yourself", all parts and components, and the entire aircraft are in an airworthy condition before attempting flight. If you have any reservations, **DO-NOT-FLY! ALWAYS** do your own preflight.

Refer to Figure 6-1. Starting at the nose, work around the Rans S-7LS aircraft in a clockwise manner as illustrated.
NOTE: This suggested outline for a preflight inspection generally covers the critical areas that **MUST** be checked prior to each flight. In addition, **EVERY** component should be examined, properly maintained, correctly stored or transported, and inspected before each flight to ensure structural integrity and proper flying characteristics.

BEFORE STARTING THE POWERPLANT

Adjust the pilots seat to the correct position to ensure the rudder pedals can be reached and actuated in a comfortable manner.

Adjust the seat belts and shoulder straps to ensure all controls can be operated. **MAKE** sure the seat belt buckle is securely closed. Check the fuel selector valve position. **CHECK** to see the avionics switch is OFF and all circuit breakers are set.

NEVER use the brake as a parking brake with the intention of leaving the aircraft unattended. The S-7LS is a light aircraft!

STARTING THE POWERPLANT

The powerplant starting procedure on the Rans S-7S aircraft involves only a few simple steps. When followed correctly, the powerplant should start with a few turns of the electric starter. The procedure for starting the powerplant when it is cold differs somewhat from a warm engine start.

Starting the engine when it is COLD is done in the following manner. Ensure that the Ignition Switch is OFF and the propeller area is clear (announce "CLEAR PROP"). Place the throttle lever in the IDLE position and the choke in the "ON" position. This is accomplished by pulling the choke handle (pull and hold)
Turn the Master Switch ON. Turn the ignition switch to "START". After the engine starts, RELEASE the ignition switch (should automatically release to the both position) and advance the throttle slightly. After the engine has run for a short time- “CHOKE OFF”.

Downloaded from www.Manualslib.com manuals search engine

NOTE: For more specific information regarding powerplant operation, refer to the Rotax Operator's Manual. The manual contains **IMPORTANT** safety, maintenance, and operating information.

TAXING (Ground Handling)

The S-7LS is a tail wheel aircraft. Concentrate on taxiing till the moment you tied the aircraft down.
When taxing, it is important that speed and use of brakes is held to a minimum and that all controls are utilized to maintain directional control and balance as shown in Fig. 6-2.

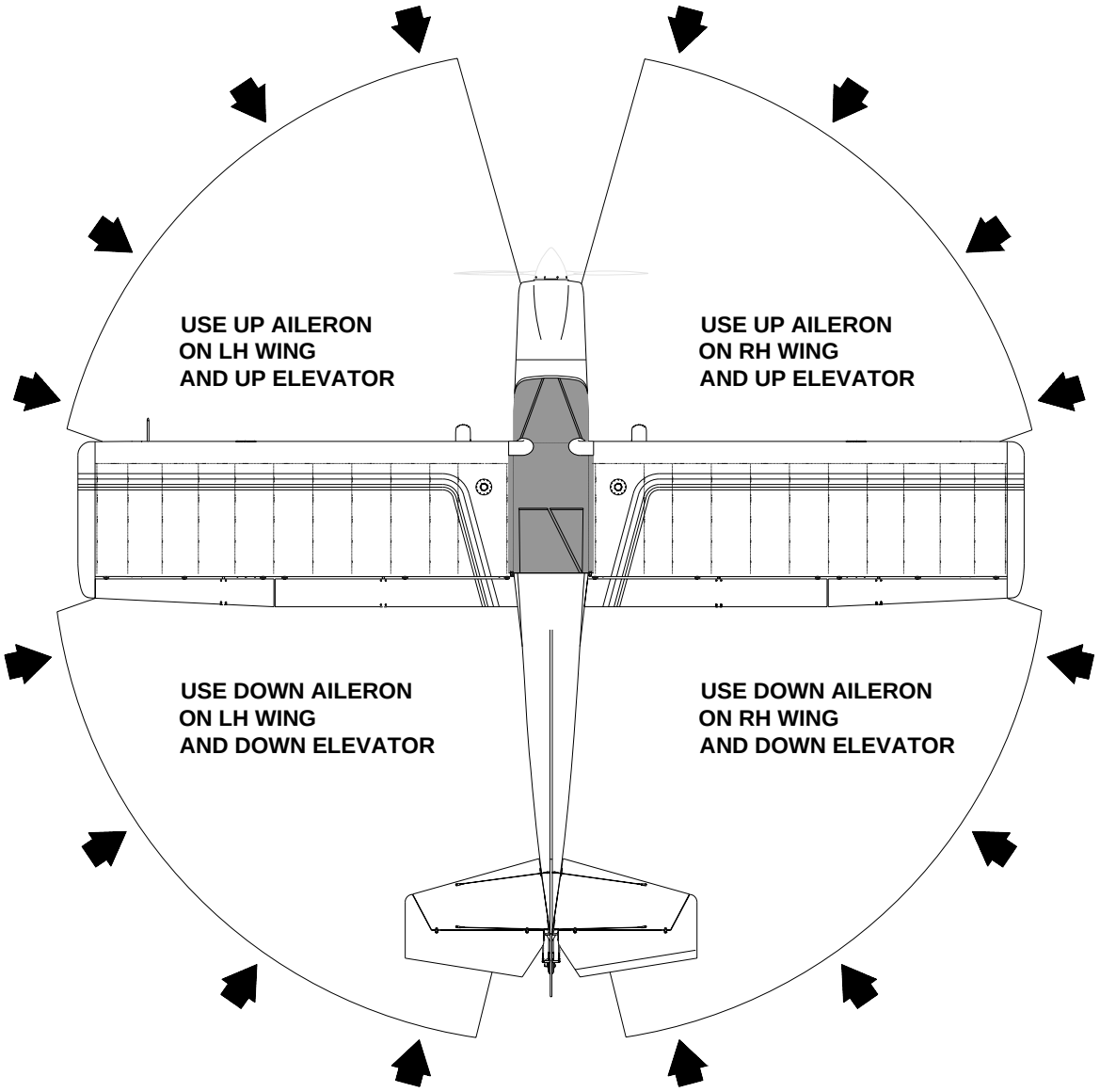


Figure 6-2. Taxiing Diagram

The arrows identify the wind direction. It is very important to hold the controls as described, even when the aircraft is not moving.

Downloaded from www.Manualslib.com manuals search engine

When taxing in strong crosswinds a little extra throttle will help the aircraft turn due to the increased airflow over the rudder. Caution should be used not to use excessive throttle, sudden throttle movements or excessive braking.
The S-7LS is equipped with a steerable full swivel tail wheel.
To taxi very small radius turns, push the desired rudder pedal and the brake pedal in the same direction. This will disengage the steering cam and will allow the tail wheel to swivel 360 degree. To reengage use opposite rudder and brake to stop turn and roll a few feet straight forward.

BEFORE TAKEOFF

Warm the engine up.
Be careful about parking and taxing with tailwinds as this can reduce the airflow over the radiator causing the engine to overheat.

Select an area that is clear of persons and property that could be adversely affected by the propeller and propeller blast. The area should be free of debris that could damage the propeller. If you are operating around other aircraft, ensure you are clear of runway and taxiway areas.

Move the control stick and rudder pedals to full deflection in all directions. Ensure that they move freely. Inspect all flight control surfaces and ensure that they respond in the correct corresponding directions to the control stick and rudder pedal movements.

The ignition system or "mag" check should be made by running the engine up to 4000 to 4500 RPM as follows. Turn the ignition switch first to the "R" position and note the RPM. Next move the switch back to "BOTH" to clear the other set of plugs. Then move the switch to the "L" position, note the RPM then return the switch to the "BOTH" position. You should observe a slight drop (approximately 100 RPM) in RPM but NO MORE than 300 RPM for either the "L" or "R" position or a differential of 120 RPM between Magnetos. The flaps should be moved from FULL UP to FULL DOWN, stopping at each flap setting. Ensure that the flap selector handle seats securely at each setting and visually verify that each flap moves to the correct corresponding position. Set the trim Indicator to middle position.

TAKEOFF

Power Check and Takeoff Roll

Prior to commencing the takeoff roll, align the aircraft in the intended direction of takeoff and allow it to roll forward a few feet to straighten tail wheel and to assure the steer-cam is engaged -before applying full power. This prevents possible harmful side-loading of the tail wheel. When full power is applied, immediately verify that proper takeoff thrust is created. Also feel for any abnormal vibrations and listen for any abnormal noises.
Note: The hard rubber tail wheel will transmit some noises in the cabin. **If you suspect any problem at all, discontinue the takeoff run.**

Downloaded from www.Manualslib.com manuals search engine

If the takeoff is being made over loose impediments, advance the throttle slowly. This will allow the aircraft to be well into the takeoff roll before high propeller RPM's are reached, and decreases the possibility of propeller damage. The rate the throttle is advanced must be dictated by the available runway and obstructions in the departure path.

Flap Settings

Normal takeoffs are accomplished with flaps up or half. Using half flaps reduces the ground roll and the total distance to clear an obstacle.
If half flaps are used for takeoff, they should be left in that position until all obstacles are cleared and a flap retraction speed of 60 MPH, and minimum altitude of 100 feet AGL, is reached.
The pilot must always be prepared for an engine/power system failure and ensure there is always sufficient altitude, airspeed, and a suitable landing site to perform an "Emergency Landing Without Power".

Short Field Takeoff

Short field takeoffs are performed with half flaps. An obstacle clearance speed of 55 MPH should be used.

Crosswind Takeoff

Takeoffs in crosswinds of 5-15 MPH (4-12 kts) normally are performed with the minimum flap setting necessary for the field length in order to minimize the drift angle immediately after liftoff. The aircraft is accelerated to a speed slightly higher than normal, then pulled off a bit more abruptly than normal to prevent possible settling back to the runway while drifting. When clear of the ground, neutralize controls as required for coordinated flight and turn the airplane into the wind to correct for drift. At the beginning of the takeoff roll, it is advisable to apply aileron control into the wind.

ENROUTE CLIMB

A normal enroute climb is performed at 65-80 MPH with flaps up. Operation above 5500 RPM is limited to 5 minutes. Monitor engine temperatures and adjust climb speed as required. A higher climb speed will provide better engine cooling.

CRUISE

Normal cruise is performed between 4500 RPM and 5500 RPM. The fuel consumption, speed, and range will vary according to the particular power setting selected. A good number for your cross- country planning is 2.65 hrs (2 hrs and 40 minutes) endurance plus 30 min reserve.
In your cross country planning always consider that the weather and wind can change. Plan accordingly and leave yourself room for alternate procedures.

Downloaded from www.Manualslib.com manuals search engine

STALLS

The stall characteristics of the S-7LS aircraft are conventional. Use slow deceleration. The position and feel of the flight controls can be used as an indication of an impending stall. The control stick will be aft of its normal flight position and the aircraft will feel "mushy". A stall can be terminated by smoothly moving the control stick forward far enough to allow the aircraft to accelerate to normal flight speed.

Power-off stall speeds at maximum weight for forward CG positions are presented in Section 4.

APPROACH

It is recommended to plan your prolonged descents from high altitudes to allow for small reductions in power every two to five minutes. This will enhance the life of the engine. Airspeed should be controlled with angle of descent and power. Avoid prolonged descents at low power settings.

LANDING

Normal Landing

Flap position selection for approach and landing should be determined by considering height of obstructions on the approach, wind direction and velocity, and usable runway length. Touchdown on two- or three wheels as desired. If touched down on two wheels lower tail wheel gently.

Short Field Landing

Use 59 MPH on short final (with full flaps) and power as required to control the approach angle. Touch down on the main wheels, or all wheels as desired. Immediately after touchdown lower the tail wheel to the ground and apply braking as required. Hold control stick back and retract flaps.

Crosswind Landing

When landing in a crosswind, use a 0 degree flap setting unless flaps are required for the field length. The wing-low method should be used during approach and touchdown since it will provide the best directional control. This method, when done correctly, will prevent side-loads from being imposed on the landing gear. Continue to hold the ailerons into the wind.

EXAMPLE: When landing with a crosswind from right, place the control stick to the right as required.

Downloaded from www.Manualslib.com manuals search engine

SECURING THE AIRCRAFT

If the aircraft must be left unattended outdoors, always secure it with tie-downs. The type of tie-downs used is a matter of personal choice. A good "rule-of-thumb" is to ensure that what you secure the aircraft to (and with) will restrain at least 1235 lbs at each tie-down location. Secure the controls in the cockpit and use the following tie down points:

- Tail gear
- Left forward wing strut (top- closed to wing attach)
- Right forward wing strut (top-closed to wing attach)

If strong winds or gusts are advised seek shelter for the AC.

HOT WEATHER OPERATION

Avoid prolonged engine operation on the ground.

NOISE CHARAKTERISTICS AND NOISE REDUCTION

The certificated noise level for the S-7LS aircraft at 1200 pounds is 70.24 dB(A). No determination has been made that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, into, or out of, any airport.

Downloaded from www.Manualslib.com manuals search engine

SECTION 7
AIRCRAFT GROUND HANDLING AND SERVICING

TABLE OF CONTENTS

Page

Ground Handling 7-2

Towing and Tie- Down Instructions 7-2

Servicing with Fuel 7-2

Servicing with Oil 7-3

Servicing with coolant 7-3

Aircraft Care 7-3

Introduction..... 7-3

Windshield and Windows 7-4

Painted Surfaces 7-4

Interior Care 7-4

Downloaded from www.Manualslib.com manuals search engine

GROUND HANDLING

On the ground the aircraft is most easily maneuvered by hand using the handles on the leading edge of the horizontal stabilizer. The aircraft has a 360 degree full swivel tail wheel, which is connected to the rudder by a centering cam. You can disengage the tail wheel through pushing sideways on the rear fuselage (using the handles on the horizontal stabilator's) and allow it to swivel freely in any direction. This will help you to maneuver the aircraft in tight spaces.

TOWING AND TIE – DOWN INSTRUCTIONS

There are no provisions for towing of the S-7LS Aircraft on the airframe.

If the aircraft must be left unattended outdoors, always secure it with tie-downs. The type of tie-downs used is a matter of personal choice. A good "rule-of-thumb" is to ensure that what you secure the aircraft to (and with) will restrain at least 1235 lbs at each tie-down location. Secure the controls in the cockpit using the seat belts and use the following tie down points:

- Tail gear
- Left forward wing strut (top- closed to wing attach)
- Right forward wing strut (top-closed to wing attach)

If strong winds or gusts are advised seek shelter for the AC.

SERVICING WITH FUEL

The S-7LS retains fuel in two wing mounted fuel tanks with each 9 gallons capacity.
Reference Section 1 for a description of the system and Section 2 for approved Fuel grades.
For additional information refer to ROTAX Operators - and Maintenance Manual.

►**NOTE:** Due to cross feeding between fuel tanks, the tanks should be re- topped after each refueling to assure maximum capacity.

Visual inspect the fuel level through the filler neck opening.

Pay special attention during refueling to avoid fuel spills onto the lexan windshield or doors.
It is therefore best, to refuel the airplane with its doors closed and to have a towel handy to remove fuel immediately. Rinse window surfaces immediately off with plenty of water should they come in contact with fuel.

Downloaded from www.Manualslib.com manuals search engine

SERVICING WITH OIL

The engine oil is contained inside the oil bottle which is mounted firewall forward.
Oil quantity is 3 qts.

Reference Section 1 for a description of the system and approved oil grades.
For additional information refer to ROTAX Operators - and Maintenance Manual.

Visual inspect the oil level using the dipstick in the top of the oil bottle. The top cowling is equipped with an oil door to allow for access.

Prior to oil check turn the propeller several times by hand to pump oil from the engine into the oil tank, or let the engine idle for 1 min. This process is finished when air is returning back to the oil tank and can be noticed by a murmur from the open oil tank.

> **WARNING** –Do not stand within the arc of the propeller, check ignition off, throttle closed and park brake set before rotating the propeller by hand.

SERVICING WITH COOLANT

Check the coolant level inside the coolant expansion bottle.
The bottle is located on the left side of the firewall.
Inspection is possible using a flash light via the oil door on the top cowling.
Remove the top cowling if required for a thorough inspection.
For filling - the top cowling must be removed.
Fluid is added to the expansion bottle to just above the minimum fluid mark. Use a long funnel to fill the system.
For approved coolant fluids and additional information about the system refer to ROTAX Operators – and Maintenance Manual.

AIRCRAFT CARE

INTRODUCTION

If your airplane is to retain that new airplane performance and dependability, certain inspection and maintenance requirements must be followed. It is recommended to follow a planned schedule of lubrication and preventive maintenance based on the climatic and flying conditions encountered.

Downloaded from www.Manualslib.com manuals search engine

WINDSHIELD AND WINDOWS

The windshield and windows are made from lexan. **Do not bring in contact with fuel. Fuel will harm these surfaces almost immediately.** If fuel is spilled accidentally wipe off with lots of water.
Always close the doors when you refuel the AC. Otherwise it is possible, that spelled fuel runs around the wing trailing edge and drops on the open door.

Clean the windshield with plenty of water and if you need to, with a mild detergent in low concentration. Rinse thoroughly and dry with a clean soft cloth or tow.
We recommend “Brillianize” for windshield care. Brillianize is available through the factory.

Note:
Never use gasoline, benzine, alcohol, acetone, thinner or glass cleaner on lexan surfaces (windows).

PAINTED SURFACES

The painted exterior surfaces of your S-7LS aircraft have a durable and long lasting finish.
No polishing of buffing will be required under normal conditions.

It is recommended to keep your aircraft out of the sun as much as possible.
If you keep your aircraft outside it is recommended to wax the exterior surface.

It is also recommended to clean the exterior surface of your airplane on a regularly base. This can also be accomplished with “Brillianize”. It is possible to wash the airplane carefully with water and a mild soap, followed by a rinse with water and drying with clothes.

INTERIOR CARE

Use a vacuum cleaner to remove dust and loose dirt from the interior and upholstery. Household spot removers or upholstery cleaner may also be used for the seat upholstery. Always test it on an obscure place on the fabric to be cleaned.
The plastic baggage enclosure can be cleaned with a damp cloth and an automotive plastic interior care.
The instrument panel, control knobs need only be wiped of with a damp cloth.

Downloaded from www.Manualslib.com manuals search engine

SECTION 8
REQUIRED PLACARDS AND MARKINGS

TABLE OF CONTENTS

Page

Airspeed Indicator Markings 8-2
Powerplant Instrument Markings 8-2
Placards 8-3

Downloaded from www.Manualslib.com manuals search engine

AIRSPEED INDICATOR MARKINGS

Airspeed indicator markings and their color code meanings are shown in Table 8-1.

Marking	IAS Value or Range(mph)	Meaning
White Arc	45 - 69	Full Flap Operating Range. Lower limit is maximum weight stalling speed in landing configuration. Upper limit is maximum speed permissible with flaps extended.
Green Arc	50 - 97	Normal Operating Range. Lower limit is maximum weight VS at most forward CG with flaps retracted. Upper limit is maximum structural cruising speed.
Marking	**IAS Value or Range(mph)**	**Meaning**
Yellow Arc	97 - 128	Operation must be conducted with caution and in smooth air only.
Red Line	128	Maximum speed for all operations

Table 8-1: Airspeed Indicator Markings

POWER PLANT INSTRUMENT MARKINGS

Power plant instrument markings and their color code meanings are shown in Table 8-2.

Instrument	Red Line	Green Arc	Yellow Arc	Red Line
	Minimum Limit	Normal Operating	Caution Area	Maximum Limit
Tachometer		1400 – 5500 RPM	5500 – 5800 RPM	5800 RPM
Cylinder Head Temperature				275 ° F
Oil Temperature	120° F	190° –230° F	230° - 266° F	266°
Oil Pressure	12 PSI	29 – 73 PSI		100 PSI

Table 8-2: Power plant instrument Markings

Downloaded from www.Manualslib.com manuals search engine

PLACARDS

The following labels and placards contain important information needed for proper operation of the RANS S-7LS aircraft and must be displayed in the location described in this section.
All placards are available through Rans Inc. Refer to your parts manual.

The numbers correspond to the labels shown at the following pages.

1. In full view on top of knobs of forward and rear throttle lever.
2. At the right top of the carburetor heat control.
3. Aft fuselage enclosure (cabin).
4. In full view of the pilot on the instrument panel.
5. Aft fuselage enclosure (cabin).
6. Right door besides door lock (lever).
7. Left door besides door lock (lever).
8. On floor board besides the fuel shut off valve.
9. Right wing root enclosure in clear view from the pilot seat.
10. Inside of oil check door (cowling).
11. Around both filler necks of fuel tanks.
12. On both door top longerons in view of pilot.
13. On left and right fuel side gauge. For placement instructions refer to Maintenance Manual.
14. Below circuit breaker at instrument panel
15. Below corresponding switches at instrument panel
16. Between emergency plug ins at instrument panel
17. On front face of oil temperature gauge
18. On front face of oil pressure gauge

Downloaded from www.Manualslib.com manuals search engine

19. On front face of CHT gauge

20. Besides ELT remote control on instrument panel

21. All range markings on instrument front face as shown

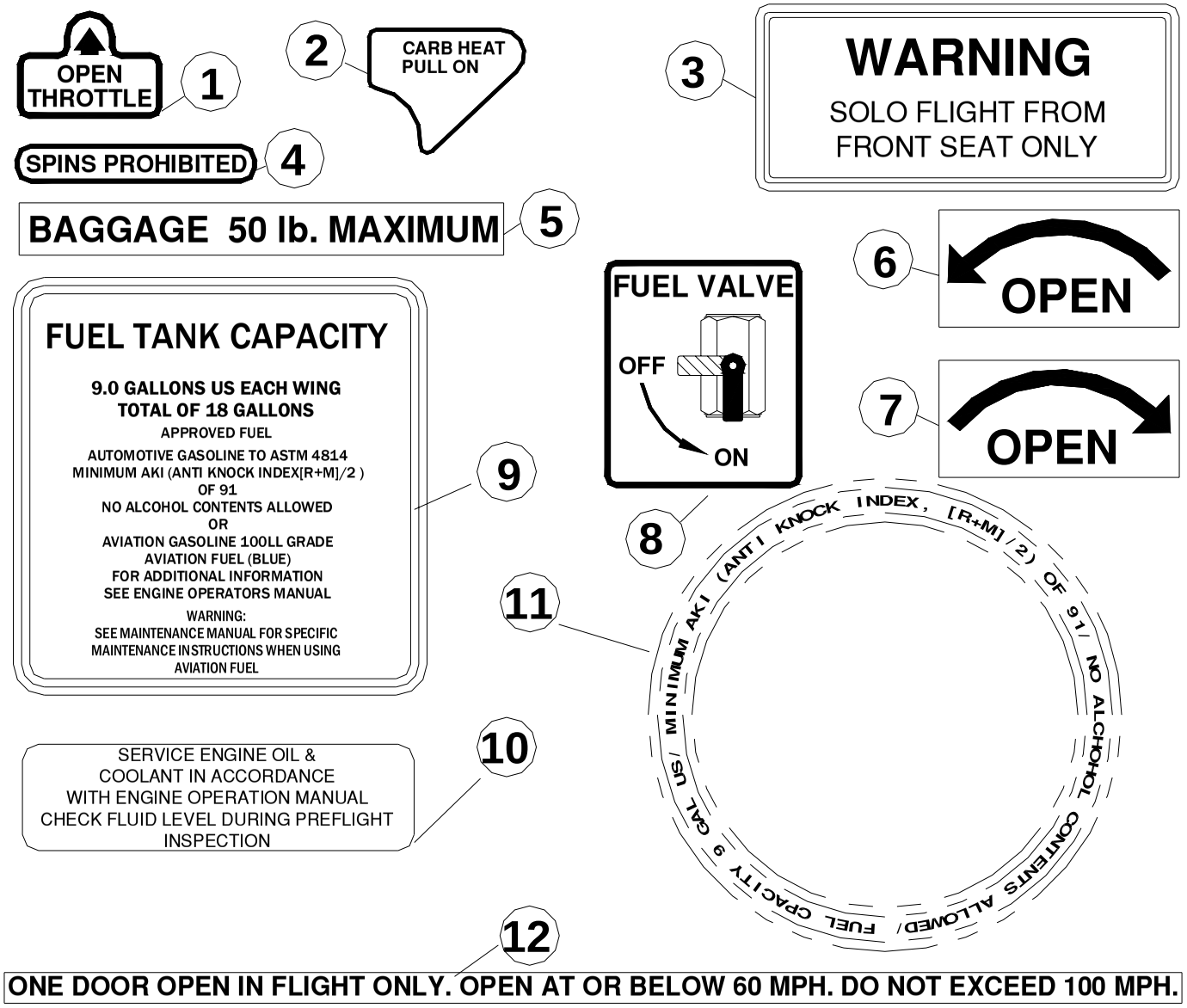
22. Passenger Warning on lower left side of instrument panel.

> **"THIS AIRCRAFT WAS MANUFACTURED IN ACCORDANCE WITH LIGHT SPORT AIRCRAFT AIRWORTHINESS STANDARDS AND DOES NOT CONFORM TO STANDARD CATEGORY AIRWORTHINESS REQUIREMENTS"**

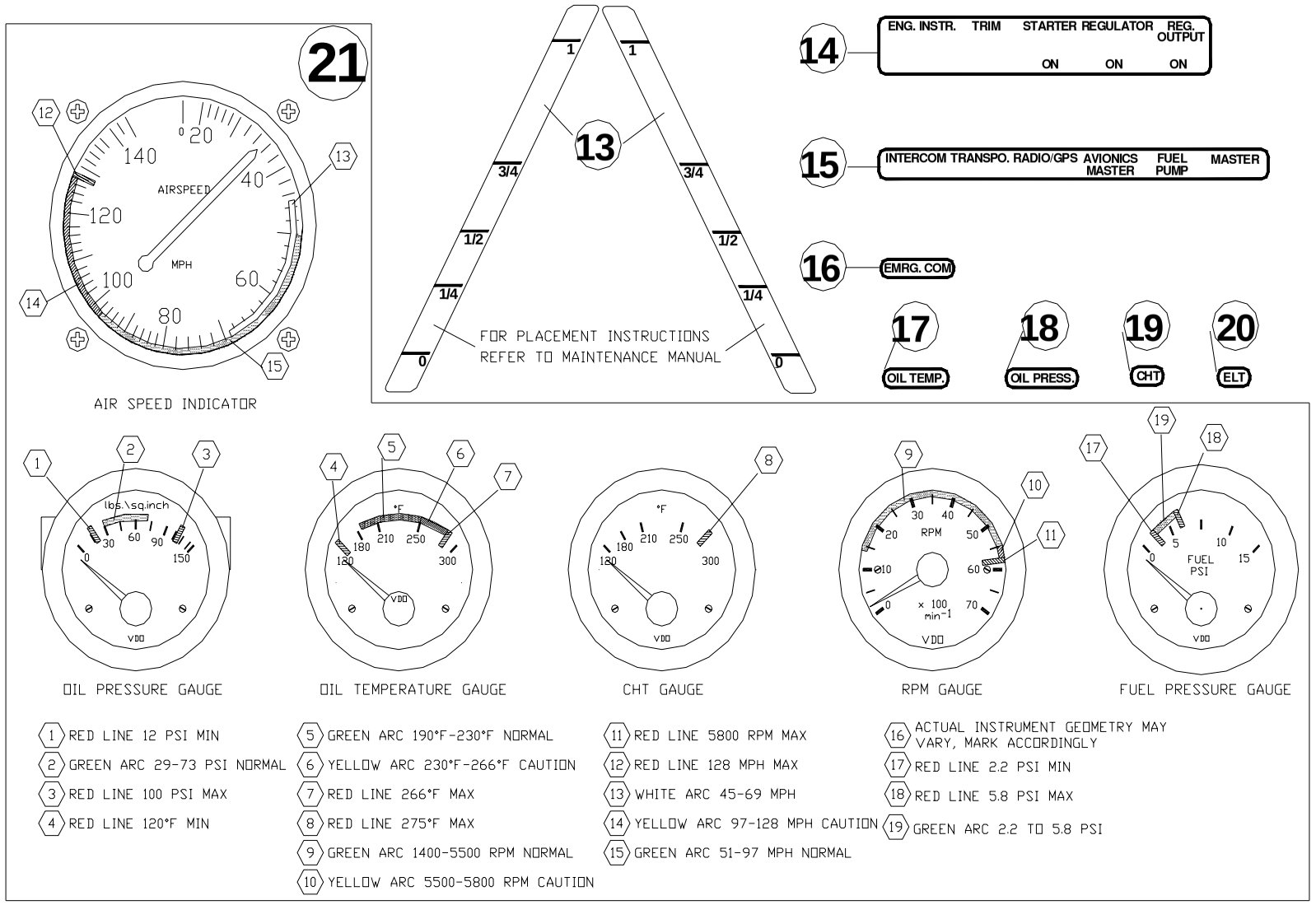
23. Placard **"LIGHT SPORT"** IN 2" letters at inside of left and right cabin door.

Downloaded from www.Manualslib.com manuals search engine

Downloaded from www.Manualslib.com manuals search engine



Downloaded from www.Manualslib.com manuals search engine



SECTION 9
SUPPLEMENTARY INFORMATION

TABLE OF CONTENTS

Page

Familiarization Flight Procedures 9-3
Pilot Operating Advisories..... 9-4

Downloaded from www.Manualslib.com manuals search engine

FAMILIARIZATION FLIGHT PROCEDURES

The pilot should familiarize himself thoroughly with this Manual, ROTAX Engine Operators Manual, applicable Aviation Regulations and the aircraft itself, before any solo flight is attempted.

Scope and detail of a familiarization flight will depend on level of experience and currency of the pilot.
Any familiarization flight shall include at least all Normal Procedures including a preflight inspection as per Section 6 of this Manual.
It is also recommended, to perform slow flight, power off stalls in clean and flapped configuration.
All emergency procedures as per Section 5 of this Manual, including recovery from a spiral dive or spin shall get at least reviewed.
For pilots with little or no experience in light aircraft, additional the special characteristics of such shall be reviewed.

PILOT OPERATING ADVISORIES

The S-7LS shall only be operated by pilots with proper tailwheel training.

It is recommended to carry weight in the baggage compartment (up to the max loading of 50 lb) if the airplane is occupied solo and is operated in windy conditions.
The ground handling will be improved.
This is especially advisable if the front seat is loaded heavy (solo).

The S-7LS is a tailwheel airplane and requires as such special attention on the ground.
Always deflect the controls as required in windy conditions. Refer also to Section 6 for more information on control deflections.

The S-7S is equipped with brakes on the rear rudder pedals also. Always brief the passenger in the rear seat to remove their feet from the pedals at least for take off and landing.

Additional passenger briefings are recommended as required.

Should a door open in flight, fly the airplane first, before you attempt to do anything. The S-7LS handles well with one or even two door’s open. Bring the airplane in horizontal level flight and slow it down to about 60 mph. Kick the rudder opposite the open door, the door will come down, reach for the door handle, and lock the door.

Downloaded from www.Manualslib.com manuals search engine