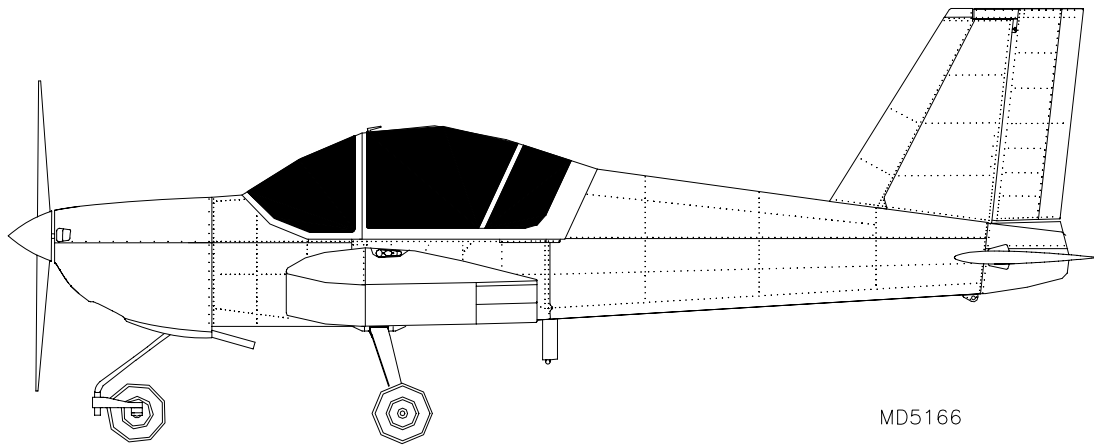




RANS

S-19 VENTERRA

OPERATIONS MANUAL



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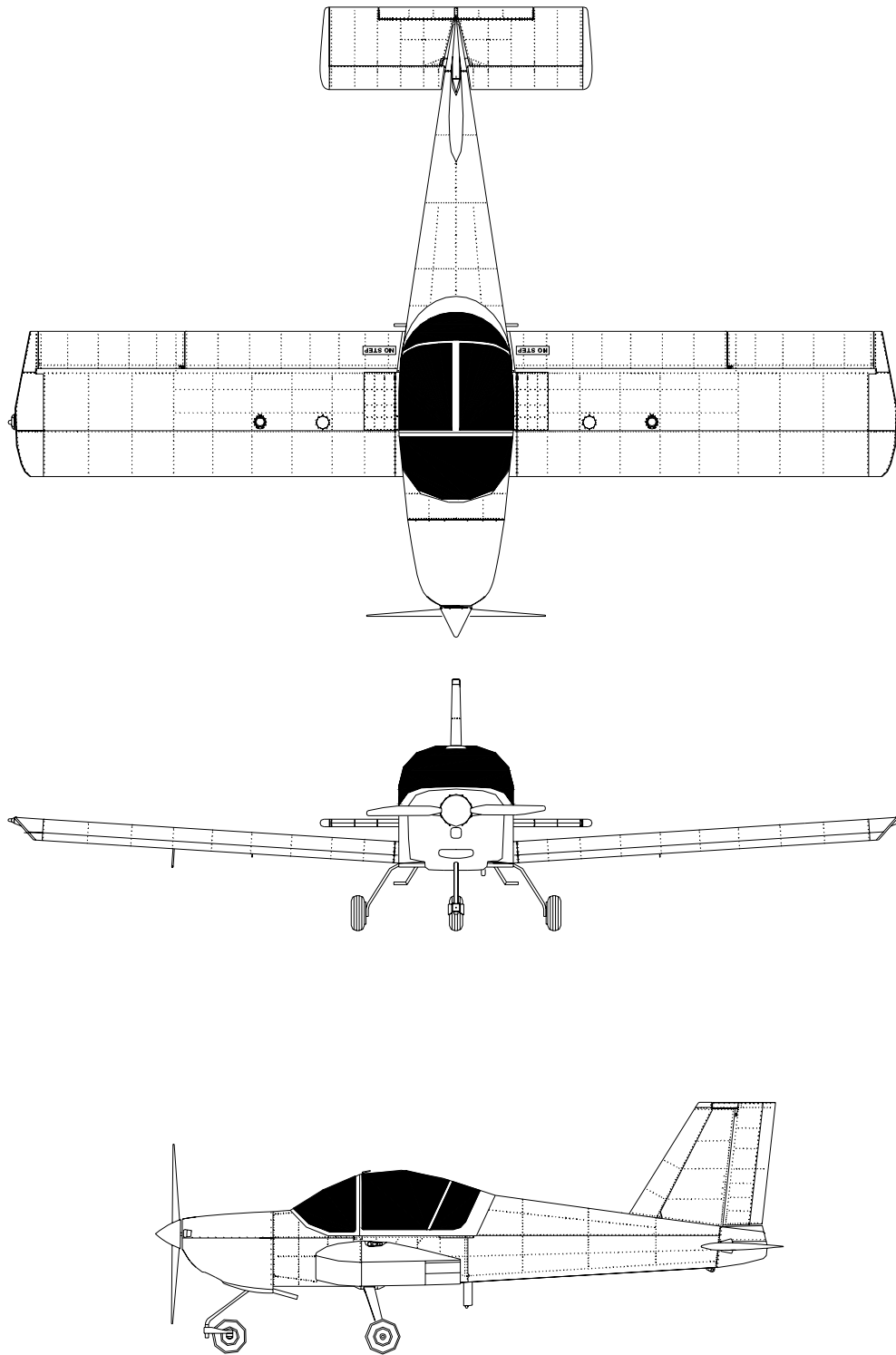
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THREE VIEW



17 - GENERAL INFORMATION

This handbook contains sections 17 thru 17G.

Use this Operations Manual as a guide. Every aircraft is slightly different due to such factors as weight, equipment, paint finish and builder skills, just to name a few.

The pilot should study the entire Operations Manual to familiarize themselves with the limitations, performance, and procedures applicable for this aircraft.

ENTERING AND EXITING AIRCRAFT

To enter the S-19:

- Open the canopy by rotating the latch handle
- Slide canopy aft until past the canopy locks
- Flip the canopy locks into place
- Lower the flaps completely to gain access to the foot step
- Use the front edge of the canopy, once locks are in place as a hand hold
- Place the inside foot on the foot peg
- Lean forward, keeping weight over the rear spar
- Move up onto the wing
- Stand holding the roll bar
- Place both feet on the seat
- Hold the roll bar and lower onto seat
- Move legs into rudder pedal area
- Adjust and lock seat in position

CAUTION: *The S-19 is a light aircraft and it is easy to tip over onto the tail. To avoid this, enter with your body weight over the rear spar, do **NOT** stand straight up on the foot step; this will force the tail down. Weight in the baggage compartment, any tail low incline, or surface winds blowing on the tail will contribute to this tendency to rest on the tail.*

NOTE: *Seats should be aft for easy entry.*

Adjust seat position using roll bar support tube as a hand hold. See below for seat adjustment details.

To exit the S-19:

- Lower the flaps completely to gain access to the foot step
- Slide canopy aft until past the canopy locks
- Flip the canopy locks into place
- Move seat into aft position and lock
- Use the roll bar as a hand hold
- Stand up in the seat with both feet
- Step onto wing facing forward, use the canopy front as a hand hold
- Find foot step and step backwards off wing, keeping weight over rear spar

NOTE: *Seat should be aft for easy exit.*

CANOPY

The sliding canopy can open in flight if the latch is not secure. Due to aerodynamic pressure the canopy will only open between 1" or 2", and can easily be closed.

CAUTION: *If canopy opens in flight, continue to fly the plane, trim to hands-off level flight if possible, then close canopy.*

Canopy Open Flight

The canopy latch features a setting for canopy open flight. The front of the latch has a fish-mouth shape to allow it to rest against the latch pin on the roll bar and hold the canopy open about 1". This allows extra airflow into the cockpit and should be used only for brief periods if experiencing extra warmth within the cabin. To use this feature, trim aircraft for hands-off level flight, open latch, and pull canopy back enough to set the fish-mouth portion of the latch against the latch pin on the roll bar.

To close canopy: Trim aircraft for hands off level flight, pull canopy aft off the latch pin, and close normally.

17A - OPERATING LIMITATIONS

This section includes operating limitations, instrument markings, and basic placards necessary for the safe operation of the aircraft, power plant, and standard equipment.

The Rotax 912 ULS Operators Manual must be onboard of the aircraft.

AIRSPPEED LIMITATIONS

Airspeed limitations and their operational significance are shown in **Table 17A-1**. All speeds are given for maximum takeoff weight. Speed are given in MPH and (KNOTS)

	Airspeed	CAS	IAS	Remarks
VNE	Never Exceed Speed	150 (130)	143 (124)	Do not exceed this speed in any operation
VA	Maneuvering Speed at maximum gross weight	125 (109)	120 (104)*	Do not make full or abrupt control movements above this speed.
VFE	Maximum Flap Extended Speed	90 (78)	86 (75)	Do not exceed this speed with flaps extended.
VSO	Stall speed	45 (39)	47 (41)**	Flaps full down
VS	Stall speed	51 (44)	49 (43)**	Flaps up

TABLE 17A-1: AIRSPPEED LIMITATIONS

* At weights below maximum gross weight, maneuvering speed should be reduced 3 mph for each 50 lbs. the aircraft weighs below maximum gross weight.

** Power-off configuration

MAXIMUM DEMONSTRATED CROSSWIND VELOCITY

Takeoff23 MPH (20 Knots) @ 90 degrees
Landing.....23 MPH (20 Knots) @ 90 degrees

This is not considered limiting.

WEIGHT LIMITS

Maximum Ramp weight: 1320 lbs.
 Maximum Takeoff weight: 1320 lbs.
 Maximum Landing weight: 1320 lbs.
 Maximum weight in Baggage compartment: 70 lbs.

CENTER OF GRAVITY LIMITS

Forward:84.0 inches aft of datum
 Aft:.....91.5 inches aft of datum

Reference Datum: 72" forward of the wing leading edge.

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-19 VENTERRA aircraft.**

FLIGHT LOAD FACTOR LIMITS

Flaps Up:..... + 4.4 g, - 2.0g
 Flaps Down: + 2.0 g, 0 g

FLIGHT CONDITIONS OPERATION LIMITS

Flight into known icing conditions is prohibited.

This aircraft is limited to two occupants only.

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: Dependent on engine used

Fuel Capacity:

Total Capacity: 24 U.S. GAL

Total Capacity each Tank: 12 U.S. GAL

Total Usable: 22 U.S. GAL

Total Unusable: 2 U.S. GAL

Takeoffs have not been demonstrated with less than 2 gallons of total fuel (1 gallon per tank).

Fuel gauge accuracy is only accurate at the “**EMPTY**” reading for any type of gauge.

OTHER LIMITATIONS

Flap Limitations:

Approved Takeoff Range: retracted, 1/3 or 2/3 flaps (0° to 30°)

Approved Landing Range: retracted to full flaps (0° to 40°)

17B - WEIGHT AND BALANCE

INTRODUCTION

SECTION 16 of this manual has full information on WEIGHT and BALANCE. Information from the Weight and Balance calculations may be recorded in this section for your convenience.

This section describes the proper procedures for determining the weight and balance of the S-19 Venterra.

Always check your weight and balance during your preflight planning. It is recommended to check the data for landing and take-off due to fuel burn weight change.

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

AIRCRAFT WEIGHING PROCEDURES

1. Preparation:
 - Inflate tires to recommended operating pressure
 - Drain all fuel
 - Service engine oil as required to obtain a normal indication
 - Service engine coolant as required to obtain a normal indication
 - Retract flaps
 - Place all control surfaces in neutral position
2. Leveling:
 - Shim scales to level Upper Longeron. Place scales under each wheel (400 lbs. minimum capacity)
3. Weighing:
 - With the aircraft level, record the weight shown on each scale.

CALCULATING CENTER OF GRAVITY

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

The S-19 Venterra is a simple aircraft, and so are the weight and balance calculations.

The aircraft is limited to 2 occupants.

For baggage storage a baggage compartment behind the seats is available. The compartment is rated for 70 lbs. Baggage should be secured in flight.

Enter the following data on the chart. Refer to **FIGURE 17B-01** below and in the Figure Manual.

NOTE: *The Figure Manual has a full page format chart which may be copied as needed.*

- Weight of Nose Gear.
- Weight of Main Gear – Left.
- Weight of Main Gear - Right.
- Weight of Pilot.
- Weight of Passenger.
- Usable Fuel (at 6 lbs. / gal).
- Weight of Baggage (Max 70 pounds).

Calculate the moments (Weight x Arm).

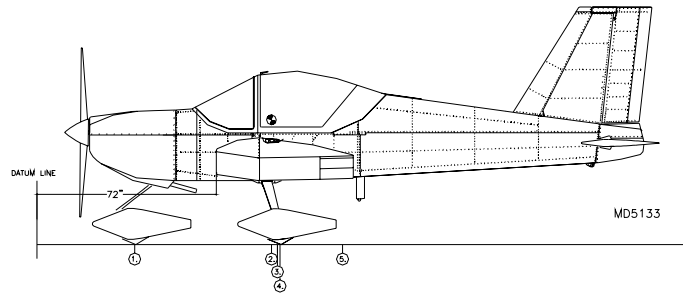
Add moments to obtain total moment.

Add weights to obtain total weight.

Calculate Center of Gravity. (**CG = Total Moment / Total Weight**)

Check that the Center of Gravity calculated for take off falls inside of the acceptable Center of Gravity envelope.

Repeat for landing configuration.



RANS S-19
WEIGHT AND BALANCE

N _____	
DATE WEIGHED	
ENGINE TYPE	
C.G. CONDITION	
EMPTY WEIGHT	
MTOW (912 ULS)	1320 LBS.

ACCEPTABLE C.G. 84" TO 91.5" FROM DATUM LINE.
DATUM LINE IS 72" AHEAD OF WINGS LEADING EDGE.

#	ITEM	WEIGHT	ARM	MOMENT
1	NOSE GEAR	147	39.3"	5777.1
2	PILOT	175	94.0"	16450
2	PASSENGER	140	94.0"	13160
3	FUEL	144	96.3"	13867.2
4	MAIN GEAR - RIGHT	347	97.6"	33867.2
4	MAIN GEAR - LEFT	345	97.6"	33672
5	BAGGAGE*	22	122.7"	2699.4
TOTAL=		1320	TOTAL=	119492.9

$$\frac{\text{TOTAL MOMENTS}}{\text{TOTAL WEIGHT}} = \text{C.G.} = \frac{119492.9}{1320} = 90.5"$$

#	ITEM	WEIGHT	ARM	MOMENT
1	NOSE GEAR		39.3"	
2	PILOT		94.0"	
2	PASSENGER		94.0"	
3	FUEL		96.3"	
4	MAIN GEAR - RIGHT		97.6"	
4	MAIN GEAR - LEFT		97.6"	
5	BAGGAGE*		122.7"	
TOTAL=			TOTAL=	

$$\frac{\text{TOTAL MOMENTS}}{\text{TOTAL WEIGHT}} = \text{C.G.} = \text{_____} = \text{_____}$$

* 70 POUNDS MAXIMUM BAGGAGE

FIGURE 17B-01 – WEIGHT AND BALANCE CHART

17C - EMERGENCY PROCEDURES

This section 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 PLANE FIRST - maintain control.

AIRSPEEDS FOR EMERGENCY OPERATION - IAS MPH (Knots)

Engine Failure After Takeoff	Flaps UP	79 (69)
	Flaps DOWN	72 (63)
Maneuvering Speed		120 (104)
Maximum Glide	Flaps UP	83 (72)
Precautionary Landing with Engine Power	Flaps UP	72 (63)
	Flaps DOWN	65 (57)
Landing without Engine Power	Flaps UP	83 (72)
	Flaps Down	78 (68)

OPERATIONAL CHECKLISTS

ENGINE FAILURE

Engine Failure During Takeoff Run:

Fly the Aircraft!

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

Engine Failure Immediately After Takeoff

Fly the Aircraft!

- (1) Airspeed - Flaps Up 79 MPH (69 kts)
Flaps Down 72 MPH (63 kts)
- (2) Brakes - APPLY As Needed.
- (3) Ignition Switch - OFF.
- (4) Master Switch - OFF.

Engine Failure During Flight

Fly the Aircraft!

- (1) Airspeed – Best Glide 83 MPH (72 kts)
- (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 Aircraft!

- (1) Flaps - As REQUIRED for Landing Site.
Airspeed - Flaps Up 83 MPH (72 kts).
 Flaps Down 78 MPH (68 kts).
- (2) Fuel Selector Valve - OFF.
- (3) All Switches - OFF.
- (4) Open canopy and lock open prior final approach
- (5) Touchdown - MINIMUM FLIGHT SPEED.
- (6) Brakes - APPLY As Needed.

Precautionary Landing With Engine Power

Fly the aircraft!

- (1) Select Field - FLY OVER, noting terrain, obstructions and wind direction.
- (2) Flaps - AS REQUIRED (for landing site).
- (3) Airspeed – Flaps UP 72 MPH (63 kts).
 Flaps FULL DOWN 65 MPH (57 kts) (Use flaps as required for
 landing site).
- (4) Master Switch - OFF.
- (5) Canopy – Locked OPEN.
- (6) Touchdown - MINIMUM FLIGHT SPEED.
- (7) Ignition - OFF.
- (8) Brakes - APPLY As Needed.

Ditching

Fly the aircraft!

- (1) Flaps - FULL.
Airspeed - 65 MPH (57 kts).
- (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) Canopy – Locked OPEN.
- (6) Touchdown - LEVEL ATTITUDE AT ESTABLISHED DESCENT RATE.
- (7) Place folded coat or cushion over face at touch down
- (8) Aircraft - Unlatch Seat Belts and EVACUATE through doors.
- (9) Life Raft and Vests - INFLATE (If onboard).

LANDING WITH A DEFECTIVE MAIN WHEEL TIRE

Fly the Aircraft

- (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.
- (4) Canopy – Locked OPEN.

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 aircraft!

- (1) Fuel Selector Valve - OFF.
- (2) Ignition switch- OFF.
- (3) Master switch - OFF.
- (4) Cabin heat - OFF.
- (5) Airspeed - 113 MPH (98 kts) (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 aircraft!

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

IMPORTANT: 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 of 83 mph (72 knots) 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.

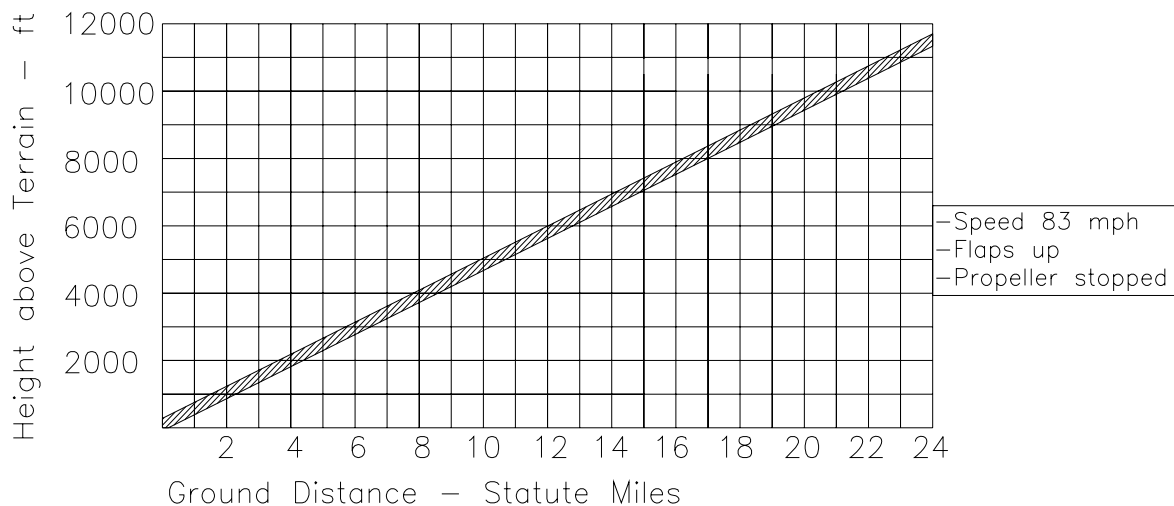


FIGURE 5-1 - MAXIMUM GLIDE

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-19 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 rudder opposite to the direction of rotation.
- (4) Move the control stick (yoke) forward 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 from 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.

CARBURETOR ICE

A sudden engine roughness or loss of rpm could be Carburetor Ice problems. Actuate Carburetor Heat by pulling on the Carburetor Heat Control Knob.

As soon as the engine roughness or suspected carburetor ice is gone, turn off the Carburetor Heat. Repeat as necessary.

17D - NORMAL PROCEDURES

This section provides checklists and amplified (detailed) procedures for the conduct of normal operations.

AIRSPEEDS FOR NORMAL OPERATION

Following airspeeds are based on operations at a Maximum Gross Weight of 1320 lbs.

NOTE: ALL SPEEDS ARE INDICATED AIRSPEEDS MPH (kts)

Takeoff:

Normal Climb out	75-80 (65-70)
Short Field Takeoff, flaps HALF, speed at 50 ft	70 (61)

Enroute Climb, Flaps UP:

Normal	75-85 (65-74)
Best Rate of Climb, V_y , Sea Level	75 (65)
Best Angle of Climb, V_x Sea Level	70 (61)

Landing Approach:

Normal Approach, Flaps UP	75 (65)
Normal Approach, Flaps FULL	65 (57)
Short Field Approach, Flaps FULL	65 (57)

Balked Landing (Missed Approach):

Maximum Power, Flaps half	70 (61)
---------------------------	---------

Maximum Recommended Rough Air Penetration Speed:

120 (104)

Maximum Demonstrated Crosswind Velocity:

Takeoff	20 kts
Landing	20 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 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.

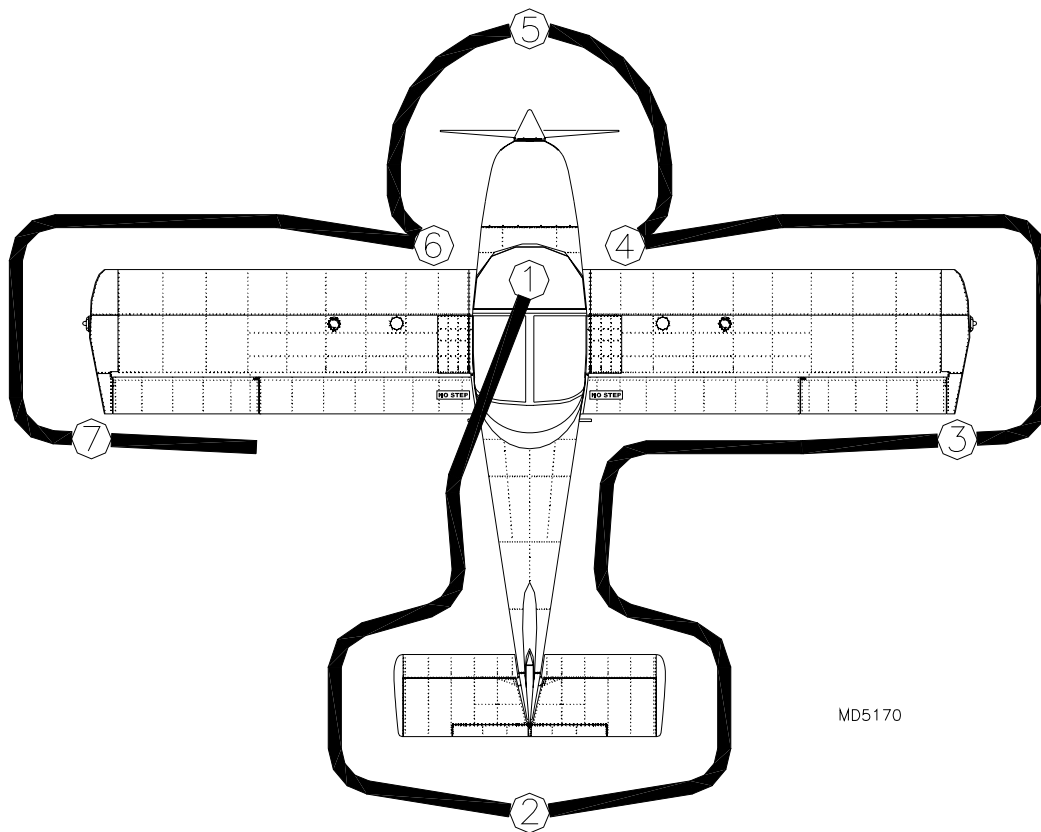


FIGURE 17E-1: PREFLIGHT INSPECTION SEQUENCE

The entire outer surface of the aircraft should be inspected for damage of any kind during the preflight inspection.

1 Cabin

- (1) Aircraft Flight Manual & Required Aircraft Documentation – 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) Baggage - SECURE
- (13) For Solo flight – SECURE passenger seat belt
- (14) Check fuselage.

2 Empennage

- (1) Vertical fin - CHECK
- (2) Control surfaces – CHECK freedom of movement and security
- (3) Tail Tie Down – DISCONNECT
- (4) Surface – CHECK for damage
- (5) Check fuselage.

3 Right Wing - Trailing Edge

- (1) 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 then 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) Flap – CHECK security
- (3) Aileron – CHECK freedom of movement and security
- (4) Surface - CHECK for damage

4 Right Wing

- (1) Wing tip – CHECK security
- (2) Leading edge – CHECK condition, dents, nicks
- (3) Wing Tie Down - DISCONNECT
- (4) Fuel filler cap – CHECK secure
- (5) Main wheel tire – CHECK for proper inflation
- (6) Main Wheel – CHECK security, brake
- (7) Surface - CHECK - damage

5 Nose

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.

- (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 then 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, then 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 when the prop is turned 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
- (9) Nose gear and attach – CHECK freedom of movement

6 Left Wing

- (1) Main wheel tire – CHECK for proper inflation
- (2) Main Wheel – CHECK security, brake
- (3) Fuel filler cap – CHECK secure
- (4) Wing Tie Down – DISCONNECT
- (5) Pitot tube – CHECK security
- (6) Leading edge – CHECK condition, dents, nicks
- (7) Wing tip – CHECK security
- (8) Surface – CHECK - damage

7 Left wing - Trailing Edge

- (1) Aileron – CHECK freedom of movement and security
- (2) Flap – CHECK security
- (3) 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 then gently rock the wings to move any additional contaminants to the sampling points. Take repeated sampling from all points until no contamination is found
- (4) Surface – CHECK - 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 ON
- (7) Fuel Selector Valve – ON FULLEST TANK.

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.

TAXIING

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

BEFORE TAKEOFF

- (1) Canopy - CLOSED and 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 FULLEST TANK – Feel for click of fuel valve to ensure valve is in proper position.
- (7) Fuel Quantity - CHECK
- (8) Throttle – 4000 RPM
 - a. Ignition - CHECK (Ignition drop should not exceed 300 RPM on either Ignition and the differential between Ignitions 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 1st Notch.
- (2) Carburetor heat – COLD
- (3) Fuel pump - ON
- (4) Throttle – SLOWLY FULL OPEN.
- (5) Climb Speed – 75-80 MPH (65-70 Kts)

SHORT FIELD TAKEOFF

- (1) Flaps – 1st or 2nd Notch.
- (2) Carburetor heat - COLD
- (3) Fuel pump - ON
- (4) Brake - APPLY.
- (5) Elevator Control- FULL BACK
- (6) Throttle – FULL OPEN.
- (7) Brake - RELEASE.
- (8) Climb Speed - 70 MPH (61 Kts) until all obstacles are cleared.
- (9) Flaps - RETRACT slowly after reaching 86 MPH (75 kts)

ENROUTE CLIMB**NORMAL CLIMB**

- (1) Airspeed – 75-85 MPH (65-70 kts)
- (2) Throttle - 5800 RPM for 5 minutes max., 5500 RPM continuous

CRUISE

- (1) Throttle - 4500 to 5500 RPM (Maximum continuous setting).
- (2) Elevator Trim - adjust.
- (3) Fuel pump – OFF- monitor fuel pressure
- (4) Switch fuel tanks every 30 min or as needed to trim roll. Feel for click of fuel valve to ensure valve is in proper position.

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) – Flaps UP - 75 MPH (65 kts).
- (2) Flaps (on final) - AS REQUIRED (below 86 MPH (75 kts))
- (3) Airspeed (on final) – Full Flaps 65 MPH (57 kts)
- (4) Touchdown - MAIN WHEELS FIRST
- (5) Nosewheel - Gently lower
- (6) Brake - MINIMUM REQUIRED for field length and directional control

SHORT FIELD LANDING

- (1) Airspeed (approach) – FLAPS UP 75 MPH (65 kts)
- (2) Flaps (on final) – FULL (below 86 MPH (75kts))
- (3) Airspeed - MAINTAIN 65 MPH (57 kts)
- (4) Power - REDUCE to idle as obstacle is cleared
- (5) Touchdown - MAIN WHEELS FIRST
- (6) Nosewheel - Gently lower
- (7) Brake - APPLY as required for field length and directional control
- (8) Wing Flaps - RETRACT for maximum brake effectiveness

BALKED LANDING

- (1) Throttle – FULL OPEN
- (2) Carburetor heat – COLD
- (3) Airspeed – 70 MPH (61 kts)
- (4) Establish Climb
- (5) Wing Flaps – Slowly RETRACT TO 2/3
- (6) Airspeed – 75-80 MPH (65-70 kts)
- (7) Wing flaps – Slowly RETRACT

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

AMPLIFIED PROCEDURES

PRE-FLIGHT INSPECTION

The importance of thorough pre-flight cannot be over-emphasized. Follow the recommended pre-flight 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, 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 17E-1**. Starting at the nose, work around the S-19 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 pilot's seat to the correct position to ensure the rudder pedals and brakes 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-19 is a light aircraft!

STARTING THE ROTAX 912ULS POWERPLANT

The powerplant starting procedure on the S-19 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".

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-19 is equipped with a free-swivel nose wheel and is a brake steer aircraft. Concentrate on taxiing till the moment you've tied the aircraft down.

When taxiing, 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 **FIGURE 17E-2**.

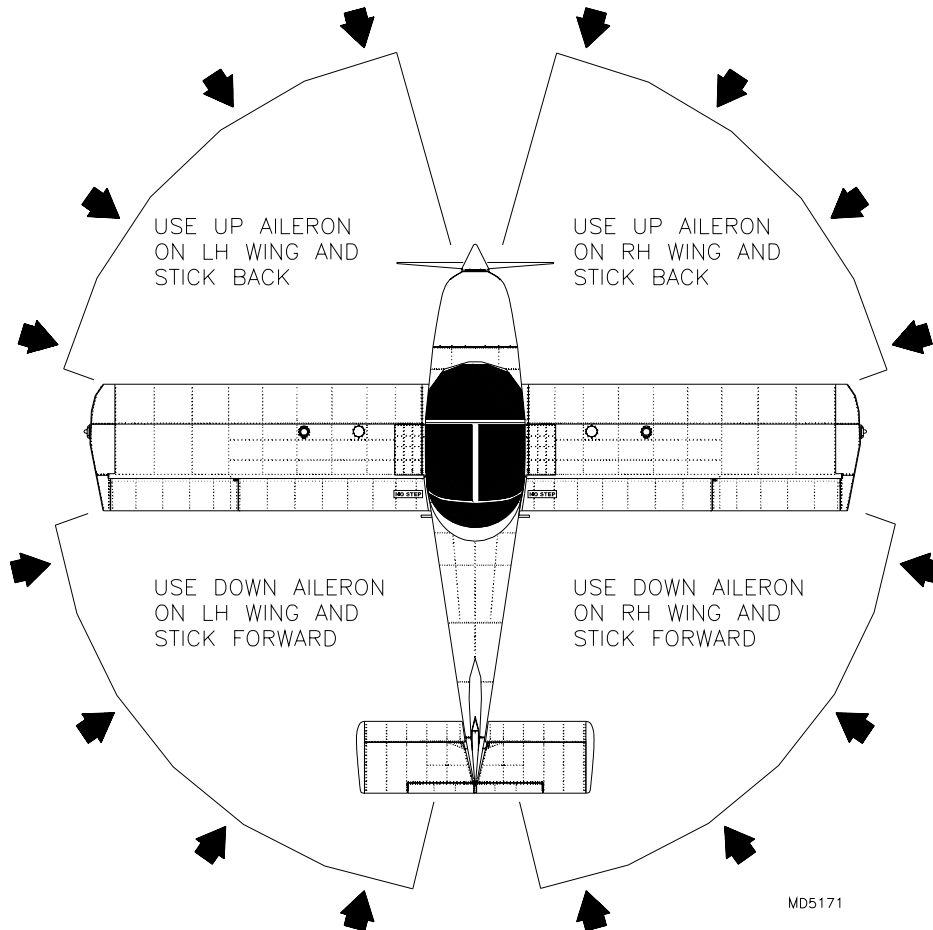


FIGURE 17E-2 - TAXIING DIAGRAM

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

When taxiing 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.

BEFORE TAKEOFF

Warm the engine up.

Be careful about parking and taxiing 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 Ignitions.

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. 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.

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 1st notch down. Using flaps reduces the ground roll and the total distance to clear an obstacle.

If flaps are used for takeoff, they should be left in that position until all obstacles are cleared and a flap retraction speed of 86 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 1/3 to 2/3 down flaps. An obstacle clearance speed of 70 MPH (61 Kts) should be used.

Soft Field Takeoff

Short field takeoffs are performed with 2/3 down flaps. An obstacle clearance speed of 70 MPH (61 Kts) should be used. Procedure: Apply brakes; Full power; 2/3 Flaps; Release brakes, Rotate and hold as soon as possible. Let aircraft accelerate and fly. Maintain climb speed 70 MPH (61 Kts).

Crosswind Takeoff

Takeoffs in crosswinds of 5-15 Knots 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, and 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 aircraft 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 75-85 MPH (65-74 kts) 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 4 hrs 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.

STALLS

The stall characteristics of the S-19 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.

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 main wheels first. Gently lower nose wheel.

Short Field Landing

Use 65 MPH (57 kts) on short final (with full flaps) and power as required to control the approach angle. Touch down on the main wheels first. Immediately after touchdown gently lower the nose 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.*

HOT WEATHER OPERATION

Avoid prolonged engine operation on the ground.

17E - AIRCRAFT GROUND HANDLING AND CARE

GROUND HANDLING

On the ground the aircraft is most easily maneuvered by hand using a tow bar attached to the nose gear. This will help you to maneuver the aircraft in tight spaces.

TIE-DOWN INSTRUCTIONS

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 1320 lbs at each tie-down location. Secure the controls in the cockpit using the seat belts and use the following tie down points:

- Tail
- Left wing
- Right wing

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

AIRCRAFT CARE

If your aircraft is to retain that new aircraft 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.

WINDSHIELD AND CANOPY

The windshield and canopy are made from Acrylic and the aft canopy is Lexan. **Do not bring Lexan in contact with fuel. Fuel will harm these surfaces almost immediately.** If fuel is spilled accidentally wipe off with lots of water.

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 towel.

We recommend "Brilliance" for windshield and canopy care.

Brilliance is available from RANS or aircraft supply houses such as Aircraft Spruce.

IMPORTANT: Never use Gasoline, Benzene, Alcohol, Acetone, thinner or glass cleaner on Lexan surfaces (windows).

PAINTED SURFACES

The painted exterior surface of your S-19 aircraft is a durable and long lasting finish.

No polishing or buffing should 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 aircraft on a regularly base. This can also be accomplished with "Brilliance". It is possible to wash the aircraft with water and a mild soap, followed by a rinse with water and drying with cloths.

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 product.

The instrument panel, control knobs need only be wiped of with a damp cloth.

17F - REQUIRED PLACARDS AND MARKINGS

AIRSPEED INDICATOR MARKINGS

Airspeed indicator markings and their color code meanings are shown in Table 17G-1.

Marking	IAS Value or Range in MPH (KNOTS)	Meaning
White Arc	45 - 90 (39 -78)	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	51 - 125 (44 - 109)	Normal Operating Range. Lower limit is maximum weight stalling speed at most forward CG with flaps retracted. Upper limit is maximum structural cruising speed.
Yellow Arc	125 - 150 (109 - 130)	Operation must be conducted with caution and in smooth air only.
Red Line	150 (130)	Maximum speed for all operations

Table 17G-1: Airspeed Indicator Markings

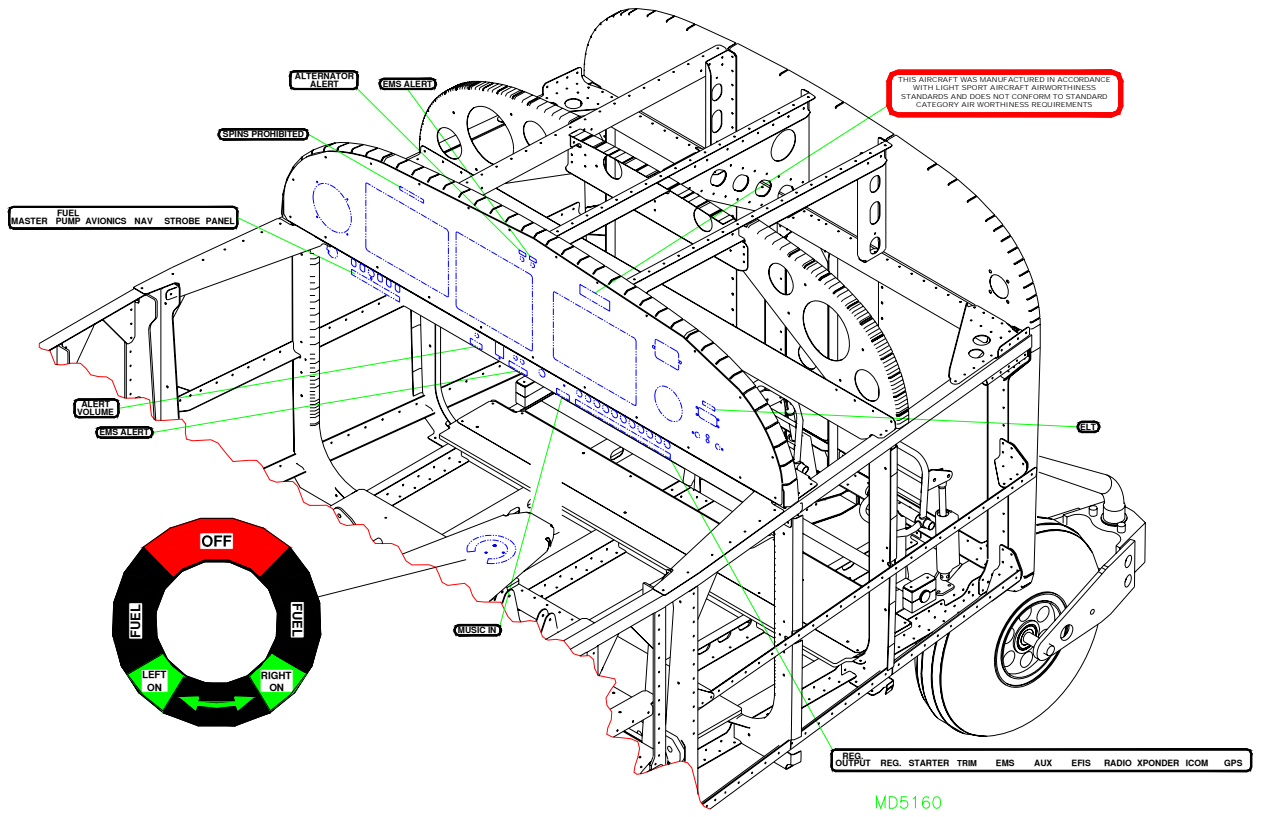
PLACARDS

The following labels and placards contain important information needed for proper operation of the S-19 and must be displayed in the location described in this section.

All placards are available through RANS Aircraft Parts Department.

Placards shown below are included on RANS decal sheet KPPL0019.





17G - SUPPLEMENTARY INFORMATION

FAMILIARIZATION FLIGHT PROCEDURES

The pilot should familiarize themselves 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.

It is also recommended, to perform slow flight, power off stalls in clean and flapped configuration.

All emergency procedures 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-19 shall only be operated by pilots with proper training.

The S-19 is a swivel nose wheel aircraft and as such, requires special attention on the ground.

Always deflect the controls as required in windy conditions.

If the equipped with optional dual brakes on the passenger rudder pedals. Always brief the passenger to remove their feet from the pedals, at least for take off and landing.

Additional passenger briefings are recommended as required.

Should the canopy open in flight, **fly the aircraft first**, before you attempt to do anything. The S-19 handles well with the canopy open. Due to aerodynamic pressure the canopy will only open between 1" or 2", and can easily be closed. Bring the aircraft in horizontal level flight and slow it down to about 60 mph, reach for the canopy handle, push the canopy forward, and lock the canopy.

CAUTION: *If canopy opens in flight, continue to fly the aircraft, trim to hands-off level flight if possible, then close canopy.*