



RANGER™

PILOT OPERATING HANDBOOK

Aircraft Serial Number

Aircraft N Number

19825 141st PI NE
Woodinville, WA 98072

VASHONAIRCRAFT.COM

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INTRODUCTION

The aircraft is compliant with the following standards

Design ASTM F 2245

Construction ASTM F 2563

Continued Airworthiness ASTM F 2295

Pilot Operating Handbook ASTM F 2746

Manufacturer Contact Information

Vashon Aircraft

19825 141st PI NE

Woodinville, WA 98072

Phone: 425-527-9944

Data location and contact information for recovery of certification documentation should Vashon Aircraft lose its ability to support this aircraft:

www.vashonaircraft.com

This handbook has been prepared to inform the pilot of the features and systems incorporated in the VASHON RANGER R7. Recommended operating procedures and performance data are provided so that maximum utilization can be obtained with the utmost of safety, economy, and serviceability. A companion manual, the Vashon Aircraft RANGER R7 Flight Training Supplement (FTS), mirrors the content of this manual but presents operating procedures at a greater level of detail than can effectively be presented in this handbook.

It is strongly recommended that the pilot be familiar with the aircraft, the RANGER R7 FTS, and this manual prior to flight.

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

WARNING

**AN OPERATING PROCEDURE, PRACTICE, OR
CONDITION, ETC. WHICH MAY RESULT IN INJURY
OR FATALITY IF NOT CAREFULLY OBSERVED OR
FOLLOWED.**

CAUTION

**AN OPERATING PROCEDURE, PRACTICE, OR
CONDITION, ETC. WHICH IF NOT STRICTLY OBSERVED
MAY DAMAGE THE AIRCRAFT OR EQUIPMENT.**

NOTE

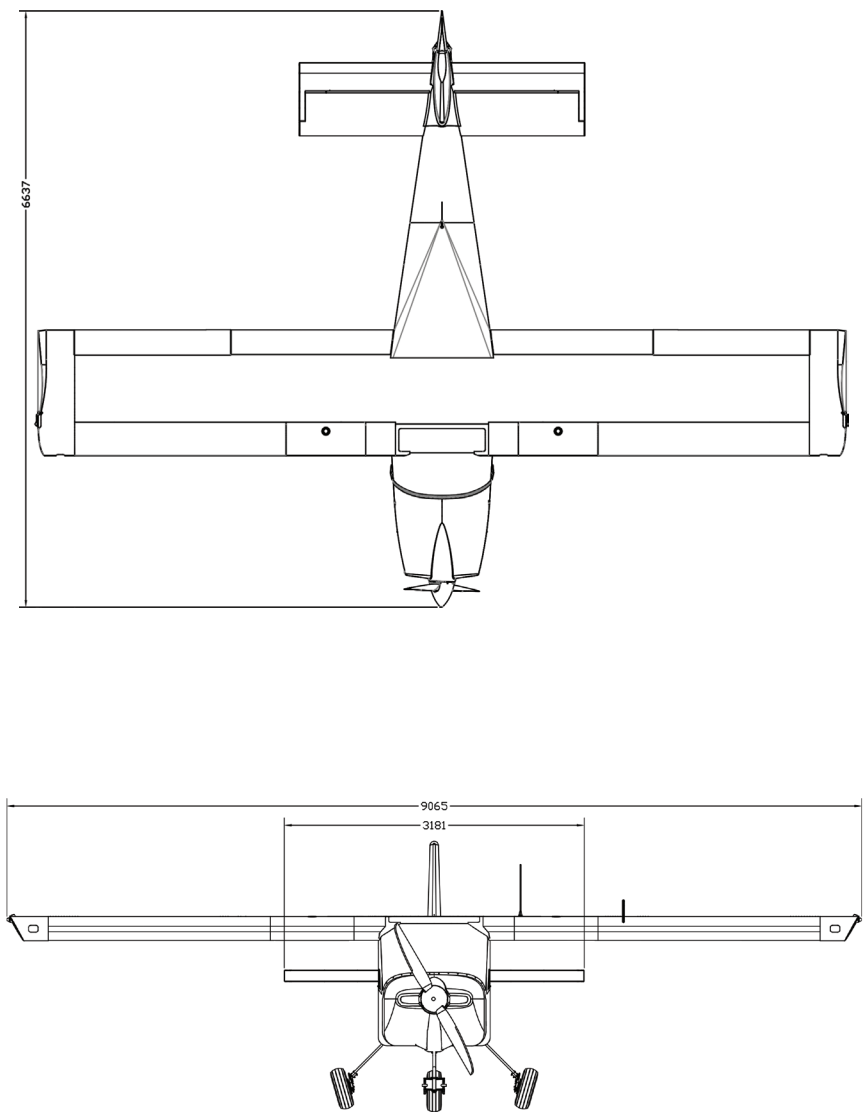
An operating procedure, practice, or condition, etc.

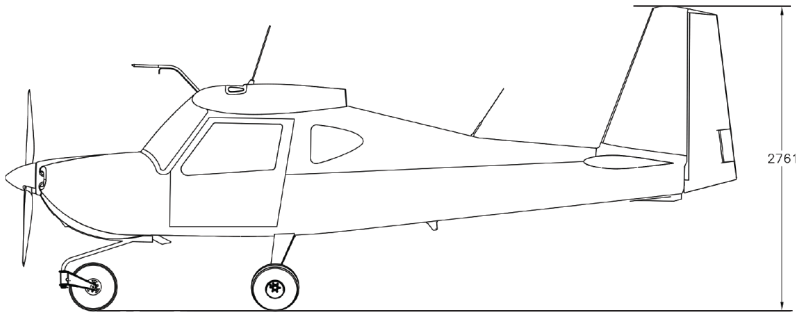
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THREE VIEW - NORMAL GROUND ATTITUDE





DESCRIPTIVE DATA

ENGINE

Number of Engines: 1

Engine Manufacturer: Teledyne Continental Motors

Engine Model Number: O-200-D

Engine Type: Normally aspirated, direct drive, air-cooled, horizontally opposed, carburetor equipped, four cylinder engine with 201.0 cu. In. displacement.

Horsepower Rating and Engine Speed: 100 BHP at 2750 RPM

PROPELLER

Propeller Manufacturer: CATTO

Propeller Model Number: 2B-70x48

Number of Blades: 2

Propeller Diameter: 70 in

Propeller Type: Fixed Pitch

Note

For the Ranger, the Indicated Air Speed (IAS) has been corrected by The SkyView system to display Calibrated Air Speed (CAS).

SUMMARY OF PERFORMANCE SPECIFICATIONS

Gross Weight	1320 lb
Top Speed (@ Gross Weight)	117 KIAS
Cruise (@ Gross Weight, 2700 RPM, 7500 FT Density Altitude)	114 KIAS
Range (@ Gross Weight, 2700 RPM, 7500 FT Density Altitude, 30 Min Reserve)	501 NM
Rate of Climb (@ Gross Weight, VY 75 KIAS, Sea Level)	833 FT/MIN
Stall - Landing Configuration (@ Gross Weight V _{so})	41 KIAS
Stall - Takeoff Configuration (@ Gross Weight V _{so})	43 KIAS
Stall - Cruise Configuration (@ Gross Weight, V _s)	45 KIAS
Total Fuel Capacity	28.0 US GAL
Wing Tanks Fuel Capacity	25.5 US GAL
Reserve Tank Fuel Capacity	2.5 US GAL
Approved Fuel Types	100 LL
Maximum Engine Power	100 HP @ 2750 RPM

SECTION 2: OPERATING LIMITATIONS

OPERATING LIMITATIONS

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GENERAL

This section lists all power plant and airframe operating limitations. These limitations are also indicated in the aircraft in the form of placards, instrument color markings, and audio warnings. The aircraft placards, instrument color markings, and audio warnings are to be the authority if an inconsistency exists with this manual.

WARNING

**ALL OPERATING LIMITATIONS MUST BE STRICTLY
ADHERED TO FOR REASONS OF SAFETY AND
SERVICEABILITY.**

FLIGHT OPERATIONS

The RANGER R7 is designed for operation in the Light Sport Category.

Flight in VFR conditions only is approved providing that the aircraft is operating as specified under Part 91 of the Federal Air Regulations (F.A.R.'s).

WARNING

FLIGHT IN IFR/IMC CONDITIONS IS PROHIBITED.

WARNING

**FLIGHT INTO KNOWN ICING CONDITIONS IS
PROHIBITED.**

AIRSPEED LIMITATIONS

AIRSPEED DESIGNATION	IAS (kts)
Stall Flaps Down (@ gross weight 1320 lb) (VSO)	41
Stall (@ gross weight 1320 lb) (VS)	45
Flap Operating Range (VSO – VFE)	41-90
Normal Operating Range (green arc)	45-103
Maneuvering (VA – blue line)	90
Maximum Structural Cruise (VNO)	103
Caution Range (yellow arc)	103-131

AIRSPEED DESIGNATION	IAS (kts)
Never Exceed (VNE – red line)	131

Maximum Direct Crosswind Component	15 kts
Maximum Wind Limitation	30 kts

NOTE

- CAS Calibrated airspeed is indicated airspeed (IAS) corrected for installation and instrument error.
- IAS Indicated airspeed is the airspeed read directly from the airspeed indicator on the aircraft, driven by the pitot-static system.
- TAS Speed of the aircraft relative to the air mass in which it is flying.
- VNE Maximum safe airspeed, not to be exceeded at any time.
- VNO Not to be exceeded except in smooth air only and then with caution.
- VFE Not to be exceeded with flaps extended.
- VA No full or abrupt control movements allowed above this airspeed.

CEILING

Service Ceiling 12,000 ft

FLIGHT LOAD FACTORS

Category	Limit Load Factor
Light Sport	+4.0g/-2.0g

PROHIBITED MANEUVERS

AEROBATICS PROHIBITED!
Intentional spins prohibited

POWER PLANT LIMITATIONS

Tachometer		
	Normal Range (green arc)	900 to 2750 RPM
	Caution Range (yellow arc)	675 to 900 RPM
	Maximum (red line)	above 2750 RPM
Cylinder Head Temperature		
	Minimum for Take-Off	240°F
	Normal in Cruise (green arc)	240° to 420°F
	Caution Range (yellow arc)	420° to 525°F
	Maximum (red line)	525°F
Oil Temperature		
	Minimum for Take-Off	75°F
	Normal in Cruise	170° to 220°F
	Caution Range (yellow arc)	220° to 240°F
	Maximum (red line)	240°F
Oil Pressure		
	Minimum at Idle (red line)	10 PSI
	Normal Operation	30 to 60 PSI
	Maximum – Cold (red line)	100 PSI
Fuel Pressure		
	Minimum	0.2 PSI
	Maximum (red line)	6.0 PSI

FUEL LIMITATIONS

Fuel		
	Type	100 LL Aviation Fuel
	Capacity	28.1 US Gallons (total)
		27.6 US Gallons (useable)
Unusable Fuel		
	Level Flight	0.5 US Gallons

NOTE

When there is less than 2.5 gallons of useable fuel remaining, the EFIS will display a “LOW FUEL” warning.

AIRSPEED/POWER PLANT INDICATOR MARKINGS

Limitations are displayed electronically.

OPERATING LIMITATIONS

Limitations are displayed electronically.

PASSENGER WARNING

Displayed on instrument panel:

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

INTENTIONAL SPINS PROHIBITED

WARNING

**FLIGHT INTO IMC (INSTRUMENT METEOROLOGICAL
CONDITIONS) IS PROHIBITED.**

**THIS IS AN LSA AIRCRAFT, UNDER ASTM
CERTIFICATION.**

MISCELLANEOUS PLACARDS

N number on outside of aircraft, 2 places

Stainless steel data plate on outside of aircraft

N number on instrument panel

LIGHT-SPORT placard on baggage bulkhead

Instrument panel switches are all labeled

OPEN placard (near latch handle on inside of each door)

Fuel type and capacity placard (near each fuel cap)

THROTTLE above throttle knob, PUSH OPEN on knob end

CABIN HEAT above cabin heat knob, PULL ON on knob end

Fuel valve on/off placard adjacent to fuel valve

Baggage capacity maximum 100 lb on baggage bulkhead

12 Volt Power Outlet 5A max adjacent to power outlet

ELT label adjacent to instrument panel switch

CARB HEAT above carb heat knob, PULL HOT on knob end

MIXTURE above mixture knob, PUSH RICH

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SECTION 3: EMERGENCY PROCEDURES

EMERGENCY PROCEDURES

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GENERAL

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

It is mandatory that the pilot be familiar with this entire manual, in particular, the "Emergency Procedures" section prior to flight.

NOTE

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

For the Ranger, the Indicated Air Speed (IAS) has been corrected by The SkyView system to display Calibrated Air Speed (IAS).

FIRE

ENGINE FIRE DURING START

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

- Continue cranking engine with starter
- Throttle – FULL OPEN
- Mixture – IDLE CUT-OFF
- Inspect aircraft thoroughly for damage and cause prior to restart

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

- Fuel Shut-Off Valve – PULL OUT-OFF
- Electrical switches – ALL OFF
- Ignition switch - OFF
- Exit Aircraft
- Direct fire extinguisher through the air outlet tunnel at the bottom of the cowl

ENGINE FIRE IN FLIGHT

- Fuel Shut-Off Valve – PULL OUT-OFF
- Ignition switch – OFF
- Effect an expedited descent and land immediately
- Radio – MAYDAY 121.5 MHz (or frequency in use)

WARNING

DO NOT ATTEMPT TO RESTART ENGINE.

- Master switch – OFF
- On Final Approach
 - a) Airspeed – 60 kts (55 kts minimum)
 - b) Flaps – DOWN after intended point of landing assured
- Touchdown with minimum airspeed particularly if landing on rough terrain.

ELECTRICAL FIRE

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

- Electrical Switches – ALL OFF (Both Master and Alternator OFF) (leave ignition switches ON)
- Doors &/or Air Vent – OPEN if necessary for smoke removal and ventilation
- Use hand fire extinguisher if available
- Land immediately (or as soon as practical if location for safe landing is not available)

ALTERNATOR/ELECTRICAL FAILURE

An alternator failure is indicated by a voltage indication less than 13.5 volts.

- Turn OFF all non-essential electrical equipment to conserve battery power.

WARNING

**ELECTRICAL FUEL PUMP OPERATION DEPENDS
UPON SUFFICIENT BATTERY POWER. TURN FUEL
PUMP ON ONLY IN CASE OF LOW FUEL INDICATION
ON THE EFIS.**

- Avionics switch – OFF

NOTE

The primary EFIS and GPS will continue to operate on their internal battery.

- Land as soon as possible as the battery will furnish electrical power for a limited time only.

OVERVOLTAGE CONDITION

An overvoltage condition is indicated by a voltage indication in excess of 14.8 volts.

- ALT switch – OFF
- Turn OFF all non-essential electrical equipment to conserve battery power.
- Avionics switch – OFF
- Land as soon as possible as the battery will furnish electrical power for a limited time only.

ENGINE MALFUNCTION

ENGINE FAILURE ON TAKE-OFF

WARNING

IN THE EVENT OF ENGINE FAILURE, THE CONTROL STICK MUST BE IMMEDIATELY AND AGGRESSIVELY MOVED FORWARD TO PREVENT LOSS OF AIRSPEED.

- Airspeed – 60 kts IAS (55 kts IAS minimum)

If airborne and sufficient runway remains:

- Throttle – CLOSED
- Land using maximum braking after touchdown.

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

- Ignition Switch – BOTH
- Fuel Shut-Off Valve – CHECK ON – PUSH
- Mixture – FULL RICH - PUSH
- Fuel Pump – ON
- Carburetor Heat - ON - PULL

If no restart is possible:

- Select most favorable landing area ahead
- Flaps – FULL DOWN
- Fuel Shut-Off Valve – OFF
- Ignition switch – OFF

WARNING

MAINTAIN FLYING SPEED AT ALL TIMES AND DO NOT ATTEMPT TO TURN BACK TOWARD THE RUNWAY UNLESS SUFFICIENT ALTITUDE HAS BEEN ACHIEVED.

Just before touchdown:

- Master switch - OFF
- Touchdown with minimum airspeed particularly if landing on rough terrain.

ENGINE AIR RESTART

- Maintain Airspeed – 60 kts IAS (55 kts IAS minimum)
- Ignition Switch – BOTH
- Fuel Shut-Off Valve – CHECK ON – DOWN
- Mixture – FULL RICH - PUSH
- Fuel Pump – ON
- Carburetor Heat - ON
- If restart not possible, change throttle and/or mixture settings in attempt to restart
- Follow “Forced Landing Procedure” if unable to restart

NOTE

The engine starter may be engaged in flight should the propeller stop windmilling.

PARTIAL POWER LOSS/ROUGH RUNNING

- Follow the engine air restart procedures
- Land as soon as possible using “Precautionary Landing Approach” procedures

ABNORMAL OIL PRESSURE/TEMPERATURE INDICATIONS

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

High oil temperature is generally a result of loss of oil or overheating (note CHT). If the situation remains unchecked, oil pressure usually drops resulting in possible engine damage.

Power should be reduced while maintaining cruise airspeed; land as soon as practical.

Low or zero oil pressure is usually caused by a failed pressure relief valve, oil pump, loss of oil, high oil temperature or a defective gauge. A landing should be made as soon as practical using minimum RPM changes. Plan a “Precautionary Landing Approach” as complete engine failure is possible at any time.

LANDING EMERGENCIES

PRECAUTIONARY LANDING APPROACH

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

- Airspeed – 60 kts recommended (55 kts minimum)
- Throttle – CLOSED when in gliding distance of runway
- Flaps – LOWER AS NEEDED to increase approach descent angle

NOTE

Slipping the aircraft by cross controlling the rudder and ailerons will increase the rate of descent either with or without flaps.

NOTE

If a crosswind exists, place the lower wing into the wind.

**INDICATED AIRSPEED IN A FULL RUDDER
DEFLECTION SLIP IS 3 KT HIGHER THAN IN
COORDINATED FLIGHT.**

FORCED LANDING (Complete Power Failure)

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

Extending flaps or slipping the aircraft can lose additional altitude. Diving the aircraft in an attempt to lose altitude when flying into a headwind will only increase the required landing distance.

- Maximum gliding distance airspeed – 63 kts
- Minimum rate of descent airspeed- 59 kts
- Fuel Shut-Off Valve – OFF – PULL OUT
- Flaps – UP to maximize glide range
- Radio – MAYDAY 121.5 MHz (or frequency in use)
- Attempt to position the aircraft approximately 1000 feet above ground level (AGL) when on downwind and abeam the intended point of landing.
- Ignition switches – BOTH OFF
- On Final Approach:
 - Airspeed – 60 kts IAS (55 kts IAS minimum)
 - Flaps – DOWN after intended point of landing assured
- Master switch – OFF
- Touchdown with minimum airspeed particularly if landing on rough terrain.

DITCHING

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

- Land into wind if high winds are evident or parallel to swells with calm winds
- Flaps – UP (allows higher nose attitude at touchdown)
- Door – UNLATCH (just before touchdown)
- Contact the water with nose high attitude
- After coming to complete stop – EXIT AIRCRAFT

NOTE

Aircraft cannot be depended upon to provide flotation after contacting the water.

UNUSUAL FLIGHT CONDITIONS

SEVERE TURBULENCE

To prevent overstressing the aircraft do not exceed 103 kts in rough air.

To minimize personal discomfort, decrease the IAS below 90 kts.

Maintain a level flight attitude rather than flying by reference to the EFIS as the pitot-static indications may become very erratic.

3

STALLS

The RANGER R7 stall characteristics are conventional. Additionally, the RANGER R7 is equipped with an Angle of Attack (AoA) system that warns of impending stall via visual indication and audio indications beginning approximately 5 knots above stall speed.

Aileron control response in a fully stalled condition is marginal. Large aileron deflections will aggravate a near stalled condition and their use is not recommended to maintain lateral control. The rudder is very effective and should be used for maintaining lateral control in a stalled condition with the ailerons placed in a neutral position.

To recover from a stall, proceed as follows:

- Nose attitude – LOWER with relaxation of back pressure on control stick
- Throttle – FULL OPEN simultaneously with relaxation of back pressure on stick
- Use rudder to maintain lateral control

SPINS

If a spin is inadvertently entered, immediate recovery should be initiated. The recovery procedure is as follows:

- Throttle – CLOSED
- Rudder – FULL DEFLECTION opposite direction of rotation
- Elevator – SLIGHTLY FORWARD OF NEUTRAL
- Ailerons – NEUTRAL POSITION

When rotation stops (1/2 – 1 turn after recovery initiated):

- Rudder – NEUTRALIZE
- Nose Attitude – RAISE smoothly to level flight attitude

WARNING

DURING THE SPIN RECOVERY, THE AIRSPEED WILL BUILD VERY RAPIDLY WITH A NOSE LOW ATTITUDE. DO NOT USE FULL OR ABRUPT ELEVATOR CONTROL MOVEMENTS.

RUNAWAY TRIM MOTOR

If the trim motor should begin to run uncommanded in either direction the following actions should be taken:

- Autopilot Switch - OFF
- Elevator - HOLD against out of trim condition
- (Airspeed may be reduced as a way to lessen the amount of stick force required to maintain level flight)
- Land as soon as possible

IN-FLIGHT OVERSTRESS

Should an overstress occur due to exceeding the airspeed and/or load factor limits, aggressive maneuvering should be immediately terminated.

Fly at a reduced airspeed (65 – 75 kts) IAS to a suitable landing point. DO NOT under any circumstances make large control movements or subject the aircraft to additional G loadings above that required for straight and level flight.

After landing, the aircraft should be inspected by a mechanic or repairman prior to the next flight.

SECTION 4: NORMAL PROCEDURES

NORMAL PROCEDURES

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GENERAL

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

NOTE

All recommended airspeeds in this section are **INDICATED AIRSPEED (IAS)** with the aircraft loaded to the maximum gross weight of 1320 lb.

PREFLIGHT INSPECTION

Cabin

- Left Door – OPEN check condition, operation
- Master Switch - ON
- Flight Control Locks – REMOVE
- Flaps – FULL DOWN, check indication on EFIS
- Header Tank-check FULL indication on EFIS
- Fuel gauge – check FUEL LEVEL indication on EFIS (no take-off with less than 4 gallons of total fuel in wing tanks)
- Master Switch - OFF
- EFIS-POWER OFF
- ELT – check OFF
- Baggage – RESTRAINED

Left Main Landing Gear

- Tire – CONDITION, proper inflation 25 PSI
- Brake – CHECK condition, no leakage
- Axle Nut – CHECK cotter pin installation
- Wheel Attach Bolts – CHECK proper installation
- Brake Line – CHECK condition, no leakage at either end
- Wheel Chocks – REMOVE

Left Wing

- Flap – CHECK condition, security
- Inboard Access Plates, Fwd & Aft – CHECK proper screw installation
- Outside Air Temperature (OAT) probe – CHECK condition
- Flap Hinge Pins – CHECK installation
- Outboard Access Plate –CHECK proper screw installation
- Inboard Aileron Hinge Bracket - CHECK bolt/washer/nut installation
- Aileron Pushrod - CHECK installation, freedom of bearing, jamnut tight
- Aileron – CHECK condition, straightness of trailing edge, freedom of movement
- Tie-Down – UNTIE RESTRAINT from eyelet, REMOVE eyelet (as desired)
- Wing Lower Surface – CHECK overall condition, no dents, damage, missing or loose rivets
- Wing Upper Surface – CHECK overall condition, no dents, damage, missing or loose rivets
- Outboard Aileron Hinge Bracket - CHECK bolt/washer/nut installation
- Wing Tip – CHECK condition, NAV/Strobe light, access plate installation
- Landing Light – CHECK condition, all screws installed
- Pitot/Static/AoA & Fuel Vent Mast – CHECK attachment to wing
- Pitot/Static/AoA & Fuel Vent - all ports CLEAN & OPEN
- Wing Leading Edge – CHECK overall condition, no dents, damage, missing or loose rivets
- Fuel Outlet – DRAIN fuel sample, CHECK for leakage
- Fuel Sample – CHECK for water or sediment contamination
- Fuel Cap – REMOVE
- Fuel Level – CHECK
- Fuel Cap – INSTALLED
- Comm Antenna - CHECK condition & security

Nose Section

- Windscreen – CHECK overall condition, all screws installed, cleanliness
- Exhaust Pipe – CHECK condition, security of attachment
- Nose Landing Gear Leg – CHECK attachment to fuselage
- Cowling – CHECK condition, screws properly installed on bottom edge
- Nose Tire – CHECK condition, proper inflation 22 PSI
- Nose Wheel – CHECK axle bolt/washer/nut installation
- Nose Landing Gear Fork – CHECK pivot nut cotter pin installation, pivot flange stop screw installation
- Wheel Chocks - REMOVE
- Cowl Door - OPEN
- Engine Oil – CHECK quantity, color, and clarity
- Cowl Door – CLOSED
- Left Air Inlet – CHECK unobstructed
- Left Side Cowl Hinge Pin – CHECK proper installation, security
- Propeller and Spinner – CHECK condition, security
- Cowl Attach Screws aft of spinner – CHECK for proper installation
- Right Air Inlet – CHECK unobstructed
- Right Side Cowl Hinge Pin – CHECK proper installation, security
- Top Cowl Hinge Pin Retainer – CHECK proper installation, security

Right Wing

- Wing Leading Edge – CHECK overall condition, no dents, damage, missing or loose rivets
- Fuel Outlet – DRAIN fuel sample, CHECK for leakage
- Fuel Sample – CHECK for water or sediment contamination
- Fuel Cap – REMOVE
- Fuel Level – CHECK
- Fuel Cap – INSTALLED
- Comm Antenna (if installed) - CHECK condition & security
- Landing Light – CHECK condition, all screws installed
- Wing Tip – CHECK condition, NAV/Strobe light, access plate installation
- Outboard Aileron Hinge Bracket - CHECK bolt/washer/nut installation
- Wing Upper Surface – CHECK overall condition, no dents, damage, missing or loose rivets
- Wing Lower Surface – CHECK overall condition, no dents, damage, missing or loose rivets
- Tie-Down – UNTIE RESTRAINT from eyelet, REMOVE eyelet (as desired)
- Aileron – CHECK condition, straightness of trailing edge, freedom of movement
- Aileron Pushrod - CHECK installation, freedom of bearing, jamnut tight
- Inboard Aileron Hinge Bracket - CHECK bolt/washer/nut installation
- Outboard Access Plate – CHECK proper screw installation
- Flap – CHECK condition, security
- Flap Hinge Pins – CHECK installation
- Inboard Access Plates, Fwd & Aft – CHECK proper screw installation

Right Main Landing Gear

- Tire – CONDITION, proper inflation 25 PSI
- Brake – CHECK condition, no leakage
- Axle Nut – CHECK cotter pin installation
- Wheel Attach Bolts – CHECK proper installation
- Brake Line – CHECK condition, no leakage at either end
- Wheel Chocks – REMOVE

Fuselage (Right Side)

- Right Door – OPEN check condition, operation
- Fuel Outlet – DRAIN fuel sample, CHECK for leakage
- Fuel Sample – CHECK for water or sediment contamination
- ELT Antenna – CHECK condition & security
- Fuselage Lower, Right Side, & Upper Surfaces – CHECK overall condition, no dents, damage, missing or loose rivets

Empennage

- Vertical Stabilizer (Right Side) – CHECK overall condition, no dents, damage, missing or loose rivets
- Horizontal Stabilizer (Right Side) – CHECK overall condition, no dents, damage, missing or loose rivets
- Right Elevator - CHECK condition, freedom of movement
- Rudder – CHECK condition, proper attachment, freedom of movement
- Rudder Anti-Servo Tab - CHECK attachment of pushrod, presence of cotter pin, free play not greater than 3 mm/1/8 inch
- Rudder Cables – CHECK proper attachment to rudder horn, presence of cotter pins in cable attach nuts
- Tie-Down – UNTIE RESTRAINT from hole in structure
- Left Elevator - CHECK condition, freedom of movement
- Left Elevator Trim Tab – CHECK attachment of actuator, hinge pin safety wire, free play not greater than 3 mm/1/8 inch
- Trim Motor Access Plate – CHECK proper screw installation
- Horizontal Stabilizer (Left Side) – CHECK overall condition, no dents, damage, missing or loose rivets
- Vertical Stabilizer (Left Side) – CHECK overall condition, no dents, damage, missing or loose rivets
- Nav Antenna (if installed) - CHECK condition & security

Fuselage (Left Side)

- Fuselage Lower, Left Side, & Upper Surfaces – CHECK overall condition, no dents, damage, missing or loose rivets

PRE-START

- Rudder Pedal Position – ADJUST as necessary/desired
- Seat Belt/Shoulder Harness/Crotch Strap – FASTENED & SNUG
- Passenger Briefing - PERFORMED
- Doors – CLOSED and LATCHED
- Master Switch – ON
- Avionics Switch – ON
- Autopilot Switch – ON
- Alternator Field Switch – ON
- Flaps - UP
- Fuel Valve – OPEN (PUSH IN)
- Throttle – ADJUST FRICTION
- Mixture – RICH (PUSH IN)
- Carburetor Heat – COLD

ENGINE START

CAUTION

DO NOT START ENGINE WITH OUTSIDE AIR
TEMPERATURE BELOW -13°F (-25°C) OR ABOVE 122°F
(50°C).

- Fuel Pressure – 0.5 PSI min
- Prime – AS REQUIRED using carburetor accelerator pump.
Engine Cold - fully open then close the throttle 3 to 5 times.
Engine Hot - do not prime before starting.

NOTE

The amount of prime required depends on engine temperature. Familiarity and practice will enable the operator to accurately estimate the amount of prime to use.

- Throttle – 1/8 in OPEN
- Brakes – HOLD
- Propeller – CLEAR
- Ignition Key – START, release to BOTH after engine fires
- Throttle – 900 to 1000 RPM
- Oil Pressure – CHECK 10 PSI min within 30 seconds or immediately shutdown the engine
- Voltmeter – 13.8 to 14.4 Volts

CAUTION

LIMIT THE USE OF THE STARTER TO 10 SECONDS DURATION MAXIMUM WITH A 20 SECOND COOLING OFF PERIOD BETWEEN EACH STARTER ENGAGEMENT.

AFTER START

- Nav/Strobe Lights – ON, strobe for day ops, nav for night ops
- Landing Light – ON, pulse for day ops, steady for night ops
- COM Radio – TUNE as desired, ADJUST volume
- Intercom – CHECK functionality, ADJUST volume, squelch as desired

TAXIING

Taxiing during high winds requires the conventional use of the flight controls. With a headwind or quartering headwind, place the control stick full aft and into the wind.

With a tailwind or quartering tailwind, use the opposite procedures. The use of the wheel brakes in conjunction with the rudder will assist the pilot in maintaining directional control.

- Engine Gauges – CHECK
- Brakes – RELEASE
- Taxi rpm – 900–1000 RPM until oil temp over 75° F (24° C)

BEFORE TAKEOFF

- Brakes – HOLD
- Flight Controls – CHECK freedom of movement, proper operation
- Flight Instruments – CHECK & SET
- Fuel Valve – CHECK OPEN
- Fuel Quantity Indication - CHECK (no take-off with less than 4 gallons fuel)
- Trim – SET for takeoff - tab “in-trail” with left elevator
- Flaps – SET –20° or UP (as desired)
- Doors – CHECK Closed and Latched
- Engine Run-Up
 - Elevator – STICK BACK
 - Minimum Oil Temp 75° F
 - Throttle – 1700 RPM
 - Ignition Key
 - L then BOTH, note RPM drop
 - R then BOTH, note RPM drop
 - (max drop – 150 RPM)
 - (max difference between drops – 75 RPM)
 - Carb Heat -ON, note increase in carb temp, then COLD
 - Engine Instruments – CHECK
 - Normal Indications
 - Fuel Pressure – CHECK 0.5 PSI minimum
 - Volt Meter – CHECK
- Throttle – IDLE
- Seat Belt, Pilot and Passenger – FASTENED & SNUG
- Brakes – RELEASE

NOTE

Extended periods of ground operation with carburetor heat ON should be avoided as the air filter is bypassed when carburetor heat is selected.

NOTE

High power operation (above 1500 RPM) and engine run-up should be made into the wind and kept to a minimum especially during high temperature conditions.

TAKE-OFF (Normal)

- Control Stick – half way between neutral and aft
- Throttle – smoothly FULL OPEN
- Elevator Control –
RAISE NOSE just clear of ground, release back pressure on stick as required
- Rotate – LIFT OFF 50-55 kts IAS
- Climb – 75 kts IAS
- Flaps – UP
- Trim – AS REQUIRED to hold desired airspeed

During crosswind conditions, place the control stick into the wind (up wind aileron UP) and raise the nose just clear of the ground as early in the take-off roll as possible to improve rudder authority and prevent drifting or premature lift-off. When taking off with a left crosswind and full power, right rudder is a limiting factor.

TAKE-OFF (Obstacle)

During an obstacle take-off, use the normal take-off procedures with the following exceptions:

- Flaps – 20°
- Hold Brakes – until application of full power
- Lift –Off – 50 to 55 kts IAS
- Climb – 60 kts IAS (best angle of climb) until clear of obstacle

TAKE-OFF (Soft Field)

For soft field take-off, use the normal take-off procedures with the following exceptions:

- Flaps – 20°
- Elevator Control – RAISE NOSE to Take-Off Attitude
- Lift-Off – as EARLY as possible
- After Lift-Off – LEVEL FLIGHT to obtain safe margin of air-speed prior to climb

WARNING

**THE AIRCRAFT WILL LIFT-OFF AT VERY LOW IAS BUT
CONTINUED CLIMB-OUT BELOW 60 KTS IMMEDIATELY
AFTER TAKE-OFF IS NOT RECOMMENDED.**

CLIMB

- Throttle – FULL
- Airspeed –
Best Rate 75 kts IAS
Flaps – UP
Best Angle 60 kts IAS
Flaps – 20°
Cruise-climb 85 kts IAS
Flaps – UP
- Trim – AS REQUIRED to hold desired airspeed

CRUISE

- Flaps – CHECK UP
- Level-off – TRIM as required
- Airspeed – ACCELERATE to desired cruise airspeed
above 103 kts IAS in smooth air only
- Throttle – SET to cruise power
- Mixture – LEAN when below 75% power
- Engine Gauges – CHECK

DESCENT

- Airspeed – AS DESIRED
103 kts IAS to 131 kts IAS in smooth air only
- Throttle – REDUCE as desired (2750 RPM max)
- Mixture – ADJUST as required
- Flaps – UP (above 90 kts IAS),
AS DESIRED (below 82 kts IAS)
- Trim – AS REQUIRED to hold desired airspeed

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

LANDING (NORMAL)

- Seat Belt – Pilot and Passenger – FASTENED & SNUG
- Mixture – RICH
- Brakes – CHECK firm then release
- Ignition Switch – BOTH ON
- Throttle – AS DESIRED to control rate of descent
- Carburetor Heat – ON
- Trim – AS REQUIRED
- Flaps – AS DESIRED (below 82 kts IAS)
- Approach Speed – 55-60 kts IAS
- Touchdown – MAIN WHEELS FIRST
- After Touchdown –
 - Elevator Control – FULL AFT
 - Brakes – AS REQUIRED

The best technique for use on soft or rough fields is to fly the landing approach at minimum speed carrying power into the landing flare and using an extreme nose high landing attitude so as to touchdown with minimum airspeed.

During gusty wind conditions, fly the landing approach at approximately 5 kts above normal and touchdown with the nose slightly lower than for a normal landing.

Crosswind approaches can best be accomplished by using the wing down top rudder method touching first on the down wind side main wheel, followed by the other main wheel, and finally lowering the nose wheel all the while keeping the stick into the wind.

LANDING (Obstacle)

Use of normal landing procedures in addition:

- Flaps – FULL DOWN
- Approach Airspeed – 55 kts
- Throttle – AS DESIRED to control rate of descent
- Slip aircraft as necessary to increase rate of descent

NOTE

If a crosswind exists, place the lower wing into the wind.
Indicated airspeed in a full-rudder deflection slip is 3 kt higher than in coordinated flight.

WARNING

A RELATIVELY HIGH RATE OF DESCENT IS POSSIBLE IN THIS CONFIGURATION WHEN AT FULL GROSS WEIGHT AND THE THROTTLE CLOSED. IF AIRSPEED IS ALLOWED TO DECREASE BELOW 55 KTS, LEVEL OFF CAN ONLY BE ASSURED WITH AN APPLICATION OF POWER.

LANDING (Balked)

Use of normal landing procedures in addition at the time of going around:

- Throttle – FULL OPEN
- Carburetor Heat – COLD
- Flaps – 20°
- Airspeed –
Best Angle 60 kts IAS
Flaps – 20° until clear of obstacle, then
Best Rate 75 kts IAS
Flaps – UP

SHUTDOWN

Throttle – 900 to 1000 RPM

ELT – CHECK LIGHT OFF & CHECK no signal on 121.5 MHZ

Mixture – IDLE CUT-OFF

Ignition Key – OFF

Avionics – OFF

Master – OFF

Tie Down – CHOCK two wheels minimum

NOTE

If high winds are anticipated, the aircraft should be hangared. If the aircraft must be left out, park with the aircraft headed into the wind and use additional tie-down ropes for security. Place the flaps in the full up position and secure the control stick full aft with the lap belt.

SECTION 5: PERFORMANCE

PERFORMANCE

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GENERAL

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

The data has been compiled from both estimated calculations and actual flight test using average piloting techniques, with an aircraft and engine in good operating conditions. All information is corrected for standard atmospheric conditions.

Note

For the Ranger, the Indicated Air Speed (IAS) has been corrected by The SkyView system to display Calibrated Air Speed (CAS).

AIRSPEED CALIBRATION TABLE

CALIBRATED AIRSPEED	INDICATED AIRSPEED
45	45
50	50
55	55
60	60
65	65
70	70
75	75
80	80
85	85
90	90
95	95
100	100
110	110
120	120
130	130
140	140

STALL SPEEDS (KIAS)

	GROSS WEIGHT	
FLAP POSITION	1150 lb	1320 lb
UP	42.0	45
20°	40.0	42
FULL DOWN	38.3	41

TAKE-OFF PERFORMANCE

PRESS ALTITUDE (FT)	TEMP (°F)	TAKE-OFF DISTANCE (FT)	
		GROUND ROLL	50 FT OBSTACLE
SEA LEVEL	0	180	439
	20	288	703
	40	391	953
	60	489	1191
	80	582	1419
	100	671	1636
2000	0	364	888
	20	471	1147
	40	572	1393
	60	668	1628
	80	760	1851
	100	847	2064
4000	0	548	1335
	20	653	1590
	40	752	1832
	60	846	2062
	80	937	2282
	100	1023	2492
6000	0	731	1781
	20	834	2032
	40	931	2269
	60	1024	2496
	80	1113	2711
	100	1197	2917
8000	0	914	2226
	20	1015	2472
	40	1110	2705
	60	1202	2927
	80	1289	3139
	100	1372	3342

CLIMB PERFORMANCE

PRESS ALTITUDE (FT)	TEMP (°F)	MAX RATE OF CLIMB (FT/MIN)	
		AT 1320 lb	AT 1150 lb
SEA LEVEL	0	1031	1194
	20	962	1125
	40	896	1059
	60	833	997
	80	774	937
	100	717	880
2000	0	913	1077
	20	845	1009
	40	780	944
	60	719	883
	80	660	824
	100	605	768
4000	0	796	959
	20	729	892
	40	665	829
	60	605	769
	80	547	711
	100	492	656
6000	0	679	842
	20	613	777
	40	551	714
	60	491	655
	80	435	598
	100	381	544
8000	0	562	726
	20	498	661
	40	436	600
	60	378	542
	80	323	486
	100	270	433

LANDING PERFORMANCE – ZERO WIND

DENSITY ALTITUDE (FT)	APPROACH SPEED (KIAS)	LANDING DISTANCE (FT)	
		GROUND ROLL	50 FT OBSTACLE
0	55	284	1079
2500	55	339	1151
5000	55	395	1223
7500	55	450	1294

NOTE

Decrease the distances shown by 10% for each 5 knots of headwind.

NOTE

The data given is with flaps fully extended.

CRUISE PERFORMANCE

DENSITY ALTITUDE (FT)	RPM	IAS (KTS)	FUEL BURN (GAL/HR)	ECONOMY (NM/GAL)	ENDURANCE (H:MM)	RANGE (NM)
2500	2500	114	6.9	16.5	4:03	460
	2750	117	7.7	15.2	3:37	424
5000	2500	112	5.8	19.3	4:49	538
	2750	115	6.8	16.9	4:06	471
7500	2500	111	5.4	20.7	5:10	572
	2750	114	5.8	19.8	4:49	547
10000	2500	110	5.2	21.3	5:22	589
	2650	113	5.4	20.9	4:43	534

NOTE

Lean mixture to Peak EGT when below 75% power.

NOTE

No fuel allowance is made for take-off, climb, descent, or reserve.

SECTION 6: WEIGHT AND BALANCE

WEIGHT AND BALANCE
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GENERAL

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

The actual licensed empty weight and CG of a specific aircraft can be found on the Weight and Balance Form which is a permanent part of the aircraft's file and onboard documentation. All additional changes to the aircraft's empty weight and CG after the time of manufacture must also be attached or indicated. From this information and the following instructions, the pilot can easily determine the useful load and proper loading distribution for the aircraft.

INSTALLED EQUIPMENT LIST

ITEM	WEIGHT (lb)	ARM (in)	MOMENT (in-lb)
DYNON SV-D1000			
DYNON SV-EMS-220			
DYNON SV-XPNDR-261			
DYNON SV-BAT-320			
DYNON SV-ADAHRS-200			
DYNON SV-GPS-250			
DYNON SV-COM-X83			
DYNON SV-NAV-C25			
DYNON SV42 (ROLL)			
DYNON SV42 (PITCH)			
DYNON ADS-B			
ADVANCED 70050			
ACK 406 ELT			
EARTH-X PC-680			
TOTAL			

SAMPLE LOADING PROBLEM

ITEM	ARM (IN) (LIMITS 112.13 – 117.64)	SAMPLE AIRPLANE	
		WEIGHT (LB)	MOMENT (IN-LB)
EMPTY AIRCRAFT WITH OIL & UNUSABLE FUEL	112.26	882	99014
PILOT	121.50	185	22478
PASSENGER	121.50	185	22478
BAGGAGE – MAIN	150.04	20	3001
BAGGAGE – AFT	174.03	0	0
HEADER FUEL	88.40	15.0 (2.5 GAL@ 6 LB/GAL)	1326
WING FUEL	107.20	33.0 (5.5 GAL@ 6 LB/GAL)	3538
TOTAL	115.03	1320	151835

YOUR AIRPLANE

ITEM	ARM (IN) (LIMITS 112.13 – 117.64)	SAMPLE AIRPLANE	
		WEIGHT (LB)	MOMENT (IN-LB)
EMPTY AIRCRAFT WITH OIL & UNUSABLE FUEL			
PILOT	121.50		
PASSENGER	121.50		
BAGGAGE –MAIN	150.04		
BAGGAGE - AFT	174.03		
HEADER FUEL	88.40	15.0 (2.5 GAL@ 6 LB/GAL)	1326
WING FUEL	107.20	(GAL@ 6 LB/GAL)	
TOTAL			

LOADING GRAPH

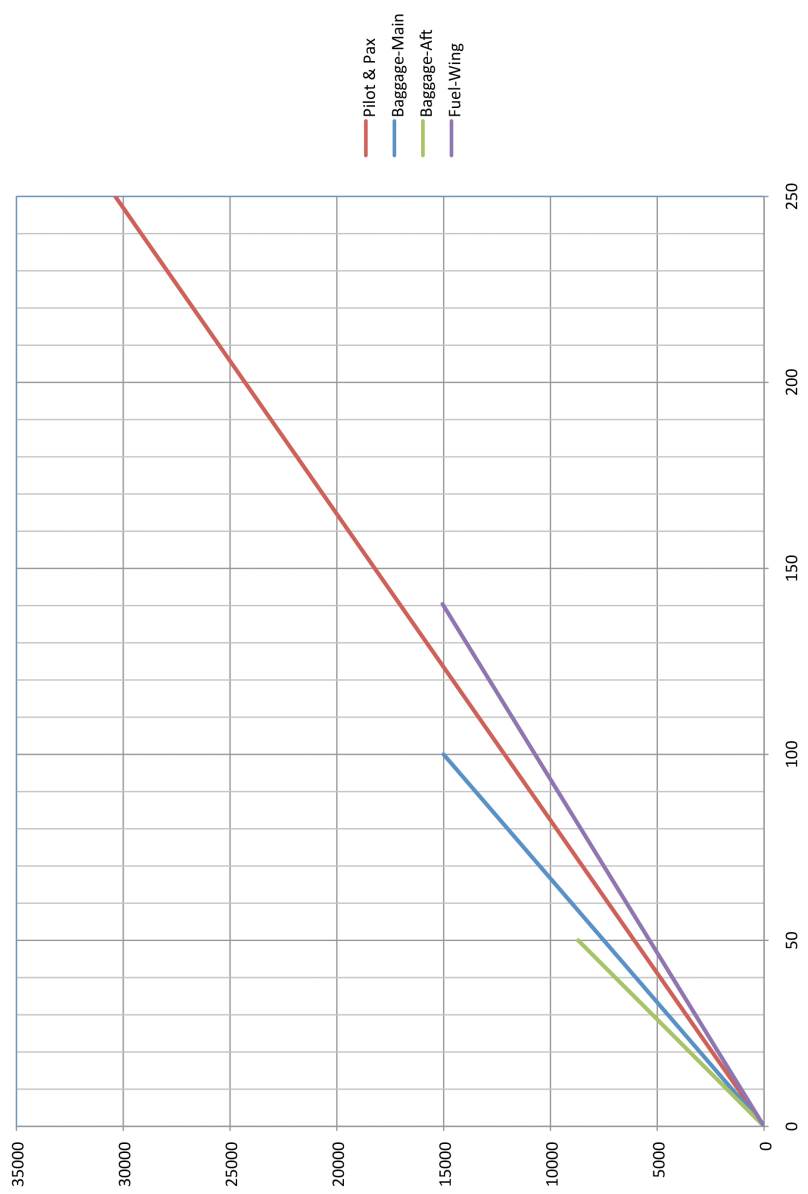


FIGURE 6-1 LOADING GRAPH

FLIGHT ENVELOPE

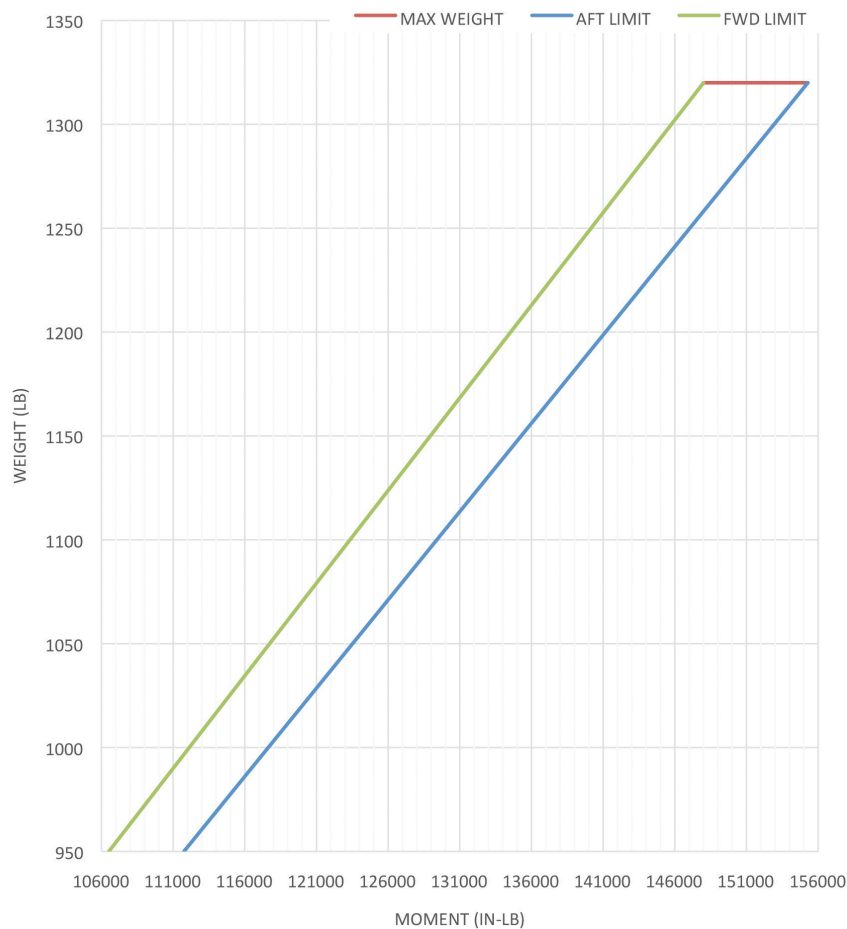


FIGURE 6-2 FLIGHT ENVELOPE

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SECTION 7: DESCRIPTION OF AIRCRAFT & SYSTEMS

DESCRIPTION OF AIRCRAFT & SYSTEMS
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POWER PLANT SUMMARY

Engine Description		
	Make	Continental Motors, Inc.
	Model	O-200-D
	Displacement	201 in3 / 3.29 liter
	Ignition	Dual Slick Magnetos
	Carburetor	MA3-SPA
	Rated Power	100 HP / 74.5 kW @ 2750 RPM
Propeller		
	Make	Catto
	Model	2B-70x48
Fuel		
		See Operating Limitations - Section 2-5
Oil		
		See Aircraft Ground and Servicing - Section 2-4

OPERATING WEIGHTS & LOADING

Category	Max Weight	Center of Gravity Range
Light Sport	1320 lb	113.23” to 117.64” (24 to 32% – Mean Aerodynamic Chord)

NOTE

All measurements are aft of the datum line which is 100 inches forward of the wing leading edge.

RANGER R7 AIRCRAFT SPECIFICATIONS

Exterior Dimensions		
	Span	29 ft 6 in
	Length	21 ft 9 in
	Height	8 ft 4 in
	Wing Area	135.6 ft2
Weights		
	Empty Weight	875 lb (typical)
	Gross Weight	1320 lb
Loading		
	Wing Loading	9.7 lb/ft ²
	Power Loading	13.2 lb/hp

Performance (1150 lb)		
	Top Speed	119 kts
	Cruise Speed	117 kts (2750 RPM @ 7500 ft DA)
	Range	506 nm
	Cruise Speed	113 kts (2500 RPM @ 7500 ft DA)
	Range	519 nm
	Stall – Flaps Up	42 kts
Ground Performance		
	Take-off Distance	384 ft
	Landing Distance	265 ft
Climb/Ceiling		
	Rate of Climb	1000 ft/min
	Ceiling (estimated)	12,000 ft

Performance (1320 lb)		
	Top Speed	117 kts
	Cruise Speed	114 kts (2750 RPM @ 7500 ft DA)
	Range	501 nm
	Cruise Speed	111 kts (2500 RPM @ 7500 ft DA)
	Range	524 nm
	Stall – Flaps Up	45 kts
Ground Performance		
	Take-off Distance	489 ft
	Landing Distance	285 ft
Climb/Ceiling		
	Rate of Climb	833 ft/min
	Ceiling (estimated)	12,000 ft

ELECTRICAL SYSTEM

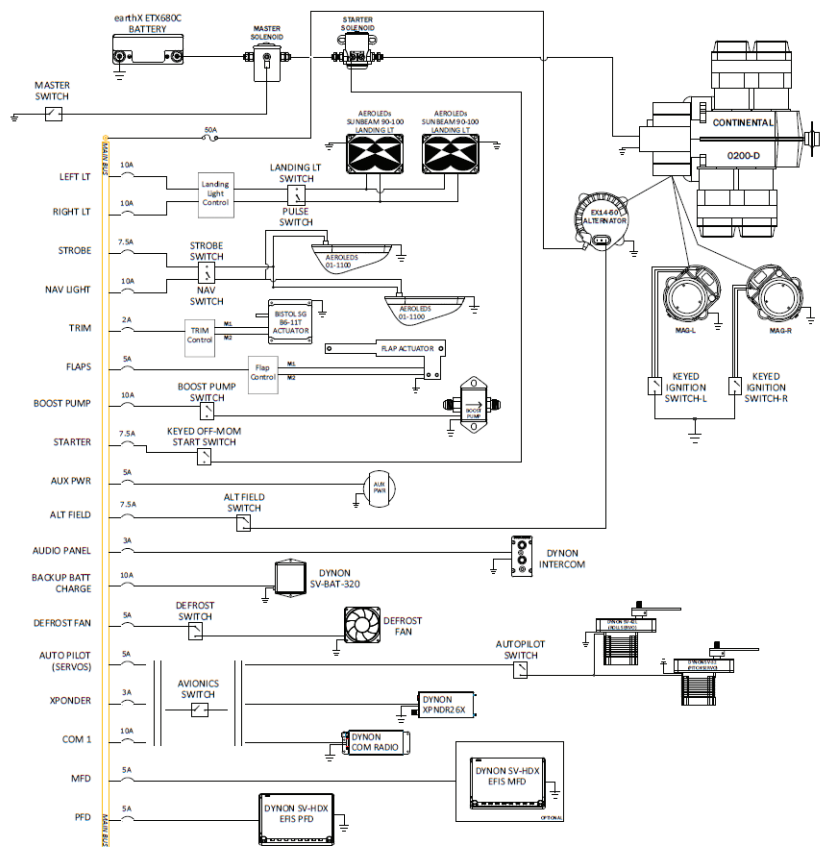


FIGURE 7-2 ELECTRICAL SYSTEM

FUEL SYSTEM

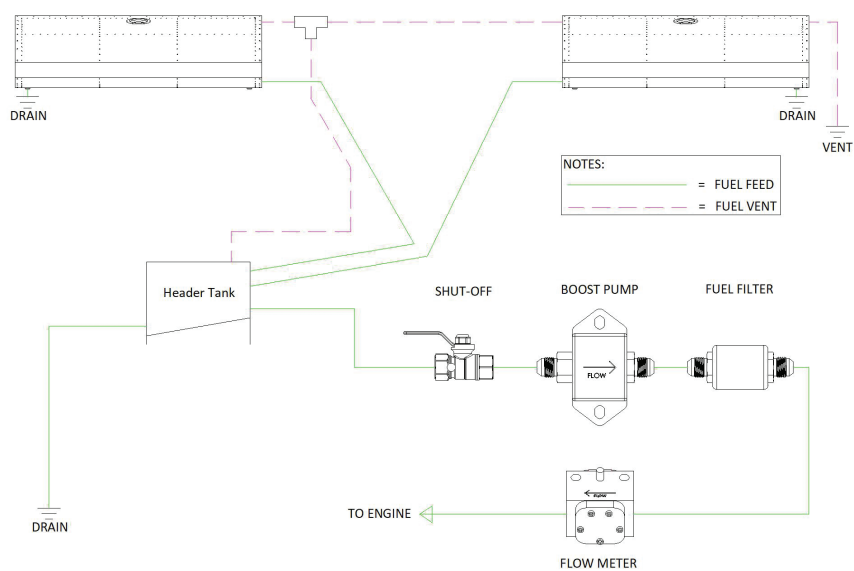


FIGURE 7-3 FUEL SYSTEM

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SECTION 8: AIRCRAFT GROUND HANDLING & SERVICING

AIRCRAFT GROUND HANDLING & SERVICING
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TORQUE VALUES TABLE

	ft-lb	in-lb	N-m
Plug, Oil Sump Drain	15.8-17.5	190-210	21.5-23.7
Oil Filter	15.0-18.0	180-216	20.3-24.4
Spark Plugs ¹	25.0-30.0	300-360	33.9-40.6

TABLE 8-1 CONTINENTAL O-200-D

NOTE

¹Lubricate spark plug threads with spark plug manufacturer’s recommended lubricant.

FUEL

The Continental O-200-D engine installed in the Ranger R7 is certified for operation with 100LL Blue aviation fuel. If the minimum fuel grade is not available, use the next higher available grade. Never use a lower grade fuel.

Fueling Procedure

Plane stopped, engine and master power OFF.

Attach grounding cable to exhaust pipe.

Use a ladder to gain access to the filler cap (located on the upper surface of each wing at approximately 30% of the distance from the cabin to the wing tip.)

- Remove filler cap
- Insert fuel nozzle, add desired amount of fuel.
- Remove fuel nozzle
- Visually check fuel level
- Replace fuel cap
- Wipe away any spilled fuel

Re-locate ladder to opposite wing to gain access to the filler cap.

Remove filler cap

Insert fuel nozzle, add desired amount of fuel

Remove fuel nozzle

Visually check fuel level

Replace fuel cap

Wipe away any spilled fuel

Return ladder to storage location.

Remove grounding cable from exhaust pipe.

Adjust the fuel totalizer quantity upon powering up the EFIS

OIL

Oil Sump Capacity:

5.0 Quarts 4.73L

Specifications:

Aircraft piston engine ashless-dispersant oil which meets specification SAE J-1899.

Aircraft piston engine non-dispersant mineral oil which meets specification SAE J-1966 (first 25 hours of engine operation or until oil consumption stabilizes).

Recommended Oil Grade:

Above 40°F ambient air, sea level – SAE 50 or Multi Viscosity

Below 40°F ambient air, sea level – SAE 30 or Multi Viscosity

Oil Filter

Tempest Oil Filter AA48162

SPARK PLUGS

Type	Socket	Electrode Gap
REM40E	7/8" Deep Socket	.016-.021"
REM437BY	7/8" Deep Socket	.016-.021"

EXHAUST

Lubricate exhaust ball and slip joints regularly with anti-seize lubricant (Loctite Anti-seize) to prevent gripping and seizing of the joints.

TIRES

All three tires are 6.00 x 6 size and 4 ply load rating.

Inflation Pressure:

Nose Tire: 22 PSI (optimum)/23 PSI (maximum)

Main Tires: 25 PSI (optimum)/28 PSI (maximum)

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SECTION 9: SUPPLEMENTARY INFORMATION

FAMILIARIZATION FLIGHT PROCEDURES

TAKE-OFF & CLIMB

Normal take-off followed by climb at 75 kt IAS to selected target altitude (suggest 3,000 to 4,000 ft AGL)

Strive to maintain target airspeed during climb.

While climbing, perform left and right turns of approximately 90° heading change using not more than 30° bank.

Strive to keep slip/skid ball centered while rolling into and out of turns.

CRUISE

Upon reaching target altitude, level-off and allow the aircraft to accelerate to cruise speed. Trim as required to minimize pilot workload. Reduce power if/as required to keep engine speed below 2750 RPM.

Strive to maintain target altitude while the aircraft accelerates.

Once established in level, hands-off flight perform left and right turns of 180 to 360° heading change using not more than 45° bank.

Strive to keep slip/skid ball centered while rolling into and out of turns. Strive to maintain target altitude throughout.

For added challenge, increase maximum bank angle to 60° and/or begin and end turns with the nose pointed at preselected points on the horizon.

Strive to keep slip/skid ball centered while rolling into and out of turns. Strive to maintain target altitude throughout.

Strive to begin and end turns with the nose exactly on point.

SLOW FLIGHT

Reduce power and allow the aircraft to decelerate to 60 kt IAS while maintaining target altitude. Trim as required to minimize pilot workload. Adjust power if/as required to achieve target airspeed while maintaining altitude.

Strive to maintain target altitude. Strive to keep slip/skid ball centered during power changes.

Once established in level, hands-off flight perform left and right turns of 180 to 360° heading change using not more than 45° bank.

Strive to keep slip/skid ball centered while rolling into and out of turns. Strive to maintain target airspeed and altitude throughout.

For added challenge, increase maximum bank angle to 60° and/or begin and end turns with the nose pointed at preselected points on the horizon.

Strive to keep slip/skid ball centered while rolling into and out of turns. Strive to maintain target altitude throughout.

Strive to begin and end turns with the nose exactly on point.

Lower flaps to ½ deflection and repeat exercises listed above using target airspeed of 57 kt IAS.

Lower flaps to full deflection and repeat exercises listed above using target airspeed of 55 kt IAS.

Raise flaps and re-establish level hands-off flight at 60 kt IAS.

STALLS, POWER-OFF

Reduce power to idle and maintain wings level flight while increasing nose-up attitude to maintain target altitude until aircraft stalls. Stall will be noted by the nose pitching-down abruptly and rolling right or left up to 15°.

While approaching the stall, maintain wings-level using rudder only and keeping the ailerons neutral. Upon stall, release stick back pressure and increase power to 18 inches manifold pressure. Allow the aircraft to accelerate to 60 kt IAS and re-establish wings level climbing flight.

Strive to maintain wings level using only rudder.

Strive to maintain target altitude as airspeed decays to the stall.

Strive to quickly and smoothly reduce stick back pressure, increase power, and accelerate to 60 kt IAS after the stall.

Establish 30° bank turn to the right and repeat above exercise.

Establish 30° bank turn to the left and repeat above exercise.

Lower flaps to ½ deflection and repeat exercises listed above.

Lower flaps to full deflection and repeat exercises listed above.

STALLS, POWER-ON

Establish full power, wings level climb at 65 kt IAS. Increase nose-up attitude by approximately 15° and maintain that attitude as airspeed decays to the stall.

Stall will be noted by the nose pitching-down abruptly and rolling right or left up to 15°.

While approaching the stall, maintain wings-level using rudder only and keeping the ailerons neutral. Upon stall, release stick back pressure and re-establish wings level climbing flight at target airspeed.

Strive to maintain constant pitch attitude as airspeed decays to the stall. Strive to maintain wings level using only rudder. Strive to quickly and smoothly reduce stick back pressure, accelerating to target climb airspeed after the stall.

Establish 30° bank turn to the right and repeat above exercise.

Establish 30° bank turn to the left and repeat above exercise.

Lower flaps to ½ deflection and repeat exercises listed above.

CRUISE & DESCENT

Re-establish cruise flight and choose heading to landing pattern entry point.

When at appropriate point, reduce power to establish 500 ft/min descent while maintaining a particular airspeed between 100 and 110 kt IAS. Initiation of descent should be selected so as to arrive over the landing pattern entry point at proper traffic pattern altitude and target airspeed.

Strive to maintain airspeed while varying descent rate as little as possible. Strive to make pitch and power adjustments as small and as smooth as possible.

APPROACH & LANDING

Enter the landing pattern at target airspeed and altitude. Maintain traffic pattern altitude and adjust power so as to arrive on downwind opposite the target touchdown point at 80 kt IAS and at target altitude. Smoothly reduce power to idle maintaining target altitude until airspeed decays to 65 kt IAS. Lower flaps to ½ deflection and allow airspeed to decay to 55 kt IAS. Maintain target airspeed by allowing altitude to decay.

Choose point for base turn so as to allow for arrival at the target touchdown point while maintaining engine power at idle. Vary descent rate by lowering flaps to full deflection.

Choose point for turn to final so as to allow for ground contact at the target touchdown point at minimum airspeed while maintaining engine power at idle.

Descent rate may be increased by slipping the aircraft.

Descent rate may be decreased by addition of engine power.

Strive to maintain target airspeed until initiating the landing flare. Strive to touchdown at target touchdown point at minimum airspeed without the need to add power or slip the aircraft. Strive to touchdown on runway centerline. Strive to touchdown as smoothly as possible.

Maintain nose-high attitude after touchdown as long as possible after touchdown.

Apply brakes if/as required to stop before the end of the runway or make the next runway turn-off.

Raise flaps and taxi back to parking.

Strive to use the brakes as little as possible while maintaining control using rudder and throttle. Strive to taxi as straight as possible staying as close to the taxiway centerline as possible.

Shut down the engine and aircraft electrical systems, secure the cockpit, and exit the aircraft

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APPENDIX 1

V-SPEED REFERENCE CARD

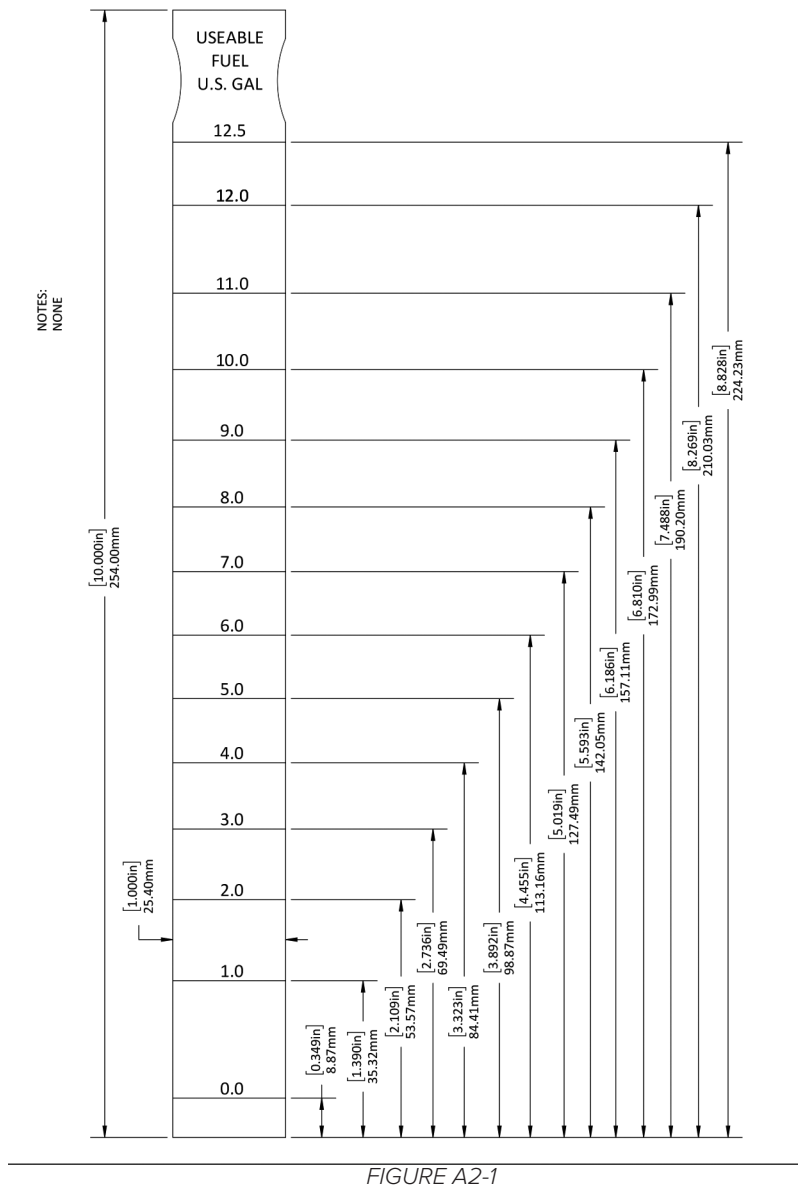
FLIGHT PHASE	V speed	KIAS
Take-Off & Climb	Vr (Normal)	60
	Vr (Short/Soft)	55/F20
	Vx	65/F20
	Vy	75
	Cruise Climb	85
In-Flight	Va	90
	Vfe	90
	Vs	50
	Vso	46
	Vno	103
	Vne	131
	Vglide (min sink)	59
	Vglide (max dist)	63
Maneuvers	Chandelle/Lazy 8	95
	Steep Turns	95
Approach	Downwind/Base/Final	80/70/60
Landing	Normal	60
	Short	55
	Balked	60/F20

APPENDIX 2

The pilot should directly measure the amount of fuel in each wing tank by holding a calibrated fuel quantity dipstick vertically at the center of the fuel cap opening in each wing tank.

A wooden paint stirring stick (available for free in most paint stores) can be used to make a fuel quantity dipstick. Use a pencil or permanent ink marker and a dial caliper, 12 inch machinist's scale, or a ruler to accurately place fuel level lines at the locations show in Figure A2-1.

FUEL QUANTITY DIPSTICK





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