F.8L Falco Flight Manual

Section 1
General Characteristics

General Description

The F.8L Falco is a two seat aircraft with side by side seating for the pilot and passenger and provisions for adding a third seat in the luggage compartment behind the pilot and passenger's seat. This third seat is limited to a maximum weight of 90 pounds.

The engine is the 150, 160 or 180 hp Lycoming. Constant-speed or fixed-pitch propellers may be installed.

The tricycle landing gear is retractable, operated by a single electric motor which drives screwjacks to each of the gear legs. A hand crank is provided for emergency operation. The hand crank is located under a cover on the console between the pilot and passenger's seats.

Dual control sticks are provided, and the stick on the right side is removable to allow for freedom of movement for the passenger. The control system transfers the control forces of the sticks to the ailerons and elevator via pushrods and control cables.

Rudder pedals are provided for both pilot and passenger. The rudder pedals are connected to the steerable nose gear and rudder with control cables. When the landing gear is retracted, the nose gear is automatically disengaged from the control system. Brakes are provided for the pilot only, and a parking brake valve is located in the console between the pilot's and passenger's seats.

An elevator trim tab is provided, and it is operated by a trim control wheel located in the console between the pilot's and passenger's seats. The elevator trim control wheel is attached to an angle drive which operates a screwjack. The motion of the screwjack is transmitted to the elevator tab by a single push-pull control cable. An indicator for the elevator trim is located to the left of the trim tab control wheel.

The Falco is provided with large, effective flaps for landing and take-off. The flaps are controlled by an electric actuator. The flap switch has a shaped handle and is located below the throttle quadrant. The flap indicator is located to the left of the flap switch. The flaps are set to the desired angle by holding the flap switch down or up. Due to the design of the actuator, the actuator will "free-wheel" when the flaps reach the end of their limits. This "free-wheeling" does not cause any damage to the actuator.

The engine controls consist of throttle, propeller and mixture control levers located in a center throttle quadrant. These controls are connected to the engine by Teflon-lined stainless-steel push-pull control cables. A friction control knob is located on the left side of the throttle quadrant. An optional left-hand throttle may be installed. This left-hand throttle is connected to the center throttle by pushrods and a torque tube. Thus, both throttles work together, and either may be used.

Carburetor heat (for carbureted engines) or alternate air (for fuel injected engines) are provided. The control is located below the center throttle quadrant.

The landing gear switch is located on the left side of the instrument panel, thus inaccessible to the passenger. The switch has a wheel-shaped knob, and the switch is of the lever-lock type to prevent the accidental operation of the switch. The landing gear switch has two positions, "Up" and "Down", and the knob must be pulled out before the switch will move.

The landing gear indicator lights are located located at the top center of the instrument panel, in the "annunciator panel". A green light indicates that the landing gear is down. A red light indicates that the landing gear is "in transit": specifically that the landing gear motor is running to retract or extend the landing gear. When the landing gear is fully retracted, both the red and green lights are extinguished.

A yellow landing gear warning light is provided in the annunciator panel. In addition, a landing gear warning horn is located at the base of the center console panel—below the throttle quadrant. The landing gear circuit has a pitot-pressure switch which senses airspeed. If "gear up" is selected below 68 knots, the warning horn will sound, the gear warning light will flash, and the landing gear will not retract. With the landing gear up, the warning light will flash and the warning horn will sound below 68 knots.

Throttle and flap position switches are provided which sense landing configuration and these are part of the landing gear circuit. The warning light will flash and the warning horn will flash when the flaps are lower to 17° or when the throttle is reduced to 13 to 15 inches of manifold pressure.

During some acrobatic maneuvers, the pilot's use of the throttle may cause the system to "warn" the pilot. The landing gear horn may be switched off for acrobatics. This switch is located in the annunciator panel, along with a "horn off" warning light. The landing gear warning light will continue to operate when the horn is switched off.

The annunciator panel contains other warning lights as well. During take-off and landing, only the green "gear down" light should be illuminated, and during normal flight all lights should be extinguished. Thus, the annunciator panel provides a "single glance" to check for adverse conditions.

Below the annunciator panel is a built-in audio panel, providing for the selection of the microphone and avionics. The microphone push-to-talk switches are located on the two control sticks. Microphone and phone jacks are provided on each side of the instrument panel for the pilot and passenger's headphones.

A David Clark Isocom is normally installed on the right side of the instrument panel. This intercom allows for hands-free communication between pilot and passenger and a "transmit" light is provided to indicate when the microphone push-to-talk switches are closed. Intercom bypass switches are located to the right of the intercom. These switches should be in the "normal" position. If the intercom is removed from the aircraft for service, the switches should be in the "bypass" position. In the "bypass" position, only the pilot's microphone push-to-talk switch will work.

Power for the electrical system is furnished by a battery accessible from the exterior, and a 14 volt 60 or 70 ampere alternator. The system is noise-suppressed and is designed so that, in the event of alternator failure, all connected loads are adequately supplied until a landing can be made at the nearest airfield.

An ammeter is provided to show the charge, or discharge, of the battery. An optional load-reading ammeter shows the load on the alternator and a voltmeter shows the voltage of the system and the state of the battery prior to starting.

An optional alternator analyzer indicates a shorted stator winding or blown diodes in the alternator, allowing the pilot to reduce the electrical loads on the alternator and reduce the risk of an inflight alternator failure.

A high voltage warning light (white) is located in the annunciator panel, and this comes on if the system voltage reaches 15 volts.

A low voltage warning light (yellow) in the annunciator panel comes on to indicate that the system voltage is below 13 volts, giving immediate indication of an alternator failure.

The ignition switch is located to the bottom left of the instrument panel. To its right are the separate master and alternator switch. The master switch is provided with a green indicator light.

The voltage regulator is set at 14 volts. In the event that the system voltage reaches 16 volts, the voltage regulator will automatically cut off the alternator. The voltage regulator may be reset by switching the alternator switch "off" and then back "on".

The electrical system is protected by circuit breakers which are located on the bottom right side of the instrument panel. Six of these are switch-type circuit breakers, each provided with an indicator light. When an excess load occurs, these circuit breakers automatically trip to the "off" position, with the switch handle down. All of the other circuit breakers are of the push-pull type. This allows the pilot to disable any of the circuits. In addition, fuses are used elsewhere in the aircraft for circuit protection.

The airspeed indicator is marked with the operating speeds of the aircraft. The white arc indicates the flap speeds. The white arc is stepped. Full flaps may be used only for the speeds indicated by the broad white arc, while 20° of flaps may be used for the full range indicated by the white arc. The maximum landing gear retraction or extension speed is indicated by a small G. The maneuvering speeds are also indicated, MU for the utility category and MU for the acrobatic category.

The rate of climb and altimeter share the pitot static system of the airspeed indicator. The static ports are located on the sides of the fuselage tail cone. In the event that these two ports become clogged, an alternate static source is provided. This is located at the base of the instrument panel on the left. The alternate static source is a drain valve, and it is opened by pushing up and turning the two protruding rods to the locked-open position.

The pitot tube is located on the left wing and is heated. The switch for the pitot heat is located in the row of circuit breakers, and its yellow indicator light shows that the switch is on.

The artificial horizon and direction gyro are of a special design for acrobatic flight, thus no special procedures are required for acrobatic flight. These two instruments are operated by the vacuum system, and a suction gauge is provided to the left of the airspeed indicator. A filter is provided to supply clean air to these instruments. This filter is located on the forward—*away* from the pilot—side of the instrument panel, directly in front of the master switch. The suction gauge is vented into the filter, thus the gauge is a proper "differential" gauge, indicating both a clogged filter or a failure of the vacuum pump.

The turn and bank is electric, and the switch is located in the row of circuit breakers. Its green indicator light is located above the switch, and this shows that the switch is on.

Optionally, a Century I autopilot may be installed. The electric gyro in this autopilot is switched on and off by the turn and bank switch. The operation of the autopilot is controlled by a separate switch, normally installed near the top of the avionics stack. The autopilot may be coupled to the navigation radios, and a "NAV 1 - NAV 2" selector switch is located with it. This autopilot is entirely electric, thus is will continue to work in the event of a vacuum system failure.

The tachometer and the manifold pressure/fuel pressure gauges are provided in the center of the instrument panel, above the throttle quadrant.

A cluster of instruments are provided below the flight instruments in front of the pilot. This cluster included the cylinder head temperature (CHT) gauge, the oil pressure temperature gauge, the oil temperature gauge, the ammeter, and the two fuel gauges. All of these instruments are electric and include internal lighting controlled by the light dimmer switch. The fuel gauges are marked in U.S. gallons, and the red arc indicates the last three gallons in each tank—for approximately 30 minutes of flight at low power settings.

The aircraft may be equipped with a single cylinder or four cylinder exhaust gas temperature gauge (EGT). As an option, the CHT may be a four cylinder gauge if it is wired through the switch for the 4 cylinder EGT.

A Davtron clock-timer may be installed. The flight time is connected to the landing gear circuit, thus the flight time is automatically timed from gear retraction to gear extension. The incandescent display is automatically dimmed.

A Silver Fuelgard may be installed to precisely monitor the fuel flow and fuel usage. The Fuelgard normally displays *fuel flow*, and *fuel used* may be indicated by holding down the switch. The incandescent display is manually dimmed with a switch on the Fuelgard.

A Davtron digital outside-air-temperature indicator may be installed. This is located on the right side of the instrument panel. The incandescent display is automatically dimmed.

An accelerometer is normally provided on the left side of the instrument panel. This instrument has a green arc for the Utility category. Red lines are provided for the Utility category and for the Acrobatic category, and each is marked with a U or A.

A magnetic compass is provided above the instrument panel at the center of the airplane.

The Falco is provided with dual circuits for the instrument panel lighting and each is controlled with a solid state dimmer. The combined switch/dimmers are located on the right side of the instrument panel. The dimmers control the internal lighting of the cluster of instruments, most avionics, the Isocom, and the magnetic compass. The instrument panel is provided with post lights at the instruments. In addition, the glare shield has four lights which illuminate the instrument panel.

A full avionics installation may be installed. The marker beacon indicator is normally installed above the artificial horizon, and a switch is provided for dimming the lights.

A landing light switch is located in the row of circuit breakers, along with its white indicator light. The switches for the navigation and anti-collision (strobe) lights are located in the same area, along with their blue indicator lights.

The fuel selector valve is located below the throttle quadrant. The valve has four positions, one for each tank and two "off" positions, although the bottom "off" position is not normally used. An auxillary electric fuel pump is provided for aircraft with fuel injected engines. The switch is located in the row of circuit breakers, along with its red indicator light.

Placards on the instrument panel provide landing and take-off check lists, flight limitations, and acrobatic entry speeds.

Fresh air is provided from two vents located on each side of the cockpit, below the instrument panel. Cabin heat is controlled by a knob located below the throttle quadrant. An optional windshield defrost system may be installed, controlled by a knob in the same location.

The seats are adjustable fore-and-aft, and the seat or back cushions can be removed to accommodate a back-type or seat-type parachute.

The restraint system consists of a five-point harness for pilot and passenger. Each belt end may be individually inserted into the buckle. After take-off, the two shoulder belts may be released by pressing on a metal tab on the upper back of the buckle. This allows the other belts to remain in place.

Dimensions

Wings	
Wing Area	107.5 sq ft
Wing span	26' 3"
Aspect ratio	6.4
Dihedral	5.5°
Washout	3°
Airfoil, wing root	NACA $64_2$212-1/2
Airfoil, wing tip	NACA $64_2$210
Ailerons	
Percent of wing span	38%
Average relative chord	30%
Movement	24° up, 16° down
Area (each)	3.45 sq ft
Flaps	
Percent of wing span	39%
Average relative chord	30%
Movement	Neutral to 45° down
Surface area (each)	5.06 sq ft
Fuselage	
Overall length	21' 4"
Interior width (cockpit)	40"
Height	7' 6"

Horizontal tail surfaces	
Span	9' 10.11"
Total area	23.44 sq ft
Aspect ratio	4.1
Fixed surface	14.44 sq ft
Movable surface	9 sq ft
Movement	22° up, 16° down
Elevator trim tab	
Surface area	.39 sq ft
Movement	20° up, 20° down
Vertical tail surfaces	
Height	4' 2.6"
Total area	10.88 sq ft
Movable surface	5.21 sq ft
Movement	20° left, 20° right
Landing gear, main	
Width	6' 10"
Tire size	5.00x5 or 5.30x6
Tire pressure	30 psi
Oleo strut pressure	600 psi
Landing gear, nose	
Tire size	11.4x5
Tire pressure	30 psi
Oleo strut pressure	115 psi
Engine	
Lycoming IO-320-B1A	
Nominal power	160 hp at 2,700 RPM
Cruising RPM, 75% power	
Cruising RPM, 65% power	

Propeller
Hartzell HC-C2YL-1BF/F7663-4 with A-2476-19 spinner mounting kit installed
Pitch setting at 30" station, low: 13°, high: 30°
Diameter: 72"

Spinner
Hartzell A-2298-2

Fuel capacity	
Front tank	21 U.S. gallons
Aft tank	19 U.S. gallons
Inverted header tank (if installed)	2 U.S. gallons

Grade of fuel
Avgas 91/96 minimum octane

Oil capacity
8 qts

Oil used	
Above 60°F	SAE 50
32°F to 90°F	SAE 40
-4°F to 68°F	SAE 30
Below 14°F	SAE 20

◆ *Note:* Mineral oil is recommended during engine break-in (first 50 hours).

Instrumentation

Magnetic compass
Airspeed indicator
Artificial horizon
Altimeter
Turn & bank
Directional gyro
Rate of climb
Fuel pressure/manifold pressure
Tachometer
Cylinder head temperature gauge with internal lighting (4 cyl optional)
Oil temperature gauge with internal lighting
Oil pressure gauge with internal lighting
Ammeter with internal lighting
Front fuel gauge with internal lighting
Aft fuel gauge with internal lighting
Suction gauge
Accelerometer
Davtron clock-timer (optional)
Voltmeter/alternator amps (60 or 70 amp)
Exhaust gas temperature (4 cylinder optional)
Silver Fuelgard (optional)
Alternator analyzer (optional)
Low voltage monitor, with indicator light (yellow)
High voltage monitor, with indicator light (white)
Carburetor ice detector (optional)

Electrical Equipment

Master switch, with indicator light (green)
Alternator switch
Ignition switch with key (combination magneto and starter switch)
Alternator, Prestolite 60 amp or 70 amp
Battery 12V, Gill PS6-11 (35 amp/hr) or Gel/Cell U-128 (27 amp/hr)
Ammeter shunt, 80 amp, 100 MV
Alternator shunt, 80 amp, 50 MV
Voltage regulator, solid state with high voltage shut-off
Magnetos, dual (impulse coupling or retard breaker)
Starter vibrator (for retard breaker magnetos only)
Master relay, with coil suppression diode
Starter relay, with coil suppression diode
Starter warning light (red)
Starter, Prestolite 12 volt, geared or direct drive
Circuit breaker (7.5 amp) alternator field
Circuit breaker (10 amp) fuel pump with indicator light (red)
Circuit breaker (10 amp) pitot heat with indicator light (yellow)
Circuit breaker (5 amp) turn & bank with indicator light (green)
Circuit breaker (10 amp) strobes with indicator light (blue)
Circuit breaker (7.5 amp) navigation lights with indicator light (blue)
Circuit breaker (10 amp) landing light with indicator light (white)
Circuit breaker (15 amp) landing gear actuation
Circuit breaker (5 amp) landing gear indication
Circuit breaker (15 amp) flaps
Circuit breaker (5 amp) panel lights
Circuit breaker (5 amp) panel lights
Circuit breaker (5 amp) instrumentation
Circuit breaker (5 amp) instrumentation
Circuit breaker (7.5 amp) COM 1, NAV 1
Circuit breaker (7.5 amp) COM 2, NAV 2
Circuit breaker (5 amp) transponder, altitude encoder

Circuit breaker (5 amp) ADF, DME
Circuit breaker (2 amp) intercom, fuelgard
Circuit breaker (5 amp) marker beacon, outside air temperature
Circuit breaker (7.5 amp) Auxiliary
Fuse (3 amp) ammeter shunt (2 fuses)
Fuse (3 amp) alternator shunt (2 fuses)
Fuse (3 amp) landing gear motor (2 fuses)
Fuse (3 amp) starter warning light
Landing gear selector switch, lever lock with shaped handle
Landing gear down indicator light (green)
Landing gear in transit indicator light (red)
Landing gear warning light (yellow)
Landing gear warning horn
Landing gear "horn off" switch
Landing gear "horn off" warning light (blue)
Pitot pressure switch
Flap position switch, with reverse current diode
Throttle position switch, with reverse current diode
Pitot pressure transistor, with resistor
Pitot pressure relay, with coil suppression diode
Landing gear down limit relay, with coil suppression diode
Flasher relay, with coil suppression diode
Landing gear down limit switch
Landing gear up limit switch
Landing gear up relay, with coil suppression diode
Landing gear down relay, with coil suppression diode
Landing gear actuator motor and gearbox with disconnect mechanism
Auxiliary fuel pump
Heated pitot
Anticollision (strobe) light power supply
Combination anticollision and navigation lights (3)
Landing light, 100 watt
Flap actuator
Instrument post lights (16)
Glareshield lights (4)
Light dimmers (potentiometer, transistor, switch & resistor), 2 each
Cylinder head temperature sender (four senders optional)
Oil pressure transducer
Oil temperature sender
Fuel quantity sender (2)
Fuelgard transducer (optional)
Alternator analyzer transducer (optional)
Outside air temperature probe

Avionics

VHF/VOR NAV/COM (optional)
VHF/VOR/LOC/GS NAV/COM, with localizer and glide slope (optional)
ADF (optional)
DME or RNAV (optional)
Marker beacon receiver, with switch and three lights (optional)
Transponder (optional)
Altitude encoder (optional)
LORAN navigation receiver (optional)
COM 1 internal antenna
COM 2 internal antenna
NAV internal antenna
NAV splitter
Marker beacon internal antenna
DME internal antenna
Transponder internal antenna

ADF sense & loop antenna, internal (optional)
LORAN internal antenna, with antenna coupler (optional)

Audio System Components

Microphone push-to-talk switch (2)
Microphone jack (2)
Headphone jack (2)
Intercom, voice actuated
Intercom microphone bypass switch
Intercom phone bypass switch
Microphone selector switch
COM 1 audio selector switch
COM 2 audio selector switch
NAV 1 audio selector switch
NAV 2 audio selector switch
Marker beacon audio selector switch
ADF audio selector switch
DME audio selector switch

Controls

Control sticks, dual
Rudder pedals, dual
Elevator trim tab, with indicator
Flap control, with indicator
Landing gear switch
Emergency landing gear hand crank
Differential brake pedals (pilot's side only)
Parking brake
Throttle control lever
Propeller RPM control lever
Mixture control lever
Throttle quadrant friction knob
Left hand throttle control lever (optional)
Cabin heat
Fresh air vents (2)
Windshield defrost (optional)
Carburetor heat (if applicable)
Alternate air (if applicable)

Other Equipment

Dry vacuum pump
Suction regulator with filter
Instrument filter
Alternate static source

Section 2
Operating Limitations

The following limitations must be observed when flying the F.8L Falco with Lycoming engine IO-320-B1A and Hartzell HC-C2YL-1BF/F7663-4 constant speed propeller.

Engine Limitations

			Maximum Temperature	
	HP	RPM	Oil	Cylinder Head
For all operations:	160	2700	245°F	500°F

◆ *Note:* For 180 hp engines, avoid continuous operation between 2000 and 2250 rpm.

Fuel

Minimum octane: 100/130 aviation gasoline

Usable capacity: 21 U.S. gallons in front tank
19 U.S. gallons in aft tank
2 U.S. gallons in inverted header tank (if installed)

Engine Instruments Markings

Oil temperature gauge
- Normal temperature range (green arc): 100° to 245°F
- Maximum temperature (red line): 245°F

Oil pressure gauge
- Minimum pressure (red line): 25 psi
- Caution range, idling (yellow arc): 25 to 60 psi
- Normal operating range (green arc): 60 to 90 psi
- Caution range, warm up (yellow arc): 90 to 100 psi
- Maximum pressure (red line): 100 psi

Fuel pressure gauge
- Normal operating range (green arc): 0 to 7 psi
- Maximum pressure (red line): 7 psi

Cylinder head temperature gauge
- Normal operating range (green arc): 150° to 435°F
- Caution range (yellow arc) 435° to 500°F
- Maximum temperature (red line): 500°F

Tachometer
- Normal operating range (green arc): 500 to 2700 RPM
- Maximum RPM (red line): 2700 RPM

Oil quantity indicator
- As indicated on the oil dip stick

Speed Limitations (TIAS)

	Utility	Acrobatic
Maximum speed (Vne):	208.5 kt	208.5 kt
Maximum structural cruise speed (Vno):	161 kt	161 kt
Maneuvering speed (Va):	122 kt	135 kt
Maximum with landing gear down:	108.5 kt	108.5 kt
Maximum with flaps at 20° (Vfe):	97.5 kt	97.5 kt
Maximum with flaps at 45° (Vfe):	87 kt	87 kt

Airspeed Indicator Markings (CAS)

Red line (never exceed):	208.5 kt
Yellow arc (caution range):	161 to 208.5 kt
Green arc (normal operating range):	65 to 161 kt
MA (Maneuvering speed, Acrobatic):	135 kt
MU (Maneuvering speed, Utility):	122 kt
G (Maximum with landing gear down):	108.5 kt

Limit Load Factors

	Positive	Negative
Utility category	4.4 *g*	2.2 *g*
Acrobatic category	6 *g*	3 *g*

Accelerometer Markings

Normal operating range, Utility (green arc):	+4.4 to –2.2 *g*
Maximum Positive *g*, Utility (red line "U"):	+4.4 *g*
Maximum Positive *g*, Acrobatic (red line "A"):	+6 *g*
Maximum Negative *g*, Utility (red line "U"):	–2.2 *g*
Maximum Positive *g*, Acrobatic (red line "A"):	–3 *g*

Suction Gauge Markings

Normal operating range (green arc):	4.5 to 5.4 inches Hg.

Alternator Amps Markings

Alternator:	70 Amp.	60 Amp.
Normal operating range (green arc):	0-56 Amp.	0-48 Amp.
Caution range (yellow arc):	56-70 Amp.	48-60 Amp.
Maximum load (red line):	70 Amp.	60 Amp.

Fuel Quantity Gauge Markings

Front fuel quantity gauge	
Green arc:	3 to 21 U.S. gal.
Red arc:	0 to 3 U.S. gal.
Aft fuel quantity gauge	
Green Arc:	3 to 19-7/8 U.S.gal.
Red arc:	0 to 3 U.S. gal.

◆ *Note:* Inverted header tank, if installed, increases capacity of aft tank by approximately 2 U.S. gallons, which is not indicated on the gauge.

Approved Maneuvers

Utility Category:
It is prohibited to apply full flight controls at speeds higher than maximum maneuvering speed.

Only the following aerobatic maneuvers are permitted with the recommended entry speeds shown:

Steep turn:	126 kt
Chandelle:	126 kt
Lazy eight:	126 kt
Stall (except snap roll)	65 kt

Acrobatic Category:
It is prohibited to apply full flight controls at speeds higher than maximum maneuvering speed.

Recent wind-tunnel research in France has shown that abrupt maneuvers can put excessive loads on the wings of some aircraft, even below the maneuvering speed. This phenomenon is particularly apparent in aircraft with very clean wings, like the Falco. For this reason, the full and quick deflection of the elevator as speeds below or equal to the manuevering speed can cause loads in excess of the limit load factors and cause structural damage and failure. Because of this, the maximum speed for snapped maneuvers is 105 kts.

The recommended entry speeds for the main acrobatic maneuvers are as follows:

Spin	Stall
Loop	160 kt
Roll	135 kt
Immelman	160 kt

Maximum Weight

	Utility	Acrobatic
Maximum take-off weight	1,808 lb.	1,650 lb.
Maximum landing weight	1,808 lb.	1,650 lb.

- *Note:* Operation of the aircraft in the Experimental, Amateur-Built category allows for the maximum weight to be determined by the builder of the aircraft. To such ends, the following suggestions are offered:

  1. Center of gravity limitations should not be exceeded.

  2. Limit load factors be observed for Utility category up to a weight of 2,250 lb (1,650 lb x 6*g* = 9,900 lb total flight load, 9,900 lb ÷ 4.4*g* = 2,250 lb). Above 2,250 lb, Normal category limits (+3.8*g*, –1.9*g*) should be observed. Observe lower maneuvering speeds as necessary.

  3. Any increase in maximum weight will result in an increase in take-off and landing roll, and will also decrease the rate of climb. For safe operations, the maximum weight should allow the aircraft to climb at a minimum of 600 ft/min in sea-level standard conditions.

Center of Gravity Limitations

With the aircraft in normal flight attitude, the distances of the center of gravity are measured from a vertical line passing through the front surface of the engine propeller flange (the datum).

Forward limit (distance from the datum):	68.5 in. (19% MAC)
Aft limit (distance from the datum):	74.8 in. (30% MAC)

◆ *Note:* The forward face of the cowling (directly aft of the spinner) is located .138" (3.5mm) forward of the datum, if the cowling is properly installed.

Determination of the Center of Gravity

The total weight at takeoff (empty weight + loaded weights) must not exceed the maximum authorized total weight.

Center of gravity distance from datum in inches (X) is obtained by the following formula:

X = total moment ÷ total weight

This value, X, must be more than 68.5 inches and less than 74.8 inches for *both* the minimum total weight at landing *and* for the total weight at takeoff.

	Weight (Lb.)	x	Arm (In.)	=	Moment (In.Lb.)
Empty weight:		x		=	
Pilot and passenger:		x	85.2"	=	
Baggage:		x	109.9"	=	
Minimum total weight at landing:					
Total moment at landing:					
Fuel, front tank:		x	44.8"	=	
Fuel, aft tank:		x	128.4"	=	
Oil:		x	21.6"	=	
Total weight at takeoff:					
Total moment at takeoff:					

The following is an example of how to determine the aircraft. In this example, the aircraft has an empty weight of 1,140 lbs and the empty weight center of gravity is 66.9".

	Weight (Lb.)	x	Arm (In.)	=	Moment (In.Lb.)
Empty weight:	1,140	x	66.9	=	76,266.0
Pilot and passenger:	340	x	85.2"	=	28,968.0
Baggage:	80	x	109.9"	=	9,891.0
Minimum total weight at landing:	1,560				
Total moment at landing:					115,125.0
Fuel, front tank:	126	x	44.8"	=	5,644.8
Fuel, aft tank:	114	x	128.4"	=	14,637.6
Oil:	15	x	21.6"	=	324.0
Total weight at takeoff:	1,815				
Total moment at takeoff:					135,731.4

CG at takeoff: 135,731.4 ÷ 1,815 = 74.78
Okay, within the 68.5" to 74.8" limits
CG at landing: 115,125.0 ÷ 1,560 = 73.80
Okay, within the 68.5" to 74.8" limits

Placards

On instrument panel (all versions):

RECOMMENDED ENTRY SPEEDS:	TURN OFF STROBES IN CLOUDS
LOOP: 160 KTS	OR NEAR OTHER AIRCRAFT
SPIN: STALL	
ROLL: 135 KTS	FLIGHT IN ICING CONDITIONS OR
CHANDELLE: 160 KTS	ELECTRICAL ACTIVITY PROHIBITED
LOAD LIMITS	NO SMOKING
UTILITY CATEGORY: +4.4G, -2.2G	
ACROBATIC CATEGORY: +6G, -3G	REPLACE ELT BATTERY BY:
MAXIMUM WEIGHT FOR ACROBATIC CATEGORY: 1650 LBS	

If equipped with fuel injected engine and constant-speed propeller:

TAKEOFF:	FUEL PUMP: ON	LANDING:	GEAR: DOWN
	FLAPS: 15°		FLAPS: 20°
	MIXTURE: RICH		MIXTURE: RICH
	CANOPY LOCKED		PROP: FULL INCREASE
	SEAT BELT: FASTENED		FUEL PUMP: ON

If equipped with fuel injected engine and fixed pitch propeller:

TAKEOFF:	FUEL PUMP: ON	LANDING:	GEAR: DOWN
	FLAPS: 15°		FLAPS: 20°
	MIXTURE: RICH		MIXTURE: RICH
	CANOPY: LOCKED		FUEL PUMP: ON
	SEAT BELT: FASTENED		

If equipped with carbureted engine constant-speed propeller, and electric fuel pump:

TAKEOFF:	FUEL PUMP: ON	LANDING:	GEAR: DOWN
	FLAPS: 15°		FLAPS: 20°
	MIXTURE: RICH		MIXTURE: RICH
	PROP: FULL INCREASE		PROP: FULL INCREASE
	CANOPY: LOCKED		FUEL PUMP: ON
	SEAT BELT: FASTENED		CARB HEAT: ON

If equipped with carbureted engine, constant-speed propeller and no electric fuel pump:

TAKEOFF:	FLAPS: 15°	LANDING:	GEAR: DOWN
	MIXTURE: RICH		FLAPS: 20°
	PROP: FULL INCREASE		MIXTURE: RICH
	CANOPY: LOCKED		PROP: FULL INCREASE
	SEAT BELTS: FASTENED		CARB HEAT: ON
	FUEL: FRONT TANK		FUEL: FRONT TANK

If equipped with carbureted engine, fixed pitch propeller and electric fuel pump:

TAKEOFF:	FUEL PUMP: ON	LANDING:	GEAR: DOWN
	FLAPS: 15°		FLAPS: 20°
	MIXTURE: RICH		MIXTURE: RICH
	CANOPY: LOCKED		FUEL PUMP: ON
	SEAT BELTS: FASTENED		CARB HEAT: ON

If equipped with carbureted engine, fixed pitch propeller and no electric fuel pump:

TAKEOFF:	FLAPS: 15°	LANDING:	GEAR: DOWN
	MIXTURE: RICH		FLAPS: 20°
	CANOPY: LOCKED		MIXTURE:RICH
	SEAT BELTS: FASTENED		CARB HEAT: ON
	FUEL: FRONT TANK		FUEL: FRONT TANK

At circuit breakers:

ALT FLD	FUEL PUMP	PITOT HEAT	TURN & BANK	STROBES	NAV LTS	LNDG LTS
	ON	ON	ON	ON	ON	ON
	OFF	OFF	OFF	OFF	OFF	OFF

At circuit breakers:

GEAR ACT	GEAR IND	FLAPS	PANEL LTS	PANEL LTS	INSTR	INSTR

At circuit breakers:

COM 1	COM 2	TPS	ADF	INTCM	MKR	AUX
NAV 1	NAV 2	ALT ENC	DME	FUELGARD	OAT	

At annunciator panel:

LANDING GEAR							
DOWN	TRANSIT	WARNING	HORN ON OFF	HORN OFF	CARB ICE	LOW VOLT	HIGH VOLT

At audio panel:

MIC	COM1	COM1	COM 2	NAV 1	NAV 2	MKR	ADF	DME
COM 2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

At master and alternator switches:

MASTER	ALTERNATOR
ON	ON
OFF	OFF

At ignition switch:

OFF	R	L	BOTH	START

At alternate static source:

ALTERNATE STATIC SOURCE

On center console:

EMERGENCY LANDING GEAR ACTUATION

On nose gear strut:

INFLATE TO 115 PSI WARNING: RELEASE ALL AIR PRESSURE FROM STRUT BEFORE DISASSEMBLY

On main gear shock absorber struts:

INFLATE TO 600 PSI WARNING: RELEASE ALL AIR PRESSURE FROM STRUT BEFORE DISASSEMBLY

At front fuel tank filler cap:

CAPACITY: 21 U.S. GALLONS FUEL: 100/130 AVGAS

At aft fuel tank filler cap:

CAPACITY: 19 U.S. GALLONS FUEL: 100/130 AVGAS

At oil dip stick:

CAPACITY: 8 QTS

Section 3
Emergency Procedures

Electrical System Failure

If the electrical system fails, switch off the master switch and land as soon as practical.

The landing gear must be extended manually.

⚠ **Caution** If the electrical system has failed, it is impossible to extend the flaps. Revise landing approach as necessary. ⚠

Electrical System Malfunctions

Alternator Failure
When the ammeter needle is left of the zero (center) position during flight, there is usually a malfunction in the alternator or regulator. In this case, switch off all equipment not essential to flight safety and land as soon as practical.

Short in an Electrical Circuit
The failure of a load due to a short circuit is shown when its associated circuit breaker trips. The circuit breakers are of two types. The push-pull circuit breaker trips by popping out, revealing a white band. The switch-type circuit breakers trip by switching themselves to the "off" position (toggle lever down).

About half a minute after the circuit breaker has tripped, close the circuit breaker again by depressing the push button (or switching on a switch-type circuit breaker). In the circuit breaker trips again, no further attempts should be made to reset the circuit breaker, and in no case should it be kept depressed (on held in the "on" position in the case of a switch-type circuit breaker), since this could cause a fire in the electrical system.

Fuses are used to protect the wires for the ammeter, alternator amps meter, landing gear in transit light and starter warning light. These fuses are difficult or impossible to replace in flight. The failure of these circuits does not prevent the safe completion of the flight.

Drop in Fuel Pressure

If the fuel pressure falls below the minimum permissible value, the auxiliary electrical fuel pump must be turned on. The airplane should be landed as soon a practical.

A pressure drop can be caused by a leaky or clogged fuel line (for example, due to frozen condensation water). The problem may be confined to one tank only; therefore, switching tanks is suggested for diagnosis.

A pressure drop can also be caused by the failure of the mechanical fuel pump.

A temporary pressure drop will occur shortly before a fuel tank runs dry. Typically, the fuel pressure will become erratic for 5 to 20 seconds before the tank and fuel lines are completely empty, then the fuel pressure will drop sharply and the engine will falter and quit firing. Switch tanks immediately and restart the engine if it stops firing.

- *Note:* If the propeller continues to turn (windmill), no other action (other than switching tanks) is normally necessary. If the propeller stops turning, it may be necessary to lean the mixture of fuel injected engines to restart the engine.

Restarting Engine in Flight

If the propeller continues to turn (windmill):

Fuel selector.....Front tank (or aft tank, but not off)
Master switch.....On
Ignition switch.....Both
Throttle.....Half open
Mixture.....Full rich

If the propeller stops turning:

Fuel selector.....Front tank (or aft tank, but not off)
Master switch.....On
Ignition switch.....Left (or both, but left is better)
Throttle.....Half open
Propeller RPM.....????
Mixture.....Full rich (see note below)
Airspeed (approximate).....160 kts (or faster, until engine turns)
Ignition switch.....Both (after engine starts)
The starter may be used, especially if performed at low altitude.

- *Note:* It may be necessary to lean the mixture of fuel injected engines to restart the engine.

Engine Failure During Spin

In case of engine failure during a spin, immediately apply spin recovery techniques (see Section ????). Apply engine restart instruction only after spin recovery.

Propeller Spinner Failure

Spinner failure is usually indicated by slight, moderate or severe vibration in the engine. To minimize the vibration, reduce the engine RPM with throttle and propeller RPM controls. If vibration is severe, shut off engine as follows:

Ignition switch.....Off
Mixture.....Lean
Fuel selector valve.....Off
Make emergency landing as described below.

Propeller Failure

Propeller failure is usually indicated by severe vibration in the engine (for example, in the case of the loss of a single blade) or by sudden increase in the engine RPM (for example, in the case of total loss of the propeller). In either case it is imperative that the engine be stopped as quickly as possible since continued severe vibration could tear the engine from the airplane, rendering it uncontrollable due to the extreme aft center of gravity. Immediate action:

Ignition switch.....Off
Mixture.....Lean
Fuel selector valve.....Off
Make emergency landing as described below.

Emergency Landings

⚠ **Caution** The master switch should not be switched off until shortly before touchdown, as the flaps and landing gear are electrically operated. ⚠

Engine Failure

If possible, establish cause (fuel selector position, ignition). If attempts to restart the engine fail, or if the propeller suddenly stops (seized pistons, due to lack of lubricant), reduce airspeed to 85 kt and trim the airplane.

Extend the landing gear, select suitable emergency landing field. No changes in direction greater than 15-20° near the ground! Maintain airspeed! Tighten seat belts, fuel selector OFF, ignition OFF, landing flaps as necessary, master switch OFF. Touch down, brake hard if necessary.

If a normal landing appears impossible, adjust your flight path to contact the ground/obstacle at the slowest possible speed without stalling the aircraft. The aircraft's altitude should be wings-level, slightly nose-high to reduce the impact forces as much as possible. This will allow the aircraft structure to absorb much of the impack while affording the pilot/passenger the maximum protection from the restraint system.

▲ **Warning** Do *not* allow the aircraft to stall. ▲

Emergency Extension of Landing Gear

If, for any reason, the landing gear cannot be extended, or if the green "gear down" indicator light does not illuminate after operation of the landing gear switch although the red "gear in transit" indicator light and yellow "gear warning" indicator are extinguished, check circuit breakers and then retract the landing gear again. Determine whether the red "gear in transit" indicator light illuminates during retraction and whether the yellow "gear warning" indicator light flashes (and gear warning horn sounds) when the throttle is pulled back. If this is the case, normal landing can be conducted after extending the landing gear, as it is simply the green "gear down" indicator light that is defective. In this case, the bulb may be replaced from supply of spare bulbs (or by using a bulb from another indicator light such as the starter warning light).

If the landing gear cannot be extended electrically, or if the red light continues to light up after actuation of the landing gear switch, the landing gear may be extended with the hand crank located between the pilot's and passenger's seats.

1. Disable landing gear actuation circuit by pulling out its 15 amp circuit breaker (not the 5 amp circuit breaker for the landing gear indication circuit).

2. Remove the cover between the seats marked "Emergency Landing Gear Actuation".

3. Turn over the hand crank to engage with the slotted shaft fitting.

4. Disengage the motor by pulling up on the knurled knob just aft of the hand crank.

5. Turn the hand crank in the direction indicated by the arrow until the green "gear down" light illuminates or until the hand crank will not turn (about 100 revolutions).

Landing with Retracted Landing Gear

If, for any reason, a landing with retracted landing gear is necessary, a smooth grass landing strip should be selected if possible for minimum abrasion damage to the airplane. Land with flaps up. Prior to touchdown, stop engine with mixture FULL LEAN, then fuel selector OFF and ignition OFF.

Depending on the pilot's proficiency, an attempt may be made during the long approach to stop the engine. If the propeller fails to stop in a horizontal position, actuate the starter to inch the propeller to a horizontal position so as to preclude damage. Turn the master switch OFF. Adjust approach speed as required for flaps up landing.

Failure of Flaps to Lower

The only effect of flaps failure to lower is an increase of landing speed by 5-8 kts.

Failure of Flaps to Raise

If the flaps fail to raise during a go-around (balked landing), maintain a speed of 85-98 kts and avoid steep turns.

Engine Fire

In case of a fire in the engine compartment:

Fuel selector valve.....Off
Throttle.....Full open
Cabin heat.....Off
Master switch.....Off
Ignition switch.....Off (after engine stops)
Airspeed.....75 kts
Select suitable emergency landing field and land.
Do not try to restart engine in flight.

Primary Flight Control System Failure

Yaw Control Failure
If the rudder controls fail, turns above 30° bank and airspeed in excess of 135 kts must be avoided. Observing these limitations, the flight, including landing, may be completed using pitch and roll control.

Roll Control Failure
If the roll control is lost, a safe landing is possible if the following procedure is applied:

Airspeed not less than 80 kts, flaps preferable in the 0° position (flaps up).

If the airplane drops a right wing, this condition should be corrected and the wing picked up by applying left rudder ("step on the high wing"), and vice versa (for a dropped left wing).

Make straight-in approach and make exceedingly wide turns.

Slight roll control can be accomplished by the pilot and passenger leaning to one side of the airplane to shift weight side-to-side.

Depending on the pilot's proficiency or on the availability of a passenger, an attempt may be made to remove the floor boards and at manipulating the rudder cables. Exercise great caution in manipulating control cables since an unknown failure has occured and controls might become jammed in one direction. Remove the floor board on both pilot's and passenger's side before attempting to manipulate the cables. Attempt to diagnose the failure. If the forward aileron cables (attached to control sticks) have failed, the aft aileron cable may still work. Manipulate aft aileron cable in the same manner as the control stick, i.e. move cable to the left to roll left and vice versa. Forward cables are manipulated in the opposite manner from the control stick, so excercise great caution due to the likely confusion.

Pitch Control Failure
In case of inoperative pitch control, the airplane is trimmed for an angle of glide of approximately 3° by using the elevator trim control and power setting. It is recommended that a long straight approach at 85 knots and a rate of descent of 400 ft/min be used. Increase in engine power results (?) in a nose-up, decrease in power in a nose-down moment (CHECK THIS). Landing flap position may be selected as desired; however, adjustment should be accomplished slowly, i.e. in small increments. As the ground is approached, the aircraft may be flared out by carefully employing the elevator trim control. The throttle is closed immediately prior to contacting the ground.

Secondary Control System Failure

Elevator Trim Control Failure
In case of inoperative elevator trim control failure, the flight may be completed by use of the primary pitch control, i.e. by using the stick as in normal flight.

If possible, diagnose the failure. Turn the trim control wheel—if the indictor does not move the angle drive has failed, and the flight may be continued in a normal manner. If the indicator moves, the failure is elsewhere. One possible failure is that the elevator trim tab has become unattached to the push-pull control cable. Because of the risk of elevator trim tab flutter, this event can be extremely dangerous. Accordingly, reduce airspeed to 85 knots and land as soon as practical.

- *Note:* If unable to repair the elevator trim tab controls after landing, it may be possible to continue the flight by removing the elevator trim tab. If this is attempted, remove the elevator trim tab push pull control cable or secure it tightly to the elevator so that it will not vibrate and contribute to elevator flutter. Continue the flight at moderate speed (say 135 knots).

Evacuation of Aircraft

▲ **Warning** No actual experience has occured, and the following procedures are based only on general principals and experience in other aircraft and may be incorrect. ▲

The canopy is not designed to be jettisoned. The canopy is difficult to open at high speeds due to the suction created by the flow of air over the canopy. To open the canopy in flight, it is expected that the canopy will be easier to open if the airspeed is low; therefore, the slowest controllable speeds are advised. When the canopy if fully-open, it is expected that the suction will be broken and that the canopy will remain open and/or depart the aircraft (especially at high speeds); however, it is also possible that the canopy will slam shut.

If the aircraft is in a spin or in a turn, the evacuation should be made, if possible, towards the outside at the trailing edge of the wing. The pilot and passenger should remain in a crouching position as long as possible before opening the parachute in order to minimise the chances of the parachute becoming entangled with the aircraft when it opens.

If the aircraft is in a flat spin and standard recovery techniques have failed, experience with other aircraft has shown that opening the canopy can sometimes assist in the recovery since the airflow over the canopy can cause the aircraft to pitch nose-down.

Crash Landings

Most crash landings are survivable, but you can increase your chances of avoiding injury by practicing emergency procedures, briefing any passengers and keeping the aircraft under control at impact. If a crash is unavoidable, the following suggestions are offered.

The seat belts of the Falco are extremely strong and are designed to withstand a load of 40gs before failing. The seat belts (lap, shoulder and crotch straps) should be tightened as much as is possible. In particular, the crotch strap should be tight enough so that the lap belts transfers deceleration forces into the pelvic bone (and not into the soft tissues of the abdomen).

It is always preferable that the aircraft land in an upright position.

Landings in open fields are preferable to all other locations.

Landings in water are preferable to landing in obstructed area (cities, power lines, forests, etc.). Experience with other aircraft has shown that approximately 95% of emergency landings in water are survived at time of impact, although 5 to 6% more drown. Landings in water should be made with the landing gear retracted and with flaps down 20°. Full flaps are not suggested as they may increase the possibility of a nose-over. Touch down at minimum controllable speed. If possible, land parallel to waves. If possible, land near the shore or a ship.

If landing in an obstructed area cannot be avoided, it is preferable to land in such a way that the wings of the aircraft absorb most of the deceleration forces as possible. For example, the aircraft can be guided so that trees hit both wings simultaneously. Contact of a single wing will cause the aircraft to rotate violently, sometimes causing rotation-induced injuries.

If extremely violent impacts are unavoidable, lean head forward, feet on instrument panel with knees at shoulder width, one arm across forehead for pilot, both arms across forehead for passenger and tighten body muscles. The pilot has the option of using both arms across forehead or using one arm to move the control stick to one side just prior to impact, since experience with other aircraft has shown that the stick can sometimes impale the body if the seat belts fail. If time permits, the passenger's control stick may be removed and placed on the floor under the instrument panel, along with loose objects behind the pilot and passenger. Luggage, loose clothing or other soft material may be placed in front of the forehead to cushion blows to the head. Such preparations, however, should not be used if they will prevent the control of the aircraft. All such impacts should be made in a normal landing attitude (wings level, nose high) and as slow as possible (flaps fully down).

Section 4
Normal Operating Procedures

Ground Pre-Flight Check

Ignition switch	Off (remove key)
Parking brake	Set
Canopy and windshield	Clean
Wing walk, L.H.	Check condition
Flap, L.H.	Check condition
Aileron, L.H.	Check condition
Wing tip nav and strobe light, L.H.	Check condition
Pitot tube	Remove cover
Front fuel tank	Check fuel level
Front fuel tank	Cap secure
Front fuel tank sump	Drain water
Landing gear, L.H.	Check tire pressure
Landing gear, L.H.	Check oleo strut pressure
Landing gear, L.H.	Check gear doors
Engine, left side	Check condition, leaks, etc.
Brake reservoir	Check fluid level
Engine cowling, left side	Door closed
Nose gear	Check tire pressure
Nose gear	Check oleo strut pressure
Nose gear	Check doors
Oil cooler	Check condition
Propeller and spinner	Check condition
Alternator belt	Check condition and belt tension
Alternator wiring	Check condition
Engine, right side	Check condition, leaks, etc.
Oil level	Check
Induction filter and system	Check condition
Gascolator (if installed)	Drain water
Engine cowling, right side	Door closed
Landing gear, R.H.	Check tire pressure
Landing gear, R.H.	Check oleo strut pressure
Landing gear, R.H.	Check gear doors
Wing tip nav and strobe light, R.H.	Check condition
Aileron, R.H.	Check condition
Flap, R.H.	Check condition
Wing walk, R.H.	Check condition
Static port, R.H.	Check condition
Elevator	Check condition
Elevator trim tab	Check condition
Rudder	Check condition
Tail position and strobe light	Check condition
Static port, L.H.	Check condition
Battery door	Closed
Aft fuel tank	Check fuel level
Aft fuel tank	Cap secure
Aft fuel tank sump	Drain water

If the engine has been inactive for several hours, especially in cold weather, rotate the propeller by hand for two or three complete turns. During cold weather operation, make a thorough check of airplane for freedom from frost, snow and ice on exterior surfaces.

Cockpit Pre-Flight Check, Before Starting Engine

Fuel/oil quantity.....Checked
Load.....Secured
Controls.....Checked
Seats.....Adjusted
Seat belts.....Fastened
Parking brake.....On
Canopy.....Closed and locked
Landing gear switch.....Down
Fuel selector.....Front
Master switch.....On (the green indicator light should come on)
Alternator switch.....On
Landing gear down light (green).....Check
Avionics.....Off
Voltmeter.....Check battery voltage
Fuel quantity gauges.....Check
Flight controls.....Check for full movement

Engine Starting Procedure (Injected Engines), Normal Start (Cold Engine)

Alternate air.....Off
Throttle.....Advance 2" (?)
Propeller RPM.....Full increase
Mixture.....Rich
Auxiliary fuel pump.....On until fuel pressure stabilizes (4-5 sec), then Off
Mixture.....Lean
Throttle.....Advanced 1/4" (?)
Ignition switch.....Start (release when engine starts)
Mixture (after engine fires).....Rich
(Advance mixture at moderate rate—about 1 second. Too rapid enrichment can choke engine.)
Throttle (after engine starts).....Retard to 800 RPM

Minimum oil pressure must be indicated within 30 seconds

Engine Starting Procedure (Injected Engines) Warm Start (Warm Engine, But Not Hot)

- *Note:* This starting procedure is controversial. Use hot start procedure if this does not work consistently.

Alternate air.....Off
Throttle.....Advance 2" (?)
Propeller RPM.....Full increase
Mixture.....Rich
Auxiliary fuel pump.....On (2 seconds MAX), then Off
Mixture.....Lean
Throttle.....Advance 1/4" (?)
Ignition switch.....Start (release when engine starts)
Engine will crank over 6 to 8 times before starting.
Mixture (after engine fires).....Rich
(Advance mixture at moderate rate—about 1 second. Too rapid enrichment can choke engine.)
Throttle (after engine starts).....Retard to 800 RPM

Minimum oil pressure must be indicated within 30 seconds

Engine Starting Procedure (Injected Engines)
Hot Start (Hot Engine)

Alternate air.....Off
Throttle.....Half open (Parke says 1/4"-1/2")
Propeller RPM.....Full increase
Mixture.....Lean
Ignition switch.....Start (release when engine starts)
Engine will crank over 6 to 8 times before starting.
Mixture (as soon as engine fires).....Rich
Advance mixture at moderate rate—about 1 second. Too rapid enrichment can choke engine.
Throttle (after engine starts).....Retard quickly to 800 RPM

Minimum oil pressure must be indicated within 30 seconds

Engine Starting Procedure (Carbureted Engines)

Carburetor heat.....Off
Propeller RPM.....Full increase
Mixture.....Rich
Auxiliary fuel pump.....On
Throttle.....Actuate fully 2-3 times, then open 1/2"
Auxiliary fuel pump.....Off
Ignition switch.....Start (release when engine starts)

Minimum oil pressure must be indicated within 30 seconds

Engine Starting Procedure, Carbureted or Injected Engines (Flooded engine)

Carburetor heat (carbureted engines).....Off
—*or*—
Alternate air (injected engines).....Off
Propeller RPM.....Full increase
Mixture.....Lean
Throttle.....Full open
Ignition switch.....Start* (release when engine starts)
Mixture (as soon as engine fires).....Rich
(Advance mixture at moderate rate—about 1 second. Too rapid enrichment can choke engine.)
Throttle (as soon as engine starts).....Retard *quickly* to 800 RPM

Minimum oil pressure must be indicated within 30 seconds

* 30 seconds maximum. If engine does not start within 30 seconds, allow the starter to cool for several minutes for attempting to start again.

Warm-Up and Taxi

Throttle.....1000-1200 RPM
Ammeter.....Indicating on + side
Oil pressure.....Green sector
Fuel pressure*.....Green sector
Parking brake.....Release
Brakes .....Check

During low power warm-up and taxi, the mixture may be leaned approximately halfway. The mixture must be full rich for takeoff.

* During warm-up and taxi, the auxiliary fuel pump is off to check the operation of the engine-driven mechanical fuel pump.

Run-Up Check

Mixture.....Rich
Propeller RPM.....Full increase
Throttle.....1200 RPM, then:
- Suction gauge.....Green sector
- Cylinder temperature gauge.....Green sector*
- Oil temperature gauge.....Green sector
- Oil pressure gauge.....Green sector
- Ammeter.....Indicating on + side
- Fuel gauges.....Check
- Fuel pressure gauge.....Green sector
- Voltmeter.....14 volts

Throttle (after 5 minutes from starting).....1700 RPM, then:
- Magneto check.....Max drop 75-100 RPM
- Propeller RPM.....Check drop
- Carburetor heat, check drop.....Approx. 80 RPM

* If cooler than green sector, takeoff may be made if engine does not stumble when full throttle is applied.

Before Takeoff

Canopy.....Closed & locked
Seat belts.....Fastened
Flaps.....15° (align with down aileron for 16°)
Flight controls.....Final check
Elevator trim.....Neutral (Or at setting normally used for level flight.)
Fuel selector.....Front tank
Auxiliary fuel pump.....On
Propeller RPM.....Full increase
Mixture.....Rich
Carburetor heat.....Off
Annunciator warning light panel.....Green light only

Normal Takeoff

Parking brake.....Release
Throttle.....Full open
Best rotation speed.....63 kts

Climb

Landing gear switch.....UP
(During retraction, red "gear in transit" light is on. Red light goes off when gear is fully retracted.)
Airspeed.....80 kts (80-85 kts?), then:
Flaps.....Up
Auxiliary fuel pump.....Off
Engine instruments.....Check
Annunciator warning light panel.....All lights off

Use the front fuel tank during takeoff and initial climb, then select the aft fuel tank. When the aft fuel tank is exhausted or during approach, select the front fuel tank.

▲ **Warning** Failure to use aft fuel tank after intial climb can cause CG of aircraft to shift beyond aft limits, creating a dangerous situation. When the aft CG limits are exceeded, the aircraft will become unstable and uncontrollable. ▲

Cruise

Trim	Set
Carburetor heat	On or Off as necessary
RPM/Manifold pressure	See engine operating manual
Mixture	Above 5000 ft MSL
Annunciator warning light panel	All lights off

Descent

Mixture	Rich, below 5000 ft MSL
Carburetor heat	Off (unless necessary)
Tachometer and airspeed	Frequent check
Annunciator warning light panel	All lights off

Landing Approach

Seat belts	Fastened
Carburetor heat	On
Mixture	Rich
Propeller RPM	Full increase
Landing gear	Down (below 108.5 kts)
Flaps	Down 20° (below 97.5 kts)
Fuel selector valve	Front tank
Auxiliary fuel pump	On
Annunciator warning light panel	Green "Gear Down" light only
Airspeed	85 kts

Go-Around

Throttle	Advance smoothly to full open
Carburetor heat	Off
Climb	80 kts
Landing gear	Up
Flaps	Up

Normal Landing

Airspeed	85 kts
Flaps (below 87 kts)	Full down
Landing gear	*Check down!!!*
Annunciator warning light panel	Green "Gear Down" light only
Airspeed ("over the fence")	70 kts
Touchdown	On main wheels

After Landing

Carburetor heat	Off
Auxiliary fuel pump	Off
Flaps (*not the landing gear!*)	Up

Parking

Parking brake	Set
Avionics	Off
Tachometer	1000 RPM
Mixture	Lean
Ignition switch (when engine stops)	Off
All switches	Off

Section 5
Performance Information

General
All operating data have been calculated on the basis of measurements obtained during flight testing on original production F.8L Falco aircraft, and (for such aircraft) are reproducible under similar conditions providing the aircraft and engine are in good condition and the pilot possesses average flying skill. Performance of individual amateur-built aircraft may vary from the data shown here, and it is the responsibility of the pilot to confirm the performance of the aircraft and to note any variations that occur.

In using the following tables, the prevailing local conditions must be taken into account. The difference between the indicated airspeed (IAS) and the calibrated airspeed (CAS) is normally negligible in all situations. The position of the landing flaps normally has no effect on airspeed indication.

Takeoff settings: Engine-full throttle, mixture-full rich, carburetor heat-off, flaps 15°, propeller rpm-full increase.

Takeoff and Landing Distances
The distances are actual measured values for still air, but the headwinds are factored by 50%. Figures apply to level, dry concrete runways and must be increased by 10% when operating from grass surfaces.

When prevailing ambient temperature is not shown in the tables, the takeoff distance shall be obtained as follows:

The takeoff distance is 10% longer for each temperature increase of 15°C (27°F). The takeoff run is 10% shorter for each temperature decrease of 15°C (27°F).

On grass runways, the takeoff and landing rolls can be much greater, especially the landing ground roll when the grass is wet. In the case of snow, slush or standing water, a takeoff can be completely impossible.

When the prevailing ambient temperature is not shown in the tables, the landing distance shall be obtained as follows: The landing ground roll is 10% longer for each temperature increase of 25°C (45°F). The landing distance is 10% longer for each temperature increase of 25°C (45°F).

Level Flight Performance and Ranges
The ranges given are for the takeoff weight given, under normal conditions and with no reserve for takeoff and climb.

Rates of Climb
Rates of climb are reduced by 50 ft/min for each temperature of 10°C (18°F). The pressure altitude is indicated by the altimeter when it is set to 26.92 inch Hg. (1013.2mb).

Consumption Values
These are merely for information and can be considered approximations only.

Fixed Pitch Propellers

Glide with Engine Inoperative
With the engine inoperative, the airplane has a glide ratio of 1:___ with the flaps fully retracted, landing gear fully retracted and ___ knots IAS at a gross weight of ____ lbs.

Alternatively, the glide ratio of 1:___ may be expressed as a glide of ___ nautical miles per 1000 ft altitude.

The glide speed is to be reduced by one knot per ___ lbs less of weight, and respectively the glide distance by ___ nautical miles per 1000 ft.

Operating Data, 150 Hp Engine, Fixed Pitch Propeller

Takeoff distance (feet)
Distance required to takeoff and climb 50 ft.
Full throttle, 63 kt climb speed, flaps 20°

	Outside Air Temperature				
Altitude	0°F	25°F	50°F	75°F	100°F
Sea level	1320	1450	1590	1770	1930
2000 ft	1580	1740	1910	2130	2410
4000 ft	1910	2100	2300	2560	2790
6000 ft	2320	2550	2810	3120	3400

Landing distance (feet)
Distance required to land over 50 ft. obstacle and stop.
Flaps full down, 78 kt approach speed.

	Outside Air Temperature				
Altitude	0°F	25°F	50°F	75°F	100°F
Sea level	1255	1300	1345	1385	1440
2000 ft	1310	1360	1405	1450	1505
4000 ft	1385	1440	1490	1535	1590
6000 ft	1450	1500	1550	1600	1670

Rate of climb (ft/min)
Full throttle, flaps up, 87 kts.

	Outside Air Temperature				
Altitude	0°F	25°F	50°F	75°F	100°F
Sea level	1075	1050	1020	975	930
2000 ft	970	950	920	880	840
4000 ft	865	845	820	790	750
6000 ft	760	740	720	690	660

Balked Landing Climb (ft/min)
Full throttle, flaps down, 69.5 kts.

	Outside Air Temperature				
Altitude	0°F	25°F	50°F	75°F	100°F
Sea Level	610	580	550	515	475
2000 ft	510	490	460	430	400
4000 ft	405	390	365	340	315
6000 ft	300	285	270	250	230

Stalling Speed (Knots)
Power off

	Angle of bank			
	0°	20°	40°	60°
Flaps up	59	61	68	83.5
Flaps full down	53	55	61	75