# Section 4
# Normal Procedures

## Table of Contents

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# Introduction

This section provides amplified procedures for normal operation. Normal procedures associated with optional systems can be found in Section 9.

# Airspeeds for Normal Operation

Unless otherwise noted, the following speeds are based on a maximum weight of 3400 lb. and may be used for any lesser weight. However, to achieve the performance specified in Section 5 for takeoff and landing distance, the speed appropriate to the particular weight must be used.

Takeoff Rotation:

- Normal, Flaps 50% ..... 70 KIAS
- Obstacle Clearance, Flaps 50% ..... 78 KIAS

Enroute Climb, Flaps Up:

- Normal ..... 110-120 KIAS
- Best Rate of Climb, SL ..... 101 KIAS
- Best Rate of Climb, 10,000 ..... 95 KIAS
- Best Angle of Climb, SL ..... 78 KIAS
- Best Angle of Climb, 10,000 ..... 82 KIAS

Landing Approach:

- Normal Approach, Flaps Up ..... 90-95 KIAS
- Normal Approach, Flaps 50% ..... 85-90 KIAS
- Normal Approach, Flaps 100% ..... 80-85 KIAS
- Short Field, Flaps 100% ($V_{REF}$) ..... 77 KIAS

Go-Around, Flaps 50%:

- Full Power ..... 80 KIAS

Maximum Recommended Turbulent Air Penetration:

- 3400 lb ..... 133 KIAS
- 2900 lb ..... 123 KIAS

Maximum Demonstrated Crosswind Velocity:

- Takeoff or Landing ..... 20 Knots

# Normal Procedures

## Preflight Inspection

Before carrying out preflight inspections, ensure that all required maintenance has been accomplished. Review your flight plan and compute weight and balance.

• Note •

Throughout the walk-around: check all hinges, hinge pins, and bolts for security; check skin for damage, condition, and evidence of delamination; check all control surfaces for proper movement and excessive free play; check area around liquid reservoirs and lines for evidence of leaking.

In cold weather, remove all frost, ice, or snow from fuselage, wing, stabilizers and control surfaces. Ensure that control surfaces are free of internal ice or debris. Check that wheel fairings are free of snow and ice accumulation. Check that pitot probe warms within 30 seconds of setting Pitot Heat to ON.

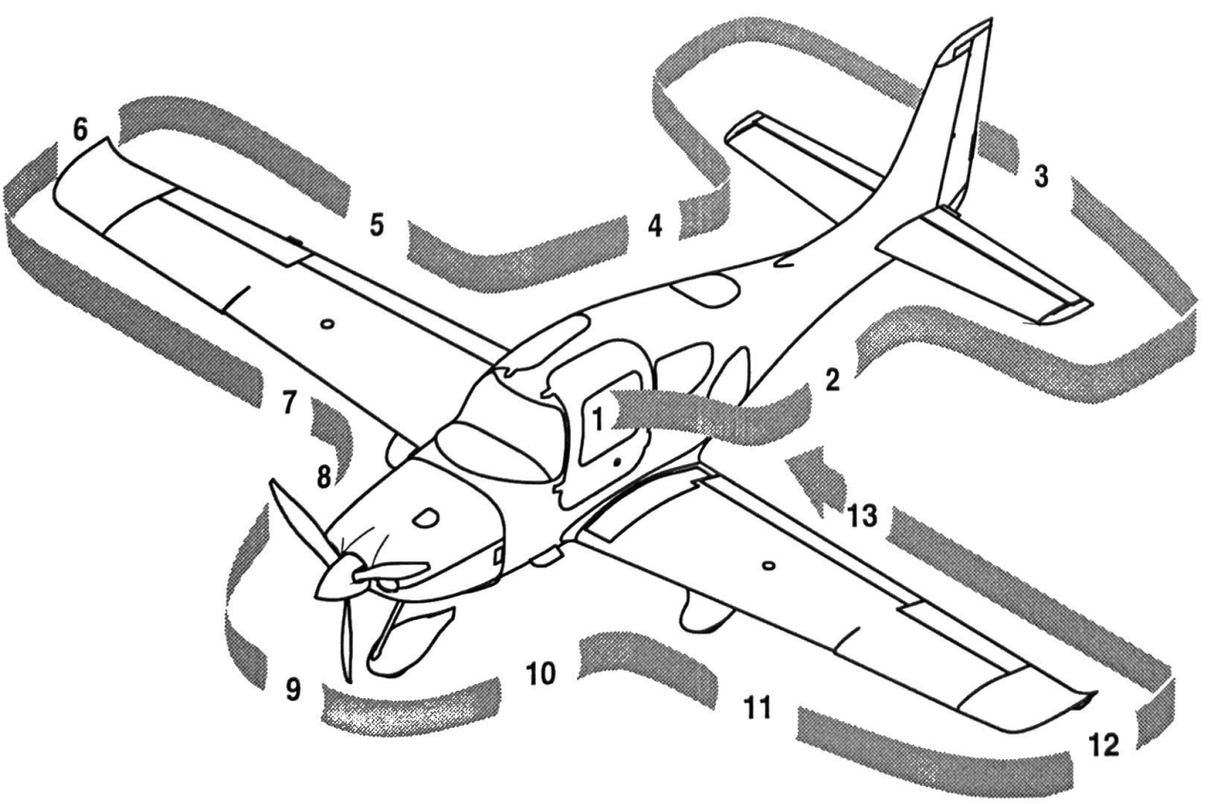


**Figure 4-1**
**Walk-Around**

## Preflight Walk-Around

1. Cabin
   - a. Required Documents ..... On Board
   - b. Avionics Power Switch ..... OFF
   - c. Bat 2 Master Switch ..... ON
   - d. PFD - *Serials 0435 and subsequent with PFD* ..... Verify On
   - e. Avionics Cooling Fan ..... Audible
   - f. Voltmeter ..... 23-25 Volts
   - g. Flap Position Light ..... OUT
   - h. Bat 1 Master Switch ..... ON
   - i. Lights ..... Check Operation
   - j. Stall Warning ..... Test

   • Note •

   Test stall warning system by applying suction to the stall warning system inlet and noting the warning horn sounds.

   - k. Fuel Quantity ..... Check
   - l. Fuel Selector ..... Select Fullest Tank
   - m. Flaps ..... 100%, Check Light ON
   - n. Oil Annunciator ..... On
   - o. Bat 1 and 2 Master Switches ..... OFF
   - p. Alternate Static Source ..... NORMAL
   - q. Circuit Breakers ..... IN
   - r. Fire Extinguisher ..... Charged and Available
   - s. Emergency Egress Hammer ..... Available
   - t. CAPS Handle ..... Pin Removed
2. Left Fuselage
   - a. Door Lock ..... Unlock
   - b. COM 1 Antenna (top) ..... Condition and Attachment
   - c. Wing/Fuselage Fairing ..... Check

d. COM 2 Antenna (underside) ..... Condition and Attachment
e. Baggage Door ..... Closed and Secure
f. Static Button ..... Check for Blockage
g. Parachute Cover ..... Sealed and Secure

3. Empennage
   a. Tiedown Rope ..... Remove
   b. Horizontal and Vertical Stabilizers ..... Condition

• Note •

Verify tape covering the forward and aft inspection holes located on outboard ends of horizontal stabilizer is installed and securely attached.

   c. Elevator and Tab ..... Condition and Movement
   d. Rudder ..... Freedom of Movement
   e. Rudder Trim Tab ..... Condition and Security
   f. Attachment hinges, bolts and cotter pins ..... Secure
4. Right Fuselage
   a. Static Button ..... Check for Blockage
   b. Wing/Fuselage Fairings ..... Check
   c. Door Lock ..... Unlock
5. Right Wing Trailing Edge
   a. Flap and Rub Strips (if installed) ..... Condition and Security
   b. Aileron and Tab ..... Condition and Movement
   c. Aileron Gap Seal ..... Security
   d. Hinges, actuation arm, bolts, and cotter pins ..... Secure
6. Right Wing Tip
   a. Tip ..... Attachment
   b. Strobe, Nav Light and Lens ..... Condition and Security
   c. Fuel Vent (underside) ..... Unobstructed

*(Continued on following page)*

7. Right Wing Forward and Main Gear
   a. Leading Edge and Stall Strips ..... Condition
   b. Fuel Cap ..... Check Quantity and Secure
   c. Fuel Drains (2 underside) ..... Drain and Sample
   d. Wheel Fairings ..... Security, Accumulation of Debris
   e. Tire ..... Condition, Inflation, and Wear

**• Caution •**

*Serials 0002 through 1727 after Service Bulletin SB 2X-32-14 and airplane serials 1728 and subsequent:* Clean and inspect temperature indicator installed to piston housing. If indicator center is black, the brake assembly has been overheated. The brake linings must be inspected and O-rings replaced.

   f. Wheel and Brakes ..... Fluid Leaks, Evidence of Overheating, General Condition, and Security.
   g. Chocks and Tiedown Ropes ..... Remove
   h. Cabin Air Vent ..... Unobstructed

8. Nose, Right Side
   a. Vortex Generator ..... Condition
   b. Cowling ..... Attachments Secure
   c. Exhaust Pipe ..... Condition, Security, and Clearance
   d. Transponder Antenna (underside) .. Condition and Attachment
   e. Gascolator (underside) ..... Drain for 3 seconds, Sample
9. Nose gear, Propeller, and Spinner

**• WARNING •**

Keep clear of propeller rotation plane. Do not allow others to approach propeller.

   a. Tow Bar ..... Remove and Stow
   b. Strut ..... Condition
   c. Wheel Fairing ..... Security, Accumulation of Debris
   d. Wheel and Tire ..... Condition, Inflation, and Wear

e. Propeller ..... Condition (indentations, nicks, etc.)

f. Spinner ..... Condition, Security, and Oil Leaks

g. Air Inlets ..... Unobstructed

h. Alternator ..... Condition

10. Nose, Left Side

a. Landing Light ..... Condition

b. Engine Oil ..... Check 6-8 quarts, Leaks, Cap & Door Secure

c. Cowling ..... Attachments Secure

d. External Power ..... Door Secure

e. Vortex Generator ..... Condition

f. Exhaust Pipe(s) ..... Condition, Security, and Clearance

11. Left Main Gear and Forward Wing

a. Wheel fairings ..... Security, Accumulation of Debris

b. Tire ..... Condition, Inflation, and Wear

**• Caution •**

*Serials 0002 through 1727 after Service Bulletin SB 2X-32-14 and airplane serials 1728 and subsequent:* Clean and inspect temperature indicator installed to piston housing. If indicator center is black, the brake assembly has been overheated. The brake linings must be inspected and O-rings replaced.

c. Wheel and Brakes ..... Fluid Leaks, Evidence of Overheating, General Condition, and Security.

d. Chocks and Tiedown Ropes ..... Remove

e. Fuel Drains (2 underside) ..... Drain and Sample

f. Cabin Air Vent ..... Unobstructed

g. Fuel Cap ..... Check Quantity and Secure

h. Leading Edge and Stall Strips ..... Condition

12. Left Wing Tip

a. Fuel Vent (underside) ..... Unobstructed

b. Pitot Mast (underside) ..... Cover Removed, Tube Clear

*(Continued on following page)*

c. Strobe, Nav Light and Lens ..... Condition and Security

d. Tip ..... Attachment

13. Left Wing Trailing Edge

a. Flap And Rub Strips (If installed)..... Condition and Security

b. Aileron ..... Freedom of movement

c. Aileron Gap Seal ..... Security

d. Hinges, actuation arm, bolts, and cotter pins ..... Secure

## Before Starting Engine

1. Preflight Inspection ..... COMPLETED

**• WARNING •**

Ensure that the airplane is properly loaded and within the AFM's weight and balance limitations prior to takeoff.

2. Weight and Balance ..... Verify within limits
3. Emergency Equipment..... ON BOARD
4. Passengers ..... BRIEFED

• Note •

Ensure all the passengers have been fully briefed on smoking, the use of the seat belts, doors, emergency exits, egress hammer, and CAPS.

Verify CAPS handle safety pin is removed.

5. Seats, Seat Belts, and Harnesses ..... ADJUST & SECURE

**• Caution •**

Crew seats must be locked in position and control handles fully down before flight. Ensure seat belt harnesses are not twisted.

## Starting Engine

If the engine is warm, no priming is required. For the first start of the day and in cold conditions, prime will be necessary.

Weak intermittent firing followed by puffs of black smoke from the exhaust stack indicates over-priming or flooding. Excess fuel can be cleared from the combustion chambers by the following procedure:

- Turn fuel pump off.
- Allow fuel to drain from intake tubes.
- Set the mixture control full lean and the power lever full open.
- Crank the engine through several revolutions with the starter.
- When engine starts, release ignition switch, retard power lever, and slowly advance the mixture control to FULL RICH position.

If the engine is under-primed, especially with a cold soaked engine, it will not fire, and additional priming will be necessary. As soon as the cylinders begin to fire, open the power lever slightly to keep it running.

*Refer to Cold Weather Operation* in this section or additional information regarding cold weather operations.

**• WARNING •**

If airplane will be started using external power, keep all personnel and power unit cables well clear of the propeller rotation plane.

**• Caution •**

Alternators should be left OFF during engine starting to avoid high electrical loads.

After starting, if the oil gage does not begin to show pressure within 30 seconds in warm weather and about 60 seconds in very cold weather, shut down engine and investigate cause. Lack of oil pressure indicates loss of lubrication, which can cause severe engine damage.

1. External Power (If applicable) ..... CONNECT
2. Brakes ..... HOLD
3. Bat Master Switches ..... ON (Check Volts)

4. Strobe Lights ..... ON
5. Mixture ..... FULL RICH
6. Power Lever ..... FULL FORWARD
7. Fuel Pump ..... PRIME, then BOOST

• Note •

*Serials 0002 - 0278 before SB 22-73-01:* On first start of the day, especially under cool ambient conditions, holding Fuel Pump switch to PRIME for 30-60 seconds will improve starting.

*Serials 0002 - 0278 after SB 22-73-01 and serials 0279 and subsequent:* On first start of the day, especially under cool ambient conditions, holding Fuel Pump switch to PRIME for 2 seconds will improve starting.

8. Propeller Area ..... CLEAR
9. Power Lever ..... OPEN ¼ INCH
10. Ignition Switch ..... START (Release after engine starts)

**• Caution •**

Limit cranking to intervals of 20 seconds with a 20 second cooling period between cranks. This will improve battery and contactor life.

11. Power Lever ..... RETARD (to maintain 1000 RPM)
12. Oil Pressure ..... CHECK
13. Alt Master Switches ..... ON
14. Avionics Power Switch ..... ON
15. Engine Parameters ..... MONITOR
16. External Power (If applicable) ..... DISCONNECT
17. Amp Meter/Indication ..... CHECK

## Before Taxiing

1. Flaps ..... UP (0%)
2. Radios/Avionics ..... AS REQUIRED
3. Cabin Heat/Defrost ..... AS REQUIRED
4. Fuel Selector ..... SWITCH TANK

## Taxiing

When taxiing, directional control is accomplished with rudder deflection and intermittent braking (toe taps) as necessary. Use only as much power as is necessary to achieve forward movement. Deceleration or taxi speed control using brakes but without a reduction in power will result in increased brake temperature. Taxi over loose gravel at low engine speed to avoid damage to the propeller tips.

**• WARNING •**

*Maximum continuous engine speed for taxiing is 1000 RPM on flat, smooth, hard surfaces. Power settings slightly above 1000 RPM are permissible to start motion, for turf, soft surfaces, and on inclines. Use minimum power to maintain taxi speed.*

*If the 1000 RPM taxi power limit and proper braking procedures are not observed, the brake system may overheat and result in brake damage or brake fire.*

1. Parking Brake ..... DISENGAGE
2. Brakes ..... CHECK
3. HSI Orientation ..... CHECK
4. Attitude Gyro ..... CHECK
5. Turn Coordinator ..... CHECK

## Before Takeoff

During cold weather operations, the engine should be properly warmed up before takeoff. In most cases this is accomplished when the oil temperature has reached at least 100° F (38° C). In warm or hot weather, precautions should be taken to avoid overheating during prolonged ground engine operation. Additionally, long periods of idling may cause fouled spark plugs.

**• WARNING •**

Do not takeoff with frost, ice, snow, or other contamination on the fuselage, wing, stabilizers, and control surfaces.

1. Doors ..... LATCHED
2. CAPS Handle ..... Verify Pin Removed
3. Seat Belts and Shoulder Harness ..... SECURE
4. Fuel Quantity ..... CONFIRM
5. Fuel Selector ..... FULLEST TANK
6. Fuel Pump ..... ON
7. Mixture ..... AS REQUIRED
8. Flaps ..... SET 50% & CHECK
9. Transponder ..... SET
10. Autopilot ..... CHECK
11. Navigation Radios/GPS ..... SET for Takeoff
12. Cabin Heat/Defrost ..... AS REQUIRED
13. Brakes ..... HOLD
14. Power Lever ..... 1700 RPM
15. Alternator ..... CHECK
    a. Pitot Heat ..... ON
    b. Navigation Lights ..... ON
    c. Landing Light ..... ON
    d. Annunciator Lights ..... CHECK
    - Verify both ALT 1 and ALT 2 caution lights out and positive amps indication for each alternator. If necessary, increase RPM

to extinguish ALT 2 caution light. ALT 2 caution light should go out below 2200 RPM.

16. Voltage ..... CHECK
17. Pitot Heat ..... AS REQUIRED

• Note •

Pitot Heat should be turned ON for flight into IMC, flight into visible moisture, or whenever ambient temperatures are 40° F (4° C) or less.

18. Navigation Lights ..... AS REQUIRED
19. Landing Light ..... AS REQUIRED
20. Magnetos ..... CHECK Left and Right
    a. Ignition Switch .....R, note RPM, then BOTH
    b. Ignition Switch ..... L, note RPM, then BOTH

• Note •

RPM drop must not exceed 150 RPM for either magneto. RPM differential must not exceed 75 RPM between magnetos. If there is a doubt concerning operation of the ignition system, RPM checks at higher engine speeds will usually confirm whether a deficiency exists.

An absence of RPM drop may indicate faulty grounding of one side of the ignition system or magneto timing set in advance of the specified setting.

21. Engine Parameters ..... CHECK
22. Power Lever ..... 1000 RPM
23. Flight Instruments, HSI, and Altimeter ..... CHECK & SET
24. Flight Controls..... FREE & CORRECT
25. Trim .....SET Takeoff
26. Autopilot ..... DISCONNECT

## Maximum Power Fuel Flow

Leaning for Takeoff and Maximum Climb is accomplished at full throttle by leaning the mixture from full rich to the target fuel flow for the given pressure altitude. The fuel flow values in the table below were demonstrated to obtain the takeoff and climb performance presented in Section 5.

• Note •

Excessively rich mixture will occur if the Mixture control is set to FULL RICH above 7500 feet pressure altitude.

| Pressure Altitude | Target Fuel Flow | Pressure Altitude | Target Fuel Flow | Pressure Altitude | Target Fuel Flow |
|---|---|---|---|---|---|
| 0 | 27.1 | 7000 | 21.4 | 14,000 | 17.5 |
| 1000 | 26.2 | 8000 | 20.5 | 15,000 | 16.9 |
| 2000 | 25.1 | 9000 | 19.9 | 16,000 | 16.7 |
| 3000 | 24.3 | 10,000 | 19.5 | 17,000 | 16.2 |
| 4000 | 23.6 | 11,000 | 18.8 | 17,500 | 16.1 |
| 5000 | 22.8 | 12,000 | 18.4 | | |
| 6000 | 22.1 | 13,000 | 17.9 | | |

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| 1000 | 26.2 | 8000 | 20.5 | 15,000 | 16.9 |
| 2000 | 25.1 | 9000 | 19.9 | 16,000 | 16.7 |
| 3000 | 24.3 | 10,000 | 19.5 | 17,000 | 16.2 |
| 4000 | 23.6 | 11,000 | 18.8 | 17,500 | 16.1 |
| 5000 | 22.8 | 12,000 | 18.4 | | |
| 6000 | 22.1 | 13,000 | 17.9 | | |

## Takeoff

***Power Check:*** Check full-throttle engine operation early in takeoff run. The engine should run smoothly and turn approximately 2700 RPM. All engine parameters should read in the green. Discontinue takeoff at any sign of rough operation or sluggish acceleration. Make a thorough full-throttle static run-up before attempting another takeoff.

For takeoff over a gravel surface, advance Power Lever slowly. This allows the airplane to start rolling before high RPM is developed, and gravel will be blown behind the propeller rather than pulled into it.

***Flap Settings:*** Normal and short field takeoffs are accomplished with flaps set at 50%. Takeoffs using 0% are permissible, however, no performance data is available for takeoffs in the flaps up configuration. Takeoffs with 100% flaps are not approved.

Soft or rough field takeoffs are performed with 50% flaps by lifting the airplane off the ground as soon as practical in a tail-low attitude. If no obstacles are ahead, the airplane should be leveled off immediately to accelerate to a higher climb speed.

Takeoffs into strong crosswinds are normally performed with the flaps set at 50% to minimize the drift angle immediately after takeoff. With the ailerons fully deflected into the wind, accelerate the airplane to a speed slightly higher than normal while decreasing the aileron deflection as speed increases then - with authority - rotate to prevent possibly settling back to the runway while drifting. When clear of the ground, make a coordinated turn into the wind to correct for drift.

• Note •

Fuel BOOST should be left ON during takeoff and for climb as required for vapor suppression with hot or warm fuel.

## Normal Takeoff

1. Brakes ..... RELEASE (Steer with Rudder Only)
2. Power Lever ..... FULL FORWARD
3. Engine Parameters ..... CHECK
4. Elevator Control ..... ROTATE Smoothly at 70-73 KIAS
5. At 80 KIAS, Flaps ..... UP

## Short Field Takeoff

1. Flaps ..... 50%
2. Brakes ..... HOLD
3. Power Lever ..... FULL FORWARD
4. Mixture ..... SET
5. Engine Parameters ..... CHECK
6. Brakes ..... RELEASE (Steer with Rudder Only)
7. Elevator Control ..... ROTATE Smoothly at 70 KIAS
8. Airspeed at Obstacle ..... 78 KIAS

## Climb

Normal climbs are performed flaps UP (0%) and full power at speeds 5 to 10 knots higher than best rate-of-climb speeds. These higher speeds give the best combination of performance, visibility and engine cooling.

For maximum rate of climb, use the best rate-of-climb speeds shown in the rate-of-climb chart in Section 5. If an obstruction dictates the use of a steep climb angle, the best angle-of-climb speed should be used. Climbs at speeds lower than the best rate-of-climb speed should be of short duration to avoid engine-cooling problems.

1. Climb Power ..... SET
2. Flaps ..... Verify UP
3. Mixture ..... LEAN as required for altitude
4. Engine Parameters ..... CHECK
5. Fuel Pump ..... OFF

• Note •

The Fuel Pump may be used for vapor suppression during climb. Fuel BOOST should be left ON above 6000 feet pressure altitude if takeoff was made with hot or warm fuel.

# Section 4 - Normal Procedures

## Normal Procedures

### Cruise

Normal cruising is performed between 55% and 85% power. The engine power setting and corresponding fuel consumption for various altitudes and temperatures can be determined by using the cruise data in Section 5.

The selection of cruise altitude is made based on the most favorable wind conditions and the desired power settings. These significant factors should be considered on every trip to reduce fuel consumption.

• Note •

For engine break-in, cruise at a minimum of 75% power until the engine has been operated for at least 25 hours or until oil consumption has stabilized. Operation at this higher power will ensure proper seating of the rings, is applicable to new engines, and engines in service following cylinder replacement or top overhaul of one or more cylinders.

1. Fuel Pump ..... OFF

• Note •

The Fuel Pump may be used for vapor suppression during cruise.

The Fuel Pump must be set to BOOST during maneuvering flight (i.e. flight training maneuvers, chandelles, stalls, etc.).

2. Cruise Power ..... SET
3. Mixture ..... LEAN as required
4. Engine Parameters ..... MONITOR

• Note •

Fuel BOOST must be used for switching from one tank to another. Failures to activate the Fuel Pump before transfer could result in delayed restart if the engine should quit due to fuel starvation.

5. Fuel Flow and Balance ..... MONITOR

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1. Fuel Pump ..... OFF

• Note •

The Fuel Pump may be used for vapor suppression during cruise.

2. Cruise Power..... SET
3. Mixture .....LEAN as required
4. Engine Parameters ..... MONITOR

• Note •

Fuel BOOST must be used for switching from one tank to another. Failures to activate the Fuel Pump before transfer could result in delayed restart if the engine should quit due to fuel starvation.

5. Fuel Flow and Balance ..... MONITOR

## Cruise Leaning

Exhaust gas temperature (EGT) may be used as an aid for mixture leaning in cruise flight. ***For "Best Power" use 75% power or less. For "Best Economy" use 65% power or less***. To adjust the mixture, lean to establish the peak EGT as a reference point and then adjust the mixture by the desired increment based on the following table:

| Mixture Description | Exhaust Gas Temperature |
|---|---|
| Best Power | 75° F Rich Of Peak EGT |
| Best Economy | 50° F Lean Of Peak EGT |

Under some conditions, engine roughness may occur while operating at best economy. If this occurs, enrich mixture as required to smooth engine operation. Any change in altitude or Power Lever position will require a recheck of EGT indication.

## Descent

1. Altimeter ..... SET
2. Cabin Heat/Defrost ..... AS REQUIRED
3. Landing Light ..... ON
4. Fuel System ..... CHECK
5. Mixture ..... AS REQUIRED
6. Brake Pressure ..... CHECK

## Before Landing

1. Seat Belt and Shoulder Harness ..... SECURE
2. Fuel Pump ..... BOOST
3. Mixture ..... AS REQUIRED
4. Flaps ..... AS REQUIRED
5. Autopilot ..... AS REQUIRED

# Landing

**• Caution •**

Landings should be made with full flaps. Landings with less than full flaps are recommended only if the flaps fail to deploy or to extend the aircraft's glide distance due to engine malfunction. Landings with flaps at 50% or 0%; power should be used to achieve a normal glidepath and low descent rate. Flare should be minimized.

Before landing, verify aircraft Center of Gravity does not fall in the landing limitation zone as depicted in the C.G. Envelope in section 2. Allow flight time for fuel burn so the landing C.G. falls outside of this zone.

## *Normal Landing*

Normal landings are made with full flaps with power on or off. Surface winds and air turbulence are usually the primary factors in determining the most comfortable approach speeds.

Actual touchdown should be made with power off and on the main wheels first to reduce the landing speed and subsequent need for braking. Gently lower the nose wheel to the runway after airplane speed has diminished. This is especially important for rough or soft field landings.

## *Short Field Landing*

For a short field landing in smooth air conditions, make an approach at 77 KIAS with full flaps using enough power to control the glide path (slightly higher approach speeds should be used under turbulent air conditions). After all approach obstacles are cleared, progressively reduce power to reach idle just before touchdown and maintain the approach speed by lowering the nose of the airplane. Touchdown should be made power-off and on the main wheels first. Immediately after touchdown, lower the nose wheel and apply braking as required. For maximum brake effectiveness, retract the flaps, hold the control yoke full back, and apply maximum brake pressure without skidding.

## *Crosswind Landing*

Normal crosswind landings are made with full flaps. Avoid prolonged slips. After touchdown, hold a straight course with rudder and brakes

as required. The maximum allowable crosswind velocity is dependent upon pilot capability as well as aircraft limitations. Operation in direct crosswinds of 20 knots has been demonstrated.

## Balked Landing/Go-Around

In a balked landing (go around) climb, disengage autopilot, apply full power, then reduce the flap setting to 50%. If obstacles must be cleared during the go around, climb at 75-80 KIAS with 50% flaps. After clearing any obstacles, retract the flaps and accelerate to the normal flaps up climb speed.

1. Autopilot ..... DISENGAGE
2. Power Lever ..... FULL FORWARD
3. Flaps ..... 50%
4. Airspeed ..... 75-80 KIAS

*After clear of obstacles:*

5. Flaps ..... UP

## After Landing

1. Power Lever ..... 1000 RPM
2. Fuel Pump ..... OFF
3. Flaps ..... UP
4. Transponder ..... STBY
5. Lights ..... AS REQUIRED
6. Pitot Heat ..... OFF

• Note •

As the airplane slows the rudder becomes less effective and taxiing is accomplished using differential braking.

## Shutdown

1. Fuel Pump (if used) ..... OFF
2. Throttle ..... IDLE
3. Ignition Switch ..... CYCLE

**• Caution •**

Note that the engine hesitates as the switch cycles through the "OFF" position. If the engine does not hesitate, one or both magnetos are not grounded. Prominently mark the propeller as being "Hot," and contact maintenance personnel immediately

4. Mixture ..... CUTOFF
5. All Switches ..... OFF
6. Magnetos ..... OFF
7. ELT ..... TRANSMIT LIGHT OUT

• Note •

After a hard landing, the ELT may activate. If this is suspected, press the RESET button.

8. Chocks, Tie-downs, Pitot Covers ..... AS REQUIRED

## Stalls

SR22 stall characteristics are conventional. Power-off stalls may be accompanied by a slight nose bobbing if full aft stick is held. Power-on stalls are marked by a high sink rate at full aft stick. Power-off stall speeds at maximum weight for both forward and aft C.G. positions are presented in Section 5 - Performance Data.

When practicing stalls at altitude, as the airspeed is slowly reduced, you will notice a slight airframe buffet and hear the stall speed warning horn sound between 5 and 10 knots before the stall. Normally, the stall is marked by a gentle nose drop and the wings can easily be held level or in the bank with coordinated use of the ailerons and rudder. Upon stall warning in flight, recovery is accomplished by immediately by reducing back pressure to maintain safe airspeed, adding power if necessary and rolling wings level with coordinated use of the controls.

**• WARNING •**

Extreme care must be taken to avoid uncoordinated, accelerated or abused control inputs when close to the stall, especially when close to the ground.

# Environmental Considerations

## Cold Weather Operation

### *Starting*

If the engine has been cold soaked, it is recommended that the propeller be pulled through by hand several times to break loose or limber the oil. This procedure will reduce power draw on the battery if a battery start is made.

When the engine has been exposed to temperatures at or below 20° Fahrenheit (-7° C) for a period of two hours or more, the use of an external pre-heater and external power is recommended. Failure to properly preheat a cold-soaked engine may result in oil congealing within the engine, oil hoses, and oil cooler with subsequent loss of oil flow, possible internal damage to the engine, and subsequent engine failure.

If the engine does not start during the first few attempts, or if engine firing diminishes in strength, the spark plugs have probably frosted over. Preheat must be used before another start is attempted.

**• WARNING •**

If airplane will be started using external power, keep all personnel and power unit cables well clear of the propeller rotation plane.

**• Caution •**

Inadequate application of preheat to a cold soaked engine may warm the engine enough to permit starting but will not de-congeal oil in the sump, lines, cooler, filter, etc. Congealed oil in these areas will require considerable preheat.

An engine that has been superficially warmed, may start and appear to run satisfactorily, but can be damaged from lack of lubrication due to the congealed oil blocking proper oil flow through the engine. The amount of damage will vary and may not become evident for many hours. However, the engine may be severely damaged and may fail shortly following application of high power. Proper procedures require thorough application of preheat to all parts of the engine. Hot air must be applied directly to the oil sump and external oil lines as well as the

cylinders, air intake and oil cooler. Because excessively hot air can damage non-metallic components such as composite parts, seals, hoses, and drives belts, do not attempt to hasten the preheat process.

1. Ignition Switch ..... OFF

**• WARNING •**

Use extreme caution when pulling the propeller through by hand. Make sure ignition switch is OFF, keys are out of ignition, and then act as if the engine will start. A loose or broken ground wire on either magneto could cause the engine to fire.

2. Propeller ..... Hand TURN several rotations
3. External Power (If applicable) ..... CONNECT
4. Brakes ..... HOLD
5. Bat Master Switches ..... ON (check voltage)
6. Mixture ..... FULL RICH
7. Power lever ..... FULL FORWARD
8. Fuel Pump ..... PRIME, then BOOST

• Note •

*Serials 0002 - 0278 before SB 22-73-01:* In temperatures down to 20°F, hold Fuel Pump switch to PRIME for 60-120 seconds prior to starting.

*Serials 0002 - 0278 after SB 22-73-01 and 0279 and subsequent*: In temperatures down to 20°F, hold Fuel Pump switch to PRIME for 15 seconds prior to starting.

9. Propeller Area ..... CLEAR
10. Power Lever ..... OPEN ¼ INCH

*(Continued on following page)*

11. Ignition Switch..... START (Release after engine starts)

• Caution •

Limit cranking to intervals of 20 seconds with a 20 second cooling period between cranks. This will improve battery and contactor life

12. Power Lever .....RETARD (to maintain 1000 RPM)
13. Oil Pressure ..... CHECK
14. Alt Master Switches .....ON
15. Avionics Power Switch .....ON
16. Engine Parameters ..... MONITOR
17. External Power (If applicable) ..... DISCONNECT
18. Amp Meter/Indication..... CHECK
19. Strobe Lights.....ON

## Hot Weather Operation

Avoid prolonged engine operation on the ground.

• Note •

Fuel BOOST must be ON for engine start and takeoff, and should be ON during climb for vapor suppression which could occur under hot ambient conditions or after extended idle.

# Noise Characteristics/Abatement

The certificated noise levels for the Cirrus Design SR22 established in accordance with FAR 36 Appendix G are:

| Configuration | Actual | Maximum Allowable |
|---|---|---|
| Hartzel 3-blade Propeller PHC-J3YF-1RF/F7694 | 83.65 dB(A) | 88.00 dB(A) |
| Hartzel 3-blade Propeller PHC-J3YF-1RF/F7693DF | 84.81 dB(A) | 88.00 dB(A) |
| McCauley 3-blade Propeller D3A34C443/78CYA-0 | 83.15 dB(A) | 88.00 dB(A) |
| MT 3-blade Propeller MTV-9-D/198-52 | 84.80 dB(A) | 88.00 dB(A) |

No determination has been made by the Federal Aviation Administration that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, into, or out of, any airport. The above noise levels were established at 3400 pounds takeoff weight and 2700 RPM.

Recently, increased emphasis on improving environmental quality requires all pilots to minimize the effect of airplane noise on the public. The following suggested procedures minimize environmental noise when operating the SR22.

• Note •

Do not follow these noise abatement procedures where they conflict with Air Traffic Control clearances or instructions, weather considerations, or wherever they would reduce safety.

1. When operating VFR over noise-sensitive areas, such as outdoor events, parks, and recreational areas, fly not less than 2000 feet above the surface even though flight at a lower level may be allowed.
2. For departure from or approach to an airport, avoid prolonged flight at low altitude near noise-sensitive areas.

# Fuel Conservation

Minimum fuel use at cruise will be achieved using the best economy power setting described under cruise.

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