

# OPERATING INSTRUCTIONS

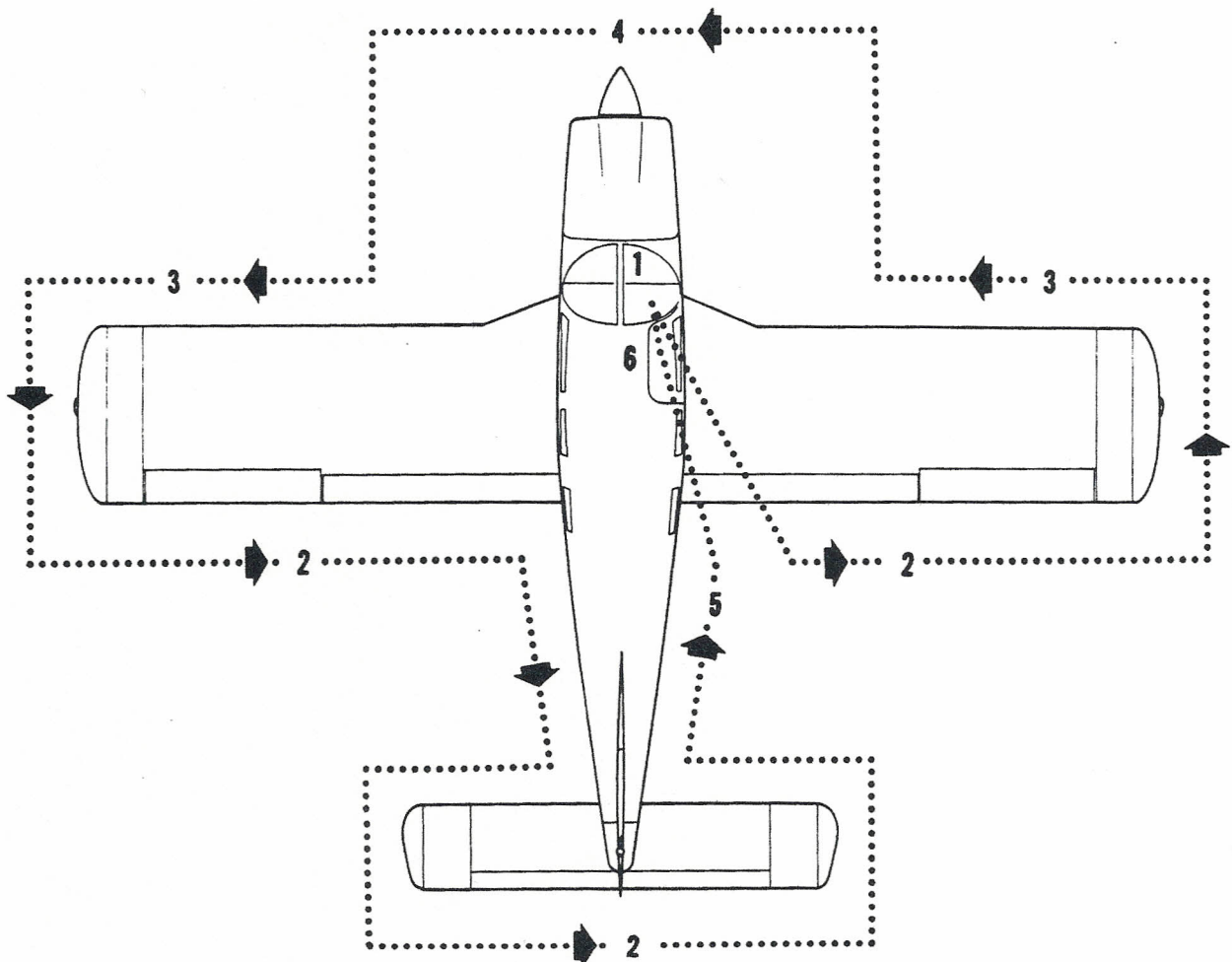
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## OPERATING INSTRUCTIONS

## PREFLIGHT

The airplane should be given a thorough visual inspection prior to each flight. Particular attention should be given to the following items:

1. Master switch and ignition OFF; landing gear switch DOWN; remove seat belt securing control wheel.
2. a. Check for external damage and operational interference of control surfaces or hinges.  
b. Insure that wings and control surfaces are free of snow, ice or frost.
3. a. Visually check fuel supply; secure caps.  
b. Drain all fuel system sumps and lines.  
c. Check that fuel system vents are open.  
d. Check landing gear shock struts for proper inflation (approximately 2 inches showing).  
e. Check hydraulic lines and landing gear cylinders for leaks.



- f. Check tires for cuts, wear and proper inflation.
- g. Check brake blocks and discs for wear and damage.
4. a. Check windshield for cleanliness.
- b. Check propeller and spinner for defects or nicks.
- c. Check for obvious fuel or oil leaks.
- d. Check oil level. (Insure dipstick is properly seated.)
- e. Check cowling and inspection covers for security.
- f. Check cowl scoop for obstructions.
- g. Check nose wheel tire for inflation or wear.
- h. Check nose gear shock strut for proper inflation (approximately 2-3/4 inches showing).
- i. Check hydraulic lines and landing gear cylinder for excessive leaks.
- j. Check for foreign matter in air inlet.
5. a. Stow tow bar and control locks if used.
- b. Check baggage for proper storage and security.
- c. Close and secure the baggage compartment door.
6. a. Upon entering airplane check that all primary flight controls operate properly, and that aircraft is properly loaded.
- b. Close and secure cabin door.
- c. Check that required papers are in order and in the airplane.

### STARTING ENGINE

After completion of the preflight inspection:

1. Set parking brakes ON.
2. Set the propeller control in full INCREASE RPM (control forward).
3. Select the desired tank with fuel selector valve.

### STARTING ENGINE WHEN COLD

1. Open the throttle approximately 1/2 inch.
2. Turn the master switch ON.
3. Turn the electric fuel pump ON.
4. Move the mixture control to FULL RICH until an indication on the fuel flow meter is noted. (Engine is primed.)
5. Move the mixture control to IDLE CUT-OFF.
6. Engage the starter by rotating magneto switch clockwise and pressing in.
7. When the engine fires, advance mixture control to FULL RICH and move throttle to the desired setting.
8. If the engine does not fire within five to ten seconds, disengage starter and reprime.

### STARTING ENGINE WHEN HOT

1. Open the throttle approximately 1/2 inch.
2. Turn the master switch ON.
3. Turn the electric fuel pump ON.
4. Put mixture control in IDLE CUT-OFF.
5. Engage the starter by rotating magneto switch clockwise and pressing in. When the engine fires, advance the mixture control and move the throttle to desired setting.



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## STARTING ENGINE WHEN FLOODED

1. Open the throttle full.
2. Turn the master switch ON.
3. Turn the electric fuel pump OFF.
4. Put mixture control in IDLE CUT-OFF.
5. Engage the starter by rotating the magneto switch clockwise and pressing in. When the engine fires, advance the mixture control and retard the throttle.

When the engine is firing evenly, advance the throttle to 800 RPM. If oil pressure is not indicated within 30 seconds, stop the engine and determine the trouble. In cold weather it will take a few seconds longer to get an oil pressure indication. If the engine has failed to start, refer to the "Engine Troubles and Their Remedies" section of the Lycoming Operating Handbook.

Starter manufacturers recommend that cranking periods be limited to 30 seconds with a two minute rest between cranking periods. Longer cranking periods will shorten the life of the starter.

## STARTING WITH EXTERNAL POWER\*

An optional feature known as Piper External Power (PEP) allows the operator to use an external battery to crank the engine without having to gain access to the aircraft battery.

The procedure is as follows:

1. Turn aircraft MASTER SWITCH to OFF.
2. Connect RED lead of PEP kit jumper cable to POSITIVE (+) terminal of external 12 volt battery and BLACK lead to NEGATIVE (-) terminal.
3. Insert plug of jumper cable into socket located on aircraft fuselage.
4. Turn aircraft MASTER SWITCH to ON and proceed with NORMAL engine starting technique.
5. After engine has been started, turn MASTER SWITCH to OFF and remove jumper cable plug from aircraft.
6. Turn aircraft MASTER SWITCH to ON and check alternator ammeter for indication of output. DO NOT ATTEMPT FLIGHT IF THERE IS NO INDICATION OF ALTERNATOR OUTPUT.

## WARM-UP AND GROUND CHECK

Warm-up the engine at 1400 to 1500 RPM for not more than two minutes in warm weather, four minutes in cold weather. Avoid prolonged idling at low RPM as this practice may result in fouled spark plugs. If necessary to hold before take-off, it is recommended that engine be operated at 1400-1500 RPM.

The magnetos should be checked at 2000 RPM with the propeller set at increase RPM. Drop off on either magneto should not exceed 175 RPM and the differential should be not more than 50 RPM. Prolonged operation on one magneto should be avoided.

\*Optional Equipment

Check vacuum gauge. Indicator should read 5" Hg  $\pm$  .1" Hg at 2000 RPM. Check both the oil temperature and pressure. The temperature may be low for some time if the engine is being run for the first time of the day, but as long as the pressure is within limits the engine is ready for takeoff. For air conditioner ground check, refer to page 7-10.

**Check the annunciator panel lights with the press-to-test button\*.**

The propeller control should be moved through its complete range to check for proper operation and then placed to full increase RPM for take-off. To obtain maximum RPM, push the pedestal-mounted control fully toward the instrument panel. In cold weather the propeller control should be cycled at least three times to ensure that warm engine oil has circulated through the system.

The electric fuel pump should be turned off momentarily during ground check to make sure that the engine driven pump is operating. The electric fuel pump should be on during take-off to prevent loss of power should the engine driven pump fail. The engine is warm enough for take-off when the throttle can be opened without the engine faltering.

### TAKE-OFF

Just before take-off the following items should be checked:

1. Fuel - on proper tank
2. Electric fuel pump - ON
3. Engine gauges - checked
4. Flight instruments - checked and set as required
5. Master Switch - ON
6. Alternate air - closed
7. Prop - set
8. Mixture - set
9. Seat backs - erect
10. Fasten belts/harness
11. Empty seats - seat belts snugly fastened
12. Flaps - exercised and set
13. Trim tab - set
14. Controls - free
15. Door - latched
16. Air condition - OFF

The takeoff technique is conventional for the Cherokee Arrow II. The tab should be set slightly aft of neutral, with the exact setting determined by the loading of the aircraft. Allow the airplane to accelerate to 60 to 70 MPH. Then ease back on the wheel enough to let the airplane fly from the ground.

\*Serial nos. 7535001 and up



**Short Field, Obstacle Clearance:**

Lower flaps to 25° (second notch), accelerate aircraft to 60-65 MPH and ease back on the wheel to rotate. After breaking ground, accelerate to best angle of climb speed, 85 MPH, select gear "up"\* and continue climb while accelerating to best rate of climb speed, 100 MPH, and slowly retract the flaps while climbing out.

**Soft Field, Obstacle Clearance:**

Lower flaps to 25° (second notch), accelerate aircraft, pull nose gear off as soon as possible and lift off at lowest possible airspeed. Accelerate just above the ground to best angle of climb speed, 85 MPH, select gear "up"\* and climb past obstacle clearance height. Continue climb while accelerating to best rate of climb speed, 100 MPH, and slowly retract the flaps.

**Soft Field, No Obstacle:**

Proceed as above after gear retraction, continue climb at best rate of climb speed, 100 MPH, and slow retract the flaps.

\*If desired, on aircraft equipped with backup gear extender, the "Override Engaged" position can be selected and latched before takeoff. The gear will now retract as soon as the gear selector switch is placed in the "up" position. Care should be taken not to retract the gear prematurely, in event aircraft should settle back onto the runway. If the override lock is used for takeoff, disengage as soon as sufficient terrain and obstacle clearance is obtained, to return the gear system to normal operation.

**CLIMB**

The best rate of climb at gross weight will be obtained at 95 MPH with gear down and 100 MPH with gear up. The best angle of climb may be obtained at 85 MPH with gear down and 96 MPH with gear up. For climbing en route a speed of 110 MPH is recommended. This will produce better forward speed and increase visibility over the nose during the climb, with little sacrifice in rate of climb. Air conditioner may be turned on after all obstacles have been cleared.

**STALLS**

Angle of Bank	Flaps 40°	Flaps Retracted
0°	64 MPH	71 MPH
20°	66 MPH	73 MPH
40°	73 MPH	81 MPH
60°	90 MPH	100 MPH

Power Off - Gear Up or Down - Gross Weight 2650 Lbs.

### CRUISING

The cruising speed of the Cherokee Arrow II is determined by many factors, including power setting, altitude, temperature, loading, and equipment installed on the airplane. The normal cruising power is 75% of the rated horsepower of the engine. True airspeeds which may be obtained at various altitudes and power settings can be determined from the charts in "Section XIII" of this manual.

When selecting RPM below 2400, limiting manifold pressure for continuous operation, as specified by the Lycoming Operator's Manual, should be observed.

To INCREASE power, first increase RPM (propeller control); then increase manifold pressure (throttle control).

To DECREASE power, first decrease manifold pressure (throttle); then decrease RPM (propeller control).

Use of the mixture control in cruising flight reduces fuel consumption significantly, especially at higher altitudes. The mixture should be leaned during cruising operation above 5000 feet altitude and at the pilot's discretion at lower altitudes when 75% power or less is being used. If any doubt exists as to the amount of power being used, the mixture should be in the FULL RICH position for all operations under 5000 feet.

To lean the mixture, disengage lock\* and pull the mixture control until the engine becomes rough, indicating that the lean mixture limit has been reached in the leaner cylinders. Then enrich the mixture by pushing the control toward the instrument panel until engine operation becomes smooth. The fuel flow meter will give a close approximation of the fuel being consumed.

If the airplane is equipped with the optional exhaust gas temperature (EGT) gauge, a more accurate means of leaning is available to the pilot. For this procedure, refer to the Avco Lycoming Operator's Manual.

The pilot should monitor weather conditions while flying and should be alert to conditions which might lead to icing. If icing conditions are encountered or induction system icing is suspected (uncommanded loss in manifold pressure or engine roughness), place the alternate air control in the ON position.

In order to keep the airplane in best lateral trim during cruising flight, the fuel should be used alternately from each tank. It is recommended that one tank be used for one hour after take-off, then the other tank be used for two hours, then return to the first tank for one hour. Each tank will then contain approximately 1/2 hour of fuel if tanks were full (24 gallons usable each tank) at take-off. Do not run tanks completely dry in flight.

#### NOTE

There are no mechanical uplocks in the landing gear system. In the event of a hydraulic system malfunction, the landing gear will free fall to the gear down and locked position. The pilot should be aware that the airplane true airspeed with gear down is approximately 75% of the gear retracted airspeed for any given power setting. Allowances for the reduction in airspeed and range should be made when planning extended flight between remote airfields or flight over water.

\*Serial nos. 7535001 and up



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## APPROACH AND LANDING

Before landing check list:

1. Seat backs - erect
2. Fasten belts/harness
3. Fuel - on proper tank
4. Fuel pump - ON
5. Mixture - set
6. Propeller - set
7. Gear - DOWN (150 MPH MAX)
8. Flaps - set (125 MPH)
9. Air conditioner - OFF

The airplane should be trimmed to an approach speed of about 90 MPH with the flaps and gear extended. The flaps can be lowered at speeds up to 125 MPH and the gear can be extended at speeds up to 150 MPH if desired. The propeller should be set at approximately 2600 RPM to facilitate ample power for emergency go-around and to prevent over-speeding of the engine if the throttle is advanced sharply. The mixture control should be kept in the full rich position to insure maximum acceleration if it should be necessary to open the throttle again.

The amount of flap used during landings and the speed of the aircraft at contact with the runway should be varied according to the landing surface and conditions of wind and airplane loading. It is generally good practice to contact the ground at the minimum possible safe speed consistent with existing conditions.

Normally, the best technique for short and slow landings is to use full flaps and enough power to maintain the desired approach flight path. The mixture should be full rich, fuel selector on the fullest tank, and the electric fuel pump on. The airspeed should be reduced during flare out and contact with the ground should be made close to stalling speed. After ground contact, the nose wheel should be held off. As the airplane slows down, the nose should be eased down and the brakes applied. There will be less chance of skidding the tires if the flaps are retracted before applying the brakes. Braking is most effective when back pressure is applied to the control wheel, putting most of the airplane weight on the main wheels without lifting the nose wheel. In high wind conditions, although it may be desirable to approach at higher than normal speeds, it is still desirable to make contact with the runway when the airplane is approximately at its minimum speed.

## STOPPING ENGINE

At the pilot's discretion, the flaps should be raised and the electric fuel pump turned off. After parking, the air conditioner and radios should be turned off, the propeller set to increase RPM and the engine then stopped by disengaging mixture control lock\* and pulling the mixture control to idle cut-off. The throttle should be left full aft to avoid engine vibration while stopping. Then the ignition and master switches should be turned off and the parking brake set.

\*Serial nos. 7535001 and up



## ARROW II

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### AIRSPEED DATA

All airspeeds quoted in this manual are calibrated unless otherwise noted. Calibrated airspeed is indicated airspeed corrected for instrument and position errors. The following table gives the correlation between indicated airspeed and calibrated airspeed if zero instrument error is assumed. This calibration is valid only when flown at maximum gross weight in level flight.

#### AIRSPEED CORRECTION TABLE

Flaps 0°														
IAS - MPH	60	70	80	90	100	110	120	130	140	150	160	170	180	
CAS - MPH	70	77	85	94	103	111	120	129	138	147	157	166	175	
Flaps 40°														
IAS - MPH	60	70	80	90	100	110	120							
CAS - MPH	67	74	82	91	100	109	118							

### MOORINGS

The Cherokee Arrow II should be moved on the ground with the aid of the nose wheel tow bar provided with each plane and secured in the baggage compartment. Tie down ropes may be secured to rings provided under each wing and to the tail skid. The aileron and stabilator control should be secured by looping the seat belt through the control wheel and pulling it snug. The rudder is held in position by its connections to the nose wheel steering and normally does not have to be secured. The flaps are locked when in the full up position and should be left retracted.

### WEIGHT AND BALANCE

It is the responsibility of the pilot to determine that the airplane remains within the allowable weight vs. center of gravity envelope while in flight. For weight and balance data see the Airplane Flight Manual and Weight and Balance form supplied with each airplane.

### EMERGENCY LOCATOR TRANSMITTER\*

The Emergency Locator Transmitter (ELT) when installed, is located in the aft portion of the fuselage just below the stabilator leading edge and is accessible through a plate on the right side of the fuselage. (On aircraft manufactured prior to mid-1975, this plate is retained by three steel Phillips head screws. On aircraft manufactured from mid-1975 and on, this plate is attached with three slotted-head nylon screws for ease of removal; these screws may be readily removed with a variety of common items such as a dime, a key, a knife blade, etc. If there are no tools available in an emergency the screw heads may be broken off by any means.) It is an emergency locator transmitter which meets the requirements of FAR 91.52. The unit operates on a self-contained battery.

\*Optional equipment

A battery replacement date is marked on the transmitter label. To comply with FAA regulations, the battery must be replaced on or before this date. The battery must also be replaced if the transmitter has been used in an emergency situation or if the accumulated test time exceeds one hour, or if the unit has been inadvertently activated for an undetermined time period.

On the unit itself is a three position selector switch labeled "OFF," "ARM" and "ON." The "ARM" position is provided to set the unit to the automatic position so that it will transmit only after impact and will continue to transmit until the battery is drained to depletion or until the switch is manually moved to the "OFF" position. The "ARM" position is selected when the transmitter is installed at the factory and the switch should remain in that position whenever the unit is installed in the airplane. The "ON" position is provided so the unit can be used as a portable transmitter or in the event the automatic feature was not triggered by impact or to periodically test the function of the transmitter.

Select the "OFF" position when changing the battery, when rearming the unit if it has been activated for any reason, or to discontinue transmission.

#### NOTE

If the switch has been placed in the "ON" position for any reason, the "OFF" position has to be selected before selecting "ARM." If "ARM" is selected directly from the "ON" position, the unit will continue to transmit in the "ARM" position.

A pilot's remote switch, located on the left side panel, is provided to allow the transmitter to be controlled from inside the cabin.

1. On some models the pilot's remote switch has three positions and is placarded "ON," "AUTO/ARM," and "OFF/RESET." The switch is normally left in the "AUTO/ARM" position. To turn the transmitter off, move the switch momentarily to the "OFF/RESET" position. The aircraft master switch must be "ON" to turn the transmitter "OFF." To activate the transmitter for tests or other reasons, move the switch upward to the "ON" position and leave it in that position as long as transmission is desired.
2. On other models the pilot's remote switch has two positions and is placarded "ON/RESET" and "ARM (NORMAL POSITION)." The switch is normally left in the down or "ARM" position. To turn the transmitter off, move the switch to the "ON/RESET" position for one second then return it to the "ARM" position. To activate the transmitter for tests or other reasons, move the switch upward to the "ON/RESET" position and leave it in that position as long as transmission is desired.

The locator should be checked during the ground check to make certain the unit has not been accidentally activated. Check by tuning a radio receiver to 121.5 MHz. If there is an oscillating sound, the locator may have been activated and should be turned off immediately. Reset to the "ARM" position and check again to insure against outside interference.



**NOTE**

If for any reason a test transmission is necessary, the test transmission should be conducted only in the first five minutes of any hour and limited to three audio sweeps. If tests must be made at any other time, the tests should be coordinated with the nearest FAA tower or flight service station.

**AIR CONDITIONING \***

To operate the air conditioning system either on the ground or in flight:

1. Start the engine (ground operation).
2. Turn the air conditioning "Master" switch to "ON."
3. Turn "TEMP" control to desired temperature. Clockwise rotation increases cooling.
4. Select desired "FAN" position, "LOW," "MED" or "HIGH."

**AIR CONDITIONER OPERATIONAL CHECK PROCEDURE**

Prior to take-off the air conditioner should be checked for proper operation as follows:

1. Check aircraft Master Switch ON.
2. Select desired "FAN" position, "LOW," "MED" or "HIGH."
3. Turn the air conditioner control switch to "ON" - the "Air Cond. Door Open" warning light will turn on, thereby indicating proper air conditioner condenser door actuation.
4. Turn the air conditioner control switch to "OFF" - the "Air Cond. Door Open" warning light will go out, thereby indicating the air conditioner condenser door is in the up position.
5. If the "Air Cond. Door Open" light does not respond as specified above, an air conditioner system or indicator bulb malfunction is indicated, and further investigation should be conducted prior to flight.

The above operational check may be performed during flight if an inflight failure is suspected.

**AIR CONDITIONER EFFECTS ON AIRPLANE PERFORMANCE**

Operation of the air conditioner will cause slight decreases in the cruise speed and range of the Cherokee Arrow II. Power from the engine is required to run the compressor, and the condenser door, when extended, causes a slight increase in drag. When the air conditioner is turned off there is normally no measurable difference in climb, cruise or range performance of the airplane.

**NOTE**

To insure maximum climb performance the air conditioner must be turned off manually before take-off to disengage the compressor and retract the condenser door. Also the air conditioner must be turned off manually before the landing approach in preparation for a possible go-around.

\*Optional equipment

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Although the cruise speed and range are only slightly affected by the air conditioner operation, these changes should be considered in preflight planning. To be conservative, the following figures assume that the compressor is operating continuously while the airplane is airborne. This will be the case only in extremely hot weather.

1. Decrease true airspeed - approximately 5 mph at normal cruise power setting.
2. Decrease range - may be as much as 30 statute miles for 48 gallon capacity.

When the full throttle is not used or in the event of malfunction which caused the compressor to operate and the condenser door to be extended, a decrease in rate of climb of as much as 100 feet per minute can be expected. Should a malfunction occur which prevents the condenser door retraction when the compressor is turned off, a decrease in rate of climb of as much as 50 feet per minute can be expected.