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SECTION 4
NORMAL PROCEDURES

4.1 GENERAL

This section provides the normal operating procedures for the PA-28R-201, Arrow airplane. All of the normal operating procedures required by the FAA, as well as those procedures which have been determined as necessary for the operation of the airplane, as determined by the operating and designed features of the airplane, are presented.

Normal operating procedures associated with optional systems and equipment which require handbook supplements are presented in Section 9, Supplements.

These procedures are provided to supply information on procedures which are not the same for all airplanes and as a source of reference and review. Pilots should familiarize themselves with these procedures to become proficient in the normal operation of the airplane.

This section is divided into two parts. The first part is a short form checklist supplying an action - reaction sequence for normal procedures with little emphasis on the operation of the systems. Numbers in parentheses after each checklist section indicate the paragraph where the corresponding amplified procedure can be found.

The second part of this section contains the amplified normal procedures which provide detailed information and explanations of the procedures and how to perform them. This portion of the section is not intended for use as an inflight reference due to the lengthy explanation. The short form checklists should be used on the ground and in flight. Numbers in parentheses after each paragraph title indicate where the corresponding checklist can be found.

4.3 AIRSPEEDS FOR SAFE OPERATIONS

The following airspeeds are those which are significant to the safe operation of the airplane. These figures are for standard airplanes flown at gross weight under standard conditions at sea level.

Performance for a specific airplane may vary from published figures depending upon the equipment installed, the condition of the engine, airplane and equipment, atmospheric conditions and piloting technique.

(a) Best Rate of Climb Speed	
gear up, flaps up	90 KIAS
gear down, flaps up	78 KIAS
(b) Best Angle of Climb Speed	
gear up, flaps up	78 KIAS
gear down, flaps up	72 KIAS
(c) Turbulent Air Operating Speed (See Subsection 2.3)	118 KIAS
(d) Maximum Flap Speed	103 KIAS
(e) Landing Final Approach Speed (Flaps 40°)	75 KIAS
(f) Maximum Demonstrated Crosswind Velocity	17 KTS

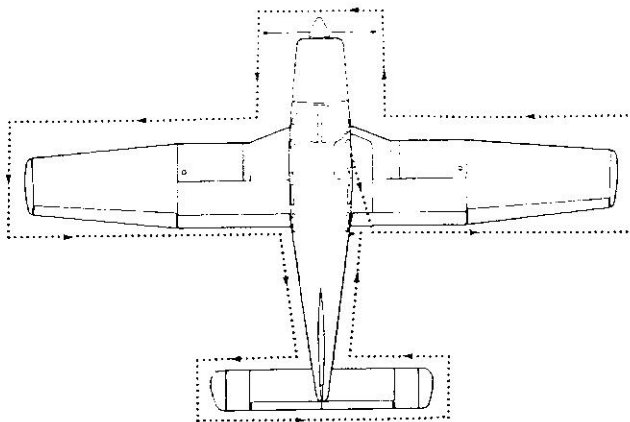
**WALK-AROUND**

Figure 4-1

4.5 NORMAL PROCEDURES CHECKLIST**4.5a Preflight Checklist (4.9)***CAUTION*

The flap position should be noted before boarding the airplane. The flaps must be placed in the UP position before they will lock and support weight on the step.

COCKPIT (4.9a)

Control Wheel.....	release restraints
Gear Handle	DOWN
Parking Brake	SET
Avionics.....	OFF
All Switches	OFF
Mixture.....	IDLE CUT-OFF
Magneto Switch	OFF
BATT MASTR Switch.....	ON

4.5a Preflight Checklist (4.9) (continued)

COCKPIT (4.9a) (continued)

- Fuel Gaugescheck QUANTITY
- Annunciator Panel.....CHECK
- BATT MASTR Switch.....OFF
- Primary Flight Controls.....PROPER OPERATION
- FlapsPROPER OPERATION
- Trim.....NEUTRAL
- Pitot and Static Systems.....DRAIN
- Windowscheck CLEAN
- Required Papers and POHcheck ON BOARD
- Tow Bar and BaggageSTOW PROPERLY - SECURE
- Baggage DoorCLOSE and SECURE

RIGHT WING (4.9b)

- Surface ConditionCLEAR of ICE, FROST, SNOW
- Flap and HingesCHECK
- Aileron and HingesCHECK
- Static Wicks.....CHECK - SECURE
- Wing Tip and LightsCHECK
- Fuel TankCHECK supply
visually - SECURE cap
- Fuel Tank Vent.....CLEAR

CAUTION

When draining any amount of fuel, care should be taken to ensure that no fire hazard exists before starting engine.

- Fuel Tank Sump.....DRAIN and CHECK
for water, sediment,
and proper fuel
- Tie Down and ChockREMOVE
- Main Gear StrutPROPER INFLATION
(2.0 +/- 0.25 in.)
- TireCHECK
- Brake Block and DiscCHECK
- Fresh Air InletCLEAR

NOSE SECTION (4.9c)

General Condition	CHECK
Cowling	SECURE
Oil	CHECK QUANTITY
Dipstick	PROPERLY SEATED
Oil Filler Cap	SECURE
Engine Baffle Seals	CHECK
Windshield	CLEAN
Propeller and Spinner	CHECK
Air Inlets	CLEAR
Alternator Belt	CHECK TENSION
Landing Light	CHECK
Chock	REMOVE
Nose Gear Strut	PROPER INFLATION (2.75 +/- 0.25 in.)
Nose Wheel Tire	CHECK

When draining any amount of fuel, care should be taken to ensure that no fire hazard exists before starting engine.

LEFT WING (4.9d)

Surface Condition	CLEAR of ICE, FROST, SNOW
Stall Warning Vane.....	CHECK
Fuel Tank	CHECK Supply visually - SECURE CAP
Fresh Air Inlet	CLEAR
Chock	REMOVE
Main Gear Strut	PROPER INFLATION (2.0 +/- 0.25 in.)
Tire.....	CHECK
Brake Block and Disc	CHECK
Fuel Tank Vent.....	CLEAR

When draining any amount of fuel, care should be taken to ensure that no fire hazard exists before starting engine.

4.5a Preflight Checklist (continued)

LEFT WING (4.9d) (continued)

- Fuel Tank Sump.....DRAIN and CHECK
for water, sediment,
and proper fuel
- Tie Down.....REMOVE
- Pitot Mast.....REMOVE COVER
- HOLE CLEAR
- Wing Tip and LightsCHECK
- Aileron and HingesCHECK
- Flap and HingesCHECK
- Static Wicks.....CHECK - SECURE

FUSELAGE (4.9e)

- AntennasCHECK
- Left Static Vent.....CLEAR
- Fresh Air InletCLEAR
- EmpennageCLEAR of ICE,
FROST, SNOW
- Stabilator and Trim TabCHECK
- Tie Down.....REMOVE
- Right Static Vent.....CLEAR
- BATT MASTR Switch.....ON
- Cockpit LightingCHECK
- Navigation and Strobe LightsCHECK
- Landing Light.....CHECK
- Stall Warning.....CHECK
- Pitot HeatCHECK
- All SwitchesOFF
- BATT MASTR Switch.....OFF
- Passengers.....BOARD
- Cabin Door.....CLOSE and SECURE
- Seat Belts and Harness.....FASTEN - CHECK
inertia reel

4.5b Before Starting Engine Checklist (4.11)

BEFORE STARTING ENGINE (4.11)

- Brakes.....SET
- Circuit Breakers.....IN
- Alternate Air.....OFF
- PropellerFULL INCREASE RPM
- Avionics.....OFF
- Fuel SelectorDESIRED TANK

4.5c Engine Start Checklist (4.13)**ENGINE START - GENERAL (4.13)****CAUTION**

Do not attempt flight if there is no indication of primary alternator output.

CAUTION

If a positive oil pressure is not indicated within 30 seconds following an engine start, stop the engine and determine the trouble. In cold weather it will take a few seconds longer to get a positive oil pressure indication.

NOTE

Starter manufacturer recommends starter cranking periods be limited to 10 seconds with a 20 second rest period between cranking attempts. Maximum of 6 start periods allowed. If start is not achieved on sixth attempt allow starter to cool for 30 minutes before attempting additional starts.

NORMAL START - COLD ENGINE (4.13)

Throttle.....	1/2 INCH OPEN
ALTR Switch	ON
BATT MASTR Switch.....	ON
Electric Fuel Pump	ON
Mixture.	RICH - then IDLE
	CUT-OFF
Propeller	CLEAR
Starter.....	ENGAGE
Mixture.....	FULL RICH
Throttle.	ADJUST
Oil Pressure	CHECK

4.5c Engine Start Checklist (4.13) (continued)

NORMAL START - HOT ENGINE (4.13b)

Throttle.....1/2 INCH OPEN
ALTR SwitchON
BATT MASTR SwitchON
Electric Fuel PumpON
Mixture.....IDLE CUT-OFF
PropellerCLEAR
Starter.....ENGAGE
Mixture.ADVANCE
Throttle.ADJUST
Oil Pressure.....CHECK

ENGINE START WHEN FLOODED (4.13c)

Throttle.....FULL OPEN
ALTR SwitchON
BATT MASTR Switch.....ON
Electric Fuel PumpOFF
Mixture.....IDLE CUT-OFF
PropellerCLEAR
Starter.....ENGAGE
Mixture.ADVANCE
Throttle.....RETARD
Oil Pressure.....CHECK

ENGINE START WITH EXTERNAL POWER SOURCE (4.13d)

BATT MASTR Switch.....OFF
ALTR Switch.....OFF
All Electrical Equipment.....OFF
TerminalsCONNECT
External Power PlugINSERT in receptacle

Proceed with normal start.

ThrottleLOWEST POSSIBLE RPM
External Power PlugREMOVE from receptacle
BATT MASTR Switch.....ON
ALTR SwitchON - CHECK AMMETER
Oil Pressure.....CHECK

4.5c Engine Start Checklist (4.13) (continued)**ENGINE START WITH EXTERNAL POWER SOURCE (4.13d)
(continued)****CAUTION**

It is possible to use the ship's battery in parallel by turning only the battery master switch ON. This will give longer cranking capabilities, but will not increase the amperage. Care should be exercised because if the ship's battery has been depleted, the external power supply can be reduced to the level of the ship's battery. This can be tested by turning only the battery master switch ON momentarily while the starter is engaged. If cranking speed increases, the ship's battery is at a higher level than the external power supply.

NOTE

For all normal operations using the PEP jumper cables, the battery master and alternator switches should be OFF.

4.5d Warm-Up Checklist (4.15)**WARM-UP (4.15)**

Throttle..... 1400 to 1500 RPM

4.5e Taxiing Checklist (4.17)**TAXIING (4.17)**

Taxi Area..... CLEAR
 Parking Brake..... RELEASE
 Propeller..... HIGH RPM
 Throttle..... APPLY SLOWLY
 Brakes..... CHECK
 Steering CHECK

4.5f Ground Check Checklist (4.19)**GROUND CHECK (4.19)**

Parking Brake..... SET
 Propeller..... FULL INCREASE
 Throttle..... 2000 RPM

4.5f Ground Check Checklist (4.19) (continued)

GROUND CHECK (4.19) (continued)

Magnetos	CHECK
	max. drop 175 RPM
	- max. diff. 50 RPM
Vacuum	4.8 to 5.1 inches Hg
Oil Temperature	CHECK
Oil Pressure	CHECK
Ammeter	CHECK
Annunciator Panel	PRESS-TO-TEST
Propeller	EXERCISE - then
	FULL INCREASE
Alternate Air	CHECK
Engine is warm for takeoff when throttle can be opened without engine faltering.	
Electric Fuel Pump	OFF
Fuel Pressure	CHECK
Throttle	RETARD

4.5g Before Takeoff Checklist (4.21)

BEFORE TAKEOFF (4.21)

BATT MASTR Switch	ON
ALTR Switch	ON
Flight Instruments	CHECK
Fuel Selector	PROPER TANK
Electric Fuel Pump	ON
Engine Gauges	CHECK
Alternate Air	CLOSED
Seat Backs	ERECT
Mixture	SET
Propeller	SET
Belts/Harness	FASTENED/CHECK
Empty Seats	SEAT BELTS
	SNUGLY FASTENED
Flaps	SET
Trim	SET
Emergency Gear Extension Lever	UP POSITION
Controls	FREE
Doors	LATCHED
Air Conditioner	OFF

4.5h Takeoff Checklist (4.23)

NORMAL TECHNIQUE (4.23a)

FlapsSET
Trim.....SET
Accelerate to 65 to 75 KIAS.
Control Wheel.....back pressure to ROTATE
smoothly to CLIMB ATTITUDE

SHORT FIELD, OBSTACLE CLEARANCE TECHNIQUE (4.23b)

Flaps25° (second notch)
Accelerate to 50 to 60 KIAS depending on aircraft weight.
Control Wheel.....back pressure to ROTATE
to CLIMB ATTITUDE
After breaking ground, accelerate to 55 to 65 KIAS depending on
aircraft weight.
GearUP
Accelerate to best gear up angle of climb speed - 78 KIAS, slowly retract
the flaps and climb past the obstacle.
Accelerate to best gear up rate of climb speed - 90 KIAS.

SOFT FIELD TECHNIQUE (4.23b)

Flaps25° (second notch)
Accelerate to 50 to 60 KIAS depending on aircraft weight.
Control Wheel.....back pressure to ROTATE
to CLIMB ATTITUDE
After breaking ground, accelerate to 55 to 65 KIAS depending on aircraft
weight.
GearUP
Accelerate to best gear up rate of climb speed - 90 KIAS.
FlapsRETRACT SLOWLY

4.5i Climb Checklist (4.25)

CLIMB (4.25)

Best Rate (2750 lb.) (Gear Up, Flaps Up)	90 KIAS
Best Rate (2750 lb.) (Gear Down, Flaps Up)	78 KIAS
Best Angle (2750 lb.) (Gear Up, Flaps Up)	78 KIAS
Best Angle (2750 lb.) (Gear Down, Flaps Up)	72 KIAS
En Route.....	104 KIAS
Electric Fuel Pump.....	OFF at desired altitude

4.5j Cruise Checklist (4.27)

CRUISE (4.27)

Reference performance charts, Avco-Lycoming Operator's Manual and power setting table.	
Normal Maximum Power	75%
Power.....	SET per power table
Mixture.....	ADJUST

4.5k Approach And Landing Checklist (4.29)

APPROACH AND LANDING (4.29)

Fuel Selector	PROPER TANK
Seat Backs	ERECT
Belts/Harness.....	FASTEN
Electric Fuel Pump.....	ON
Mixture.....	SET
Propeller	FULL INCREASE
Emergency Gear Extension Lever	UP POSITION
Gear	DOWN - 129 KIAS max
Flaps	SET - 103 KIAS max
Air Conditioner	OFF
Trim to 75 KIAS	

4.5m Stopping Engine Checklist (4.31)**STOPPING ENGINE (4.31)***CAUTION*

The flaps must be placed in the UP position for the flap step to support weight. Passengers should be cautioned accordingly.

FlapsRETRACT

Electric Fuel PumpOFF

Air ConditionerOFF

AvionicsOFF

Electrical SwitchesOFF

PropellerFULL INCREASE

ThrottleCLOSED

MixtureIDLE CUT-OFF

MagnetosOFF

ALTR SwitchOFF

BATT MASTR SwitchOFF

4.5n Mooring Checklist (4.33)**MOORING (4.33)**

Parking BrakeSET

FlapsFULL UP

Control WheelSECURED with belts

Wheel ChocksIN PLACE

Tie DownsSECURE

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4.7 AMPLIFIED NORMAL PROCEDURES (GENERAL)

The following paragraphs are provided to supply detailed information and explanations of the normal procedures necessary for the safe operation of the airplane.

4.9 PREFLIGHT CHECK (4.5a)

The airplane should be given a thorough preflight and walk-around check. The preflight should include a check of the airplane's operational status, computation of weight and C.G. limits, takeoff and landing distances, and in-flight performance. A weather briefing should be obtained for the intended flight path, and any other factors relating to a safe flight should be checked before takeoff.

4.9a Cockpit (4.5a)

CAUTION

The flap position should be noted before boarding the airplane. The flaps must be placed in the UP position before they will lock and support weight on the step.

Upon entering the cockpit, release the seat belts securing the control wheel. Check that the landing gear selector handle is in the DOWN position and set the parking brake. Ensure that all avionics and electrical switches are OFF. Check that the mixture is in the idle cut-off and the magneto switch is OFF. Turn ON the battery master (BATT MASTR) switch; check the fuel quantity gauges for adequate supply and check that the annunciator panel illuminates. Turn OFF the battery master (BATT MASTR) switch. Check the primary flight controls and flaps for proper operation and set the trim to neutral. Open the pitot and static drains to remove any moisture that has accumulated in the lines. Check the windows for cleanliness and that the required papers and POH are on board. Properly stow the tow bar and baggage and secure. Close and secure the baggage door.

4.9b Right Wing (4.5a)

Begin the walk-around at the trailing edge of the right wing by checking that the wing surface and control surfaces are clear of ice frost, snow or other extraneous substances. Check the flap, aileron and hinges for damage and operational interference. Static wicks should be firmly attached and in good condition. Check the wing tip and lights for damage.

4.9 PREFLIGHT CHECK (4.5a) (continued)

4.9b Right Wing (4.5a) (continued)

Open the fuel cap and visually check the fuel color. The quantity should match the indication that was on the fuel quantity gauge. Replace cap securely. The fuel tank vent should be clear of obstructions.

CAUTION

When draining any amount of fuel, care should be taken to ensure that no fire hazard exists before starting engine.

Drain a fuel sample from the fuel tank into a container, through the quick drain located at the lower inboard rear corner of the tank. Make sure that enough fuel has been drained to ensure that all water and sediment is removed; check for proper fuel. The fuel system should be drained daily prior to the first flight and after each refueling.

Remove the tie down and chock.

Next, a complete check of the landing gear. Check the gear strut for proper inflation, there should be 2.0 +/- 0.25 inches of strut exposure under a normal static load. Check the tire for cuts, wear, and proper inflation. Make a visual check of the brake block and disc.

Check that the fresh air inlet is clear of foreign matter.

4.9c Nose Section (4.5a)

Check the general condition of the nose section and check for oil or fluid leakage and that the cowling is secure. Check the oil level; make sure that the dipstick has been properly seated and the oil cap properly secured. Check the engine baffle seals. Check the windshield and clean if necessary. The propeller and spinner should be checked for detrimental nicks, cracks, or other defects. The air inlets should be clear of obstructions and check the alternator belt for proper tension. The landing light should be clean and intact.

Remove the chock and check the nose gear strut for proper inflation; there should be 2.75 +/- 0.25 inches of strut exposure under a normal static load. Check the tire for cuts, wear, and proper inflation.

4.9 PREFLIGHT CHECK (4.5a) (continued)**4.9c Nose Section (4.5a) (continued)***CAUTION*

When draining any amount of fuel, care should be taken to ensure that no fire hazard exists before starting engine.

Open the fuel strainer located on the left side of the firewall long enough to remove any accumulation of water and sediment.

4.9d Left Wing (4.5a)

The wing surface should be clear of ice, frost, snow, or other extraneous substances. Check the stall warning vane for condition and freedom of movement. Open the fuel cap and visually check the fuel color. The quantity should match the indication that was on the fuel quantity gauge. Replace fuel cap securely. Check that the fresh air inlet is clear of foreign matter and remove the chock.

Check the main gear strut for proper inflation; there should be 2.0 +/- 0.25 inches of strut exposure under a normal static load. Check the tire for cuts, wear, and proper inflation. Make a visual check of the brake block and disc.

CAUTION

When draining any amount of fuel, care should be taken to ensure that no fire hazard exists before starting engine.

The fuel tank vent should be clear of obstructions. Drain enough fuel into a container to ensure that all water and sediment has been removed; check for proper fuel.

Remove tie down and remove the cover from the pitot mast on the underside of the wing. Make sure the hole is open and clear of obstructions. Check the wing tip and lights for damage. Check the aileron, flap, and hinges for damage and operational interference and that the static wicks are firmly attached and in good condition.

4.9e Fuselage (4.5a)

Check the condition and security of the antennas and that the ports in the left side static pad are clear. The empennage should be clear of ice, frost, snow, or other extraneous substances. Check that the fresh air inlet on the left side of the fuselage is clear. Check the stabilator and trim tab for damage and operational interference; the trim tab should move in the same direction as the stabilator. Remove the tie down. Check that the ports in the right side static pad are clear.

4.9 PREFLIGHT CHECK (4.5a) (continued)

4.9e Fuselage (4.5a) (continued)

Upon returning to the cockpit, an operational check of the interior lights, exterior lights, stall warning system, and pitot heat should now be made. Turn the battery master switch and other appropriate switches ON. Check the panel lighting and the overhead flood light. Visually confirm that exterior lights are operational. Lift the stall detector on the leading edge of the left wing and determine that the warning horn is activated. With the pitot heat switch ON the pitot head will be hot to the touch. After these checks are complete, the battery master (BATT MASTR) switch and all electrical switches should be turned OFF.

Board the passengers and close and secure the cabin door. Fasten the seat belts and shoulder harness and check the function of the inertia reel by pulling sharply on the strap. Fasten seat belts on empty seats.

4.10 ENGINE START - GENERAL

CAUTION:

Do not attempt flight if there is no indication of engine output.

CAUTION:

If a positive oil pressure is not indicated within 30 seconds following an engine start, stop the engine and determine the trouble. In cold weather it will take a few seconds longer to get a positive oil pressure indication.

NOTE:

Starter manufacturer recommends starter cranking periods be limited to 10 seconds with a 20 second rest period between cranking attempts. Maximum of 6 start periods allowed. If start is not achieved on sixth attempt allow starter to cool for 30 minutes before attempting additional starts.

4.11 BEFORE STARTING ENGINE (4.5b)

Before starting the engine, set the parking brake ON. Check that all circuit breakers are in and that the alternate air is OFF. Move the propeller control to the full INCREASE rpm position. Ensure that all avionics switches are OFF. Set the fuel selector to the desired tank.

4.13 ENGINE START (4.5c)

4.13a Normal Start - Cold Engine (4.5c)

Open the throttle lever approximately 1/2 inch. Turn ON the alternator and battery master switches, and the electric fuel pump. Move the mixture control to full RICH until an indication is noted on the fuel flow meter. The engine is now primed.

Move the mixture control to idle cut-off, check that the propeller area is clear, and engage the starter by rotating the magneto switch clockwise. When the engine fires, release the magneto switch, advance the mixture control to full RICH and move the throttle to the desired setting. Check the oil pressure.

If the engine does not fire within five to ten seconds, disengage the starter and reprime.

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4.13 ENGINE START (4.5c) (continued)**4.13b Normal Start - Hot Engine (4.5c)**

Open the throttle approximately 1/2 inch. Turn ON the alternator and battery master switches, and the electric fuel pump. The mixture control lever should be in idle cut-off. Check that the propeller area is clear, and engage the starter by rotating the magneto switch clockwise. When the engine fires, release the magneto switch, advance the mixture, and move the throttle to the desired setting. Check the oil pressure.

4.13c Engine Start When Flooded (4.5c)

The throttle lever should be full OPEN. Turn ON the alternator and battery master switches, and turn OFF the emergency fuel pump. The mixture control lever should be in idle cut-off. Check that the propeller area is clear, and engage the starter by rotating the magneto switch clockwise. When the engine fires, release the magneto switch, advance the mixture, and retard the throttle. Check the oil pressure.

4.13d Engine Start With External Power Source (4.5c)

An optional feature called the Piper External Power (PEP) allows the operator to use an external battery to crank the engine without having to gain access to the airplane's battery.

Turn OFF the alternator switch, the battery master switch, and all electrical equipment. Connect the RED lead of the PEP kit jumper cable to the POSITIVE (+) terminal of an external 12-volt battery and the BLACK lead to the NEGATIVE (-) terminal. Insert the plug of the jumper cable into the socket located on the fuselage. Note that when the plug is inserted, the electrical system is ON. Proceed with the normal starting technique.

After the engine has started, reduce power to the lowest possible rpm and disconnect the jumper cable from the aircraft. Turn the alternator and battery master switches ON. Check the alternator ammeter for an indication of output. **DO NOT ATTEMPT FLIGHT IF THERE IS NO INDICATION OF ALTERNATOR OUTPUT.**

CAUTION

It is possible to use the ship's battery in parallel by turning only the battery master switch ON. This will give longer cranking capabilities, but will not increase the amperage. Care should be exercised because if the ship's battery has been depleted, the external power supply can be reduced to the level of the ship's battery. This can be tested by turning only the battery master switch ON momentarily while the starter is engaged. If cranking speed increases, the ship's battery is at a higher level than the external power supply.

4.13 ENGINE START (4.5c) (continued)

4.13d Engine Start With External Power Source (4.5c) (continued)

NOTE

For all normal operations using the PEP jumper cables, the battery master and alternator switches should be OFF.

When the engine is firing evenly, advance the throttle to 800 rpm. If oil pressure is not indicated within thirty 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 Lycoming Operating Handbook, Engine Troubles and Their Remedies.

Starter manufacturer recommends starter cranking periods be limited to 10 seconds with a 20 second rest period between cranking attempts. Maximum of 6 start periods allowed. If start is not achieved on sixth attempt allow starter to cool for 30 minutes before attempting additional starts.

4.15 WARM-UP (4.5d)

Warm-up the engine at 1400 to 1500 rpm. Avoid prolonged idling at low rpm, as this practice may result in fouled spark plugs.

Takeoff may be made as soon as the ground check is completed, provided that the throttle may be opened without backfiring or skipping, and without a reduction in engine oil pressure.

Do not operate the engine at high rpm when running up or taxiing over ground containing loose stones, gravel or any loose material that may cause damage to the propeller blades.

4.17 TAXIING (4.5e)

Before attempting to taxi the airplane, ground personnel should be instructed and approved by a qualified person authorized by the owner. Ascertain that the propeller back blast and taxi areas are clear.

Release the parking brake and apply power slowly to start the taxi roll. Taxi a few feet forward and apply the brakes to determine their effectiveness. Taxi with the propeller set in low pitch, high rpm setting. While taxiing, make slight turns to ascertain the effectiveness of the steering.

4.17 TAXIING (4.5e) (continued)

Observe wing clearances when taxiing near buildings or other stationary objects. If possible, station an observer outside the airplane.

Avoid holes and ruts when taxiing over uneven ground.

Do not operate the engine at high rpm when running up or taxiing over ground containing loose stones, gravel or any loose material that may cause damage to the propeller blades.

4.19 GROUND CHECK (4.5f)

Set the parking brake and check that the propeller control is set at high rpm. Advance the throttle to 2000 rpm for checking the magnetos. Drop off on either magneto should not exceed 175 rpm and the difference between the magnetos should not exceed 50 rpm. Operation on one magneto should not exceed 10 seconds.

Check the vacuum gauge; the indicator should read between 4.8 and 5.1 inches Hg at 2000 rpm. Retard the throttle. Check both oil temperature and oil pressure. The temperature may be low for some time if the engine is being run for the first time of the day. The engine is warm enough for takeoff when the throttle can be opened without the engine faltering. Check the ammeter for proper alternator output.

Check the annunciator panel lights with the press-to-test button. Also check the alternate air.

The propeller control should be moved through its complete range to check for proper operation, and then placed in full INCREASE rpm for takeoff. To obtain maximum rpm, push the pedestal mounted control fully forward on the instrument panel. Do not allow a drop of more than 500 rpm during this check. In cold weather the propeller control should be cycled from high to low rpm at least three times before takeoff to make sure that warm engine oil has circulated.

Turn the electric fuel pump OFF after starting or during warm-up and check the fuel flow/pressure gauge to make sure that the engine driven pump is operating. Prior to takeoff, the electric pump should be turned ON again to prevent loss of power during takeoff should the engine driven pump fail.