IO-580-B1A Operation and Installation Manual

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FAA Approved

LYCOMING

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Williamsport, PA 17701

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IO-580-B1A Operation and Installation Manual

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ATTENTION

OWNERS, OPERATORS, AND MAINTENANCE PERSONNEL

This manual contains a description of the engine, its specifications, and detailed information on how to operate and install it. This manual is FAA Approved and complies with FAR 33.5 and is intended for use by owners, pilots and maintenance personnel responsible for care of Lycoming powered aircraft. Modifications and repair procedures are contained in the Lycoming Maintenance and Overhaul Manual; maintenance personnel should refer to these for such procedures.

SAFETY WARNING

MAINTENANCE MUST BE PERFORMED BY QUALIFIED AND PROPERLY CERTIFIED PERSONNEL. NEGLECTING TO FOLLOW THE OPERATING INSTRUCTIONS AND TO CARRY OUT PERIODIC MAINTENANCE PROCEDURES CAN RESULT IN POOR ENGINE PERFORMANCE AND POWER LOSS. ALSO, IF POWER AND SPEED LIMITATIONS SPECIFIED IN THIS MANUAL ARE EXCEEDED, FOR ANY REASON, DAMAGE TO THE ENGINE AND PERSONAL INJURY CAN HAPPEN. CONSULT YOUR LOCAL FAA APPROVED MAINTENANCE FACILITY.

SERVICE PUBLICATIONS

Lycoming service publications and subscriptions are available through Lycoming distributors or direct from the factory.

NOTE

The illustrations, pictures and drawings shown in this publication are typical of the subject matter they portray; in no instance are they to be interpreted as examples of any specific engine, equipment or part thereof.

IMPORTANT SAFETY NOTICE

Proper service and repair is essential to increase the safe, reliable operation of all aircraft engines. The service procedures recommended by Lycoming are effective methods for performing service operations. Some of these service operations require the use of tools specially designed for the task. These special tools must be used when and as recommended.

It is important to note that this manual uses the following Notes, Cautions and Warnings which must be carefully read in order to minimize the risk of personal injury or the use of improper service methods that may damage the engine or render it unsafe.

NOTE	Read for added information and reminders.
⚠ ***CAUTION***	Equipment damage may result if instructions are not followed.
⚠ ***WARNING***	Personal injury could result if instructions are not followed.

It is also important to understand that these Warnings and Cautions are not all inclusive. Lycoming could not possibly know, evaluate or advise the service trade of ail conceivable ways in which service might be done or of the possible hazardous consequences that may be involved. Accordingly, anyone who uses a service procedure must first satisfy themselves thoroughly that neither their safety nor aircraft safety will be jeopardized by the service procedure they select.

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DESCRIPTION

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SECTION I

PART 1
DESCRIPTION

The IO-580-B1A is a direct drive, six cylinder, fuel injected, horizontally opposed, air cooled engine. This engine is supplied with automotive type starter. Drives for two (2) AN type accessories and propeller governor are included.

In referring to the location of the various components, the parts are described in their relationship to the engine as installed in the airframe. Thus the power take-off end is considered the front and the accessory drive end the rear. The sump section is considered the bottom and the opposite side of the engine where the shroud tubes are located is the top. Reference to the left and right side is made with the observer facing the rear of the engine. The cylinders are numbered from front to rear, odd numbers on the right, even numbers on the left. The direction of rotation for accessory drives is determined with the observer facing the drive pad. The direction of rotation of the crankshaft, viewed from the rear, is clockwise.

Cylinders – The cylinders are of conventional air-cooled construction with the two major parts, head and barrel, screwed and shrunk together. The heads are made from an aluminum alloy casting with a fully machined combustion chamber. Rocker shaft bearing supports are integral with the head along with housings to form the rocker boxes for both valve rockers. The cylinder barrels, which are machined from chrome nickel molybdenum steel forgings, have deep integral cooling fins and the inside of the barrels are ground and honed to a specified finish.

Valve Operating Mechanism – A conventional type camshaft is located above and parallel to the crankshaft. The camshaft actuates hydraulic tappets which operate the valves through push rods and valve rockers. The valve rockers are supported on full-floating steel shafts. The valve springs bear against hardened steel seats and are retained on the valve stems by means of split keys.

Crankcase – The crankcase assembly consists of two reinforced aluminum alloy castings, fastened together by means of studs, bolts, and nuts. The mating surfaces of the two castings are joined without the use of a gasket, and the main bearing bores are machined for use of precision type main bearing inserts.

Crankshaft – The crankshaft is made from a chrome nickel molybdenum steel forging. All bearing journal surfaces are nitrided. Freedom from torsional vibration is assured by a system of pendulum type dynamic counterweights.

Connecting Rods – The connecting rods are made in the form of "H" sections from alloy steel forgings. They have replaceable bearing inserts in the crankshaft ends and bronze bushings in the piston ends. The bearing caps on the crankshaft ends are retained by two bolts and nuts through each cap.

Pistons – The pistons are machined from an aluminum alloy forging. The piston pin is a full floating type with a plug located in each end of the pin. The pistons are machined for three rings and may employ either half-wedge or full-wedge rings.

Accessory Housing – The accessory housing is made from an aluminum casting fastened to the rear of the crankcase and the top rear of the sump. It forms a housing for the oil pump and the various accessory drives.

Oil Sump and Induction Assembly – The oil sump incorporates a baffle assembly, two oil drain plugs and an oil suction screen. It is bolted to the bottom of the crankcase. The induction housing is bolted to the bottom of the oil sump, and the intake pipes are inserted into the housing. The fuel injector is mounted forward on the induction housing.

Cooling System – This engine is designed to be cooled by air pressure actuated by the forward speed of the aircraft. Baffles are provided to build up a pressure and force the air through the cylinder fins. The air is then exhausted to the atmosphere through gills or augmentor tubes usually located at the rear of the cowling.

Induction System – This engine is equipped with a Precision Airmotive RSA type fuel injection system based on the principle of measuring air flow and using the air flow signal in a stem type regulator to convert the air force into a fuel force. This fuel force (fuel pressure differential) when applied across the fuel metering section (jetting system) makes fuel flow proportional to air flow.

Magnetos – This engine is equipped with two magnetos, a plain type on the right side and a retard type on the left. The direction of rotation for the magneto shafts is clockwise. The engine firing order is 1-4-5-2-3-6 and the spark advance is 20°.

SECTION I

PART 2
SPECIFICATIONS

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SECTION I

PART 2

1. SPECIFICATIONS.

Model Designation	IO-580-B1A
FAA Type Certificate	E00004NY
Rated horsepower	315
Rated speed, RPM	2700
Bore, inches	5.319
Stroke, inches	4.375
Displacement, cubic inches	583
Compression ratio	8.9:1
Firing order	1-4-5-2-3-6
Spark occurs, degrees BTC	20°
Valve rocker clearance (hydraulic tappets collapsed)	.028-.080
Prop. drive ratio	1:1
Prop. driven rotation	Clockwise

2. Standard Engine, Dry Weight (Includes all engine accessories except alternator.)

IO-580-B1A	444 lbs.

3. Moments of Inertia (Standard Dry Weight, all

About the axis parallel to the crankshaft centerline (Ixg)	84 in. lb. sec²
About the vertical axis (Izg)	145.8 in. lb. sec²
About the axis parallel to the centerline (Iyg)	93.5 in. lb. sec²

4. Accessory Drives

*Accessory Drive	Drive Ratio	**Direction of Rotation
Starter	16.556:1	Counter-Clockwise
Alternator	3.200:1	Clockwise
Vacuum Pump	1.300:1	Counter-Clockwise
Hydraulic Pump	1.385:1	Clockwise
Tachometer	.500:1	Clockwise
Propeller Governor	.947:1	Clockwise
Magneto Drive	1.500:1	Clockwise
Fuel Pump – AN (Gear Driven)	1.000:1	Counter-Clockwise

* - When applicable.
** - Viewed facing drive pad.

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SECTION I

PART 3
OPERATING INSTRUCTIONS

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SECTION I

PART 3

1. GENERAL.

Close adherence to these instructions will greatly contribute to the long life, economy and satisfactory operation of the engine.

NOTE

YOUR ATTENTION IS DIRECTED TO THE WARRANTIES THAT APPEAR IN THE FRONT OF THIS MANUAL REGARDING ENGINE SPEED, THE USE OF SPECIFIED FUELS AND LUBRICANTS, REPAIRS AND ALTERATIONS. PERHAPS NO OTHER ITEM OF ENGINE OPERATION AND MAINTENANCE CONTRIBUTES QUITE SO MUCH TO SATISFACTORY PERFORMANCE AND LONG LIFE AS THE CONSTANT USE OF CORRECT GRADES OF FUEL AND OIL, CORRECT ENGINE TIMING, AND FLYING THE AIRCRAFT AT ALL TIMES WITHIN THE SPEED AND POWER RANGE SPECIFIED FOR THE ENGINE. DO NOT FORGET THAT VIOLATION OF THE OPERATION AND MAINTENANCE SPECIFICATIONS FOR YOUR ENGINE WILL NOT ONLY VOID YOUR WARRANTY BUT WILL SHORTEN THE LIFE OF YOUR ENGINE AFTER ITS WARRANTY PERIOD HAS PASSED.

New engines have been carefully run-in by Lycoming and therefore, no further break-in is necessary insofar as operation is concerned; however, new or newly overhauled engines should be operated using only the recommended lubricating oils. Refer to Oil Requirements, Section 8.d.

NOTE

Cruising should be done at 65% to 75% power until a total of 50 hours has been accumulated or the oil consumption has stabilized. This is to insure the proper seating of the rings as is applicable to new engines and engines in service following cylinder replacement or top overhaul of one or more cylinders.

The minimum fuel octane rating is listed in the flight chart, Part 9 of this section. Under no circumstances should fuel of a lower octane rating or automotive fuel (regardless of octane rating) be used.

2. PRESTARTING ITEMS OF MAINTENANCE.

Before starting the aircraft engines for the first flight of the day, the following items of maintenance inspection should be performed in conjunction with the aircraft Pilot's Operating Handbook preflight check.

(a) Be sure all switches are in the "Off" position.

(b) Be sure magneto ground wires are connected.

(c) Check oil level.

(d) Check fuel level.

(e) Check fuel and oil line connections, note minor indications for repair at 50 hour inspection. Repair any leaks before aircraft is flown.

(f) Open the fuel drain to remove any accumulation of water and sediment.

(g) Make sure all shields and cowling are in place and secure. If any are missing or damaged, repair or replacement should be made before the aircraft is flown.

(h) Check engine controls for general condition, travel and freedom of operation.

(i) Induction system air filter should be inspected and serviced in accordance with the airframe manufacturer's recommendations.

3 STARTING PROCEDURES.

The following starting procedures are recommended; however, the starting characteristics of various installations will necessitate some variation from these procedures.

NOTE

Cranking periods should be limited from ten (10) to twelve (12) seconds with 5 minutes rest between cranking periods.

(a) *Cold Engine.*

(1) Perform pre-flight inspection.

(2) Set propeller governor in "Full RPM".

(3) Turn fuel valve to "on" position.

(4) Open throttle approximately ¼ inch travel.

(5) Turn boost pump on and move mixture control to "Full Rich" position until a slight but steady flow is indicated.

(6) Return mixture control to "Idle Cut-Off" position.

(7) Set magneto selector switch. Consult aircraft manufacturer's handbook for correct position.

(8) Engage starter.

(9) When engine starts, place magneto selector switch in "Both" position.

(10) Move mixture control slowly and smoothly to "Full Rich".

(11) Check oil pressure gage for indicated pressure. If oil pressure is not indicated within thirty seconds, stop the engine and determine trouble.

NOTE

If engine fails to achieve a normal start, assume it to be flooded. Crank engine over with throttle wide open and ignition off. Then repeat above procedure.

Hot Engine – Because fuel percolates, the system must be cleared of vapor; it is recommended that the same procedure, as outlined above be used for starting a hot engine.

4. COLD WEATHER STARTING.

During extreme cold weather, it may be necessary to preheat the engine and oil before starting.

5. GROUND RUNNING AND WARM-UP.

Subject engines are air pressure cooled and depend on the forward movement of the aircraft to maintain proper cooling. Particular care is necessary, therefore, when operating these engines on the ground. To prevent overheating, it is recommended that the following precautions be observed.

NOTE

Any ground check that requires full throttle operation must be limited to three minutes, or less if indicated cylinder head temperature should exceed the maximum stated in this manual.

(a) Head the aircraft into the wind.

(b) Leave mixture in "Full Rich".

(c) Operate the engine on the ground only with the propeller in minimum blade angle setting.

(d) Warm up at approximately 1000-1200 RPM. Avoid prolonged idling and do not exceed 2200 RPM on the ground.

(e) Engine is warm enough for take-off when the throttle can be opened without the engine faltering.

6. GROUND CHECK.

(a) Warm up as directed above.

(b) Check both oil pressure and oil temperature.

(c) Leave mixture in "Full Rich".

(d) (Where applicable) Move the propeller control through its complete range to check operation and return to full low pitch position. Full feathering check (twin engine) on the ground is not recommended but the feathering action can be checked by running the engine between 1000-1500 RPM; then momentarily pulling the propeller control into the feathering position. Do not allow the RPM to drop more than 500 RPM.

(e) A proper magneto check is important. Additional factors, other than the ignition system, affect magneto drop-off. They are load-power output, propeller pitch and mixture strength. The important thing is that the engine runs smoothly because magneto drop-off is affected by the variables listed above. Make the magneto check in accordance with the following procedures.

(1) (Controllable Pitch Propeller) With propeller in minimum pitch angle, set the engine to produce 50-65% power as indicated by the manifold pressure gage. Mixture control should be in the full rich position. At these settings, the ignition system and spark plugs must work harder because of the greater pressure within the cylinders. Under these conditions, ignition problems can occur. Mag checks at low power settings will only indicate fuel-air distribution quality.

NOTE

Aircraft that are equipped with fixed pitch propellers, or not equipped with manifold pressure gage, may check magneto drop-off with engine operating at approximately 2100-2200 RPM.

(2) Switch from both magnetos to one and note drop-off; return to both until engine regains speed and switch to the other magneto and note drop-off, then return to both. Drop-off should not exceed 175 RPM and should not exceed 50 RPM between magnetos. A smooth drop-off past normal is usually a sign of a too lean or too rich mixture.

(f) Do not operate on a single magneto for too long a period; a few seconds is usually sufficient to check drop-off and will minimize plug fouling.

7. *OPERATING IN FLIGHT.*

(a) Subject engines are equipped with a dynamic counterweight system and must be operated accordingly. Use a smooth, steady movement (avoid rapid opening and closing) of the throttle.

(b) See airframe manufacturer's instructions for recommended power settings.

8. *FUEL MIXTURE LEANING PROCEDURE.*

Improper fuel/air mixture during flight is responsible for many engine problems, particularly during take-off and climb power settings. The procedures described in this manual provide proper fuel/air mixture when leaning Lycoming engines; they have proven to be both economical and practical by eliminating excessive fuel consumption and reducing damaged parts replacement. It is therefore recommended that operators, of all Lycoming aircraft power-plants, utilize the instructions in this publication any time the fuel/air mixture is adjusted during flight.

Manual leaning may be monitored by exhaust gas temperature indication, fuel flow indication, and by observation of engine speed and/or airspeed. However, whatever instruments are used in leaning the mixture, the following general rules should be observed by the operator of Lycoming aircraft engines.

GENERAL LEANING RULES

Never exceed the maximum red line cylinder head temperature limit.

For maximum service life, cylinder head temperatures should be maintained below 435°F. (224°C.) during high performance cruise operation and below 400°F. (205°C.) for economy cruise powers.

On engines with manual mixture control, maintain mixture control in "Full Rich" position for rated take-off, climb and maximum cruise powers (above approximately 75%). However, during take-off from high elevation airport or during climb, roughness or loss of power may result from over-richness. In such a case adjust mixture control only enough to obtain smooth operation – not for economy. Observe instruments for temperature rise. Rough operation due to over-rich fuel/air mixture is most likely to be encountered at altitudes above 5,000 feet.

Always return the mixture to full rich before increasing power settings.

Operate the engine at maximum power mixture for performance cruise powers and at best economy mixture for economy cruise power; unless otherwise specified in the airplane owners manual.

During let-down flight operations it may be necessary to manually lean carbureted or fuel injected engines to obtain smooth operation.

(a) Leaning to Exhaust Gas Temperature.
(Normally aspirated engines with fuel injectors or carburetors)

(1) *Maximum Power Cruise (approximately 75% power)* – Never lean beyond 150°F. on rich side of peak EGT unless aircraft operator's manual shows otherwise. Monitor cylinder head temperatures.

(2) *Best Economy Cruise (approximately 75% power and below)* – Operate at peak EGT.

(b) Leaning to Flowmeter.

Lean to applicable fuel-flow tables or lean to indicator marked for correct fuel-flow for each power setting.

9. ENGINE FLIGHT CHART.

(a) Fuel Requirements.

*100/100LL Octane, Minimum Aviation Grade Fuel

NOTE

Aviation grade 100LL fuels in which the lead content is limited to 2 c.c. per gal. are approved for continuous use.

(b) Fuel Pressure, psi	Min.	Max.	Idle Min.
Inlet to fuel pump	-2	35	
Inlet to fuel injector	18	55	12

(c) Oil Requirements

Average Ambient Air	*Recommended Grade Oil MIL-L-6082B or SAEJ1966 Spec. Mineral Grades Grades	 MIL-L-22851 or SAEJ1899 Spec. Ashless Dispersant Grades
All Temperatures	---	SAE15W50 or SAE20W-50
Above 80°F.	SAE 60	SAE60
Above 60°F.	SAE 50	SAE40 or SAE50
30°F. to 90°F.	SAE 40	SAE40
0°F. to 70°F.	SAE 30	SAE40, SAE30, SAE20W40
0°F. to 90°F	SAE20W50	SAE20W50 or SAE15W50
Below 10°F.	SAE 20	SAE30 or SAE20W-30

* - In new, newly overhauled, or rebuilt engines or following the replacement of one or more cylinders, mineral oil only shall be used during the first 50 hours of operation.

(d) Oil Sump Capacity

IO-580-B1A ..... 11 U.S. Qts.
(Minimum safe quantity in sump) ..... 4 U.S. Qts.

(e) Oil Pressure, psi	Maximum	Minimum	Idling	Start and Warm-up
Normal Operation	95	55	25	115

(f) Oil Temperature: The maximum permissible oil temperature is 235°F. (118°C.). For maximum engine life, desired oil temperature should be maintained between 165°F. (73.8°C.) and 200°F. (93.3°C.) in level-flight cruise conditions.

(g) Fuel and Oil Consumption

Operation	RPM	HP	Fuel Cons. Gal/Hr.	Max. Oil Cons. Qts./Hr.	*Max. Cyl. Head Temp.
Normal Rated	2700	315	----	1.0	465°F. (260°C.)
Performance Cruise (75% Rated)	2450	225	18.0	0.75	465°F. (260°C.)
Economy Cruise (60% Rated)	2350	180	12.8	0.60	465°F. (260°C.)

* - At Bayonet Location – For maximum service life of the engine maintain cylinder head temperatures between 150°F. and 435°F. during continuous operation.

10. ENGINE SHUT DOWN.

(a) Set propeller at minimum blade angle.

(b) Idle until there is a decided decrease in cylinder head temperature.

(c) Move mixture control to "Idle Cut-Off".

(d) When engine stops, turn ignition switch off.

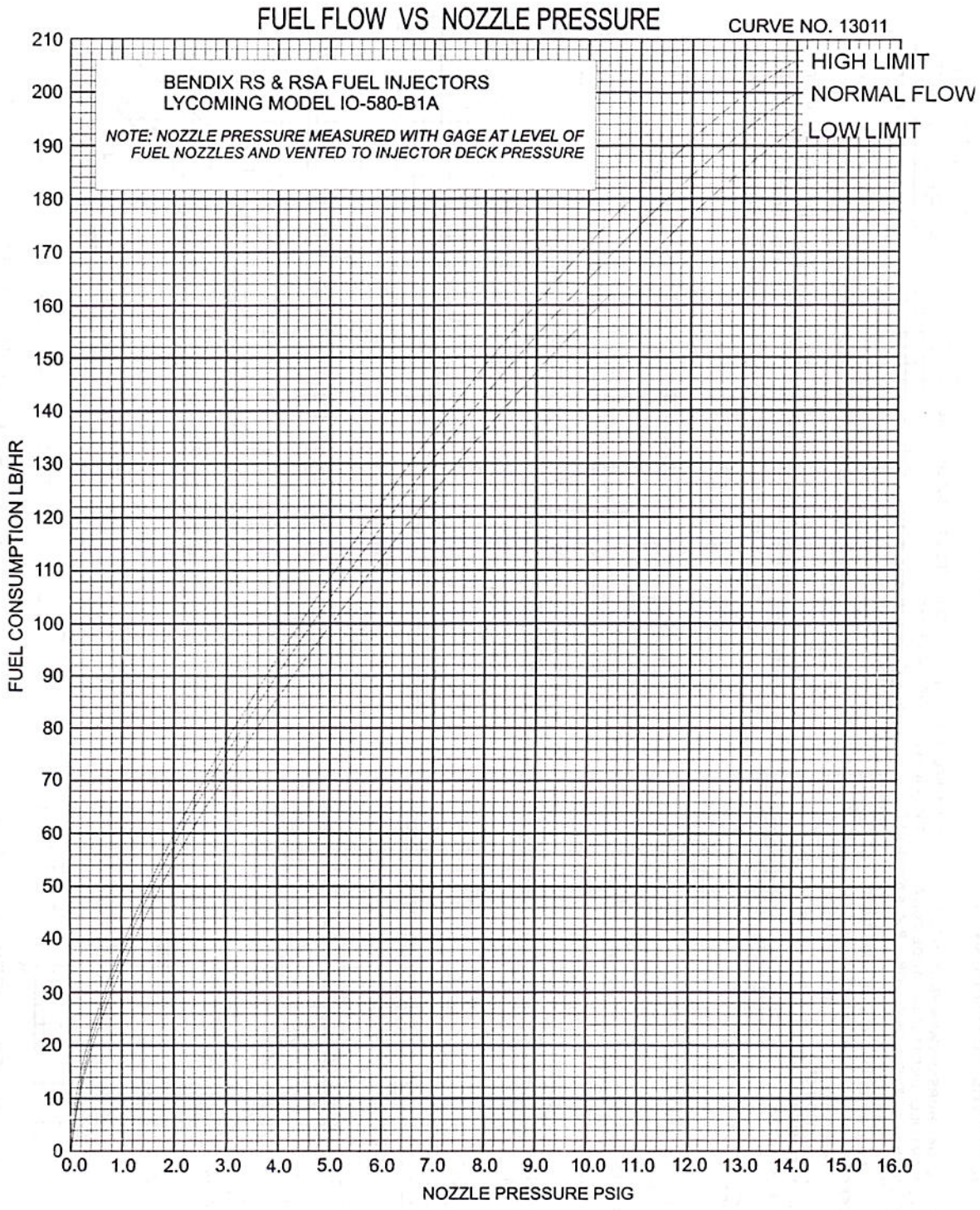

Figure 3-1. Part Throttle Fuel Consumption

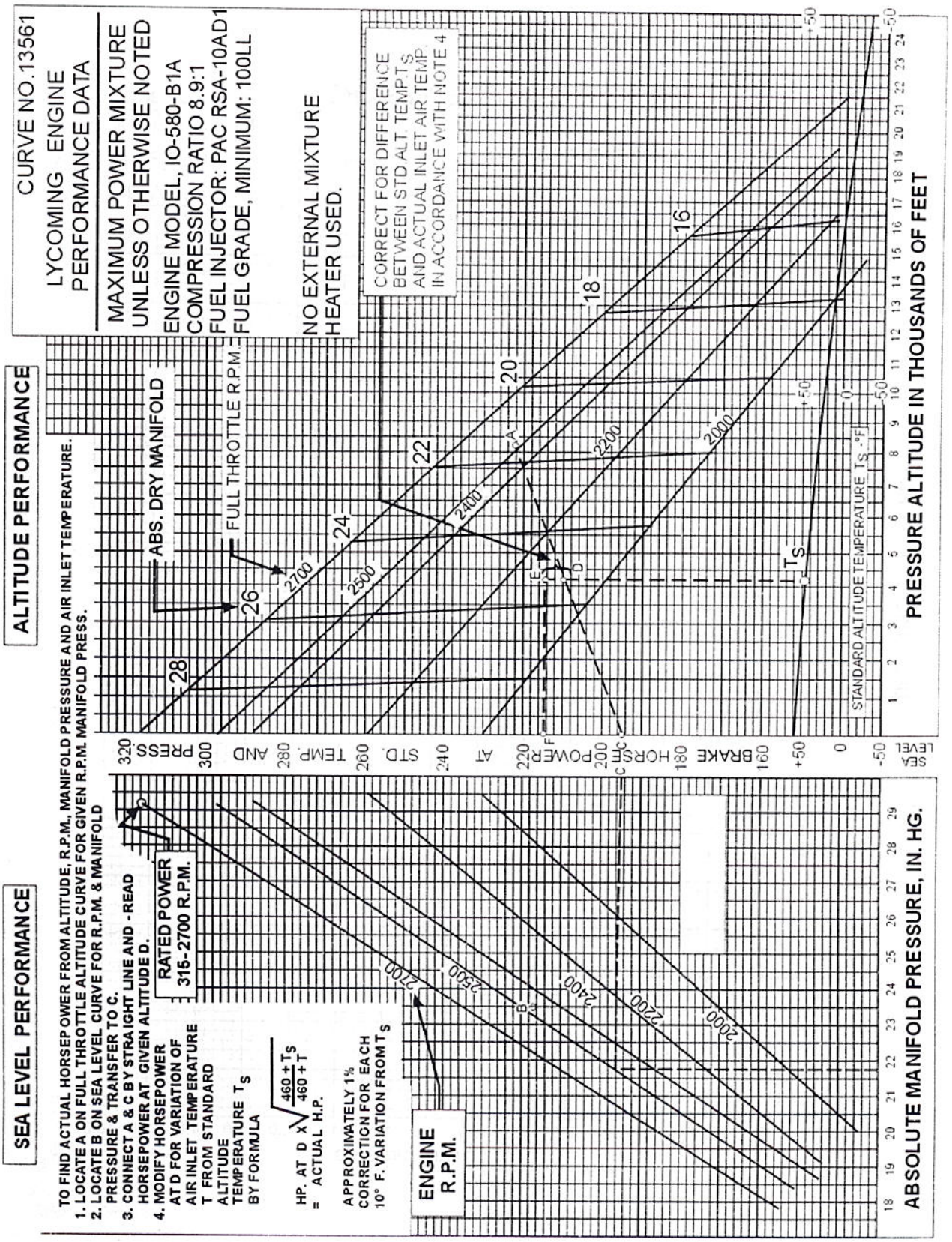

Figure 3-2. Sea Level and Altitude Performance Curve

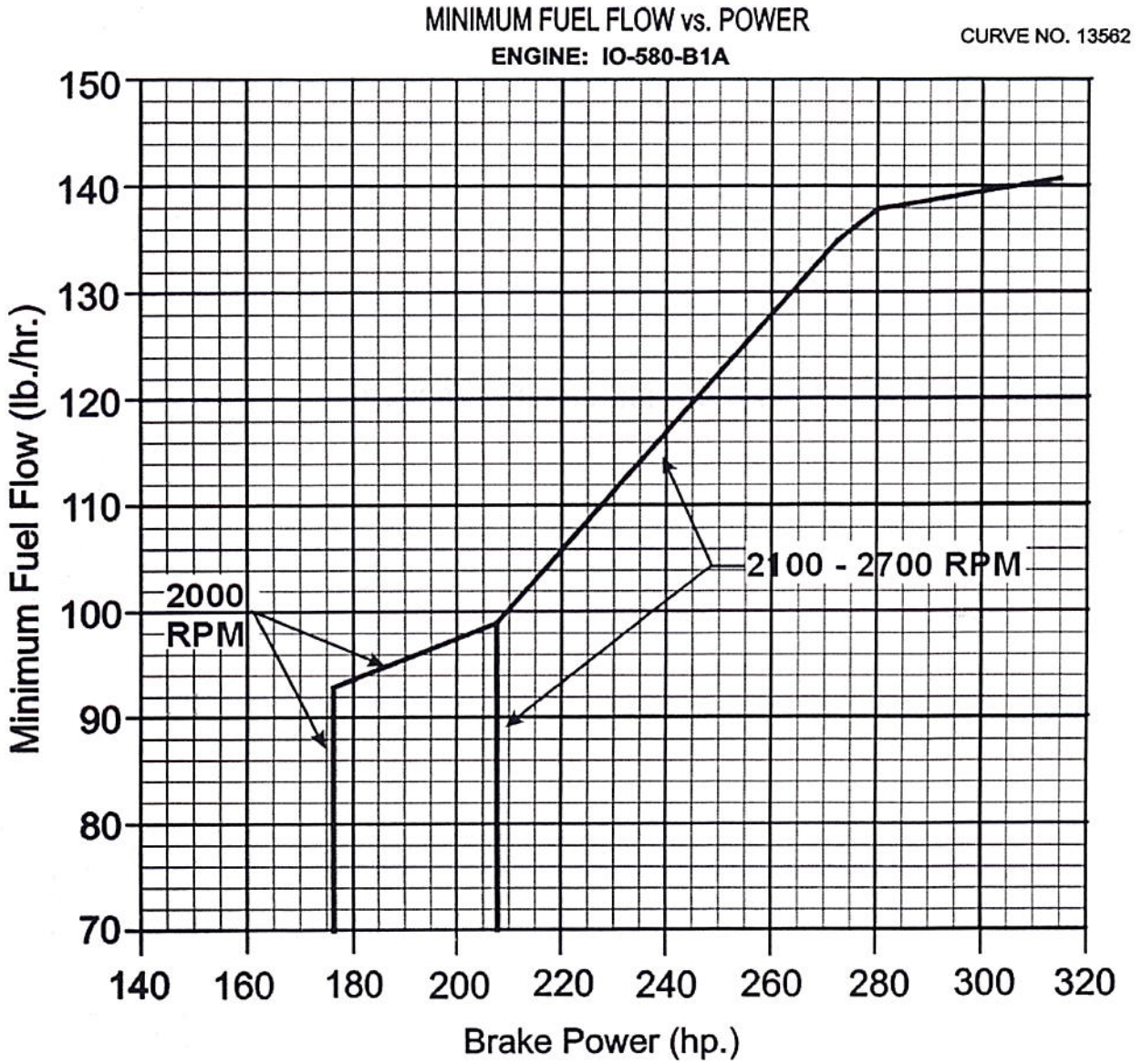

Figure 3-3. Minimum Fuel Flow vs. Power

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SECTION II

PART 1
PREPARATION

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SECTION II

PART 1
PREPARATION OF ENGINE FOR INSTALLATION

Each Lycoming engine undergoes a thorough preservative treatment before leaving the factory. To protect the cylinders and related parts, preservative oil is sprayed into each cylinder. Careful uncrating and uninhibiting of the engine is very important to prevent any of the preservative oil from entering the induction system.

1. UNCRATING.

The Lycoming IO-580-B1A engine has been carefully packed for shipment to prevent damage in transit and to ensure that the engine reaches its destination in perfect condition.

NOTE

Any engine that has been stored in a cold area must be brought into an area with a temperature of at least 70°F (21°C) for 24 hours before uncrating. If this is not possible, the preservative oil in the engine must be warmed to facilitate draining by heating the cylinders with heat lamps.

a. Remove the top of the crate and set it aside.

b. Lift and set aside any packing materials from on top of the engine.

c. Connect an engine lifting cable to a winch, hoist, or crane able to support a minimum load of 750 lbs.

d. Connect the engine lifting cable to the lifting lugs on the top of the engine.

e. Lift the engine from the crate.

2. UNIHIBITING ENGINE.

⚠ *CAUTION*

Do not rotate the crankshaft of an engine containing preservative oil before removing the bottom spark plugs. Engine damage will result.

⚠ *CAUTION*

Avoid contact of preservation oil with painted surfaces. If preservation oil does contact a painted surface, clean it off with a solvent as soon as possible.

a. Remove all the bottom spark plugs.

b. Turn the crankshaft three or four revolutions by hand.

c. Tilt the engine to one side until the spark plug holes on that side are oriented vertically.

d. Rotate the crankshaft at least two revolutions and allow the oil to drain out through the spark plug holes.

e. Repeat steps (3) and (4) for the opposite side of the engine.

f. Inspect the spark plugs before reinstalling them. If they are not clean, wash them in clean oil-based solvent. Dry them with compressed air.

g. Remove the oil sump plug and allow any preservative oil that has accumulated in the sump to drain.

h. Remove the oil screen and clean it with a hydrocarbon-based solvent such as Varsol or equivalent.

i. Reinstall the oil screen.

j. If a constant speed propeller is to be used, the expansion plug must be removed from the crankshaft. Pierce a 1/8" to 3/16" hole in the center of the plug to remove it.

k. Replace the oil sump plug and install a safety wire. Refer to Maintenance and Overhaul Manual for lockwire information.

l. Fill the sump with 11 quarts of aviation-grade oil. Refer to Section I, Part 2 for oil recommendations.

m. Inspect the induction riser to ensure that it is clean and dry. If a significant amount of preservative oil is noted, clean, reinspect, and reinstall the intake pipes.

3. *PREPARATION OF FUEL INJECTOR.*

a. Remove the fuel inlet strainer and clean it with a hydrocarbon-based solvent such as Varsol or equivalent.

b. Inspect the fuel supply lines, fuel manifold, throttle body, and "bullet nose" venturi to ensure they are clean and dry.

c. Reassemble the injector. Inject clean fuel into the fuel inlet connection with the fuel outlets uncapped until clean fuel flows from the outlets. Do not exceed 15 psi inlet pressure.

⚠ *CAUTION*

Dispose of used engine preservative and solvents in accordance with all applicable federal, state, and local environmental regulations.

NOTE

If a small amount of preservative oil remains in the engine, it will not be harmful; however, during the first oil change, the oil should be drained while the engine is hot. This will remove any residual preservative oil.

SECTION II

PART 2
PROCEDURES

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SECTION II

PART 2

1. INSTALLING ENGINE.

a. Refer to Figures 2-1 through 2-3 for dimensions and connection locations.

b. If the engine is to be installed in an airframe from which an engine has previously been removed, inspect the engine mounts to ensure they are not bent, misaligned, distorted, or damaged.

⚠ *CAUTION*

Distorted, misaligned, bent, or damaged engine mounts may cause engine or airframe damage or engine failure.

c. Refer to the airframe manufacturer's instructions for attaching the engine to the engine mounts.

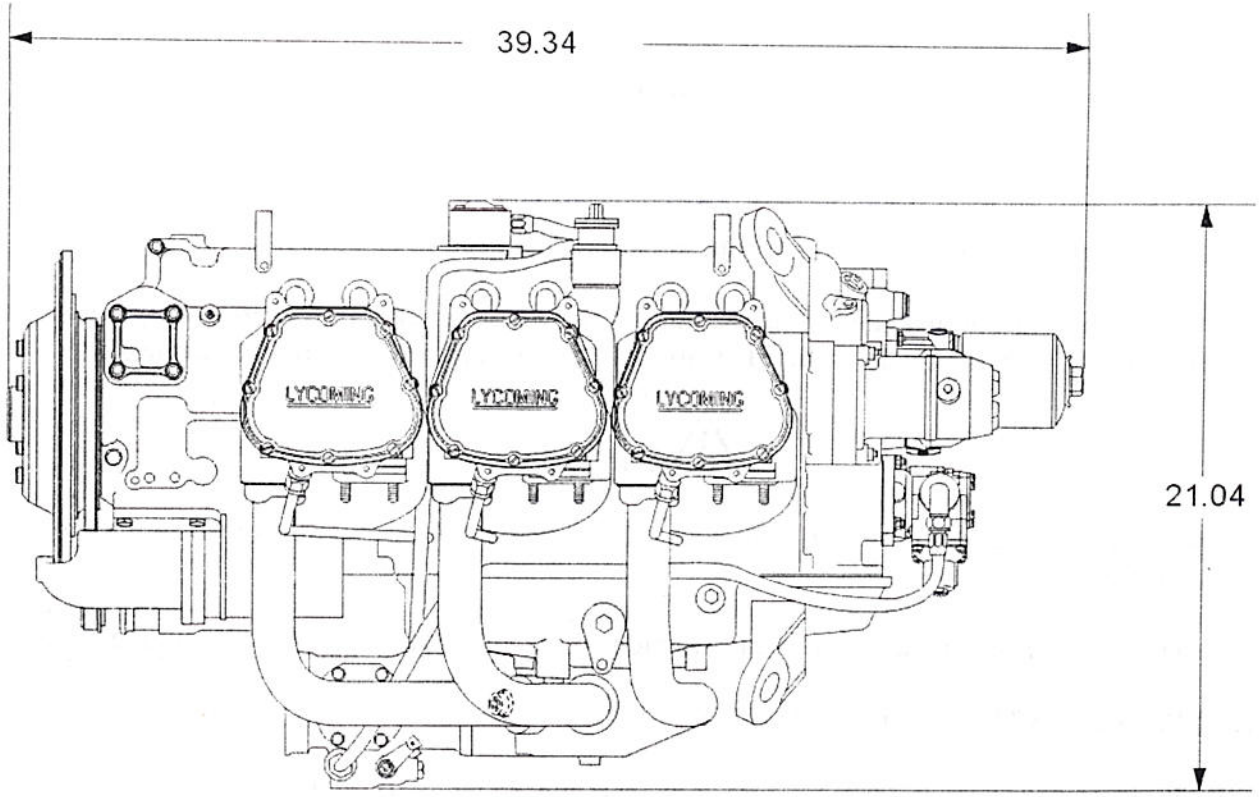
2. CONNECTING EXTERNAL ACCESSORIES.

a. Refer to installation drawing, Figure 2-3. Remove cover plate and gasket. When installing the accessory, use the gasket and hardware specified by the airframe manufacturer. Torque to the value specified for the thread size in the Table of Limits, IO-580-B1A Maintenance and Overhaul Manual.

b. Connect oil and fuel supply lines and any reporting devices, sensors, and senders per the airframe manufacturer's instructions. Refer to Figures 2-2 and 2-3 for connection locations.

Table 2-1.

Accessory	Location	Thread Size
Accessory Pad 1	Upper Right Side of Accessory Housing	¼-20
Accessory Pad 2	Lower Right Side of Accessory Housing	¼-20
Prop. Governor Pad	Upper Left Front of Crankcase	5/16-18



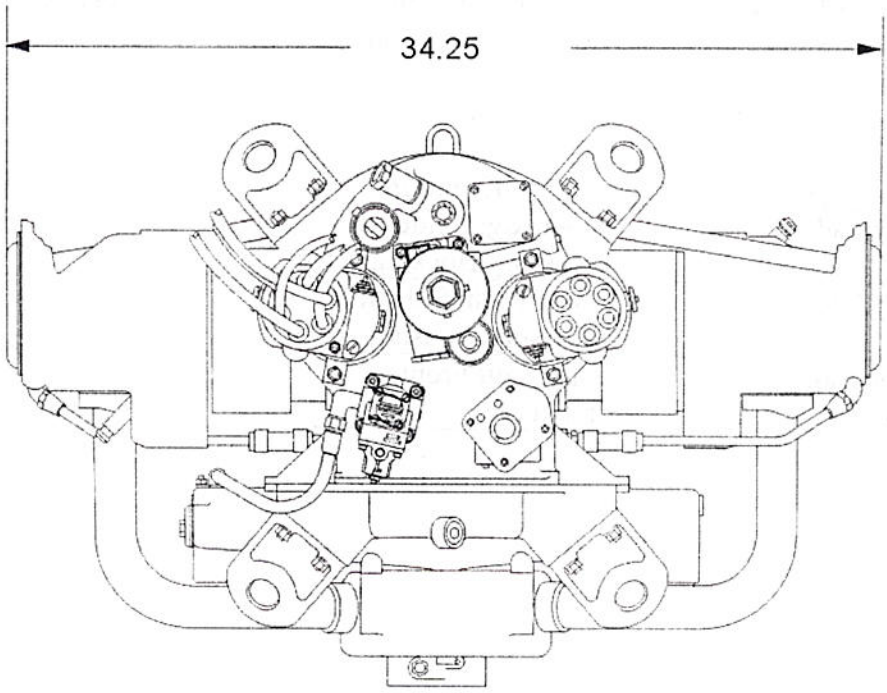


Figure 2-1. Dimensions

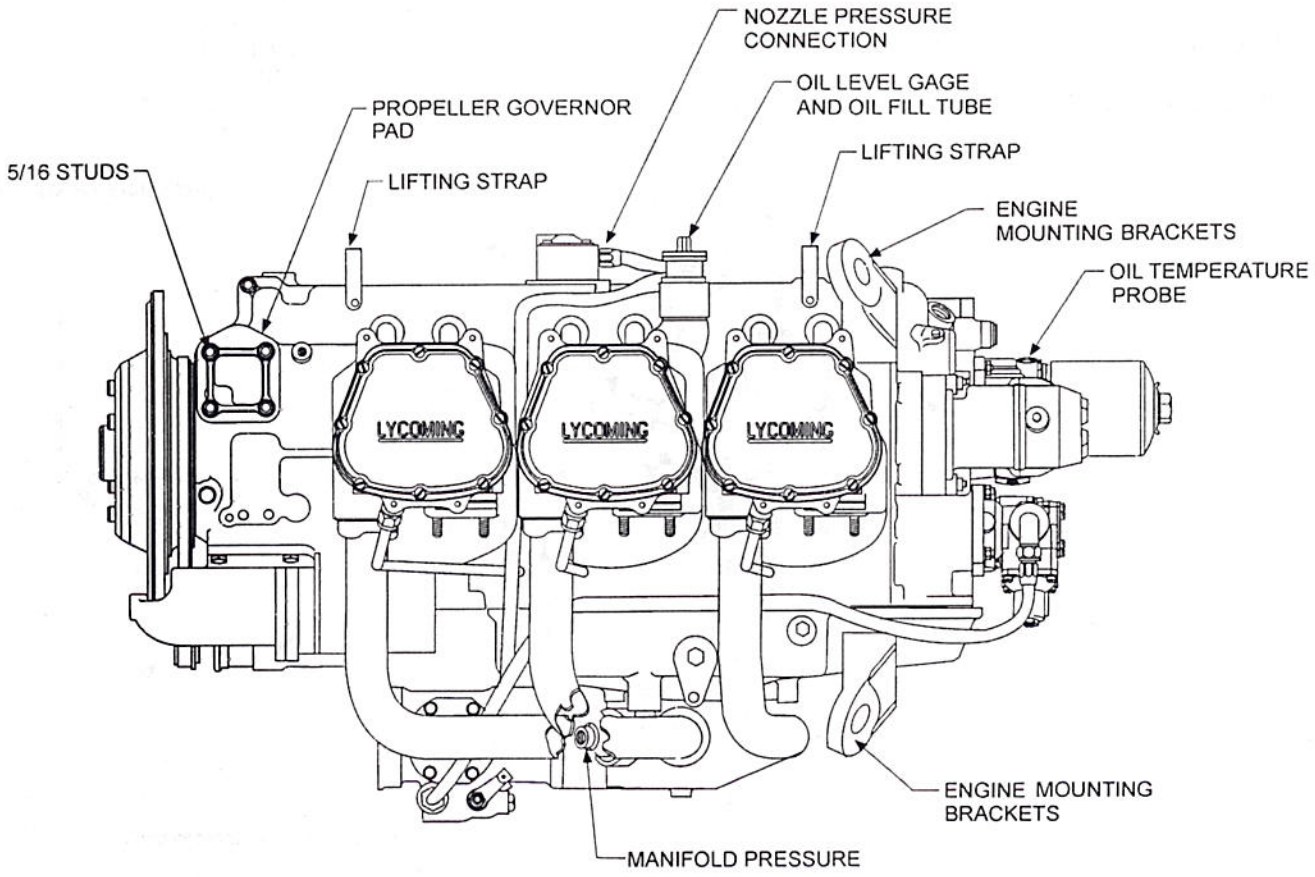


Figure 2-2. Installation, Left Side View

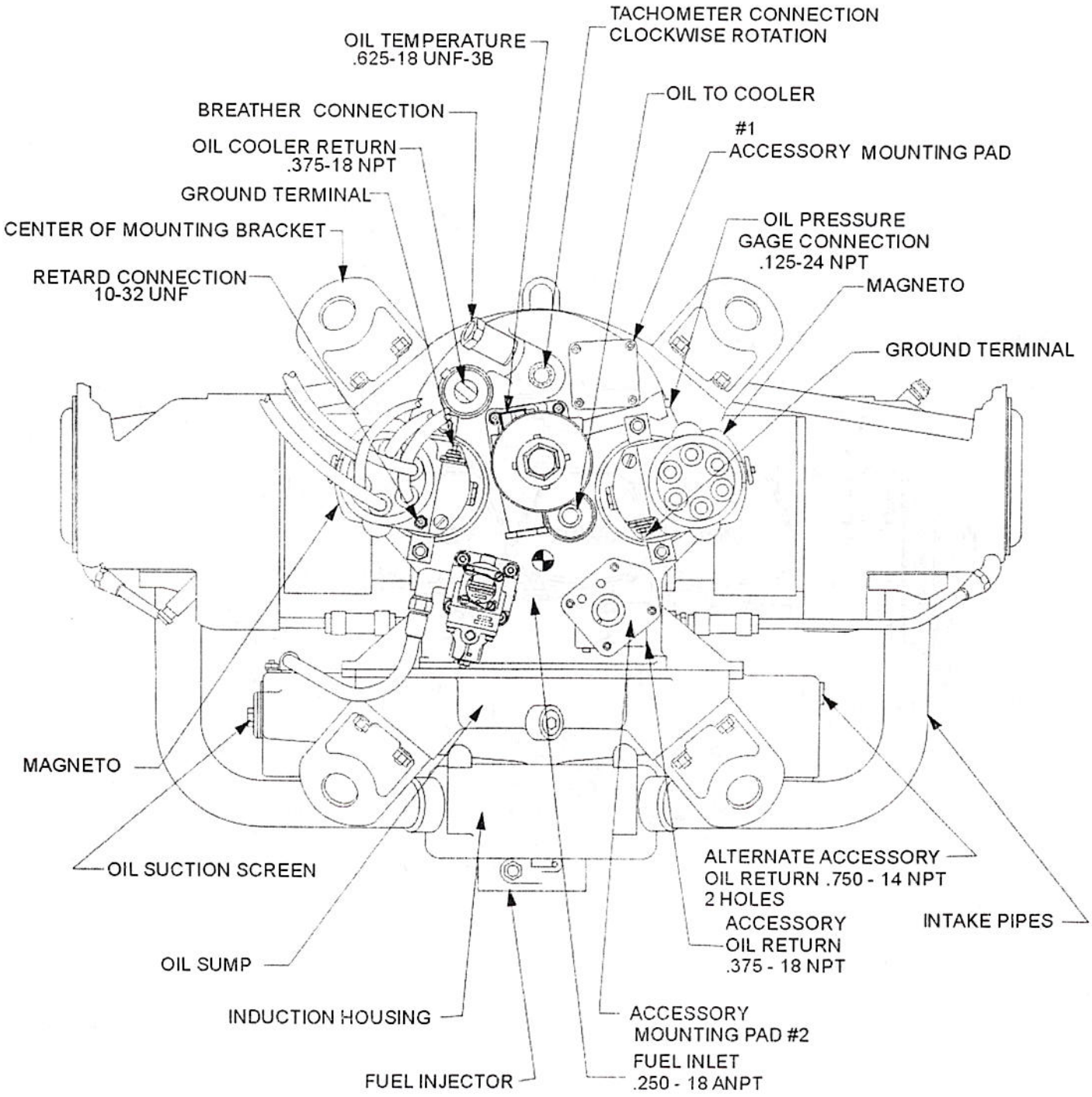


Figure 2-3. Installation, Rear View

3. PRE-OILING ENGINE PRIOR TO START.

CAUTION

To eliminate the possibility of high-speed bearing failure resulting from insufficient lubrication during initial starts, all aircraft engines must be pre-oiled after an overhaul, following oil cooler draining or replacement, or whenever the oil lines have been disconnected.

WARNING

If a propeller is installed, remain clear of the propeller turning arc. The propeller will turn during this procedure, and could cause injury.

a. Fill the oil cooler with oil.

b. Remove one spark plug from each cylinder of the engine.

c. If the aircraft is not equipped with an oil pressure gage, remove the STD-1102 allen plug from the upper left front of the main galley, aft of the propeller governor pad.

d. Place the mixture control lever in the "IDLE CUT-OFF" position and the fuel selector switch in the "OFF" position.

e. Turn the engine with the starter (or with an external power source, if available) until a minimum oil pressure of 20 lb. is indicated on the oil pressure gage or until there is a steady flow of oil from the opening on the engine.

CAUTION

Do not energize the starter for periods longer than 15 seconds. Allow the starter to cool after each energizing period. Refer to the starter manufacturer's instruction manual for additional information.

NOTE

If oil pressure is not determined after the first cranking of 10 to 15 seconds, allow the starter to cool and repeat the cranking/starter cooling sequence until 20 lb. is indicated on the oil pressure gage or oil flow is observed.

CAUTION

If there is no indication of steady oil pressure after five attempts, the cause should be determined and fixed.

f. Turn the starter for an additional 10 seconds to verify that the oil pressure remains at latest 20 lb.

g. Reinstall the spark plugs and proceed with normal starting procedures immediately. Refer to Section I, Part 3.

h. When the engine starts, observe the oil pressure gage. If there is no oil pressure indication, shut down the engine until cause is determined.

i. Allow the engine to run for approximately 3 minutes at 1000 rpm.

j. Shut down in accordance with Section I, Part 3, Step 10.