SECTION 3
OPERATING INSTRUCTIONS

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SECTION 3

OPERATING INSTRUCTIONS

1. GENERAL. Close adherence to these instructions will greatly contribute to 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, REPAIR 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 on straight mineral oil for a minimum of 50 hours or until oil consumption has stabilized. After this period, a change to an approved additive oil may be made, if so desired.

NOTE

Cruising should be done at 65% to 75% power until a total of 50 hours has accumulated or oil consumption has stabilized. This is to ensure proper seating of the rings and 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 8 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 engine for the first flight of the day, there are several items of maintenance inspection that should be performed. These are described in Section 4 under Daily Pre-Flight Inspection. They must be observed before the engine is started.

3. STARTING PROCEDURES. O-360, HO-360, IO-360, AIO-360, HIO-360, TIO-360 Series.

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

a. Engines Equipped with Float Type Carburetors.

(1) Perform pre-flight inspection.

(2) Set carburetor heat control in "off" position.

(3) Set propeller governor control in "Full RPM" position (where applicable).

(4) Turn fuel valves "On".

(5) Move mixture control to "Full Rich".

(6) Turn on boost pump.

(7) Open throttle approximately ¼ travel.

(8) Prime with 1 to 3 strokes of manual priming pump or activate electric primer for 1 or 2 seconds.

(9) Set magneto selector switch (consult airframe manufacturer's handbook for correct position).

(10) Engage starter.

(11) When engine fires, move the magneto switch to "Both".

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

b. Engines Equipped with Pressure Carburetors or Bendix Fuel Injectors.

(1) Perform pre-flight inspection.

(2) Set carburetor heat or alternate air control in "Off" position.

(3) Set propeller governor control in "Full RPM" position (where applicable).

(4) Turn fuel valve "On".

(5) Turn boost pump "On".

(6) Open throttle wide open, move mixture control to "Full Rich" until a slight but steady fuel flow is noted (approximately 3 to 5 seconds) then return throttle to "Closed" and return mixture control to "Idle Cut-Off".

(7) Turn boost pump "Off".

(8) Open throttle ¼ of travel.

(9) Set magneto selector switch (consult airframe manufacturer's handbook for correct position).

(10) Engage starter.

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

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

c. *Engines Equipped with Simmonds Type 530 Fuel Injector.*

(1) Perform pre-flight inspection.

(2) Set alternate air control in "Off" position.

(3) Set propeller governor control in "Full RPM" position.

(4) Turn fuel valve "On".

(5) Turn boost pump "On".

(6) Open throttle approximately ¼ travel, move mixture control to "Full Rich" until a slight but steady fuel flow is noted (approximately 3 to 5 seconds) then return throttle to "Closed" and return mixture control to "Idle Cut-Off".

(7) Turn boost pump "Off".

(8) Open throttle ¼ travel.

(9) Move combination magneto switch to "Start", using accelerator pump as a primer while cranking engine.

(10) When engine fires allow the switch to return to "Both".

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

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.

The engines covered in this manual are air-pressure cooled and depend on the forward speed 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 the cylinder head temperature should exceed the maximum as stated in this manual.

a. *Fixed Wing.*

(1) Head the aircraft into the wind.

(2) Leave mixture in "Full Rich".

(3) Operate only with the propeller in minimum blade angle setting.

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

(5) Engine is warm enough for take-off when the throttle can be opened without the engine faltering. Take-off with a turbocharged engine must not be started if indicated lubricating oil pressure, due to cold temperature is above maximum. Excessive oil pressure can cause overboost and consequent engine damage.

b. *Helicopter.*

(1) Warm-up at approximately 2000 RPM with rotor engaged as directed in the airframe manufacturer's handbook.

6. *GROUND CHECK.*

a. Warm-up as directed above.

b. Check both oil pressure and oil temperature.

c. Leave mixture control in "Full Rich".

d. *Fixed Wing Aircraft (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 point 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) Fixed Wing Aircraft.

(a) (Controllable pitch propeller). With the propeller in minimum pitch angle, set the engine to produce 50-65% power as indicated by the manifold pressure gage unless otherwise specified in the aircraft manufacturer's manual. 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. Magneto checks at low power settings will only indicate fuel/air distribution quality.

(b) *(Fixed pitch propeller).* 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 1800 RPM (2000 RPM maximum).

(c) 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 must not exceed 175 RPM and must not exceed 50 RPM between magnetos. Smooth operation of the engine but with a drop-off that exceeds the normal specification of 175 RPM is usually a sign of propeller load condition at a rich mixture. Proceed to step e. (1) (d).

(d) If the RPM drop exceeds 175 RPM, slowly lean the mixture until the RPM peaks. Then retard the throttle to the RPM specified in step e.(1)(a) or e.(1)(b) for the magneto check and repeat the check. If the drop-off does not exceed 175 RPM, the difference between the magnetos does not exceed 50 RPM, and the engine is running smoothly, then the ignition system is operating properly. Return the mixture to full rich.

(2) Helicopter.

Raise collective pitch stick to obtain 15 inches manifold pressure at 2000 RPM.

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. Drop-off must not exceed 200 RPM. Drop-off between magnetos must not exceed 50 RPM. 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 to minimize plug fouling.

7. *OPERATION IN FLIGHT.*

a. See airframe manufacturer's instructions for recommended power settings.

b. Throttle movements from full power to idle or from idle to full power are full range movements. Full range throttle movements must be performed over a minimum time duration of 2 to 3 seconds. Performing a full range throttle movement at a rate of less than 2 seconds is considered a rapid or instant movement. Performing rapid movements may result in detuned counterweights which may lead to failure of the counterweight lobes and subsequent engine damage.

c. *Fuel Mixture Leaning Procedure.*

Improper fuel/air mixture during flight is responsible for 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 engines 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 monitoring the mixture, the following general rules must be observed by the operator of Lycoming aircraft engines.

GENERAL 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.

Do not manually lean engines equipped with automatically controlled fuel system.

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 in carbureted engines at altitude 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 owner's manual.

During letdown flight operations it may be necessary to manually lean uncompensated carbureted or fuel injected engines to obtain smooth operation.

On turbocharged engines never exceed 1650°F turbine inlet temperature (TIT).

1. *LEANING TO EXHAUST GAS TEMPERATURE GAGE.*

   a. *Normally aspirated engines with fuel injectors or uncompensated 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. *Turbocharged engines.*

      (1) *Best Economy Cruise* – Lean to peak turbine inlet temperature (TIT) or 1650°F, whichever occurs first.

      (2) *Maximum Power Cruise* – The engine must always be operated on the rich side of peak EGT or TIT. Before leaning to obtain maximum power mixture it is necessary to establish a reference point. This is accomplished as follows:

         (a) Establish a peak EGT or TIT for best economy operation at the highest economy cruise power without exceeding 1650°F.

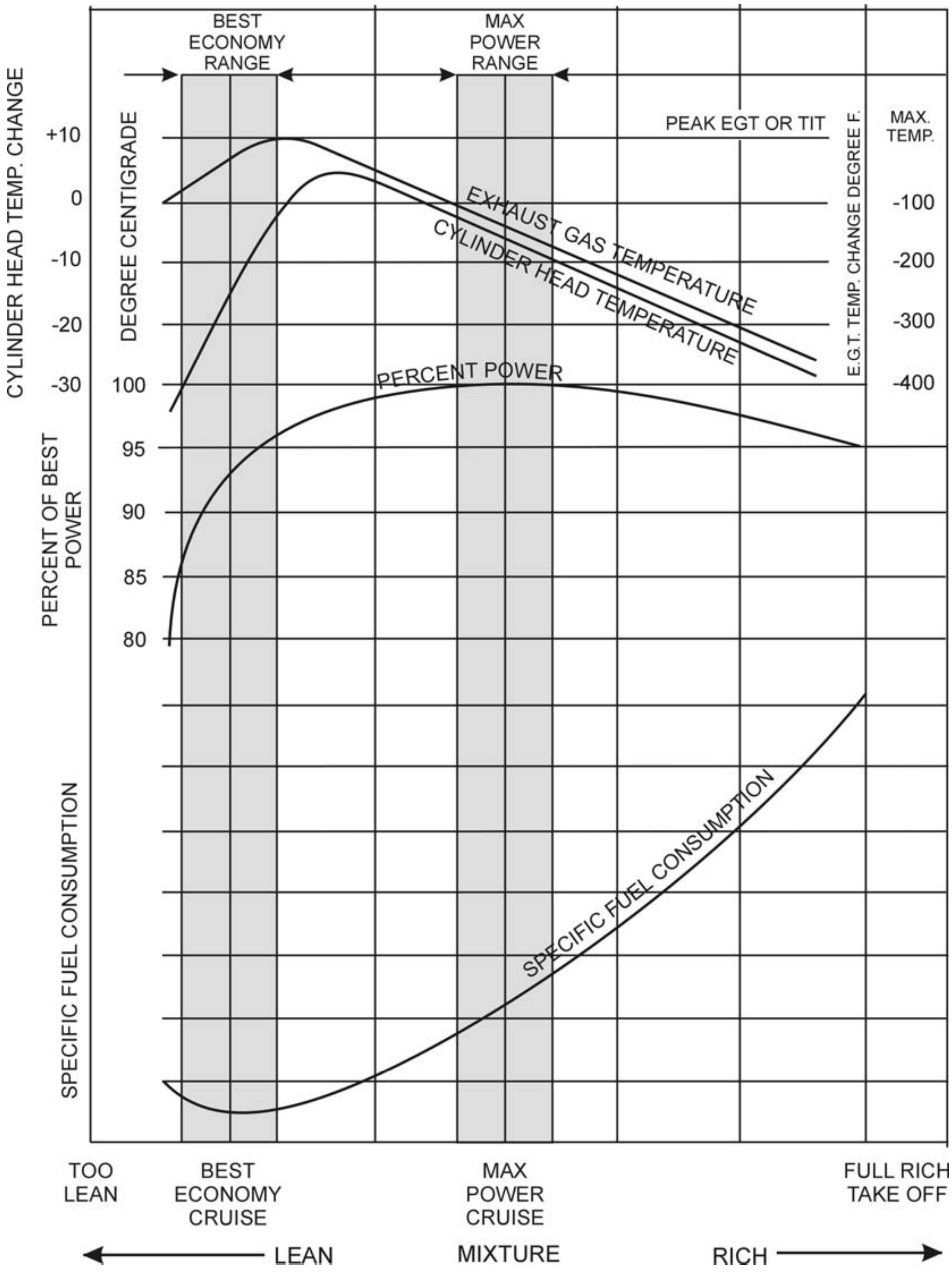

Figure 3-1. Representative Effect of Fuel/Air Ratio on Cylinder Head Temperature, Power and Specific Fuel Consumption at Constant RPM and Manifold Pressure in Cruise Range Operation

(b) Deduct 125°F from this temperature and thus establish the temperature reference point for use when operating at maximum power mixture.

(c) Return mixture control to full rich and adjust the RPM and manifold pressure for desired performance cruise operation.

(d) Lean out mixture until EGT or TIT is the value established in step (b). This sets the mixture at best power.

2. LEANING TO FLOWMETER.

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

3. LEANING WITH MANUAL MIXTURE CONTROL. (Economy cruise, 75% power or less, without flowmeter or EGT gauge.)

a. Carbureted Engines.

(1) Slowly move mixture control from "Full Rich" position toward lean position.

(2) Continue leaning until engine roughness is noted.

(3) Enrich until engine runs smoothly and power is regained.

b. Fuel Injected Engines.

(1) Slowly move mixture control from "Full Rich" position toward lean position.

(2) Continue leaning until slight loss of power is noted (loss of power may or may not be accompanied by roughness.

(3) Enrich until engine runs smoothly and power is regained.

WARNING

REFER TO THE PILOT'S OPERATING HANDBOOK OR AIRFRAME MANUFACTURER'S MANUAL FOR ADDITIONAL INSTRUCTIONS ON THE USE OF CARBURETOR HEAT CONTROL. INSTRUCTIONS FOUND IN EITHER PUBLICATION SUPERSEDE THE FOLLOWING INFORMATION.

c. Use of Carburetor Heat Control – Under certain moist atmospheric conditions (generally at a relative humidity of 50% or greater) and at temperatures of 20° to 90°F it is possible for ice to form in the induction system. Even in summer weather ice may form. This is due to the high air velocity through the carburetor venturi and the absorption of heat from this air by vaporization of the fuel. The temperature in the mixture chamber may drop as much as 70°F below the temperature of the incoming air. If this air contains a large amount of moisture, the cooling process can cause precipitation in the form of ice. Ice formation generally begins in the vicinity of the butterfly and may build up to such an extent that a drop in power output could result. In installations equipped with fixed pitch propellers, a loss of power is reflected by a drop in manifold pressure and RPM. In installations equipped with constant speed propellers, a loss of power is reflected by a drop in manifold pressure. If not corrected, this condition may cause complete engine stoppage.

To avoid this, all installations are equipped with a system for preheating the incoming air supply to the carburetor. In this way sufficient heat is added to replace the heat loss of vaporization of fuel, and the mixing chamber temperature cannot drop to the freezing point of water (32°F). The air preheater is a tube or jacket through which the exhaust pipe from one or more cylinders is passed, and the air flowing over these surfaces is raised to the required temperature before entering the carburetor. Consistently high temperatures are to be avoided because of a loss in power and a decided variation of mixture. High charge temperatures also favor detonation and preignition, both of which are to be avoided if normal service life is to be expected from the engine. The following outline is the proper method of utilizing the carburetor heat control.

(1) *Ground Operation* – Use of the carburetor air heat on the ground must be held to an absolute minimum. On some installations the air does not pass through the air filter, and dirt and foreign substances can be taken into the engine with the resultant cylinder and piston ring wear. Only use carburetor air heat on the ground to make certain it is functioning properly.

(2) *Take-Off* – Set the carburetor heat in full cold position. For take-off and full throttle operation the possibility of expansion or throttle icing at wide throttle openings is very remote.

(3) *Climbing* – When climbing at part throttle power settings of 80% or above, set the carburetor heat control in the full cold position; however, if it is necessary to use carburetor heat to prevent icing it is possible for engine roughness to occur due to the over-rich fuel/air mixture produced by the additional carburetor heat. When this happens, lean the mixture with the mixture control only enough to produce smooth engine operation. Do not continue to use carburetor heat after flight is out of icing conditions, and return mixture to full rich when carburetor heat is removed.

(4) *Flight Operation* – During normal flight, leave the carburetor air heat control in the full cold position. On damp, cloudy, foggy or hazy days, regardless of the outside air temperature, be alert for loss of power. This will be evidenced by an unaccountable loss in manifold pressure or RPM or both, depending on whether a constant speed or fixed pitch propeller is installed on the aircraft. If this happens, apply full carburetor air heat and open the throttle to limiting manifold pressure and RPM. This will result in a slight additional drop in manifold pressure, which is normal, and this drop will be regained as the ice is melted out of the induction system. When ice has been melted from the induction system, return the carburetor heat control to the full cold position. In those aircraft equipped with a carburetor air temperature gauge, partial heat may be used to keep the mixture temperature above the freezing point of water (32°F).

WARNING

CAUTION MUST BE EXERCISED WHEN OPERATING WITH PARTIAL HEAT ON AIRCRAFT THAT DO NOT HAVE A CARBURETOR AIR TEMPERATURE GAUGE. USE EITHER FULL HEAT OR NO HEAT IN AIRCRAFT THAT ARE NOT EQUIPPED WITH A CARBURETOR AIR TEMPERATURE GAUGE.

(5) *Landing Approach* – In making a landing approach, the carburetor heat is generally in the "Full Cold" position. However, if icing conditions are suspected, apply "Full Heat". In the case that full power needs to be applied under these conditions, as for an aborted landing, return the carburetor heat to "Full Cold" after full power application.

8. ENGINE FLIGHT CHART.

FUEL AND OIL –

Model Series	*Aviation Grade Fuel Minimum Grade
O-360-B, -D	80/87
O-360-A1P, -C1F, -C4F; HO-360-C1A	91/96
O-360-C, -F; HO-360-A, -B; IO-360-B, -E; HIO-360-B	91/96 or 100/130
O-360-J2A	91/96 or 100/100LL
IO-360-L2A, -M1A, -M1B	91/96 or 100LL
HIO-360-G1A	91/96 or 100LL
O-360-A, -C1G, -C4P, -A1H6; TIO-360-C1A6D	100/100LL
IO-360-B1G6, -C1G6, -J, -K2A, -A1D6D, -A3B6, -A3D6D; HIO-360-A1B	100/100LL
AIO-360-A, -B; IO-360-A, -C, -D, -F	100/130
HIO-360-A, -C, -D, -E, -F	100/130
TIO-360-A	100/130

NOTE

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

* - Refer to latest revision of Service Instruction No. 1070.

FUEL PRESSURE, PSI –

Model	Max.	Desired	Min.
O-360 Series (Except -A1C, -C2B, -C2D); HO-360-A, -C Series			
Inlet to carburetor	8.0	3.0	0.5
O-360-A1C, -C2B, -C1D; HO-360-B Series			
Inlet to carburetor	18	13	9.0
HIO-360-A1B			
Inlet to fuel pump	30	-----	-2
IO-360 Series (Except -B1A, -F1A); AIO-360 Series, HIO-360 Series (Except -A1B)			
Inlet to fuel pump	35	-----	-2
IO-360-F1A			
Inlet to fuel pump	35	-----	-2
IO-360 Series (Except -B1A), AIO-360 Series; HIO-360 Series			
Inlet to fuel injector	45		14
IO-360-B1A			
Inlet to fuel injector	2		-2

FUEL PRESSURE, PSI (CONT.) –

Model	Max.	Desired	Max.
HIO-360-E, -F Series			
Inlet to fuel pump	55		-2
Inlet to fuel injector	55		27
TIO-360-A Series			
Inlet to fuel pump	50		-2
Inlet to fuel injector	45		20
TIO-360-C1A6D			
Inlet to fuel pump	65		-2
Inlet to fuel injector	65		22

OIL – (All Models) –

Average Ambient Air	*Recommended Grade Oil MIL-L-6082B Grades	MIL-L-22851 Ashless Dispersant Grades
All Temperatures	---------	SAE 15W-50 or 20W-50
Above 80°F	SAE 60	SAE60
Above 60°F	SAE 50	SAE 40 or SAE 50
30° to 90°F	SAE 40	SAE 40
0° to 70°F	SAE 30	SAE 40, 30 or 20W40
Below 10°F	SAE 20	SAE 30 or 20W30

* - Refer to latest revision of Service Instruction No. 1014.

OIL SUMP CAPACITY

All Models (Except AIO-360 Series, O-360-J2A) .... 8 U.S. Quarts
Minimum Safe Quantity in Sump
(Except – IO-360-M1A, -M1B; HIO-360-G1A) .... 2 U.S. Quarts
IO-360-M1A, -M1B; HIO-360-G1A .... 4 U.S. Quarts
AIO-360 Series .... Dry Sump
O-360-J2A.. 6 U.S. Quarts

OPERATING CONDITIONS

Average Ambient Air	*Oil Inlet Temperature Desired	Maximum
Above 80°F	180°F (82°C)	245°F (118°C)
Above 60°F	180°F (82°C)	245°F (118°C)
30° to 90°F	180°F (82°C)	245°F (118°C)
0° to 70°F	170°F (77°C)	245°F (118°C)
Below 10°F	160°F (71°C)	245°F (118°C)

* - Engine oil temperature should not be below 140°F (60°C) during continuous operation.

OPERATING CONDITIONS (CONT.)

Oil Pressure, psi (Rear)	Maximum	Minimum	Idling
Normal Operation, All Models (Except Below)	95	55	25
TIO-360-C1A6D	95	50	25
Oil Pressure, psi (Front)			
O-360-A4N, -F1A6	90	50	20
Start, Warm-up, Taxi, and Take-off (All Models)	115		

Operation	RPM	HP	Fuel Cons. Gal/Hr.	Max. Oil Cons. Qts./Hr.	*Max. Cyl. Head Temp.
O-360-A, -C Series**					
Normal Rated	2700	180	-----	.80	500°F (260°C)
Performance Cruise (75% Rated)	2450	135	10.5	.45	500°F (260°C)
Economy Cruise (65% Rated)	2350	117	9.5	.39	500°F (260°C)
O-360-B, -D Series					
Normal Rated	2700	168	-----	.75	500°F (260°C)
Performance Cruise (75% Rated)	2450	126	11.6	.42	500°F (260°C)
Economy Cruise (65% Rated)	2350	109	9.0	.37	500°F (260°C)
O-360-A1P, -A4D, -A4P, -C4P, -F, -G Series					
Normal Rated	2700	180	-----	.80	500°F (260°C)
Performance Cruise (75% Rated)	2450	135	9.7	.45	500°F (260°C)
Economy Cruise (65% Rated)	2350	117	8.3	.39	500°F (260°C)

* - At Bayonet Location – For maximum service life of the engine maintain cylinder head temperature between 150°F and 400°F during continuous operation.

** - O-360-C2D Only – Take-off rating 180 HP at 2900 RPM, 28 in. Hg.

OPERATING CONDITIONS (CONT.)

Operation	RPM	HP	Fuel Cons. Gal./Hr.	Max. Oil Cons. Qts./Hr.	*Max. Cyl. Head Temp.
O-360-J2A					
Normal Rated	2400/2700	145	-----	.50	500°F (260°C)
Performance Cruise (75% Rated)	1800/2025	109	9.3	.36	500°F (260°C)
Economy Cruise (65% Rated)	1560/1755	94	6.8	.31	500°F (260°C)
HO-360-A, -C Series; HIO-360-G1A					
Normal Rated	2700	180	-----	.80	500°F (260°C)
Performance Cruise (75% Rated)	2450	135	9.7	.45	500°F (260°C)
Economy Cruise (65% Rated)	2350	117	9.0	.39	500°F (260°C)
HO-360-B Series					
Normal Rated	2900	180	-----	.80	500°F (260°C)
Performance Cruise (75% Rated)	2700	135	10.5	.45	500°F (260°C)
Economy Cruise (65% Rated)	2700	117	9.0	.39	500°F (260°C)
IO-360-A, -C, -D, -J, -K; AIO-360 Series					
Normal Rated	2700	200	-----	.89	500°F (260°C)
Performance Cruise (75% Rated)	2450	150	12.3	.50	500°F (260°C)
Economy Cruise (65% Rated)	2350	130	9.5	.44	500°F (260°C)
IO-360-B, -E, -F Series (Except -B1C); IO-360-M1A, -M1B****					
Normal Rated	2700	180	-----	.80	500°F (260°C)
Performance Cruise (75% Rated)	2450	135	11.0	.45	500°F (260°C)
Economy Cruise (65% Rated)	2350	117	8.5	.39	500°F (260°C)

* - At Bayonet Location – For maximum service life of the engine maintain cylinder head temperature between 150°F and 400°F during continuous operation.

** - This engine has an alternate rating of 160 HP at 2400 RPM.

OPERATING CONDITIONS (CONT.)

Operation	RPM	HP	Fuel Cons. Gal./Hr.	Max. Oil Cons. Qts./Hr.	*Max. Cyl. Head Temp.
		IO-360-B1C			
Normal Rated	2700	177	-----	.79	500°F (260°C)
Performance Cruise (75% Rated)	2450	133	11.0	.45	500°F (260°C)
Economy Cruise (65% Rated)	2350	115	8.5	.39	500°F (260°C)
		IO-360-L2A			
Normal Rated	2400	160	-----	.52	500°F (260°C)
Performance Cruise (75% Rated)	2180	120	8.8	.39	500°F (260°C)
Economy Cruise (65% Rated)	2080	104	7.6	.34	500°F (260°C)
		HIO-360-A Series			
Normal Rated	2900	180†	-----	.80	500°F (260°C)
Performance Cruise (75% Rated)	2700	135	11.0	.45	500°F (260°C)
Economy Cruise (65% Rated)	2700	117	9.5	.39	500°F (260°C)
		HIO-360-B Series			
Normal Rated	2900	180	-----	.80	500°F (260°C)
Performance Cruise (75% Rated)	2700	135	12.0	.45	500°F (260°C)
Economy Cruise (65% Rated)	2700	117	10.0	.39	500°F (260°C)
		HIO-360-C Series			
Normal Rated	2900	205	-----	.91	500°F (260°C)
Performance Cruise (75% Rated)	2700	154	12.5	.52	500°F (260°C)
Economy Cruise (65% Rated)	2700	133	10.5	.45	500°F (260°C)

* - At Bayonet Location – For maximum service life of the engine maintain cylinder head temperature between 150°F and 400°F during continuous operation.

† - At 26 in. Hg. manifold pressure.

OPERATING CONDITIONS (CONT.)

Operation	RPM	HP	Fuel Cons. Gal./Hr.	Max. Oil Cons. Qts./Hr.	*Max. Cyl. Head Temp.
HIO-360-D Series					
Normal Rated	3200	190	-----	.85	500°F (260°C)
Performance Cruise (75% Rated)	3200	142	12.0	.48	500°F (260°C)
Economy Cruise (65% Rated)	3200	123	10.0	.41	500°F (260°C)
HIO-360-E Series					
Normal Rated	2900	190	-----	.85	500°F (260°C)
Performance Cruise (75% Rated)	2700	142	11.8	.47	500°F (260°C)
Economy Cruise (65% Rated)	2700	123	10.0	.41	500°F (260°C)
HIO-360-F Series					
Normal Rated	3050	190	-----	.84	500°F (260°C)
Performance Cruise (75% Rated)	2700	142	11.8	.47	500°F (260°C)
Economy Cruise (65% Rated)	2700	123	10.0	.46	500°F (260°C)
TIO-360-A Series**					
Normal Rated	2700	200	-----	.89	500°F (260°C)
Performance Cruise (75% Rated)	2450	150	14.0	.50	500°F (260°C)
Economy Cruise (65% Rated)	2350	130	10.2	.44	500°F (260°C)
TIO-360-C Series**					
Normal Rated	2575	210	-----	.70	500°F (260°C)
Performance Cruise (75% Rated)	2400	157.5	13.2	.53	500°F (260°C)
Economy Cruise (65% Rated)	2200	136.5	10.2	.46	500°F (260°C)

* - At Bayonet Location – For maximum service life of the engine maintain cylinder head temperature between 150°F and 400°F during continuous operation.

** - MAXIMUM TURBINE INLET TEMPERATURE 1650°F (898.8°C).

9. SHUT DOWN PROCEDURE.

a. Fixed Wing.

(1) Set propeller governor control for minimum blade angle when applicable.

(2) Idle until there is a decided drop in cylinder head temperature.

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

(4) When engine stops, turn off switches.

b. Helicopters.

(1) Idle as directed in the airframe manufacturer's handbook, until there is a decided drop in cylinder head temperature.

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

(3) When engine stops, turn off switches.