


OPERATOR'S MANUAL

Lycoming
Aircraft Engines

SERIES
O-360, HO-360, 
AIO-360, HIO-360 & TIO-360

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LYCOMING
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SECTION 6

TROUBLE-SHOOTING

Experience has proven that the best method of trouble-shooting is to decide on the various causes of a given trouble and then to eliminate causes one by one, beginning with the most probable. The following charts list some of the more common troubles, which may be encountered in maintaining engines and turbochargers; their probable causes and remedies.

1. TROUBLE-SHOOTING—ENGINE.

TROUBLE	PROBABLE CAUSE	REMEDY
Failure of Engine to Start	Lack of fuel	Check fuel system for leaks. Fill fuel tank. Clean dirty lines, strainers or fuel valves.
	Overpriming	Leave ignition "off" and mixture control in "Idle Cut-Off", open throttle and "unload" engine by cranking for a few seconds. Turn ignition switch on and proceed to start in a normal manner.
	Defective spark plugs	Clean and adjust or replace spark plugs.
	Defective ignition wire	Check with electric tester, and replace any defective wires.
	Defective battery	Replace with charged battery.

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TROUBLE	PROBABLE CAUSE	REMEDY
Failure of Engine to Start (Cont.)	Improper operation of magneto breaker	Clean points. Check internal timing of magnetos.
	Lack of sufficient fuel flow	Disconnect fuel line and check fuel flow.
	Water in fuel injector or carb.	Drain fuel injector or carburetor and fuel lines.
	Internal failure	Check oil screens for metal particles. If found, complete overhaul of the engine may be indicated.
Failure of Engine to Idle Properly	Incorrect idle mixture	Adjust mixture
	Leak in the induction system	Tighten all connections in the induction system. Replace any parts that are defective.
	Incorrect idle adjustment	Adjust throttle stop to obtain correct idle.
	Uneven cylinder compression	Check condition of piston rings and valve seats.
	Faulty ignition system	Check entire ignition system.
	Insufficient fuel pressure	Adjust fuel pressure.
Low Power and Uneven Running	Mixture too rich indicated by sluggish engine operation, red exhaust flame at night. Extreme cases indicated by black smoke from exhaust.	Readjustment of fuel injector or carburetor by authorized personnel is indicated.

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TROUBLE	PROBABLE CAUSE	REMEDY
Low Power and Uneven Running (Cont.)	Mixture too lean; indicated by over-heating or back-firing	Check fuel lines for dirt or other restrictions. Readjustment of fuel injector or carburetor by authorized personnel is indicated.
	Leaks in induction system	Tighten all connections. Replace defective parts.
	Defective spark plugs	Clean and gap or replace spark plugs.
	Improper fuel	Fill tank with fuel of recommended grade.
	Magneto breaker points not working properly	Clean points. Check internal timing of magnetos.
	Defective ignition wire	Check wire with electric tester. Replace defective wire.
	Defective spark plug terminal connectors.	Replace connectors on spark plug wire.
Failure of Engine to Develop Full Power	Leak in the induction system	Tighten all connections and replace defective parts.
	Throttle lever out of adjustment	Adjust throttle lever.
	Improper fuel flow	Check strainer, gage and flow at the fuel inlet.
	Restriction in air scoop	Examine air scoop and remove restrictions.

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TROUBLE	PROBABLE CAUSE	REMEDY
Failure of Engine to Develop Full Power (Cont.)	Improper fuel	Drain and refill tank with recommended fuel.
	Faulty ignition	Tighten all connections. Check system with tester. Check ignition timing.
Rough Engine	Cracked engine mount	Replace or repair mount.
	Defective mounting bushings	Install new mounting bushings
	Uneven compression	Check compression.
Low Oil Pressure	Insufficient oil	Fill to proper level with recommended oil.
	Air lock or dirt in relief valve	Remove and clean oil pressure relief valve.
	Leak in suction line or pressure line	Check gasket between accessory housing and crankcase.
	High oil temperature	See "High Oil Temperature" in "Trouble" column.
	Defective pressure gage	Replace
	Stoppage in oil pump intake passage	Check line for obstruction. Clean suction strainer.
High Oil Temperature	Insufficient air cooling	Check air inlet and outlet for deformation or obstruction.

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TROUBLE	PROBABLE CAUSE	REMEDY
High Oil Temperature (Cont.)	Insufficient oil supply	Fill to proper level with specified oil.
	Low grade of oil	Replace with oil conforming to specifications.
	Clogged oil lines or strainers	Remove and clean oil strainers.
	Excessive blow-by	Usually caused by worn or stuck rings.
	Failing or failed bearing	Examine sump for metal particles. If found, overhaul of engine is indicated.
	Defective temperature gage	Replace gage.
Excessive Oil Consumption	Low grade of oil	Fill tank with oil conforming to specification.
	Failing or failed bearings	Check sump for metal particles.
	Worn piston rings	Install new rings.
	Incorrect installation of piston rings	Install new rings.
	Failure of rings to seat (new nitrided cyls.)	Use mineral base oil. Climb to cruise altitude at full power and operate at 75% cruise power setting until oil consumption stabilizes.

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2. TROUBLE-SHOOTING—TURBOCHARGER

TROUBLE	PROBABLE CAUSE	REMEDY
Excessive Noise or Vibration	Improper bearing lubrication	Supply required oil pressure. Clean or re- place oil line; clean oil strainer. If trouble persists, overhaul turbocharger.
	Leak in engine intake or ex- haust manifold	Tighten loose connec- tions or replace manifold gaskets as necessary.
	Dirty impeller blades	Disassemble and clean.
Engine will not Deliver Rated Power	Clogged manifold system	Clear all ducting.
	Foreign material lodged in com- pressor impeller or turbine	Disassemble and clean.
	Excessive dirt build-up in com- pressor	Thoroughly clean com- pressor assembly. Service air cleaner and check for leakage.
	Leak in engine intake or ex- haust	Tighten loose connec- tions or replace mani- fold gaskets as necessary.
	Rotating assembly bearing seizure	Overhaul turbocharger.
	Restriction in re- turn lines from actuator to waste gate controller	Remove and clean lines.

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TROUBLE	PROBABLE CAUSE	REMEDY
Engine will not Deliver Rated Power (Cont.)	Exhaust bypass controller is in need of adjustment	Have exhaust bypass controller adjusted.
	Oil pressure too low	Tighten fittings. Replace lines or hoses. Increase oil pressure to desired pressure.
	Inlet orifice to actuator clogged	Remove inlet line at actuator and clean orifice.
	Exhaust bypass controller malfunction	Replace unit.
	Exhaust bypass butterfly not closing	Low pressure. Clogged orifice in inlet to actuator. Butterfly shaft binding. Check bearings.
	Turbocharger impeller binding frozen or fouling housing.	Check bearings. Replace turbocharger.
	Piston seal in actuator leaking. (Usually accompanied by oil leakage at drain line)	Remove and replace actuator or disassemble and replace packing.
Critical Altitude Lower than Specified	Controller not getting enough oil pressure to close the waste gate	Check pump outlet pressure, oil filters, external lines for leaks or obstructions.
	Chips under metering valve in controller holding it open	Replace controller.

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TROUBLE	PROBABLE CAUSE	REMEDY
Critical Altitude Lower Than Specified (Cont.)	Metering jet in actuator plugged	Remove actuator and clean jet.
	Actuator piston seal failed and leaking exces- sively	If there is oil leakage at actuator drain, clean cylinder and replace piston seal.
	Exhaust bypass valve sticking	Clean and free action.
Engine Surges or Smokes	Air in oil lines or actuator	Bleed system.
	Controller meter- ing valve stem seal leaking oil into manifold	Replace controller.
	Clogged breather	Check breather for re- strictions to air flow.

NOTE

Smoke would be normal if engine has idled for a prolonged period.

High Deck Pres- sure (Compressor Discharge Pres- sure)	Controller meter- ing valve not opening, aneroid bellows leaking	Replace controller as- sembly or replace aneroid bellows.
	Exhaust bypass sticking closed	Shut off valve in return line not working.
		Butterfly shaft binding. Check bearings.
		Replace bypass valve or correct linkage binding.

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TROUBLE	PROBABLE CAUSE	REMEDY
High Deck Pressure (Compressor Discharge Pressure) (Cont.)	Controller return line restricted	Clean or replace line.
	Oil pressure too high	Check pressure 75 to 85 psi (80 psi desired) at exhaust bypass actuator inlet. If pressure on outlet side of actuator is too high, have exhaust bypass controller adjusted.
	Exhaust bypass actuator piston locked in full closed position. (Usually accompanied by oil leakage at actuator drain line).NOTE: Exhaust bypass normally closed in idle and low power conditions.Should open when actuator inlet line is disconnected.	Remove and disassemble actuator, check condition of piston and packing or replace actuator assembly.
	Exhaust bypass controller malfunction	Replace controller.