Starting

Can the starter turn the engine?	NO → YES ↓	1. Loose or oxidized battery terminals 2. Inadequate, discharged or faulty battery 3. Wiring resistance too high, short circuit or bad contact 4. Faulty starter, solenoid or switch 5. Starter turns without cranking engine: faulty starter sprag clutch
The engine turns, but does it start?	NO → YES ↓	1. *Faulty fuel intake[1]* 2. *Water or ice contamination in fuel[4]* 3. *Faulty ignition system[7]* 4. *Fuel/air mixture too rich[9]* 5. *Fuel/air mixture too lean[10]* 6. *Engine mount problem[12]* 7. Ignition switch is off 8. Faulty carburetor 9. Insufficient gearbox preload 10. Chokes out of synch or deactivated 11. Revolution too low
Is the engine difficult to start in cold weather?	YES → NO ↓	1. *Excessive propeller load[13]* 2. Inadequate starting jet 3. Chokes out of synch or deactivated 4. Throttle open above idle 5. Revolution too low 6. Too high voltage drop; discharged battery 7. Engine too cold 8. Inadequate oil viscosity grade 9. Too much resistance in oil return circuit, signalled by too high an oil pressure
Is the engine difficult to start when warm?	YES → NO ↓	1. *Faulty fuel intake[1]* 2. *Obstructed air filter[6]* 3. Carburetor too hot
Does the engine stop immediately after it has started?	YES → NO ↓	1. *Faulty fuel intake[1]* 2. *Intake air infiltration[11]* 3. Faulty carburetor diaphragm 4. Idle speed too low 5. Faulty exhaust system

Operation

Does the engine vibrate excessively at idle?	YES → NO ↓	1. *Faulty fuel intake[1]* 2. *Faulty ignition system[7]* 3. *Fuel/air mixture too rich[9]* 4. *Engine mount problem[12]* 5. *Excessive propeller load[13]* 6. Choke still on 7. Carburetors out of synch 8. Insufficient gearbox preload 9. Insufficient exhaust system pressure
Does the engine miss at idle?	YES → NO ↓	1. *Bad fuel quality[3]* 2. *Water or ice contamination in fuel[4]* 3. *Faulty ignition system[7]*
Does the engine miss at takeoff and cruise speeds?	YES → NO ↓	1. *Bad fuel quality[3]* 2. *Faulty ignition system[7]* 3. *Spark plug problem[8]* 4. *Fuel/air mixture too lean[10]* 5. Carburetor too hot
Is the engine lacking power and having difficulty reaching maximum RPM?	YES → NO ↓	1. *Bad fuel quality[3]* 2. *Excessive propeller load[13]* 3. Faulty exhaust system

Operation *(continued)*

Do the engine and prop seem to work against each other at shutdown? Does the engine keep turning over after shutdown?	YES → 1. Idle speed too high 2. Insufficient gearbox preload NO → 3. Engine overheating	
Does the engine detonate and preignite?	YES → *1. Bad fuel quality[3]* *2. Spark plug problem[8]* *3. Intake air infiltration[11]* NO → 4. Carburetors out of synch	

Oil

Does the oil level rise?	YES → 1. Oil stays too cold through operation 2. If oil has a distinct smell of fuel: *Faulty float valve operation[5]* NO	
Does the oil level drop?	YES → 1. Oil return to tank obstructed 2. Inadequate tension of the bypass valve spring, dirt or wear on ball or seat 3. Eroded pump cover interior 4. Excessive rotor tolerances NO	
Does the oil pressure fluctuate?	YES → 1. Resistance in oil pump intake circuit 2. Worn bypass valve NO	
Is the oil leaking?	YES → Determine the source of the leak: 1. Gaskets 2. Cracks in crankcase 3. Excessive crankcase pressure 4. Insufficient cylinder head nuts tightening torque NO	

Cooling system

Is there a cylinder heat temperature (CHT) reading?	NO → 1. Instrument or connection problem 2. Probe melted after overheating YES	
Is the engine overheating?	YES → 1. Inadequate air circulation 2. Insufficient cooling liquid level in expansion tank 3. Trapped air bubbles in liquid cooling system 4. Overflow bottle of insufficient capacity or inadequate installation 5. Inadequate cooling liquid mix 6. Dirty or corroded radiator NO	

Ignition system

Is there an excessive RPM drop when testing ignition systems independently?	YES → 1. Check carburetors first. Activate choke. If there is a change, suspect the carburetors. 2. Clean grounding terminals 3. Check pick-up coil gaps 4. Swap the position of the red charging coil wires to the electronic modules. If the problem remains on the same mag, the charging system is OK. If it shifts, the stator coil, its wiring or its grounding are faulty. 5. Swap positions of the pick-up coil connectors. If the problem shifts there is a faulty pick-up. 6. Install new spark plugs, inspect spark plug caps and measure their resistance and the secondary coil's resistance. 7. Swap ignition module A with module B, measure their primary coil resistance (on new style modules the ground goes through the connector). If the problem moves, there is a faulty ignition module.	

1. Faulty fuel intake
- Closed fuel circuit valve
- Empty fuel tank
- Obstruction in fuel circuit (hoses, filter, pump, fittings, selectors, carburetor intake)
- Insufficient or obstructed fuel tank vent
- Defective fuel pump
- *Air infiltration in fuel circuit*[2]
- Fuel circuit installation (length, height, restrictions) overwhelms pump capacity

2. Air infiltration in fuel circuit
- Leak at connections, in hoses, in filter
- Faulty primer pump (lost its sealing)

3. Bad fuel quality
- Fuel degraded over time
- Insufficient octane rating

4. Water or ice contamination in fuel
- Water or ice in system
- Water or ice in tank
- Gascolator full of water

5. Faulty float valve operation
- Worn float valve
- Dirt on valve sealing surface
- Blocked floats
- Permeable floats: low floatation

6. Obstructed air filter
- Obstructed by dirt or debris
- Soaked with water or fuel
- Excessive oiling

7. Faulty ignition system
- Faulty connection in circuit
- Inadequate trigger coil gap
- Defective ignition coils
- Shorted or damaged ignition cable
- Faulty spark plug cap
- *Spark plug problem*[8]
- Faulty switch or wiring

8. Spark plug problem
- Inadequate electrode gap
- Contact between electrodes
- Fouled spark plug
- Broken or wet insulating porcelain
- Worn or defective spark plug
- Inadequate spark plug range (too cold/hot)

9. Fuel/air mixture too rich
- Needle adjusted too high
- Float level too high
- *Faulty float valve operation*[5]
- *Obstructed air filter*[6]

10. Fuel/air mixture too lean
- Needle adjusted too low
- Float level too low
- *Air infiltration in fuel circuit*[2]
- *Intake air infiltration*[11]
- Fuel foaming caused by violent vibration of the carburetors.

11. Intake air infiltration
- Leak at compensation tube and its connections
- Leak at o-rings
- Cracked or worn carburetor rubber socket

12. Engine mount problem
- Worn or untightened rubber mounts
- Inadequate rubber mount selection
- Faulty engine mount design

13. Excessive propeller load
- Excessive pitch, diameter or number of blades
- Excessive moment of inertia

OPERATING PARAMETERS

		912 A/F/UL	912 S/ULS/ULSFR	914 F/UL
RPM	Minimum idle	1400 RPM	1400 RPM	1400 RPM
	Maximum sustained	5500 RPM	5500 RPM	5500 RPM
	Maximum take-off*	5800 RPM	5800 RPM	5800 RPM
Oil	Minimum pressure < 3500 RPM	0.8 bar / 12 psi	0.8 bar / 12 psi	0.8 bar / 12 psi (1.5 bar / 22 psi)[A]
	Normal pressure > 3500 RPM	2-5 bar / 29-73 psi	2-5 bar / 29-73 psi	2-5 bar / 29-73 psi (1.5-5 bar / 22-73 psi)[A]
	Maximum pressure *for a short period at cold start*	7 bar / 102 psi	7 bar / 102 psi	7 bar / 102 psi
	Minimum temperature	50°C / 120°F	50°C / 120°F	50°C / 120°F
	Normal temperature	90-110°C / 195-230°F	90-110°C / 195-230°F	90-110°C / 195-230°F
	Maximum temperature	140°C / 285°F	130°C / 265°F	130°C / 265°F
	Maximum consumption	0.06 L/h / 0.13 pt/h	0.06 L/h / 0.13 pt/h	0.06 L/h / 0.13 pt/h
Cylinder heads	Maximum temperature	150°C / 300°F	150°C / 300°F	150°C / 300°F
Outside air	Minimum temperature	-25°C / -13°F	-25°C / -13°F	-25°C / -13°F
	Maximum temperature	50°C / 120°F	50°C / 120°F	50°C / 120°F
Fuel	Minimum pressure	0.15 bar / 2.2 psi	0.15 bar / 2.2 psi	Airbox+ 0.15 bar / 2.2 psi
	Normal pressure			Airbox+ 0.25 bar / 3.6 psi
	Maximum pressure	0.4 bar / 5.8 psi	0.4 bar / 5.8 psi	Airbox+ 0.35 bar / 5.1 psi
Airbox / Intake manifold	Maximum pressure sustained power			1200 hPa / 35.4 in.Hg
	Maximum pressure take-off*			1350 hPa / 39.9 in.Hg
	Intervention temperature			72°C / 160°F (88°C / 190°F)[B]
Exhaust gases	Normal temperature	800°C / 1472°F	800°C / 1472°F	900°C / 1650°F
	Maximum temperature sustained	850°C / 1562°F	850°C / 1562°F	950°C / 1740°F
	Maximum temperature take-off*	880°C / 1620°F	880°C / 1620°F	

*: Maximum take-off power should only be used for a maximum of 5 minutes

A: 914 F ≥ 4,420.085, 914 UL ≥4,417.665 B: 914 F ≥ 4,420.200, 914 UL ≥4,417.598