

Aircraft ground movement:

- The tow bar, stowed at the rear of the baggage compartment, should be used for aircraft movement. Push only on the wing strut. The POH specifically advises against pushing on either the vertical or horizontal stabilizer to move or rotate the aircraft on the ground. Do not move the aircraft with the cabin or baggage doors left open.
- Please install the control lock whenever parking the aircraft (including in the hangar)
- Chocks and/or tie-downs should be used in lieu of leaving the parking brake set. The parking brake is a valve that prevents return of hydraulic fluid to the reservoir; using it requires setting the toe-brakes and then engaging the hand lock located beneath the yoke. Prolonged (overnight) use of the parking brake should be avoided since the isolated hydraulic fluid will expand or contract with temperature changes which can result in ruptured seals or inadvertent brake release. Additionally, in wet wintry conditions, prolonged application can allow the brakes to freeze in place.
- Brakes should be tested for responsiveness on initial taxi. Should the brakes subsequently fade or become less responsive the POH advises that pumping the brakes may build sufficient pressure to enable effective actuation. Once stopped in this condition, the aircraft should be towed and not taxied until the brakes have been serviced.

Oil

- Oil is the lifeblood of the engine - providing cooling, reducing friction, cushioning against shock, protecting against corrosion and removing contaminants. By FAR 33.39 the engine must be able to be operated at 6 quarts in the sump, however the POH specifies that the aircraft should not be operated with less than 9 quarts of oil as measured on the dipstick. 10 quarts is acceptable for most flights (POH says <3hrs). Experience has shown that quantities much above 10 quarts tend to get blown out through the crankcase breather tube. Prior to the first flight of the day is the best time to check oil sump quantity. Stable mid-range temperature is the best indication in-flight of adequate oil quantity. Oil pressure should be >10 psi at idle and 30-60 psi at cruise. Oil temp should be in green band for takeoff.
- One unopened quart of oil is kept in the baggage compartment to allow for contingencies when the aircraft has been flown to a field without services and requires an oil addition to be safely flown home. If you are planning a flight of several hours, you should take additional oil with you or plan to purchase oil during your trip. It is not okay to start a flight with insufficient oil just to get the plane home because oil is not conveniently available.

Fueling

- Ensure the static line is attached to unpainted metal on the aircraft (exhaust pipe or tow bar lugs).
- When topping off the tanks, the POH advises placing the fuel selector switch in either the Right or Left position to maximize the fill and avoid cross feed and overflow spillage. Wait 15 (ideally 30) minutes after fueling to allow any water to settle before sampling. At <32°F, water contaminants may appear as ice crystals precipitating to the bottom.
- Do not use the fill neck as a fulcrum to support the fuel nozzle as this will flex the metal, causing it to work-harden and eventually crack. Take care to wipe off any spillage on the wing as fuel will degrade the surface finish.
- Minimum grade is 100LL. Filling to the bottom of the fill neck will provide 34.4 gal (32.5 gal useable) in each tank.

Care and cleaning

- Please keep the interior looking good by not using any tobacco products, not carrying animals/pets of any kind, and not using open beverage containers – please use capped bottles vice cans. Also consider pencils instead of pens.
- Do not slam the doors or force the locking arm. This has caused damage. The door seals are tight and so constant, steady pressure (from the outside if necessary) is typically sufficient to be able to rotate the door handle to lock.
- Do not remove aircraft seats or make other configuration changes without prior approval by the owner.
- A shackle secured to the floor of the baggage compartment is provided to attach the top strap of a child seat.
- When parking the aircraft outside, a pitot tube cover, cowl plugs (after engine is cool), and tiedown straps are available in the baggage compartment. In cold weather, the extension cord should be carried to allow for pre-heat.
- Use only water or Pledge with clean micro-fiber towels on the windows - supplies have been provided in the baggage compartment. Do not use Windex or other cleaners, or paper towels on the windows.
- After your flight please take a few minutes to wipe down the leading edges, struts, and cowling with Pledge in order to remove bugs from the airframe. They are much easier to remove immediately following flight and it requires only a small amount of Pledge and some rubbing to leave the airplane as clean as you would like to find it. Thank you.

Battery Charging and Pre-heat

- A BatteryMinder has been provided to prolong battery life and ensure max charge. Typically, in the hangar at KOSU it should be plugged in continuously. It can also be used to charge a dead battery (Concorde Aircraft Battery only).
- Pre-heating is required whenever the engine has been exposed to temperatures $\leq 32^{\circ}\text{F}$ for a period of 2 hrs or more.
- N116HR is equipped with a Tanis engine heater. An extension cord is provided in the hangar and the receptacle (protected by a dummy plug) is located adjacent to the oil dipstick. A red LED next to the plug illuminates when the heater is powered. Electric pre-heat must be used for a minimum of 4 hrs immediately prior to flight to be effective. When temperatures are routinely expected to be below freezing, the heater may be left plugged in continuously.
- Alternatively, the aircraft may be placed in a heated hangar for a minimum of 4 hrs prior to flight. Directed forced air heaters should not be used due to the risk of uneven heating and potential damage to belts, hoses, and paint.

According to Continental Motors: Superficial application of preheat to a cold soaked engine can cause damage to the engine. An inadequate application of preheat may warm the engine enough to permit starting but will not de-congeal oil in the sump, lines, cooler, filter, etc. This requires considerable preheat. The engine may start and appear to run satisfactorily, but can be damaged from lack of lubrication.. The amount of damage will vary and may not become evident for many hours or the engine may fail after application of high power.

Engine Start

- Ensure the avionics power switch is OFF before turning the Master Switch ON or OFF or starting the engine.
- Set the throttle to start at ≤ 1000 rpm. Having the engine catch at high rpm and then quickly throttling back puts stress and wear on engine components before oil may be adequately distributed.
- Shutdown immediately if oil pressure is not in the green band within 30 seconds (60 seconds max in winter).
- Operate the engine at 1000 rpm until some oil temp is indicated (retard throttles to maintain oil pressure < 100 psi).
- Do not operate the engine above 1200 rpm unless oil temperature is $\geq 75^{\circ}\text{F}$ and oil pressure is 30-60 psi.
- Perform all ground ops with cowl flaps OPEN, mixture in FULL RICH and propeller control at FULL INCREASE.
- Avoid prolonged run-ups. Always face the engine into the wind and open cowl flaps during run-up (even in cold weather) to ensure adequate cooling. Carburetor heat OFF and propeller in steep pitch except for momentary checks.
- Prolonged idling at low RPM or on a single magneto can foul spark plugs. Minor spark plug fouling can usually be cleared by: (1) ensure both magnetos are ON; (2) advance throttle to 2200 rpm (monitor CHT); (3) move mixture control toward IDLE CUTOFF until RPM peaks and hold for 10 sec; (4) return to FULL RICH, retard the throttle and recheck magnetos. This procedure may be attempted once recognizing that it is adverse to the engine's health.
- Don't ever run the engine up under high power with the cowling removed. When high power run-ups are necessary, ensure you idle the engine at 600-800 rpm for a few minutes prior to shutdown to remove the excess heat developed.

According to Continental Motors: Excessive ground run-up can cause damage to pressure cooled engines. It is seldom great enough to show up right at that moment of abuse. Instead it goes by undetected, but accumulates with more abuse and finally shows up "down the road" in the form of broken piston rings, scored cylinders, or premature overhauls.

In-flight

- Recommended power for a normal climb is 75% with FULL RICH mixture setting.
- At any power settings above 75% do not use E.G.T. gauge as an aid to adjust mixture – use FULL RICH only.
- Recommend setting for 65% power at cruise unless higher is essential to meet mission. This setting provides significant improvement in fuel consumption and endurance while still delivering more than 90% of the speed the aircraft is capable of. Modest power settings also reduce wear and tear on the engine.
- POH authorizes leaning in cruise at any altitude once engine temp has stabilized (usually 5 mins after leveling off). Lean of peak operation is not authorized. Set for $\sim 100^{\circ}\text{F}$ rich of peak or by onset of roughness.
- Utilize cowl flaps (and mixture) as necessary to keep Cylinder Head Temperature at $\sim 2/3$ of green arc.
- According to the POH, selection of Left or Right fuel tank is only permitted in level cruise.
- Do not attempt to override the autopilot with the flight controls as this will likely burn out the servo motors.
- Note that Takeoff and Landing Performance charts assume short field technique is used perfectly under ideal conditions. A 100% margin is considered prudent for general aviation operations. Touch and go's are not authorized.

According to Continental Motors: Avoid long descents at low MP which can result in excessive engine cooling. If power must be reduced for long periods, adjust propeller to minimum governing RPM and set MP no lower than necessary to obtain desired performance. Do not permit CHT to drop below 300°F for periods exceeding 5 minutes.