

- d. Decrease in speed when ignition switch is turned from "BOTH" to "L" or from "BOTH" to "R". Maximum 75 R.P.M.
- e. Carburetor air heat: Move control to full "HOT" position, and observe decrease in engine speed if air heater and control are operating properly. Return control to full "COLD" position.

NOTE

Under some conditions, ice may form in the carburetor during ground test. It must be eliminated before take-off.

- f. Fuel supply valve: "ON", full tank.
- g. Propeller pitch control (if installed): High R.P.M.

7-5. TAKE-OFF

Usually the throttle will be opened wide for take-off, however, it is possible to exceed the rated take-off speed of the engine if an automatic or controllable pitch propeller is improperly adjusted or if a fixed pitch propeller of sub-standard dimensions is installed. Rated take-off speed must not be exceeded at any time. With approved propeller in proper adjustment, the take-off speed will not be realized until the aircraft is nearly airborne. If a special take-off speed is specified for the engine model, it must not be maintained longer than one minute, in order to prevent overheating. It is advisable to reduce speed to the normal rating for the engine model as quickly after take-off as immediate obstacles are cleared.

7-6. CLIMBING

Except in unusual situations, it is advisable to reduce engine speed below maximum and to restrict the angle of climb so as to maintain adequate air speed to assure proper cylinder cooling. This is particularly important in warm weather.

7-7. LEVEL FLIGHT

When the desired cruising altitude has been reached, adjust the throttle (and propeller pitch control, if installed) to obtain the specified cruising R.P.M. With hydraulic controllable propellers,

reduce manifold pressure first with the pitch control: then reduce R. P. M. with the throttle. During flight, observe the following procedures and precautions:

- a. If a Stromberg carburetor is installed leave mixture control in the "FULL RICH" position at altitudes less than 5000 ft. above sea level. If a Marvel-Schebler carburetor is installed the mixture control may be adjusted to obtain best rich power at any cruising altitude.
- b. To obtain best rich power, move the mixture control toward the "LEAN" position, and watch the tachometer closely to detect any change in engine speed. If speed decreases or remains unchanged return the control to the "FULL RICH" position. However, as the control is moved to lean mixture an increase in speed will ordinarily result if an automatic enrichment has occurred, due to decreased air pressure. Further control movement will cause a decrease in speed. When the position of maximum speed has been found, return the control toward "RICH" position until engine R.P.M. decreases just perceptibly. This setting produces the best power obtainable under existing atmospheric conditions with a slightly rich mixture to prevent overheating.
- c. If the mixture control is in any but "FULL RICH" position change the setting, as described in paragraph 7-7b., for each change in altitude or power setting. If a Stromberg carburetor is installed return the mixture control to the "FULL RICH" position before letting down below an altitude of 5000 feet.
- d. The carburetor air heat control should be in the "COLD" position unless icing conditions are encountered. Formation of ice in the carburetor is indicated by a loss in R.P.M. (usually progressive). To overcome ice formation, first apply full heat to melt the ice which has formed; then close the hot air valve in small steps until only enough heat is applied to prevent further ice formation.
- e. Observe engine oil temperature and pressure frequently. Unless other temperature and pressure gauges are installed, these indications

will give the first warning of trouble. If a rapid or continuous rise in oil temperature or drop in oil pressure is noticed the aircraft should be landed without delay and the cause determined.

7-8. LET-DOWN AND LANDING

Before the throttle is retarded, place the mixture control in the "FULL RICH" position. During let-down and final approach:

- a. Retard throttle to obtain approximately 1200 R. P. M.
- b. The mixture control must be in "FULL RICH" position prior to landing. If a long glide is made, it is good practice to "gun" the engine periodically to clear the cylinders and retain engine temperatures so that the engine will remain ready for instant use.
- c. Carburetor heat is available only when engine output is well above that for idle; therefore, the carburetor heat control should be applied before closing the throttle and "off" after closing the throttle so that full power will be available if required in an emergency.

CAUTION

Do not open a carburetor throttle abruptly after idling in flight. To do so may cause the engine to stop. If the engine tends to stop while gliding with closed throttle, the idling mixture should be readjusted. If the engine stops when throttle is opened suddenly, return the throttle to the closed position and open slowly or operate the primer for one or two strokes.

7-9. STOPPING THE ENGINE

- a. Normally the engine will have cooled sufficiently during the glide and taxiing period to permit placing the ignition switch in the off position without additional idling. If taxi time has been excessive, operate the engine at 800-100 RPM for two or three minutes before stopping.

- b. If the engine is equipped with a Stromberg NA-S3A1 carburetor, stop the engine from idling speed by turning the ignition switch to "OFF". As the engine stops open the throttle rapidly and leave it open to prevent after firing. If the carburetor is a Marvel-Schebler MA-25SPA, stop the engine by moving the mixture control to the "full lean" position, where it acts as an idle cut-off. Do not open the throttle, because it actuates the accelerator pump and rapid opening will flood the engine.

7-10. LUBRICATING OIL

Teledyne Continental Aircraft Engines are certificated on straight mineral oil. Detergent oils are not a requirement. It is recognized that for engine operation in extreme ambient temperature ranges of high or low temperatures, detergent oils show advantages of coping with sludge, varnish and carbon formation in the engine, and improved performance can be obtained for aircraft operating under these adverse conditions. For obvious reasons, we do not propose to indulge in testing of any oils to ascertain whether or not they meet our specifications MHS-24B. The proof of compliance rests with the oil manufacturer. Recommendations relative to transition from a straight mineral oil to a detergent oil, as outlined in Federal Aviation Administration "Power Plant Branch Report No. 1" titled "Evaluation of Aircraft Engine Fuels and Lubricating Oils", apply to the use of Specification MHS-24B detergent oil. It is safest and simplest to begin use of this oil when the engine is new or just major overhauled. However, if an engine has been using straight mineral oil for a considerable period of time, and it is desired to change MHS-24B oil, it is generally agreed that the oil should be drained after five or ten hours of operation and the condition of the oil screen checked. If an abnormal amount of sludge is found, the oil should be changed and the screen should be checked at approximately five hour intervals, until the condition of the screen appears normal. Teledyne Continental Motors approves the use of only those detergent oils meeting oil specifications MHS-24B.

7-11. VISCOSITY

Viscosity grades of oil, as listed in Table XVIII, should be used in season, according to the prevailing air temperature. In extremely cold weather it is advisable to drain the oil sump immediately after