

### FUEL SYSTEM

Fuel is carried in two integrally sealed sections of the forward, inboard area of wing. Total usable fuel capacity is 89 U.S. gallons (336.9 liters). There are sump drains at the lowest point in each tank for taking fuel samples to check for sediment contamination or condensed water accumulation.

The recessed three position handle aft of the console, on the floor, allows pilot to set selector valve to LEFT tank, RIGHT tank or OFF position.

The gascolator, located at right of selector valve, in the floorboard, is for draining condensed water and sediment from lowest point in fuel system before first flight of the day and after each refueling. The gascolator sump can be used to drain the selected fuel tank.

Fuel is delivered, by the engine driven pump, to a throttle body fuel injector where pressure is regulated and the correct volume of fuel is metered to each cylinder of the engine. Fuel not needed by the engine is returned to the tank from which it is drawn.

The HIGH BOOST pump switch operates the fuel boost pump on high power. The high boost setting is capable of operating the engine in case of engine driven fuel pump failure or severe fuel filter blockage. A guard on the "HIGH BOOST" switch prevents inadvertent operation and must be lifted for switch operation. High Boost may be used on the ground as an engine starting aid. Continuous operation should be avoided except in an emergency. Never run the boost pump without fuel in the system. Refer to SECTIONS III and IV for proper use of the HIGH BOOST setting.

#### **-CAUTION-**

***Pushing HIGH BOOST pump switch ON when engine driven pump is operating properly will cause engine to quit due to excessive rich fuel mixture.***

The BOOST PUMP (Low Boost) switch operates the fuel boost pump on low power to provide a means of suppressing fuel vapor from fuel system during hot day and high altitude conditions. Low boost may also be used as an engine starting aid. Continuous operation of the low boost is permitted. Never run the boost pump without fuel in the system. Refer to SECTIONS III and IV for proper use of the BOOST PUMP setting

#### **-CAUTION-**

***Pushing LOW BOOST pump switch ON when engine is operating properly at idle conditions will cause engine to run rough or quit due to excessive rich fuel mixture. For this reason LOW BOOST should normally be turned off except where prescribed in the normal operating procedures.***

Two electric fuel-level transmitters, working in series, in each wing tank operate the appropriate, left or right, fuel quantity gauges. The master switch actuates the fuel quantity indicator system to depict an indication of fuel remaining in each tank. Vents in each fuel tank allow for overflow and pressure equalization.

The optional, visual fuel quantity indicators, in the top of each wing, are to be used for PARTIAL FUEL LOADING only and NOT for preflight inspection purpose. The Fuel Flow indicating system indicates the volume of fuel being used, total fuel used or fuel remaining or time remaining (refer to GARMIN User Manual).

### ELECTRICAL SYSTEM

#### **ALTERNATOR & BATTERY**

The M20TN has a 28 Volt DC electrical system, powered by a 100-amp alternator which is mounted on the front of the engine. It is driven by the engine crankshaft through a shear mechanism and charges the main batteries. The alternator is the primary source of aircraft power and is



**OXYGEN SYSTEM****■ AVOX OXYGEN SYSTEM**

A four-place oxygen system provides supplementary oxygen necessary for continuous flight at high altitude. An oxygen cylinder is located in the equipment bay, accessible through a removable panel on the aft wall of the baggage compartment, or through the standard external, right side, panel in the tailcone. A combined pressure regulator/shutoff valve, attached to the cylinder, automatically reduces cylinder pressure to the delivery pressure required for operating altitude. The oxygen cylinder filler valve is located under a spring loaded door aft of the baggage door.

**NOTE:**

For the **PRECISE FLIGHT OXYGEN SYSTEM (Optional)**  
Refer to Section IX for Supplemental Data

A pilot's oxygen panel contains a cylinder pressure gauge, on the pilot's arm rest, effectively a quantity gauge, and a control knob, below arm rest, which is mechanically connected to the shut-off valve at the cylinder. The supply of oxygen can thus be shut off from the cockpit when not required. When the control is in the "ON" position, sufficient oxygen flow is available at the maximum airplane operating altitude (see Section II Limitations) while at lower altitudes the reducing valve automatically economizes the flow to conserve oxygen for longer duration or for future availability, without requiring any action by the pilot (See Fig. 7-12 or Fig. 7-13).

Four oxygen outlets are provided in the overhead panel between the pilot's and co-pilot's seat for the convenience of all occupants. Oxygen flows from the outlets only when a mask hose is connected. Four partial re-breathing type masks are provided, each with vinyl plastic hoses and flow indicators. The three passenger masks are of the disposable type. The pilot's mask is a permanent type with a built-in microphone for ease of radio communication while using oxygen. To use the mask-microphone, connect its lead to the microphone jack located left of the instrument panel, in place of the aircraft or headset microphone lead, and key the switch on the control yoke.

The oxygen cylinder, (composite) when fully charged, contains either a 77.1 ft.<sup>3</sup> or 115.7 ft.<sup>3</sup> of aviator's breathing oxygen (Spec No. MIL-0-27210) under a pressure of 1850 PSI at 21° C (70° F).

Filling pressures will vary, however, due to ambient temperature in filling area, and the rise of temperature resulting from compression of the oxygen. Because of this, merely filling to 1850 PSI will not necessarily result in a properly filled cylinder. Fill to pressures indicated on Fig. 7-11 for ambient temperatures.

**-WARNING-**

*Oil, grease or other lubricants in contact with oxygen create a serious fire hazard, and such contact must be avoided when handling oxygen equipment.*

| Ambient Temperature<br>° F | Filling Pressure<br>PSIG | Ambient Temperature<br>° F | Filling Pressure<br>PSIG |
|----------------------------|--------------------------|----------------------------|--------------------------|
| 0                          | 1650                     | 50                         | 1875                     |
| 10                         | 1700                     | 60                         | 1925                     |
| 20                         | 1725                     | 70                         | 1975                     |
| 30                         | 1775                     | 80                         | 2000                     |
| 40                         | 1825                     | 90                         | 2050                     |

FIGURE 7-11 OXYGEN FILLING PRESSURES

**NOTE:**

The oxygen cylinder should not be run down to less than 100 PSI. Below this pressure, atmospheric contamination of the cylinder may occur, requiring valve removal and cylinder cleaning and inspection at an FAA approved repair station.



For FAA requirements concerning supplemental oxygen, refer to FAR 91.211. Supplemental oxygen should be used by all occupants when cruising above 12,500 feet. It is often advisable to use oxygen at altitudes lower than 12,500 feet under conditions of night flying, fatigue, or periods of physiological or emotional disturbances. Also the habitual and excessive use of tobacco or alcohol will usually necessitate the use of oxygen at less than 10,000 feet.

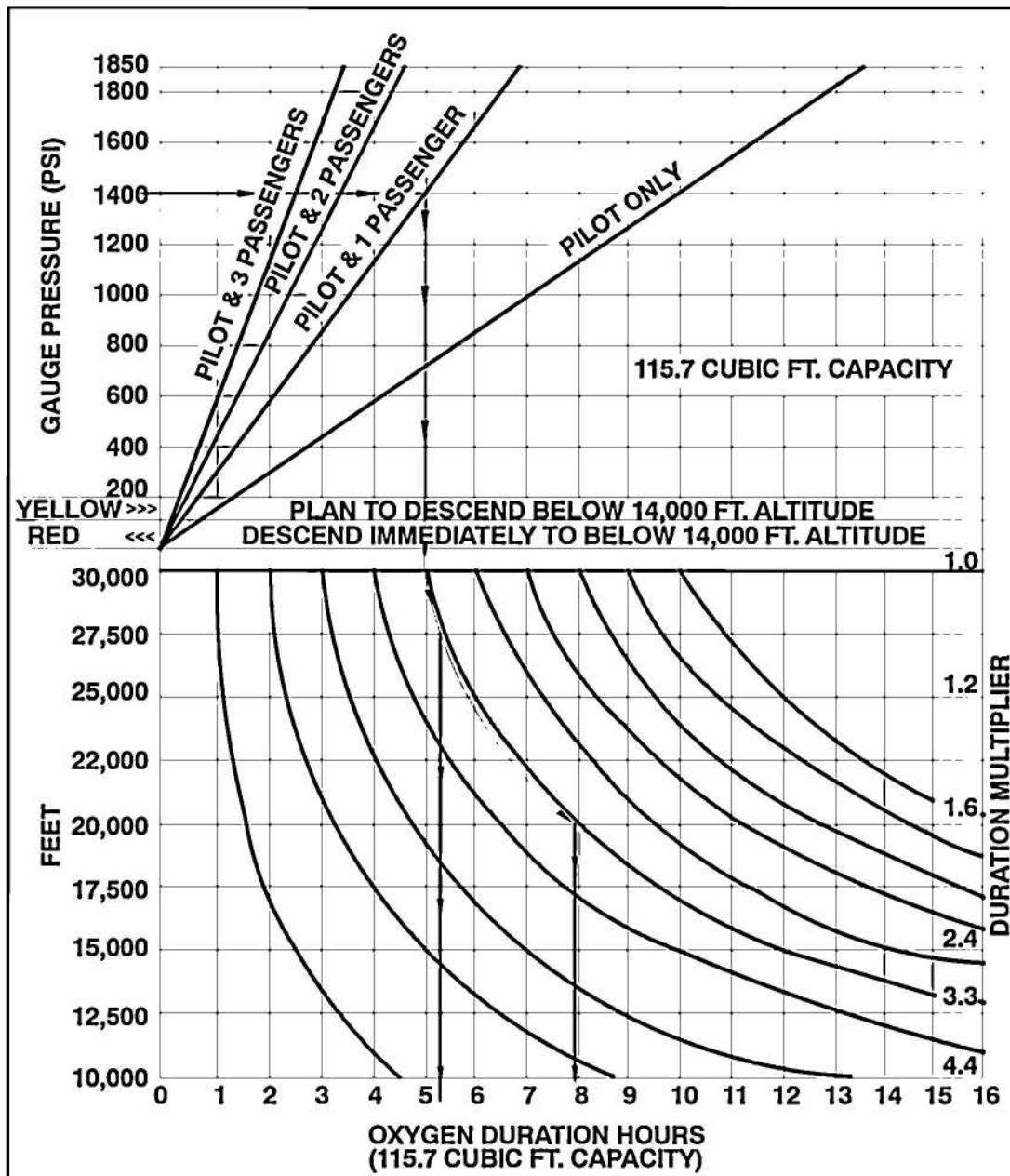


FIGURE 7-12 AVOX OXYGEN DURATION CHART (115.7 CU.FT.)



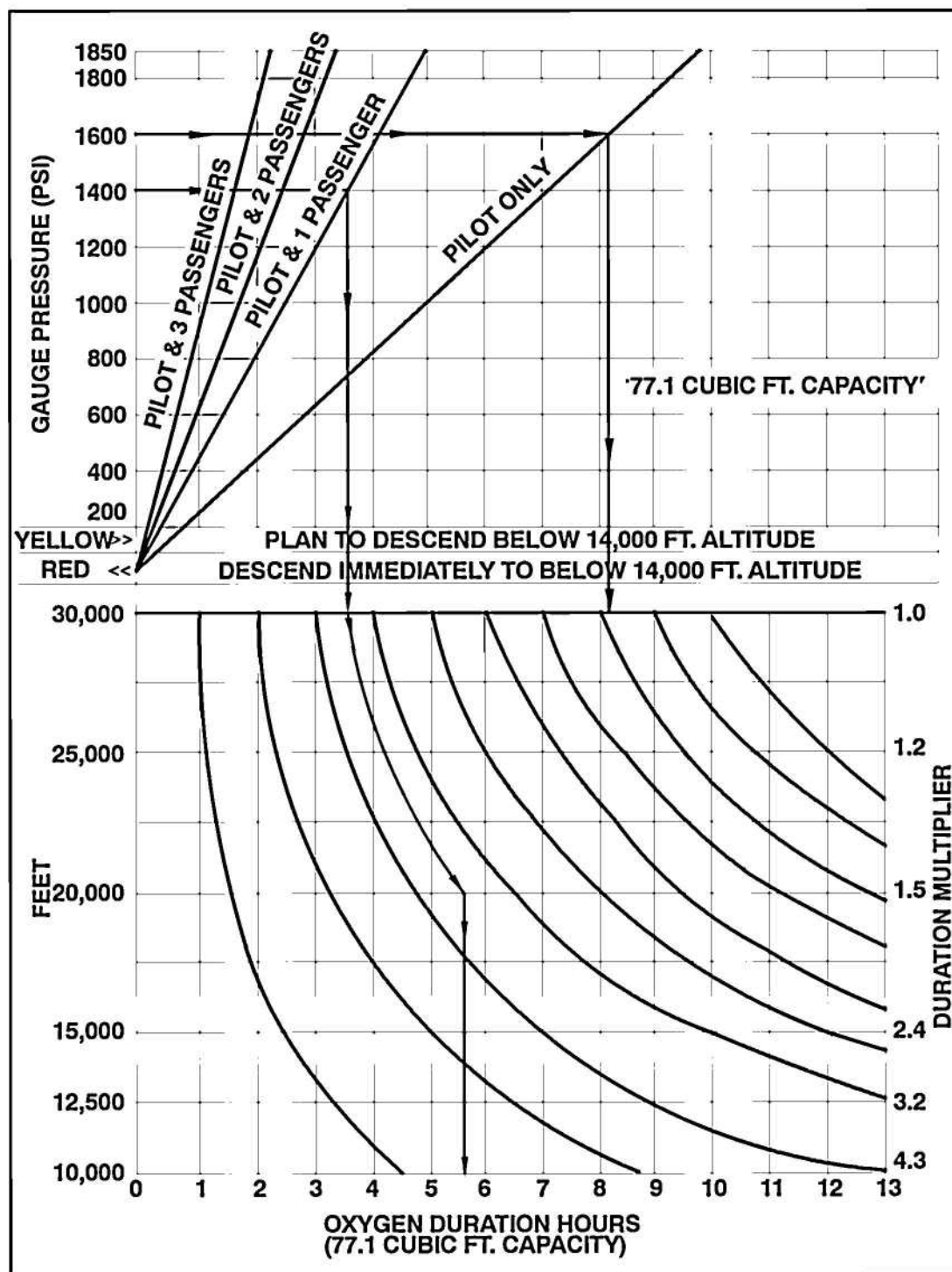


FIGURE 7-13 AVOX OXYGEN DURATION CHART (77.1 CU.FT.)

The Avox oxygen system duration chart (Fig. 7-12 or Fig. 7-13) should be used in determining the usable duration (in hours) of the oxygen supply in the airplane for the chosen cruising altitude. The following procedure outlines the method of finding the duration from the chart:

1. Note the available oxygen pressure shown on the pressure gauge.
2. Locate this pressure on the scale on the left side of the chart. Then go across the chart horizontally to the right until intersecting the diagonal line which represents the number of persons on board. From that intersection drop vertically down to the heavy line, marked 30,000 ft..



3. From this point on the heavy line, follow the trend of the curved lines, down to the horizontal line representing cruise altitude. Then drop vertically down to the bottom of the chart and read the duration in hours given on the scale.
4. As an example of the above procedure (refer to Figure 7-12), 1400 PSI of pressure will safely sustain the pilot and one passenger for 4 hours and 55 minutes at 28,000 ft.; however, cruising at 20,000 ft. would permit an oxygen duration of 7 hours and 55 minutes.

Light crew loads and relatively low altitudes will permit oxygen durations off the chart. Such durations can be calculated by determining the duration at 30,000 feet (by steps 1 and 2 above) and multiplying by the "duration multiplier" shown on the right of the appropriate cruising altitude.

Example, Pilot only, at 1600 PSI has 11.25 hours duration at 30,000 ft. Duration Multiplier of 2.4 for 20,000 ft., gives 26 hours and 54 minutes duration. Oxygen durations off the chart obviously exceed the airplanes duration. However, judicious choices of altitude for the number of persons on board can permit flight planning for several fuel stops, without need for recharging oxygen system at each stop.

### **-CAUTION-**

*Facial hair, beards and mustaches may prevent a proper seal between face and mask, causing 16-67% leakage. Duration chart may be invalid.*

### **VACUUM SYSTEM**

GX aircraft are all electric. There is no Vacuum System in the standard aircraft.

### **EMERGENCY LOCATOR TRANSMITTER**

The Emergency Locator Transmitter (ELT) is located in the tailcone and is accessible from the battery access door on the right side of the tailcone. The emergency locator transmitter meets the requirements of FAR 91.52 and is automatically activated by a longitudinal force of 5 to 7 g's. The ELT transmits a distress signal on both 121.5 MHz and 243.0 MHz for a period of from 48 hours in low temperature areas and up to 100 hours in high temperature areas. The unit operates on a self-contained battery. The battery should be checked at each annual inspection. The battery has a useful life of four years. However, to comply with FAA regulations it must be replaced after two years of shelf life. The battery should also be replaced if the transmitter has been used in an emergency situation or if accumulated test time exceeds one hour. The battery replacement date is marked on the transmitter label.

On the unit itself is a three position selector switch placarded "ARM", "OFF", "ON". The "ARM" position is provided to set the unit to the automatic position so that it will transmit only after impact and will continue to transmit until battery is drained to depletion or until the switch is manually moved to "OFF". "ARM" position is selected when the transmitter is installed at the factory and switch should remain in that position whenever unit is installed in the airplane. The "ON" position is provided so unit can be used as a portable transmitter or in the event the automatic feature was not triggered by impact or to periodically test the function of the transmitter. Select the "OFF" position when changing battery, when rearming the unit if it has been activated for any reason, or to discontinue transmission.

### **NOTE:**

**If the switch has been placed in the "ON" position for any reason, the "OFF" position has to be selected before selecting "ARM". If "ARM" is selected directly from the "ON" position the unit will continue to transmit in the "ARM" position.**



**SPEED and POWER SETTINGS vs ALTITUDE - (BEST POWER)**

**Conditions:**

**Example:**

|                                                        |  |                                      |  |
|--------------------------------------------------------|--|--------------------------------------|--|
| <b>Mixture:</b><br>Best Power (50° F Rich of Peak TIT) |  | <b>Pressure Altitude:</b> 16000 ft   |  |
| <b>Cruise Weight:</b> 3100 LB                          |  | <b>Propeller Speed:</b> 2400 RPM     |  |
| <b>Altimeter:</b> Set to 29.92                         |  | <b>Manifold Pressure:</b> 30.5 in HG |  |
| <b>Configuration:</b> Clean                            |  | <b>Outside Air Temp:</b> -16°C       |  |
|                                                        |  | <b>True Airspeed:</b> 220 KTAS       |  |
|                                                        |  | <b>Fuel Flow:</b> 20.3 GPH           |  |

**25000 Ft. Pressure Altitude**

| $\Delta$ ISA:<br>(OAT) |      | -30<br>-54 | (-65)°C<br>(-81)°F | 0<br>0 | (-34)°C<br>(-27)°F | 30<br>54 | (-4)°C<br>(27)°F |
|------------------------|------|------------|--------------------|--------|--------------------|----------|------------------|
| RPM                    | MAP  | KTAS       | GPH                | KTAS   | GPH                | KTAS     | GPH              |
| 2500                   | 30.5 | 241        | 22.6               | 242    | 21.1               | 240      | 19.5             |
| 2500                   | 29.0 | 237        | 21.5               | 238    | 20.1               | 236      | 18.5             |
| 2500                   | 26.0 | 228        | 19.4               | 229    | 18.1               | 227      | 16.8             |
| 2500                   | 22.0 | 215        | 16.9               | 216    | 15.8               | 213      | 14.6             |
| 2400                   | 30.5 | 237        | 21.8               | 239    | 20.3               | 237      | 18.8             |
| 2400                   | 27.0 | 228        | 19.4               | 229    | 18.1               | 227      | 16.7             |
| 2400                   | 24.0 | 219        | 17.5               | 220    | 16.4               | 218      | 15.2             |
| 2400                   | 21.0 | 210        | 15.8               | 209    | 14.8               | 207      | 13.7             |
| 2300                   | 28.0 | 226        | 19.1               | 227    | 17.8               | 225      | 16.5             |
| 2300                   | 25.0 | 218        | 17.2               | 218    | 16.0               | 215      | 14.8             |
| 2300                   | 22.0 | 208        | 15.4               | 208    | 14.4               | 205      | 13.3             |
| 2300                   | 19.0 | 197        | 13.7               | 196    | 12.8               | 192      | 11.9             |
| 2200                   | 21.0 | 199        | 13.9               | 198    | 13.0               | 195      | 12.0             |

**24000 Ft. Pressure Altitude**

| $\Delta$ ISA:<br>(OAT) |      | -30<br>-54 | (-63)°C<br>(-81)°F | 0<br>0 | (-32)°C<br>(-27)°F | 30<br>54 | (-2)°C<br>(27)°F |
|------------------------|------|------------|--------------------|--------|--------------------|----------|------------------|
| RPM                    | MAP  | KTAS       | GPH                | KTAS   | GPH                | KTAS     | GPH              |
| 2500                   | 30.5 | 239        | 22.6               | 240    | 21.1               | 238      | 19.5             |
| 2500                   | 29.0 | 235        | 21.5               | 236    | 20.1               | 234      | 18.6             |
| 2500                   | 26.0 | 226        | 19.4               | 227    | 18.2               | 225      | 16.8             |
| 2500                   | 22.0 | 213        | 16.9               | 214    | 15.8               | 212      | 14.6             |
| 2400                   | 30.5 | 235        | 21.8               | 237    | 20.3               | 235      | 18.8             |
| 2400                   | 27.0 | 226        | 19.4               | 227    | 18.1               | 225      | 16.7             |
| 2400                   | 24.0 | 217        | 17.5               | 218    | 16.4               | 215      | 15.1             |
| 2400                   | 21.0 | 207        | 15.7               | 207    | 14.7               | 205      | 13.6             |
| 2300                   | 28.0 | 225        | 19.1               | 226    | 17.8               | 224      | 16.5             |
| 2300                   | 25.0 | 216        | 17.2               | 216    | 16.1               | 214      | 14.8             |
| 2300                   | 22.0 | 206        | 15.4               | 206    | 14.4               | 203      | 13.3             |
| 2300                   | 19.0 | 195        | 13.6               | 194    | 12.7               | 191      | 11.8             |
| 2200                   | 21.0 | 197        | 13.8               | 197    | 12.9               | 193      | 12.0             |

Some (low) power settings may not be attainable due to low cylinder or oil temperatures depending on ambient conditions

