

## SECTION 3 ENGINE INDICATION SYSTEM (EIS)

**NOTE:** Refer to the Pilot's Operating Handbook (POH) for limitations.

The Engine Indication System (EIS) displays critical engine, electrical, fuel, and other system parameters on the left side of the Multi Function Display (MFD) during normal operations (Figure 3-1). In reversionary mode (Figure 3-2), the displays are re-configured to present Primary Flight Display (PFD) symbology together with the EIS (refer to the System Overview for information about Reversionary Mode).



Figure 3-1 Multi Function Display (172S Normal Operations)



Figure 3-2 Primary Flight Display (182T Reversionary Mode)

Green bands on the instruments indicate normal ranges of operation; yellow and red bands indicate caution and warning, respectively. White bands indicate areas outside of normal operation not yet in the caution or warning ranges. When unsafe operating conditions occur, readouts, pointers and labels change color corresponding to the level of the condition; warnings also flash. If sensory data to an instrument becomes invalid or unavailable, a red "X" is shown across the instrument.

EIS information is presented in three displays, accessed using the **ENGINE** Softkey on the MFD.

172R, 172S, 182T, 206H, T182T, and T206H display the following:

- **Engine Display** – Default display, shows all critical engine, fuel, and electrical indicators
- **Lean Display** – Provides engine leaning information
- **System Display** – Shows numeric readouts of critical engine, fuel, and electrical indicators

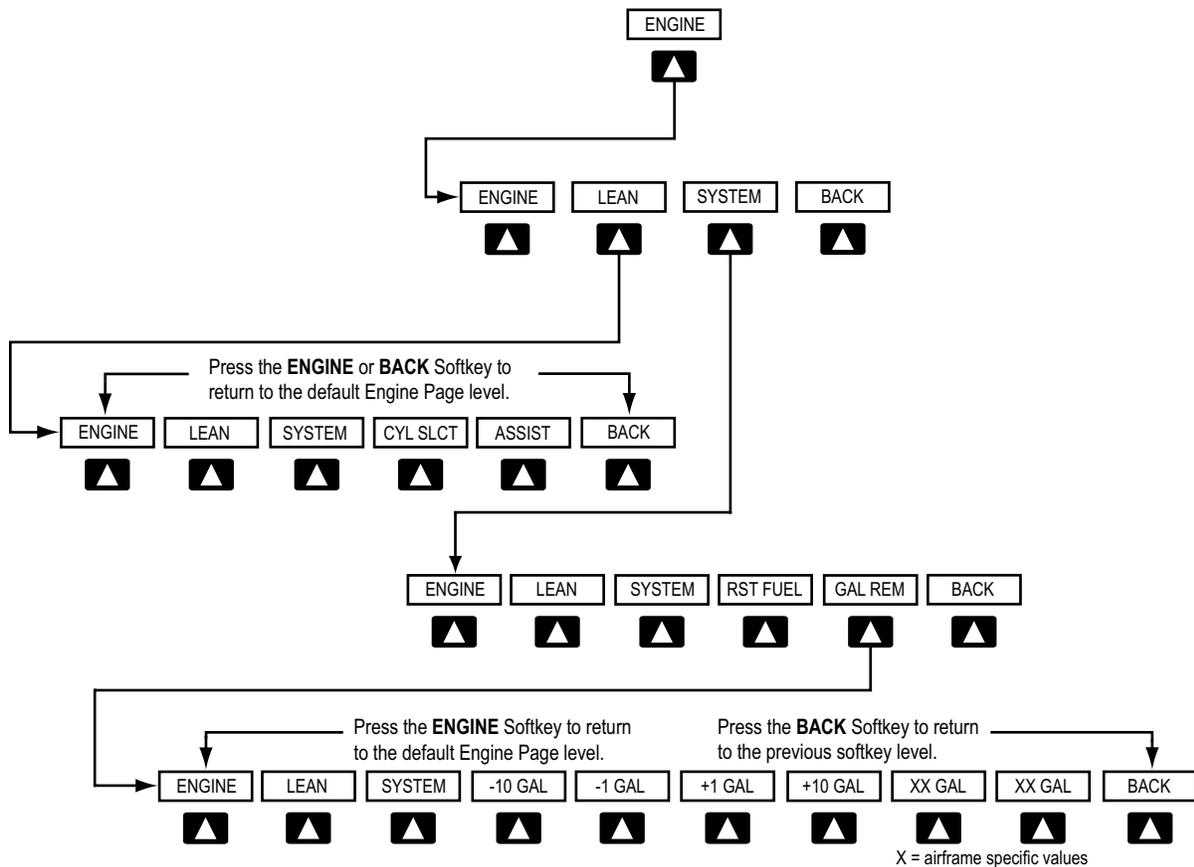


Figure 3-3 Engine Softkey Flowchart

### 3.1 ENGINE DISPLAY

The Engine Display is the default EIS display and can be displayed after viewing other EIS displays by pressing the **ENGINE** softkey. This display shows the dial gauge(s), horizontal bar indicators, and readouts for critical engine and electrical parameters.

The EIS automatically defaults back to the Engine Display from the Lean or System Display when certain parameters are exceeded. Fluctuations in engine speed and fuel quantity above certain levels, depending on the airframe, also cause reversion back to the Engine Display.

#### **NORMALLY-ASPIRATED AND TURBOCHARGED AIRCRAFT**

- |                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>① <b>Engine Manifold Pressure Gauge (MAN IN)</b><br/><i>Models 182T, T182T, 206H, T206H</i></p>   | <p>Displays engine power in inches of mercury (in Hg)<br/><i>Turbocharged aircraft</i> – Red range indicates maximum manifold pressure<br/><i>Model T182T</i> – A white tick mark indicates the cruise manifold pressure</p>                                                                                                                                                                                                                                                                                                         |
| <p>② <b>Tachometer (RPM)</b></p>                                                                     | <p>Displays propeller speeds in revolutions per minute (rpm)<br/>Red range indicates propeller overspeed warning<br/><i>Models 172S, 206H, and T206H</i> – White high-rpm range indicates above normal operating speeds<br/><i>Model 172S</i> – When ascending through 5300 ft, the upper end of the green arc displays 2600 rpm and ascending through 10,300 displays 2700 rpm. When descending below 9700 ft, the upper end of the green arc returns to 2600 rpm and descending below 4700 ft returns to 2500 rpm (Figure 3-6)</p> |
| <p>③ <b>Fuel Flow Indicator (FFLOW GPH)</b></p>                                                      | <p>Displays the current fuel flow in gallons per hour (gph)<br/><i>Turbocharged aircraft</i> – A green tick mark indicates maximum takeoff fuel flow<br/><i>Model T182T</i> – A white tick mark indicates the maximum cruise fuel flow</p>                                                                                                                                                                                                                                                                                           |
| <p>④ <b>Oil Pressure Indicator (OIL PRES)</b></p>                                                    | <p>Displays pressure of the oil supplied to the engine in pounds per square inch (psi)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>⑤ <b>Oil Temperature Indicator (OIL TEMP)</b></p>                                                 | <p>Displays the engine oil temperature in degrees Fahrenheit (°F)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p>⑥ <b>Cylinder Head Temperature Indicator (CHT)</b><br/><i>Models 182T, T182T, 206H, T206H</i></p> | <p>Displays the head temperature of the hottest cylinder (number shown in triangular pointer) in °F</p>                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p>⑦ <b>Exhaust Gas Temperature Indicator (EGT)</b><br/><i>Normally-aspirated Aircraft</i></p>       | <p>Displays the exhaust gas temperature of the hottest cylinder (number shown in triangular pointer) in °F</p>                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <p>⑧ <b>Turbine Inlet Temperature Indicator (TIT)</b><br/><i>Turbocharged Aircraft</i></p>           | <p>Displays the temperature at the turbine inlet in °F</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

- ⑨ **Vacuum Pressure Indicator (VAC)** Displays standby vacuum pump pressure  
*Models 172R and 172S*
- ⑩ **Fuel Quantity Indicator (FUEL QTY GAL)** Displays the quantity of fuel in gallons (gal) in each tank (left–L and right–R) from zero to full (F)  
When full, the indicator displays to 35 gal per side (24 gal for *Models 172R and 172S*)
- ⑪ **Engine Hours (Tach) (ENG HRS)** Displays a numeric readout for the time in hours (hrs) the engine has been in service  
*Models 172R and 172S*
- ⑫ **Voltmeter (M, E BUS VOLTS)** Displays the main and essential bus voltages
- ⑬ **Ammeter (M, S BATT AMPS)** Displays the main and standby battery load in amperes

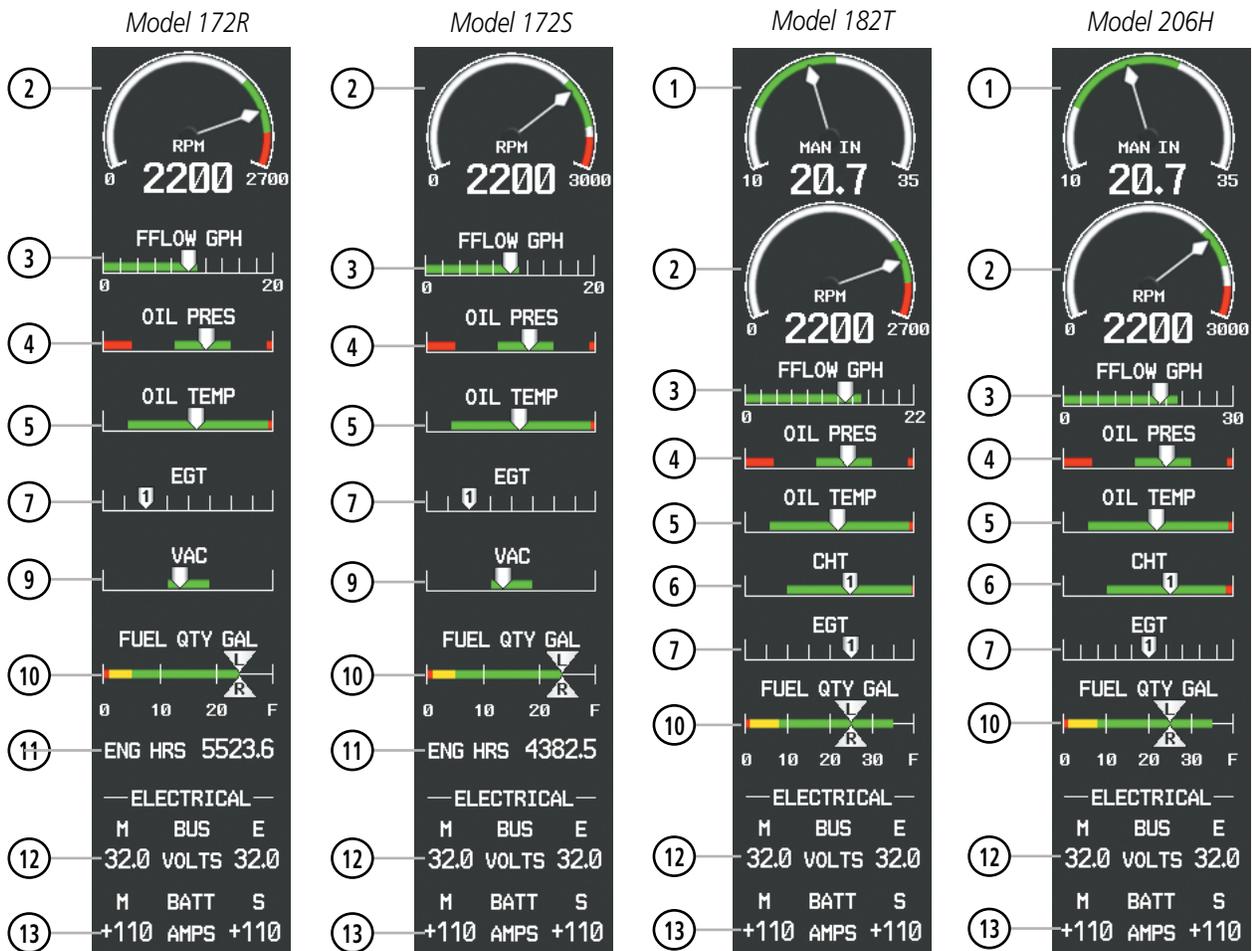


Figure 3-4 Engine Display (Normally-Aspirated Aircraft)

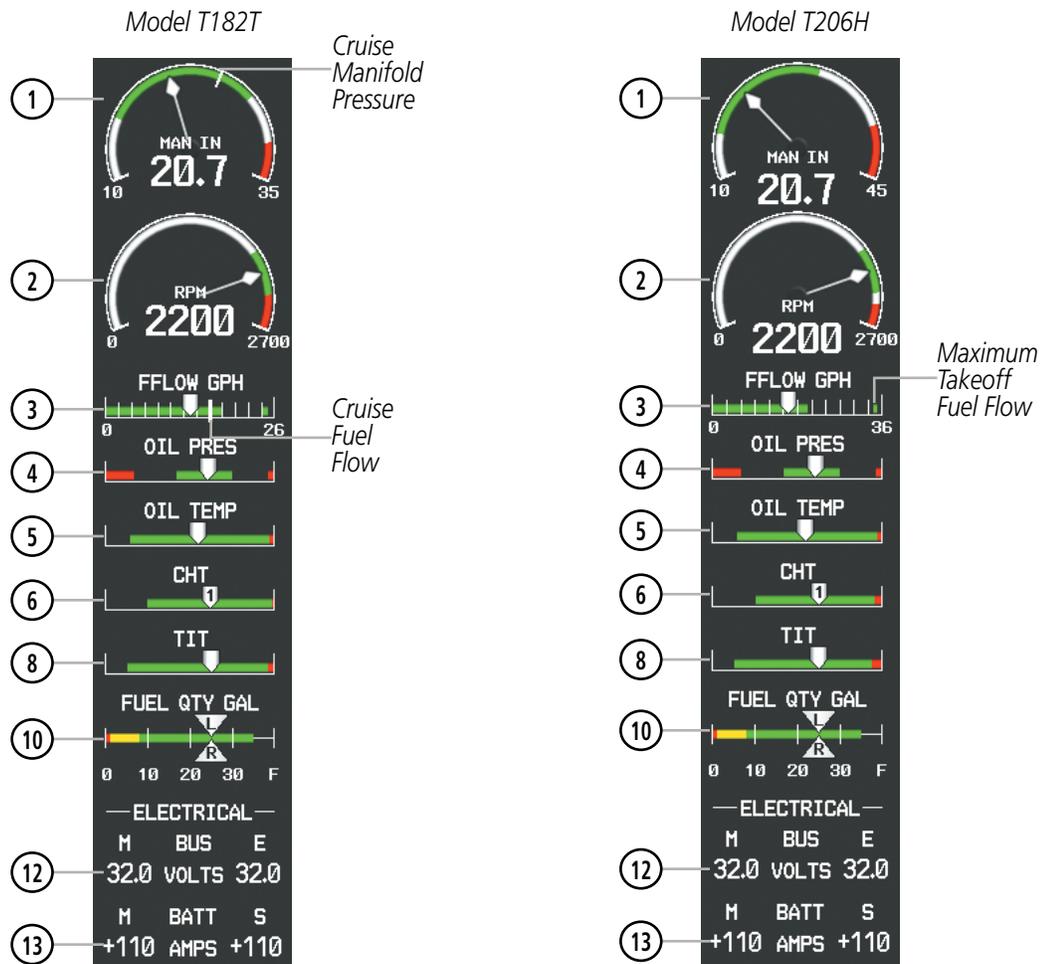


Figure 3-5 Engine Display (Turbocharged Aircraft)

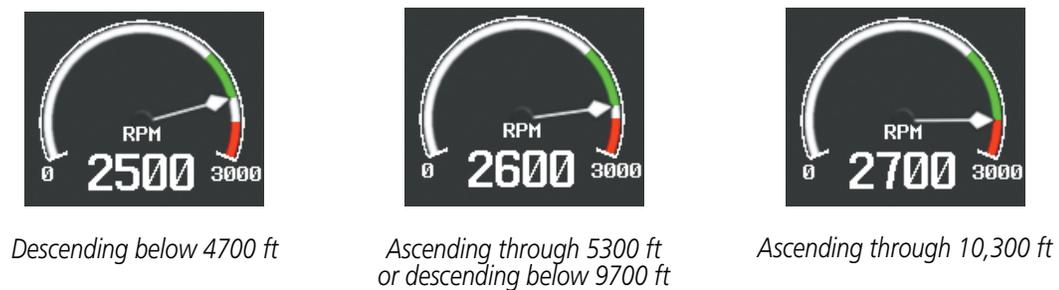


Figure 3-6 172S Tachometer Green Arc Expansion

## 3.2 LEAN DISPLAY



**NOTE:** The pilot should follow the engine manufacturer's recommended leaning procedures in the Pilot's Operating Handbook (POH).

The Lean Display is accessed by pressing the **ENGINE** Softkey followed by the **LEAN** Softkey and provides information for performing engine leaning. The engine gauge(s) and Fuel Quantity Indicator remain on the Lean Display and fuel flow is listed as a numeric readout. Exhaust gas (EGT) and cylinder head (CHT) temperatures for all cylinders are displayed graphically with numeric readouts for the selected cylinder. For turbocharged aircraft, the Turbine Inlet Temperature (TIT) Indicator is shown above the EGT Bar Graph.

### Accessing the EIS Lean Display:

- 1) Press the **ENGINE** Softkey.
- 2) Press the **LEAN** Softkey.
- 3) To return to the default Engine Display, press the **ENGINE** or **BACK** Softkey.

From the Lean Display, the pilot can use the **CYL SLCT** and **ASSIST** softkeys to get information about specific cylinders. Pressing the **CYL SLCT** (Cylinder Select) Softkey cycles through the cylinders (i.e., changes the cylinder number indicated on the bar graphs in light blue). This softkey is disabled when the **ASSIST** Softkey is pressed or when a cylinder experiences a caution or warning condition; the softkey remains disabled until the temperature returns to normal.

### Monitoring the desired cylinder's EGT and CHT:

From the Lean Display, press the **CYL SLCT** Softkey to cycle through each cylinder and view its EGT and CHT. The selected cylinder number is shown in light blue.

The **ASSIST** Softkey aids in the leaning process by identifying the peak of the first cylinder whose temperature falls. This cylinder's number below the EGT bar graph is highlighted in light blue as the selected cylinder. If the temperature of the peaked cylinder exceeds the peak value, the peak value is not updated. Monitoring of the cylinder continues until the **ASSIST** Softkey is pressed again which disables lean assist, and removes the peak block from the bar graph and the temperature deviation from peak ( $\Delta$ PEAK). The system then returns to seeking the hottest cylinder.

- ① **Engine Manifold Pressure Gauge (MAN IN)**  
*Models 182T, T182T, 206H, T206H*

Displays engine power in inches of mercury (in Hg)  
*Turbocharged aircraft* – Red range indicates maximum manifold pressure  
*Model T182T* – A white tick mark indicates the cruise manifold pressure
- ② **Tachometer (RPM)**

Displays propeller speeds in revolutions per minute (rpm)  
 Red range indicates propeller overspeed warning  
*Models 172S, 206H, and T206H* – White high-rpm range indicates above normal operating speeds  
*Model 172S* – When ascending through 5300 ft, the upper end of the green arc displays 2600 rpm and ascending through 10,300 displays 2700 rpm. When descending below 9700 ft, the upper end of the green arc returns to 2600 rpm and descending below 4700 ft returns to 2500 rpm (Figure 3-6)
- ③ **Fuel Flow (FFLOW GPH)**

Displays the current fuel flow in gallons per hour (gph)
- ④ **Turbine Inlet Temperature Indicator (TIT)**  
*Turbocharged Aircraft*

Displays the temperature at the turbine inlet in degrees Fahrenheit (°F)  
 TIT deviation from peak ( $\Delta$ PEAK) is displayed below the indicator when the **ASSIST** Softkey is pressed.
- ⑤ **Exhaust Gas Temperature Bar Graph (EGT °F)**

Displays the exhaust gas temperature of all cylinders in °F; a readout for the selected cylinder (by default, the hottest cylinder) is shown below the bar graph  
 The selected cylinder is indicated in light blue. Cylinders whose EGTs are in the normal range appear in white.  
 The EGT deviation from peak ( $\Delta$ PEAK) for the selected cylinder is displayed below the indicator when the **ASSIST** Softkey is pressed.
- ⑥ **Cylinder Head Temperature Bar Graph (CHT)**

Displays the head temperatures of all cylinders in °F; a readout for the selected cylinder (by default, the hottest cylinder) is shown below the bar graph  
 The selected cylinder number is indicated in light blue. Cylinder whose CHTs are in the normal range appear in white. Cylinders whose CHTs enter the warning range appear in red.
- ⑦ **Fuel Quantity Indicator (FUEL QTY GAL)**

Displays the quantity of fuel in gallons (gal) in each tank (left–L and right–R)  
 When full, the indicator displays to 35 gal per side (24 gal for *Models 172R and 172S*).

## NORMALLY-ASPIRATED AIRCRAFT

For normally-aspirated aircraft, when a cylinder peaks, its peak is represented by a light blue block on the EGT Bar Graph. The EGT readout for the peaked cylinder number, indicated on the bar graph in light blue, appears directly beneath the bar graph. The system automatically switches to the first peak obtained and displays the temperature deviation from peak ( $\Delta$ PEAK) in degrees Fahrenheit ( $^{\circ}$ F) below the EGT readout.

### Selecting the Engine Leaning Assist function:

From the Lean Display, press the **ASSIST** Softkey to identify the peak. The peak temperature for the selected cylinder is indicated with a blue block on the EGT Bar Graph and the temperature deviation from peak is shown underneath the EGT Bar Graph.

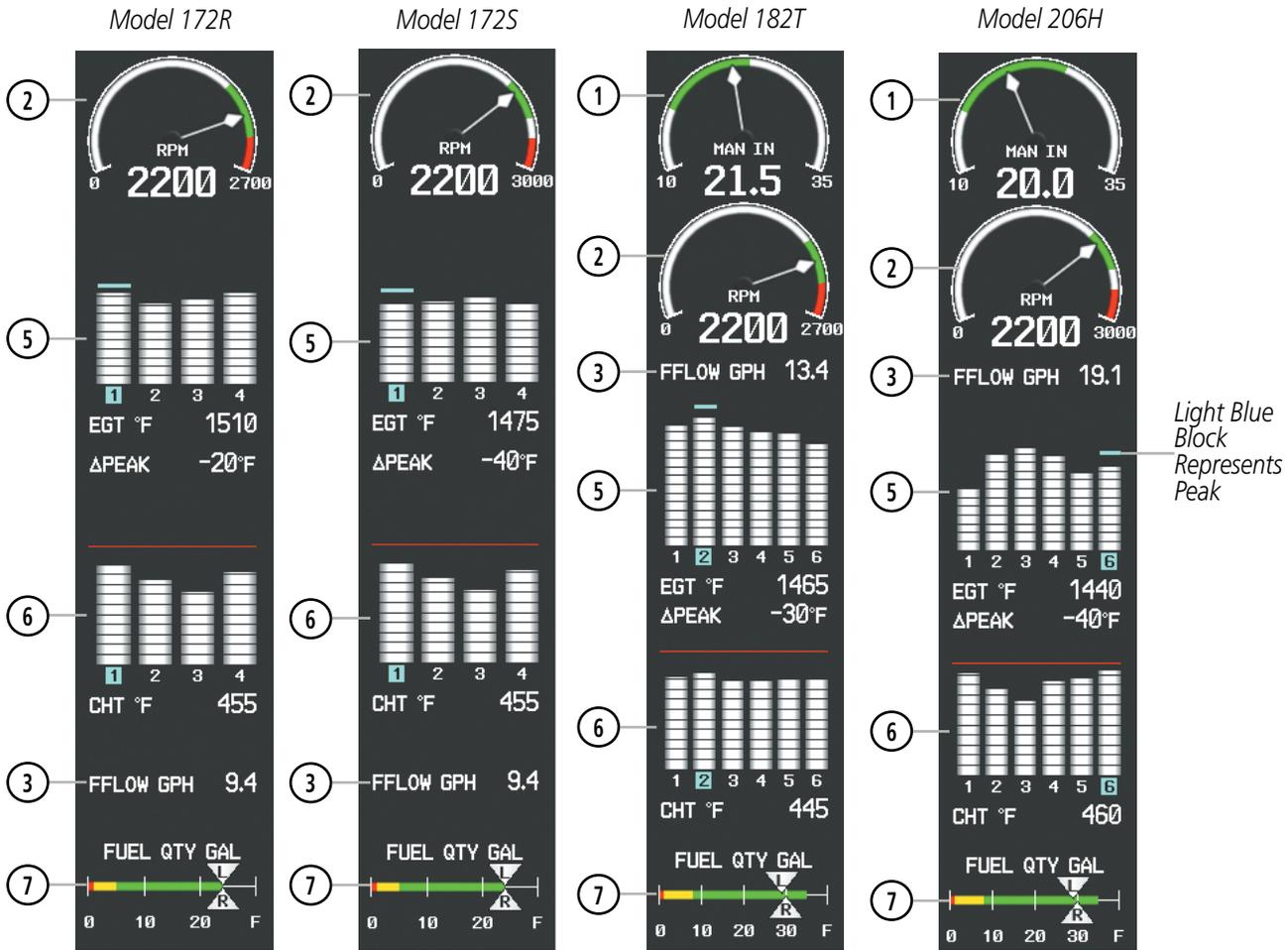


Figure 3-7 Lean Display (Normally-Aspirated Aircraft)

**TURBOCHARGED AIRCRAFT**

Leaning for turbocharged aircraft is done with reference to the Turbine Inlet Temperature (TIT). When the temperature peaks, the numeric readout ( $\Delta$ PEAK) appears below the TIT Indicator and displays the difference between peak and current TITs, in degrees Fahrenheit (°F). If a peak is not displayed, underscores are shown until one is established.

**Selecting the Engine Leaning Assist function:**

From the Lean Display, press the **ASSIST** Softkey to identify the peak. The TIT deviation from peak is shown below the TIT Indicator.

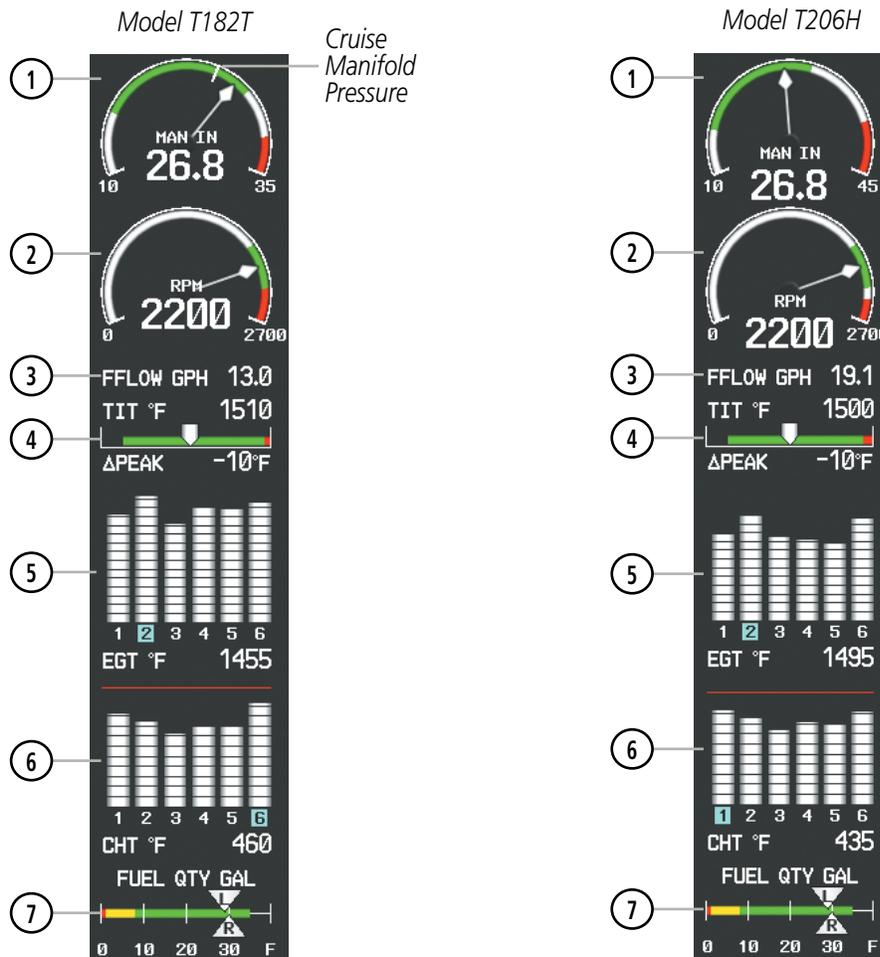


Figure 3-8 Lean Display (Turbocharged Aircraft)

## 3.3 SYSTEM DISPLAY

### NORMALLY-ASPIRATED AND TURBOCHARGED AIRCRAFT



**NOTE:** Fuel calculations do not use the aircraft fuel quantity indicators and are calculated from the last time the fuel was reset.



**NOTE:** Refer to the Pilot's Operating Handbook (POH) for fuel values and limitations. The displayed fuel remaining can be adjusted up to 53 gal (Models 172R, 172S) or 87 gal (Models 182T, T182T, 206H, T206H).

The System Display is accessed by pressing the **ENGINE** Softkey followed by the **SYSTEM** Softkey and shows critical engine, fuel, and electrical parameters. The engine gauge(s) and Fuel Quantity Indicator remain on the System Display. Numeric readouts for oil pressure and temperature are displayed, and for Models 182T, T182T, 206H, and T206H, a readout for engine hours and the Vacuum Pressure Indicator are also shown. Electrical indicators are at the bottom of the display.

Fuel calculations are also shown on this display. Fuel calculations are based on the fuel flow totalizer and the displayed fuel remaining, adjusted by the pilot using the following softkeys:

- **RST FUEL** – Resets totalizer-based fuel remaining (GAL REM) and the fuel used (GAL USED) to zero
- **GAL REM** – Gives access to softkeys for adjusting the amount of fuel remaining for purposes of fuel calculations

Fuel remaining can be adjusted using the appropriate softkeys in one or ten-gallon increments, up to either the maximum amount allowed for the aircraft or to the tab amount: 35 gallons (Models 172R and 172S) or 64 gallons (Models 182T, T182T, 206H, and T206H).

- ① **Engine Manifold Pressure Gauge (MAN IN)**  
*Models 182T, T182T, 206H, T206H* Displays engine power in inches of mercury (in Hg)  
*Turbocharged aircraft* – Red range indicates maximum manifold pressure  
*Model T182T* – A white tick mark indicates the cruise manifold pressure
- ② **Tachometer (RPM)**  
*Models 172S, 206H, and T206H* Displays propeller speeds in revolutions per minute (rpm)  
 Red range indicates propeller overspeed warning  
*Models 172S, 206H, and T206H* – White high-rpm range indicates above normal operating speeds  
*Model 172S* – When ascending through 5300 ft, the upper end of the green arc displays 2600 rpm and ascending through 10,300 displays 2700 rpm. When descending below 9700 ft, the upper end of the green arc returns to 2600 rpm and descending below 4700 ft returns to 2500 rpm (Figure 3-6)
- ③ **Oil Pressure (OIL PSI)**  
 Displays pressure of the oil supplied to the engine in pounds per square inch (psi)
- ④ **Oil Temperature (OIL °F)**  
 Displays the engine oil temperature in degrees Fahrenheit (°F)
- ⑤ **Engine Hours (Tach) (ENG HRS)**  
*Models 182T, T182T, 206H, T206H* Displays a numeric readout for the time in hours (hrs) the engine has been in service
- ⑥ **Vacuum Pressure Indicator (VAC)**  
*Models 182T, T182T, 206H, T206H* Displays vacuum pump pressure for the standby instruments
- ⑦ **Fuel Flow (FFLOW GPH)**  
 Displays the current fuel flow in gallons per hour (gph)
- ⑧ **Calculated Fuel Used (GAL USED)**  
 Displays quantity of fuel used in gallons (gal) based on fuel flow since last reset
- ⑨ **Set Fuel Remaining (GAL REM)**  
 Displays current fuel remaining in gal as set by the pilot and adjusted for fuel burn since last set
- ⑩ **Fuel Quantity Indicator (FUEL QTY GAL)**  
 Displays the quantity of fuel in gal in each tank (left–L and right–R) from zero to full (F)  
 When full, the indicator displays to 35 gal per side (24 gal for *Models 172R and 172S*).
- ⑪ **Voltmeter (M, E BUS VOLTS)**  
 Displays the main and essential bus voltages
- ⑫ **Ammeter (M, S BATT AMPS)**  
 Displays the main and standby battery load in amperes

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- FLIGHT INSTRUMENTS
- EIS
- AUDIO PANEL & CNS
- FLIGHT MANAGEMENT
- HAZARD AVOIDANCE
- AFCS
- ADDITIONAL FEATURES
- APPENDICES
- INDEX

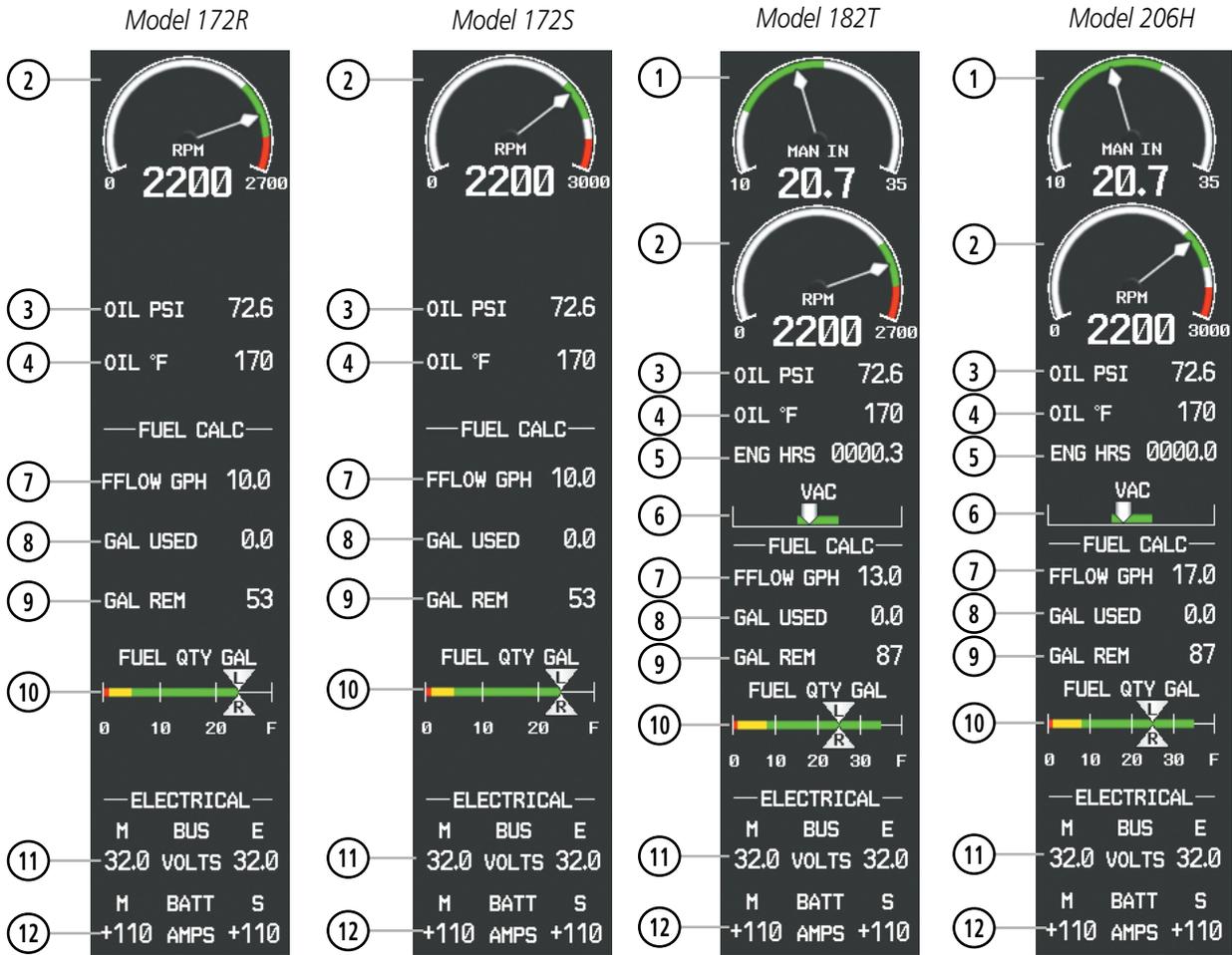


Figure 3-9 System Display (Normally-Aspirated Aircraft)

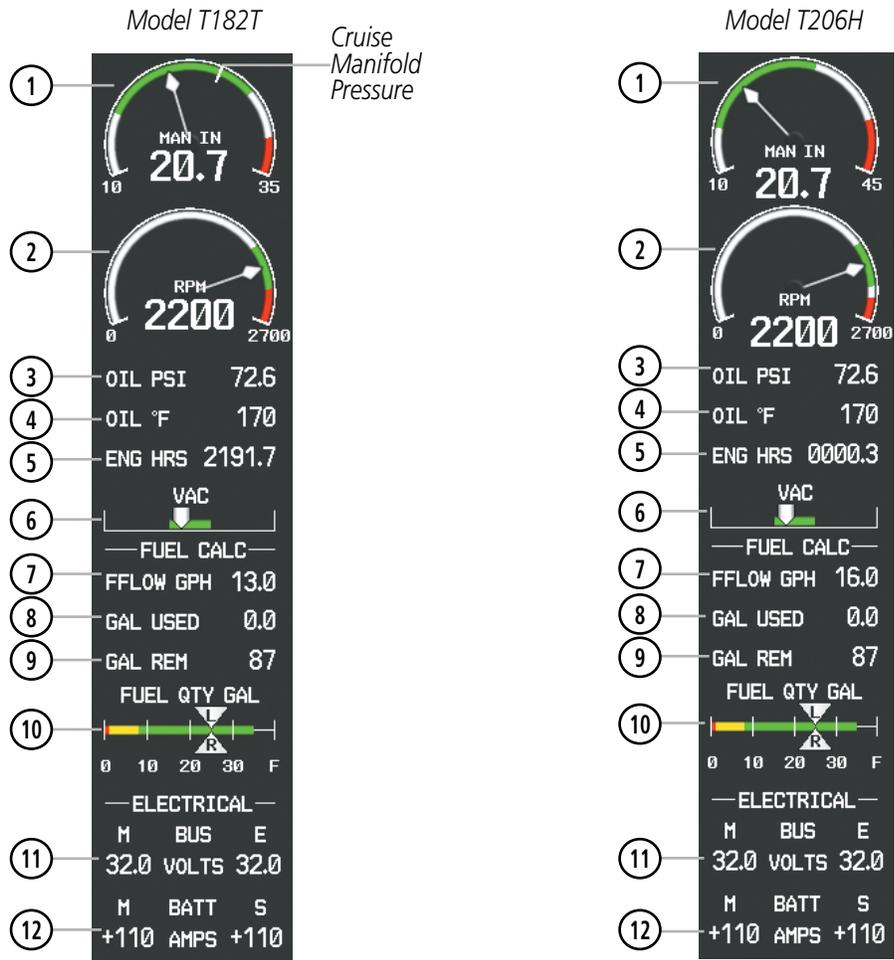


Figure 3-10 System Display (Turbocharged Aircraft)

SYSTEM  
OVERVIEW

FLIGHT  
INSTRUMENTS

EIS

AUDIO PANEL  
& CNS

FLIGHT  
MANAGEMENT

HAZARD  
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ADDITIONAL  
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