Pilot's Guide

Engine Data Management

EDM-700

EDM-711

EDM-800

J.P. INSTRUMENTS INC.

Information: P. O. Box 7033
Huntington Beach, CA 92646

Factory: 3185 B Airway
Costa Mesa, CA 92626

(714) 557-5434 Fax (714) 557-9840

www.jpinstruments.com

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Section 1 - Introduction

Product Features Chart

✓ indicates standard feature	700	711	800
Hands-free, automatic scanning	✓	✓	✓
All programming done from the Front Panel	✓	✓	✓
LeanFind™ finds the first and last cylinder to peak with true peak detect—eliminates a false peaks	✓	✓	✓
Displays both leaned temperature below peak and peak	✓	✓	✓
Battery voltage with alarm	✓	✓	✓
24 Programmable alarm limits	✓	✓	✓
Normalize view	✓	✓	✓
DIF low to high EGT with alarm	✓	✓	✓
EGTs to stable 1°F resolution	✓	✓	✓
Shock cooling monitored on *every* cylinder	✓	✓	✓
User selectable index rate	✓	✓	✓
Fast response probes	✓	✓	✓
Non-volatile long term memory	✓	✓	✓
Records and stores data up to 30 hours	✓	✓	✓
Post-flight data retrieval	✓	✓	✓
Download to Palm™ Computer	✓	✓	✓
Data retrieval software	✓	✓	✓
FAA Approved as primary temperature instruments for CHT, OIL, TIT		✓	
Alarm and warning light panel		✓	
Oil temperature	opt	✓	opt
Turbine inlet temperature	opt	opt	opt
Outside air temperature	opt	opt	opt
Compressor discharge temperature	opt	opt	opt
Carburetor temperature	opt	opt	opt
Fuel Flow	FF opt	FF opt	✓
Solid-state rotor fuel flow transducer	FF opt	FF opt	✓
Fuel quantity in gallons, kilograms, liters, or pounds	FF opt	FF opt	✓
Low fuel quantity alarm	FF opt	FF opt	✓
Low fuel time alarm	FF opt	FF opt	✓
GPS interface	FF opt	FF opt	✓

Instantaneous fuel flow rate	FF opt	FF opt	✓
Total amount of fuel consumed	FF opt	FF opt	✓
Total fuel remaining	FF opt	FF opt	✓
Time to empty at the current fuel flow rate	FF opt	FF opt	✓
Displays % horsepower and RPM			✓
Automatically calculates percent horsepower			✓

Section 2 - Getting Started

This is a summary of the basic operation. The last two pages of this manual are a Quick Reference Guide describing how to perform the most commonly used features. Detailed descriptions of all operations appear later in this Pilot's Guide.

To change the factory settings of your EDM for first time use, see Section 10 - First Time Setup and Customization on page 36. You will want to do this to change the fuel tank capacity, K-factor, alarm limits, display indexing rate, or other custom settings.

The word STEP refers to the button on the left. LF (LeanFind) refers to the button on the right.

The term ***tap*** will be used to denote pressing a button momentarily. The term ***hold*** will be used to denote pressing and holding a button for five seconds or longer.

All EDMs with fuel flow

This subsection applies only if you have fuel flow.

1. At power up you will see FILL? N. Tap LF to see FILL 75 (or whatever the capacity of your tanks or tabs are).
2. With auxiliary tanks or tabs, tap LF again to see FILL I20 (or whatever the capacity of your tanks-plus-auxiliary or full tanks are).
3. Tap STEP to exit.

The toggle switch selects which parameters are displayed during scan: EGT (temperatures, voltage), ALL parameters, or FF (fuel flow related).

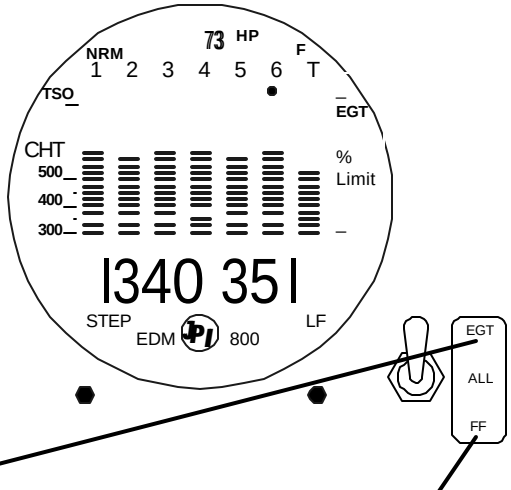
All EDMs

The EDM will go into Automatic scan mode one minute after power up. You don't have to touch any buttons.

To get into Manual scan mode, tap STEP.

To get into Automatic scan mode, tap LF and then tap STEP.

The EDM will display the following parameters on the bottom digital display—in the order shown—depending on the options installed on your instrument.



1340 376	EGT left, CHT right	2450 RPM	RPM (EDM-800)
1370 13.5 1370 TIT	TIT left, fuel flow right if option installed	23.1 MAP	Manifold pressure (EDM-800)
178 OIL	OIL temperature option		
-30 CLD	Rate of shock cooling	37.2 REM	Fuel remaining
14.2 BAT	Avionics bus voltage	25.9 REQ	Fuel required to wpt (GPS connected)
81 OAT	Outside air option	11.3 RES	Fuel reserve at wpt (GPS connected)
300 CDT	Compressor discharge option	13.0 MPG	Miles per gallon (GPS connected)
125 IAT	Induction air option	02.45 H.M	Fuel time to empty
132 C-I	Compressor minus induction difference	13.5 GPH	Gallons per hour
-22 CRB	Carburetor option	38 USD	Fuel used since fill or reset
80 DIF	Difference between hottest and colded EGT		

EGT

EGT is shown on the first four or six bar graph columns. These are labeled 1 through 4 or 1 through 6 above the columns. The lower limit of the graph range represents half of red line (default is 825°F) and the top of the range represents red line (default 1650°F). The numerical value of the EGT is shown on the left side of the digital display for each cylinder when there is a dot under one of the cylinder numbers above the column. In the example above, cylinder 6 EGT is 1340°F.

CHT

The CHT is represented by a missing segment in the bar graph column. The scale is shown on the left side of the bezel. The numerical value of the CHT is shown on the right side of the digital display for each cylinder when there is a dot under one of the cylinder numbers above the column. In the example above, cylinder 6 CHT is 351°F.

Only EGTs, the TIT option, and the OIL option have bar graph columns.

TIT and OIL options

If you have both OIL and TIT options, the TIT is shown on the right-most bar graph column and is labeled with a T above it. Oil temperature is displayed as a missing segment on the right-most bar graph column.

If you have only TIT, it will be shown on the right-most bar graph column and will be labeled with a T above it.

If you have only OIL , the OIL will be shown on the right-most bar graph column and there will be no label above it.

LeanFind

Simply pre-lean, tap the LF button and begin leaning. The EDM will assist you in finding the first cylinder to peak.

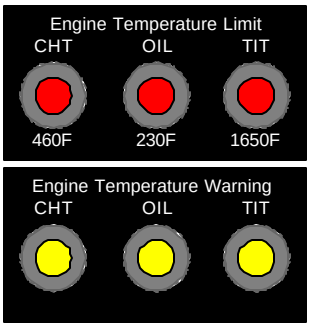
1. Establish cruise at approximately 65 to 75% power.
2. Pre-lean the mixture to 50°F estimated rich of peak EGT on any cylinder.
3. Wait about one minute.
4. Tap the LF button.
5. Lean the mixture—approx. 10°/second *without pausing*—while observing the display. When there is a 15°F rise in EGT, LeanFind mode becomes active.
6. Stop leaning when a column begins flashing. You will see LEANEST for two seconds, followed by 1560 SET (or with fuel flow option 1520 13.8).
7. If you hold LF, peak EGT will be displayed while the LF button is held down.

8. Slowly enrich the mixture. The temperature will increase, returning to peak. Stop enriching at the desired EGT.

EDM-711

These are the important differences between the EDM-700 and EDM-711.

Upon power up the EDM-711 will scan in the Automatic *primary* mode only the highest CHT, TIT, and OIL. It will scan all parameters in the Manual mode and Automatic *non*-primary scan modes. To automatically scan all parameters, tap STEP and then tap LF.



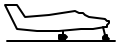
The fuel flow option toggle switch is disabled during Automatic *primary* scan mode.

The EDM-711 has an alarm display panel. A yellow warning lamp will light when the indicated temperature reaches the warning limit. A red alarm lamp will light when the indicated temperature exceeds alarm limit.

EDM-800

The EDM-800 includes fuel flow as standard and includes RPM and manifold pressure sensors to display percent horsepower. Horsepower or RPM will always be displayed at the top of the instrument.

Section 3 - Interpreting Data



Engine Run-Up

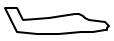
Suggested setup:	***Verify:*** uniform rise of about 50°F in all EGTs in single magneto operation and uniform rise of EGTs with application of the mixture control.
Runup RPM *Normalize* view *Manual mode*	***Be alert for:*** unusually low voltage (less than nominal battery voltage), cold OIL, abnormally high CHT, drop in EGT on one cylinder in single magneto operation—indicates fouled spark plug.

Include your EDM on your run-up checklist.

Take-Off, Climb, and Full Throttle Operations

Suggested setup:	***Verify:*** EGTs and CHTs consistent with past climbs. EGTs should be the 1100 to 1250°F range due to fuel cooling.
Percentage view *Automatic mode*	***Be alert for:*** high EGT in one cylinder, 300°F above the others may indicate plugged injector or leaking manifold gasket.

At high density altitude an overly rich mixture can significantly reduce engine power.



Cruise

After the engine is warmed up, use LeanFind to lean the mixture.

Suggested setup:	***Be alert for:*** uneven EGTs (injected engines). Make fine adjustments to throttle, then RPM, then mixture to level the display columns. Be alert for abnormal patterns of EGTs and CHT. (see "Engine Diagnosis Chart" on page 9).
Normalize view *Automatic mode*	

Descent

Suggested setup:	• ***Be alert for:*** CLD: shock cooling alarm is set to –60°F. Average cool rates of –40°F/minute to –60°F/minute are normal, depending on the engine size.
Percentage view *Manual mode*	

Typical Normal Parameters

The follow chart lists typical *normal* parameter values that you will observe for most general aircraft engines.

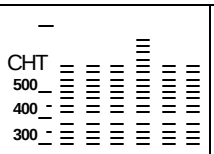
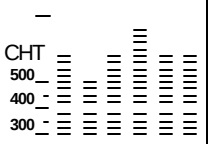
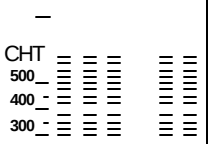
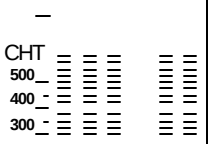
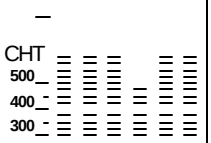
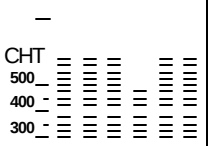
Parameter	*Normal range*	*Comments*
EGTs in Cruise	1350°F 1550°F	• under 200 HP • high performance • EGT should drop 200°F when full throttle is applied
EGT span (DIF)	70 to 90°F 120 to 150°F	• fuel injected • carbureted
TIT	1600°F average	• 100° higher than EGT
CHTs	350°F (OAT 60°F) 410°F	• normally aspirated • Turbocharged
CHT span	50 to 70°F	• 100° with gasket probes
OIL	200°F	• oil cooler thermostat opens at 180°F
Shock cooling*	-40°/minute -55°/minute -200°/minute	• tightly cowled • Bonanza • helicopter

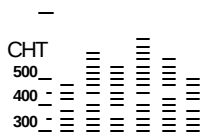
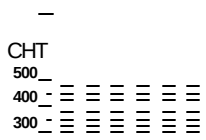
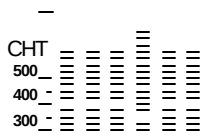
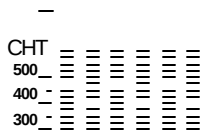
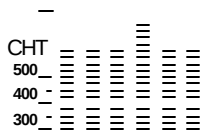
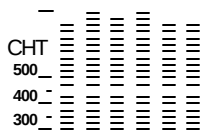
* Maintain a cooling rate of less than -60°/minute. You will find that the cylinder with the greatest shock cooling will shift from front cylinders (during climb out) to the rear cylinders (during descent).

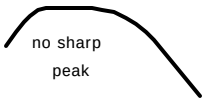
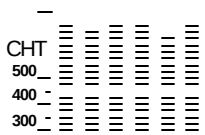
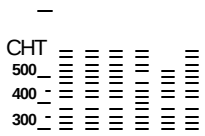
If one CHT is reading 20° to 50° above or below the others, this may be due to that cylinder having a spark plug gasket probe instead of a bayonet probe. This is necessary because the aircraft's factory original CHT probe is occupying the socket in the cylinder head rather than the EDM. This is normal. If the discrepancy is greater, be sure the spark plug gasket probe is mounted on the *top* spark plug. An adapter probe is available to occupy the same socket as the factory original probe. Contact your dealer.

Engine Diagnosis Chart

The following chart will help you diagnose engine problems in your aircraft. (Views are Percentage views). Notice that there will be always one CHT that is shown hotter than the others.

Display	*Symptom*	*Probable Cause*	*Recommended Action*
	75° to 100° EGT rise for one cylinder during flight	Spark plug not firing due to fouling, faulty plug, wire or distributor.	Enrich mixture to return EGT to normal. Have plugs checked.
	EGT Increase or decrease after ignition system maintenance	Improper timing: high EGT → retarded ignition; low EGT → advanced ignition.	Check EGT for each magneto to determine any uneven timing.
	Loss of EGT for one cylinder. Engine rough	Stuck valve. Other cylinders are okay.	Have valve train checked.
	Loss of EGT for one cylinder; *no digital EGT*	Failed probe or failed wire harness.	Swap probes to determine if probe or wire harness is bad.
	Decrease in EGT for one cylinder	Intake valve not opening fully; faulty valve lifter.	Have valve lifter or rocker arm checked.
	Increase in DIF at low RPM	Low compression (blow by) in cylinder	Check compression.

Display	*Symptom*	*Probable Cause*	*Recommended Action*
	EGT and CHT not uniform	Dirty fuel injectors or fouled plugs.	Check injectors and plugs. Non-uniformity is normal for carbureted engines
	Decrease in EGT for all cylinders	Decrease in airflow into the induction system. Carb or induction ice. Engine units set to Celsius	Check for change in manifold pressure. Check that the alarm limits are set to Celsius degrees
	Slow rise in EGT. Low CHT	Burned exhaust valve. CHT is low due to low power output.	Have compression checked.
	High CHT on cylinders on one side of engine	Obstruction under cowling.	Check for improper installed baffling, cowl flap misalignment or bird nests.
	Rapid rise in CHT of one cylinder	Detonation.	Reduce power.
	Sudden off scale rise for any or all cylinders	Pre-ignition or Normalize view. or failed probe	Full rich and reduce power. Change to Percentage view. Check probe

Display	*Symptom*	*Probable Cause*	*Recommended Action*
(no picture)	Loss of peak EGT	Poor ignition or vapor in fuel injection system.	Have magneto tested.
	Decrease in peak or flat EGT response to leaning process	Detonation. Usually the result of 80 Octane fuel in 100 Octane engine.	Enrich mixture, reduce power and relean mixture. Repeat to find power setting where normal peak is obtained or run rich.
	Below 10,000 ft. full throttle causes EGTs to rise	Weak or defective mechanical fuel pump.	Apply booster pump. If EGTs drop, replace fuel pump.
	CHT more than 500°, EGT normal. Adjacent EGT may be low	Leaking exhaust gasket blowing on CHT probe.	Look for white powder around cylinder to determine leak area.
	Large DIF at low RPM	Blow by in cylinder rings	Check compression

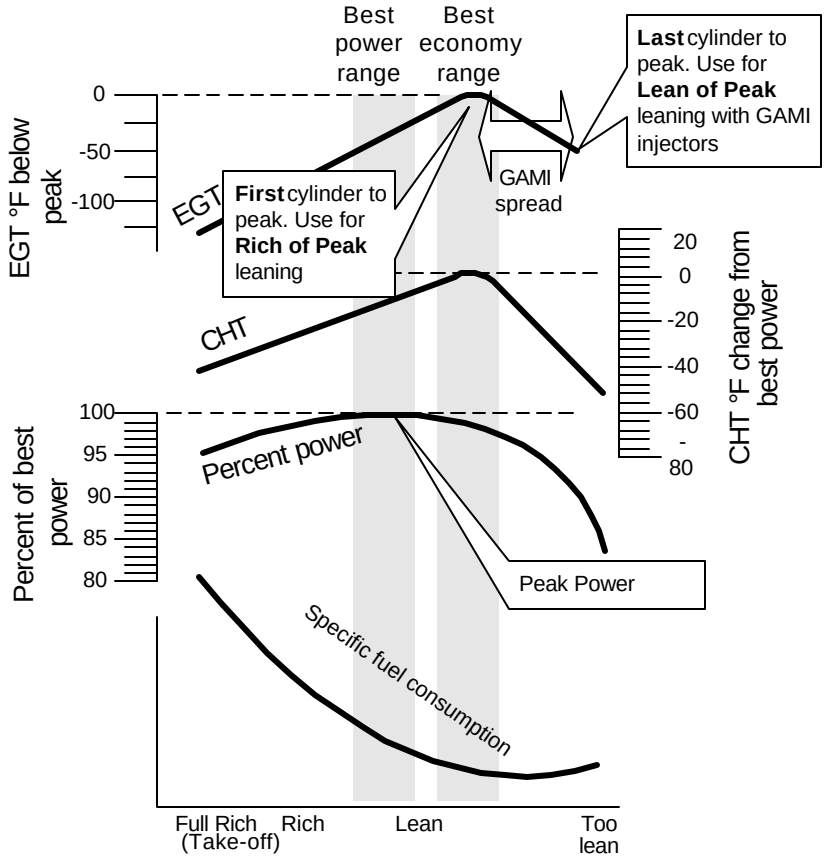
Section 4 - LeanFind

JPI's EDM-700 and EDM-800 provide two methods of leaning: lean **rich of peak** (LEAN R) or **lean of peak** (LEAN L)**.** The standard method is to lean about 20° rich of peak. With the advent of GAMI injectors it is now possible to set the mixture lean of peak—saving fuel and running the engine cooler. Teledyne Continental recommends lean of peak for the Malibu. This manual primarily describes the rich of peak method, and provides the procedure for the lean of peak method. The

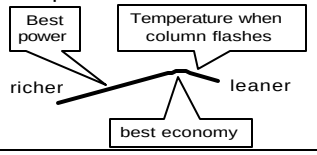
default method is set to **rich of peak**. These two methods are described and depicted in the following pages.

LeanFind Mode—Leaning Rich of Peak

Simply pre-lean, tap the LF button and begin leaning. Upon reaching cruise configuration, you will use the LeanFind mode to identify the first cylinder to reach peak EGT.



LeanFind Procedure—Step-by-Step

	Procedure	Example	Comments
1	Establish cruise at approx. 65 to 75% power.		
2	Pre-lean the mixture to 50°F estimated rich of peak EGT on any cylinder: _____ °	I490 370	*For your *first flight* with the EDM, use the method shown below.
3	Wait one minute		Let engine stabilize.
4	Tap the LF button	LEAN R	Start LeanFind. (Optionally to change to “lean of peak” method, hold both STEP and LF simultaneously.)
5	Lean the mixture—approx. 10°/second *without pausing*—while observing the display. When there is a 15°F rise in EGT, LeanFind mode becomes active.	I520 LF Without FF I520 I3.8 With FF	Flashing cylinder DOT indicates hottest cylinder and that LeanFind mode is active.
6	Stop leaning when a column begins flashing. You will see LEANEST for two seconds, followed by:	I545 SET or with Fuel Flow I545 I2.4	Flashing cylinder dot & column indicates leanest cylinder. (SET means Set the mixture.) Due to thermal inertia this will usually be about -15°F lean of peak.
7	If you hold LF, peak EGT will be displayed while the LF button is held down.	I560 PK	Captured peak EGT value is displayed.
8	Slowly enrich the mixture. the temperature will increase, returning to peak. Stop enriching at the desired EGT. Best economy Best power	I560 SET I560 SET I460 SET	• Peak EGT for best economy • 100° rich of peak for best power 
9	If you have chosen the Lean of Peak method, at step 5 continue leaning until the last cylinder has peaked.	-I5 SET OR -I5 I2.3	Only for GAMI injected engines. When each cylinder reaches peak, the cylinder number will begin flashing.

***Determining the pre-lean value:** while in cruise at under 65 percent power, choose any cylinder and lean that cylinder to peak EGT in the

Manual mode or to engine roughness, whichever occurs first. Note the peak, subtract 50° and write the resulting number in the space provided in step 2.

LeanFind Procedure—Detailed Explanation

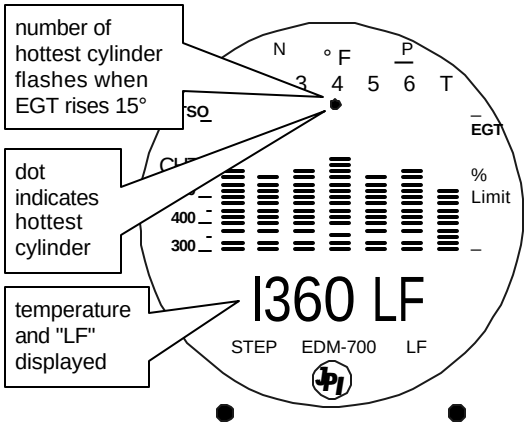
> Lycoming and Continental engines have established specific restrictions on leaning that must be followed, such as percentage of power, climb leaning, and TIT limits. Lycoming recommends operation at peak EGT for power settings of 75% or lower, while Continental recommends operation at peak EGT for power settings of 65% or lower. This guide is not meant to supersede any specific recommendations of the engine manufacturer or airframe manufacturer**.**
>
> **It is your responsibility to know your aircraft's limitations.**

Pre-lean the mixture to about 50° below peak. After pre-leaning, wait for one minute for the temperatures to stabilize. Next, begin the leaning process by tapping the LF button. This tells the EDM to begin looking for a 15° rise in EGT for any cylinder. Begin leaning the mixture *without pausing*. When a 15° rise occurs, eliminating false peaks, the LeanFind mode becomes activated shown when the cylinder dot above the column of the hottest cylinder begins flashing. **The LeanFind mode is not active until a cylinder dot is blinking.**

> With the Fuel Flow Option, instead of seeing the word LF in the display, you will see numerical fuel flow rate during the leaning process on the right side of the digital display, for example 12.4. This allows you to observe the EGT rise and at the same time watch the fuel flow rate decrease.

To show the progress of the leaning process, the EDM selects the hottest cylinder for reference in the digital display. In the example below, the 1360 is the current temperature of the hottest cylinder.

When LF is activated:



Continue leaning slowly *without pausing*. With a vernier mixture control, turn the knob about a quarter turn every second. With a non-vernier or quadrant mixture control, lean slowly and smoothly about 1/16 inch every five seconds. Eventually, one cylinder will reach peak before any of the other cylinders. The EDM will determine this automatically. *Notice that this cylinder does not necessarily have the hottest EGT.*

The EDM will indicate success in finding a peak by displaying the words LEANEST for two seconds, followed by flashing the column and displaying the value of the EGT of the cylinder that peaked first. The word SET will also be displayed. (With the Fuel Flow Option the current fuel flow rate will be displayed on the right side of the digital display instead of the word SET.) The flashing cylinder will be locked—or set—into the digital display during the remainder of the LeanFind procedure to allow you to set the final mixture. The peak EGT value is remembered by the EDM and will be displayed as long as you hold the LF button.

You may now enrichen the mixture to operate at peak or continue enriching to 100° rich of peak, or a value of your choice, consistent with the procedures defined in your aircraft engine manual.

If you lean too much, the EGT will drop and the engine will be operating lean of peak.

True and Delta Rich of Peak

TRUE EGT: After peak EGT is found using the “rich of peak” method, the left display will show the true EGT of the first cylinder to peak. As you enrich the mixture, this value will climb to peak. You can stop leaning when you have reached the desired temperature, either peak or continue to some value rich of peak.

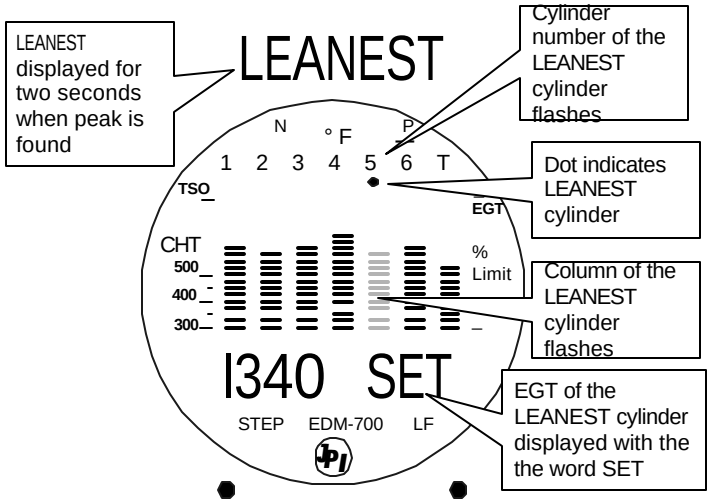
> For example see I340, enrich mixture and see peak of I350 when the value stops increasing, and then the value will decline as you continue to enrich.

DELTA EGT: If you want to see the delta EGT from peak instead of the true EGT, tap LF once after finding peak. The value will display as a negative number, showing the delta temperature below peak. As you enrich the mixture, this value will climb back to zero. You can stop leaning when you have reached the desired temperature, either 0 for peak or continue to some value rich of peak such as -50.

> For example see -I0, enrich mixture and see peak of 0 and then the value will become negative as you continue to enrich.

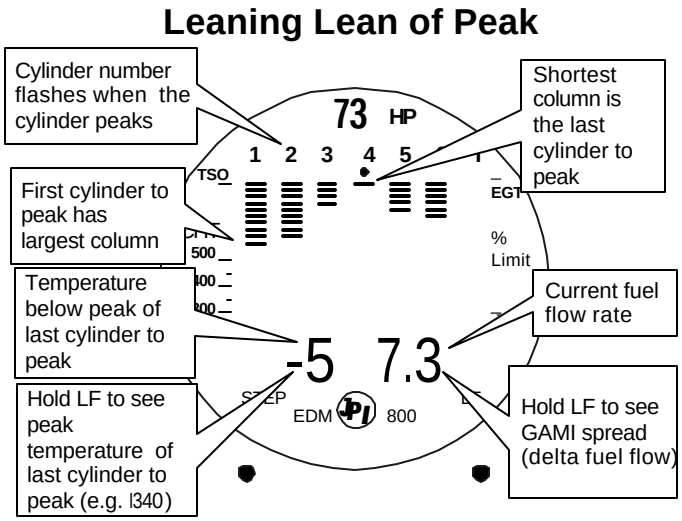
You can toggle between True and Delta displays by tapping LF. The EDM will remember the last selection chosen for the remainder of the flight.

Leaning Rich of Peak



Lean Find Mode—Leaning Lean of Peak, GAMI injectors

To use the "lean of peak" method, tap LF and then immediately hold both STEP and LF until you see LEAN L. You may toggle back to LEAN R by holding both buttons again. Once you begin leaning (flashing dot) you cannot change leaning method.



In the "lean of peak" method the columns will **invert** with the first to peak progressing down from the top of the display. The inverted column scale is **5° per segment** below peak. As you continue to lean past peak the dot of the each successive cylinder will flash as it peaks. The peaks will be shown as an **inverted bar graph;** when the last cylinder peaks its column will flash. The analog display is an inverted bar graph showing where each cylinder peaked. When the LF button is held the display will show the delta fuel flow between the first and last to peak (GAMI Spread), as well as the richest peak EGT.

Turbocharged Engines

The leaning process for turbocharged engines is by reference to the first cylinder or TIT to reach peak. However, the TIT *factory red line* may limit the leaning process. TIT red line is generally 1650°F, and up to 1750°F in some installations. In the LeanFind mode the T column—TIT—is included in the procedure. If during leaning the TIT exceeds red

line by less than 100° for less than one minute, the LeanFind procedure will continue to operate, allowing you to complete the leaning process. Otherwise the digital display will show, for example, 1650 TIT and TIT will flash. You will notice that in some cases the TIT reads **100°F hotter than the hottest EGT**. This is caused by unburned fuel in the exhaust and igniting.

The reduced size of the ***JPI*** **Hastaloy-X-tip probes produces faster response** and more accurate than the massive factory installed probe. Therefore ***JPI*** probes may read as much as 100°F higher than the factory installed probe. However, note that the engine was certified with the factory-installed probe and gauge, and this gauge reading is the limiting factor when adjusting your engine.

Section 5 - Alarms

The EDM has programmable alarms. When a parameter falls outside of its normal limits, the digital display will flash with the value and abbreviation of the alarming item. If the condition triggering the alarm returns to within normal limits, the display will stop flashing the alarm. If your installation includes a separate panel mounted alarm warning enunciator light or audible warning, it too will be activated.

There are no alarms for the individual EGTs because the temperature values can assume different ranges depending on the flight configuration—run up, climb, cruise. However there *is* an alarm on the DIF parameter, the difference between the hottest and coolest EGTs. DIF—or span—is the important parameter for monitoring the EGTs. See “Factory Set Default Limits” on page 44 for a list of the alarms and their factory default settings.

When an alarm is displayed, *tapping* the STEP button will temporarily disable the alarm digital indication for the next ten minutes.

When an alarm is displayed, *holding* the STEP button until the word OFF appears will disable that alarm digital indication for the remainder of the flight. See “Alarm Limits” on page 44.

EDM-711 primary alarm limits for CHT, high OIL and TIT are not programmable. Primary alarm display lamps cannot be extinguished by the STEP button.

Alarm Priority

If multiple alarms occur simultaneously, the higher priority alarm will temporarily "mask" the lower priority alarm(s). When an alarm occurs, note the cause of the alarm and tap the STEP button to clear the alarm indication so that you will be notified of any other alarm that might have occurred. The alarm priorities are as follows:

Highest priority	CHT	High CHT
	OIL	High OIL temperature
	TIT	High TIT
	OIL	Low OIL temperature
	CLD	Excessive CHT cooling rate
	DIF	Excessive EGT span
	BAT	High battery voltage
	BAT	Low battery voltage
	MAP	Overboost Manifold pressure
	LO FUEL	Low fuel quantity remaining
Lowest priority	LO TIME	Low fuel endurance remaining

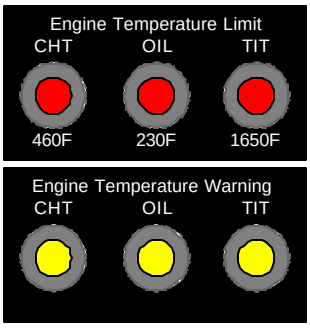
Pre-Ignition and Detonation

Combustion that is too rapid leads to detonation and possibly pre-ignition. *Detonation* is abnormally rapid combustion where the fuel-air mixture explodes instead of burning uniformly. It causes the EGT to decrease and the CHT to increase, and can appear during the leaning process. It occurs under high compression from fuel with too low an octane rating, or from avgas contaminated by jet fuel. Fuel additives, such as lead, boost the octane rating and slow down the combustion process, producing an even pressure to the piston.

Pre-ignition is caused by hot spots in the cylinder. Ignition occurs prior to the spark plug firing. The EDM depicts pre-ignition as a sudden red line of the EGT on the analog display. This may occur in one or more cylinders. The affected cylinder column(s) will flash while the digital display will show an EGT higher than 2000°F. **At this temperature pre-**

ignition will destroy your engine in less than a minute unless you take immediate corrective action.

EDM-711 Primary Alarm Display



The EDM-711—as a primary instrument—displays temperature warnings and temperature alarms for CHT, OIL and TIT. A yellow warning lamp will light when the indicated temperature reaches the warning limit. A red alarm lamp will light when the indicated temperature exceeds alarm limit. The limits for these alarms and warnings are preset by the factory for your type of aircraft. The yellow warnings are set as follows: CHT 45°F below redline, OIL 25°F below redline, and TIT 100°F below redline. A two-position toggle switch mounted near the alarm panel will allow you to dim the lights for night operations.

Tapping STEP will extinguish the flashing digital display but the yellow warning indication cannot be extinguished. The red alarm light cannot be extinguished as long as the alarm condition is present.

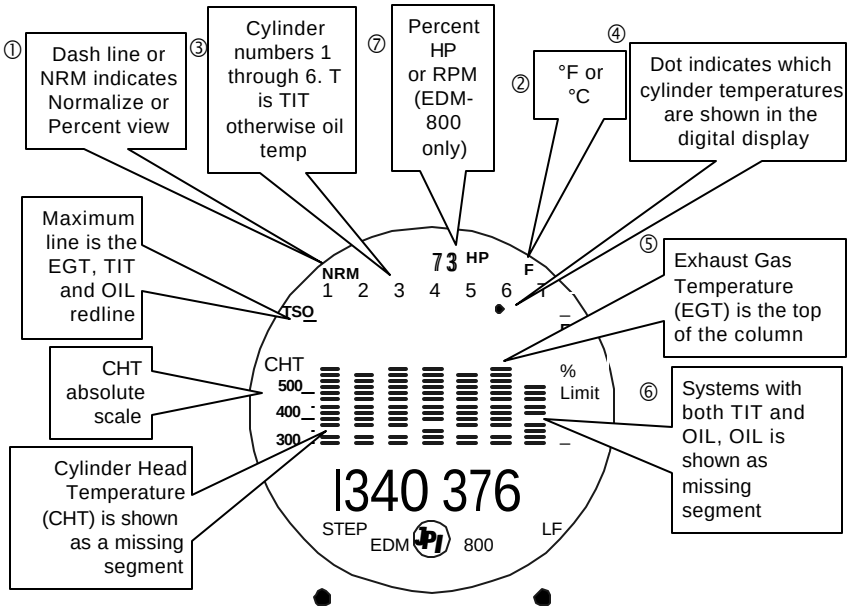
In the procedure in the described later to change the alarm limits, you will *not* be able to change the limits for CHT, OIL or TIT.

Section 6 - Displays and Controls

The EDM monitors engine temperatures and voltages, assists in adjusting the fuel/air mixture, and helps diagnose engine malfunctions. There are three components of the user interface:

- Analog display including cylinder number and index dot
- Digital display for numeric readouts and messages
- Two front panel operating buttons.

Displays



Analog Display

The upper half of the face of the EDM is the analog display with %HP.

The following is a description of the analog display, from top to bottom. Numbers in circles refer to features in the above diagram.

①*Normalize and Percentage View Indicators*

- Percentage view: when there is a dash — near the P at the top of the display (EDM-700) or NRM is not lighted (EDM-800), the columns indicate percent of EGT red line. Each column is composed of a stack of segments. A maximum height column depicts 100 % of red line and a one segment-high column depicts 50 % of red line. For example, if the red line is 1650°F, a maximum height column represents 1650°F and a one segment-high column represents half that value, or 825°F. The *Percentage view* permits comparison of EGTs *across all* cylinders. Hotter cylinders display higher columns than cooler cylinders.

- Normalize view: when there is a dash _ near the N at the top of the display (EDM-700) or the letters NRM are lighted on the left side (EDM-800), the EGT columns are displayed normalized. When you change to the Normalize view, all columns are initially set to the same half-height level for trend analysis. Any changes are shown as an increase or decrease in column height. **A one-segment change in column height represents a 10°F change**. The Normalize view permits rapid visualization of EGT *trends*, rather than a percentage of red line. You can use normalize in level cruise and run-up.

To toggle between Percentage and the Normalize views, hold the LF button for five seconds until the display changes. The analog display becomes half height and the display changes to the Normalize view. Selecting the Normalize view does not affect the digital display nor alter the parameter sequence. The CHT display—described later—is not affected by the Normalize or Percentage view.

You may select the Normalize view in either the Manual or Automatic mode. Normalize view is most helpful for engine trend monitoring of each cylinder's operation. For example using the Normalize view during engine run-up, a fouled spark plug will appear as a higher column.

A common misapplication is to be in the Normalize view and then change your power setting, causing all columns to go off scale, high or low. Set to the Percentage view before adding or reducing power. Always set Percentage View when beginning your descent.

② Temperature Units (°F or °C)

- **°F** temperatures in the digital display are in Fahrenheit degrees.
- **°C** temperatures in the digital display are in Celsius degrees.

To change the display of engine temperatures see "Changing the Alarm Limits" on page 44.

③④ Cylinder Numbers and Dot Index

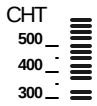
A row of numbers 1 through 6 and the letter T are the column labels for the analog display. The 1 through 6 are the cylinder numbers. If the TIT option is installed, the T denotes the last column is displaying Turbine Input Temperature (TIT) as a column. If the T is absent and the Oil

temperature option is installed, the last column displays Oil temperature. If both TIT and Oil temperature options are installed, the last column displays TIT and the missing segment displays Oil temperature. The highest Oil temperature segment will flash only when the digital display shows OIL. The highest TIT segment will flash on when the digital display shows TIT. A round dot under the numbers 1 through 6 indicates that particular column is shown numerically in the EGT and CHT digital display.

⑤⑥Bar Graph EGT and CHT

Each column in the bar graph is composed of a stack of segments. The total height of each column represents the **EGT** and the missing segment in the column represents the **CHT.**

- In the Percentage view, the EGT, TIT, and Oil temperature resolutions depend on the programmed red line limits.
- CHT is displayed by a missing segment and should be interpreted as follows: a missing segment corresponds to the CHT in 25 F° increments, starting at 300°F at the bottom. In the example shown here, the CHT is 350°F. If the EGT bar is lower than the missing CHT segment, then the CHT will be indicated by a single isolated lighted segment.



The CHT display is the not affected by mode or view.

⑦Percent HP or RPM (EDM-800 only)

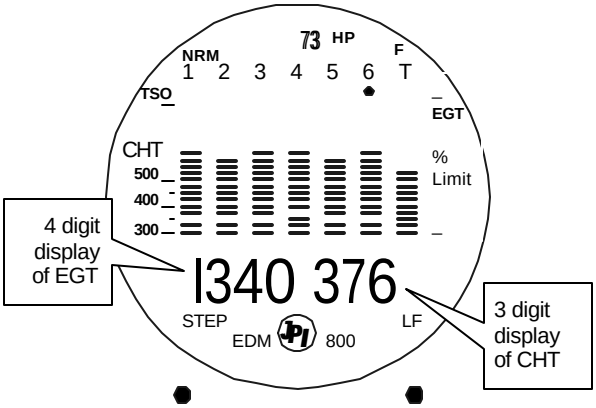
Displays percent of rated HP or RPM depending on pilot programming.

Digital Display

Beneath the bar graph is the 9-segment alphanumeric display.

EGT and CHT

When the dot index is beneath a cylinder number, 1 through 6, the digital display shows the EGT on the left (four digits) and the CHT on the right (three digits). Other parameters are displayed in the digital display as described in the subsection “Parameter Scan— EDMs without Fuel Flow Option” on page 28.



Display Dimming

The entire display panel features automatic dimming. Allow ten seconds for the display to adjust to ambient lighting conditions.

Buttons

Buttons, Front Panel

Two operating buttons control all functions of the EDM.

The term ***tap*** will be used to denote pressing a button momentarily. The term ***hold*** will be used to denote pressing and holding a button for five seconds or longer.

STEP Button

Located on the lower left side near the instrument face.

- In the Automatic mode, *tapping* the STEP button will stop and change to the Manual mode. Then each *tap* of the STEP button will display the next parameter in the sequence.

- In the LeanFind mode *tapping* the STEP button will terminate the LeanFind mode and change to the Automatic mode.

LF Button

Located on the lower right side near the instrument face.

- In Automatic or Manual modes, *tapping* the LF button will change to the LeanFind mode.
- In Automatic or Manual modes *holding* the LF button for three seconds will toggle between Percentage and Normalize views.
- In the LF mode *holding* the LF button after peak EGT is found will display peak EGT.
- In the LF mode *tapping* both the STEP and LF buttons simultaneously will **mark** a data record in long term memory and display will flash SNAP.

STEP and LF Buttons

- Holding both the STEP and LF buttons simultaneously for five seconds changes to the pilot programming procedure.
- Holding both the STEP and LF buttons simultaneously for five seconds after entering LeanFind mode but before beginning to lean will toggle between leaning “rich of peak” and “lean of peak.”
- Tapping both the STEP and LF buttons simultaneously in Manual mode toggles to include or exclude the displayed parameter from the Automatic mode. It has no affect on the displayed parameters in the Manual mode.

Fuel Flow Display Select Switch

The select switch is a three-position toggle switch mounted on your instrument panel near the display of the EDM. It affects only the display scan.

- In the **EGT** position only the installed temperature (and battery voltage) parameters are displayed.

- In the **ALL** position, the EDM both installed temperature and fuel flow parameters are displayed.
- In the **FF** position only fuel flow parameters are displayed.

Any alarm warning will appear regardless of the select switch setting. These parameters are displayed in the digital display in either the Automatic or Manual modes. The select switch does not effect the analog display. EDM-711: the toggle switch is disabled during Automatic *primary* scan mode.

Section 7 - Operation

Modes

The EDM has three different operating modes: *Automatic*, *Manual* and two *LeanFind* submodes. When you first turn on the power the EDM starts in the Manual mode, but will enter the Automatic mode after one minute. The Automatic mode provides you with engine monitoring information for the majority of flight conditions. To adjust the mixture, use the LeanFind mode. And to display specific parameters, use the Manual mode. In both the Automatic and Manual modes the analog display shows a bar graph of EGT and CHT for each cylinder and the TIT and Oil temperature.

The EDM-711 has an additional Automatic mode: the Automatic *primary* scan mode.

Automatic Mode

Just tap the LF button, then tap the STEP button. In the Automatic mode the EDM displays the parameter sequence at a user-selected rate (see Pilot Programming on page 36).

Some individual parameters can be excluded from the *Automatic mode:* tap STEP to enter the Manual mode. Tap STEP to index to the parameter you want to exclude. Then tap both the STEP and LF buttons simultaneously. Excluded parameters display a decimal point before the parameter name. For example:

Included: I84 OIL Excluded: I84 .OIL

Tapping the STEP and LF buttons simultaneously will toggle back and forth between *include* and *exclude*.

- Every time you turn on the EDM, all parameters are reset to be *included*.
- *All* installed parameters are always displayed in the Manual mode. Exclusion only applies to the Automatic mode.
- All parameters are checked for alarm conditions every second *regardless of their included or excluded status*.
- You cannot exclude EGT, CHT, TIT or OIL.

Manual Mode

Just tap the STEP button. Use the Manual mode when you want to monitor one specific parameter such as shock cooling during descent, or a particular cylinder temperature during climbs. To change to the Manual mode, tap the STEP button once. Subsequent taps will index the digital display through the parameter sequence (see "Parameter Scan— EDMs without Fuel Flow Option" on page 28). To exit the Manual mode and return to the Automatic mode, either tap the LF button and then tap the STEP button or wait 5 minutes (EDM-711 Automatic *primary* scan mode: 3 minutes). You may disable the Automatic mode by setting "0" for scan rate.

Automatic Primary Scan—EDM-711

The EDM-711 in automatic *primary* scan mode will display only the following three primary temperatures: highest CHT, OIL (optional) and TIT (optional). To enter the Automatic *non*-primary scan mode, tap STEP and then LF. To enter the Automatic *primary* scan mode, go into the Manual mode and wait 3 minutes.

Parameter Scan— EDMs without Fuel Flow Option

The EDM steps through the engine parameters in a specific sequence.

Parameter	*Example*	*Comments*
Voltage, System Bus	14.2 BAT	Battery voltage
Outside Air Temperature	81 OAT	°F or °C
Compressor Discharge Temperature	300 CDT	Into the intercooler
Induction Air Temperature	125 IAT	Out of the intercooler
CDT-IAT	132 C-I	Difference of CDT & IAT
Carburetor Temperature	-22 CRB	Not available when CDT is installed
Difference between hottest and coolest EGT	80 DIF	Dot indicates most widely deviating cylinder
EGT, CHT	1340 376	EGT, left, CHT, right. Dot indicates cylinder
TIT, Turbine Inlet Temperature	1370 TIT 1370 TI2	Turbine #1, left Turbine #2, right
Oil Temperature	178 OIL	
Shock Cooling	-30 CLD	Dot indicates fastest cooling cylinder

The display will pause at each parameter for four seconds in the Automatic mode. (The four second pause time can be changed.) In the Manual mode, tap the STEP button to advance to next parameter. Only the parameters for the options that are installed will be displayed; uninstalled parameters will not appear.

LeanFind Mode

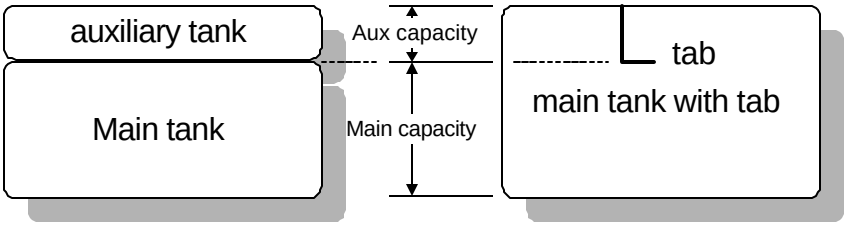
This is described in Section 4 - LeanFind, beginning on page 11.

Section 8 - Fuel Flow Option Operation

Start Up Fuel

After initial self-test, you will be asked to inform the EDM of start up fuel. The EDM will display FUEL for one second, and then flash FILL? N until any button is pressed. If your aircraft has tank fill tabs and no

auxiliary tanks, you can use the auxiliary tank feature to select either filling to the tank tabs or topping the tank. See "Main Tank Capacity" and "Auxiliary Tanks" beginning on page 47 to program the EDM for this feature. The EDM does not differentiate fuel flow between the main and auxiliary tanks; it considers only *total* fuel in the aircraft. **During flight you may also inform the EDM of startup fuel using the pilot program mode display if you forgot to do so at start up.**



Refer to the column in the chart below corresponding to your fuel tank configuration. Tap the LF button to select one of the four following fueling choices on the left column of the chart.

LF to choose	*Main tanks only, no tabs*	*Main tanks with tabs*	*Main & Auxiliary tanks*
FILL? N	Did not add any fuel since last shutdown.		
FILL 75	Topped the main tanks.	Filled only to the tabs.	Topped the main tanks. If some additional fuel is added to the auxiliary tanks, you will input this next when .0GAL is displayed
FILL 120	(not available)	Topped the main tanks.	Topped both the main and auxiliary tanks.
FILL +	Did not top, but added additional fuel to the aircraft, or removed fuel from the aircraft.		

Then tap the STEP button to complete the entry and advance to the Manual mode.

Adding Fuel and Auxiliary Tanks

If you either

a) added less than full fuel to only the main tanks, or

b) topped the main tanks but have some fuel remaining in the auxiliary tanks,

then select FILL + and the next display will ask you how much you added: .0 GAL (or selected units). Hold the LF button to count up, tap the LF button to count down. The count up will stop at full tanks, since you cannot add more fuel than would top the tanks. If you added fuel to only the main tanks, then input how much you added. If you topped the main tanks, but have some fuel remaining in the auxiliary tanks, input how much is now in the auxiliary tanks. You can "add" a negative amount of fuel if you remove fuel from the aircraft or wish to correct the total quantity of fuel on board.

Accumulate Total—Trip Total

You may either display total fuel *used* since the last time you informed the EDM that the aircraft was refueled, or for an extended trip with multiple fuel stops. This selection affects only the USD parameter. How to select whether to accumulate or reset is described in "Pilot Programming" beginning on page 36.

Resetting "USED"

Every time you inform the EDM that the aircraft is refueled, the amount of fuel *used* is set to zero, unless the instrument is programmed to accumulate. The display of fuel *used* pertains only to the fuel used since the last time you informed the EDM that the aircraft was refueled. **To reset to zero the amount of fuel *used*** at any point in time, manually step to display USD and hold both buttons for five seconds until the display shows .0 USD.

Fuel Management

The EDM Fuel Flow Option uses a small, turbine transducer that measures the fuel flowing into the engine. Higher fuel flow causes the transducer turbine to rotate faster which generates a faster pulse rate. Because the transducer turbine generates thousands of pulses per gallon of fuel, it can measure with high resolution the amount of fuel that flows into the engine. Prior to engine start you inform the EDM Fuel Flow Option of the known quantity of fuel aboard, and it will keep track of all fuel delivered to the engine. **During flight you may also inform the**

EDM of startup fuel using the pilot program mode display if you forgot to do so at start up.

Parameter Scan

Listed below is the sequence, parameter description and example of the digital display.

Select Switch	*Parameter Description*	*Example*	*Comments*
T, A	**Voltage**, System Bus	14.2 BAT	Battery voltage
T, A	**Outside Air** Temperature	81 OAT	°F or °C
T, A	**Compressor Discharge** Temperature	300 CDT	Into intercooler
T, A	**Induction** Air Temperature	125 IAT	Out of intercooler
T, A	**CDT-IAT**	132 C - I	Difference of CDT and IAT
T, A	**Carburetor** Temperature	-22 CRB	Not available when CDT is installed
T, A	**Difference** between hottest and coldest EGT	80 DIF	Dot indicates most widely deviating cylinder
T,A,F	**RPM**	2450 RPM	RPM
T,A,F	**MAP**	23.1 MAP	Manifold pressure
F, A	**Fuel Remaining**	37.2 REM	In gallons, liters or pounds or kilograms
F, A	**Fuel required to next GPS WPT or Destination**	25.9 REQ	Present with GPS interface Valid signal and way point
F, A	**Fuel Reserve at next GPS WPT or Destination**	11.3 RES	Present with GPS interface Valid signal and way point
F, A	**Nautical Miles per Gal**	13.0 MPG	Present with GPS interface and valid signal or MPK, MPL, MPP
F, A	**Time to Empty**	02.45 H.M.	**H**ours. **M**inutes Remaining at current fuel burn
F, A	**Fuel Flow Rate**	13.5 GPH	Or KPH, LPH, PPH
F, A	**Total Fuel Used**	38 USD	Since last refueling or trip total.
T, A	**EGT, CHT**	1340 376	EGT, left, CHT, right. Dot indicates cylinder

T, A	**TIT**, Turbine Inlet Temperature	1370 13.5	Turbine #1, left and fuel flow right
T, A	**Oil** Temperature	178 OIL	
T, A	**Shock Cooling**	-30 CLD	Dot indicates fastest cooling cylinder

For fuel calculations to be accurate, it is imperative that you inform the EDM of the correct amount of fuel aboard the aircraft. Do not rely on fuel flow instruments to determine fuel levels in tanks. Refer to original fuel instrumentation for primary information

Section 9 - Memory and Data Download

The EDM Long Term Data Memory will record and store **all** displayed parameters once every **six seconds** (or at the programmed interval of between 2 to 500 seconds). At a later time it will transfer them to a PC using a Palm™ Computer as a intermediate courier, or directly to a laptop PC.

When you retrieve recorded data to your Palm handheld or laptop PC you can choose to retrieve *all* the data in stored in the EDM, or only the *new* data recorded since your last retrieval. In either case, no data in the EDM is erased. The data will be saved in the Palm handheld or PC in a file in a compressed format. The PC program supplied with the Long Term Data Memory will decompress the data for display and use by other programs, such a MS Excel.

The amount of total data that the EDM can store will vary depending on how rapidly the measured temperatures change. The typical storage is 20 hours at a 0.1 minute interval (1600 hours at 8 minute interval), but may vary depending on which options are installed. When the memory becomes full, the oldest data will be discarded to make room for the newest. You may place a mark at the next data record by tapping both the STEP and LF buttons simultaneously. You will see the word SNAP at the next record snapshot, indicating a data record has been marked. Tap the STEP button to return to the Automatic mode. Recording begins when EGTs are greater than 500°F or “snap” is requested.

All data are time-stamped. The EDM Long Term Data Memory contains a real-time clock that may be reset to local time when you initially program your instrument. You may also program an *aircraft id* that will appear in the output data file. The aircraft id can be your aircraft registration number or your name. Initially the *aircraft ID* is set to the EDM's serial number.

You may change the record interval from 2 to 500 seconds, even in flight. When you change the interval in flight, the current flight file is closed, and a new flight file is created with the new record interval.

EzPalm 2

At power on, the EDM will execute its self test and then display the date (e.g., 11.12.01), the time (13.26), the percentage of memory filled since the last save (FULL 24), and the Aircraft ID.

Downloading data to the Palm handheld

The examples shown here are specifically for the Palm™ computer and a PC running Windows® 98. J. P. Instruments provides an optional cable to interface to the Palm cradle cable or travel cable. J. P. Instruments has a downloadable data transfer application program for the Palm series called EzPalm™.

Downloading the EzPalm Program from the Internet

Go to our web page www.jpinstruments.com, go the *Home* page and then go to the *downloads* page. Double click on EZPALM2.ZIP. When the *File Download* window appears select *Save this file to disk*. Save the file to folder C:\EZSAVE. If it doesn't exist, create it.

Using Windows Explorer, go to the folder C:\EZSAVE and double click on the file name EZPALM2.ZIP. In the new Windows Explorer window that opened, double-click on EZSAVEP.EXE. Select *Extract All*. Accept the default directory C:\EZSAVE and select *Next.* Answer *Yes* and select *Finish*.

Installing EzPalm on the Palm handheld

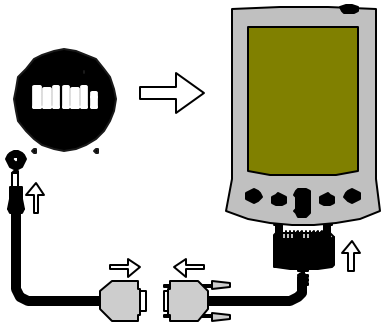
Using Windows Explorer, go to directory C:\EZSAVE and double-click on EzPalm.prc. Click Done, Click OK.

HotSync® your Palm handheld. The EzPalm icon should now appear on your applications screen.

Memory Data Capture & Import

With the Palm handheld you can transfer memory data into a file and then later HotSync the data into your PC and import it into EzSaveP™. Here are the steps used to perform these two operations.

Transferring Data from the EDM to the Palm Handheld



To transfer recorded data to your Palm handheld, proceed as follows:

1. Connect the Palm handheld cradle or travel cable option (available from Palm Computing) to the JPI Palm Download cable (gray). Insert the small round plug of the JPI cable into the data connector on your aircraft instrument panel, and the cradle or travel cable to the Palm handheld.
2. Simultaneously hold the STEP and LF buttons for five seconds. You will see the word PROGRAM for two seconds. Tap the STEP button until you see the question DUMP? N.
3. Tap the LF button once or twice to select either NEW or ALL.
   - NEW will transfer only data *newly* recorded since you last saved your data.
   - ALL will transfer *all* the data that is in the EDM memory.

   In either case, **no data will be erased** from the EDM.
4. On the Palm handheld, tap the EzPalm icon.

5. Tap the EzCapture™ button. The Palm handheld will wait a few seconds for you.

6. On the EDM-700/800, tap the STEP button to begin the transfer process. The EDM-700/800 display shows the percentage of memory remaining to be transferred. When this number reaches zero, the transfer is complete. If you want to terminate the transfer before it is complete, simultaneously hold the STEP and LF buttons for five seconds.

7. The Palm handheld will close the file named with today's date. Tap Exit to end EzPalm or tap Explorer to view the file list.

Transferring Data from the Palm handheld to your PC in Excel compatible format

1. Place the Palm handheld in the cradle and begin a HotSync. Your file will be placed in the folder C:\Palm\YourName\Backup where YourName is the folder corresponding to your Palm handheld user name. The file will have a name similar to P010318a.PDB corresponding in this example to the date 2001, March 18.

2. Using MS Explorer, move the file P010318a.PDB to the folder containing the EzSAVEP.exe application—such as C:\EZSAVE.

3. To run EzSAVEP on the PC, go to directory C:\EZSAVE and run EXSAVEP.EXE. From the main menu use the up and down arrow keys to select De-Compress Palm Pilot Data. Use the up and down arrow keys to select the file to decompress. Press the <Enter> key.

EzSAVEP will create one or more .CSV files, each of which corresponds to one flight, for example F010318A.CSV.

Data Analysis

The data stored in the .CSV file is a comma separated value file. In he Windows Explorer double click on the .CSV file and Excel® will open. MS Excel and other spreadsheets will import the file without further prompting. A program that doesn't recognize .CSV files will ask you how to interpret the data. Select delimited; delimiters: comma; *text* qualifier: " (quote).

"EZSave 3-13-2001"
"EDM- 700 V 270 J.P.Instruments (C) 1998"
"Aircraft Number N1205X_"

"Flight #5 11/12/98 11:46:24"
"Eng Deg F   OAT Deg F   F/F GPH"
"Duration   4.44 Hours "
"TIME","E1","E2","E3","E4","E5","E6","C1","C2","C3","C4","C5","C6","DIF","CLD",
"OAT","BAT","FF","USD","MARK"
"11:46:24",1375,1323,1386,1342,1437,1323,355,365,340,368,329,353,114,0,
75,13.9,12.8,21,"S"
"11:46:30",1376,1323,1387,1343,1438,1324,354,365,342,369,330,353,115,0,
75,13.9,12.8,21,""
"11:46:36",1375,1322,1385,1342,1436,1325,356,365,343,367,332,353,114,0,
75,13.9,12.8,21,""
"11:46:42",1376,1320,1385,1340,1437,1324,355,365,345,368,331,353,113,0,
75,13.9,12.8,22,""

The line

"TIME","E1","E2","E3","E4","E5","E6","C1","C2","C3","C4","C5","C6","DIF","CLD",
"OAT","BAT","FF","USD","MARK"

is the header text and is listed in the file only once. It describes the contents of each subsequent line of data starting with time in hours:minutes:seconds. The next labels are E1…E6 for EGTs, then C1…C6 for CHTs. The DIF, CLD, OAT, BAT, FF and USD are the same as on the EDM-700 display. The MARK field will be an "S" if the data was marked by pressing the LF button twice.

Import the data to your Excel or Lotus 123 spreadsheet and follow the directions for your spreadsheet for analyzing and plotting data.

Section 10 - First Time Setup and Customization

Pilot Programming

You should *not* have to modify any custom settings of your EDM unless you must change any of the following:

- Display indexing rate
- Temperature display to °C
- OAT adjustment
- EGT display resolution
- HP constant adjustment
- MAP display adjustment
- Number of cylinders if RPM reads wrong
- K-factor because the fuel flow is reading wrong
- Fuel flow units
- Carburetor smoothing filter
- Turn on or off the accumulate fuel used feature
- GPS constant
- TIT adjustment for use with a factory installed probe

- Record feature on or off
- Date or time setting of the long term memory
- Any alarm limits
- Fuel tank capacities

To start the Pilot Programming Procedure, simultaneously hold the STEP and LF buttons for five seconds. You will see the word **PROGRAM** for two seconds and then the sequence shown in the chart below.

Tap the STEP button to advance to the next item in the list. Tap the LF button to select alternate values of that item. The shaded areas in the chart below pertain only to the Fuel Flow Option.

	Tap* STEP *to advance to the next item	*Tap* LF *to sequence through these values*	*Comments*
	PROGRAM		Stays on for two seconds. Hold both buttons for 5 seconds set up the factory original TIT (see page 40).
	FUEL ? N	N ⇔ Y	Y—Yes—to change fuel status (see page 28).
	RATE 4	0 … 9	Index rate (pause time) in the Automatic Mode. 0 disables the Automatic Mode.
	OAT F	OAT F ⇔ OAT C	To calibrate the OAT ±10°, hold both the STEP and LF buttons simultaneously for five seconds, which will proceed to the next step. Otherwise the next step will be skipped.
	OAT+0	OAT-10 … OAT+10	This step will be normally be skipped. Adjust the indicated temperature up or down by up to 10°. For example, OAT+3 adjust the OAT 3° higher.
	EGT 1?N	EGT 1?N ⇔ EGT 1?Y	Y—Yes—sets the digital display to one-degree resolution; N—No—sets 10°. (10° resolution is easier to interpret the EGTs.)
	HP-? Y	N ⇔ Y	Y—Yes—displays %HP in the upper digital window. N—No—displays RPM in the upper digital window. Hold STEP and LF for 5 seconds to adjust the horsepower constant.

		70 HP HPC= l25	%HP display will change when HP constant is adjusted. See Programming the EDM-800 Horsepower Constant beginning page 38. Hold STEP and LF for 5 seconds to set the MAP calibration. Tap STEP to exit.
	MAP=29.9		Set to value in chart, section starting on page 39. Tap STEP to exit.
	KF-SET	29.00=KF	KF-set, hold both STEP and LF buttons simultaneously for five seconds to begin the next sequence.
		29.00=KF	29.00 One digit will be flash and the LF button will adjust up or down. STEP to next digit. Hold both buttons to exit set mode.
	ACCUM?N	ACCUM?N ⇔ ACCUM?Y	N—No—Upon informing the EDM that you refueled the aircraft, reset total fuel used to 0. Y—Yes—accumulate total fuel used rather than reset to 0 at each refueling.
	GPS-C=2	0 … 6	GPS Com Format.
	DUMP? N	N⇒NEW ⇒ALL⇒	Memory dump. Select to transfer ALL or only NEW data. The END Y step is skipped after a successful a Long Term Memory DUMP.
	END Y	END Y ⇔ END N	Y—Yes to exit; N—No to review list again.

Programming the EDM-800 Horsepower Constant

You must adjust the HP Constant once for your aircraft. The default display will be RPM if Fuel Flow is not operational. You must perform this adjustment in the air while the aircraft is in flight.

1. Enter the pilot program mode by simultaneously holding the STEP and LF buttons for five seconds.
2. Tap STEP repeatedly until you see **HP-? Y**. If you see **HP-? N**, change the N to a Y by tapping the LF button, then hold both the STEP and LF buttons display until you see HPC= l25.

3. Referring to the Aircraft Flight Manual (AFM) set the engine to a constant power setting of 65 to 75% at 25° to 50° Rich of peak and maintain straight and level flight at any altitude below 10,000 feet. View the reading in the %HP display and see how close it is to your current engine percent HP. If the value in the display not at your current engine percent HP setting, then change the HP reading by adjusting the HP constant in the lower display by holding or tapping the LF button. **Note: the reading is the *percent of maximum* HP, not total HP.**
4. Keep adjusting the HP constant until the upper window displays the same power level as the current engine percent HP.
5. Tap the STEP button to exit.

Programming Manifold Pressure (MAP)

Do this one time and only if the MAP on your manifold pressure gauge doesn't match the MAP shown on the EDM-800.

1. Do this on the ground with the engine turned off.
2. Enter the pilot program mode by simultaneously holding the STEP and LF buttons for five seconds.
3. Tap STEP to index to **HP-? Y**.
4. Hold both the STEP and LF buttons and you will see **HPC= 125.**
5. Hold both the STEP and LF buttons and you will see **MAP= 29.9.**
6. Use **one** of the following two methods to calibrate the MAP.
   A. Easy calibration: set the EDM-800 MAP to the same value as shown on your aircraft's manifold pressure gauge. Tap or hold the LF button to change the MAP value.

OR

   B. Absolute calibration: the table below shows the MAP for a given field elevation (down the left side of the table) and altimeter setting (along top row of the table). Find the entry in the table most closely matching your field elevation and current altimeter setting. Interpolate if necessary.

Alt setting-> field elev.	**29.0**	**29.2**	**29.4**	**29.6**	**29.8**	**29.9**	**30.0**	**30.2**	**30.4**	**30.6**	**30.8**	**31.0**
0	29.0	29.2	29.4	29.6	29.8	29.9	30.0	30.2	30.4	30.6	30.8	31.0
1000	28.0	28.2	28.4	28.5	28.7	28.8	28.9	29.1	29.3	29.5	29.7	29.9
2000	27.0	27.1	27.3	27.5	27.7	27.8	27.9	28.1	28.3	28.5	28.6	28.8
3000	26.0	26.2	26.3	26.5	26.7	26.8	26.9	27.1	27.2	27.4	27.6	27.8
4000	25.0	25.2	25.4	25.6	25.7	25.8	25.9	26.1	26.3	26.4	26.6	26.8
5000	24.1	24.3	24.5	24.6	24.8	24.9	25.0	25.1	25.3	25.5	25.6	25.8
6000	23.2	23.4	23.6	23.7	23.9	24.0	24.0	24.2	24.4	24.5	24.7	24.8
7000	22.4	22.5	22.7	22.8	23.0	23.1	23.1	23.3	23.5	23.6	23.8	23.9

Unless your airfield is close to sea level, do not set MAP to the local altimeter setting since that setting is the pressure corrected to sea level, and is not the same as your field elevation pressure.

Tap or hold the LF button to change the MAP value.

7. Tap the STEP button to exit.

Programming use of Factory Original TIT Probe

If your aircraft is using the factory original TIT probe and gauge, you should calibrate the EDM for that probe. The factory original TIT probe must be a type K and the leads must be wired red-to-red and yellow-to-yellow. Both the EDM and factory original gauge may be used concurrently. Due to the high input impedance of the EDM instrument, it will not affect the accuracy of the factory installed probe or gauge.

In normal cruise flight, record the difference between the factory installed TIT gauge and the EDM TIT reading.

TIT gauge _____ EDM _____.

If you haven't already done so, start the pilot programming procedure, by simultaneously holding the STEP and LF buttons for five seconds. You will see the word PROGRAM for two seconds.

Tap* STEP *to advance to the next item	***Tap the* LF *button to sequence through these values***	***Comments***
PROGRAM		Stays on for two seconds.
RATE4	RATE4	hold both STEP and LF buttons simultaneously for five seconds to begin the next sequence.

ORIG TIT	ORIG T-N ⇔ ORIG T-Y	Y—Yes—selects factory original TIT probe and proceeds to the next step.
CAL TIT	-975 … + 975	Tap the LF button to lower the correction; hold the LF button to raise the correction. For example, if the EDM reads 100 less than the aircraft's TIT gauge, set the display to read TIT + 100.
		Tap STEP button to exit the procedure.

Programming the Fuel Flow Option

Fuel Flow Parameters

Three additional parameters may be set by the pilot when the Fuel Flow Option is installed:

- K Factor—the fuel flow transducer calibration constant.
- Accumulate—default is OFF: resets the fuel *used* to 0 every time you inform the EDM that the aircraft was refueled. With accumulate ON fuel *used* will not be reset to 0 when you inform the EDM that the aircraft was refueled.
- GPS Communications fuel data format.

K Factor

The K factor is shown on the fuel flow transducer as a four-digit number, which is the number of pulses generated per gallon of fuel flow. **Before installing the transducer, write down the K factor here _____.** To enter the number, move the decimal point three places to the left. For example if the K factor on the fuel flow transducer is 29,123, enter 29.12 in the K factor parameter.

The K factor can be changed in the pilot programming procedure. *When the K factor is changed during a trip, calculations of fuel used, fuel remaining and time to empty are not retroactively recalculated.*

Fine Tuning the K Factor

The K factor shown on the fuel flow transducer does not take into account your aircraft's particular installation. Fuel hose diameters and lengths, elbows, fittings and routing can cause the true K factor to be different from that shown on the fuel flow transducer.

You must use the following procedure to fine tune the K factor.

1. Make at least three flights of about two to three hours each. Note the actual fuel used (as determined by topping the tanks) and the EDM calculation of the fuel consumed for each flight = USD.

Flight	*Fuel USED shown by EDM (total tank - REM)*	*Actual fuel used by topping tanks*
1		
2		
3		
Total	❶	❷

2. Total ❶ the EDM fuel used and ❷ the actual fuel used.
3. Record the current K factor here ❸_____ and in the table below.
4. Calculate the New K Factor as follows:

New K Factor = (❶EDM fuel used) x (❸Current K factor)
(❷actual fuel used)

New K Factor = (❶) x (❸)
(❷)

Every time you fine tune the K factor, record the measurements here:

Date	❶*EDM fuel used*	❷*actual fuel used*	❸*Current K factor*	*New K factor = ❶x❸/❷*	*Pilot's initials*

Fuel Flow Option Programming Procedure

Setting the K factor

This procedure is different than for setting other parameters. Place the select switch in the FF position. If you haven't already done so, start the

pilot programming procedure, simultaneously hold the STEP and LF buttons for five seconds. You will see the word PROGRAM for two seconds.

1. Tap STEP button to advance to the KF-SET screen 29.00=KF
2. Hold both the STEP and LF buttons simultaneously for five seconds. First digit flashes (shown here as a larger digit only for illustration purposes): 29.00
3. Tap or hold the LF button to change flashing digit: 19.00
4. Tap STEP button for next digit: 1**9**.00
5. Tap or hold the LF button to change flashing digit: 18.00
6. Tap STEP button for next digit: 18.00
7. Repeat items 5 and 6 for the remaining two digits.
8. Hold STEP and LF buttons simultaneously for five seconds to exit.

Accumulate Total—Trip Total

Select "No" if you wish to display total fuel used since the last time you informed the EDM that the aircraft was refueled. Select "Yes" to display total fuel used for an extended trip with multiple fuel stops. This selection affects only the USD parameter.

GPS-C Comm settings

See "Setting GPS-C Fuel Flow Communications Format" on page 54.

Programming Long Term Data Memory

If you haven't already done so, start the pilot programming procedure, simultaneously hold the STEP and LF buttons for five seconds. You will see the word PROGRAM for two seconds. To change the date, time and user id for the Long Term Data Memory, tap the STEP button until the display shows DUMP?N. Next, simultaneously hold the STEP and LF buttons for five seconds. Then set the date and time as show below:

STEP	LF	*Comments*
TIME	2⇒500	Record time interval, in seconds
MNTH	1⇒ 12	Month
DAY	1⇒ 31	Day
YEAR	80⇒79	Year (note: represents 1980 through 2079)
HOUR	00⇒ 23	24 hour time. We suggest you set Zulu time
MIN	00⇒ 59	This also zeros the seconds

N-----	**N** I23456	Current Aircraft ID. To *change* Aircraft ID, hold both STEP and LF buttons until the first character flashes. LF selects the first character. STEP moves to the next character. To *Save*, hold both STEP and LF for 5 sec.
END Y		Tap STEP button to exit the procedure.

Programming Alarm Limits

Factory Set Default Limits—Non-Primary

Parameter	*Default Low Limit*	*Default High Limit*	*Alarm Example*
CHT		450°F* 230°C	465 **CHT**
OIL	90°F 32°C	230°F* 110°C	280 **OIL**
TIT		1650°F* 900°C	I720 **TIT**
CLD		-60°F/min. - 33°C/min.	-65 **CLD**
DIF		500°F 280°C	525 **DIF**
BAT, 24 V	24V	32V	22.4 **BAT**
BAT, 12 V	12V	16V	I7.6 **BAT**
MAP		42 inches	46.3 **MAP**
LO FUEL	45 min		00.20 **H.M**
LO TIME	10 gal, kg, ltr, lbs		7.2 **REM**

* for EDM-711 primary instruments you cannot change the CHT HI, TIT HI or H OIL alarm limit settings. The alarm limits may differ from those shown here, depending on your type of aircraft.

If you change the display between Fahrenheit and Celsius, newer instruments will automatically change the alarms to the factory limits.

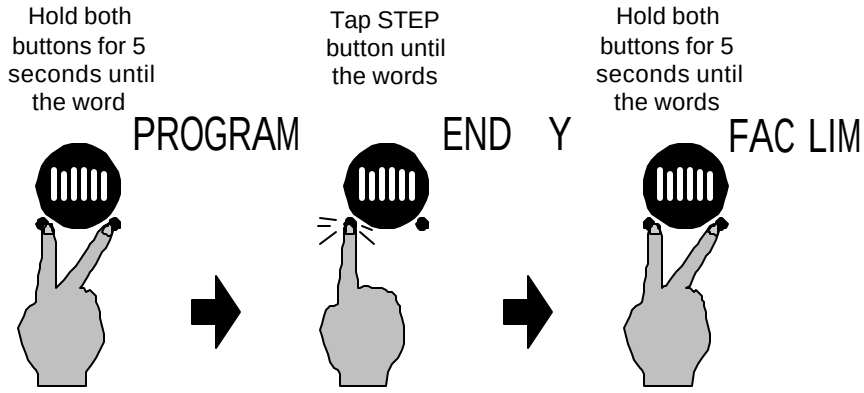
When an alarm is displayed, tapping the STEP button will temporarily reset that alarm for the next ten minutes. When an alarm is displayed, holding the STEP button until the word OFF appears will reset that alarm for the remainder of the flight. On EDM-711 the alarm and warning lights cannot be extinguished as long as the alarm or warning condition is present.

Changing the Alarm Limits

You may prefer to set your own alarm limits Follow the procedure outlined below to change any of the factory default settings.

To start the alarm limit procedure, after power up, wait until the EDM completes its self test and is in the Automatic or Manual mode. If in

doubt, tap the STEP button a few times. Then follow the steps depicted here:



The display will then sequence as shown in the chart below. Tap the STEP button to advance to the next item in the list. Tap the LF button to select alternate values of that item. *Hold* the LF button to increase a numerical value; *tap* the LF button to decrease a numerical value. The shaded areas in the chart below pertain only to the Fuel Flow Option.

Changing the Alarm Limits Procedure:

Tap* STEP *to next item	**LF** ***sequences through these value ranges***	***Description***
FAC? N	FAC? N ⇔ FAC? Y	Restore factory defaults?
ENG F	ENG F ⇔ ENG C	Select F or C degrees for all engine temps. You must also change the alarm limits to °F or °C.
I6.0 H BAT	I0.0 H BAT … 35.0 H BAT	Battery high voltage limit, set in 0.5 volt increments.
I2.0 L BAT	8.5 L BAT … 30.0 L BAT	Battery low voltage limit.
500 DIF	30 DIF … 990 DIF	EGT difference limit, set in 10° increments.
450 H CHT	90 H CHT … 500 H CHT	CHT high limit, set in 5° increments.*
-60 CLD	-5 CLD … -200 CLD	Cooling limit, set in 5°/min. increments.
I650 TIT	650 TIT … 2000 TIT	Also sets the maximum scale of the EGT and TIT bar graph.*
230 H OIL	40 H OIL … 500 H OIL	Oil temperature high limit, set in 5° increments.*
90 L OIL	I0 L OIL … 250 L OIL	Oil temperature low limit set in 5° increments
MAP=42	MAP=25 … MAP=60	MAP overboost alarm (EDM-800 only)
FUEL GAL	FUEL GAL⇒ FUEL KGS⇒ FUEL LTR⇒ FUEL LBS⇒	Selects the units in **all** parameters where fuel quantity or fuel rate is displayed
MAIN=50	MAIN=0 … MAIN=999	Main tank capacity, in units selected
AUX? N	AUX? N⇔AUX? Y	Y—Yes—aircraft has auxiliary tanks
AUX=0	AUX=0 … AUX=250	Auxiliary tank capacity
MIN =45	MIN =0 … MIN =60	Alarm limit in minutes for low time in tanks
REM = I0	REM =0 … REM =200	Alarm limit for low fuel quantity in tanks, in units selected

CARB?	CARB? N ⇔ CARB? Y	Y—Yes—carbureted engine. If Yes, see next
CARB F = 1	CARB F = 1 … CARB F =3	Higher is smoother filter
RECRD?	RECRD? Y⇔ RECRD? N	Long Term Memory. Y—only data recording. N—only real-time data output.
CYL=6	CYL=4 … CYL=12	(EDM-800 only) Set the number of cylinders. See page 48 for exceptions.
	END Y ⇔ END N	Y—Yes to exit; N—No to review list again

* for EDM-711 primary instruments you *cannot* change the CHT HI, TIT HI or H OIL alarm limit settings.

MAP, Fuel Flow Alarm Limits, Units, Fuel Capacity

MAP Overboost Alarm

Enter the redline for overboost on turbocharged engines.

Fuel Flow Units

Selects the units in *all* parameters where fuel quantity or fuel rate is displayed. If you change this parameter, it does *not* change the numerical value of the fuel tank capacity. You must do this manually. For example if you change from Gal. to Lbs., the tank capacity will be interpreted as 50 Lbs. rather than 50 gallons; the EDM will not convert 50 Gal to equivalent pounds.

Main Tank Capacity

Enter the total capacity of the main tanks in the fuel flow units selected. If you have tank tabs (but no auxiliary tanks) and sometimes fill only to the tabs, set the main tank capacity to the capacity up to the tabs.

Auxiliary Tanks

If you do not have auxiliary tanks or tank tabs, answer “No.” If you answer “Yes,” you will be asked to input the capacity of the auxiliary tanks in the fuel flow units selected. If you have tank tabs and sometimes fill only to the tabs, set the auxiliary tank capacity to the difference between full tank capacity and tab capacity. The EDM does not

differentiate fuel flow between the main and auxiliary tanks; it tracks only *total* fuel in the aircraft.

Low Time Alarm Limit

Select the value of the time remaining, in minutes, that triggers the alarm. Time remaining is calculated at the current fuel flow rate.

Low Fuel Alarm Limit

Select the value of the fuel remaining, in the selected fuel flow units, that triggers the alarm. Fuel remaining is calculated at the current fuel flow rate.

Carburetor?

Different response filters are used depending on whether your engine is carbureted or fuel injected. The filter for a carbureted engine has a slower response time to reduce sudden fluctuations in readings.

Number of Cylinders

This applies only to EDM-800. Set CYL = 4 or 6 depending on your engine. Exceptions:

- 4 cylinder engine with dual (all-in-one) magnetos set to CYL= 8.
- 4 cylinder Laser ignition set to CYL=8.
- 6 cylinder Laser ignition set to CYL=12.

Section 11 - Troubleshooting the EDM

Common Misapplications

Some of the more common misapplications made by first-time EDM users are presented here in an attempt to help you avoid similar problems.

Problem	*Situation*	*Correction*
LeanFind finds a "peak" too soon.	Failure to pre-lean before performing LeanFind or pausing while leaning.	Continue to lean without pausing. False peak will be reset and LeanFind will continue.
	Leaning too slowly.	Lean more quickly.
Peak not found	Lean Find not activated or stopping while leaning	Lean at the speed of approximately 10°F per second.
Off-scale EGT bars, too high or low	You forgot that you set the EDM in the Normalize view and later observe off-scale EGT bar readings.	The higher sensitivity (10° per segment) of the Normalize view can quickly go too high or low off-scale with only small changes in EGT.
No display of %HP	Fuel flow not reading, OAT not reading	Fuel Flow reading and OAT is required for HP.
RPM reads 2/3 of correct value	4 cylinder engine but set to 6 cylinder.	In pilot programming change 6 to 4 cylinder.
First cylinder to peak is not the hottest	This is normal. The first to cylinder peak is not necessarily the hottest.	
EGTs rise during single magneto check	This is normal, due to incomplete combustion persisting longer.	
EGTs not uniform during low power operation	This is normal. Fuel and air distribution is not optimal at low power settings.	

Diagnostic Testing on Startup and During Flight

When your EDM is first turned on, all digits light up for a few seconds, permitting you to check for non-functional segments. Then each column is self-tested in sequence while the EDM tests internal components, calibration and integrity of the probes. If a problem is found, it will be displayed as OPEN PRB or CAL ERR, followed by the name of the probe or channel.

Display	*Channel*	*Display*	*Channel*	*Display*	*Channel*
EGT 1	EGT #1	CHT 1	CHT #1	OIL	Oil
EGT 2	EGT #2	CHT 2	CHT #2	TIT 1	TIT #1
EGT 3	EGT #3	CHT 3	CHT #3	TIT2	TIT #2
EGT 4	EGT #4	CHT 4	CHT #4	CDT CRB	CDT carb
EGT 5	EGT #5	CHT 5	CHT #5	IND	IAT
EGT 6	EGT #6	CHT 6	CHT #6	OAT	OAT

During flight, probes are constantly checked for inconsistent or intermittent signals. A faulty channel or probe encountered during start-up or during flight will be deleted from the sequence, producing a missing column or blank digital data.

Diagnostic Messages, Fuel Flow

Transducer diagnostics

The following displays indicate a malfunction in the Fuel Flow Option transducer or associated electrical connections:

0.0 GPH	Zero's indicate Fuel flow is too low to register
--- GPH	Dashes indicate No fuel flow transducer signals
--- H.M	Dashes indicate No fuel flow transducer signals

GPS Interface Diagnostics

Parameters REQ,RES,&MPG are all missing from the scan.	No communications from GPS receiver to EDM. Possibly no connection or aircraft GPS is off.
NO-COM message and parameters REQ,RES,&MPG are missing.	Communications are received by EDM and the Auto-Protocol setup is in process. Verify correct output format setup in GPS receiver; check GPS connections.
NO-SIG message and parameters REQ,RES,&MPG are missing.	GPS receiver has insufficient signal for valid data.
NO-WPT message and parameters REQ& RES,are missing.	No waypoints are programmed into the aircraft GPS receiver.
---REQ or ---RES message	Your ground track is more than ±70° from your course to the next GPS waypoint.

Section 12 - Appendices

Features and Benefits

The EDM Engine Data Management system is the most advanced and accurate piston engine-monitoring instrument on the market. Using the latest microprocessor technology, the EDM will monitor up to twenty-four critical parameters in your engine, four times a second, **with a linearized thermocouple accuracy of better than 0.1 percent or 2 F°.**

As your built-in flight engineer, the EDM is constantly "red line" checking: all critical parameters are automatically checked four times a second, regardless of the current display status. Leaning is accomplished quickly and automatically using the LeanFind™ procedure. With the EDM it is now possible to have substantially more diagnostic information available to you in a timely and usable manner.

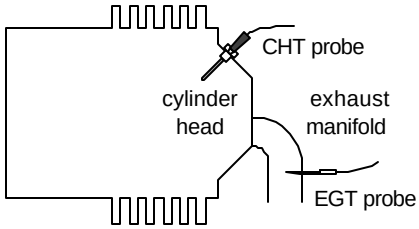
The real-time serial data port—a standard feature—permits you to record scanned parameters in real-time using a user-supplied Palm™ Computer or laptop PC.

Benefits of Proper Mixture Control

- Improved engine efficiency
- Greater fuel economy
- Smoother engine operation
- Longer spark plug life
- Reduced maintenance costs
- Reduced operating costs
- Proper engine temperatures
- Reduced engine vibration

JPI Probes

Temperature information processed by the EDM is captured by **fast response**, grounded ***JPI*** temperature probes, that accurately measure the small temperature changes—as small as 1°F—that occur during mixture adjustment.

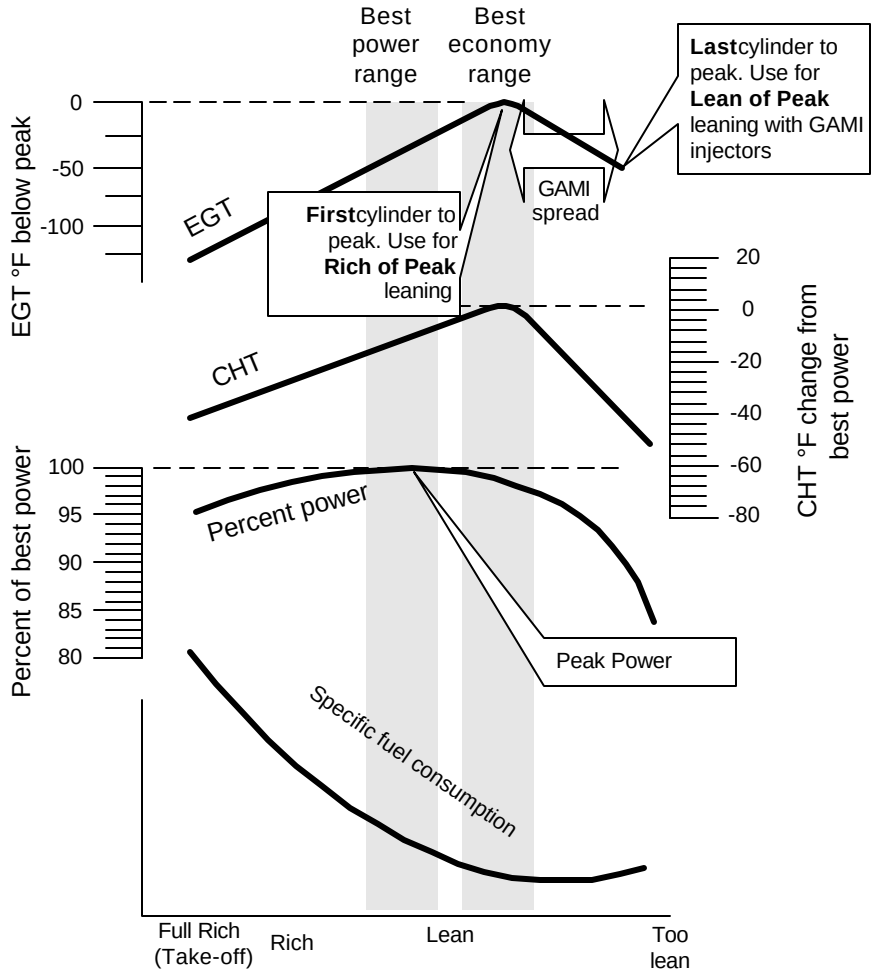


Temperature and Mixture

In a piston engine only a small portion of the energy from combustion produces movement of the piston during the power stroke. The majority of energy passes into the exhaust pipe as hot gasses. By monitoring the temperature of these exhaust gasses you will have an indication of the quality of the combustion process. Low compression, non-uniform fuel distribution, faulty ignition, and clogged injectors diminish the efficiency of the combustion process that generates power.

From the cockpit you can adjust the fuel/air ratio by a process called *leaning*. Retarding the mixture control changes the fuel/air ratio and hence the resulting Exhaust Gas Temperature (EGT).

The following figure depicts the mixture and temperature relationship.



As the mixture is leaned, EGT rises to a peak temperature, and then drops as the mixture is further leaned. Peak *power* occurs at a mixture using more fuel than at peak EGT. Best *economy* occurs at peak EGT. Accurate leaning yields optimal engine temperatures. By being able to precisely adjust the mixture, your engine can produce either the best fuel economy or maximum power, whichever you choose.

A single EGT gauge merely gives you an average of each cylinder's temperature: some cylinders can be too rich, while others too lean. Variations produced by differences in fuel distribution, ignition, and

compression will cause each cylinder to follow its own mixture and temperature relationship such that one cylinder will reach peak before another.

Shock Cooling

Cooling the cylinders too fast can result in cracking and eventual failure. Lycoming Service Instruction 1094D (March 25, 1994) on ***Fuel Mixture Leaning Procedures*** **states:**

> "At all times, caution must be taken not to shock cool the cylinders. The maximum recommended temperature change should not exceed 50°F per minute."

JPI checks shock cooling on all cylinders displaying the highest reading cylinder.

Navigation Data Formats

Output of GPS; input to EDM. The EDM automatically configures itself for one of three industry standard data formats:

Format	*Baud rate*	
NMEA-183 (Marine Nav Data Format)	4,800	This is the format for most handheld GPS receivers. Loran must have sentences RMA & RMB. GPS must have sentences RMB & RMC.
Aviation Data Format	9,600	"Output sentence type 1" Required sentences are: A, B, C, D, E, I and L first character identifier byte. Sentence terminator may be either <CR><LF> or <CR> alone.
Northstar (Northstar binary)	1,200	M1 setup select "NO EXTENDED", "NAV ONLY"

Setting GPS-C Fuel Flow Communications Format

GPS-C	Input to GPS; output of EDM
0	No fuel data output
1	Garmin (Shadin Miniflow format)
2	Allied Signal (format B)
3	Arnav/EI fuel data
4	Allied Signal (format C) *

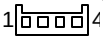
5	(Not used)
6	UPS/Garmin fuel/air data

Option Connector Pin Assignments

P1 (upper) 25-pin connector for 4 or 6 cylinder engines. See installation manual for 7, 8, 9 cylinder instruments

Pin no.	*Pin no.*	*Probe or function*
yel 1	red 2	OIL
yel 3	red 4	IAT
yel 5	red 6	CARB (or CDT)*
yel 14	red 15	OAT
yel 16	red 17	TIT
yel 18	red 19	TIT-2 (2nd TIT)
	gry 12	Remote alarm
	red 13	+ Power
	wht 24	RS-232 data port
	blk 25	Engine ground

MAP-RPM 9-pin connector (EDM-800)



MAP conn. looking at the hole side

Pin no.	*Function/ sensor pin*
grn 1	RPM sig /1
blk 2	RPM grd /2
red 3	RPM pwr /3
red 4	MAP pwr /3
blk 5	MAP grd /1
6	(not used)
7	(not used)
wht 8	MAP sig+ /2
grn 9	MAP sig- /4

Fuel Flow Option 15-pin connector

Pin no.	*Function*
1	RS-232 out
2	RS-232 in
wht 4	FF signal
red 5	FF power
blk 6	FF return
7	Switch com
8	Switch EGT
9	Switch FF
11	Remote FF alarm

* Displays as CRB if IAT probe is not present; displays as CDT is IAT is present.

Navigation Data Ports for GPS Comm

(These ports are completely independent of the EDM serial data output port.)

Navigation Data (output of GPS; input to EDM)

Compatible with RS-232, TTL, RS-423, RS-422 SDA.

Serial data format: 8 data, 1 start, no parity. Baud rates: 1,200, 4,800, or 9,600 depending on the GPS data output format. The EDM

automatically detects the GPS data output format and is independent of the GPS-C setting.

Fuel Data (input to GPS; output of EDM)

RS-232. Serial data format: 8 data, 1 start, no parity. Baud rate: 9,600.

Output format is determined by the GPS-C setting, but may be over-ridden by the GPS navigation format: If the EDM senses Northstar or NMEA-183 navigation data input, there will be no fuel data output.

Reference Reading

You may wish to know more about the effect of engine operations on EGT and CHT. The reading list below provides general overviews as well as original references on topics that may be of interest.

General Overview

These references are readily available to pilots and provide a readable source of general technical information.

- Teledyne Continental Motors, *Engine Operation for Pilots*, from the FAA Accident Prevention Program, FAA-P-8740-13.
- Editors of *Light Plane Maintenance* Magazine, *EGT Systems*, Belvoir Publications Inc., Greenwich, CT 06836. 1989.
- *Lycoming Flyer* Issue 53 dated January 93.

Technical Reviews and Original References

For those pilots who have engineering backgrounds, the references listed below present the original research on the combustion process and represent the source documents for those with technical interests.

- A. Hundere, "Autogas for Avgas," *AOPA Pilot*, October, 1969.
- A. Hundere and J. Bert, "Pre-ignition and Its Deleterious Effects in Aircraft Engines," *SAE Quarterly Transactions*, Vol. 2, No. 4, pages 547-562, October 1948.

Section 13 - Technical Support

JPI offers both e-mail and telephone technical support. Have your model and serial number ready when you call. Call ***JPI*** for a return authorization number before returning any equipment.

J.P. INSTRUMENTS Inc.

3185 B Airway
Costa Mesa, CA 92626
800 345-4574

www.jpinstruments.com

Limited Warranty

J.P. Instruments Inc. (JPI) warrants all parts in your new EDM to be free from defects in material and workmanship under normal use. Our obligation under this warranty is limited to repair or exchange of any defective part of this unit if the part is returned, shipping prepaid, within two years for electronics and one year for probes from the date of original purchase. Installation labor is the responsibility of the aircraft owner. Homebuilt aircraft warranty starts when the aircraft is certified for flight. Replacement parts carry a warranty for the balance of the warranty period.

Under this warranty, JPI is not responsible for any service charges, including removal, installation, nor any other consequential damages. JPI incurs no obligation under this warranty unless a Warranty Registration Certificate describing the warranted product has been completed and mailed to JPI with all information requested.

This warranty is void on any product which has been subject to misuse, accident, damage caused by negligence, damage in transit, handling or modification which, in the opinion of JPI, has altered or repaired the product in any way that effects the reliability or detracts from the performance of the product, or any product whereon the serial number has been altered, defaced, effaced or destroyed.

This warranty is in lieu of all other warranties expressed or implied and other obligations of liability on JPI's part, and it neither assumes nor authorizes any other person to assume for JPI any other liability in connection with the sale of JPI products.

To initiate this warranty, the aircraft owner must submit a completed Data Logging Worksheet to JPI. Upon receiving a completed worksheet, JPI will initiate the warranty from the date of original purchase. Any replacement parts carry a warranty that extends for the balance of the period of the original warranty. For homebuilt aircraft the warranty starts when the aircraft is certificated for flight and noted on the warranty card.

EDM-700 Data Logging Worksheet

A/C N _____ Make _____ Model _____ Engine _____

			EGT / CHT								RPM
Date	Tach	Alt	#1	#2	#3	#4	#5	#6	TIT	DIF	MP

Index

D

E

F

G

H

I

K

L

M

N

O

P

R

S

T

Notes

Normalize View

- Hold LF for three seconds.

Percentage View

- Hold LF for three seconds.

Automatic Scan

1. Tap LF.
2. Tap STEP.

Exclude Parameter in Automatic Scan (except EDM-711)

1. Tap STEP to index to the parameter to exclude.
2. Tap both STEP and LF.
3. See decimal point before parameter name to exclude.

Change Indexing Rate

1. Hold both STEP and LF until the display shows PROGRAM, followed by FUEL?N.
2. Tap STEP and see RATE 4.
3. Tap LF to change the number: 1 through 9 is the pause time during automatic indexing. 0 sets to never index (except EDM-711).
4. Tap STEP until you see END Y, then tap STEP to exit

Mark Data in Memory

- Tap LF twice.

Reset Fuel Used

1. Tap STEP and see USD.
2. Hold both STEP and LF until the display shows .0USD

Transfer Data in Memory

1. Connect Palm Computer to the EDM serial port.
2. Hold both STEP and LF until the display shows PROGRAM, followed by FUEL?N.
3. Tap STEP a few times until you see DUMP?N.
4. Tap LF until you see DUMP NEW or DUMP ALL.
5. On the Palm Computer tap EzPalm, then tap EzCapture.
6. On the EDM tap STEP to transfer. (to abort hold STEP and LF for 5 seconds).
7. On the Palm Computer close the file with today's date.
8. Tap STEP to exit.

Totalize Fuel Used

1. Hold both STEP and LF until the display shows PROGRAM, followed by FUEL?N.
2. Tap STEP a few times until you see ACCUM?N.
3. If you want accumulate the fuel used, tap LF and see ACCUM?Y.
4. Tap STEP until you see END Y and tap STEP once more to exit.

Filled Tanks

In flight, do this first (on power up, skip to step 4):

4. Hold both STEP and LF until the display shows PROGRAM, followed by FUEL?N.
5. Tap LF to see FUEL?Y.
6. Tap STEP
7. See FILL?N. Tap LF to see FILL75*
8. With aux tanks or tabs, tap LF again to see FILL120*
9. Tap STEP to exit.

Added or Removed Fuel

In flight, do this first (on power up, skip to step 4):

1. Hold both STEP and LF until the display shows PROGRAM, followed by FUEL?N.
2. Tap LF to see FUEL?Y.
3. Tap STEP.
4. See FILL?N. Tap LF 2 or 3 times to see FILL+.
5. Tap STEP and see .0GAL.
6. Hold LF to increase or tap LF to decrease the amount of fuel displayed.
7. Tap STEP to exit.

Reset Alarm

- **Temporary reset** (next 10 minutes): tap STEP.
- **Reset for remainder of flight**: hold STEP until the word OFF appears.

Leaning Rich of Peak

1. Pre-lean mixture and wait 1 minute.
2. Tap LF and see LEANR.
3. Lean mixture until you see a column flash and the words LEANEST followed by 1545SET*
4. Hold LF and see 1560PK* or 1560 13.5*, the peak EGT of the first cylinder to peak and fuel flow.
5. Enrich mixture to set desired temperature.

Leaning Lean of Peak

1. Pre-lean mixture and wait 1 minute.
2. Tap LF and see LEANR.
3. Hold both STEP and LF until you see LEANL
4. Lean mixture until inverted columns.
5. Continue leaning until you see a column flash. You will see the temperature below peak of the last cylinder to peak and the fuel flow.
6. Hold LF to see 1560 1.0* to see peak EGT of the first cylinder to peak and the delta fuel flow (GAMI spread).
7. Enrich mixture to set desired temperature.

* Values will vary depending on your individual installation.