Pilot's Guide

Engine Data Management

EDM-900

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(PG EDM-900T.doc)

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Filled Tanks

In flight, do this first (on power up, skip to step 3):

1. Hold both STEP and LF until the display shows *PROGRAM*, followed by *FUEL N*.
2. Tap LF to see *FILL* followed by *FUEL ? N*.
3. Tap LF to see *FILL 75**
4. With aux tanks or tabs, tap LF again to see *FILL 120**
5. 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 2 or 3 times to see *FILL +*.
3. Tap STEP and see *.0 GAL*.
4. Hold LF to increase or tap LF to decrease the amount of fuel displayed.
5. 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 (e.g.,) *1545 135**
4. Hold LF and see *LEANEST* followed by *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 *RICHEST* followed by (e.g.) *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.

Quick Reference Guide

Normalize View

- Hold LF for three seconds.

Percentage View

- Hold LF for three seconds.

Automatic Scan

1. Tap LF.
2. Tap STEP.

Exclude Measurement in Automatic Scan (toggle)

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

Change Indexing Rate

1. Hold both STEP and LF until the display shows *PROGRAM*, followed by *FUEL N*.
2. Tap STEP, 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.
4. Tap STEP until you see *END Y*. then tap STEP to exit

Reset Fuel Used

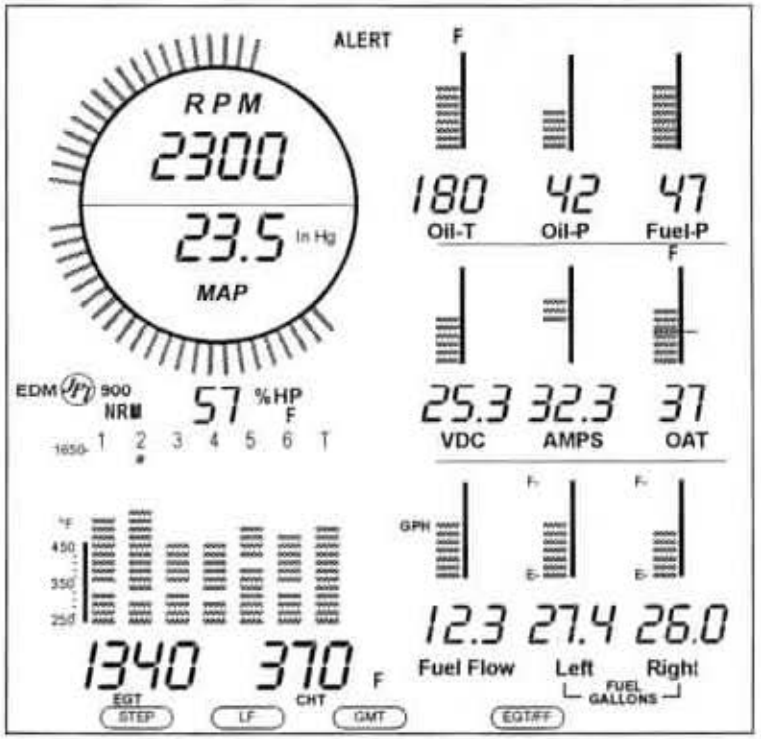
1. Tap STEP and see *USD*.
2. Hold both STEP and LF until the display shows *0 USD*

Transfer Data in Memory

1. Connect Palm Computer to the EDM-900 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-900 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 *TRIP? N*.
3. If you want accumulate the fuel used, tap LF and see *TRIP? Y*.
4. Tap STEP until you see *END Y* and tap STEP once more to exit.



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Section 1 - 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 functions. Detailed descriptions of all operations appear later in this Pilot's Guide.

To change the factory settings of your EDM-900 for first time use, see Section 9 - First Time Setup and Customization on page 35. 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 *tap* is used to denote pressing a button *momentarily*. The word *hold* is used to denote pressing and *holding a button for five seconds or longer*.

Fueling the Aircraft

1. At power up you will see *FILL? N*. Tap the LF button 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 120* (or whatever the capacity of your tanks-plus-auxiliary or full tanks are).
3. Tap the STEP button to accept the displayed value and exit.

See page 27 for a more detailed description.

The EGT/FF button selects which measurements are displayed in the lower left Scanner® section of the display screen: EGT (temperatures, voltage), ALL measurements, or FF (fuel flow related).

Display Screen

The display screen is arranged into three sections. The top left is the *RPM* and *MAP* section. The bottom left is the *Scanner* section. And the right side is the *Bar Graphs* section.

RPM and MAP Section Display

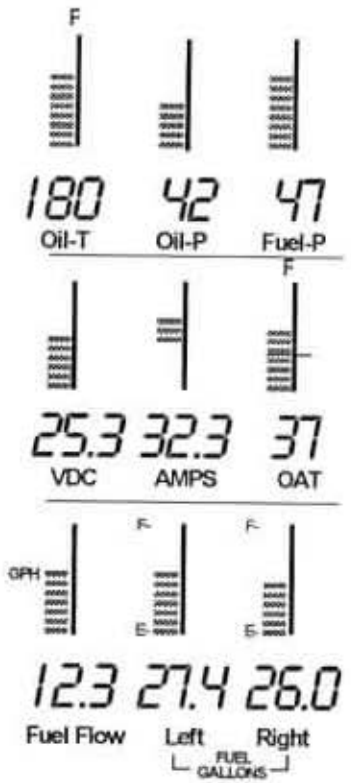
The upper semicircular bar graph shows the RPM (Revolutions per Minute) and the lower semicircular bar graph shows the MAP (Manifold Pressure). These are shown both graphically and digitally. Power settings entering red line are displayed by flashing the ALERT icon and flashing a message on the bottom left scanner section of the screen.

Percent horsepower is displayed digitally underneath the MAP arc.

Bar Graphs Section Display

The Bar Graphs section contains nine dedicated 12 segment bar graphs with digital display. Full scale is red line. The default displays are (left to right, top to bottom):

- Oil temperature
- Oil pressure
- Fuel pressure
- Bus voltage
- Amps load or charge/discharge
- Outside air temperature (or owner selectable *)
- Fuel flow, units per hour
- Left fuel quantity (default is USD or owner selectable *)
- Right fuel quantity (default is CLD or owner selectable *)



* A interchangeable screen overlay is provided with no labels for where the OAT and left and right fuel levels are. These 3 graphs can be customized. See Customizing the Bar Graph Display on page 49.

N

O

P

R

Basic Scanner Operation

The EDM-900 Scanner section is on the lower left side of the screen. It will go into Automatic scan mode a few minutes 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-900 will display the following measurements in the Scanner section—in the order top to bottom—depending on the options installed on your instrument and the setting of the *EGT ALL FF* setting.

EGT	ALL	FF	Display	Discription
x	x		1340 376	EGT left, CHT right
x	x		1370 TIT	Turbine Inlet Temperature
x	x		-30 CLD	Rate of shock cooling
x	x		80 DIF	Difference between hottest and coldest EGT
x	x		300 COT	Compressor discharge option
x	x		125 IAT	Induction air option
x	x		132 C-I	Compressor minus induction difference
x	x		-22 CRB	Carburetor option
	x	x	37.2 REM	Fuel remaining
	x	x	25.9 REQ	Fuel required to wpt (GPS connected)
	x	x	11.3 RES	Fuel reserve at wpt (GPS connected)
	x	x	13.0 MPG	Miles per gallon (GPS connected)
	x	x	02:45 H:M	Fuel time to empty
	x	x	38 USD	Fuel used since fill or reset

EGT

EGT is shown on the first four or six Scanner 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 the TIT alarm red line (default is 825°F) and the top of the range represents alarm 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—cylinder 2 in the example.

There are two views: Normalize view levels the EGT columns and increases the sensitivity of the Scanner bar graph columns to 10° per segment. To enter the Normalize view, hold the LeanFind button for three seconds. The NRM icon will be displayed above the Scanner section. Hold the LeanFind button for three seconds to return to the Percentage view. See page 19 for a more detailed description.

CHT

The Cylinder Head Temperature—CHT—is represented by a missing segment in the Scanner bar graph column. If the EGT is too low for there to be a missing segment, the CHT is represented by a lone segment in that column. The scale is shown to the left side of the columns. 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.

TIT display

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

LeanFind

Simply pre-lean, tap the LF button and begin leaning. The EDM-900 will assist you in finding the first cylinder to peak. See page 10 for a more detailed description of leaning.

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 30 to 60 seconds.
4. Tap the LF button.
5. Lean the mixture aggressively—approx. 10°/second *without stopping*—while observing the display. When there is a 15°F rise in EGT, LeanFind mode becomes active, indicated by the dot flashing above the hottest EGT column.

E

F

Index

6. Stop leaning when a column begins flashing. You will see *LEANEST* for two seconds, followed by—for example— *1520 13.8*. The left number is the current temperature of the first EGT to peak and the right number is the current fuel flow.
7. If you hold LF, peak EGT will be displayed while the LF button is held down. Release the button for the next step.
8. Slowly enrich the mixture. The temperature will increase, returning to peak. Stop enriching at the desired EGT.

Section 2 - Interpreting Data

Operation for each Phase of Flight

Engine Run-Up (you can add this to your run-up checklist.)

Suggested setup:

- Set engine to runup RPM
- *Normalize* view
- *Manual mode*

Verify:

- uniform rise of about 50°F in all EGTs in single magneto operation.
- uniform rise of EGTs with application of the mixture control.

Be alert for:

- unusually low voltage (less than nominal battery voltage)
- cold OIL and normal oil pressure
- abnormally high CHT
- large drop in EGT on one cylinder in single magneto operation—may be fouled spark plug.

Take-Off, Climb, and Full Throttle Operations

Suggested setup:

- Percentage view
- Automatic mode

Verify:

- EGTs and CHTs consistent with past climbs. EGTs should be in the 1100 to 1300°F range (100° to 300°F cooler than cruise) due to fuel cooling.

Be alert for:

- high EGT in one cylinder, 300°F above the others may indicate plugged injector or leaking manifold gasket on a carbureted engine.
- If all EGT columns go off scale to the top of the column, be sure you are not in Normalize view, as indicated by the symbol NRM to the left of the horsepower display.

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:

- Normalize view
- Automatic mode

Be alert for:

- uneven EGTs (injected engines). Make fine adjustments to throttle, then RPM, then mixture to level the display columns.
- abnormal patterns of EGTs and CHT. (see "Engine Diagnosis Chart" on page 8).

Descent

Suggested setup:

- Percentage view
- Manual mode

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.

Limited Warranty

J.P. Instruments Inc. (JPI) warrants all parts in your new EDM-900 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.

Output format is determined by the GPS-C setting, but may be over-ridden by the GPS navigation format: If the EDM-900 senses Northstar or NMEA-183 navigation data input, there will be no fuel data output.

Section 12 - 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.

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800 345-4574 www.jpinstruments.com
jpitech@pacbell.net

Typical Normal Measurements

The following chart lists typical *normal* measurement values that you will observe for most general aircraft engines. Your particular engine's ranges may not fall within these values.

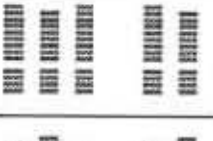
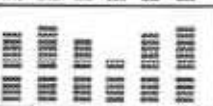
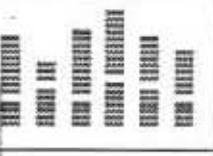
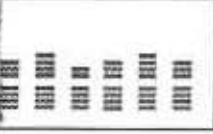
Measurement	*Normal range*	*Comments*
EGTs in Cruise	1350°F	• under 200 HP engines
	1550°F	• high performance engines
		• (EGT should drop 200°F when full throttle is applied)
EGT span (DIF)	70 to 90°F	• fuel injected engines
	120 to 150°F	• carbureted engines
TIT	1600°F average	• 100° higher than EGT
CHTs	350°F (OAT 60°F)	• normally aspirated engines
	410°F	• Turbocharged engines
CHT span	50 to 70°F	• 100° with gasket probes
OIL T	200°F	• oil cooler thermostat opens at 180°F
OIL P	30 to 60 psi	• varies with aircraft type
FUEL P	4 to 18 psi	• varies with aircraft type
Shock cooling*	-40°/minute	• tightly cowled engines
	-55°/minute	• Bonanza
	-200°/minute	• helicopter

* Maintain a cooling rate magnitude 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).

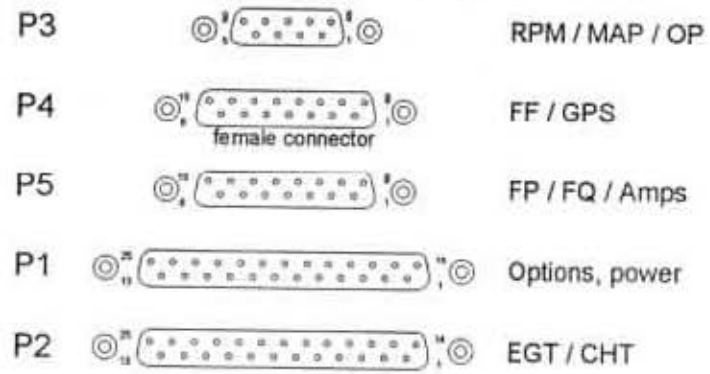
If one CHT is reading 20° to 50° above or below the others, this may be due to that cylinder having a spark plug gasket probe instead of a bayonet probe. This is necessary because the aircraft's factory original CHT probe is occupying the socket in the cylinder head rather than the EDM. This is normal. 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.

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.
	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.	Check for change in manifold pressure.

View facing rear of instrument



Interface connections to selected GPS models

EDM-900	P4 conn Pin 1	P4 conn Pin 2
Arnav 5000	Pin 4	Pin 5
Garmin 195	(nc)	Pin 4
Garmin 430 / 430	Pin 57	Pin 56
Northstar M3P	(nc)	Pin 6 (leave pin 11 open)
UPS GX50 / 60	Pin 4	Pin 5

Navigation Data Ports for GPS Comm

(These ports are completely independent of the EDM-900 serial data output port.)

Navigation Data (output from 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-900 automatically detects the GPS data output format and is independent of the GPS-C setting.

Fuel Data (input to GPS; output from EDM)

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

Connector Pin Assignments

P1 Options 25-pin connector

Pin no.	*Pin no.*	*Probe or function*
yel 1	red 2	OIL
yel 3	red 4	IND
yel 5	red 6	CARB*
yel 14	red 15	OAT
yel 16	red 17	TIT-1
yel 18	red 19	TIT-2
	gry 12	Remote alert T,V
	red 13	+ Power
	wht 11	data in
	wht 24	data out
	blk 25	Engine ground

P3 MAP-RPM 9-pin connector

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	OIL P sig
7	OIL P grd
wht 8	MAP sig+ /2
grn 9	MAP sig- /4

P4 Fuel Flow 15-pin connector

Pin no.	*Function*
1	out to GPS
2	in from GPS
3	
wht 4	FF signal
red 5	FF power
blk 6	FF ground
11	remote FF alarm
wht 12	FF2 signal
red 13	FF2 power
14	AMPS 2 +
15	AMPS 2 -

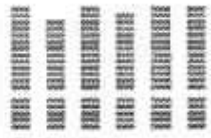
*Displays as CRB if IAT probe is not present; displays as CDT is IAT if present.

P2 EGT CHT 25-pin connector

Pin no.	*Pin no.*	*Probe or function*
yel 1	red 2	CHT 1
yel 3	red 4	CHT 2
yel 5	red 6	CHT 3
yel 7	red 8	CHT 4
yel 9	red 10	CHT 5
yel 11	red 12	CHT 6
yel 14	red 15	EGT 1
yel 16	red 17	EGT 2
yel 18	red 19	EGT 3
yel 20	red 21	EGT 4
yel 22	red 23	EGT 5
yel 24	red 25	EGT 6

P5 FP/FQ/AMP 15-pin connector

Pin no.	*Function*
1	FQ 1 (res)
2	FQ 2 (res)
3	FQ grd
4	FP Sig+
5	FP Sig-
6	FP pwr
7	FP grd
8	
9	FQ1 sig (cap)
10	FQ2 sig (cap)
11	FQ1 pwr (cap)
12	FQ2 pwr (cap)
13	Volts 2 sense
14	AMPS +
15	AMPS -

Display	*Symptom*	*Probable Cause*	*Recommended Action*
	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
(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.

Display	*Symptom*	*Probable Cause*	*Recommended Action*
	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 3 - LeanFind

JPI's EDM-900 provides 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. 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" Method

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.

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.

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-900 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"

As your built-in flight engineer, the EDM-900 is constantly "red line" checking: all critical measurements 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-900 it is now possible to have substantially more diagnostic information available to you in a timely and usable manner.

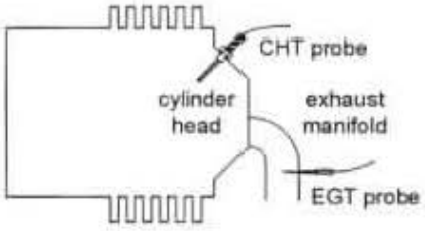
The real-time serial data port—a standard feature—permits you to externally record scanned measurements in real-time using a user-supplied Palm™ handheld or laptop PC. The built-in data recording will continue to operate.

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

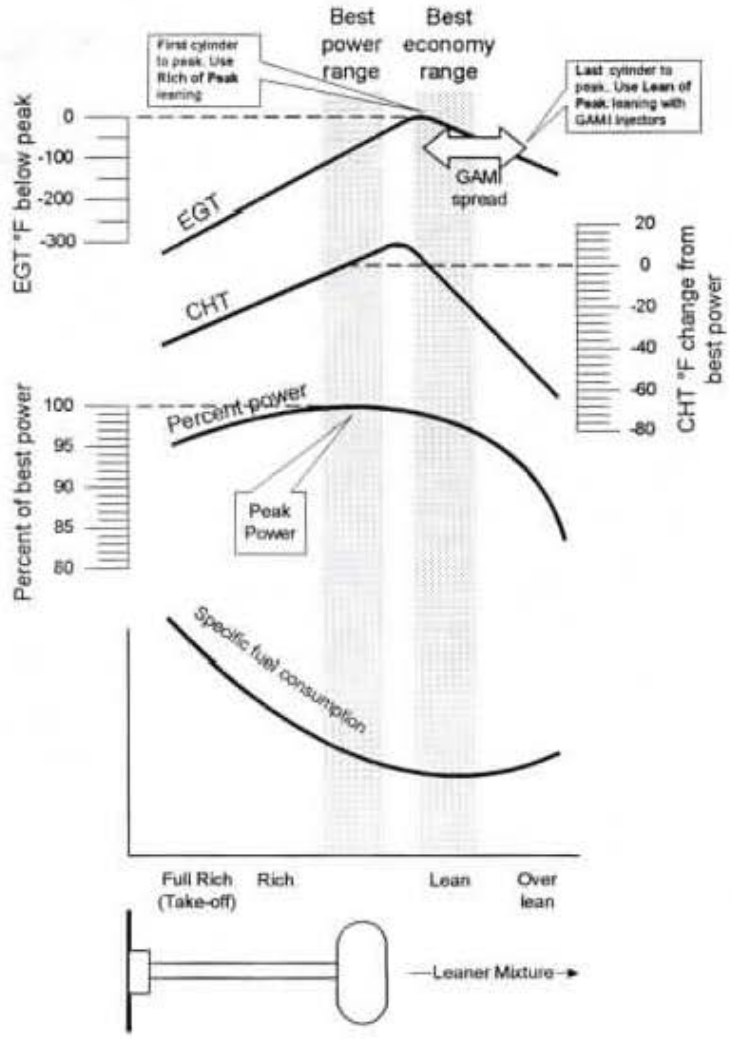
Temperature information processed by the EDM-900 is captured by **fast response**, grounded ***JPI*** temperature probes, that accurately measure the small temperature changes—as small as 1°F—that occur during mixture adjustment.



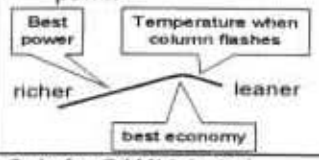
Temperature and Mixture

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).



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: ____ °	1490 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, after starting Leanfind, to change to "lean of peak" method, hold both STEP and LF simultaneously.)
5	Lean the mixture aggressively—approximately 10°/second *without pausing*—while observing the display. When there is a 15°F rise in EGT, LeanFind mode becomes active.	1520 13.8	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:	1545 12.4	Flashing cylinder dot & column indicates leanest cylinder. 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.	1560 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	1560 13.8 1560 13.8 1460 14.2	• 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. See page 15 for Lean of Peak.	-15 12.3	Only for GAMI injected engines. When each cylinder reaches peak, the cylinder number will begin flashing.

GPS Interface Diagnostics

Measurements *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 measurements *REQ, RES, & MPG* are missing.	Communications are received by EDM-900 and the Auto-Protocol setup is in process. Verify correct output format setup in GPS receiver; check GPS connections.
NO-SIG message and measurements *REQ, RES, & MPG* are missing.	GPS receiver has insufficient signal for valid data.
NO-WPT message and measurements *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.

History Display

Upon power up you can see the history of extreme values during previous flight. To do this, hold the STEP button during initial power up of the EDM-900. The bar graph section of the display will show the extreme value of each measurement for a minute or until you tap the STEP button. History cannot be displayed other than at power up. It will remain in the display until RPM exceeds Hobbs On RPM value or the EGT is above 500°F.

Section 11 - Appendices

Features and Benefits

The EDM-900 Engine Data Management system is the most advanced and accurate piston engine-monitoring instrument on the market. Using the latest microprocessor technology, the EDM-900 will monitor up to twenty-four critical measurements in your engine, four times a second, **with a linearized thermocouple accuracy of better than 0.1 percent or 2 F°.**

or during flight will be deleted from the sequence, producing a missing column or blank digital data.

Diagnostic Messages

Startup and Operational Diagnostics

The following displays indicate a malfunction in the probes, wiring or instrument:

ENG ON	Indicates that the engine is running while trying to calibrate the MAP. Turn off engine and try again.
MEM ON	Not an error. Memory on. Recording is enabled when EGT exceeds 500°F or the RPM exceeds the Hobbs RPM enable value.
HOBS ON	Not an error. Hobbs on. RPM exceeds the Hobbs RPM enable value.
TEST ING	LF tapped during self test. Tap LF again later.
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
OPEN PRB	Open probe. Wiring to probe is open circuit. Check wiring and crimps. Swap probes to troubleshoot.
BAD-PRB	Bad probe. Erratic reading. May be poor electrical connection. Swap probes to troubleshoot.
HI XX	High. Measurement over range.
LO XX	Low. Measurement under range.
CAL ERR	Calibration error. Return unit to factory.
DSP XXX	Internal communication error. Return unit to factory.
COMM ERR	Internal communication error. Return unit to factory.
NO 15MV	Calibration error. Return unit to factory.
NO 50MV	Calibration error. Return unit to factory.
NO 2.5V	Calibration error. Return unit to factory.

***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.

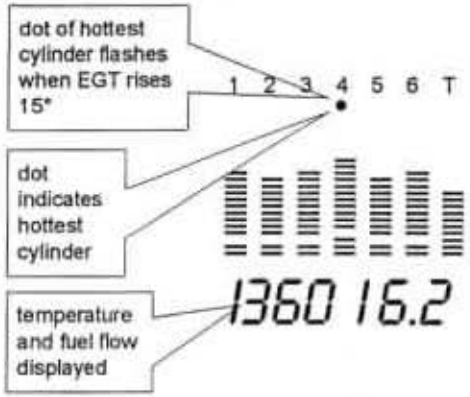
It is your responsibility to know your aircraft's limitations.

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-900 to begin looking for a 15° rise in EGT for any cylinder. Begin leaning the mixture aggressively *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.**

You will see numerical fuel flow rate during the leaning process on the right side of the Scanner 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-900 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 smoothly *without stopping*. 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-900 will determine this automatically. *Notice that this cylinder is not necessarily the hottest.*

The EDM-900 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 current fuel flow rate will be displayed on the right side of the digital display. 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-900 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 tap the LF button, the digital display will toggle to show the EGT spread (delta EGT).

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

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 columns, too high or low	You forgot that you set the EDM-900 in the Normalize view and later observe off-scale EGT column 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, only RPM displayed	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 Program 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-900 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-900 tests internal components, calibration and integrity of the probes.

During flight, probes are constantly checked for inconsistent or intermittent signals. A faulty channel or probe encountered during start-up

Programming Alarm Limits

Factory Set Default Limits—Non-Primary

JPI conservatively sets the default alarm limits below Lycoming and Continental recommendations.

Measurement	*Default Low Limit*	*Default High Limit*	*Alarm Example*
CHT		450°F* 230°C	465 CHT
OIL T	90°F 32°C	230°F* 110°C	280 OIL T
OIL P	15 psi	100 psi	120 OIL P
TIT		1650°F* 900°C	1720 TIT
CLD		-60°F/min. - 33°C/min.	-65 CLD
EGT DIF		500°F 280°C	525 DIF
BUS, 24 V	24V	36V	22.4 BUS
BUS, 12 V	12V	18V	11.6 BUS
AMPS			40 AMP
MAP		40 inHg	46.3 MAP
LO FUEL	45 min		00.20 H.M
LO TIME	10 gal. kg, ltr, lbs		7.2 REM
FP	15 psi	60 psi	7.2 FP
RPM RL		2700	2500
REM		10 gal	10 REM
H . M		45 minutes	45 H.M

If you change the display between Fahrenheit and Celsius, alarm limits will automatically change also. The bar graph scale will remain the same.

When an alarm is displayed, tapping the STEP button will temporarily ignore that alarm from the sequence for the next ten minutes. Or holding the STEP button until the word OFF appears will ignore that alarm for the remainder of the flight.

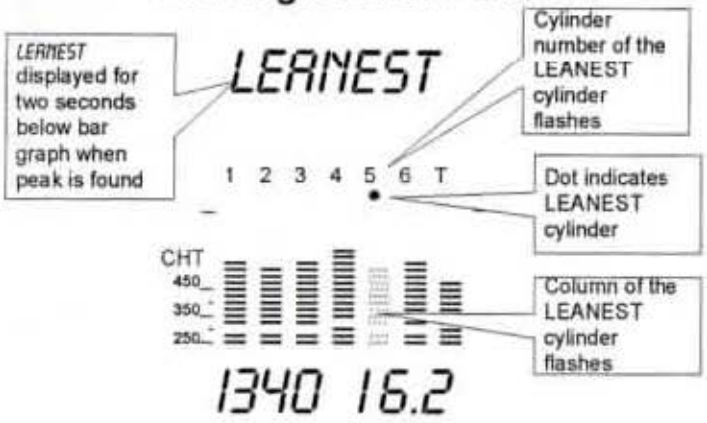
Section 10 - Troubleshooting the EDM

Common Misapplications

Some of the more common misapplications made by first-time EDM-900 users are presented here in an attempt to help you avoid similar problems.

Problem	*Situation*	*Correction*

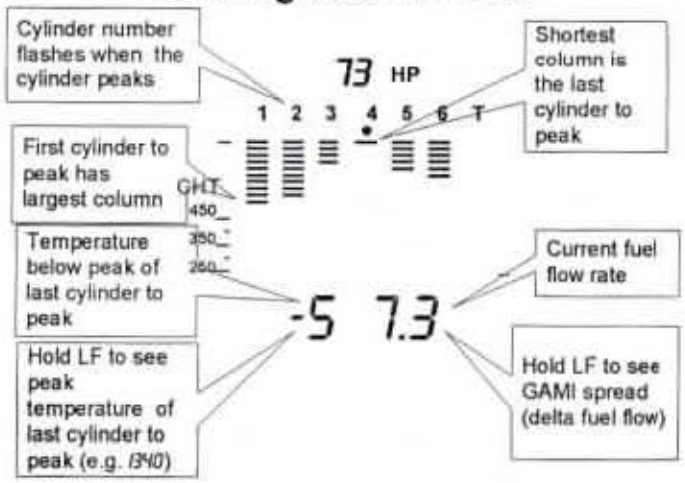
Leaning Rich of Peak



Lean Find Mode—"Lean of Peak" Method, 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. Upon power up, the EDM-900 always defaults to Rich of Peak mode.

Leaning Lean of Peak



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** Scanner bar graph column; 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.

If you tap STEP, scanning will resume. Tapping LF will return to the inverted bar graph, which can be used for fine tuning. To begin the LeanFind procedure anew, tap LF a second time.

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 may notice that in some cases the TIT reads **100°F hotter than the hottest EGT**.

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

Section 4 - Alarms

The EDM-900 has programmable alarms. When a measurement falls outside of its normal limits, the ALERT icon will flash and 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

	00000→ZZZZZ (2nd char flashes, etc.)	LF the character, STEP moves to the next character. To save, hold both STEP and LF.

TIME MENU

Sets the time and date.

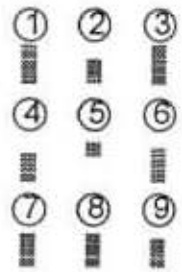
STEP	LF	
DATE	MONTH 1→12	Month
	DAY 1→31	Day
	YEAR 01→99	Year
TIME	HOUR 0→23	Time of day, hours, 24-hour time
	MIN 0→59	

ELEC MENU

Sets the amps and battery measurement parameters.

STEP	LF	
BUS2 PM	BUS2 PM ⇔ BUS2 PY	Selects second bus voltage measurement is installed.
AMP2 PM	AMP2 PM ⇔ AMP2 PY	Selects second amps measurement is installed.
AMP1 PL	AMP1 PL ⇔ AMP1 PC	Selects amps 1 measurement is load (L) or charge/discharge (C)
AMP 2 PL	AMP 2 PL ⇔ AMP 2 PC	Selects amps 2 measurement is load (L) or charge/discharge (C)

Customizing the Bar Graph Display



The bar graph display has 9 stations, 3 of which can be reconfigured to display any of the measurements that can appear in the scanner section. Stations 6, 8 and 9 can be reconfigured. Factory defaults are: station 6 OAT, station 8 USD and station 9 CLD. JPI provides a configuration program that runs on an MSWindows PC, called EzConfig. Follow the instructions in the EzConfig documentation to change these assignments.

Proceed to the next step below to enter the fuel level calibration points.

Entering the Fuel Level Calibration Points

This procedure is used to enter the fuel level calibration points (2 to 5 points for each tank) into the EDM-900. **This procedure assumes that you have determined the calibration points from the procedure described in the *Determining Calibration Points* section, above.**

Each fuel level calibration point is a seven digit number: the left four digits are the internal EDM-900 calibration constant, and the right three digits are the corresponding fuel level in fuel units (gallons, kilograms, liters, or pounds).

In the *FLVL MENU*, first select the number of fuel calibration points: 2 through 5, using LF, then tap STEP. You will see the first point as *0000.0.0* or some other number if calibration points have been previously entered. To the right of this display you will see the point number (*L1* thru *L5*, *R1* thru *R5*). To change each fuel level calibration point, hold both STEP and LF for five seconds until the first digit flashes. Tap or hold LF to set the first digit. Tap STEP to advance to the next digit (hold STEP to go back to the previous digit). Hold both STEP and LF when you are finished entering this fuel level calibration point. The digit will stop flashing.

Tap STEP to advance to the next fuel level calibration point. Repeat the steps in the preceding paragraph for each fuel level calibration point. For 2 point calibration there will be a total of 4 constants, up to a 5 point calibration of 10 constants.

Tap STEP to exit the procedure.

ID MENU

Sets the aircraft ID, registrations number, or owner into the EDM for initial startup and for use in reports.

	00000→ZZZZZ (1st char flashes)	Current aircraft ID. To change aircraft ID, hold both STEP and LF until the first character flashes.

ALERT icon and the display will stop flashing. The pressure alarms become armed when any EGT exceeds 500°F or the RPM exceeds the Hobbs RPM enable value.

The DIF measurement is the difference between the hottest and coolest EGTs. DIF—or span—is the important measurement—and associated alarm—for monitoring the EGTs. See "Factory Set Default Limits" on page 50 for a list of the alarms and their factory default settings.

To disable alarm for 10 minutes: when an alarm is displayed, *tapping* the STEP button will temporarily disable the alarm digital indication for the next ten minutes.

To disable alarm for the remainder of the flight: 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, or until the unit is turned off and on again. See "Alarm Limits" on page 49.

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
	O-P	Low oil pressure
	O-P	High oil pressure
	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-900 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.**

Section 5 - Displays and Controls

The EDM-900 monitors engine temperatures and voltages, assists in adjusting the fuel/air mixture, and helps diagnose engine malfunctions. There are multiple components of the user interface:

- RPM and MAP display in the upper left corner of the display
- Scanner® analog display including cylinder number and index dot in the lower left corner of the display
- Scanner digital display for numeric readouts and messages at the bottom left
- Bar graph displays on the right half of the display
- Four front panel operating buttons below the bottom of the display.

RPM and MAP Displays

The upper left side of the display shows RPM above the MAP. The arcs

Turn OFF the aircraft master switch	
	Empty left and right tanks and fill each to the **unusable** level (**first fuel level calibration point**)
Hold EGT/FF button while turning ON master switch, see *FUEL DSP*	
	With the left and right tanks empty, **write down** the displayed calibration values (L1 is on top, R1 is on the bottom). This is the empty (0) fuel level.
Turn OFF the aircraft master switch	
	Add fuel to the left and right tanks and bring it up to the **second fuel level calibration point** level (or full for a two point calibration)
Hold EGT/FF button while turning ON master switch, see *FUEL DSP*	
	With the left and right tanks at the second calibration point, **write down** the displayed calibration values (L2 is on top, R2 is on the bottom) **and** the amount of fuel now in each tank. For a 2 point calibration, stop here.
Turn OFF the aircraft master switch	
	Add fuel to the left and right tanks and bring it up to the **third fuel level calibration point** level (or full for a three point calibration)
Hold EGT/FF button while turning ON master switch, see *FUEL DSP*	
	With the left and right tanks at the third calibration point, **write down** the displayed calibration values (L3 is on top, R3 is on the bottom) **and** the amount of fuel now in each tank. For a 3 point calibration, stop here.
Turn OFF the aircraft master switch	
	Add fuel to the left and right tanks and bring it up to the **fourth fuel level calibration point** level (or full for a four point calibration)
Hold EGT/FF button while turning ON master switch, see *FUEL DSP*	
	With the left and right tanks at the fourth calibration point, **write down** the displayed calibration values (L4 is on top, R4 is on the bottom) **and** the amount of fuel now in each tank. For a 4 point calibration, stop here.
Turn OFF the aircraft master switch	
	Add fuel to the left and right tanks and bring it up to full for the **fifth fuel level point calibration point level.**
Hold EGT/FF button while turning ON master switch, see *FUEL DSP*	
	With the left and right tanks at the fifth calibration point, **write down** the displayed calibration values (L5 is on top, R5 is on the bottom) **and** the amount of fuel now in each tank (fuel tanks).

L4	[ ][ ][ ][ ]	[ ][ ].[ ]	R4	[ ][ ][ ][ ]	[ ][ ].[ ]
L5	[ ][ ][ ][ ]	[ ][ ].[ ]	R5	[ ][ ][ ][ ]	[ ][ ].[ ]

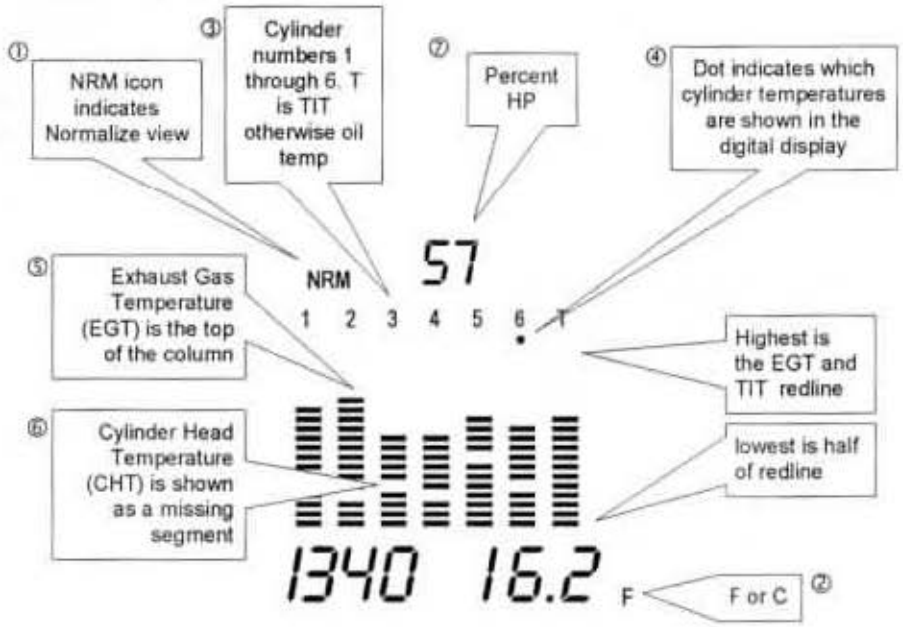
* unusable fuel level is entered as 00.0

You may choose to do this procedure totally on one tank, then the other tank, rather than moving the fuel hose back and forth between the left and right tanks.

NEVER add or remove fuel from the aircraft when the master switch is turned on.

represent the analog values. Below the arcs is shown the percent horsepower.

Scanner Displays



Scanner Analog Display

The lower left side of the display is the Scanner with %HP above it.

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

①Normalize View Indicator

- Percentage view (when the NRM icon is *not* lighted): 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 the NRM icon is lighted): 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 three seconds until the NRM icon toggles. 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 measurement sequence. The scale of 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 during cruise. When 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. Select the Percentage view before adding or reducing power. Always select Percentage View when beginning your descent.

⌀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.

The bar graph scale remains the same. To change the display of engine temperatures see "Factory Program Submenus" on page 37.

TYP

Type selects what the last two graphs in the bar graphs section display. N will leave them blank, F will display fuel flow derived REM and USD, and L will display fuel levels, left and right.

Determining Calibration Points

First determine how many fuel level calibration points you wish to use. If your tanks or fuel senders are non-linear, use more points. Otherwise use just 2. Select the row in the table below to determine how to calibrate your fuel level indicator.

Number of number of fuel level calibration points	L1 & R1	L2 & R2	L3 & R3	L4 & R4	L5 & R5
2	unusable	Full	Not used	Not used	Not used
3	unusable	½ tank	Full	Not used	Not used
4	unusable	1/3 tank	2/3 tank	Full	Not used
5	unusable	¼ tank	½ tank	¾ Tank	Full

Refer to FAR §23.959 to determine how to establish the unusable fuel level.

The following is the procedure to initially calibrate your fuel senders. You should only have to do this once. You will determine the 2 to 5 fuel level calibration points for each tank and write them in the chart below. These values will be entered using the procedure, *Entering the Fuel Level Calibration Points*, in the next subsection.

Left fuel level calibration point			Right fuel level calibration point		
	Left Cal	Left Fuel		Right Cal	Right Fuel
L1	[ ][ ][ ][ ]	[0][0].[0]*	R1	[ ][ ][ ][ ]	[0][0].[0]*
L2	[ ][ ][ ][ ]	[ ][ ].[ ]	R2	[ ][ ][ ][ ]	[ ][ ].[ ]
L3	[ ][ ][ ][ ]	[ ][ ].[ ]	R3	[ ][ ][ ][ ]	[ ][ ].[ ]

A. Easy calibration: set the EDM-900 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	26.0	26.2	26.4	26.5	26.7	26.8	26.9	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.

Tap the STEP button to proceed to the next item.

FLVL MENU

Use this to initially calibrate the fuel level senders. The JPI EzFuel program can be used to simplify this procedure. Visit www.jpinstruments.com to download.

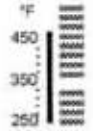
STEP	LF	
LVL TYP	TYP PN → TYP PF→ TYP PL	N – none, F – fuel flow REM and USD, L – Fuel level, proceeds to next step.
FUEL LVL	PTS? 2 → PTS? 5	Number of fuel level calibration points from 2 to 5.
0000 000 L1		See *Entering the Fuel Level Calibration Points*, page 48 below →

②④Cylinder Numbers and Dot Index

A row of numbers 1 through 6 are the column labels for the analog display. The 1 through 6 are the cylinder numbers. If the TIT function is installed, it will be displayed in the last column under the letter T. A round dot under the numbers 1 through 6 indicates that particular column is shown numerically in the EGT and CHT digital display.

⑤⑥ Scanner Bar Graph EGT and CHT

Each bar in the Scanner bar graph is composed of a column 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 and TIT 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 250°F at the bottom. In the example shown here, the CHT is 350°F. If the EGT Scanner bar column is lower than the missing CHT segment, then the CHT will be indicated by a single isolated lighted segment.

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

⑦Percent HP

Displays percent of rated HP.

Scanner Digital Display

Beneath the Scanner bar graph is the alphanumeric display.

EGT and CHT

When the index dot 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).

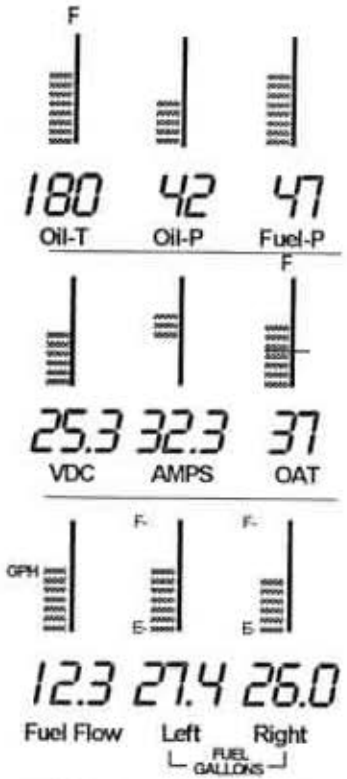
Display Dimming

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

Bar Graph Displays

There are nine bar graphs shown on the right side of the display. The default measurements displayed are (left to right, top to bottom):

- Oil temperature,
- Oil pressure,
- Fuel pressure,
- Bus voltage,
- Amps load or charge/discharge,
- OAT *,
- Fuel flow,
- Left tank fuel level *, and
- Right tank fuel level *.



* A interchangeable screen overlay is provided with no labels for where the OAT and left and right fuel levels are. These 3 graphs can be customized. See Customizing the Bar Graph Display on page 49.

The top of the bar is redline and the bottom of the bar is zero for O-T, O-P, F-P, amps load. For amps charge/discharge the center of the bar is zero and the top and bottom is maximum charge and discharge, respectively, with discharge flashing. For volts the top of the bar is high redline and the bottom of the bar is low

13. Tap STEP repeatedly until you see *END PY*, then Tap STEP once more to exit the factory setup mode.

RPM MENU

Sets the number of cylinders for the RPM sensor and the Hobbs enable RPM.

STEP	LF	
RF= 6	*RF= 4 → 12*	RPM Factor = number of pulses per revolution
HOBS ON	*RPM 800 → 1500*	Minimum RPM to enable to Hobbs counter

RPM Factor (RF)

Set the RPM Factor, *RF = 4* or *6*, depending on your engine. Exceptions:

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

RECD MENU

Sets the data recording time interval.

STEP	LF	
RATE	*RATE 2→510*	Record time interval, in seconds

MAP MENU

Sets the manifold pressure calibration (an sets the oil pressure and fuel pressure zero points.

STEP	LF	
MAP	*MAP 20→32*	Manifold pressure calibration

Do this one time and only if the MAP on your manifold pressure gauge doesn't match the MAP shown on the EDM-900

You **must** do this on the ground with the engine turned **off**.

Use **one** of the following two methods to calibrate the MAP.

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, change it by only half of the amount calculated above, and record the measurements here:

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

Programming the K factor

This procedure is different than for setting other parameters.

1. If you haven't already done so, start the Pilot Program procedure, by simultaneously hold the STEP and LF buttons for five seconds. You will see the word *PROGRAM*, followed by *FUEL N*.
2. Again, simultaneously hold the STEP and LF buttons for five seconds. You will the word *FACTORY*, followed by *RESET?N*.
3. Tap STEP button to advance to the *FFLW? N* screen.
4. Tap LF to enter the fuel flow submenu.
5. Tap STEP repeatedly until you see *KF = 29.90* (for example)
6. Hold both the STEP and LF buttons simultaneously for five seconds. The first digit flashes (shown here as a larger digit only for illustration purposes): *29.90*
7. Tap or hold the LF button to change flashing digit: *19.90*
8. Tap STEP button for next digit (hold STEP for previous digit): *19.90*
9. Tap or hold the LF button to change flashing digit: *18.90*
10. Tap STEP button for next digit (hold STEP for previous digit): *18.90*
11. Repeat items 9 and 10 for the remaining two digits.
12. Hold STEP and LF buttons simultaneously for five seconds to exit the K factor parameter setup.

redline. The top of the bar for FLW is 32 GPH. The white horizontal line indicates freezing for OAT (32° F or 0° C).

The ranges and alarm values are user settable and are described later in section Section 9 - First Time Setup and Customization on page 35.

Buttons, Front Panel

Four operating buttons control all functions of the EDM.

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

STEP Button

- 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 measurement in the sequence. Holding the STEP button will continuously sequence in reverse order.
- In the LeanFind mode *tapping* the STEP button will terminate the LeanFind mode and change to the Automatic mode.
- In the Program mode *tapping* the STEP button will advance to the next item.

LF (NRM) Button

- 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 (NRM) views.
- In the LF mode *holding* the LF button after peak EGT is found will display peak EGT.

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.

If the K factor is increased, the indicated fuel flow will decrease, and vice-versa. *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-900 calculation of the fuel used 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-900 calculated 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:

DIFF N	DIFF N⇔DIFF Y	Set whether a second differential fuel flow transducer is installed for fuel return fuel systems.
KFR29.00	KFR00.10 → 99.99	Y—Yes—sets K factor for second transducer
FDSP 0	FDSP 0 → 3	Sets what is shown on the bottom right two bar graphs. 0 will show the values selected from the Easy Config program, 1 will select used and shock cooling and 2 will show right and left fuel quantities

Fuel Capacity

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, leave *AUX* set to 0. Otherwise 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-900 does not differentiate fuel flow between the main and auxiliary tanks; it tracks only total fuel in the aircraft.

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

STEP and LF Buttons

- Holding both the STEP and LF buttons simultaneously for five seconds will enter the pilot programming and other modes.
- 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 measurement from the Automatic mode (except USED). No measurements are excluded from the Manual mode.

EGT-FF Button

In the Automatic or Manual modes, this button affects the Scanner display and selects what measurements are viewed during scan. See page 3 for detailed description of which measurements are shown.

- In the **FF** selection only fuel flow measurements are displayed.
- In the **ALL** selection, all installed measurements are displayed.
- In the **EGT** selection only the installed temperature (and battery voltage) measurements are displayed.

Any alarm warning will appear regardless of the scan select setting. Selected scan measurements are displayed in the digital display in either the Automatic or Manual modes.

Modes

The EDM-900 has four different operating modes: *Automatic*, *Manual*, *Program* and *LeanFind*. When you first turn on the power the EDM-900 starts in the Manual mode, but will enter the Automatic mode after a few minutes. 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 measurements, use the Manual mode. In both the Automatic and Manual modes the analog display shows a Scanner bar graph of EGT and CHT for each cylinder and the TIT.

Automatic Mode

Just tap the LF button, then tap the STEP button. In the Automatic mode the EDM-900 displays the measurement sequence at a user-selected rate.

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

Included: 1540 TIT Excluded: 1540 .TIT

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

- Every time you turn on the EDM, all measurements are reset to be *included*.
- *All* installed measurements are always displayed in the Manual mode. Exclusion only applies to the Automatic mode.
- All measurements are checked for alarm conditions every second *regardless of their included or excluded status*.

CHT HI	HCHT 90→500	High CHT limit (°F or °C)
COOL CHT	CLD 5→200	Shock cooling limit (°F or °C)
TIT HI	TIT 650→2000	TIT and EGT limits (°F or °C)
OIL TMP	HOIL40→500	High oil temperature limit (°F or °C)
	LOIL 10→250	Low oil temperature limit (°F or °C)
OIL PRS	HO-P 0→150	High oil pressure limit (psi)
	LO-P 0→100	Low oil pressure limit (psi)
MAP HI	MAP 25.0→60.0	High manifold pressure limit (in Hg)
LO FUEL	REM= 0→200	Low fuel amount remaining limit (gal)
LO TIME	MIN=0→60	Low time fuel alarm limit (minutes)
FUEL PRS	HF-P 0→100	High fuel pressure limit (psi)
	LF-P 0→100	Low fuel pressure limit (psi)
MAX RPM	RPM 2000→3600	High RPM limit (rev. per minute)
MAX AMP	AMP=0→300	High amp load limit
MAX AMP2	AMP2=0→300	High amp load limit for second amps (set to 0 to disable)
TBO HRS	TBO 0→2000	TBO limit (hours)

FFLW MENU

Sets the tank capacities and other constants for the fuel flow transducer system.

STEP	LF	
UNITS	FUEL GAL→KGS→LTR→LBS	Units for all fuel related measurements
MAIN TK	MAIN 0→999	Main tank capacity. See below→
AUX	AUX 0→250	Auxiliary tank capacity. See below→
CARB? N	CARB? N⇔Y CARB? Y	Y—Yes—carbureted engine, enables smoothing filter (next item)
FILTER	CARB F=1→CARB F=2→CARB F=3	Smoothing filter. Higher number is smoother
GPS-C=2	GPS-C=0→6	Sets the EDM serial data output format to the GPS. See below→
KF=29.90	KF=00.10→99.99	See K factor below→

ID ?N	Sets the aircraft ID, registrations number, or owner into the EDM for initial startup and for use in reports. See page 48→
TIME ?N	Sets the time and date. See page 49→
ELEC ?N	Sets whether a second electrical bus exists and whether the amp meter(s) is(are) load or charge/discharge. See page 49 →
END ? Y	STEP exits the Factory Limit mode. LF reenters factory programming mode.

A Windows based program called EzCfg is as an alternative to the steps shown here. See the www.jpinstruments.com web site to download.

Tap LF to enter the desired submenu. Within each submenu there are a number of choices. Choose an item within a submenu by tapping the STEP button to step through the list. Tap or hold LF to choose a value for that item. Use the STEP button to advance to the next item.

TEMP MENU

Sets the engine temperature units, calibrates TIT and thermocouple type

STEP	LF	
EGT-CHT	ENG F⇔ENG C	Select F or C degrees for all engine temperatures. Same bar graph scale.
ORIG TIT	ORIG TN⇔ORIG TY	Original TIT, Y will enter TIT calibration mode, next step
	TIT-975⇔975	For example, if the EDM reads 100 less than the aircraft's TIT gauge, set the display to read TIT +100
TYPE K	TYPE K⇔TYPE J	Toggles CHT between thermocouple type K and type J (type K is JPI standard)

ALRM MENU

Sets the alarm limits for battery voltages, engine temperatures, fuel and other measurements.

STEP	LF	
BUSV OLT	HBUS 10.0→35.0	High bus voltage limit (volts)
	LBUS 8.5→30.0	Low bus voltage limit (volts)
EGT DIF	DIF 30→990	EGT difference limit (°F or °C)

Manual Mode

Just tap the STEP button. Use the Manual mode when you want to monitor one specific measurement 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 measurement sequence. To exit the Manual mode and return to the Automatic mode, tap the LF button and then tap the STEP button. You may disable the Automatic mode by setting "0" for scan rate.

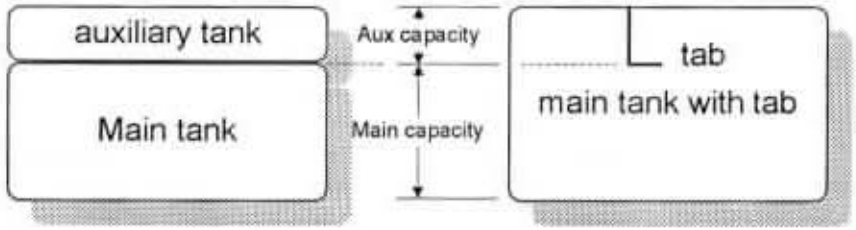
LeanFind Mode

This was described in Section 3 - LeanFind, beginning on page 10.

Section 7 - Fuel Flow Features

Start Up Fuel

After initial self-test, you will be asked to inform the EDM-900 of start up fuel. The EDM-900 will display *FUEL* for one second, and then flash *FILL? N*. 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 page 39 to program the EDM-900 for this feature. The EDM-900 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-900 of startup fuel using the pilot program mode display if you forgot to do so at start up.** The EDM-900 will retroactively calculate the fuel consumed.



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.		

* These values are customize for your aircraft.

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

Adding Fuel and Auxiliary Tanks

If you added less than full fuel to only the main 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-900 that the aircraft was refueled, or for an extended trip with multiple fuel stops. This selection affects only the USD measurement.

display total fuel used for an extended trip with multiple fuel stops. This selection affects only the USD measurement.

During normal operation, to reset the accumulated fuel used display at any time, tap STEP until you see USD. Hold both STEP and LF until the display shows .0 USD.

Factory Program Submenus

To enter the factory programming submenus:

- Simultaneously hold the STEP and LF buttons for five seconds. You will see FUEL N.
- Again, release and simultaneously hold the STEP and LF buttons for five seconds. You will see FACTORY followed by TEMP? N.

Tap the STEP button to advance to the next item in the list. Hold the STEP button to step back to the previous item. Tap LF to enter the desired submenu. When you exit the last item on a submenu the display will show ++++ +++ for a second and then display the next item. To immediately exit the Factory Program mode, hold the STEP and LF buttons for five seconds.

The name of the submenu that you are currently stepping through is displayed on the upper left side of the screen. Initially the display will be FAC MENU.

Submenus

STEP	LF enters this submenu
TEMP? N	Sets the engine temperature units, calibrates TIT and thermocouple type. See page 38→
ALRM? N	Sets the alarm limits for battery voltages, engine temperatures, fuel and other parameters. See page 38→
FFLW? N	Sets the tank capacities and other constants for the fuel flow transducer system. See page 39→
RPM? N	Sets the number of cylinders for the RPM sensor and the Hobbs enable RPM. See page 43→
RECD? N	Sets the data recording time interval. See page 43→
MAP? N	Sets the manifold pressure calibration. See page 43→
FLVL? N	Sets the fuel level parameters. See page 44→

TRIP?N	TRIP?N⇔ TRIP?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. See page 36→
HOBS VAL	2424 ENG⇔ 25 EDM⇔ 3567 FRM	Displays the engine hours and airframe hours.
END? Y	END? Y	STEP exits the pilot programming mode. LF reenters pilot programming mode.

Programming the Horsepower Constant

You must adjust the HP Constant once for your aircraft. You must perform this adjustment in the air while the aircraft is in flight between 5,000 and 8,000 feet MSL.

1. Enter the pilot program mode by simultaneously holding the STEP and LF buttons for five seconds.
2. Tap STEP repeatedly until you see—for example— *HPC= 125*. Then hold both the STEP and LF buttons display until you see *ADJUST*, followed by *HPC= 125*. The adjustment range for the HP Constant is 45 to 180.
3. Set the MP and RPM per your POH to 70 percent power. Let conditions stabilize for five minutes.
4. Change the HP reading on the EDM-900 to 70 percent by adjusting the HP constant in the lower display by holding or tapping the LF button. Percent HP should be close to 100 percent during takeoff.
5. Tap the STEP button to proceed to the next step.

Programming Accumulate Trip Total

Accumulate—default is OFF: resets the fuel *used* to 0 every time you inform the EDM-900 that the aircraft was refueled. With accumulate ON fuel *used* will not be reset to 0 when you inform the EDM-900 that the aircraft was refueled.

Select "No" if you wish to display total fuel used since the last time you informed the EDM-900 that the aircraft was refueled. Select "Yes" to

Resetting "USED"

Every time you inform the EDM-900 that the aircraft is refueled, the amount of fuel *used* is set to zero, unless the instrument is programmed to accumulate or you are in flight. The display of fuel *used* pertains only to the fuel used since the last time you informed the EDM-900 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 STEP and LF buttons for five seconds until the display shows *.0 USD*.

Fuel Management

For fuel calculations to be accurate, it is imperative that you inform the EDM-900 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 flow instrumentation for primary information

The EDM-900 Fuel Flow monitor 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 the amount of fuel that flows into the engine with high resolution. Prior to engine start you inform the EDM-900 Fuel Flow monitor 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-900 of startup fuel using the pilot program mode display if you forgot to do so at start up.**

Measurement Scan

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

SELECT FF/EGT	*Measurement Description*	*Example*	*Comments*
E, A	**EGT, CHT**	1340 376	EGT, left, CHT, right. Dot indicates cylinder
E, A	**TIT**, Turbine Inlet Temperature	1370 T I T	Turbine #1
E, A	**Shock Cooling**	-30 CLD	Dot indicates fastest cooling cylinder
E, A	**Compressor Discharge** Temperature	300 CDT	Into intercooler
E, A	**Induction** Air Temperature	125 IAT	Out of intercooler
E, A	**CDT-IAT**	132C-1	Difference of CDT and IAT
E, A	**Carburetor** Temperature	-22 CRB	Not available when CDT is installed
E, A	**Difference** between hottest and coldest EGT	80 DIF	Dot indicates most widely deviating cylinder
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.	Hours.Minutes Remaining at current fuel burn
F, A	**Total Fuel Used**	38 USD	Since last refueling or trip total.

Section 8 - Memory and Data Download

The EDM-900 Long Term Data Memory will record and store **all** displayed measurements once every **six seconds** (or at the programmed interval of between 2 to 500 seconds). At a later time it will transfer them

Section 9 - First Time Setup and Customization

Pilot Program

To start the Pilot Program 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.

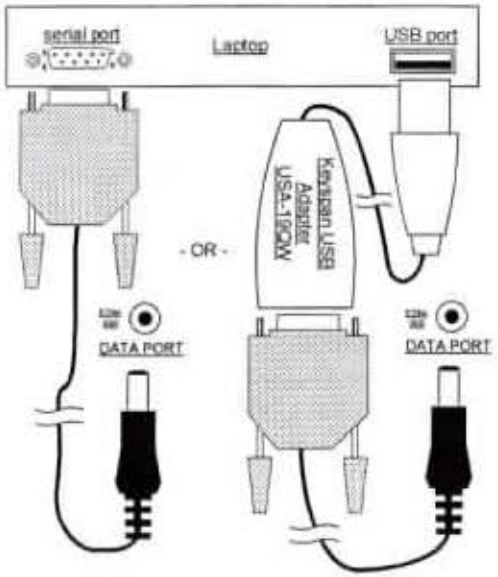
Tap the STEP button to advance to the next item in the list. Hold the STEP button to step back to the previous item. Tap the LF button to select alternate values of that item. Simultaneously hold both STEP and LF to exit.

STEP *advances next item*	LF *sequences through these values*	*Comments*
PROGRAM		Stays on for two seconds.
FUEL N	FILL? N	Tap LF to change fuel status. See page 27→ Exits program mode when done.
DUMP? N	DUMP? N→ DUMP NEW→ DUMP ALL	Dump data to a Palm or laptop computer. See page 30→
RATE 4	0...9	Index rate (pause time in seconds) in the Automatic Mode. 0 disables the Automatic Mode.
OATF	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.)
HPC= 125	70** HPC= 125	%HP display will change when HP constant is adjusted. Hold STEP and LF for 5 seconds until you see ADJUST to set the HP calibration. Tap STEP to continue to the next step. See page 36→

Install EzSave™ on your laptop PC, following the instructions included with the EzSave program or download EXSAVE.pdf. Connect to the computer serial port using the supplied serial cable or to the USB port using an optional Keyspan USB Serial Adapter (available from JPI; install the serial adapter driver). Insert the small round plug into the data connector on the EDM-900, and the other end into the computer serial port or to the USB port using the Keyspan adapter. Both types of connections are shown below.

On the Windows desktop double click EzSave icon. Click on the Download and decompress data button. You may also tab to the desired button and press the spacebar to select a menu item.

Follow the instructions on the screen. After the data is downloaded *DONE* will be displayed. EzSave program will decompress the data file that was downloaded, and produce individual Flight files.



to a PC using a Palm™ handheld as a intermediate courier, or directly to a laptop PC.

When you retrieve recorded data to your 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-900 is erased. The retrieved data will be saved in the Palm handheld or PC in a file in a compressed format. The supplied PC program will decompress the data for display and use by other programs, such a MS Excel.

The amount of total data that the EDM-900 can store will vary depending on how rapidly the measurements change. The typical storage is 20 hours at a 6 second intervals (1666 hours at 500 second intervals), 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 the GMT button. You will see the word *SNAP* at the next record snapshot, indicating a data record has been marked. Recording begins when EGTs are greater than 500°F or "snap" is requested.

All data are time-stamped. 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 *FACTORY*.

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.

Downloading data to the Palm handheld

The examples shown here are specifically for the Palm™ handheld and a PC running Windows®. 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 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.

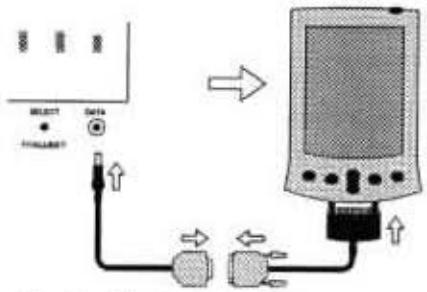
HotSync® your Palm handheld. The EzPalm icon should now appear on your applications screen.

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-900 to the Palm Handheld

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



1. Connect the Palm handheld serial 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*. Tap LF to select *DUMP NEW* or *DUMP ALL*.

3. On the Palm handheld, tap the EzPalm icon.

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

5. Tap the STEP button to begin the transfer process. The 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. You will see *ABORT*.
6. 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 files, each of which corresponds to one flight.

Transferring Data from the EDM-900 to a Laptop PC

Go to our web page www.jpinstruments.com, go to the *downloads* page. Double click on EZSAVE.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.