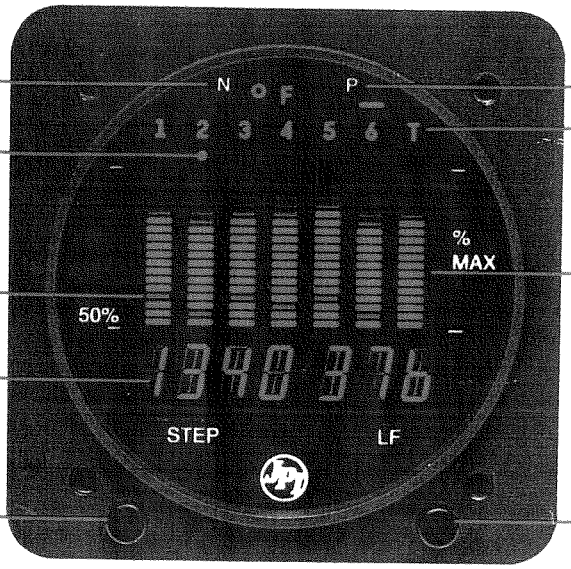
OBS! Nytt i SE-GRZ. "Lancen"

EDM-700

Precision Engine Performance

The EDM-700 the Logical Choice



N - Normalize mode for in flight trend monitoring

Dot indicates digital information for cylinder temperature. t indexes automatically.

Missing Bars indicate CHT temperature trend.

lumns represent percentage red line or max. temp.

EGT/left CHT/right

Step button can index digital information forward or backward.

P - Percent Mode

Turbine Inlet Temperature, TIT or Oil temperature if no TIT.

Analog display for quick relative EGT and TIT recognition. Columns are in percent of red line.

Alphanumeric Digital scanning display for accurate long term monitoring & Precision engine leaning.

LF, LeanFind, Automatically finds the first cylinder to achieve peak EGT

Why Measure Temperature ?

An old popular misconception fostered by a Canadian manufacturer is that it is not necessary to know the exact exhaust gas temperature. The value in measuring EGT not only lies in finding the ideal ratio of fuel to air that results in complete combustion, but in *Long Term Trend Monitoring.*

ong Term Trend Monitoring

rend monitoring will identify those nagging little problems before they turn into serious problems. It is the most **important** tool for diagnosing engine problems, and it works. Digital makes the difference. Trend Monitoring is not possible th only Bar graph. Digital engine data can be recorded by e pilot in a log book on a monthly basis. EGT & CHT will group themselves into a tight pattern at specific MAP & RPM. As a problem begins to develop in one or more cylinders the EGT span will start to enlarge. The DIFF Mode "Dot" will identify the problem cylinder causing the large span. Factory new injected engines have a typical span of 80°F , carbureted 140°F.

LeanFind Mode

The EDM-700 identifies the optimum mixture accurately and automatically. After cruise power has been established the pilot presses the LF, *LeanFind Mode,* button. As the pilot begins to lean the mixture the EDM-700 is checking all cylinders using a propriety algorithm looking for the first cylinder to achieve peak EGT. "PEAK EGT" will be displayed when the first cylinder to peak is detected, the display will also flash the cylinder column and showing peak EGT. The pilot has the option to enrichen the mixture or operate at peak.

Leaning faster than the engine can respond, will cause the display to flash "2 Fast". The EDM is monitoring all alarms in the background and if the TIT limit is exceeded during the LeanFind process the TIT column will flash first. Some turbocharged engines do peak TIT before the EGT peaks.

In *1995* **leaded** fuel will be a thing of the past. *Pre-ignition* and *Detonation* will be prevalent. It will be of the utmost importance to monitor *All EGT's* at one time during climb and leaning. Pre-ignition once started causes an extreme temperature rise and is self sustaining until engine failure occurs usually in less than a minute. Pre-ignition will cause the EDM's bar graph to reach maximum height on that cylinder. *Seeing all cylinders at once* will permit the immediate action required by the pilot.

Consider Economics

A Beech Bonanza with an 0-470 engine at 10,000 ft , 65% power and Fuel at $2.20 per gal.
At a true airspeed of 160 mph and peak EGT this engine consumed 11 gph. In 500 hours the Bonanza consumed $12,100 in fuel.

Most pilots, not knowing which cylinder peaks first, operate at 75 to 100 degrees rich of peak. Too rich a condition causes vibration and carbon deposits. Flying this condition, very rich, the aircraft would realize an airspeed increase of 2 mph and a fuel increase of 2.2 gal/hr. If the engine were leaned to 10 degrees rich of peak the owner would save approx. 20% or $2420.

Läs o Läs!

EDM-700 BASIC

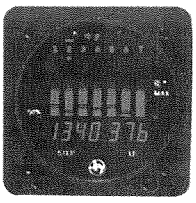
Engine Warranty Increased:

Many engine shops are increasing engine warranties when an **EDM-700** is installed.

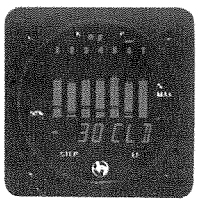
OIL TEMP.
One degree OIL temperature. Only FAA approved for all Lycoming and Continental.

DIFFERENTIAL
Calculated, highest to lowest EGT. Max deviation cyl. shown by dot.

Companies with Simple instruments claim they have the best EGT/CHT system, but we're just going to let the specs do the talking. The precision EDM-700 is the most ***complete & advanced*** engine diagnostic system available today. You'll see **JPI** has created a system that is not a bunch of trade-offs as some Simple copies are. Using the latest in microprocessor technology, the EDM will monitor up to 22 critical parameters in your engine, 3 times a second with a "linearized" thermocouple accuracy of better than 0.1% or 2°F.



NORMALIZE
All columns level for accurate trend monitoring. Bars are 10 degree steps.



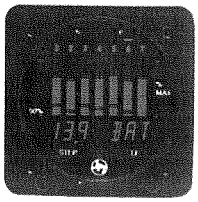
SHOCK COOLING
Calculates and displays the exact cooling rate. Max rate cyl. shown by dot.

There is ***nothing*** in the aviation market today that compares to this linearized accuracy. The EDM-700's CPU functions in the background as a ***flight engineer***; reading all engine temperatures, even those not displayed, and compares them against your engines Factory Limits. For example, if the pilot is viewing the TIT and the CHT limit is exceeded, the CHT will take over the display in seconds (not the next time it indexes around). The exceedence is displayed as a flashing alphanumeric message with remote alert light / sound option.

Consider the Advantage:

- ***Computer Assisted Diagnostics*** for troubleshooting entire system from the cockpit. Problem codes displayed.
- ***Simultaneous*** bar graph & scanning alphanumeric display.
- ***Resolution,*** all temperatures in one degree, with selectable °C or °F.
- ***Supplied with JPI's*** well known grounded "fast response" probes.
- ***Variable Scaling*** for Bar graph.
- ***Alphanumeric scanning display*** of EGT, CHT, OAT, OIL, CDT, IAT and 2 TIT's (for twin turbo engines.)
- ***Normalize Mode*** for accurate Trend Monitoring in flight.
- ***Calculates Span*** highest to lowest EGT.
- ***Identifies*** cylinder with greatest Span.
- ***Voltage*** displayed with Hi/Lo limits.
- ***Oil Temperature*** in One degree, with Hi/Lo limits.
- ***LeanFind Mode*** automatically finds the first EGT to peak.
- ***Shock Cooling***, cool rate calculated & displayed in degrees per minute.
- ***Identifies cooling cylinder*** with greatest Shock Cooling.
- ***OAT*** in °C or °F with ***Scan Rate*** pilot selectable.
- Only bar graph ***Made in USA***
- ***TSO quality,*** FAA STC and TSO approved.
- ***Two years*** electronics warranty.

The EDM-700 is not just another black box along for the ride . . it's a ***flight engineer ... a maintenance manager ... back-up instrumentation*** ... and for the price there's nothing like it.



VOLTAGE
Buss voltage with Hi/Lo alarms for early warning of system failure.

TIT
Turbine Inlet Temp. bar graph and digital with alarms. Second TIT shown digitally.

EDM-700 is a single or twin engine microprocessor based engine management system. ***Simplicity....*** Two buttons address all the major functions. Twin engine EDM's use a single display with a left/ri switch, but monitoring alarms on both engines while viewing one engine. During the leaning process the pilot no longer has to search for the first cylinder to peak EGT; it is found ***automatically.***
Obsolescence has virtually been designed out of the system. The EDM-700 is software flexible, so upgrades can be accomplished easily.

OAT
OAT accurate to 1°F for predicting ice. No alarms.

IAT
Induction Air Temp. Intercooler exit air or direct from compressor.

Benefits:

You may reduce your fuel bills by 20 percent, but when you get to the bottom line, the EDM-700's real benefits are longer engine life and reduced maintenance costs. The EDM's computer assisted diagnostic capability identify small problems before they become serious problems. The EDM-700 begins to look more and more like the new wave of the 90's for aircraft engine monitoring and management.

Pilot's Guide

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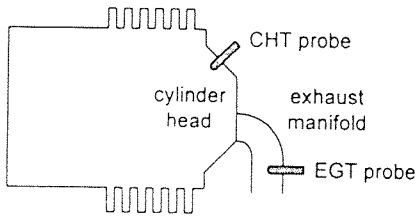
Table of Contents

Product Features

- Bar graph with user programmable scale
- Normalize view for accurate trend monitoring
- DIF display showing lowest to highest EGT spread
- Cylinder dot identifying the cylinder with the greatest EGT difference
- Battery voltage display and monitor with Hi/Lo limits
- Oil temperature measured to 1 degree with Hi/Lo limits
- EGTs displayed to one degree
- Shock cooling monitoring, identifying the cylinder with the fastest cooling rate
- Outside air temperature (OAT) option, user selectable display in °F or °C
- User selectable parameter scan rate
- LeanFind™ mode, that automatically identifies the first EGT to peak
- Alarm "green line" limits, owner programmable
- Quick response grounded probes.

JPI Probes

Temperature information processed by the EDM-700 is captured by sensitive grounded *JPI* temperature probes, that accurately measure the small temperature changes that occur during mixture adjustment. The location of these probes is on the exhaust stack of each cylinder (EGT) and on each cylinder head (CHT).



Optional probes can be installed in the oil galley, carburetor venturi, turbine inlet, and compressor discharge areas.

Section 2 - Engine Temperature

Temperature and Mixture

Power from a piston engine occurs as a result of the combustion of fuel and air in the cylinder. During the compression stroke the piston compresses the fuel/air mixture. As the piston approaches the top of the cylinder, the spark plug ignites the fuel/air mixture. The resulting rapid combustion pushes the piston down, producing power. Next, during the exhaust stroke, the exhaust valve opens, allowing hot gasses resulting from combustion to rush out of the cylinder into the exhaust manifold.

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 mixture by a process called *leaning*. Retarding the mixture control from full rich to lean changes the fuel/air mixture and hence the resulting Exhaust Gas Temperature (EGT). The ideal ratio of fuel to air is 1:15. That is, one pound of fuel for every 15 pounds of air. As the aircraft climbs to higher altitudes, the air becomes thinner, and the mixture control must be leaned to maintain the 1:15 fuel/air ratio.

The following figure depicts the mixture and temperature relationship. Notice that as the mixture is leaned, the *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.

Section 3 - Operation

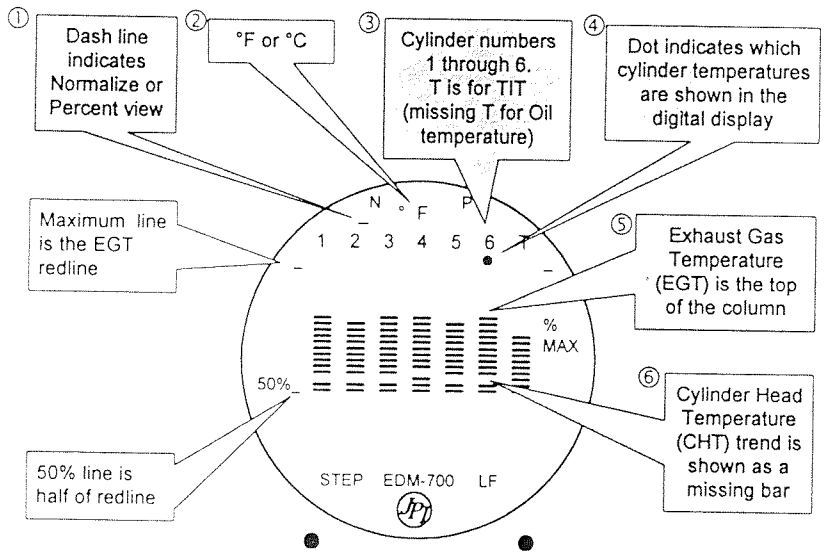
The EDM-700 is a data gathering system that displays Exhaust Gas Temperature (EGT), Cylinder Head Temperature (CHT) and other engine parameters. You use the EDM-700 to monitor engine temperatures and voltages, adjust the fuel/air mixture, and diagnose engine malfunctions. There are three components of the user interface:

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

Displays

Analog Display

The upper half of the face of the EDM-700 is the analog display.



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

①Normalize (_N) and Percentage (P_) View Indicators

- Percentage (P_) view - When the dash _ is near the P, the columns indicate percent of EGT red line. A maximum height column depicts 100 percent of red line and a one bar-high column depicts 50 percent of red line. For example, if the red line is 1650°F, a maximum height column represents 1650°F and a one bar-high column represents half that value, or 825°F.
- Normalize (_N) view - When the dash _ is near the N, the EGT columns are displayed normalized. When you change to the Normalize view, all column peaks are set to the same half-height level for trend analysis. Any changes are shown as an increase or decrease in column height. A one-bar 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. A common mistake is to be in the Normalize view and change power levels, causing all bars to go off scale, high or low. Change to the Percentage view before adding or reducing power.

  CHTs are not normalized.

②Temperature Units (°F or °C)

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

Automatic Scan Mode

Each cylinder and each parameter value is automatically sequenced and shown in the digital display for four seconds. No user intervention is required to use this mode. The factory default interval of four seconds may be changed to within the range of 1 to 9 seconds. See the section on *Personalizing* later in this guide.

Manual Scan Mode

Each cylinder and each parameter value is shown in the digital display until you step to the next parameter by manually tapping the STEP button

LeanFind Mode

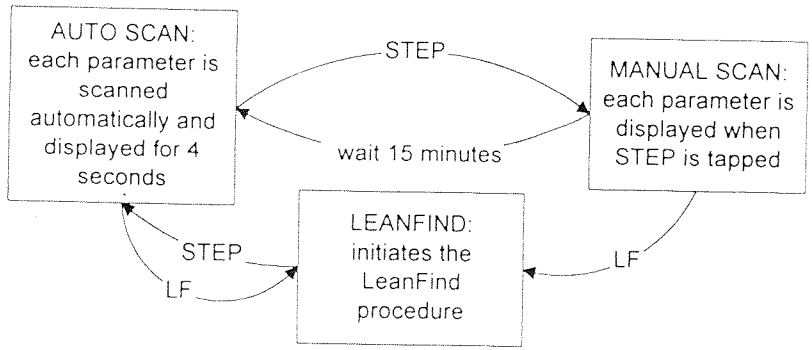
The EDM-700 will assist you in finding the leanest cylinder.

These modes will be described in more detail later in this section.

Buttons

Buttons, Front Panel

Two operating buttons control all functions of the EDM-700. Their operation can best be understood by referencing the diagram below, which shows how to navigate from one mode to another.



Mode Change Diagram

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 three seconds or longer.

STEP Button

Located on the lower left side of the panel.

- In the Automatic Scan mode, *tapping* STEP will change to the Manual Scan mode.
- In the Manual mode *tapping* STEP will display the next parameter in the parameter scan sequence.
- In the Manual mode *holding* STEP will display the previous parameters in the parameter scan sequence (rapidly backwards).
- In the LeanFind mode *tapping* STEP will change to the Automatic mode.
- In the programming procedures, described later, *tapping* STEP will advance to the next item in the list. *Holding* STEP will back up rapidly.
- When an alarm is displayed, (alarms are described later), *tapping* STEP will temporarily delete that parameter from the scan sequence for the next ten minutes.
- When an alarm is displayed, *holding* STEP until the word *OFF* appears will delete that parameter from the scan sequence for the remainder of the flight.

encountered during start-up or during flight will be deleted from the scan sequence

Operating Procedures

Modes

The EDM-700 has three different operating modes: *Automatic*, *Manual* and *LeanFind*. When you first turn on the power the EDM-700 starts in the Automatic mode. This 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, if installed (or Oil temperature, if it is installed and TIT is not installed).

Automatic Mode

In the Automatic mode the EDM-700 displays the parameter sequence at a user-selected scan rate (see the section *Personalizing*). In the Automatic mode no user intervention is required.

Manual Mode

Use the Manual mode when you want to monitor one specific parameter such as shock cooling during descent, or engine temperature during climbs. To change to the Manual mode, tap the STEP button once. Subsequent taps will advance the digital display through the parameter sequence (see *Parameter Scan*). To exit the Manual mode, either wait 15 minutes or tap LF and then tap the STEP button (see the *Mode Change Diagram*, earlier in this guide).

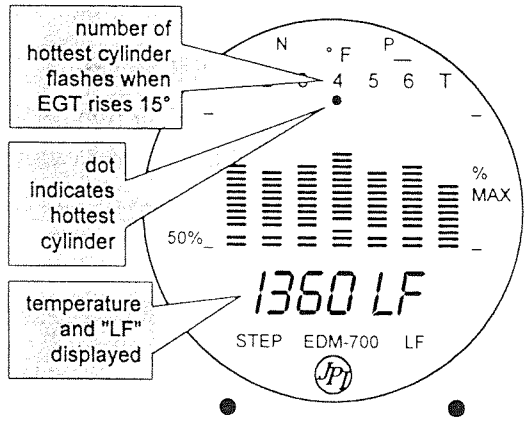
LeanFind Mode

Upon reaching cruise configuration, use the LeanFind mode to identify the first cylinder to reach peak EGT. Note: this is the *leanest* cylinder, not necessarily the *hottest* cylinder. To change to the LeanFind mode, tap the LF button. The EDM-700 will stay in this mode for five minutes or until you tap the STEP button to exit the LF mode. LeanFind mode is only active when the EGTs are higher than 1150°F

In the LeanFind mode, the analog and digital display will give you the information you need to properly lean the mixture for optimum performance or economy:

When LF is activated:

To show the progress of the leaning process, the EDM-700 selects the hottest cylinder for reference in the digital display.



Percentage and Normalize Views

The default view is a bar graph in which the height of each column represents that cylinder's EGT expressed as a percentage of red line EGT. This *Percentage view* permits comparison of EGTs *across all* cylinders. Hotter cylinders display higher columns than cooler cylinders.

An alternative analog view, the *Normalize view*, presents the EGT for each cylinder normalized to half column height. Immediately after activating the Normalize view, all column peaks are set to the same half-height level for trend analysis. Any changes show as an increase or decrease in column height.

For example one cylinder may have an EGT of 1460°F while another is 1420°F, but in the Normalize view, both will *initially* show half height columns on the analog display. From this half height display each lighted bar in a column will represent a 10°F increase or decrease in EGT. The Normalize view permits rapid visualization of EGT *trends*, rather than a percentage of red line.

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.

To toggle between Percentage and the Normalize views, hold the LF button for three seconds. 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 of the scan. The CHT heights are not affected by the Normalize view.

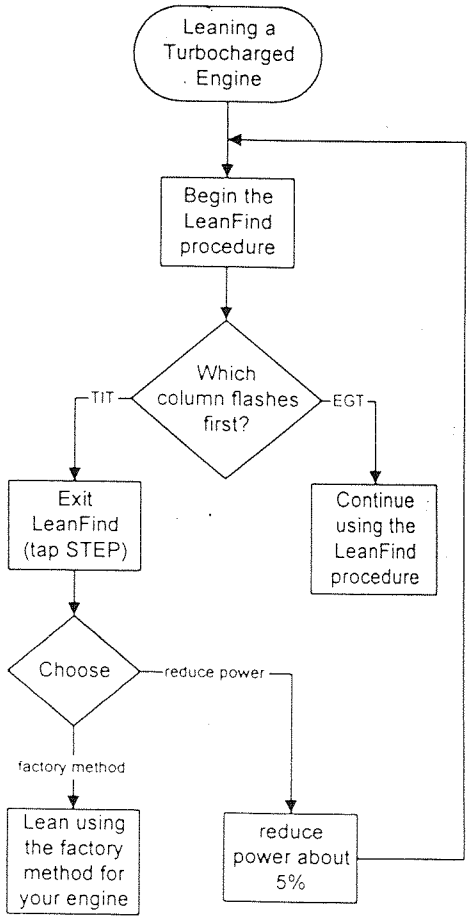
Fine Tuning the Mixture

Fuel flow is the critical issue in the leaning process. Uniform fuel distribution to all cylinders results in the best economy and smooth

operation. Estimate the uniform fuel distribution by the heights of the EGT columns on the analog display. Uniform fuel balance among all cylinders occurs when the heights of the columns, displayed in Percentage view, are uniform. Minor adjustments in throttle position, RPM, and mixture settings can dramatically improve uniformity of the fuel distribution. In fuel injected engines, interchanging injector nozzles between high and low EGT cylinders will improve fuel distribution in many cases.

Turbocharged Engines

The leaning process for turbocharged engines is also by reference to the first cylinder to reach peak. But 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 is included in the procedure. If leaning results in the TIT exceeding red line, the T column flashes.



Follow the flow chart on the right to lean a turbocharged engine.

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 igniting at the turbine inlet.

Common Misapplications

Problem	Situation	Correction
Starting LeanFind before the engine is warmed up	You attempt to change to the LeanFind mode when the EGT is below 1150°F. In this case the word *2 COOL* appears on the display.	Exit the LeanFind mode (tap STEP). Allow the engine to warm up.
Failure to pre-lean before performing LeanFind	The message *PEAK EGT* followed by *XXXX SET* does not appear and the EDM-700 leaves the LeanFind mode without having found a peak EGT.	Follow the pre-lean procedure in the section *LeanFind Procedure.*
Leaning too quickly	You lean the mixture so quickly that you by-pass the peak EGT.	If you have vernier mixture control, lean by rotating it at the speed of a second hand on a clock (about one revolution per minute). If you have a quadrant mechanism, stabilize your hand on the lever to allow a finer control of the mixture.
Off-scale EGTs, too high or low	You forgot that you set the EDM-700 in the Normalize view and later observe off-scale EGT readings.	The higher sensitivity of the Normalize display can quickly go too high or low off-scale with only small changes in EGT.

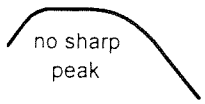
Diagnosing Engine Problems

Normal Engine Limits

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 to • 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	
Oil	200°F	• oil cooler thermostat opens at 180°F
Shock cooling*	-40°/minute -55°/minute -200°/minute	• tightly cowled • Bonanza • helicopter

* Cooling faster than -60°/minute is considered high. 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).

Display	Symptom	Probable Cause	Recommended Action
	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>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.

Pre-Ignition and Detonation

Pre-ignition and detonation are technical terms that describe anomalies in the combustion process. Combustion that is too rapid leads to detonation and possibly pre-ignition. The combustion process is affected by the compression ratio, ignition timing, fuel octane rating and lead content. *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.

When the octane rating of the fuel is too low, a rapid explosion is produced. The combustion occurs quickly and early in the cycle. By the time the exhaust valve opens, the products of combustion have cooled down, producing a lower EGT. During the leaning process, as the EGT approaches peak, the cylinder could go into detonation, and the EGT peak flattens due to the cooling described above.

Pre-ignition is caused by hot spots in the cylinder. Ignition occurs prior to the spark plug firing. The EDM-700 depicts pre-ignition as a sudden red line of the EGT on the analog display. This may occur in one or more cylinders, or in all cylinders. The effected 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.*

Data Logging

When the aircraft is in the cruise configuration, the digital display of the parameter sequence and the peak EGT and CHT will give you precise numeric data, useful for engine trend monitoring. After reaching enroute altitude and completing the LeanFind procedure, each cylinder will achieve an EGT and CHT that varies little from one flight to the next. DIF, the spread between coolest and hottest cylinder, will also remain constant. On monthly intervals, you may choose to record peak EGT, parameter sequence values, and cruise engine settings on a *data logging worksheet*. You may reproduce this worksheet to accumulate an operating history of your engine.

Data logging on the worksheet becomes a valuable tool in monitoring engine performance. Look for trends as well as absolute values. DIF is a good indicator of the overall health of the

STEP sequences to the next item	Tap the LF button to sequence through these values	Comments
PROGRAM		Stays on for two seconds.
RATE 4	4⇒3⇒2⇒1⇒0⇒9 ⇒8⇒7⇒6⇒5⇒4	Selecting 0, omits the Automatic scan mode
OATF	OAT F⇔OAT C	To calibrate the OAT ±10°, hold both STEP and LF for three seconds, which will proceed to the next step. Otherwise the next step will be skipped.
OAT+0	OAT+0⇒OAT-1⇒OAT-2 ⇒OAT-3⇒...⇒OAT-10 ⇒OAT+10⇒OAT+9⇒ ...⇒OAT+0	This step will be normally be skipped. Adjust the indicated temperature up or down by up to 10°. For example, OAT+3 would adjust the OAT upward 3° from what it was reading before this step.
EGTIPN	EGT IPN⇔EGT IPY	Y - Yes - sets the digital display to one degree resolution; N - No - sets 10°. (10° is easier to see.)
END Y	END Y⇔END N	Y - Yes to quit; N - No to review list again.

Alarm Limits

The EDM-700 has programmable alarm limits. When a parameter exceeds its normal range, the digital display will flash with the value and abbreviation of the alarming item.

Factory Set Default Limits

JPI conservatively sets the default alarm limits below Lycombing and Continental recommendations. The TIT high limit will be the same as the EGT high limit

Parameter	Default Low Limit	Default High Limit
DIF		500°F
CHT		450°F
CLD		-60°F/min.
OIL	90°F	230°F
BAT, 24 Volts	24V	32V
BAT, 12 Volts	12V	16V
EGT, TIT		1650°F

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.

> Note: the RESET button is located on the rear of the instrument through a recessed hole. Use a small, insulated probe (the pointed end of a golf tee is ideal) to tap the RESET button.

To start the Alarm Limit Procedure, tap the RESET button. You will see the word *FAC LIM* 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. Hold the LF button to rapidly back up.

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, available free from your Accident Prevention Specialist. Every pilot should have an understanding of the elements presented in this short, well written document.
- Editors of Light Plane Maintenance Magazine, *EGT Systems*, Belvoir Publications Inc., Greenwich, CT 06836. 1989. Although the instrumentation presented is somewhat dated, the discussion on operating principles of internal combustion engines provides an appreciation of the complexity of the combustion process.
- *Lycombing Flyer* Issue 53 dated January 93. Below is a quotation from that issue:

  "Fuel Information. Flyer 51 discussed recent amendments to the Clean Air Act ... First and foremost these amendments prohibit the use of leaded motor gas after 1995 ... Textron Lycombing has run premium grade unleaded automobile gasoline in Lycombing engines designed for a minimum of 91/96 octane aviation gasoline. At the service pump these automobile fuels are listed at 94 octane. Results of the test proved to be less than satisfactory because detonation occurred when the engine was leaned for cruise."

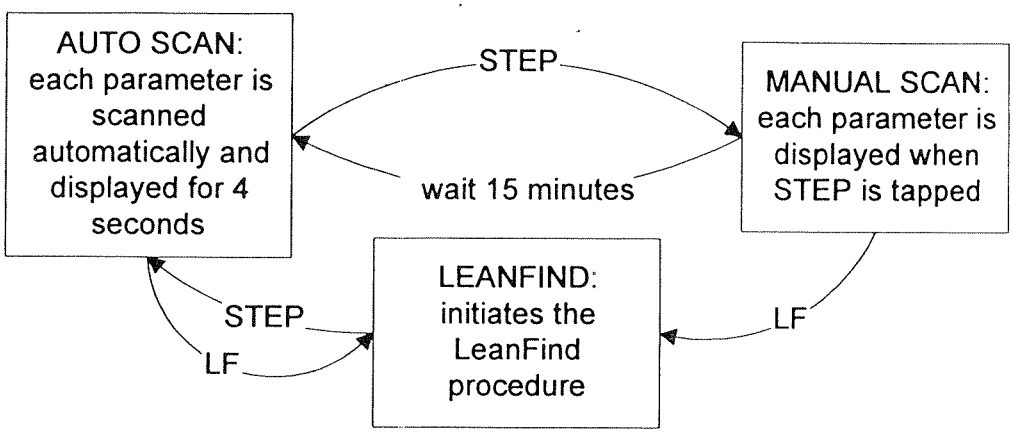
Technical Reviews and Original References

Some users of the EDM-700 have strong 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. This article is the classic reference which opened the door to the use of autogas. Principles that Mr. Hundere presents on gas quality, vapor pressure, and lead content are as true today as in 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. This is the source document on pre-ignition. Many other authors have referenced these researchers' graphs and tables from this article on combustion temperatures under different conditions of mixture, fuel burn, and ignition timing.

EDM-700 Quick Reference Guide

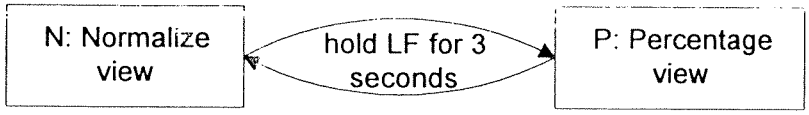
Mode Changes



Mode Change Diagram

View Changes

In either the AUTO or MANUAL scan modes:



View Change Diagram

LeanFind™ Procedure

	Procedure	Example
1	Establish cruise at approximately 65 percent power.	
2	In the Manual mode, pre-lean the mixture to 70°F below the peak EGT on any cylinder.	1490 370
3	Wait 30 seconds.	
4	Tap the LF button	1490 LF
5	Slowly lean mixture	1520 LF
6	Stop leaning when one column flashes and the digital display shows *PEAK EGT* followed by (for example):	1550 SET
7	Slowly enrich mixture to find peak, then continue to enrich to desired cooler EGT (peak for best economy, 100° cooler than peak for best power, or somewhere in between).	1560 SET 1460 SET

EDM-700 Data Logging Worksheet

A/C N _____ Make _____ Model _____ Engine _____

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