TABLE OF CONTENTS

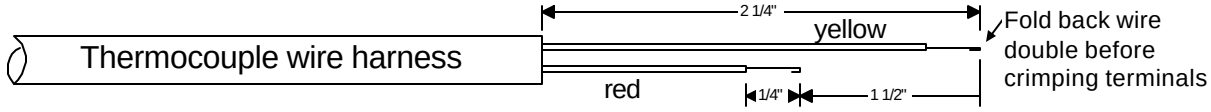
Section **Page**

The Owner of the EDM-900/930/950 must keep this manual

J.P. INSTRUMENTS
PO BOX 7033
HUNTINGTON BEACH CA

Read This First

- The following notes apply to a new installation. **Read this section before proceeding**.
- The JPI warranty found in the back of the pilots guide clearly states that JPI will replace defective parts under warranty, **but does NOT cover labor to remove or install any parts**.
- The most common cause of probe problems is poor terminal crimps. Crimp ring terminals with AMP tool or equivalent. **Fold back the wire double before crimping terminals.**



- This installation will require some parts unique to your aircraft that are not supplied with the kit, (including but not limited to tie-wraps, hoses and fittings). Acquire all the necessary parts prior to beginning the installation.
- Do not use aluminum fittings or Teflon tape or pipe sealant with the FXT-201 or FXT-231 fuel flow transducer.
- Write down the K-factor engraved on the side of the fuel flow transducer here _____. Once the transducer is installed and covered with the fire sleeve, you will not be able to access this K factor.
- Determine the locations of all holes before drilling to ensure that nothing interferes with the probe, clamp, clamp screw or wire.
- Provide service loops at the instrument so that it can be moved for maintenance or troubleshooting.
- Thermocouple wire length is not critical. Trim to required length, allowing for service loops at the engine so that probes can be swapped with probes on adjacent cylinders for troubleshooting purposes.
- Dress all wires away from high temperature components such as exhaust stacks.
- Never splice thermocouple wire using copper wire. Use only K-type thermocouple wire. Solder using zinc chloride flux such as Nokorode brand – rosin flux alone won't work.
- Observe correct polarity on all probe wires. Connect like colors together (red to red, yellow to yellow).
- **The instrument must be grounded at the engine**, not at the avionics ground.
- Record the installation of the EDM-900 or EDM-930 on a FAA form 337. Make an entry in the aircraft logbook.

1. INSTRUMENT MARKINGS

The TSO label on the instrument is marked as to the instrument configuration.
The part number of the instrument is as follows:
Model designation system by part number for EDM-900/930/950.

Model Number / Part Number	Description
EDM-900 PN 790000-A- [XXX]	**Plasma Type Display**
EDM-930 PN 790000-C- [XXX]	**TFT (liquid crystal) Type Display**
EDM-950 PN 790000-B- [XXX]	**Display less (Data Acquisition Unit for MFD)**

120		X				NA - Display only													
012																			
011																			
010																			
009		X				X	X	X	X	X	X	X	X	X	X	X	X	X	X
008					X	X	X	X	X	X	X	X	X	X	X	X			
007				X		X	X	X	X	X	X	X	X	X	X	X			
006			X			X	X	X	X	X	X	X	X	X	X				
005		X				X	X	X	X	X	X	X	X	X	X	X	X	X	
004	X					X	X	X	X	X	X	X	X	X	X	X	X	X	
003		X				X	X	X	X	X	X	X	X	X	X				
002	X					X	X	X	X	X	X	X	X	X	X				
001		X				X	X	X	X	X	X	X	X	X	X	X			
	X					X	X	X	X	X	X	X	X	X	X	X			
	4	6	7	8	9	EGT	CHT	RPM	MAP	O-P	O-T	OAT	FF	V/A	RAD	FLEV	F-P	TIT	CDT	IAT/CRB
(XXX)	Cylinder					OPTION														

CYLINDER & OPTIONS CONFIGURATION

[ ] EDM-930 PN 790000-C-[120] WT-2.7 LBS.
[ ] EDM-900 PN 790000-A-[XXX] WT-1.7 LBS.
[ ] EDM-930 PN 790000-C-[XXX] WT-2.7 LBS.
[ ] EDM-950 PN 790000-B-[XXX] WT-1.7 LBS.

Serial No.
XXXX

J.P.Instruments Inc.
31855B Airway Ave
Costa Mesa CA 92626

MFG XXXX

INDICATOR EDM-900/930/950	TSO	INDICATOR RANGE	SENSOR RANGE
EGT, CHT, Oil, TIT, CDT, IAT	TSO-C43c, Class 1A	-60 to 2400°F	-2 to 57mv
Manifold Pressure	TSO-C45a, Type I	0 to 100 In Hg	0 to 30mv
Fuel Flow	TSO-C44b	0 to 300 gph	1 to 80 gph / 4 to 300 gph
Oil Pressure / Fuel Pressure	TSO-C47, Type II	0 to 150 psi / 0 to 30 psi	0 to 200 Ω / 0 to 50 mV
Fuel Quantity	TSO-C55c, Type I / II	0 to 999 Gallons	0 to 1000 Ω / 5 to 7800Hz
RPM	TSO-C49b	25 to 4500 RPM	7 to 5000 Hz
Voltage	Not Applicable	0 to 30 VDC	0 to 40 VDC
Amperage	Not Applicable	0 to 300 Amps	+/- 50 mV
% of Horse Power	Not Applicable	0 to 100 Percent	Not Applicable

DO-160D ENV.CAT. D1XBAB[SBM]XXXXXXABBBAWM[A3C3]XXA POWER INPUT: 14 / 28 VDC
DO-178B Level -C, H/W 7999-X Rev A S/W PN 7990-X CURRENT: 4 Amps max
Note: EDM-900/930/950 TSO-C55, incomplete system for Type I (Float Inst.), no Float sensor tested.
Note: EDM-950 (Display-less) incomplete system for all TSO's
Note: PN 790000-C-120 incomplete system Display only.

Typical TSOA label shown above with definition chart of part number (series). This is not a complete chart and the TSOA Label may be missing items not installed on specific equipment.

2. Operation

The right hand side of the display has 9 vertical trend columns with a digital value below each column. The nine gages are Oil and Fuel pressure, Oil and Outside air temperature, Volts and amps, and fuel flow with fuel quantity. The engine RPM and manifold pressure are presented in the upper left corner of the instrument. The EGT,CHT and TIT are presented in the lower left corner. Below the EGT / CHT columns is a message center that will display the digital value of the EGT/CHT and additional functions like shock cooling. The display is very intuitive.
The analog display of EGT, CHT, and TIT temperatures are presented as a percentage of maximum EGT or TIT. Below the vertical columns the specific value for EGT and CHT are displayed digitally. The highlighted indicator above or below the column's indicates which cylinder's digital information is presently displayed. The missing bars at the base of the EDM-900, columns indicate CHT from 250 to 500 degrees F with 25 degrees per bar. The EDM-930 operates in the same fashion as the EDM-900, but has a separate bar graph of EGT and CHT. TIT is similarly displayed in the right hand column as an actual temperature with a scale to its right. Depressing the LF and STEP button simultaneously enters the program mode to enter fuel quantities, display scan rate, OAT display to °F or °C, EGT digital display resolution to 1 or 10° and other setup parameters. Exit by depressing STEP. If either the STEP or LF buttons are not pushed for three minutes the EDM-900/930 will revert to automatic scan mode. Depressing the STEP button will stop the automatic mode and revert to manual mode.
During constant power cruise, if the LF button is depressed for five seconds the EGT bar graphs will normalize to mid-scale. The leveled bars represent the relative value of each function quickly showing an increase or decrease in temperature.
Measurements not displayed in the nine bar graphs on the right side of the instrument are displayed digitally with acronyms after the number, as **40 IAT** or **1640 T IT**. A large value such as **–50 CLD** indicates shock cooling usually associated with rapid descents at low power. Optional functions not installed will not be displayed.

Alarm Limits

Exhaust Gas Temperature spread (DIF), cylinder head temperature (CHT), Turbine inlet temperature (TIT), oil temperature and pressure, bus voltage, shock cooling (CLD), manifold pressure (MAP), RPM, and fuel remaining (REM) and endurance (H.M.) have programmable alarm limits. The pilot can change these alarm limits as necessary.

2.1 Remote Alarm Display (RAD)

The RAD is a 0.2" high, 8 character red independent display. The RAD will still function if the main display is inoperable. Alarm output is displayed as 480CHT2, which is: the CHT on cylinder number 2 is 480 degrees. The acronym CHT2 will flash whenever the temperature is in the Caution range and will extinguish when the temperature is reduced below the limit temperature. Alarms would be displayed as: 2780RPM, 15_O-P, 34_F-P, 240_0-T,
The RAD is located directly in front of the pilot and displays digital caution and limit excedances when any of the parameters has reached its preset trigger point. Whenever caution or limit alarms are not triggered, the RAD continuously displays MAP and RPM.

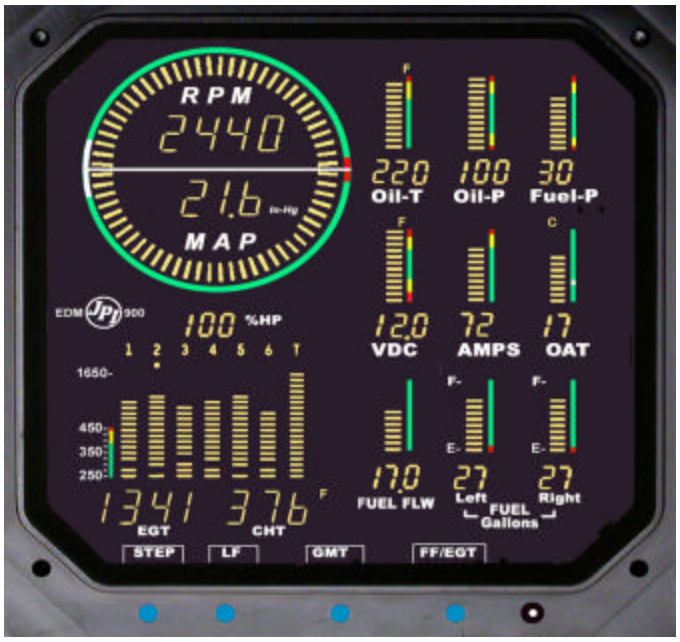
Alarm hierarchy

When a measurement limit is reached, the pilot should momentarily depress the STEP button on the EDM-900/930/950 instrument to extinguish the particular flashing alarm acronyms. If another measurement has also reached its limit, that label will then begin to flash. The pilot should continue to monitor the affected parameters as he would if a conventional analog display had reached a limit. The bar graph functions of CHT, EGT, and TIT remain displayed for easy reference should one of these limits be reached.

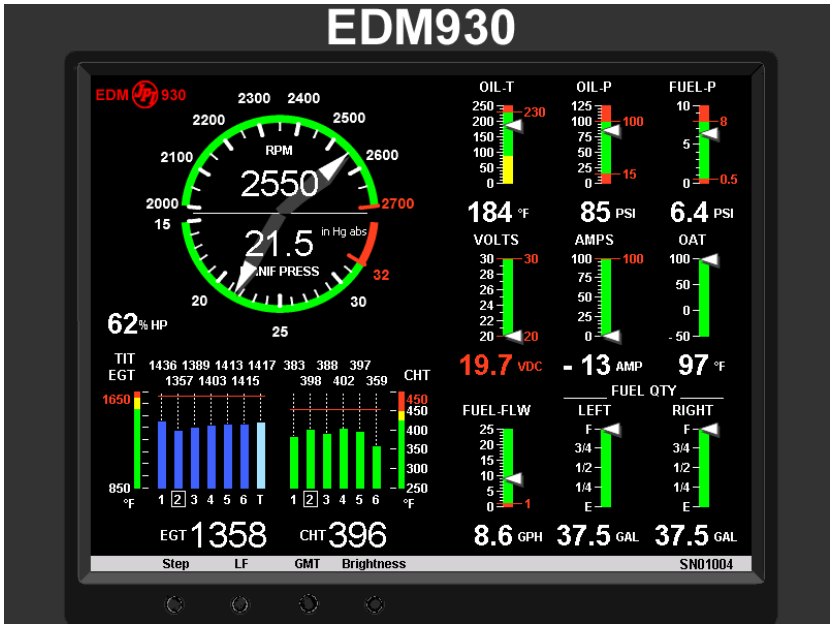
2.2 Dimming

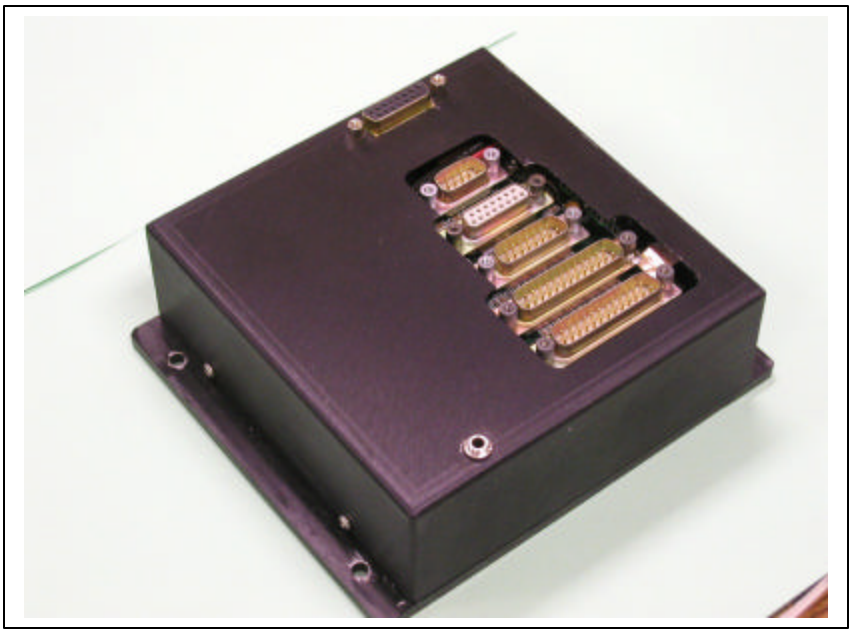
Automatic dimming is provided to dim both the panel display and the remote alarm display. Dimming can also be accomplished manually. Tapping the right hand button below the display decreases brightness. Holding this button in continuously increases brightness.

Remote Display

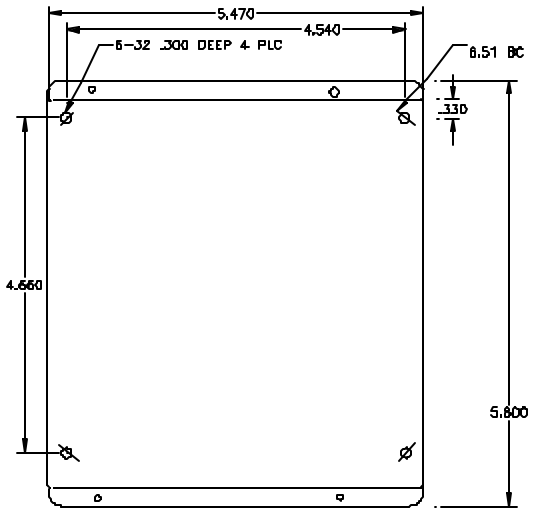


EDM-900 Display





EDM-950 Display Less

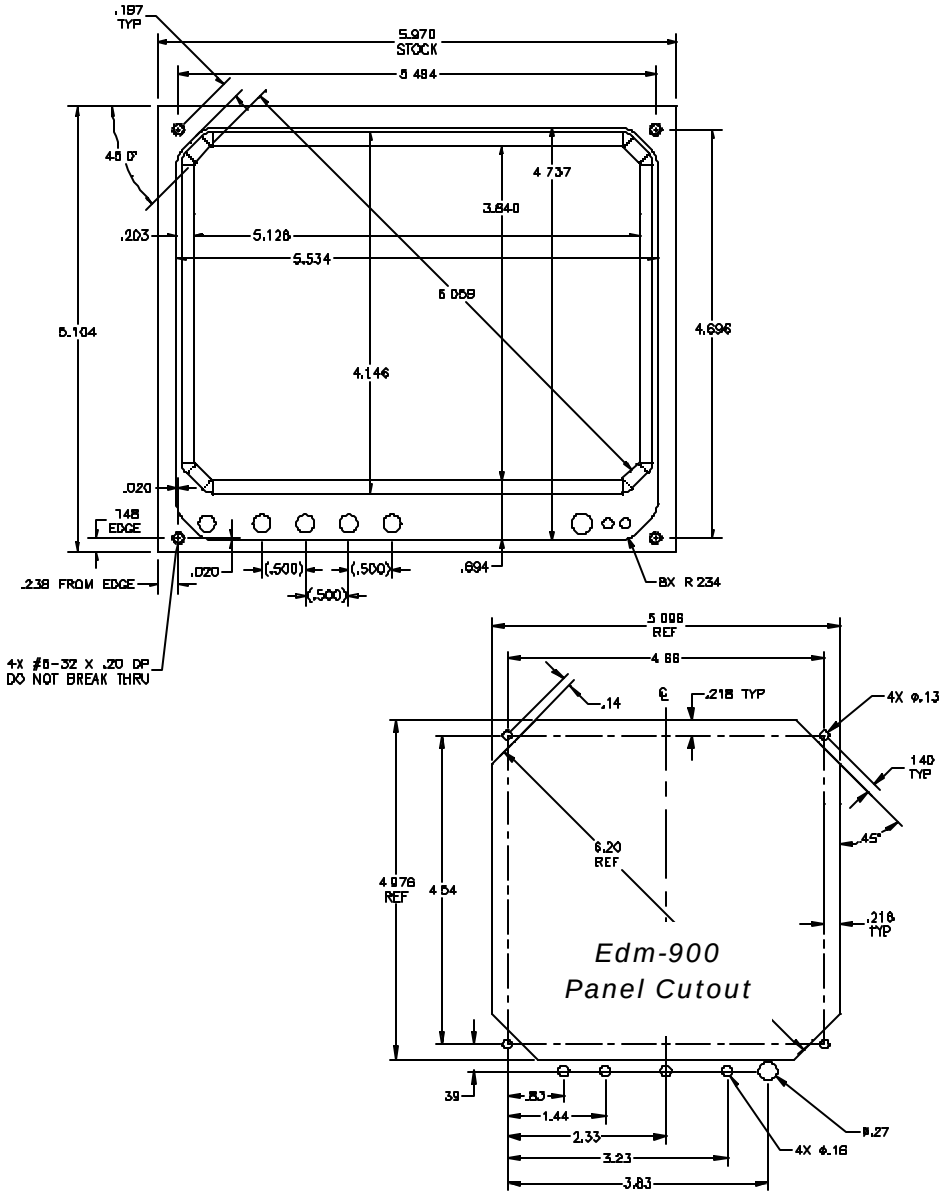


The EDM-950 has four mounting holes to mount to the avionics equipment rack or to the cockpit side of the firewall. The data port is then connected to the MFD or display unit.

3. Locating and Installing the Indicator

The EDM-900/930 indicator should be located as close as possible to the pilot with an unobstructed view and for easy access to the buttons on the instrument. If this is not possible install the remote display for alarm indications. Installation should be done in accordance with advisory circular AC43.13-1A. The EDM-950 does not have a display and outputs RS-232 to an MFD.

The diagram below should be used as a guide for cutting and drilling the mounting and buttonholes in the instrument panel. The dimensions shown are for the final cutouts. Allow extra clearance for any panel finish such as powder coat. The plastic button caps are removable by grasping and pulling each off. The EDM-900/930 mounts in a custom 5+ inch cutout and the 930 mounts in a 6x4.5 cutout. The EDM-950 mounts in the aircraft equipment rack and is the same size as the EDM-900. The instrument configures itself automatically for 4 or 6 cylinder engines, 14 or 28 volt electrical systems. Mount the indicator using the figure below as a guide. The Remote Alarm Display PN-790749 mounts in a ½ inch hole in the panel. The Remote Alarm Display PN-790749 mounts in a **½ by 2 inch hole in the panel directly in front of the pilot..**



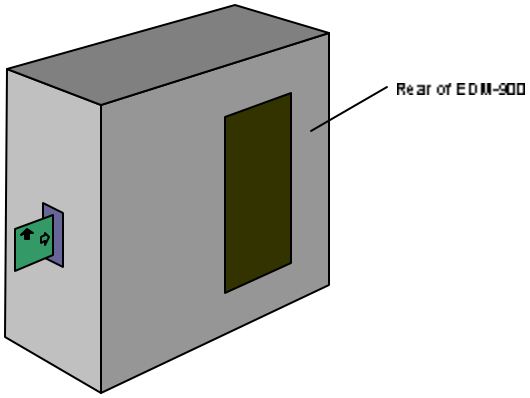
4. EDM-900 & EDM-930 Key Card Installation

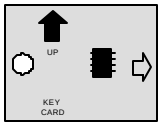
The EDM Key Card activates the primary engine instrument abilities of you engine monitor. This card contains the primary engine instrument data. After installation do not remove the Key Card from the instrument. The key card is programmed with the serial number of your EDM and the make, model and year of your aircraft. Every time you power up the EDM, the Remote Auxiliary Display (RAD) will show your aircraft make and model.

Installation

With the EDM removed from the aircraft, position it on a flat surface with the rear of the instrument facing you as shown below. You do not have to remove any cables if you have sufficient service loop available. The location of the Key Card access door is different between the EDM-900 and EDM-930. Follow the appropriate instructions below.

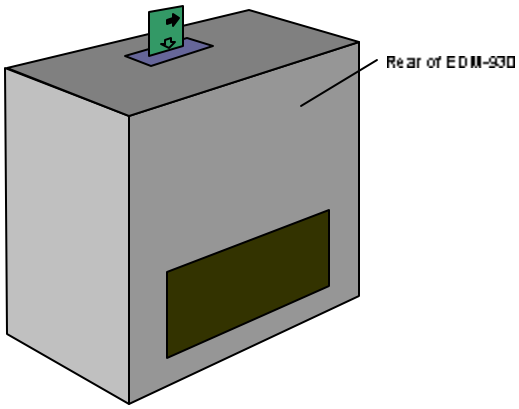
EDM-900



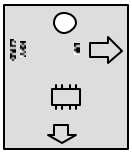


Hold the Key Card so that the UP arrow is facing up and in insertion arrow is facing to the right.

EDM-930



Open the small access door on the top of the EDM-930 using the appropriate tool.



Hold the Key Card so that the UP arrow is facing to the right and in insertion arrow is facing to down.

Insert the Key Card in the guide rails until you feel it snap into place. Secure the access door.

Power up the EDM and confirm that your aircraft make and model is initially shown in the RAD upon power up. Install the EDM back into the aircraft. Your installation of the Key Card is complete.

If your EDM should ever have to be replaced with a unit with a different serial number, the factory will reprogram your Key Card to match the new serial number.

5. Routing the Wiring Harnesses

Five connectors are protruding from the rear of the instrument. Connect the five wiring harnesses to the rear of the instrument and run the cables through the firewall into the engine compartment. Allow sufficient service loop to facilitate removal of the connectors for servicing. These wiring harnesses are labeled as follows:

Connector	Harness PN	Measurements
J1	790200	Oil temperature, Induction temperature, Carburetor temperature, Outside air temperature, Turbine inlet temperature, Turbine inlet temperature 2, Power, Engine ground, MFD input, MFD output
J2	700700 700702	CHT, EGT 6 cylinder CHT, EGT 4 cylinder
J3	790420	RPM, MAP, Oil pressure
J4	700709	Serial data to GPS, Serial data from GPS, Fuel flow transducer
J5	700719-1 no fuel level option 700719-2 capacitive fuel level 700719-3 resistance fuel level	Fuel pressure, amperes Fuel pressure, amperes, capacitive fuel level option Fuel pressure, amperes, resistive fuel level option
J6	790745	External remote display

Route the wires from the connectors through the firewall using fireproof rubber grommets and flame retarding silicone. Use an existing hole if possible. All wires must be routed **away from high temperature** areas (exhaust stacks, turbochargers, etc.). Secure probe and sensor leads to a convenient location on the engine approximately 8 to 12 inches from the probe or sensor, being sure there is sufficient slack to absorb engine torque. It is essential in routing the probe wire that this wire not be allowed to touch metal parts of the air-frame or engine since abrasion will destroy this high temperature wire. Secure wires along the route to the indicator. Secure wire using original clamps, tape or tie wrap if possible.

CAUTION: Be sure any wiring does not obstruct the control movement under the instrument panel.

The probe wires must **not** be tied in with **ignition**, alternator or engine cabin heater ignition wires because of potential interference with temperature readings.

The temperature probe wiring harness is made of Chromel-Alumel alloy wire that **must not be substituted or extended with normal copper wire**. The power and ground wire are normal copper. Temperature probe leads may be spliced with additional Chromel-Alumel wire using copper butt splices.

When the installation is complete all wires should be secured using ties and carefully checked for interference, rubbing or chaffing with flight control cables or other moving parts.

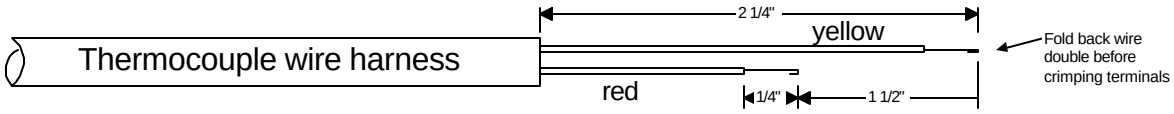
6. Power Connection

The EDM-900/930/950 automatically accommodates both 14 and 28-volt electrical systems. Using the J1 connector harness 790200, connect the power lead (red) to a **separate 5-amp circuit breaker** connected to the master power bus. **Connect the ground wire to the engine block.** The EDM-900/930/950 has a 10-second warm-up. No connection to the aircraft dimmer system is required because the instrument dims automatically with reductions in ambient light.

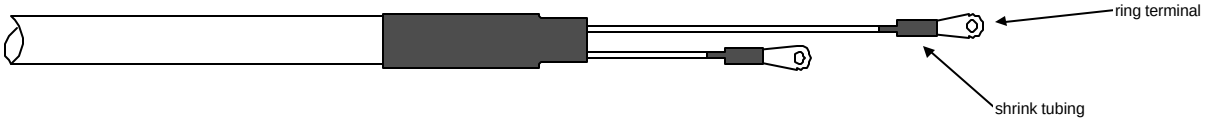
7. Probe Wiring

When cutting the pair of leads to the proper length to connect to the probes, leave enough slack in the wiring so that probe may be interchanged to an adjacent cylinder if necessary for trouble-shooting and servicing. Thermocouple wire length is not critical and should be trimmed to any length as required for a clean installation.

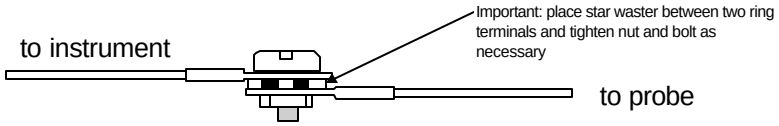
The Temperature probe must be wired with the correct polarity. The temperature probe connects to its temperature indicator with yellow jacket Teflon Chromel Alumel wire supplied. Strip the wires as shown below—observing color-coding.



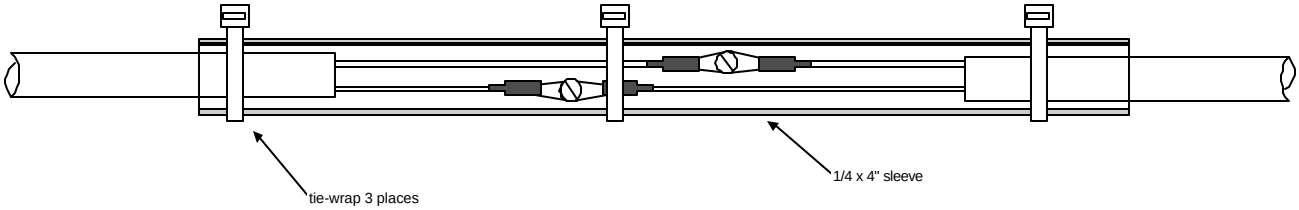
Terminate each wire with a crimp-on ring terminal, provided. The ring terminals may be crimped with a "service-type" tool, however AMP part number 48518 crimp tool is recommended. Verify the quality of each crimp with a sharp tug on the wire. The terminal should be impossible to pull off when crimped correctly.



Place a ¼ x 4-inch sleeve over each pair of wires in the wiring. Connect the wire ring lug to the probe ring lug using the supplied number 4 screws and nuts, placing the star washer *between* the ring lugs, not against the nut.



Slide the sleeve over the joint and secure with three tie-wraps.



The most common installation problems are related to poor quality terminations.

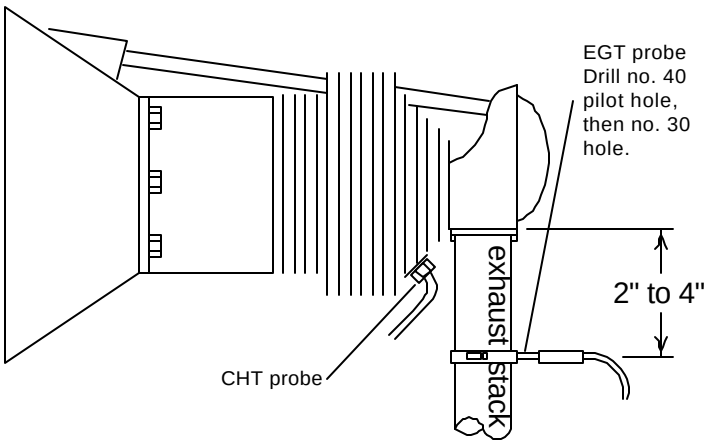
8. Wiring Markings

The EDM-900/930/950 is supplied with special Teflon insulated Chromel Alumel factory assembled wiring harness configured for the correct number of cylinders. The wire harness is marked E1= EGT-1, C1= CHT-1, etc.

NOTE: Unlike most other EGT & CHT installations **the probe wire length is not critical** and should be trimmed to any length as required for a clean installation. **Do not extend the thermocouple wire with copper wire.**

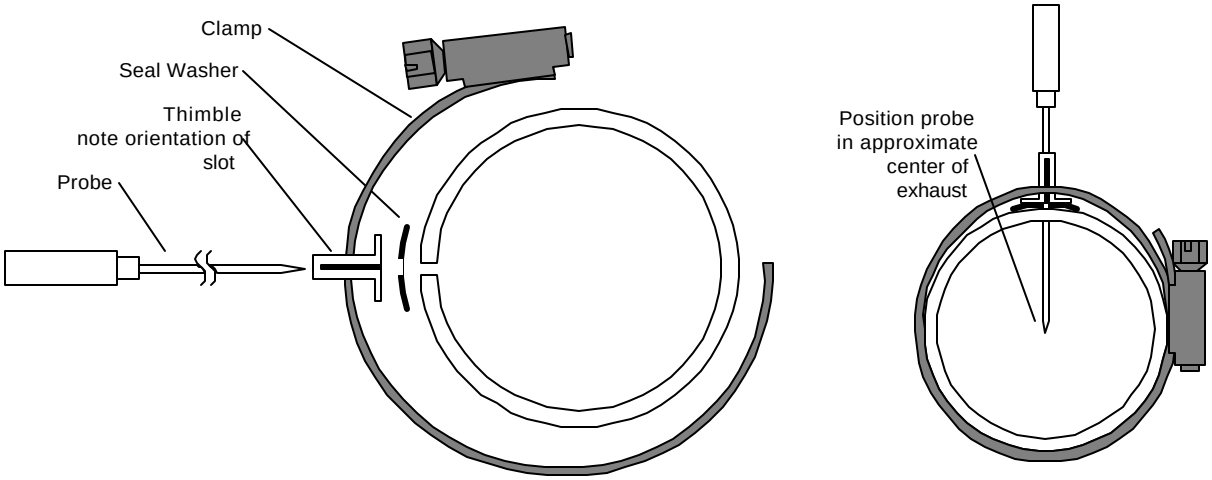
9. Exhaust Gas Temperature Probe (EGT) Installation

Use the J2 connector harness 700700 or 700702 labeled E1 through E4 or E6. Remove the existing EGT gage and Probe. Replace with JPI probe M-111 in all exhaust stacks.



The Model M-111 Probe will fit any engines where the existing holes in the exhaust stack are 1/8" to 1/4" in diameter. If no hole exists, it will require the drilling of a 1/8" diameter hole and ream to fit. It is important that each probe be mounted the same distance from its exhaust stack flange. A nominal distance of 2 to 4 inches from the exhaust flange is recommended. **If the recommended distance is impractical** because of obstructions, slip joints or bends in the exhaust system then position the probes a uniform distance from the flange as space permits. **Do not mount probes in slip joints.** Be certain to locate all holes BEFORE drilling to ensure that nothing interferes with the probe, clamp, screw or wire. Careful matching of probe position will provide best temperature readings.

Insert the probe in the exhaust or previously drilled hole so that the tip of the probe is in the **center of the exhaust stream**. Tighten the stainless steel clamp to a torque of 45 in/Lbs. Cut off the excess strap close to the screw.



10. Turbine Inlet Temperature (TIT) Probe Installation (optional)

Use the J1 connector harness 700200 and insert the yellow wire into the connector pin 16 and the red wire into pin 17. The standard TIT probe PN M111-T with a #48 clamp is placed in the exhaust stack accumulator to a maximum depth of 1/2 inch and approximately 4 inches from the turbine inlet if possible, on the waste-gate side of the turbine.

10.1 TIT for second Turbine Inlet Temperature

Use the J1 connector harness 700200 and insert the yellow wire into the connector pin 18 and the red wire into pin 17The standard JPI TIT probe P/N M-111-T with a special clamp is placed in the exhaust stack accumulator to a **maximum** depth of 1/2 inch and approximately four inches from the Turbine inlet if possible, on the waste gate side of the turbine.

10.2 Using the Factory original TIT Probe

The factory installed TIT probe (K-calibration) is compatible with the JPI EDM-900/930/950 System. Connect the JPI wire marked TIT in parallel with the factory probe noting color polarity. See the EDM-900/930/950 Pilot's Guide for the factory TIT probe calibration procedure. Replacement probes should be purchased per part number from the aircraft manufacturer.

If you choose to use only the EDM-900/930/950 TIT display you may remove the factory installed TIT indicator and leave the TIT probe installed. Connect the JPI wire marked TIT directly to the probe noting color polarity. The TIT probe should now have only the JPI leads attached to it. No calibration of the EDM-900/930/950 is necessary.

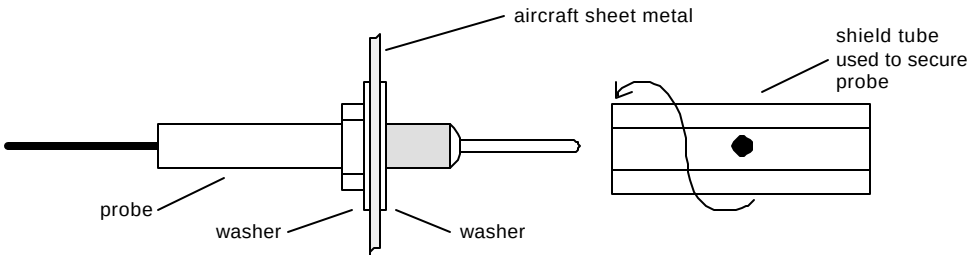
11. Cylinder Head Temperature (CHT) Probe Installation

Use the J2 connector harness 700700 or 700702 labeled C1 through C4 or C6. The JPI probe is a bayonet probe P/N 5050-T that has a captive 3/8-24 boss that is screwed into the head of each cylinder.

For Indicator replacement, replace your existing CHT probe and adapter, a bayonet or screw in type with one supplied by JPI. Install the probe on the same cylinder from which you removed the original equipment probe. Your current CHT probe is installed in the hottest cylinder as determined by the airframe manufacturer. .

12. Outside Air Temperature (OAT) Probe Installation

Use the J1 connector harness 700200 labeled OAT. All wiring must be type K thermocouple wire. Do not splice ordinary copper wire in any temperature probe circuits.



Install the OAT probe, PN 400510 in the airframe manufacturer's recommended location. If this information is not available, place the OAT probe in clean airflow such as in a cabin air scoop or below the underside of the wing away from engine heat or exhaust. In this case it is recommended that the installation be done similar to the antenna installation instructions of AC 43.12-2a *Acceptable Methods, Techniques and Practices*.

The outside aluminum shield tube is used to both hold the probe in place and shield it from radiated heat from the sun. OAT option is displayed as an independent digital temperature ribbon like "75".

13. Induction Air (IAT), Compressor Discharge Temperature Probe Installation (optional)

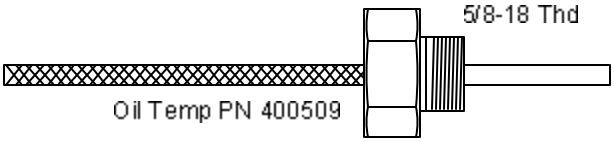
Use the J1 connector harness 700200 and insert the yellow wire into the connector pin 3 and the red wire into pin 4. All wiring must be type K thermocouple wire. The Induction Air Temperature probe, (IAT), is installed just after the inter-cooler and the Compressor Discharge Temperature (CDT) just before the inter-cooler. The probe is the same as an EGT probe and installed similarly to an EGT probe. A large clamp is supplied to fit around the airport leaving the inter-cooler. Alternately a 1/8 NPT fitting is available. IAT option is displayed as an independent digital temperature like "125 IAT". On non-turbo engines the IAT in reality is the Carburetor temperature and displayed as "34 CRB".

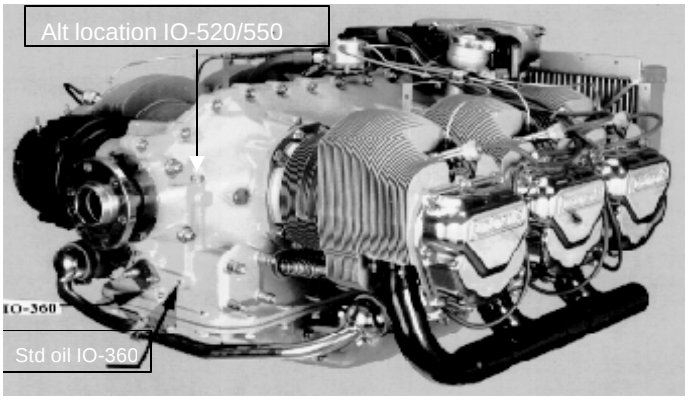
14. Carburetor Probe Installation (optional)

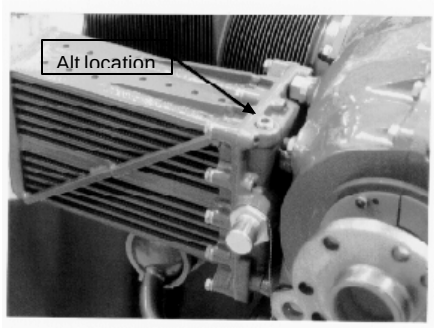
Use the J1 connector harness 700200 and insert the yellow wire into the connector pin 5 and the red wire into pin 6. All wiring must be type K thermocouple wire. Do not splice ordinary copper wire in any temperature probe circuits. Locate the access hole (1/4-24 thread) in the carburetor near the butterfly valve. Remove the screw plug now in that hole and screw the CRB probe into the carburetor throat. No drilling or machining of the carburetor is necessary.

15. Oil Temperature Probe Installation

The sensor port is a standard 5/8-18 thread for both the Continental and Lycoming engines. Probe PN 400509 is a complete assembly using type K thermocouple wire (red/yellow). Connect the wire marked oil temperature observing polarity. Wire length has no effect on the readings. Oil temperature will be displayed as an independent temperature digital and bar-graph. Check with engine manufactures proper location for oil temperature. Check for oil leaks before first flight.

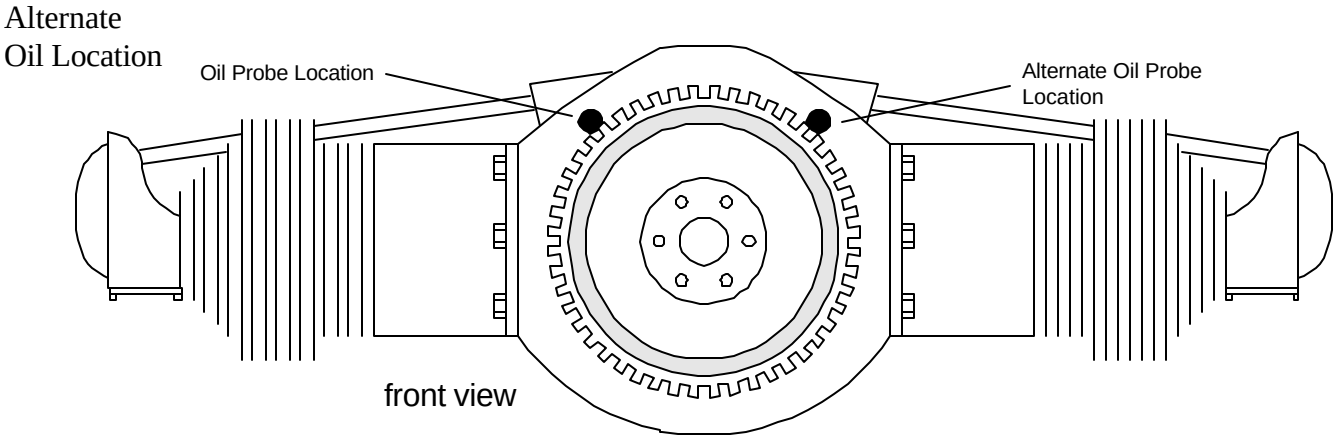






Requires ¼ NPT to 1/8 NPT reducer Oil reports after thermostat opens

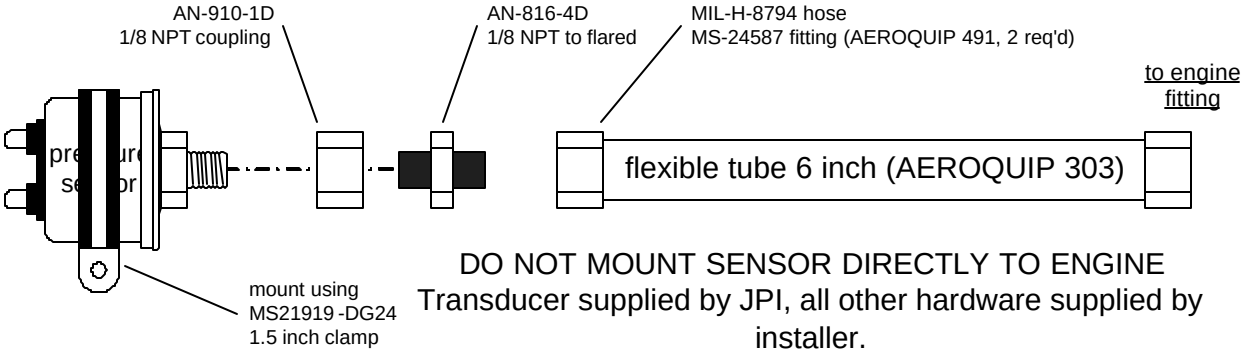
O-470



Lycoming Engines

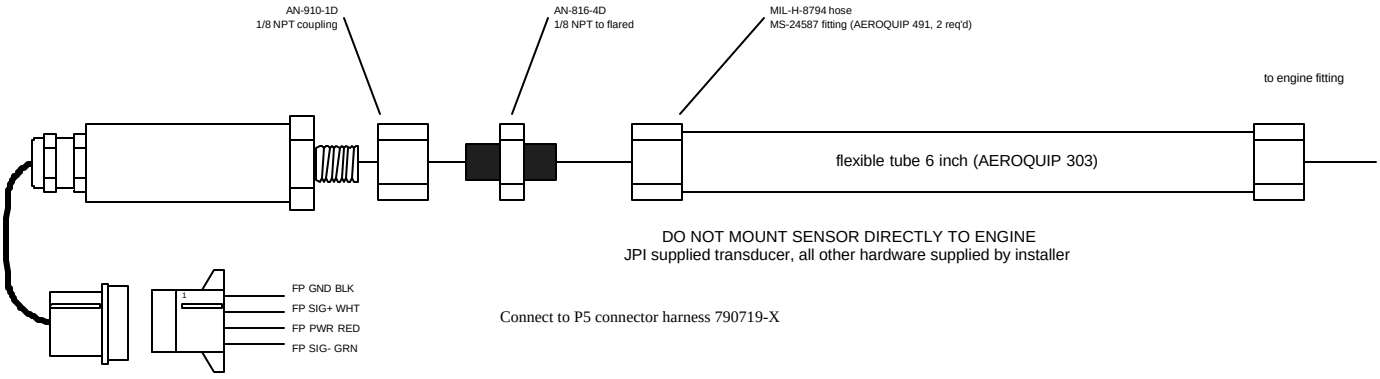
16. Oil Pressure Sensor Installation

Use the J3 connector harness 790420 labeled OILP. Mount the two ring terminals to the two terminals on the sensor using the hardware screws. Mount the pressure sensor to the pressure line using a 3 to 6-inch flexible hose and fittings (not supplied) as depicted in the drawing below. Use tie-wraps or Alon clamp to mount the pressure sensor to firewall. Do not mount the sensor directly to the engine. Connect the other end of the hose to the engine manufactures recommended location for oil pressure on the engine.



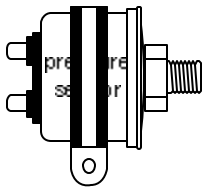
17. Fuel Pressure Sensor Installation

Use the J5 connector harness 790719-X labeled FUELP. Mount the pressure sensor to the pressure line using a 6-inch flexible hose and fittings (not supplied) as depicted in the drawing below. Use tie-wraps to mount the pressure sensor an engine mount structure. Do not mount the sensor directly to the engine. Connect the other end of the hose to the existing pressure line. Later, you will connect the pressure sensor to the four pressure sensor wires through the supplied 4-pin connector. Part No. 790775-0 or -1 required for Carburetor engines PN 306017 for injected engines. For Sensym sensor (shown below), crimp the four pins of the female Molex connector to the



harness, matching the wire colors. Secure to firewall with Aluminum Clamp MS21919 WDG14 or tie wrap to existing aircraft supports . For injected engines use clamp MS21919WDG 25.

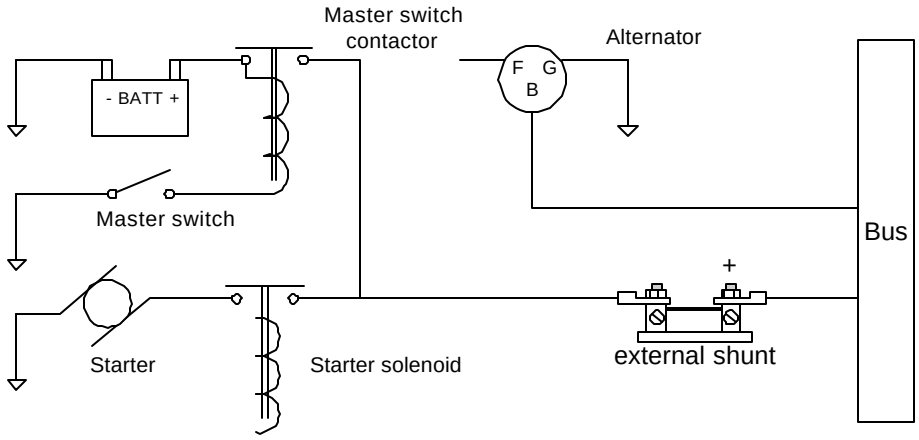
OR Transducer PN 3060-17 for injected engines



18. Ammeter Shunt Installation

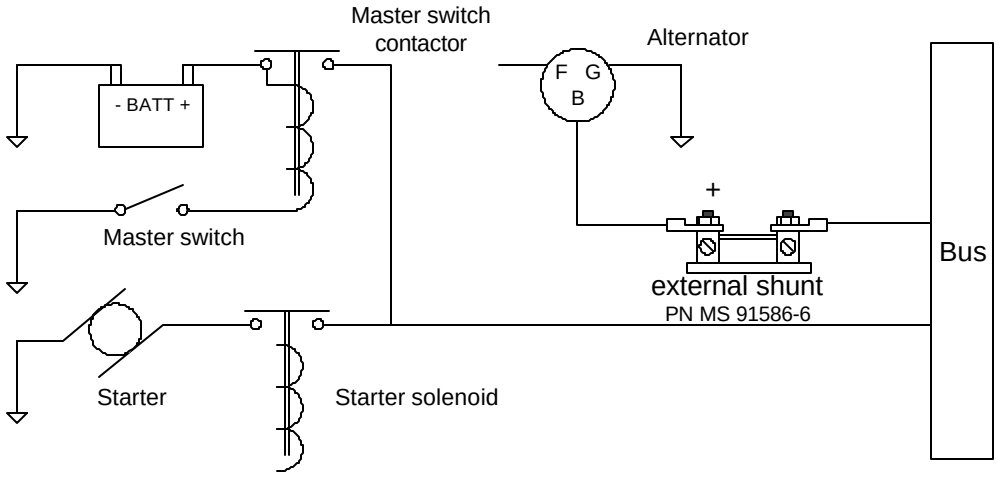
Use the J5 connect harness 790719-X labeled AMP+ and AMP-. Connect the harness leads using ring terminals to the smaller terminal screws on the side of the shunt.

Charge/Discharge configuration. The shunt can be installed between the master contactor and the main bus in which case it will be in the ammeter configuration showing battery charge and discharge. Be sure that the *positive* side of the shunt is connected to the main bus in the *ammeter* configuration. The alarm will be triggered by a discharge condition.



Ammeter Configuration

Load Meter Configuration. Or the shunt can be installed between the alternator output and the main bus in which case it will be the load meter configuration showing alternator load (positive only). Be sure that the *negative* side of the shunt is connected to the main bus in the *load meter* configuration. There is no alarm.



Load Meter Configuration

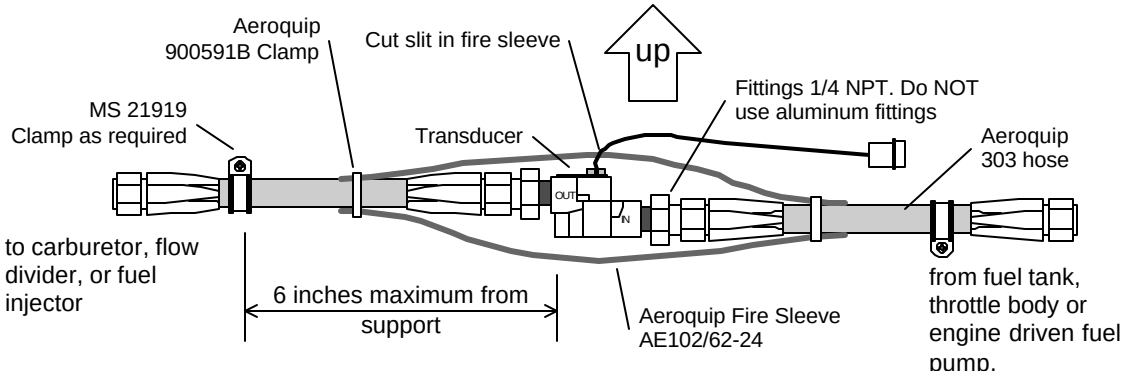
19. General Fuel Flow Transducer Installation

Use the J4 connector harness 700709 labeled FFSIG (white), FFPWR (red), and FFGND (black). If no previous fuel flow transducer is installed, install transducer per **APPENDIX-A Report 503 FUEL FLOW TRANSDUCER INSTALLATION.**

The EDM-900/930/950 receives signal from any installed digital transducer like a FloScan Transducer of the following FloScan P/N's embossed on to the top of the transducer. The K-Factor is marked on the side of the Transducer. Wire per drawing 790744, Route the JPI wires along the existing wiring bundle lacing every foot.

FloScan PN	Shadin equivalent PN
201-A	
201-B	680501/680600
201-C	
231	680503

Before connecting any hoses to the transducer, thoroughly clean them and insure they are free of any loose material. **Never pass air pressure through the transducer or use Teflon tape/pipe cement; damage will occur.** Use only steel fittings supplied never use aluminum fittings on transducer. Remove the transducer cap plugs only when ready to install the hoses. Note the direction of fuel flow marked on the transducer. Fuel must flow in this direction. Reverse flow installations will read ½ the required flow. Mount the transducer with the three wires pointing up. The K-factor is printed on the side of the transducer and on a tag. Write down the K-factor here for future reference..... 29.9 average for 201 and 19.9 average for 231 transducer.



The EDM-900/930/950 fuel flow transducer receives signal from any installed 201 or 231 transducer with either of these part numbers embossed on to the top of the transducer**.**

Fuel Flow Transducer Installation Instructions for specific engine types

General:

A complete thorough familiarization and understanding of the system and this manual is necessary before commencing the installation. All work must conform with A.C. 43.13.1A ch. 11 sec. 2, 3, 7. The accuracy of this instrument depends entirely upon the accuracy of the data entered. A periodical checking of the actual fuel onboard will eliminate the accumulation of errors due to evaporation leaks, etc.

Do not use the FXT-201 Flow Transducer on aircraft with a gravity feed system. The standard Fuel Transducer (FXT-201) shipped with the EDM-900/930/950(),with Fuel Flow option Fuel Flow instrument is intended to be used on aircraft equipped with fuel pumps. A gravity feed system requires the FXT-231 flow transducer.

Transducer Identification Markings

FXT-201 - Marked "20 l " on the top of the unit.

FXT-231 - Marked "231" on the top of the unit.

1. **If you are not an FAA Certified Aircraft Mechanic familiar with the issues of installing aircraft fuel flow, Do Not attempt to install this instrument.** The installer should use current aircraft standards and practices to install this instrument (refer to AC 43.13).
2. Read the entire Installation Instructions and resolve any issues you may have before starting the installation.
3. **THIS INSTALLATION WILL REQUIRE SOME PARTS UNIQUE TO YOUR AIRCRAFT THAT ARE NOT SUPPLIED IN THE KIT (including, but not limited to hoses and fittings).** Acquire all the parts necessary to install this instrument before starting the installation. Do not use aluminum fittings with the FXT-201 or FXT-231 transducer.
4. Check that the transducer make and model are correct before starting the installation (check the markings on the side of the instrument). A gravity feed system requires an FXT-231 flow transducer (marked "231" on top). A carbureted engine with a fuel return line requires a second transducer.
5. Before connecting any hoses to the transducer, thoroughly clean them and insure they are free of any loose material. **Never pass high pressure air through or blow through the transducer, damage will occur.**
6. Remove the transducer cap plugs when ready to install hoses. Do not use aluminum fittings with the fuel flow transducer or Gauling may occur.
7. Note the direction of fuel flow marked on the transducer. Fuel must flow in this direction. If the transducer is reversed the flow will be approx ½ the flow
8. Mount the transducer with the three wires pointing up.
9. Note and record the K-factor engraved in the side of the transducer.

Installing the Fuel Flow Transducer:

Mount the Fuel Flow Transducer using the appropriate drawing.

Aircraft Configuration	Drawing #	Location
1. All gravity Flow installations **without** fuel pump. Must use FXT-231	700923	Between Fuel tank and Carburetor.
2. All Fuel injected engines **with** vapor return lines to fuel tank , all Continental and certain Lycoming engines.	700922	Between throttle body and fuel flow divider.
3. All pump fed carbureted and Fuel injected engines **without** vapor return lines.	700921	Between engine driven pump and servo/throttle body or carburetor
4. Pressure Carbureted engines with vapor return lines	700923 700920	One transducer in Carb inlet line and one transducer in out let line

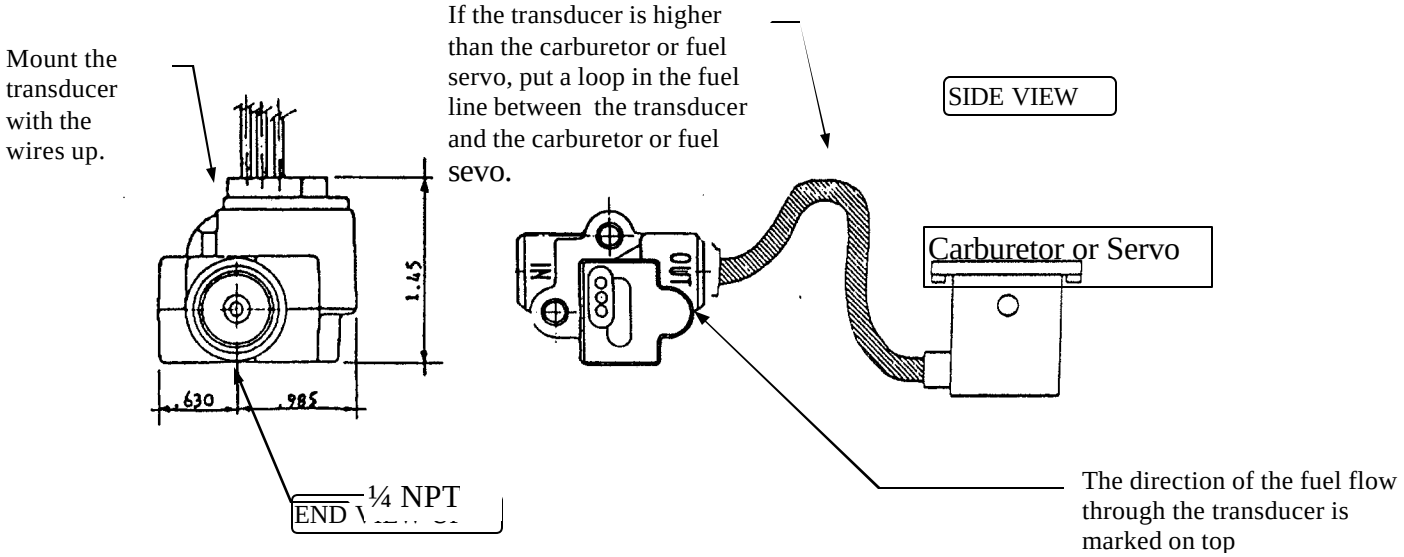
The instructions listed below must be followed when installing a Fuel Flow Transducer.

Note: If your engine is equipped with a fuel return line from the carburetor back to the fuel tank you will need to install two flow transducers... one in the feed line from the fuel pump to the carburetor and one in the return line from the carburetor back to the fuel tank.

The transducer output port should be mounted lower or even with the carburetor inlet port (or fuel servo on a fuel injected engine). If this is not possible, a loop should be put in the fuel line between the Fuel Flow Transducer and the carburetor or fuel servo (see diagram below).

Do not remove the caps on the flow transducer until the fuel hoses are ready to be installed.

The flow of fuel through the transducer must follow the direction marked on the transducer.



The flow transducer must be mounted so the wires exiting the transducer are pointing up.

Before connecting any hoses, thoroughly clean them and insure they are free of any loose material. High air pressure my be used, **However, do not allow high air pressure to pass through the flow transducer.**

Route the Fuel Flow Transducer Wires:

Route the thermocouple and fuel flow wires from the probes through the firewall using fireproof rubber grommets and flame retarding silicone. Use an existing hole if possible. Following the existing wiring harness and connect to the indicator marking each lead with the cylinder number. All wires must be routed **away from high temperature** areas (exhaust stacks, turbochargers, etc.). Secure Probe leads to a convenient location on the engine approximately 8 to 12 inches from the probe, being sure there is sufficient slack to absorb engine torque. It is essential in routing the probe and fuel flow transducer wires not be allowed to touch metal parts of the air-frame or engine since abrasion will destroy this wire.

After running the engine, check the fuel hoses, transducers and fittings for leaks.

Weight:

Flow Transducer: 3 oz

Low Fuel Warning Display

The display message will blink anytime the programmed Low Fuel Reminder, Low Fuel Warning or the Time to Empty Limit are violated.

External Warning Control Line:

Grounds when any Warning display is on or blinking. Current should be limited to 2/10 amp.

Accuracy:

Flow: 2% or better in accordance with TSO C44a.

Resolution

Fuel Flow:	0.1 Gal. or 1 Lb. or .1 Ltr.
Fuel Remaining:	0.1 Gal. or 1 Lb. or . 1 Ltr.
Fuel Used:	0.1 Gal. or 1 Lb. or .1 Ltr.
Time to Empty:	10 minute

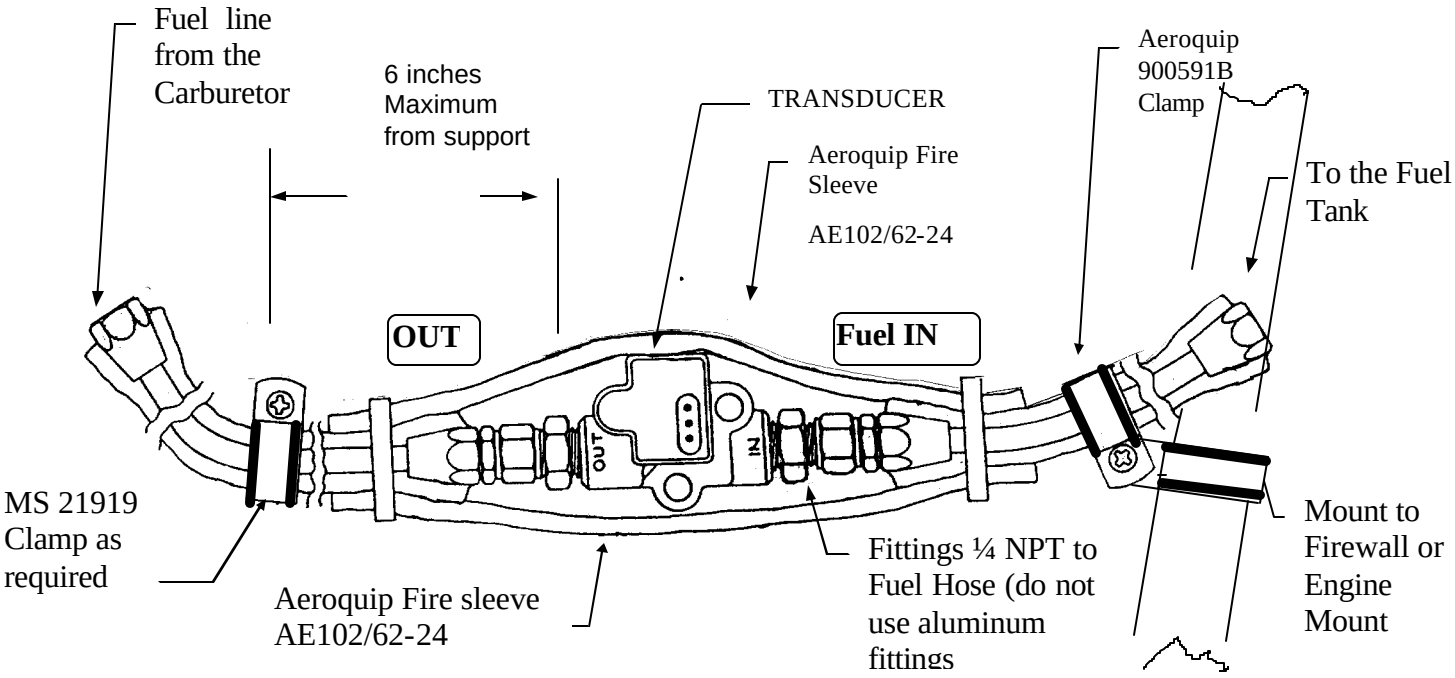
Max Displayed Range (Unit Only):

Fuel Flow:	199.9 Gals. or 162.0 or Gal/Hr or 1199 Lbs/Hr or 749 Ltr/Hr.
Fuel Remaining:	999 Gals. or 811 or Gals. or 1999 Lbs. or 1999 Ltrs.
Fuel Used:	999 Gals. or 811 or Gals. or 1999 Lbs. or 1999 Ltrs.
Time to Empty:	19 hours 59 minutes

Transducer specifications:

Transducer P/N, 700900-1		**Transducer P/N 700900-2**	
Range:	0.6 to 60 GPH	Range:	3 to 90 GPH
Linearity:	%1 (8 to 60 GPH)	Linearity:	%1 (8 to 60 GPH)
K Factor	Approx. 29,000	K Factor:	Approx. 19500
Pressure Drop:	1.2 PSI at 30 GPH	Pressure Drop:	.31 PSI at 30 GPH
	4.8 PSI at 60 GPH		2.8 PSI at 90 GPH
Working Press:	200 PSI	Working Press:	200 PSI
Min. Burst Press: 2000 PSI		Min. Burst Press: 2000 PSI	
Operating Temp. Range -55°C to 70°C		Operating Temp. Range -55°C to 70°C	
Non Operating Temp. Range: -65°C to 100 °C		Non Operating Temp. Range: -65°C to 100 °C	
Fuel Ports: 1/4" Female NPT		Fuel Ports: 1/4" Female NPT	

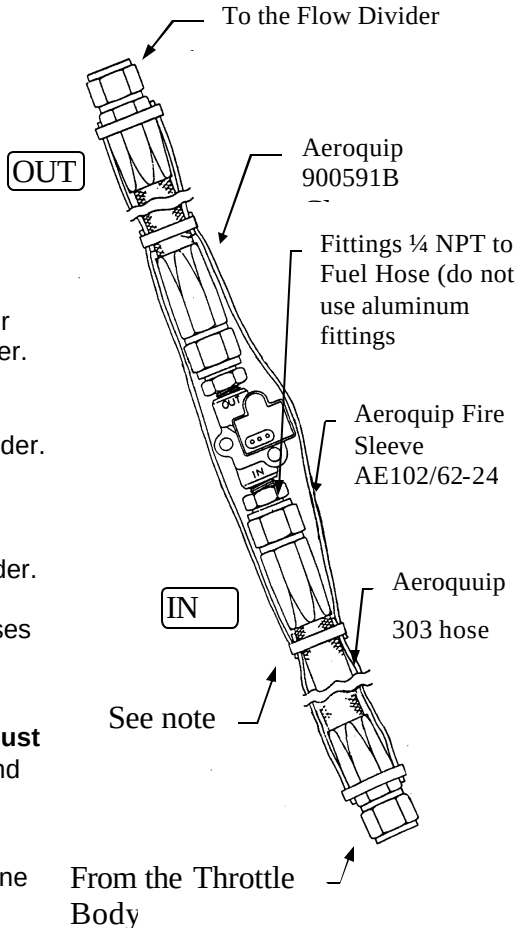
Transducer P/N (FT 4-8AEXS-LEA-2029)	
Range:	3 to 120 GPH
Linearity:	%1 (9 to 120 GPH)
K Factor	Approx. 48,000
Pressure Drop:	0.23 PSI at 30 GPH
	0.8 PSI at 60 GPH
Working Press:	1500 PSI
Min. Burst Press: 2000 PSI	
Operating Temp. Range -55°C to 70°C	
Non Operating Temp. Range: -65°C to 100 °C	
Fuel Ports: AN816-8-8	



Mounting Procedure:

1. **Find a convenient** location within 6" of a hose support or fitting and away from **any** hot exhaust pipes to suspend the Fuel Flow Transducer. The hose support or fitting may be on the input or output line of the Flow Transducer.
2. Remove the fuel hose which goes from the Carburetor to the Fuel Tank.
3. Purchase two new hoses, one from the Carburetor to the Fuel Flow Transducer and the other from the Fuel Flow Transducer to the Fuel Tank. **There must be flexible hose in and out of the Transducer.** The hoses must meet TSO-C53a Type C or D FAA specification. **The new hoses must be the same diameter as the current hose in the aircraft.**
4. Mount the Fuel Flow Transducer in the fuel supply line and in the return line for pressure carburetors. **The Flow Transducer must be wrapped with Fire Sleeving.** Place a small hole in the fire sleeve and pass the transducer wires through it. Seal with High temperature Silicone RTV sealant.
5. Before connecting fuel hose to the carburetor, verify that the boost pump delivers at least 125% of takeoff fuel consumption at minimum fuel pressure as marked on fuel pressure gage.

J.P. INSTRUMENTS **PO Box 7033** **Huntington Beach CA 92646**			
Title : Installation of a Fuel Flow Transducer in the fuel supply or return line from the carburetor to the fuel tank			
Drawing No. 700923			
Date **02/14/97**	**Drawn/** **JP**	**Approved**	**Rev NC**



Mounting Procedure:

1. Find a convenient location between the Throttle Body and the Flow Divider and away from any hot exhaust pipes to suspend the Fuel Flow Transducer.

2. Remove the fuel hose, which goes from the Throttle Body to the Flow Divider.

3. Purchase two new hoses, one from the Fuel Servo to the Fuel Flow Transducer and the other from the Fuel Flow Transducer to the Flow Divider. **There must be flexible hose in and out of the Fuel Transducer.** The hoses must meet TSO-C53a Type C or D FAA specification. The new hoses **must be the same size as the current hose in the aircraft.** A source of fittings and fabricated hoses is:

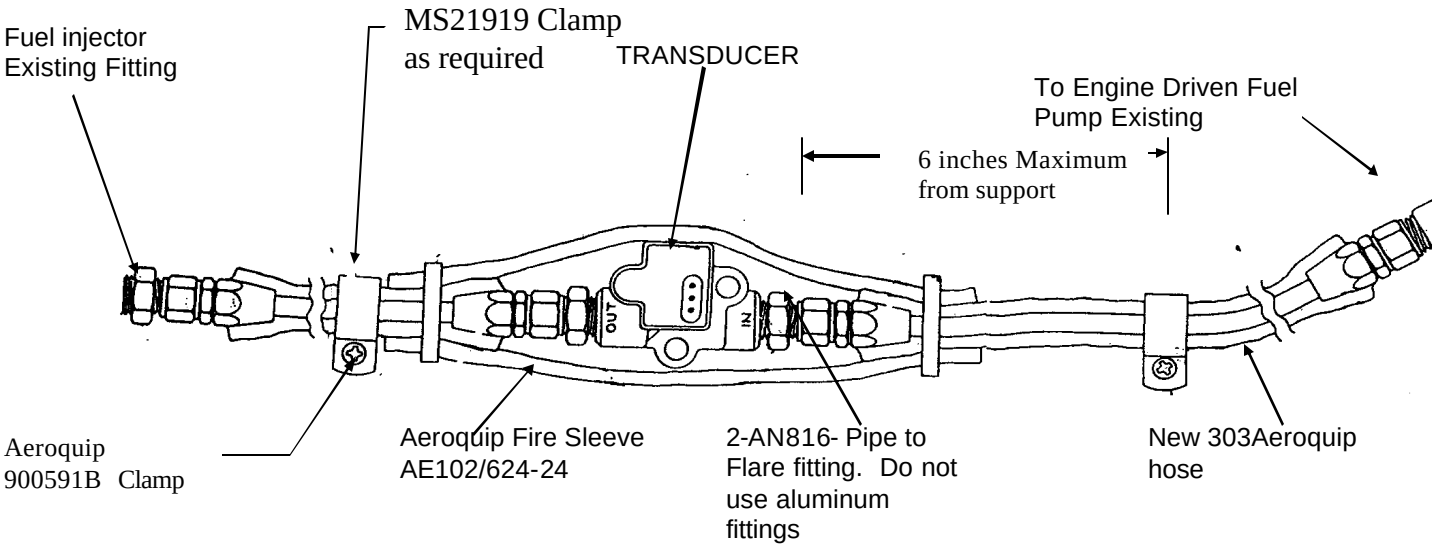
4. Mount the Fuel Flow Transducer in the fuel line. **The Flow Transducer must be wrapped with Fire Sleeving.** Place a small hole in the fire sleeve and pass the transducer wires through it. Seal with High temperature Silicone RTV sealant.

5. Secure at either end of the transducer to any convenient point on the engine with MS21919 clamps or equivalent.

6. For Continental fuel injected engines adjust the fuel pressure to account for the pressure drop across the transducer per Continental Service Bulletin M89-10

7. Cessna 182-T aircraft with an IO-540 engine replace the PN 700900-1 with the gravity 700900-2 Transducer if connecting between the Throttle Body and the Flow Divider.

J.P. INSTRUMENTS **PO Box 7033** **Huntington Beach CA 92646**			
Title Installation of the Fuel Flow Transducer in the fuel line between the Throttle Body and the Flow Divider. Only applicable for Continental Fuel Injected Engines			
Drawing No. 700922			
Date **02/14/97**	**Drawn/** **JP**	**Approved**	**Rev NC**



Mounting Procedure:

1. Find a convenient location within 6" of a hose support or fitting and away from any hot exhaust pipes to suspend the Fuel Flow Transducer. The hose support or fitting may be on the input or output line of the Flow Transducer.

2. Remove the fuel hose which goes from the Fuel Pump to the Carburetor (or Fuel Servo).

3. Purchase two new hoses, one from the fuel pump (or the Fuel Filter) to the Fuel Flow Transducer and the other from the Fuel Flow Transducer to the carburetor (or fuel servo). **There must be flexible hose in and out of the Transducer.** The hoses must meet TSO-C53a Type C or D FAA specification. **The new hoses must be the** same size as **the current hose in the aircraft.**

4. Mount the Fuel Flow Transducer in the fuel line. **You must use the FXT-231 Fuel Flow Transducer on a gravity feed system.** The FXT-201 Transducer is marked "Model 231" on the top of the transducer. **The Flow Transducer must be wrapped with Fire Sleeving.** Place a small hole in the fire sleeve and pass the transducer wires through it. Seal with High temperature Silicone RTV sealant.

5. Before connecting fuel hose to the carburetor , verify that the boost pump delivers at least 125% of takeoff fuel consumption at minimum fuel pressure as marked on fuel pressure gage.

J.P. INSTRUMENTS **PO Box 7033** **Huntington Beach CA 92646**			
Title: Installation of a Fuel Flow Transducer in the fuel line from the fuel pump to the carburetor or fuel servo.			
Drawing No. 700921			
Date **02/14/97**	**Drawn** **JP**	**Approved**	**Rev NC**

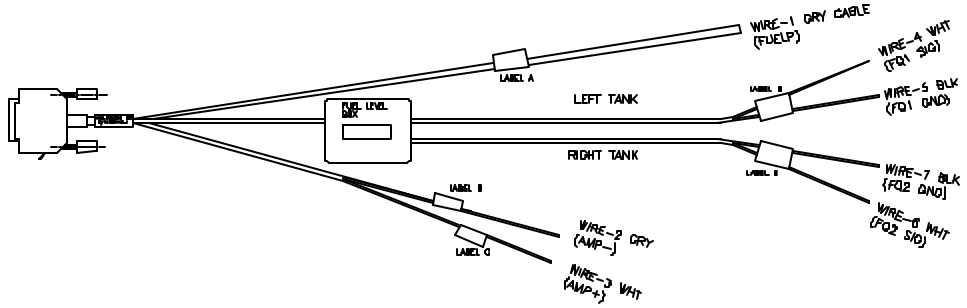
20. Types of Fuel Level senders

The EDM-900/930/950 functions with Resistive/voltage (Change in Resistance or voltage) and Capacitance (Change in frequency) type fuel level senders. In some cases the resistive reading is converted into voltage before it enters the EDM.

20.1 Voltage / Resistive Sender

Disconnect the fuel level senders from the aircraft's existing wiring harness, and connect them to the JPI supplied harnesses as described below. Make sure they do not have voltage on them before connecting to the EDM.

Use J5 connector harness 700719-3 with two black/white wire pairs labeled LEFT TNK RES and RT TANK RES. On installed sensors connect them to the J5 FP/FQ/AMP wiring harness as shown below. Connect the white wire to the signal terminal and black wire to the ground terminal of the resistive fuel level sensor. Tank setup 1- record the sender resistance/voltage (using the EDM-930) at full (top off, make sure the aircraft is full). 2-Burnoff or remove approximately ½ tank, and record the resistance/voltage**.** 3- Then empty the tank and add the unusable back in and take a reading as empty**.** Now with the tank size you can create an input table. Repeat for the other tank sender.



20.2 Capacitive Sender

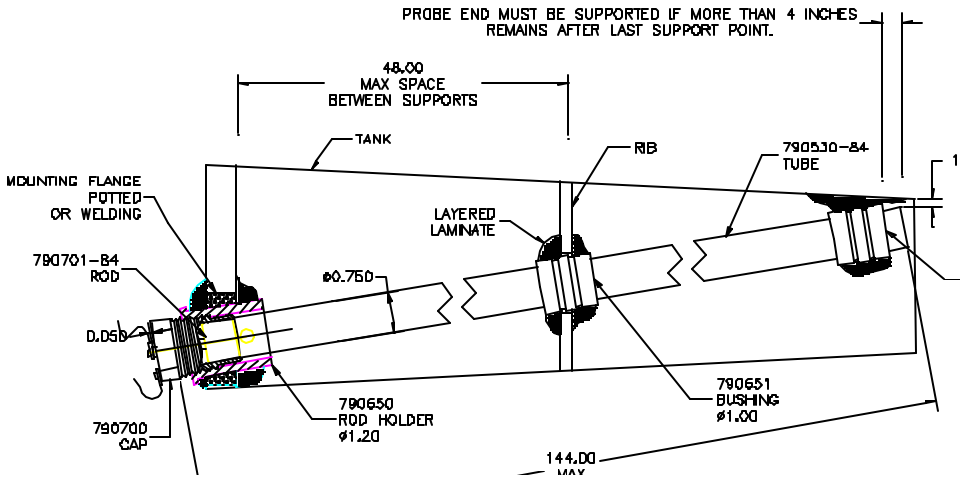
Fuel level system sender installation:
Do not install probe into metal mounting flange without first applying thread lubricant or damage will occur. Insure all threads are free from burrs and debris.
The fuel level probes are designed to be installed in virtually all types of wing tank configurations. The basic objective are to install the probe so that it can sense the fuel level change from full tank to empty tank (i.e. the probe is wetted the least at empty tank and is wetted the most at full tank) and to position it in such a manner as to allow insertion and removal.
The probe may be cut to a minimum of **16 inches** in length overall (metal end to metal end) and mounted in any direction. Internal spacers are located approximately every foot that supports the inner rod and crimp the rod to prevent it from moving.
See the drawing in illustration section for an example probe installation. These are intended as examples only. As each tank configuration may be different, it is your responsibility to design and implement a proper installation method for your aircraft:
The example shows a cross section of a typical long, flat wing tank. Typically the probe enters the tank from the inboard fuel bulkhead and angles upward so that it is wetted from empty tank to full tank proportionately. Insure that nothing interferes with the probe such as a flop tube, fuel pick-ups, vents or drains, etc.
The probe may enter a fuel tank from the bottom up or vice versa as long as the probe sees at least an **85%** coverage change from full to empty.
The following notes should be observed to aid in the proper installation of the probes. See the illustration below.

NOTE 1: Mounting flange installation (Metal knurled flange).
For composite aircraft, the metal mounting flange is "potted" into the tank closeout rib at an angle as dictated by probe placement in the tank. INSURE that the flange edges are surrounded by a generous margin of the plotting and that 3 layers of laminate are laminated over the potted areas. This is necessary to insure that the flange is "fuel tight", mechanically rigid and will not be "cracked' loose during fuel probe installation or vibration in use. For metal tanks, the mounting flange is a weldable aluminum alloy allowing many attachment options.

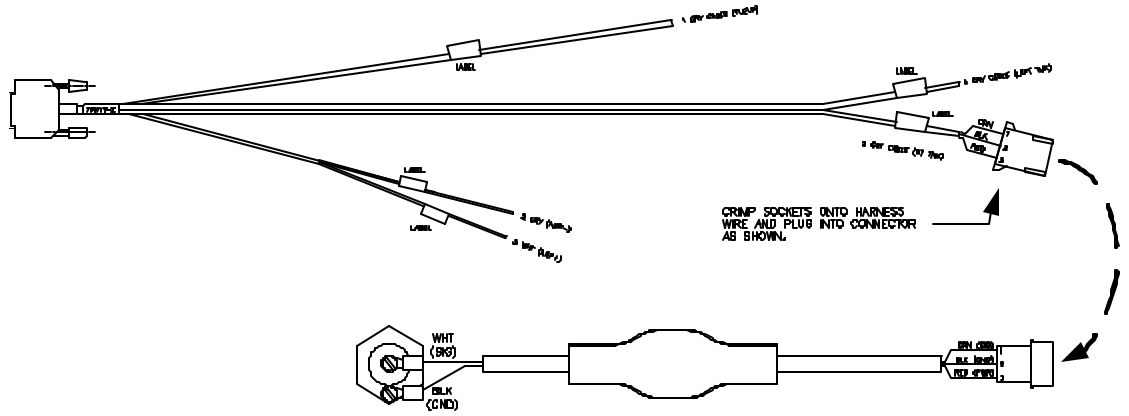
NOTE 2: Bushing installation (white bushing)
The probe (if longer than 48 inches) should be supported in the middle. Install a bushing in the middle rib or baffle using the fuel probe as the alignment guide. Bond the bushing to the rib / baffle using the techniques recommended in your aircraft construction manual.

NOTE 3: End supports (white bushing)
The probe end must be supported if more than 4 inches of length remains after the last support point.
Position a bushing near the end of the probe so that the edge of the probe is approximately 1/8 inch from the wing skin. Secure the bushing at the surface of the wing using potting mixture. Lay up two layers over the bushing while the potting mixture is still soft to hold the bushing in place. Use the bonding techniques recommended in your aircraft construction manual.

For 'finale installation', prepare the pipe threads of the probe with an aviation fuel proof thread sealant/lubricant according to sealant manufactures' directions. Insert the probe into the tank and through the bushings until the threads engage. Hand tighten the probe. Now tighten the probe with a torque wrench to **230 INCH POUNDS.**



Use the J5 connector harness 700719-2 labeled LEFT TNK and RT TANK. After senders are installed, connect them to the J5 FP/FQ/AMP wiring harness as shown below (only the right tank sender is shown for illustration purposes). Trim the longest pair of gray cables labeled LEFT TNK and RT TANK to length, then crimp the three sockets onto the harness wire, and insert them into the connector housing. Connect this to the Capacitive sender pod cable and connect the white wire of the pod cable to the center, insulated terminal on the sender, and the black wire to the terminal mounted on the metal body on the sender. Repeat for the other tank sender.



20.2.1 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.

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 one tank and write them in the chart below. These values will be entered using the procedure, 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	[ ] [ ] [ ] [ ]	[ ] [ ].[ ]

* unusable fuel level is entered as 00.0

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

20.2.2 Setting Fuel Calibration Points

The fuel quantity gauges will not be present on the display until the fuel table for your aircraft has been installed on the Key Card by JPI. Use the following procedure for determining the values that JPI will install into the fuel tables on your Key Card. The most accurate reading come from the installed EDM-930. Inform JPI if the readings were taken off of the EDM or a digital volt meter. Note: Before you install the EDM-930 you can take readings with an Ohm Meter. If you feel the factory Fuel Level gages were accurate you can disconnect the aircraft fuel level transducer and in its place, place an Variable **Ohm Box**. Adjusting the Ohm Box to get the aircraft fuel level needle to a specific location and then reading the ohms, thus creating a table. The most accurate method is using the EDM system to measure.

Turn OFF the aircraft master switch	
1	Empty left then right tanks, <u>putting back the unusable fuel</u>. (**first fuel level calibration point**)
Hold the right-most button while turning ON master switch, and see one of three messages:	1. Resistive Fuel Level or 2. Fuel Level Voltage or 3. Capacitive Fuel Level
2	With the left and right tanks empty and at unusable fuel level, **write down** the displayed calibration values L1 & R1. This is the empty (0) fuel level. You will see typical reading like: LEFT TANK READING 148.8 OHMS or 2.55 volts or 4532 Hz RIGHT TANK READING 151.8 OHMS or 2.45 volts or 4123 Hz
Turn OFF the aircraft master switch	
3	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) Make sure the tank is full. Some aircraft seem full but can take much more fuel by filling slowly.
Hold the right-most button while turning ON master switch.	
4	With the left and right tanks at the second calibration point, **write down** the displayed calibration values L2 & R2 **and** the amount of fuel now in each tank. For a 2 point calibration, stop here.
Turn OFF the aircraft master switch	
5	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 the right-most button while turning ON master switch.	
6	With the left and right tanks at the third calibration point, **write down** the displayed calibration values L3 & R3 **and** the amount of fuel now in each tank. For a 3 point calibration, stop here.
Turn OFF the aircraft master switch.	
7	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 the right-most button while turning ON master switch.	
8	With the left and right tanks at the fourth calibration point, **write down** the displayed calibration values L4 & R4 **and** the amount of fuel now in each tank. For a 4 point calibration, stop here.
Turn OFF the aircraft master switch	
9	Add fuel to the left and right tanks and bring it up to **full** for the **fifth fuel level point calibration point** level. Shake the aircraft to make sure you are full. On some aircraft full is not at the filler cap point.
Hold the right-most button while turning ON master switch.	
10	With the left and right tanks at the fifth calibration point, **write down** the displayed calibration values L5 & R5 **and** the amount of fuel now in each tank (fuel tanks).

21. GPS Interface

Use the J4 connector harness 700709 labeled RS232 OUT TO GPS (white) and RS232 IN FROM GPS (gray). Refer to the GPS manual for the required pin connections on the GPS.

22. Multi-Function Display (MFD) Interface EDM-950, Incomplete System

EDM950 Communications Overview:
The EDM950 acquires raw engine data, converts it to standard engineering units (degrees, volts, amps, etc.), records it in data log memory, and exports it serially to an external display.

The protocol used is standard ASCII data in Comma Separated Variable (CSV) format. The communications settings are: 19200 BAUD, 8 bit data, 1 stop bit, no parity, with no hardware handshaking. This is a one way protocol. That is, data is sent from the EDM950 to the external display unit. There are no commands that can be sent in the opposite direction.

For details regarding this protocol, please consult the JPI ASCII Protocol Specification 500.

In general, data is sent at a rate of four records per second. There are two basic record types.

- A header record indicating which measurements are contained in the data records.
- The actual data record.

Each data record contains:

- Record type
- All captured measurements, separated by commas
- Record checksum
- CR/LF indicating end of record

Each measurement data field consists of ASCII hex data representing the 16 bit signed value of the measurement. The value is a fixed point integer. That is, a measurement of 123 may represent a value of 12.3. Details as to which measurements do or do not have a fixed point are in the specification.

There are three error messages indicating severe instrument errors. Receiving any one of these errors indicates that the unit is not operating properly.

- CFG – Configuration error
- DATALOG – Data Log error
- CAL – Calibration error
-

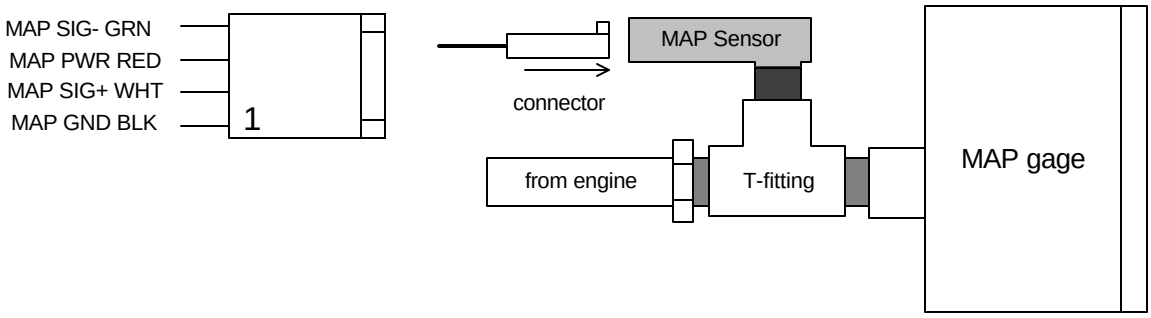
Use the J1 connector harness 790200 labeled OUT MFD (white) and IN MFD (gray). Refer to the MFD manual for the required pin connections to the MFD.

shown below if not already installed from the aircraft factory MAP gage.

22.1 Alternate method of Manifold pressure transmitter installation in aircraft using existing Manifold Pressure gage

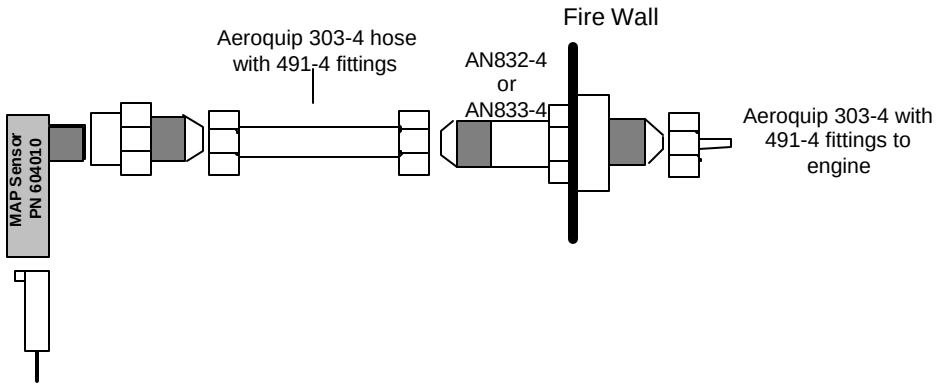
For the JPI sensor use the J3 connector harness 790420 and connect the 4 leads using the supplied 4-pin connector and pins.

Install a T-fitting in the aircraft's MAP gage line in the cockpit near the MAP gage. Install the JPI MAP sensor P/N 604010 on the T-fitting. The MAP sensor uses a 1/8 NPT fitting.



23. Manifold Pressure (MAP) Sensor

The manifold pressure sensor is mounted external to the EDM in the cockpit and has a female 1/8 NPT port. It is mounted to he EDM or the firewall. Screw a AN823-2 (flared to pipe thread) into the EDM Port using Aeroquip 471 fitting and 306-2 1/8 tubing. Run the tubing to the firewall bulkhead fitting AN832-2. From the firewall bulkhead



fitting using a flared fitting AN818-2 and Aluminum 1/8 inch tubing made of 3003-0 connect to the engine manifold.

Fitting not supplied by JPI

24. Manifold Pressure Calibration

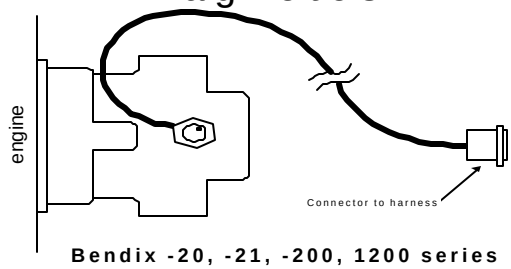
The manifold pressure must be calibrated to the ambient air pressure. Enter the current ambient barometric pressure. The engine must ***not*** be running. This setting is *not* the same as the altimeter setting that you receive from ATIS or Unicom. It will vary with field elevation. Use the chart below to calculate the MP FACTOR. Multiply this MP FACTOR by the altimeter setting that you receive from ATIS or Unicom. For example if the field elevation is 1700 ft and the altimeter setting is 30.1, the MP FACTOR is 0.9400 from the table. Multiply 30.1 x 0.9400 to get the ambient MP of 28.29. The manifold pressure is adjustable +/- 3 in Hg.

Field Elev.	MP FACTOR				
-500	1.0182	2100	0.9264	4700	0.8414
-400	1.0145	2200	0.9230	4800	0.8382
-300	1.0109	2300	0.9196	4900	0.8351
-200	1.0073	2400	0.9162	5000	0.8320
-100	1.0036	2500	0.9129	5100	0.8289
0	1.0000	2600	0.9095	5200	0.8258
100	0.9964	2700	0.9062	5300	0.8227
200	0.9928	2800	0.9028	5400	0.8196
300	0.9892	2900	0.8995	5500	0.8165
400	0.9856	3000	0.8962	5600	0.8135
500	0.9821	3100	0.8929	5700	0.8104
600	0.9785	3200	0.8896	5800	0.8074
700	0.9750	3300	0.8863	5900	0.8043
800	0.9714	3400	0.8830	6000	0.8013
900	0.9679	3500	0.8798	6100	0.7983
1000	0.9644	3600	0.8765	6200	0.7953
1100	0.9609	3700	0.8733	6300	0.7923
1200	0.9574	3800	0.8700	6400	0.7893
1300	0.9539	3900	0.8668	6500	0.7863
1400	0.9504	4000	0.8636	6600	0.7833
1500	0.9469	4100	0.8604	6700	0.7804
1600	0.9435	4200	0.8572		
1700	0.9400	4300	0.8540		
1800	0.9366	4400	0.8508		
1900	0.9332	4500	0.8477		
2000	0.9298	4600	0.8445		

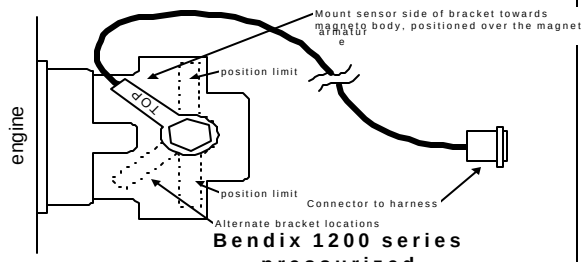
25. RPM Sensor installation

Use the J3 connector harness 790420 and connect the 3 leads using the supplied 3-pin connector and pins. There are three types of magnetos commonly in use. You must have the correct RPM sensor for the magneto installed in the aircraft. The following part numbers apply: Slick -4000, -6000 use JPI P/N 420809. For the Bendix -1200 use P/N 420807. Dual magnetos use JPI PN 420810. For the Bendix -20 -A,-B,-C use JPI P/N 420806. Mount the sensor as shown in the appropriate diagram below.

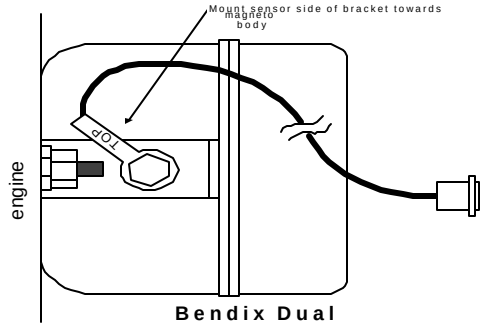
Bendix Magnetos



Bendix -20, -21, -200, 1200 series non-pressurized
JPI 420815-2

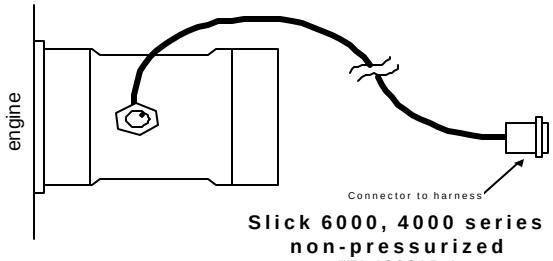


Bendix 1200 series pressurized
JPI 420807

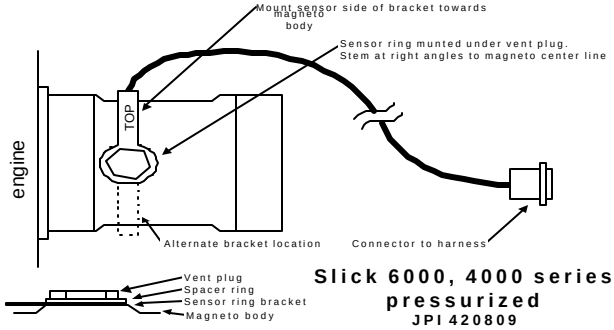


Bendix Dual Magneto

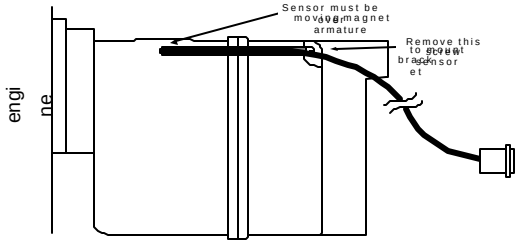
Slick Magnetos



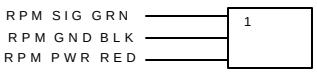
Slick 6000, 4000 series non-pressurized
JPI 420815-1



Slick 6000, 4000 series pressurized
JPI 420809



Slick 600 series



26. Limitations and Specifications

The following parameters must be customized for the aircraft into which the EDM-900/930/950 is installed.

Factory set limits or default values for EDM-900/930/950

1	TIT 1650 F	TSO-C43
2	CHT 450 F	TSO-C43
3	Oil Temp Low 90 F	TSO-C43
4	Oil Temp HI 230F	TSO-C43
5	Oil Press low 15 psi	TSO-47
6	Oil Press Hi 100 psi	TSO-47
7	Vacuum 0- 15"hg	TSO-47
8	RPM 2700 Limit and range	TSO-C49
9	RPM set to cyl 6	TSO-C49
10	Map 32 In hg HI	TSO-C45
11	Map setting 29.90 In Hg	TSO-C45
12	Fuel Pressure Hi 35 psi Injected	TSO-47
13	Fuel Pressure Lo 15 psi Injected	TSO-47
14	Fuel Pressure Hi 8 psi Carb	TSO-47
15	Fuel Pressure Lo .5 psi Carb	TSO-47
16	Fuel Flow 24 GPH	TSO-C44
17	K-factor 29.99	
18	Carburetor filter smoothing 1	
19	Ammeter configuration (load or charge-discharge). Load	
20	HC-120 (% of HP)	NON TSO
21	Fuel Level Resistive/Capacitive	TSO-55
22	Low fuel 10 Gal	
23	Low time 45 Min	
24	Main tank 75 gallons	
25	Aux tank 0	
26	GPS set at GARMIN	
27	Diff 500 degrees	TSO-C43
28	CLD 60 degrees per minute	TSO-C43
29	Amps limit 100 amps	Mil Spec MS91586-6
30	Record time, 6 sec intervals	NON TSO
31	Hobbs on at 1000 RPM	NON TSO

The conditions and test required for TSO approval of this article are minimum performance standards. It is the responsibility of those desiring to install this article either on or within a specific type or class of aircraft to demonstrate that the aircraft installation conditions are within the TSO standards. The article may be installed only if further evaluation by the applicant (user/installer) documents and acceptable installation and is approved by the Administrator.

The functions of Volts, Amps, and Horsepower were tested to DO-160D and DO-178B, but not TSO'd since no TSO exist for these functions. Deviation granted for TSO-C49b to include digital display and sensor. All TSO required probes, transmitters and sensors also tested to DO-160D.

There are two independent displays for fuel onboard. The Fuel Flow based system requires the user to set initial fuel remaining onboard. Accuracy of Fuel Remaining readings (REM in lower left display) depends on correct entry at the start of the flight. The Fuel Level system is a direct reading system that displays fuel tank levels based on inputs from tank level sensors.

INCOMPLETE SYSTEM		
TSO	**ITEM**	**DESCRIPTION**
ALL	EDM-950	No display
TSO-C55	EDM-900/930/950	Type I (float inst) input available, sensor not tested

27. Component Parts all parts on this list were TSO tested

DISCRIPTION	Part No.	Option	-4Cyl	-6Cyl
Display and Indicator EDM 900/930/950	790000 (-A,-B,-C)		1	1
Remote Display Unit	790749	1		
EGT probe	M-111		4	6
CHT probe	5050		4	6
EGT/CHT harness	700702 4 cyl 700700 6cyl		1	 1
TIT probe	M-111-T		1	1
OAT probe	400510		1	1
IAT probe	M-111		1	1
Carb temp probe	400128		1	1
Oil temperature probe/adapter	400505/400503		1	1
Harness (all options and power)	790200		1	1
Fuel pressure Transmitter Carb engine Fuel pressure Transmitter Injected engine	790775 -1,-2,-3 3060-17		1	1
Ammeter shunt	MS –91586-6		1	1
Fuel Flow transducer	700900-1,-2		1	1
Harness Fuel Flow	700709		1	1
Fuel Level sender option	791000		1	1
Harness (Fuel Level/Amps/Fuel pressure)	790719-1		1	1
Oil pressure Transmitter	306018		1	1
MAP	604010		1	1
RPM	420806, 7, 9, 15		1	1
Harness (RPM/MAP/O-P)	790420		1	1
Fuel Level Sensor (capacitance)	791000-(xx)	2		
Remote alarm light	159121-14,28	2		

27.1 Component Parts List for EGT (PN 128) ,TIT (PN 120) Probe

1 EGT/TIT/IAT/CDT Probe PN M-111
1 Stainless Steel Clamp Thimble
1 Stainless Steel Exhaust Seal Washer
1 Stainless Steel Screw Type Clamp
2 Ring Terminals
2 Screws and nuts 6-32 X 1/4
1 Fiberglass tube 1/2" X 4"

27.2 Component Parts list for CHT (PN 126) probe

1 Bayonet Probe PN 5050
1 Or Gasket thermocouple probe PN M-113
2 Ring Terminals
2 Screws and Nuts 6-32 X 1/4"
1 Fiberglass tube 1/2" X 4"

27.3 Component Parts list for OAT (PN 122) probe

1 P/N 400509, OAT probe
2 Ring Terminals
2 Screws and Nuts 6-32 X1/4"
Fiberglass tube 1/2" X 4"

27.4 Component Parts list for CARB (PN 121) probe

1 P/N 400128 CARB probe

2 Ring Terminals
2 Screws and Nuts 6-32 X1/4"
1 Fiberglass tube 1/2" X 4"

27.5 Component Parts list for OIL (PN 124) probe

1 P/N 400505 OIL probe
2 Ring Terminals
2 Screws and Nuts 6-32 X 1/4"
1 Fiberglass tube 1/2" X 4"

27.6 Component Parts list for Oil Pressure sensor

1 P/N 306018, Oil pressure sender
2 Ring Terminals

27.7 Component Parts list for Fuel Pressure Sensor

1 P/N 159930 Fuel pressure sensor
1 4-pin male connector housing
4 male crimp pins
1 4-pin female connector housing
4 female crimp pins or 1 PN 306017
2 Ring Terminals

27.8 Component Parts list for ampere shunt

1 P/N MS-91586-6 100 amp shunt
2 Ring Terminals

27.9 Component Parts list for Fuel Flow Transducer

1 fuel flow transducer, PN 700900
8 inches of 1.5"dia fire sleeve
1 3-pin connector housing
3 female pins
2 AN816-4-4 fittings

27.10 Component Parts list for MAP sensor

1 P/N 604010, MAP sender

27.11 Components Parts list for RPM sensor P/N depends on Magneto make and model

Bendix magneto -20,21…….P/N 420806
Bendix magneto -1200,……...P/N 420807
Bendix magneto Dual ……...P/N 420815
Slick magneto 4000 or 6000 P/N 420809

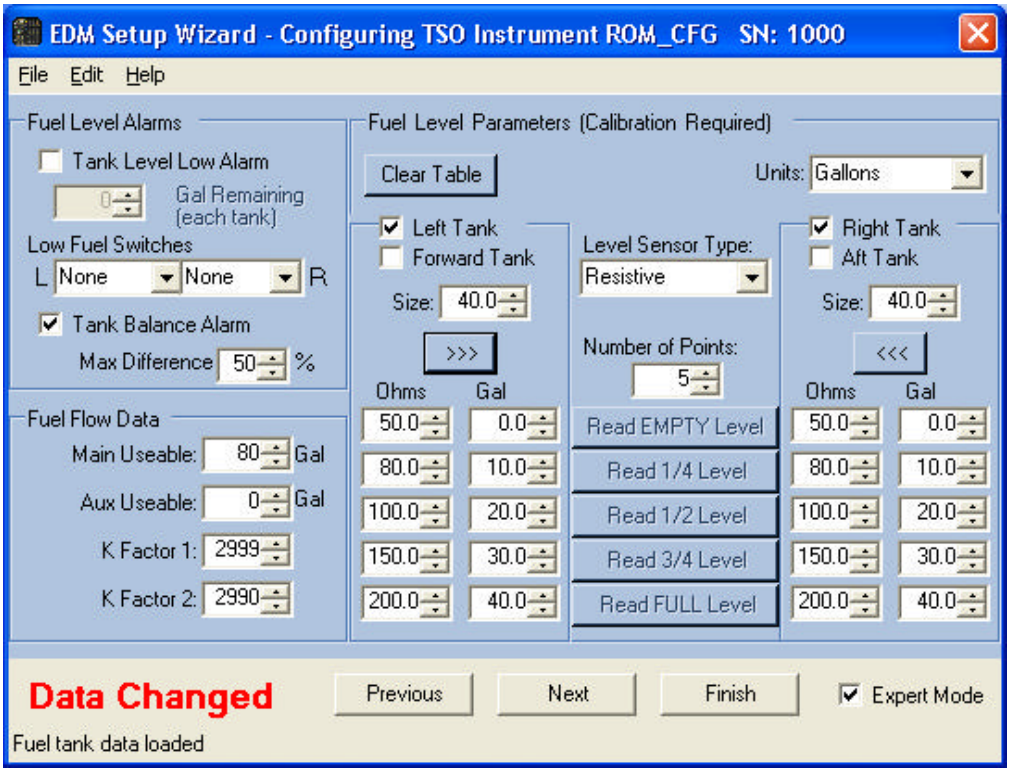
28. Weight and Balance Data

Indicator PN 790000(-A) EDM-900	2.0 Lbs
Indicator PN 790000(-B) EDM-950	1.8 Lbs
Indicator PN 790000(-C) EDM-930	3.0 Lbs
EGT / TIT / CDT / IAT / OAT probe	2.0 oz. each / 0.125 lbs
CHT / Oil Temperature probe	1.5 oz. each / 0.094 lbs
4/6 Cylinder Harness 8 ft.	14.0 oz. each / 0.88 lbs
RPM and MAP	1.5 oz each / .094 lbs
Fuel Pressure Sender	3.9 oz each /
Oil Pressure Sender	4.4 oz each /
Harness each	1.0 Lbs

29. Pilot Programmable Mode

29.1.1.1 Pilot Programming Using EzConfig

JPI provides a configuration program that runs on an MSWindows PC, called EzConfig. See the www.jpiTech.com web site to download. Follow the instructions in the EzConfig documentation to change these assignments.



29.1.1.2 Pilot Programming without EzConfig

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. Exits program mode when done.
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-I0 … OAT+I0	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 I?N	EGT I?N⇔ EGT I?Y	Y—Yes—sets the digital display to one-degree resolution; N—No—sets 10°. (10° resolution is easier to interpret the EGT's.)
HPC I25	70 HP HPC= I25	%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 37→ To adjust the MAP, 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.
MAP 29.9	MAP 20→32	Adjust the MAP. See page 37→
KP 29.90		Adjust the instrument's K-factor to match the fuel flow transducer K-factor. See page 37→
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 37→
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.

29.1.2 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 = I25. Then hold both the STEP and LF buttons display until you see ADJUST, followed by HPC= I25. 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.
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 at sea level.
5. Tap the STEP button to proceed to the next step.

29.1.3 Programming the MAP

Sets the manifold pressure calibration (an sets the Carbureted fuel pressure zero points).

You may need to correct the MAP based on the **altimeter setting at a sea level airport.**

1. Enter the pilot program mode by simultaneously holding the Step and LF buttons for five seconds.
2. Tap Step/OK repeatedly until you see—for example— HPConstant=125. Then hold both the first two buttons Step/OK and Change buttons display until you see Adjust, followed by HP Constant=125.
3. Again, Hold both the two buttons, Step/OK and Change buttons display until you see ADJUST, followed by MAP+0. The adjustment range for the MAP is ±3.0 in Hg. As you adjust the MAP up or down you will see a change in the MAP gage under RPM. When you see the correct setting stop.

4. Tap the Step/OK button to proceed to the next step or hold both buttons again to exit setup.

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.

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

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

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

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

Tap the STEP button to proceed to the next item.

29.1.4 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.

29.1.4.1.1 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:

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

29.1.4.2 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: I 9.90

8. Tap STEP button for next digit (hold STEP for previous digit): I 9.90

9. Tap or hold the LF button to change flashing digit: I 8.90

10. Tap STEP button for next digit (hold STEP for previous digit): I8.90

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.

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

29.1.5 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.

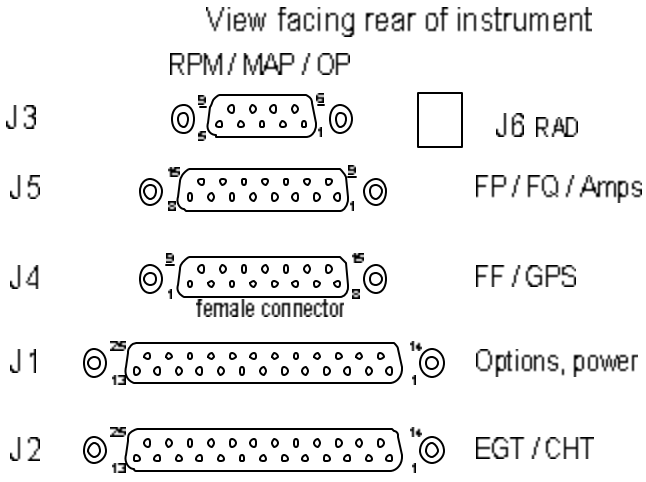
Select "No" if you wish to display total fuel used since the last time you informed the EDM-900 that the aircraft was refueled. Select "Yes" to display total fuel used for an extended trip with multiple fuel stops. This selection affects only the USD measurement.

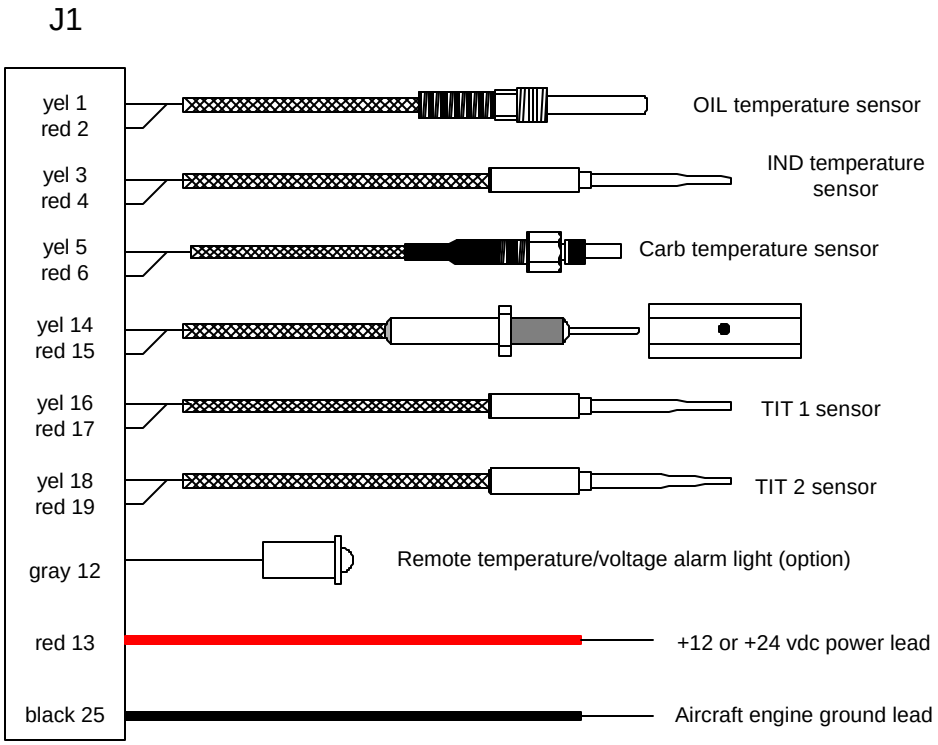
During normal operation, to reset the accumulated fuel used display at any time, tap STEP until you see USD. Hold both STEP and LF until the display shows .0 USD.

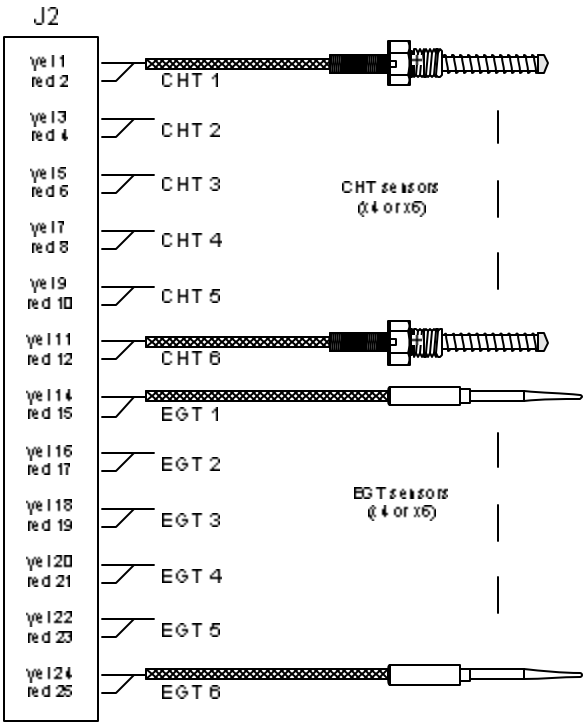
30. Trouble Shooting

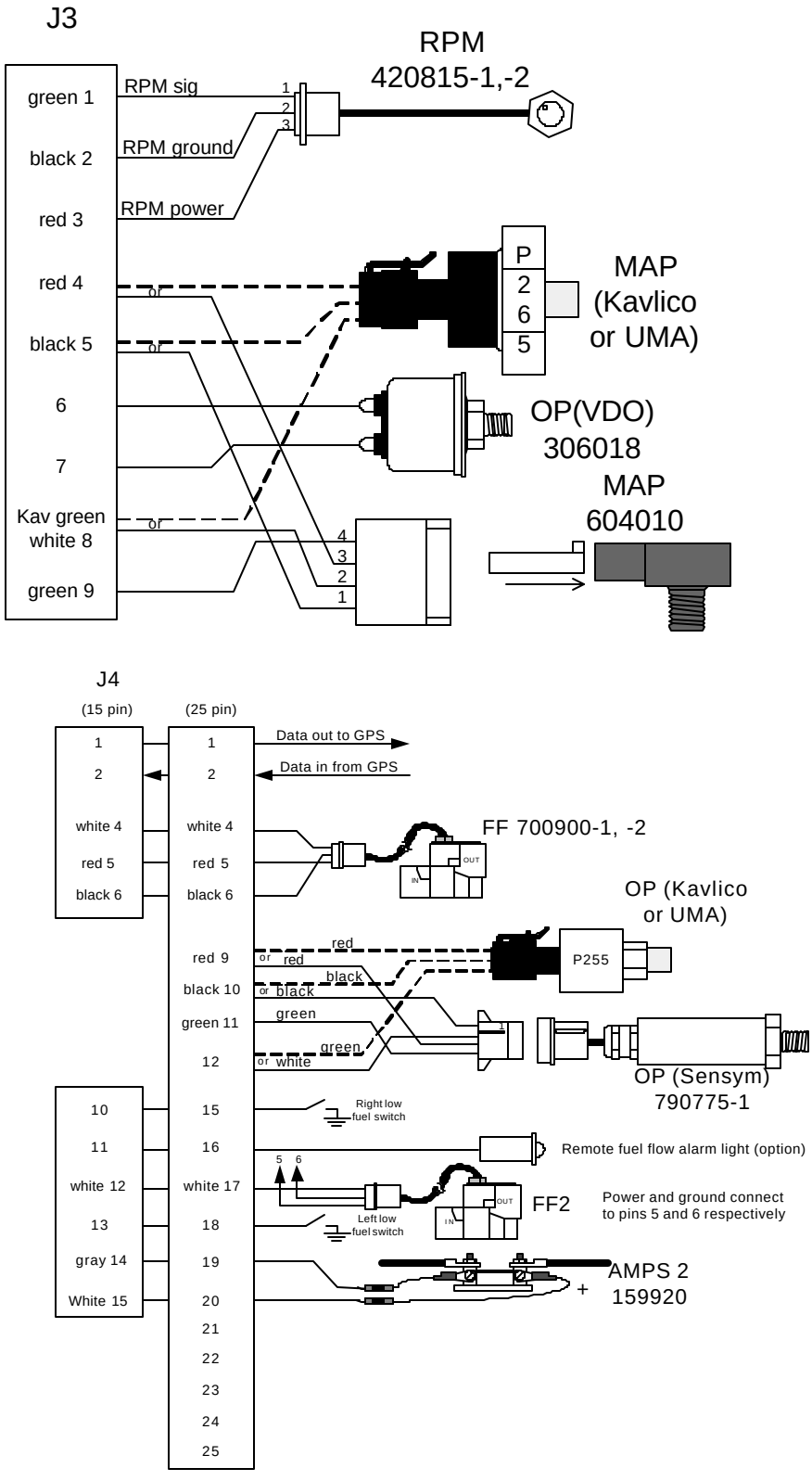
1. **A missing column in the display upon start up** indicates the continuity check diagnostic routine has found an open line or probe with no connection. An error message will indicate which cylinder to look at.
2. **A missing column in the display during flight** indicates a reading that is jumping around or incorrect. The probe is removed from the line up to prevent false alarms.
3. **A negative reading** (-) in front of the number indicates reverse polarity on the red/yellow wire to probe.
4. **Using an Ohmmeter** or continuity checker measure across the probe output leads. A good probe should be around 2- ohms and at the connector to the probe around 20 ohms.
5. **Having problems with one cylinder reading ?** Swap the suspected probe with a probe from a good cylinder. If the problem goes to the good cylinder the probe should be replaced. If the problem remains the same, it is in the Thermocouple hook-up wiring from the probe to the instrument or it can be in the ring terminals crimped to the wire. Remember to double back on the wire going into the ring terminal.
6. **EGT, large span**. Normally aspirated (carburetor) engines at normal cruise display a "DIFF" of 125 to 175 ^{o}F spread between cylinders. Injected engines at normal cruise display a "DIFF" 50 to 90 ^{o}F spread between cylinders. All cylinders are measured by a common circuitry. It is almost impossible **not to have** identical calibration on all channels.
7. If the temperature is changing more than 500 F in one second it should not be trusted and a loose wire crimp or probe should be suspected. A malfunctioning probe will automatically be removed from the scan.
8. **All EGT or CHT readings seem to High or Low or Unsteady**. Use a DVM (digital voltmeter) to measure the difference between 900/930/950 SCANNER ground and the engine block ground. If the difference is greater than 0.5 volts with the alternator charging. Then remove the EDM-900/930/950 ground (Black wire) from the instrument panel and connect it directly to the ENGINE BLOCK for GROUND.
9. **OAT readings off by 25 degrees,** but oil and CHT readings OK, look for *copper wire spliced* in line to OAT probe. OAT reading can be fine tuned +/- 5 degrees, see reset procedure. Engine heat could also be the cause.

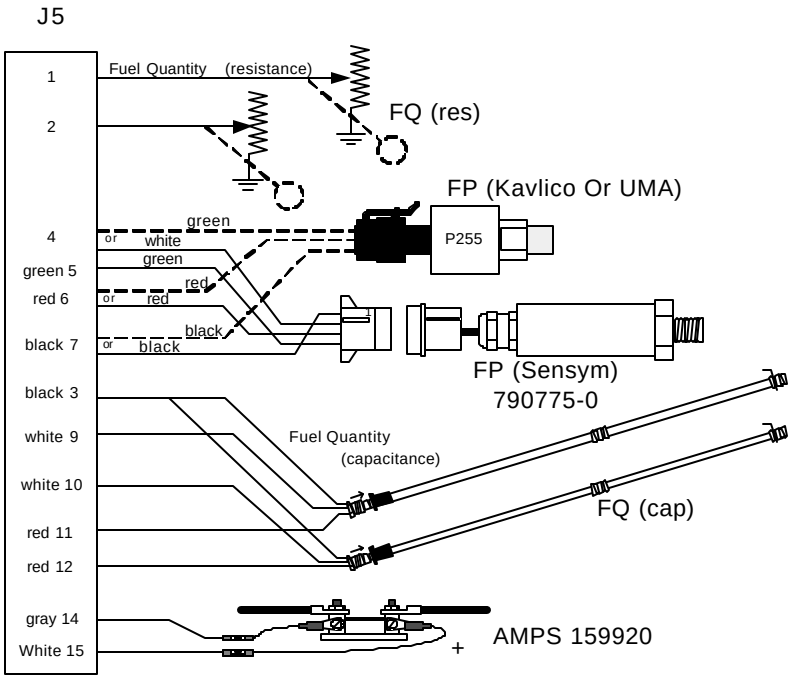
31 Connector Pin Assignments

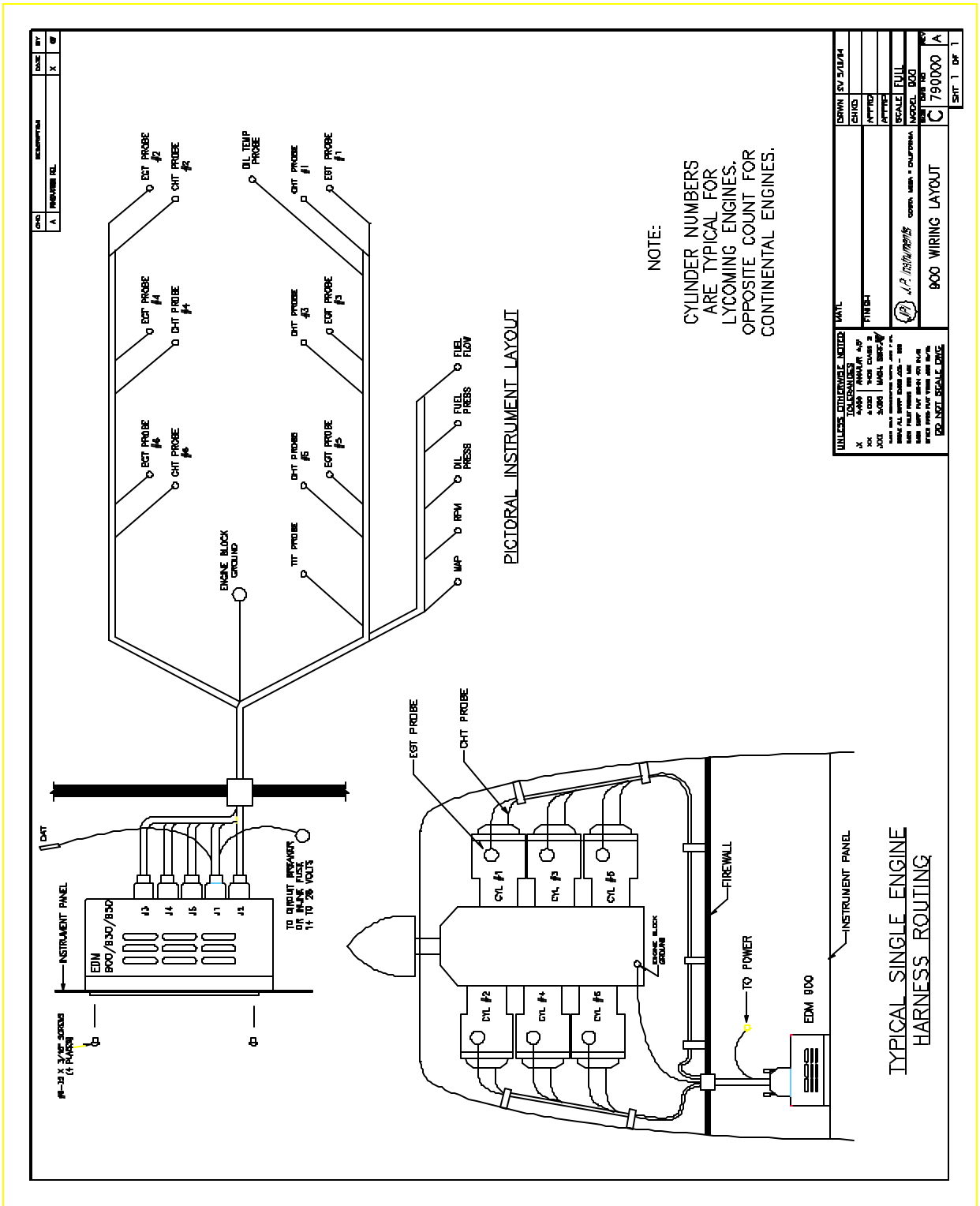


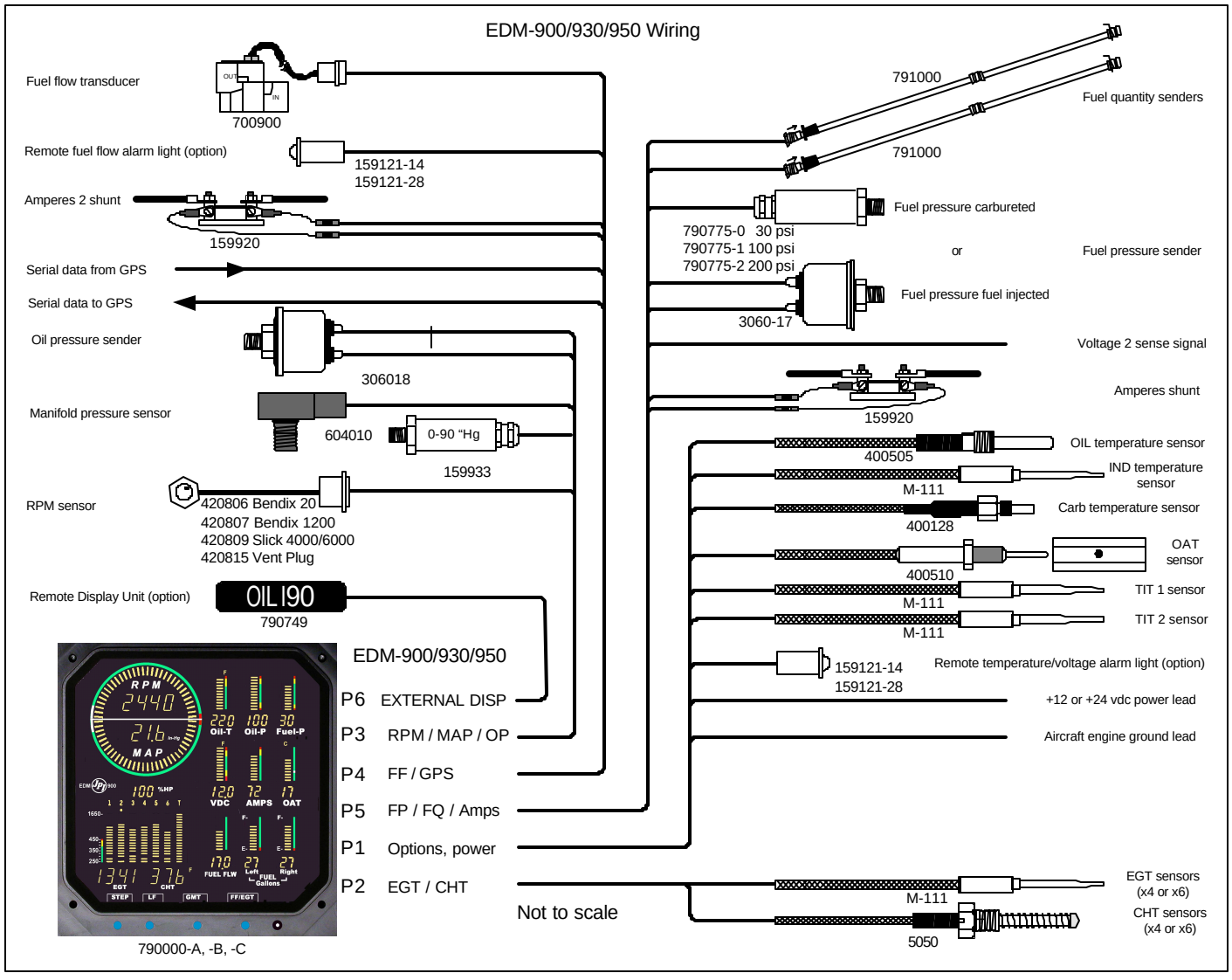

J1
yel 1
red 2
OIL temperature sensor
yel 3
red 4
IND temperature sensor
yel 5
red 6
Carb temperature sensor
yel 14
red 15
yel 16
red 17
TIT 1 sensor
yel 18
red 19
TIT 2 sensor
gray 12
Remote temperature/voltage alarm light (option)
red 13
+12 or +24 vdc power lead
black 25
Aircraft engine ground lead


J2
yel 1
red 2
CHT 1
yel 3
red 4
CHT 2
yel 5
red 6
CHT 3
CHT sensors
(4 or 6)
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
EGT sensors
(4 or 6)
yel 18
red 19
EGT 3
yel 20
red 21
EGT 4
yel 22
red 23
EGT 5
yel 24
red 25
EGT 6


J3
RPM
420815-1,-2
green 1
black 2
red 3
red 4
black 5
6
7
Kav green
white 8
green 9
RPM sig
RPM ground
RPM power
1
2
3
or
P
2
6
5
MAP
(Kavlico
or UMA)
OP(VDO)
306018
MAP
604010
4
3
2
1
J4
(15 pin)
(25 pin)
Data out to GPS
Data in from GPS
white 4
red 5
black 6
FF 700900-1, -2
OUT
IN
OP (Kavlico
or UMA)
red 9
black 10
green 11
12
red
black
green
white
P255
OP (Sensym)
790775-1
10
11
white 12
13
gray 14
White 15
15
16
white 17
18
19
20
21
22
23
24
25
Right low
fuel switch
Remote fuel flow alarm light (option)
5 6
Left low
fuel switch
FF2
Power and ground connect
to pins 5 and 6 respectively
AMPS 2
159920
+


J5
1
2
4
green 5
red 6
black 7
black 3
white 9
white 10
red 11
red 12
gray 14
White 15
Fuel Quantity (resistance)
FQ (res)
FP (Kavlico Or UMA)
P255
green
or white
green
red
or red
black
or black
FP (Sensym)
790775-0
Fuel Quantity
(capacitance)
FQ (cap)
AMPS 159920
+


NOTE:
CYLINDER NUMBERS ARE TYPICAL FOR LYCOMING ENGINES. OPPOSITE COUNT FOR CONTINENTAL ENGINES.
PICTORAL INSTRUMENT LAYOUT
EGT PROBE #2
CHT PROBE #2
OIL TEMP PROBE
CHT PROBE #1
EGT PROBE #1
EGT PROBE #4
CHT PROBE #4
CHT PROBE #3
EGT PROBE #3
EGT PROBE #6
CHT PROBE #6
EGT PROBE #5
CHT PROBE #5
TIT PROBE
ENGINE BLOCK GROUND
FUEL FLOW
FUEL PRESS
OIL PRESS
RPM
MAP
EDM 900/930/950
INSTRUMENT PANEL
TO CIRCUIT BREAKER OR FUSE 1A TO 2A VOLTS
OAT
CYL #1
CYL #3
CYL #5
CYL #2
CYL #4
CYL #6
FIREWALL
TO POWER
EDM 900
INSTRUMENT PANEL
TYPICAL SINGLE ENGINE HARNESS ROUTING
900 WIRING LAYOUT
C 790000 A
SHT 1 OF 1
SCALE FULL
DRAWN GV 5/10/94
CHKD
APPVD
MATL
FINISH
UNLESS OTHERWISE NOTED TOLERANCES
DO NOT SCALE DWG



32 Instructions for Continued Airworthiness (ICA)

There are no field adjustments and or calibration requirements for the EDM-900/930/950 instrument after initial installation. ICA is not required. Maintenance of nonfunctioning or malfunctioning components is limited to removal and replacement of JPI factory supplied new or repaired components as described in the troubleshooting section of the installation instructions.