34 Channel Installation

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1. DATA LOGGER SPECIFICATION & WIRING

A. Dimensions and Weight 34 Channel Data Logger
   Weight: 2.8 lb
2. INSTALLATION NOTES

1) The computer can be mounted at any angle in the vehicle and should be supported by foam rubber or weatherstripping. When properly installed, you should be able to move the unit 1/8" to 1/4" in any direction with one finger.
2) The cables included with your system are interchangeable. Each cable is labeled for its specific function. The system is designed to survive an accidental mis-connection for a short period of time. Damage may occur from prolonged mis-connections.
3) Route all cables separate from ignition sources, plug wires, distributors, electric fuel pumps, power wires and battery cables.
4) Do NOT mount the computer within 3-feet of ANY ignition sources, ie. MSD boxes, coils, timers or distributors.
5) The RPM sensors are “unipolar” and will only respond to the silver or black (non-red) end of the trigger magnet. Be sure the silver or black end faces the sensor. The air gap between the sensor and trigger magnet should be set between .125 and .250 inches.
6) The pressure sensors supplied with your unit are very accurate AND very sensitive. For best results mount sensors away from direct engine heat or engine and chassis vibrations. The sensors are rugged and can handle the vibration but sensor readings may show vibration noise. The maximum operating temperature of the sensors is 210 °F. Be sure to isolate the sensors from elevated temperature. If readings are taken directly from the engine, isolate the sensor from hot components by adding tubing (braided line) between the sensor and the engine. When installing the sensors with Teflon tape. Start the Teflon tape after the first two full threads. Prevent any component from touching exhaust manifold or exhaust. If measuring boost pressure where the temperature exceeds 200 °F, isolate the sensor from hot gasses by adding tubing between the sensor and manifold.
7) Wiring: Power harness; connect red wire to 12 volt positive and black wire to battery ground. Connect the “CHASSIS” lug or gray wire (on rear of computer) to the chassis ground using the 16 gauge wire. (This provides a shield ground for signal cables and needs to be kept short).
8) Position EGT cables clear of all other wiring for best noise isolation. (i.e. avoid plug wires or any ignition wiring)
9) The accelerometer needs to be mounted SOLID and LEVEL. Vibrations in the mount will produce noise in the readings.
10) Installation in magneto fired applications requires a shielding enclosure for the computer. Some applications may require shielding at the pressure sensor as well. These enclosures need to be constructed of steel material. Aluminum and stainless steel do not provide sufficient absorption of EMI radiation. (Review the magneto application notes.)

3. INSTALLATION IN MAGNETO FIRED APPLICATION

High cylinder pressures combined with magneto ignition creates a very strong oscillating magnetic field at each firing. This field can interfere with the normal operation of electronic instruments. The interference produced can be mild to severe. Mild interference may manifest itself as noise on data curves. Although we have incorporated several shielding and noise reduction techniques into the system, severe interference may prevent normal operation of the computer and result in no data recording at all.

When installing the system on magneto fired applications, careful attention to some basic techniques will produce the best results.

A. Computer location:

The computer needs to be mounted in a shielded enclosure that is well grounded. This box should be constructed of steel. (Stainless steel or aluminum won’t work) The material thickness needed will vary depending on distance from the mag, and cylinder pressure at firing. High compression engines with high boost pressures generate the most interference. Since the energy of the field decreases rapidly as the distance increases, the basic rule is to mount the computer as far as is practical from the mag. This will also reduce the shielding thickness required. At a distance of five feet, .030 steel should suffice.

B. Cable routing:

All the cables are shielded, but the shielding efficiency is not 100% and the cables will pick up energy from the magnetic field of the mag. If this energy is sufficiently strong, it can cause ground noise in the computer which may prevent normal operation. Again, the basic idea is to keep all cables as far from the mag and ignition wire as possible.
C. Suppression plug wires:
Although RF suppression wires reduce the noise emission a great deal, this is usually a "last resort" measure. A high output magneto will limit the effective life of suppression wires, and they need to be replaced frequently. Maintaining the proper distance and shielding when installing the system will allow normal ignition wires to be used.

D. Chassis ground:
The chassis ground (gray wire or lug) on the back of the computer is not the same as the power ground. This ground is the common point for the shields in the cables, and needs to be connected to the car chassis, and kept as short as possible.

E. Battery power:
The plates in the battery can pick up a great deal of noise energy from the magnetic field. If this energy is great enough it can get through the power filters in the computer, and interfere with proper operation. If this occurs you may find it best to have a separate battery for the computer, and mount it inside the shielding enclosure.

F. Initial testing:
The first step is to make sure everything is functioning correctly with the engine at an idle. If the noise problem is severe, errors will occur at an idle even though cylinder pressures are low. With the engine idling, enter the display mode "DISP" and monitor the RPM and sensor channels for proper operation. If the computer function is not stable, or display screens jump around, begin disconnecting sensor inputs until proper operation is achieved, then alternately reconnect the inputs to identify the interference sources. Once the interference source is determined steps can be taken to correct the problem (relocate the sensor or cable routing).

If all the functions are correct at idle, start the acquisition mode and record several seconds of data with the engine at idle, then down load the data to be sure any interference is minimal and all data curves present reasonable responses.

The next step is to repeat the previous test while increasing the noise generated by the mag. Start the acquisition with the engine at idle and momentarily increase cylinder pressure by quickly opening and closing the throttle to whatever degree your combination will allow. If no problems are encountered, the final step is to attempt an acquisition under race conditions. As before, if interference is encountered, attempt to isolate the noise input by disconnecting inputs and repeating the test. If you have any problems just let us know. We will be glad to provide whatever assistance is necessary to solve them.
4. MOUNTING THE COMPUTER

Steel enclosures are not required on Non-magneto ignitions. Fabricate a secure mounting bracket similar to the one shown in Figure 1A.

Figure 1A. Mounting Bracket

Figure 1B. Installed in finished mounting bracket

Mounting the Computer:

1) The computer may be mounted at any angle in the car so the front panel is easily accessible for proper operation. In full body cars, mount the computer to the roll-cage close to the passenger side door. This will allow easy access by crew members during staging (Figure 2A). In dragster chassis applications, mount the computer in front of the driver compartment to allow easy access (Figure 2B).

Figure 2A. Computer mounted to top of roll-cage by passenger window

Figure 2B. Mounting in front of the driver in a dragster

2) The previously created mounting bracket (Figure 1) ensures a secure mount and isolation from vibrations. Use this bracket to construct a mounting pad/base that can be securely mounted to the roll-cage (Figure 3).

Figure 3. Computer Mounted to Mounting Pad
3) The Data Logger requires 12-20 volts DC power for operation. Turn off computer's main power before charging battery or doing any welding on the vehicle. Wire the RED lead to the positive (+) side of the battery and the BLACK lead to the negative (-) side. For additional noise suppression there is a chassis gray ground wire at the rear of the computer, this is not the main power ground. This ground is the common point for the shields in the cables. From this ground trim gray wire to the shortest length to provide a good chassis ground.

5. MOUNTING THE AUXILLARY INTERFACES

1) Connect the 15 pin cable to either the Aux 5-12 or Aux 13-20 connector on the back panel of the Data Logger.
2) Route the cable to the location where you wish to mount the Auxiliary interface.
3) Connect the 15 pin cable to the Auxillary interface.
4) Place the Auxillary interface on the surface you will mount it to.
5) Using the 4 holes in the mounting tabs as a guide, mark the mounting surface where holes will be drilled.
6) Drill four $\frac{3}{16}$" holes in the mounting surface.
7) The gray wire must be connected to a good chassis ground.
8) If the surface you are mounting the interface to is bare metal, install the eyelet on the gray wire under one foot of the interface.
9) Install mounting hardware and secure the Auxillary interface.

6. SENSOR INSTALLATION

Match pressure sensors to the operating pressure of your specific system. There are a variety of pressure sensors with different ratings that can be used for monitoring various pressures. Use only pressure sensors that are designed to work in the pressure ranges you will be monitoring. For example: Do not use a sensor that is designed to operate from 0-100 psi to measure pressures that may exceed 100 psi. Likewise, when measuring lower pressures do not use a sensor with a rating that is much higher than the pressures you are measuring. All sensors are allowed a certain amount of tolerance and this tolerance level increases with higher pressure rated sensors. The higher pressure sensor may not read as accurate at lower pressures. Sensor should operate between 50 & 75% of max sensor reading (100 psi sensor should operate between 50 and 75 psi). An exception to this is to use a 200 psi sensor for blower pressure to allow for a pressure spike in a burst panel rupture.

After matching the appropriate sensor with the system being measured, wire each sensor to it's selected channel (see "Sensor Cable Installation" in this manual). Each channel has been calibrated at Auto Meter for a specific sensor and no further calibration should be necessary. If the sensors are changed, re-calibration will be necessary (see the Operating Instructions/Calibrating the Data Logger for further details).

Note: Always use good quality Teflon tape on the sensor's threads. Do not apply tape to the first two full threads of the sensor.

Note: If pressure readings are taken directly from the engine, the sensor may need to be isolated from hot components and vibrations. Mount the sensor to the firewall or chassis and run steel braided line to the sensor.