DataMite Hardware Installation Notes

These DataMite Installation instructions cover most all optional sensors. Typically the appropriate printed sheet is included with the DataMite hardware when it is shipped from the factory, to avoid confusion. Here, they are not organized in any particular fashion, and many of these notes can be outdated, or could be meant for internal build instructions within Performance Trends. They are provided here as general information, and to anynone not very well versed with the DataMite options, it would be easy to use the wrong instructions with a sensor. It is therefore recommended you email Performance Trends at feedback@performancetrends.com for the appropriate page number for your sensor or situation.

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DataMite Wide Band Exhaust Oxygen A/F Sensors

Bosch Exhaust Oxygen Sensor(s): Note installation instructions which came with unit. Your unit may have only 1 sensor.

4 pin connector for signal out. Connect these to your DataMite's analog inputs.

Connector with orange wire is for Sensor #1, connector with blue wire (if present) is for Sensor #2.

Sensor #2

Sensor #1

Main Control Unit

First plug has fewer connections and is recommended for higher power consuming A/F sensors

Optional 2nd plug can be used for DataMite Power

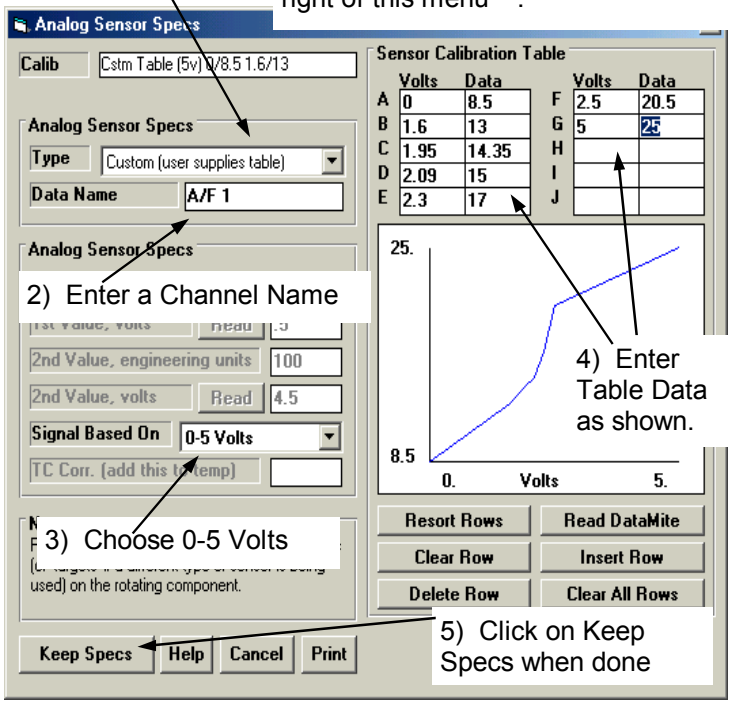
12 VDC power supply

Plug power supply into 110 VAC from the same power strip that powers the DataMite or DataMite II box, **OR** use the 2nd plug from the power supply for your DataMite power.

IMPORTANT: For the DataMite II, it is important that this power does not come on before the DataMite II is powered up. By using the 2nd plug shown above for the DataMite II power this problem can be avoided.

1) Choose "Custom Table"

This is how you fill out the Calibration Table for a DataMite II to read A/F for gasoline. For DataMite using 0-1000 counts, see table to right of this menu **.



2) Enter a Channel Name

3) Choose 0-5 Volts

4) Enter Table Data as shown.

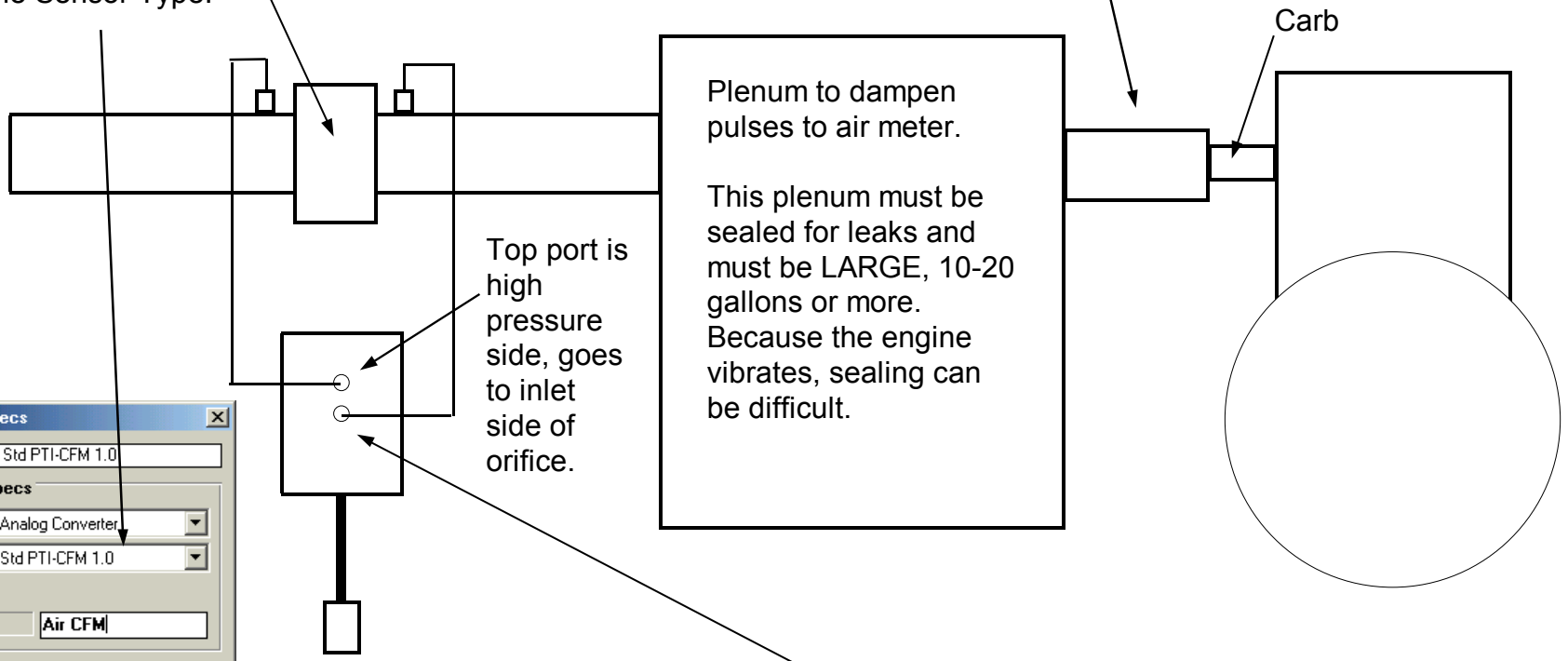
5) Click on Keep Specs when done

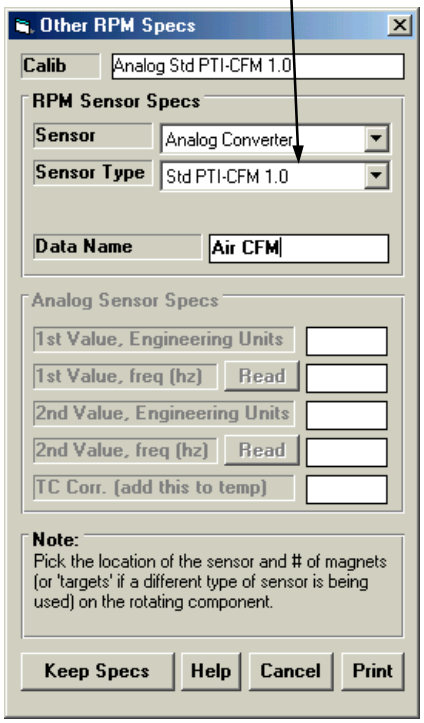
** For 4 channel DataMite, multiply Volts by 200 to get counts: A = 0, B = 320, C = 390, D = 417, E = 460, F = 500, G = 1000.

DataMite Single Cylinder Air Meter

The connection between the air plenum and engine must be at lease 2 times the diameter of the engine's air inlet, like the carb's inlet diameter. Otherwise, you are changing the tuning of the engine.

Orifice size, for example 1.0" diameter is what you will choose for the Sensor Type.



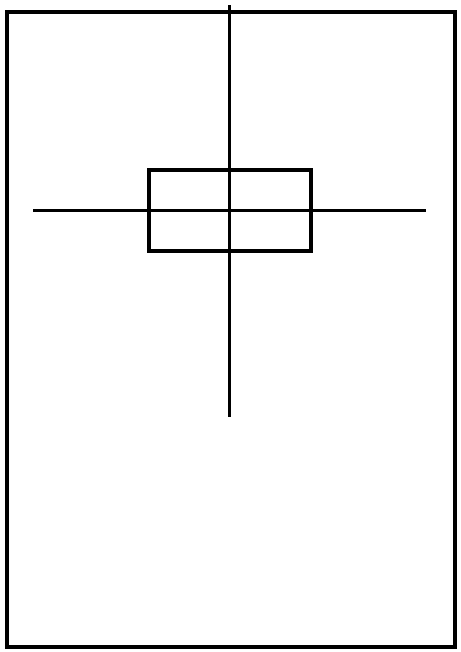


4 pin connector has signal and connects to DataMite.

IMPORTANT: If you must replace a plastic line on the pressure sensor, BE SURE to moisten the port on the plastic sensor. Then push the plastic line GENTLY straight down on the port (not sideways). You will not be able to push the line on more than 1/8 to ¼ inch, but that is enough. Be careful not to break off the ports on the pressure sensors.

Click on the appropriate row in the "Sensor and Calibration" column to bring up this screen to choose the sensor specs.

Pres Sensor Template for DataMite Single Cylinder Air Meter

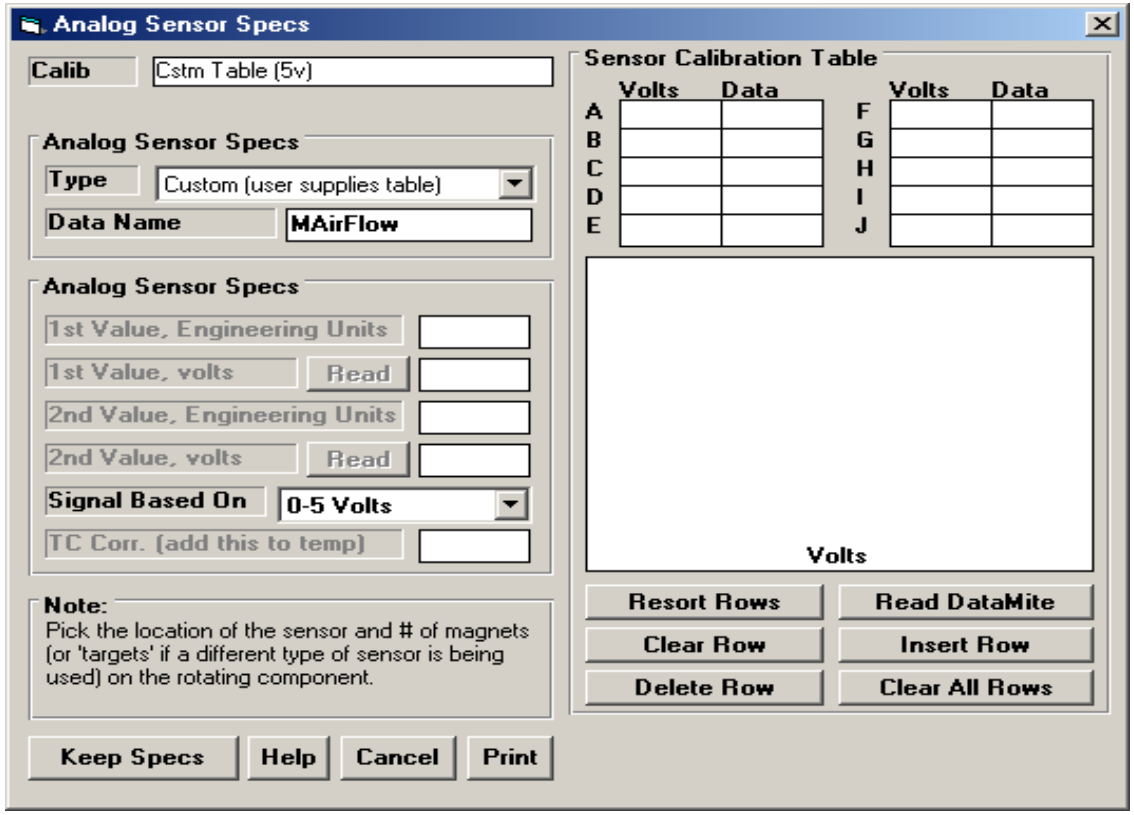


Pin 2 = power volts red
pin 3 = signal white
pin 4 = ground black

Mass Air Flow Sensor Calibration

The Mass Air Flow sensor requires 12 VDC to power it up. The standard DataMite II analog connector only provides 5 VDC, so a jumper must be set inside the DataMite II box. See attached jumper sheet for instructions.

Then click on the Sensor and Calibration column in the DataMite Specs for the appropriate channel (the one has the jumper set for the 12 volts power). Select Custom (user supplies table) for the Type as shown below. Fill in the Volts and Data Columns as written below from the calibration sheet for the sensor. Note that to get a calibration in pounds per hour, multiply KG/Hr by 2.205.



IMPORTANT

This sensor requires one or more jumpers to be changed inside the DataMite II box.

First decide which channel will be used for this sensor, for example Analog #8, the connector with green shrink tubing on the 2nd set of 4 analog connectors. Then follow the instructions on the attached sheet for setting the jumpers for that channel.

Then only connect this sensor to that particular channel.

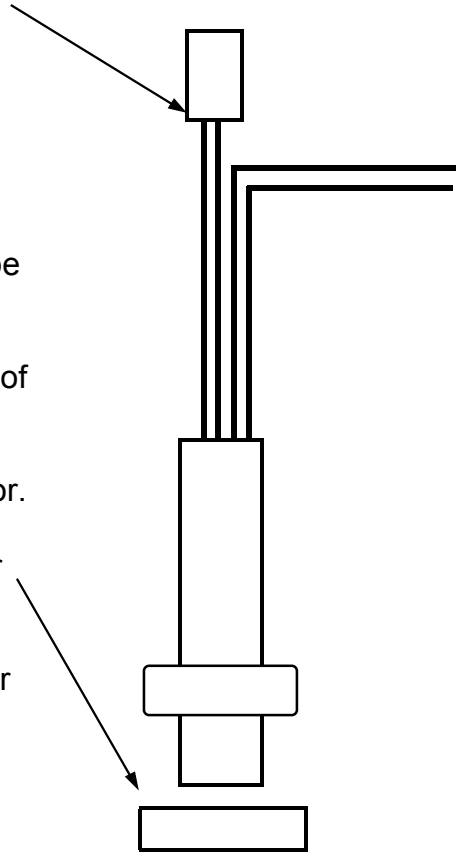
DO NOT connect this sensor to a different channel on the DataMite II.

DO NOT connect sensors other than this sensor to this connector. You may damage some other type of sensor by providing too much voltage to it.

DTM-HEGO (heated exhaust gas oxygen

4 pin molex connector which plugs into 0-5 volt analog converter or analog input.

2 white leads to be wired to 12-16 volt power source which can provide up to 2 amps power. This is required to heat sensor for better temperature control and repeatable results.



DTM-EBS sensor boss to be welded to the exhaust pipe or exhaust header primary. Weld to top of pipe or side of pipe, NOT bottom of pipe where condensation may contaminate or crack sensor. Locate sensor as close to engine as practical, and far from exhaust tip which empties into open air. Pulsations can pull room air back into exhaust tip and close enough to sensor to produce an incorrect (too lean) reading.

This type of oxygen sensor is basically an Rich/Lean indicator, but is not accurate or stable enough for true A/F measurement. A good calibration selection for this sensor is Standard 0-5 volt.

If the voltage is greater than .4 volts, then it indicates it is richer than 14.7 A/F. (For alcohol fuels, this “stoichemetric” A/F is a much lower number than 14.7, but the trends described here are the same.) This voltage may be as high as .95 or more when the sensor is new, but may be as low as .5 volts on older sensors, or sensors which have been exposed to leaded fuel.

If the voltage is less than .4 volts, it indicates the A/F is leaner than 14.7, or excess contamination from room air (leaks or too close to the exhaust tip), or significant misfire or poor running condition (like idle with a race cam).

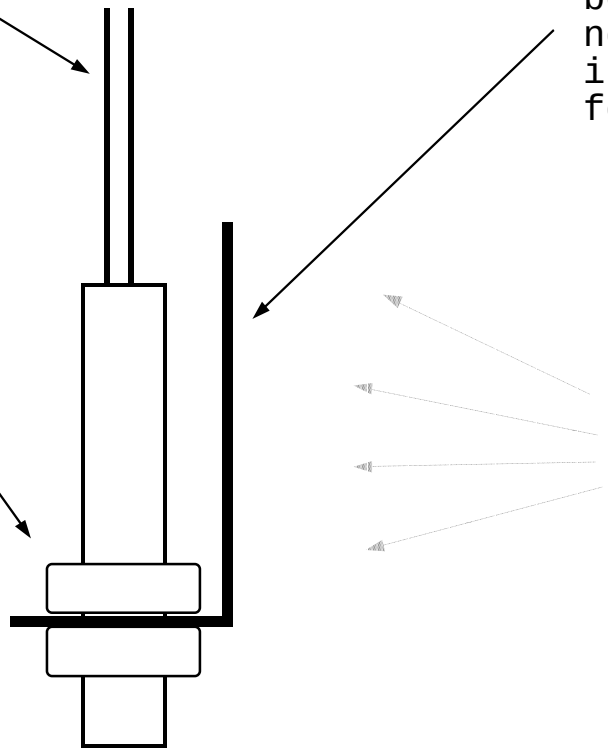
Note that best power comes at an A/F considerably richer than 14.7, so for best power you want to see a voltage of greater than .4 volts.

DTM-RPMA (high temp RPM sensor)

Sensor is simply an On/Off swirtch and does not have polarity. It does not matter which lead you hook to

Place shield between sensor body and heat source. Do not cover or try to insulate sensor, but allow for good air flow around

Note: **Do NOT** overtighten these nuts as you may crack the body of the sensor.



Heat Source (brakes, exhaust

Calibration Sheet for Custom

This sensor does not have a pre-programmed calibration in the DataMite software. Therefore, you must specify it as a Custom sensor as follows:

- Click on ***DataMite*** at the top of the Main Screen.
- Click on the ***Sensor and Calibration*** (rightmost column) for the channel where the Custom sensor will be installed. The screen at the right will be displayed.
- Select ***Analog Converter*** and ***Custom (user supplies specs)*** for the Sensor Type.
- Enter the ***Analog Sensor Specs*** in the lower section as written in the menu shown to the right. You can also enter a ***Data Name***, with a suggested name shown to the right.
- When finished, click on Keep Specs. In the DataMite screen, this channel will now be listed as:

  Cstm xxx-xxx Hz = xx-xx xxxx

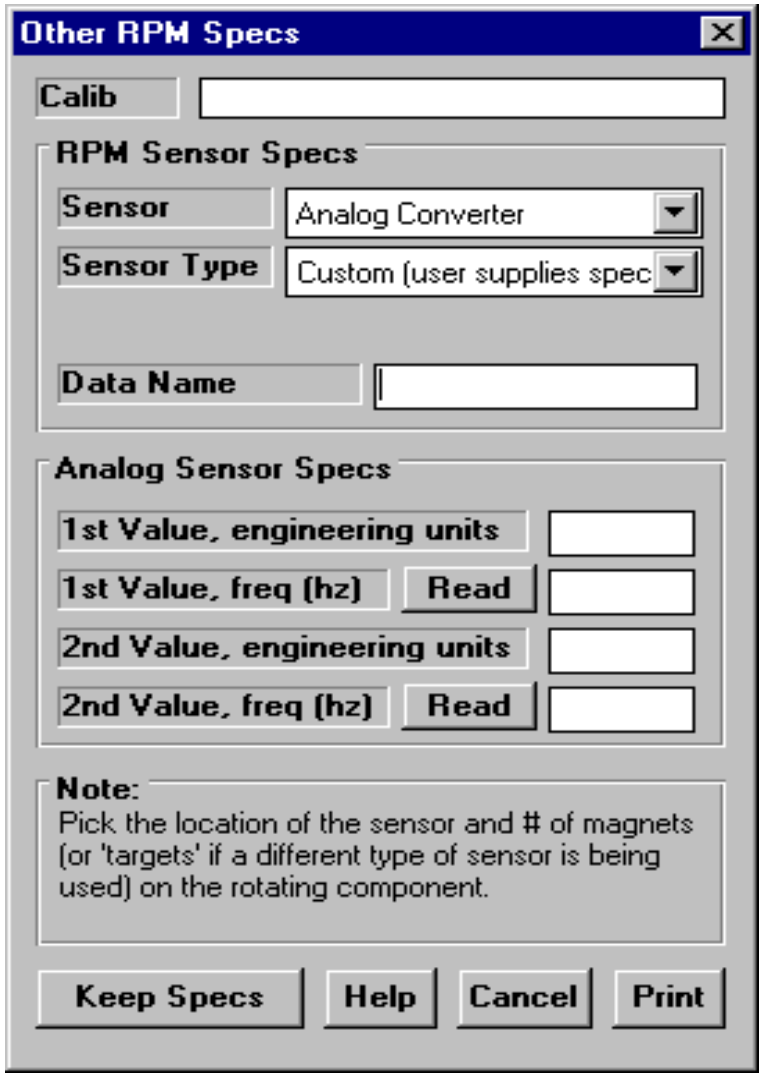
This will produce the calibration (conversion from DataMite signal to actual units) recommended by the factory.

Notes: _____

_____

_____

_____



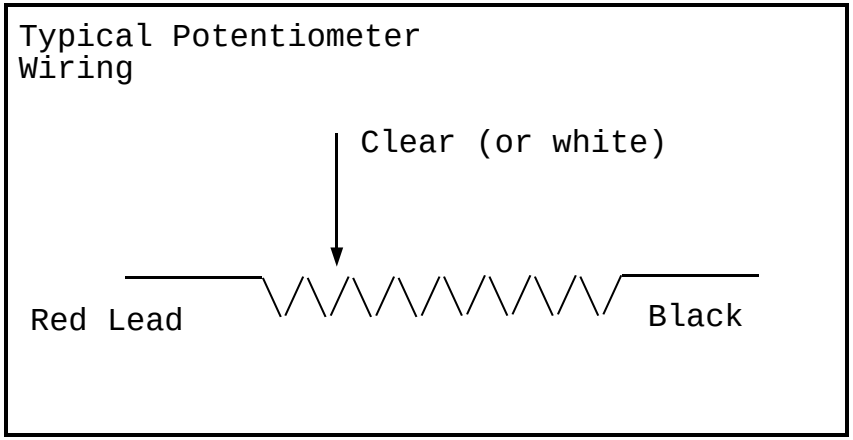
Possible Choices Include:

Std 0-15 PSI
Std 0-70 PSI
Head Thermocouple
Std 0-150 PSI
Std 150-230 Deg
Std Thermocouple
Std 0-5 Volts
Std 0-20 Volts
Std PTI-CFM 1.2
Std PTI-CFM 1.0
Std PTI-CFM 0.8
Std PTI-CFM3 1.5
Std PTI-CFM3 1.0
Std Frequency (Hz)
25 PSI MSI600 Sensor
50 PSI MSI600 Sensor
75 PSI MSI600 Sensor
100 PSI MSI600 Sensor
250 PSI MSI600 Sensor
500 PSI MSI600 Sensor
1000 PSI MSI600 Sensor
2500 PSI MSI600 Sensor
5000 PSI MSI600 Sensor
Dyno Torque, ft lbs
Std Accel., Forward
Std Accel., Side
Std Accel., Up
Custom Accel., Forward
Custom Accel., Side
Custom Accel., Up
RF Shock Travel
LF Shock Travel
RR Shock Travel
LR Shock Travel
Steering
Throttle
Brake
Std RTD Air Temp
Std RTD Fluid Temp
Custom (user supplies specs)
Custom (user supplies table)

Notes on DataMite Cables:

DTM-LD Standard analog cable with 4 pin connector for DTM-AC5 0-5 volt converter

- Red (pin 2) is 5 volt power, **50 milliamps MAX**. ***DO NOT connect red lead to ground or to a voltage source (for example, do not connect to 12 volt battery).*** If you are not using 5 volt power (for example, you want to record a 0-5 volt signal where the signal source has its own power, like an Exhaust Gas Oxygen sensor) ***do not*** connect this lead to anything. Insulate the end with a piece of tape or shrink tubing.
- Black (pin 1) wire is signal ground
- Silver, uninsulated wire is shield ground. (We recommend you do not connect this lead to anything as it is connected to the black signal ground at the connector.)
- Clear or white (pin 4) insulated wire is 0-5 volt signal input



DTM-205 (0-20 to 0-5 volt converter cable)

- Black wire is signal ground
- Silver, uninsulated wire is shield ground. (We recommend you do not connect this lead to anything as it is connected to the black signal ground at the connector.)
- Clear or white insulated wire is 0-20 volt signal input

Follow instructions on Calibration Sheet for Custom Sensor for proper voltage reading on computer.

Notes for Exhaust Oxygen Sensors: If you notice “soot” on a new sensor from us, it is because we have checked the sensor (and related wiring) on the bench. Oxygen sensors must be **HOT** to work properly. Install the sensor close to the engine and out of ambient air flow. The DataMite Analog Converter may “load down” a typical oxygen sensor, creating an incorrect signal. You may need a pre-amp, available from Performance Trends to create a true signal.

Important. If you are trying to read a signal from a sensor with its own power supply (not getting power from the DataMite cable pictured here), you must check with Performance Trends first on how to hook up the cable. It is possible to create “ground loops” and other unexpected conditions which can damage the DataMite or DartaMite II. **This damage is not covered under warranty. Damage to a DataMite from a user improperly wiring up a cable to a sensor (not following the instructions above) can also void the warranty.**

Notes for Pressure Sensors:

Safety Note: This pressure sensor is made of 17-4 stainless steel and is rated as being compatible with fluids compatible with this stainless steel.

However, the manufacturer DOES NOT rate it specifically for fuels. You are using it at your own risk if you use it to measure fuel pressure. Performance Trends does not recommend its use for measuring fuel pressure.

When measuring any pressure on an engine, use only high quality parts. Low quality, brass or thin wall fittings may crack under the high pressure and constantly vibrating conditions of being attached to a running engine. Do not "stack up" several fittings between the engine and the sensor. The longer the fittings, the higher the stress from vibrations shaking the sensor.

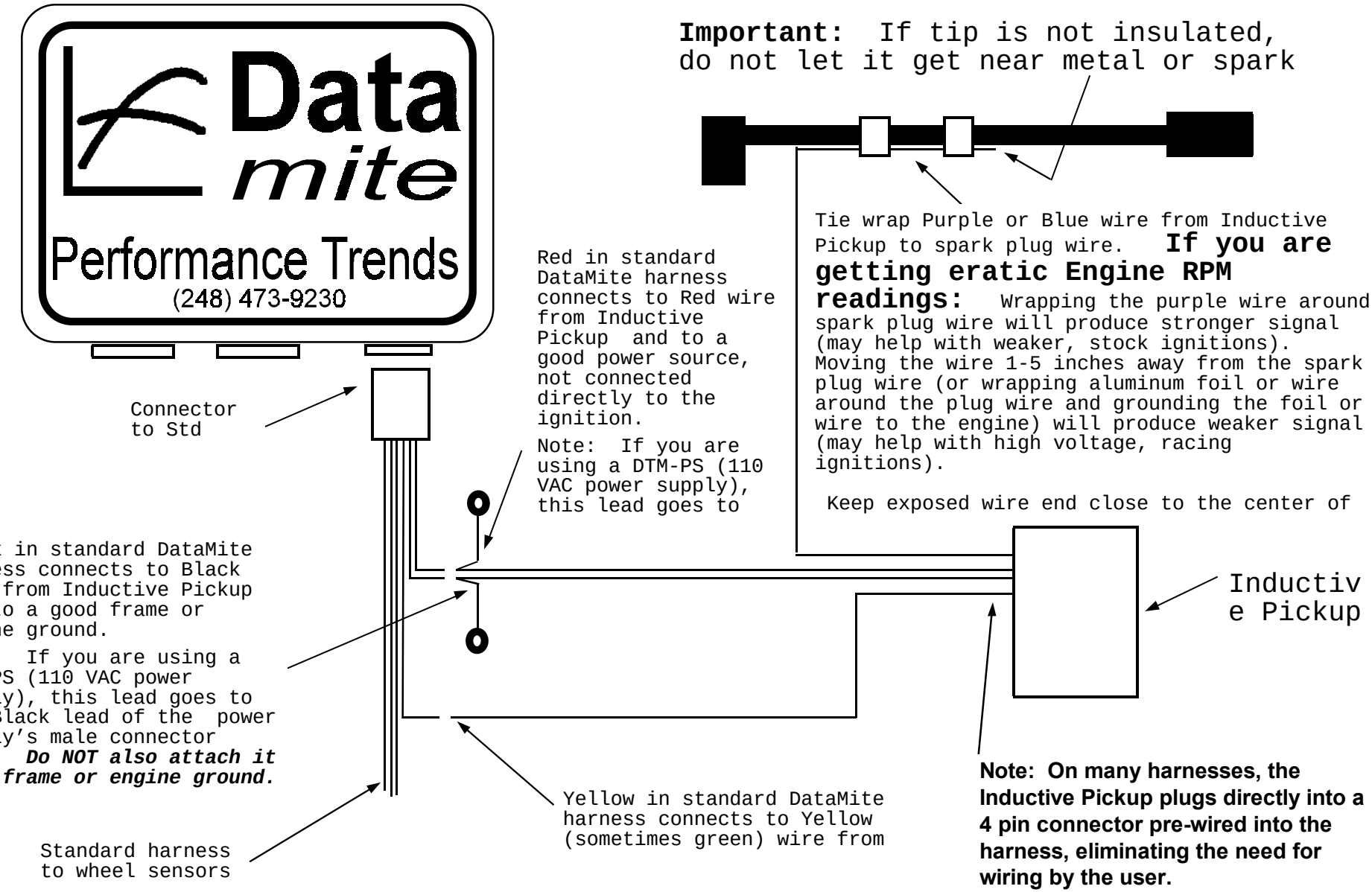
Labeling: The part number gives the pressure range of the sensor. For example, the numbering for MSP sensors is as follows:

MSP 600 xxx

Where the 600 is the model number (indicating their best, most rugged stainless steel sensor for accuracy and noise rejection). The "xxx" is the pressure range, for example "025" would be 25 PSI, "100" is 100 PSI. For ranges over 500 psi, a "K" is added to indicate thousands of psi. For example "2K5" means 2.5 thousand or 2500 psi, "1K0" means 1000 PSI.

DataMite External Inductive Pickup Wiring Installation

Important: Do ***not*** kill engine by disconnecting the plug wire from the spark plug. This may cause high voltage spikes to travel back to your computer, damaging your COM port. Instead, ground the spark plug to kill the engine.

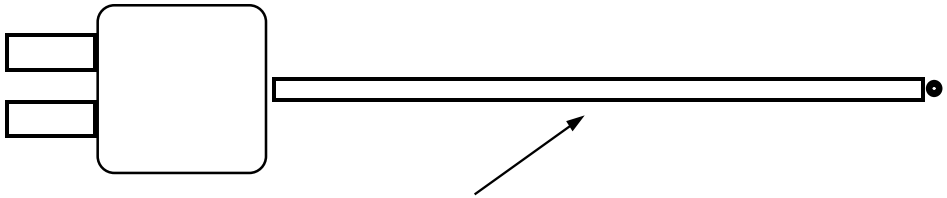


See Appendix 2 in the User's Manual for full details

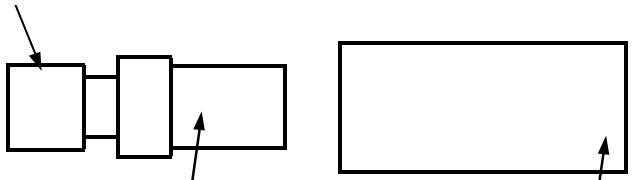
DataMite Thermcouple Mounting Hardware

After ferrule crimp fitting is installed, slide thermocouple through it and the ferrule inside. Adjust the thermocouple to the depth you need. Then tighten the end cap to crimp the ferrule to the thermocouple shaft. **You can not adjust the depth once the ferrule has been**

For systems reading a fluid temperature: The ferrule in the brass fitting is replaced by 2 neoprene O rings. **After installation, be sure to check for leaks.**

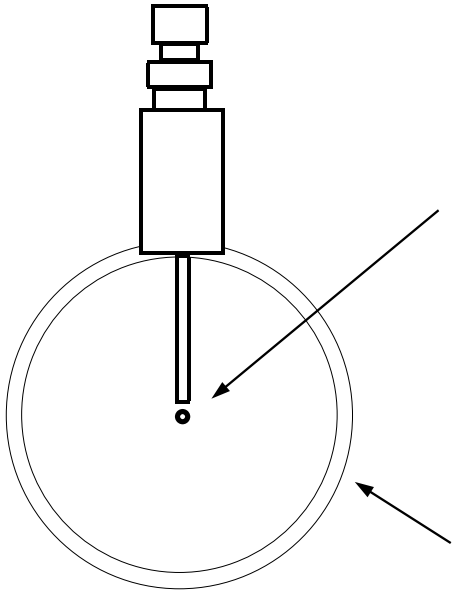


You can gently bend this thermocouple shaft to approximately a 3/4” radius. Be careful not to kink.



Ferrule crimp fitting with ferrule inside. The ferrule is the small ring, some people call a “wedding ring” or “wedding band”. This is what gets crimped to the thermocouple shaft. **Once it is crimped, you can not adjust the depth of the**

Weld pipe nipple to exhaust pipe. If you already have a pipe thread to fit the ferrule crimp fitting, you don’t need this fitting.

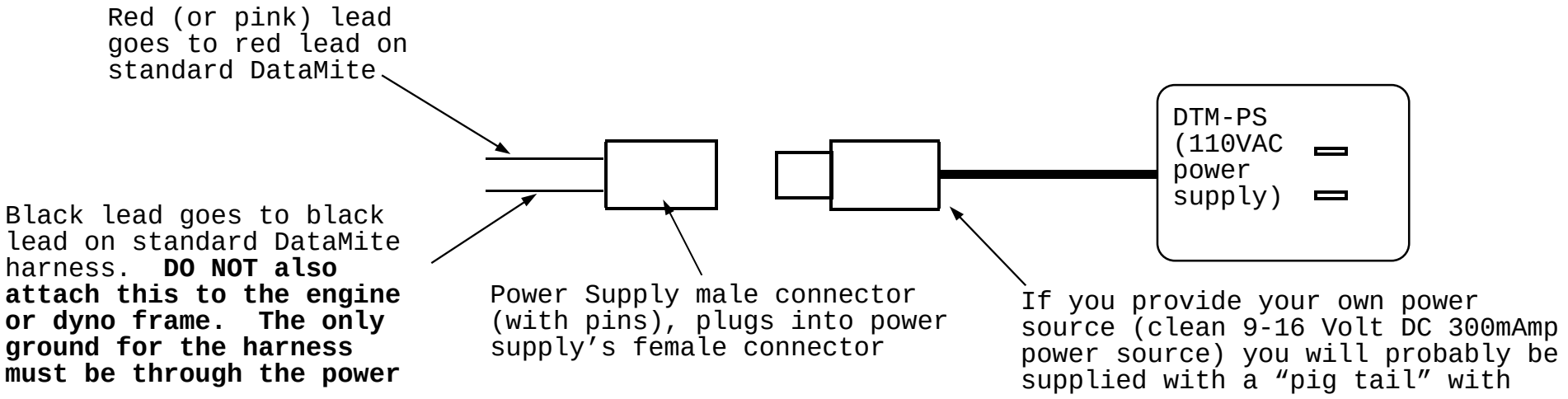


Typical mounting in exhaust pipe. Position tip to center of pipe, then tighten down fitting to lock thermocouple in place.

For individual cylinder exhaust temps, most dyno operators place the exhaust thermocouple 1.5 inches or closer to the exhaust port.

Exhaust (header) pipe cross section.

DataMite Wiring Using DTM-PS (110VAC power supply)



Precautions:

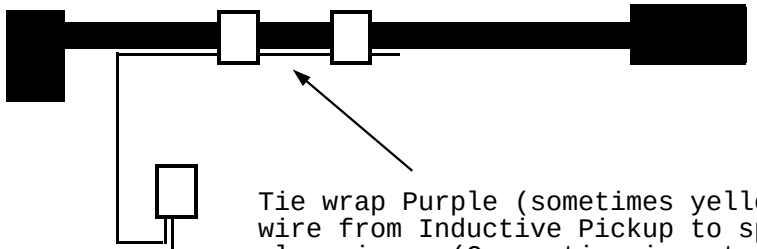
The DataMite software allows you to read the sensors "real time" (right now) through the 9 pin downloading cable. However, this is only for troubleshooting. Improper grounding of the system or a high voltage spikes coming from a sensor through the DataMite can damage your computer. Here are some tips to reduce this possibility:

1 The DTM-PS power supply MUST be grounded to your computer. Plug both into the same power strip.
2 The engine or dyno frame MUST NOT be grounded to the DataMite harness, power supply or computer. Engine RPM is only available by using an inductive pickup or wheel speed RPM sensor and magnets on the crankshaft.
3 Disconnect the 9 pin downloading cable unless you are actually downloading data. You can purchase switch boxes which would let you easily switch this cable Off.
4 Only download data with the engine off.
5 Laptop computers running off their battery, not a 110 VAC power supply, are less likely to have problems.
6 When using the "real time" feature to troubleshoot with the 9 pin downloading cable connected, only run the engine at smooth running/light load conditions, no maximum RPM, maximum HP conditions.

We have not had a problem when the DataMite's harness is grounded through the power supply ONLY,

See Appendix 2 in the User's Manual for full details

DataMite Internal Inductive Pickup Wiring



Tie wrap Purple (sometimes yellow) wire from Inductive Pickup to spark plug wire. (Connection is not usually very “fussy”.)

Keep exposed wire end close to the center of spark plug wire, and away

Connector to Std

External Inductive Picup box usually plugs into this 4 pin connector. That box is not used here, but is replaced by a jumper wire.

If you are getting eratic Engine RPM readings:

Wrapping the purple wire around spark plug wire will produce stronger signal (may help with weaker, stock ignitions). Moving the wire 1-5 inches away from the spark plug wire (or wrapping aluminum foil or wire around the plug wire and grounding the foil or wire to the engine) will produce weaker signal (may help with high voltage, racing ignitions).

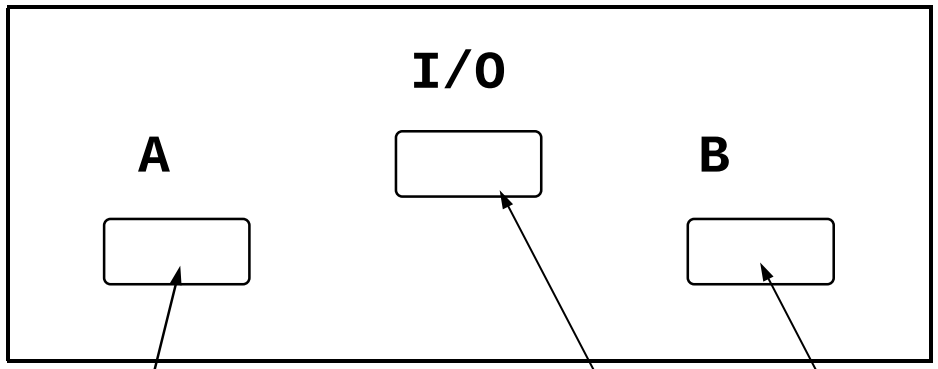
Keep exposed wire end close to the center of spark plug wire, and away

Standard harness to other sensors

Using 9 Pin Switch Box

Some users may want to use a switch box to disconnect the DataMite from their computer when they are running the engine on their dyno. This ensures no voltage "spikes" can travel back to the computer and damage it.

With this configuration, switch to the A position to download data from the DataMite. Switch to B to disconnect the DataMite from the computer when running the engine.



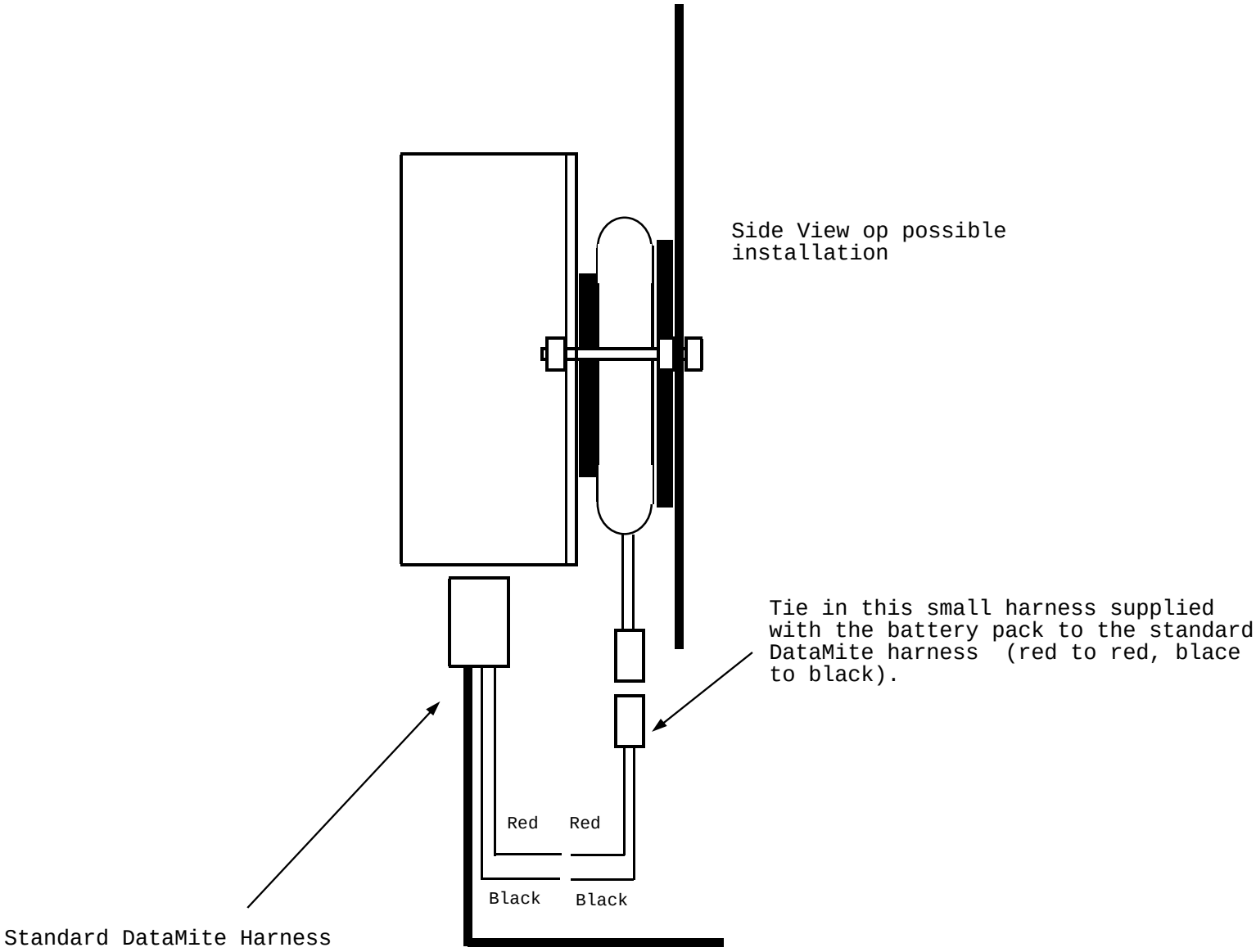
To Computer COM port using standard DataMite downloading cable. You must use a female to female "gender changer" (Radio Shack) to connect the female plug here to the female end of the standard Datamite downloading cable. (Do not use a "null modem" type of

Leave open, no

To DataMite using special cable provided by Performance Trends with the switch box (male on 1 end, female

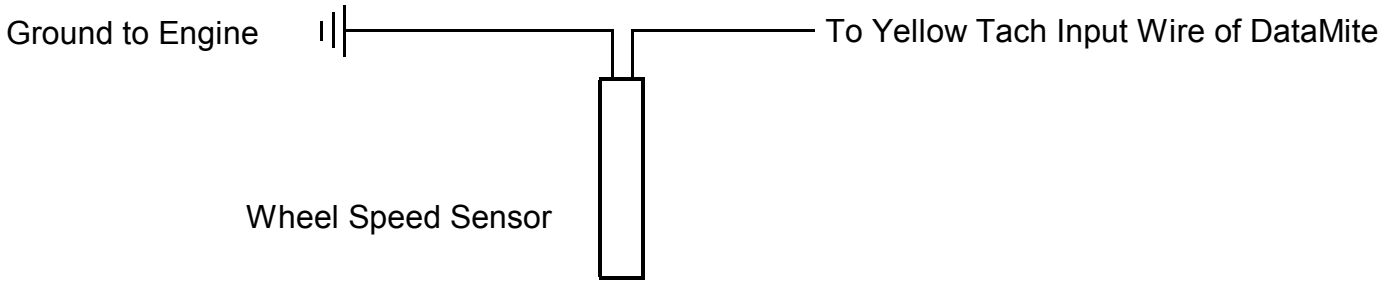
Note: Do not substitute any serial cables for the cables specified here, as not all cables are wired the same internally.

DataMite Battery Pack Installation

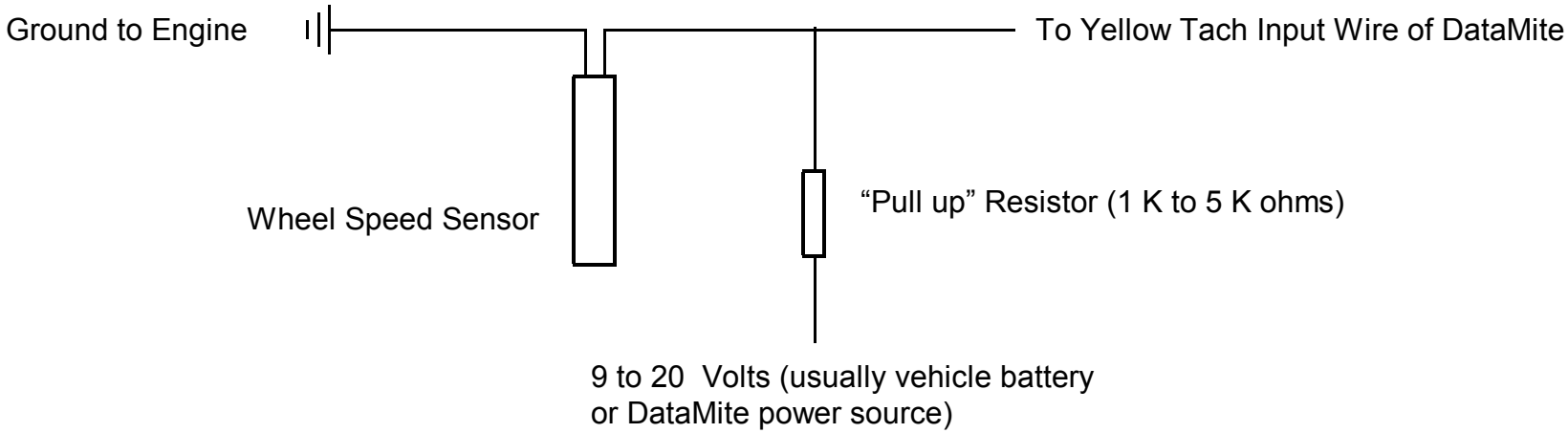


DataMite Engine RPM using Wheel RPM Sensor

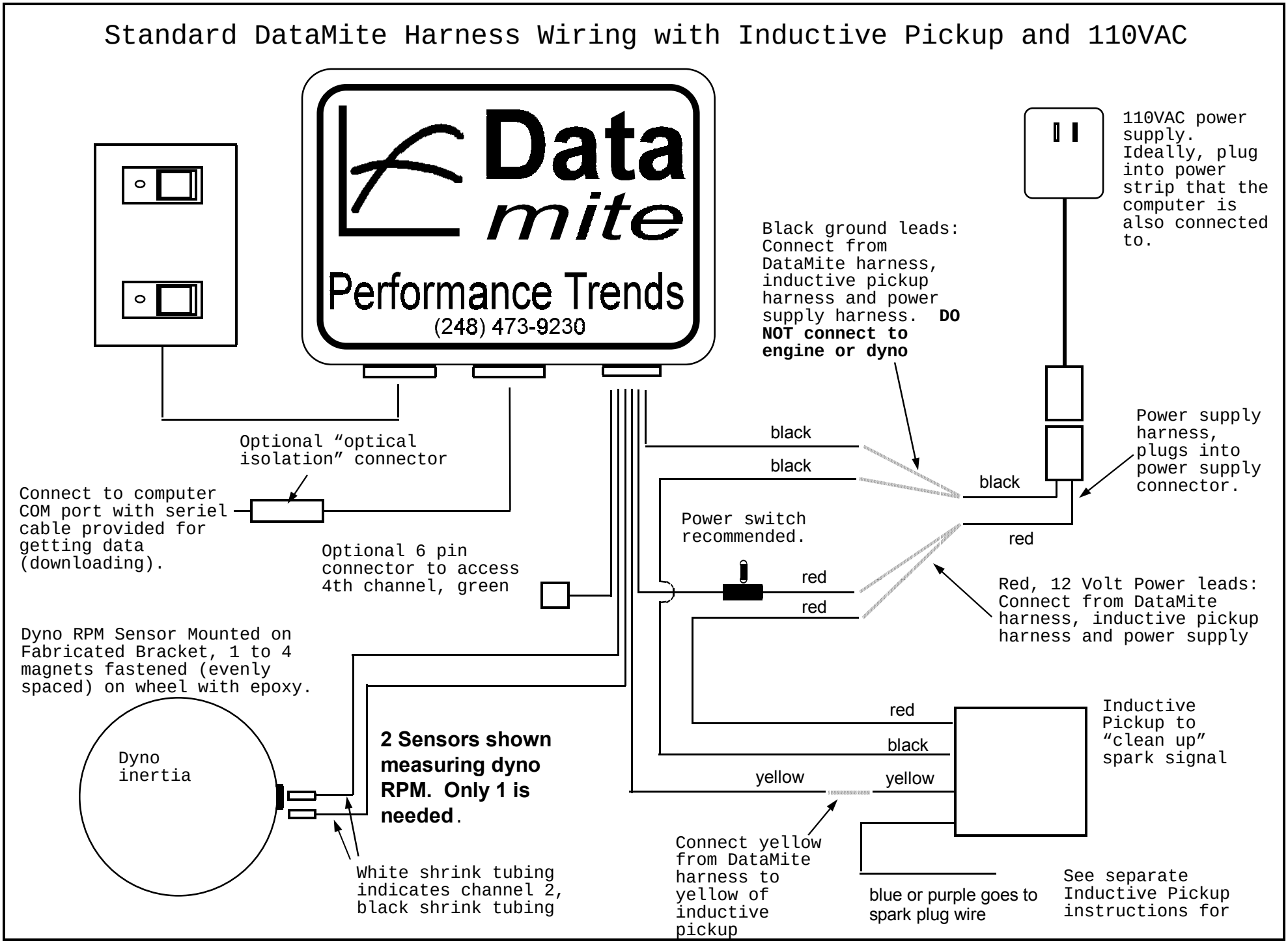
Simple Method (usually works fine)



More Reliable Method (works in most all situations)



Standard DataMite Harness Wiring with Inductive Pickup and 110VAC



See Appendix 2 in the User's Manual for full details

DataMite Optical Isolator for Serial (COM)

Install at either end of the cable which connects your computer to the DataMite. The Optical Isolator is powered by your computer's COM port. It the Optical Isolator is labeled, the end labeled DTE usually goes to the PC and the end labeled DCE usually goes to the DataMite.

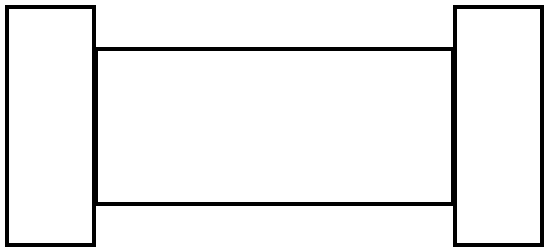
Notes:

If you install the Isolator and you no longer can read the DataMite, you may have an adapter or serial cable in the line which does not pass all 9 lines through. Try moving the Isolator to a connection closer to your computer.

If the transfer rate of data from the DataMite to the computer is very slow, try moving the Isolator to the the DataMite end of the cable.

The Optical Isolator is designed to be powered from the COM ports and does not need an external power supply. However, some new computers (especially lap tops) have very low voltage on the COM port, and may not be able to power the Isolator. Performance Trends has a more expensive isolator which is externally powered which can solve this problem.

The isolator is rated at 2500 volts. Though unlikely, extremely large electrical surges may short out and pass through the isolator and still damage your computer.



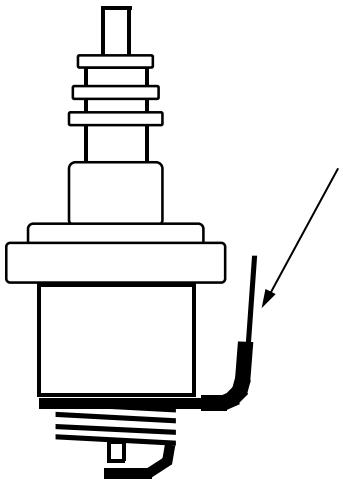
DataMite Cylinder Head Thermocouple

Install the thermocouple under the spark plug. The thermocouple ring is light and soft (copper) for fast response, but it can bend easily. Bending it on the first installation is OK. Repeated bending or twisting can break it.

Thread the ring onto the spark plug threads. It will fit snug on the threads. It is usually recommended that you bend the lead up along side the spark plug to clear the heads cooling fins. When you tighten the spark plug, do not try to prevent the thermocouple from turning, but let it turn with the spark plug.

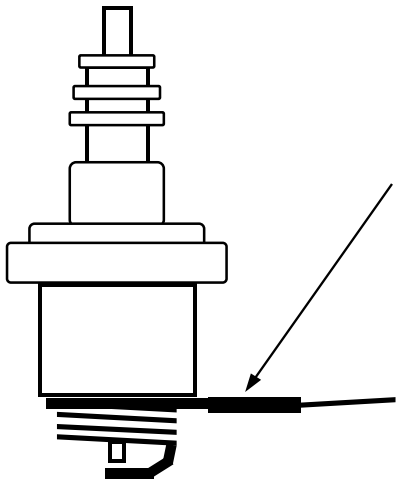
Signal Noise. With thousands of volts passing through the spark plug and a thermocouple signal being only a few milivolts, its not suprising “noise” will appear in this signal. Things which may reduce this noise include:

- Resistor or suppressor plugs, boots or wires. Note that this also reduces the signal to an inductive pickup, so you may have to wrap the inductive pickup wire around the spark plug wire several times to maintain an RPM signal.
- Cut the white jumper wire under the cover of the thermocouple analog converter. Leave enough wire on both sides of the cut so you can reattach it if you need to.



Correct:

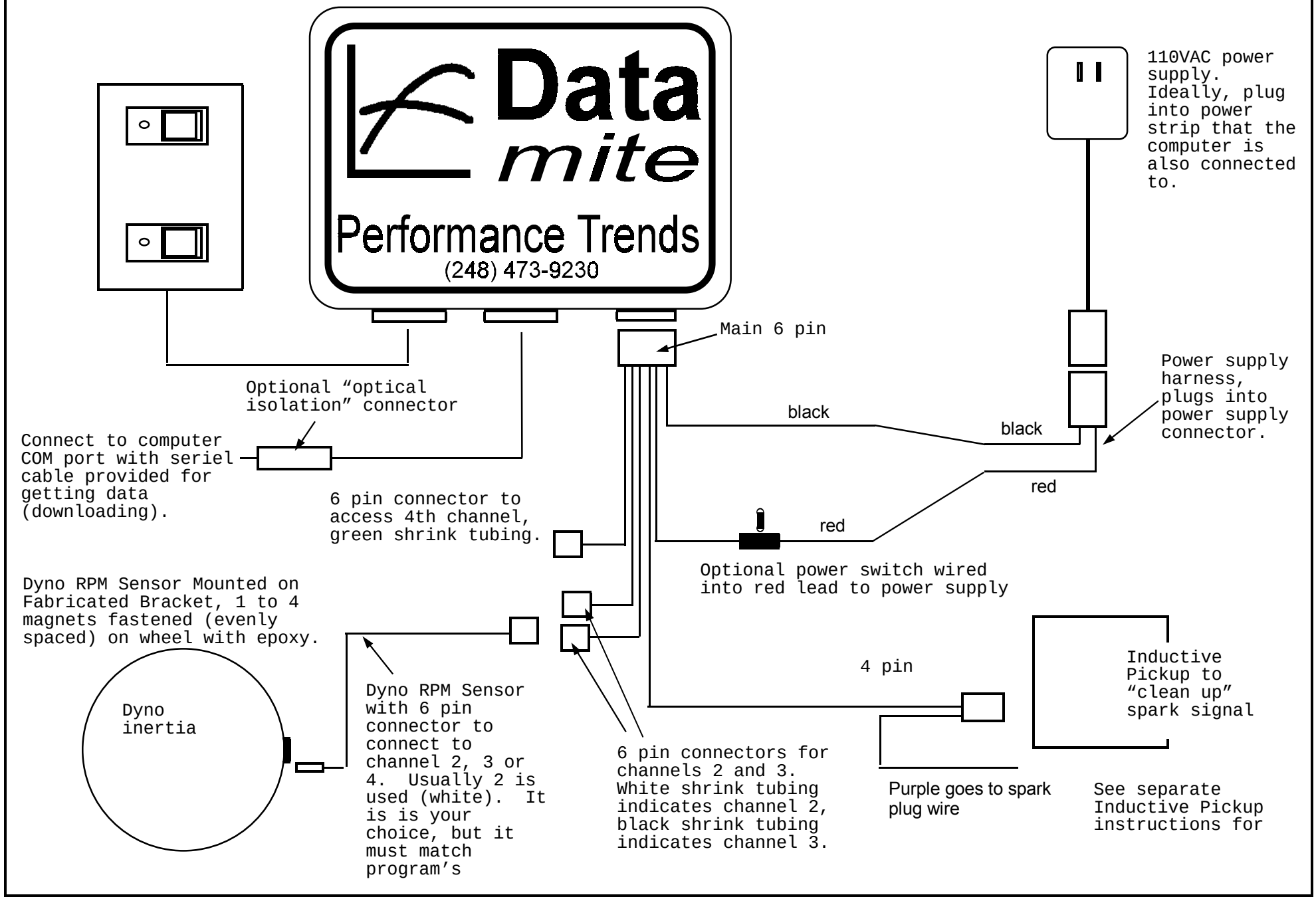
In most cases, it is best if you bend the thermocouple up along side spark plug to clear the cooling fins.
You may not be able to push the socket wrench all the way down, because it may hit the thermocouple.



Wrong:

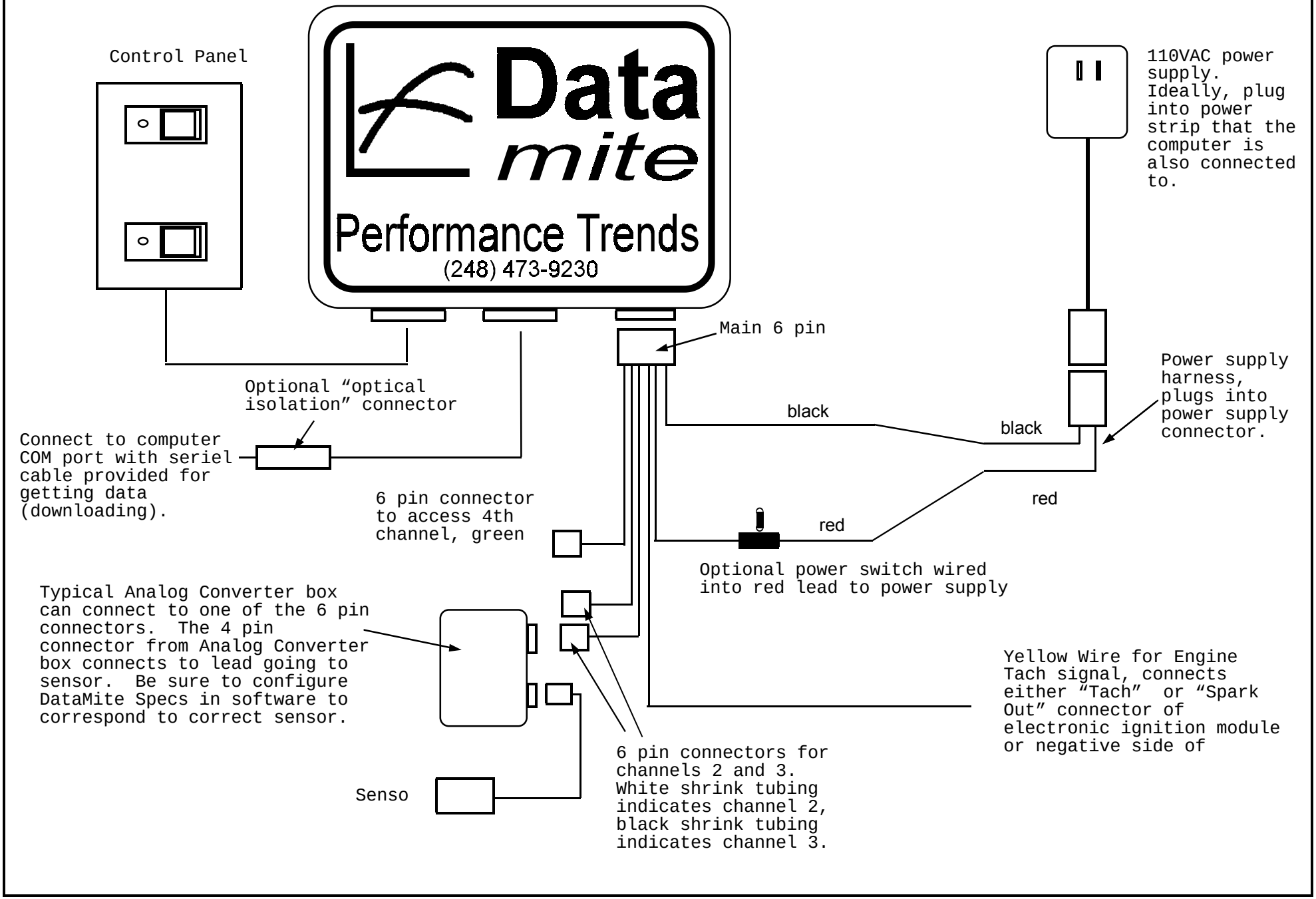
Keeping the thermocouple flat usually means it will catch the cooling fins when you tighten or loosen the spark plug, causing it to bend, twist and eventually break.

Dyno DataMite Harness Wiring with Inductive Pickup and 110VAC Power



See Appendix 2 in the User's Manual for full details

Analog DataMite Harness Wiring (Engine RPM and 3 analog connectors)



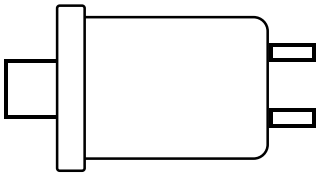
See Appendix 2 in the User's Manual for full details

DataMite Resistor Pressure Sensor Wiring

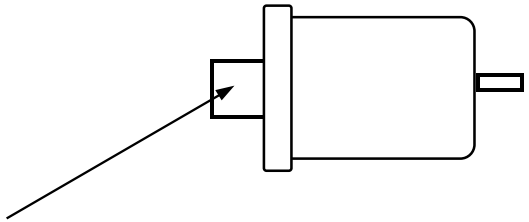
The inexpensive (less accurate) pressure sensors are sufficient for measuring “non-critical” pressures like oil pressure. The accuracy of these sensors can be off by as much as 5 PSI in some situations, but the number repeats quite well from test to test.

The sensor is basically a variable resistor. Therefore, polarity is not important (you can reverse the leads). However, these sensors need a good ground reference for good results. If the sensor has 2 connectors, one of these connectors is the ground and grounding should be no problem. If the sensor has only 1 connector, you must attach one lead from the DataMite lead to this pin and the other to a “good ground”. This “good ground” can be either be to the body of the sensor (the best method, but do not drill or make a hole in the sensor), or a point on the engine block close to the sensor. If you ground to the engine block, ***do not*** use teflon tape to seal the threads or “stack up” several fittings as this can add resistance between the sensor body and the ground location.

If 2 connectors are present, attach the leads from the 4 pin connector on the analog converter. It doesn’t matter which lead goes to which connector.

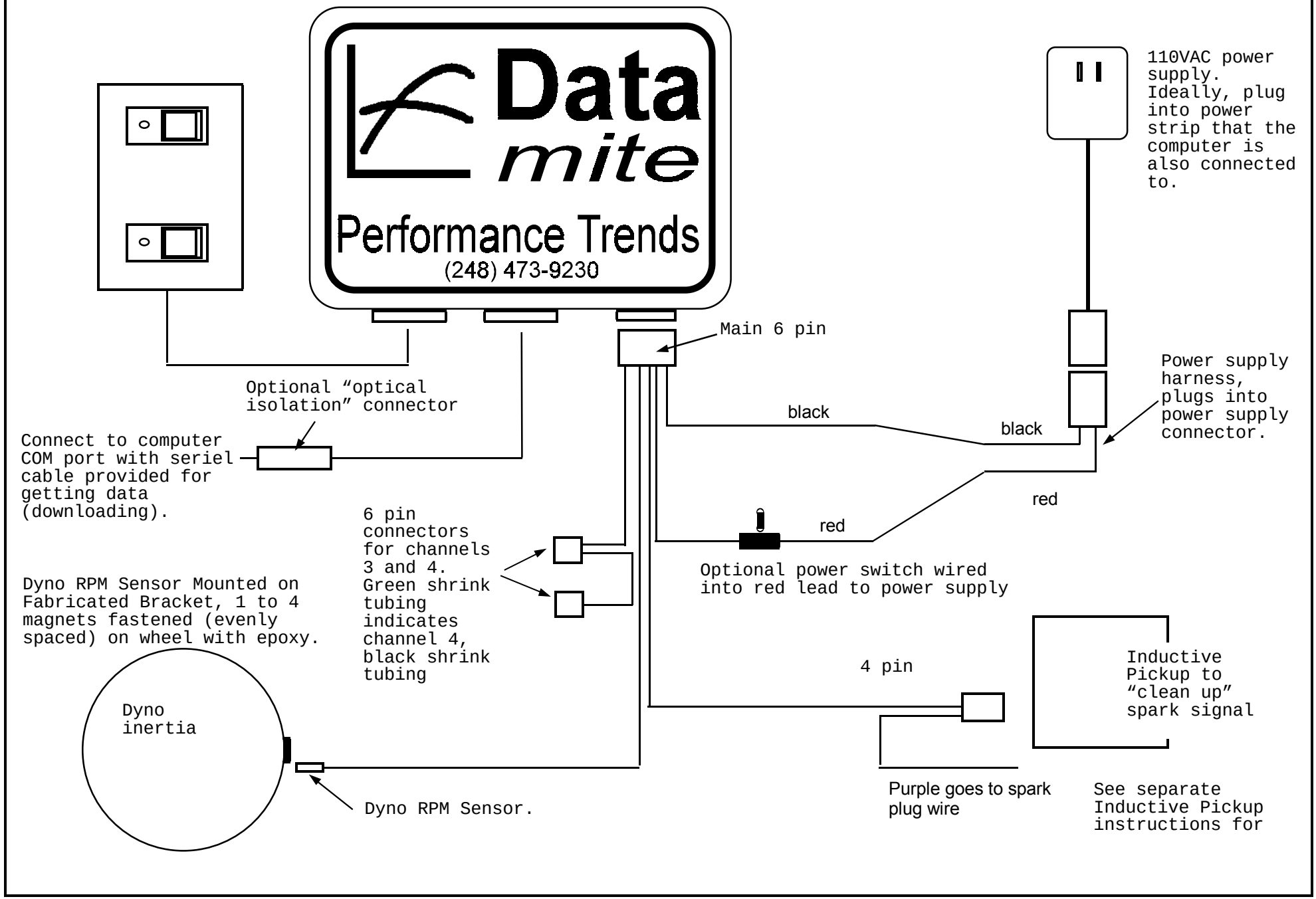


If only 1 connector is present, attach 1 of the leads from the 4 pin connector on the analog converter to this connector. It doesn’t matter which lead goes to this connector. Connect the other lead either to the body of the sensor for a good ground reference, or connect to a point on the engine block (or whereever the sensor is mounted) for a ground reference.



If the ground is not to the body of the sensor, be sure not to use teflon tape or anything which will add resistance between the sensor body and the point where you attach the other ground reference lead from the analog converter.

Dyno DataMite Harness Wiring with Inductive Pickup and 110VAC Power

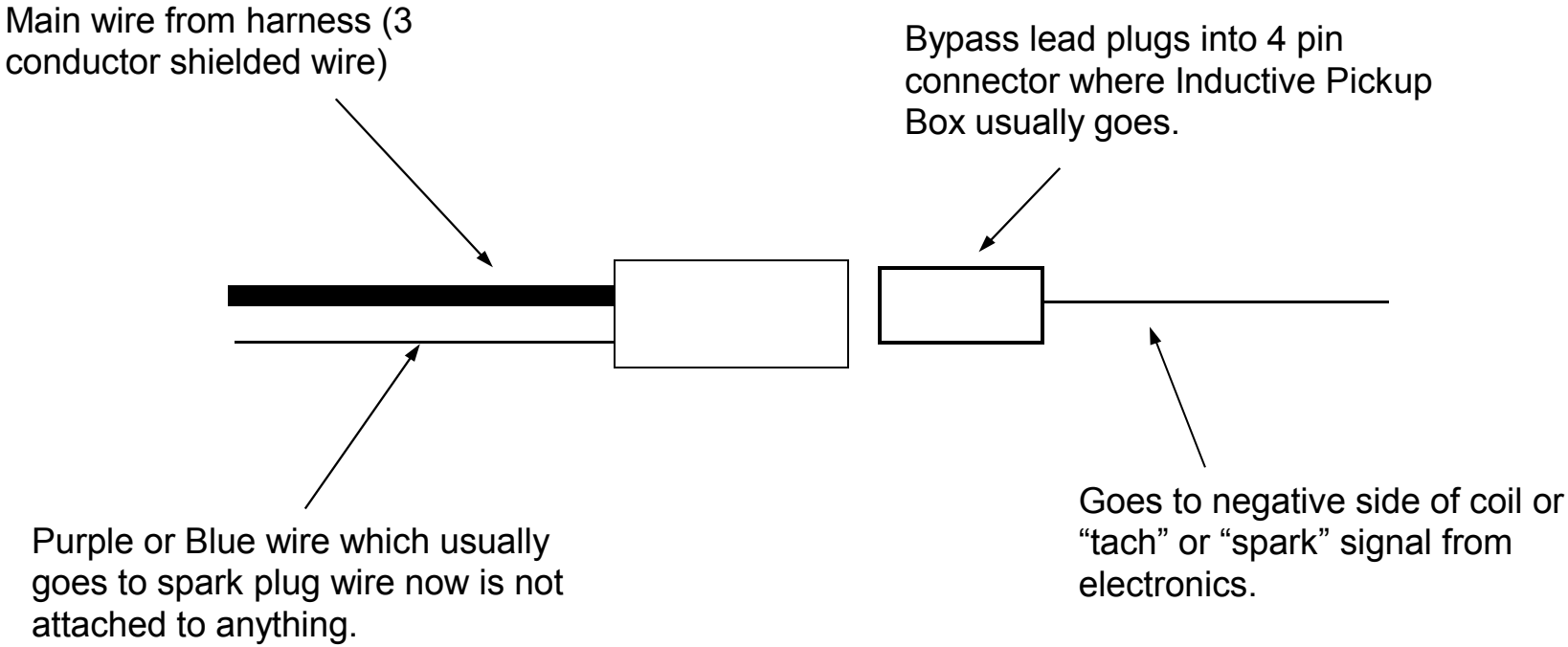


See Appendix 2 in the User's Manual for full details

DataMite Inductive Pick-Up/Magneto Bypass

Occasionally, you may want to bypass the inductive pickup, which is typically used for small 2 stroke and Briggs engines. That would be to input typical automotive ignition signals, like the negative side of the coil or to an electronic ignition controller, like an MSD (tm). To do so, simply disconnect the inductive pickup from the harness and plug in the Bypass Lead. Route the Bypass Lead to the automotive ignition source. Let the Blue or Purple lead from the harness (normally wrapped around the plug wire) unattached to anything.

Note: The DataMite will now need a ground reference to the engine to record spark signals, so attach a ground reference to the engine block or vehicle battery. A ground reference is a wire attached to the ground side of the power supply. You are now ***more likely to damage your computer*** if you run the engine with the DataMite connected to your computer, like if you use the 'Current Readings" screen with the gauges. Therefore, we ***strongly recommend using the optical isolator*** for this situation.

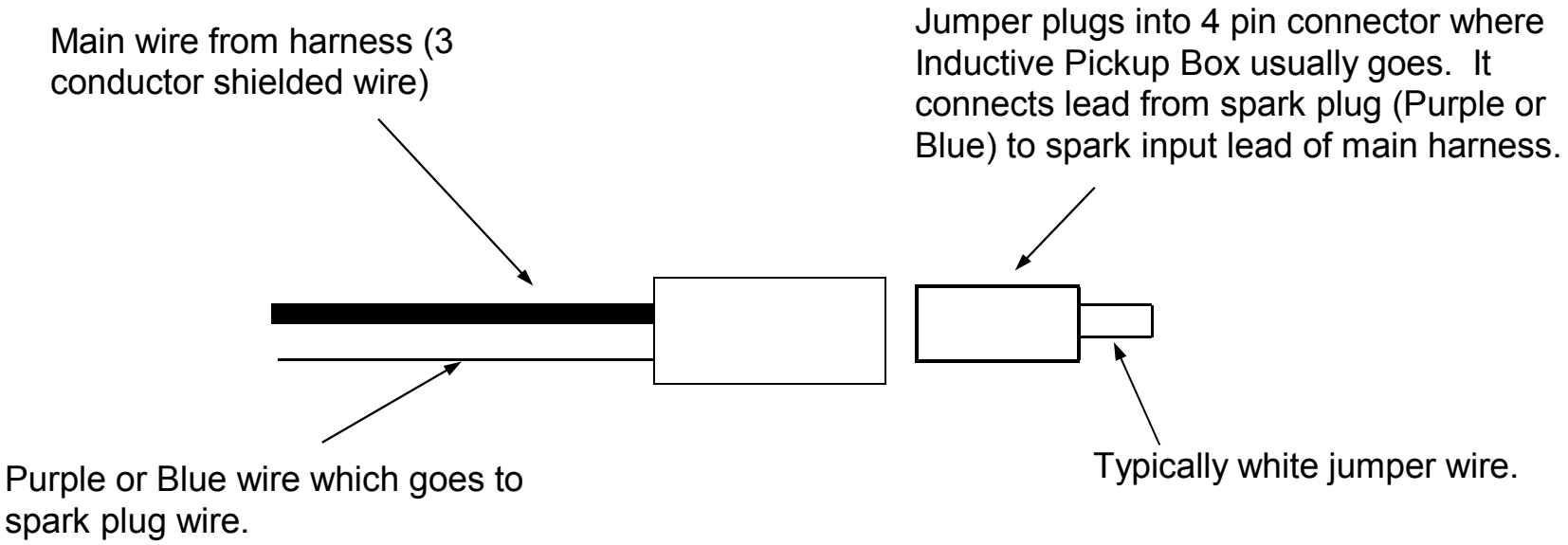


P

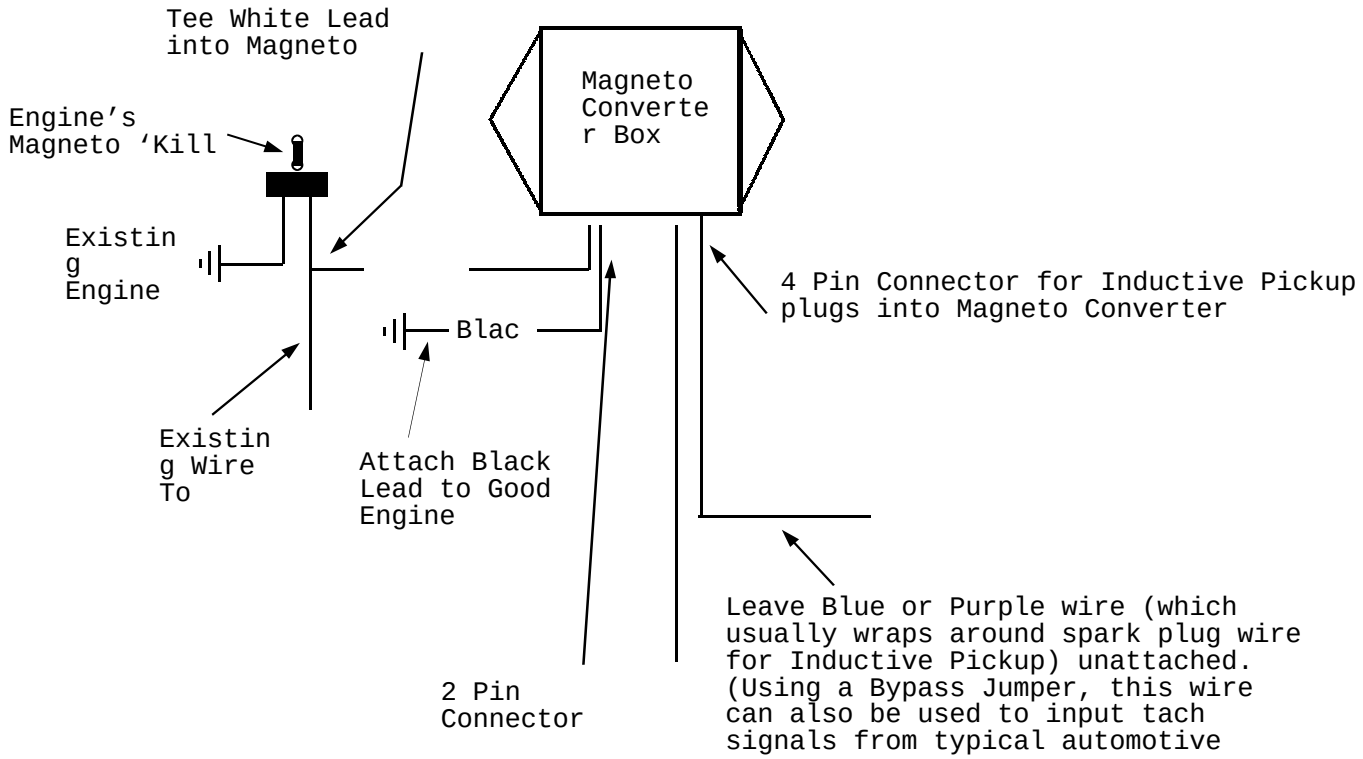
Davis Instruments instructions are stored in MS Pub's DataMite folder under Davis-in.pub.

DataMite ***Internal*** Inductive Pick-Up Jumper

If your DataMite has an Internal Inductive Pickup, then you do not need the external Inductive Pickup box. However, the standard harness will probably have a 4 pin connector for this external Inductive Pickup box. Performance Trends will supply a jumper connector which will plug into this 4 pin connector so that the spark input signal from the Blue or Purple wire will be directed to the spark input wire of the DataMite.



DataMite Wiring for Magneto Plugging Into

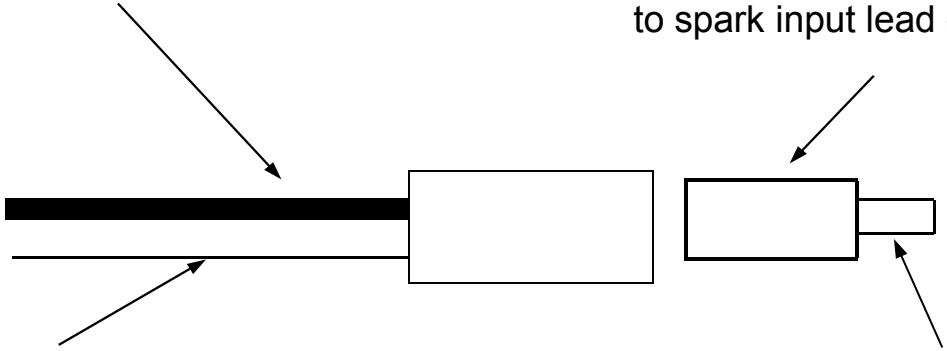


DataMite Inductive Pick-Up or Magneto Bypass Jumper

You may want to use the typical tach signal for your DataMite, instead of using the Inductive Pickup or Magneto signal conditioning boxes. Performance Trends canl supply a jumper connector which will plug into this 4 pin connector (replacing the Inductive Pick-Up or Magneto box) so that the tach input signal from the Blue or Purple wire will be directed to the spark input wire of the DataMite's main harness.

Main wire from harness (3 conductor shielded wire)

Jumper plugs into 4 pin connector where Inductive Pickup or Magneto Box usually goes. It connects lead from spark plug (Purple or Blue) to spark input lead of main harness.



Purple or Blue wire which can now be attached to typical tach input, like negative side of ignition coil or MSD "Spark Out" or "Tach Out" terminal. This wire can be extended to 10 feet or longer.

Typically white jumper wire.

Unpotted Dyno Analog Converter

This analog converter is not “potted”, meaning it is not filled with epoxy to help withstand vibration, moisture and abuse. We do this because of the various levels of electrical noise we find in dyno installations. This converter can be readjusted for electrical noise (filter settings in the circuitry) if needed.

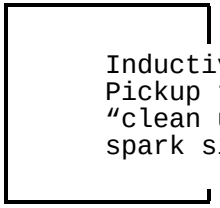
We usually ***do not*** recommend you use this converter on a vehicle, especially a motorcycle or go-cart due to the high vibration present in these vehicles.

If you need to use it on a vehicle, contact Performance Trends. We will let you know where to send it so it can be potted, and returned to you.

Performance Trends

Standard DataMite Harness, with Inductive Pickup connector

See separate Inductive Pickup instructions for



Inductive Pickup to "clean up" spark signal

Purple goes to spark plug wire

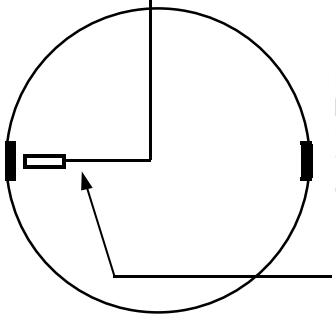
Black, Ground: Securely fasten to metal frame ground close

Red, 12 Volt Power. Can be from switched power, but must not be from switch that controls power to

Connect to computer COM port with seriel cable provided for getting data (downloading).

Optional Power

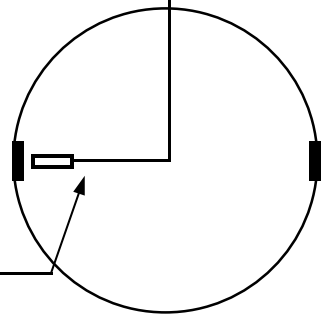
Optional 6 pin connector to access 4th channel



Rear Wheel Sensor Mounted on Fabricated Bracket, 2 or 4 magnets fastened (evenly spaced) on wheel with epoxy.

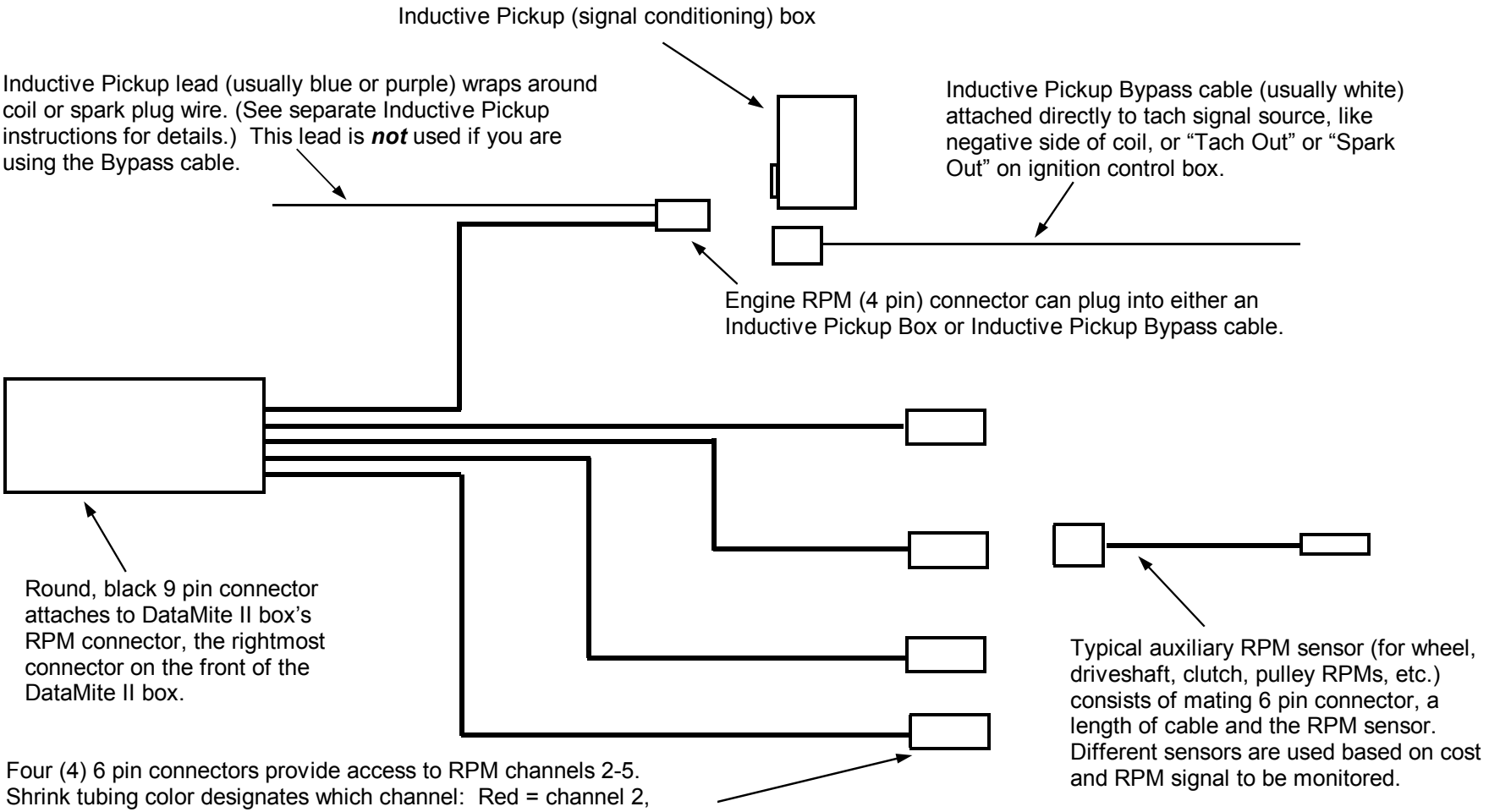
Black shrink tubing designates this sensor goes to channel 3

Front Wheel Sensor Mounted on Fabricated Bracket, 2 or 4 magnets fastened (evenly spaced)



White shrink tubing designates this sensor goes to channel 2

DataMite II RPM Break Out Harness, and Typical Connections



RPM pin assignments in 9 pin connector:

	signal		
RPM 2 (red)	2	Power	9
RPM 3 (yellow)	3	Ground	4 and/or 6
RPM 4 (blue)	7	Eng RPM	5
RPM 5 (green)	8		

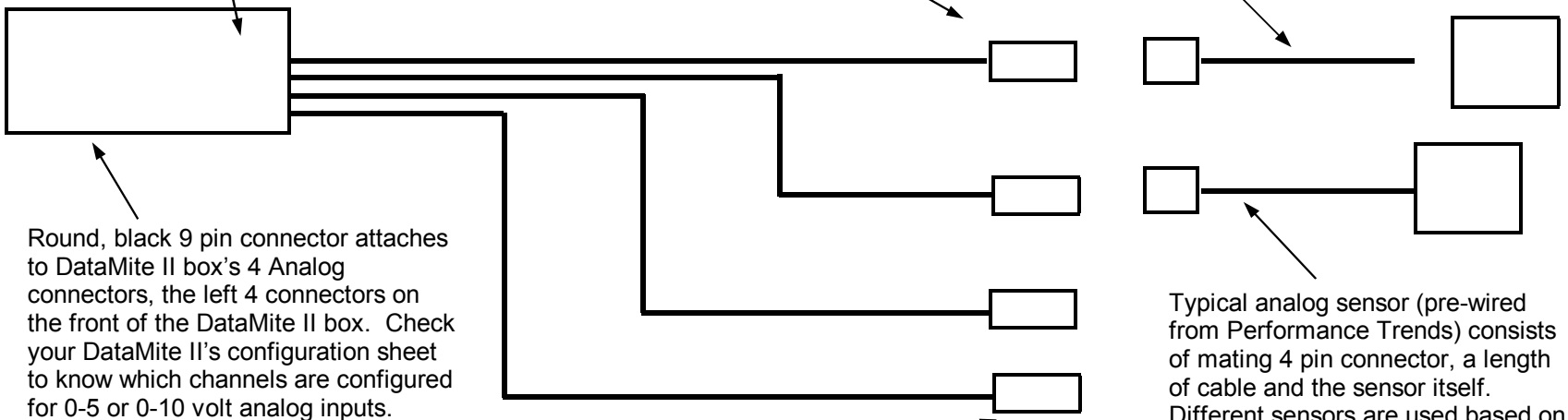
DataMite II 0-5 Volt or 0-10 Volt Analog Break Out Harness, and Typical Connections

12 V Power Notes

This harness may be marked with a colored "tie wrap" here with a similar colored sticker on the DataMite II box to identify this harness is for that connector.

If you are using a sensor which requires more than 5 volts power, Performance Trends may modify this harness, and install 6 pin analog connectors and use a 6 pin connector on that sensor's lead. This way you can make an incorrect connection. A jumper inside the DataMite will also be changed to produce approximately 12 VDC power on the analog connector. This marness may be marked with a colored "tie wrap" here with a similar colored sticker on the DataMite II box to identify this harness is for that connector.

Typical analog sensor to be wired by customer. Performance Trends will provide the DTM-LD, 3 conductor lead and mating 4 pin connector. See the separate DTM-LD instructions for wiring details.



Round, black 9 pin connector attaches to DataMite II box's 4 Analog connectors, the left 4 connectors on the front of the DataMite II box. Check your DataMite II's configuration sheet to know which channels are configured for 0-5 or 0-10 volt analog inputs.

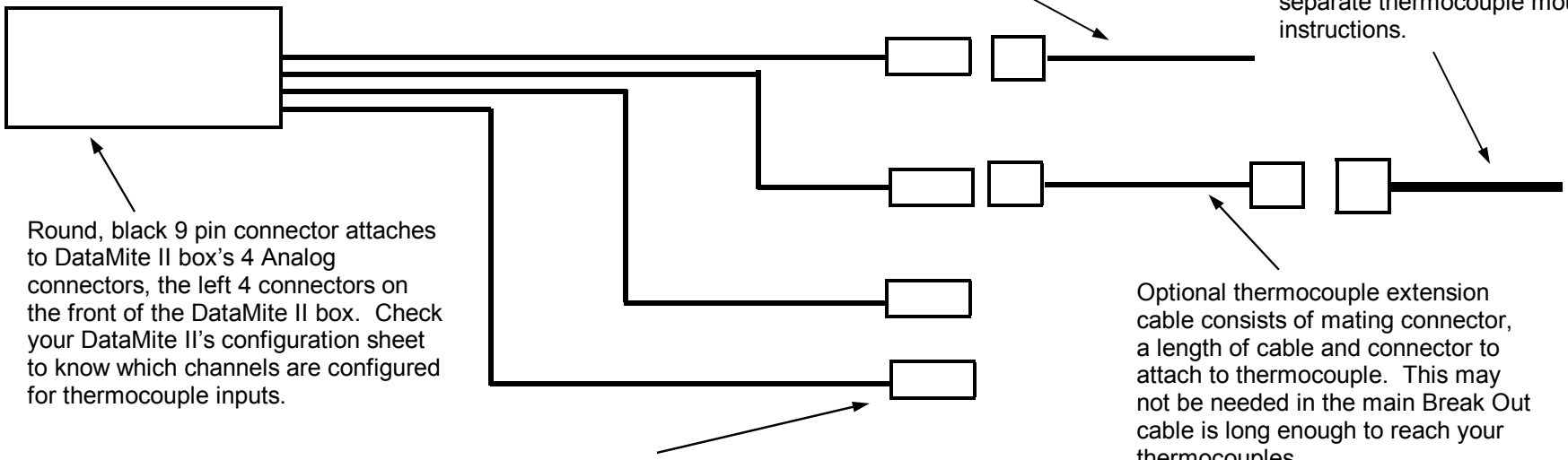
Typical analog sensor (pre-wired from Performance Trends) consists of mating 4 pin connector, a length of cable and the sensor itself. Different sensors are used based on cost and signal to be monitored.

Four (4) 4 pin connectors provide access to Analog channels. Shrink tubing color designates which channel of the 4: Red = 1st, Yellow = 2nd channel, Blue = 3rd channel, and Green = 4th channel. You may have to look in back side of connector strain relief to see color.

Analog pin assignments in 9 pin connector:

	signal		
Channel 1 (red)	2	Power	9
Channel 2 (yellow)	3	Ground	4 and/or 6
Channel 3 (blue)	7	Shield	5
Channel 4 (green)	8		

DataMite II Thermocouple Break Out Harness, and Typical Connections



Typical air temperature thermocouple has connector on 1 end only and crimped thermocouple wire end to sense air temperature.

Typical exhaust temperature thermocouple mounts in exhaust header. Similar thermocouples can be used to measure water, oil and other fluid temperatures with proper fittings. See separate thermocouple mounting instructions.

Round, black 9 pin connector attaches to DataMite II box's 4 Analog connectors, the left 4 connectors on the front of the DataMite II box. Check your DataMite II's configuration sheet to know which channels are configured for thermocouple inputs.

Optional thermocouple extension cable consists of mating connector, a length of cable and connector to attach to thermocouple. This may not be needed in the main Break Out cable is long enough to reach your thermocouples.

Four (4) 2 pin thermocouple connectors provide access to Thermocouple channels. Shrink tubing color designates which channel of the 4: Red = 1st, Yellow = 2nd channel, Blue = 3rd channel, and Green = 4th channel. You may have to look in back side of connector strain relief to see color.

Thermocouuple pin assignments in 9 pin connector:

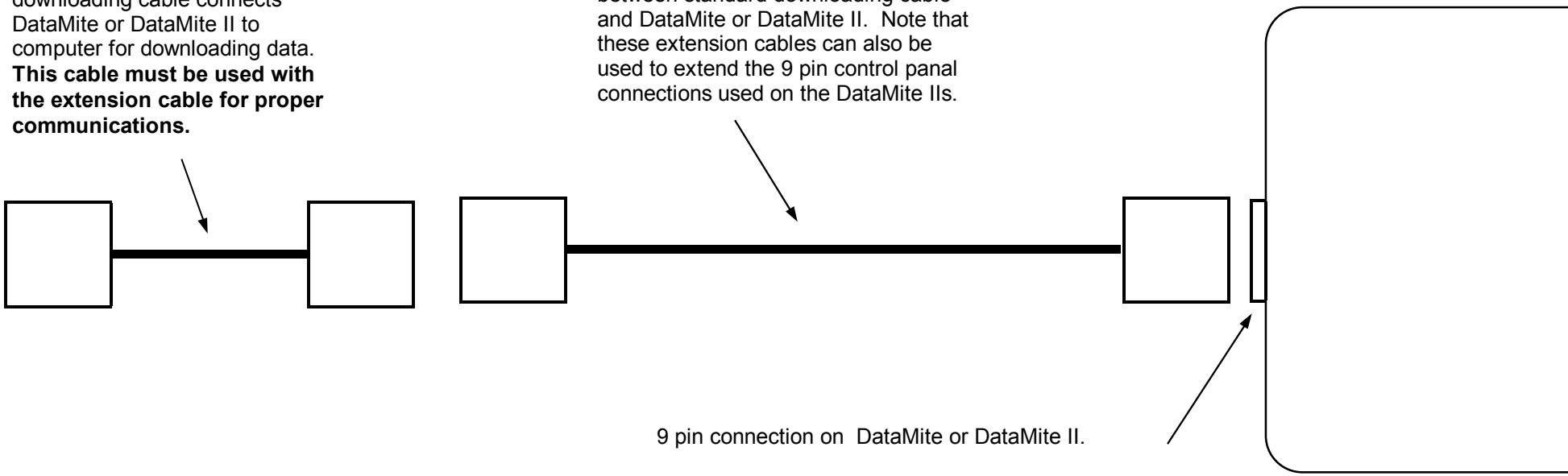
	+ side	- side (red)
Channel 1 (red)	2	1
Channel 2 (yellow)	3	6
Channel 3 (blue)	7	4
Channel 4 (green)	8	9

DataMite Extension Cable

9 pin Extension Cables are used to extend the standard downloading cable or the control panal used for DataMite IIs.

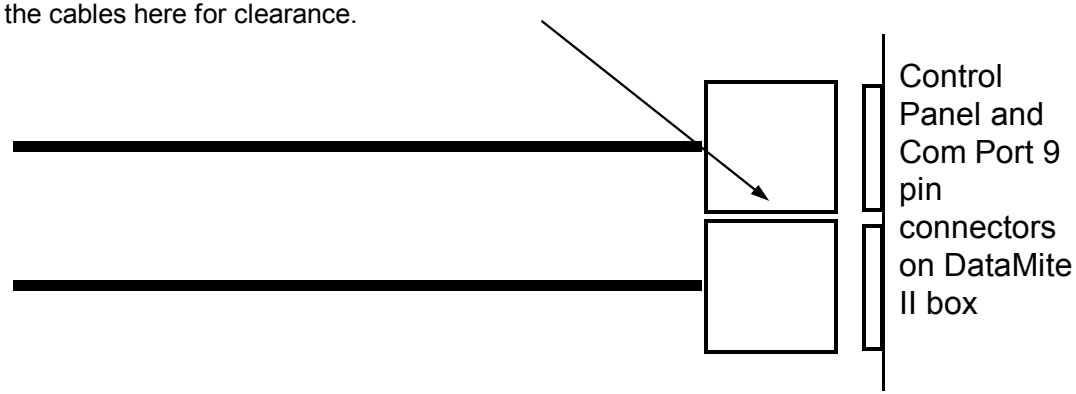
Standard 6 foot or 10 foot downloading cable connects DataMite or DataMite II to computer for downloading data. **This cable must be used with the extension cable for proper communications.**

25 foot or 50 foot extension cable goes between standard downloading cable and DataMite or DataMite II. Note that these extension cables can also be used to extend the 9 pin control panal connections used on the DataMite IIs.



9 pin connection on DataMite or DataMite II.

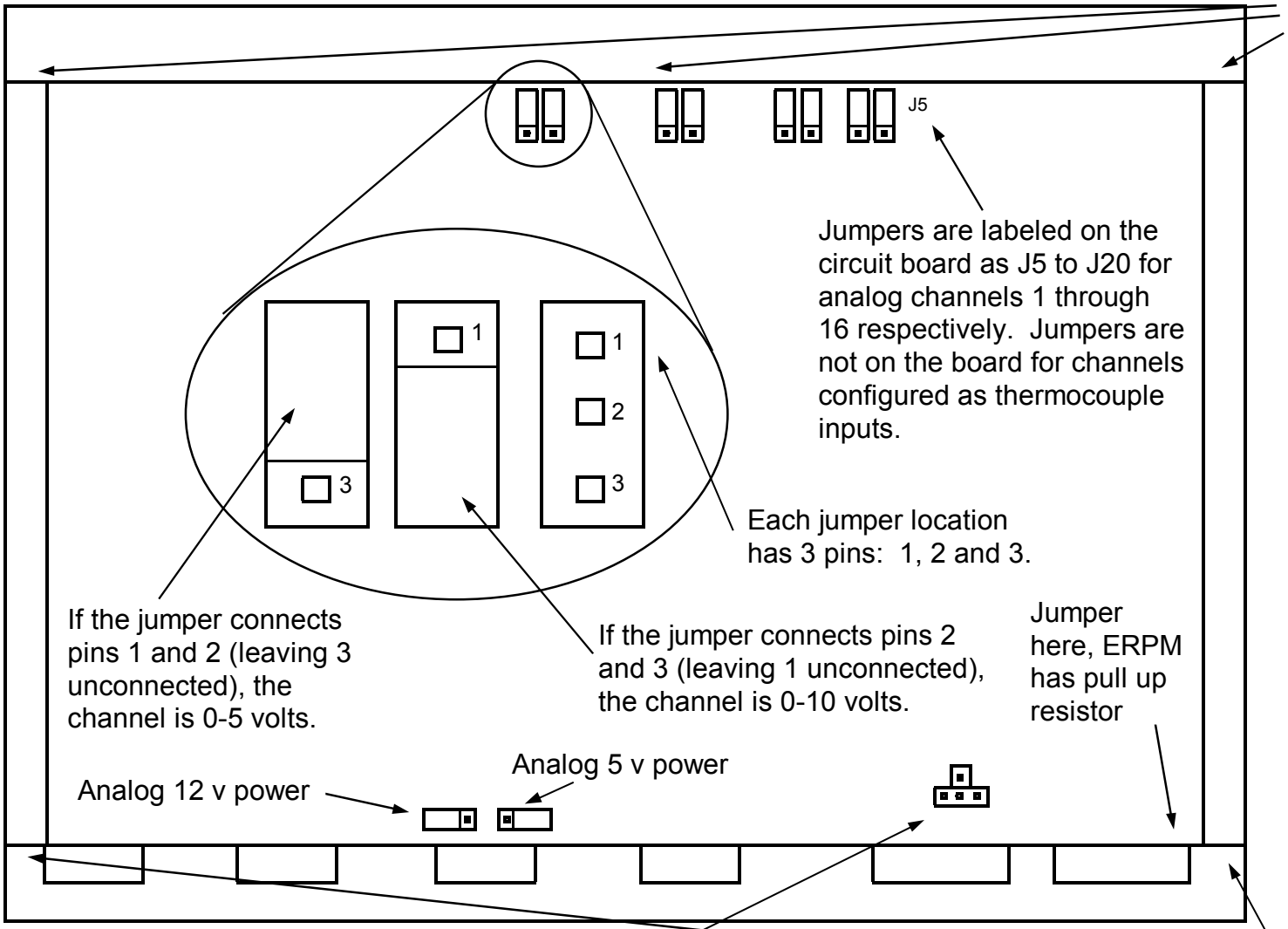
To use 2 molded extension cables for the Control Panel and the downloading cable on a DataMite II, you may have to trim one of the cables here for clearance.



Control Panel and Com Port 9 pin connectors on DataMite II box

DataMite II Jumper Settings

Jumpers inside the DataMite II box determine if analog channels are 0-5 or 0-10 volt inputs. Remove the five 2 mm (metric) Allen head screws on the back panal. The jumpers (small, black plastic parts which connect 2 male pins on the circuit board) are located on the back edge of the main board. If they are set closest to the edge (connecting pins 1 and 2), they are configured for 0-5 volts. If they are connecting pins 2 and 3 (positioned farther in from edge of board), they are configured for 0-10 volts.



1) Remove 5 2 mm Allen head screws and remove back cover.

2) Jumpers are located on back edge of main board, with 1 jumper for each analog channel.

Note: If you need to remove the top cover to switch the jumpers (usually not necessary), then loosen the four 2 mm Allen screws on the front panal. Then the panal slides out much easier. Also, when you slide the top panal back in, it will fit snuggly on the top of the vertical circuit board directly behind the front panal. Be sure not to force the top panal or damage this circuit board.

DataMite II Notes

Look in MS Word DTM2Notes in the DTM folder

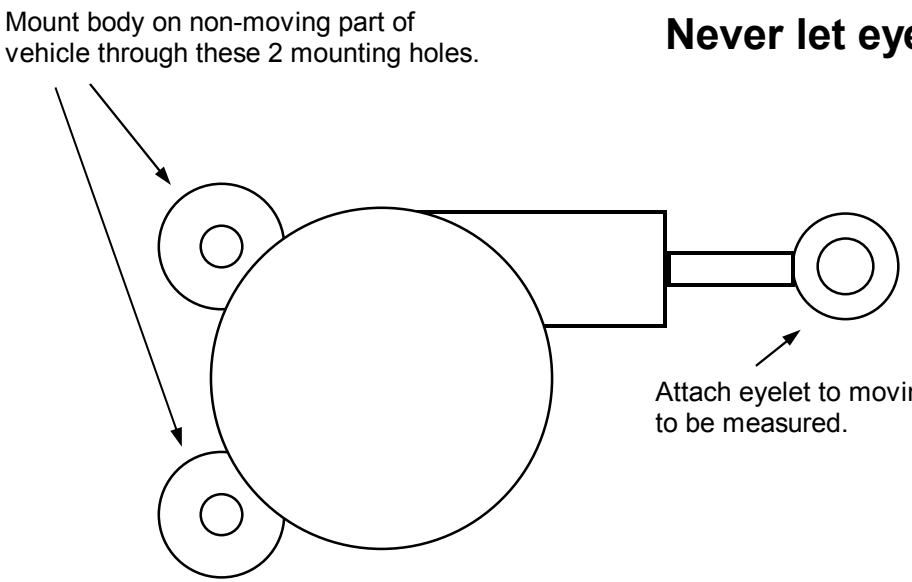
DataMite String Potentiometer (string "pot")

String Pots are convenient, easy and inexpensive ways to measure movement, like throttle position, shock position, movable wing position, etc. (Note that some authorities will argue that string pots are not fast enough for detailed shock motion measurement.)

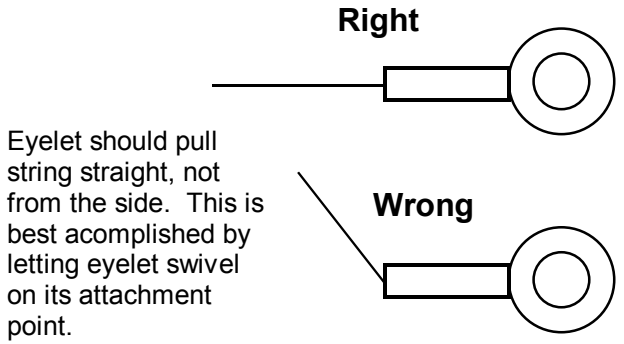
You will want to mount the body of the pot on the stationary part, and the eyelet on the moving part.

For throttle position always mount the pot so the string is pulled out from the pot as the throttle opens. Never have the spring in the string pot help to open the throttle. Following these rules minimizes the possibility of the string pot holding the throttle open.

Never let the string "snap" back to the pot body. This can snap off the eyelet, or have the string come off the reel inside. String pots can be rebuilt, but the cost is high and the time delay is long.



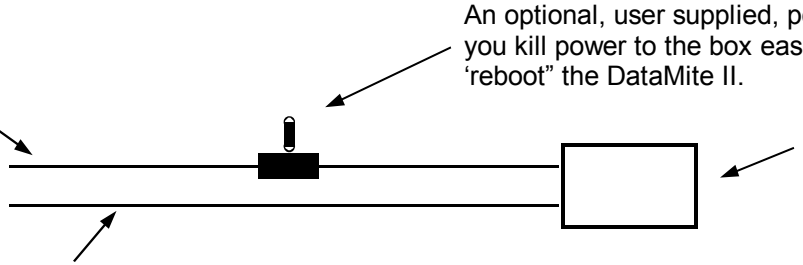
Never let eyelet "snap" back.



Never attach to throttle so string pot helps open the throttle. Always mount so opening the throttle pulls the string out of the pot, and the string pot's internal spring helps close the throttle. This helps ensure that a "stuck" throttle pot does not hold the throttle open.

DataMite II Power Connector Wiring Diagram

White lead is power. If you provide your own power source, it must be a clean (no A/C ripple) 12-18 Volt DC, up to 1.5 amps. For vehicle installations, direct to battery is best, direct to kill switch is OK. DO NOT wire to feed which powers your ignition box.



For vehicle installations, black lead goes to battery ground or good frame ground. Poor grounding can be a source for many problems in operation and poor data quality. Note the precautions below. Welded stud is best ground point to frame. Pop riveted brackets are a poor ground. Do NOT ground to same point which grounds your ignition system.

Important: The power light on the DataMite II will not come on without the button panel plugged in.

Precautions:

The DataMite software allows you to read the sensors "real time" or "live display" (what's happening right now) through the 9 pin downloading cable. Improper grounding of the system or a high voltage spikes coming from a sensor through the DataMite can damage your computer. Here are some tips to reduce this possibility:

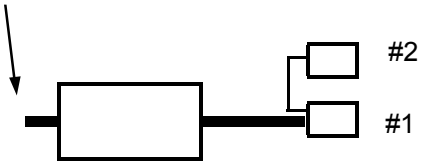
1 Use an Optical Isolator in series with the cable from the DataMite to the computer. We can provide an Optical Isolater DTM-OI which can eliminate this problem for $100.
2 The DTM-PS power supply should be plugged into the same outlet as your computer (plug both into the same power strip).
3 The engine or dyno frame should have a good earth ground (grounded to cold water pipe or grounding rod).
4 Laptop computers running off their battery, not a 110 VAC power supply, are less likely to have problems.

Also, if you are using sensors which have their own power supply (like an A/F sensor, emission analyzer, etc), it is important that the DataMite II system power up before or at least at the same time as that sensor. This is usually accomplished by plugging in that sensor's power cord to the same power strip that powers the DataMite II box.

Dual Plug Power Supplies.

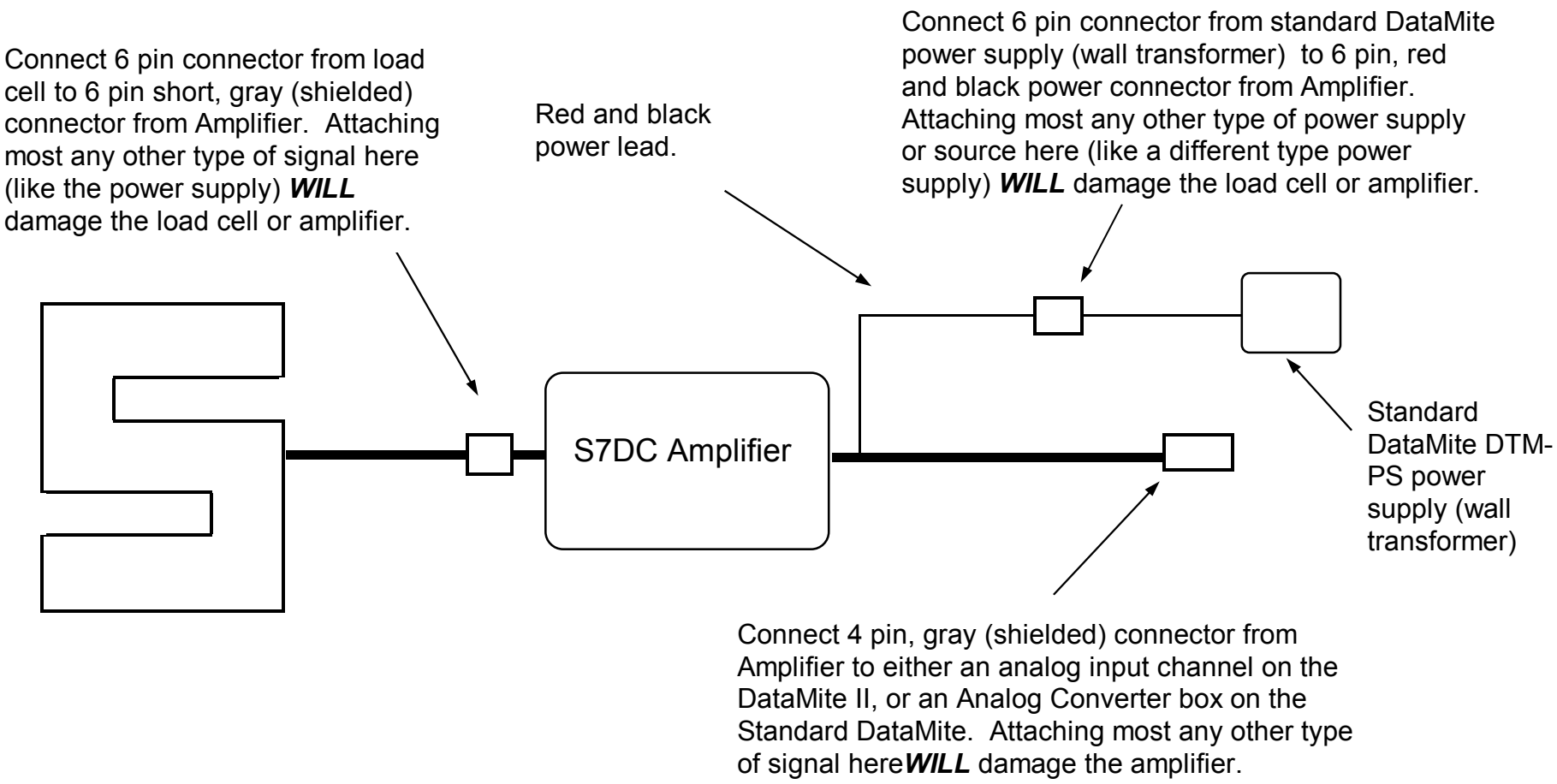
For systems with additional power requirements (like A/F Sensors), you may receive a power supply with 2 power connectors. Plug your DataMite into plug #2. For an On/Off switch, you must use one on the AC input, like that on a power strip.

AC In: Switch would go here.



See Appendix 2 in the User's Manual for full details

DataMite Load Cell and Amplifier Wiring Diagram

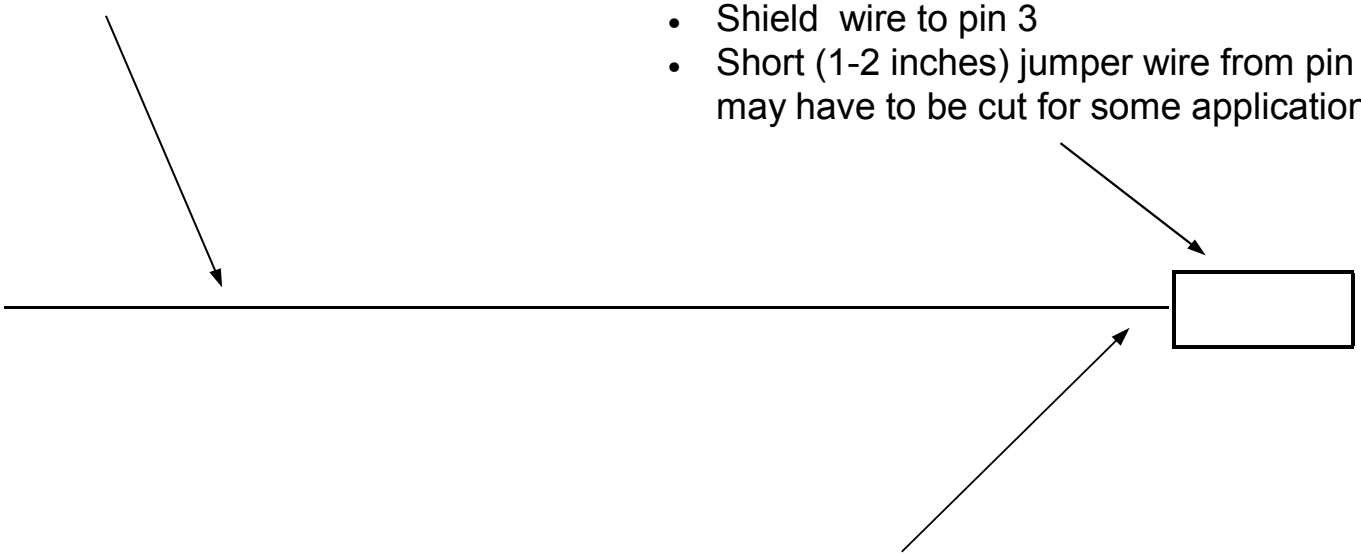


DataMite Analog Sensor Pigtail

10 feet of shielded, 3 conductor cable.

4 pin male Molex connector with strain relief.

- Black wire to pin 1
- Red wire to pin 2
- White wire to pin 4
- Shield wire to pin 3
- Short (1-2 inches) jumper wire from pin 3 to pin 1 This wire may have to be cut for some applications



Important: When tightening the strain relief, push the cable in, so there is plenty of slack on all 4 wires. This ensures you do not put tension on these wires and sockets when you tighten the strain relief.

DataMite Powered (active) RPM Sensors

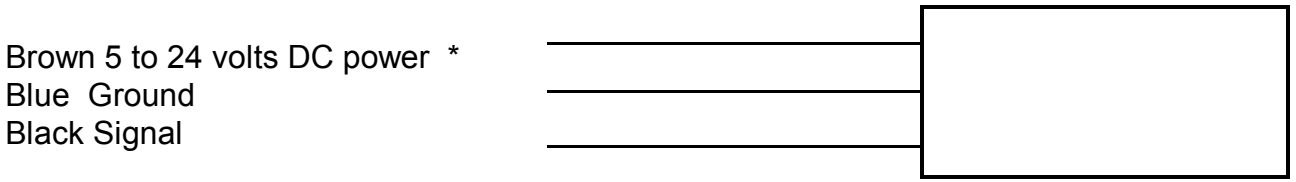
Active sensors are generally less prone to false triggering due to vibration, but cost more, require more wiring and power, and are "more fussy" about the type of magnet as a target.

Usually they can be wired into a DataMite harness as a direct replacement for the Reed Switch as follow:

- Black wire to reed switch is ground, and can be connected to the Ground lead of the sensors below. As this usually does not matter with reed switches, double check the harness. Check for less than 10 ohms between this black wire and another ground in the harness to confirm it is wired correctly.
- White or clear wire is typically the signal and can be wired to the signal wire of the sensors below
- Red (if present) may (or may not) be wired for 5 volts from the DataMite. This can provide power to the sensors below, or pull power from the 12 volt power source.

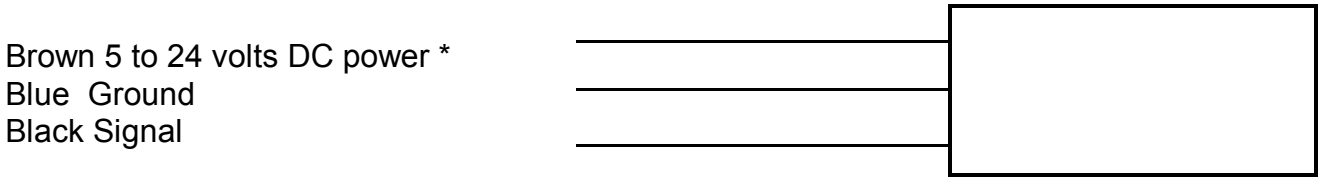
RPM Sensor requiring external magnet

Black plastic body (sensor is NOT magnetic itself, it does not attract a piece of steel placed close to it)
Triggers on south pole of magnet only



RPM Sensor with internal magnet

Black plastic body (sensor IS magnetic itself, it DOES attract a piece of steel placed close to it)
Triggers on metal (steel/iron) target



* Note: Some sensors come with red = 5-24 VDC power, black = ground, and green = signal.

Note: For engine RPM sensor for Channel 1, put a 2K pullup between signal and power (black and brown)

DataMite* USB to Serial Adapter

Installation Procedure:

Many new computers come without COM serial ports, but with just USB ports. The Keyspan USB to Serial adapter has proven to work well in converting USB ports to serial COM ports for use with our DataMite electronics*.

Start your computer, but do ***not*** start the DataMite software or install the adapter on the USB port. You should be at the Windows 95/98/Mi/2000 desktop.

Insert the CD included with the USB adapter into the CD rom drive. It will auto run (start automatically).

Select “Install Sodftware” at the first screen.

Select “install Keyspan High Speed Serial Adapter Software” at the next screen.

Use the defaults (settings suggested by the installer program) to install the Keyspan software.

When the software has been installed, plug the USB adapter into one of the computer’s USB ports. The computer will recognize that something has been plugged in and it will configure itself.

Find the status of the USB adapter: Click on Start, Programs, Keyspan High Speed USB Serial Adapter, and then High Speed USB Serial Adapter Assistant. In the Assistant you should see it configured as Com 1, or Com 2, or Com 3, etc. Close down the Assistant.

Attach your DataMite serial cable to the KeySpan adapter’s DB9 (9 pin) connection.

Start your DataMite program. It should now find an available Com port to “talk” to your DataMite. You may want to go into the DataMite specs screen (click on DataMite at top of main screen) and set the Com Port to the same port shown in the “Assistant” software 2 steps above.

* The DataMite USB adapter can also be used by the Port Flow Analyzer or most any other Performance Trends program which talks through a serial port to an electronic device.

DataMite RPM Sensor and Cable

15 feet of shielded, 3 conductor cable.

6 pin female Molex connector with strain relief.

- Black wire to pin 1
- Red wire to pin 6
- White wire to pin 4
- Shield wire to pin 3

Standard black plastic Reed switch, connected to black and white wire. Use black shrink tubing over end of red wire to prevent shorting to shield or shield wire. Then use 1 piece of black shrink tubing over all wires to finish off.

Important: When tightening the strain relief, push the cable in, so there is plenty of slack on all 4 wires. This ensures you do not put tension on these wires and sockets when you tighten the strain relief.

DataMite **Channel 1** RPM Sensor and Cable

This is the same as the cable above except it has a 4 pin Molex connector and a “pull up”

4 pin female Molex connector with strain relief.

- Black wire to pin 1
- Red wire to pin 2
- White wire to pin 3
- Shield wire to pin 4
- Connect 1K to 2K resistor from pin 2 to pin 3 (insulate with shrink tubing to prevent shorting to shield)

Standard DataMite Harness, with Inductive Pickup connector

See separate Inductive Pickup instructions for

Inductive Pickup to "clean up" spark signal

Purple goes to spark plug wire

Black, Ground: Securely fasten to metal frame ground close to

Red, 12 Volt Power. Can be from switched power, but must not be from switch that controls power to

Optional Power

Connect to computer COM port with seriel cable provided for getting data (downloading).

Optional 6 pin connector to access 4th channel

Optional 6 pin connector to access 3rd channel, or connect to RPM sensor with 6 pin connector

Rear Wheel Sensor Mounted on Fabricated Bracket, 2 or 4 magnets fastened (evenly spaced) on wheel with epoxy.

Black shrink tubing designates this sensor goes to channel 3

Front Wheel Sensor Mounted on Fabricated Bracket, 2 or 4 magnets fastened (evenly spaced)

White shrink tubing designates this sensor goes to channel 2

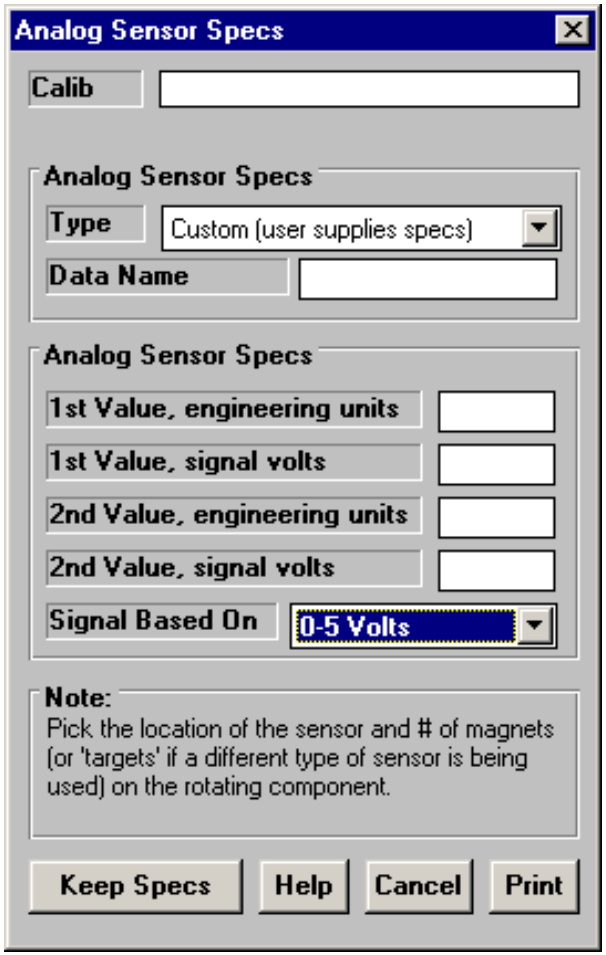
DataMite II Calibration Sheet for Custom

This sensor does not have a pre-programmed calibration in the DataMite software. Therefore, you must specify it as a Custom sensor as follows:

- Click on ***DataMite*** at the top of the Main Screen.
- Click on the ***Sensor and Calibration*** (rightmost column) for the channel where the Custom sensor will be installed. Be sure this channel is configured in the DataMite II box as an Analog channel and not a Thermocouple channel. The screen at the right will be displayed.
- Select ***Custom (user supplies specs)*** for the Sensor Type and ***0-5 Volts*** for Signal Based On.
- Enter the ***Analog Sensor Specs*** in the lower section as written in the menu shown to the right. You can also enter a ***Data Name***, with a suggested name shown to the right.
- When finished, click on Keep Specs. In the DataMite screen, this channel will now be listed as:

  Cstm xxx-xxx Hz = xx-xx xxxx

This will produce the calibration (conversion from DataMite signal to actual units) recommended by the factory.



Notes:

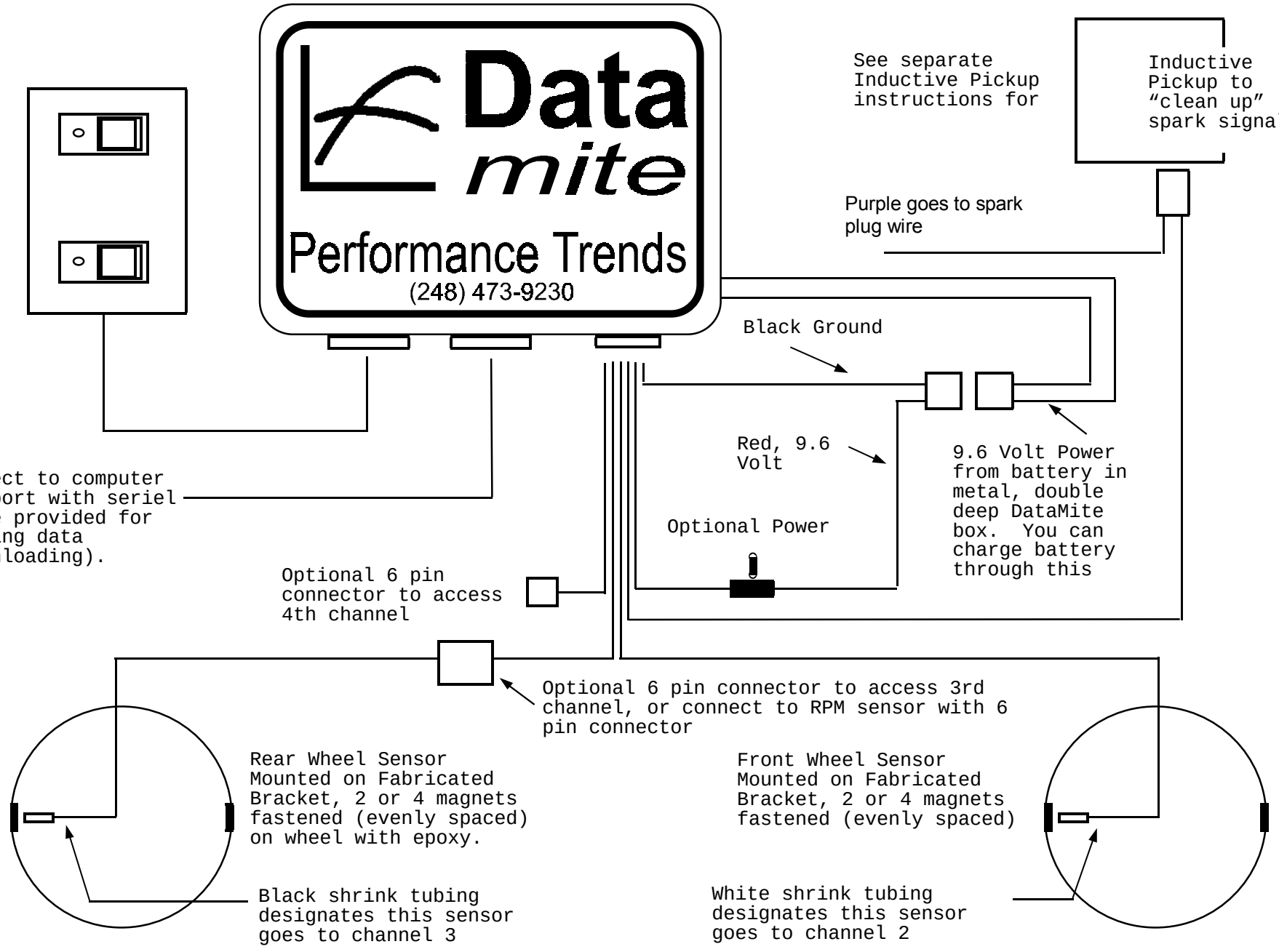
_____

_____

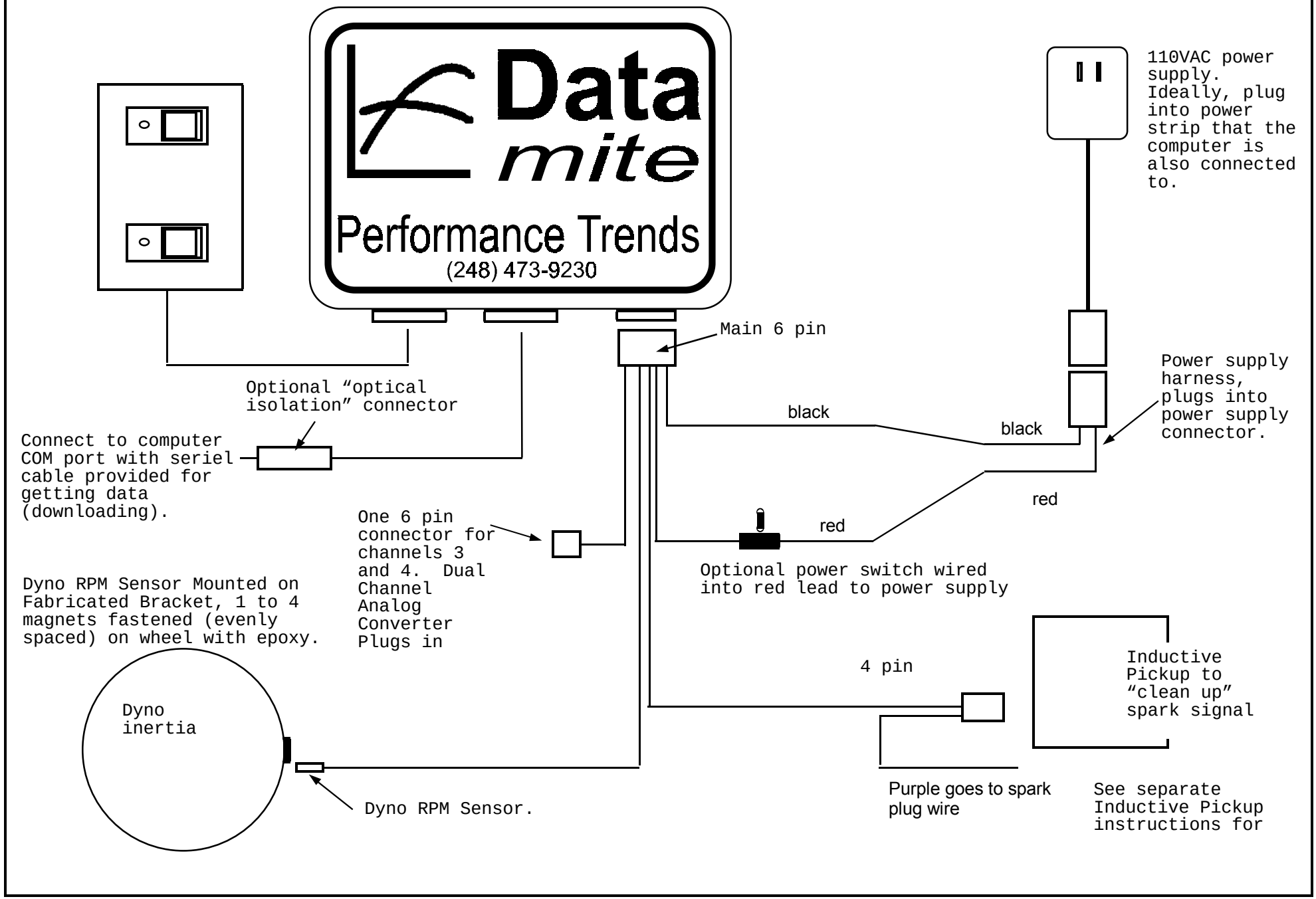
_____

Possible Choices Include:	Std PTI-CFM3 1.0	Dyno Torque, ft lbs	Steering
	Std Frequency (Hz)	Std Accel., Forward	Throttle
Std 0-15 PSI	25 PSI MSI600 Sensor	Std Accel., Side	Brake
Std 0-70 PSI	50 PSI MSI600 Sensor	Std Accel., Up	Std RTD Air Temp
Head Thermocouple	75 PSI MSI600 Sensor	Custom Accel., Forward	Std RTD Fluid Temp
Std 0-150 PSI	100 PSI MSI600 Sensor	Custom Accel., Side	Custom (user supplies specs)
Std 150-230 Deg	250 PSI MSI600 Sensor	Custom Accel., Up	Custom (user supplies table)
Std Thermocouple	500 PSI MSI600 Sensor	RF Shock Travel	
Std 0-5 Volts	1000 PSI MSI600 Sensor	LF Shock Travel	
Std 0-20 Volts	2500 PSI MSI600 Sensor	RR Shock Travel	
Std PTI-CFM3 1.5	5000 PSI MSI600 Sensor	LR Shock Travel	

Standard Vehicle DataMite Harness, with Inductive Pickup connector and



Dyno DataMite Harness for Dual Channel Anlg. Conv. with Ind. Pickup &



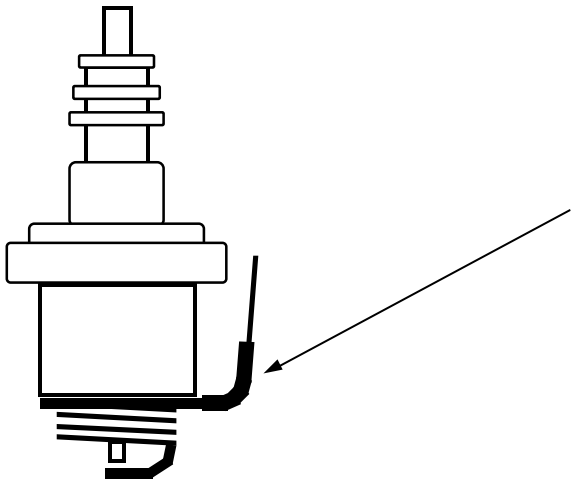
See Appendix 2 in the User's Manual for full details

DataMite Cylinder Head Thermocouple

Install the thermocouple under the spark plug as shown below.

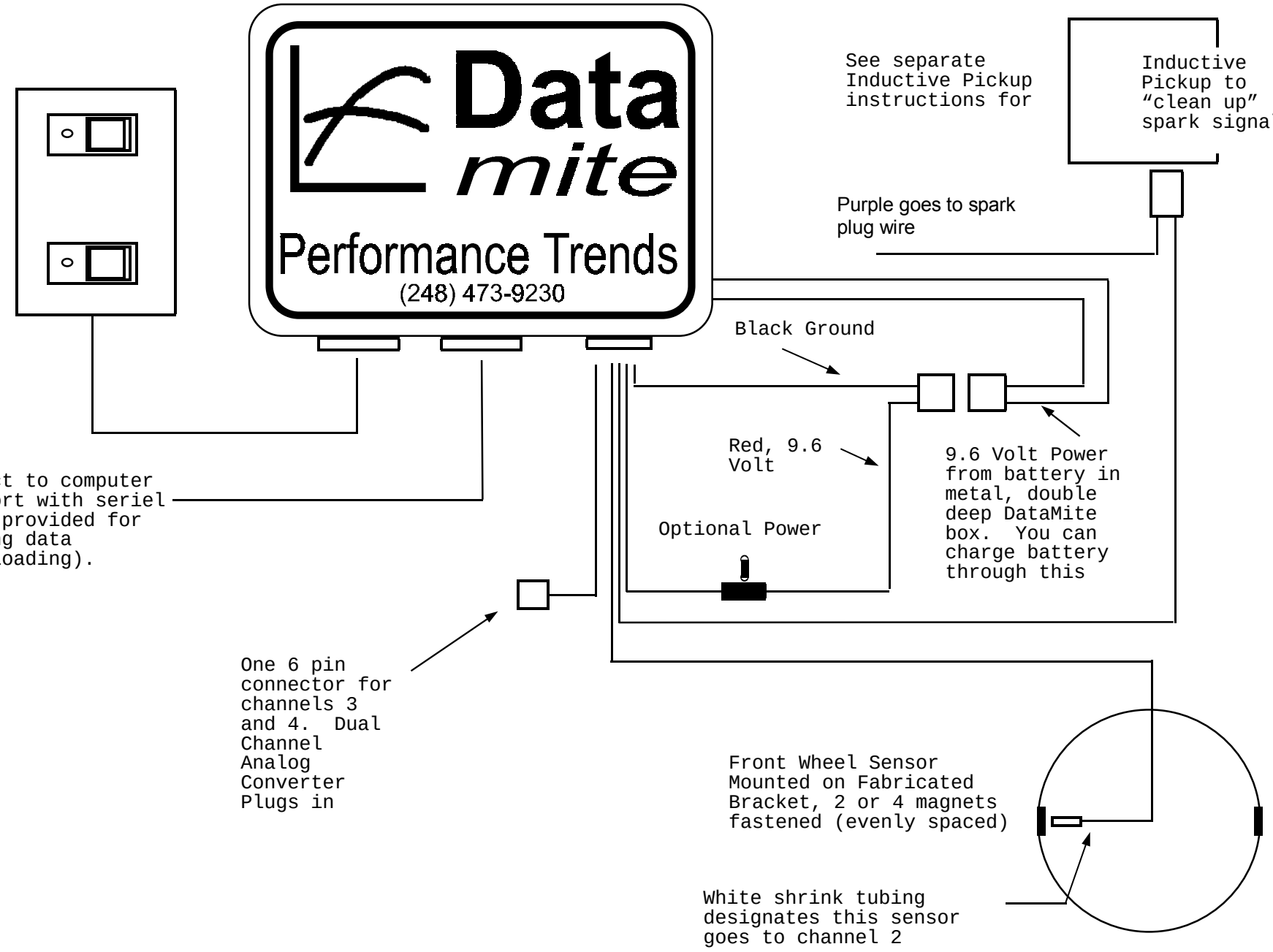
Signal Noise. With thousands of volts passing through the spark plug and a thermocouple signal being only a few milivolts, its not suprising “noise” will appear in this signal. Things which may reduce this noise include:

- Resistor or suppressor plugs, boots or wires. Note that this also reduces the signal to an inductive pickup, so you may have to wrap the inductive pickup wire around the spark plug wire several times to maintain an RPM signal.
- For Briggs engines, use an NGK Resistor Boot on the spark plug to help eliminate electrical noise. They are available from most karting suppliers, like American Power Sports.
- You can route the plug wire through some braided grounding strap (or wrap some wire many times around the plug wire) and then ground this braid to the engine block.



Install the cylinder head thermocouple under the spark plug, between it an the cylinder head. Then plug it into a thermocouple lead to connect it to a dataMite box or DataMite Analog Converter.

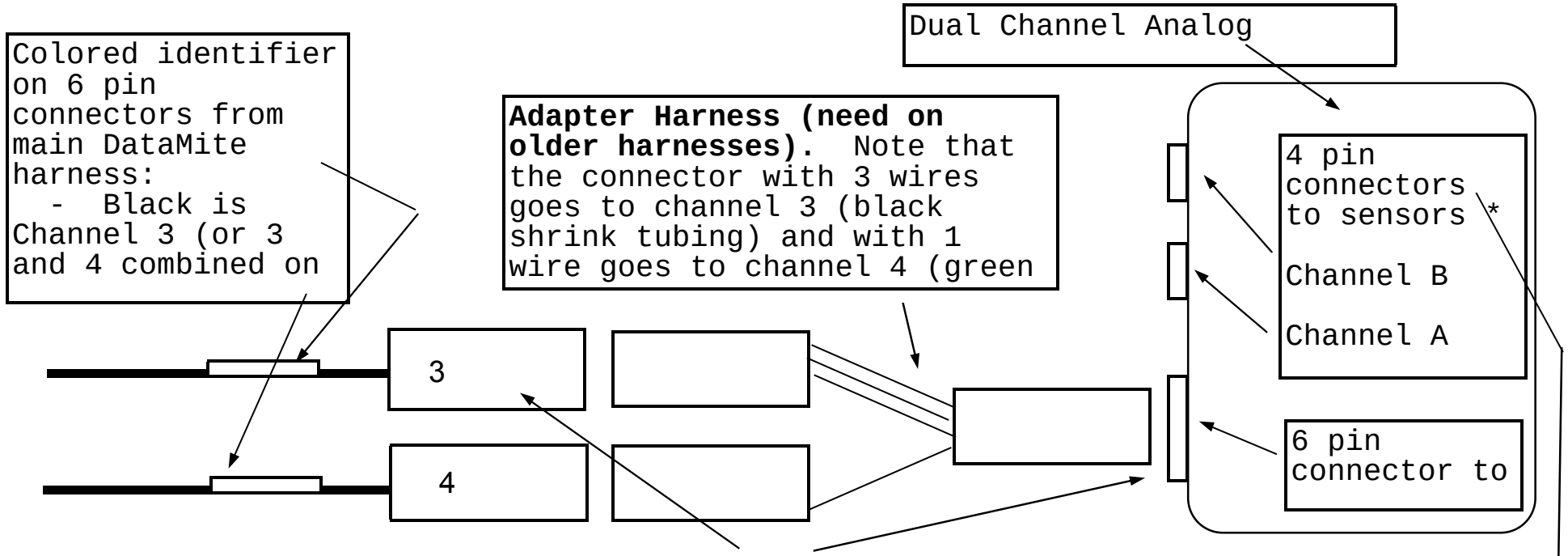
Standard Vehicle DataMite Harness, with Inductive Pickup connector and



Dual Channel Analog Converter (and Adapter Harness) Installation

The Analog Converter makes it possible for the DataMite which records RPMs (or frequency) to record analog signals like temperature, pressure, acceleration, etc. The dual channel box provides access to 2 channels (usually channel 3 and 4). The Adapter harness is needed for harnesses which were wired for individual channels 3 and 4. Newer Dyno harnesses (as of Jan 2002) have only 1 plug for channel 3 and 4 together, which plug directly into the analog converter. (Vehicle harnesses may have separate channel 3 and 4 connectors.)

Important: Be sure to change DataMite Setup in the computer program to match the new sensors being installed. Read DataMite Specs starting on page 41 for more info.

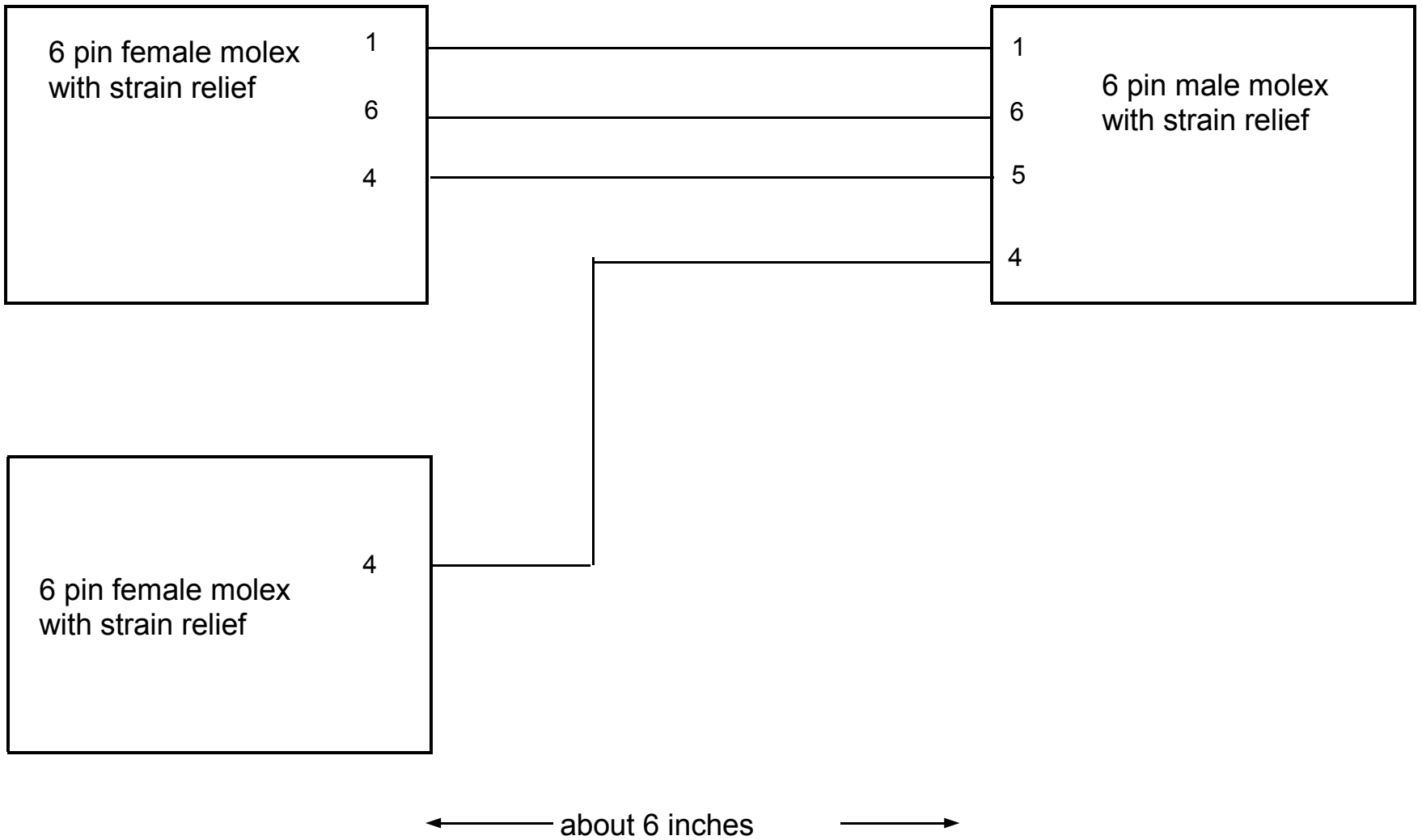


Most ***dyno*** harnesses produced after Jan 2002 would only have the # 3 connector with black shrink tubing. This connector would then plug directly into the Dual Channel Analog Converter box 6 pin connector and would not need the adapter harness. New ***vehicle*** harnesses may have separate channel 3 and 4 connectors and DO still need the adapter to use both channels.

* Note that the 4 pin connector is not installed if only 1 channel has been activated or if the channel is an

* Note that if thermocouple channels are installed, there is a white jumper wire for each. This jumper should be connected (not cut) for ungrounded thermocouples (typical of most all thermocouples provided by Performance Trends). However, if

Dual Channel Analog Converter Adapter Harness



DTM-OI2 Externally Powered DataMite

Install at either end of the cable which connects your computer to the DataMite. The Optical Isolator can be powered by your computer's COM port, and has the option of being powered by external power supplies. **The isolation protection works best in neither power supply or only one supply is used.** If the Optical Isolator is labeled, the end labeled DTE usually goes to the PC and the end labeled DCE usually goes to the DataMite.

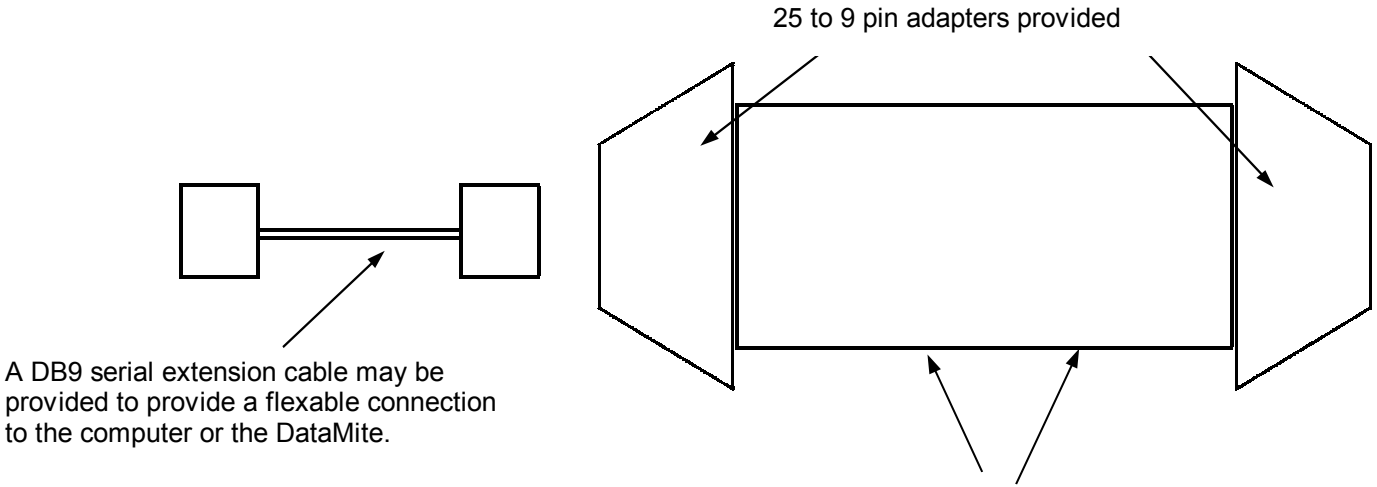
Notes:

Install the optical isolator ***without*** either power supply connected. If you no longer can read the DataMite:

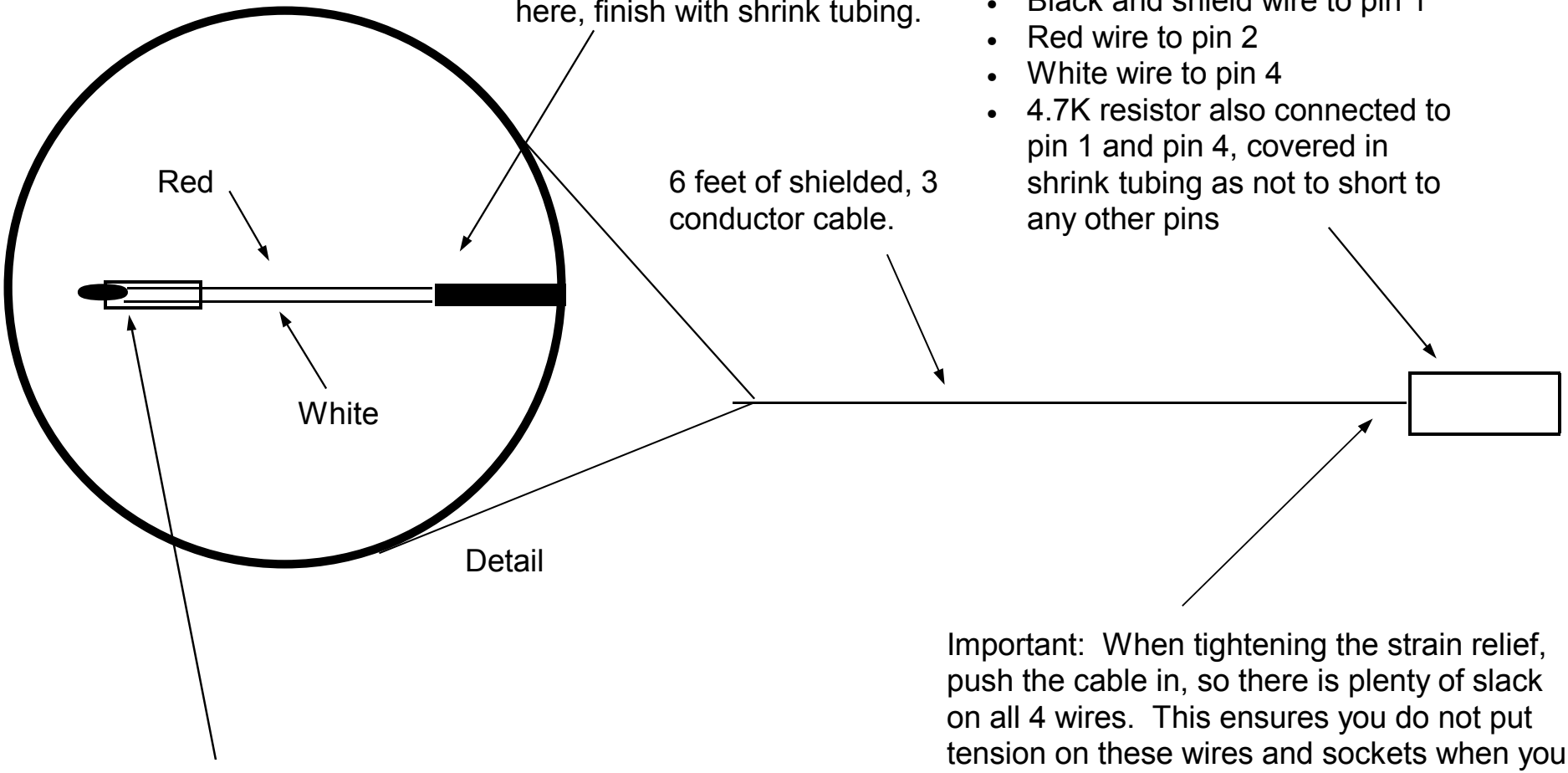
- Try plugging in one power supply to one of the power input ports. If you still can not read the DataMite, try plugging that one power supply to the other power input port. If you still can not read the DataMite, try plugging both power supplies into both power input ports. Note that using both power supplies provides the least optical isolation protection. For optimum optical isolation, the 2 power supplies should be powered from 2 different electrical circuits (different circuit breakers at your main junction box for your shop's AC power).
- You may have an adapter or serial cable in the line which does not pass all 9 lines through. Try moving the Isolator to a connection closer to your computer.

If the transfer rate of data from the DataMite to the computer is very slow, try moving the Isolator to the the DataMite end of the cable.

The externally powered optical isolator is rated at 4000 volts. This rating drops to about 1500 volts if you use both power supplies that are on the same AC power circuit. Though unlikely, extremely large electrical surges may short out and pass through the isolator and still damage your computer.



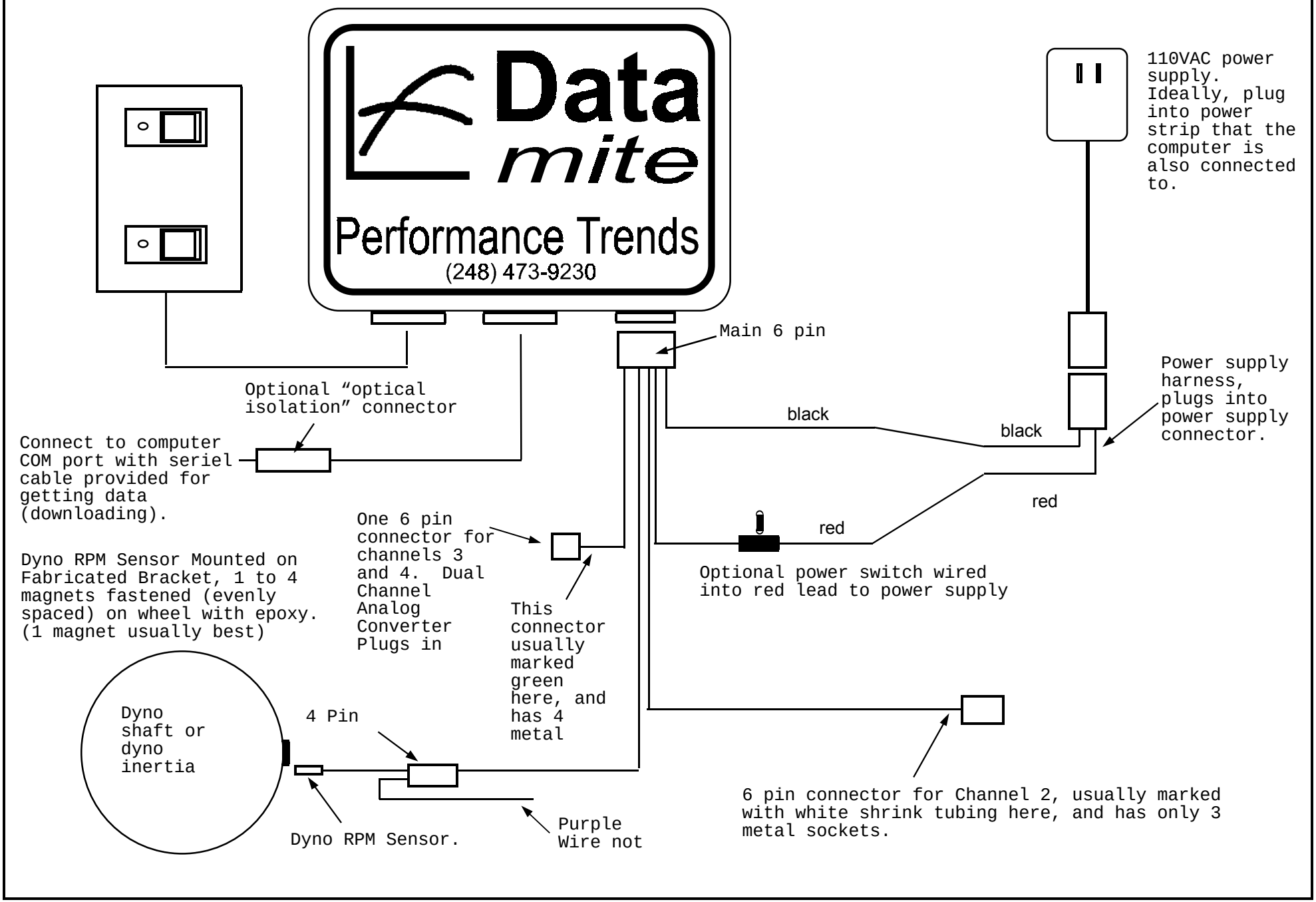
DataMite Thermistor Sensor



Solder connections and insulate both with shrink tubing. Then place shrink tubing over approximately half the thermister to provide strain relief and over shrink tubing convering solder joints.

Important: When tightening the strain relief, push the cable in, so there is plenty of slack on all 4 wires. This ensures you do not put tension on these wires and sockets when you tighten the strain relief.

Dyno DataMite Harness: Dual + Single Channel Anlg. Conv., Dyno RPM Sensor & 110vac Power Supply



See Appendix 2 in the User's Manual for full details

DataMite Tips for Jr Dragsters

Jr Dragsters present problems for data loggers due to the high amount of vibration and the very high amount of electrical noise emitted by their ignition system. Here are some tips for installations on Jr Dragsters:

Use an NGK Resistor Boot on the spark plug to help eliminate electrical noise. They are available from most karting suppliers, like American Power Sports.

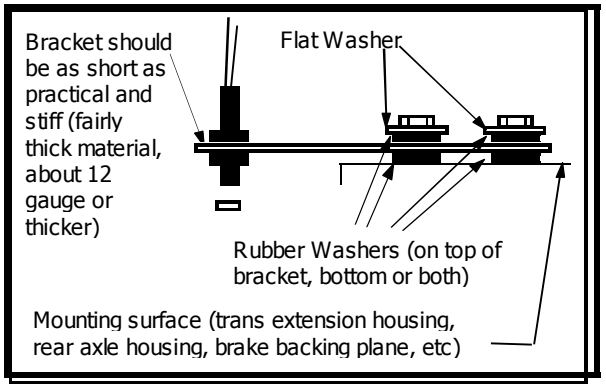
Unless you have a very low power engine, you will need the “Metal Box” option for your DataMite. This must be ordered “up front” and can’t be added unless you trade in your standard plastic box DataMite.

Mount the DataMite away from the engine. The best location is by the driver’s feet, but that can be inconvenient for downloading. Do not leave the downloading cable hooked up to the DataMite during a run (it will act like an antenna) unless you have a grounding plug from Performance Trends attached to the computer end of the downloading cable.

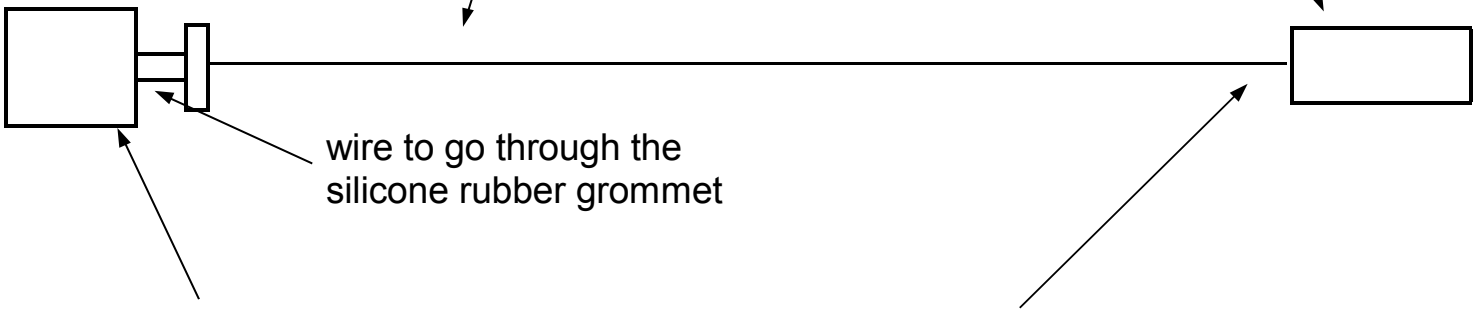
If possible, mount the DataMite box on rubber to dampen out vibration.

Mount the jackshaft RPM sensor bracket on rubber to dampen out vibration. See Figure to the right. If this doesn’t work, you may need a different sensor from Performance Trends.

If you are using the small .150” diameter magnets for the RPM sensors, alignment can be critical. Be sure the magnet passes directly under the sensor during all conditions, that the shaft can not move during different conditions, taking the magnet out of alignment.



DataMite Thermocouple Extension Cable



10 feet of teflon 2 conductor thermocouple wire

4 pin male Molex connector with strain relief.

- Red wire to pin 3
- Yellow wire to pin 4

wire to go through the silicone rubber grommet

Standard female thermocouple "mini-blade" connector with Omega strain relief. Red wire to - terminal, yellow to + terminal.

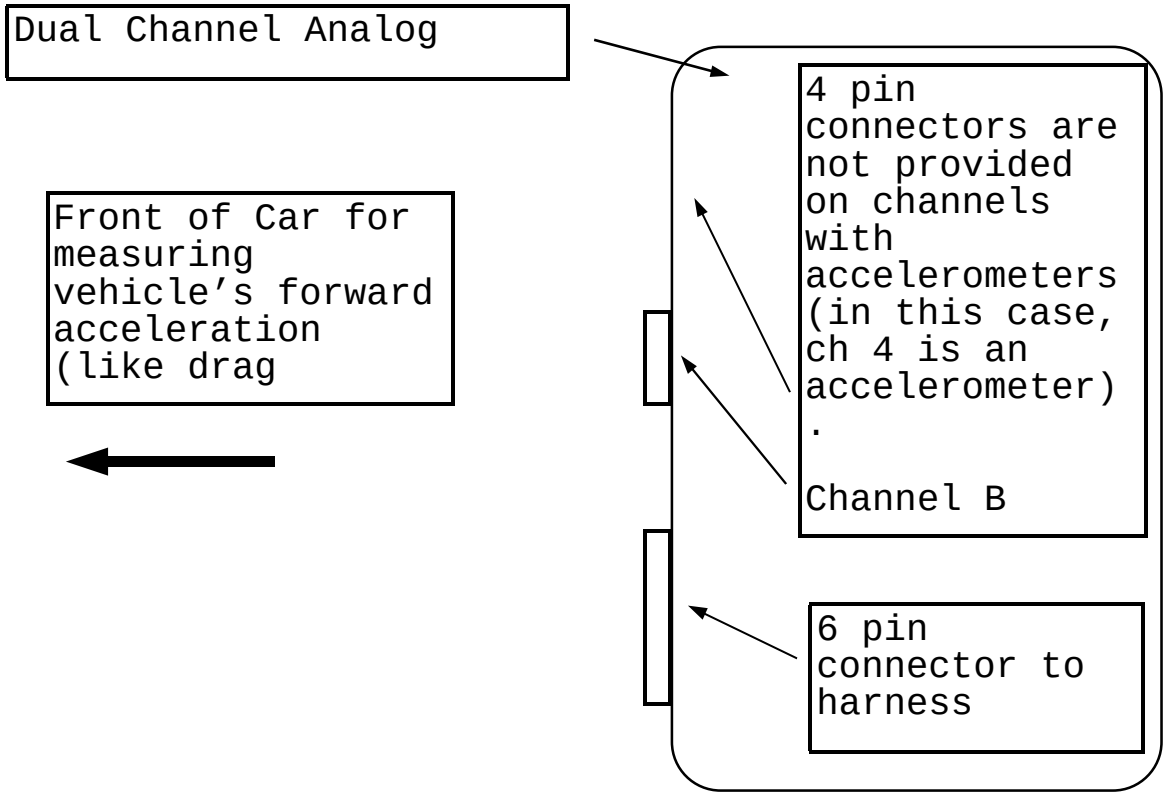
Important: When tightening the strain relief, push the cable in, so there is plenty of slack on all wires. This ensures you do not put tension on these wires and sockets when you tighten the strain relief.

DataMite Dual Channel Converter Accelerometer

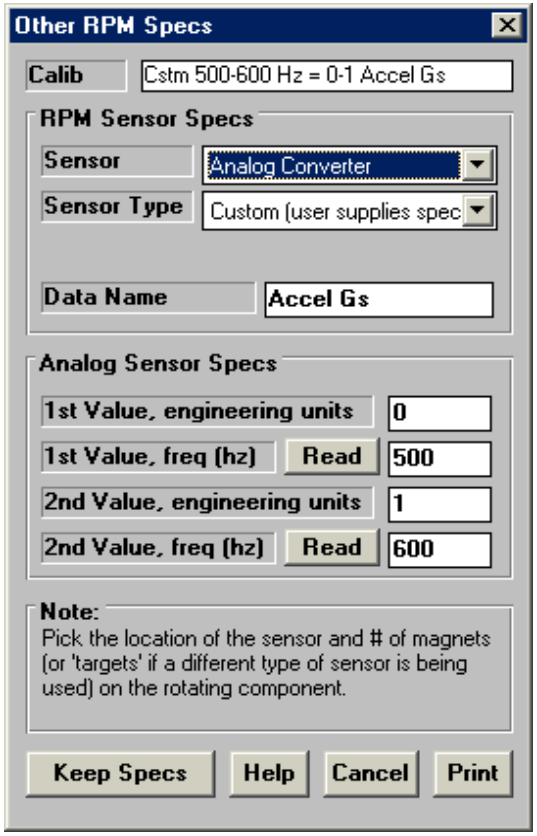
The Dual Channel Analog Converters can be provided with an accelerometer on channel B or both channel A and B. You will know which channels are an accelerometer because there is no 4 pin connector on that channel.

How you mount the converter in the car determines what accelerations you will measure. Typically you mount it flat on the floor of the passenger compartment (tabbed side with mounting holes) on the floor. Usually the connectors are pointing toward the front of the car.

It is strongly recommended you mount something soft between the floor and converter, like carpet or foam rubber and the converter not be bolted to the floor, but attached with adhesive or velcro, so the soft material acts like a motor mount. This helps eliminate the vibrations being picked up as acceleration.



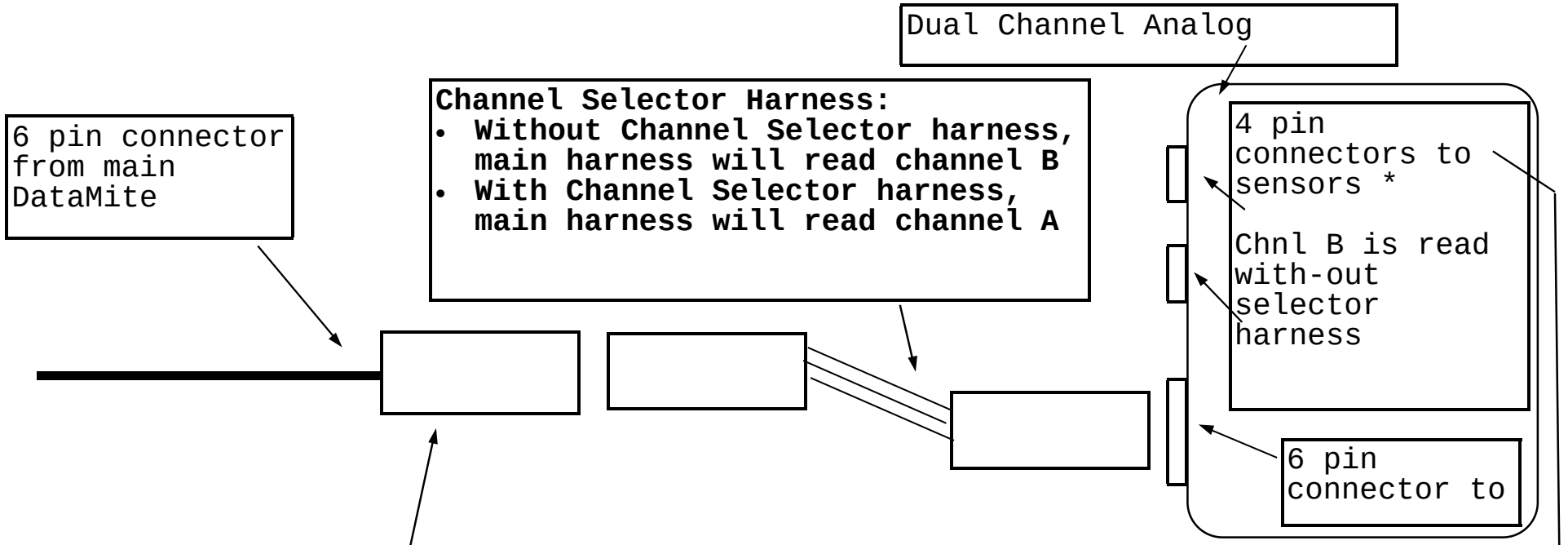
Typical Accelerometer Calibration Screen for 4



Dual Channel Analog Converter Channel Selector Harness

This “Channel Selector” harness is can be used with harnesses which were wired for individual channels 3 and 4. These harnesses can be identified if the 6 pin connectors have only 3 metal sockets. (Harnesses which activate both channnels of the Dual Channel converters have 4 metal sockets.) It lets you select which channel in the converter box will be read by harness. Newer Dyno harnesses (as of Jan 2002) have only 1 plug for channel 3 and 4 together (4 metal sockets), which plug directly into the analog converter.

Important: Be sure to change DataMite Setup in the computer program to match the new sensors being installed. Read DataMite Specs starting on page 41 for more info.



DataMite Data Logger for Jr Dragsters

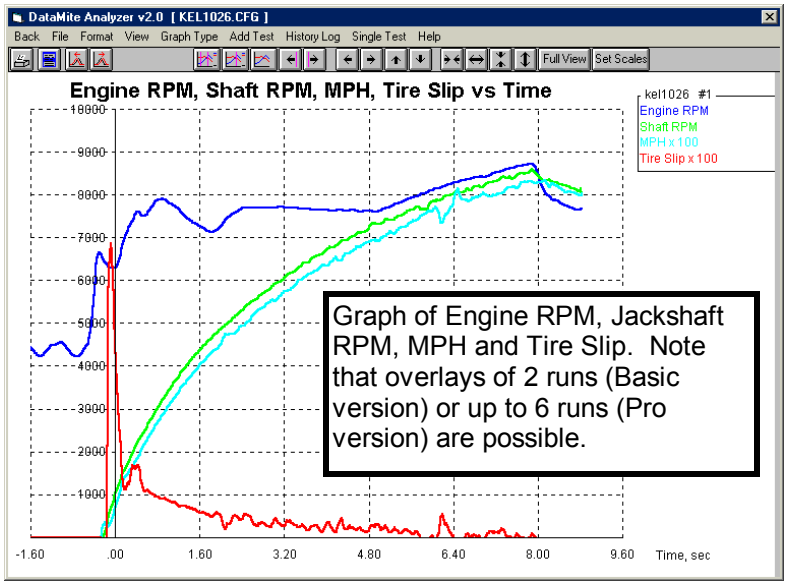
In 2002, the NHRA rule books allowed data loggers in the Jr Dragster classes, as long as no info was given to the driver during the run. Our DataMites are designed to download all data after the run, and do not proved data to the driver.

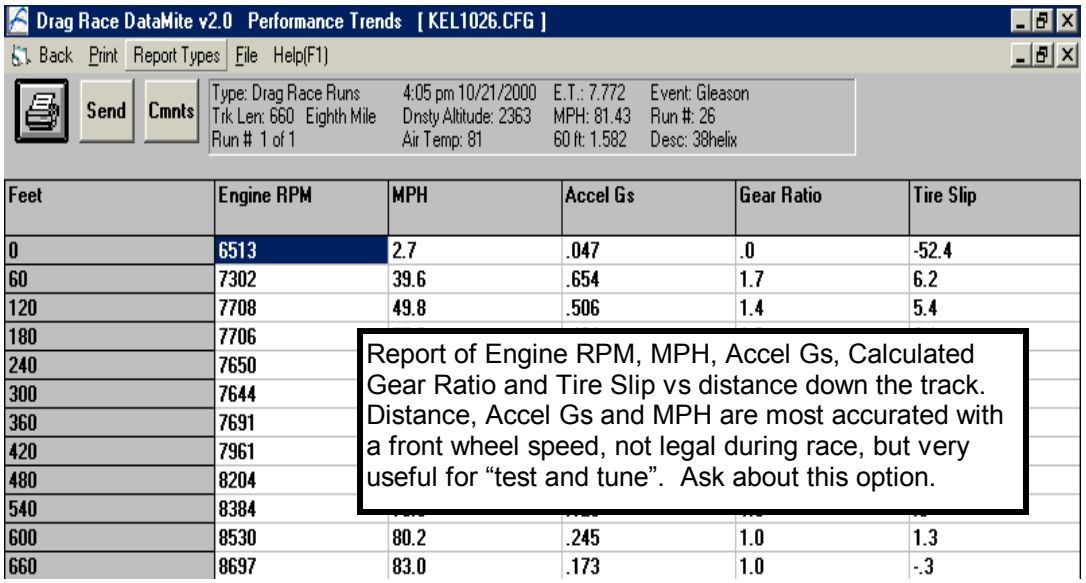
Our basic Jr Dragster DataMite data logger consists of the following:

- DataMite 4 channel data logger system which records Engine and jackshaft RPM (may not be legal for all NHRA events) for downloading to a computer after the run.
- Metal box option for insulating against excessive ignition electrical interference, and for storing battery pack.
- 9.6 volt battery pack and charger.
- Inductive Pickup for Spark for "cleaning up" Engine RPM

This basic system costs $724 and uses 2 of the 4 channels for diagnosing clutch and shifting operation, engine RPM, tire slip, etc. Popular options racers add to the DataMite inclcude:

- Dual temperature sensors and signal conditioning for cylinder head temp and exhaust temp ($310).
- Front wheel RPM sensor for test and tune (not legal in NHRA events) ($50)
- Pro version of software which includes full log book for recording additional data for all runs ($100).
- Weather station for recording weather for each run ($170 or $350).
- One temperature sensor (exhaust or head temp) and one position sensor (suspension travel) ($500).



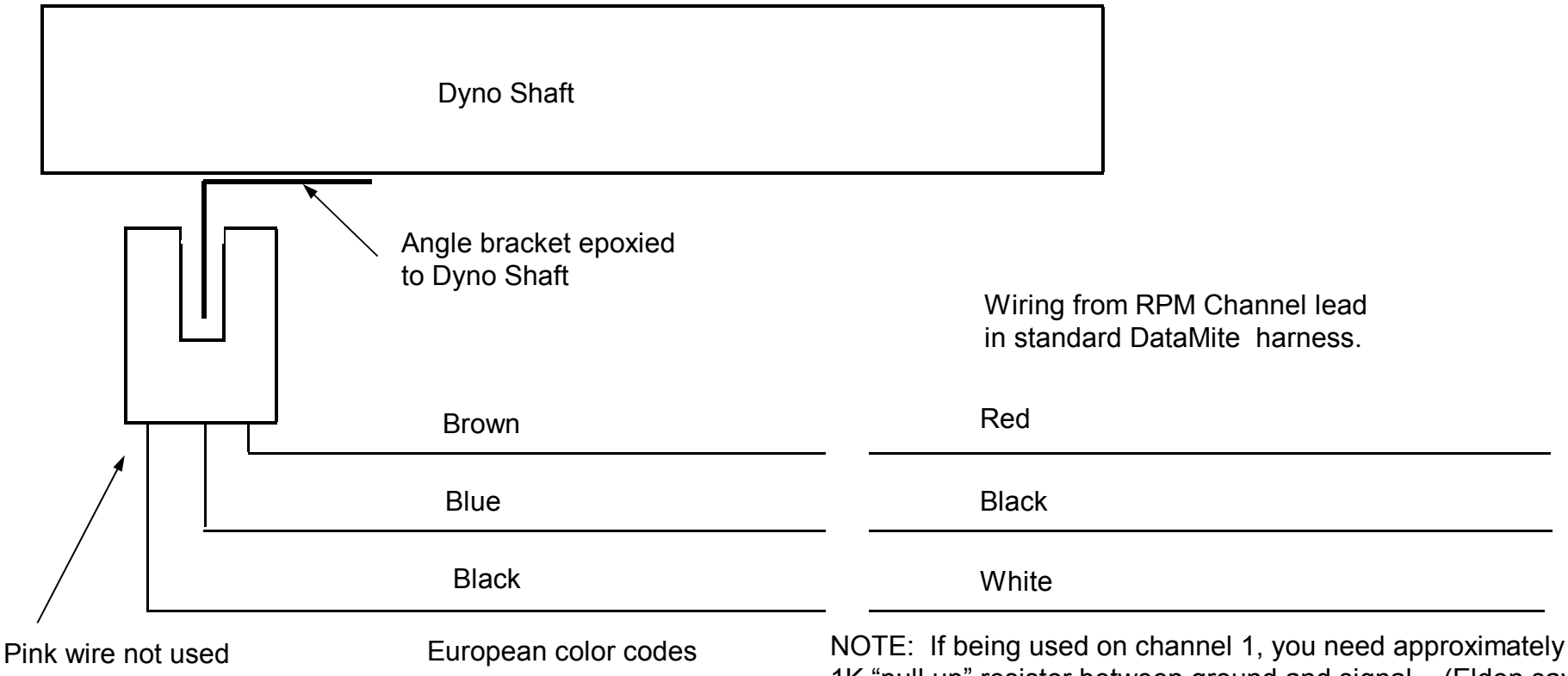


DataMite Optical RPM Sensors

Optical sensors are generally less prone to false triggering due to vibration, but cost more, require more wiring and power, and require a different type of “target”, a “cutter” wheel that can pass through its slot and break its beam. As with the magnet sensors, one target per revolution will probably work the best.

Usually they can be wired into a DataMite harness as a direct replacement for the Reed Switch as follow:

- Black wire to reed switch is ground, and can be connected to the Ground lead (blue) of the sensor below. As this usually does not matter with reed switches, double check the harness. Check for less than 10 ohms between this black wire and another ground in the harness to confirm it is wired correctly.
- White or clear wire is typically the signal and can be wired to the signal wire (black) of the sensor below
- Red (if present) may (or may not) be wired for 5 volts from the DataMite. This can provide power to the sensors below, or pull power from the 12 volt power source. Connect this to the brown wire from the optical sensor.

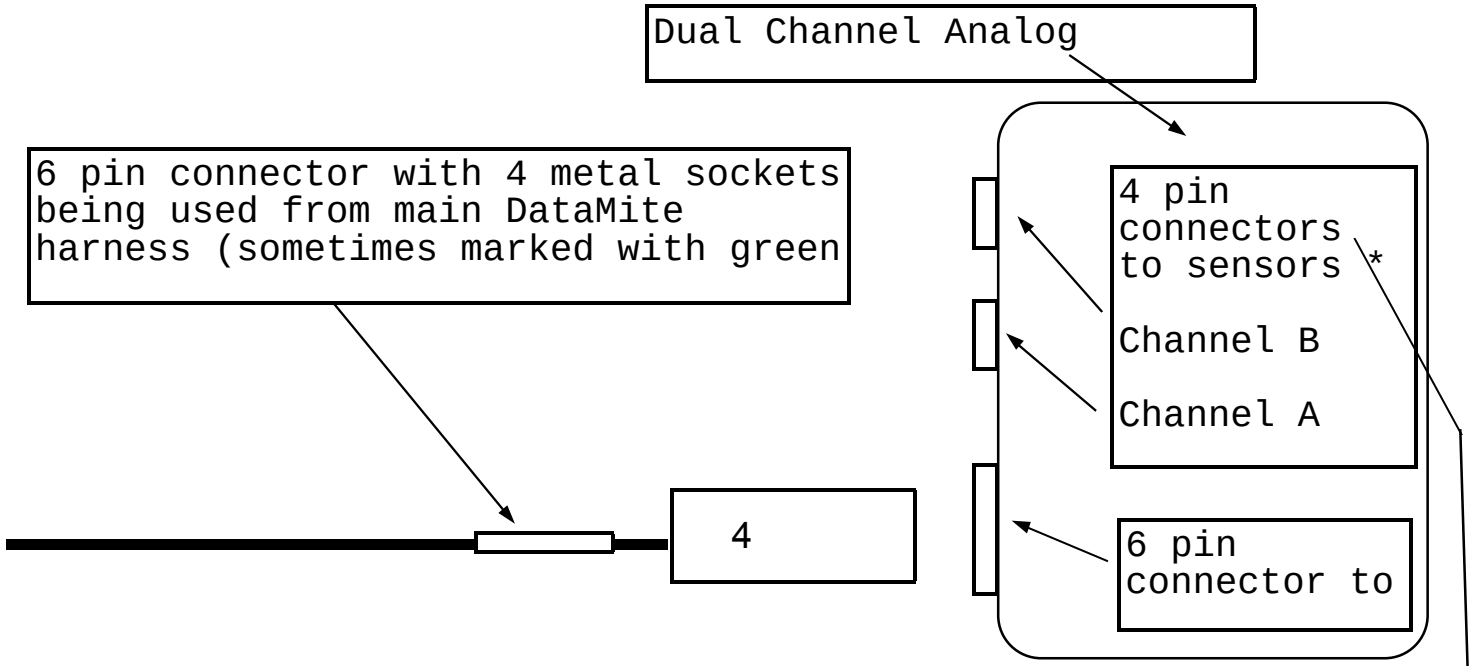


NOTE: If being used on channel 1, you need approximately a 1K “pull up” resistor between ground and signal. (Eldon says between power and signal.)

Dual Channel Analog Converter Installation

The Analog Converter makes it possible for the DataMite which records RPMs (or frequency) to record analog signals like temperature, pressure, acceleration, etc. The dual channel box provides access to 2 channels (usually channel 3 and 4).

Important: Be sure to change DataMite Setup in the computer program to match the new sensors being installed. Read DataMite Specs starting on page 41 for more info.



* Note that the 4 pin connector is not installed if only 1 channel has been activated or if the channel is an accelerometer.

* Note that if thermocouple channels are installed, there is a white jumper wire for each. This jumper should be connected (not cut) for ungrounded thermocouples (typical of most all thermocouples provided by Performance Trends). However, if the thermocouple is grounded, this jumper wire must be cut.

*** Thermocouple channels may be labeled "Temp Head", which means that channel is designed for cylinder head (spark plug) thermocouples. It can be used for other thermocouples, but your Head Temp thermocouple must go to this channel.**

DataMite Thermocouple Extension Cable

Shielded, twisted pair thermocouple wire. Keep away from hot surfaces and sources of electrical noise like ignition wires and electric motors.

4 pin male Molex connector with strain relief plugs into analog converter.

DO NOT overtighten these screws as it can break the insulation causing bad readings

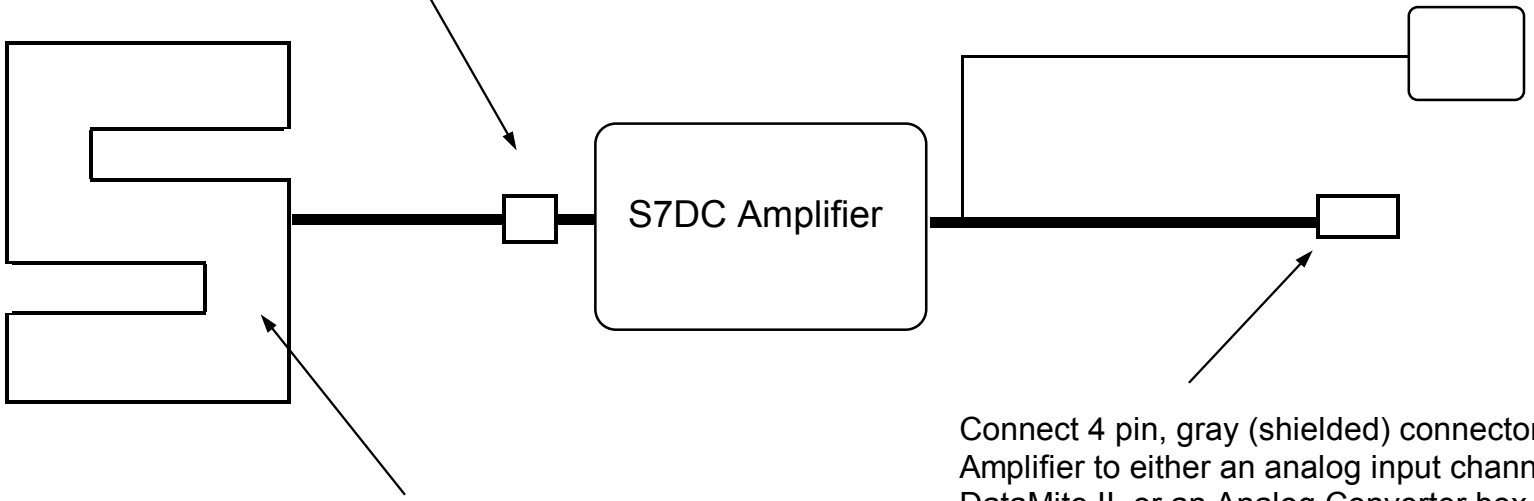
Standard female thermocouple “mini-blade” connector plugs into either exhaust or head temp thermocouple. Noise can be caused by loose connection here vibrating from engine vibrations. If you suspect this, put slight bend in the male terminals on the thermocouple lead to provide for a tighter fit.

I**mportant:** Ground the shielding of the thermocouple lead to the engine. If the engine is not well grounded (say to an earth ground on a dyno setup), the signal may actually be cleaner without connecting this to anything. In that case, disconnect the ground lead and leave it unattached to anything.

DataMite Load Cell and Amplifier Wiring Diagram

Power supply (wall transformer). DO NOT substitute a different power supply or modify any power wiring without prior approval from Performance Trends as it may damage the sensor.

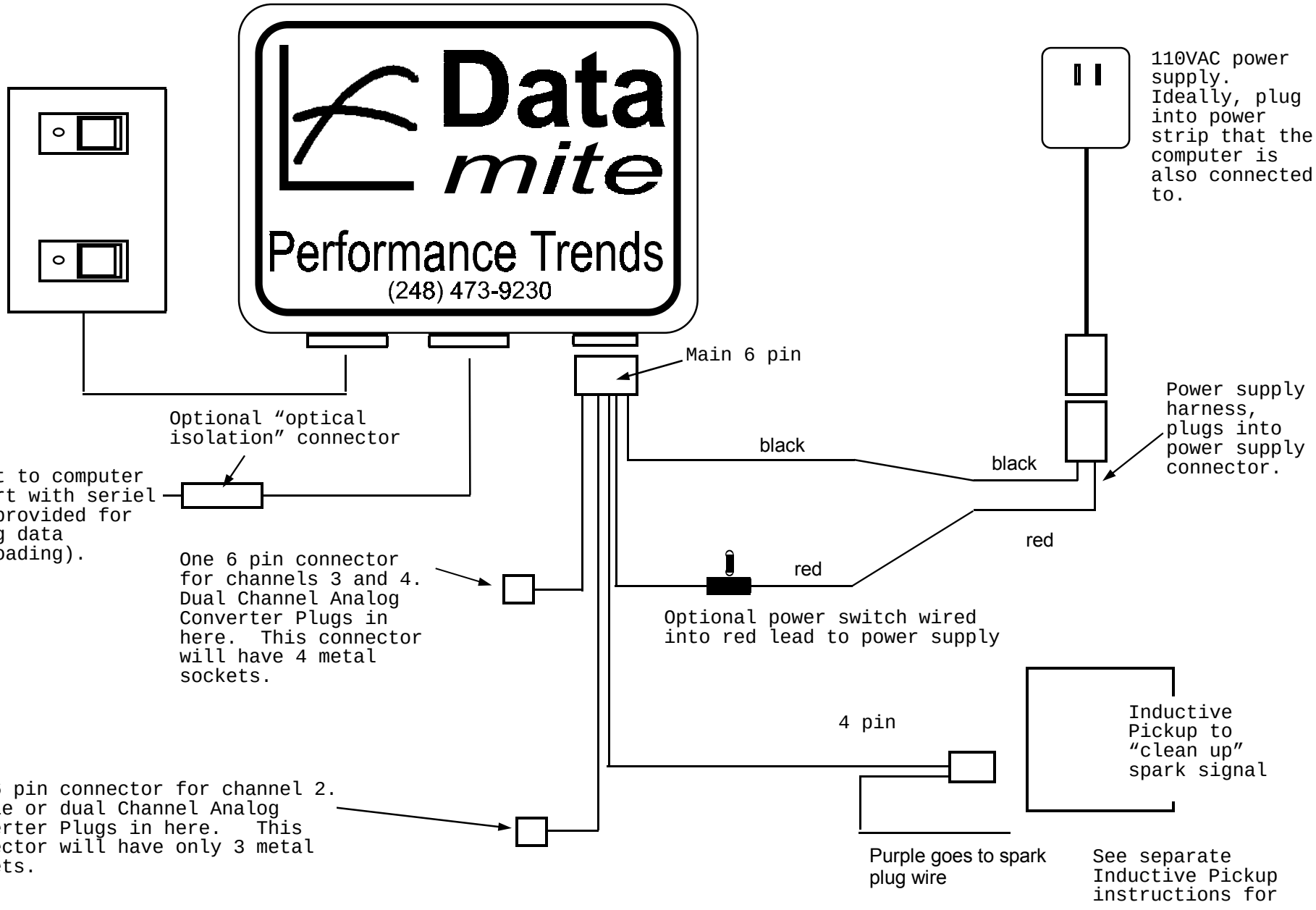
Connect 6 pin connector from load cell to 6 pin short, gray (shielded) connector from Amplifier. Attaching most any other type of signal here (like the power supply) ***WILL*** damage the load cell or amplifier.



"S" beam load cell, typically designed for your application for either Compression Only or Tension Only, not both Compression and Tension. Strength of Load Cell is typically 2-3 times as much as the load rating (500 lb cell should be good to hold 1000-1500 lbs).

Connect 4 pin, gray (shielded) connector from Amplifier to either an analog input channel on the DataMite II, or an Analog Converter box on the Standard DataMite. Attaching this to most any other type of electronics could damage the amplifier.

Dyno DataMite Harness for Dual Channel Anlg. Conv. with Ind. Pickup &



See Appendix 2 in the User's Manual for full details

DataMite* # UMC-100 USB to Serial Adapter

Installation Procedure:

Many new computers come without COM serial ports, but with just USB ports. The UMC-100 USB to Serial adapter has proven to work well in converting USB ports to serial COM ports for use with our DataMite electronics*.

Start your computer, but do ***not*** start the DataMite software or install the adapter on the USB port. You should be at the Windows 95/98/Me/2000 desktop.

Insert the 3.5" disk into the A drive. Now install the Adapter into a USB port and wait for the computer to say "New Hardware Found" and then click Next. At the next screen, let the computer Search for New Driver and click Next. The computer should automatically find the driver software on the A drive. Follow the driver installation program instructions, accepting all the defaults.

To find the status of the USB adapter (if it was installed OK): Click on Start, then Settings, then Control Panel, then System, then the Device Manager tab at the top of this last screen. Click on the + to the left of Ports (Com & LPT) in the list shown. You should see USB Serial Port (Com X), where X could be most any number between 1 and 6. For most Performance Trends software, a Com Port # between 1 and 6 is fine. If you want to change the Com Port #:

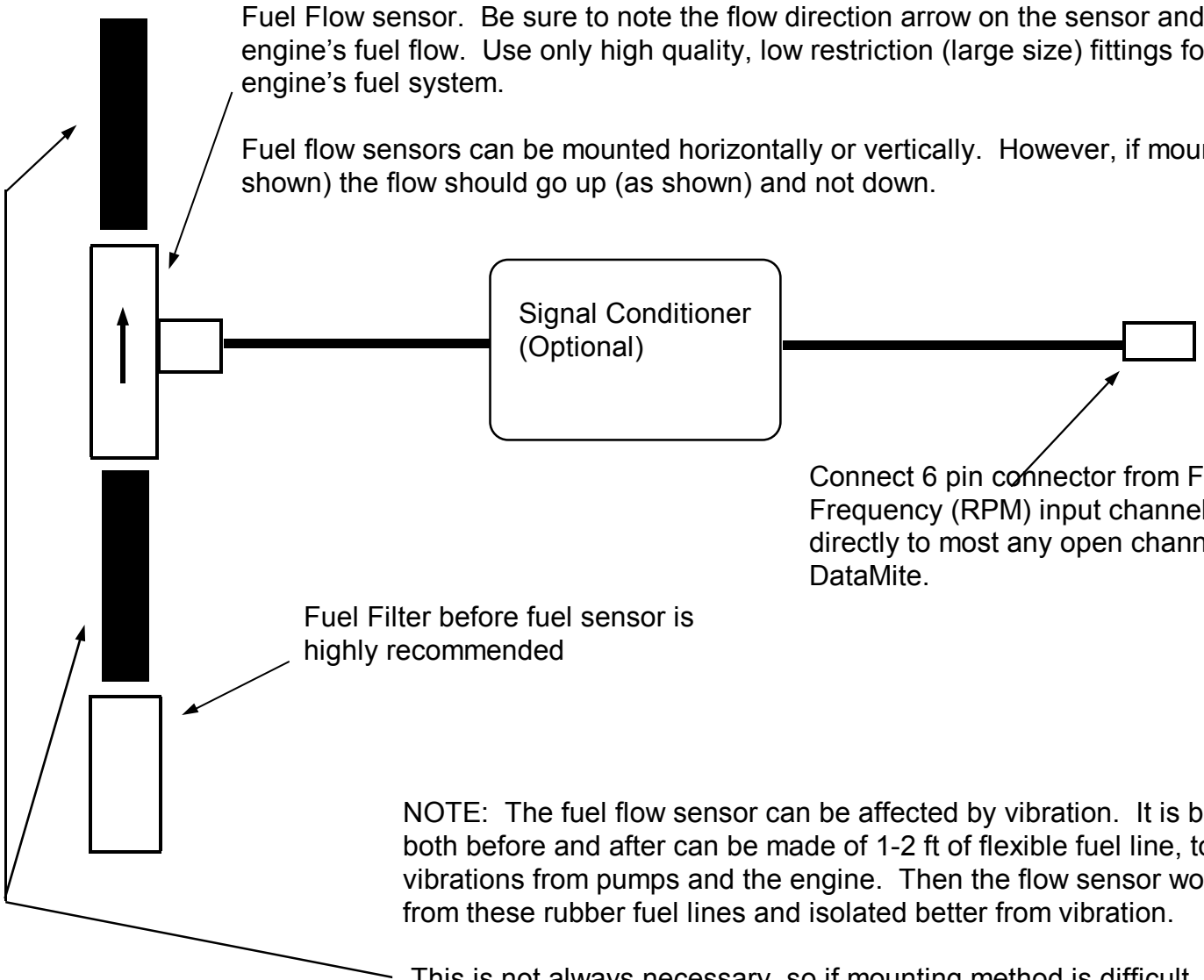
- Double click on USB Serial Port (Com X),
- Click on the Port Settings Tab at the top, then the Advanced button.
- Here you should be able to choose most any Com port # which is not currently being used by another driver. Click on the 2 OK buttons to save this change.

Attach your DataMite serial cable to the DB25 (25 pin) connecter using the 25 to 9 pin adapter provided.

Start your DataMite program. It should now find an available Com port to "talk" to your DataMite. You may want to go into the DataMite specs screen (click on DataMite at top of main screen) and set the Com Port to the same port shown in the Device Manager.

* The DataMite USB adapter can also be used by the Port Flow Analyzer or most any other Performance Trends program which talks through a serial port to an electronic device.

DataMite Fuel Flow Meter Wiring Diagram



Fuel Flow sensor. Be sure to note the flow direction arrow on the sensor and plumb correctly for engine's fuel flow. Use only high quality, low restriction (large size) fittings for plumbing into the engine's fuel system.

Fuel flow sensors can be mounted horizontally or vertically. However, if mounted vertically (as shown) the flow should go up (as shown) and not down.

Connect 6 pin connector from Fuel Flow sensor to a Frequency (RPM) input channel on the DataMite II directly to most any open channel on the Standard DataMite.

Fuel Filter before fuel sensor is highly recommended

NOTE: The fuel flow sensor can be affected by vibration. It is best if the plumbing both before and after can be made of 1-2 ft of flexible fuel line, to dampen out vibrations from pumps and the engine. Then the flow sensor would be mounted only from these rubber fuel lines and isolated better from vibration.

This is not always necessary, so if mounting method is difficult, plumb into your fuel system as you normaly would. Then check the data for noisy or erratic results which seem to get worse when the engine is running at heavy load or vibrating more.

Standard DataMite Harness, with Inductive Pickup connector

See separate Inductive Pickup instructions for

Inductive Pickup to "clean up" spark signal

Purple goes to spark plug wire

Black, Ground: Securely fasten to metal frame ground close to

Red, 12 Volt Power. Can be from switched power, but must not be from switch that controls power to

Optional Power

Connect to computer COM port with seriel cable provided for getting data (downloading).

6 pin connector to access 3rd and 4th channel, or connect to RPM sensor with 6 pin connector

Rear Wheel Sensor Mounted on Fabricated Bracket, 2 or 4 magnets fastened (evenly spaced) on wheel with epoxy.

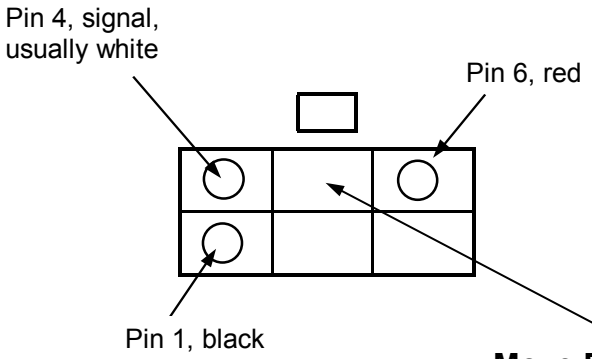
Black shrink tubing designates this sensor goes to channel 3

Front Wheel Sensor Mounted on Fabricated Bracket, 2 or 4 magnets fastened (evenly spaced)

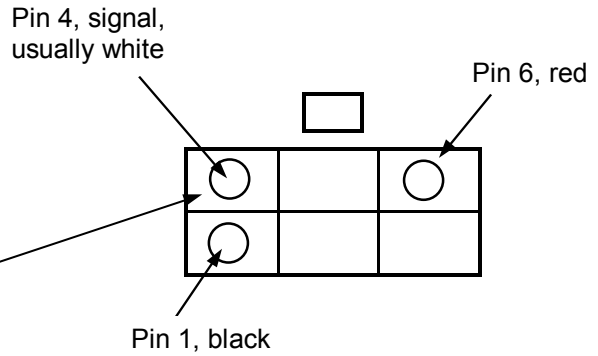
White shrink tubing designates this sensor goes to channel 2

Harness Modification for Dual Channel Analog Converter

Channel 3, usually black shrink tubing

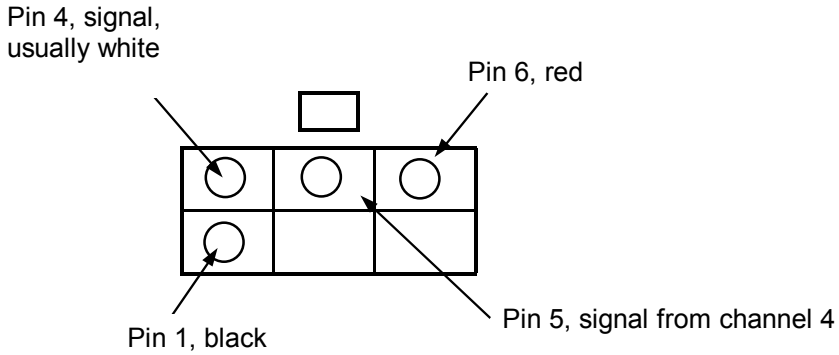


Channel 4, usually green shrink tubing



Move Pin 4 to position 5 on Channel 3. Channel 4 connector is no longer used.

Resulting Channel 3, usually black shrink tubing, can now plug into dual channel Analog Converter



This modification is required for using the Dual Channel Analog Converters on harnesses built before approximately Jan 1, 2002. These early harnesses have a seperate 6 pin connector for channel 3 and channel 4. Later harnesses have channel 3 and 4 combined into 1 connector for easier plugging into the Dual Converters.

If you mix up channel 3 and 4 (put channel 3's pin 4 into channel 4's connector), it will still work. Its just that channel 3 in the Dual Analog Converter will now be channel 4 and vice versa.

Black Box Weather Station Installation

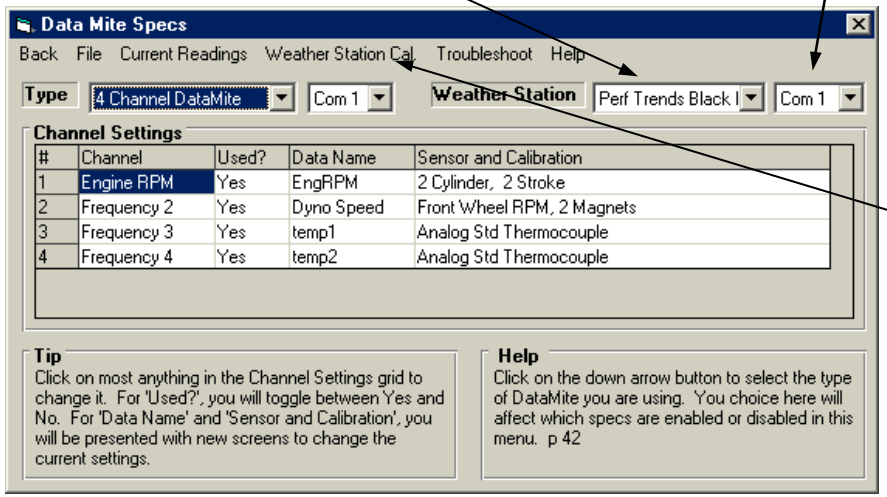
Mount your Black Box weather station near the engine, ideally in the air flow to the engine intake, but away from exhaust heat and the ignition system. Attach the special 25 pin/9 pin cable to a 9 pin com port on your computer. Performance Trends has extension cables if needed.

Power up the weather station using the power supply provided. The LED indicates when power is on. The weather station's fan will cycle on every 20-50 seconds or so. Keep its air intake (circle of holes) free from debris or blockage. Some connectors will not be used as the Black Box can be used for other applications.

You must configure the DataMite software for the Black Box weather station as shown below.

Select 'Black Box' as the weather station in the DataMite specs.

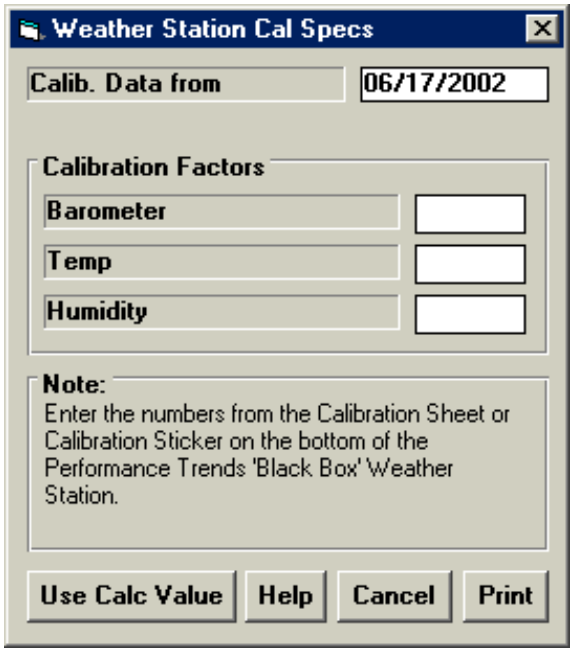
Select the correct Com Port for the Weather Station. Note, if you specify the same Com Port as for the DataMite (as shown here because the computer has only 1 com port), you must switch cables between the 2, or purchase a switch box from Performance Trends. It is much more convenient and reliable to have 2 com ports on the computer. Performance Trends also has adapters to turn unused USB ports into com ports which can read the weather station.



Click on Weather Station Cal. (visible only after you select 'Black Box' as the weather station) to bring up the calibration screen shown to the right.

Calibration #s for Black Box sn _____

Type in the numbers written below, then click on 'Use Calc. Value' so the program can more accurately read the weather station's readings.

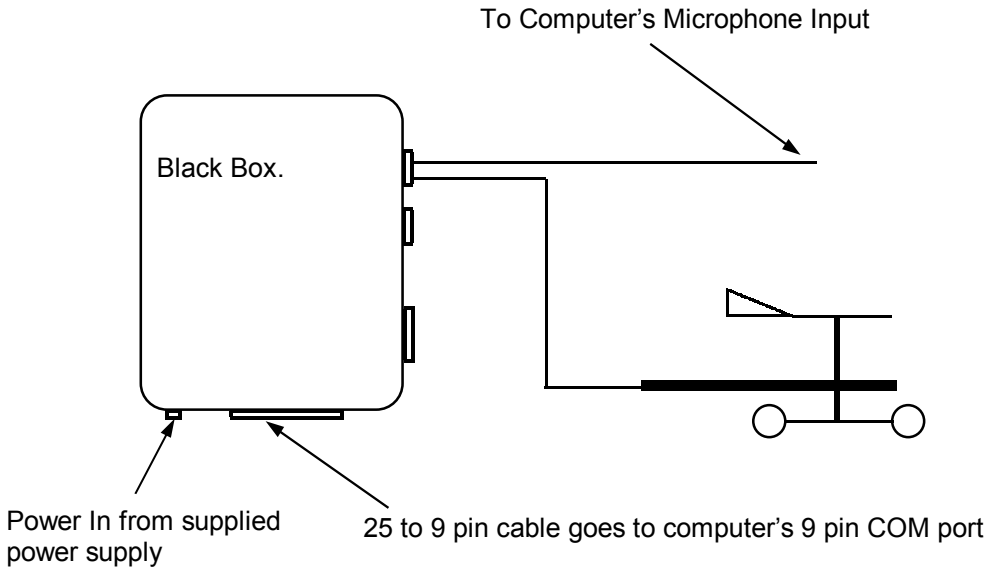


Black Box Weather Station Installation for Drag Race Pro

Mount your Black Box weather station in a sheltered, shaded area with good air circulation. Attach the special 25 pin/9 pin cable to a 9 pin com port on your computer. Performance Trends has extension cables if needed.

Power up the weather station using the power supply provided. The LED indicates when power is on. The weather station's fan will cycle on every 20-50 seconds or so (it may take 15 minutes of warmup for cycling to start). Keep its air intake (circle of holes) free from debris or blockage. Some connectors will not be used as the Black Box can be used for other applications.

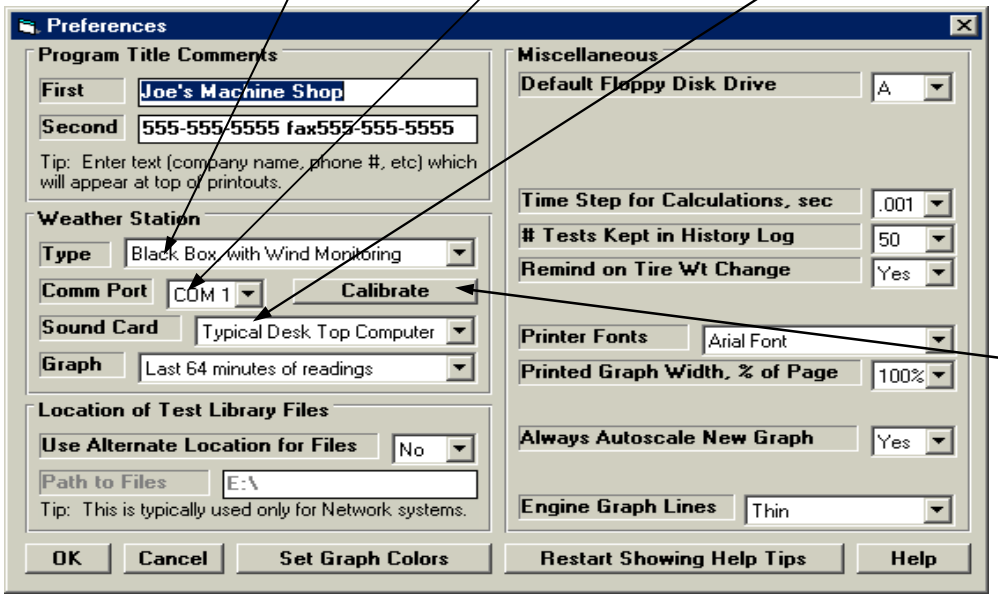
You must configure the Drag Race Pro software for the Black Box weather station as shown below.



Select 'Black Box' as the weather station in the Preferences specs, either with or without Wind Monitoring.

Select the correct Com Port for the Weather Station.

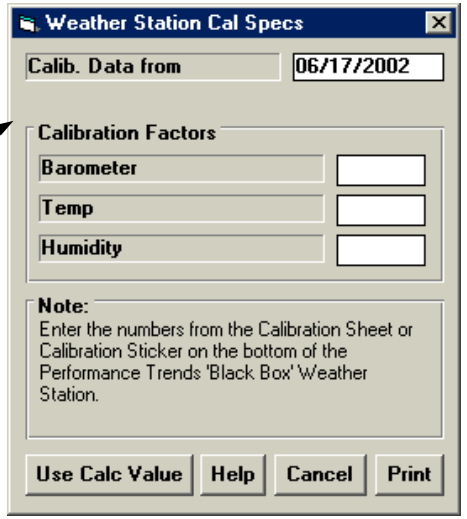
Select the correct type of Sound Card if using wind anemometer.



Click on Calibrate button to bring up the calibration screen shown to the right.

Calibration #s for Black Box sn _____

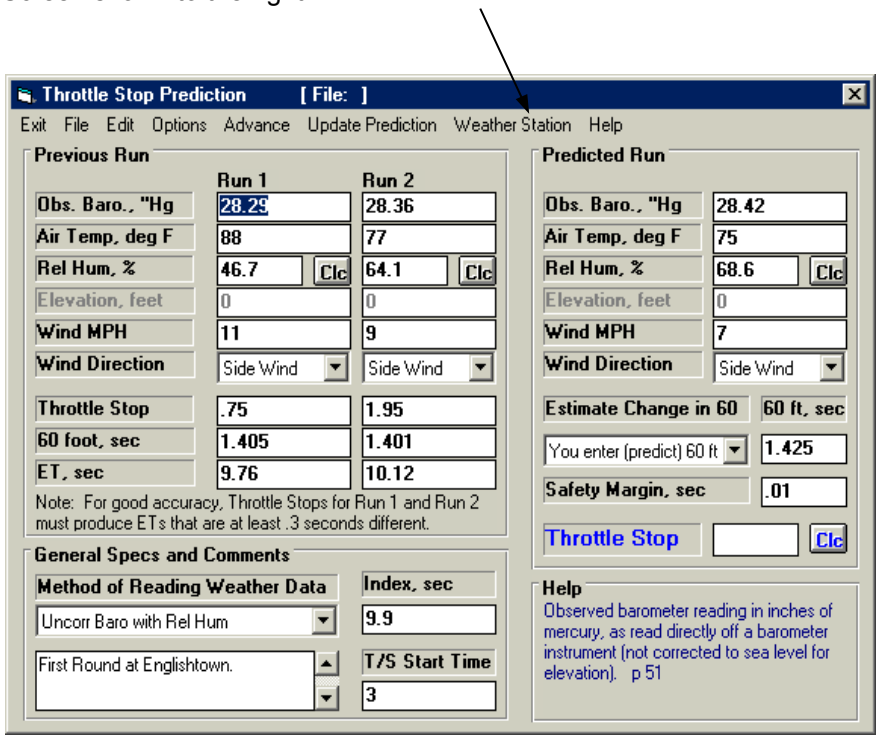
Type in the numbers written below, then click on 'Use Calc. Value' so the program can more accurately read the weather station's readings.

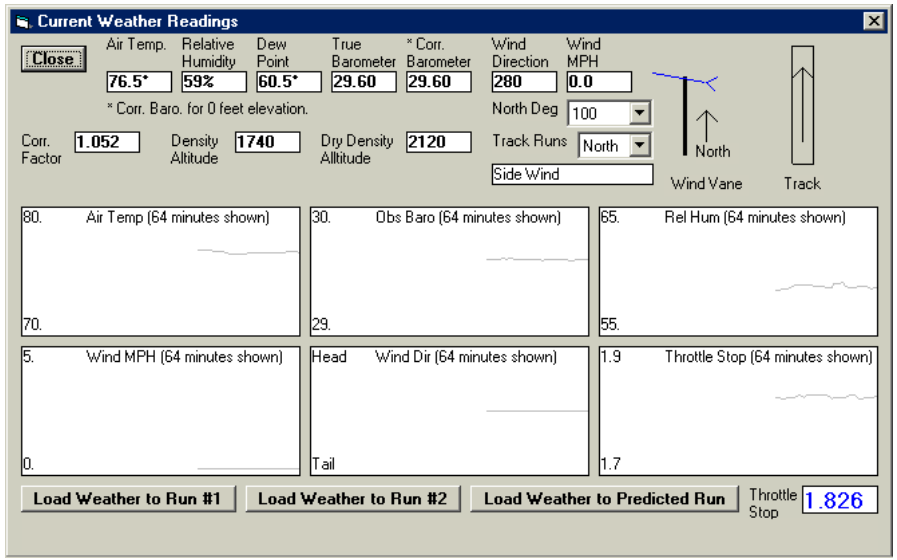


Black Box Weather Station for Drag Race Pro: Operation

Most users will use the weather station for predicting Dial Ins and Throttle Stops. See Examples 4.3 and 4.4 in the manual. If you select one of the Weather Station options in Preferences, these screens will have a “Weather Station” option at the top of their respective screens. Click on it to display the weather station screen shown below.

Click on Weather Station to bring up Weather Station Screen shown to the right





DataMite II Calibration Sheet for Fuel Flow

Fuel Flow sensors come in different ranges with different calibration factors. They are typically read using one of the RPM channels. Plug the sensor's cable into an RPM channel that is NOT channel 1. Then enter the calibration factor as follows:

- Click on ***DataMite*** at the top of the Main Screen.
- Click on the ***Sensor and Calibration*** (rightmost column) for the frequency (RPM) channel where the Fuel sensor will be installed. The screen at the right will be displayed.
- Select ***Fuel Flow*** for the Sensor Type .
- Determine the Multiplier as follows:

  Multiplier = 29977.2 / K (pulses/gallon) *

  For example, if the K factor was 21629, the multiplier would be 1.386

- Enter the ***Multiplier*** determined above and a name in ***Data Name***, with a suggested name shown to the right.
- When finished, click on Keep Specs. In the DataMite screen, this channel will now be listed as:

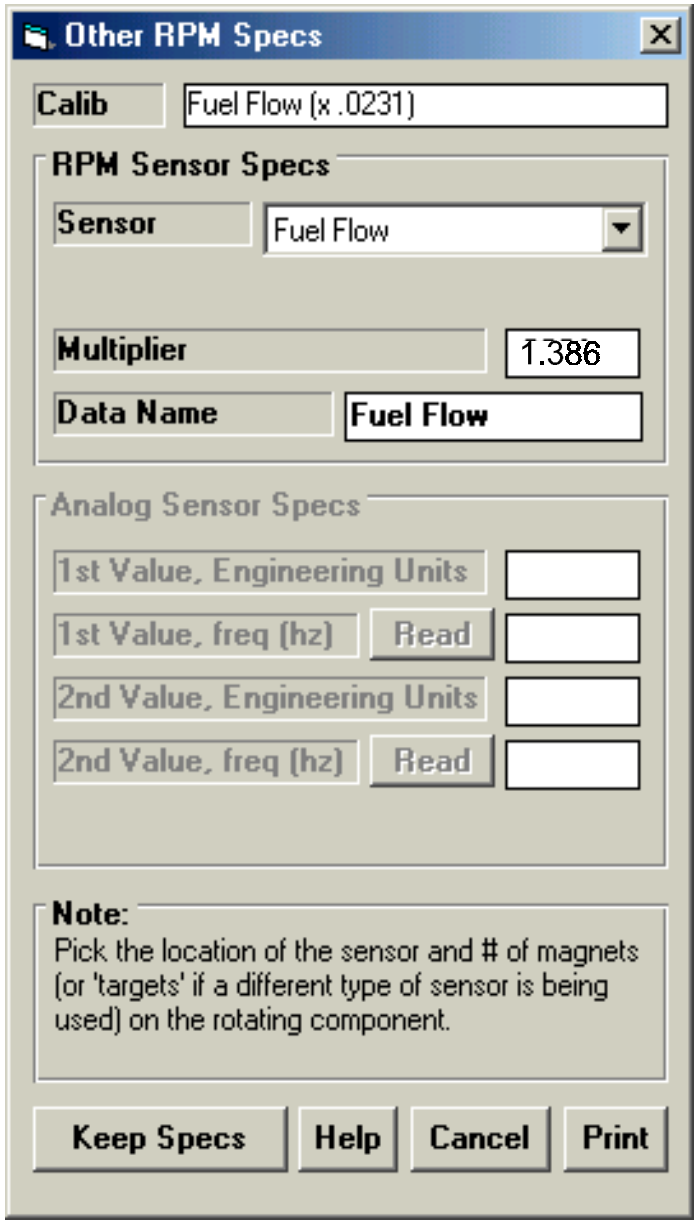
  Fuel Flow (x .xxxx)

This will produce the calibration (conversion from DataMite signal to actual units) recommended by the factory.

Notes: _____

_____

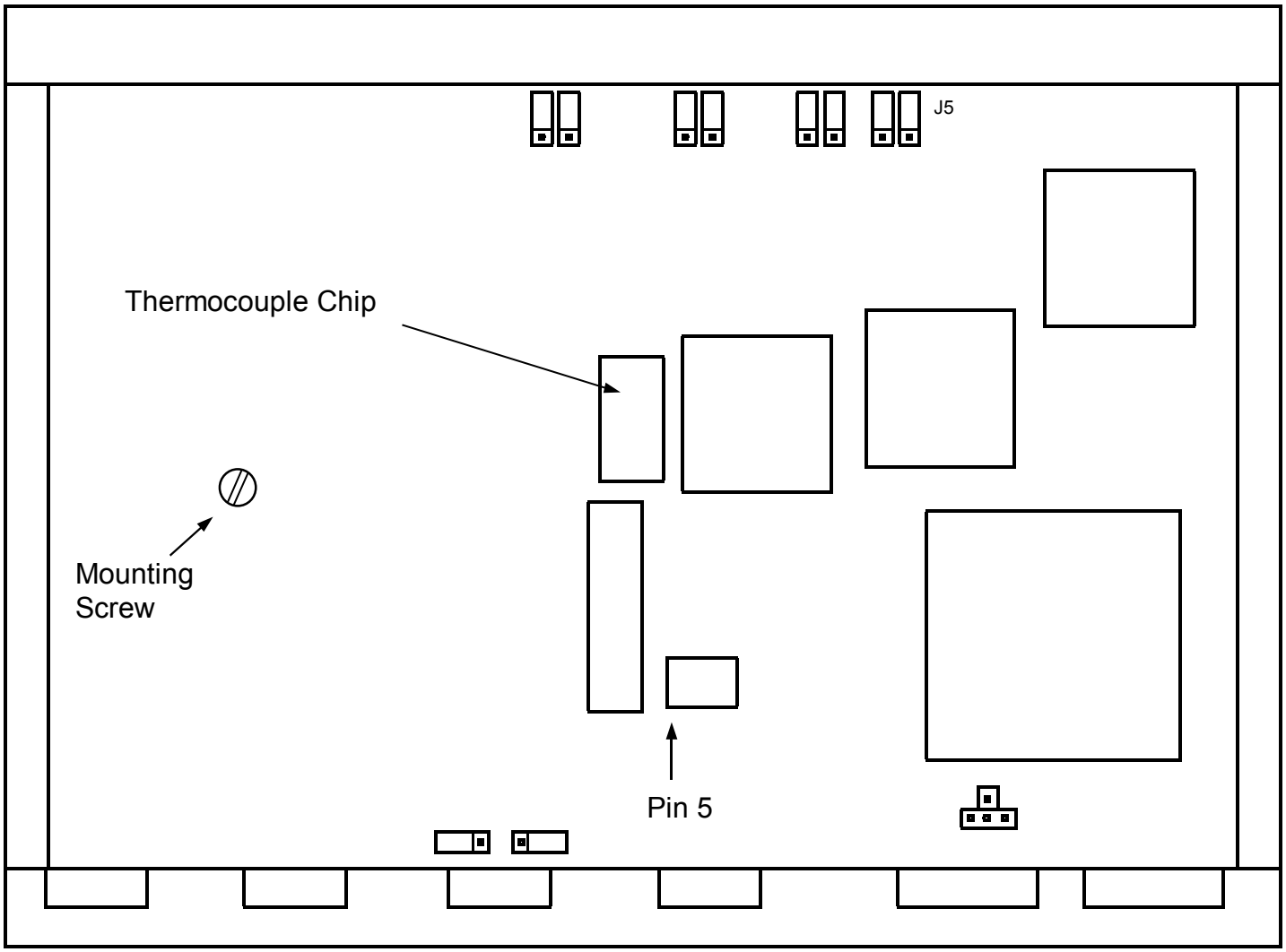
IMPORTANT: To obtain correct fuel flow in lb/hr, you must also enter the spec. gravity of the fuel you are using in the Test Conditions screen in the DataMite software. If nothing is entered, the program assumes .75.



* 29977.2 is a constant based on 8.327 lb/gal water and 60 min per hour.

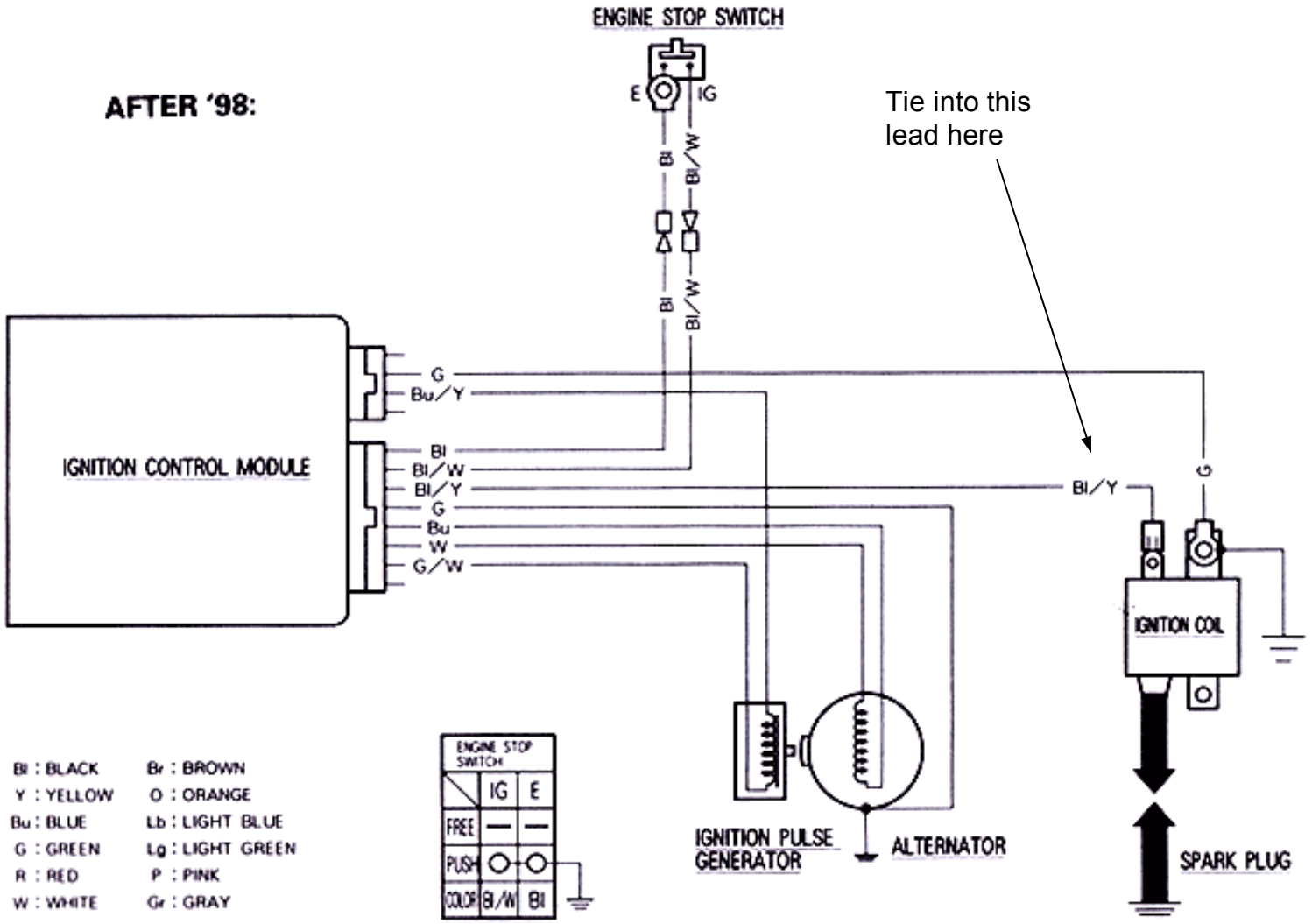
DataMite II Board Layout

ONLY if instructed by Performance Trends, short Pin 5 of the op amp chip to the mounting screw head. YOU MUST HAVE POWER TURNED OFF before you do this.

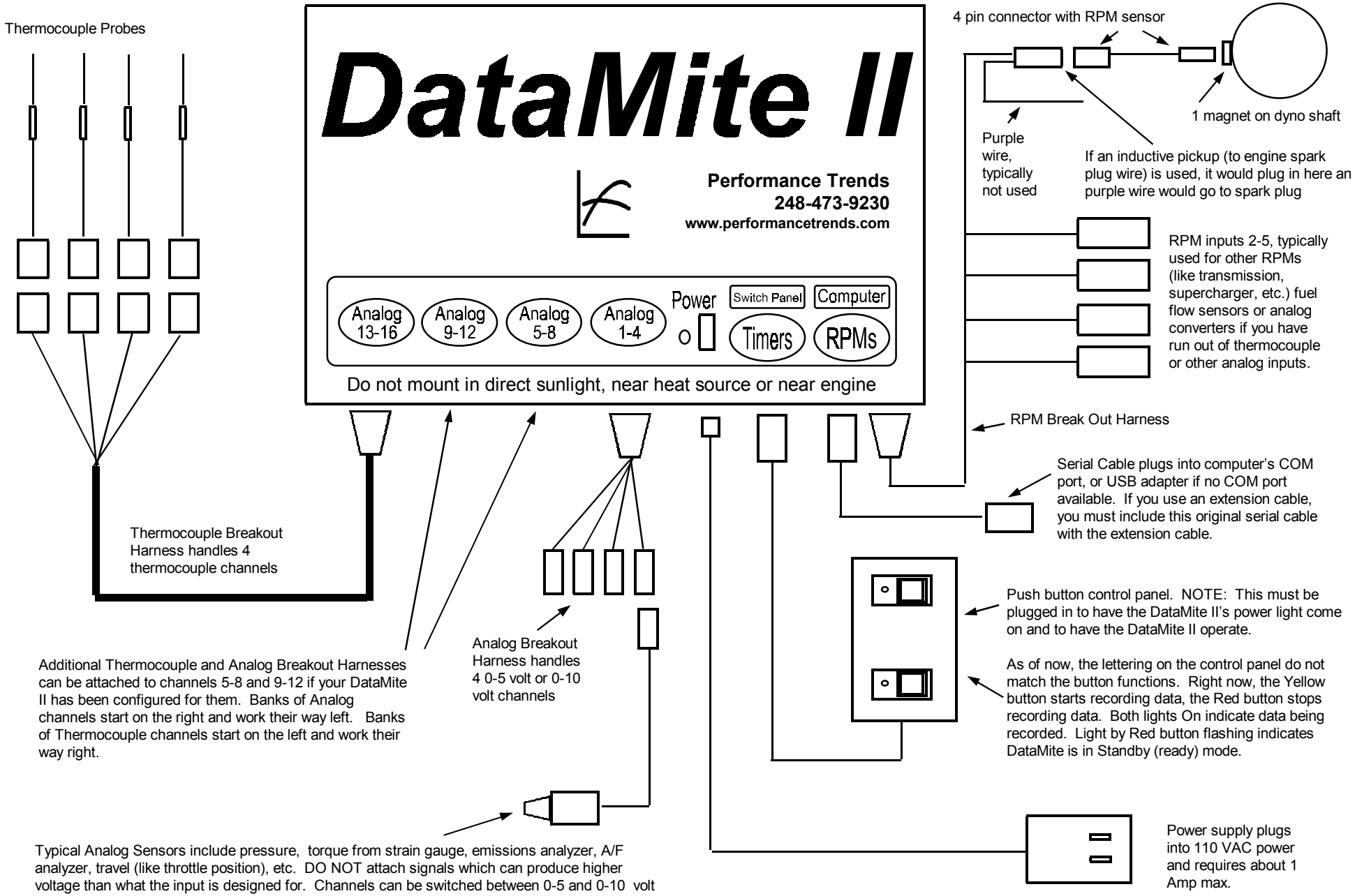


Alternate RPM input from Honda 2 Stroke

Attach tach signal wire (not inductive pickup wire) to the black/yellow wire which attaches to the ignition coil. If you do this, you need to ground your harness's black power wire to the engine block also.



Typical DataMite II Dyno Installation (refer to individual part instructions for more details)



Additional Thermocouple and Analog Breakout Harnesses can be attached to channels 5-8 and 9-12 if your DataMite II has been configured for them. Banks of Analog channels start on the right and work their way left. Banks of Thermocouple channels start on the left and work their way right.

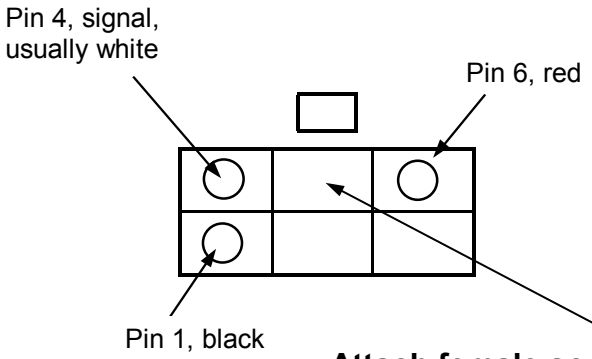
Typical Analog Sensors include pressure, torque from strain gauge, emissions analyzer, A/F analyzer, travel (like throttle position), etc. DO NOT attach signals which can produce higher voltage than what the input is designed for. Channels can be switched between 0-5 and 0-10 volt by adjusting jumpers inside the DataMite II box.

IMPORTANT: If you are attaching signals from sensors powered from outside the DataMite II (like a strain gauge or A/F sensor which has its own power supply), you must use special precautions to ensure you do not over voltage, or introduce negative voltage into the DataMite II.

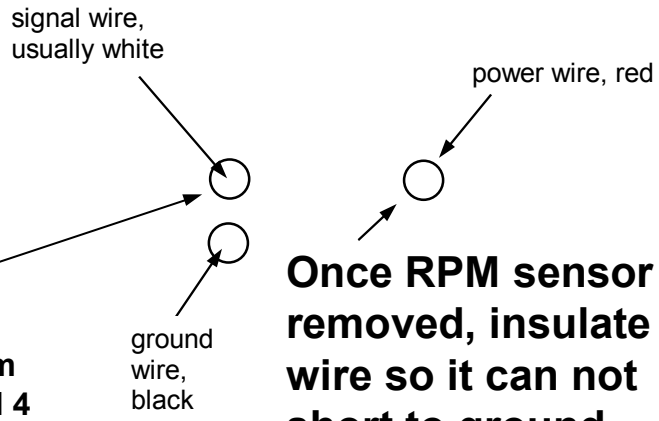
It is recommended that the DataMite II and all externally powered sensors be powered up by one power strip. This will ensure that the other sensors are not producing voltages on the DataMite II inputs when the DataMite II is not powered up.

Harness Modification for Dual Channel Analog Converter

Channel 4, usually green shrink tubing



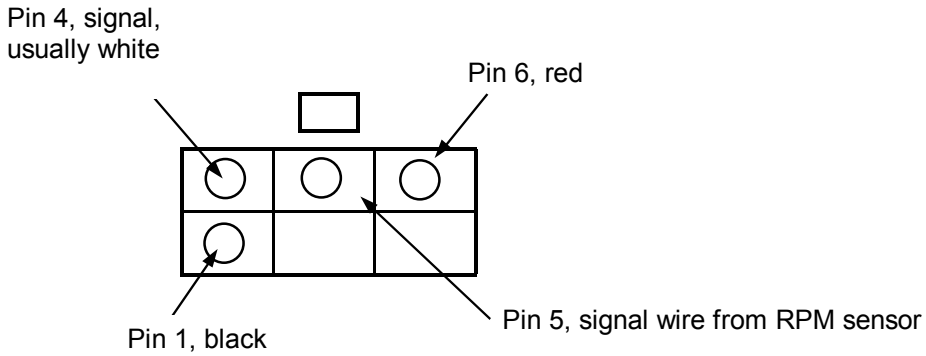
Channel 3 RPM Sensor wires are exposed when you cut off the RPM sensor.



Once RPM sensor is removed, insulate red wire so it can not short to ground.

Attach female socket terminal to white wire from RPM sensor and move to position 5 on Channel 4 connector. RPM sensor is no longer used.

Resulting Channel 4, usually green shrink tubing, can now plug into dual channel Analog Converter



This modification is required for using the Dual Channel Analog Converters on harnesses built before approximately Jan 1, 2002. These early harnesses have a seperate 6 pin connector for channel 3 and channel 4. Later harnesses have channel 3 and 4 combined into 1 connector for easier plugging into the Dual Converters.

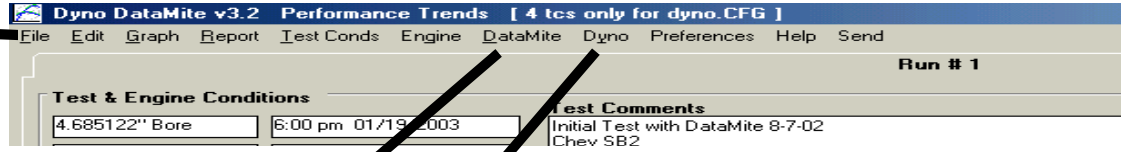
If you mix up channel 3 and 4 (put channel 3's pin 4 into channel 4's connector), it will still work. Its just that channel 3 in the Dual Analog Converter will now be channel 4 and vice versa.

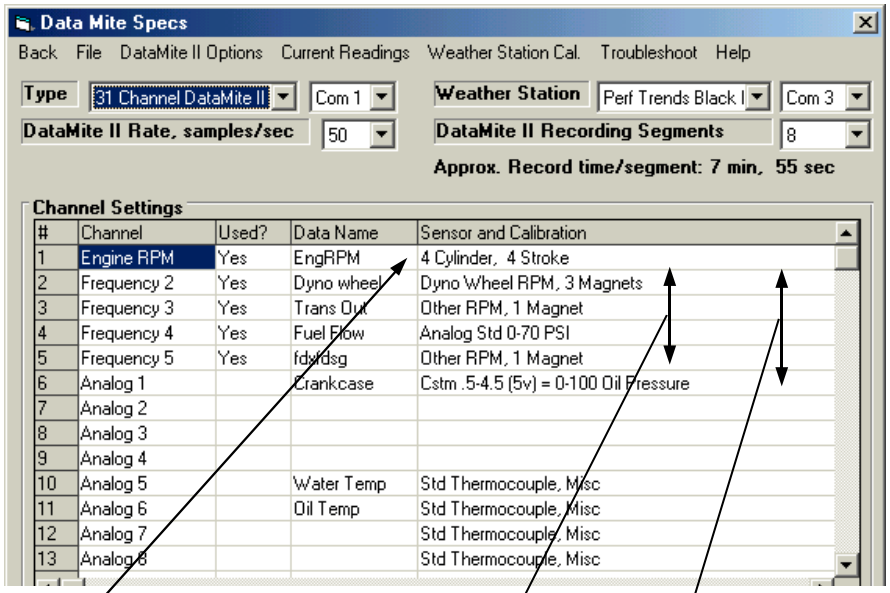
Notes on Your Dyno Configuration

First click on File, then Open (from all saved tests) to open an example test file, similar to the dyno and DataMite system you have. Then click on DataMite and Dyno to obtain critical menus shown below to configure your Dyno system

Click on “File”, then “Open (from all saved tests)”. Then choose this Example test to start building your first test file, which will configure your DataMite and Dyno Specs.

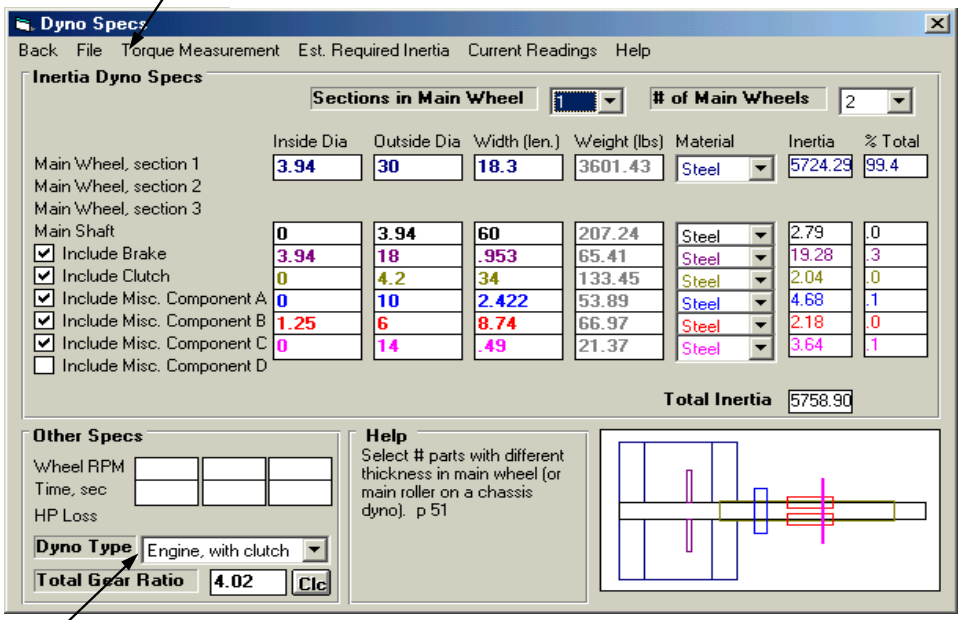
____Stock Briggs.cfg ____ALC-MAG.cfg





Click here to tell program you have:

1) An inertia dyno
2) An absorber (torque arm) dyno (see Appendix 5 in manual).



First row, Engine RPM: set to

_____

Another Frequency row (2-5): set to

_____

Another row (Frequency row 2-5, or first Analog, row 6): set to

_____

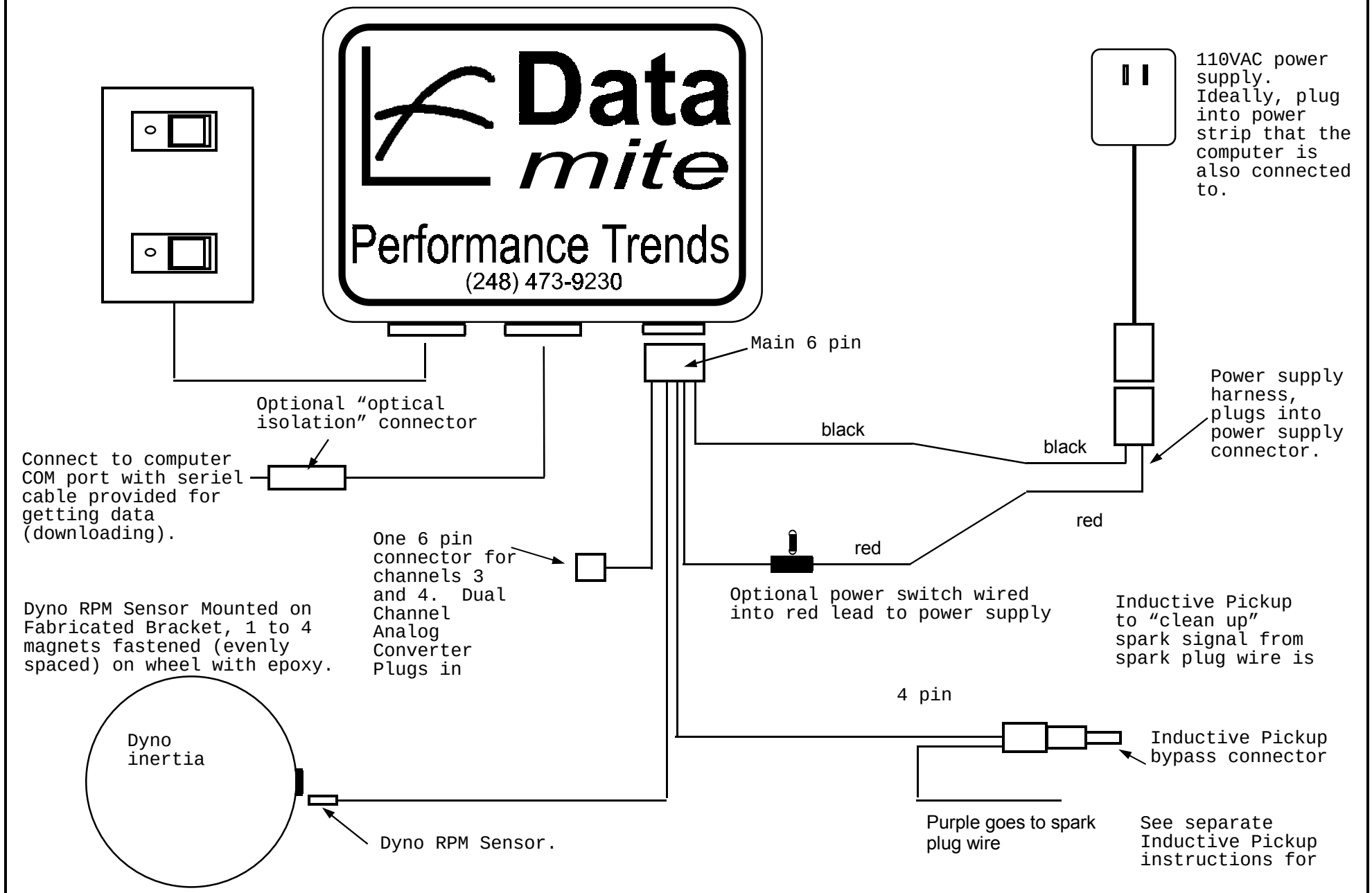
Dyno Type setting determines if you will measure both engine and dyno RPM, or if you need to. We recommend you select

_____

Total Gear Ratio is then: Used only for clutch slip calculations
Critical to enter correctly Not used

Once you have made these critical changes, click on File at the top of these screens, then Save as Master DataMite (or Dyno) specs.

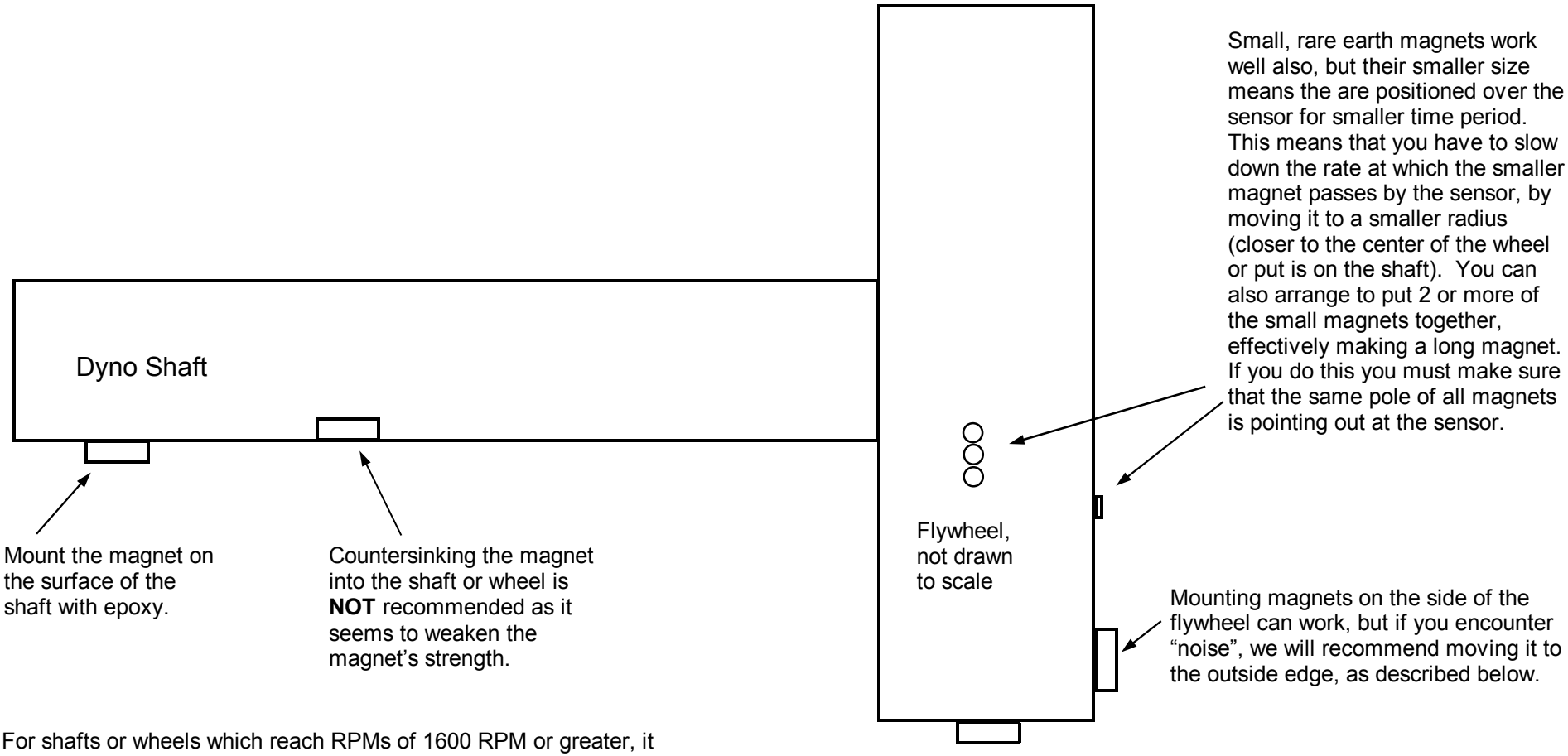
Dyno DataMite Harness for Dual Channel Anlg. Conv. with Internal Ind. Pickup & 110vac Power Supply



See Appendix 2 in the User's Manual for full details

Installing Magnets for RPM Measurements

Most of the DataMite RPM sensors will trigger off magnets. The 2 wire sensors trigger off either a North or South pole, the 3 wire sensors only trigger off a South pole only. It is ideal to isolate the sensor from vibration, like mounting the bracket in rubber.



For shafts or wheels which reach RPMs of 1600 RPM or greater, it is recommended to use **ONLY 1 MAGNET**. This eliminates any spacing issues which produces erratic RPM readings.

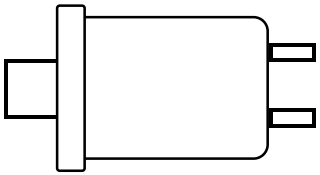
DataMite Resistive Temperature Device (RTD) Sensor Wiring

The inexpensive RTD temp sensors are used for measuring air and fluid temperatures. They use sensors found on production vehicles for their electronic controls.

The sensor is basically a variable resistor. Therefore, polarity is usually not important (you can reverse the leads). However, these sensors need a good ground reference for good results. If the sensor has 2 connectors, one of these connectors is the ground and grounding should be no problem. If the sensor has only 1 connector, you must attach one lead from the DataMite lead to this pin and the other to a "good ground". This "good ground" can be either be to the body of the sensor (the best method, but do not drill or make a hole in the sensor), or a point on the engine block close to the sensor. If you ground to the engine block, ***do not*** use teflon tape to seal the threads or "stack up" several fittings as this can add resistance between the sensor body and the ground location.

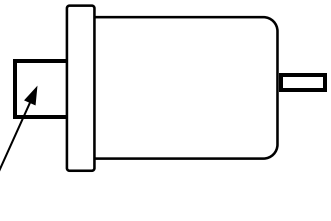
Note: You must use either "Air RTD" or "Fluid RTD" as the sensor type in the DataMite configuration software. You can NOT use just any production RPD type sensor, only those provided by Performance Trends have the correct calibration.

If 2 connectors are present, attach the leads from the 4 pin connector on the analog converter. It doesn't matter which lead goes to which connector.



IMPORTANT: The fluid temp RTD sensor have been calibrated to read up to 240 deg F, but will read less accurately up to about 300 deg F. However, due to variation in parts, it may max out at 270 deg F or even less. If temps start to approach 270 deg F and become VERY stable (don't change), you may have maxed out the sensor and may be running HOTTER than 270 deg F.

If only 1 connector is present, attach 1 of the leads from the 4 pin connector on the analog converter to this connector. It doesn't matter which lead goes to this connector. Connect the other lead either to the body of the sensor for a good ground reference, or connect to a point on the engine block (or whereever the sensor is mounted) for a ground reference.



If the ground is not to the body of the sensor, be sure not to use teflon tape or anything which will add resistance between the sensor body and the point where you attach the other ground reference lead from the analog converter.

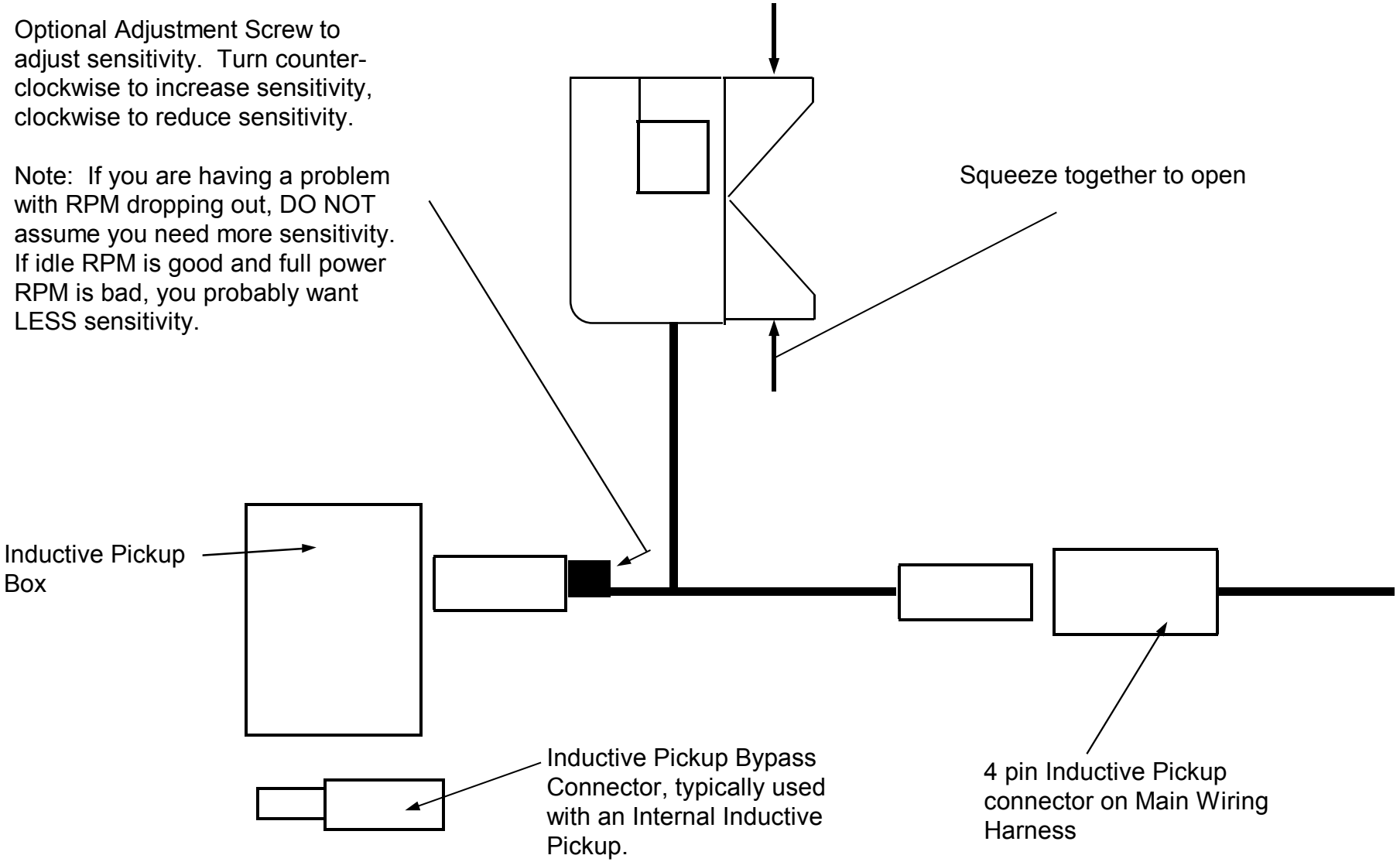
VDO temp sensor, 800-303-6211 or 517

DataMite Inductive Pickup “Clamp On” Input

The “clamp on” inductive pickup is installed between the wiring harness and the inductive pickup box (or bypass connector) as shown below.

Optional Adjustment Screw to adjust sensitivity. Turn counter-clockwise to increase sensitivity, clockwise to reduce sensitivity.

Note: If you are having a problem with RPM dropping out, DO NOT assume you need more sensitivity. If idle RPM is good and full power RPM is bad, you probably want LESS sensitivity.

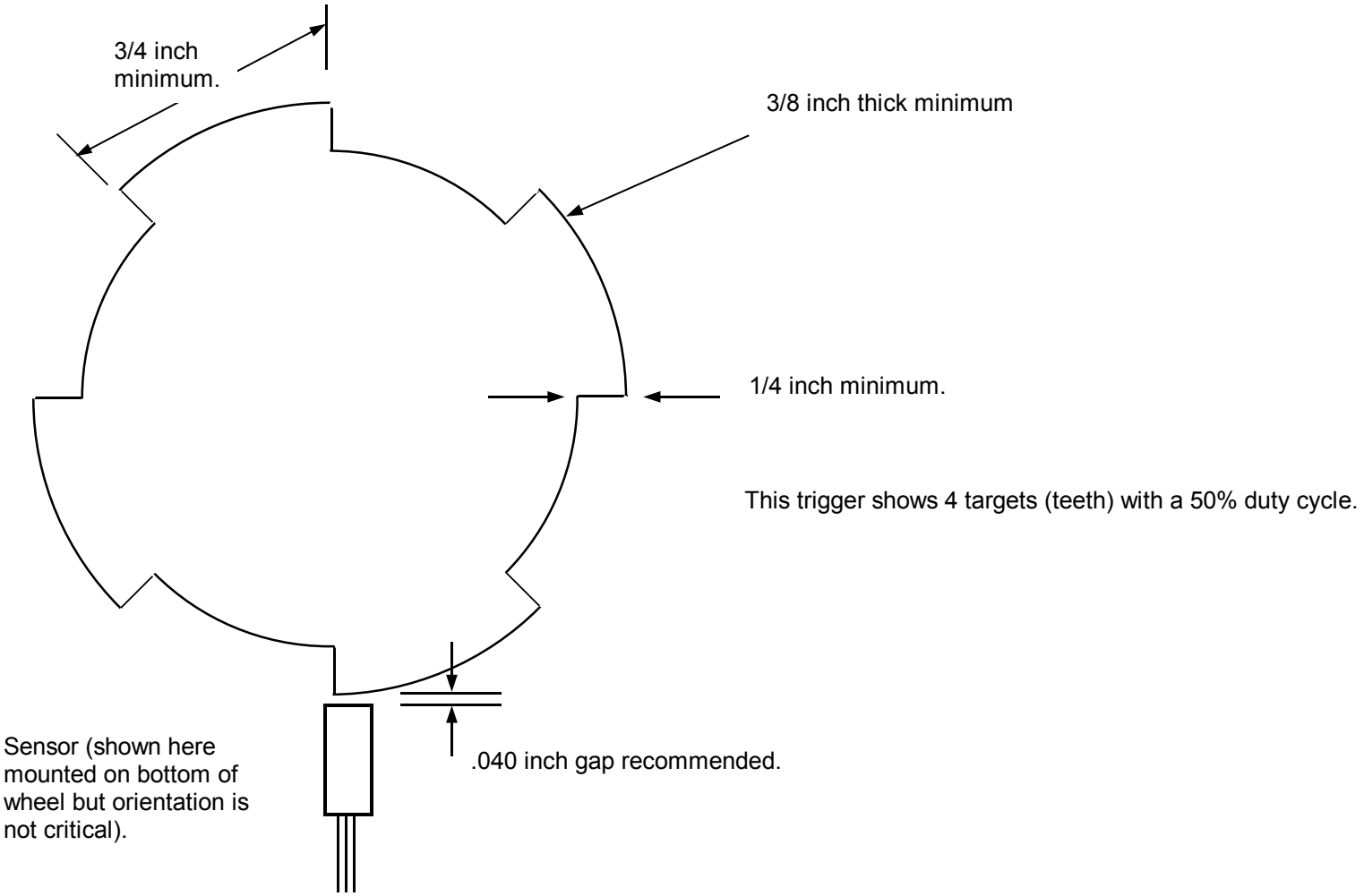


Molex male

Male - female

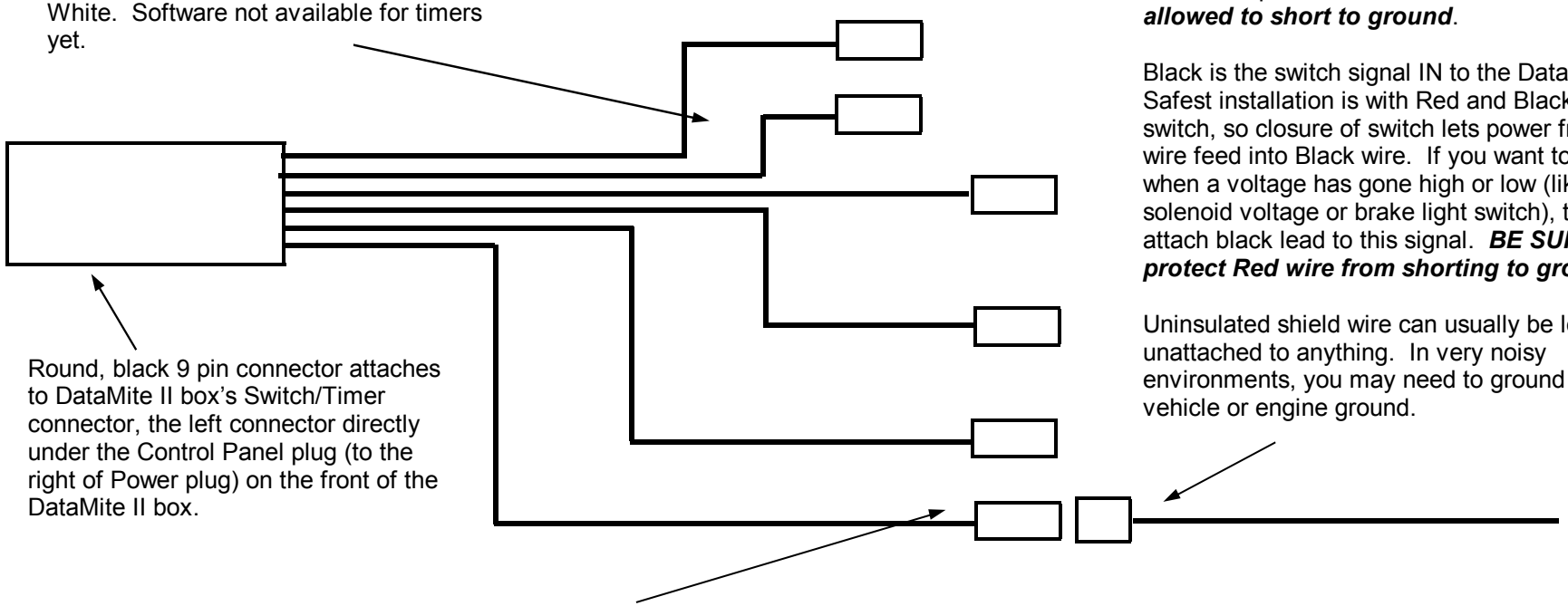
Steel Target Requirements for DTM-ARL Active RPM Sensors

The DTM-ARL sensor is designed to trigger off a ferrous metal (like steel) target. Ferrous materials are ones which are attracted to magnets. The target must be of a minimum size to be sensed. A typical trigger wheel is shown below. The thickness should be 3/8 inch minimum. The “ideal” duty cycle should be approximately 50%, meaning the teeth should be high as much as they are low. The depth of the teeth should be 1/4” minimum and the length of the teeth should be 3/4 inch minimum.



DataMite II Switch/Timer Break Out Harness, and Typical Connections

Two (2) 2 pin connectors provide access to Timer channels, color coded Black and White. Software not available for timers yet.



Performance Trends will provide the DTM-LDS, 2 conductor lead and mating 2 pin connector. Red is the power lead and ***MUST NOT be allowed to short to ground***.

Black is the switch signal IN to the DataMite. Safest installation is with Red and Black across a switch, so closure of switch lets power from Red wire feed into Black wire. If you want to sense when a voltage has gone high or low (like solenoid voltage or brake light switch), then attach black lead to this signal. ***BE SURE to protect Red wire from shorting to ground.***

Uninsulated shield wire can usually be left unattached to anything. In very noisy environments, you may need to ground to vehicle or engine ground.

Round, black 9 pin connector attaches to DataMite II box's Switch/Timer connector, the left connector directly under the Control Panel plug (to the right of Power plug) on the front of the DataMite II box.

Four (4) 2 pin connectors provide access to Switch channels. Shrink tubing color designates which channel of the 4: Red = 1st, Yellow = 2nd channel, Blue = 3rd channel, and Green = 4th channel. Two (2) 2 pin connectors provide access to Timer channels, color coded Black and White. Software not available for timers yet.

Switch pin assignments in 9 pin connector:

	signal (black wire)		
Channel 1 (red)	1 *	Power	4 and 6
Channel 2 (yellow)	2 *	Ground	none
Channel 3 (blue)	3 **	Shield	5
Channel 4 (green)	7 *		
Timer 1 (white)	8 **		
Timer 2 (black)	9 **		

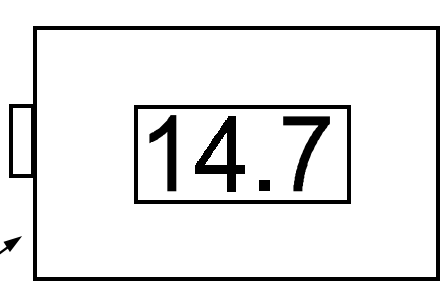
* use pin 4 power
** use pin 6 power

Note: Timers 1 and 2 may be combined into 1 Timer channel with power, 4 pin connector, typically marked with white shrink tubing. Then Black is ground (pin 5), red is power from pin 9, and white is signal (pin 8). This requires a jumper change in the DataMite II box for this configuration. On the Molex connector, Black is pin 1, Red is pin 2 and White is pin 4.

DataMite A/F (Lambda Boy) Connection and Operation

Sensor in via 9 pin DB9 cable. Read Lambda Boy instructions for precautions handling and mounting sensor.

Analog signal out via 2 pin connector. Performance Trends may provide an adapter to a 4 pin connector.



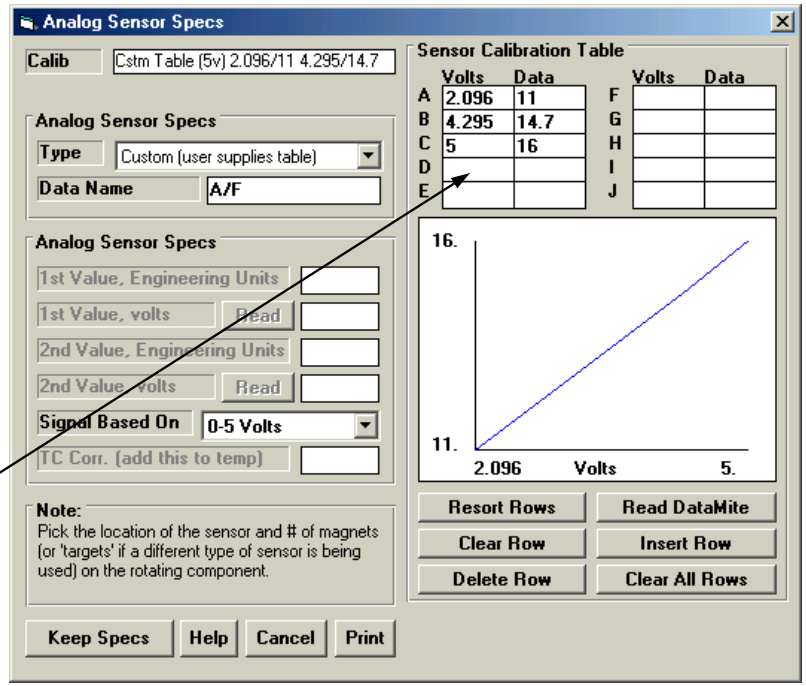
Power In from user supplied 12V DC source. Note: Some DataMite systems will come with 1 power supply to power up both the DataMite and LambdaBoy. Then the "IMPORTANT" note below will not apply.

IMPORTANT FOR DATAMITE II:
You must power up the DataMite II before powering up any sensor attached to the DataMite II. If not, the analog channels will be very obviously incorrect (probably at max or min of the scale). This can be best avoided by powering up the DataMite II and the A/F electronics by the same power strip, and using the power strip's switch for turning on the system.

If the above described problem occurs, turn off both the A/F and DataMite II electronics and restart them in the correct sequence, DataMite II first.

Calibration:

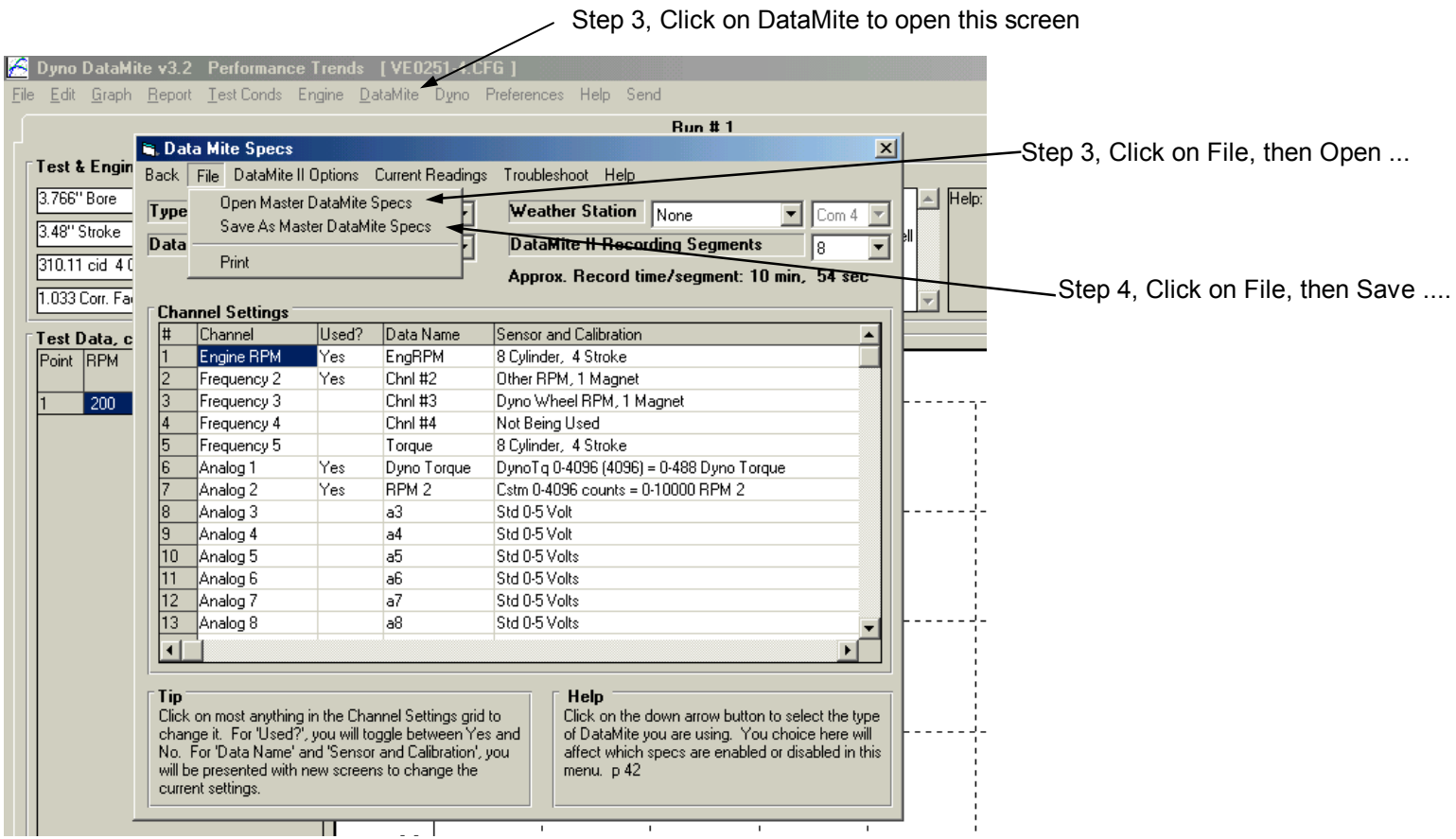
Upon powering up the Lambda Boy, it will produce an analog voltage for 11, 14.7 and 16 A/F for 10 seconds each. These volts can be recorded by the DataMite as a test, or you can just watch the Current Readings screen. You will then go to DataMite at top of main screen, click on the Sensor and Calibration column for the appropriate channel for A/F. A screen like below will appear. For Sensor Type, select "Custom (user supplies table)" and fill in 3 points of the table with the A/Fs and the resulting signal. Note: If you are using an Analog Converter, the Volts column will be called "Counts" and not Volts. Each 200 counts is equal to 1 volt.



For an Analog Converter using "Signal Based On" = "Counts" (typically used with the 4 channel DataMite), the calibration table would read:

	Counts	Data
A	419	11
B	859	14.7
C	1000	16

Reconfiguring a DataMite II After Repair

During a repair, the configuration of a DataMIte II may be changed. When you get it back, you must return it to the configuration you were using before you sent it in as follows:

1 Plug the DataMite II back into all harnesses, plug in power and the control box.
2 Start up the DataMite software and open some test or run which is very recent, probably the last good run you made.
3 Click on DataMite at top of the Main Screen. The program should say that these spec DO MATCH your Master DataMite specs. If they do NOT match, then determine if the DataMite settings in this screen for this recent test are the most up to date settings, or, click on File, then Open Master DataMite specs and see if these specs are the most up to date settings. If these Master specs are not what you want to keep, click on Back and choose No, to not keep these changes. Then click on DataMite again to return to the DataMite specs with the settings for this recent test.
4 Having determined that the DataMite settings shown here are the ones you want to download to the DataMite box, click on File, then Save as Master DataMite Specs. After saving these to the PC, then the program will download them to the DataMite II Box. Follow the program's instructins about Turning Power Off and On, etc.