



BD X-MONITOR

Universal Top Button Dash-Mount Gauge System

I n s t a l l a t i o n M a n u a l

Part #	Application
1080000	Universal Pyro & Turbo Only
1080200	Universal Pyro/Turbo + Accessory

Date Purchased _____

Purchased from _____

Installed by _____

READ THIS MANUAL COMPLETELY BEFORE INSTALLING THIS PRODUCT.
 Installation Manual Part # I1080200

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Kit Contents



1830030

Universal Installation Kit

(Includes thermocouple, bushing, control module vacuum tube boost connection, 6ft of 1/8" air tubing, & fused power wire with ground wire)



Display Kit (Dash Top Mount)



1820210

Control Module



1300837

Dodge Boost Fitting



1300838

Ford/Chevy Boost Fitting



1830010

Sensor Wire Kit

Welcome

Thank you for purchasing the BD X-Monitor. Your kit should have the above-mentioned items for your installation. This manual is divided into different areas to assist you with your installation and operation of your unit.

Pre-Installation

If you have existing gauges installed, you may have to determine where to reposition them to accommodate the X-Monitor. This style of X-Monitor mounts on a flat surface, most times being the steering column or also on the dash.

This X-Monitor comes with all the programming to measure exhaust temperature and boost pressure. If you have the 1080200 model, you can also add a third monitoring value by adding one of the following: automatic transmission temperature (using the OEM sensor), remote temperature sender (for use with differentials for example), exhaust brake backpressure, fuel pressure and aftermarket fuel tank levels.

Here are the standard list measurements:

Exhaust Gas Temperature	(PYRO)
Turbo Boost Pressure	(TURBO)

If you have the 1080200 model, you can also add one of the following:

Description	Value	BD P/N#
Transmission Temperature	(TRANS)	INCLUDED
Remote Oil Temp	(OIL)	CALL
Exhaust Brake Back Pressure	(B-PSI)	CALL
Fuel Pressure	(F-PSI)	1080156
Auxiliary Tank Level	(FUEL)	1080160 *

* The fuel tank level accessory kit interfaces with an aftermarket level sender with a range of 240ohms (Empty) to 330ohms (Full). Sender is not included.

Once the components have been installed, the X-Monitor will have to be programmed to match the application and the measurements being monitored. This will be done via the buttons on the display and will be explained further in this manual. If you wish to change from one optional measurement to another, the X Monitor can be reprogrammed to that application but an additional accessory kit may be required.

The following sections will give detail on the install of each measurement available but not all will apply to your installation.

Installation

NOTE: The ground terminals of the vehicle's batteries should be disconnected before performing any welding or taping onto any ECM/PCM wire.

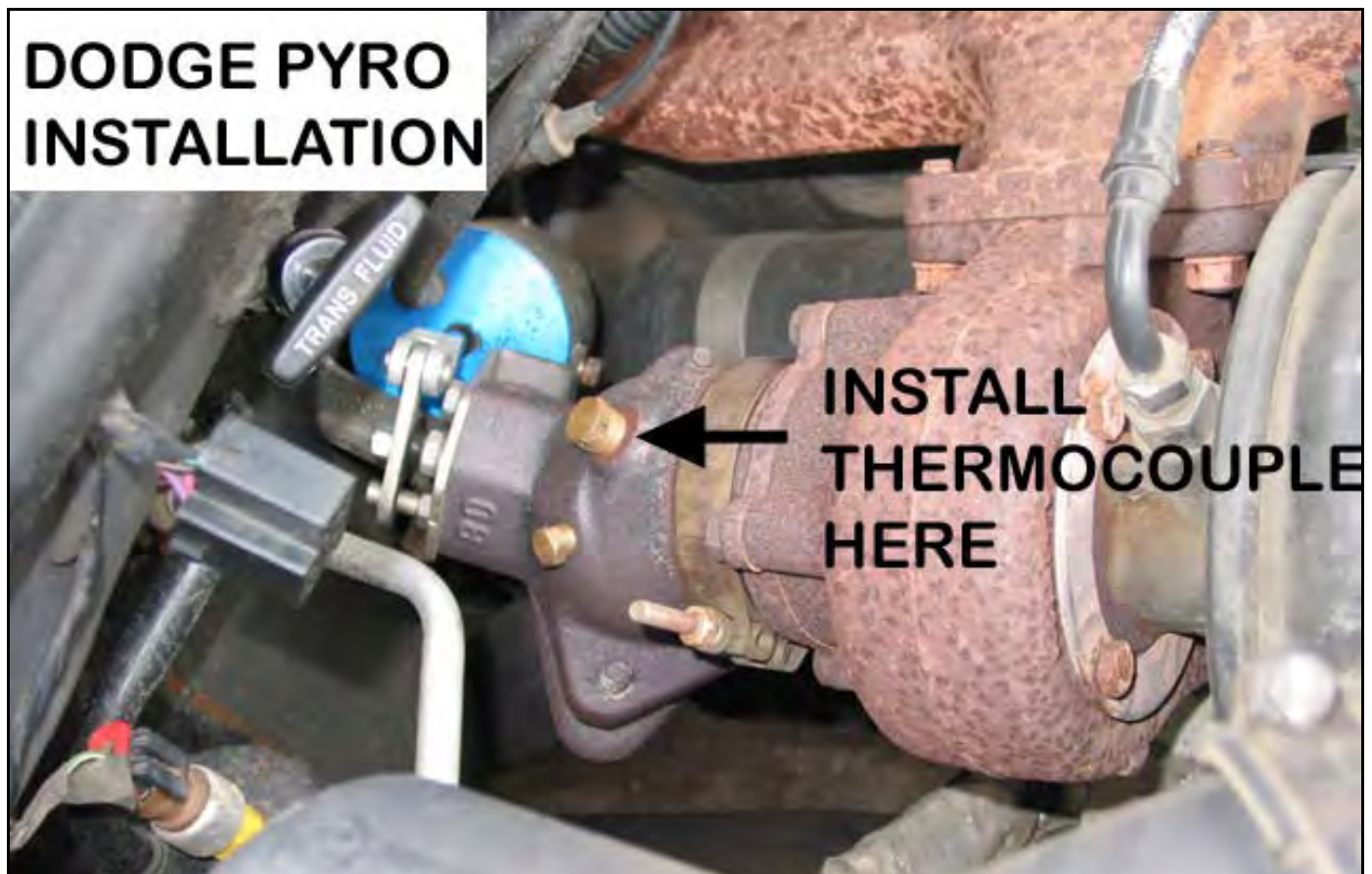
If your existing exhaust does not have a fitting to install a pyrometer sender unit (thermocouple), you will have to install the bushing supplied in this kit. The best place to locate the thermocouple is in the turbocharger down pipe.

If you have a TURBO-MOUNT EXHAUST BRAKE or an after market down pipe installed, there may be a ¼" NPT plug already in the system. Remove this plug and install the supplied thermocouple into the ¼" NPT hole and tighten with an open-ended wrench. We recommend using an anti-seize compound on the threads of the thermocouple.

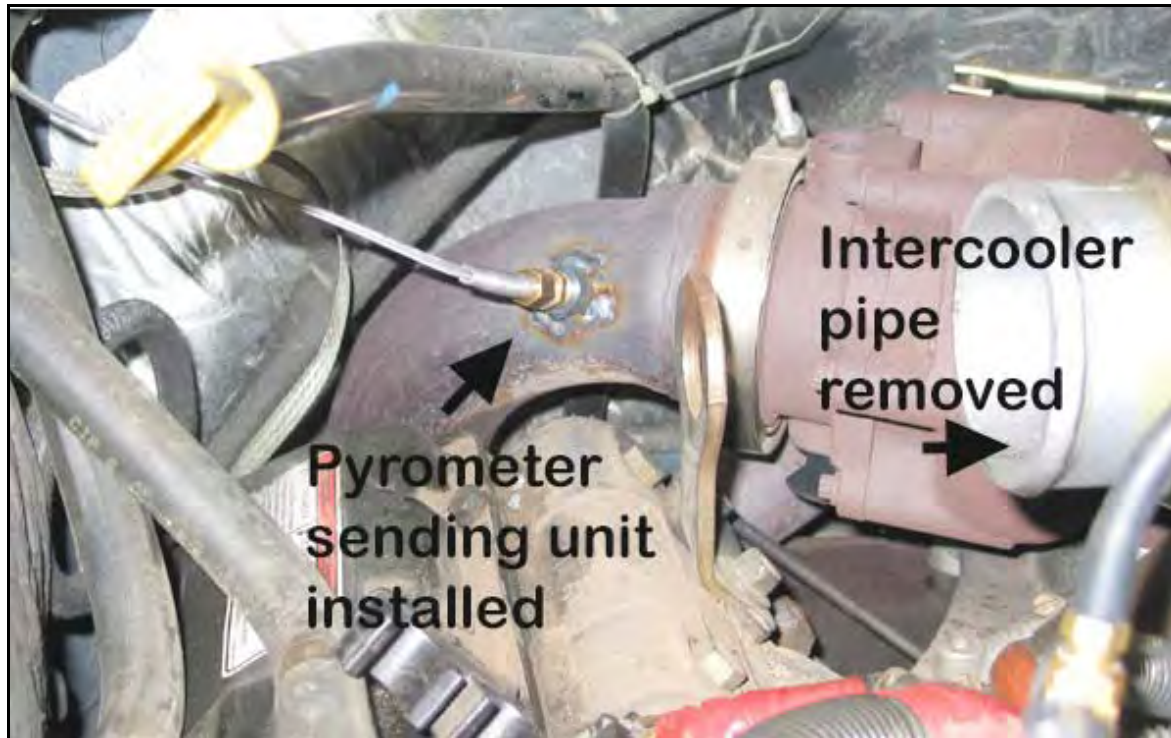
If you have an OEM or stock down pipe you will have to drill a hole and then weld the bushing that is supplied with this kit in place. It is recommended that you remove the existing down pipe for ease of drilling and welding but it is possible to install with pipe in place. Install thermocouple into the ¼" pipe plug and tighten with an open-end wrench. We recommend using a never seize compound on the threads of the thermocouple.

Pyrometer Sending Unit Assembly

Dodge Style



Ford Style



Duramax Style



Thermocouple Wiring

Route the thermocouple wire towards the firewall, taking precaution to keep it away from hot and moving parts, and then pass it through the firewall by piercing a large rubber grommet in the firewall beside the brake booster canister.

NOTE: Do NOT cut or splice the thermocouple lead wire, as it is special wire that provides correct reading to the gauge. Simply coil any excess wire out of the way. If the thermocouple wire is too short, call factory for longer leads.

From under the dash, route the thermocouple to the X-Monitor Control Module. Install the wires onto the Control Module as shown in the diagram.

CAUTION: DO NOT MIX UP THESE WIRES, ENSURE YELLOW TO YELLOW AND RED TO RED OR DAMAGE WILL RESULT AND WARRANTY WILL BE VOIDED.

Boost Pressure Sender Assembly

Dodge Style



Locate and remove one of the intake plenum-to-manifold bolts and install the drilled bolt provided with this kit and tighten to the proper specifications. (These bolt holes all open into the intake manifold)

Attach one end of the supplied 6' piece of 1/8" plastic air hose onto the open fitting and route it through the firewall by piercing a large rubber grommet beside the brake booster canister.

Route the hose into the cab under the dash taking care not to kink the tubing and to keep it away from hot and moving parts.

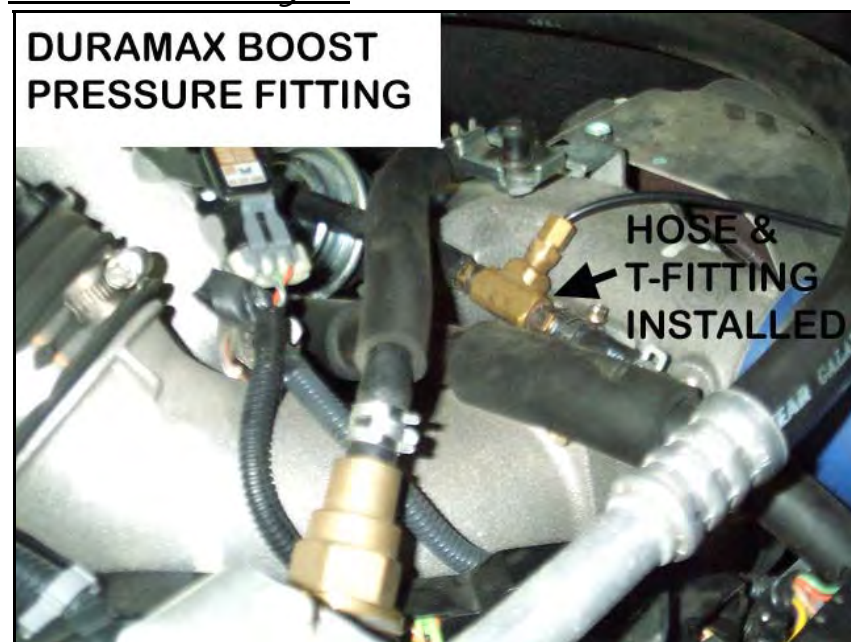
Push this end into the supplied fitting (see diagram on page 9) and connect the rubber hose to the pressure sensor on the back of control box. **MAKE SURE TO USE THE RUBBER HOSE AND NOT THE PLASTIC TUBING WHEN MAKING THIS CONNECTION.**

NOTE: The module should be mounted with the boost fitting pointed down.

Ford Style

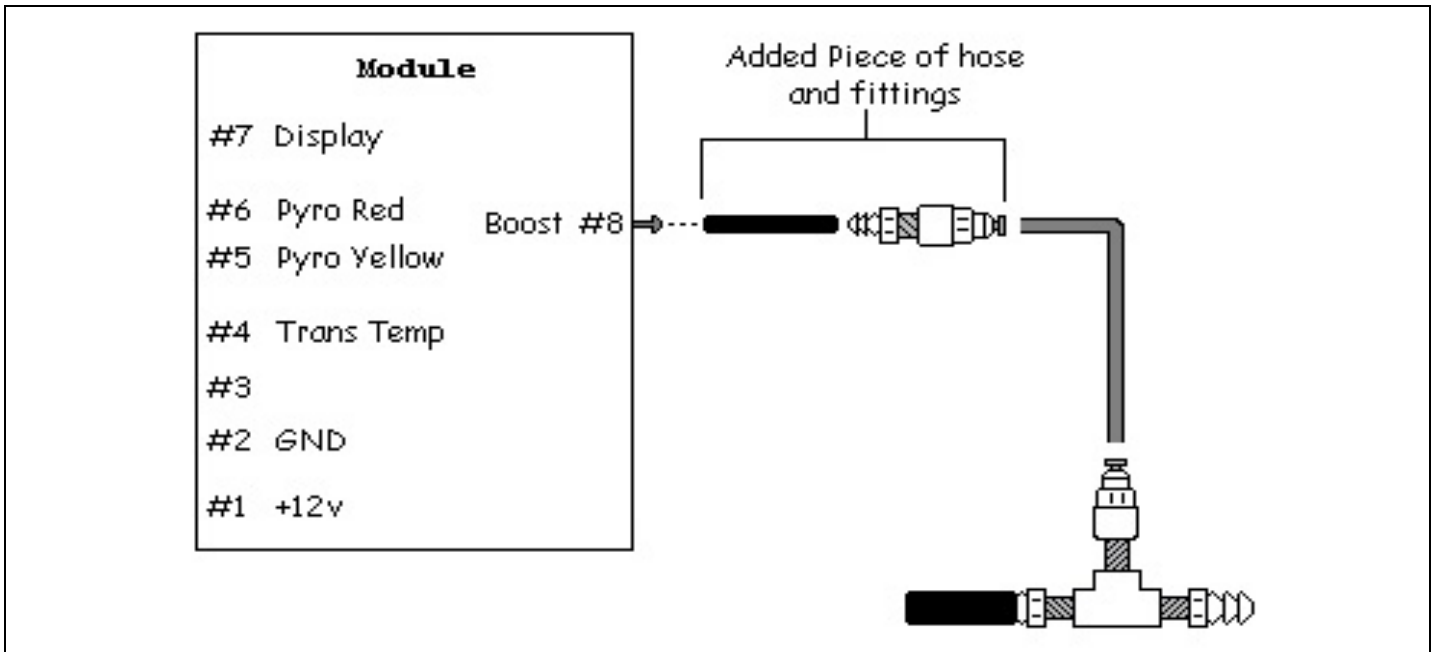
Locate the MAP Sensor hose and follow it along to the intake plenum.

Install the other end of the fitting with the 3" hose onto the fitting of the plenum as shown in the photo on the next page.

Duramax Style

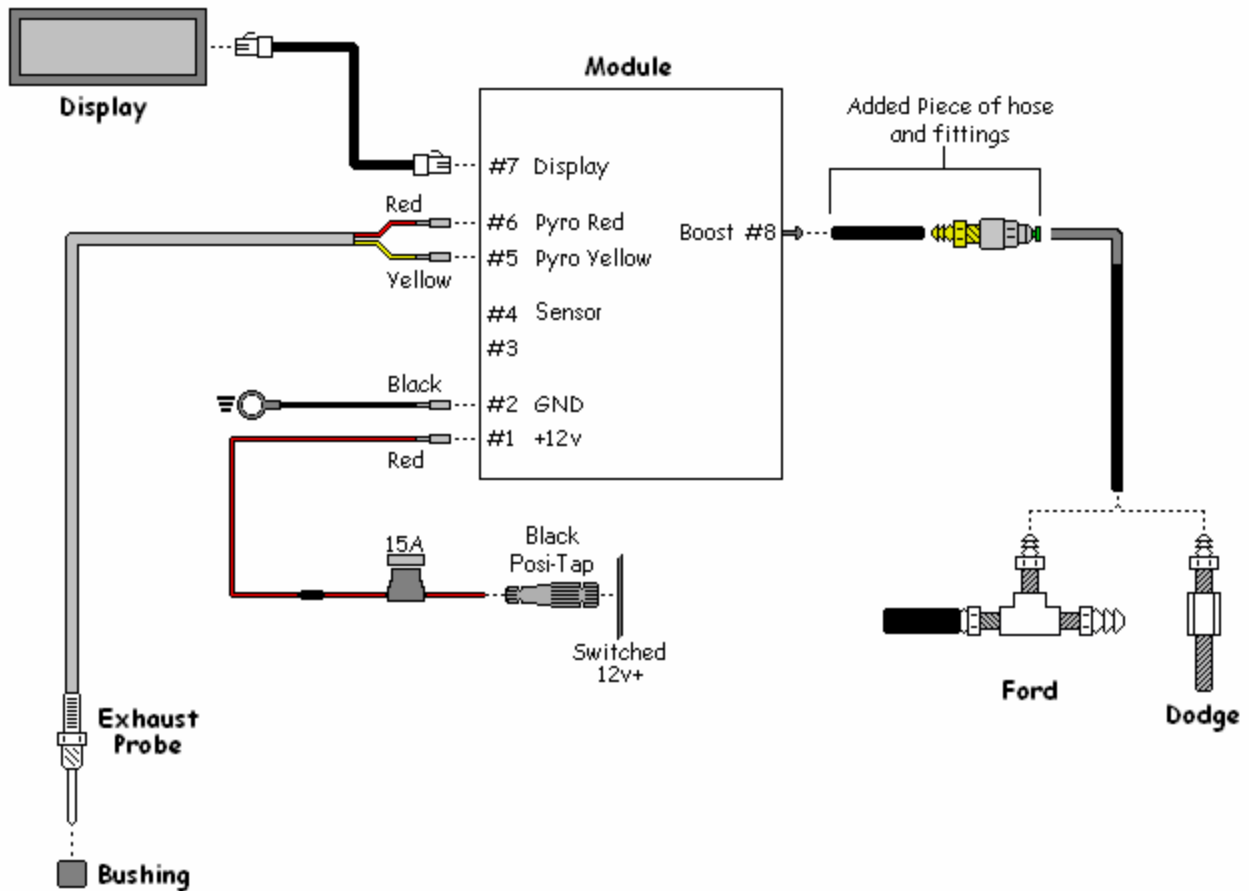
Locate the Turbo Wastegate hose and follow it along to the Plenum.

Install the other end of the fitting with the 3" hose onto the fitting of the plenum as shown in the photo on the next page.

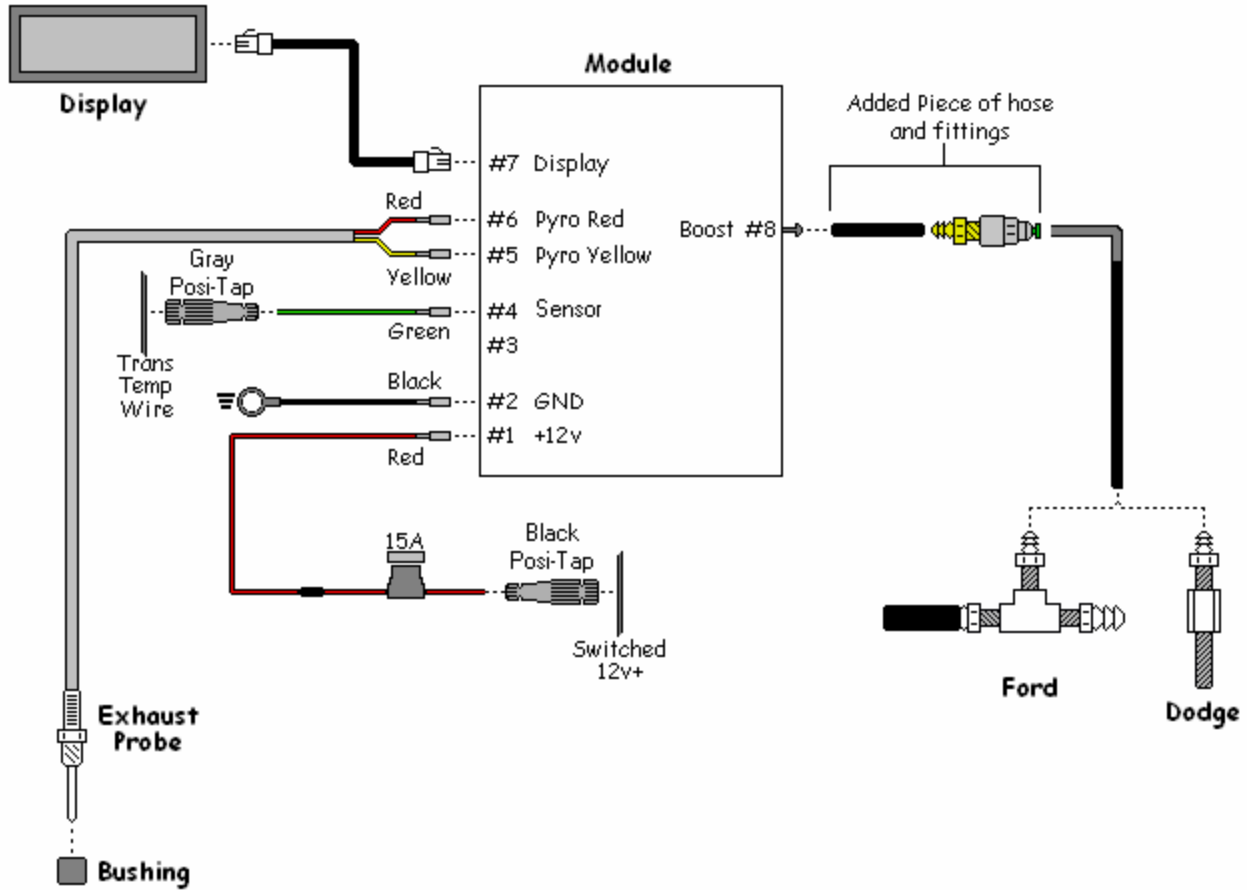


Connect the rubber hose to the pressure sensor on the back of control box. **MAKE SURE TO USE THE RUBBER HOSE AND NOT THE PLASTIC TUBING WHEN MAKING THIS CONNECTION.** The module should be mounted with the boost fitting pointed down.

Basic Installation with Pyro & Boost (1080000 Model)



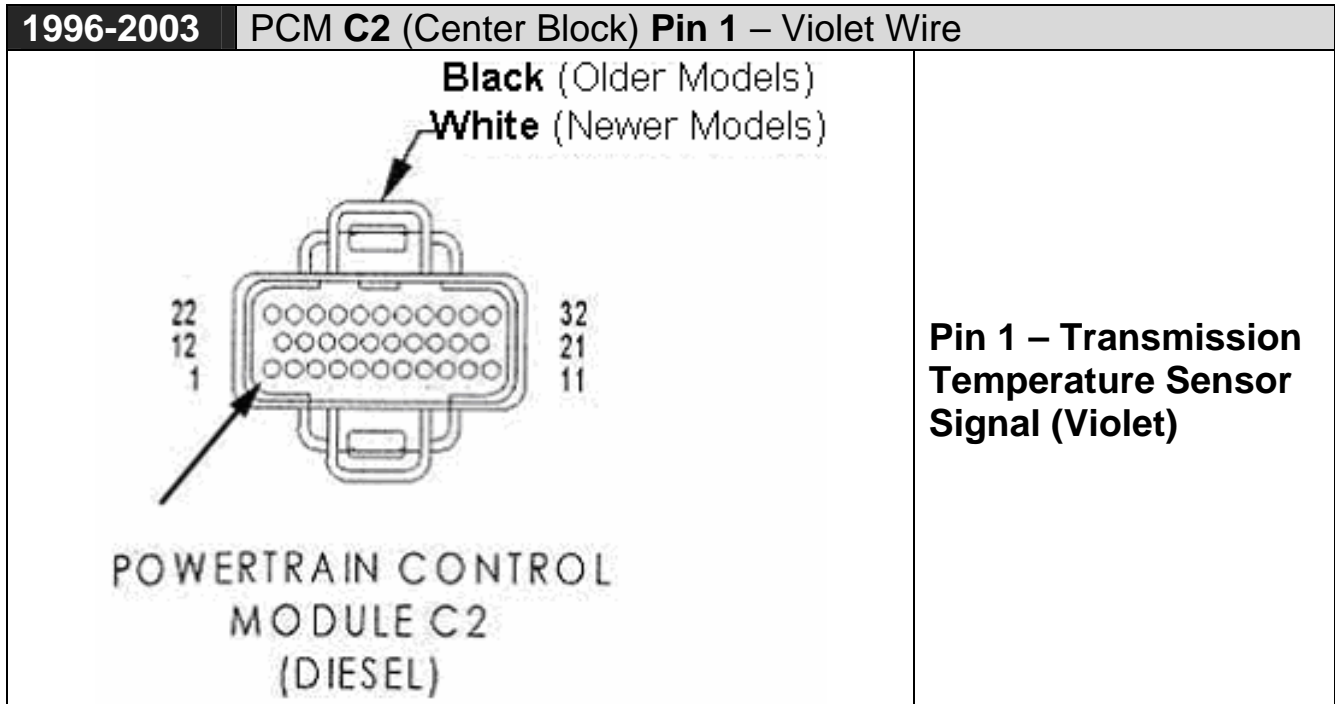
Basic Installation with Transmission Temp (1080200 Only)



Automatic Transmission Temp Sensor

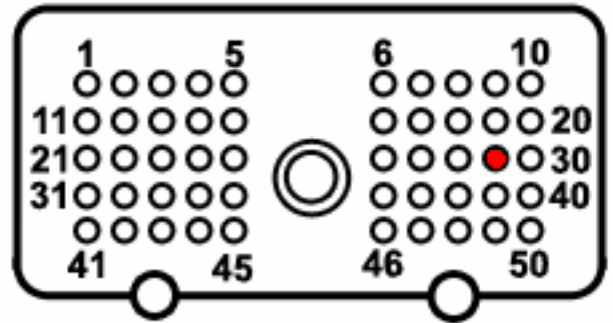
Dodge Style

Locate the transmission temperature monitor wire at the PCM connector on 1998-2003 and the ECM on 2004 model year.



2004-2005

ECM C2 (50-pin block closest to the firewall) Pin 29 - Dark green w/ orange tracer wire



NOTE for 1999 model year (Dodge)

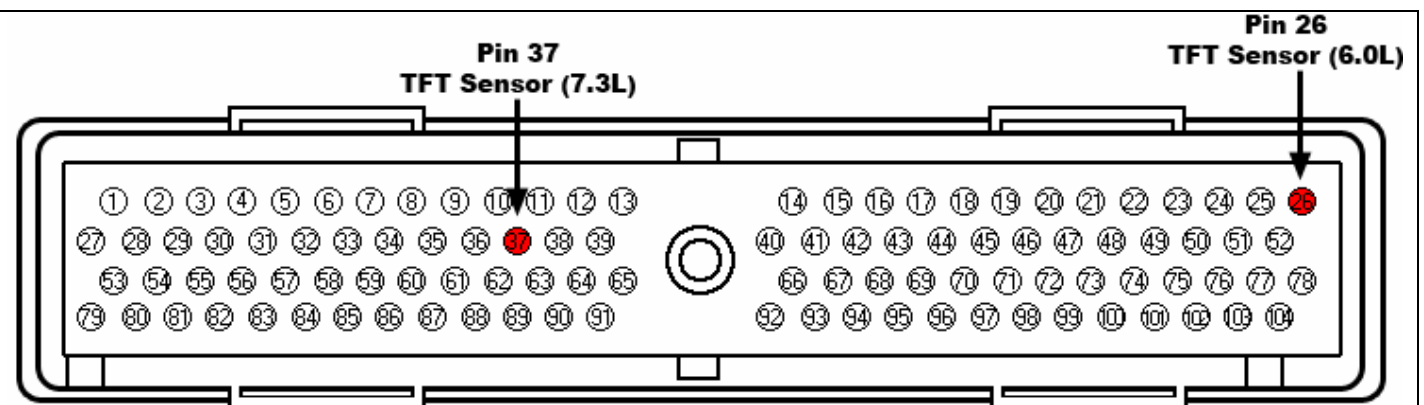
In some of the 1999 model year vehicles, Dodge had a different PCM that would give a lower reference voltage output than what the conventional PCM used to for the transmission temperature sender throughout the 1998-2003 model years. To ensure that the proper program is being used, measure the voltage on the **violet** wire on **Pin 1** of **plug C2** on the PCM at an ambient temperature of 40-100°F :

2 - 2.75 Volts	Conventional Sender	Use Program # 1085010 *
1 - 1.75 Volts	Low Voltage Sender	Use Program # 1085012 *

* Programming is explained in the "Programming and Set-up" section later in this install manual.

Ford Style

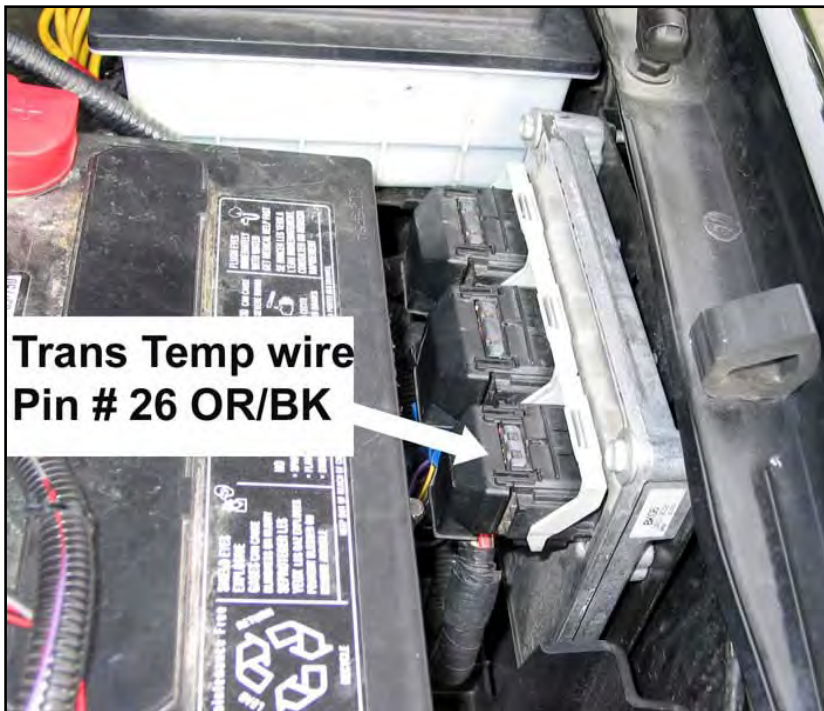
Locate the transmission temperature sensor wire at the PCM connector on the vehicle.



Transmission Fluid Temperature Sensor Wire Tap Location

1999-2002 7.3L Powerstroke	Pin 37 – Orange w/ Black Wire
2003-2006 6.0L Powerstroke	Pin 26 – Orange w/ Black Wire

Install the gray Posi-Tap provided, attach the monitor wire to this connector and route the wire into the cab to the control box. Install the female connector to the connection marked 'Sensor' (see "Control Box Installation" diagram on page 8).



Ford 6.0L Computer Location

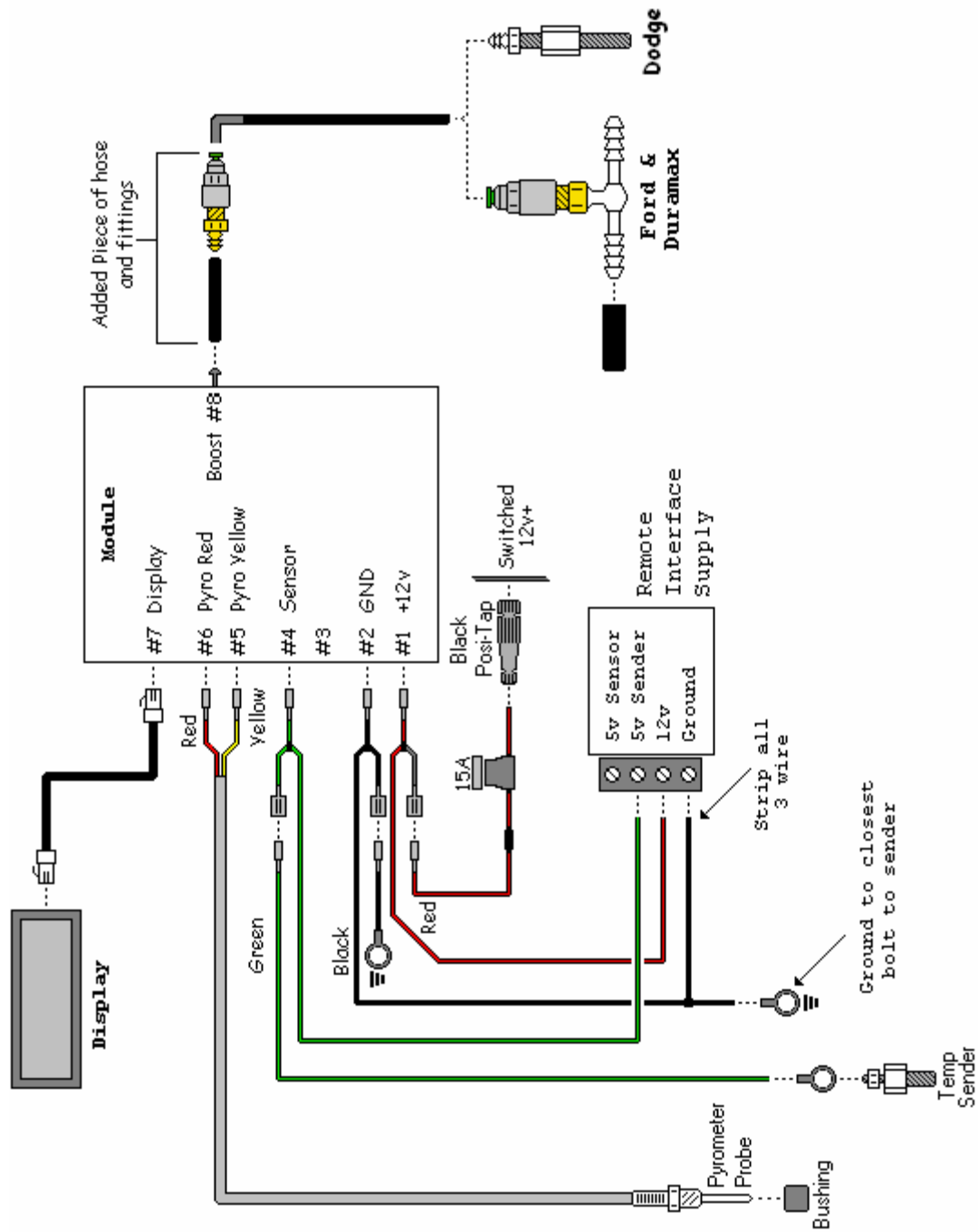
Locate the transmission temperature sensor wire at the PCM connector on the vehicle.

Install the Posi-Tap provided and attach the male end of the monitor wire to this connector and route the wire into the cab to the control box. Install the female connector to the connection marked 'Sensor' (see "Control Box Installation" diagram on page 8).

Remote Oil Temperature (Diff/Manual Trans) (1080200 Only)

Insert the temperature sender into the large bushing. This will replace the rear differential housing fill plug on the back cover. To use this feature monitoring the temperature of your manual transmission, locate the appropriate location for the sender to fit. Not all locations will accommodate the size of the sender or the bushings supplied in the kit. An alternative location, sender, or bushing may have to be purchased to be installed in the desired location.

Remote Temp Wiring Diagram

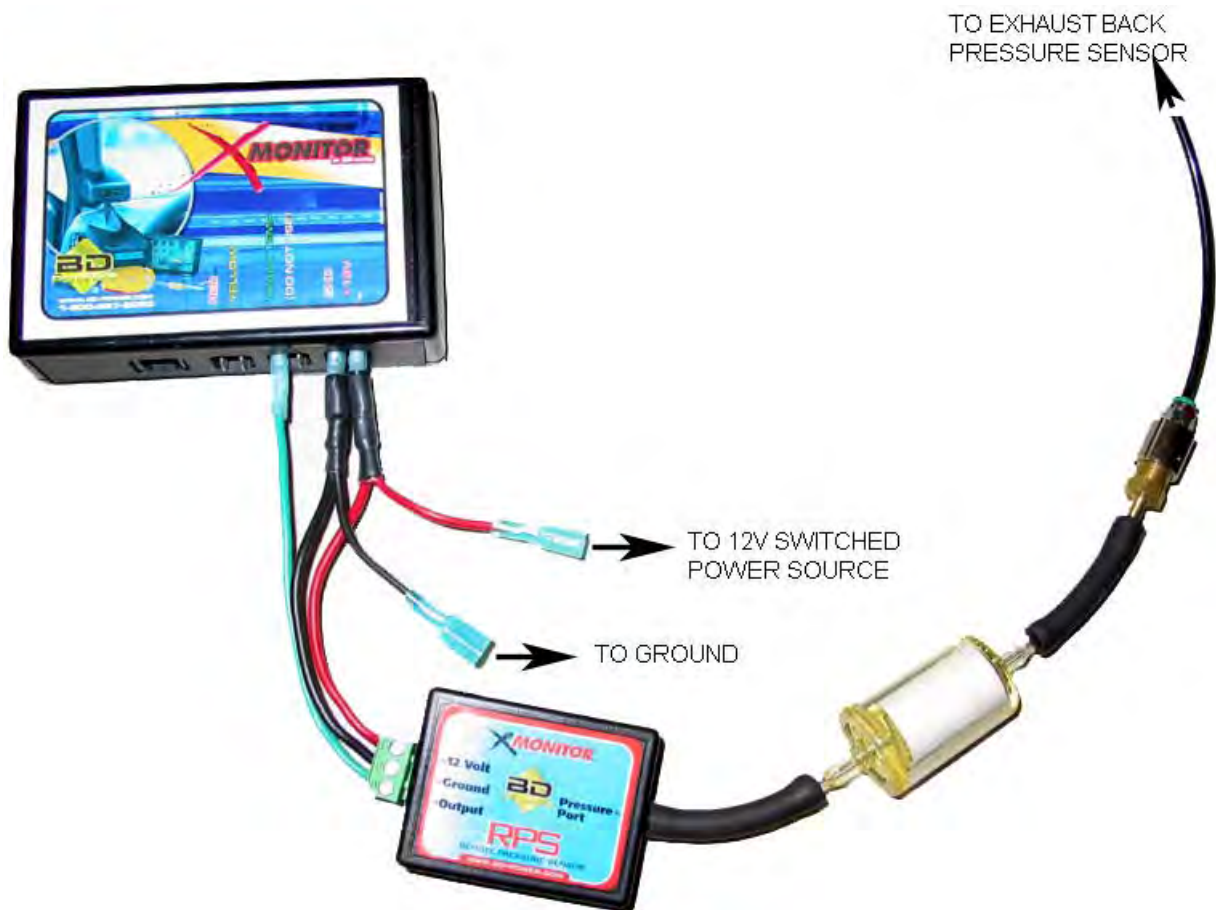


Brake Back Pressure (1080200 Only)

On the BD Exhaust Brake valve there is a 1/8" NPT plug used for measuring brake backpressure. Remove this plug and install the tube fitting with 1/8" NPT male threads. One end of the formed piece of stainless tube has a fitting attached and other end is bare - Insert the bare end into the fitting on the brake valve.

Secure the stainless tube to one of the manifold studs using the supplied hardware in the brake pressure kit. Connect the plastic tubing to the fitting on the end of the stainless tube, run it into the cab and connect it to the filter attached to the RPS module.

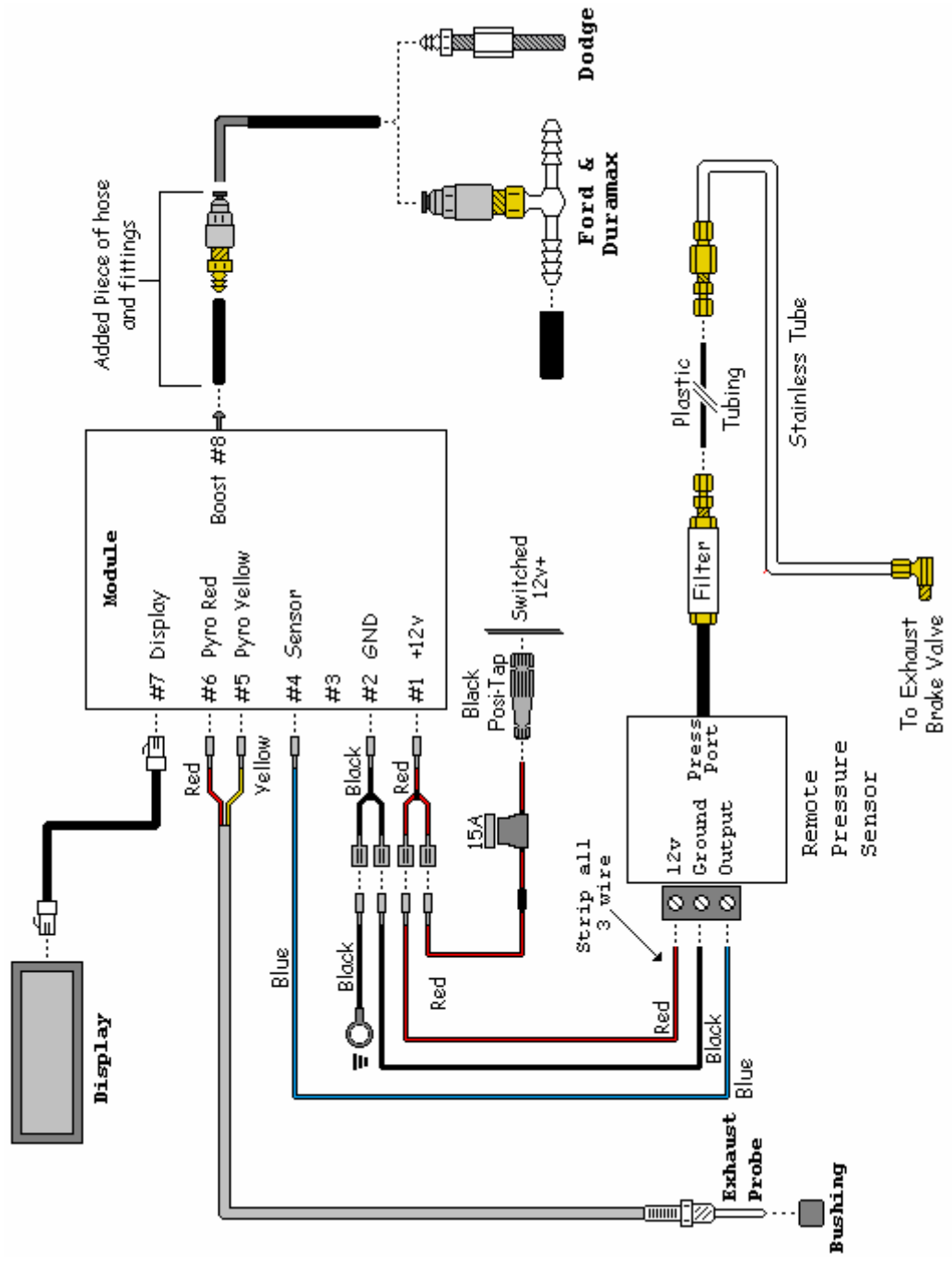
Connect the RPS module to the X-Monitor module as per diagrams and secure all wires and tubing, keeping them away from heated or moving components.



Note that the plastic filter housing will need to be changed out after 6-12 months of use. This time is dependant on air humidity and the amount of moisture that is trapped in the actual filter. The replacement filter part # is **1800135**. This filter should be mounted in a visible, easy to access location.

Because of the moisture accumulating in the line and filter, it is highly recommended that the RPS unit be mounted at the highest point of the air line causing all the moisture to run back down the line into the exhaust.

Back Pressure Wiring Diagram

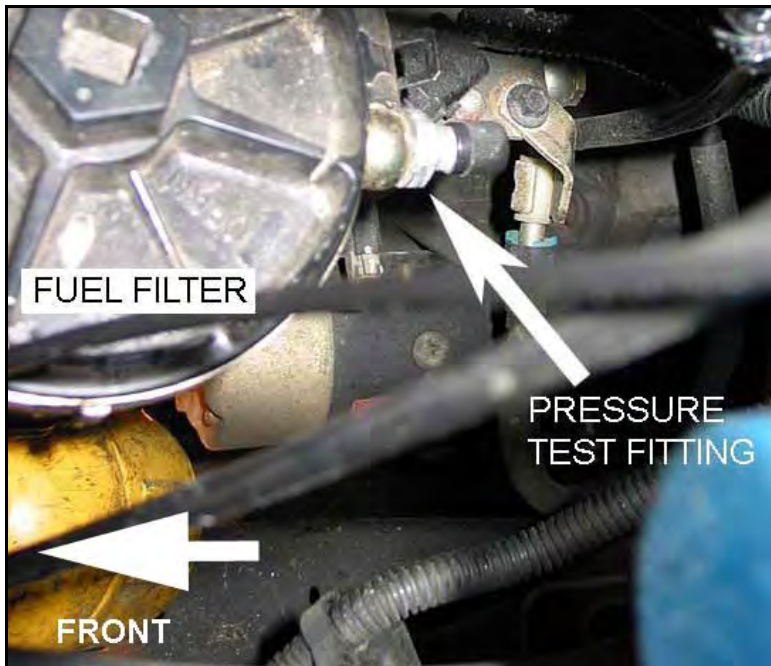


Lift Pump Fuel Pressure (1080200 Only)

Dodge 1998½-2002



Apply some pipe 'dope' or Teflon tape to the supplied pressure sender, and then insert and tighten the sender into the brass banjo bolt fitting supplied.



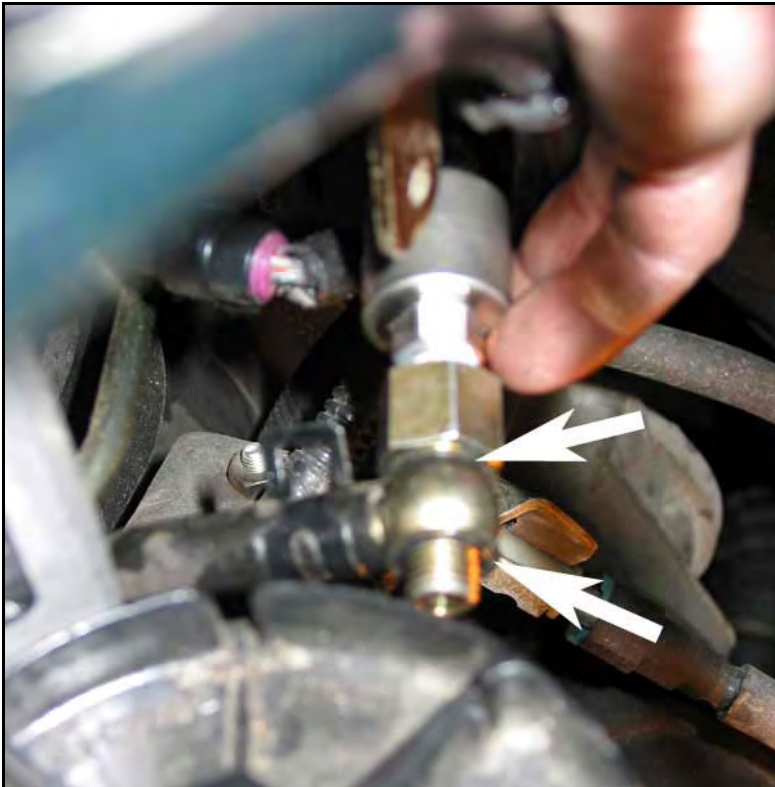
Locate the fuel filter on the left hand side of the engine just in front of the fuel lift pump.

At the rear of the filter housing is a fuel inlet line and pressure test fitting. Remove the test fitting and then remove and save the washers.

CAUTION: Fuel will escape from this line, ensure a small drip pan or some rags are in place to prevent excessive fuel from leaking.



Install one of the supplied washers onto the supplied banjo bolt fitting.



Insert the banjo bolt fitting through the fuel line.

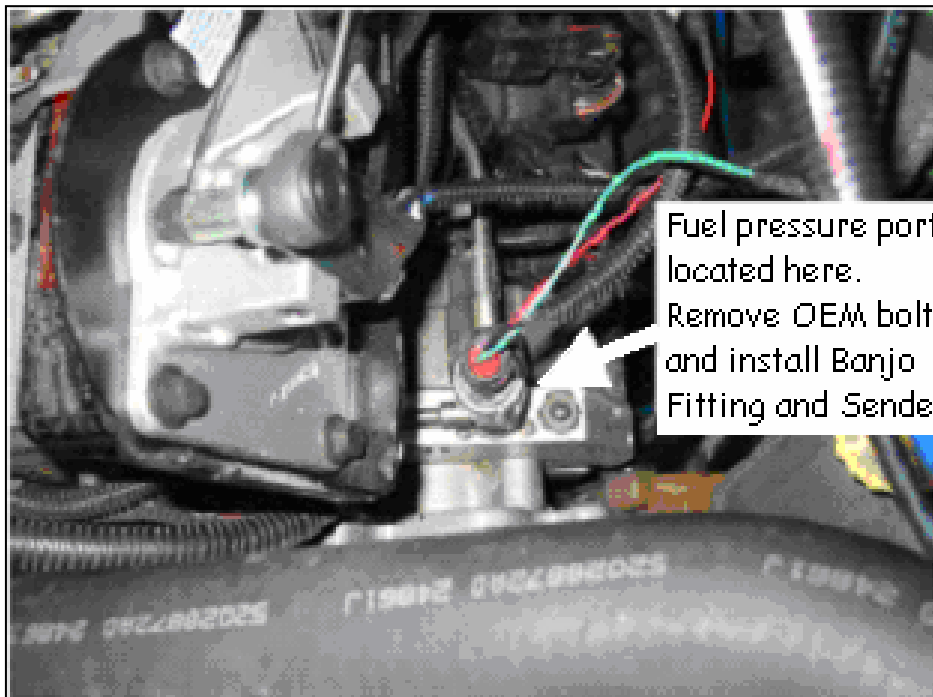
Install the other washer, and then insert the fitting into the fuel filter housing.

Start threading the fitting with your fingers to prevent cross-threading, and then secure it hand tight before tightening with a wrench.

When installation is complete, run the engine and check for leaks.

Dodge 2003-2006

The sensor mounts on the high-pressure pump located on the driver's side of the engine, top/front section. There are two different styles of throttle linkages on the 2003-2006 Dodge Ram pick-ups.



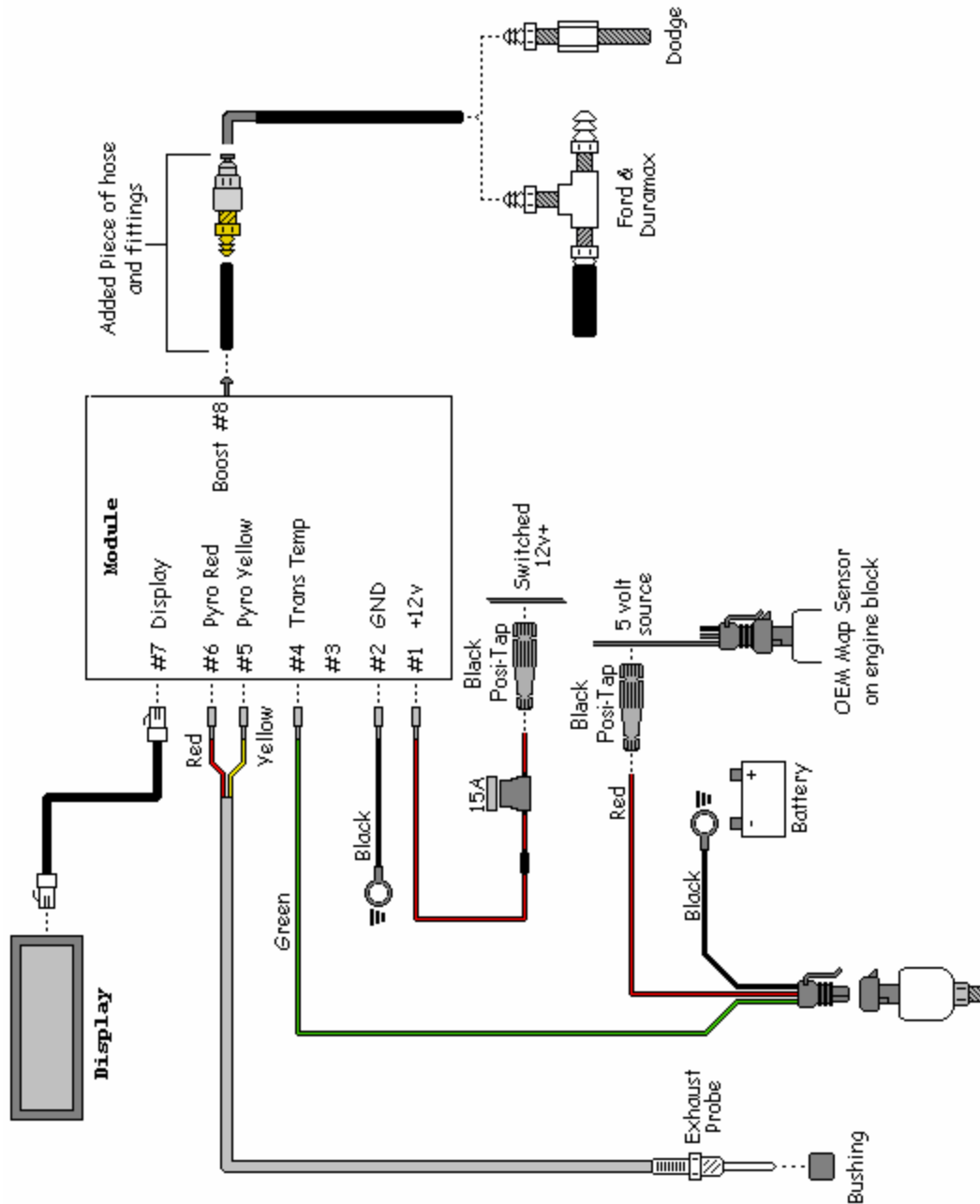
If the throttle linkage is located near the top of the engine, remove the throttle linkage plastic cover before proceeding.

Once the fuel pressure port is located, remove the existing factory banjo bolt and install supplied banjo bolt in X-Monitor kit.

When installation is complete, run the engine and check for leaks.

Run the wiring along the driver's side of the engine and through the firewall near to the control box and connect the wiring as per the "Lift Pump Pressure" wiring diagram.

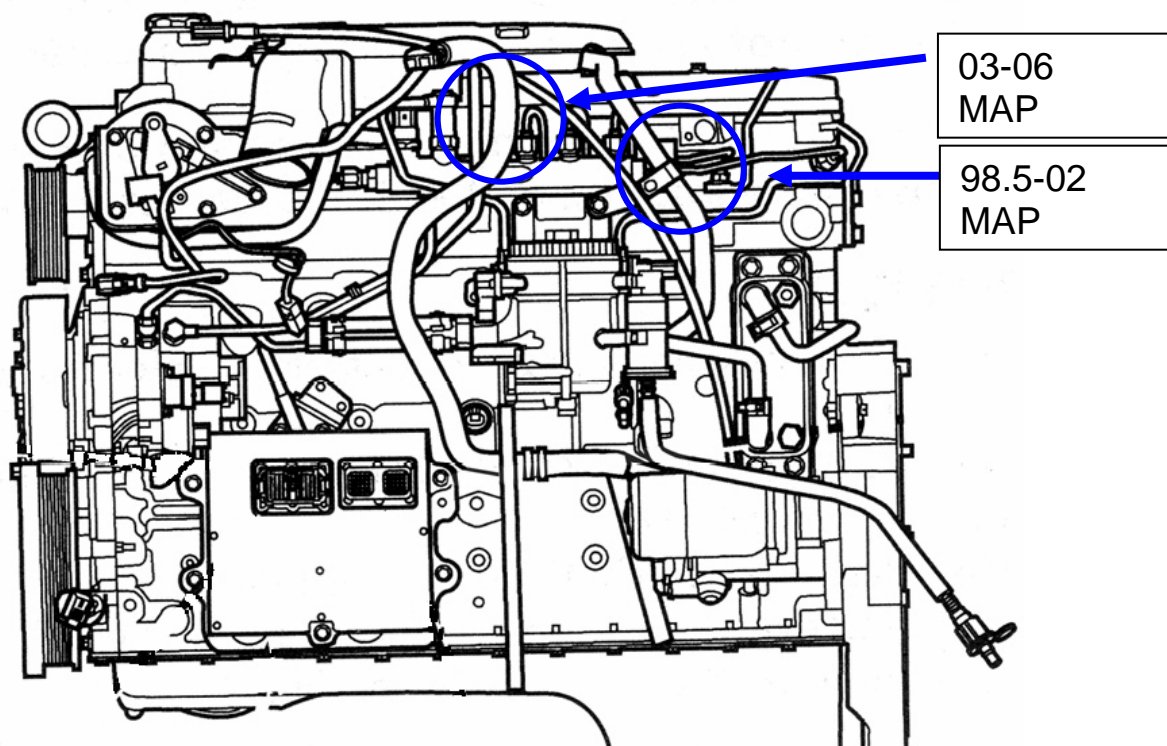
Wiring Diagram – Lift Pump Pressure



Fuel Pressure Sensor Power and Ground

To power the auxiliary fuel pressure sensor a 5 volt source is needed. You can locate this power source at the MAP (Manifold Absolute Pressure) sensor located near the driver's side rear of the engine block. On 1998½-2002 model trucks it is located on the side of engine at the rear, while on 2003-2004 model trucks it is located on the top of the engine near the rear. Use the supplied Posi-Tap to pierce this wire and use the red wire to route power to the sensor connector assembly.

The ground connection can be routed back towards and connected to the battery.

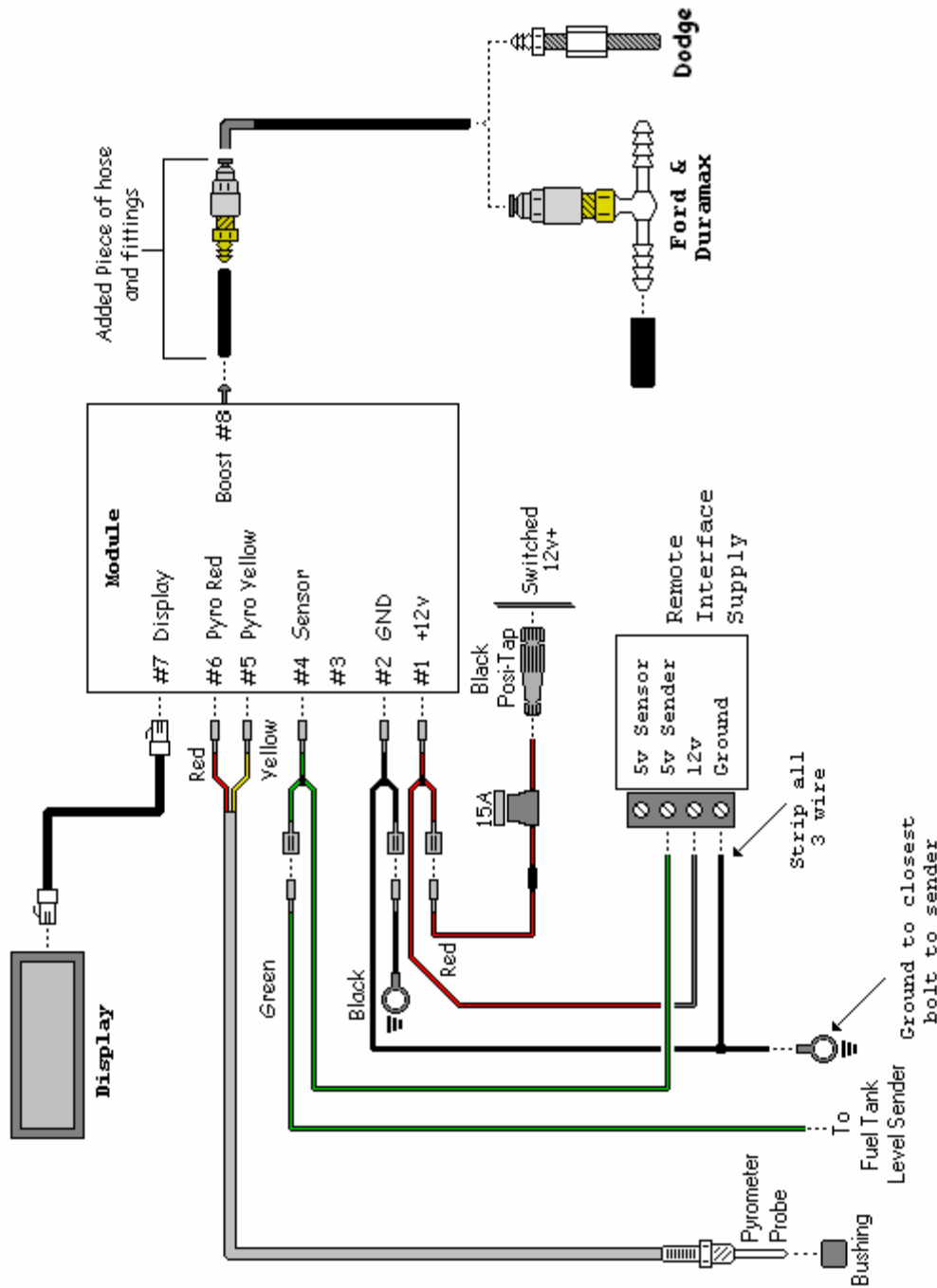


5 Volt Supply – Located at the MAP Sensor

Model Year	Wire Color	Pin
1998.5-2001	Orange	A
2002	Violet w/ White tracer	3
2003	Dark Green w/ Orange tracer	C
2004-06	Pink w/ Yellow tracer	C

Auxiliary Fuel Tank Level (1080200 Only)

Consult this diagram for correct hook-up of the auxiliary fuel tank level sender kit. Notice that the green wire from the control module connects to the output of the auxiliary fuel tank's fuel sender. Consult the literature from the sender for the correct terminal or wire for the output.



X-Monitor Power and Ground

Locate a switched 12-volt power source under the dash and install the Red wire to it. Install the other end to the Power connector of the control box.

Install the Black ground loop to a good ground and install the other end to the Ground connector of the control box.

Display Assembly Installation

*** * * EXTREME CAUTION * * ***

*THE DISPLAY IS VERY FRAGILE AND IS INSTALLED AND TESTED AT THE MANUFACTURER. IF YOU MUST REMOVE THE DISPLAY IN ORDER TO PAINT THE PILLAR MOUNT TAKE EXTREME CARE DURING RE-INSTALLATION. DO NOT OVER-TIGHTEN THE MOUNTING SCREWS OR THE DISPLAY WILL BE DAMAGED AND YOUR **WARRANTY WILL BE VOIDED.***

Install the telephone type communication wiring into the back of the display circuit board. Apply Velcro or two-sided tape to the mounting surface and/or the tabs on the bottom of the mount and put into place.

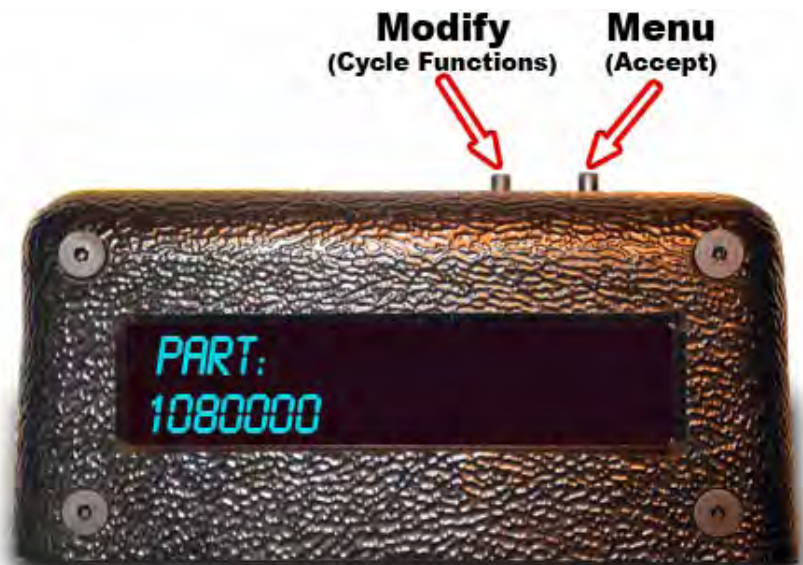
Run cable to the control box and insert telephone type connector in the socket of the Control Box. Once all connections are made, secure the box in place under the dash and away from moving parts.

Programming and Set Up

Press both buttons in on the X Monitor display and set your ignition into **KOEO mode** (Key On / Engine Off). The X-Monitor screen should light up and after the boot-up has completed, the words "SIDE OR TOP BTN?" should appear and the bottom line will read "SIDE". Push the MODIFY (left) button to toggle the "TOP" function, then let go of both buttons. Press the ACCEPT (right) button to go to the next screen.



You will now get a screen that will read "**PART:**" on the top line and "**1080000**" on the bottom line. Using the programming chart located on the next page, find the program number that matches the application and measurements you are going to program the X Monitor for. Press the upper button until the program number appears, then press the right button to activate that program (see diagram to the right). The display will now cycle through the normal start-up screens that will appear every time the ignition is started.



After the program has been set, the boot-up screen should display the following:



Programming Chart

Application	Pyro	Turbo Boost	Trans Temp	Remote Temp	Brake Press	Oil Press	Fuel Press	Fuel Level	Program #
Dodge Cummins									
All Years	•	•							1085000
1996-1998 12V	•	•	•						1085015
1998½-2002 24V	•	•	•						1085010
Late 1999*	•	•	•						1085012
2003	•	•	•						1085011
2004 (305hp)	•	•	•						1085013
2004½-06 (325hp)	•	•	•						1085014
All Years	•	•		•					1085020
All Years	•	•			•				1085030
All Years	•	•					•		1085050
All Years**	•	•						•	1085060
Ford Powerstroke									
All Years	•	•							1087000
1999-2002	•	•	•						1087010
2003 (7.3L)	•	•	•						1087011
2003-2006 (6.0L)	•	•	•						1087012
All Years	•	•		•					1087020
1999-2006	•	•			•				1087033
All Years**	•	•						•	1087060
GMC/Chevy Duramax									
All Years	•	•							1086000
All Years	•	•		•					1086020
All Years	•	•			•				1086030
2001-2002	•	•				•			1086040
2003-2006	•	•				•			1086041
All Years*	•	•						•	1086060
Universal Applications									
Universal	•	•							1080000
Universal	•	•		•					1080020
Universal	•	•			•				1080030
Universal	•	•					•		1080050
Universal**	•	•						•	1080060
* Late 1999 Dodge with 1-1.75V on sensor wire at 40-100°F transmission temperature (Ref. TB#30803)									
** Connects to an aftermarket fuel level sender with a ranger of 240 ohms at empty and 33 ohms at full; optional senders are available.									

Operation

Once the display has gone through the startup cycle it should end up with the following, default display.

To change the settings and set alarm values there are 2 buttons on the top of the display: the right (**MENU**) button cycles through the different modes and the right (**MODIFY**) button controls the setting of the values.

<i>Recommended Alarm Settings</i>	
PYRO	900
TURBO	40
TRANS *	200
OIL *	Dependant on location of sender
B-PSI *	User Defined – Consult Exhaust Brake manual for safe ranges
F-PSI *	3
FUEL *	25

** 1080200 model only*

These are only suggested settings and will vary depending on vehicle condition, performance enhancements and driving techniques.

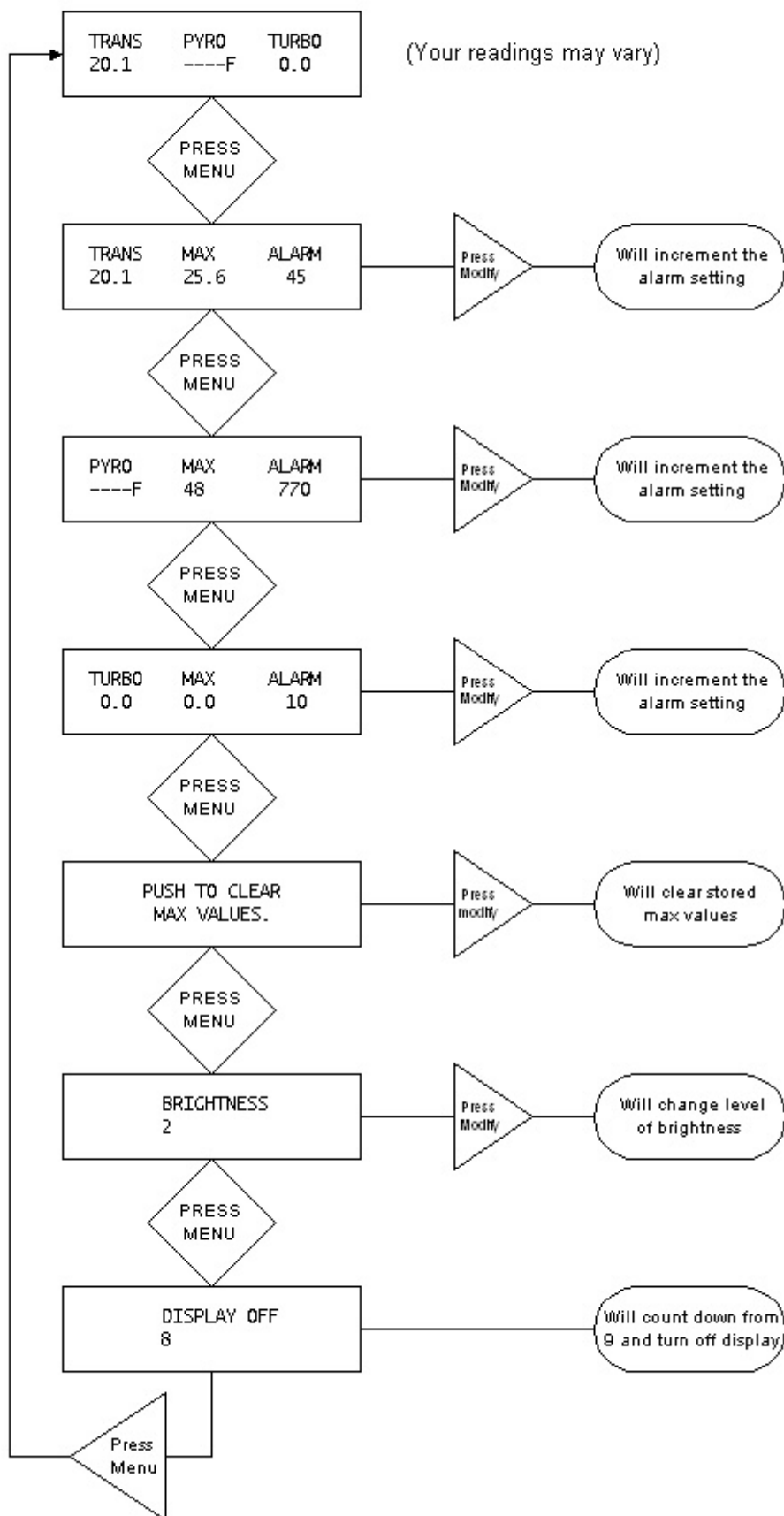
NOTES: All temperature readings are in Fahrenheit (°F), pressures are in pounds-per-square-inch (PSI) and fuel level is displayed in percentages. All readings are approximate and may vary due to characteristics of sensor, sender or probe, and, certain conditions can cause interference or sway the reading.

The alarm settings for fuel pressure (F-PSI), oil pressure (O-PSI) and fuel level (FUEL) will display an alarm when the measurement drops below the set value; all other measurements will alarm when the value is above the set value. The history value also works the same where it records the lowest achieved value on (F-PSI), (O-PSI) and (FUEL) and the highest value on all others.

The X-Monitor is calibrated to the thermocouple that is supplied with the kit and will not register accurately if an existing or different thermocouple is used.

If the thermocouple was installed after the turbo, in the exhaust pipe, all temperatures will indicate lower and the maximum safe temperature is 900 degrees.

X-Monitor Display Settings



When placed in Display Shutdown Mode, the X-Monitor counts down from 9 to shut off the display ONLY; all the functions still continue to work in the background. Press the MENU (lower) button to turn the display back on.



****CAUTION**:** DO NOT RUN ENGINE AT HIGHER THAN 900 DEG INDICATED FOR EXTENDED PERIODS OR ENGINE DAMAGE MAY RESULT. DO NOT run the transmission higher than 250 degrees for prolonged periods or transmission damage may result.

THE X-MONITOR IS A VERSATILE GAUGE PACKAGE THAT CAN BE PROGRAMMED TO MONITOR DIFFERENT SYSTEMS OF THE VEHICLE. THESE INSTRUCTIONS ARE FOR GENERAL INSTALLATION AND SPECIFIC APPLICATIONS WILL RECEIVE INDIVIDUAL APPLICATION INFORMATION.

NOTE: It is recommended that when mounting/securing the X-Monitor module (or RPS module used in Back Pressures applications), the barb of the pressure sensor on the modules point downwards to prevent any condensation from the tubing collecting inside the modules.

Maintenance & Troubleshooting

Following the diagrams in this manual, tracing hoses and wiring, checking continuity through electric components or checking for any lines that are disconnected should solve any problems that may arise.

NOTE: Analog signals are naturally affected by RF (radio frequency) noise. To eliminate any possible chance of an erratic signal please choose a clean ground signal for the X Monitor, that is clearly mounted away from the alternator wires or any other voltage sources (positive battery cables, etc.). If for some reason you still have erratic sensor readings try a direct ground connection to the battery.

Thermocouple wires should also be clear from any RF noise sources as well (i.e. alternator, positive battery cables, etc.). If the thermocouple signal is erratic then the copper ground wire that is contained inside of the yellow loom can be connected to ground to reduce a small amount of noise. Be sure to connect only one end of this copper wire to eliminate any ground loops from forming.

If you have any problems or need replacement parts, call us at 1-800-887-5030, between 8:30am and 4:30pm Pacific Time.

BD ENGINE BRAKE, INC. *LIMITED WARRANTY STATEMENT*

THE INSTALLATION OF THIS PRODUCT INDICATES THAT THE BUYER HAS READ AND UNDERSTANDS THIS AGREEMENT AND ACCEPTS ITS TERMS AND CONDITIONS.

DISCLAIMER OF LIABILITY

BD Engine Brake Inc., its successors, distributors, jobbers, and dealers (hereafter "**BD**") shall in no way be responsible for the product's proper use and service. THE BUYER HEREBY WAIVES ALL LIABILITY CLAIMS.

BD disclaims any warranty and expressly disclaims any liability for personal injury or damages. **BD** also disclaims any liability for incidental or consequential damages including, but not limited to, repair labor, rental vehicles, hotel costs, or any other inconvenience costs by reason of use or sale of any such equipment. The **BUYER** acknowledges and agrees that the disclaimer of any liability for personal injury is a material term for this agreement and the **BUYER** agrees to indemnify **BD** and to hold **BD** harmless from any claim related to the item of any equipment purchased.

This warranty shall not apply to any unit that has been improperly stored or installed, or to misapplication, improper operation conditions, accidents, neglect, or which has been improperly repaired or altered or otherwise mistreated by the **BUYER** or his agent. **BD** also assumes no liability regarding the improper installation or misapplication of its products. It is the installer's responsibility to check for proper installation and if in doubt, contact the manufacturer.

LIMITATION OF WARRANTY

BD Engine Brake Inc. (hereafter "**BD**") warrants to the **BUYER** that any parts purchased shall be free from defects in material workmanship. A defect is defined as a condition within the product that would render the product inoperable. **BD** gives Limited Warranty as to description, quality, merchantability, fitness for any product's purpose, productiveness, or any other matter of **BD's** product sold herewith. **BD** shall be in no way responsible for the product's open use and service and the **BUYER** hereby waives all rights other than those expressly written herein. This Warranty shall not be extended or varied except by a written instrument signed by **BD** and the **BUYER**.

The Warranty is Limited to one (1) year from the date of sale and labor costs incurred by the removal and replacement of the BD product, while performing warranty work, will be covered for 1 (one) year, payable at BD rates, at authorized centers and with prior approval. Until BD has approved the claim, the consumer may be responsible for these costs.

A Return Authorization (WA) number, obtained in advance from **BD**, must accompany all products returned for warranty consideration. All products must be returned, shipping prepaid, to **BD** and must be accompanied by a dated proof of purchase receipt. All Warranty claims are subject to approval by **BD** and repaired or replaced product will be returned to the customer freight collect. Accepted warranty units, which have been replaced, become the sole property of **BD**.

This warranty is in lieu of all other warranties or guaranties, either expressed or implied, and shall not extend to any consumer or to any person other than the original purchaser residing within the boundaries of the continental U.S. or Canada.

IN THE EVENT THAT THE BUYER DOES NOT AGREE WITH THIS AGREEMENT, THE BUYER MAY PROMPTLY RETURN THIS PRODUCT, IN A NEW AND UNUSED CONDITION, WITH A DATED PROOF OF PURCHASE, TO THE PLACE OF PURCHASE WITHIN THIRTY (30) DAYS FROM DATE OF PURCHASE FOR A FULL REFUND.