



BD X-MONITOR

2001-2006 GMC/Chevy 6.6L Duramax

Installation Manual

Date Purchased _____

Purchased from _____

Installed by _____

READ THIS MANUAL COMPLETELY BEFORE INSTALLING THIS PRODUCT.

OWNER'S MANUAL - LEAVE IN GLOVE BOX
 Installation Manual Part # I1086210
 Printed in Canada

BD Engine Brake Inc.
 Plant Address: Unit A10, 33733 King Rd, Abbotsford, BC, Canada V2S 7M9
 U.S. Shipping Address: 88-446 Harrison St, Sumas, WA 98295 U.S. Mailing Address: P.O. Box 231, Sumas, WA 98295
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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)



1830010

Sensor Wire Kit



1820210

Control Module



1806200

Display Kit (Side)



1300838

**LB7
Boost Kit**



1300835

**LLY-LBZ
Boost Kit**

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Welcome

Thank you for purchasing the BD X-Monitor. Your kit should have the items mentioned on the previous page 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. The X-Monitor mounts on the driver's side A-pillar panel, or, a custom dash-top universal kit can be purchased as well.

This X-Monitor comes with all the programming to measure exhaust temperature and boost pressure, plus, the option of adding one of the following: automatic transmission temperature (using the OEM sensor), remote temperature sender (for use with differentials for example), exhaust brake backpressure, and aftermarket fuel tank levels.

Here are the standard list measurements:

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

The above two measurements can be displayed by themselves or you can add one of these options along with them:

Description	Value	BD P/N#
Transmission Temperature	(TRANS)	INCLUDED
Remote Oil Temp	(OIL)	1080126
Exhaust Brake Back Pressure	(B-PSI)	1080136
Auxiliary Tank Level	(FUEL)	1080160 *

The standard kit comes with all the components and wiring to hook up the exhaust temperature, turbo boost pressure and automatic transmission temperature (using the trucks OEM sensor); all other applications will require one of the accessories above to install.

* The fuel tank level accessory kit interfaces with an aftermarket level sender with a range of 240ohms (Empty) to 33ohms (Full). Sender 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

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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.

Pyrometer Sending Unit (Thermocouple)

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 turbo charger down pipe.



If you have a TURBO-MOUNT EXHAUST BRAKE or an after market down pipe installed there may be a 1/4" NPT plug already in the system. Remove this plug and install thermocouple into the 1/4" NPT hole and tighten with an open-end wrench.

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 1/4 pipe tap hole and tighten with an open-end wrench.

For advanced users, the thermocouple can be directly installed into the manifold before the turbo. This is a more difficult installation and should only be attempted by an experienced mechanic. When drilling and tapping the 1/4" hole, be sure not to drill into any webbing or critical areas of the exhaust manifold. When monitoring the exhaust temperature before the turbo the critical temperature is ~1250-1300°F.

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Thermocouple Wiring

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

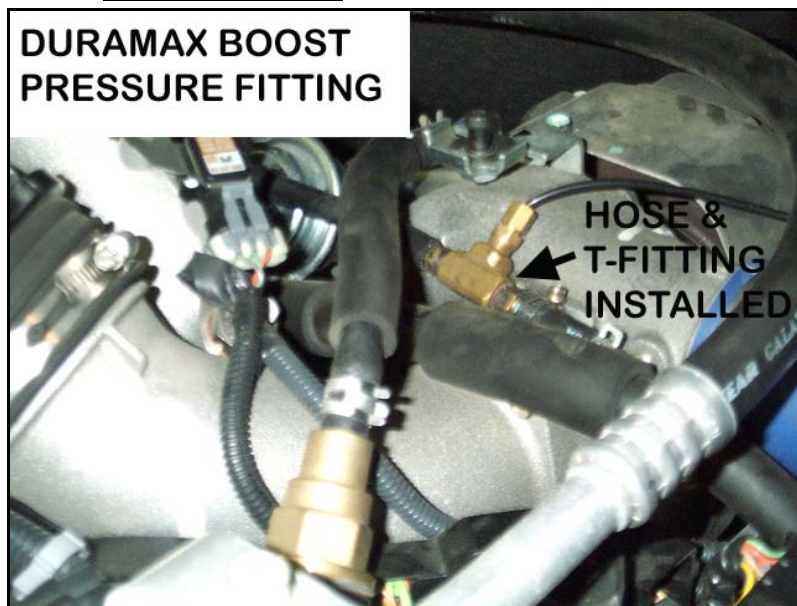
Do NOT cut or splice the thermocouple lead wire as it is special wire that provides correct reading to the gauge. Simply coil any excess wire out of the way.

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

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

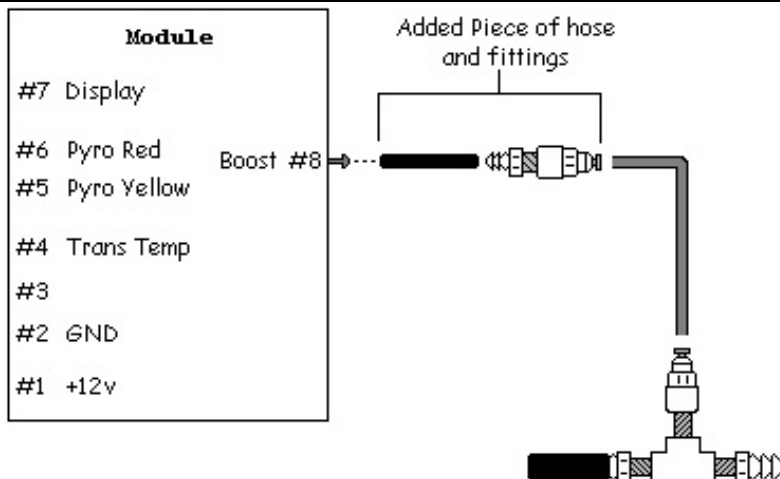
Boost Pressure Sender Installation

LB7 Motor



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 photos.



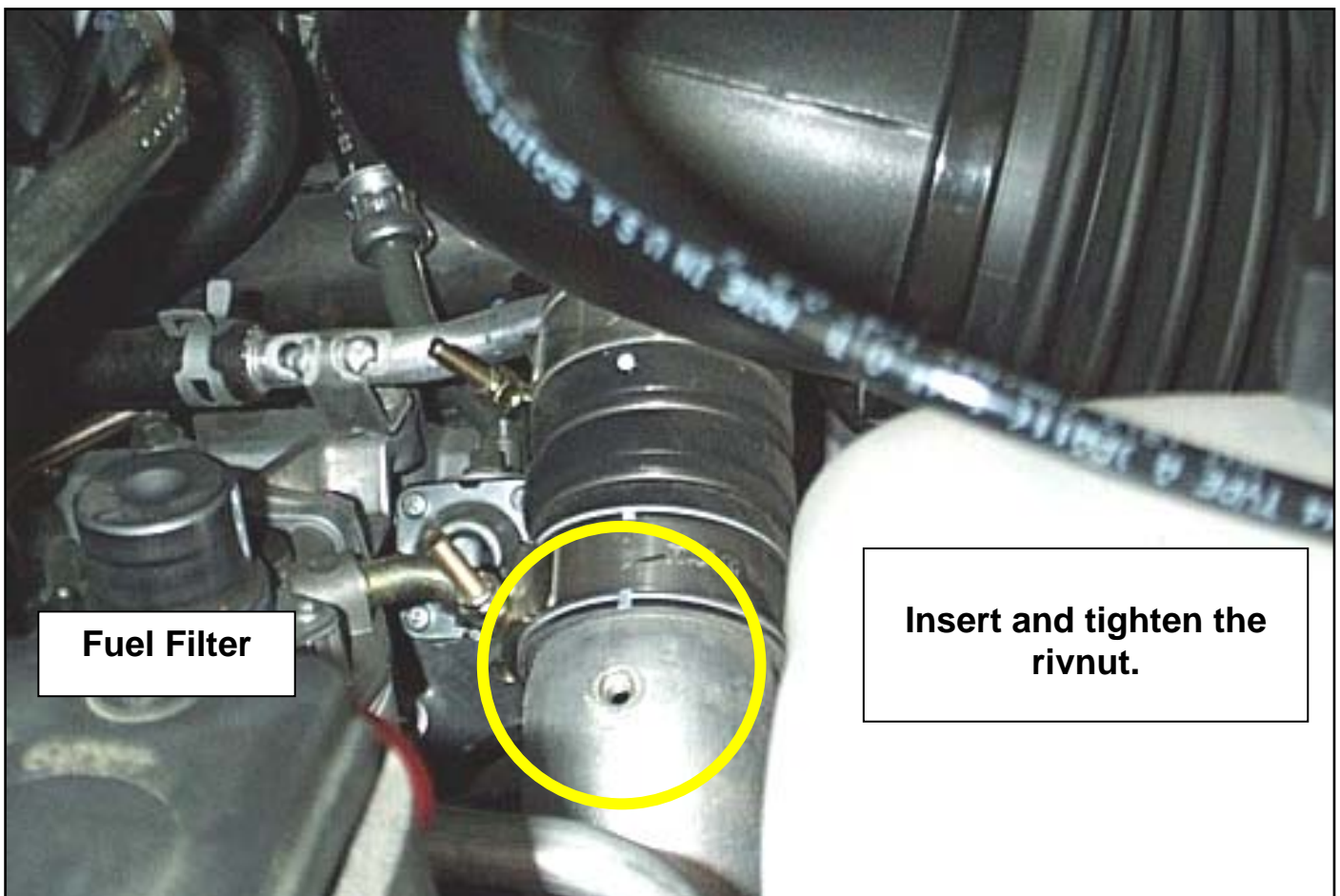
Connect the supplied tubing to the fitting and route to the inside the cab. Push this end into the supplied fitting (see diagram above) and connect the short section of rubber hose (with the female quick-connect fitting) to the pressure sensor on the back of control box.

WARNING: BE SURE TO USE THE RUBBER HOSE AND NOT THE PLASTIC TUBING WHEN MAKING THE CONNECTION TO THE CONTROL BOX.

NOTE: The module should be mounted with the boost fitting pointed down to avoid condensation from collecting inside the module.

LLY & LBZ motor

Using a 7/16 deep socket, remove the 'T' clamps at either end of the intercooler tube on the passenger side of the engine. Once this pipe is removed, drill a 3/8" hole on the top of the pipe closest to the turbo. Use a file or de-burring wheel to clean to hole. Coat the nutsert or rivnut with a moderate temperature silicon or gasket maker. Insert the coated nutsert or rivnut into the 3/8" hole in the pipe. Insert the Allen head screw through the install nut with the serrated end facing towards the nutsert or rivnut. Use a wrench to hold the nut in place while tightening the Allen screw with the provided Allen key. Continue to tighten the Allen key until the force needed to turn it drastically increases. Reinstall the tube into place on the truck, making sure the all the intercooler boots are clean of oil and the clamps are tight.



Install the 90° quick connect swivel fitting into the small brass adapter and tighten it before installing the assembly into the nutsert. When installing the adapter assembly into the nutsert use a small amount of silicone sealer/gasket maker around the base of the brass adapter being careful not to obstruct the hole in the end. When tightening the assembly into the nutsert, do not over torque or breakage will result!

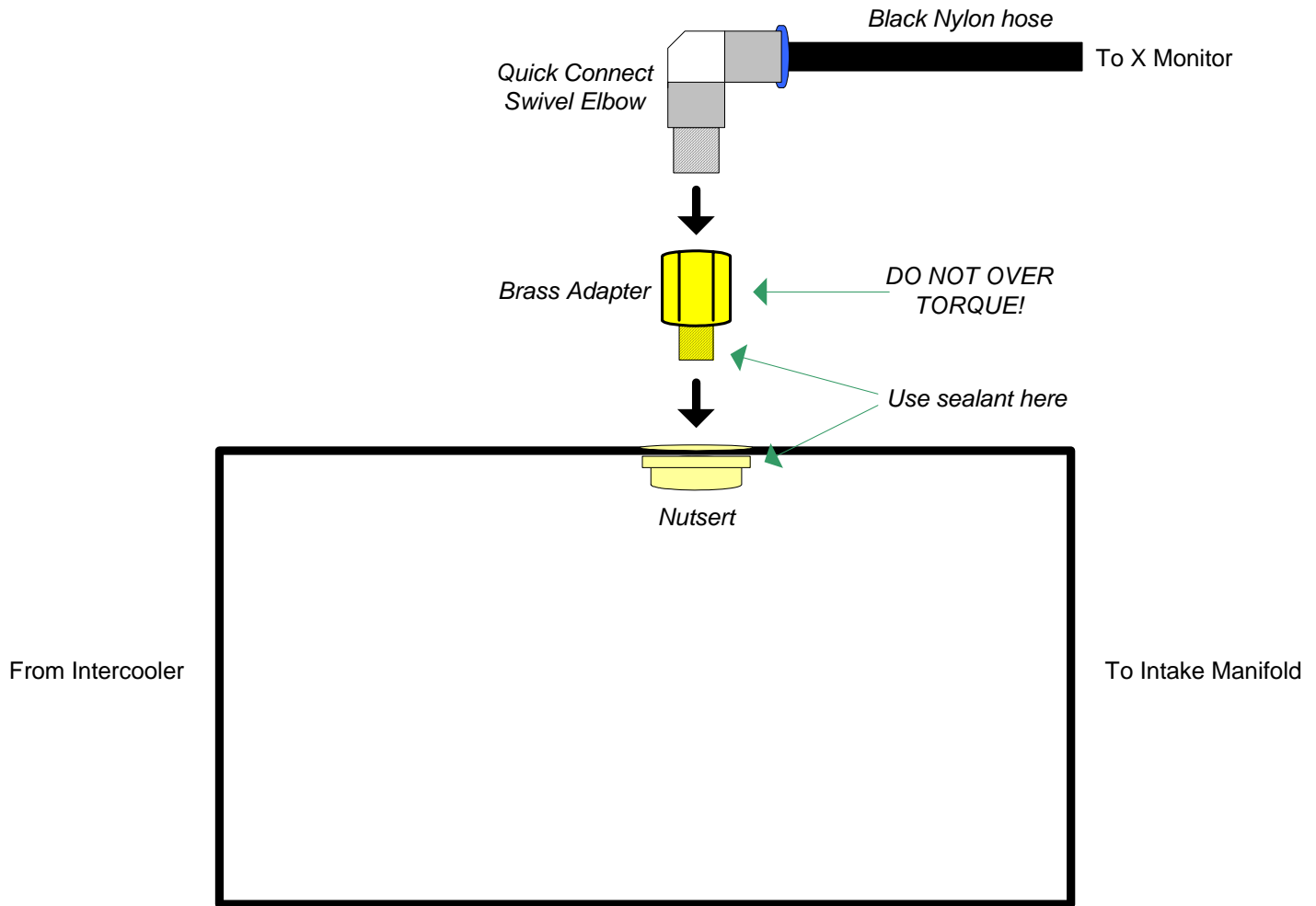
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You can now route the nylon tubing from the quick connect nutsert assembly to the boost input on the X-monitor.

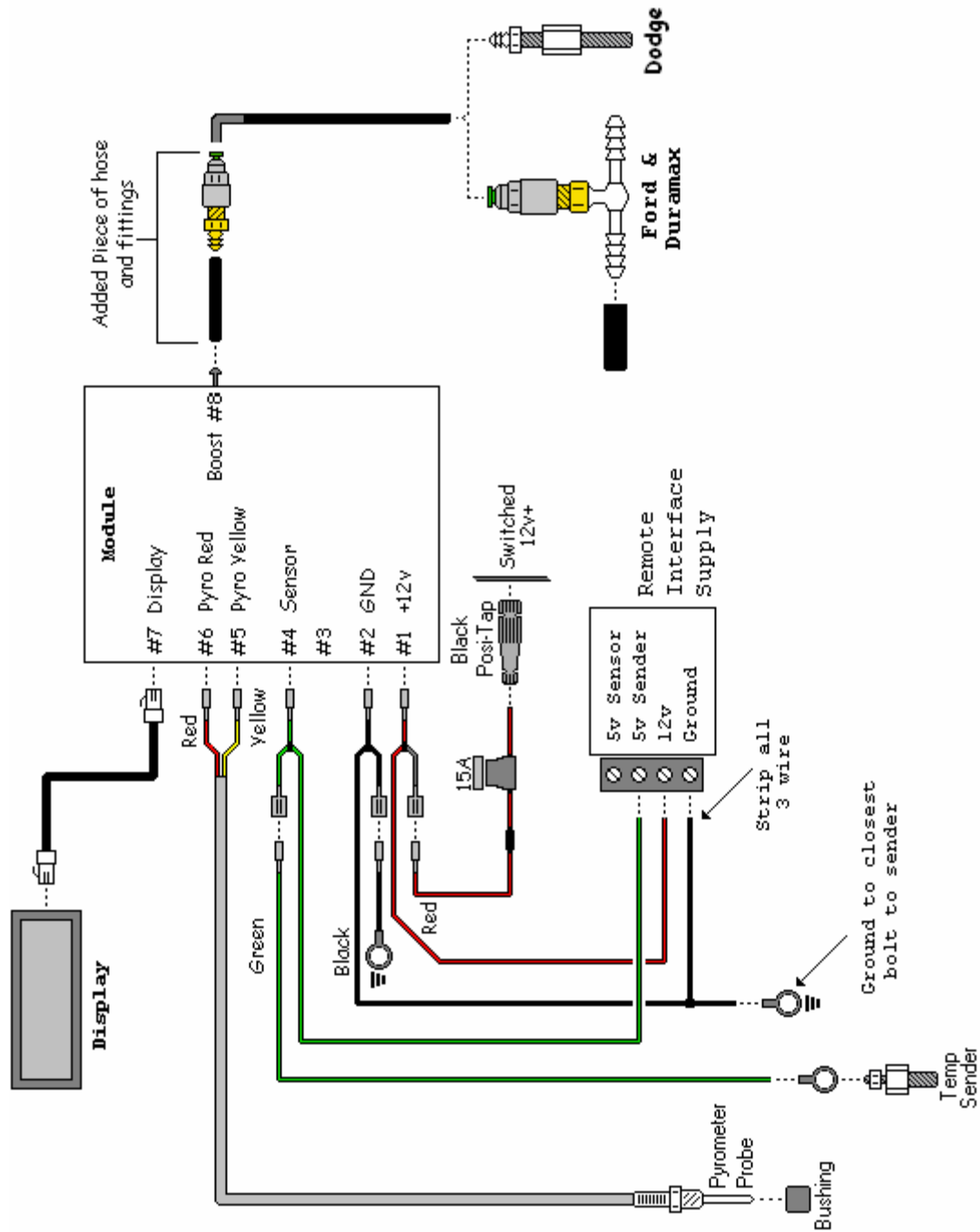


Manual Transmission / Diff Temperature Sensor

Using parts supplied in X-Monitor kit, insert the Temperature Sender into the large bushing. This will replace the rear differential housing fill plug on the back cover. For manual transmission temperature, locate the appropriate location for sender to fit.

NOTE: Not all locations will accommodate the size of the sender or the bushings supplied in the kit. An alternative location may need to be found, or a sender or bushing may have to be purchased to be installed in the desired location.

Wiring Diagram - w/Remote Temp Sensor



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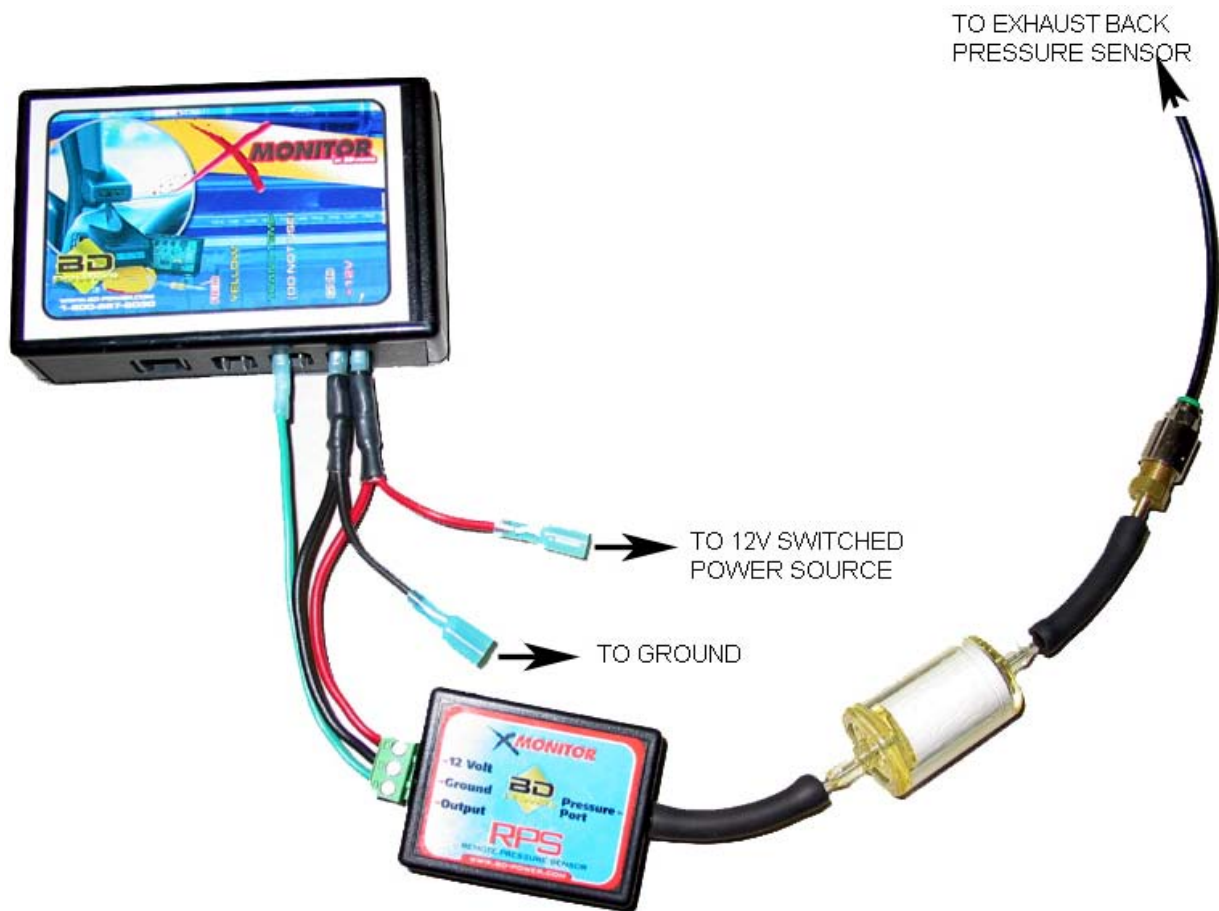
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Exhaust Brake Pressure Sensor

Install the supplied stainless steel line and fitting into the test port of the exhaust brake. Secure the line and attach the plastic hose.

Route the hose up along the vehicle frame and into the cab then attach the hose to the interface filter and connect the wires as per the "Back Pressure" diagram that will follow after this section.

Use the following diagram/photo as a guide. Install the filter and tubing together and insert onto the inlet of the RPS Module.



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 moisture trapped in the actual filter. The replacement filter part number is **1800135**. This filter should be mounted in an easy to access, visible 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.

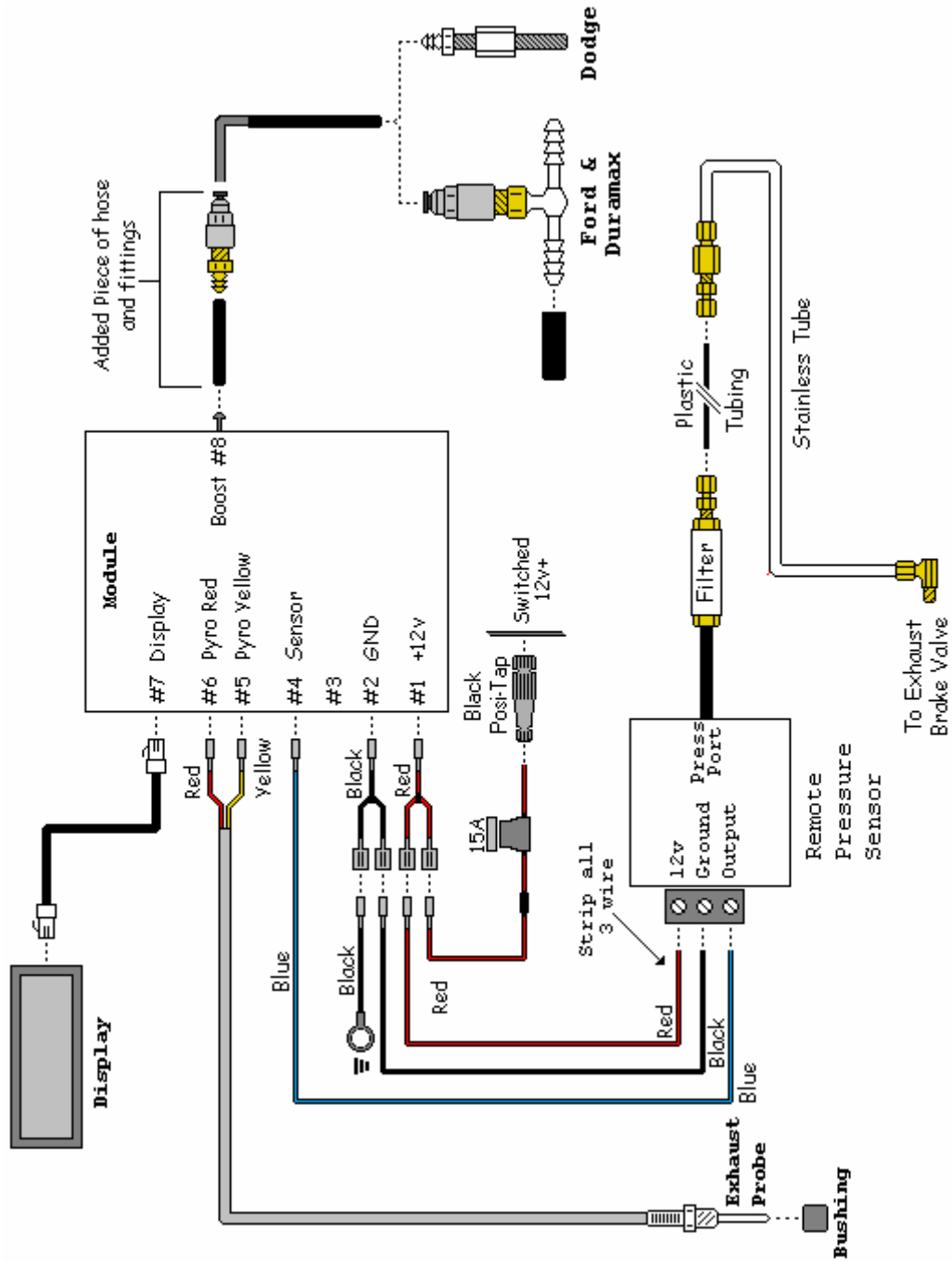
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Wiring Diagram - Back Pressure



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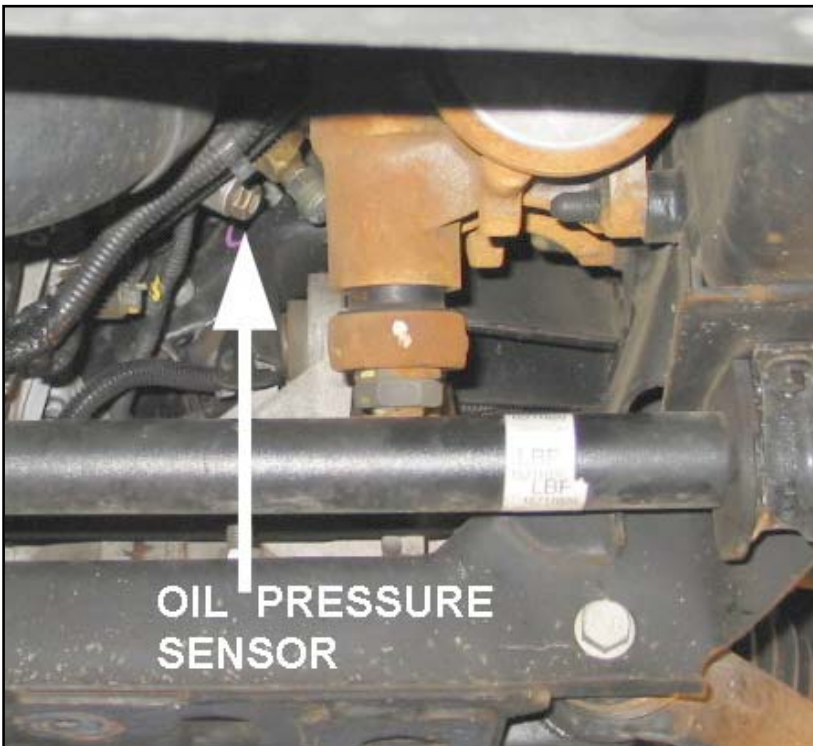
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Engine Oil Pressure Sensor

2001-02 Duramax



Remove the front skid plate from the bottom of engine and locate the oil pressure-sending unit on left side of engine block by the steering box.

This sensor has only one (1) wire attached.

Install a gray Posi-Tap onto the **tan w/white tracer** wire of the sensor then insert one end of the green wire from the oil pressure sensor kit to the gray Posi-Tap and run the wire up into the cab.

Attach the other end of green wire to the 'DO NOT USE' terminal on the control box. That's right, this wire goes to the 'DO NOT USE' terminal (this should have been labeled 'Future Expansion').

Secure the green wire in place away from any moving and/or hot parts and install the skid plate that was removed in the first step. Tighten all fastening bolts. See page 13 for the wiring diagram.

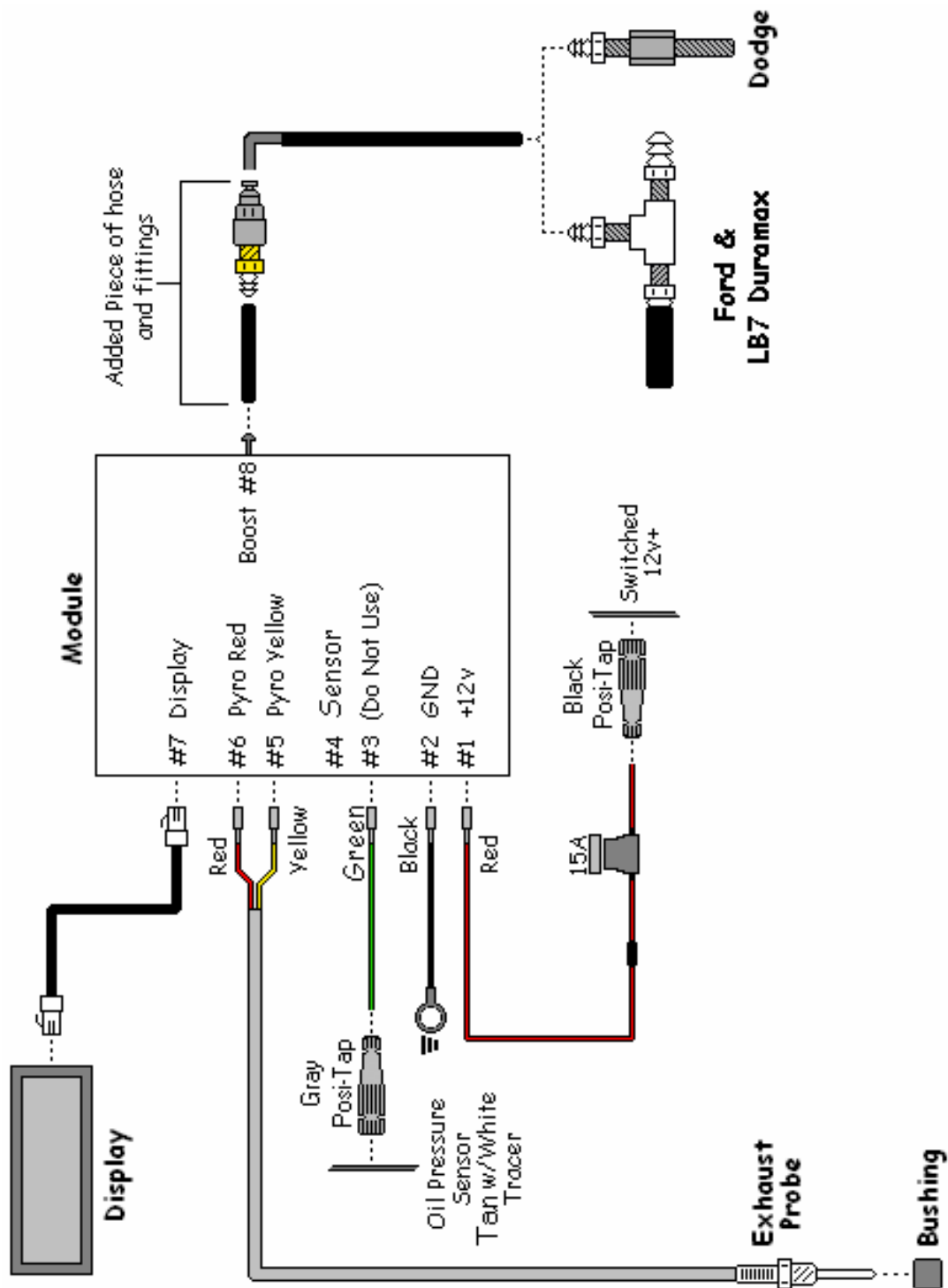
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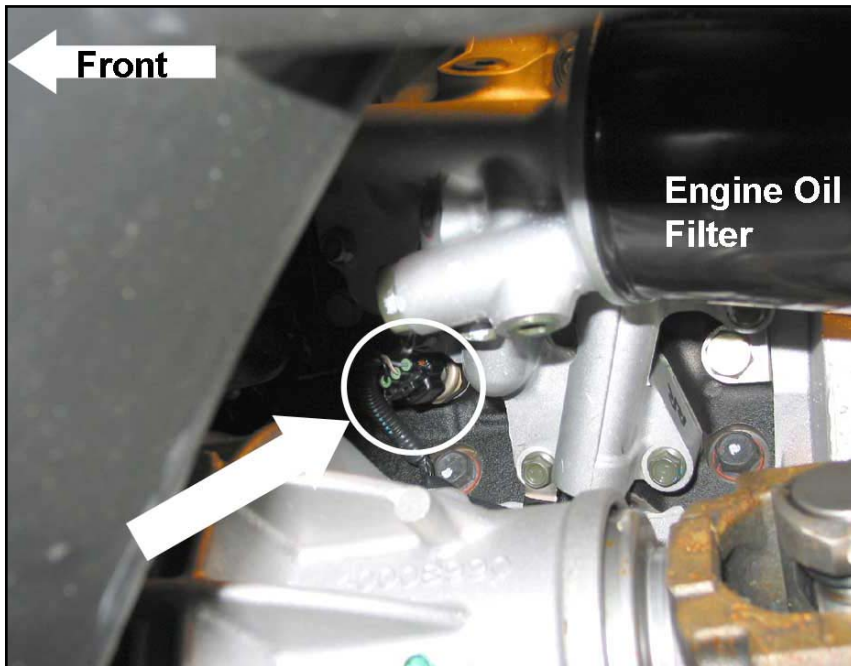
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2001-02 Duramax Oil Pressure Wiring Diagram



NOTE: THE GREEN WIRE FROM THE OIL PRESSURE SENSOR IS ATTACHED TO THE 'DO NOT USE' TERMINAL OF THE CONTROL BOX NOT 'SENSOR'.

2003+ Duramax

The engine oil pressure sensor is located just in front of the engine oil filter and housing. This sensor has 3 wires attached.

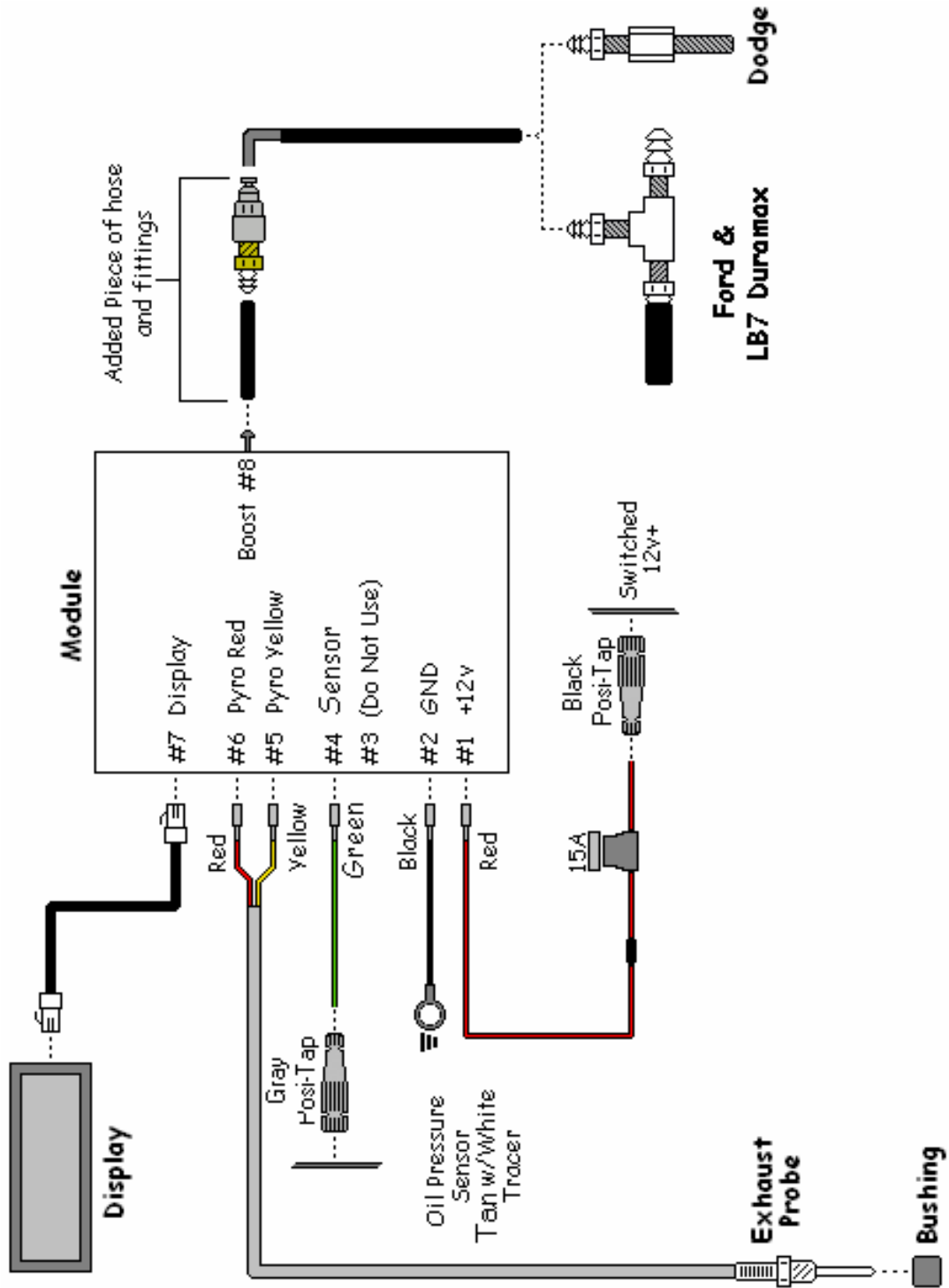
Install a gray Posi-Tap onto the **tan w/white tracer** wire of the sensor harness then insert one end of the green wire from the oil pressure kit to the gray Posi-Tap and then run the wire up into the cab.

Attach the other end of the green wire to the #4 'Sensor' terminal on the control box.

terminal on the control box.

Secure the green wire in place away from any moving and/or hot parts and install the skid plate that was removed in the first step. Tighten all fastening bolts. See page 15 for the wiring diagram for reference.

2003+ Duramax Oil Pressure Wiring Diagram



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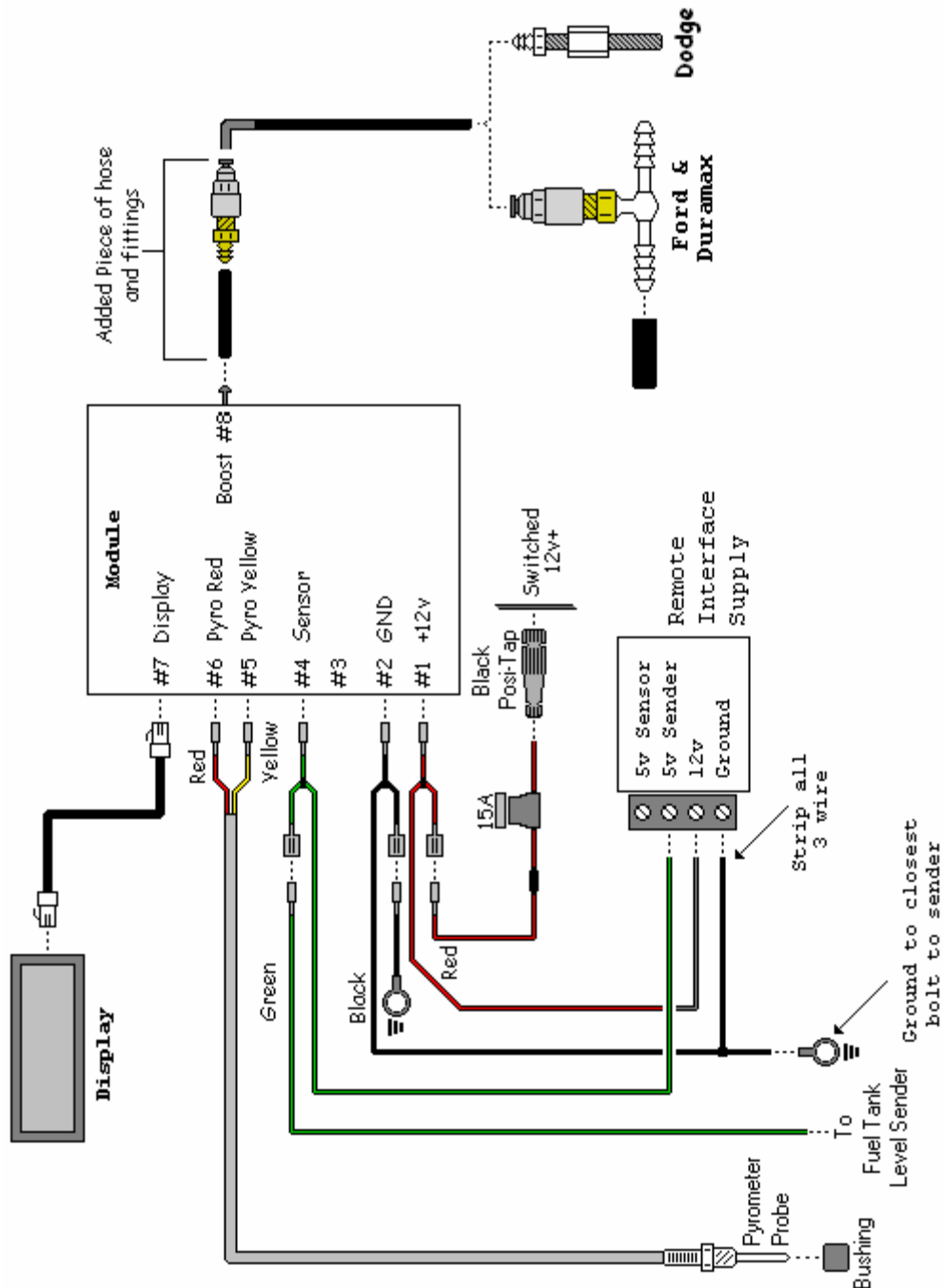
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Auxiliary Fuel Tank Level

This wiring for the auxiliary fuel tank level is virtually similar to the remote temperature installation. Consult the literature for the sender for the correct terminal or wire for the output.

Auxiliary Fuel Tank Level Wiring Diagram



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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 WHEN REINSTALLING. DO NOT OVERTIGHTEN MOUNTING SCREWS OR DISPLAY WILL BE DAMAGED AND WARRANTY WILL BE VOIDED. ***

Place the display assembly on the A-pillar to determine the best mounting location and mark this location on the pillar. Remove the A-pillar for ease of installation.

Hold the display assembly in place on the A-pillar. Drill 3/16" holes into the corners of the display assembly mount and also through the pillar.

Drill a hole through the A-pillar large enough for the display control wiring connector to pass through. This hole is NOT required if you decide to run wiring along the outside of the A-pillar.

Install the telephone-type communication cable into the back of the display circuit board and route the wiring through the drilled hole or along the outside of the pillar as preferred.

Insert the supplied ratchet fasteners through the drilled holes and into the A-pillar, securing the X-Monitor display assembly to the A-pillar. Install the A-pillar into place and route the control wiring down to the control box.

Insert the other end of the communications cable into the socket of the control box. Once all connections are made, secure the box in place under the dash and away from moving parts.

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Programming and Set Up

Press both buttons in on the X-Monitor display and turn on the ignition. You will get a screen that the first line on the display will read "SIDE OR TOP BTN?" and the bottom line reads "SIDE". Let go of both buttons. Press the bottom 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 bottom button to activate that program. The display will now cycle through the normal start-up screens that will appear every time the ignition is started.



It 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.									

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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 side of the display, the bottom (MENU) button cycles through the different modes and the upper (MODIFY) button controls the setting of the values.

RECOMMENDED ALARM SETTINGS:	
PYRO *	900°F *
TURBO	25
TRANS	200
OIL	Dependant On Location of Sender
B-PSI	User Defined – Consult Exhaust Brake Manual for safe ranges
F-PSI	3
FUEL	25
* <i>This value based on a pyrometer probe mounted post-turbo.</i>	

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 reading.

The alarm settings for fuel pressure (F-PSI), oil pressure (O-PSI) and fuel level (FUEL) are for will display an alarm with the measurement drops below the set value; all other measurements will alarm when the value is above the setting. 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.

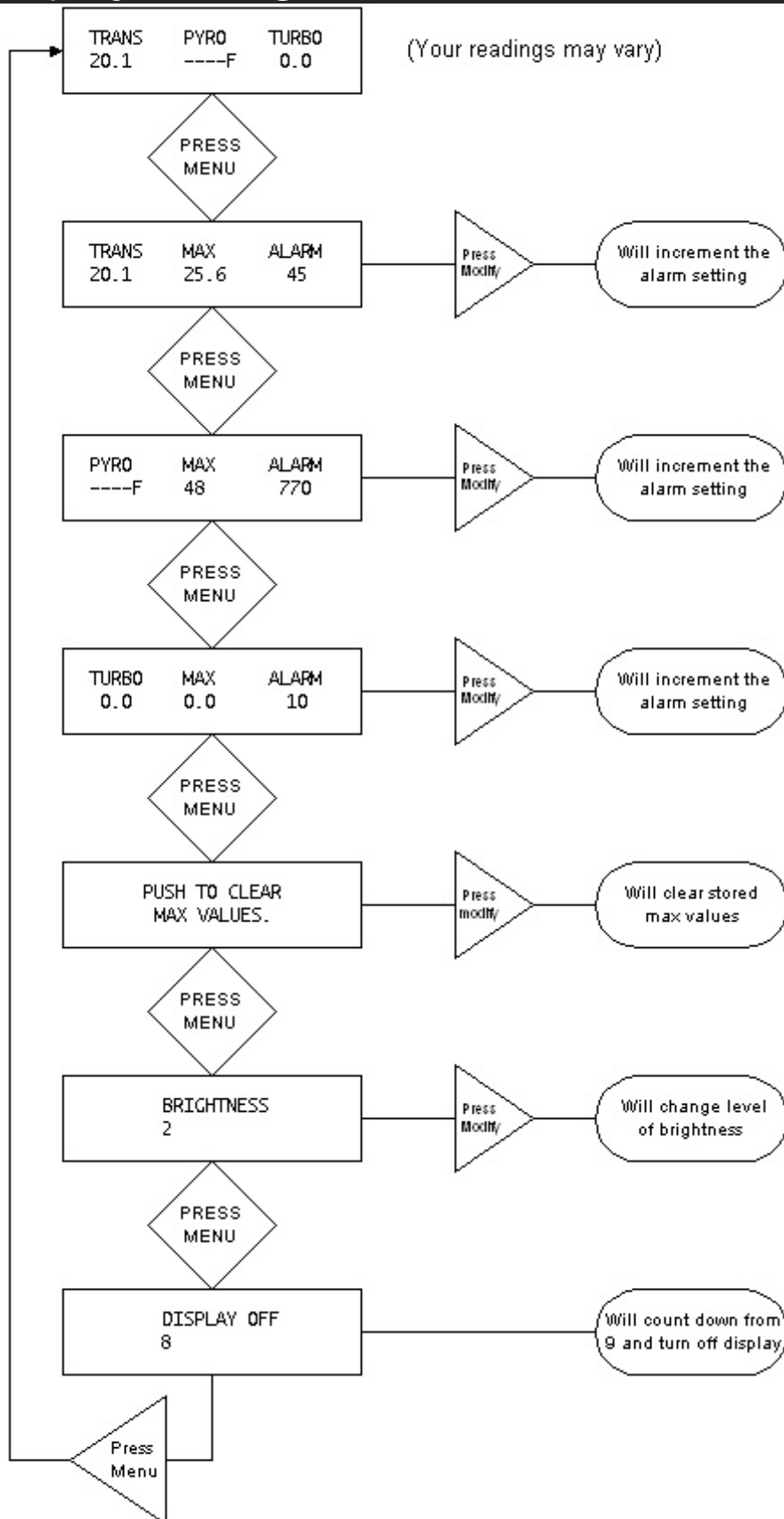
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X-Monitor Display Settings Flowchart



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.

The X-Monitor is calibrated to the thermocouple that is supplied with the kit and may 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.

DO NOT RUN ENGINE AT HIGHER THAN 900 DEG INDICATED FOR EXTENDED PERIODS OR ENGINE DAMAGE MAY RESULT. DO NOT run transmission at higher than 250 degrees indicated 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.

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 downward 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 thermocouple wire 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.

BD Engine Brake Inc.

Plant Address: Unit A10, 33733 King Rd, Abbotsford, BC, Canada V2S 7M9

U.S. Shipping Address: 88-446 Harrison St, Sumas, WA 98295 U.S. Mailing Address: P.O. Box 231, Sumas, WA 98295

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