



2003-05 GMC Duramax
C4500/5500

BD Remote Mount Air Exhaust Brake

Part Number	Application
1023310	GMC C4500/5500 Brake (without Air Compressor)
1023311	GMC C4500/5500 Brake (with BD Air Compressor)

Serial # _____

Date Purchased _____

Purchased from _____

Installed by _____

OWNER'S MANUAL – LEAVE IN GLOVE BOX
 Installation Manual Part # I1023310

TABLE OF CONTENTS

Welcome.....3

Kit Contents3

Exhaust Brake Valve Installation.....4

Air Compressor Installation (If applicable)5

Air Regulator Installation.....6

Air Solenoid Valve Installation6

Vehicle Wiring.....7

 LB7 Engine7

 LLY Engine10

In Cab Installation12

Overview with BD Air Compressor13

Overview with without new Air Compressor14

LLY Exhaust Brake Switch Addendum.....15

Maintenance & Trouble Shooting.....16

Operating Guidelines16

Exhaust Back Pressure Testing Air Actuated Brakes18

Welcome

Thank you for purchasing a BD Engine Exhaust Brake. Your kit should have the items mentioned below for your installation; please check to make sure that you have everything. This manual is to aid you with the installation and operation of your braking unit. We strongly suggest that you fill out the installation information and retain this manual for any future reference.

Kit Contents

1023310 – GMC C4500/5500 Brake (w/o new Air Compressor)

1	1127038	Exhaust Brake valve
2	1100300	Adapter Pipe
2	1100404	Marmon Clamp
1	1100730	3" Exhaust Seal Clamp
1	1220010	Control Kit
1	1220100	Air snorkel kit (w/ tubing)
1	1220046	Regulator Kit
1	1220048-C	Solenoid Assy.

1023311 – GMC C4500/5500 Brake (w/ BD Compressor)

1	1127038	Exhaust Brake valve
2	1100300	Adapter Pipe
2	1100404	Marmon Clamp
1	1100730	3" Exhaust Seal Clamp
1	1220010	Control Kit
1	1220113	Air snorkel kit (w/ tubing)
1	1220048-C	Solenoid Assy.
1	1030116	BD Air Compressor kit (w/ regulator)

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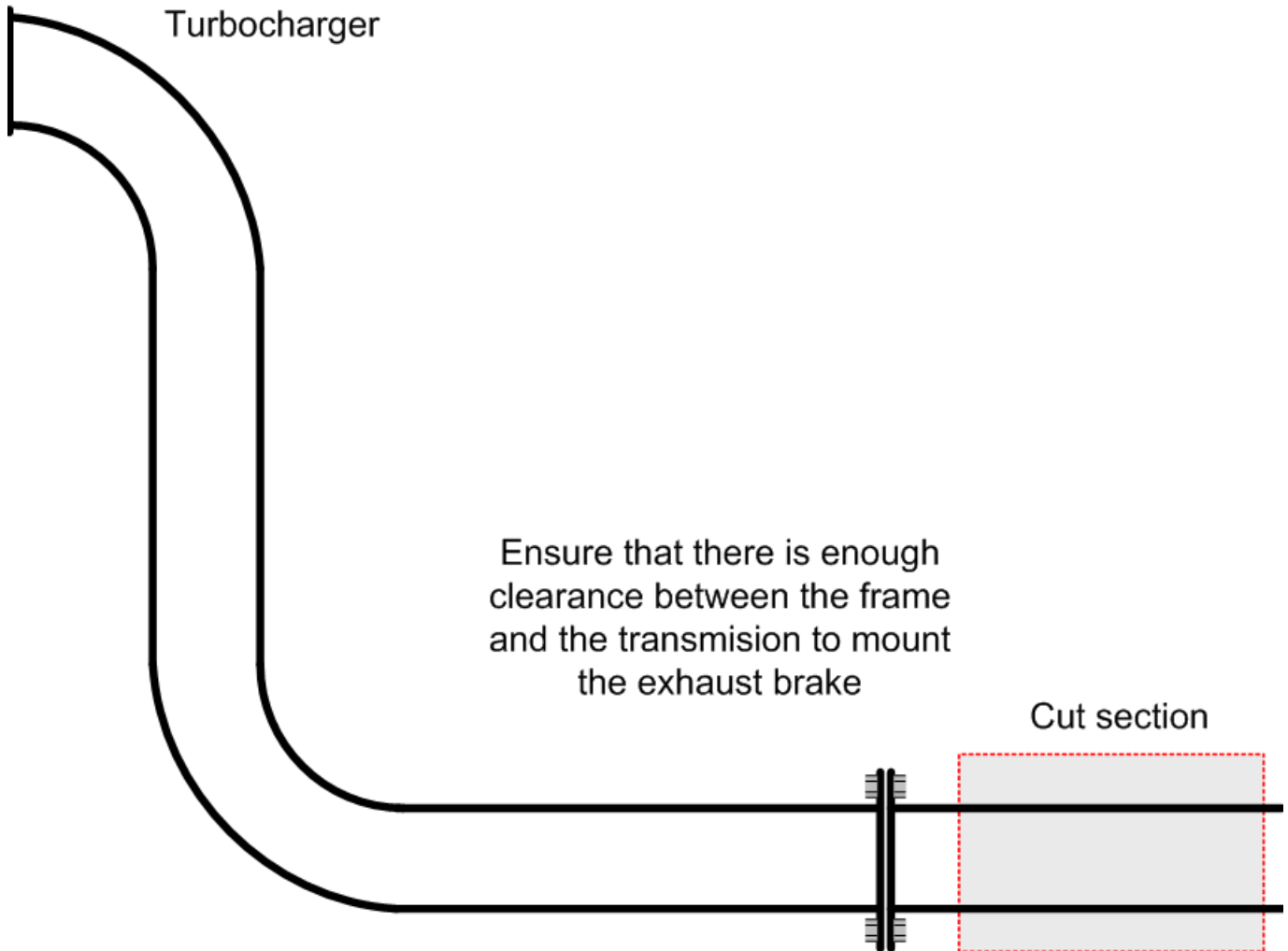
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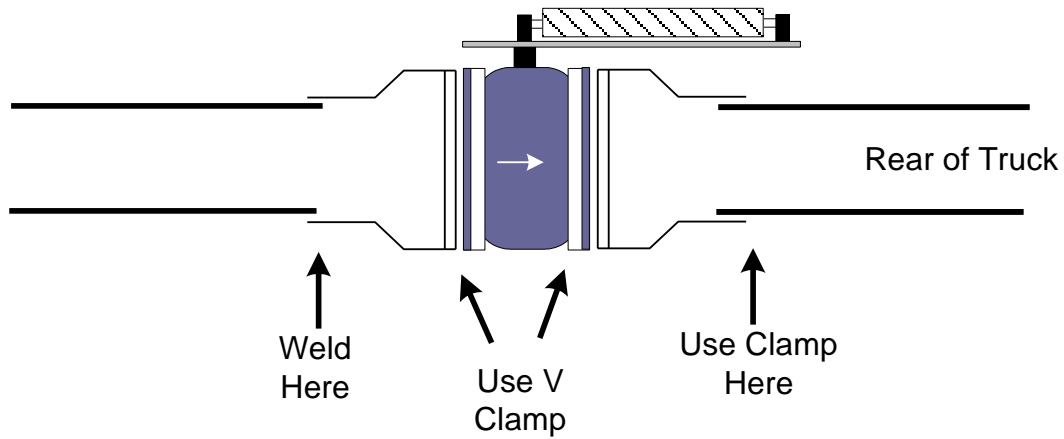
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Exhaust Brake Valve Installation

Locate the turbo down pipe from underneath the vehicle. You will need to locate a 7 1/4" section of pipe to mount the exhaust brake assembly. Be sure to check clearances between the brake and the transmission and frame rail. Mark the desired cut section and remove the pipe for welding. The exhaust adapter closest to the turbo will need to be welded. The rear adapter can be secured using the stainless steel band clamp. Ensure that the brake is installed in the right flow direction - there is an arrow molded into the casting on the valve assembly indicating the correct exhaust flow path.

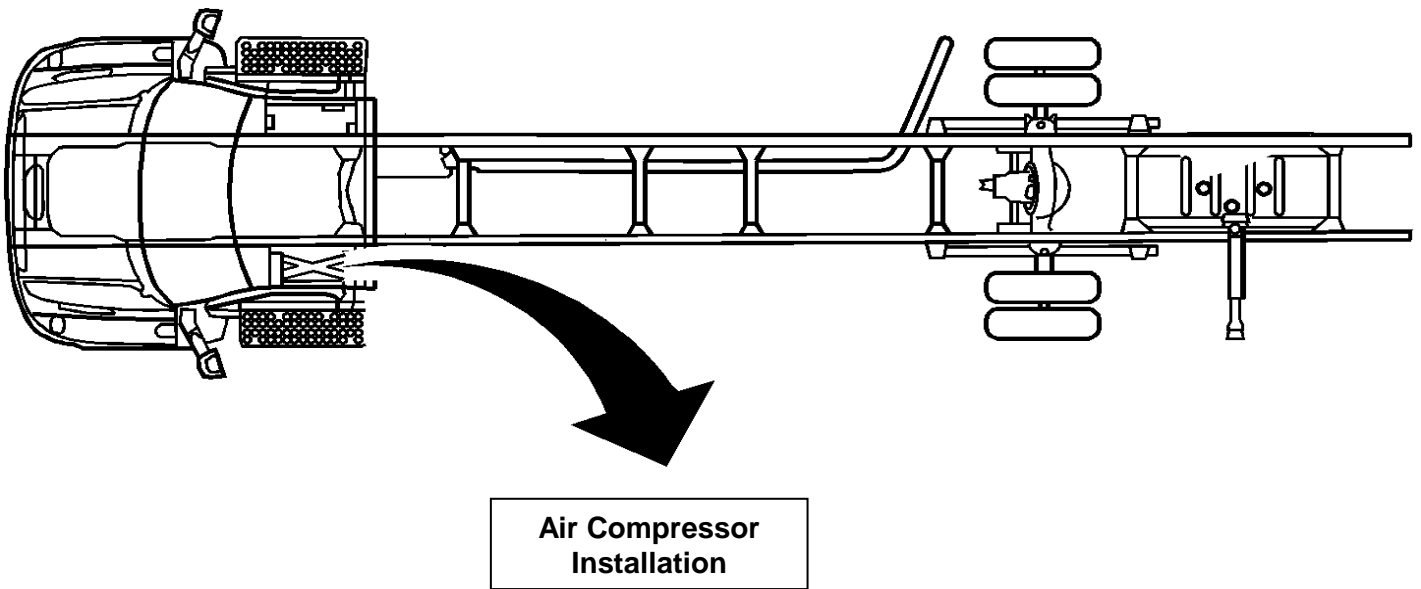




Air Compressor Installation (If applicable)

If your vehicle has a factory mounted air compressor, please move to the next installation section.

If you are installing the BD air compressor with this kit you will need to mount the air compressor underneath the cab on the drivers side. Select a position that will prevent any road debris or water from contacting the unit. Use the supplied mounting hardware to secure the air compressor unit assembly to the frame rail underneath the driver's cab. You will also need to connect the power and ground for the wiring harness to the battery located on the passenger side or to the power point and ground underneath of the hood.



Air Regulator Installation

If you installed the BD Air Compressor kit already you can skip this step.

For vehicles equipped with a factory installed air compressor, you will need to “tee” into the air tank supply line and route this into the air regulator ‘IN’ port.

Install the air regulator assembly in a clean environment close to the factory air tank. Make sure that the installation location is still easily accessible as you will have to adjust the regulator at a later time.

You will need to run the nylon tubing from the air tank ‘tee’ into the regulator IN port (>). You can use the supplied quick connect fittings to accomplish this.

Air Solenoid Valve Installation

Mount the air solenoid on the inside of the frame rail just across from the exhaust brake. Clean a section of the frame for the installation of the ground point. Use the supplied hardware to bolt the solenoid to an existing hole in the frame rail.

Route the supplied nylon tubing from the “IN” port of the solenoid valve to previously installed air regulator “OUT” (>) port. The “CYL” or “OUT” port on the valve should go to the quick connector located on the exhaust brake valve cylinder you installed earlier.

The air solenoid installation kit also includes a small wiring harness which contains a noise suppression diode. This should be installed to the electrical connectors on the solenoid valve.

Vehicle Wiring

You will need to remove both passenger side fender shields.

LB7 Engine

Locate the vehicles ECM and remove the second (or lower) ECM connector. Connect the supplied ECM pin connector to the supplied 18 awg grey wire. You will need to insert the pin connector into **port #7** of the ECM connector. You may need to poke a hole through the weather seal to ease the installation of the pin. Once the pin is inserted you may now reconnect the lower ECM connector.

There are two pins included in the application kit – one for an LB7 computer and one for an LLY computer – The LB7 motor uses the longer pin terminal. There will be a plastic pin in the location that you will need to remove before installing the ECM pin. The pin and wire assembly that you just inserted should travel to **connector 86** of the relay assembly.



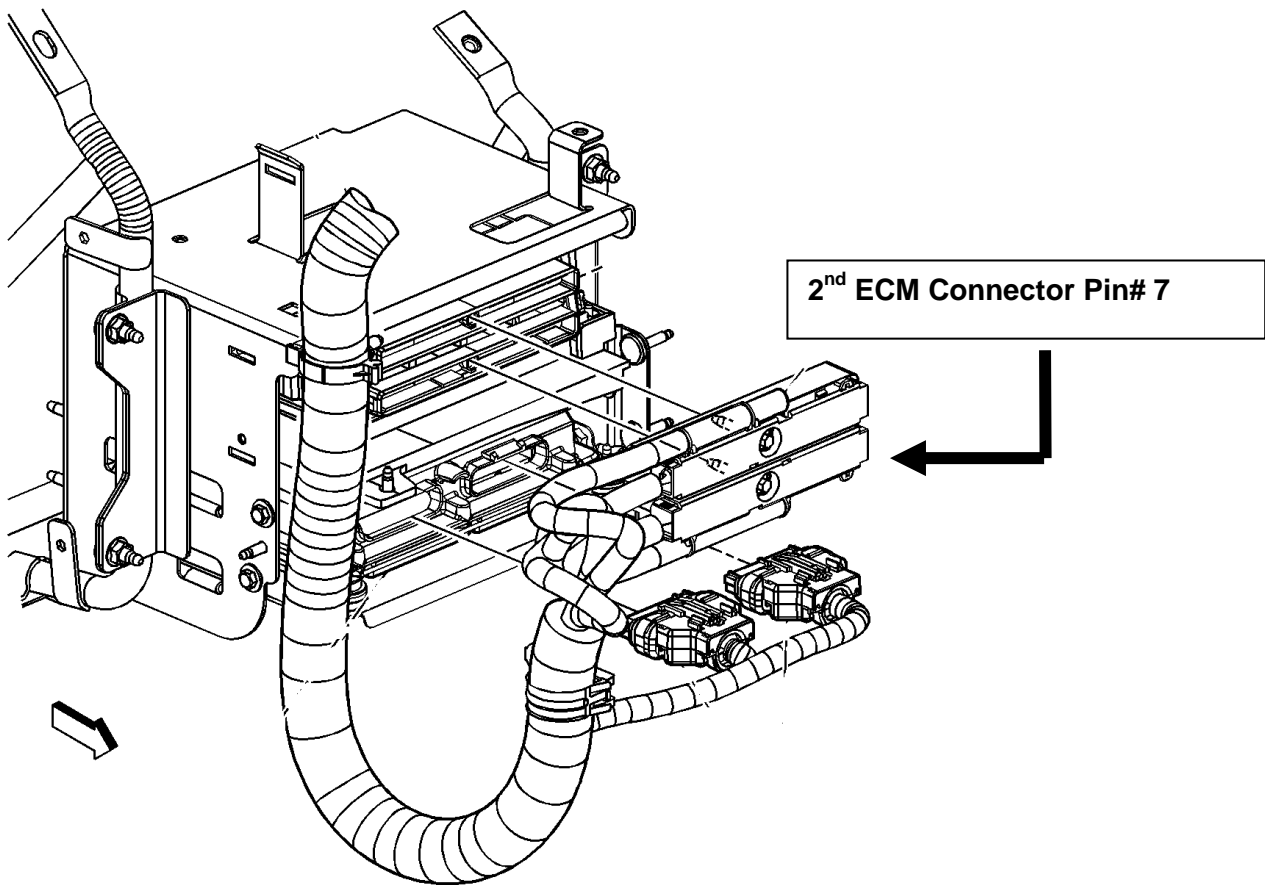
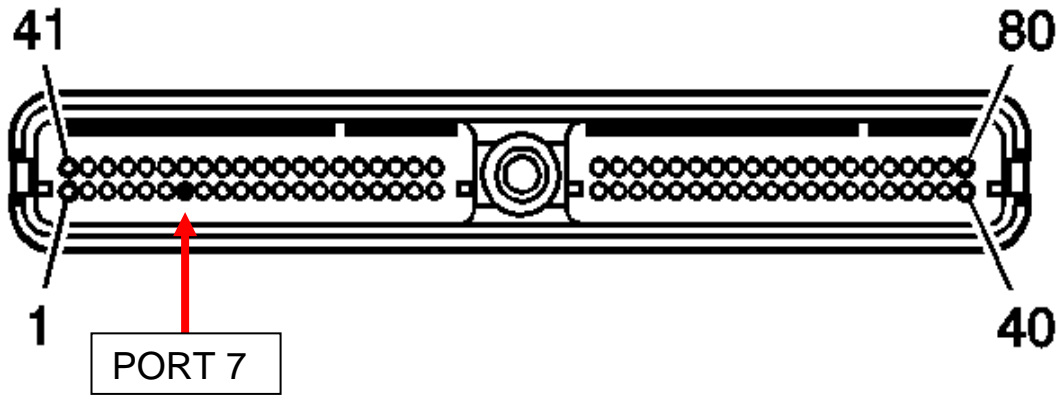
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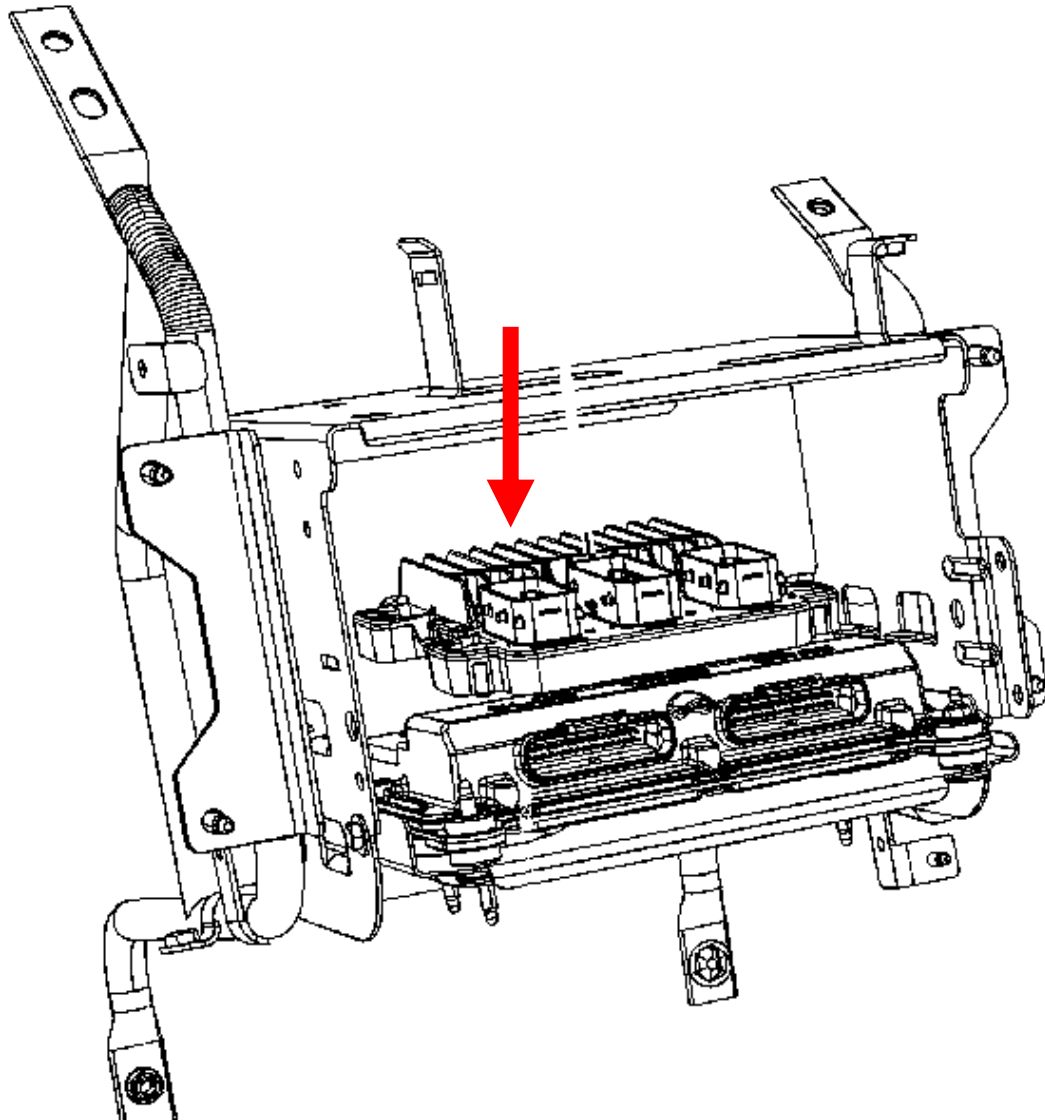
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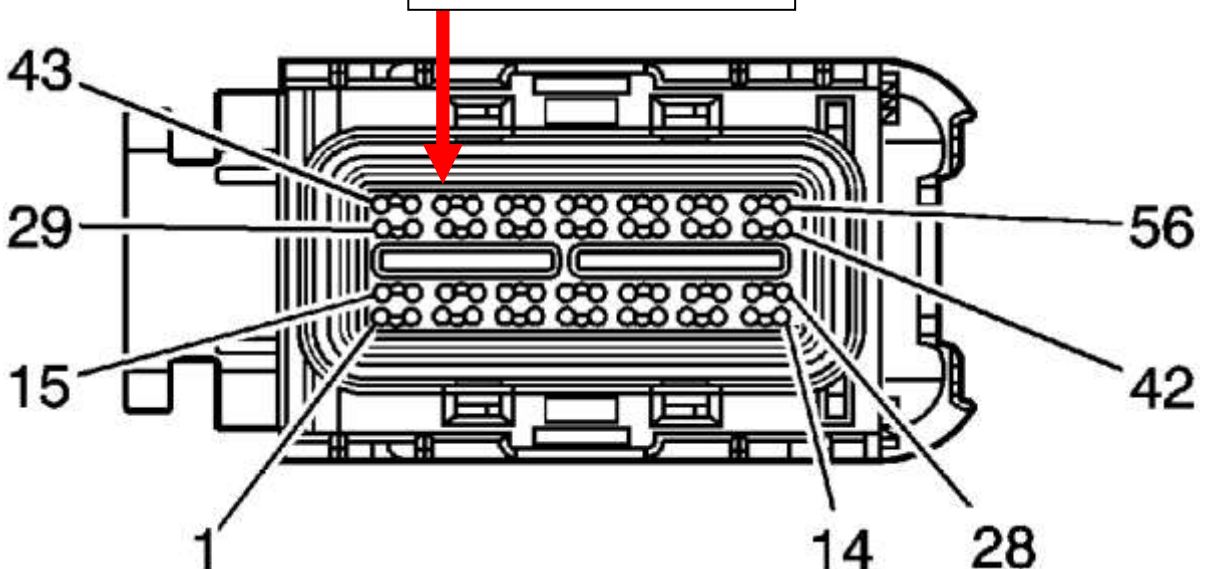
2003 LB7 Engines



2004 LLY Engines



Connector #1 Pin 45



LLY Engine

Locate the vehicles ECM, remove the first ECM connector. Connect the supplied ECM pin connector to the supplied 18 awg grey wire. You will need to insert the short pin connector into port #45 of the ECM connector. You may need to poke a hole through the weather seal to ease the installation of the pin. Note: on some applications you may need to remove the connector's lock pin before poking the hole. Once the pin is inserted you may now reconnect the lower ECM connector.



There maybe a plastic blank pin in the location that you will need to remove before installing the ECM pin.

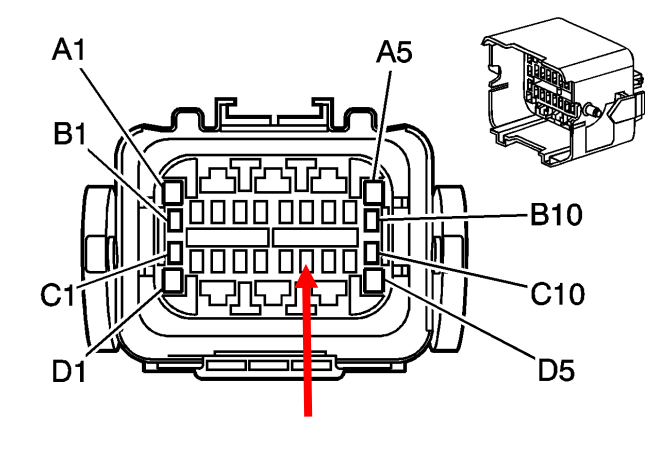
On some LLY models you will find a PURPLE wire in place in pin location 45. You will need to cut this wire and connect the supplied relay harness's grey wire to the ECM's purple wire. The other side of the wire should be left floating.

The pin and wire assembly that you just inserted should travel to connector 86 of the relay assembly.

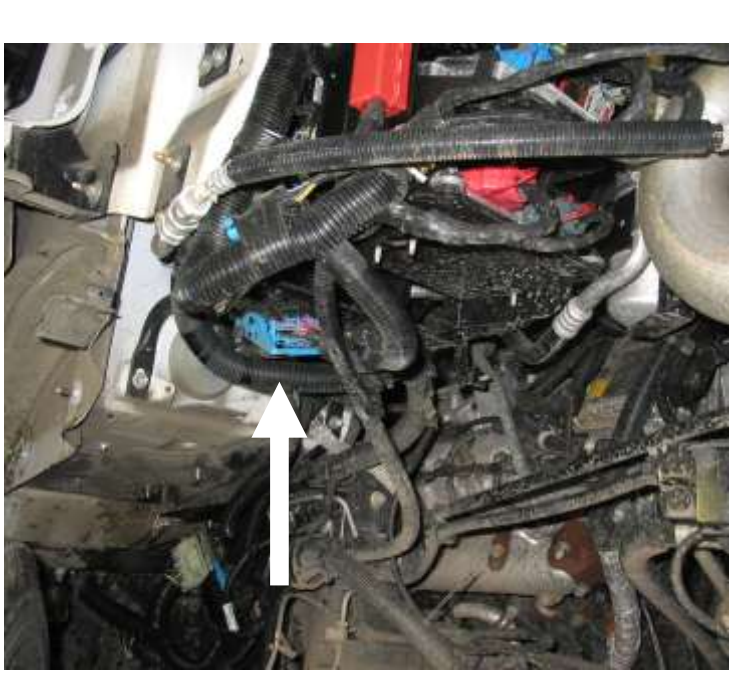
Next install the supplied relay harness to side of the ECM support bracket. Use the supplied sheet metal screw to fasten it the support structure.

Connect the fused red wire lead to 12V battery red quick access point. This wire should travel to pin 30 of the relay assembly.

Just below the ECM and TCM you will need to locate the outer 30 pin weather pack connector (C101). This connector will have the locking blue latch on it. You can separate the two connectors for easy access. At pin C7 you should find a black with white wire (or tan/white), cut this wire and attach the supplied BD wiring harness using the butt connector to the wiring harness end, not the connector end.



Pin	Color
C5	PURPLE
C6	YELLOW
C7	BLACK/White Tracer
C8	GREEN



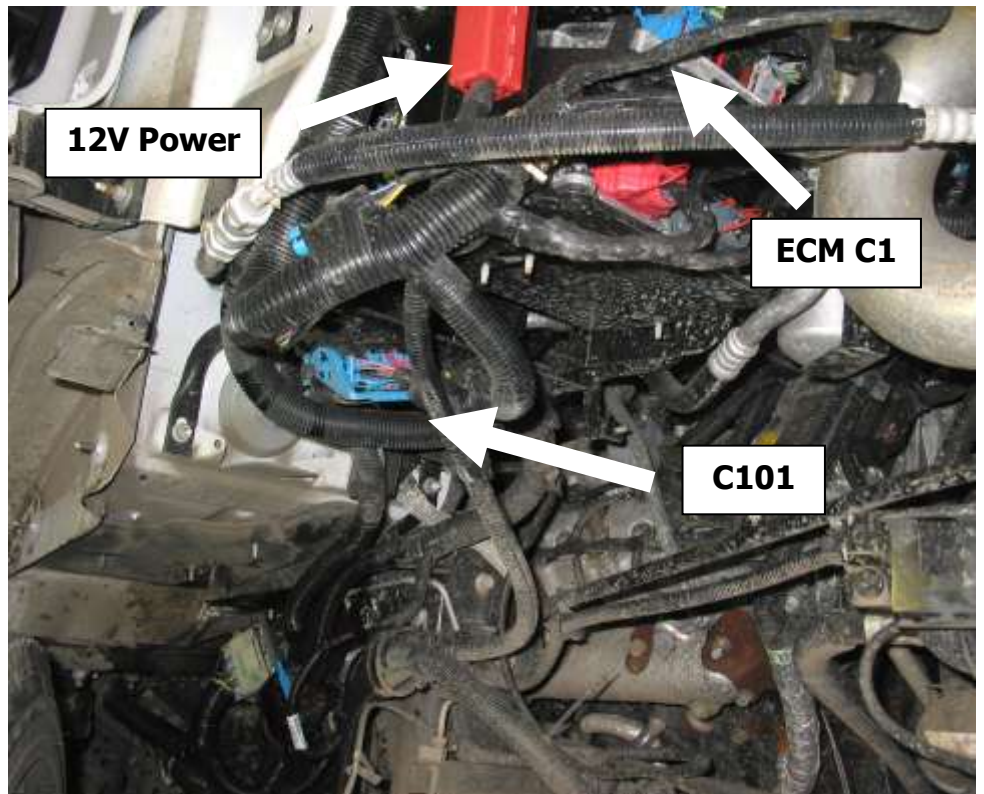
This wire will only exist on one side of the connector. The picture shows the connector with the locking tab on it.

Connector	Location	Wire Color
C101 (Blue)	Pin C7	Black w/ White tracer or Tan w/ White tracer

This new connection at C7 should travel to pin 87 of the relay assembly and also down to the brass solenoid valve mounted on the frame rail.

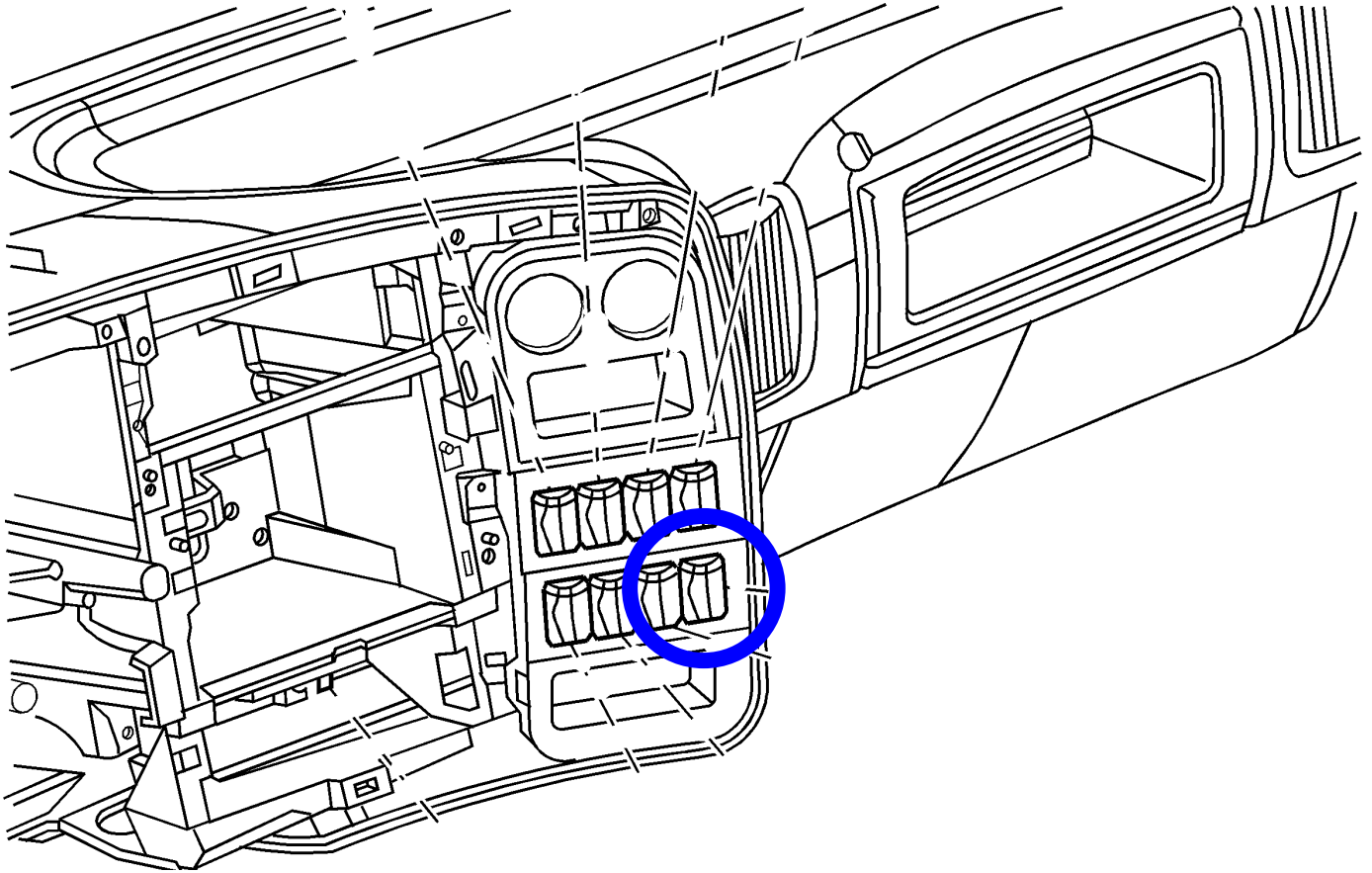
Pin 85 from the relay should be connected to a clean solid ground with the black wire provided.

Now you may re-install the two inner fender shields.

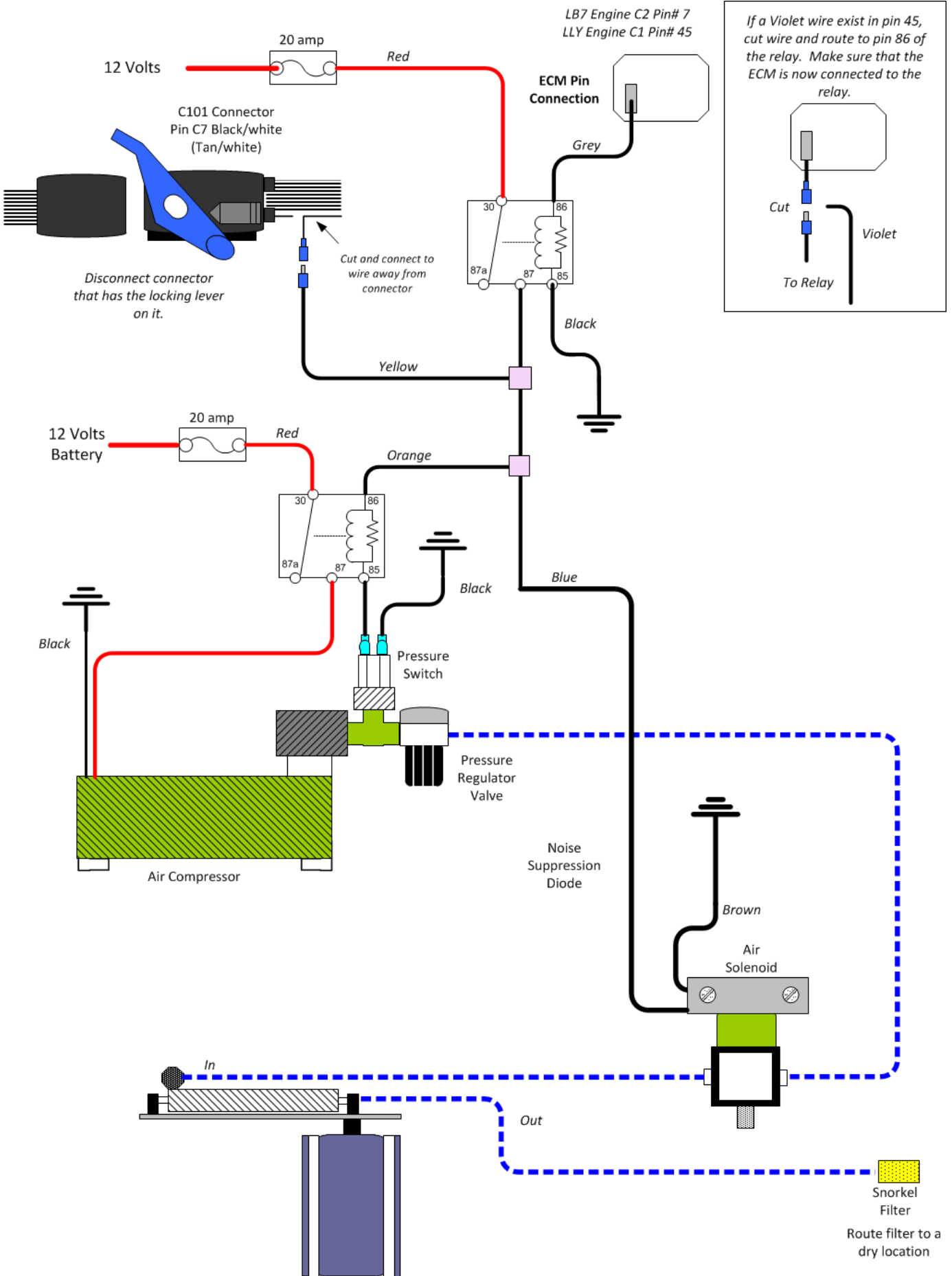


In Cab Installation

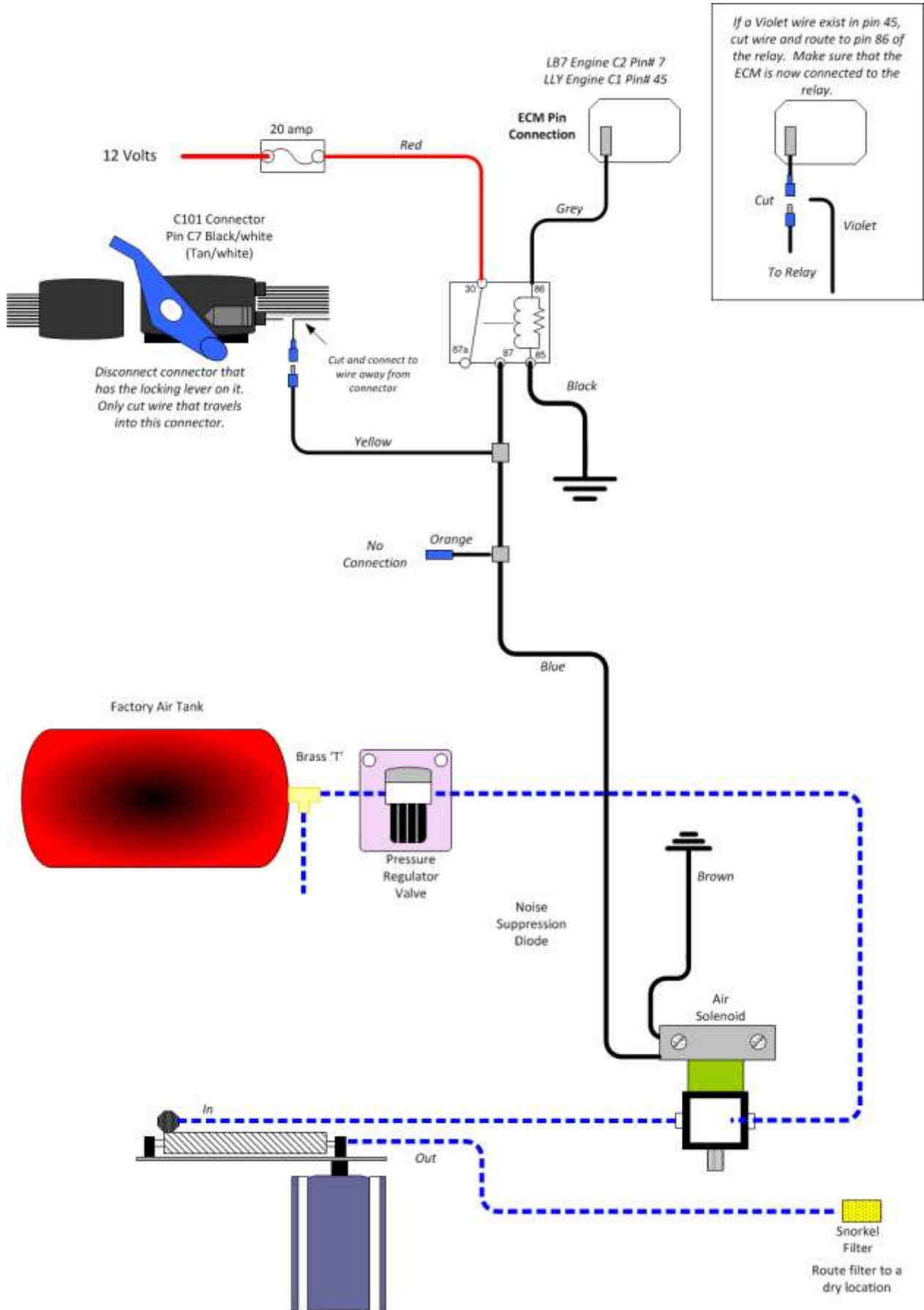
You will now need to remove the dash panel to gain access to the accessory switches. You should now be able to install the GM switch (15010301) into an empty slot. The wiring should already be pre installed to the bottom right switch location. You should locate a Light Green wire.



Overview with BD Air Compressor

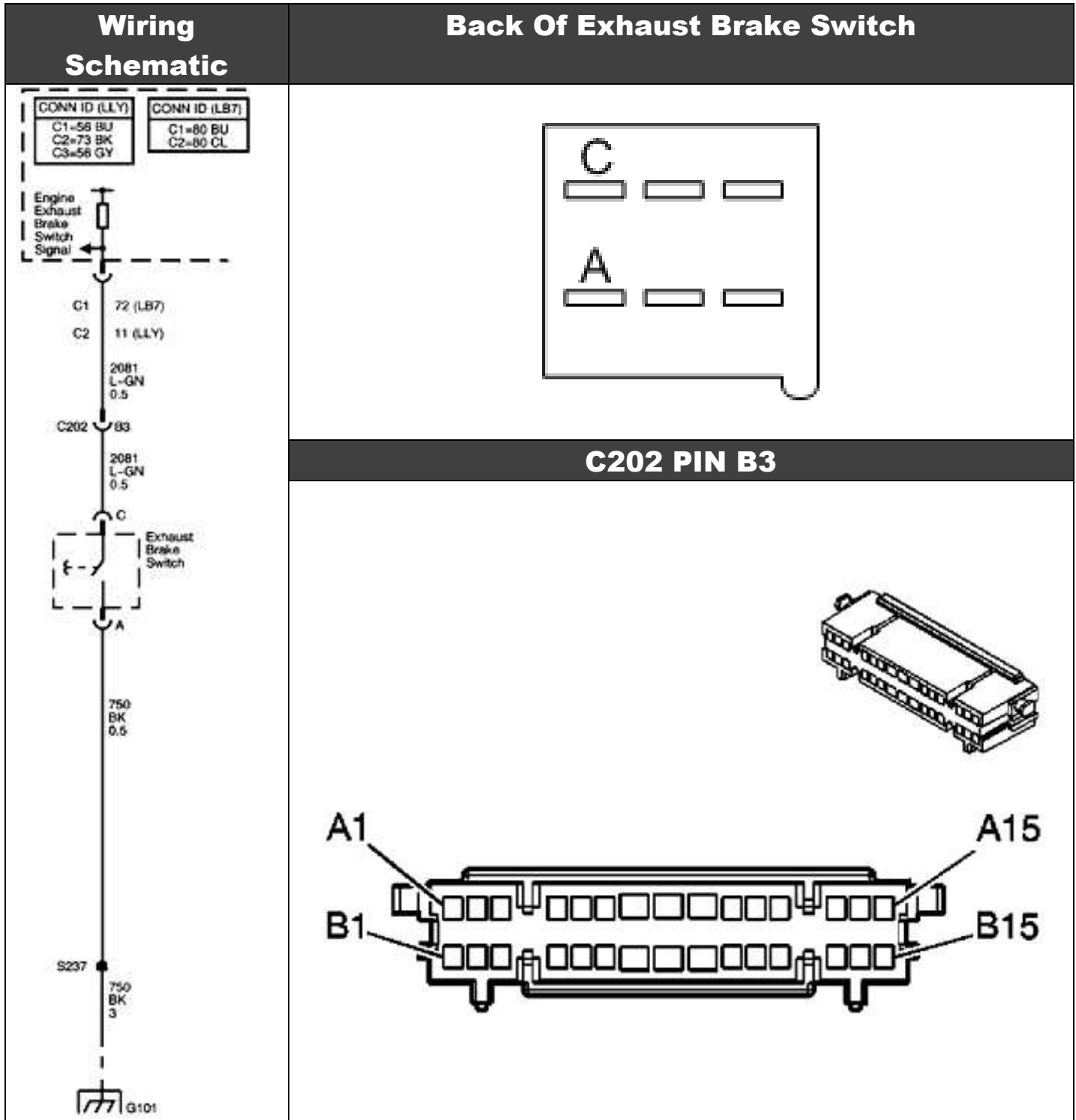


Overview with without new Air Compressor



LLY Exhaust Brake Switch Addendum

Note: Some LLY C4500/5500 models have not been pre-wired from GM to accept the factory exhaust brake switch. To check for this, locate Connector #2 of the ECM and check for a Light Green wire on Pin # 11. If it exists, the vehicle has been pre-wired. If not, you will need to use the extra LLY ECM pin (P/N#: 15356827) and insert it into Pin #11 of the C2 connection of the ECM and wire it back to the factory switch. You can either wire it to Pin B3 of the C202 connector (which is located just behind the factory exhaust brake switch location) or you can wire it directly to the switch. The ECM is looking for ground or low signal to activate the exhaust brake.



Maintenance & Trouble Shooting

To extend life of the valve assembly, do not operate the vehicle for extended periods of time without activating the brake. We suggest activating the exhaust brake at least a couple times a day while operating the vehicle to prevent any carbon or rust build up on the inner parts of the valve assembly.

The hoses, wires, fittings and clamps should be inspected on a regular basis for any deterioration, damage or leaks. Periodically clean the filter on the Air Compressor, and, when cleaning the engine, cover the filter on the compressor to prevent moisture from entering filter.

To increase the life of your exhaust brake we recommend daily operation. By simply switching the brake on and off a couple times a day will prevent the butterfly from sticking due to carbon build-up.

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

Operating Guidelines

Thank you for taking interest in the BD Engine Exhaust Brake. As a driver, you probably already know the need for extra braking power that your vehicle requires on the hills and long grades. With loads being towed behind you, the extra push when slowing down or maintaining speed on downward grades can prove to be a great strain on the vehicle hydraulic braking system, even to point of "burn-up".

These guidelines were designed to offer a better understanding of the benefits of using exhaust brakes and are based on material developed by the US Department of Transportation National Highway Traffic Safety Administration.

The emphasis on today's vehicles is to give the consumer a product that can give them usable power with fuel efficiency. But, in the transition, the vehicles have lost their natural braking power, making it more easy for the vehicle to continue to roll and harder to stop. Of course, this gets more noticeable with the increase of weight, on or behind the vehicle. This is where an exhaust brake becomes a useful tool in increasing the driveline drag of the vehicle without the use of the hydraulic brakes.

A tool, with maximum use or even occasional use, that can reduce wear on hydraulic braking parts and at the same time increase safety. The BD Exhaust Brake can be used to help maintain a controlled vehicle speed on a downward grade, as well as slowing the vehicle down for such times as turns or exit ramps, without you using your hydraulic brakes.

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However, the exhaust brake cannot be used as a parking brake or a service brake to bring your vehicle to a complete stop.

By using a BD Exhaust Brake, the life and effectiveness of your hydraulic brakes will increase. This is because of the decreased use of the hydraulic brakes in situations like hills, the wear factor is reduced and there is less opportunity for your hydraulic brakes to heat up which would reduce the efficiency.

When you ride your hydraulic brakes, make hard stops or have poorly adjusted brakes, this creates high temperatures and as your brakes get hotter, the more chance there is for fading or failure. With terrain that is a series of up and down grades, the BD Exhaust Brake will aid in reducing exhaust valve warpage. Because of the power needed to pull your vehicle and load up a hill, this generates a lot of heat.

When you have reached the crest of the hill and are now coasting down the other side, the heated valves are too quickly cooled. With the exhaust brake engaged, the heat loss to the valves will be reduced, which can prevent valve warpage. When the toggle switch is turned to the "On" position, the valve is activated every time the driver takes his foot off of the throttle pedal. When the driver puts pressure back on the throttle pedal, the relay is activated and the valve opens again.

Exhaust brakes are designed to operate with the throttle at idle, not to be used in conjunction with cruise controls, and not designed to aid in gear shifting. Such cases could cause damage to engine and/or the exhaust brake. Vehicles may require downshifting to obtain the necessary retarding force.

Automatic transmissions with lock-up clutches in the converters can achieve the best retarding force with the use of a clutch control device (i.e. AutoLoc).

Incorporated with the BD Exhaust Brake, there is a pressure regulating system that will control the created backpressure. If the backpressure reaches the set limit, the exhaust valve will open slightly to relieve the excess pressure.

The brake pressure at idle is required to be checked and adjusted at time of installed, two weeks after installed, and on a regular twice a year interval.

Using a standard pressure gauge and the pressure port on the exhaust valve, the brake pressure at idle must be set between 10 and 15 psi. The best scenario for exhaust braking is when going down hill, select a gear that lets you maintain a constant speed with little or no use of the hydraulic brakes, or, the same gear that would be used to go up the same grade of hill. This also depends on the weight, load or road conditions that the vehicle will come upon.

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Therefore, in summary, by using the BD Exhaust Brake, you reduce the need for use of your hydraulic brakes in situations where you need to slow down or maintain speed (i.e. hills, off ramps, corners, approaching speed changes or traffic lights). By reducing the use of your hydraulic brakes in these situations, this reduces the heat build up, as well as wear and damage to linings and drums. And, when you reduce these factors, you save your hydraulic brakes for when you really need them (i.e. for stopping or emergencies).

The BD Exhaust Brake is not a substitute for your hydraulic brakes and, cannot correct or compensate for poorly maintained or misadjusted brakes. But, when you need to slow down or maintain a constant speed, the BD Exhaust Brake will be a valuable and effective tool. Exhaust Brakes are more efficient at preventing than correcting an over-speed condition.

Exhaust Back Pressure Testing Air Actuated Brakes

It is recommend that you purchase the BD pressure gauge kit #1030050



NOTE: The brake stop-bolt and regulator have been preset at the factory and should not need to be adjusted.

You do not need to measure the air pressure in the system, just the exhaust backpressure, which is located on the cast valve.



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Idle Pressure Test

With the BD brake engaged and the engine at idle check the exhaust backpressure using a pressure gauge (such as BD PN 1030050) at the test port on the brake valve.

If the back pressure is below 13 psi at idle you have a number of likely causes. The most common being an exhaust leak either at the clamp joint or at the welds (only on some models). Apply the exhaust brake and have someone assist you looking for soot trails or the visible leak. Another culprit would be an exhaust manifold leak, turbocharger gasket leak, turbocharger problem or an EGR issue.

If the back pressure is greater than 25psi, you will need to make an adjustment on the stop bolt. Loosen the jam nut, and lengthen the stop bolt towards the actuator, this will shorten the stroke distance. Only turn 1/4 rotation at a time and re-secure the jam nut. Retest idle pressure.

We generally do not recommend adjusting the stop bolt, please consult BD before doing this as it may void your warranty.

Off-Idle Pressure Test & Adjustment

Your BD exhaust brake is a variable-orifice design so when the brake is active and the engine is at higher RPM the brake lever does not rest on the stop bolt. Off-idle backpressure is set by adjusting the air pressure regulator which will in turn increase or decrease off-idle exhaust backpressure. You will need to secure your pressure gauge somewhere that you can see it while you are driving. Using a long extension hose & bringing the gauge into the cab through an open window or clipping it under a windshield wiper works well.

Get the truck up to speed (a downhill grade or a load in the truck is helpful) and activate the exhaust brake. Note the maximum backpressure achieved. You should get peak backpressure at higher RPM (try 3000 RPM in Drive). If you cannot reach the desired backpressure (compare table below) you can begin troubleshooting, the first step is to look for exhaust leaks either from the clamps, exhaust manifolds or feed pipes. Also look for leaks at the clamps located at the back of the turbo and also at the down pipe. If all connections are sealed, you can then use the adjusting regulator to increase the backpressure. Note that small regulator adjustments can have a significant effect on off-idle backpressure.

Turning the regulator **clockwise** will increase pressure.

Turning the regulator **counter clockwise** will decrease pressure.



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NOTE: Over the next two weeks, the backpressure at idle may rise due to initial carbon build up on the inside of the brake housing and on the butterfly. The stop bolt may need to be adjusted again to compensate.

Application	Maximum Back Pressure
GM/Chevy 6.5	35 psi
GM/Chevy Duramax	55 psi
Ford Powerstroke	45 psi
Dodge Cummins 1988-98 12V w/o 60lbs Springs	40 psi
Dodge Cummins 1988-98 12V with 60lbs Springs	60 psi
Dodge Cummins 2002 and Newer	60 psi

*HD Spring part# is 1030060.

CAUTION: Do NOT exceed the maximum back pressure value in the exhaust system. Exceeding this pressure will force the exhaust valves open during the intake stroke which could cause engine damage.

Thank you and happy motoring,
BD Engine Brake, Inc.