## Smart Emissions Reducer Installation Instructions

### 1.0 General Objective

The Smart Emissions Reducer (SER) is like a catalytic converter for the crankcase gasses. It mounts in the Positive Crankcase Ventilation (PCV) hose on gasoline engines, and in the Crankcase Ventilation (CCV) hose on diesel engines. The SER contains different metallic screens which do condense the oils in the crankcase gasses. It is therefore important that the SER be mounted as close to vertical as possible (Figure 1). Upwards of a 45° angle is acceptable (Figure 2). The lower port (inlet) should be the side facing the crankcase, while the higher port (outlet) should face the air intake (or throttle body). This allows collected oils to drain back into the oil pan and not get drawn into the engine's air intake.

### 2.0 Gasoline (Petrol) Applications

Since 1964 gasoline engines have used a PCV system. This system incorporates an inlet and an outlet; or a primary and secondary hose. The primary side will connect the PCV valve to manifold vacuum. This could be the base of the carburetor/throttle body, or a port mounted in the intake manifold. The secondary (breather) side will connect a port in the valve cover (crankcase area) to filtered air. Usually this is a nipple in the air cleaner, but could simply be a filtered cap. When possible, the SER should be placed in the primary (vacuum) hose. This could be as simple as cutting the PCV hose and mounting the SER inline. Some engines like certain GM V-6's and the Dodge 5.7 Hemi have integral PCV valves which are nearly impossible to interface without custom adaptors. For these applications, the SER should be mounted in the secondary hose. Although not as effective, it still offers improvements in emissions and economy.

It may be necessary to purchase 45° and/or 90° fittings from your local auto parts store. They are available in rubber and plastic in the "HELP!" section (brand name is HELP!). Often the PCV valve is placed at the same level, or worse yet, at a higher level than the manifold vacuum fitting. There may be hood clearance issues. Locate the SER as close to vertical as spacial limitations will allow. Pull ties can secure the SER and/or vacuum hoses to hold it in place.

### 3.0 Maintenance

The SER collects oil and carbon over time and requires periodic cleaning; about every oil change. It should be cleaned with brake parts cleaner or carb & throttle body cleaner. Just be sure the cleaner does not contain carbon tetrachloride. To clean, remove the SER, hold a finger over one of the ports, spray the brake cleaner into the other port slowly for a couple of seconds. Shake the SER vigorously and dump into a recycle container. Repeat this process until the cleaner comes out clean. If normal maintenance is sufficient, this will be the third cleaning. If it takes more than 3 times for the cleaner to come out clear, increase the frequency of cleanings.

### 3.1 Safety

Be sure to wear eye protection and nitrile surgical gloves when cleaning the SER. Parts cleaners contain chemicals that are detrimental to internal organs like the liver. They are absorbed through the skin. Furthermore, spraying the cleaner into the SER may splash into your eyes. THIS HURTS! Also, be eco-conscious. Don't dump the cleaner down a drain or onto the ground. Dispose of it in a used engine oil recycling container.

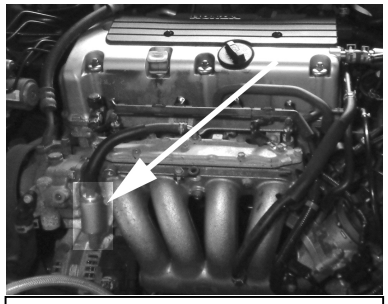

**Figure 1;** ***Perfect Installation.***

**Figure 2;** ***Acceptable Installation.***



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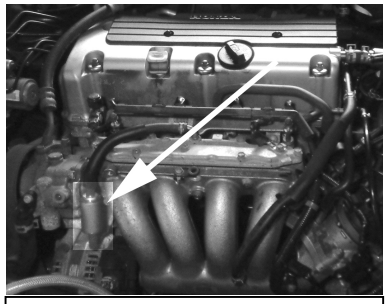

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Extreme Energy Solutions, www.SmartEmissionsReducer.com

## 4.0 Diesel Applications

For diesel applications with CCV, installation is very similar to gasoline engines. The SER is placed between the CCV filter and the air inlet. Diesels do not have a secondary side. This makes it easier to determine the proper hose to interface; there's only one. Diesel SERs have 45° and 90° adaptors available. They are handy when fitting the SER in tight places (see Figure 3). As with the gasoline applications, the SER should be mounted as close to vertical as possible, with the inlet pointing down such that the accumulated oil can drain back into the CCV filter. For some applications this can be virtually impossible. Late model Dodges with the Cummins Diesels are an easy installation, mounting it in the flex hose between the hard steel tube and the turbo inlet (see Figure 4). However, there is no way to install the SER in the preferred manner, due to hood clearance.

## 5.0 Additional Considerations

Getting access to the PCV/CCV system can be quite challenging on some vehicles. It is recommended you mount the SER in a location that is convenient for maintenance cleaning. Use additional hose to route back to the factory hose connections (see Figure 5). If installing the SER on a high mileage engine, you should clean it after 500 miles, then again every 1000 miles until the cleaner comes out clean on the third cleaning. After that, revert to maintenance cleanings at oil change intervals. Use fuel and oil compatible hose. Never use heater hose, as it swells and separates. Automotive PCV hose is recommended for smaller hose applications, and Push Loc is recommended for larger hose requirements. Use hose clamps to secure the hose to the SER and factory ports. Be careful not to kink the hose. Use elbows to facilitate bends, or use longer sections of hose that allow for a more gradual bend (see Figure 6).

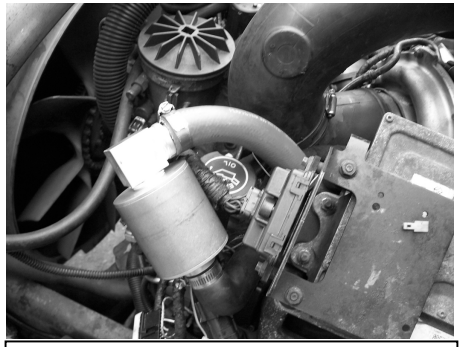

**Figure 3** *International Diesel with 90° Fitting.*


**Figure 4** *Dodge Cummins Diesel.*

**Figure 5** *Remote Mounted SER, Convenient Access for Cleaning.*

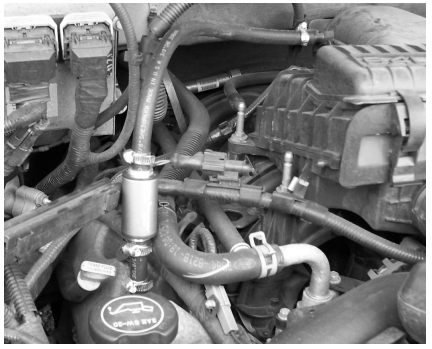

**Figure 6** *Gentle Bend in Hose, Vertical Mount.*



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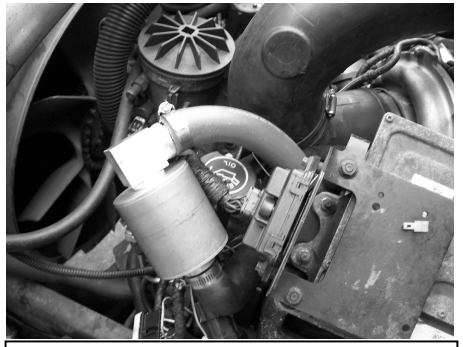

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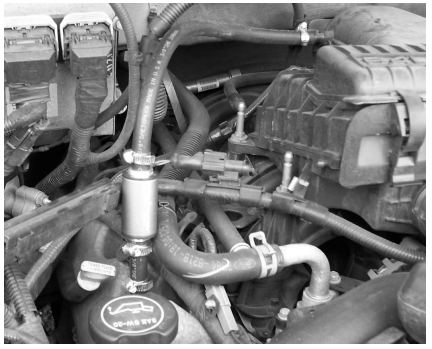

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