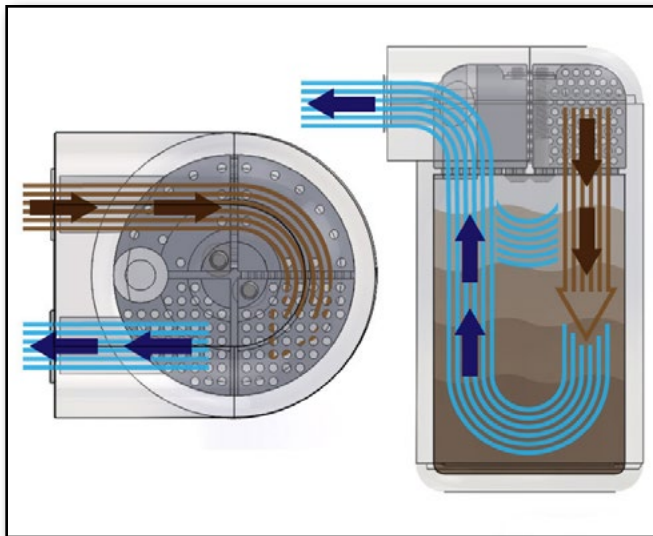




Performance Baffled Oil Catch Can & Oil Drain System Installation Guide



Proper service and repair procedures are vital to the safe, reliable operation of all motor vehicles as well as the personal safety of those performing the repairs. Standard safety procedures and precautions (including use of safety goggles and proper tools and equipment) should be followed at all times to eliminate the possibility of personal injury or improper service which could damage the vehicle or compromise its safety.

INTRODUCTION

Turner Motorsport Performance Baffled Oil Catch Can System

Our Baffled Oil Catch Can System offers the following features:

- Constructed of strong and lightweight 6061-T6 billet aluminum
- Black anodized for corrosion resistance
- In-house designed and engineered
- All mounting hardware included
- Easy installation
- Includes preassembled nylon braided feed and return lines with AN fittings
- Includes a dipstick to check content level
- Fully serviceable and completely reversible

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CATCH CAN COMPONENTS



Catch Can Reservoir with 1/4" Allen Key
(6, 8, or 10 oz; Standard or Reverse Flow)



Baffled Separator with
2.5mm Allen Key



Catch Can Dipstick



Bracket Mounting Hardware



Angled Catch Can Bracket



Flat Catch Can Bracket



Riser Bracket

INSTALLATION NOTES

- **RH** refers to the *passenger side* of the vehicle.
- **LH** refers to the *driver side* of the vehicle.
- Always use the proper torque specifications.
- If applicable to this installation, torque specifications will be listed throughout the document and at the end as well.
- Please read all of these instructions and familiarize yourself with the complete process **BEFORE** you begin.

GENERAL PREPARATION AND SAFETY INFORMATION

Turner Motorsport cares about your health and safety, please read the following safety information. This information pertains to automotive service in general, and while it may not pertain to every job you do, please remember and share these important safety tips.

- Park your car in a safe, well lit, level area.
- Shut the engine off and remove the key from the ignition switch.
- Make sure any remote start devices are properly disabled.
- **ALWAYS** wear safety glasses.
- Make sure the parking brake is applied until the vehicle is safely lifted and supported.
- Whether lifting a vehicle using an automotive lift or a hydraulic jack, be sure and utilize the factory specified lift points.
- Lifting a vehicle in an incorrect location can cause damage to the suspension/running gear.
- **ALWAYS** support the vehicle with jack stands.
- **ALWAYS** read and follow all safety information and warnings for the equipment you are using.



NEVER get underneath a vehicle that is supported only by a jack, and **ALWAYS** make sure that the vehicle is securely supported on jack stands.

PCV SYSTEM OPERATION

In order to properly install a catch can on any application, you must first have a basic understanding of the PCV system operation on your car so you can determine the correct position of the feed and return lines. We will begin here with a quick run-down of the PCV system.

PCV, or Positive Crankcase Ventilation, is an emission control which has been mandated for use since the 1960's.

How it works:

No piston ring seals perfectly. Some combustion gas blows past the rings into the crankcase on each power stroke. The gas contains exhaust fumes, raw fuel, and water. These blow-by gasses will accumulate and build pressure inside the crankcase. If the pressure gets too great, it will push engine oil past seals and gaskets causing multiple oil leaks. The fuel and water also contaminate the engine oil.

Pre-PCV cars vented crankcase pressure to the atmosphere through a vent pipe or mesh restriction, commonly located in the oil fill cap. This was not only polluting the atmosphere, but was inefficient and left a lot of raw blow-by gas and water inside the crankcase, where it quickly contaminated the engine oil, creating sludge and oil breakdown.

The modern PCV system draws these harmful blow-by gasses and vapors back to the intake plenum where they make up a small part of the combustion air charge. More importantly, the system replaces blow-by contamination with fresh, filtered air that dilutes contamination to reduce concentrations of acids, oxidants, and water in the engine oil.

To minimize the amount of liquid oil drawn through the PCV valve, many modern engine designs - including those from Euro-car manufacturers, now include a separator that removes liquid oil from recirculated gases and returns it to the crankcase before it can be sucked back to the intake. This reduces oil consumption and protects sensors and catalytic converters from contamination, however in many cases they are not completely successful at removing all of the oil.

Turbocharged engines pose special problems since boost pressure increases blow-by volume and can easily turn manifold vacuum into boost pressure greater than crankcase pressure, disrupting normal PCV flow. Special crankcase ventilation methods are required in boosted engines, such as more sophisticated oil separation devices and/or catch cans.

CATCH CAN INSTALLATION GUIDELINES

Overview:

When installing your catch can, first identify the components of your PCV system and determine where you will locate the feed and return lines.

Next determine where you will mount the catch can.

All of our catch cans are assembled with the feed (inlet) on the left and the return (outlet) on the right. To improve your options for line routing and catch can location, you may reverse the flow of the catch can.

Obtain the necessary hardware and lines you will need. The fittings on our catch can separators are -10 AN ORB (O-ring boss) fittings.

We recommend the use of braided hose that is oil and fuel resistant and rated for automotive use, or our silicone hoses which are also rated for automotive use.

Our bracket kit gives you a number of different options for mounting the catch can, some examples are shown on the right.

Route your feed and return lines so they do not interfere with or rub on any moving or hot components.

Connect the feed line between the crankcase and the catch can.

Connect the return line between the catch can and your intake system.



CATCH CAN INSTALLATION GUIDELINES

Overview:

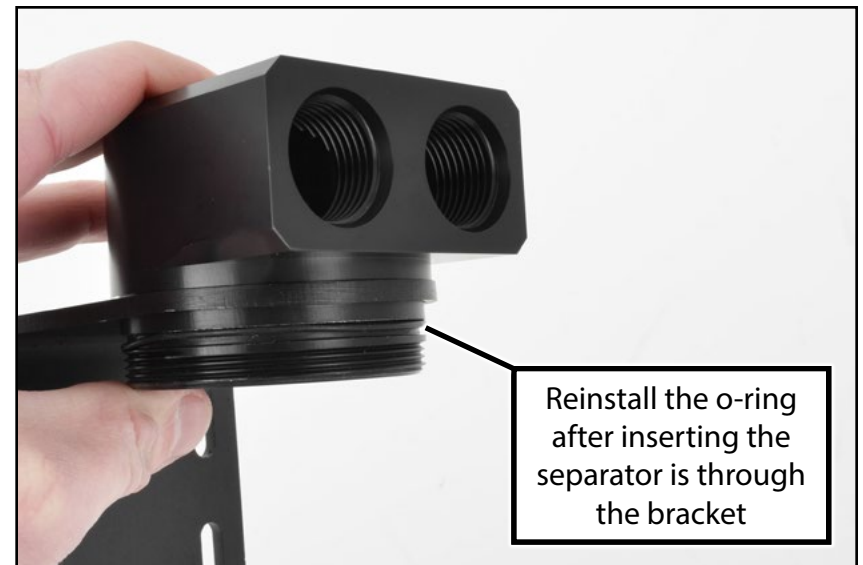
Our catch cans are designed so the separator will be installed through the top of the bracket, then the reservoir threaded on from the bottom. When the reservoir is completely tightened, it will lock the catch can in place in the bracket.

When installing the separator into the bracket, be sure and **ALWAYS** remove the o-ring seal first. Failure to do so will damage the o-ring.

After the separator is through the bracket, reinstall the o-ring seal.

Lubricate the o-ring seal with clean engine oil before threading on the reservoir.

It is only necessary to tighten the reservoir by hand. Do not use any tools.



CATCH CAN INSTALLATION GUIDELINES

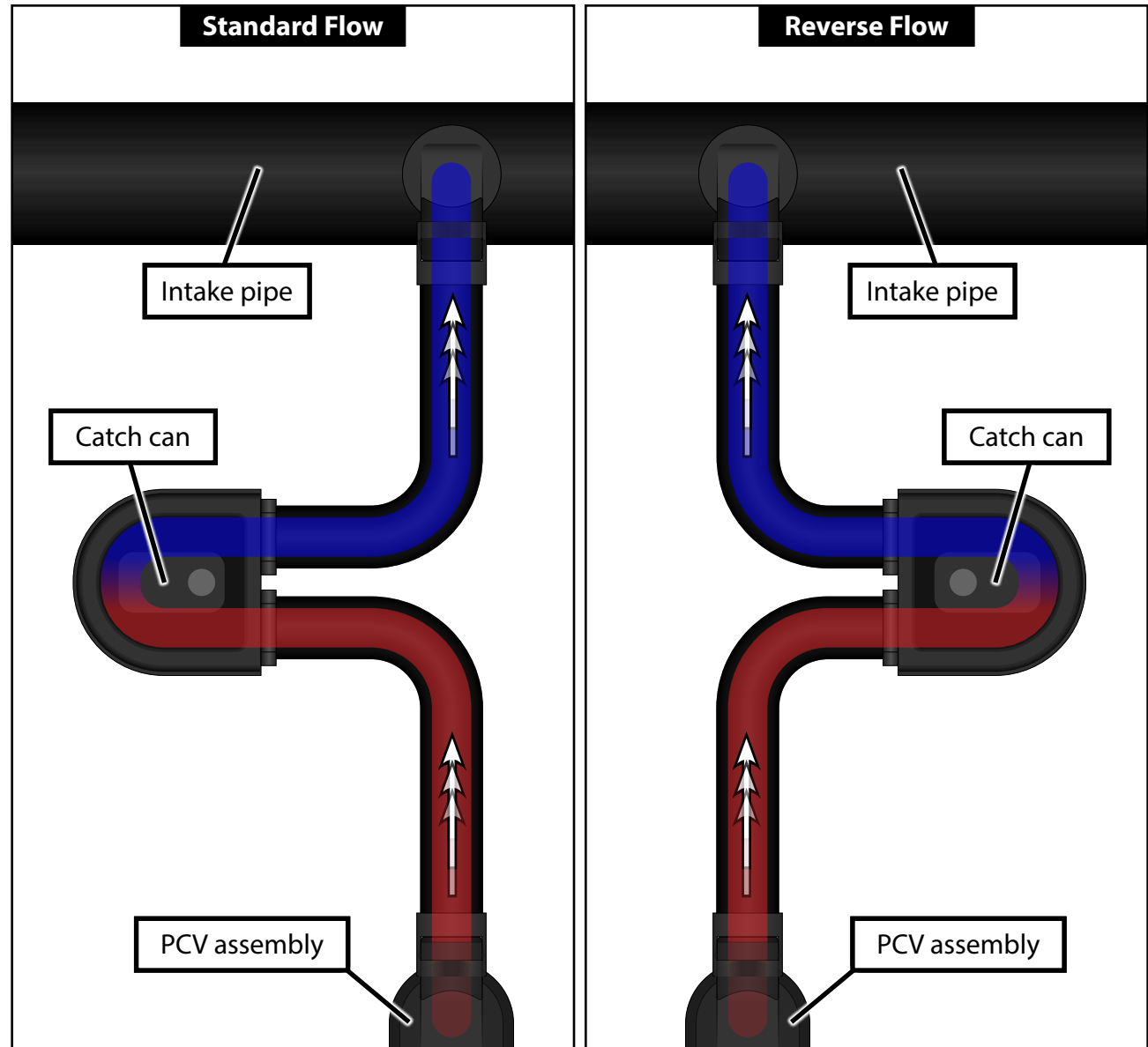
System Diagram:

Let's take a moment and look at how our catch can system interacts with the PCV system on your BMW.

The illustrations on the right represent the installation of our catch can kit onto an N54 engine. In this setup we removed a crank vent hose from the back of the PCV assembly and added the catch can in its place. The ultra-fine oil vapors from the PCV assembly enter the feed hose (**RED**), they then enter the catch can and pass through the four chamber baffle system to maximize oil/air separation. From there they are directed through the return hose (**BLUE**) and into the intake pipe.

Note how you can utilize a reverse flow catch can as long as the feed and return hoses are positioned properly.

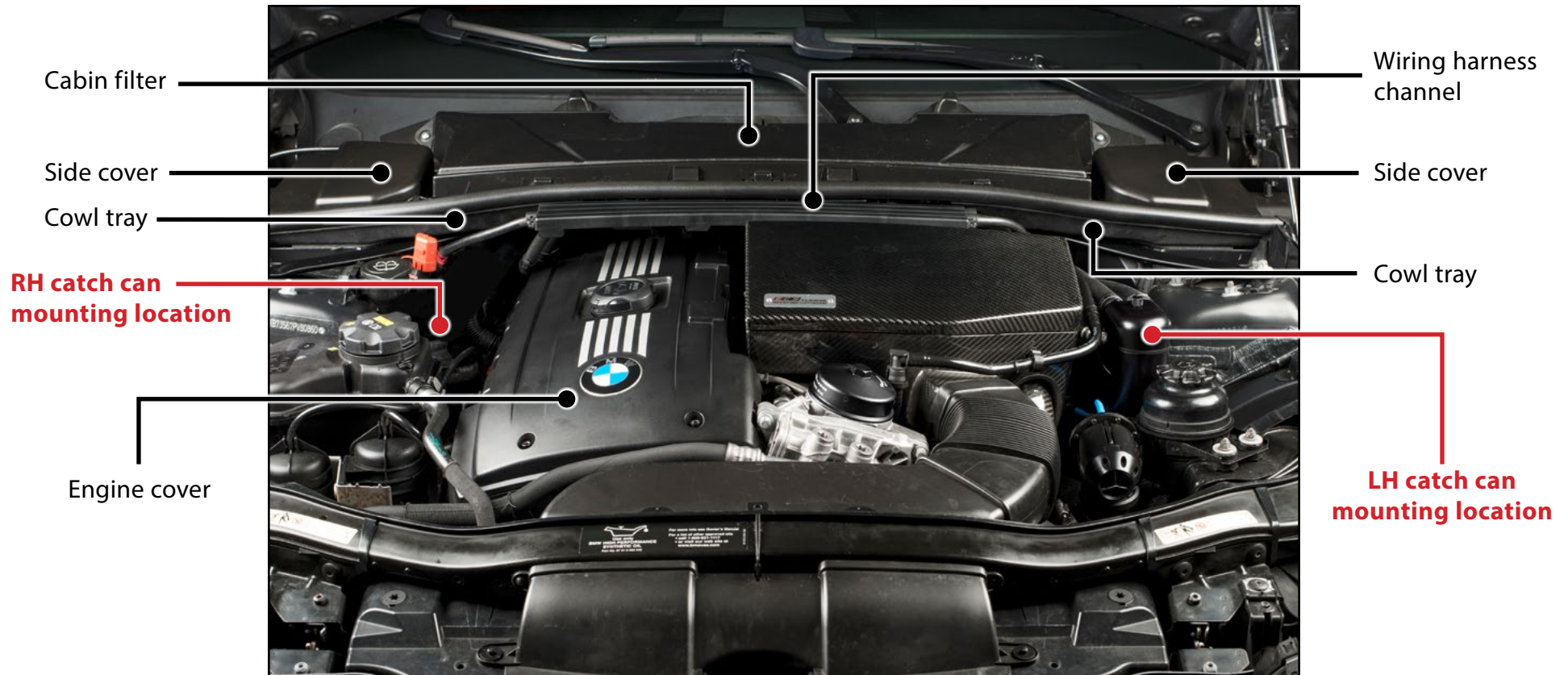
We have N54 and S54 specific instructions in the coming sections, or you can skip to the Catch Can Drain System section starting on Page 17, or the Cleaning and Maintenance section starting on Page 20.



N54 CATCH CAN INSTALLATION

Here is a picture of the N54 Catch Can system installed on our 335i. As you can see, the Catch Can is mounted on the LH (driver's) side, but we keep in mind that we have mounting brackets to allow you to mount it on the RH (passenger's) side as well. The only things that limit access are the cowl tray and the engine cover. The cowl tray is a common design, and has to be removed for many different service procedures on these newer BMW's. As a result, they've designed them for easy removal. So now, to get started, remove the following:

- Cowl tray - remove the cabin filter, wiring harness channel, side covers, then the cowl tray.
- Engine cover - hold down screws at the front and rear.
- Air box - this is optional, but can give you some extra working room.

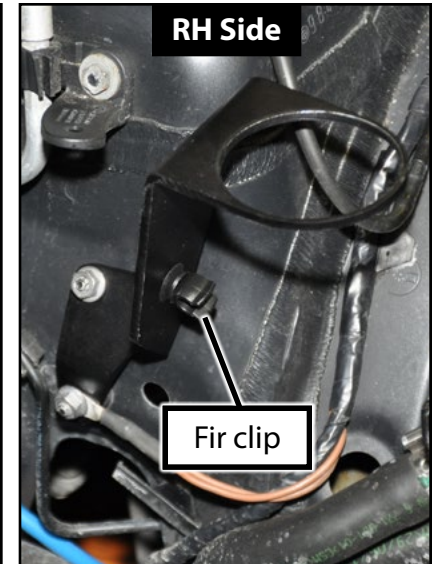
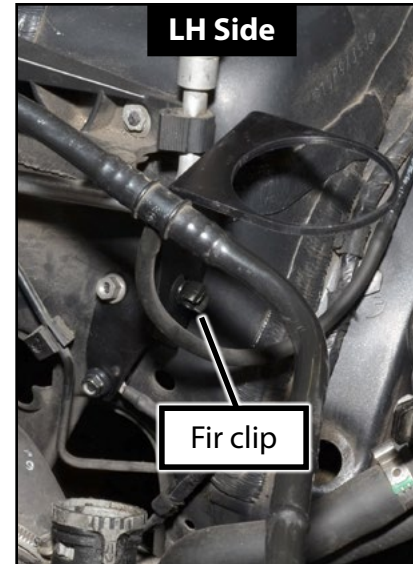


N54 CATCH CAN INSTALLATION

Step 1: 10mm Socket & Ratchet

Locate the two studs on the inner fender, the lower of which will have a ground wire attached. Remove the ground wire and mount the catch can bracket in place, relocating the ground wire onto the lower stud. Two nuts are included with the kit to be used here (this will leave the one you took off as an extra). The photos on the right show both the LH and RH side mounting options.

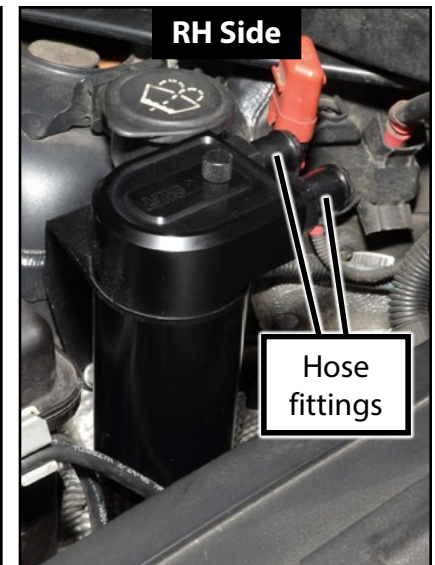
Also install the fir clip into the side of the catch can bracket. This will secure the vacuum line that runs along side.



Step 2: Crescent (Adjustable) Wrench

Install the catch can into the bracket by doing the following:

- Unthread the catch can reservoir **and** remove the O-ring from the catch can separator.
- Thread the hose fittings into the catch can separator and tighten them.
- Place the separator into the bracket.
- Lubricate the O-ring with clean engine oil, then install it into the groove in the separator.
- Thread the reservoir onto the separator to lock the catch can into the bracket.



N54 CATCH CAN INSTALLATION

Step 3: Small Angled Pick

Moving to the back of the engine, remove the crank vent hose between the valve cover and the intake tube (highlighted in **GREEN** in the photo). These are a little tricky at times, due to the self locking fittings on the end. You'll have to use a pick and gently work around the perimeter of each fitting to release it.



Step 4: Heat Gun -or- Razor Blade

Now you'll have to separate the fittings from the crank vent hose itself, they're needed to install the system. There are two ways you can do this:

1. Heat the ends of the hose and pull the fittings out - use caution with this method since you can easily get the fittings too hot and melt them.
2. Carefully slice the hose at each fitting using a sharp razor blade, then pull the fittings out.

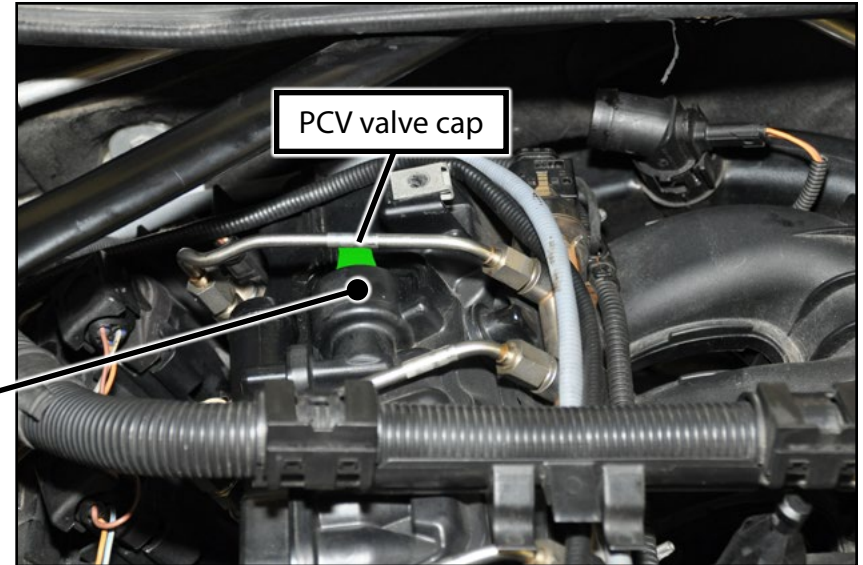
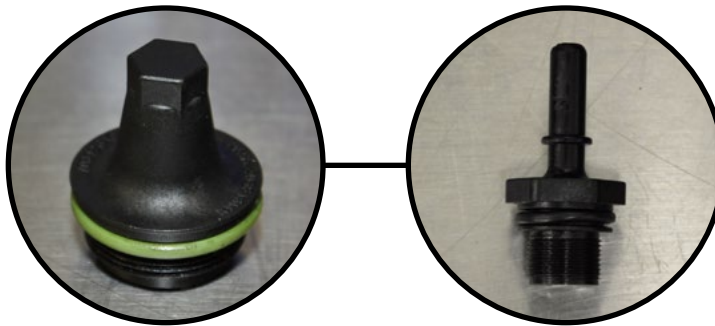
Set these fittings aside just for the moment.



N54 CATCH CAN INSTALLATION

Step 5:

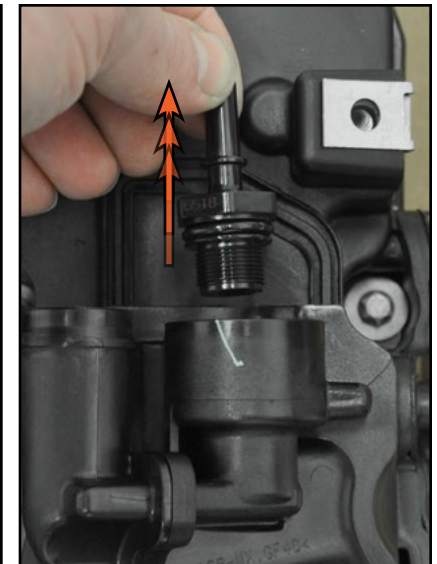
Locate the PCV valve cap (highlighted in the photo). It's threaded into the valve cover, but it's partially hidden under a fuel injector pipe. The PCV valve is located inside this cap.



Step 6: 13mm Socket & Ratchet

Here we've taken pictures of a valve cover off the car so you get a clear picture of what's going on. The PCV valve cap has a 13mm hex on the end. Unthread and remove the cap.

Underneath the cap, you'll see the end of the PCV valve. Grab the end of it and pull it out. You can set the PCV valve aside, you will not be reusing it.



N54 CATCH CAN INSTALLATION

Step 7:

Replace the o-ring on the PCV valve cap with the new one from your kit, and install the remaining o-ring from the kit onto the new PCV plug.



Be sure to lubricate both of these O-rings with clean engine oil prior to installation.

Step 8:

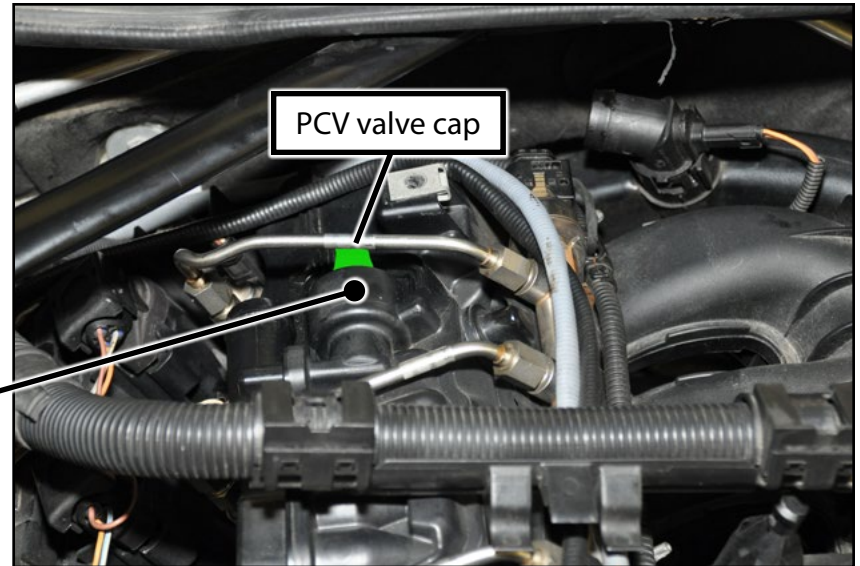
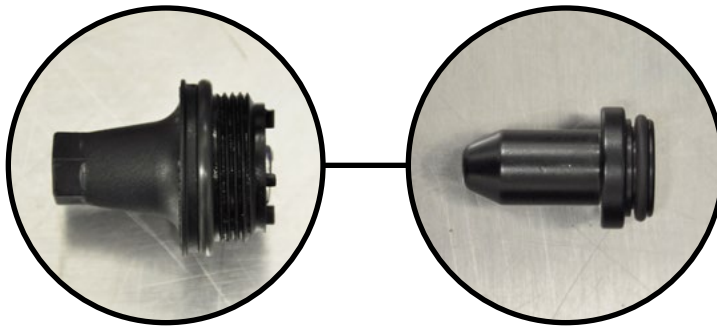
Slide the PCV plug into the PCV cap.



N54 CATCH CAN INSTALLATION

Step 9: 13mm Socket & Ratchet

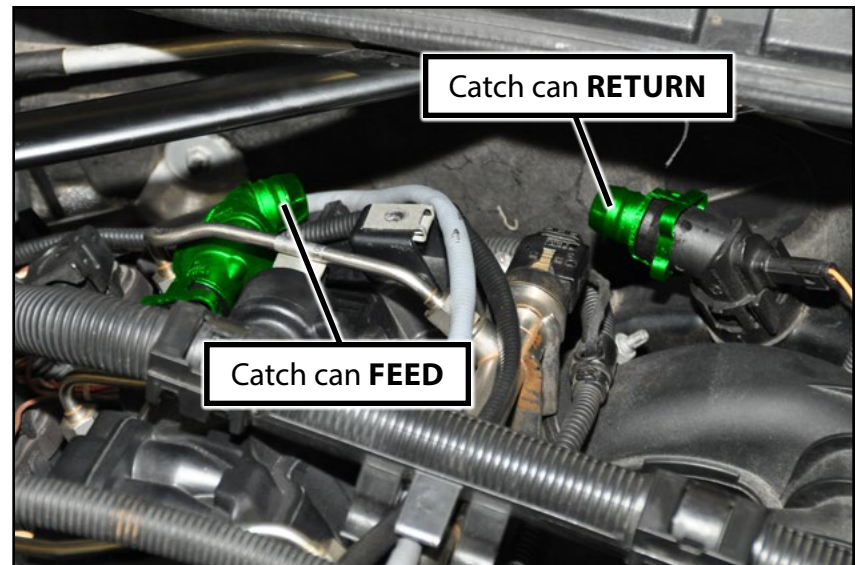
Install the PCV plug and cap back into the valve cover.



Step 10:

Reinstall the crank vent hose fitting onto the intake tube. This will be connected to the catch can **RETURN** hose.

Reinstall the crank vent hose fitting onto the valve cover. This will be connected to the catch can **FEED** hose.



N54 CATCH CAN INSTALLATION

Step 11: Flat Blade Screwdriver

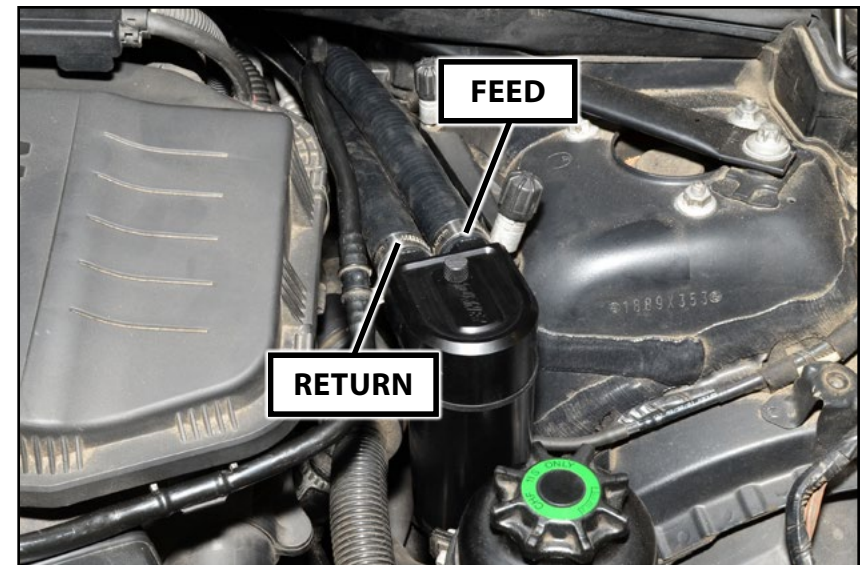
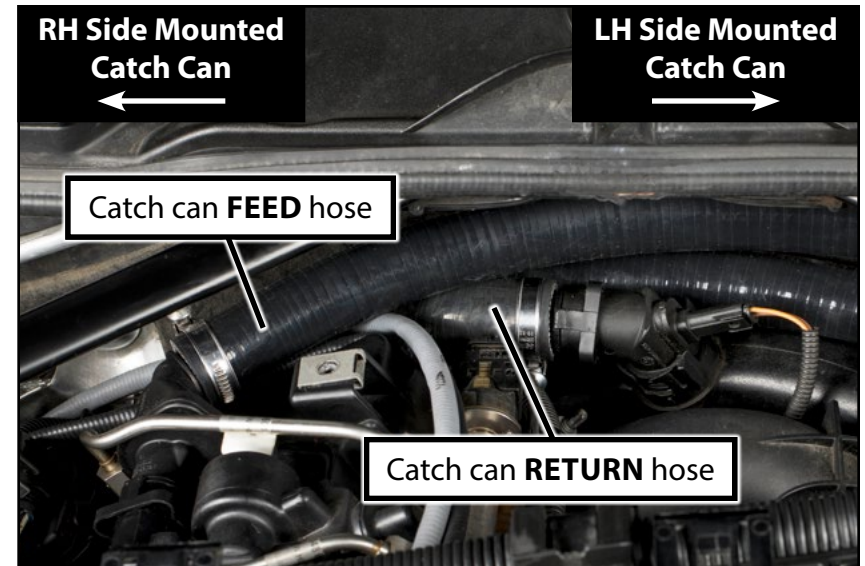
Install both of the catch can hoses onto the crank vent hose fittings and tighten the clamps until they are snug.

- The **FEED** hose connects to the valve cover fitting.
- The **RETURN** hose has a 180 degree bend on the end and connects to the intake pipe.

Step 12: Flat Blade Screwdriver

Connect both hoses at the catch can, making sure to correctly locate the feed and return.

Your N54 catch can installation is complete!

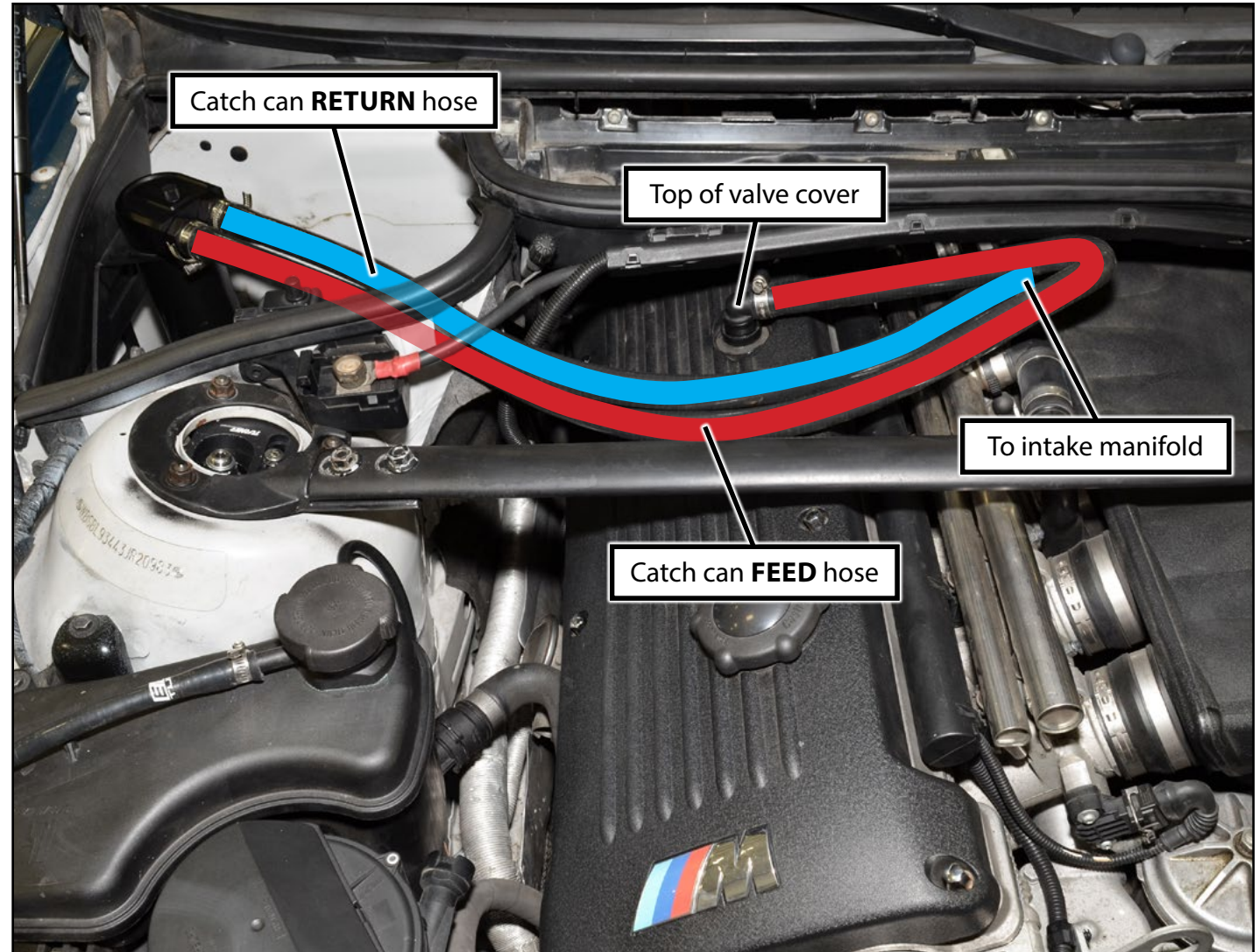


S54 CATCH CAN INSTALLATION

System Layout:

The catch can system layout is rather straightforward for the S54, the catch can is in the rear RH (passenger's) corner of the engine compartment via our custom mounting bracket, then the hoses are routed to the top of the valve cover and the intake manifold. The photo on the right shows the system setup in **STANDARD FLOW**.

Simply remove the breather pipe which connects the top of the valve cover to the intake manifold, and transfer the fittings on the end into the catch can hoses.



Your S54 catch can installation is complete!

CATCH CAN DRAIN SYSTEM COMPONENTS



36" Section of 1/4" ID Hose (**QTY 1**)



1/4" Shut Off Valve (**QTY 1**)
3/8" Clamps (**QTY 2**)



5.8mm to 7.0mm Ear Clamp (**QTY 1**)



1/4" Hose x 1/4" Male NPT Brass Hose Barb
(**QTY 1**)



1/4" Hose x 1/4" Male NPT 90° Brass Hose Barb
(**QTY 1**)

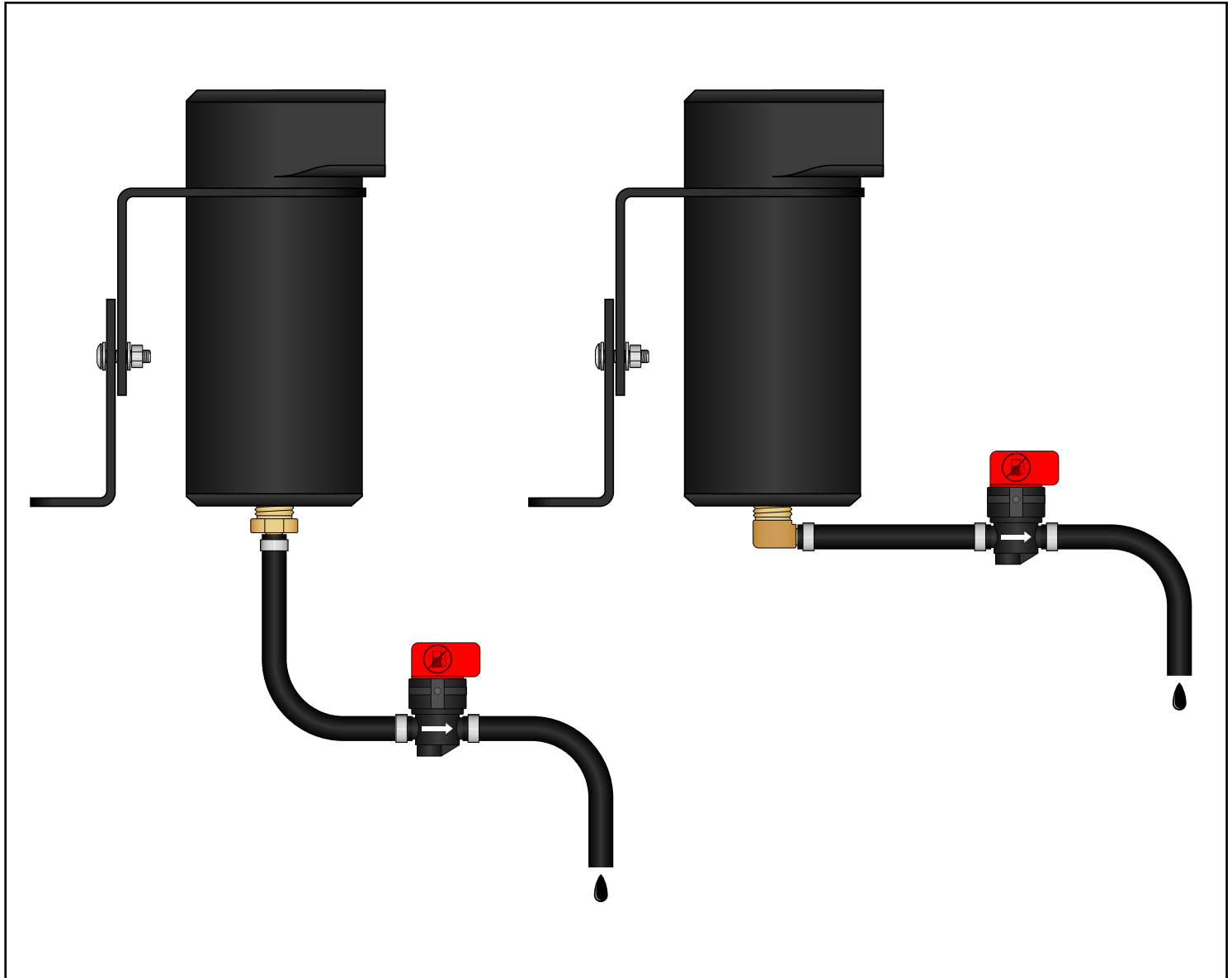
CATCH CAN DRAIN SYSTEM INSTALLATION GUIDELINES

Step 1:

Let's take a moment and look at the catch can drain system, the diagram on the right shows two different system configurations.

This system has been designed with flexibility in mind, YOU get to choose where you want the drain valve to be located in the vehicle. You want the valve mounted up high so you can drain the system from under the hood? No problem! You want to route the hose down to the bottom side near the oil pan for easy access during oil changes? You got it!

Reference the diagram on the right and familiarize yourself with the overall system layout, then proceed to the next page.



CATCH CAN DRAIN SYSTEM INSTALLATION GUIDELINES

Step 2:

All of our catch cans feature a 1/4" NPT black zinc plated brass plug in the bottom of the can, you can easily remove this plug with the included 1/4" allen key.

You will need to select one of the two 1/4" NPT to 1/4" brass hose barb fittings; one is straight, while the other has a 90° bend. Select the fitting which allows you to route the drain hose to wherever you want to access it from in the vehicle.

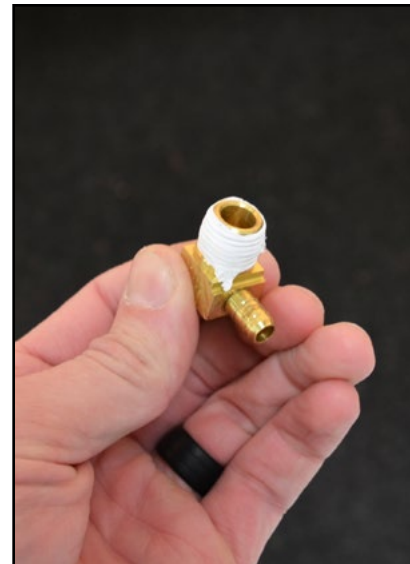
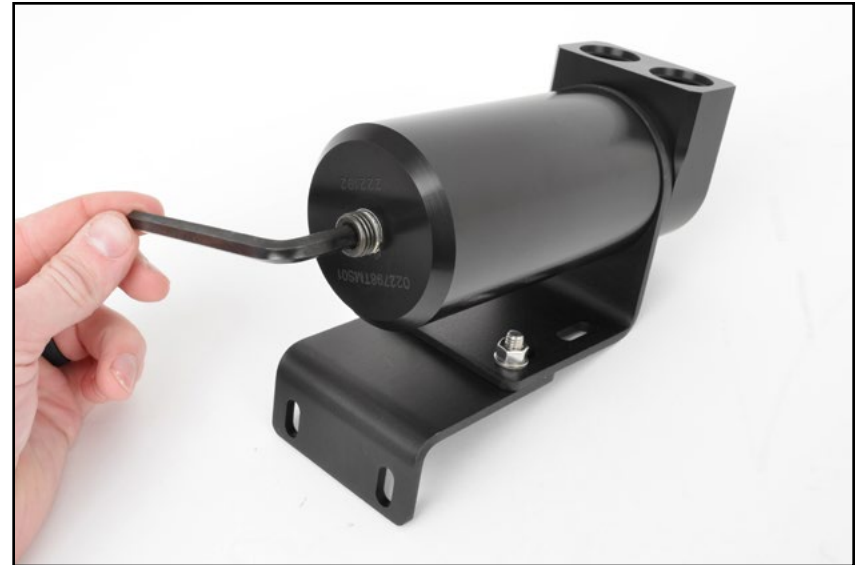
Apply thread sealant to the threads on one of the two 1/4" NPT to 1/4" brass hose barb fittings, then install the new fitting in place of the plug we removed in step 2.

Route the hose to your desired location, securing it along the way, then attach the drain valve and tighten all of the clamps.



Use an appropriately sized wrench to turn the hose barb fitting into the catch can, stop once it is snug.

Your catch can drain installation is complete!



CLEANING AND MAINTENANCE

Step 1:

We recommend that you check the level of the waste in your catch can on a regular basis. Start with once a week until you determine the amount of time it takes your car to fill the reservoir.

Note that if you have the 8oz or the 10oz reservoir, the dipstick will not reach all the way to the bottom. When you begin to see waste register on the dipstick you will already have some buildup in the bottom.

The dipstick reaches the bottom on the 6oz reservoir, waste will register on the dipstick as soon as it begins to collect.

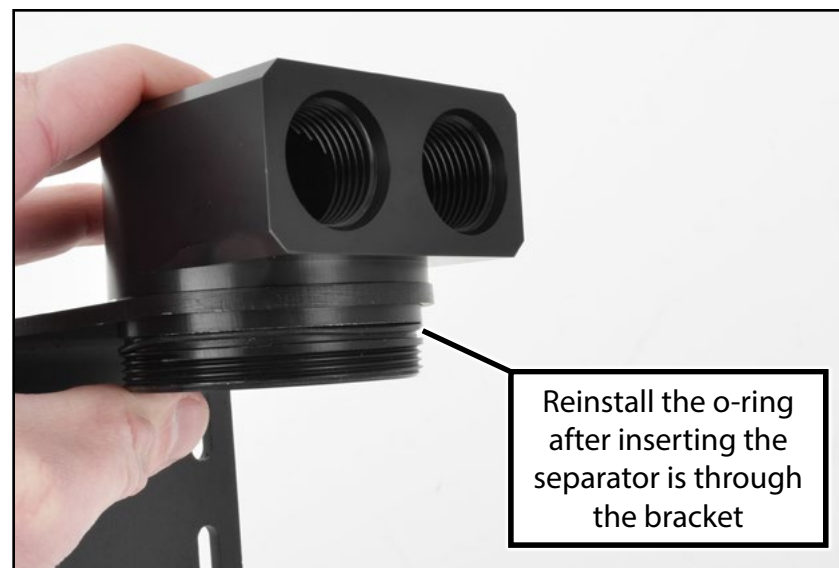
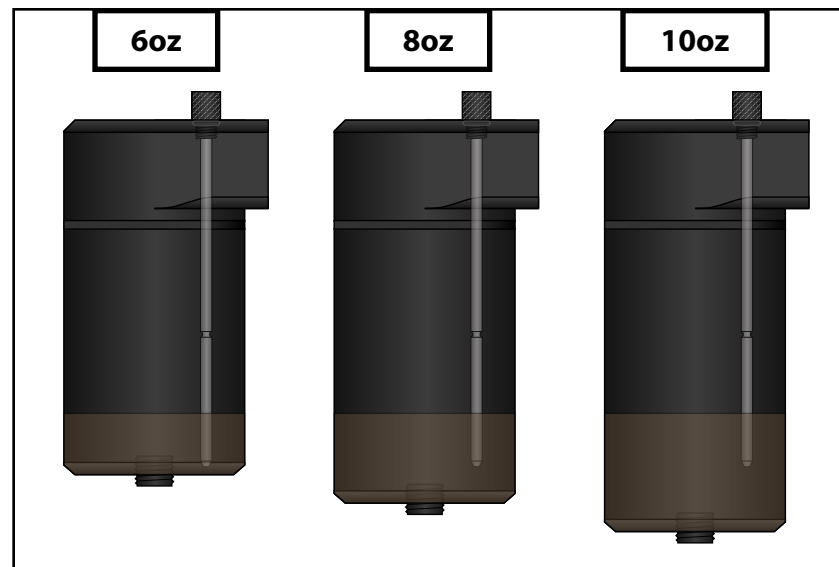
Empty and clean either reservoir when the waste registers approximately 2" up on the dipstick.

Step 2:

About twice a year, we recommend that you remove the separator for cleaning. To remove it, remove the lines and the reservoir. Remember to remove the o-ring seal, then lift the separator out of the bracket.



If the o-ring seal needs to be replaced, it is available as a replacement part on our website: [T#402946](#)



CLEANING AND MAINTENANCE

Step 3:

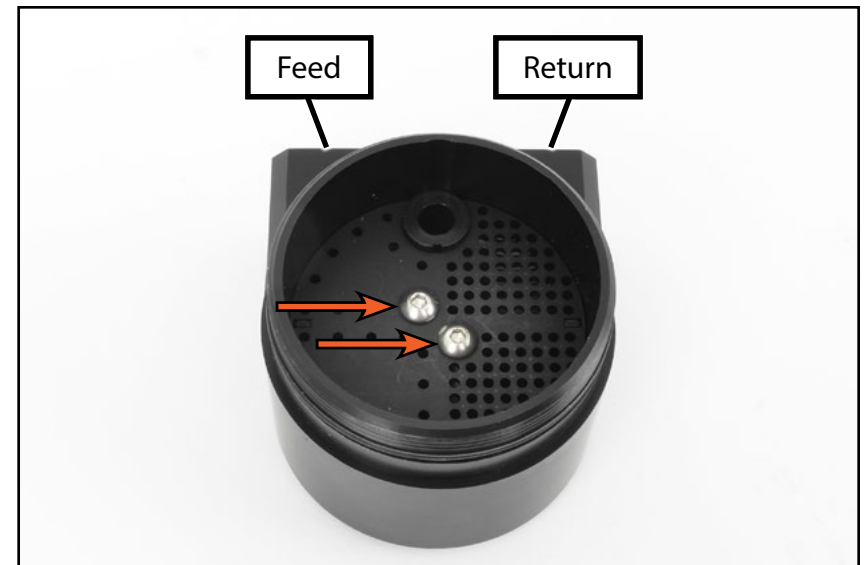
Once you have removed the separator, note the orientation of the baffle inside. The feed side of the separator has a number of small holes in it, the return side looks like a flat plate.



The baffle may be reversed on your separator, it is important to note the position now so the separator is reassembled in the correct order. If your catch can is set up for reverse flow, these pictures will appear backwards, but the procedure will be the same.

Step 4:

Using the 2.5mm allen wrench included with the kit, remove the two baffle plate screws.



CLEANING AND MAINTENANCE

Step 5:

Lift the baffle plate out of the separator housing.



Step 6:

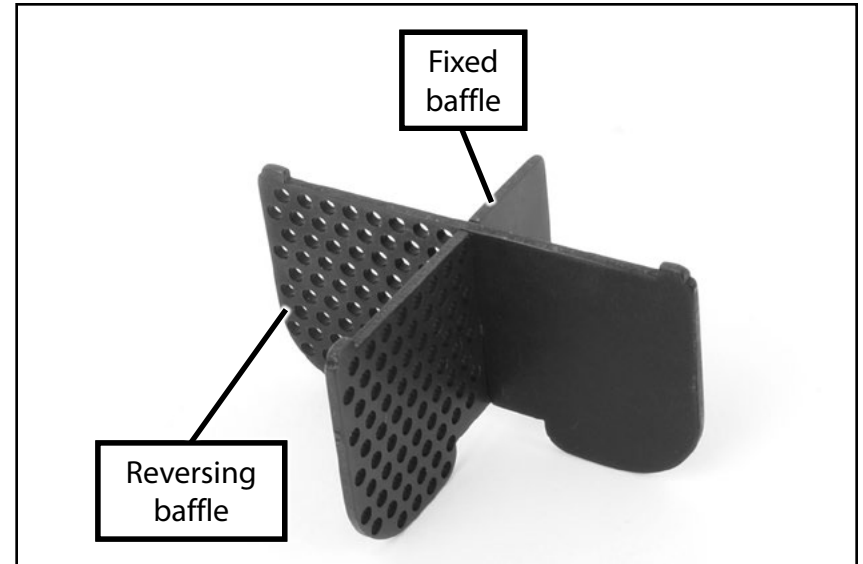
Lift the remaining baffles out of the separator housing.



CLEANING AND MAINTENANCE

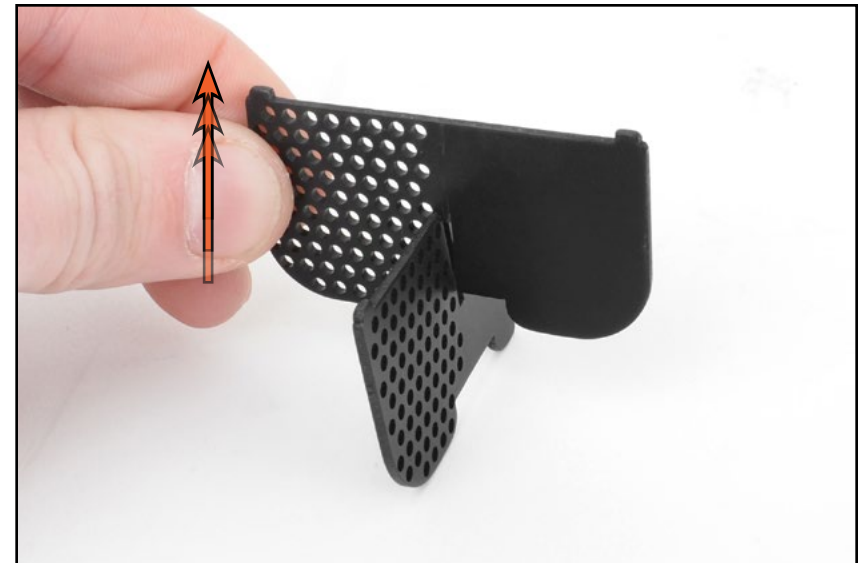
Step 7:

Note the positions of the fixed baffle and the reversing baffle.



Step 8:

Slide the two baffles apart.



CLEANING AND MAINTENANCE

Step 9:

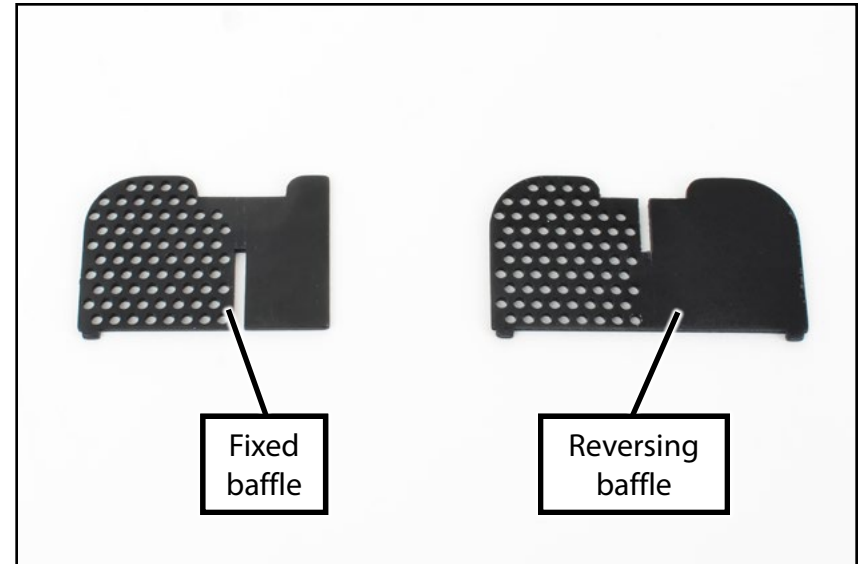
Clean the separator baffles, housing, and reservoir, using any mild cleanser or solvent. Note in the picture on the right that the fixed baffle is shorter than the reversing baffle.



Any mild cleanser or solvent can be used to clean the catch can, however we recommend that you test all cleansers on an inconspicuous area inside the reservoir to check for discoloration before you clean the outside surfaces.

Step 10:

Reassemble the baffles into the separator housing and make sure that the baffles have not been reversed and the feed and return sides are positioned correctly. Reference step 4 in this section to make sure it is properly installed.



CLEANING AND MAINTENANCE - COLD WEATHER



COLD TEMPERATURE WARNING:

In cold temperatures, the crank vent system will generate a much greater amount of moisture which can present a risk of freezing.

When the temperature outside approaches freezing, your catch can should be cleaned on a weekly basis to prevent freeze up of the crank vent system and damage to engine seals.

When the temperature reaches freezing and below, we recommend disconnecting the feed and return lines and installing the original PCV hose between the intake pipe and PCV valve assembly.

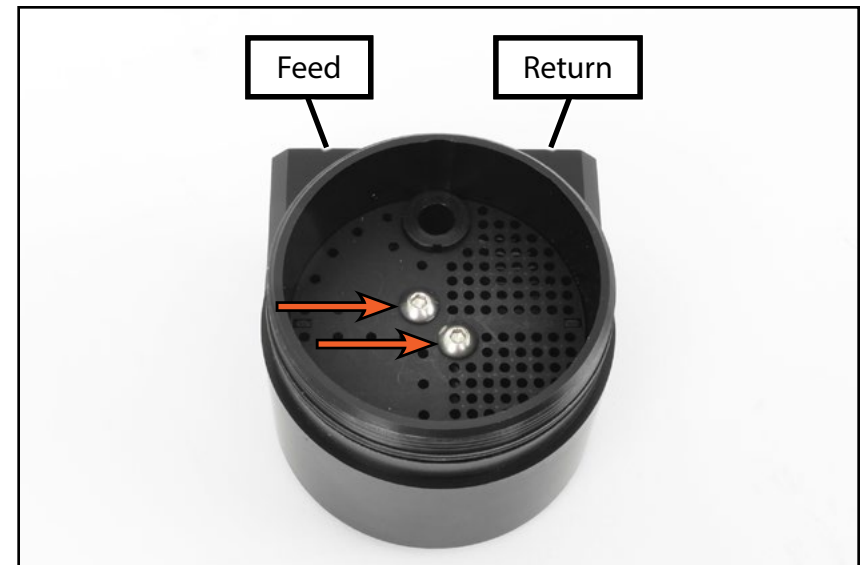
REVERSING THE FLOW OF THE CATCH CAN

Step 1:

You can reverse the flow of your catch can in order to create the best mounting location and line routing for your application. To begin, look into the separator and identify where the feed and return sides are oriented from when the catch can was originally assembled. The feed side of the separator has a number of small holes in it, the return side looks like a flat plate.

Step 2:

Using the 2.5mm allen wrench included with the separator, remove the two baffle plate screws (arrows).



REVERSING THE FLOW OF THE CATCH CAN

Step 3:

Lift the baffle plate out of the separator housing.



Step 4:

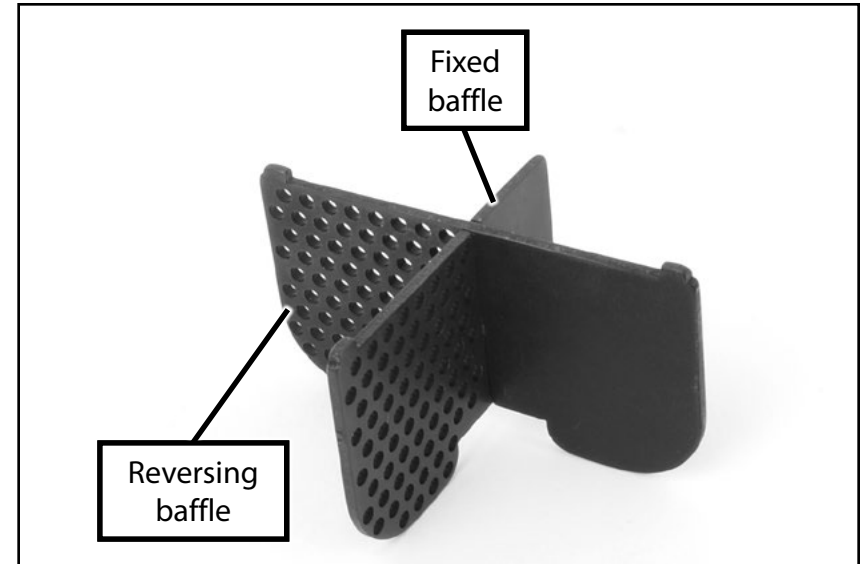
Lift the remaining baffles out of the separator housing. Note the position of the inlet screen on the reversing baffle (arrow).



REVERSING THE FLOW OF THE CATCH CAN

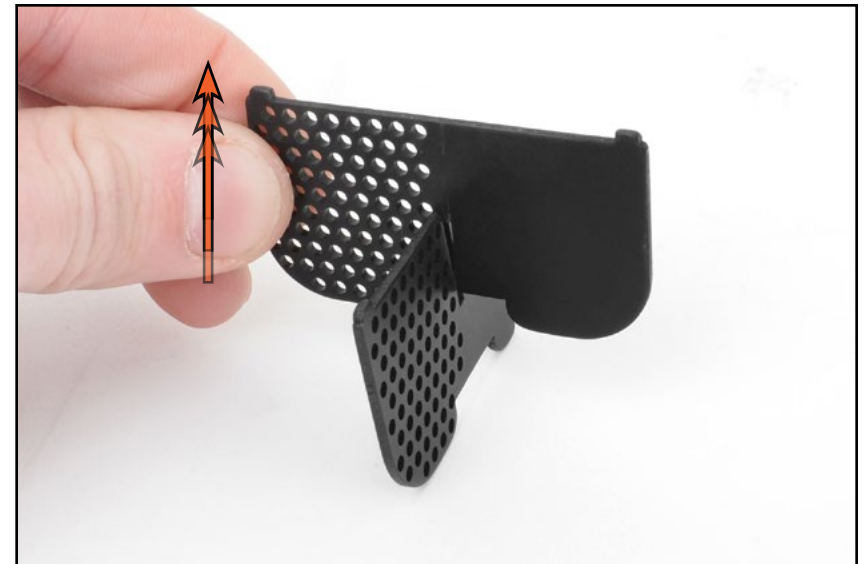
Step 5:

Again note the positions of the fixed baffle and the reversing baffle.



Step 6:

Slide the two baffles apart.



REVERSING THE FLOW OF THE CATCH CAN

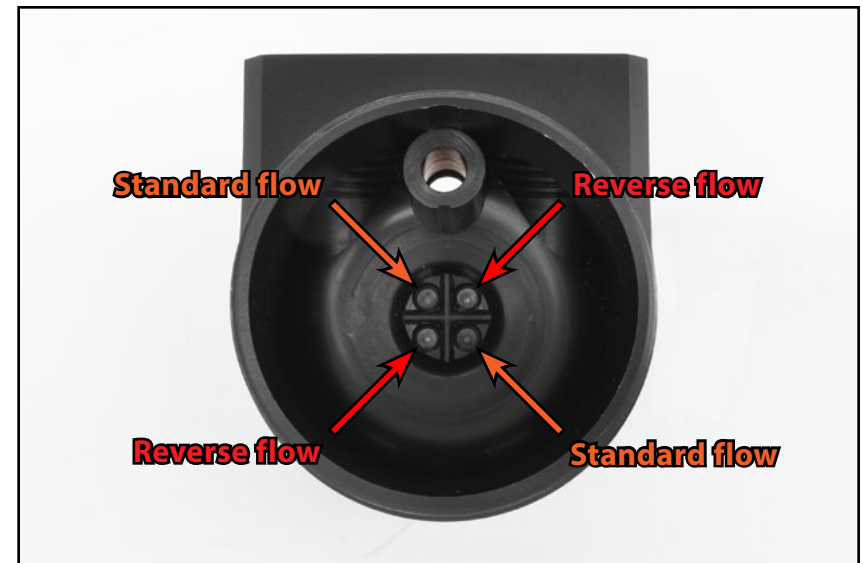
Step 7:

Flip the reversing baffle and slide it back onto the fixed baffle.



Step 8:

Inspect the inside of the separator housing. You will see that there are two sets of threaded holes for the baffle plate screws. When you reverse the flow, you will use the opposite holes when reinstalling the baffle plate screws.



REVERSING THE FLOW OF THE CATCH CAN

Step 9:

Reinstall the baffles into the separator housing. Note that the inlet screen on the reversing baffle should now be located on the opposite side.



Step 10:

Flip the baffle plate so it is opposite of the removal position and place it back into the separator housing.



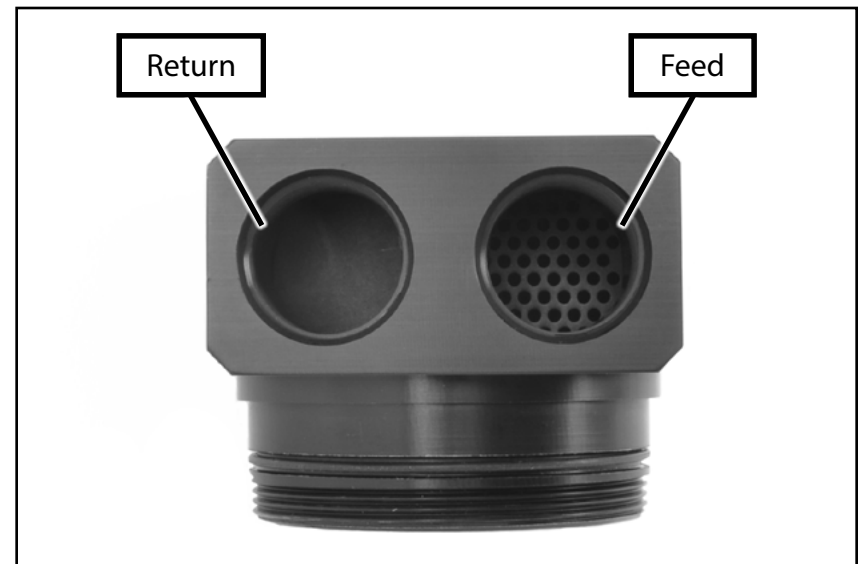
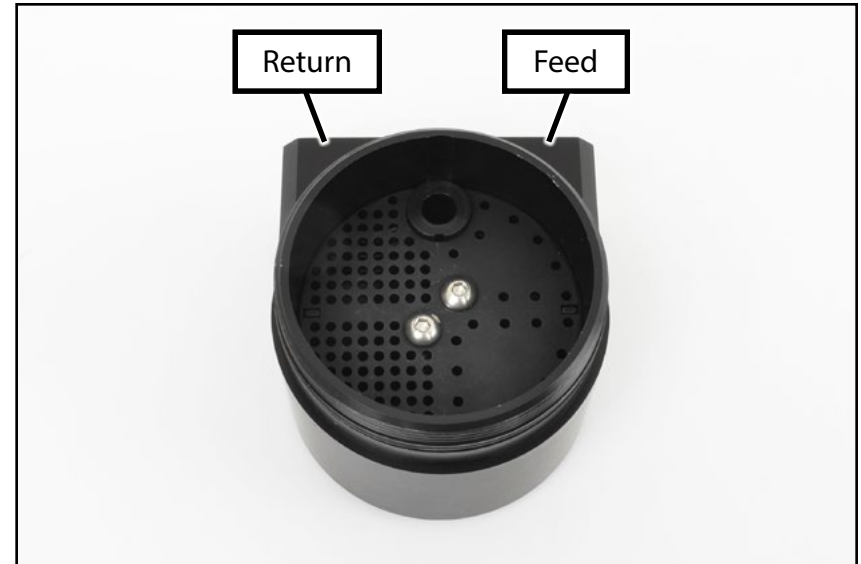
REVERSING THE FLOW OF THE CATCH CAN

Step 11:

Reinstall the baffle plate screws utilizing the opposite holes in the separator housing. Compare the new baffle plate position with step 2 in this section to make sure it is properly installed for reverse flow.

Step 12:

Your reverse flow separator will now have the feed side and return side located as shown in the photo.



Your Performance Baffled Oil Catch Can installation is complete!



These instructions are provided as a courtesy by Turner Motorsport

Proper service and repair procedures are vital to the safe, reliable operation of all motor vehicles as well as the personal safety of those performing the repairs. Standard safety procedures and precautions (including use of safety goggles and proper tools and equipment) should be followed at all times to eliminate the possibility of personal injury or improper service which could damage the vehicle or compromise its safety.

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