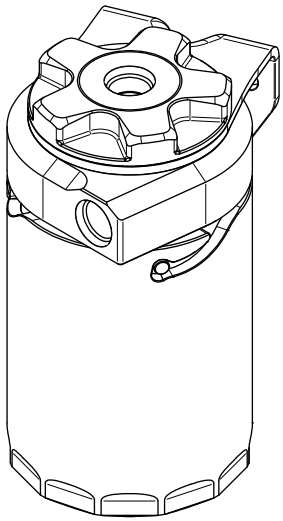
CATCH CAN SPORT

PART NO. CCS-350, CCS-700

MADE IN USA



Important: Read these instructions in their entirety prior to installation.

For contact information, visit www.improvedracing.com
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Rev 260902

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APPLICATIONS

- Gasoline direct injection engines seeking to combat carbon build-up on the intake valves.
- Factory and modified internal combustion engines experiencing:
  - Oil buildup inside the intake manifold.
  - Oil buildup on turbocharger/supercharger compressors.
  - Oil buildup on supercharger rotors, and at the base.
  - Tailpipe smoke from ingested oil.
  - Oil buildup on the throttle body from vented valve covers.
  - Oil buildup within charge air coolers.

MOUNTING THE CATCH CAN

A 90° mounting bracket is included with both catch can kits. Three slots accept hardware up to M6 or $^1/_4$" for secure mounting. The bracket has sixteen rotation positions for ideal fitment to your specific application.

Improved Racing sells a universal flat bracket. The flat bracket also fits M6 or $^1/_4$" hardware and has sixteen rotation positions. The part number is CCS-30 and is available for purchase on www.improvedracing.com.

RELEASING THE RESERVOIR

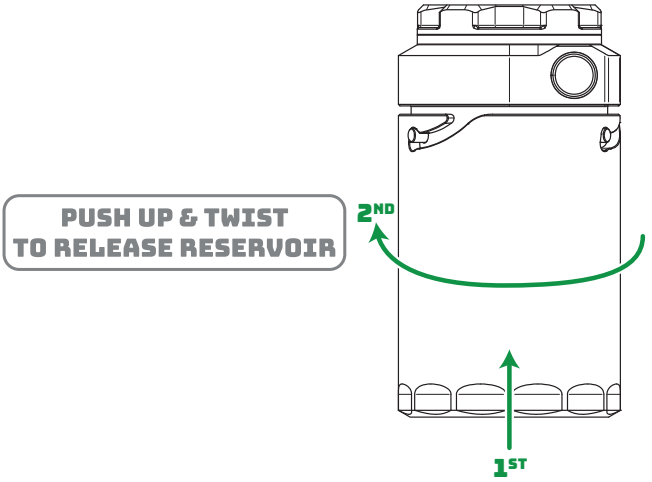


Figure 1 - Releasing the Reservoir

CATCH CAN FITTINGS

Catch cans have -6 SAE O-ring ports (ORB) for plumbing flexibility. The fittings in this section are available on www.improvedracing.com.

FACTORY QUICK CONNECT FITTINGS (SAE J2044)

- The -6 ORB to male quick connect adapters have the prefix OQ.
  - Available OQ angles are straight and 90°.
  - Available OQ sizes are 10mm, 12mm and $^{5}/_{8}$".
- The female quick connect fittings have the prefix BQF.
  - BQF fittings connect to the male barbs found on valve covers and PCV components.
  - BQF fittings must match the diameter of factory barbs, and OQ fittings.
  - Emission-compliant PH1 hose attaches and clamps to BQF fittings.

HOSE BARB FITTINGS & PUSH-LOCK HOSE ENDS

- The -6 ORB to barb adapters have the prefix OB-06.
  - OB-06 are straight adapters.
  - Available OB-06 hose barb sizes are $^{5}/_{16}$", $^{3}/_{8}$" and $^{1}/_{2}$".
- OM-06 adapters are required for angled barb and hose connections.
  - OM-06 are ORB to male flare adapters.
  - Push-lock hose ends install onto OM-06.
  - Push-lock hose ends have the prefix PL.
  - Standard angles are available for PL hose ends.
- Emission-compliant PH1 hose attaches and clamps to OB adapters and PL hose ends.

37° AN/SAE HOSE ENDS & FITTINGS

- The -6 ORB to male flare adapters have the prefix OM-06.
  - Available OM-06 angle is straight only.
  - Available OM-06 sizes are -6, -8 and -10 SAE male flare.
  - 37° hose ends connect to OM-06.

EUROPEAN NORMA ADAPTERS

- NORMA adapters are currently not offered by Improved Racing.

PLUMBING CONFIGURATIONS

⚠ **WARNING: NEVER tee vent lines into the PCV circuit.**

⚠ **Caution: This section only provides general advice.**

Note: The installer understands each engine is unique.

FACTORY CONSIDERATIONS

This section presents general information for factory vehicles. The figures that do not vent to atmosphere are emissions compliant because the factory plumbing is kept the same. Use these figures to install a catch can on factory vehicles with naturally aspirated engines and forced induction engines.

PCV circuits usually route from the valve cover to the intake manifold. Most catch cans install into the PCV line because oil vapor is abundant here.

- Check PCV valves and PCV diaphragms before installing a catch can.
    - The ball/plunger inside a PCV valve should move freely when shaken.
    - Clean the valve when stuck or replace the valve.
- Check PCV diaphragms on European/newer engines for tears and replace when torn.

Oil vapor released from the engine crankcase vent(s) can justify adding a catch can to the vent line. V-engines might have two vents. Catch cans are most effective on the dirtier vent, and the plumbing figures show this.

AFTERMARKET CONSIDERATIONS

This section has general advice for aftermarket-tuned engines. Examples of aftermarket-tuned vehicles include:

- Increasing or adding forced induction to an engine.
- Converting to dry sump engine oiling.
- Swapping non-original engines into a vehicle.

NATURALLY ASPIRATED ENGINES

PCV systems remove positive pressure from the crankcase. Reducing positive pressure is important for aftermarket engines. Positive pressure in the engine crankcase is like a shock absorber, damping usable horsepower and torque.

Removing PCV systems is not advised unless an auxiliary vacuum pump replaces it. The same is true if the engine is converted to dry-sump engine oiling. (*Fun Fact: Vacuum in the crankcase helps piston rings seal better and reduces the*

damping from positive pressure. This increases compression, or usable horsepower and torque.)

- Auxiliary vacuum pumps and dry sump oiling systems allow the installer to adjust gas scavenging from the crankcase when PCV systems are removed.

MEASURING MANIFOLD VACUUM

A quick test measures manifold vacuum for every engine out there. Measuring manifold vacuum tells the installer if a catch can is going to be effective.

- Tee a vacuum gauge into the PCV line.
- Warm-up the engine and measure the vacuum at idle
- Engines with vacuum less than 7 inHg should confirm the vacuum drop is no more than 1 inHg after installation.
    - This ensures the crankcase is properly scavenged by the intake manifold vacuum.
    - This also shows if auxiliary vacuum pumps are going to be needed.

BOOSTED CONSIDERATIONS

Pressure check the PCV valve/diaphragm when adding/increasing forced induction to an engine:

- Double the intended boost pressure and safely pressure check the valve/diaphragm.
- Upgrade failing PCV valves/diaphragms with in-line check valves to stop boost from going into the crankcase through the PCV circuit.

Improved Racing sells check valves suitable for this application.

- DCV-06, FCV-06 and FCV-12 check valves:
    - Cracking pressure = 0.05 psi (3.4 mb).
    - Checking pressure = 300 psi (20.6 bar).

Forced induction engines with vented crankcases require experimentation when choosing a recirculated vent versus venting to atmosphere. High boost, wet sump vehicles typically require vent to atmosphere setups.

- This plumbing immediately vents crankcase pressure from boost blowby.
- Blowby exists even when piston rings are designed for boost.
- Vent lines have to recirculate with non-boosted induction air, so the crankcase is not pressurized.
- Shop manuals and engine builders may provide this info. In general, tune the crankcase for vacuum conditions always.

PLUMBING FIGURES

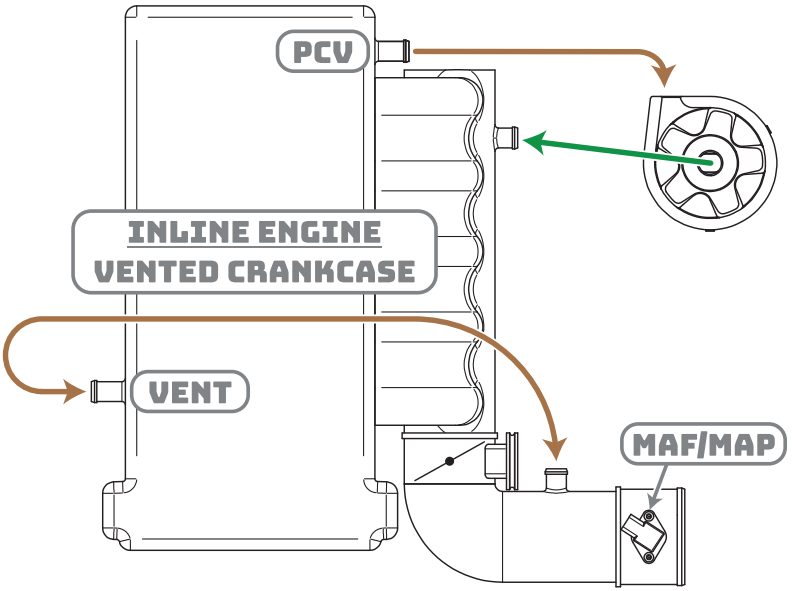


Figure 2 - N/A Inline Engine, Vented Crankcase, PCV Filtered

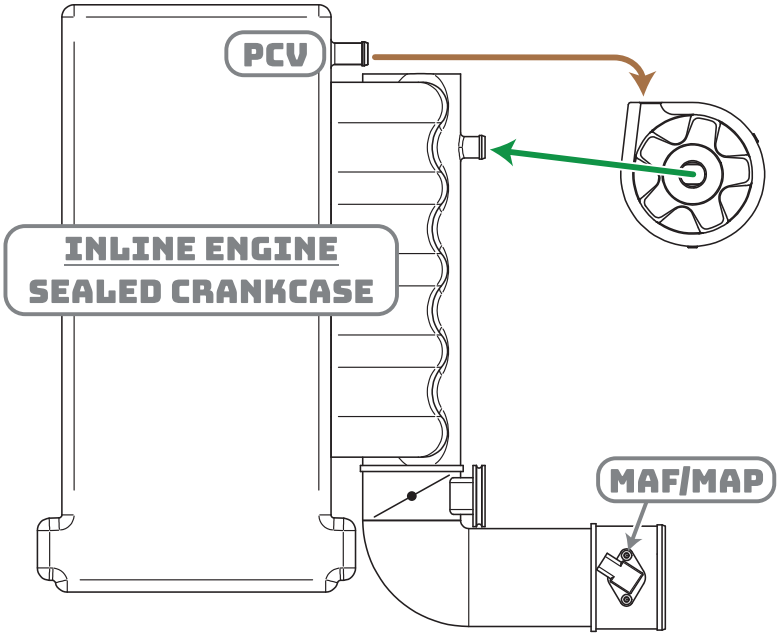


Figure 3 - N/A Inline Engine, Sealed Crankcase, PCV Filtered

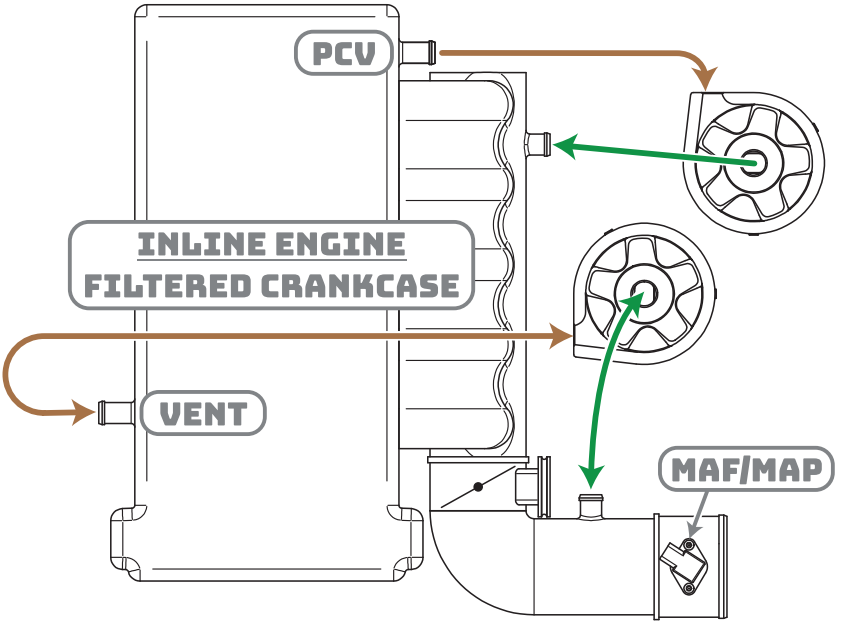


Figure 4 - N/A Inline Engine, PCV & Vented Crankcase Filtered

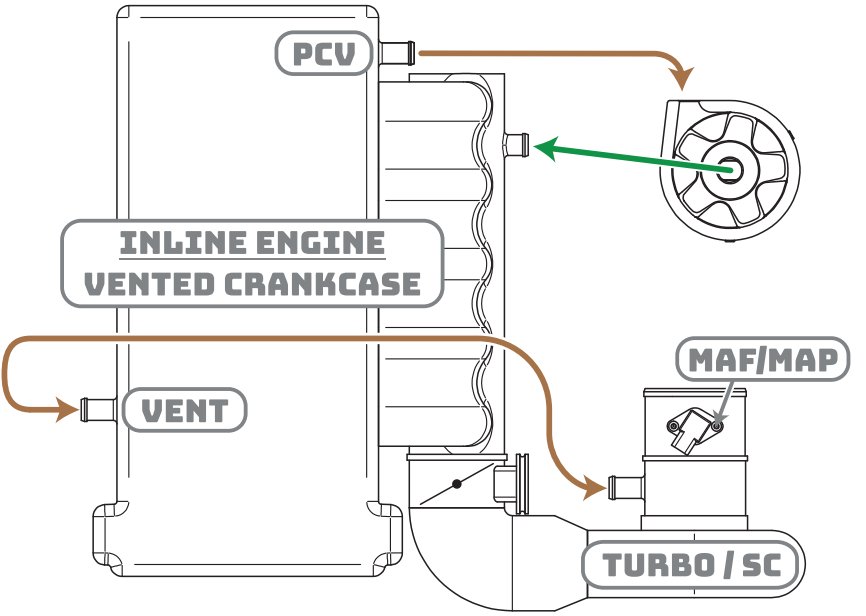


Figure 5 - Forced Induction Inline Engine, Vented Crankcase, PCV Filtered

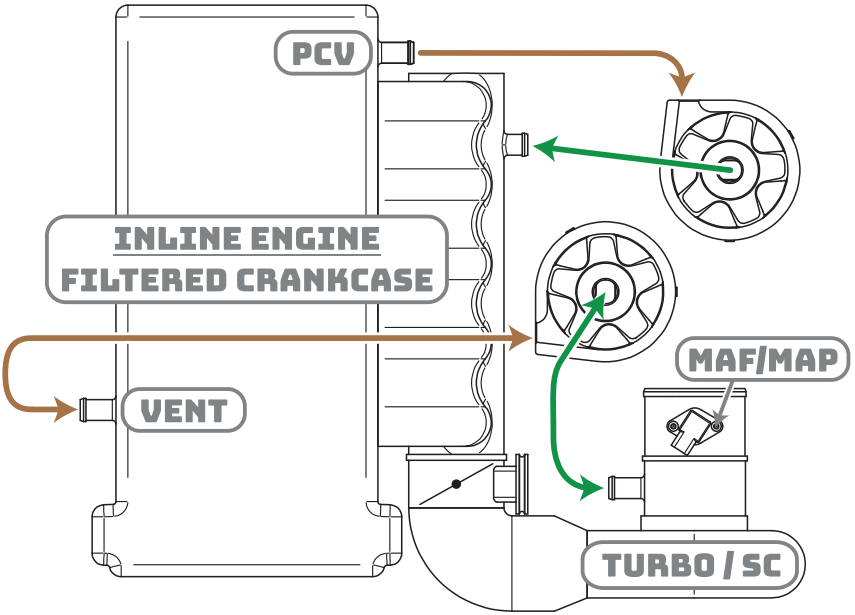


Figure 6 - Forced Induction Inline Engine, PCV & Vented Crankcase Filtered

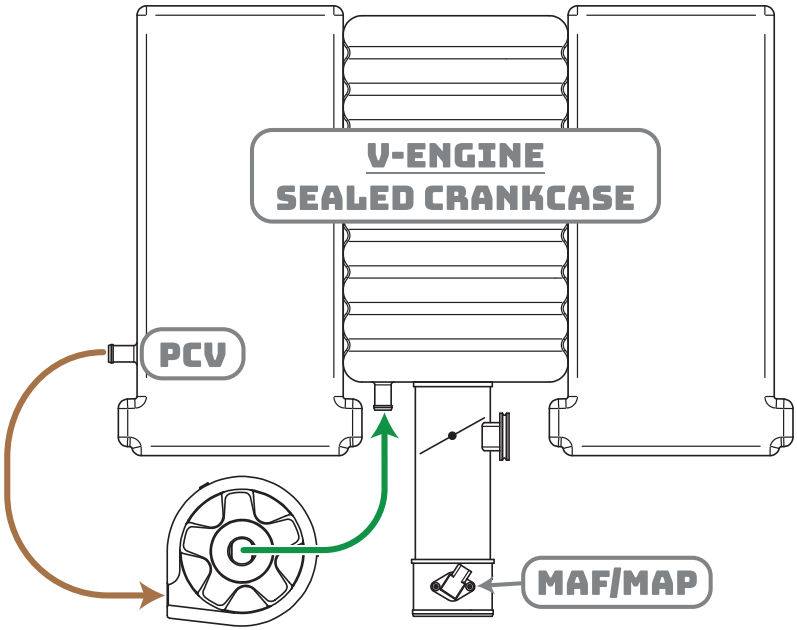


Figure 7 - N/A V-Engine Plumbing, Sealed Crankcase, PCV Filtered

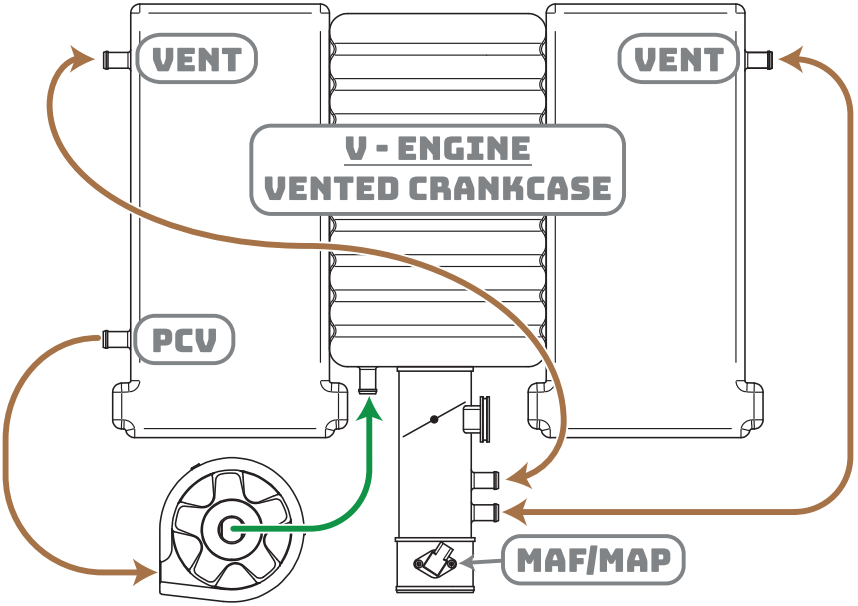


Figure 8 - N/A V-Engine, Vented Crankcase, PCV Filtered

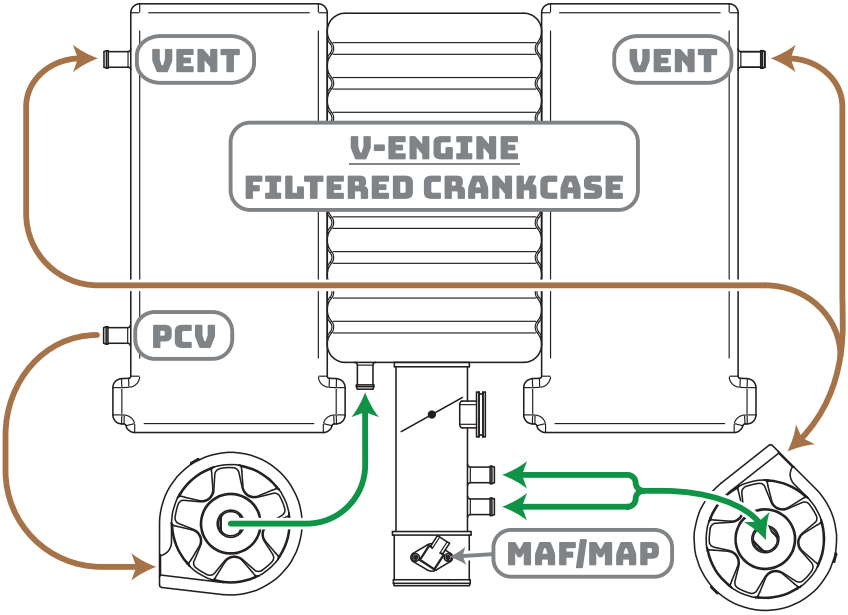


Figure 9 - N/A V-Engine, PCV & Vented Crankcase Filtered

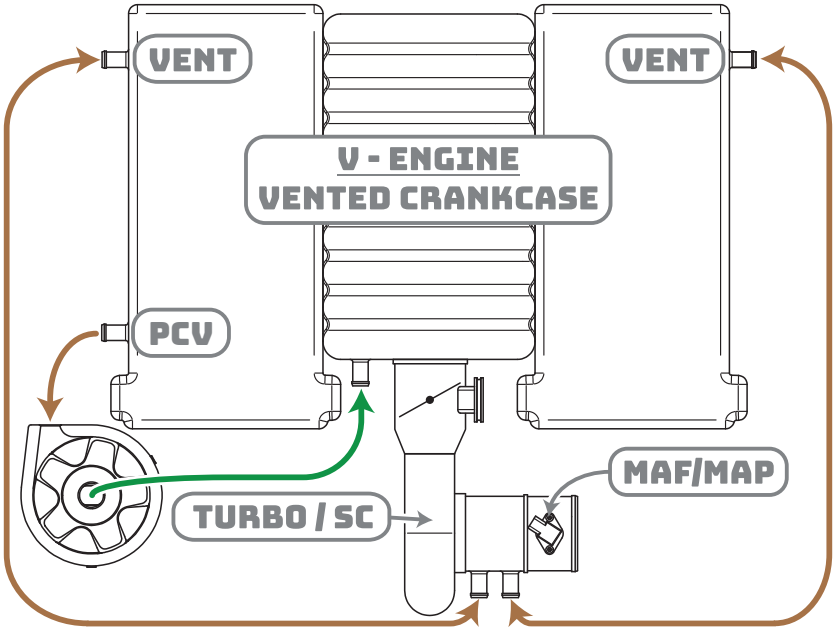


Figure 10 - Forced Induction V-Engine, Vented Crankcase, PCV Filtered

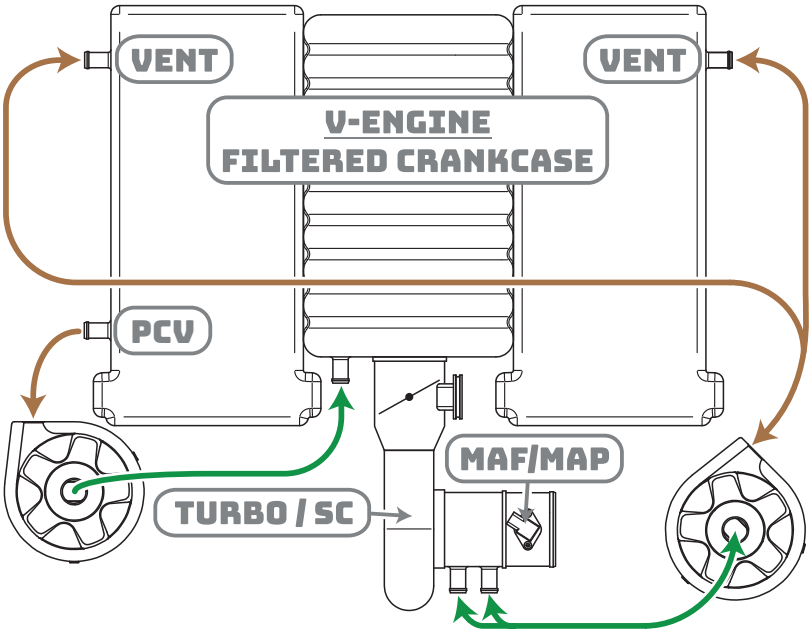


Figure 11 - Forced Induction V-Engine, PCV & Vented Crankcase Filtered

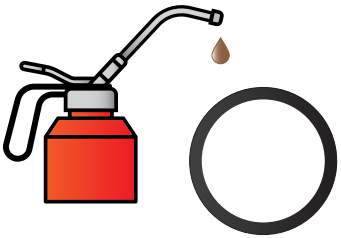
BEFORE YOU BEGIN

WARNING: This product should only be installed by a qualified mechanic. Improper installation could result in severe engine damage.

Please verify the PCV system functions, or that a vacuum pump is installed on custom built engines before installing catch can(s).

Refer to the Measuring Manifold Vacuum section of this manual when installing this on custom built engines.

Lubricate O-rings prior to installation to prevent damage and ensure a leak-free seal.



INSTALLATION INSTRUCTIONS

1. Select a location to install the catch can(s) on your vehicle.
2. Use 2 to 3 mounting slots in the supplied bracket.
3. Install the catch can to your vehicle based on the plumbing configurations presented in **Figure 2** through **Figure 11**.
4. Position the can ports as needed and tighten the green nut.
5. Torque the can fittings in between 13 to 16 lb-ft (17 to 22 N-m).
6. Connect and tighten all the lines.
7. Start the vehicle and confirm there are no vacuum leaks.

Installation is now complete. Thank you for purchasing an Improved Racing product!

PRODUCT SUPPLEMENT

TECHNICAL SPECIFICATIONS

Max. Operating Temp.	230°F (110°C)
Min. Operating Temp.	-30°F (-34°C)
Aluminum Parts	Top, Funnel, Plenum, Bracket Nut, Bracket, Reservoir, Reservoir Plugs, Lock Clip
Aluminum Finish	Plain Metal or MIL-A-8625, Type II Anodizing Black & Green
Stainless Steel Parts	Pins, Filter, Spring, Retaining Clip
Seals	FKM and NBR Elastomer

SAFETY LOCK CLIP

Improved Racing includes a safety lock clip with all CCS catch can kits. This lock clip makes sure the can never opens in the harshest conditions, or under high idle vacuum. Install and remove as shown in **Figure 12**, and as instructed on the clip itself.

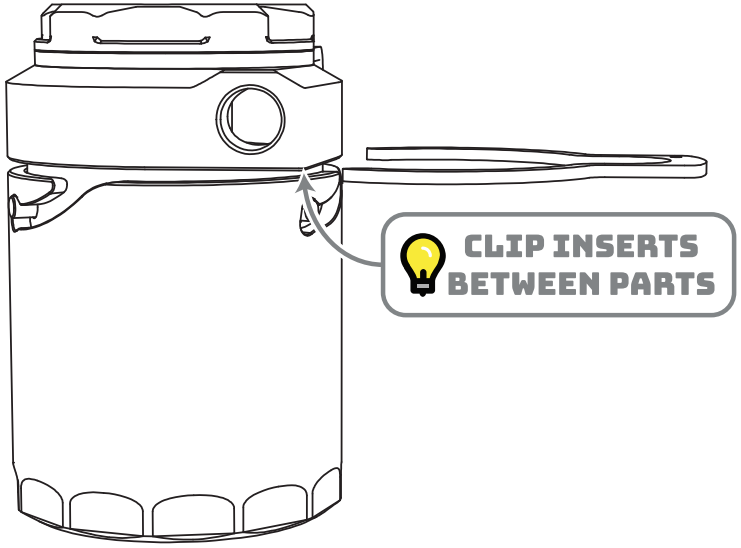


Figure 12 - Installing & Removing Safety Lock Clip

COLD CLIMATE CUSTOMERS

Customers living in cold weather climates should remove their catch can if the can collects more water than oil. Unless the filter was recently cleaned, there is always fluid that remains in the filter.

When the fluid collected is more water than oil, it freezes within the filter and blocks flow until the engine bay is warm enough to melt the water.

If this condition applies to your engine, removing the can during freezing winter temperatures ensures the PCV system operates properly.

WHEN TO DRAIN YOUR CATCH CAN

- The recommended draining interval for this catch can is after each oil change or track event.

Fluid begins to appear in the reservoir once the filter becomes fully saturated after approximately 200 miles of driving on the street.

D.I.Y. BRACKETS

Use the 1:1 scale (real world size) template below to create custom brackets from $^{1}/_{8}$" **thick metal**.

- When printing, set scale to 100%. Do not use "Fit to Page" or "Shrink to Fit," the template will not be actual size.
- Verify the printed template measures 2.44 in across before drilling.

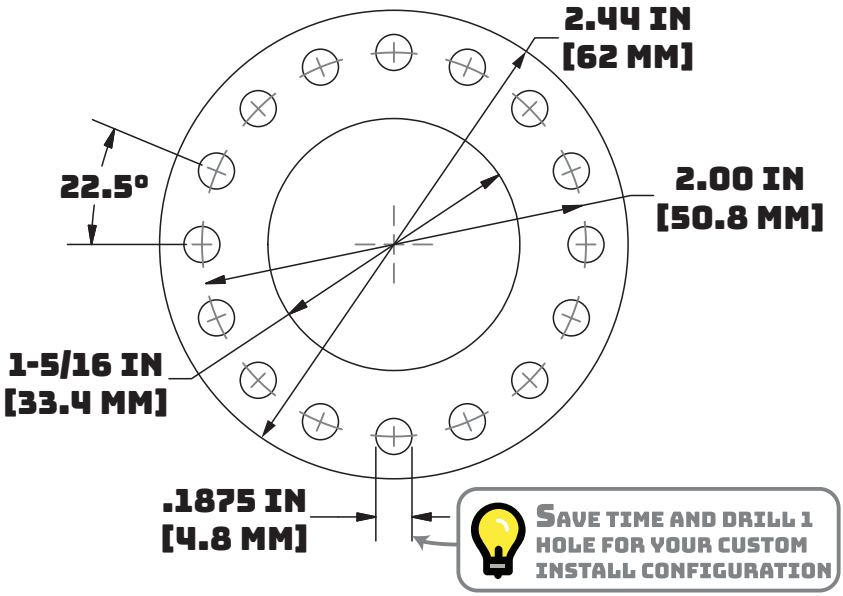


Figure 13 - CCS Bracket Hole Pattern for DIY Brackets (1:1 Scale)

CLEANING THE FILTER

- The filter should be removed from the catch can when cleaning.

Ensure the filter is installed in the same orientation it was removed, shown in **Figure 14** (page 17).

- CCS catch cans have a lifetime filter.

Regular filter maintenance is important for optimum performance.

Inspect the filter every 15,000 to 30,000 miles, or if you have experienced engine failure which might have sent debris inside your catch can.

- Clean the filter with your favorite parts cleaner, degreaser, ultrasonic cleaner, etc.

Do not spray brake cleaner or degreaser into the assembled can because it can damage the O-rings.

- Dry the filter with compressed air.

REMOVING THE FILTER

Follow these steps while referring to **Figure 14** (page 17) to remove the filter from the catch can top for cleaning. A video of this process is available **here**.

Take pictures for reassembly.

Reassembly is done in reverse order.

1. Remove the reservoir, bracket nut and bracket from the top.
2. Use a small regular screwdriver to remove the retaining clip.
3. Remove the funnel.
4. Inserting the tool from the OUT port, remove the plenum with a 10mm hexagon key.

Turn the tool clockwise to loosen the plenum.

   a. Ensure the small O-ring is removed with the plenum.
   b. Loosen = Turn Right.
   c. Tighten = Turn Left.
   d. Reassembly Torque = 35 lb-in (3955 N-mm).

5. Remove the filter from the plenum.
   a. The small square O-ring remains on the plenum.
   b. The large square O-ring remains in the top.

MANIFOLD SCHEMATIC

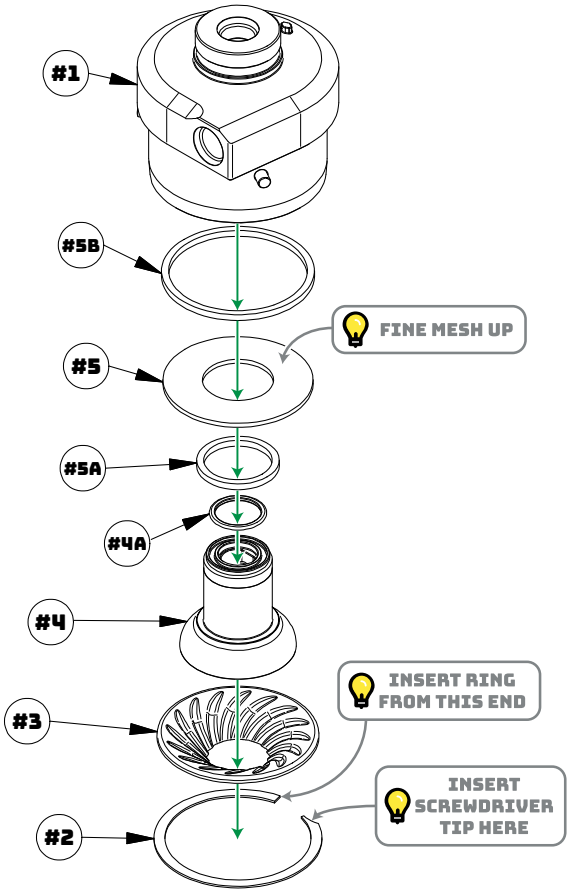


Figure 14 - Manifold Schematic

#	Part #	Name
#1	CCS-00-B	Manifold (can top)
#5B	HRG-1035	O-ring, filter upper
#5	HFL-2100	Filter, 100 micron
#5A	HRG-1019	O-ring, filter lower
#4A	HRG-1033	O-ring, plenum
#4	CCS-02-A	Trumpet plenum
#3	CCS-01-A	Funnel
#2	HRC-2001	Retaining clip