

# Combustion Technologies By-Pass Filtration Instructions



Made in the USA

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**PLEASE READ AND UNDERSTAND ALL INSTALLATION INSTRUCTIONS PRIOR TO BEGINNING THE INSTALLATION OF THE COMBUST FILTRATION SYSTEM.**

**Your Combust Filtration By-Pass kit should come with the following items:**

**Part List and Part Number:**

- Combust Filter Machined Blue Aluminum Head Unit (Part # CT-CBFHB-1)
- Combust Filter 11" (inch) 3-Micron Spin On Filter (Part # CT-510SPC)  
*Optional Combust Filter 7" (inch) 3-Micron Spin On Filter (Part # Ct-507SPC)*
- Mounting Bracket (Part # CT-CFAHMB-1)
- Slide Bracket (optional) "for extended frame mount or cab mount support" (Part # CT-CFEFMB-1)
- Oil Pressure Gauge 1-100 psi (Part # CT-OPG-100-1/8)
- Oil Sample Valve (Part # CT-OSV-1/8)
- 3/8"x 3/4" Flange Bolts (4)
- 3/8"x 1.5" Mounting Bolts (4), Flat Washers (8), 3/8" Nylon Lock Nuts (4)
- Brass 1/4" NPT x 4 MJIC Fitting (oil pressure "IN" on head unit) (Part # CT-004-4JIC)
- Aluminum (Blue) 1/4" x 4 MJIC Fitting (oil pressure "Out" on head unit) (Part # CT-004-4JIC.50)
- 1/8" NPT Allen Recessed Plug (Part # CT-008-Plug -H)
- Engine Block Oil Pressure Port Fitting (optional, see table for oil pressure port fitting for your application)
- Engine Oil Return Line Fitting (optional, see table for oil pan oil return fitting matching your application)

**Combust Filter Kit # CT-CBFK-1**



**Optional Frame Mount (Part # CT-CGEFMB-1)**



**Safety Precautions:**

- Before beginning work, ensure the engine has sufficiently cooled to prevent burn injuries.
- Installation of this filter should be performed by a qualified technician

**General Precautions:**

- Always wear safety glasses and other necessary protective gear during the installation of your Combustion Technologies Oil By-Pass Filtration System

**Notes for all Hose Connections:**

- If using non-crimped fittings for your hose assemblies use a heat gun or soak the hose ends in hot water to expand them to ease assembling hoses over barbed fittings. Be sure to shake off any water from the hoses.
- Apply light oil such as silicon spray or penetrating spray inside the hose end to ease the assembly of the adaptor into the hose end. *DO NOT* use grease or engine oil for this purpose.
- Slide a 1/2" hose over each 1/4" hose at those places where the hose comes close to moving or vibrating parts. This is to protect the 1/4" hose from abrasion. Also add the 1/2" hose to the parts of the hose that bend. This will help the 1/4" hose hold its shape and prevent crimping.
- Route all hoses away from extremely hot components, such as exhaust pipes and the turbo.
- Route all hoses away from moving parts, such as the radiator fan, belts and pulleys.
- Use ties to secure the hoses in place.
- Ensure the hose is the proper length before sliding them over the barbed hose fitting, as hoses must be cut to be removed from the fittings.
- Leave a slight amount of slack in the hose to allow for engine vibration.
- Use Liquid Teflon on all NPT threads. (Teflon Tape not recommended)

**Before Installing the Combustion Technologies By-Pass Filtration System:**

- It is recommended that you perform an oil change on the vehicle as part of the installation of this system.
- Be sure to handle used oil in compliance with all applicable laws. This will usually include making provisions for recycling.
- Always wear oil resistant gloves when handling used oil.
- It is recommended that you take an oil sample test of the used oil. This sample can then be used as a "Base Line" to compare with future samples.

**Technical Support** .....Call Toll Free 866-680-3055

## Installation of your Combustion Technologies By-Pass Filtration System

1. Position bracket and use as a template to mark and drill (4) 3/8" holes.

**Note:** Make sure that there is room for removal and service of the filter and that it is clear of steering components, axle movement, hood access, or other moving parts when looking for a suitable mounting location.

**NOTE:** Before drilling into the frame, check inside the frame rail for hoses or wiring that may be routed there. If hoses or wiring are present, move them out of the way or select a different location on which to mount the filter.

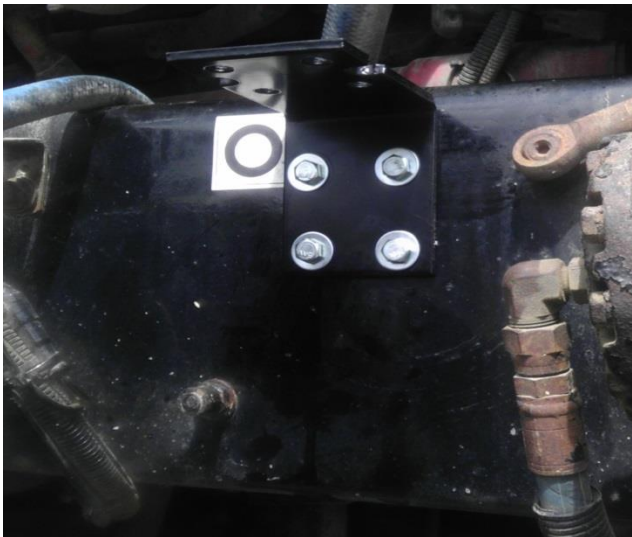
**See Illustration 1:**



**Illustration # 1**

2. Attach steel mounting bracket to frame rail using supplied 3/8" x 1.5" bolts, washers, Nylon locknuts.

**See illustration 2:**



**Illustration # 2**

3. Attach the Combustion Technologies By-Pass Filtration head unit to the mounting bracket using supplied 3/8" x 3/4" Flange Bolts.

**See illustration 3:**



**Illustration # 3**

4. On each side of the oil pressure "IN" port is a 1/8" NPT port for the supplied Oil Sample Valve. Choose the port that is best suited for your application and install the Oil Sample Valve.

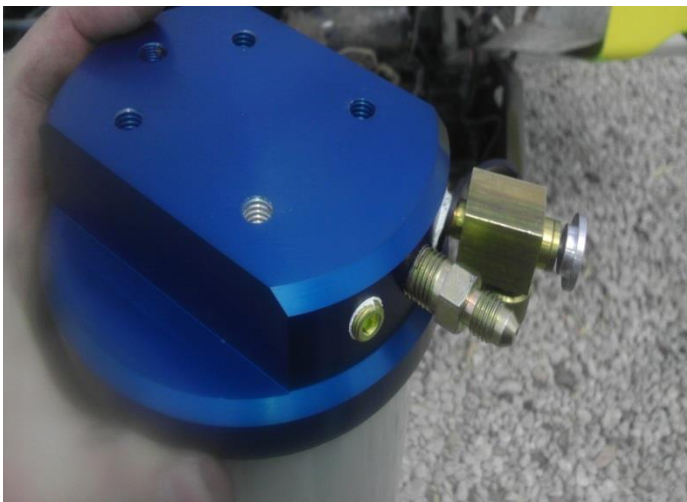
**See illustration 4:**

5. Use the supplied 1/8" NPT Allen head plug to seal the other port not in use.

**See illustration 4:**

6. Install Steel/Brass 1/4" NPT x 4 JIC fitting to the "IN" oil port on the aluminum head unit

**See illustration 4:**



**Illustration # 4**

7. Install aluminum (blue) 1/4" NPT x 4 JIC fitting to the "OUT" oil port on the aluminum head unit.  
**Note:** This aluminum fitting has been flow tested and must be used only on the "OUT" oil port for the oil pressure gauge to work correctly.

**See illustration 5 & 5.1**



**Illustration # 5**



**Illustration # 5.1**

8. Install the supplied oil pressure gauge in the 1/8" NPT port located on the top of the Blue Combust Filter Head. Face the gauge so the dial is visible for easy inspection and does not interfere with any moving parts. This gauge will allow you to determine the oil pressure at start-up of your engine as well as tell you when the Combust Spin-On Filter needs to be changed/replaced. (Please read Servicing your filter on page 7 of the instructions)

**Note:** Always use liquid Teflon instead of tape when installing fittings and gauges into an aluminum material. This will help protect the threads from stretching and allow for a nice seal.

**See illustration 6:**



**Illustration # 6**



9. Locate a suitable oil pressure port on engine block, oil filter housing, or other location and install necessary fitting. We do not recommend using the turbo oil feed line. Refer to your owner's manual if necessary.

**See illustration 7 & 7.1**



**Illustration # 7**



**Illustration 7.1**

10. Route and install oil supply line to the 1/4" NPT x 4 JIC on the (IN) port of the Combustion Technologies By-Pass Filtration Aluminum Head Unit. Secure oil supply line with wire ties as needed. Make sure that the oil supply line will not rub on moving parts or melt or burn on the exhaust and turbo.

**See illustration 8**



**Illustration # 8**

11. Locate a suitable location for the oil return line. The oil pan is preferred in most cases. Other possible locations include the oil fill tube or cap, valve cover, front engine cover, or other non-pressure location that will return the clean oil to the sump. Refer to your owner's manual if necessary.

**See illustration 9 & 9.1:**



**Illustration # 9**



**Illustration # 9.1**

12. Install the correct fitting for your application to the selected oil return port.
13. Route the oil return line in a similar manner. Use care and avoid rubbing and close proximity to heat sources. Secure with wire ties and protective covering as needed.
14. Install the replaceable Combust Spin on Filter (Part # CT-510SPC or CT-507SPC) to the blue aluminum head unit.
15. Use a small amount of oil on the rubber seal and hand tighten. **Do not prefill filter with oil.**

**Note:** BEFORE STARTING YOUR ENGINE: MAKE SURE YOU HAVE CHECKED THE OIL FOR THE PROPER LEVEL AND THAT ALL FITTINGS, HOSES, FILTERS AND GAUGES ARE INSTALLED CORRECTLY!

**Operational Testing:**

- Check and fill all oil levels before operational testing.  
Note: (DO NOT PREFILL THE COMBUSTION TECHNOLOGIES SPIN ON FILTER)
- Start Engine
- Look at the oil pressure gauge on the top of the aluminum head unit and watch for pressure. (This could take a couple of minutes as the filter is being filled)
- When pressure is indicated you will know that the filter is full and the oil is flowing correctly.
- Check for leaks. If a leak is detected shut-off the engine and repair as needed.
- Shut off engine and check oil level. Fill to proper level.
- The Combustion Technologies Spin on Filter holds approximately 2.5 quarts of oil.

### **Road Test:**

After the installation is complete you will want to go on a road test. It is important that you periodically check the Combustion Technologies By-Pass Filtration System for leaks, rubbing on hoses, and bolts that may have vibrated loose. Always check fluid levels and monitor gauges for safe operation.

**Note: Never run an engine that is low on oil!**

### **Servicing:**

#### **Replacing the Spin-On Filter Element**

***(The pressure gauge that comes with the kit (illustration # 6) will help determine when your spin-on Combust Filter may need to be replaced. Please note the pressure at start up after the engine has come to the operating temperature. (Example 60-psi) Once your Combust Spin-On Filter has become full of contamination and water, the pressure gauge should show a drop in reading which indicates it is time to replace the filter. (Example 15-psi)***

Replace the Combustion Technologies spin-on filter at the oil service interval recommended by the manufacturer. (See your owner's manual) The manufacturer's recommended oil change interval is a safe starting point to do an oil analysis and safely extend oil change intervals.

- Make sure your engine is at a safe temperature to work on to avoid burn injuries
- Place an oil drain pan below the filter in case of a spill
- Remove the used filter by hand or with a filter wrench
- Before installing the new filter, lubricate the new rubber seal with clean oil (DO NOT pre-fill filter)
- Tighten the replacement Combustion Technologies filter by hand until the gasket contacts the base and ensure proper seating of the filter and new gasket.  
Note: (DO NOT USE A FILTER WRENCH AND DO NOT OVER TIGHTEN)
- Start Engine and run until oil pressure is indicated on the oil pressure gauge on the top of the aluminum head unit. This insures that the filter is full.
- Check for leaks
- Stop engine. Check oil level and fill as required

We recommend that you change the Combustion Technologies Filter every normal service interval as recommend by the engine manufacturer.

- The OEM Full Flow Filters should be changed at a maximum of 1 year or 80,000 miles.
- Take Oil Samples at the normal service interval (as recommend by the manufacturer).
- Shorten this interval if the results of the previous oil test indicated a potential problem.

### **Oil Sample Procedure:**

- Start the engine and bring the engine to normal operating temperature.
- With the engine running, remove the safety cap on Oil Sample Valve (part #7). To ensure an accurate sample reading, purge the sampling valve to flush out impurities that may have settled in the valve opening.
- Hold the clean sample bottle under the sample valve and push on the button until bottle is filled to correct level.
- Screw cap tightly onto the sample bottle
- Screw the Safety Cap back onto the Sample Valve
- Fill out documentation forms with all the necessary information required by your lab and return with oil sample to your test facility.

Oil Sample Testing is the only way to safely extend oil drain intervals. Working with a qualified testing facility can help you determine when an oil change is needed. Your new Combustion Technologies By-Pass Filtration System can safely extend oil change intervals, reduce engine wear, reduce waste oil disposal costs, and increase fuel efficiency by simply keeping the oil clean!



## Engine Manufacture Port Fitting Size Chart

<u>Engine</u>	<u>Oil Pressure Port Fitting Specifications</u>
Caterpillar 3406	1/4" Male NPTF to 1/4" Hose Barb fitting
Caterpillar 3408	1/4" Male NPT to 1/4" Hose Barb fitting
Cat C-7	7/16 x # 4 JIC Adapter to # 4 JIC to 1/4" Barb Fitting
Cat C-9	# 4 O-ring x # 4 JIC to # 4 JIC to # 4 barb
Cat C13	Tap oil pressure gauge line
Cat C15	1/4" NPT on filter block or 7/16" O-ring x 4 JIC to 1/4" Hose barb fitting on the sending unit block
Cummins B5.9	1/4" NPT Tee or #4 JIC Branch Tee or 1/8" NPT Tee
Cummins ISM 2005	14mm x 1.5 plug or 14mm x # 4 JIC
Cummins ISX	14mm x 1.5 plug on oil cooler
Cummins M11	1/2" Boss O-Ring, 1/4" Male NPTF to 1/4" Hose Barb fitting
Cummins N14	1/2" Boss O-Ring, 1/4" Male NPTF to 1/4" Hose Barb fitting
Detroit Diesel 60 Series	1/4" Male NPTF to 1/4" Hose Barb fitting
Detroit Diesel 60 Series	1/8" NPTF Tee with 1 male and 2 females fitting, 1/8" Male NPTF to 1/4" Hose Barb fitting
Detroit Diesel 60 Series	1/4" Oil Pressure ports (2) located on Passenger side behind exhaust
Detroit Diesel 60 Series	1/4" JIC Tee or #4 JIC Branch Tee
Detroit Diesel DD13	33mm-2.0 X 1/2" NPT
Detroit Diesel DD15	33mm-2.0 X 1/2" NPT
International DT 466	#4 Branch Tee to # 4 JIC hose barb
Isuzu NPR	1/8" NPTF Tee with 1 male and 2 females fitting, 1/8" Male NPTF to 1/4" Hose Barb fitting
John Deere	1/8" NPTF Tee with 1 male and 2 females fitting, 1/8" Male NPTF to 1/4" Hose Barb fitting
Johnston	1/8" Male NPTF to 1/4" Hose Barb
Komatsu	1/8" Male NPTF to 1/4" Hose Barb
Mack E7	1/4" NPT to 1/4" Hose Barb
Mack 427 & 454	1/4" NPT to 1/4" Hose Barb
Mack 460-E	1/4" Male NPTF to 1/4" Hose Barb
Mack MP7 - M8	16 MM Male w/O-Ring x 1/4" NPT Female
Mercedes 900 Series	M14 under filter housing storm to 1/4" hose barb
Mercedes 4000	14mm x # 4 JIC to # 4 JIC x 1/4" Hose Barb
Perkins F406	(3/8 x 1/4 FE Coupler) to 1/4" barb
Volvo 5.0	1/8" NPTF Tee with 1 male and 2 females fitting, 1/8" Male NPTF to 1/4" Hose Barb fitting
Volvo VED12	16mm x 1.5 plug x 1/4" NPT to 1/4" Hose Barb Fitting
Volvo VE16	10mm x 1.5 x 1/8" NPT to 1/8" 90 degree elbow to 1/8" NPT x 1/4" barb
Yanmar Marine	1/8" Male NPTF to 1/4" Hose Barb

**\*Check your owner's manual or consult your OEM dealer for additional pressure port locations**