



# Eco-Pur™ Installation Instructions & Maintenance Manual

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Technical Support	Call Tol	l Free: (724) 360-4080

#### **Technologies For a Greener Future**

OPS prides itself on being a green company and is committed to protecting the environment by providing high-quality "green" products, and technologies for a wide range of industrial and commercial applications. Our goal is to aggressively reduce consumption of petroleum and synthetic based lubricants and fluids.

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## Installation

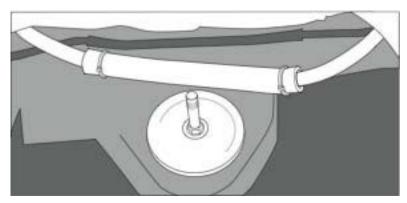
### Safety Precautions Before Beginning Work

- Work in a clean, well-lighted area.
- Wear proper safety apparel.
- Chock wheels.
- Ensure the engine has sufficiently cooled to prevent burn injuries.
- Disconnect batteries.
- Follow any and all other applicable safety procedures.

Ensure the voltage (12V or 24V) of the system being installed matches that of the truck. (See Section 4).

#### Notes for all Hose Connections

- To expand hoses and ease assembling over barbed fittings, use a heat gun or soak the hose ends in hot water. (Shake off any water from the hoses.)
- To ease the assembly of the adaptor into the hose end, apply light oil such as silicon spray or WD40 inside the hose end. *DO NOT* use grease or engine oil for this purpose.
- To protect the ¼" hose from abrasion, slit and wrap a ½" hose over each ¼" hose where it comes close to moving or vibrating parts (Fig. 1). Also, to help the ¼" hose hold its shape and prevent kinking, add the ½" hose to the parts of the hose that bends.



#### Figure 1: Protecting Hose Assembly

- Ensure that all hoses are of adequate length to prevent kinking.
- Route all hoses away from extremely hot parts, like exhaust components. ROUTE ALL HOSES AT LEAST 8" AWAY FROM TURBO AND ANY OTHER HEAT SOURCES OR EXHAUST COMPONENTS.

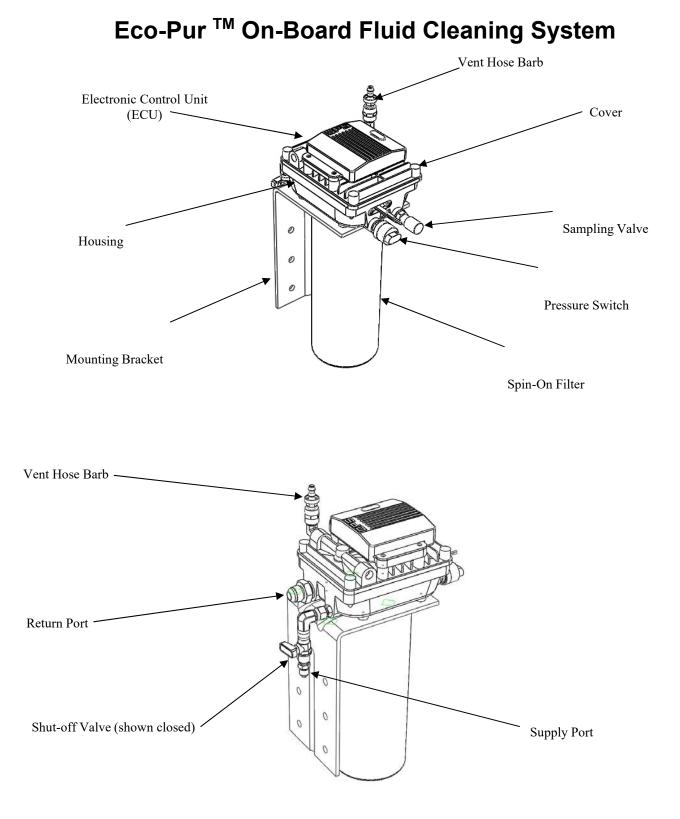
- Route all hoses away from moving parts.
- Use tie straps (provided) to secure hoses in place.
- Ensure the hose is the proper length before sliding it over the barbed hose fittings, as hoses must be cut to be removed from the fittings.
- Leave a slight amount of slack in the hose to allow for engine vibration.
- Use the shortest length of hose that will meet these guidelines.
- Use two wrenches when tightening fittings to ensure a secure connection.

#### Before Installing This System

- For optimal performance, OPS recommends changing the oil and filters at time of installation, if your current oil has more than 5,000 miles on it.
- Be sure to handle used oil in compliance with all applicable laws. This usually includes making provisions for recycling.
- Always wear proper personal protection equipment such as oil-resistant gloves and safety glasses when handling oil products.
- Follow any and all other applicable safety procedures.

**Technical Support** 

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#### Figure 2: Major Components

(For a listing of Part Numbers refer to page 15)

## Section 1 – Locate the Supply and Return Ports on Vehicle/Equipment

#### Supply Port

This port supplies the Eco-Pur System with pressurized lubricating oil. Typical locations may include:

- Pressurized ports on the engine block.
- The filter head assembly.
- Auxiliary components with an oil supply line (i.e. an air compressor) where applicable.

#### **Return Port**

This port returns oil by gravity from the Eco-Pur System. Typical locations may include:

- Access ports on the oil pan.
- Auxiliary dipstick or oil-fill tube port.
- Access plates (which may require drilling and tapping to accept a return fitting).
- Auxiliary drain plugs.

**Note:** If there are multiple options for the Return Port, select the one that is lowest on the engine, as this provides the most options for mounting Eco-Pur. The selected return port may be below the oil level. This does not affect the operation of the system.

## Section 2 – Mounting the System

#### Select a location

Selecting the optimal mounting location is important to ensuring that the Eco-Pur System operates properly. Choose a location with the straightest access to the return port.



DO NOT MOUNT DIRECTLY TO ENGINE.

Follow these guidelines when determining a final mounting location, which should:

- Position the System's return fitting at least 12" above the oil level in the oil pan.
- Allow the system to be mounted vertically.
- Allow easy access to the filter.
- Provide at least 1-½" (38 mm) clearance below the bottom of the filter and any obstruction.
- Provide room for supply and return hoses.
- Allow room to access the oil sample valve.
- Allow the hood to close.
- Be capable of supporting 175 lbs (80 kg) to handle forces exerted during normal operation.
- Facilitate hose routing. See page 10 for hose routing requirements.
- Minimize interference to nearby serviceable components.
- Allow clearance from spring hangers, steering components and wheel turning radius when mounting to frame rail.

#### **Mounting Notes**

- The universal bracket (provided) supports 6 different Eco-Pur placement positions. Select the mounting direction that best facilitates hose routing and oil sample valve access, and protects the unit from moving parts.
- The bracket typically mounts directly to the frame, Firewall or support structure of another component, such as a radiator or air filter. If such a location cannot be found, you may need to fabricate a secondary bracket to position the unit properly.
- If mounting to the Firewall, be sure to check the opposite side for wiring or components that could be damaged during the installation process.
- 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.

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*If you're unable to determine a proper mounting location, call OPS Technical Services at (724) 360-4080* 

#### Mounting the Bracket (provided)

- Identify existing holes or mark new mounting holes using the bracket as a template. A minimum of 2 holes are required to mount the bracket; 3-4 are recommended.
- Drill 3/8" mounting holes.
- Mount the bracket using the 5/16" bolts, split washers and nuts provided with the unit. (Fig. 3).

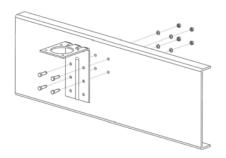


Figure 3: Mounting Bracket to Vehicle

#### Mounting the Housing to the Bracket

• Remove the protective red plastic plug in the brass orifice.

## \*\*\*\*DO NOT REMOVE THE BRASS ORIFICE\*\*\*\*

- Position the housing on the bracket.
- Secure with four (4) <sup>1</sup>/<sub>4</sub>-20 bolts and split washers provided with the unit. (Fig. 4). **Torque bolts to a maximum of 10 ft. lbs. DO NOT OVER TIGHTEN.**



Figure 4: Mounting Housing to Bracket

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## **Section 3 – Installing Fittings and Connecting Hoses**

**Note:** After a suitable location for **ECO-PUR** unit has been established, proceed with hose fabrication and installation.

#### Hose (provided) Specifications

- 1/4" Supply Hose, use Parker 836 high temperature push lock hose (or equivalent).
- <sup>1</sup>/<sub>2</sub>" Return Hose, use Parker 801 general-purpose push lock hose (or equivalent).
- <sup>1</sup>/<sub>4</sub>" Vent Hose, general-purpose hose.

#### Connecting to the Supply Line

Connecting to the selected oil supply source may require the insertion of a T-fitting, replacing a plug with a hose fitting, or the use of an adaptor fitting and hose fitting. The fittings for the supply hose will have  $\frac{1}{4}$  barbs on one end.

Once the oil supply port has been identified install the required adaptor if necessary.

Measure the distance from this source to the inlet port on the shut-off valve on the housing. Run a tape measure along the route you will use for this hose. Add adequate distance to the measured length to accommodate engine vibration, movement and hose-bend radius.

- Cut the <sup>1</sup>/<sub>4</sub>" Push Lok hose to length.
- Insert the ¼" Barb x #4 JIC fitting into one end of the supply hose for connection to the inlet port on the shut-off valve on the filter unit. (see Notes for Hose Connections, page 3 and 4)
- Insert the required ¼" hose barb fitting in the other end of the hose for connection to the adaptor (if used) or directly to the pressurized oil source on the engine. Attach the hose to the oil supply port on the engine block or adaptor used in the oil supply port.

The  $\frac{1}{4}$ " Barb x #4 JIC fitting can now be connected to the inlet port on the shut-off valve on the filter.

- Using cable ties, secure lines to minimize chafing and wear.
- Cover <sup>1</sup>/<sub>4</sub>" hose with <sup>1</sup>/<sub>2</sub>" hose in areas that may chafe.

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#### Connecting the Oil Return Line

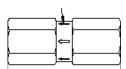
Connecting to the selected oil return port may require the insertion of a T-fitting, replacing a plug with a hose fitting, or the use of multiple fittings. The fitting(s) will connect to a  $\frac{1}{2}$ " return hose.

#### Because this connection is gravity fed, you must:

- Choose a location with the straightest access to the return port.
- Assure all hose slopes downward for the entire run of the return line.
- Remove all kinks or sharp bends in the hose.
- Follow all rules applicable to all hoses.

#### **Return Hose Fabrication**

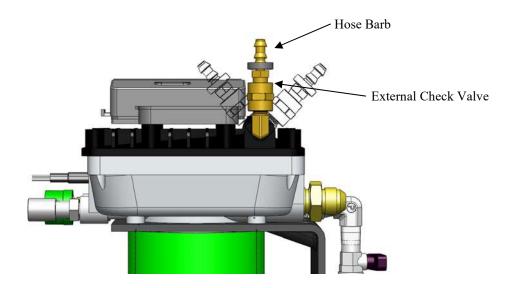
- Install adaptor in oil return port (if necessary for connection of return hose).
- Cut a length of ½" Push-Lok hose approximately 8" to 10". Install the hose barb to pipe adapter (or tee) in one end and the inline check valve assembly (with the arrows pointing toward the return port or oil pan) into the other end of the hose. This will be the bottom section of your return line. (See Notes for Hose Connections, page 3 and 4). See figure below for arrows on check valve.
- Measure the distance from the check valve to the return port of the housing. Run a tape measure along the route you will use for this hose. Add adequate distance to the measured length to accommodate engine vibration, movement and hose-bend radius.
- Cut the <sup>1</sup>/<sub>2</sub>" Push-Lok hose to length.
- Insert the lower hose assembly into the ½" Push-Lok hose making certain the arrows on the check valve are pointed toward the end of the hose that will be connected to the selected return port. (See Notes for Hose Connections, page 3 and 4).



- Insert the ½" Barb x 90 degree #8 JIC fitting supplied on evaporator in the other end of return hose.
- Insert the required fitting and hose into the selected return port on the engine or oil pan. Now attach the 90 degree fitting to the return port on the evaporator.
- Using cable ties, secure lines to minimize chafing, wear and at least 8" away from heat sources.

#### Attach Vent Tube (24" of 1/4 hose, provided)

- Push Hose onto vent hose barb located on the external check valve (see figure below). The valve may be rotated 45 degrees in either direction to provide clearance if necessary. Do not rotate it further as it will not function properly. If more than 45 degrees is required, the valve may be removed and relocated to the opposite side of the filter head to prevent angles greater than 45 degrees. Remove the check valve as an assembly whenever possible. There are 2 hollow check balls inside that allow the valve to function properly. If the check valve is disassembled, take caution not to lose the balls and make certain they are reinstalled once the valve is relocated.
- Secure hose to barb using a cable tie.
- Route hose down and secure with additional ties.



## **Section 4 – Electrical Connections**

#### Selecting an electrical source

• A constant power source using the shortest length of wire possible is recommended. The pressure switch on the OPS unit does not allow the system to get power until the engine is running and it actually senses oil pressure. Although several electrical sources can be used for the Eco-Pur System, an Alternator Positive Terminal is most common and recommended.

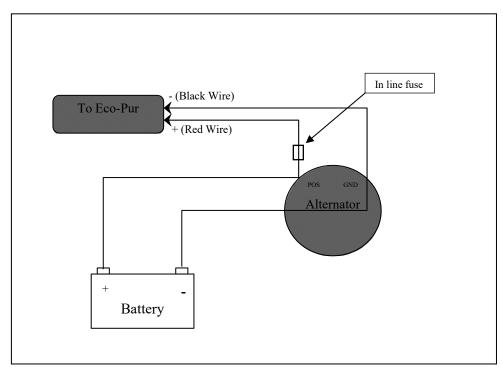


Figure 5: Electrical Connection

#### Notes

- The pressure switch wires will be connected when you unpack the system. It does not matter which pressure switch terminal the wires attach to.
- Ensure the system voltage of the equipment matches the voltage of the Eco-Pur System you are installing:
  - Heaters with **BLACK** wires (See Fig. 6) are for a **12V** system.

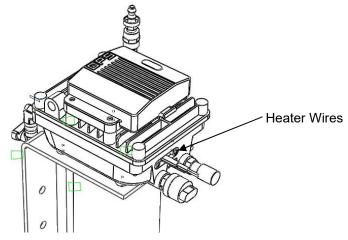


Figure 6: Heater Wires

- Use wire ties to secure all wires away from moving parts or extreme heat.
- Use care when removing the nut from the positive terminal on the back of the alternator. Be sure the nut alone is turning and that you are not also turning the stud. Internal alternator component damage may occur if the stud turns.
- Clean the alternator post to insure a good connection.
- Use wire loom (provided) to protect all wiring.

#### Attach Power Harness

- Add in-line fuse to red wire and terminate with ring terminal.
- Attach in-line fuse to electrical source.
- Terminate black wire with ring terminal and attach to ground.
- Connect wires to pressure switch (connect wires to either terminal, polarity does <u>not</u> matter).

Note: Use wire ties to secure all wires away from moving parts or extreme heat.

## Section 5 – Operational Test and LED Operation

- Install Spin-on filter. (See Section 7)
- Fill and check oil levels before the operational testing. (Do not pre-fill spin-on filter)
- Start engine.
- Ensure the Shut-off Valve is in the ON position (See Fig. 7).



Figure 7: Shut-Off Valve (Shown Open)

- Verify power to system; green light on ECU is on steady with the engine running (See Fig 8).
- Verify operation of system; green light on steady and red light on steady or flashing.
- Check for leaks. If a leak is detected turn the shut-off valve to OFF position. Repair as needed.

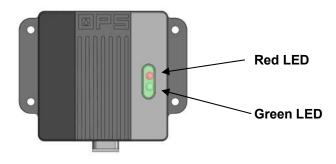


Figure 8: ECU LED's

### LED Operation

- The green and red LED's should both come on when the engine is started.
- The green LED indicates that the system is getting power.
- The red LED indicates that the heater is on. There may be times when the red LED is not lit, especially during hotter times of the year. This simply means that the system is maintaining optimal temperature and additional heat is not required.

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### Maintenance

Part Description	P/N	Part Description	P/N
Eco-Pur <sup>™</sup> – 12V	A-116-J	Replacement Filter 4"	M-210-A
Sampling Valve	P-113-B	Replacement Filter 6"	M-211-A
Shut-off Valve assembly	S-112-A	Replacement Filter 8"	M-212-A
Pressure Switch	P-700-B	Replacement Filter 10"	M-213-A
Vent check valve assembly	S-114-A	In-line Check Valve	S-118-B

## **Section 6 – Service Parts**

## Section 7 – Replacing the OPS Oil Filter Element

Always wear proper personal protection equipment such as oil-resistant gloves and safety glasses when handling oil products.

Follow any and all other applicable safety procedures.

Replace the OPS Spin-On Filter at the oil service interval recommended by the table on page 19.

- 1. Stop the engine and allow the vehicle to cool.
- 2. Position shut-off valve to OFF.
- 3. Place an oil drain pan below the Filter.
- 4. Remove the used filter either by hand or with a filter wrench/strap. When using a filter wrench/strap, make sure the tool is positioned within 2 inches of the top.
- 5. Before installing the new filter: Spray up into the center of the orifice with a spray cleaner such as brake cleaner or engine starting fluid. This will remove any buildup that may have accumulated and reduce the possibility of the orifice restricting oil flow. Lubricate the O-ring with clean oil (do not pre-fill filter). Tighten by hand until the gasket contacts the base, then rotate an additional 3/4 turn to ensure proper seating. DO NOT USE A FILTER WRENCH AND DO NOT OVERTIGHTEN as this may damage the unit and VOID YOUR WARRANTY.

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- 6. Check the engine oil level. Fill, as necessary.
- 7. Start the engine. Open the Shut-off Valve and check for leaks.
- 8. Stop the engine. After 5 minutes, check the engine oil level to ensure it is full.
- 9. Bring engine to operating temperature. Take an oil sample of **new** oil to establish a baseline for sample result interpretation. (See **Taking An Oil Sample** in Section 8.)

**NOTE**: Please be sure to use only official OPS filters to avoid loss of warranty.

## Section 8 – Taking an Oil Sample

Always wear proper personal protection equipment such as oil-resistant gloves and safety glasses when handling oil products.

Follow any and all other applicable safety procedures.

#### Frequency

Use the chart below to best determine your service intervals. If your specific application is not listed, please consult your OPS sales representative, or call OPS technical support to discuss appropriate service intervals which will meet your needs.

	Filter Part Number and Size	Component Interval	Service Requirement	
Engine - Transportation	M-210-A 4"	5,000 to 10,000 miles		
	M-211-A 6"	10,000 to 15,000 miles		
	M-212-A 8"	15,000 to 20,000 miles	Sample oil and change the OPS filter	
	M-213-A 10"	20,000 to 25,000 miles		
	OEM Filter	Oil changes are to be performed at OEM recommended intervals. Oil changes have the potential to be extended based off the oil sample analysis results.	Sample oil and change the OPS and the OEM Filter.	
Engine – Vocational Application	M-212-A 8"	250 hours or OE recommended interval	Sample oil and change the OPS filter	
	M-213-A 10"	300 hours or OE recommended interval	Sample oil and change the OPS filter	
	OEM Filter	Change OEM filter at every other OPS filter change interval, not to exceed 500 hours, or 6 months on the OEM filter.	Sample oil and change the OPS and the OEM Filter.	
Engine – Transit Bus	M-212-A 8"	3,000 miles or OE recommended interval	Sample oil and change the OPS filter	
	M-213-A 10"	4,000 miles or OE recommended interval	Sample oil and change the OPS filter	
	OEM Filter	Change OEM filter at every other OPS filter change interval, not to exceed 6,000 miles, or 6 months on the OEM filter.	Sample oil and change the OPS and the OEM Filter.	

Table 1: Suggested Sampling Intervals & Methods

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- Take oil samples at the normal service intervals. Shorten this interval if results of the previous oil sample indicated a potential problem.
- If sample reports show increased solid contaminant levels, clean the orifice out as outlined in Section 7, Paragraph 5.
- Oil changes should be performed when the oil analysis indicates the need for it. If you have trouble understanding your report, please call OPS Technical Support at (724) 360-4080 for support to review it with you.

#### Procedure

- 1. Start the vehicle and bring the engine up to operating temperature.
- 2. With the engine running, remove the Safety Cap from the Sampling Valve. (See *Fig 2. on page 5.)* To ensure an accurate sample reading, purge the sampling valve to flush out impurities that may have settled in the valve opening.
- 3. Hold a clean sampling bottle under the Sampling Valve and push on the button until the bottle is filled to line. **DO NOT completely fill the sample bottle because it may cause leaking during shipping.**
- 4. Screw the cap tightly onto the sample bottle.
- 5. Screw the Safety Cap back onto the Sampling Valve.

## Section 9 – Submitting the Oil Sample

# Refer to Sample Form Insert for complete instructions NOTES:

- Include mileage/hours on engine and mileage/hours on oil. This important information helps oil analysts determine correct contamination levels.
- 1 Write in the component ID or truck/equipment number and attach bar code label (Section C in Figure 9) to the sample jar
- 2. Completely fill in the required fields on the sample registration form (Figure 9).

1. 460 380		= A			
POLARIS	SAMPLE INFORMATION	-			
Laboratories	Acct # Assigned after 1st sample is proce	ssed	Distributor/Sales Rep Not requ	red	INTERNAL USE ONLY
	Customer Your name or company name		Contact Required only if sor	neone else is handling the sa	mple reports for you
СОМВО	Address Your address or company address	s	City - State/Province - Postal Cod	e - Country Part of the address	
	Phone Telephone number for the contact if different	from customer	Email Address Required to view	or receive samples online	
	Sample Point See note 1 Component ID Truck/Eq			Secondary ID Not required for r	nost companies
	Engine     Compressor     Gear     Bearing     Differential     Final Drive	New Lube Reference D See note 3 Date		ate Sampled The date the sample was actually taken	
0000000000	Hydraulic Planetary Dirbine		Lube Time Total mi/hrs on the oil since last changed 🗆 Mi 🗅 Km 🗅 Hr 🗅 Day 🗅 Mo 🗅 Yr		Contraction of the Contraction o
Part #: AIP 1-877-808-3750		Component T	ime Total mi/hrs since engine	was new/rebuilt  Mi G Km G	Hr 🗆 Day 📮 Mo 🖵 Yr
www.polarislabs.com	Position (If Applicable) See note 2 Chassis Left Right	Lube Added of	Oil added during interval 🗆 01 🗆	Sal 🗆 Ltr 🛛 Lube Changed 🖾 Yes 🗆	No Was the oil changed?
	Front Rear Center	Misc Not re	equired	Filter Changed  Yes	No Was the OEM filter changed?
Apply barcode	amments. Use this line to note any repairs made	te to the engin	ne, or if any additives have been	added.	
to bothe	COMPONENT REGISTRATION (Required ONL	Y for registering n	ew components or to request changes.) T	his section only needs completed for a	new truck, or if the oil type changed.
-	Component Manufacturer Engine Mfg.: i.e. Cat, C			t Model Engine Model: i.e. C15, IS3	
2 Submit sample online via	Component Type (Check One) Component being samp			Hydraulie:	Compressor:
HCRIZON'	E Transmission: sel (AA)	Differentia     Final Drive		BB) Diston Pump (BHPIP) Gear Pump (BHGP)	Reciprocating (BCREC)     Rotary Screw (BCRSC)
OR complete this form	B volne (ABUNL)  ural Gas (BANGE)  G Auto/Powershift (BBAPT) Ural Gas (BANGE) G Torque Converter (BBTRO)	Planetary Steering (	(BBPLT) Other	Vane Pump (BHVAN)	Rotary Vane (BCRVN)     Centrifugal (BCCEN)
	Gas (BALPG) D Hydrostatic (BHHYD)	C Wheel Hut	b (BGWHL) Industrial Bearing:		Refrigeration (BR)
B Place form in mailer	Methane Gas (BAMGE)     Other      Dual Fuel (AA2P)	Power Tak     Other	e Off (BBPTO) Sleeve (BGSLV) Rolling Element 6	IGRLL) Gas (BTGST)	Other
funiess sample info is	Other		C Other	Steam (BTSTM)	
and ship sample	Application D Transportation - 100 D	0-T-R Trucking -	110 D Rairoad - 800	Construction - 220	Utility - 490
	Plant/Industrial - 400 C	Power Generatio	n - 290 D Off-Highway - 200	Waste Handling/Landfill - 230	Mining - 600
4 Receive report		Quarry - 288	Marine - 500	Cther	Gas/Oil Field - 300
by email	Lube Manufacturer I.E. Shell, Mobil, Chevron			T6, Mobil 1, Delo 400 Grade I.E.	
	There a Fail-Flow a By-Pass a Kidney Loop a None	Other OP	s will be by-pass   Filter Micron Hat	ng OPS is 3   Sump Capacity How no	ch of the engine holds _ (); _ Gal _ Ltr
	C				
APPLY TO SAMPLE JA	FOR YOUR RECORDS				
			POLARIS LABORATORI 7898 ZIONSVILLE ROAD		ABORATORIES SAM HOUSTON PKWY NORTH
0000000000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	P.O. BOX 68983 INDIANAPOLIS, IN 4626	SUITE 700	
Component ID Truck/Equipment number	Component ID Truck/Equipment number	_/		noosion	
				s D	
POLARIS LABORATORIES 3060 CALIFORNIA AVE, SUI	POLARIS LABORATORIES 1950 EVERGREEN BLVD, SU	ITE 400	POLARIS LABORATORI 5140 75TH STREET	is D	
P.O. BOX 30820 SALT LAKE CITY, UT 84104	P.O. BOX 100070 DULUTH, GA 30096		EDMONTON, AB T6E 6V CANADA	12	
0111 01010	001011, 04 0000		VARIANA		
Note 1: Which component was sam	pled? Note 2: This mainly applies to heavy equip	ment and doe	s not need checked. Note 3: C	heck this only if you are submitting	a sample of new oil from the container
					the second s

Figure 9 – The Sample Registration Form

Section A, Sample Information: This section must be completed and submitted with EVERY sample.

**Section B, Component Registration:** This section will only need to be filled out during the first sample, or, if a new oil type is being used in the component.

- 3. For U.S. Mail: place sample bottle in mailing bag, apply address label for lab nearest your location (supplied with bottle label form), add proper postage and mail the mailing bag.
- 4. For UPS: place sample bottle in mailing bag, apply UPS pre-printed shipping label and seal bag. Drop in UPS box, bring to UPS Store or hand to a UPS Driver.

### Section 10 – Troubleshooting

<i>Issue</i> Leak at filter-to-base Seal	<ul> <li>Resolution</li> <li>Check for dirt around O-Ring &amp; that it's seated properly</li> <li>Ensure proper installation (i.e.: Seal lubricated before installation and filter is properly tightened)</li> </ul>
Leak at Vent Hose	<ul> <li>Ensure return line is not kinked and the arrows on the return line check valve are pointed in the direction of flow.</li> <li>Verify the orifice is still in place.</li> <li>Check for excessive engine blowby</li> <li>Ensure return hose is sloped downward</li> <li>Ensure the evaporator is higher than the return port</li> <li>If the vent leaks at the threads, reseal connection with Teflon tape.</li> </ul>
Leak at hose connections	<ul> <li>Ensure that all connections are properly tightened</li> <li>Verify use of thread tape or sealant on all NPT (pipe) threads</li> </ul>
Leaks anywhere on filter body	Call Pittsburgh Power Toll Free: (724) 360-4080
ECU does not light up at all	<ul> <li>Check for proper power source (fused connection)</li> <li>Check fuse</li> <li>Check for proper ground</li> <li>Check pressure switch operation</li> </ul>
Red light does not come on after system cold startup	<ul> <li>Ensure that the shutoff valve is in the on position (handle in line with the valve body)</li> <li>Check battery voltage is 13.2 volts or higher for a 12 Volt system and 27 Volts or higher for a 24 Volt system</li> <li>Check to see that the power cable (Red and Black wires) to the Eco-Pur is not more than 10 feet.</li> <li>Note – It is normal for the RED light to flash or remain off for a brief period of time during operation.</li> </ul>
Evaporator Vent is emitting smoke	<ul> <li>Ensure the evaporator and vehicle voltages match</li> </ul>
Oil Analysis indicates high levels of liquid contamination	<ul> <li>Use a direct current (DC) amp probe to verify amperage from the evaporator canister heating element. (Normal operating range is ~4.5 – 5.5 amps.)</li> </ul>
Oil Analysis indicates high levels of solid contamination	<ul> <li>Spray up into the center of the orifice with a spray cleaner such as brake cleaner or engine starting fluid. This will remove any buildup that may have accumulated.</li> </ul>

If you have any additional issues, questions or concerns, call a Service Technician at (724) 360-4080

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Oil Purification Systems, Inc. ("OPS") warrants that ECO-PUR shall be free from defects in materials and workmanship and will substantially conform to its specifications for a period of three (3) years after the date of purchase (the "period"), provided ECO-PUR is properly installed, operated, and maintained, and, in each instance, in accordance with the documentation.

Should ECO-PUR have been found and demonstrated to be defective during the period for the reason covered by this limited warranty, OPS, at its option, shall:

- 1. REPAIR ECO-PUR or part thereof; or
- 2. REPLACE ECO-PUR or part thereof.

In the event of a discrepancy between any purchase order accepted by OPS and this warranty, the terms of this warranty apply. OPS reserves the right to use either new, used, or refurbished parts.

This Limited warranty does not cover any damages caused by you or due to external causes, including any act of God, natural disaster, accident, flood, war, sabotage, terrorism, military actions, or problems with the engine, e.g., failure to maintain the engine in accordance with its documentation (other than manufactures recommended oil changes). OPS does not warrant that ECO-PUR will be free from design defects or errors.

To request warranty service from OPS, you need to contact the commercial enterprise that supplied you the ECO-PUR. In the case of OPS, you must contact OPS within Five (5) calendar days following discovery of the defect or damage at the following telephone number: (724) 360-4080; or address:

Pittsburgh Power 3600 South Noah Dr Saxonburg, PA 16056; and

Return ECO-PUR or the defective part for inspection, including in such package a copy of the applicable warranty card, a detailed description of the problem, proof of purchase, and detailed records associated with the installation and maintenance of ECO-PUR and the engine, and such other information as requested by OPS.

THESE WARRANTIES REPLACE ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE. THESE REMEDIES ARE THE SOLE AND EXCLUSIVE REMEDIES FOR ANY BREACH OF WARRANTY AND ONLY APPLY TO USE OF ECO-PUR IN THE UNITED STATES OF AMERICA, THE ORIGINAL PURCHASER FOR THE SPECIFIC ENGINE INDENTIFIED ON THE WARRANTY CARD, AND ONLY LASTS FOR AS LONG AS SUCH PURCHASER OWN ECO-PUR AND THE APPLICABLE ENGINE.

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