POLAR POWER INC.

Exceeding Military Standards without the Cost

Filter Refining Pack

Oil Refining:

- Extend the engines service life
- Extends the oil change interval
- Reduces the operational cost of the generator engine

Diesel Fuel refining:

- Significant improvement on generator reliability
- Reduces generator set failure due to water in fuel
- Improves fuel injector service life and reliability

Water is a combustion by-product of any fuel, and small amounts of combustion gas leaking past the piston rings places water in the engines lubricating oil.

Standard oil and fuel filters have a limited particle filtration performance of only 20 to 40 µ. The media used in these filters is strong on surface area but limited in volume or weight; therefore absorption of water is limited. These filters use a near paper thin media for a surface filtration effect.

The Polar Power refining pack has sub-micron filtration capability with 880 grams of media to absorb water in the fuel or lubricating oil. We use depth filtration with over 100 mm of dense filter media depth through which the oil or fuel must pass. Depth filtration is the most efficient means for refining fuel and oil. The refining pack protects every precision part of your engine against wear by removing the smallest harmful particles as well as up to six ounces of water.

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Removing water from oil extends the service life by reducing:

- Rust and corrosion inside the engine;
- Water etching/erosion caused by generation of hydrogen sulfide and sulfuric acid from water-induced lubricant degradation.
- Vaporous cavitation, water vapor leaving the oil and low pressure areas of the engine such as the suction side of the oil pump or the load zone of a bearing.
- Oil/water froth freezing and plugging crankcase ventilation.
- Hydrogen embrittlement with water entering the microscopic cracks in the steel and under pressure and temperature breaking down into hydrogen and oxygen.
- Oxidation of bearing babbitt
- Wear caused by loss of oil film due to changes in oil viscosity.

Water within the engines oil system is particularly bad as it:

- Accelerates oxidation of the oil and depletes oxidation inhibitors and demulsifiers
- Can cause some additives to precipitate and causes ZDDP anti-wear additive to destabilize over 180°F
- Competes with polar additives for metal surfaces.

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The slightest amounts of water in the fuel will destroy the fuel injectors in short time also for the above reasons.

The engine's primary oil filter is typically a full flow system where all the oil that is pumped passes through this filter. Polar's refining filter diverts a small flow of engine oil from the primary oil filter and passes it through the sub micron filter. With a bypass filter and a number of circulations, it takes only a few minutes to filter all the oil in the engine.

As a fuel filter the refining pack is a full flow filter, filtering hundred percent of the fuel as it enters the injector pumps. It's recommended that the refining pack is installed on the discharge side of the fuel pump; this will ensure there will be positive fuel pressure into the injector pumps.

The refining pack can be operated at any angle but we strongly recommend that the canister point downward; this allows the filter service with minimum spillage.

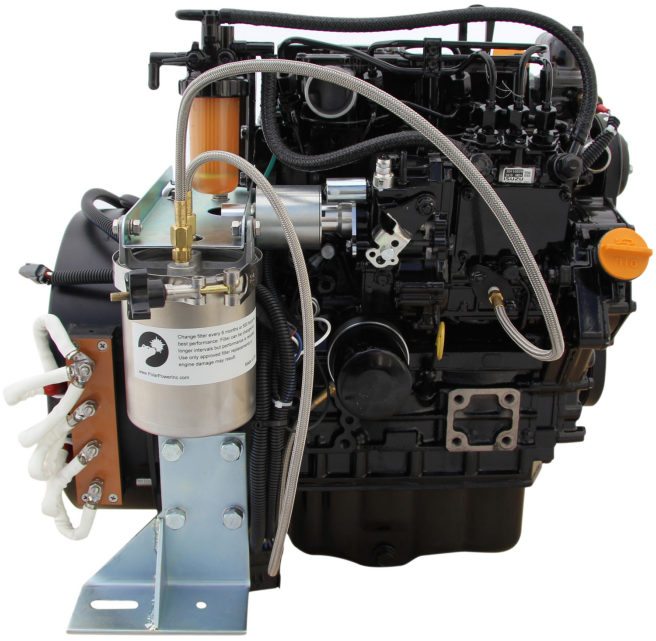
Using the refining packs for oil and fuel filtration has the advantage of having one common filter cartridge; this facilitates supply of maintenance parts to the field. The filter cartridges provide a strong advantage in that the cost is inexpensive and sold at fraction of the cost of the other "standard" filters.

The kit for the oil refining pack uses stainless steel braid over Teflon hoses for long life and reliability. The purpose of the stainless steel braid is to help prevent rodents from chewing the hose creating leaks leading to engine failure.

The sandwich adapter is mounted under the oil filter and diverts a small flow of oil (bypass) to the refining filter pack. The process oil is then returned directly to the engine's crankcase.

Incorporating the refining pack with your fuel system will require that you add an electric fuel pump, if an electric pump is not presently in place. Electric pumps tend to be more reliable than mechanical fuel pumps, so there is an advantage gained here. The refining pack is installed on the discharge side of the pump and not the suction side.

The canister housing is constructed of stainless steel and the base is die-cast aluminum.



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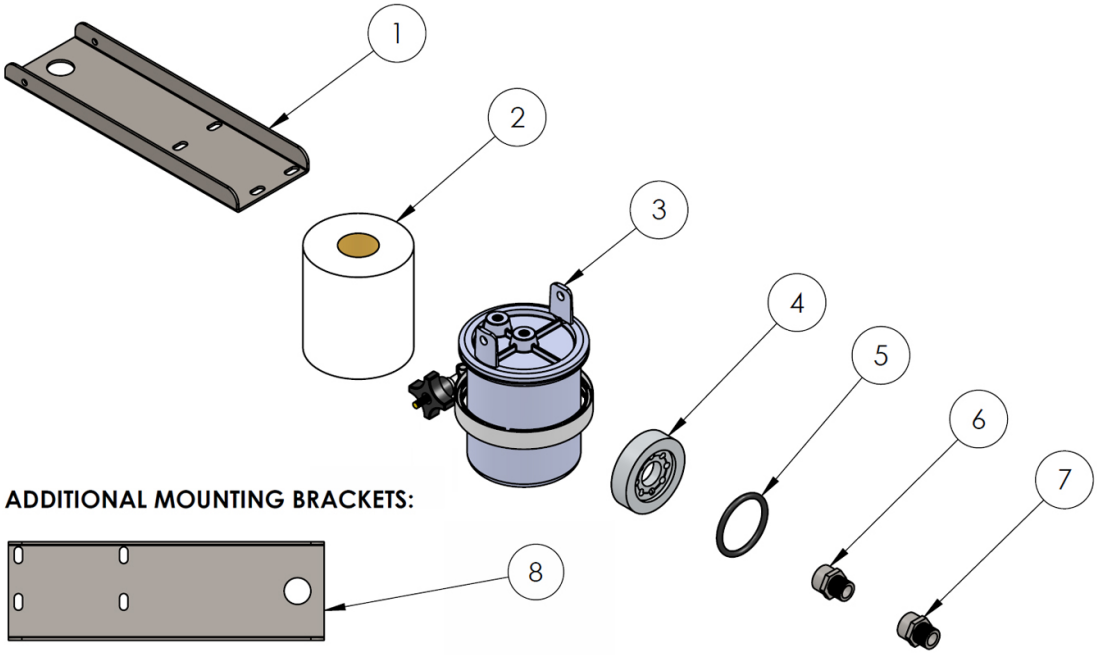
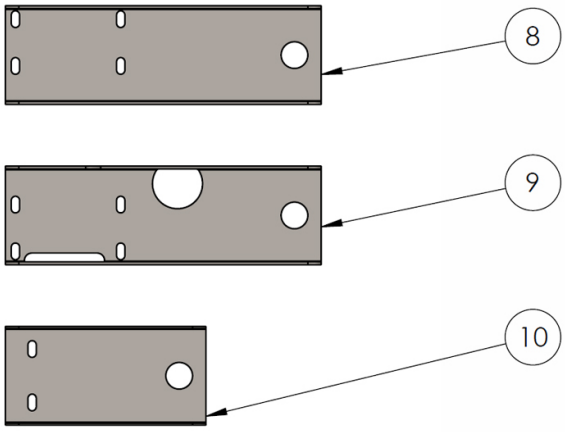


ADDITIONAL MOUNTING BRACKETS:



ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	19-20-0001	Oil Filter Mounting Bracket - Standard	1
2	20-14-0003	Oil Filter Cartridge	1
3	20-14-0002	Lube Oil Filter Unit (Filter & Enclosure)	1
4	20-14-0004	Oil Filter Sandwich Adapter	1
5	36-20-0004	O-Ring, Buna-N 70 for Oil Filter Kit	1
6	20-14-0006	¾-16 Steel Bushing, SAE	1
7	20-14-0007	20M x 1.50MM Steel Bushing, Metric	1
8	19-20-0002	Oil Filter Mounting Bracket - 2 Cyl Perkins	1
9	19-20-0003	Isuzu Oil Filter Mounting Bracket	1
10	19-20-0004	Oil Filter Mounting Bracket - Small	1

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