

## 3.5 KW DC Generator

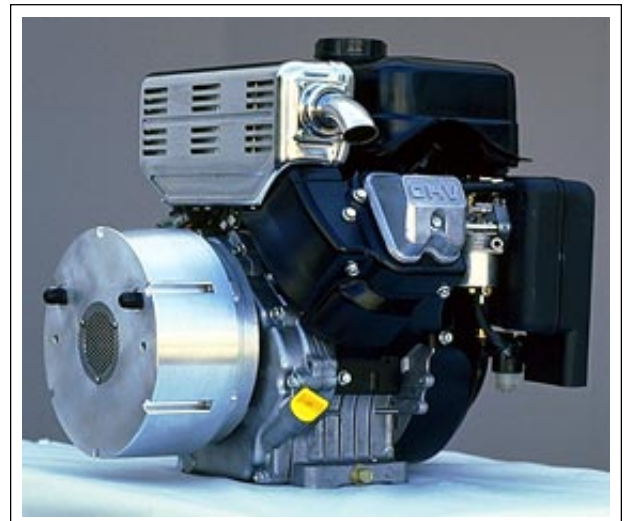
### For Telecommunications And UPS Systems

### Applications

Polar's 3.5 KW DC Generator is a product optimized to provide extended run time for systems using battery backup. Whereas the batteries can provide cost effective utility power backup up to 20 minutes, Polar's 3.5 KW DC generator is the most effective solution for providing continuous power for 15 minutes to 30 days. The public's reliance on telecommunications and emergency services during disasters (fire, flood, earthquake, storm, etc.) make DC generators essential. Polar's 3.5 KW generator is also ideal for prime power applications using photo-voltaics (PV). Polar's DC generator can provide power during extended periods of low insolation and heavy site usage. In addition, as the batteries age, they will lose efficiency and demand more energy during the recharge cycle; Polar's DC generator will provide this supplemental energy until the battery bank eventually gets replaced. The integration of Polar's DC generator into a PV system enhances reliability and lowers cost.

### Why DC instead of AC?

No transfer switch, no frequency fluctuations, no dependence on engine speed controls, no power loss converting from AC to DC, and no problems with voltage fluctuations. The DC generator is small, light-weight, and fuel efficient. Repair is simple; it can be picked up by hand and replaced in the field.



### Low Maintenance

The alternator is designed to last a lifetime. Polar has taken every step to minimize corrosion and electrolysis within the alternator. All steel is either epoxy encapsulated or CAD plated; aluminum surfaces are hard anodized (Type III). The alternator rotor is dynamically balanced so there are no radial nor thrust loads on the bearings. The engine is a heavy-duty industrial type. The engine has been derated 20% for longer life. Controls and electronics will withstand temperature ranges of -40° F to +125° F. Circuits are conformally coated. Signal connectors are gold plated.

## Description

### • Alternator

Polar's 3.5 KW DC alternator has been derived from its proven and tested 2.2 KW military generator model. The 3.5 KW operates within 2500 to 3600 RPM; a higher speed range than other Polar alternators, which operate in the 1200 to 3000 RPM range. The higher speed of the 3.5 KW reduces the weight, size, and cost of the alternator and engine.

The 3.5 KW DC generator uses Polar's Permanent Magnet Hybred Homopolar (PMHH) technology. This unique technology eliminates all parts which typically wear or fail inside an alternator, including brushes, slip rings, rotating fields, excitors, and bearings. The unique design also allows us to operate the engine at viable speeds while maintaining precise voltage regulation. The six-phase stator design reduces voltage ripple on the output and reduces filtering requirements.

The voltage regulator is unique in its ability to regulate and limit the output current. In an over-current condition, most DC generators will either stall the engine, overheat the alternator or engine, or trip the output circuit breaker. The most common cause of an overcurrent load is a battery in low state of charge. Polar's generator will stay on-line without overheating, stalling, or tripping a circuit breaker.

### • Engine

Polar selected the Kawasaki Model FE290 to drive its alternator because it is the best engine on the market for this application.

*Note the following features:*

**Oil Pump** - The most important criteria Polar used in the selection of Kawasaki's Model 290 was the full pressure lubrication system using an oil pump. Unlike your automobile, most small engines do not use an oil pump. Instead, these engines splash lubricant with the spinning crankshaft. Unfortunately, it takes a while for oil to migrate to the bearings supporting the shaft. Using splash lubrication requires critical maintenance for the engine oil level.

The once-a-week automatic exercise of the generator, or long periods without operation create the need for a full pressure lubrication system.

**Large 286CC Displacement** - Most generator manufacturers use a 286CC displacement engine to deliver 5 KW. Polar derated the 286CC engine to deliver a continuously rated 3.5 KW in order to extend engine life. Engine deration is important for sets operating on propane and natural gas, because these fuels burn at higher temperatures, and can burn the exhaust valves.

**Low Vibration** - Kawasaki has incorporated a unique reciprocating balancer within its engine design. Typical single-cylinder engines will vibrate more than multi-cylinder engines. Vibration causes noise and can adversely affect electronic assemblies located near the generator. Kawasaki's Model 290 produces amazingly little vibration and noise.

**Additional Features** - Overhead head valve • electronic ignition • RFI plugs • dual element air cleaner • proven gas carburetor

## Specifications

	24 Vdc Model	48 Vdc Model
Output voltage adjustable	22 - 32 Vdc	46 - 64 Vdc
Output current	125 amps	67 amps

*Output current is regulated and limited without tripping a circuit breaker.*

**Ripple:** Less than 30 mv (measured on battery)

**Voltage Regulation:** 1.7%

**Engine:** Kawasaki Model 290

**Fuel:** Natural gas, vapor propane, or liquid propane.  
Diesel models available.

**Weight:** 97 lbs. (without enclosure)

**Dimensions:** 16" x 16.1" x 17.3"

**Accessories:**

- All-Weather Enclosure
- Starting Battery Charger
- Automatic Lube Oil Replenishing
- Spin-On Oil Filter

## Limited warranty:

Materials and workmanship for a period of two years. Repairs and materials are FOB Carson, California. Extended 10 year warranties and on-site warranty/maintenance available under separate contract.

