

USER MANUAL

EMERGENCY ENGINE STARTING UNIT & BATTERY CHARGER

MODEL: GEN-12/24-75

Manufactured by,

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Gasoline Powered Battery Charger and Engine Stoner

Polar Products' light weight DC generator is currently being supplied to the U.S. Military for state of the art all-weather starting of vehicles, boats tractors tanks, and For fast, reliable, efficient charging of batteries.

Features Include:

*** Reliable 5 hp Honda Electronic Ignition Engine**

This overhead valve engine was radically improved for cold weather starting, reduced maintenance, and economy.

*** Long Life - Heavy Duty Brushless Generator**

*** Adjustable Voltage - 13 to 35 Vdc for Charging 12 to 24 Vdc Systems**

Boosting of batteries, equalization of cells, float charging, or fast charging via control panel dial.

*** Up to 100 amps Charging Current**

*** Digital Amperage and Voltmeter**

For accurate charging adjustment and battery monitoring. LCD meters are used in place of analog type because LCD are more durable, readable and accurate.

*** 20 ft Heavy Duty #4 AWG Charging Cable**

All copper 400 amp clamps.

*** Protection Mechanisms Include:**

Oil sensor for automatic system shutdown in the event of low oil.

Automatic load dump clamps voltage after engine starts to eliminate damage to electrical system.

*** Equalization**

Reduce your battery replacement costs and improve reliability by periodically equalizing your batteries with our generator.

*** Dimension:** 23.5" long X 16.3" high X 13.5" wide

*** Weight:** 81 pounds!!!

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READ THE FOLLOWING INSTRUCTIONS BEFORE OPERATION

1. Set the toggle switch located in the control box to the desired voltage range: either "12 - 16 Vdc" or "24 - 35 Vdc". Do not switch ranges while engine is operating or the voltage regulator may be damaged. The toggle switch is the locking type, pull lever and move the switch up or down.
2. Set voltage adjust knob dial to start.
3. Start engine before connecting charger to battery.
4. To start engine, move fuel lever to the "ON" position.
5. Move choke lever to the "CLOSED" position.
6. Move the throttle lever to the "40/20 AMP" setting.
7. Turn the engine switch to the "ON" position.
8. Pull the starter grip until resistance is felt, then pull briskly.
9. Do not allow starter grip to snap back against the engine. Return grip gently to prevent damage to the starter.
10. As the engine warms up, gradually move the choke lever to the "OPEN" position.
11. Position the throttle lever to the desired charging current range.
12. If the engine fails to start, check the oil level in the engine.
13. Before connecting the charging cables to the battery, be sure to correctly identify the polarities. Reversed polarities will blow the fuse on the alternator, it may damage the regulator and vehicle electrical system, and it may cause the battery to explode.

Connecting and removing the battery clamps off the battery terminals will cause sparks, which can possibly ignite hydrogen gas trapped in the battery or released by the battery. This can cause a fire or explosion. To avoid sparks at the battery, use the red connector between the charger and the cable assembly as a means of connecting and disconnecting power; or connect the positive clamps to the battery first, then connect the negative to the vehicle chassis (negative ground vehicle).
14. When the battery is properly connected to the charger, adjust the voltage dial to the desired charging rate.
15. If there is no charging current and the voltage is low, go

to full throttle for about 10 seconds. If there is still no charging current, check the fuse and proceed to the section on alternators.

16. Do not allow the battery temperature to rise above 125 degrees F (unless recommended by the manufacturer) while charging. Either suspend charging or decrease the charging voltage.

17. Charge the battery and operate the engine only in well ventilated areas.

18. To stop the engine, return throttle lever to "IDLE", and turn engine switch to "OFF".

19. Read the engine manual for further details.

20. Emergency shutdown: Switch engine to "OFF" position.

I. ALTERNATOR

The alternator is a brushless design and therefore has no slip rings or brushes to service.

The alternator was designed for a continuous output of 75 amps in the 12 volt range, and 50 amps in the 24 volt range. The maximum output is 100 amps in the 12 volt range and 80 amps in the 24 volt range. The maximum output can be sustained on a 24 hour cycle.

The designed voltage adjustment range is 13.2 - 16 Vdc and 27.5 - 35 Vdc. In the 24 Vdc range the alternator loses efficiency operating below 27 Vdc. The lower efficiency places a heavier load on the engine and the current output on the alternator is limited to 65 amperes.

The charger's output voltage can be forced under 27 Vdc if the charger is connected to a large battery bank which is at a low state of charge (heavy current demand).

The charger will continue charging the battery bank at around 65 amperes until the charge capacity of the battery allows the charging voltage to rise above 27 Vdc. At this point the charging current can quickly rise up to 80 - 85 amperes.

IMPORTANT: When the charger is operating in the 24 Vdc range, at a charging voltage under 27 Vdc due to a heavy load, the voltage adjustment pot will have no effect. Make sure that the voltage setting does not over charge the battery. The same situation can also occur with the 12 volt range.

The alternator is self excited. This means that electrical power can be produced without connecting the alternator to a battery.

There is a residual magnetic field in the alternator rotor that allows the alternator to generate sufficient current to power the field coil during start up. However, there is the possibility that this magnetic field may be lost and will have to be re-established. This problem will cause the alternator not to produce current or voltage sufficient to operate the control panel.

To re-establish the field, remove the front control panel in order to gain access to the terminal block connecting the alternator and regulator. Connect a 12 or 24 volt battery to the charging cables. Start the engine and set to full throttle. Using a jumper of 14 to 18 gauge wire and without removing the wires from the terminal block, short the green and black wire from the alternator. Apply the short for no more than one second; just tap the terminal with the jumper wire as fast as you can. If this procedure fails to correct the alternator, then the problem lies elsewhere.

II. COLD WEATHER OPERATION

In climates below 20 degrees F, a cold weather kit is available for the Honda engine. The cold weather kit consists of an elastic band which fits over the recoil starter assembly. The band restricts the cooling air which enters through the grill in the recoil starter assembly from flowing over the engine. The cold weather kit part number is HMP/N2933521.

III. SPARK ARRESTOR

The engine muffler is provided with a spark arrestor screen as standard equipment. Periodically, the spark arrestor screen should be cleaned and then inspected for holes and breaks. Cleaning and inspection intervals will depend on usage. We suggest every 6 months or 100 hours. When using charger in areas sensitive to fire, an inspection should be performed before to operation. The screen should be replaced if there are holes or breaks. The spark arrestor screen part number is HMP/N1427780.

To replace or clean the spark arrestor screen we recommend using a magnetic screw driver. The self tapping screw which retains the spark arrestor screen may be accessed through the grill in the muffler guard (protector).

The Honda engine manual shows five screws and the muffler protector being removed in order to gain access to the screen. Following this procedure may be more difficult because the temperature cycles tend to bind one or more of the screws.

IV. LUBRICATION

Engine oil is a major factor effecting engine performance and service life. Selection of the most optimum oil is based on the ambient temperatures.

For average temperatures within the range of 0 degrees F to 90 degrees F we recommend using SAE 10W/30 SG, and for temperatures of 0 degrees F to 110 degrees F using SAE 10W/40 SG.

Using the new classifications of SG will provide superior performance over SE or SF ratings. The SE and SF ratings are acceptable.

For temperatures below 0 degrees F we recommend using Mobil 1, 5W/30W synthetic oil. Do not use this oil in temperatures

above 0 degrees F. At warmer temperatures this lubricant can flow past the piston rings.

For very hot climates we recommend avoiding the multi viscosity grade lubricants. Penzoil 30W has proven quite effective in hot climates.

V. FUSE

To help protect against damage due to reverse polarity and short circuit, there is a fuse link located on the B+ terminal of the alternator. Refer to Circuit Diagram.

Four spare fuse links are shipped with each charger unit, and stored in the control box. Additional spare fuse links may be ordered from Polar Products. Part number is G8952-N9333.

VI. CHARGING CABLES

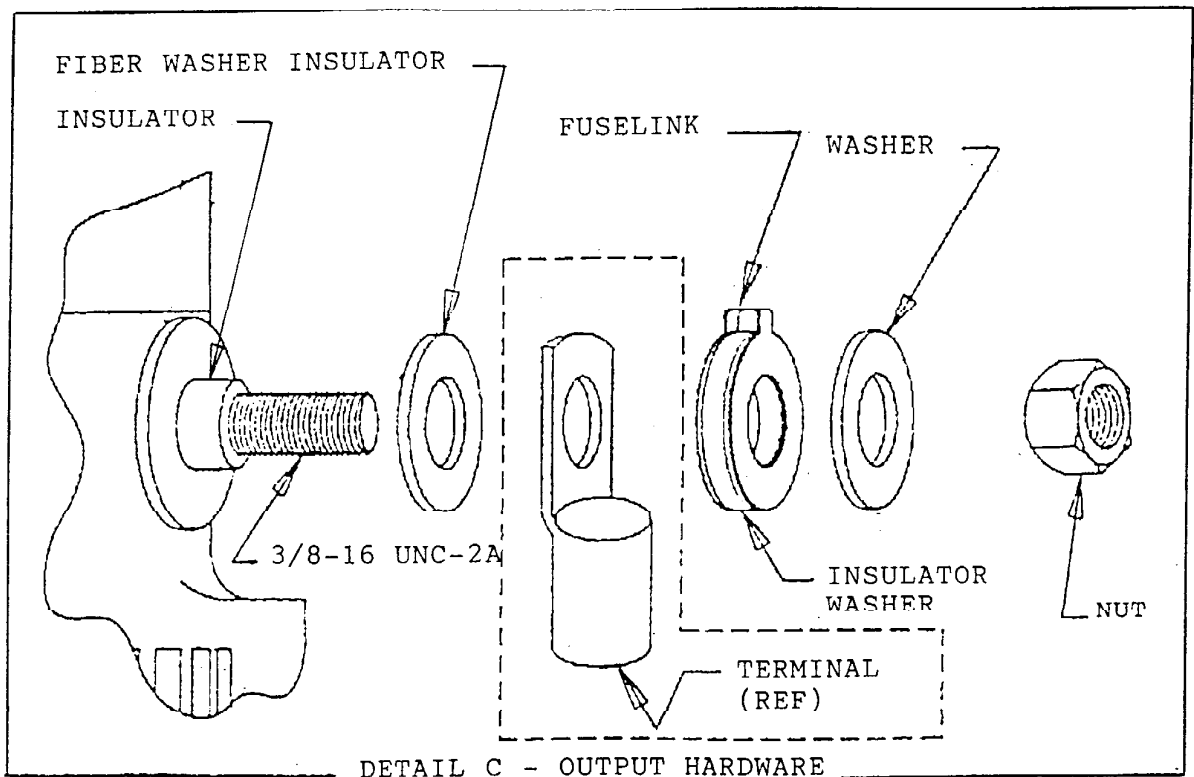
The 25 foot long charging cable is constructed of 2 gauge super flex wire in order to minimize the voltage drop to the battery while the engine is being started.

If required, the charging cable can be conveniently connected via the red connector to a second set of charging cables to form a 50 foot jumper cable.

For lighter carrying weight, a 4 gauge charging cable can be purchased in lengths of 10, 15, and 20 feet.

The battery clips and the red connector are replaceable. Part numbers are:

25 foot, 2 awg cable set	P/N: G8952-C0225
20 foot, 4 awg cable set	P/N: G8952-C0420
15 foot, 4 awg cable set	P/N: G8952-C0415
10 foot, 4 awg cable set	P/N: G8952-C0410
Red connector assembly	P/N: G8952-A1327



DETAIL C - OUTPUT HARDWARE
 FULL SCALE
 (REF ONLY)

FUSE LINK ASSEMBLY DRAWING

SPARE PARTS LIST

<u>Description</u>	<u>Part Number</u>
1.0 Engine, Honda	140QX
1.1 Spark Plug	BPR6ES (NGK)
1.2 Dual Element Filter	DE-25
1.3 Spark Arrestor Screen	HMP/N1427780
2. Alternator	N1083
2.1 Fuse Link	G8952-N9333
2.1 Insulator Washers	G8952-W3268
3. Control Panel Assembly	
3.1 Voltage Adjust Pot (10K)	3852A-282-103A
3.2 Voltage Range Switch	M-2022
3.3 Panel Meter (Voltage Current)	DP600S
3.4 Instrument Module	G8952-PC145
3.5 Red Connector Assembly	G8952-A1327
4. Frame Assembly	
4.1 Vibration Isolators (Set of 4)	G8952-I4537
4.2 Rubber Feet (Set of 4)	G8952-F4523
4.3 V-Belt	AX-24
4.4 Pulley Sheave	2A40D
4.5 Bushing	D-3/4