

START GUARD™

Model: NS-12-20

INSTALLATION/OPERATION MANUAL



NEWMAR®
DC Power Onboard™

Tools Required: Volt/Ohm meter (V.O.M.), 12 volt power source, 10 K ohm resistor.

1) Check for continuity in the input fuse with the ohm meter. If the fuse is blown, replace with another of the same type and value. (See previous section, FUSE REPLACEMENT.)

If the StartGuard is blowing fuses repeatedly, check to make sure your load does not exceed 20 amps. If the fuses continue to blow and you are certain the StartGuard is not being overloaded, return the unit to NEWMAR for service.

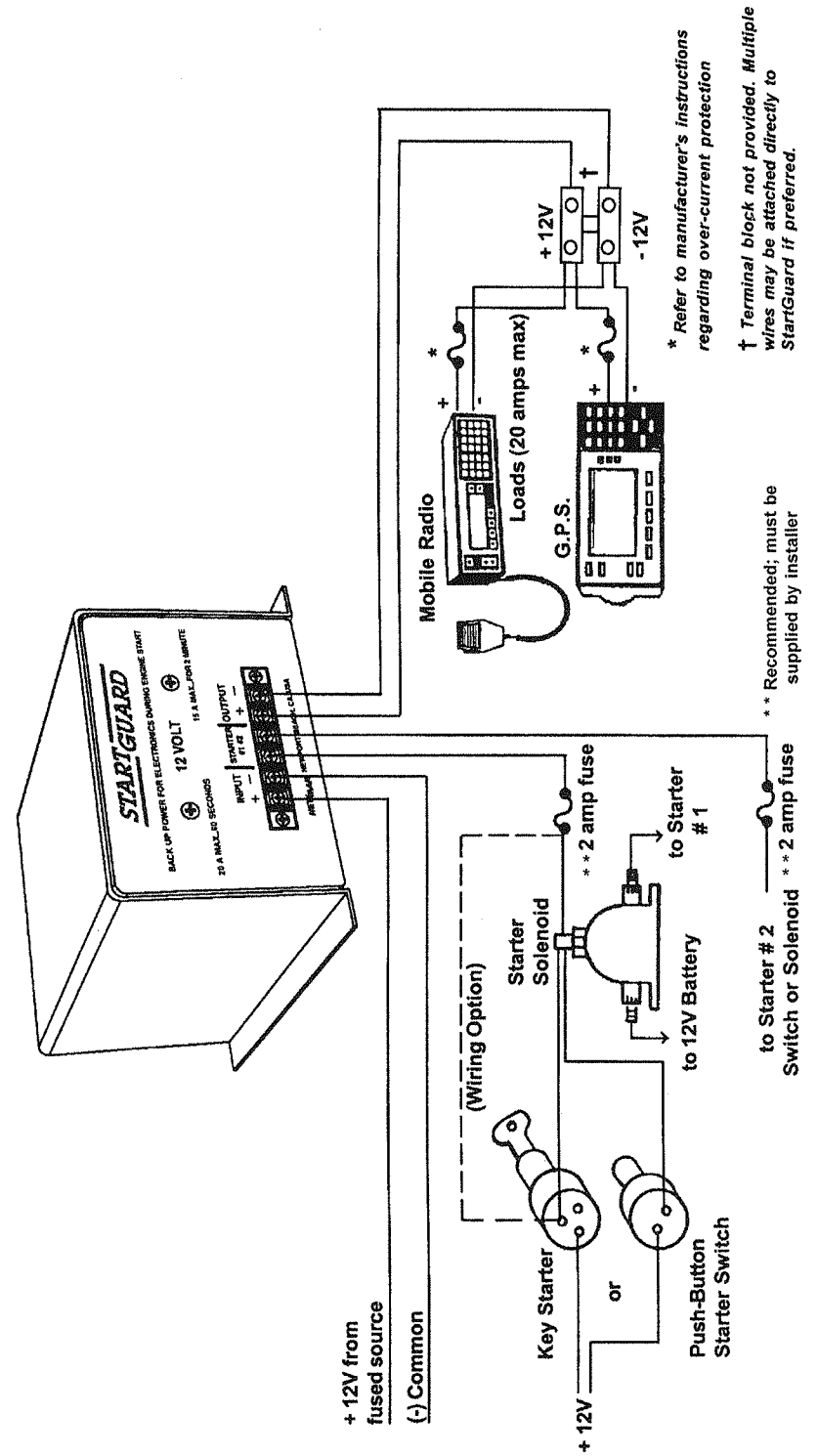
2) Disconnect all wiring to the StartGuard.

3) Connect the 10 K ohm resistor between the (+) and (-) OUTPUT terminals. *Note: If you check voltage on the output without the resistor attached you will read some output voltage. This is due to reverse diode leakage and is normal.* Use the volt meter to measure the voltage on the OUTPUT terminals. With the resistor wired across the output terminals, you should measure less than 1 volt.

4) Now apply 12 VDC from your power source (power supply or 12 volt battery) across the STARTER #1 and INPUT (-) terminals. (Connect power supply (+) to STARTER terminal and power supply (-) to INPUT (-)). You should hear an audible click and the voltmeter should read 12.4 - 12.7 VDC. Repeat this step with the input power applied across the STARTER #2 and INPUT (-) terminals. If applying 12 VDC power to either of these terminals does not bring the internal battery on-line, the unit should be returned to NEWMAR for service.

5) If the internal battery does come on-line but the voltmeter indicates less than 12 VDC, recharge the battery with an input voltage of 13.8 - 14.8 VDC for 3 - 4 hours. Then disconnect the input, wait 10 minutes, and repeat steps 2 through 4. If you still are not getting a normal 12.4 - 12.7 VDC reading, the battery must be replaced. (See previous section, BATTERY REPLACEMENT)

TYPICAL NS-12-20 STARTGUARD WIRING



In order to operate, the StartGuard must "see" +12 VDC at one of the two "STARTER" terminals whenever the starter is engaged. Attach the sense wire to the StartGuard, as above, then route the sense wiring either directly to the ignition switch or to the starter solenoid, as shown in the diagram. Each lead must be attached to a terminal which receives +12 VDC *only* when the starter is engaged. The second sense terminal is provided only for vessels or vehicles with dual engines and may be ignored in single engine applications.

Sense Wiring

- Use any gauge from #12 AWG (4mm) to # 18 AWG (2mm)

III) OPERATION

Operation of the StartGuard is automatic. Whenever 12 VDC is sensed on either of the "STARTER" terminals, the internal relay will close and bring the internal battery on-line to provide supplemental voltage to the sensitive electronic device.

When the starter is disengaged and there is no longer 12 VDC present on either terminal, the relay will open, disengaging the battery.

The Start-Guard battery relies on your main battery system voltage for recharging. Therefore, there should always be 12 VDC (nominal) present on the +/- input terminals. Charging the StartGuard battery requires an input voltage of 13.8 - 14.8 VDC for about 3-4 hours minimum per month. (These voltages are produced by any typical 12 volt alternator.) Maintenance voltages above 13.4 VDC will prevent any self-discharge.

Important: Batteries can be permanently damaged if left in a discharged state for an extended period of time. If the StartGuard is to be put into storage, the internal battery must be charged first. Leaving it hooked up to your main battery system for at least 48 hours before storing it should be sufficient.

IV) BATTERY REPLACEMENT

To guarantee proper operation, the StartGuard battery should be replaced at least every 5 years, or as soon as it will no longer hold a charge.

To determine the age of the battery in your StartGuard, check the quality control sticker on the end of the unit. The first four digits of the serial number (designated "S/N") refer to the year and month of manufacture. For instance, a unit with a serial number starting "0135" was manufactured the 35th week of 2001. Be sure to mark the date of replacement on this sticker for future reference.

Caution: Take care to ensure that you do not short the battery terminals during installation. The resulting high current can melt wires and cause other damage to the unit.

- 1) Turn off power to the input wiring and disconnect all input and output connections to the Start-Guard. Remove the unit from the mounting surface.
- 2) Using a phillips screwdriver, remove the four corner screw/lockwasher sets from the top of the unit and remove the top cover.
- 3) Disconnect the red and black power leads from the battery terminals.
- 4) Remove and dispose of the battery properly and according to local codes. Although the battery is sealed, it is a lead-acid type and there may be restrictions on its disposal.

5) Set the new battery in place in the unit. Note that the terminals are color coded and marked "+" (red) and "-" (black). Reattach the power leads, red to "+" and black to "-".

6) Replace the top cover and reinstall on the mounting surface.

V) "EXERCISING" NEW BATTERIES

New batteries may need to be "exercised" once before they will be capable of delivering their full rated capacity. Take the following steps if you wish to exercise the new battery prior to putting the StartGuard back in service.

Requirement: 12 volt power source, 2-3 amp 12 volt load

- 1) Ensure that all input wires, including the starter sense leads are disconnected.
- 2) Connect the load to the (+) and (-) OUTPUT terminals.
- 3) Apply 12 volts to either the STARTER #1 or #2 terminal and the INPUT () terminal to activate the internal relay and bring the battery on-line with the load.
- 4) Let the load draw current from the battery for about 15 minutes.
- 5) Disconnect the load, reconnect all input wiring and charge the StartGuard for 3-4 hours at 13.8-14.8 VDC.

VI) FUSE REPLACEMENT

The StartGuard is equipped with an internal fuse to protect wiring from overloads and short circuits. Should the fuse need replacement it must be with another of the same type and value: ATC blade type, 20 amps. A spare fuse has been provided with the unit. If you cannot locate this fuse and cannot find one locally, spare fuses may also be obtained from the factory.

To replace the internal fuse:

- 1) Turn off power to the StartGuard input and disconnect the input, output and starter connections. Remove the unit from the mounting surface.
- 2) Using a phillips screwdriver, remove the four corner screw/lockwasher sets from the top of the unit and remove the top cover.
- 3) The fuse is located in the center of the printed circuit board (marked "20"). Use a pair of needle-nose pliers to remove it and to install the new fuse.
- 4) Replace the top cover and reinstall on the mounting surface.

VII) TEST AND TROUBLESHOOTING

If you suspect that the StartGuard is not operating properly, you may use the following procedure to verify whether or not there is a problem.

I) GENERAL INFORMATION

The abrupt DC system voltage drop that accompanies engine starting can cause microprocessor-driven electronics aboard vehicles or vessels to "dump" programmed memory. In mobile communications, this can result in transmission errors and loss of "handshake" in data transmitters, or cause programmable radios to re-set at incorrect channels. In marine applications, GPS, SAT-NAV or other navigation/communication transceivers may lose signal lock or "crash" resulting in a loss of pre-programmed waypoints or frequencies.

StartGuard solves these problems by providing supplemental power to sensitive electronics while the engines are being cranked. It contains a sealed rechargeable battery which is switched on-line whenever the starter switch or solenoid is engaged. When the engine is running and system voltage returns to normal, StartGuard automatically goes off-line and the internal battery is recharged by the alternator and readied for the next start sequence. Two separate sense terminals are provided for vessels or vehicles with dual engines or ignition switches.

The internal battery is replaceable. Typical life is 5-7 years.

II) INSTALLATION

The following items are provided. If anything is missing from the packaging, please contact the factory for replacement: (1) 20 amp StartGuard unit, (4) #10-3/4" mounting screws, (1) spare 20 amp fuse, (1) Customer Satisfaction/Warranty card

Mounting

Mount the StartGuard in any convenient location, such as under the dash or console, using the four mounting screws provided or # 10 bolts. The case is electrically isolated and does not require grounding, therefore mounting on either a metal or non-metal surface is acceptable. The internal battery is sealed, so the StartGuard may be oriented in any position. *Note: mounting under an engine hood or other high-heat environment is not recommended.*

IMPORTANT: Although the StartGuard is constructed of materials which are resistant to the corrosive effects of moisture in the environment, it is not waterproof. Do not mount the StartGuard where there is a possibility of water entering the unit. Evidence of water entry into the unit will void the warranty.

Wiring

Input from the power source to the electronics must be routed through the StartGuard. For optimum performance, wiring from the power source to the StartGuard and from the StartGuard to the electronic device(s) being protected should not exceed 10 feet (each way).

Input/Output Power Wiring

- For wire lengths up to 5 feet, use #14 AWG (2.5mm) wire.
- For wire lengths 5-10 feet, use #12 AWG (4mm) wire.

The wiring to the StartGuard should be over-current protected at the power source. If it has not already been done, install a 25 amp circuit breaker or fuse at the power source. Shut off or disconnect power to the input wires before proceeding.

The StartGuard is equipped with a wire-ready terminal block with "capture" screw terminals. Remove the yellow terminal block cover and loosen the terminal screws. Strip the wire ends about 1/4" and attach them to the terminal block as shown in the diagram (opposite page).

VIII) SPECIFICATIONS

Input Voltage:	13.8 - 14.8 VDC nominal, 15.5 VDC max.
Relay Activation Input Voltage:	7 - 15 VDC
Output:	20 amps max
Battery:	12 VDC, 4.0 amp/hour, sealed rechargeable, 3-5 year life (typical)
Back-Up Capacity (Fully Charged)	20 amps for one minute 18 amps for 2 minutes
Operating Temperature Range:	0-40° C
Winter Storage Temperature Range	-20° to +40° C
Dimensions:	8.25" x 4.9" x 3.5"
Weight:	5.5 lbs.

IX) SCHEMATIC DIAGRAM

