

# BATTERY CHARGER

## FOR NFPA20 FIRE PUMP SYSTEM APPLICATIONS INSTALLATION AND OPERATION

**THIS MANUAL REFERS TO THE FOLLOWING MODULES**

**G150 12V (FP option)**

**G300 12V (FP option)**

**G300 24V (FP option)**

**G600 24V (FP option)**



For safe and correct use of these chargers, read and save the safety information that precedes the installation and operation instructions.

This guide contains 5 pages (including this one). If any pages are missing, contact the battery charger supplier or manufacturer for replacement documentation.

## IMPORTANT SAFETY INFORMATION – READ AND SAVE THESE INSTRUCTIONS

This manual contains important safety and operating instructions for models G150, G300, G600, EG150, EG300 and EG600.

- Do not expose the battery charger to rain, snow or wet environments.
- The use of any attachment not recommended or sold by the battery charger manufacturer may result in risk of fire, electric shock or injury to persons.
- Do not operate charger if it has received a sharp blow, been dropped, or otherwise damaged in any way: return to supplier.
- Do not disassemble the charger: return to supplier when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.

### WARNING – RISK OF EXPLOSIVE GASES

**WORKING IN THE VICINITY OF A LEAD ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION.**

To reduce the risk of battery explosion, follow these instructions and those published by the battery manufacturers and the manufacturer of any equipment you intend to use in the vicinity of the battery. Review cautionary marking on these products and any attached equipment.

### PERSONAL PRECAUTIONS.

- (i) Someone should be within range of your voice or close enough to come to your aid when you work near a lead-acid battery.
- (ii) Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing or eyes.
- (iii) Wear complete eye protection and clothing protection. Avoid touching eyes whilst working near batteries.
- (iv) If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eyes, immediately flood eyes with running cold water for at least 10 minutes and get immediate medical attention.
- (v) NEVER smoke or allow a spark or flame in vicinity of battery.
- (vi) Be extra cautious to reduce risk of dropping a metal tool on to the battery. It may spark or short-circuit the battery or other electrical part that may cause explosion.
- (vii) Remove personal metal items such as rings, bracelets, necklaces and watches when working with a lead-acid battery. A lead-acid battery can produce a short-circuit current high enough to weld a ring or the like to metal, causing a severe burns.
- (viii) Use the charger only for charging batteries as stated on the charger. Do not use the battery charger for charging dry-cell batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage to property.
- (ix) NEVER CHARGE A FROZEN BATTERY

### PRIOR TO INSTALLATION /COMMISSIONING

- Clean battery terminals. Be careful to keep corrosion from coming into contact with eyes.
- Add distilled water in each cell until the battery acid reaches a level specified by battery manufacturer. This helps purge excessive gas from the cell. Do not overfill. For a battery without cell caps, carefully follow manufacturer's recharging instructions.
- Study all battery manufacturer's specific precautions, such as removing or not removing cell caps while charging and recommended rates of charge.
- Determine the voltage of battery by referring to engine manual and ensure this matches the charger's output voltage.

### CHARGER LOCATION AND CONNECTION

- Never place the charger directly above battery being charged: gases from the battery will corrode and damage the charger.
- Never allow battery acid to drip on to the charger when reading specific gravity or filling battery.
- Do not operate the charger in a closed-in area or restrict ventilation in any way.
- The battery charger should be connected to a grounded, metal, permanent wiring system; or an equipment-grounding conductor should be run with circuit conductors not connected to equipment-grounding terminal on the battery charger.
- Connections to the battery charger should comply with all local codes and ordinances.
- G150, G300 & G600 – these battery chargers should be installed so that they are not likely to be contacted by people.
- EG150, EG300 & EG600 – the AC wiring should be independent of the DC and alarm wiring. Use 2x 2.5mm (total wire  $\text{Ø}=5\text{mm}^2$ ) or larger wire for DC (charger to battery) leads. Use 2.5mm<sup>2</sup> or larger for input and ground connections.

For safe and correct use of the charger, follow the following steps. Should you have any problems or the unit does not function as expected, consult our troubleshooting guide at the end of these instructions.

- Visually inspect unit for any signs of damage, caused by transport or storage.
- Mount the charger as outlined above, paying attention to ambient temperature.
- Ensure the mains AC supply is isolated, and ensure the correct rated input voltage before connection.
- Ensure the charger is earthed at the marked earth stud.
- Check batteries in accordance with the manufacturer's guidelines.
- Check that the charger is correct for battery type and voltage.
- Connect the charger to the batteries, observing correct polarity and ensuring a secure and tight connection.
- Switch on charger at the mains AC supply.

## GENERAL INFORMATION

Please read the following before installing. A visual inspection of this product for damage during shipping is recommended before installation. It is your responsibility to ensure that qualified mechanical and electrical technicians install this product. If in doubt, please contact your local Computronic representative.

WARNING

**BEFORE BEGINNING INSTALLATION OF THIS PRODUCT**

- ✓ Disconnect all electrical power to the charger
- ✓ Make sure the charger cannot operate during installation
- ✓ Follow all safety warnings of the battery manufacturer
- ✓ Read and follow all installation instructions

### DESCRIPTION & OPERATION

The Guardian FP range provides automatic, current limited and voltage controlled charging of vented lead acid batteries. Guardian FP units are designed for controlling and maintaining the charge of batteries used to start internal combustion engines driving fire pump system applications.

Each charger consists of a transformer, rectifier and thyristor control circuit. The units are available as either an open frame module for mounting in an enclosed panel, or as a wall-mounted enclosure with DC charge ammeter and voltmeter. *(Note: In the event of no AC supply to the charger, the voltmeter displays the DC voltage of the battery or connected DC equipment.)*

Electrical connection of the AC supply, battery and (boost/alarm) control circuits is via spring-clamp terminals.

### Float charge operation

In normal charging mode, the Guardian maintains the battery at a pre-calibrated float voltage (see table right), while supplying any additional DC load up to the specified current limit (see Specification right).

When fully charged, a battery will only accept the charge required to replace internal losses (approx. 1mA per AH of battery). E.g. for a system with a 1 Amp standing load and a fully charged 50 AH lead acid battery, Guardian will typically supply 1.05 Amps.

### Auto boost (equalising) operation

Auto boost operation provides a temporary increase in output voltage (see table right), equalising the charge between cells and maximising battery capacity and service life.

Auto boost is triggered automatically when the battery falls below a preset voltage. An Auto Boost cycle can also be triggered manually (regardless of battery voltage) by linking two 'boost' terminals, e.g. via a panel switch or push-button.

Once the batteries have reached the boost voltage level, Guardian reverts to its normal float charge mode, preventing battery over-charge and gassing.

### Temperature compensation

The optimum charge voltage for lead acid batteries varies with ambient temperature. Guardian chargers provide output temperature compensation as standard: output voltage decreases as ambient temperature increases at a rate of 3mV/°C/cell.

'TC' option units provide greater accuracy of ambient temperature measurement, using a remote sensing device (supplied) that can be mounted close to the battery pack.

### PRODUCT SPECIFICATION

<b>power supply:</b>	
operating voltages	120 VAC ±6% 230 VAC ±10%
operating frequency	50 / 60 Hz
<b>DC charge output:</b>	
nominal voltage	12 or 24 V DC
float / boost voltages	see table below
maximum current limit:-	
(E)G150-12V, (E)G300-24V	10 A
(E)G300-12V, (E)G600-24V	20 A
<b>'A' (alarm) option outputs:</b>	
charge fail, under volts & over volts relays	SPDT volt free contacts, relays de-energise on fault (120 sec delay on under volts)
contact rating	1A @ 30 V DC (resistive load)
<b>general:</b>	
transformer	single phase 50-60Hz class 155 (F)
operating temperature	-10 to +55°C
dimensions	see 'assembly' section overleaf
weight	see 'assembly' section overleaf
EMC emission / immunity	EN61000-6-4 / EN61000-6-2

### OUTPUT CALIBRATION

Calibration figures at 20 deg C. Output voltage automatically decreases by 3mV per cell per 1°C increase in temperature.

Battery type	float volts (V DC)	boost volts (V DC)
12V vented lead acid (6 cells)	13.7	15.6
24V vented lead acid (12 cells)	27.4	31.2

### Indicating LED's

Two LED's are provided on the front of the charger. A green LED indicates that AC power is applied to the charger. An amber LED indicates that DC power (battery) is connected to the charger output.

### Charge fail & alarms option

The Guardian provides 3 x alarm relay outputs – charge fail, battery under volts (with 120 sec delay) and battery over volts. The volt-free relays de-energise in the event of a charging fault or high/low battery voltage.

### WARRANTY AND SERVICING

These chargers are supplied with a 1 year warranty on parts and workmanship.



**WARNING:** Guardian battery chargers contain no user serviceable parts, and should be returned to the supplier in the event of failure.

No attempt should be made to replace or repair the charger. Any attempt to do so may invalidate warranties, cause damage to the charger and equipment, and result in serious personal injury.

# ELECTRICAL CONNECTION



**WARNING: DANGER OF INJURY OR DEATH.** During normal operation, Guardian is connected to high voltage AC circuits. Before connection, disconnection or handling of these units, ensure that all AC power supplies are isolated. Connection or disconnection with live wiring can also cause hazardous sparking and component damage.

## General

Electrical connection is via terminals on the Guardian circuit board:-

OUTPUT	BOOST	CHARGE FAIL			OVER VOLTS			UNDER VOLTS			INPUT
- +	↓ ↓	Com	NO	NC	Com	NO	NC	Com	NO	NC	N L

Connection of the wiring harness is by spring-clamp terminals as follows:-



Strip and position the wire just before the clamping unit.



Press down on the clamp spring (e.g. using a 3mm flat-head screwdriver) and insert the wire into the clamp.



Release the clamp spring and check that the wire is secure.

Terminal functions are listed below. A typical connection diagram is shown above right.

## DC Output



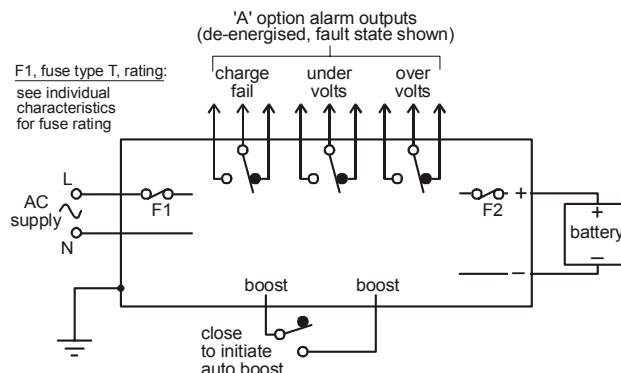
Before connection or disconnection of the DC charge output:-

- Ensure AC supply input is isolated. **Disconnecting the batteries while the AC supply is live can result in sparking at the battery terminals, ignition of battery gasses and serious personal injury.**
- Check that the charger output is compatible with battery type & voltage. **Incompatibility may result in damage to the charger, batteries and serious personal injury.**

Connect the Guardian output to the battery terminals, observing the warnings above and the correct DC polarity.

The outputs of (E)G150 and (E)G300 models include a self-resetting polyfuse for protection of reverse polarity and short-circuit faults. In the event of these faults, isolate the AC supply, disconnect the output terminals and allow the fuse to reset. No replacement of the fuse should be necessary. The charger can then be re-connected and switched back on. If the fuse fails to reset, return the charger to the supplier.

The outputs of (E)G600 models include an automotive type blade fuse. Ensure the correct rating when replacing fuses.



## Boost Initiate

The Guardian Auto Boost feature provides an automatic increase in output voltage, as described on page 3. The Boost Initiate terminals, when linked via a panel switch or momentary push button, allow the operator to manually initiate a single Auto Boost cycle (at any time, regardless of battery voltage).

## Charge Fail, Over Volts, Under Volts

Guardian chargers are fitted with 3 relay outputs. Each output has SPDT volt-free contacts, rated 1 Amp max. at 30V DC.

All relays are energised (COM closes to NO contact) during normal charging. Charge fail and battery overvolts relays immediately de-energise (COM closes to NC contact) in the event of a fault. The under volts relay de-energises on low battery voltage, but only after a 120 second delay, allowing for normal under voltage conditions such as engine cranking.

## AC Input (power supply)



Before connection or disconnection of the mains AC supply, or replacement of AC fuses:-

- Ensure AC supply is isolated.
- Ensure a good earth connection to the earth stud on the charger's metal chassis.
- Ensure the AC supply voltage is compatible with the charger's supply rating. **Exceeding the maximum rated voltage may result in damage to the charger and connected equipment, and cause serious personal injury.**

All Guardian models are fitted with mains AC input fuses at the required ratings - see markings on each chargers. Before replacing any fuses, ensure the charger is isolated from the mains AC supply.

# TROUBLESHOOTING FLOWCHART

