

Sentinel 70/140 series

Automatic Battery Chargers

INSTALLATION AND OPERATION

THIS MANUAL REFERS TO THE FOLLOWING MODULES

SNS70
SNS140
SNL70
SNL140
ESNS70
ESNS140
ESNL70
ESNL140



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

This guide contains 6 pages (including this one). If any pages are missing, contact the battery charger supplier or manufacturer for replacement documentation.



Sentinel (SNS shown)



Enclosed Sentinel

IMPORTANT SAFETY INFORMATION – READ AND SAVE THESE INSTRUCTIONS

This manual contains important safety and operating instructions for all (non UL approved) SN and ESN models.

- 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

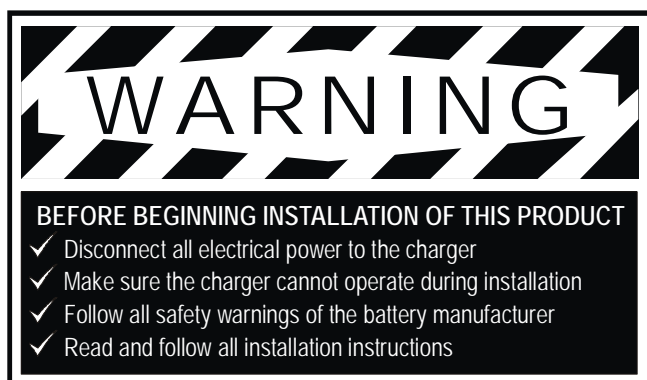
- Never place the charger directly above battery being charged: gases from the battery will corrode and damage the charger.
- Never allow battery acid to drip on to the charger when reading specific gravity or filling battery.
- Do not operate the charger in a closed-in area or restrict ventilation in 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.
- SNS/SNL models – these battery chargers should be installed so that they are not likely to be contacted by people.
- ESNS/ESNL models – the AC wiring should be independent of the DC and alarm wiring. Use 2x 2.5mm (total wire $\varnothing=5\text{mm}^2$) or larger wire for DC (charger to battery) leads. Use 2.5mm² 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.



Description & operation

The Sentinel range provides automatic, current limited and voltage controlled charging of wet lead acid, VRLA or NiCd batteries. The units may be used in a wide range of industrial charging applications, including standby engines, pumps and generators.

Sentinel uses switch mode power supply technology to give a compact and lightweight construction, improved efficiency and low heat dissipation, wide supply voltage tolerance and low output ripple.

Sentinel chargers are available as a module for surface mounting in an enclosed panel (SN models), or as a stainless steel, wall-mounted enclosure with DC charge ammeter (ESN models). SNS and ESNS models provide basic charging, while SNL and ESNL models have higher specification features. For all models, electrical connection of the AC supply, battery and control circuits is via screw terminals.

Float charge operation

Sentinel operates an intelligent, multi-stage battery charge regime. In normal charging mode, the charger 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, Sentinel will typically supply 1.05 Amps.

Auto boost operation

SNL and ESNL models include an Auto boost feature. Auto boost provides a temporary increase in output voltage, equalising the battery charge between cells and maximising battery life and capacity.

Auto boost is triggered automatically when the battery falls below a preset voltage, or can be initiated manually by linking two 'boost' terminals, e.g. via a momentary push-button or panel switch. Once the batteries have reached the boost voltage level, Sentinel reverts to its normal float charge mode, preventing battery over-charge and gassing.

Temperature compensation and RTC option

The optimum charge voltage for lead acid and NiCd batteries varies with ambient temperature. All Sentinel chargers include on-board temperature sensing and output compensation (3mV/cell decrease for each °C increase). For even greater temperature accuracy, 'RTC' option units include a remote temperature sensor with 3 metre lead assembly (other lengths available to special order).

Product specification

power supply:	(E)SNS70 (E)SNL70	(E)SNS140 (E)SNL140 (24V)	(E)SNS140 (E)SNL140 (12V)
supply voltage, 120 V units:	85 – 135 V ac		
240 V units:	185 – 305 V ac		
operating frequency	47 – 63 Hz		
DC charge output:			
maximum current	5	5	10
nominal voltage	12	24	12
line regulation	+/- 1%		
load regulation	+/- 1%		
output ripple	< 1%		
float / boost voltages	see table overleaf		
alarm output:			
output polarity	negative DC during fault (switched SPNC relay contact, de-energising on fault),		
current rating	1A max. @ 30 VDC (resistive load)		
general:			
operating temperature	-20 to +55°C		
humidity	20% to 90% RH		
dimensions	see table overleaf		
weights (approx.): SNS, SNL	0.55 Kg / 1.2 lb, 0.6 Kg / 1.3 lb		
ESNS, ESNL	1.3 Kg / 2.9 lb, 1.4Kg / 3.1 lb		
EMC emission / immunity	EN50081-2 / EN50082-2		

Output calibration

Battery type	float volts (V DC)	boost volts (V DC)
12V	Vented lead acid (6 cells)	13.5
	Calcium-Calcium (6 cells)	13.8
	VRLA, AGM (6 cells)	13.5
	VRLA, Gel (6 cells)	13.5
	NiCd (10 cells)	14.1
24V	Vented Lead acid (12 cells)	27.0
	Calcium-Calcium (12 cells)	27.6
	VRLA, AGM (12 cells)	27.0
	VRLA, Gel (12 cells)	27.0
	NiCd (18 cells)	25.6
	NiCd (20 cells)	28.2

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

Alarm output

All Sentinel chargers include an alarm relay output. On SNS models, the relay de-activates immediately during a charge fail condition (e.g. AC supply/fuse failure, DC fuse failure or low/no charge current). On SNL models, the relay also de-activates on high or low battery voltage faults, but only after a 120 second delay, to allow for normal battery voltage variations, e.g. engine cranking.

Warranty and servicing

Sentinel chargers are supplied with a 2 year warranty on parts and workmanship.



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

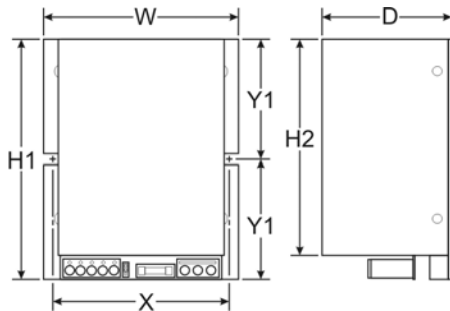
No attempt should be made to repair the charger. Any attempt to do so may invalidate warranties, cause damage to the charger and equipment, and result in serious personal injury.

DIMENSIONS AND ASSEMBLY

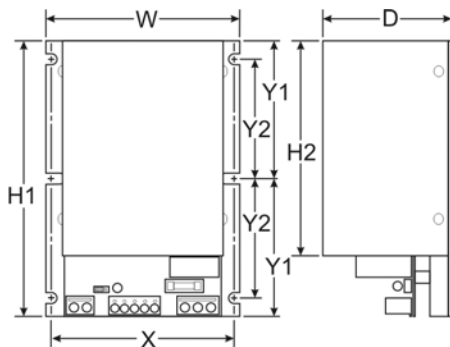


CAUTION: Sentinel chargers should be handled by the circuit board cover (on SNS/SNL modules) or steel enclosure (ESNS/ESNL models). Care should be taken not to handle static sensitive components on exposed circuit boards.

SNS



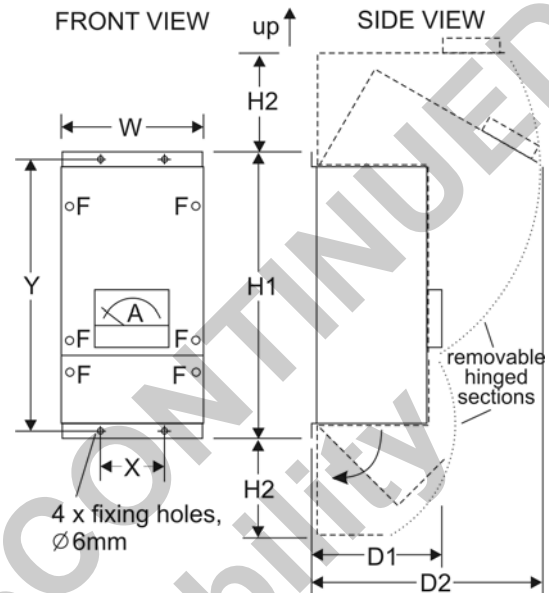
SNL



	SNS	SNL
Overall:-		
W	105mm / 4.13"	
H1	130mm / 5.19"	150mm / 5.91"
H2	117mm / 4.61"	
D	72mm / 2.83"	
Fixing holes:-		
X	99mm / 3.90"	
Y1	65mm / 2.56"	75mm / 2.95"
Y2	n/a	65mm / 2.56"

- These chargers are designed for mounting on a vertical facia inside an enclosed control panel or housing. Mounting orientation should be as shown above.
- For safe heat dissipation, mount Sentinel in the orientation shown, with a minimum air-gap clearance of 40mm above/below and 25mm at the sides. Consideration must be given to ventilation for proper heat dissipation.
- For surface mounting, use the 2 centre slots (Ø 6mm) or 4 corner slots (Ø 6mm). Ensure that the mounting studs/bolts/nuts/screws adequately support the charger, and are tightened sufficiently to not to become loose during normal use, e.g. due to engine/equipment vibration.
- Optional clip for DIN rail mounting (2 required for each charger), part number 045-0001.

ESNS/ESNL



Overall:-	
W	142mm / 5.59"
H1	268mm / 10.55"
H2	85mm / 3.35"
D1	130mm / 5.12"
D2	222mm / 8.74"
Fixing holes:-	
X	64mm / 2.52"
Y	274mm / 10.79"

- These chargers are designed for wall or frame mounting in the orientation shown above, with enclosure air vents uppermost. Adequate consideration should be given to ventilation for proper heat dissipation.
- Mounting is via the enclosure back-plate, using 4 holes (Ø 6mm) on the upper and lower edges. Ensure that the mounting studs/bolts/nuts/screws adequately support the charger weight, and are tightened sufficiently to not to become loose during normal use (e.g. due to engine/equipment vibration).
- Access to the electrical connection terminals is via removable / hinged sections on the front facia. Remove the 6 x securing screws (marked F above), then remove or rotate the upper and lower sections through 90 degrees.
- Electrical cable entry is via knock-outs on either side of the enclosure, which must be carefully removed from the enclosure sides. A suitable cable-gland (20mm/0.8" diam.) must be used to prevent damage to cables and stop unwanted entry into inner part of charger.
- Connect the charger wiring as detailed in the following section, "Electrical connection". When wiring is complete, and before using the charger, re-secure the hinged sections using the 6 fixing screws.

ELECTRICAL CONNECTION

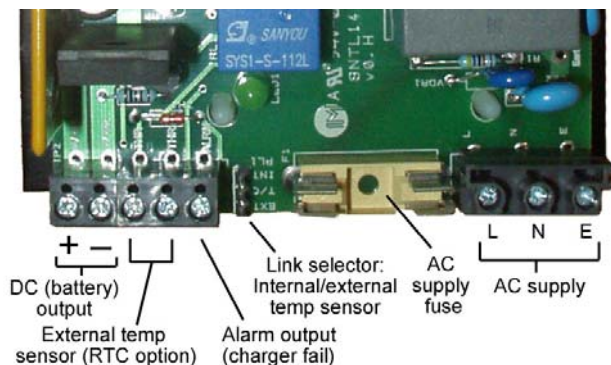


WARNING: DANGER OF INJURY OR DEATH. During normal operation, Sentinel is connected to high voltage AC circuits. Before connection, disconnection or handling of these chargers, ensure isolation of all AC power supplies. Connection or disconnection with live wiring can also cause hazardous sparking and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

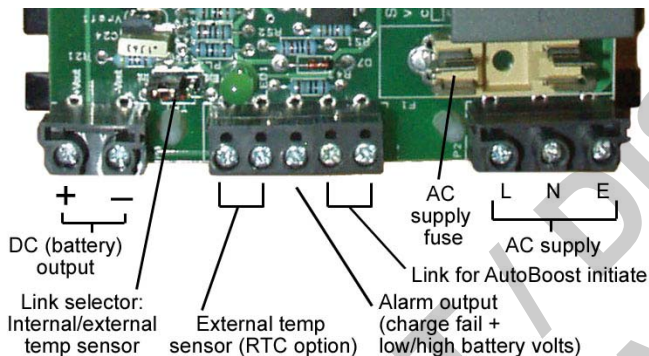
General

Electrical connection is via screw terminal blocks on the Sentinel circuit board.

For SNS models:-

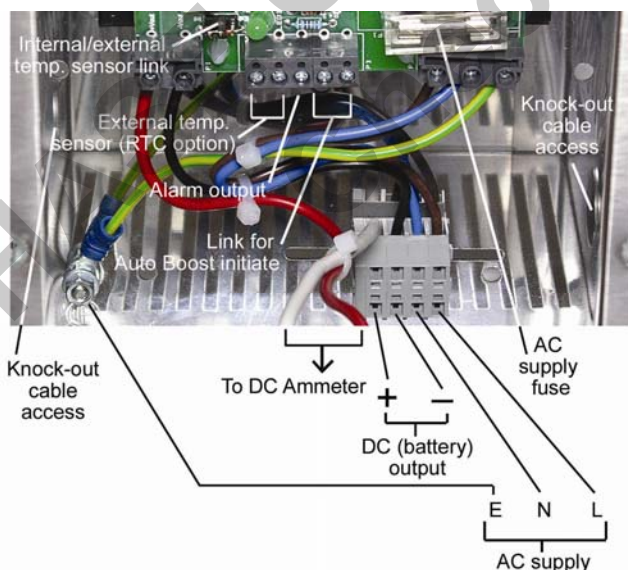


For SNL models:-



On enclosed ESNS/ESNL models, an additional terminal block provides convenient connection of AC supply and DC output. The AC supply Earth must be connected to the stud connector on the metal enclosure, as shown below.

For ESNL models:-



DC Output



Before DC connection or disconnection:-

- 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 Sentinel output to the battery terminals, observing the warnings above and the correct DC polarity.

The Sentinel output includes a self-resetting polyfuse for protection of reverse polarity and short-circuit faults. In the event of such faults, isolate the AC supply, disconnect the output terminals and allow the fuse to reset; replacement of the fuse should not 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.

Auto Boost Initiate

On (E)SNL chargers, two terminals may be linked (e.g. using an operator-controlled momentary push button or panel switch) to give manual initiation of an Auto Boost cycle (at any time, regardless of battery voltage).

Alarm output

All Sentinel models include a relay-based output for remote signalling of faults. During fault conditions, the relay de-energises and the output gives a negative DC signal, rating 1A max. at 30 VDC.

(E)SNS models monitor charge fail faults, i.e. AC supply or fuse failure, DC fuse failure or low/zero current output.

(E)SNL models monitor for charge fail faults, plus battery low voltage and battery high voltage.

The alarm relay de-energises immediately on detection of a charge fail fault, and 120 sec after detection of low or high battery voltage faults (to allow for normal voltage variations, e.g. during engine cranking).

AC Input (power supply)



Before AC connection, disconnection or fuse replacement:-

- Isolate the AC supply
- 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 rated voltage may result in damage to the charger and connected equipment, and cause serious personal injury.**

All Sentinel models are fitted with mains AC input fuses, with ratings as labelled on each charger.

TROUBLESHOOTING FLOWCHART

