

RUTLAND HRDX CHARGE CONTROLLER

INSTALLATION & OPERATION

Models:
HRDX/12v
HRDX/24v



INTRODUCTION

Please read and understand these instructions before installing the controller. Save these instructions for future reference.

The HRDX Charge Controllers regulate the charge current to a single or dual battery banks from the Rutland 503, 913 or FM910-3 Windcharger plus a solar array up to 100w maximum. Internal blocking diodes allows connection of additional charge sources (e.g. engine alternator, mains charger).

Note: Additional charge sources must be connected directly to the battery and not to the input of the HRDX controller.

The unit features a LCD digital panel meter to display currents and voltages via a selector switch, a switch to shutdown the wind generator and solar array during installation and servicing and an LED to indicate when the regulator is operating.

Unless stated otherwise when ordered, the regulator is set in accordance with table 1. This setting is suitable for lead-acid, absorbed glass matt and most gel batteries. **(Check the max voltage rating for the battery before wiring your system).** If the regulator is to be used with any other battery type e.g. Nickel Cadmium and some gel types, the regulator may require re-setting according to the battery manufacturer's recommendations.

Nominal Battery Voltage	Cut-in Voltage	Max Voltage
12	13.8	14.4v
24	27.6	28.8v

IMPORTANT NOTES

- Ensure correct polarity is observed at all times during connection. Failure to do so will cause severe damage to the HRDX and other equipment.
- Ensure the voltage indicated on the HRDX is correct for your battery system.
- Additional charge sources other than the wind generator and solar module must be connected directly to the battery and not to the inputs of the HRDX controller.
- Select suitable wiring and connectors for the interconnections that are capable of continuously carrying 10Amps minimum.
- Keep wiring lengths to a minimum to eliminate unnecessary voltage drop.
- Never attempt to service or adjust this product yourself, incorrect settings could cause damage to other system components or equipment.
- The housing is not waterproof and must be mounted in a suitably protected location.
- Avoid operating the shutdown switch during stormy conditions to minimise stresses applied to the system.

FEATURES

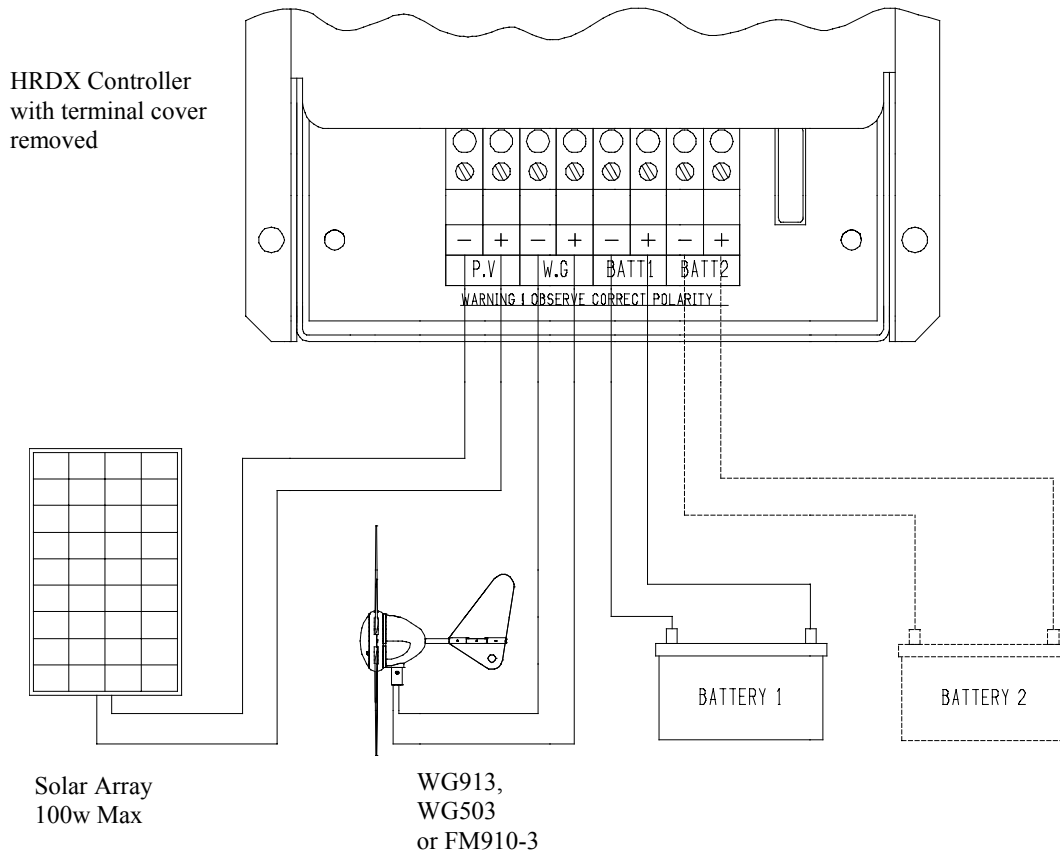
- Pulse Width Modulated battery charge current regulator
- LED indication of regulating mode
- LCD digital panel meter with selector switch to display:
 - WG output current. (Wind Generator)
 - PV output current. (PhotoVoltaic Solar module)
 - Combined net battery charge current *
 - Voltage battery 1
 - Voltage battery 2
- Shutdown/run switch. ***See Important Notes.***
- Charge splitter to allow charging of 2 isolated batteries
- System fuse – It is not necessary to fit the in-line fuse supplied with the windcharger when using this HRDX Controller.
- Built in Solar Array blocking diode

* The combined net battery charge current is the current being supplied to the battery/batteries from the combination of wind & solar inputs after the regulator. If the regulator is not on (Indicator LED not lit), this will be the sum of the WG & PV outputs. If the regulator is on (Indicator LED Lit) this will be the sum of the WG & PV outputs less the amount diverted by the regulator. In a dual battery system, this reading is the current being supplied to both batteries, this current will be split between the batteries depending on their state of charge, the lower charged battery will take a larger share of the current.

SPECIFICATION

Dimensions	138mm x 160mm x 75mm
Weight	850g
Maximum input	1 x WG913 or 1 x FM910-3 or 1 x WG503 + max 100w Solar
Fuse rating/type	20A ATO Automotive blade type
Display	15mm high 3 ½ digit LCD
Accuracy	Voltage: ± 2%. Current: ± 5%.*
Operating Temperature	0°C – 40°C

*Note: default readings in the event of no current generated are 0.01V on 12V systems & 0.1V on 24V systems.

BASIC SYSTEM WIRING SCHEMATIC**Note:**

The HRDX controller is provided with a built in blocking diode to allow direct connection of maximum 100w solar array. If the array is made up of modules in parallel then each module should be fitted with it's own blocking diode.

INSTALLATION

Mounting

- Choose a suitable location for the controller within a maximum run of 1.5m of cable from the battery. Mount the regulator to a flat, vertical surface via the four mounting holes provided.

Electrical Connection

- Select suitable wiring and connectors for the interconnections that are capable of continuously carrying 10Amps minimum.
- Keep wiring lengths to a minimum to eliminate unnecessary voltage drop, maximum cable length between regulator and battery should be 1.5m max to ensure accurate voltage sensing.
- **Ensure that the panel mounted shutdown switch is in the shutdown position, all other charge sources are switched off and battery cables are disconnected from the batteries before connecting the controller to the system. Ensure correct polarity is observed at all times during connection. Failure to do this at time of installation and on subsequent disconnection and reconnection may irreparably damage the controller, invalidating the warranty.**
- Remove the 2 screws on the underside of the unit which retain the terminal access cover. Remove the cover.
- Pierce the grommets on the underside of the unit.
- Connect the WG, PV and battery cables to the corresponding connectors inside the HRDX after first passing them through the grommets. **Observe correct polarity.**
- If using a single battery bank, ensure this is connected to **BATT1. *The LCD meter will only display correctly when a battery is connected to BATT1.***
- Replace the terminal access cover and secure with the 2 screws.
- Make connections to the batteries.
- Remove restraints from the wind generator and covers from the solar modules.
- Move Shutdown/run switch to the run position

Assuming sufficient wind/sun the system should now operate as described in the following sections.

PRINCIPLE OF OPERATION

The HRDX protects batteries from overcharge, avoiding the loss of electrolyte through gassing and prolongs battery life. This also helps protect other electronic equipment from damage due to high battery voltage.

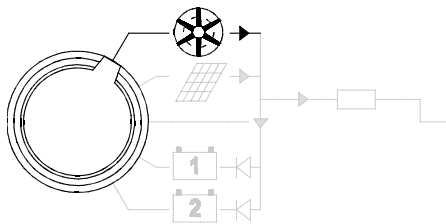
The HRDX constantly monitors the battery voltage and when the pre-set cut-in level is reached (see table 1.) tapers the charge current down until very little charge current is flowing into the battery. The regulator will be fully on at approximately 0.5v above the initial cut-in voltage. The regulator achieves this by shunting excess current and slowing the generator, reducing it's output. The regulating LED indicator on the front of the unit will light red when the regulator cuts in.

CONTROLS AND GRAPHICS EXPLAINED

LCD DISPLAY SELECTOR SWITCH

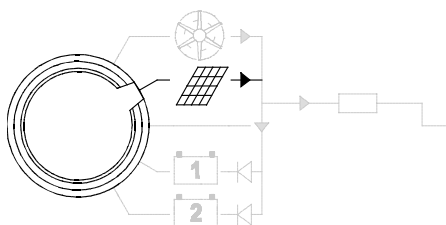
The rotary selector switch changes the LCD display to show readings as follows:

Wind Generator Output Current



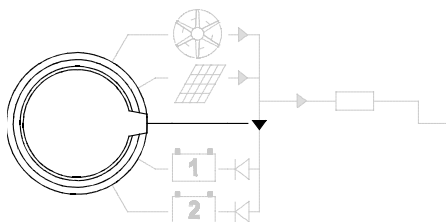
This displays the output current in Amps from the Wind Generator. *Note: A negative reading may be seen if solar power is being generated when there is none from the windcharger When the switch is in the Shutdown position a current reading may still be displayed, this is normal but current is NOT flowing to the battery.*

Solar Module Output Current



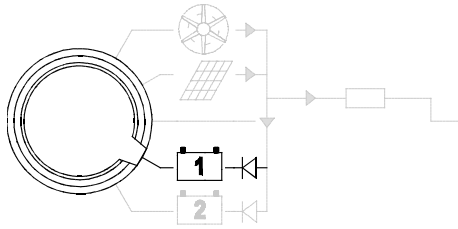
This displays the output current in Amps from the Solar Module. *Note: A negative reading may be seen if wind power is being generated when there is none from the solar panel When the switch is in the Shutdown position a current reading may still be displayed, this is normal but current is NOT flowing to the battery.*

Net Charge Current



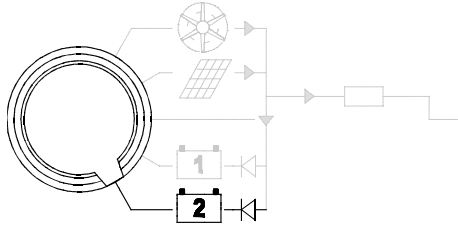
This displays the charge current into the battery from both the wind generator and solar module combined but less the amount diverted by the regulator depending on the state of charge of the battery.

Battery Voltage (Battery 1)



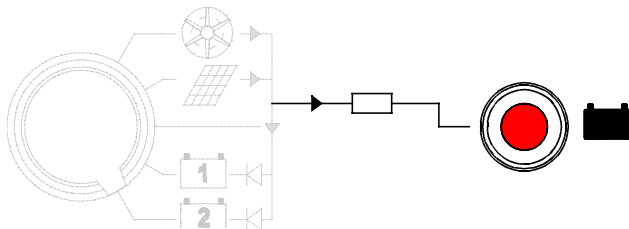
This displays the voltage of the battery connected to **BATT1** terminals on the controller.

Battery Voltage (Battery 2)



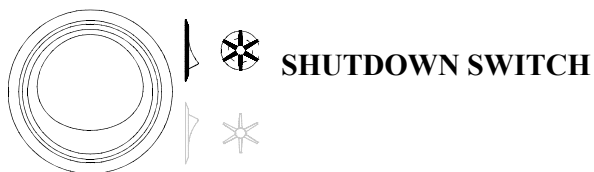
This displays the voltage of the battery connected to **BATT2** terminals on the controller. *Note: If no battery is connected to the BATT2 terminals a voltage will still be displayed.*

REGULATING LED

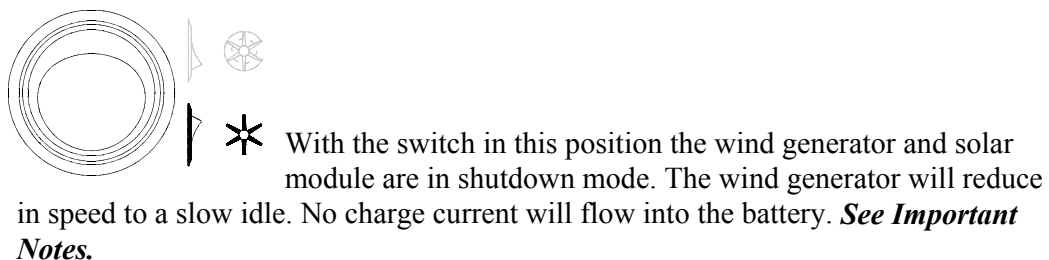


When the LED is lit, this indicates that the battery has reached it's fully charged condition and the regulator is operating to control the current allowed into the battery. In this mode the wind generator may be

seen to slow down, this is normal, the controller will slow the generator to reduce the amount of power it is generating. As the battery discharges the controller will allow more current into the battery and allow the wind generator to run faster.



With the switch in this position the wind generator and solar module are in run/charge mode.



LIMITED WARRANTY

The Marlec Engineering Company Limited Warranty provides free replacement cover for all defects in parts and workmanship for 12 months from the date of purchase. Marlec's obligation in this respect is limited to replacing parts which have been promptly reported to the seller and are in the seller's opinion defective and are so found by Marlec upon inspection. A valid proof of purchase will be required if making a warranty claim.

Defective parts must be returned by prepaid post to the manufacturer Marlec Engineering Company Limited, Rutland House, Trevithick Road, Corby, Northamptonshire, NN17 5XY, England, or to an authorised Marlec agent.

This Warranty is void in the event of improper installation, owner neglect, misuse, damage caused by flying debris or natural disasters including lightning and hurricane force winds. This warranty does not extend to support posts, inverters, batteries or ancillary equipment not supplied by the manufacturer.

No responsibility is assumed for incidental damage. No responsibility is assumed for consequential damage. No responsibility is assumed for damage caused by the use of any unauthorised components.

No responsibility is assumed for use of a non "furling" versions of the Rutland Windcharger where Marlec or one of its authorised agents finds that a generator incorporating a furling device should have been used.

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