



## Solar Panels and Controllers

### Models 6904H, 6912C-12, 6912D-12, 6912CR-12



#### Revision History

File name / Revision	Date	Authors & Change Details	Checked/ Approved
Previous version BX	2004	RS/ JH	MS
Unidata Manual - 6904 & 6912 Solar Recharge System Issue 2.0	2007	AB/CB/JH/MS/KC	MS
Unidata Manual - 6904 & 6912 Solar Recharge System Issue 3.0	2013	MP	MS
Unidata Manual - 6904H Solar Panels and 6912 Controllers 4.0.docx	03 06 14	IM/CB Update	MS

Copyright © Unidata Pty Ltd 2000-2013. All rights reserved. No part of this publication may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any spoken or computer language, in any form or by any means. Electronic, mechanical, magnetic, optical, chemical, manual or otherwise, without prior written permission of Unidata Pty Ltd 40 Ladner St, O'Connor Western Australia 6163.



## **TABLE OF CONTENTS**

<b>1.0</b>	<b>Introduction .....</b>	<b>1</b>
1.1	Operating Life .....	1
<b>2.0</b>	<b>Solar Panels .....</b>	<b>2</b>
<b>3.0</b>	<b>Solar Power Controllers .....</b>	<b>2</b>
<b>4.0</b>	<b>Installation .....</b>	<b>3</b>
<b>5.0</b>	<b>Solar Power &amp; Relay Controller Model 6512CR-12 .....</b>	<b>5</b>

## **1.0 INTRODUCTION**

The solar powered system enables the long-term use of 12V sealed lead acid batteries in the field without the need for recharging from the mains. The entire system is designed to be maintenance free once installed.

Solar powered system consists of solar panel (6904H range), sealed lead acid battery (6907B range) and solar controller (6912 range). This set may be used for externally powering all data loggers, Starflow and conductivity instruments.

In an installation with a prolonged period (more than 10 consecutive days) without sunlight we recommend the using the Model 6904H-10 Solar Panel (10W) with two Model 6907B-14 Sealed Lead Acid Batteries (28Ah). This system will also operate a cellular phone site for up to 5 “sunless” days.

### **1.1 Operating Life**

The solar panel life is at least ten years.

The operating life of sealed lead acid rechargeable batteries is normally three years.

## 2.0 SOLAR PANELS

**Voltage:** 12VDC

**Power:**

Model 6904H-10 – 10W

Model 6904H-20 – 20W

Model 6904H-50 – 50W

**Cable:** 5m single pair instrumentation cable

**Fittings:** Hardware for pole mounting included

**Size/Weight:**

Model 6904H-10: 357x303x35mm/2kg

Model 6904H-20: 300x540x35mm/2.5kg

Model 6904H-50: 637x540x35mm/4.5kg

## 3.0 SOLAR POWER CONTROLLERS

Two Solar Power controllers are provided and can be selected to suit your requirements. They maintain a lead acid battery in a fully charged condition, providing an expected service life of at least three years.

**Model 6912C-12**

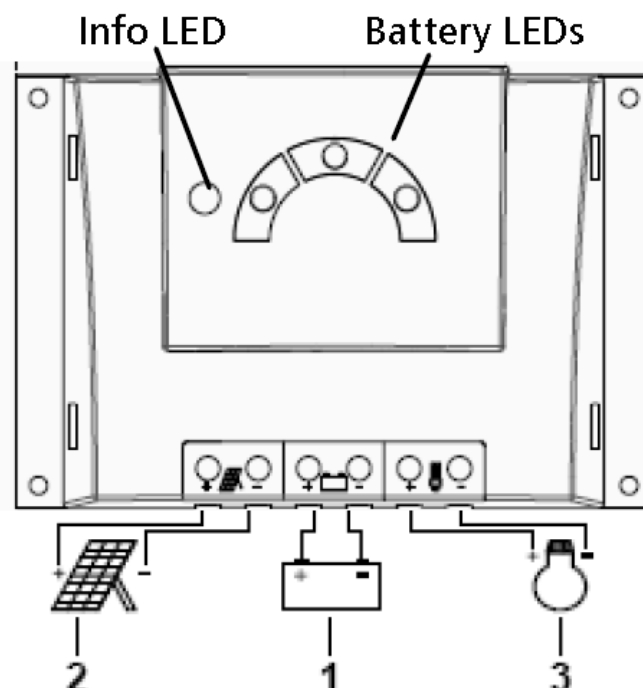
**Inputs:** 12V solar panel, 2 x 12V SLA battery (parallel connection)

**Outputs:** 12V regulated, Load current 6A

**Operating Temperature:** -25C to +50C

**Size (LxWxD):** 145x100x30mm

**Weight:** 150g



**Model 6912D-12**

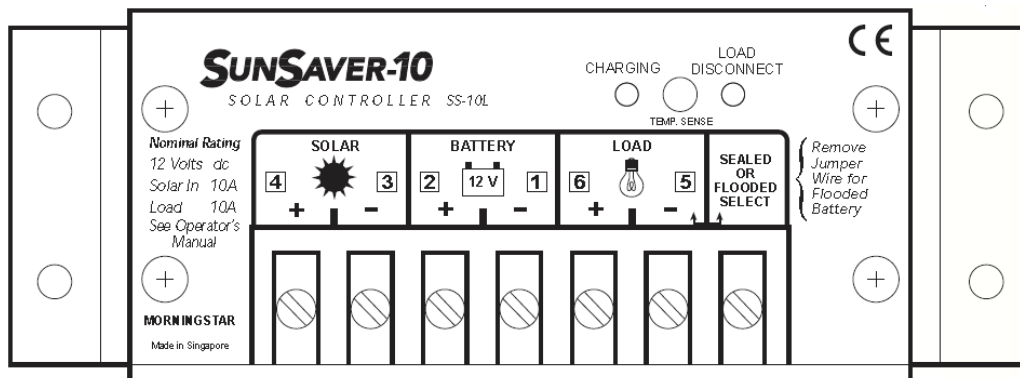
**Inputs:** 12V solar panel, 2 x 12V SLA battery (parallel connection)

**Outputs:** 12V regulated, Load current 10A

**Operating Temperature:** -40C to +85C

**Size (LxWxD):** 152x55x34mm

**Weight:** 230g



## 4.0 INSTALLATION

The optimum installation will maximize the solar panels exposure to sunlight, provide good electrical connections, protect the cabling against damage and allow rain water to cleanse the panel surface.

### WARNINGS

- Read the documentation supplied.
- Ensure that the battery is housed in a ventilated enclosure to eliminate the possibility of hydrogen gas build-up.
- When connecting the solar panel, be aware that sparking may occur if the panel is exposed to sunlight. This may cause an explosion if hydrogen gas from a charging battery is present.
- Note that even sealed batteries do vent hydrogen gas.
- Always use a regulator such as Unidata Model 6912C-12 to charge lead acid batteries.

#### 4.1.1 Positioning

The solar module should be installed in a position that allows the maximum sunlight to fall on it for the entire day. For maximum performance, face the solar panel towards the equator (North in the Southern Hemisphere, South in the Northern Hemisphere), and tilt at an angle depending on Latitude. This allows maximum exposure to both the winter and summer sun

The angle of the face regardless should always be tilted slightly to allow rainwater to wash accumulated dust off the glass face.

If the panel is to be used on a motor vehicle or ship, mount the panel horizontally to enable optimum sunlight regardless of vehicle positioning.

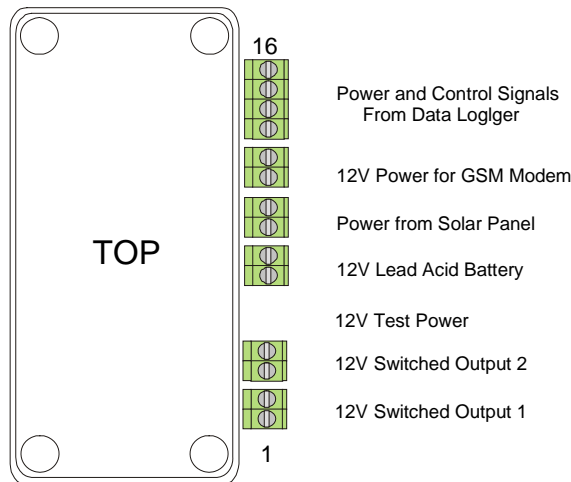
#### **4.1.2 Mounting**

The mounts supplied with the system allow the panel to be installed in a number of ways:

1. By using the U-Bolts the panel may be mounted to a vertical or horizontal pole.
2. The panel may also be bolted to any vertical or horizontal surface using 6 – 8 mm bolts.

## 5.0 SOLAR POWER & RELAY CONTROLLER MODEL 6512CR-12

The Model 6512CR-12 solar power and relay controller will charge a 12V Lead Acid Battery, provide a supervised 12V Modem power output, provide two 12V relay switched outputs, and a 12V Test output. It is mainly used with Unidata evap systems Model 6529. It is housed in a non-sealed a polycarbonate enclosure, and must be installed in a waterproof enclosure along with the battery and instrumentation. Connection is via pluggable screw terminals.



Terminal	Function	Remarks
1	Output 1 +12V	+12V 2A Relay switched Controlled by Logger 0
2	Output 1 GND	Power Ground
3	Output 2 +12V	+12V 2A Relay switched Controlled by Logger 1
4	Output 2 GND	Power Ground
5	Test +12V	+12V Normally vacant. Plug in the Output 1/2 connector to test system
6	Test GND	Power Ground
7	Battery +12V	Connects to rechargeable sealed lead acid battery. Max 1.5A charge
8	Battery GND	Power Ground
9	Solar Panel +	Connects to solar panel (14 - 18VDC)
10	Solar Panel -	Power Ground
11	Modem +12V	Provides power for GSM MODEM (if required)
12	Modem GND	Power Ground.
13	OUT 0	Output 1 relay control signal. Jumper selectable to Hi/Lo control
14	OUT 1	Output 2 relay control signal. Jumper selectable to Hi/Lo control
15	Ext. Power +	Powers system components
16	Ext. Power GND	Power Ground



All devices are connected to the row of pluggable terminals located at the front of the enclosure.

The controller has two 2A relays with the capacity to operate either solenoids or small pumps. A Starlogger or Prologger can interface with the controller allowing program control or the two relay outputs. A Test terminal socket is provided with continuous 12V power. All outputs have a 1A fly-back diode between 12V and GND, for protection from inductive loads (solenoids and motors).

The solar panel or battery system supplies continuous power. A temperature compensated regulator manages battery charging from the solar panel. A second regulator provided 12V power for a modem, which is automatically shut down if the battery voltage falls below 10.2V. The Modem supply re-starts automatically once the batteries are charged above 11.3V