ACOPOWER HY-PWM-PX20A

ACOPOWER ProteusX 20A 12V PWM Waterproof Solar Charge Controller User Manual

Model: HY-PWM-PX20A

1. INTRODUCTION

This manual provides essential instructions for the installation, operation, and maintenance of your ACOPOWER ProteusX 20A 12V PWM Waterproof Solar Charge Controller. This device is designed to manage the power flow from your solar panel to your battery, ensuring efficient charging and protecting the battery from overcharge and over-discharge. Please read this manual thoroughly before installation and use to ensure proper function and longevity of the product.

2. SAFETY INFORMATION

- Ensure all wiring is correctly polarized before connecting to the controller. Incorrect polarity can damage the device and connected components.
- Always connect the battery to the charge controller first, then the solar panel. Disconnect in the reverse order: solar panel first, then battery.
- The controller is designed for 12V systems only. Do not connect to 24V or higher voltage systems.
- Install the controller in a well-ventilated area, away from flammable gases or liquids.
- Although waterproof (IP65 rated), ensure terminal connections are protected from direct water exposure to prevent corrosion and short circuits.
- Do not attempt to disassemble or repair the controller. Contact qualified personnel for service.
- Use appropriate wire gauges for connections to prevent overheating.

3. PACKAGE CONTENTS

Verify that all items listed below are included in your package:

- ACOPOWER ProteusX 20A 12V PWM Solar Charge Controller
- User Manual
- Mounting Screws
- Wire Nuts (for connections)

Figure 3.1: Contents of the ACOPOWER ProteusX package, including the solar charge controller, user manual, mounting screws, and wire nuts.

4. PRODUCT OVERVIEW

4.1 Key Features

- **4-Stage PWM Technology:** Optimizes charging across Bulk, Absorption, Float, and Equalization stages to protect and extend battery life.

- **IP65 Rated Waterproof:** Designed to operate reliably in various weather conditions, suitable for outdoor installations.

- **Comprehensive Protection:** Includes reverse polarity, overcharging, short circuits, reverse current, overloads, and over-discharge protection.

- **Versatile Compatibility:** Supports 8 different battery types: Lithium-ion, LiFePO4, LTO, Gel, AGM, Flooded, Crystal, and Calcium.

- **Backlit LCD Display:** Provides real-time insights into charging current, energy output, temperature, battery voltage, and error codes.

4.2 Component Identification

Figure 4.1: Front view of the controller, showing the LCD display, AMP/VOLT button, and BATTERY TYPE button.

- **LCD Display:** Shows system status, battery voltage, charging current, and error codes.
- **AMP/VOLT Button:** Toggles between displaying current and voltage.
- **BATTERY TYPE Button:** Used to select the battery type (hold for 3 seconds to enter settings).
- **Solar Input Terminals:** Connect to the solar panel.
- **Battery Output Terminals:** Connect to the battery.
- **Temperature Sensor Port:** For optional external temperature sensor (not included).

Figure 4.2: Rear view of the controller, illustrating the terminal block for solar and battery connections.

Figure 4.3: The controller's IP65 waterproof rating ensures durability in various outdoor conditions.

Figure 4.4: Overview of the controller's integrated safety protections, including negative ground design, overload, short circuit, reverse current, over-temperature, and over-voltage protection.

5. SETUP AND INSTALLATION

5.1 Mounting the Controller

Mount the controller on a vertical surface in a location that is protected from direct sunlight and excessive heat. Ensure there is adequate air circulation around the unit for proper heat dissipation. While the unit is IP65 waterproof, protecting the terminal connections from direct water exposure is recommended.

Figure 5.1: Physical dimensions of the controller: 142mm (5.591in) length, 94mm (3.701in) width, and 27mm (1.063in) depth.

5.2 Wiring Sequence

Follow this sequence carefully to avoid damage to the controller or battery:

1. **Connect the Battery:** Connect the positive (+) and negative (-) terminals of the battery to the corresponding battery terminals on the charge controller. The LCD will illuminate.

2. **Connect the Solar Panel:** Connect the positive (+) and negative (-) terminals of the solar panel to the corresponding solar input terminals on the charge controller.

3. **Verify Connections:** Double-check all connections for correct polarity and secure fastening.

Disconnection Sequence: To disconnect the system, always disconnect the solar panel first, then the battery.

Figure 5.2: Wiring diagram showing the correct connection order: solar panel to controller, and controller to battery.

6. OPERATING INSTRUCTIONS

6.1 LCD Display and Indicators

The backlit LCD provides real-time information about your solar charging system. It displays battery voltage, charging current, and various status icons.

- **Battery Voltage (V):** Shows the current voltage of the connected battery.
- **Charging Current (A):** Indicates the current flowing from the solar panel to the battery.
- **Battery Type Indicator:** Displays the selected battery type.
- **Charging Status Icon:** Indicates if the battery is currently charging.
- **Error Codes:** Specific codes will appear if a fault is detected (refer to Troubleshooting section).

6.2 Setting Battery Type

The controller supports 8 different battery types. It is crucial to select the correct battery type for optimal charging and battery longevity.

1. Press and hold the **BATTERY TYPE** button for 3 seconds to enter the battery type selection mode.

2. The current battery type will flash on the LCD.

3. Press the **BATTERY TYPE** button repeatedly to cycle through the available battery types: Lithium-ion, LiFePO4, LTO, Gel, AGM, Flooded, Crystal, and Calcium.

4. Once your desired battery type is displayed, stop pressing the button. The controller will automatically save the selection after a few seconds of inactivity.

Note: Incorrect battery type selection can lead to improper charging and potential battery damage.

6.3 Charging Stages (PWM Technology)

The ProteusX controller utilizes advanced 4-stage Pulse Width Modulation (PWM) charging to efficiently charge and maintain your battery:

- **Bulk Charge:** Delivers maximum current to rapidly charge the battery to approximately 80% capacity.

- **Absorption Charge:** Charges the battery at a constant voltage, gradually reducing current as the battery approaches full capacity.

- **Float Charge:** Maintains the battery at a full state of charge by providing a small, constant voltage.

- **Equalization Charge:** Periodically overcharges flooded batteries to balance cell voltages and prevent sulfation (not applicable to all battery types).

7. MAINTENANCE

- **Regular Inspection:** Periodically check all wiring connections for tightness and signs of corrosion.

- **Cleaning:** Keep the controller's surface and LCD display clean. Use a soft, dry cloth. Do not use abrasive cleaners or solvents.

- **Environmental Check:** Ensure the mounting area remains free of obstructions that could impede airflow or expose the unit to excessive heat.

- **Battery Health:** Monitor your battery's health and electrolyte levels (for flooded batteries) as per the battery manufacturer's recommendations.

8. TROUBLESHOOTING

If you encounter issues with your solar charge controller, refer to the following common problems and solutions:

Problem	Possible Cause	Solution
No Display / Controller Off	Battery not connected or low voltage; reverse polarity.	Check battery connections and voltage. Ensure correct polarity. Recharge battery if voltage is too low.

Problem	Possible Cause	Solution
No Charging Current	Solar panel not connected; insufficient sunlight; solar panel reverse polarity; open circuit in solar wiring.	Verify solar panel connections. Ensure adequate sunlight. Check solar panel polarity. Inspect wiring for breaks.
Battery Not Fully Charged	Incorrect battery type setting; insufficient solar input; battery degradation.	Confirm correct battery type is selected. Increase solar panel size or improve sun exposure. Test battery health.
Error Code Displayed	Specific system fault (e.g., over-voltage, over-current, over-temperature).	Refer to the specific error code in the original PDF manual for detailed resolution steps. Generally, check for overloads, short circuits, or excessive temperatures.

9. SPECIFICATIONS

Parameter	Value
Model Number	HY-PWM-PX20A
Grounding	Common Negative
Nominal Voltage	12V DC
Rated Charge Current	20A
Max. PV Input Voltage	50V
Battery Start Charging Voltage	3V
Temperature Compensation Coefficient	-24mV/°C
Operating Temperature	-40°F to 140°F (-40°C to 60°C)
Storage Temperature	-40°F to 185°F (-40°C to 85°C)
Terminals	Up to 10 AWG
IP Enclosure Grade	IP65
Dimensions	5.51 x 3.94 x 1.18 inches (140 x 100 x 30 mm)
Weight	0.2 Kilograms (0.44 lbs)

SPECIFICATION

Grounding	Common Negative
Nominal Voltage	12v DC
Rated Charge Current	20A
Max. PV Input Voltage	50V
Battery Start Charging Voltage	3V
Temperature Compensation Coefficient	-24mv/°C
Operating Temperature	-40°F to 140°F
Storage Temperature	-40°F to 185°F
Terminals	Up to 10 AWG
IP Enclosure Grade	IP65
Dimensions	5.59x 3.7x 1.06 inches
Weight	1.1 lbs

Figure 9.1: Detailed technical specifications of the ACOPOWER ProteusX 20A Solar Charge Controller.

10. WARRANTY AND SUPPORT

ACOPOWER products are designed for reliability and performance. For warranty information, technical support, or service inquiries, please refer to the official ACOPOWER website or contact their customer service directly. Keep your purchase receipt as proof of purchase for warranty claims.

For additional resources, including the full PDF user manual, please visit the ACOPOWER support page or the product's Amazon listing page.
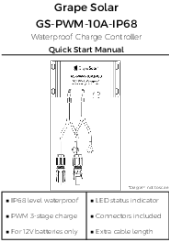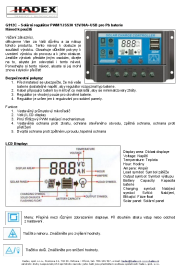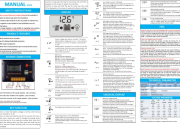
Related Documents - HY-PWM-PX20A

[Renogy Voyager 20A PWM Waterproof Solar Charge Controller Manual](#)
Comprehensive guide to the Renogy Voyager 20A PWM Waterproof Solar Charge Controller, covering safety instructions, installation, operation, charging stages, technical specifications, and troubleshooting for 12V solar systems.

[HOST Voyager 20A PWM Waterproof Solar Charge Controller Manual](#)

User manual for the HOST Voyager 20A PWM waterproof solar charge controller, covering installation, operation, safety, technical specifications, and troubleshooting. Features include 4-stage PWM charging, multiple battery type support, and electronic protections.

[Grape Solar GS-PWM-10A-IP68 Waterproof Solar Charge Controller Quick Start Guide](#)

Get started quickly with the Grape Solar GS-PWM-10A-IP68, a 10A PWM waterproof solar charge controller for 12V battery systems. Learn about installation, LED indicators, and specifications.

[Mean Well PWM-120 Series 120W Constant Voltage PWM Output LED Driver Datasheet](#)

Datasheet for the Mean Well PWM-120 series, a 120W AC/DC LED driver with constant voltage PWM output. Features include IP67 rating, wide input range, active PFC, and dimming options (3-in-1 and DALI/DALI-2). Suitable for various LED lighting applications.

[HADEX G912C Solární Regulátor PWM YJSS30: Návod k Použití a Specifikace](#)

Kompletní návod k použití pro solární regulátor HADEX G912C YJSS30 12V/30A s USB. Obsahuje bezpečnostní pokyny, funkce, nastavení displeje, připojení, často kladené dotazy a technické parametry pro efektivní správu solárních systémů.

[Eco-Worthy Solar Charge Controller Manual V3.0](#)

User manual for the Eco-Worthy Solar Charge Controller V3.0, detailing safety instructions, product features, system connection, key functions, display indicators, troubleshooting (FAQ), and technical parameters for various battery types and system voltages.