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› HTRC P25 Smart Battery Charger User Manual

HTRC P25

HTRC P25 Smart Battery Charger User Manual

Model: P25

Brand: HTRC

1. PRODUCT OVERVIEW

The HTRC P25 Smart Battery Charger is an intelligent, automatic battery charger designed for a wide range of 12V and 24V batteries, including Lithium, LiFePO4, Lead-Acid (AGM, GEL, EFB, MF, Flooded, VRLA, SLA, and wet batteries). It features quick charging capabilities with ultra-high power (12V 25A, 24V 13A) and incorporates advanced protection and maintenance functions to prolong battery life. This versatile charger is suitable for various vehicles such as cars, trucks, motorcycles, SUVs, golf carts, agricultural vehicles, and motorboats.



Figure 1.1: The HTRC P25 Smart Battery Charger with its included alligator clips, featuring a clear digital display.

2. PACKAGE CONTENTS

Upon opening your HTRC P25 Smart Battery Charger package, please ensure all the following items are present and in good condition:

- HTRC P25 Smart Charger Unit
- 3-meter Power Cord
- Battery Cable with Alligator Clips
- 2 Ring Terminals (for permanent battery connection)
- User Manual



Figure 2.1: All components included with the HTRC P25 Smart Battery Charger, showing the main unit, power cord, battery clips, and ring terminals.

3. SPECIFICATIONS

Feature	Specification
AC Input	100V-240V ~ 50/60Hz
Output Voltage	12V / 24V (Automatic Detection)
Output Current	12V 25A, 24V 13A
Minimum Starting Voltage	2.0V
Supported Battery Capacity	2AH-500AH+
Supported Battery Types	Lithium, LiFePO4, Lead-Acid (AGM, GEL, EFB, MF, Flooded, VRLA, SLA, Wet)
Max Power & Load	300W
Product Dimensions	1.39 x 2.48 x 9.84 inches (158 x 90 x 50mm)
Item Weight	1.5 pounds (680g)
Cable Length	13 ft (approx. 3M)

4. SAFETY INFORMATION

Always prioritize safety when operating the battery charger. Read and understand all instructions before use.

4.1. General Safety Precautions

- Use the charger in a well-ventilated area.
- Keep the charger away from flammable materials, moisture, and extreme temperatures.
- Do not attempt to charge non-rechargeable batteries.
- Ensure proper polarity connection before plugging in the charger.
- Do not operate the charger if it is damaged.
- Only charge Lithium batteries with a Battery Management System (BMS).
- For batteries below 15AH, use the minimum current setting.

4.2. Built-in Protections

The HTRC P25 is equipped with 8 types of intelligent protections to ensure safe and reliable operation:



Figure 4.1: Visual representation of the 8 built-in protection features: Overheat, Pulse Repair, Short-circuit, Overcurrent, Overvoltage, Reverse Protection, Intelligent Detection, and Cooling Function.

- **Overcurrent Protection:** Prevents damage from excessive current.
- **Overvoltage Protection:** Safeguards against voltage surges.
- **Short Circuit Protection:** Automatically enters standby mode if a short circuit is detected.
- **Reverse Polarity Protection:** Prevents damage from incorrect battery connections with an alarm.
- **Overheat Protection:** Integrated cooling system prevents overheating.
- **Flame Retardant Enclosure:** Constructed from fire-resistant materials for enhanced safety.



5. SETUP

Follow these steps to set up your HTRC P25 Smart Battery Charger:

1. **Prepare the Battery:** Ensure the battery terminals are clean and free of corrosion.
2. **Connect to Battery:** Attach the red (+) alligator clip to the positive battery terminal and the black (-) alligator clip to the negative battery terminal. Ensure a secure connection.



Figure 5.1: A user connecting the HTRC P25 Smart Battery Charger to a vehicle battery, demonstrating the ease of connection.

Video 5.1: This video demonstrates the correct procedure for connecting the HTRC P25 Smart Battery Charger to a battery, including how to switch between charging modes and highlighting safety features like short-circuit and reverse polarity protection.

3. **Connect to Power:** Plug the charger's power cord into a standard 100-240V AC outlet. The charger will automatically detect the battery voltage (12V or 24V) and display the current status on its LCD screen.



Figure 5.2: The charger comes with pure copper cables and all-inclusive alligator clips for efficient and secure connections.

6. OPERATING INSTRUCTIONS

6.1. Battery Compatibility

The HTRC P25 is designed to work with a wide array of battery types, automatically identifying 12V/24V batteries and selecting the appropriate charging parameters:

- Lithium Batteries
- LiFePO4 Batteries
- Lead-Acid Batteries (AGM, GEL, EFB, MF, Flooded, VRLA, SLA, Wet)

Compatible with built-in batteries of various vehicles

For Lithium, LiFePo4, Lead-acid batteries
(AGM, GEL, SLA, Flooded, WET, EFB, VRLA, etc).



Figure 6.1: The HTRC P25 charger is compatible with batteries found in a wide range of vehicles, from motorcycles to heavy machinery.

Intelligent identification of voltage and battery type

Automatic Identification Battery voltage 12V/24V, Support Battery type LITHIUM/LiFePO4/Lead-Acid(AGM, Calcium, GEL, MF, EFB, SLA, VRLA, WET etc.)



Figure 6.2: The charger intelligently identifies the voltage (12V or 24V) and type of battery connected, including Lithium, LiFePO4, and Lead-Acid.



Figure 6.3: This charger is an all-in-one solution for 12V/24V Lithium, LiFePO4, and various Lead-Acid batteries.

6.2. Charging Modes

The charger offers three adjustable charging current options and a repair mode, selectable with a single button:

- **LOW:** Minimum current for smaller batteries or slower charging.
- **MEDIUM:** Moderate current for general charging.
- **HIGH:** Maximum current (up to 25A) for fast charging larger batteries.
- **REPAIR:** Used to repair and activate old and weak Lead-Acid batteries (not for Lithium/LiFePO4).

One-key selection mode

Three charge current options: LOW, MEDIUM, HIGH, and REPAIR



Figure 6.4: Easily switch between Low, Medium, High charging currents, and the Repair mode using the single 'MODE' button.

6.3. 9-Stage Smart Charging Process

The charger utilizes a sophisticated 9-stage charging process to optimize battery power precisely and gently, ensuring efficient charging and extended battery life. This includes automatic detection of sulfate and acid layers, and pulse repair functions.

All-in-one charger

Only used for 12V/24V LITHIUM, LiFePO4 and Lead-Acid(AGM, Calcium, GEL, MF, EFB, SLA, VRLA, WET etc.) batteries



Figure 6.5: The 9-stage smart charging process includes Battery Desulfation, Soft Start Charging, Bulk Charging, Absorption Charging, Trickle Charge, Battery Test, Recondition Charging, Float & Maintenance Charging, and Small Current to Maintain Charging.

6.4. Temperature Adaptive Charging

The charger automatically adjusts the charging voltage according to the ambient temperature, preventing both overcharge in hot weather and undercharge in cold weather. This feature ensures optimal charging performance regardless of environmental conditions.

Temperature adaptive

Automatically adjust the charging voltage according to the ambient temperature to prevent overcharge and undercharge



104°F/40°C
Hot weather

Avoids over-charging in hot weather.



14°F/-10°C
Cold weather

Avoids under-charging in cold weather.



Figure 6.6: The charger adapts its charging profile for both hot (104°F/40°C) and cold (14°F/-10°C) weather to prevent overcharging or undercharging.

6.5. Charging Time Reference

The following table provides approximate charging times for various battery capacities at different current settings. These values are theoretical and for reference only; actual charging times may vary based on battery condition and other factors.

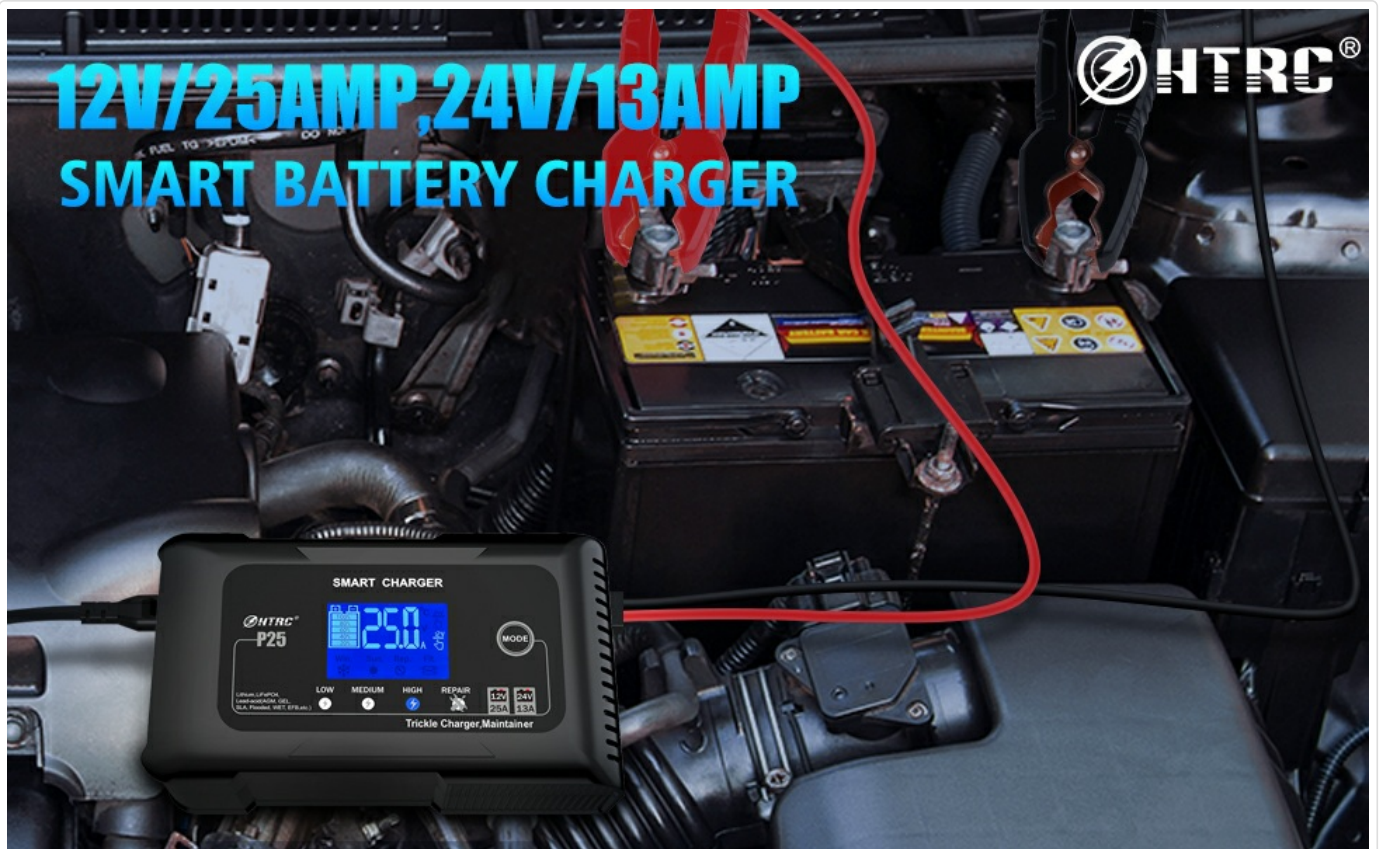


Figure 6.7: Reference table for estimated charging times (in hours) for 12V and 24V batteries across various capacities and charging current settings.

7. MAINTENANCE

Proper maintenance ensures the longevity and optimal performance of your HTRC P25 Smart Battery Charger.

7.1. Cleaning

- Always disconnect the charger from both the AC power and the battery before cleaning.
- Wipe the exterior of the charger with a soft, dry cloth. Do not use abrasive cleaners or solvents.
- Keep the cooling fan and vents free from dust and debris to ensure proper airflow.



Figure 7.1: The charger features a built-in cooling fan to dissipate heat during operation, which should be kept clear of obstructions.

7.2. Storage

Store the charger in a cool, dry place when not in use. Ensure cables are neatly coiled to prevent damage.

8. TROUBLESHOOTING

This section addresses common issues you might encounter with your HTRC P25 Smart Battery Charger.

8.1. Charger Not Activating / Displaying Error

- **Check Connections:** Ensure the alligator clips are securely attached to the correct battery terminals (red to positive, black to negative). The charger has **Reverse Polarity Protection** and will sound an alarm and display an error (e.g., "ERO") if connected incorrectly.
- **Short Circuit:** If the clips touch or there's a short circuit, the charger will intelligently identify it and enter a standby state, displaying "OFF". Separate the clips and reconnect properly.

Video 8.1: This video illustrates the charger's short-circuit and reverse polarity protection features, showing how the device reacts to incorrect connections to prevent damage.

- **Battery Voltage Too Low:** The charger requires a minimum starting voltage of 2.0V. It cannot activate a completely depleted battery (below 2.0V).
- **Power Supply:** Ensure the AC power outlet is functioning correctly.

8.2. Charging Current Not Reaching Maximum

To protect the battery, the system automatically identifies the battery voltage and selects the most appropriate current. When the battery voltage is low (e.g., a 12V battery voltage is less than 11V), the system automatically charges the battery at the maximum current. The three gears allow you to adjust the charging current, but the charger's internal logic will prioritize battery health.

8.3. LiFePO4 Battery Not Fully Charged

When a LiFePO4 battery is fully charged, the charger has a callback function, reducing the charge by approximately 1V-2V. This is normal behavior. The charger also adds a small current after full charge for uninterrupted maintenance.

8.4. Fan Noise

It is normal for the cooling fan to produce audible noise during operation, especially when charging at higher currents or in warmer environments. This indicates the cooling system is actively working to maintain optimal operating temperature.

9. WARRANTY AND SUPPORT

HTRC is committed to providing quality products and excellent after-sales service. We offer permanent after-sale service for this product. If you have any questions, concerns, or require technical assistance, please do not hesitate to contact us through the platform where you purchased the product or refer to the contact information provided in your product packaging. Your satisfaction is our priority, and we are here to help you get the most out of your HTRC P25 Smart Battery Charger.

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