



7 Stage Automatic Smart Battery Charger

Desulfator & Maintainer

(FOR CHARGING 12V AGM, GEL, WET, MF, EFB BATTERIES)

USER MANUAL

THIS MANUAL CONTAINS IMPORTANT SAFETY AND OPERATING INSTRUCTIONS

IMPORTANT SAFETY INSTRUCTIONS

Please read this manual and follow the instructions carefully before using the charger.

WARNING:

- The **EPA1205MT** charger is designed to charge **12V** lead-acid batteries from 15Ah to 120Ah and maintain batteries up to 150Ah.
- Check battery manufacturer specifications before using this charger.
- Explosive gases may escape from the battery during charging. Provide ventilation to prevent flames and sparks.
- Do not expose charger to rain, snow or liquids.
- Battery acid is corrosive. Rinse immediately with water if acid comes into contact with skin or eyes.
- Do not charge a frozen or damaged battery.
- Do not charge non-rechargeable batteries.
- Do not place the charger on the battery while charging.
- Be extra cautious to reduce risk of dropping a metal tool onto battery. It might spark or short-circuit battery or other electrical part that may cause explosion.
- When working with a lead-acid battery, remove personal metal items such as rings, bracelets, necklaces, watch...
- Do not smoke or allow a spark or flame while charging.
- In order to reduce risk of electric shock, unplug charger from AC outlet before doing any maintenance or cleaning.
- Not for use by children or by anyone who is unable to follow instructions of this manual, unless they are supervised by an adult to ensure the proper use of charger.

2. FEATURES

7-STAGE AUTOMATIC CHARGING

This is a fully automatic battery charger with 7 charge stages. Automatic charging protects your battery from being overcharged. So you can leave the charger connected to the battery indefinitely.

7-stage charging is a very comprehensive and accurate charging process that gives your battery longer life and better performance compared to using traditional chargers.

7-stage chargers are suitable for most battery types including Calcium, Gel and AGM batteries. They may also help restore drained and sulphated batteries.

The 7 stages are: ^{1. 2.} Desulphation ; Soft Start; Bulk; Absorption; Battery Test; Recondition and Float.



Desulphation

The Desulphation stage may break down sulphation that occurs in batteries that have been left flat for extended periods of time, returning them back to full charge. sulphation occurs when lead-sulphate hardens and clogs up the battery cells.

If the charger determine your battery is in good condition and no need for desulphation so it will not stay in this stage and skip quickly, it works only when battery discharge too much which below 10V usually.

Soft Start

A preliminary charge processes that gently introduces power to the battery. This protects the battery and increases battery life.

This stage stays only when the first desulphation stage stays also, in this stage the charger will raise the battery's voltage to around 12V with a charging current 2-3A, if skip quickly in the first stage then it will skip quickly too of this stage.

Bulk (Constant Current)

Bulk mode charges the battery at the maximum rate (constant current 5A) putting a large amount of power into the battery in a short amount

of time. This stage will charge the battery to approximately 80%, until the voltage reaches 14.5volts

Bulk mode for the charging cycle. The start phase continues until the battery's terminal voltage has risen above the set limit (14.5V), at which point the charger switches to bulk charging. If the terminal voltage has not passed the voltage limit within the time limit (24 hours), the charger switches to fault mode (lamp 3 solid) and discontinues the charging. If so, the battery is faulty or its capacity is too large.

Absorption (Constant Voltage)

The charge rate slows down so the battery can absorb more power and reach 100% charge. The voltage remains at a constant 14.5 volts for 12V charger while the current is gradually reduced until no more power can be added without over-charging the battery.

Battery Test

An automatic battery test is conducted immediately after the absorption stage. The test monitors the voltage for 90 seconds to determine if the charge was successful.

◆ 12V charger If the voltage is below 13.2 volts (fail), the charger will initiate the Recondition stage.

◆ 12V charger If the voltage is above 13.2 volts (pass), the charger will proceed to the final stage: Float.

Recondition

The battery reconditioning function is initiated automatically in the case that the battery fails the battery test (stage 5). Failing the battery test indicates that the absorption stage was unable to fully charge the battery. The recondition mode will then begin to introduce a low constant current for a period of 4 hours. Then the charger will go into float charging mode.

This recondition stage can recover batteries from a deeply discharged state increasing performance and battery life.

RECOND- This mode is used to recover deep discharged flooded batteries where you could expect a stratified acid (high acid weight in the bottom, low on top). Check with battery manufacturer when in doubt. Use this mode with care, because the high voltage will cause some water loss. 16V is normally no problem for electronics in 12V system. Consult your supplier when in doubt. Life of light bulbs will be reduced at higher voltage. Try to disconnect light from the battery during this phase. Maximum effect and minimum risk for electronics is achieved by charging a disconnected battery.

Float

The Float stage maintains the battery at 100% charge without overcharging or damaging the battery. This means the charger can be left connected to the battery indefinitely.

The battery charger has an 7-step fully automatic charging cycle. the cycle is repeated infinitely. If the terminal voltage drops below a low er limit of 10.5V, the charger automatically goes back to the beginning of the charging curve.

3. SWITCHMODE TECHNOLOGY

Using the latest technology in battery chargers, switch mode chargers convert 100V-240V AC power to 12V DC power using electronic components unlike traditional battery chargers that rely on heavy transformers. This allows the charger to be light weight and compact without sacrificing on performance.

4. PROTECTIVE FEATURES

POLARITY PROTECTION

Prevents the output leads from sparking due to accidental reverse connection or short circuit, making the charger safer to use around batteries.

OUTPUT SHORT PROTECTION

Short circuit connection of the clips: Check clips are not touching each other OR Check the clips are correctly connected to the battery.

NON BATTERY LINK PROTECTION

If battery charger connects with non battery load, it will go into protection state.

FAULTY BATTERY

Bulk charging has timed out and stopped after 24 hours. Battery is faulty and may need to be replaced.

OVER VOLTAGE PROTECTION

The 12V charger will automatically protection if the voltage is higher than 17.5V.

OVER TEMPERATURE PROTECTION Internal temperature is above $65^{\circ}\text{C} \pm 5^{\circ}\text{C}$

5. CHARGE STATUS INDICATOR

The CHARGING and FULLY CHARGED LEDs will illuminate and flash in various patterns to indicate the different stages of charging. See below for flash patterns.

	Red LED ● Power On	Yell LED ● Charging	Green LED ● Fully Charged	Red LED ● Fault
Power Off	—	—	—	—
Power On	☐	—	—	—
Charging				
1. Desulphation	☐	☆	—	—
2. Soft Start	☐	☆	—	—
3. Bulk	☐	☆	—	—
4. Absorption	☐	☆	—	—
5. Battery Test	☐	☆	—	—
6. Recondition	☐	☆	—	—
7. Float	☐	☆	—	—
Fully Charged	☐	—	☐	—
Non Battery Link Protection	☐	—	—	☆
Output Polarity Reverse Protection	☐	—	—	☆
Output Short Protection	☐	—	—	☆
Over Voltage Protection	☐	—	—	☆
Faulty Battery	☐	☐ (Bulk Led)	—	☆
Thermal Protection	☐	—	—	☐

Note: ☐ SOLID : ☆ FLASH : — EXTINGUISH POWER ON LED: Red LED illuminates (solid) when power on.

CHARGING LED: Yellow LED illuminates and flashes when 7-stage charging process.

FULLY CHARGED LED: Green LED illuminates (solid) when fully charged. FAULT LED: When Red LED illuminates and flashes, it may be caused by:

1. Reverse connection between positive and negative of the DC lead.
2. Battery charger output short.
3. Non battery link.
4. 12V charger connects to a battery voltage higher than 17.5V
5. Charger's internal temperature is higher than 70°C .
6. When Red LED flashes and Yellow LED illuminates (solid) means bulk charging has timed out and stopped after 24 hours.

6. TECHNICAL SPECIFICATIONS:

Model	EPA1205MT
Type	7-stage Smart & Automatic
Input	100-240Vac 50/60Hz
Output Voltage	12V
Output Current	5Amp(MAX)
Minimum Start Volt	>2.0V
Input Power W / Load	88W
Input Power No Load	0.8W
Float	13.8V also w ith pulse feature
Types of Batteries	12V AGM GEL WET MF EFB Batteries
Size (L*W*H)	149*69*55mm
Net Weight	1.1LB
Approval	CE&ROHS

ELECTRICAL PARTS:

- AC power cord: 6 feet SPT-2 w ith UL plug or VVTEU plug
- Output lead: 6 feet SPT-1 2X18AWG w ith insulated battery clamps.

ENVIRONMENTAL CHARACTERISTICS:

- Operating temperature range: 32 to 104° F
- Storage temperature range: 10 to 170°F
- Operating humidity range: 90% RH Max

ADJUSTABLE CHARGE RATES: 12 VOLT BATTERY

CHARGE RATE BATTERY SIZE (12V)	
Deep Cycle (AH)	Charger Time (Hours)
15	3
25	5
40	8
60	12
80	16

100	20
120	24

8. FAULT CODES

There are error codes that may be displayed. These will be displayed in the following way:

Error Code	Charging LED	Fully Charged LED	Fault LED	Cause	Remedy
Polarity Reverse / Output Short	—	—	☆	Short circuit or reverse connection of the clips	Check clips are not touching each other OR Check the clips are correctly connected to the battery.
Non Battery Link	—	—	☆	Non battery link	Please choose the right battery type for connection.
Faulty Battery	☐ (Bulk Led)	—	☆	Bulk charging has timed out and stopped after 24 hours.	Battery is faulty and may need to be replaced.
Over Voltage	—	—	☆	The 12V battery voltage is above 17.5V. The 24V battery voltage is above 35V.	Disconnect the charger and check the battery voltage. This charger is suitable for 12V or 24V Batteries only.
Over Temperature	—	—	☐	Internal temperature is above 65°C +/-5°C	Turn off charger and allow to cool.

FREQUENTLY ASKED QUESTIONS

Q. How do I know if the battery is charged? The charger's FULLY CHARGED LED will illuminate (solid). Alternatively use a Battery Hydrometer A reading of 1.250 or more in each cell indicates a fully charged battery.

Q. I have connected the charger properly but the 'CHARGING LED' does not come on. In some cases batteries can be flattened to the point where they have very little or no voltage. This can occur if a small amount of power is used for a long time, for example a map reading light is left on for a week or more. 7-Stage chargers are designed to charge from as little as 12V charger 2.0 Volts. If the voltage is lower

than 2.0 Volts use a pair of booster cables to connect between two batteries to provide more than 2.0 Volts to the battery being charged. The charger can then start to charge the battery and the booster cables can be removed.

Q. Can I use the charger as a power supply?

A. 7-Stage chargers are designed to only supply power to the battery clips when they are connected correctly to a battery. This is to prevent sparks during connection to the battery or if connected incorrectly by mistake. This safety feature prevents the charger from being used as a 'Power Supply'. No Voltage will be present at the clips until connected to the battery.

Q. How can I know what stage the battery charger is in?

A. Below are the conditions that are displayed by the LEDs for each of the charge stages

CAUTION

ALWAYS PLACE THE BATTERY CHARGER IN AN ENVIRONMENT WHICH IS: A. WELL VENTILATED. B. NOT EXPOSED TO DIRECT SUNLIGHT OR HEAT

SOURCE: C. OUT OF REACH FROM CHILDREN. D. AWAY FROM WATER / MOISTURE, OIL OR GREASE. E. AWAY FROM ANY FLAMMABLE SUBSTANCE. F. SECURE NO RISK OF FALLING.

