



Welcome. Thank you for buying the ICS1. Read and understand the PRODUCT INSTRUCTION before operating the charger.

1. WHAT'S IN THE BOX.

ICS1 Charger
 Charge Connect Cable/s
 Product Instruction
 Information Guide

2. ABOUT ICS1.

The ICS1 represents most advanced technology and efficiency in the market, making each charge a simple process. The ICS1 is designed for charging all types of 6V&12V lead-acid batteries, including Wet, Gel, MF, and VRLA, AGM batteries. It is suitable for charging battery capacities from 4 to 20Ah and maintaining all battery sizes.

3. GETTING STARTED.

Before using the charger, carefully read the battery manufacturer's specific precautions and recommended rates of charge for the battery. Make sure to determine the voltage and chemistry of the battery by referring to your battery owner's manual prior to charging.

4. CHARGING MODES.

The ICS1 has multiple modes: The ICS1 has multiple colors LED to indicate various charging mode: SOLID, FAST BLINK, SLOW BLINK IN (RED/GREEN/BLUE) It is important to understand the differences and purpose of each charge mode. Do not operate the charger until you confirm the appropriate charge mode for your battery. Below is a brief description:

Mode		Explanation
SOLID RED		In Standby mode, the charger is not charging and providing no power to the battery. Energy save is activated during this mode, drawing microscopic power from the electrical outlet. Solid RED LED will illuminate. No Power
FAST BLINK RED		Wrong polarities +/- No Power
12V	12V SLOW BLINK GREEN	For charging 12-volt Wet Cell, Gel Cell, AGM, EFB and Maintenance-Free batteries. Slow blinking GREEN LED will illuminate. 14.7V 1.0A 4-20Ah Batteries
6V	6V SLOW BLINK BLUE	For charging 6-volt Wet Cell, Gel Cell, AGM, EFB and Maintenance-Free batteries. Slow blinking BLUE LED will illuminate. 7.3V 1.0A 4-20Ah Batteries

5. AUTO SELECT 6V/12V MODE.

6V charge mode is designed for 6-volt lead-acid batteries only, like Wet Cell, Gel Cell, AGM, EFB and Maintenance-Free batteries. It is automatically determines the correct voltage for your target battery.



6. CONNECTING TO THE BATTERY.

Identify the correct polarity of the battery terminals on the battery. The positive battery terminal is typically marked by these letters or symbol (POS, P, +). The negative battery terminal is typically marked by these letters or symbol (NEG, N, -). If polarities are incorrect, a FAST BLINKING RED will illuminate. Do not make any connections to the carburetor, fuel lines, or thin sheet metal parts. The below instructions are for a negative ground system (most common). If your vehicle is a positive ground system (very uncommon), follow the below instructions in reverse order.

- 1.) Connect the positive (red) battery clamp or eyelet terminal connector to the positive (POS, P, +) battery terminal.
- 2.) Connect the negative (black) battery clamp or eyelet terminal connector to the negative (NEG, N, -) battery terminal or vehicle chassis.
- 3.) When disconnecting the battery charger, disconnect in the reverse sequence, removing the negative first (or positive first for positive ground systems).

7. BEGIN CHARGING.

- 1.) Verify the voltage and chemistry of the battery.
- 2.) Plug in AC power and the charger will begin in Standby mode. In Standby, the charger is not providing any power.
- 3.) Connect the battery clamps or eyelet terminal connectors properly to the battery terminal.
- 4.) The voltage (6V/12V) will be determined automatically.
- 5.) Either slow blinking BLUE (6V) or GREEN (12V) will be illuminated.
- 6.) The charger can now be left connected to the battery at all times to provide maintenance charging.
- 7.) Once charging is completed or maintenance mode started, the solid BLUE (6V) or GREEN (12V) will be illuminated.

8. ICS1 CHARGER OPERATING MANUAL.

- 1.) First, plug in and LED will light up in solid RED.
- 2.) At anytime, there is no power at the clamps. This is a safety interlock feature.
- 3.) This charger is suitable and safe for all SLA and AGM type batteries.
- 4.) The charging rate is fixed at 1A for both 6V and 12V respectively.
- 5.) Attach the RED (+) and BLACK (-) clamps to the correct polarity of your vehicle battery
- 6.) a) If you incorrectly attach to the wrong polarity, the LED will rapid flash RED and stop operation.
b) 6V and 12V is automatically detect and select.
- 7.) a) If the polarity is attached correctly, the LED will slow flash in GREEN for 12V.
b) If your vehicle battery is a 6V, it will automatically detect and select the correct charging voltage. The LED will slow flash in BLUE for 6V.
- 8.) a) The charger will now go through the pre-programmed 7 STEPS(6V), 6 STEPS(12V) and slow charge your vehicle battery .
b) Once the charger has completed the charging cycle, and confirmed battery is in good operation, the LED will shows solid GREEN (12V) or solid BLUE (6V) and it will continue to trickle charge your vehicle battery continuously as needed.

BATTERY GUARDIAN



12. CHARGING PROGRAMS AND CURVES

Step 1. Qualification

Ensure the battery is in good condition prior to charge. Charger will not start if battery is less than 4V (6V system). If charger detects the battery is slightly fatigue with minor sulphated condition, it will rejuvenate and recover the battery back to its peak performance.

Step 2. Recondition

Recondition follows when the qualification mode is completed, it aims to re-activate the element of battery for battery charging condition.

Step 3. Bulk

The normal charge is commenced to deliver the constant current for charging up the battery until 80% full.

Step 4. Absorption

The charge program has switched over to constant voltage; the charge current has to be reduced according to the rise of battery charge level, until the battery is full.

Step 5. Full

The charge will stop once the battery is 100% charged.

Step 6. Analysis

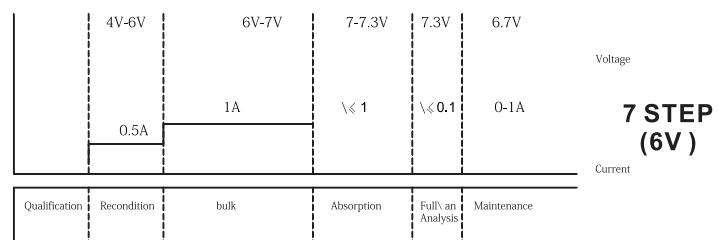
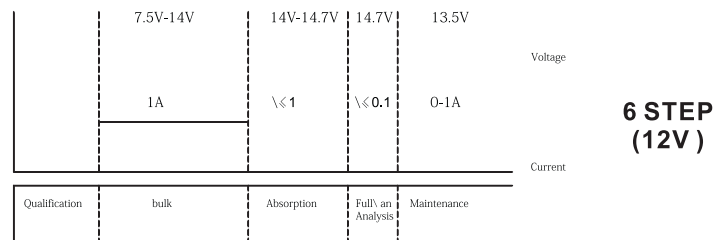
It checks the battery voltage after charged, to make sure the voltage can be retained. Otherwise, the battery is classified as a dead battery

Step 7. Maintenance

(fully charged) - Maintaining the battery voltage at maximum level by providing a constant voltage charge. The battery can be permanently maintained at a proper work level and to be kept ready to go.

12. LED DISPLAY

LED STATUS	EXPLANATION
SOLID RED	Standby, AC plug in
FAST BLINK RED	Wrong polarities, +/-
SLOW BLINK GREEN	12V charging, process begin
SOLID GREEN	12V charging finished or maintenance mode started
SLOW BLINK BLUE	6V charging, process begin
SOLID BLUE	6V charging finished or maintenance mode started





13. CHARGING TIMES.

The estimated time to charge a battery is shown below. The size of the battery (Ah) and its depth of discharge (DOD) greatly affect its charging time. The charge time is based on an average depth of discharge to a fully charged battery and is for reference purposes only. Actual data may differ due to battery conditions. The time to charge a normally discharged battery is based on a 50% DOD.

Battery Size (Ah)	Approx. Time to charge in hours.	
	6V	12V
2	2.6	2.6
4	5.2	5.2
8	10.4	10.4
10	13.0	13.0
15	19.5	19.5
20	26.0	26.0

14. TECHNICAL SPECIFICATIONS

Input Voltage AC:	100-240 VAC, 50-60Hz
Working Voltage AC:	85-264 VAC, 47-63Hz
Efficiency:	80% Approx.
Power:	19W Max
Charging Voltage:	6V/12V
Charging Current:	1A
Low-Voltage Detection:	7.5V(12V), 4V(6V)
Back Current Drain:	<2mA
Ambient Temperature :	-10°C to 45°C
Charger Type:	7 Step, Smart Charger
Type of Batteries:	6V & 12V
Battery Chemistries:	Wet, Gel, MF, VRLA and AGM
Battery Capacity:	4-20Ah (12V), 4-20Ah (6V), Maintains up to 100Ah
Housing Protection:	IP20
Cooling:	Natural Convection
Dimensions (L x W x H):	84X49.3X32mm
Weight:	0. 25/0. 3kg with box

15. WARRANTY INFORMATION & PROCEDURE:

If this product is in any way defective (other than resulting from abnormal use) within the stated period, you can, at your cost, return it (with its original packaging if possible) with purchase receipt to the place of consumer purchase or call: (02) 9519-1200 or email: returns@master-instruments.com.au for an issuance of a Return Goods Authority Number.

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure. The benefits under this warranty are in addition to other rights you may have at law.

This warranty against defects is provided by the import agent Master Instruments Pty Ltd: 13 Sheridan Close Milperra NSW 2214.



16. THIS WARRANTY DOES NOT COVER THE FOLLOWING:

- Failure resulting from misuse, accident, modification, unsuitable physical or operating environment, or improper maintenance by you.
- Failure caused by a product for which our company is not responsible; and any non our company approved products.

The warranty is voided by removal or alternation of identification labels on the device or its parts.

17. THIS WARRANTY DOES COVER THE FOLLOWING:

- Any manufacture defects that are under normal operation circumstance.

For warranty claims or repair, please contact your local reseller or authorized distributor for further information

18. WARRANTY CERTIFICATE.

Record the following information for safe keeping.

Product model	
Purchase date	
Dealer name	
Dealer address	
Dealer phone no.	
Dealer email	