NDS

SMARTCHARGER

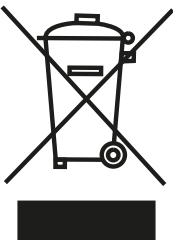User Manual   ENGLISH

VALID FOR THE FOLLOWING MODEL

SCM25

INSTRUCTIONS FOR THE PROPER DISPOSAL

This electronic device is subject to the European Directive 2012/19/EU. According to the local waste disposal rules, do not dispose of old products with normal household waste. The proper disposal of products that can no longer be used prevents potential negative consequences for the environment and for the population.

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1. INTRODUCTION

Easy to use, Automatic, Professional battery charger with advanced microcontroller and the whole New **OPTICHARGE** firmware algorithm.
SMARTCHARGER is perfect for daily battery charging and every technology, and maintenance in every application, including: Cars, Motorcycles, Nautical, Campers, Work vehicles, etc...

SAFETY INSTRUCTIONS

- Child Safety: Keep the device Out of Reach.
- Carefully check the integrity of the device and connectors.
- <u>To avoid overheating and possible fires</u> do not install the device in a sealed environment, Always choose a well ventilated area.
- Do not place the device on highly flammable surfaces or environments (eg: paper, cloth, etc.).
- Do not cover the cooling slits on the side and the fan on the top.
- Do not install the device near wet batteries: they produce flammable, corrosive and explosive gas while working, and it can damage the product.
- Protect the device from sunlight or direct sources of heat.
- <u>To avoid malfunctions</u>, DO NOT install and use the device in very humid environments, in contact with water splashes, various liquids, or exposed to rain.
- To avoid risk of electric shock and/or fire, the vehicle's fuel system must be in good condition.
- In case of damaged connecting cables or inadequate section, immediately replace them with suitable cables as specified by this manual or by a qualified electrician.
- <u>In case of anomalies in the conformity of the product do not use it!</u> it is strictly forbidden to open the device. Repairs may only be carried out by

qualified technical personnel using original spare parts.
- Keep the instruction manual near the device for easy access to the essential safety, use and maintenance information.
- The information contained in this manual may be changed without notice. NDS Energy s.r.l. reserves the right to make changes and improvements to the product at any time without notice and without obligation to apply these changes to the devices previously distributed.
- The images of the products are purely indicative and may therefore not be fully representative of the characteristics of the product, differing in color, size or accessories.

2. CONTENTS OF THE PACK

Check the package contents:

- N°1 **SMARTCHARGER** with clamp connectors terminals, and power cable connector.
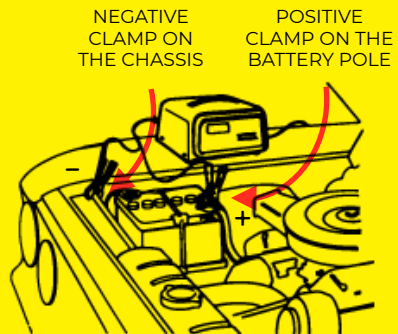
3. MAIN FEATURES

- Plug and play.
- **OPTICHARGE** the new firmware algorithm to check the battery status and optimize the charge.
- Specific Charging curve Ideal for every battery technology, lithium batteries included.
- Up to 9 charging steps.
- IP20 protection.
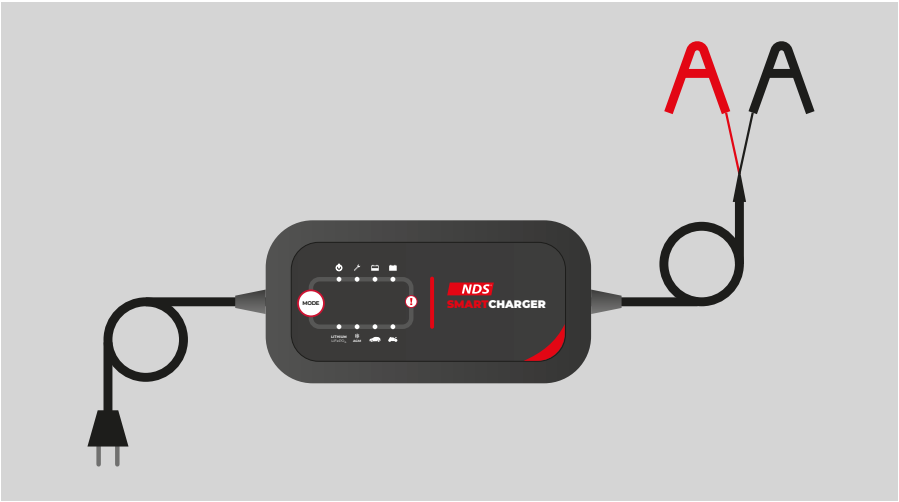
4. PRELIMINARY PROCESS

1. Remove battery from vehicle (if necessary).
2. Clean the terminals.
3. In case of lead acid Wet battery Add distilled water in each cell until battery acid reaches level specified by battery manufacturer. Do not overfill!
4. Before to start, always remove grounded connection from battery and Make sure all the appliances in the vehicle are off.
5. Be sure that the area around battery is well ventilated while battery is charging.

CAUTION

To charge an engine battery directly inside the vehicle connect the negative clamp to the vehicle chassis (usually connected to the battery negative pole), then the positive clamp to the battery positive pole.

NEGATIVE CLAMP ON THE CHASSIS

POSITIVE CLAMP ON THE BATTERY POLE

5. INSTALLATION

1. **CONNECT THE DEVICE CLAMP CONNECTORS TERMINALS TO THE BATTERY**
   The Red terminal to the positive battery pole and black terminal to the positive battery pole.
   Switching the connection polarity on the battery poles will stop the charge and **SMARTCHARGER will light up the error led**!

2. **CONNECT SMARTCHARGER TO AC POWER SOCKET.**

3. **IF POWER INDICATOR LED IS ON, SMARTCHARGER IS READY TO CHARGE.**
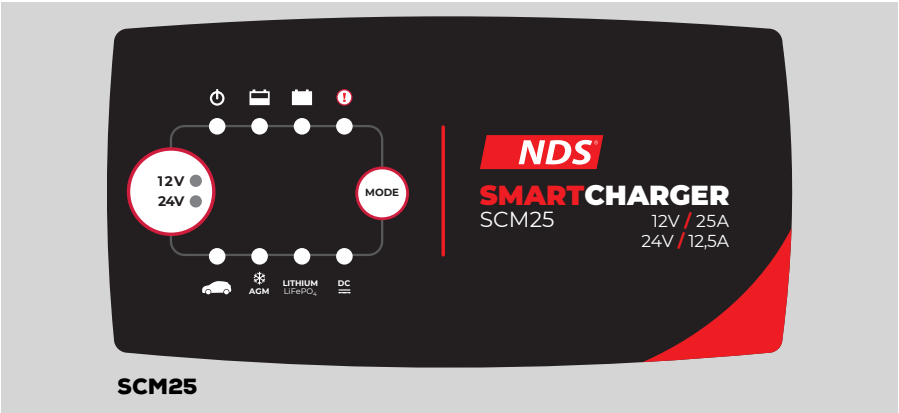
4. **SET THE CORRECT CHARGING CURVE PRESSING THE MODE BUTTON**
   The Charging curve depends on battery technology and specifications.
   See the curve description at Page 9.

6. START THE CHARGE

The **SMART****CHARGER** led menu let immediately understand the selected charging curve and the running charge step.

SCM25

ICON	STATE OF CHARGE
MODE	Selection Button - Curve selection and reset during charge
⏻	Power status Led
⊙!	Error Led - short circuit, reverse polarity, bad battery
🔋	Battery is Charging
🔋	Full charge / maintenance mode on
🚗	Car battery charging curve
❄ AGM	AGM batteries / Cold temperature charging curve
LITHIUM LiFePO₄	Lithium (LiFePO$_4$) battery charging curve
DC	DC Power Supply mode
12V 24V	Voltage output selection

See the charging curve full description (Page 9).

Follow this steps to start the charge:

1. Connect the **SMART****CHARGER** to the battery (P.5), then plug the AC power socket. The power status led will turn on.

    ⏻

> **NOTE**
> If the AC power socket is connected before connecting the clamps to the battery, the error led will be turned on ❗
> Connect the clamps to the battery then push the mode selection button **MODE** to restart the process.

2. Select charging voltage by pressing the 12V / 24V Button

    12V ○
    24V ○

3. If everything is ok **SMART****CHARGER** will start charging directly.
   Use the "**MODE**" selection button to switch between auto, AGM, Lithium, charging curve.

    🚗 ❄️ **LITHIUM**
    AGM LiFePO$_4$

    When a charging curve or mode is selected, the process will start.

4. **SMART****CHARGER** will check battery status before to start. If the battery is ok the charge will start normally (step 6), if not the device will try to recover the battery (step 5).

5. If there's something wrong with the battery **SMART****CHARGER** will try to recover by the Rescue mode.
   Rescue can take 30 to 120 minutes.

Charge will turn to "Normal charge" (step 6) when the battery is recovered. If battery can't be recovered the error led will be light up.

6. If everything is ok the "Normal charge" will start and the charging led will light up.

7. The full charge / maintenance led will light up when the battery is fully charged and now is in trickle charge: If the voltage drops down **SMARTCHARGER** sends current to the battery. **SMARTCHARGER** can be connected for months without any trouble.

Using the Power Supply function:

The DC Power Supply function is not suitable to charge batteries, so don't use this function with a battery connected.
Selecting this function:

the device will deliver 27V at 12,5A and 13,5V at 25A.
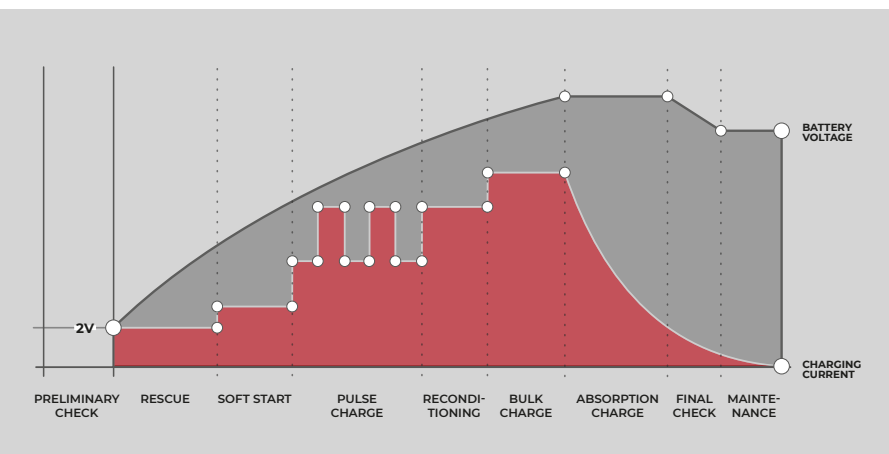
8. CHARGING CURVES

The new **"OPTICHARGE"** firmware engineered by NDS software team optimize the battery charge according to the battery technology using optimal charging parameters and constantly checking current and voltage levels to let you have always ready to go and healthy batteries.

With **OPTICHARGE** you will have the best charging experience ever created by NDS, the easiest way: just plug the device into the power socket, **SMARTCHARGER** will do the rest!

SMARTCHARGER SCM25 - 4 different charging program: auto, AGM, Lithium, DC. Suitable for auto and motor vehicle, RV, marine, truck.

(auto)	❄ AGM	LITHIUM LiFePO$_4$	DC
14,4V / 25A	14,7V / 25A	14,4V / 25A	13,5V / 25A
28,8V / 12,5A	29,4V / 12,5A	28,8V / 12,5A	27V / 12,5A

SCM25 - CHARGING CURVE

SCM25 at 12V/25A - PHASES DISCUSSION	
PRELIMINARY CHECK	Battery status Check. Charge will not start with voltage under 2.0V and more then 15.5V
RESCUE	For deeply discharged battery: current will be 500-800mA at 16V for 5 seconds until voltage reduces to 14V (2 hours max timeout)
SOFT START	If battery voltage is between 2.0V–6.0V a 5A current is delivered to re-activate the battery elements, until voltage rises above 6V (2 hours max timeout)
PULSE CHARGE	If battery voltage is between 6.0V-10.5V, current will be at 5A and 12.5A for 5 seconds alternately (4 hours max timeout)
RECONDITIONING	After Pulse charge, If battery voltage reaches 10.5V–12.0V smartcharger will constantly deliver 12.5A current to charge the battery until it has risen over 12.0V. This stage will not be carrying over 8 hours, otherwise the battery is classified as defected.
BULK CHARGE	If battery level has reached 12.0V-13.6V. A constant current 25A, will charge the battery until it has reached 80% of the capacity.
ABSORPTION CHARGE	If battery level is between 13.6V-14.4V (14.7V for AGM), Smartcharger will switch to Constant voltage mode: output current will automatically adjust as according to the raise of battery voltage. The charge will stop at 14.4/14.7V. Smartcharger will turn on the Full charge icon led if the current reduces to 1.5A.
FINAL CHECK	Battery voltage is monitored for 1 minute. If voltage has a dramatic drop down under 12.2V, the battery will be classified as exhausted and the error led will turn on. If voltage can be retained at 1 minute, then the Maintenance mode will start.
MAINTENANCE	Battery maintained at 13.7V, a proper work level to be kept always ready to go. If voltage drops below 12V, smartcharger will restart from bulk charge

SCM25 at 24V/12,5A - PHASES DISCUSSION	
PRELIMINARY CHECK	Battery status Check. Charge will not start with voltage under 2.0V and < 31V
RESCUE	For deeply discharged battery: current will be 500-800mA at 32V maximum for 5 seconds until voltage reduces to 28V (2 hours max timeout)
SOFT START	If battery voltage is between 2.0V–24.0V a 2.5A current is delivered to re-activate the battery elements, until voltage rises above 24V (2 hours max timeout)
PULSE CHARGE	If battery voltage is between 12.0V-21V, current will be at 2.5A and 6A for 5 seconds alternately (4 hours max timeout)
RECONDITIONING	After Pulse charge, If battery voltage reaches 21V–24.0V Smartcharger will constantly deliver 6A current to charge the battery until it has risen over 24.0V. This stage will not be carrying over 8 hours, otherwise the battery is classified as defected.
BULK CHARGE	If battery level has reached 24.0V-27.2V. A constant current 12.5A, will charge the battery until it has reached 80% of the capacity.
ABSORPTION CHARGE	If battery level is between 27.2V-28.8V (29.4V for AGM), Smartcharger will switch to Constant voltage mode: output current will automatically adjust as according to the raise of battery voltage. The charge will stop at 28.8/29.4V. Smartcharger will turn on the Full charge icon led if the current reduces to 1.5A.
FINAL CHECK	Battery voltage is monitored for 1 minute. If voltage has a dramatic drop down under 24.4V, the battery will be classified as exhausted and the error led will turn on. If voltage can be retained at 1 minute, then the Maintenance mode will start.
MAINTENANCE	Battery maintained at 27.4V, a proper work level to be kept always ready to go. If voltage drops below 25.6V, Smartcharger will restart from bulk charge.

SCM25 LITHIUM AT 12V/25A - PHASES DISCUSSION	
PRELIMINARY CHECK	Battery status Check. Charge starts.
RESCUE	For deeply discharged battery: current will be 500-800mA at 13.8V until voltage will be >11.5V (2 hours max timeout)
CHECK	If battery voltage >10.8V, Smartcharger moves to next step
BULK CHARGE	If battery level has reached 10.8V-11.5V. A constant current of 25A will begin.
ABSORPTION CHARGE	If battery level is between 13.8V-14.4V, Smartcharger will switch to Constant voltage mode: output current will automatically adjust as according to the raise of battery voltage. The charge will stop at 14.4V. Smartcharger will turn on the Full charge icon led if the current reduces to 1.5A
FINAL CHECK	Battery voltage is monitored for 1 minute. If voltage has a dramatic drop down under 12.2V, the battery will be classified as exhausted and the error led will turn on. If voltage can be retained at 1 minute, then the Maintenance mode will start
MAINTENANCE	Battery maintained at 13.8V to be kept always ready to go. Routine is: 2 minutes charge and 2 minutes pause for 12 hours, then stop. If voltage drops below 13.4V, the maintenance mode routine will restart. If voltage drops below 13.2V, the Smartcharger will restart from bulk charge.

SCM25 LITHIUM AT 24V/12,5A - PHASES DISCUSSION	
PRELIMINARY CHECK	Battery status Check. Charge starts.
RESCUE	For deeply discharged battery: current will be 500-800mA at 13.8V until voltage will be >23V (2 hours max timeout)
CHECK	If battery voltage >21.6V, Smartcharger moves to next step
BULK CHARGE	If battery level has reached 21.6V-23V. A constant current of 12.5A will begin.
ABSORPTION CHARGE	If battery level is between 27.6V-28.8V, Smartcharger will switch to Constant voltage mode: output current will automatically adjust as according to the raise of battery voltage. The charge will stop at 28.8V. Smartcharger will turn on the Full charge icon led if the current reduces to 1.5A
FINAL CHECK	Battery voltage is monitored for 1 minute. If voltage has a dramatic drop down under 24.4V, the battery will be classified as exhausted and the error led will turn on. If voltage can be retained at 1 minute, then the Maintenance mode will start
MAINTENANCE	Battery maintained at 27.2V to be kept always ready to go. Routine is: 2 minutes charge and 2 minutes pause for 12 hours, then stop. If voltage drops below 26.8V, the maintenance mode routine will restart. If voltage drops below 26.4V, the Smartcharger will restart from bulk charge.

NOTE

THE red DOTTED box • • • • • • • underlines the whole rescue mode section that is activated only in case of battery low performances.

9. TECHNICAL FEATURES

SMARTCHARGER SCM25		
Output rated voltage	**12V**	**24V**
Output charging current	25A	12,5A
Input rated voltage	220-240V	220-240V
Input rated current	2,4A	
🚗	14,4V / 25A	28,8V / 12,5A
❄ AGM	14,7V / 25A	29,4V / 12,5A
LITHIUM LiFePO$_4$	14,4V / 25A	28,8V / 12,5A
DC	13,5V / 25A	27V / 12,5A
Charging curves	AGM, Wet, Lithium	
Charging method	9 steps	
Activation voltage	2V	
Battery Charge Capacity	50-350Ah	
Battery Maintenance Capacity	Up to 500Ah	
Protection	IP20	

10. WARRANTY

NDS

WARRANTY COUPON

FIRST NAME _____

SURNAME _____

POSTCODE _____

E-MAIL _____

MODEL _____

SERIAL NUMBER _____

PURCHASE DATE _____

STAMP AND SIGNATURE OF THE SELLER

I CONSENT TO THE ACTIVITY DESCRIBED IN POINT 3.C OF THE INFORMATION NOTICE ON WWW.NDSENERGY.IT/PRIVACY-POLICY/

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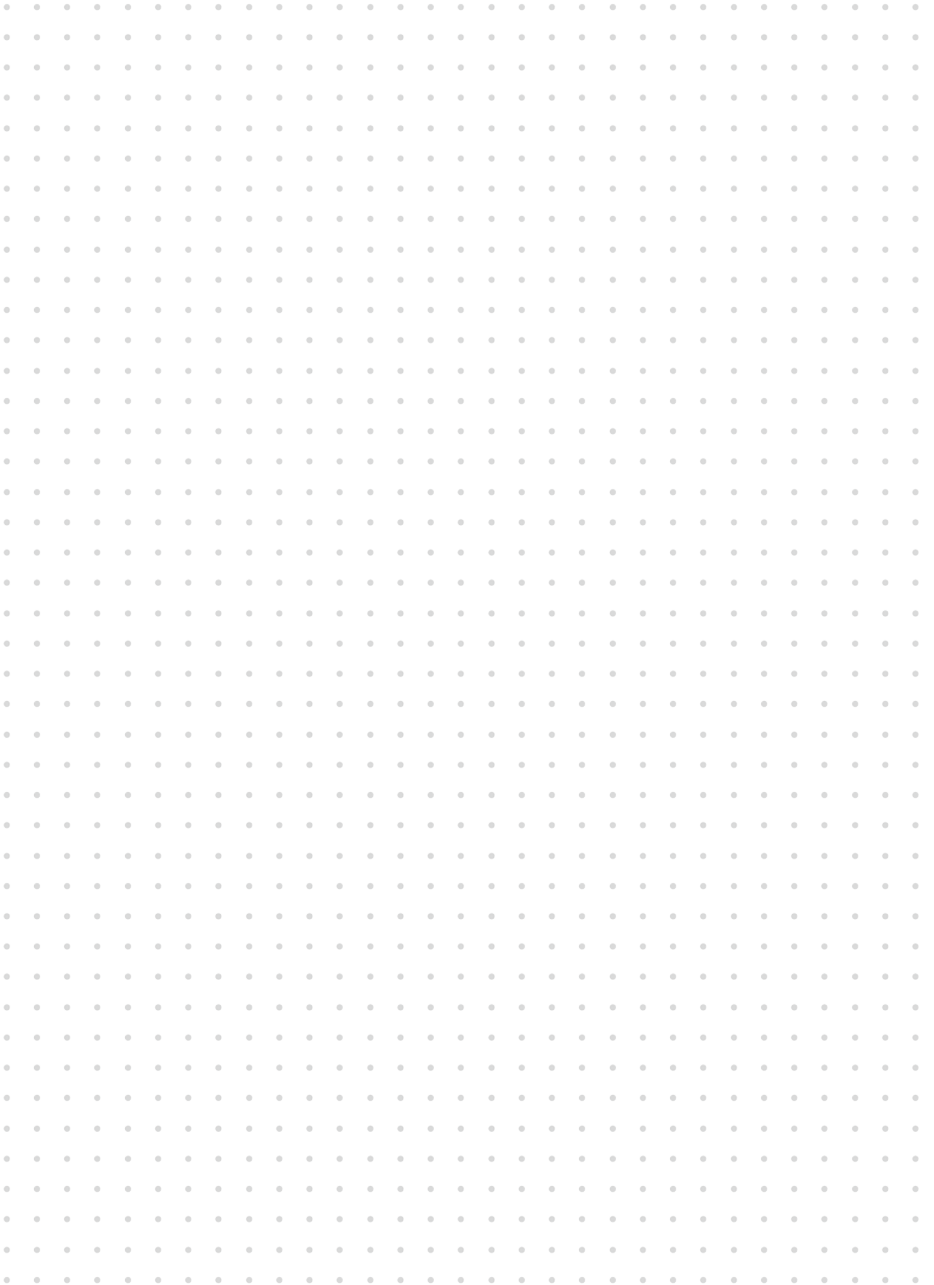FAX: +39 085 9112263
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NOTES

NOTES

ALL THE ENERGY YOU NEED

TUTTA L'ENERGIA CHE TI SERVE

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