

SOLAR[®] Owner's Manual

Model 4001

Commercial Jump Starter



Clore Automotive • Kansas City, MO 64161 • www.solaronline.com • 913.310.1050

⚠ WARNING: This product can expose you to lead, which is known to the State of California to cause birth defects or other reproductive harm, and Vinyl Chloride, Styrene and Acrylonitrile, which are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov

⚠ WARNING	
	READ ENTIRE MANUAL CAREFULLY BEFORE OPERATING UNIT!

⚠ WARNING - 12/24 VOLT MODELS	
	Never hook up a 12 Volt DC power source to a 24 Volt DC vehicle. This will grossly overcharge the 12 Volt power source and generate flammable gasses that may explode and cause property damage and/or bodily harm.

Congratulations! You have just purchased the most versatile and dependable unit on the market today.

Keep the unit plugged in when not in use and it will provide long, continuous service and satisfaction.







SOLAR Jump Starter is specifically designed to jump start 12 Volt and 24 Volt lead-acid batteries. Follow all battery/vehicle manufacturer's safety and jump starting or charging instructions.

DO NOT JUMP START WITH AC POWER CORD CONNECTED TO AN AC POWER SOURCE.

The unit's charger will maintain its internal battery and recharge most lead-acid batteries within 6-12 hours. It will automatically shut off. When the charge complete indicator LED is lit, the onboard batteries are fully charged.

All flooded acid batteries emit gases when charging. It is critical that fluid levels in onboard flooded batteries be checked every 30-45 days. (Does not apply to AGM batteries.)

⚠ WARNING	
	DO NOT TIP UNIT OR LAY UNIT FLAT WITH BATTERY INSTALLED!

⚠ WARNING	
	Read these instructions completely before using the SOLAR Jump Starter and save them for future reference. Before using the SOLAR Jump Starter to jump start a car, truck, boat or to power any equipment, read these instructions and the instruction manual/safety information provided by the car, truck, boat or equipment manufacturer. Following all manufacturers' instructions and safety procedures will reduce the risk of accident.
	Working around lead-acid batteries may be dangerous. Lead-acid batteries release explosive gases during normal operation, charging and jump starting. Carefully read and follow these instructions for safe use. Always follow the specific instructions in this manual and on the SOLAR Jump Starter each time you jump start using the SOLAR Jump Starter. All lead-acid batteries (car, truck and boat) produce hydrogen gas which may violently explode in the presence of fire or sparks. Do not smoke, use matches or a cigarette lighter while near batteries. Do not handle the battery while wearing vinyl clothing because static electricity sparks are generated when vinyl clothing is rubbed. Review all cautionary material on the SOLAR Jump Starter and in the engine compartment.
	Always wear eye protection, appropriate protective clothing and other safety equipment when working near lead-acid batteries. Do not touch eyes while working on or around lead-acid batteries.
	Always return clamps to their proper storage positions, away from each other or common conductors. Improper storage of clamps may cause the clamps to come in contact with each other, or a common conductor, causing the battery to short circuit and generate high enough heat to ignite most materials.
	Use extreme care while working within the engine compartment, because moving parts may cause severe injury. Read and follow all safety instructions published in the vehicle's Owner's Manual.
	The battery in the SOLAR Jump Starter contains liquid acids which are hazardous if spilled. In addition, batteries being started with the SOLAR Jump Starter likely contain liquid acids which are hazardous if spilled.

SAFETY INSTRUCTIONS

1. Use of an attachment not recommended or sold by manufacturer may result in a risk of fire, electric shock, or injury to persons.
2. To reduce risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting unit.
3. Make sure cord is located so that it will not be stepped on, tripped over or otherwise subjected to damage or stress.
4. An extension cord should not be used unless absolutely necessary. Use of an improper extension cord could result in a risk of fire and electric shock. If an extension cord must be used, make sure pins on plug of extension cord are the same number, size and shape as those of plug on unit; extension cord is properly wired and in good condition; wire size is large enough for the length of cord as specified in the following chart:

Length in feet:	25	50	100	150
Cord AWG size:	16	12	10	8

5. Do not operate unit with damaged cord or plug - replace them immediately.
6. Do not disassemble Control Cabinet – take it to or call a qualified technician when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
7. To reduce risk of electric shock, unplug unit from outlet before attempting any maintenance or cleaning.
8. Ensure all vents on Battery Tray Assembly remain unobstructed.

PERSONAL SAFETY PRECAUTIONS

1. Someone should be within range of your voice or close enough to come to your aid when you work near a lead-acid battery. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing or eyes.
2. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least 10 minutes and get medical attention immediately.
3. NEVER smoke or allow a spark or flame in vicinity of battery or engine.
4. 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.
5. Remove personal metal items such as rings, bracelets, necklaces and watches when working with a lead-acid battery. A lead acid battery can produce a short circuit current high enough to weld a ring or the like to metal, causing a severe burn.
6. When using unit as charger, charge LEAD-ACID batteries only. It is not intended to supply low-voltage power for applications other than battery charging. Do not use with batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage property.
7. NEVER JUMP START OR CHARGE a frozen battery. Any battery that is suspected of being frozen must be thawed before jump starting or charging.

GROUNDING AND AC POWER CONNECTION INSTRUCTIONS

Unit should be grounded to reduce risk of electric shock. Unit is equipped with an AC electric cord having an equipment grounding conductor and a grounding plug (120VAC cord only). The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

DANGER

Never alter the AC cord or plug provided – if it will not fit outlet, have proper outlet installed by a qualified electrician. A temporary adapter may be used to connect this plug to a two-pole receptacle if a properly grounded outlet is not available. The temporary adapter should be used only until a properly grounded outlet can be installed by a qualified electrician. Before using adapter, be certain that center screw of outlet plate is grounded. The green rigid ear or lug extending from adapter must be connected to a properly grounded outlet – make certain it is grounded. If necessary, replace original outlet cover plate screw with a longer screw that will secure adapter ear or lug to outlet cover plate and make ground connection to grounded outlet.

CONTROLS AND INDICATORS



Control Cabinet Front

The front panel of the Control Cabinet features important status indicators related to two functional areas, Jump Starting and Recharging the Unit.

Jump Starting Indicators include:

GOOD CONNECTION DETECTED

This indicator signifies that a correct vehicle connection has been made. This allows the Boost Mode to be engaged. Boost Mode engagement cannot occur if this LED is not lit.

BOOST MODE ENGAGED

This indicator signifies that the unit is fully powered to perform the jump start. The duration of the Boost Mode is determined by the Timer setting (See Control Cabinet Top).

VOLTAGE ERROR

When the Voltage Selector is engaged in either the 12V or 24V position, the VOLTAGE ERROR light will be lit until a proper battery connection has been made, at which point it will turn off and the green GOOD CONNECTION DETECTED LED will light. After a battery connection is made, if the VOLTAGE ERROR LED is lit, it indicates that an abnormal voltage condition has been identified. For example, if the unit were set to 12V mode and then connected to a 24V system, this condition would trigger this error. When this LED is lit, Boost Mode engagement cannot occur

REVERSE POLARITY

This indicator will light when the unit detects that it has been connected in reverse fashion. When this LED is lit, Boost Mode engagement cannot occur.

Recharging Indicators Include:

CHARGING

This indicator will light when the unit is connect to AC supply and the onboard batteries are charging.

CHARGE COMPLETE

This indicator will light when the onboard batteries have reached full charge. The unit can remain connected to the AC outlet indefinitely with no adverse consequences, as the charging system is fully automatic and there is no risk of overcharging. The charging system will maintain the onboard batteries until the unit is next needed for jump starting.



Control Cabinet Top

The top panel of the Control Cabinet features important controls and indicators related to Recharging the Unit and the Jump Starting function.

MASTER ON/OFF SWITCH

This control turns unit output on or off.

BATTERY TYPE SETTING

This setting is used to optimize the charging system based on the type of batteries installed.

BATTERY STATUS DISPLAY

Depressing the DISPLAY ON Switch will activate the display and provide the voltage of the onboard battery bank. The voltage displayed will reflect the voltage mode in which the unit is configured. If, when the Switch is depressed (and the unit is not connected to a vehicle), the display voltage is less than 12.5V, the unit should be recharged. If, when the Switch is depressed (and the unit is not connected to a vehicle), the display voltage is less than 11.8V, the display will alternate between the battery voltage and “LO” – the unit should be recharged immediately.

BOOST MODE TIMER

This control is used to lengthen or shorten the duration of the BOOST MODE ENGAGED function.

Output Controls

There are several Quick Connect housings used to control and/or configure the output of Model No. 4001. They are color-coded and will only mate with like-colored connectors.

12V Quick Connect – Red

This connector is used to engage the 12/24V configured 4001 in 12V mode. In this case, the Voltage Selection Quick Connect is mated to this connector to engage the unit in 12V mode.

24V Quick Connect – Red

This connector is used to engage the 12/24V configured 4001 in 24V mode. In this case, the Voltage Selection Quick Connect is mated to this connector to engage the unit in 24V mode.

Voltage Selection Quick Connect – Red

This connector is used to determine the output voltage of the 12/24V configured 4001 or to place the unit into Charging Mode. To select an output voltage, this connector is mated to either the 12V Quick Connect (12V Mode) or the 24V Quick Connect (24V Mode). To select Charging Mode, this connector is mated to the Charging Quick Connect.

Charging Quick Connect – Red

This connector is used to place the unit into Charging Mode. To place the unit into Charging Mode, the Voltage Selection Quick Connect is mated to this connector.

Output Quick Connect – Gray

Cable Quick Connect – Gray

These connectors are used to transfer the power generated by the 4001 to the cables and clamps for delivery to the vehicle. The Output Quick Connect is located on the back of the Battery Tray and the Cable Quick Connect is located at the end of the output cables opposite the clamps. These two connectors only mate with each other – they cannot be mated to any of the above Red connectors.



12 Volt Quick Connect (Red)
with Voltage Selection Quick Connect Attached



24 Volt Quick Connect (Red)
with Voltage Selection Quick Connect Attached



Charging Quick Connect (Red)
with Voltage Selection Quick Connect Attached



Output Quick Connect (Gray)
with Cable Quick Connect Attached

ASSEMBLY AND CONFIGURATION INSTRUCTIONS

Unit Contents

- Battery Tray Assembly, with Wheels
- Upper Handle Assembly
- Control Cabinet Assembly
- Voltage Selector Cable
- Output Cable Set with Clamps
- 3 Input Power Cords (North America, EU, UK)
- Remote Switch Storage Bracket
- Polybag Containing Hardware
 - (2) M6x60mm Hex Bolts, (6) M6x40mm Hex Bolts, (13) M6 Flat Washers, (9) M6 Hex Nuts,
 - (4) #4 x 3/8" Sheet Metal Screws

Tools Needed

- 2 x 10mm Wrench or Socket
- #2 Phillips Screwdriver

Recommended Battery Specifications



1. Model No. 4001 is designed to be used with (2) installed Group 31 batteries equipped with top-mounted, threaded stud terminals, with a starting capacity of 900-1200 CCA each. (Smaller batteries can be installed, but this will likely result in decreased starting power and care will need to be taken to ensure that the batteries are properly secured in place.)
2. When installing flooded (wet cell) batteries, use batteries with sealed top or with screw type flush fill caps. This will help reduce acid leakage should the unit be inadvertently laid flat or turned over.
3. A high quality battery emits fewer gases as it recharges. Using a high quality battery will extend charger and wiring life. Battery acid and petroleum resistant wiring is used in this unit. Battery fluid level (wet cell batteries) must be checked every 30 to 45 days.

Initial Unit Assembly

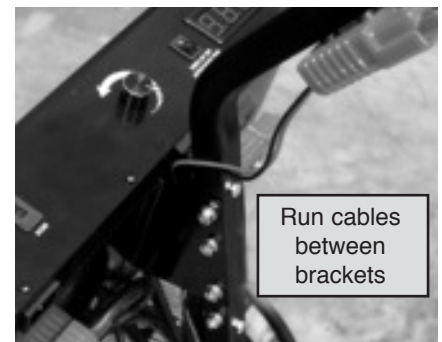
1. Remove the Battery Tray Assembly, Upper Handle Assembly and Output Cable Set from the Shipper Carton. Remove bubble wrap from around Battery Tray Assembly and Upper Handle Assembly.
2. Open the Battery Tray Assembly to expose the Charger Cabinet Assembly, which is placed inside of the Battery Tray Assembly for shipment. The Charger Cabinet will be covered by a protective shipping wrapper, which should be removed at this time.



Handle Assembly



Mounting Control Cabinet



Control Cabinet with Charging Quick Connect Wires Protected

3. Inspect Control Cabinet assembly for damage. For instance, all wires exiting cabinet are terminated (with Anderson connectors, ring terminals, etc.).

4. Connect Upper Handle to Control Cabinet. Carefully lay the Control Cabinet face down on a clean surface. The Upper Handle comes equipped with two bolts installed, an upper and a lower bolt. Remove the lower bolt, which is designed to secure the handle stabilizer tube during shipment. Position the Handle, with stabilizer tube in place, between the mounting brackets of the Control Cabinet, feeding the wires of the Charging Quick Connect through the space between the Control Cabinet brackets and the Handle. Align mounting holes in the Handle, stabilizer tube and Control Cabinet brackets. Insert (2) M6 x 40 bolts through the holes, fastening each with a flat washer, lock washer and nut.
5. Insert (1) M6 x 40 bolt through the bottom hole of the lower handle and secure using a flat washer, lock washer and nut. Insert the stabilizer tube from the Handle/Control Cabinet assembly into the Lower Handle. The two Handle sections, with stabilizer tube internal to both, are secured together by inserting (2) M6 x 40 bolts through the holes in the lower handle, one of which passes through the lower Cabinet bracket holes. Complete the assembly using flat washers, lock washers and nuts on each of the two bolts. Tighten all bolts snug.
6. Install batteries. Please note unit markings as to which battery will be referred to as Battery #1 and Battery #2.
 - Both batteries should be oriented with the Positive (POS, +) terminal toward the front of the tray (away from the wheels).
 - Based on the battery type installed, set Battery Type to the corresponding position on the top of the Control Cabinet
 - Unit should not be able to tip backwards after battery installation!

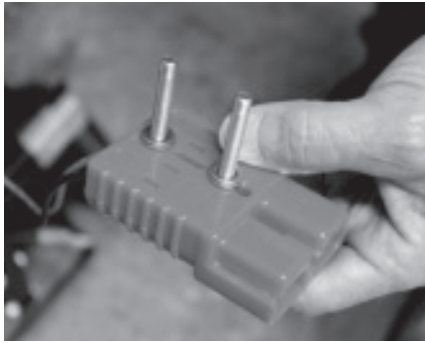


12/24 Volt Configuration

12/24 Volt Wiring Instructions

NOTE: Both batteries should be oriented with the Positive (POS, +) toward the front of the tray (away from the wheels). See wiring diagram for reference. Also wiring for charging Quick Connect should have been run between Control Cabinet mounting ears for protection.

1. Mount the Charging (Red) Quick Connect Assembly. The Charging Quick Connect Assembly is connected to the Control Cabinet with a red and a black wire. To mount it to the Handle, insert (2) M6x60mm bolts through the Quick Connect housing, with the bolts oriented such that the bolt head is on the recessed side of the Quick Connect. Insert (2) flat washers on each of the mounting bolts (on opposite side of the Quick Connect from the bolt heads). These flat washers will provide the clearance needed to allow connections without interference. Once washers are in place, mount the Quick Connect Assembly on the underside of the Handle by inserting the (2) bolts through the holes in the Handle. Quick Connect should be oriented with the wires pointing downward. Place a lock washer, washer and nut on each of the (2) exposed bolts on the top of the Handle and tighten both until snug.



Insert (2) washers on each bolt.



Secure charging Quick Connect to upper handle.



Charging wires should run through Control Cabinet mounting ears.



Mounting Gray output power connection.

2. Mount the Output Cable (Gray) Quick Connect Assembly. The Output Cable Quick Connect is connected to the Control Cabinet with a heavy gauge positive cable and has a loose negative cable. To mount it to the Battery Tray Assembly, insert two M6x40mm bolts through the inside of the Battery Tray (with the bolts oriented such that the bolt head is on the inside of the Battery Tray) and through the Gray Quick Connect, situated on the outside of the Battery Tray. Place a washer and nut on each of the (2) exposed bolts coming through the Quick Connect and tighten both until snug.

3. Positive Connection #1. Run Positive Control Cabinet Cable (terminal end Red, labeled P1) through the cable access hole located at the back of the Battery Tray and place it over the Positive (POS, +) Terminal of Battery #1.
4. Negative Connection #1. Run Negative 12V Quick Connect Cable (terminal end Black, labeled N1) through the cable access hole located at the back of the Battery Tray and place it over the Negative (NEG, -) Terminal of Battery #2.
5. Positive Connection #2. Run Positive 12V Quick Connect Cable (terminal end Red, labeled P2) through the cable access hole located at the back of the Battery Tray and place it over the Positive (POS, +) Terminal of Battery #1.
6. Negative Connection #2. Run Negative Cable from Gray Quick Connect (terminal end Black and labeled N2) through the cable access hole located at the back of the Battery Tray and place it over the Negative (NEG, -) Terminal of Battery #2.



Voltage selector cable assembly

7. Negative Voltage Selector Connection. Run Negative cable from Voltage Selector Quick Connect (terminal end black, labeled vN) through the cable access hole located at the back of the Battery Tray and place it over the Negative (NEG, -) Terminal of Battery #1.
8. Positive Voltage Selector Connection. Run Positive cable from Voltage Selector Quick Connect (terminal end black, labeled vP) through the cable access hole located at the back of the Battery Tray and place it over the Positive (POS, +) Terminal of Battery #2.
9. Small Diameter Wire Connections. There are (4) small diameter wires exiting the bottom of the Control Cabinet, all terminated with ring terminals: (1) thick red wire, (1) thick black wire, (1) thin red wire, (1) thin black wire. In the sequence listed, run each wire through the cable access hole and make the following connection:

- thick red wire (R1) to Positive (POS, +) Terminal of Battery #1
- thick black wire (B1) to Negative (NEG, -) Terminal of Battery #2

- thin red wire to (R2) Positive (POS, +) Terminal of Battery #2
- thin black wire (B2) to Negative (NEG, –) Terminal of Battery #2

10. Using hardware supplied with batteries, secure the terminal connections on each battery post. Follow all battery manufacturer's recommend torque specifications to ensure secure, lasting connections.

11. Connect Output cables via Quick Connection to the matching gray Quick Connect housing at the rear of the Battery Tray.

Your Model No. 4001 jump starter is now wired for 12/24V operation.

Mount Remote Switch Storage Bracket

Using (4) #4 x 3/8" sheet metal screws, mount Remote Switch Storage Bracket to side of Control Cabinet by inserting screws through the holes in the Storage Bracket and into the holes in the side of the Control Cabinet.



Set Battery Type

The charging system on Model No. 4001 is designed to accommodate either flooded (wet cell) batteries or AGM batteries. On the top of the Control Cabinet is an indicator switch used to optimize the charging routine based on the battery type chosen. Set Battery Type Indicator Switch to the proper setting based on the batteries installed. This will ensure a proper charge every time.

Set Timer Duration

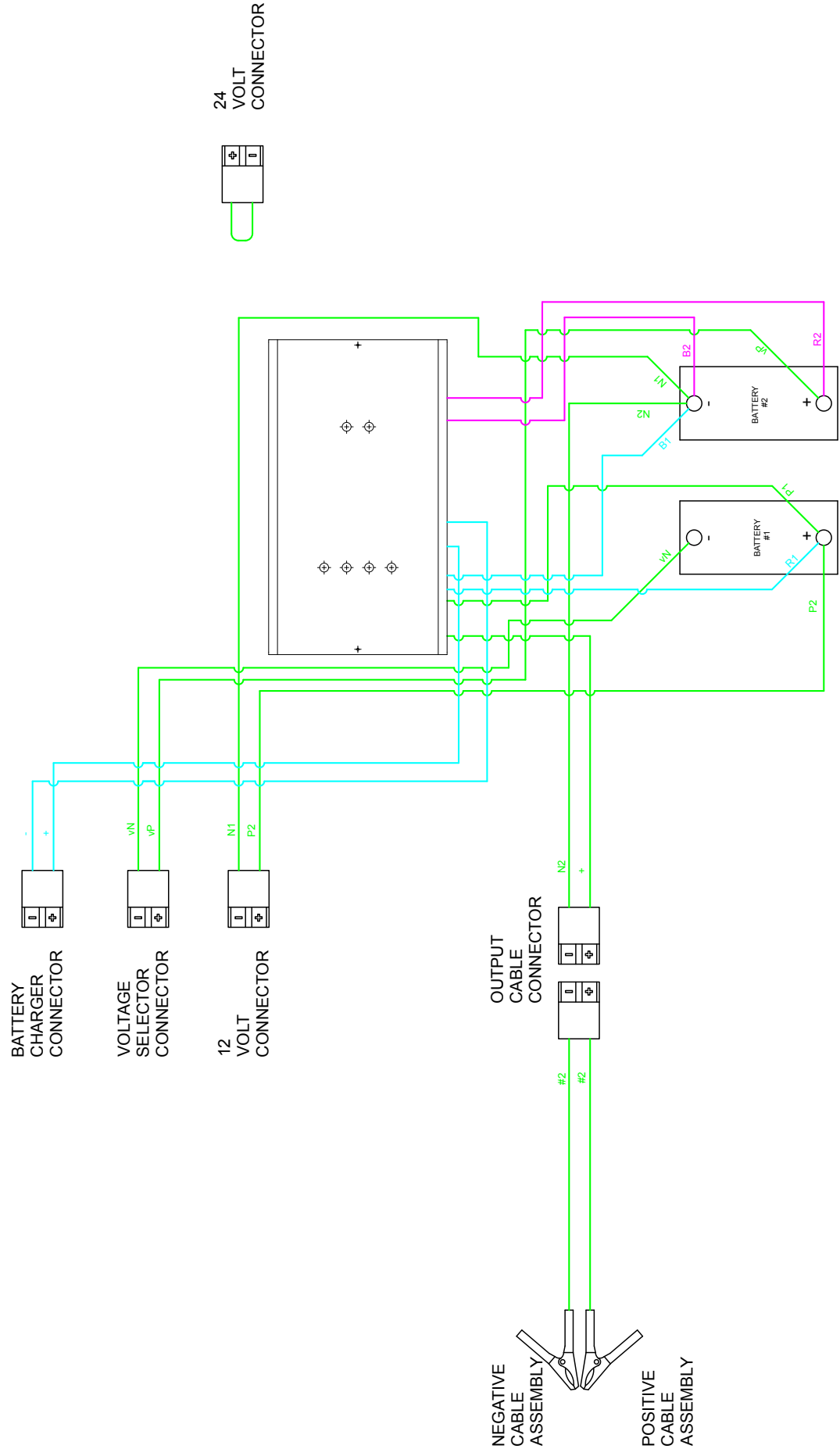


Model No. 4001 incorporates a Remote Switch to engage the starting function (BOOST MODE). The unit is engaged in starting mode as long as the Remote Switch is depressed. Some applications involving use on larger vehicles prevent the operator from keeping the Remote Switch depressed while starting the vehicle. For these situations, we have added a Timer function to the Remote Switch's operation.

Once the Remote Switch is depressed and released, the BOOST MODE is engage for a period of time base on the setting of the Timer on the top of the Control Cabinet. Set Timer to your desired duration. This setting can be adjusted from start to start.

NOTE: We recommend setting the timer to the shortest manageable duration. Output is live until timer times out, even if the jump starting event has ended. Always take care not to short output when unit is in "Boost Mode Engaged" status.

12/24V Wiring Diagram



OPERATING INSTRUCTIONS

Jump Starting

WARNING: DO NOT JUMP START WITH AC POWER CORD CONNECTED TO AC POWER SOURCE. NEVER JUMP START A FROZEN BATTERY. A SPARK NEAR BATTERY MAY CAUSE BATTERY EXPLOSION.



1. Set selector cable to proper voltage of vehicle being jump-started and turn unit on.
2. Position DC jumper cables to reduce risk of damage by hood, door or moving engine part.
3. Stay clear of fan belts, pulleys and other parts that can cause injury to persons.
4. Connect POSITIVE (RED) clamp from unit to POSITIVE (POS, P, +) ungrounded post of battery. Connect NEGATIVE (BLACK) clamp to vehicle ground (chassis or engine block away from battery).

NOTE: Do not connect clamp to carburetor, fuel lines or sheet-metal body parts. Connect to a heavy gauge metal part of the frame or engine block.

NOTE: If vehicle has 12 Volt system with dual batteries, connect to battery closest to starter.

5. Upon proper vehicle connection, green PROPER CONNECTION DETECTED LED will light.

NOTE: When jump starting severely depleted batteries, the PROPER CONNECTION DETECTED LED will not light as under normal jump starting conditions.

a. For battery / battery bank voltage under 1VDC, the Voltage Error LED will light. See Step 6a for next steps.

b. For 12V systems with Voltage from 1-6VDC or 24V systems with Voltage from 1-15.4VDC, the Voltage Error LED will light and the GOOD CONNECTION LED will flash. See Step 6b for next steps.

6. Depress Remote Switch to activate Boost Mode, Green BOOST MODE ENGAGED LED will light.

a. For Step 5a condition above, check all vehicle connections. Upon confirmation of proper vehicle connection, depress Remote Switch for 10 seconds to override Reverse Connection Safety Feature (buzzer will beep once per second).

b. For Step 5b condition above, check all connections. Upon confirmation of proper vehicle connection, depress Remote Switch for 5 seconds to override Reverse Connection Safety Feature.

NOTE: Boost Mode engaged as long as switch is depressed. Boost duration can also be managed based on the Timer setting. If longer Boost Mode is desired, adjust Timer.

7. Start the vehicle (turn on the vehicle ignition).

NOTE: If the vehicle doesn't start within 6 seconds, let the unit cool for 3 minutes before attempting to start the vehicle again or you may damage the unit.

8. Once vehicle has started, adjust timer to minimum setting to turn off output.

9. When disconnecting unit from vehicle, ALWAYS disconnect the negative clamp from vehicle ground first. Always remove positive clamp from battery terminal second.

10. When jump starting event is complete, disconnect output cables to prevent accidentally shorting the output.

Recharging Onboard Batteries

NOTE: Ensure that the Battery Type Indicator Switch is properly set to match the onboard batteries (AGM or Flooded/Wet Cell). This will ensure a proper charge and improve battery life.

1. This step for 12/24V configuration only. For 12V or 24V configurations, skip to Step 2. Connect Voltage Selector Quick Connect to Charging (Red) Quick Connect Assembly on unit handle.
2. Plug female end of included power cord into the receptacle on the back of the Control Cabinet. Plug male end of power cord into AC outlet.
3. CHARGING LED will light to indicate charging is in progress.

NOTE: When charging cord is first connected, Charging LED will flash several times before lighting solid. If flashing continues, this indicates an internal wiring error. Disconnect charging cord and check internal connections.

4. When the onboard batteries are fully recharged, the CHARGE COMPLETE LED will light. The unit features a fully automatic charging system, which eliminates the possibility of overcharging the batteries. As a result, the unit can be left connected to AC indefinitely with no adverse consequences.

LIMITED WARRANTY

Clore Automotive, LLC warrants your **SOLAR** Commercial Jump Starter (excluding batteries) to be free from defects in material and workmanship for a period of one year from the date of sale to the original user or consumer purchaser. If your **SOLAR** Commercial Jump Starter malfunctions or fails within the first 30 days of the warranty period because of a defect in material or workmanship, we will replace it. If your **SOLAR** Commercial Jump Starter malfunctions or fails within the 12 month warranty period because of a defect in material or workmanship, we will repair it without charge.

This warranty is in lieu of all other express warranties. The duration of any implied warranty, including but not limited to any implied warranty of merchantability or fitness for a particular purpose, made in respect to your **SOLAR** Commercial Jump Starter is limited to the period of the express warranty set forth above.

This warranty excludes and does not cover defects, malfunctions, or failures of your **SOLAR** Commercial Jump Starter which were caused by repairs made by an unauthorized person, mishandling, modifications, normal wear, unreasonable use, signs of battery acid corrosion from improper use or storage, or damage to the **SOLAR** Commercial Jump Starter/Charger while in your possession. This warranty applies neither to battery, deterioration of the battery, nor damage to the unit caused by the use of a faulty battery.

In no event shall Clore Automotive, LLC be liable for consequential or incidental damages. Some states do not allow limitations on the length of the implied warranty or the exclusion or limitation of incidental or consequential damages so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

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For best service and to receive periodic product updates, please visit www.cloreregistration.com, click on the **SOLAR** brand link, complete the information in the web form and click "submit." It's that easy!

For answers to questions concerning use, out-of-warranty service, or warranty/service information on this or other Clore Automotive products, contact Clore Automotive Technical Service at 800.328.2921; 913.310.1050; www.cloreautomotive.com.