

Owner's Manual & Safety Instructions

Save This Manual Keep this manual for the safety warnings and precautions, assembly, operating, inspection, maintenance and cleaning procedures. Write the product's serial number in the back of the manual near the assembly diagram (or month and year of purchase if product has no number). Keep this manual and the receipt in a safe and dry place for future reference.

19f

THUNDERBOLT MAGNUM™ solar

62449

1.5 WATT solar battery charger



Visit our website at: <http://www.harborfreight.com>
Email our technical support at: productsupport@harborfreight.com

When unpacking, make sure that the product is intact and undamaged. If any parts are missing or broken, please call 1-888-866-5797 as soon as possible.

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No portion of this manual or any artwork contained herein may be reproduced in any shape or form without the express written consent of Harbor Freight Tools. Diagrams within this manual may not be drawn proportionally. Due to continuing improvements, actual product may differ slightly from the product described herein.
Tools required for assembly and service may not be included.

⚠ WARNING

Read this material before using this product.
Failure to do so can result in serious injury.
SAVE THIS MANUAL.

IMPORTANT SAFETY INFORMATION

In this manual, on the labeling, and all other information provided with this product:



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to personal injury.

CAUTION

CAUTION, without the safety alert symbol, is used to address practices not related to personal injury.



WARNING Read all safety warnings and instructions. *Failure to follow the warnings and instructions may result in electric shock, fire and/or serious injury.*

Save all warnings and instructions for future reference. The warnings, precautions, and instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be supplied by the operator.

Installation Precautions

1. **Exercise special caution if working on roof or another high location.** Keep proper footing and balance at all times. Follow ladder supplier's precautions whenever working near or on a ladder.
2. **Install all sensitive electrical components (including wiring connections, regulator, and battery) inside a weatherproof enclosure to prevent electric shock.**
3. **Do not wire multiple panels in series.** If you need to connect two or more solar panels together, this work must be done by a qualified electrician unless they are connected through a regulator.
4. This solar panel kit is not designed for tie-in to a grid. Only a licensed electrician and a licensed building contractor can safely design and implement a grid tie-in system. Any grid tie-in system must meet all applicable building and electrical codes, and must meet standards established by the area power company. Improper grid tie-in can result in electrocution, fire, and other serious personal injury and property damage. An incorrectly installed grid tie-in system can cause feedback voltage, resulting in electrocution of electrical utility workers.
5. **Do not stand on or otherwise apply pressure to panel.**
6. **Handle solar panel with care, edges may be sharp.**
7. **Do not focus light on panel.**
8. **Install components with enough space to allow proper cooling.**
9. **This product may occasionally produce more current and/or voltage than its rated output. Increase output ratings by 25% when determining component required voltage and amperage ratings.** Refer to Section 690-8 of the National Electrical Code for an additional multiplying factor of 125 percent (80 percent derating) which may apply.

10. Panel must be connected using UL listed outdoor rated wire of the correct thickness (gauge) for the amperage rating and length (see warning number 9 also). Follow the guidelines in the chart below:

Current in Amps	Maximum Length				
	5'	10'	15'	20'	25'
0-5	18				
6-7	18				16
8	18			16	
10	18		16		
11-12			16		14
15			14		12
18	18	16	14		10
20			14	12	
22-24			12		
30	16	14	10		
40		12	10		8
50	14				
100	12	10	6		4
150	10	8	4		2
200	8	6			

Minimum Wire Gauge

11. Install an appropriate charge controller/regulator to regulate output and prevent damage. Do not attach panel to battery or power grid without proper regulator, inverter, and/or charge controller.
12. Install and use according to applicable National Electrical Code (NEC) standards.
13. This panel is not rated for use as fire-resistant roofing. If installing on a roof, install only over a fire resistant roof covering rated for the application.
14. Verify that installation surface has no hidden utility lines before drilling or driving screws.
15. Install only according to these instructions. Improper installation can create hazards.
16. Wear ANSI-approved safety goggles and heavy-duty work gloves during installation. Do not wear jewelry or metal watches when working near solar panels, wiring or batteries.
17. Handle panel with care. Glass may break or a sharp edge may be exposed during movement.
18. Keep installation area clean and well lit.
19. Install out of reach of children.
20. Keep bystanders out of the area during installation.

21. Do not install when tired or when under the influence of drugs or medication.
22. Use in 12 VDC systems only.
23. People with pacemakers should consult their physician(s) before use. Electromagnetic fields in close proximity to heart pacemaker could cause pacemaker interference or pacemaker failure.

Battery Precautions

1. **Wear splash-resistant ANSI-approved safety goggles and electrically insulated gloves while working near batteries.**
2. **Use an appropriate charge controller whenever connected to battery.**
3. Charge, store, and maintain batteries according to supplier's instructions.

Service Precautions

1. **Before service, maintenance, or cleaning:**
 - a. **Dry solar panels and outdoor wiring thoroughly while wearing electrically insulated gloves.**
 - b. **Cover all solar panels with an opaque cover, such as a blanket.**
 - c. **Disconnect all solar panels.**
 - d. **Disconnect all batteries.**
2. **Do not service during rain, fog, or any other wet/humid weather.**
3. **Do not stand on or otherwise apply pressure to panel.**
4. Do not allow children to play with or near this or electrical components.
5. Inspect at least monthly; do not use if damaged, parts are loose, water is found inside the housing, electrical insulation is cracked or damaged, or connections are loose.
6. Maintain product labels and nameplates. These carry important safety information. If unreadable or missing, contact Harbor Freight Tools for a replacement.



SAVE THESE INSTRUCTIONS.

Specifications

Rated Output	12/24 VAC / 1.5W
Panel Size	13-3/4" L x 4-3/4" W

Note: Output will decrease as the panel gets hotter than room temperature (~70° F). Angle, solar intensity, cloud cover and other factors will effect output.

Installation

IMPORTANT! Read the ENTIRE IMPORTANT SAFETY INFORMATION section at the beginning of this manual including all text under subheadings therein before set up or use of this product:

Note: For additional information regarding the parts listed in the following pages, refer to the Assembly Diagram near the end of this manual.

Location

1. Locate the Charger panel where it will receive full, unobstructed sunlight, especially during midday. Nearby trees or tall plants will drop debris, requiring the panel to be cleaned more frequently.
2. The installation location for panels, charge controller/regulator, and batteries must be inaccessible to children to prevent electric shock. Build a childproof enclosure if needed.
3. Install the charge controller/regulator and batteries in a weatherproof enclosure with proper ventilation.

Assembly/Mounting

1. Select a mounting location for the Charger Frame. The solar panel should face the Sun, and not be blocked by shadows. The location should allow the panel to be protected from accidental damage. The mounting location should be sturdy enough to support the weight of the Charger Frame, and any additional accessories. Before mounting, be sure that the main cable to either the Battery Clamp Wire or the Lighter Plug Wire will reach from the Charger Frame to the battery to be charged.
2. To mount Charger Frame to dashboard or the inside or outside of car windshield, press two Suction Cups into the mounting holes provided on the back of the Charger Frame.

NOTE: Two additional Suction Cups are included with the Solar Battery Charger for when the first pair begin to wear and need to be replaced.

WARNING! Depending on the mounting location and possible weather conditions, you may need longer mounting screws (not included) to securely install the Charger Frame.

WARNING! If using mounting screws, do NOT drill through the Charger's aluminum frame. You may damage the frame or break the glass.

3. Angle face of Charger Frame toward true south¹ according to chart that follows:

Latitude	Solar Panel Angle
0-4°	10°
5-20°	Latitude + 5°
21-45°	Latitude + 10°
46-64°	Latitude + 15°
65° or more	80°

Wiring

Note: Only a licensed electrician and a licensed building contractor can safely design and implement a grid tie-in system. Any grid tie-in system must meet all applicable building and electrical codes, and must meet standards established by the area power company.

1. Run wires from panels, through weatherproof grommets and into enclosure where charge controller/regulator is located. Use wires of the proper size and rating and use twist connectors (not included) to connect wires.
2. Connect to charge controller/regulator according to controller/regulator's instructions.
3. Secure all connections using terminals, or solder all wire splices to ensure good connections.
4. Weatherproof all connections and route the wire in a way that it will not be torn loose from the panel.

¹ Angle towards true north if installed in southern hemisphere.

Operation

Use Voltage Regulator (not included) between Solar Battery Charger and battery to prevent overcharging battery and consequent damage.

Solar Panel may also be used to maintain charge on batteries which are powering other items, such as a car radio while the car is parked.

Attach one of the two provided extensions as needed. This kit includes Battery Clamps and Car Lighter Plug Wire in addition to the Charger's main cable.

NOTICE: Disconnect the Solar Battery Charger from cigarette lighter or battery terminal before starting engine. Surges of electricity from the engine may damage the Solar Panel.

Servicing



Procedures not specifically explained in this manual must be performed by a qualified service technician.

⚠ WARNING

TO PREVENT SERIOUS INJURY FROM ELECTRIC SHOCK:

Before service, maintenance or cleaning:

- Dry Solar Battery Charger panel and outdoor wiring thoroughly while wearing electrically insulated gloves.**
- Cover all panels with an opaque cover, such as a blanket.**
- Disconnect all panels.**
- Disconnect all batteries.**



TO PREVENT SERIOUS INJURY FROM ELECTRIC SHOCK AND CUTS:

Do not use damaged solar panel. If wiring insulation is damaged or weathered, glass is cracked,

or housing is opened, have the problem corrected before further use.

Note: It is normal to see up to 20% degradation in amorphous silicon solar panel performance within the first 6 months before the amorphous coating stabilizes.

Cleaning

Clean and inspect the Solar Battery Charger system **MONTHLY**, or more frequently to maintain peak efficiency.

- Wear electrically insulated gloves and ANSI-approved safety goggles.** Dry solar panels and outdoor wiring thoroughly.
- Cover all panels with an opaque cover, such as a blanket.**
- Disconnect all panels and batteries.**
- Clean panels one at a time with mild, non-abrasive cleanser and soft cloth and paper towels. Do not clean with brushes or abrasive cleaners.
- Inspect the general condition of the Solar Battery Charger system (panels, batteries, controllers, and mounting). Check for loose hardware, wiring insulation damage or weathering, cracked glass, open housing, cracked or broken parts, loose or corroded contacts, and any other condition that may affect its safe operation.
- Inspect and maintain batteries according to supplier's instructions.

Adjustment

To increase efficiency:

- In the Winter**, increase the panel's angle by 10°.
- In the Summer**, decrease the angle by up to 10°.
- In the Spring and Fall**, keep the panel at the angle recommended on the chart on page 4.

Record Product's Serial Number Here: _____

Note: If product has no serial number, record month and year of purchase instead.

Note: Replacement parts are not available for this item.

90 Day Warranty

Harbor Freight Tools Co. makes every effort to assure that its products meet high quality and durability standards, and warrants to the original purchaser that this product is free from defects in materials and workmanship for the period of 90 days from the date of purchase. This warranty does not apply to damage due directly or indirectly, to misuse, abuse, negligence or accidents, repairs or alterations outside our facilities, criminal activity, improper installation, normal wear and tear, or to lack of maintenance. We shall in no event be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation of exclusion may not apply to you. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

To take advantage of this warranty, the product or part must be returned to us with transportation charges prepaid. Proof of purchase date and an explanation of the complaint must accompany the merchandise. If our inspection verifies the defect, we will either repair or replace the product at our election or we may elect to refund the purchase price if we cannot readily and quickly provide you with a replacement. We will return repaired products at our expense, but if we determine there is no defect, or that the defect resulted from causes not within the scope of our warranty, then you must bear the cost of returning the product.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

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