

Owner's Manual & Safety Instructions

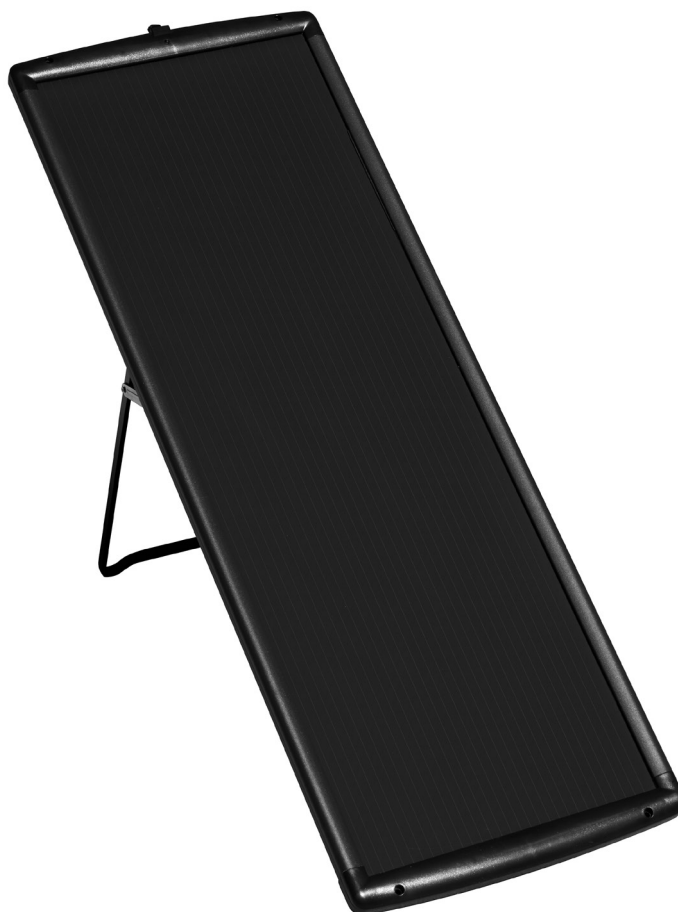
Save This Manual Keep this manual for the safety warnings and precautions, assembly, operating, inspection, maintenance and cleaning procedures. Write the product's serial number in the back of the manual near the assembly diagram (or month and year of purchase if product has no number). Keep this manual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

19f

THUNDERBOLT
MAGNUM™ **solar**

63940

25 WATT
12 volt solar panel



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.

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SAFETY



SETUP

WARNING SYMBOLS AND DEFINITIONS	
	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.
	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
	Addresses practices not related to personal injury.

OPERATION

IMPORTANT SAFETY INSTRUCTIONS

WARNING

Read all safety warnings and all 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.

MAINTENANCE

READ ALL INSTRUCTIONS

Installation Precautions

- 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.
- Install all sensitive electrical components (including wiring connections, regulator, and battery) inside a weatherproof enclosure to prevent electric shock.**
- 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.
- 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.
- Do not stand on or otherwise apply pressure to panel.**

Installation Precautions (cont'd)

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		10		8
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. Handle panel with care. Glass may break or a sharp edge may be exposed during movement.
17. Keep installation area clean and well lit.
18. Install out of reach of children.
19. Keep bystanders out of the area during installation.
20. Do not install when tired or when under the influence of drugs or medication.
21. Use in 12 VDC systems only.
22. 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.

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

SAFETY

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.

SETUP

OPERATION

MAINTENANCE

THUNDERBOLT
MAGNUM™ solar

Specifications

Rated Output	12 VDC / 25 W
Panel Size	40" L x 13-5/8" W x 1" D

Note: Performance will vary depending on temperature, brightness and time of sun exposure. Summer production will be higher than in the winter. Bright sunny days will generate higher output than cloudy days.

Set Up Instructions



Read the **ENTIRE IMPORTANT SAFETY INSTRUCTIONS** section at the beginning of this manual including all text under subheadings therein before set up or use of this product.

WARNING

TO PREVENT SERIOUS INJURY FROM ACCIDENTAL OPERATION:

Make sure that the Power Switch/Trigger is in the off-position and unplug the tool from its electrical outlet before performing any procedure in this section.

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

Installation

Location

1. Locate the Solar Panel where it will receive full, unobstructed sunlight, especially during midday. Nearby trees or tall plants will drop debris, requiring the panels 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.

Mounting

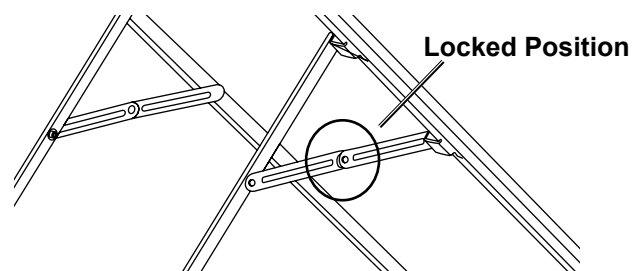
1. Select a mounting location for the Solar Panel. Do not mount on outside of vehicle. The solar panel should face the sun, and not be blocked by shadows. The location should allow the panel to be protected from accidental damage.
2. The mounting location should be sturdy enough to support the weight of the Solar Panel, and any additional accessories. Before drilling, be sure there are no hidden wires or utility lines that may be damaged during installation.
3. Angle face of Solar Panel toward true south 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°

Note: Angle towards true north if installed in southern hemisphere.

Assembly

1. The Mounting Stands on each panel come pre-assembled. Stand panels upright and pull each Mounting Stand out to locked position.



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 power inverter is located. Use wires of the proper size and rating and use twist connectors (not included) to connect wires.
2. Connect battery to power inverter according to inverter's instructions. **WARNING!** Inverter must be properly rated and designed for this type of connection and power supply.
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.

Operating Instructions



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: Performance of the Solar Panels will vary dependent on site location, angle of the panels in relation to the arc of the sun, and available sunlight.

1. Use Voltage Regulator (not included) between Solar Panel and device you are powering to prevent overcharging battery and consequent damage. Refer to the user manual for your Voltage Regulator for setup and operating instructions.
2. Attach one of the three provided extensions as needed. This kit includes a Battery Clamp Cable, Bare Wire Cable, and Lighter Cable.
3. 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.

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

Maintenance and Servicing



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

!WARNING

TO PREVENT SERIOUS INJURY FROM ELECTRIC SHOCK:
Before service, maintenance or cleaning:

- a. Dry solar panels and outdoor wiring thoroughly while wearing electrically insulated gloves.
- b. Cover solar panels with an opaque cover.
- c. Disconnect all solar panels and batteries.



TO PREVENT SERIOUS INJURY FROM ELECTRIC SHOCK OR 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, Maintenance, and Lubrication

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

1. **Wear electrically insulated gloves and ANSI-approved safety goggles.** Dry solar panels and outdoor wiring thoroughly.
2. **Cover solar panels with opaque cover.**
3. **Disconnect all solar panels and batteries.**
4. Clean solar panels one at a time with mild, non-abrasive cleanser and soft cloth and paper towels. Do not clean with brushes or abrasive cleaners.
5. Inspect general condition of Solar Kit 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.
6. Maintain batteries according to supplier's instructions.

Adjustment

To increase efficiency:

1. **In the Winter**, increase the panels' angle by 10°.
2. **In the Summer**, decrease the angle by up to 10°.
3. **In Spring and Fall**, keep the angle recommended on page 5.

Limited 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.

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.



26541 Agoura Road • Calabasas, CA 91302 • 1-888-866-5797