

# 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.

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## **THUNDERBOLT™ SOLAR**

**57991**

## **100 WATT FOLDABLE SOLAR PANEL BRIEFCASE**



Visit our website at: <http://www.harborfreight.com>  
Email our technical support at: [productsupport@harborfreight.com](mailto: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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# THUNDERBOLT™ SOLAR

## 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.

## 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.**

## 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 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.**

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:
11. Do not attach panel to power grid without proper regulator, inverter, and/or charge controller.
12. Setup and use according to applicable National Electrical Code (NEC) standards.
13. Do not leave this solar panel attached to an automobile or trailer while it is in motion.
14. Handle panel with care. Glass may break or a sharp edge may be exposed during movement.
15. Keep setup area clean and well lit.
16. Setup out of reach of children.
17. Keep bystanders out of the area during setup.
18. Do not setup when tired or when under the influence of drugs or medication.
19. This should be used to charge a 12V battery using a charge controller (sold separately).
20. 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.

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	12	10
20			12		
22-24			14		10
30	16	12	10	8	
40	14	10	6	4	
50	12	8	4	2	
100	10	8	4		
150	8	6	2		
200	8	6	2		
<b>Minimum Wire Gauge</b>					

## 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 a 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

## Specifications

Rated Output	14-22 VDC / 100 W / 7A
Open Circuit Voltage (VoC)	21.5 VDC
Typical Maximum Power Point Voltage (MPPT)	17.5 VDC
Typical MPPT Current	6.2 Amps DC

**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.

OPERATION

MAINTENANCE

**THUNDERBOLT™  
SOLAR**

## 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.

## Setup

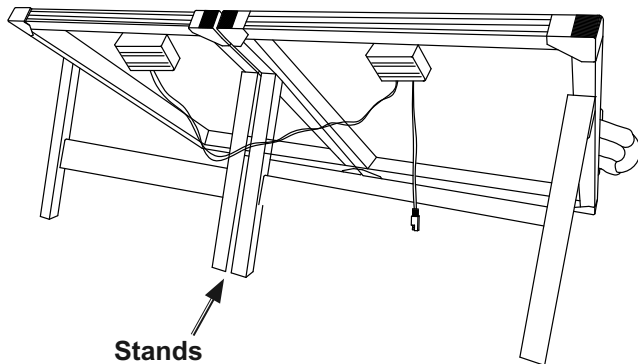
### Location

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 setup for the Solar Panel, charge controller/regulator, and batteries must be inaccessible to children to prevent electric shock. Build a childproof enclosure if needed.
3. Setup the charge controller/regulator and batteries in a weatherproof enclosure with proper ventilation.

### Setup

This Solar Panel is intended for temporary setup.

1. Use the two pull-out Stands on the rear panel.



**Note:** Avoid temporary set up on windy or stormy days.

### Wiring

Weatherproof all connections and route the wire in a way that it will not be torn loose from the panel.

2. Angle the face of the Solar Panel toward true south according to chart below:

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

**Note:** To increase efficiency, make setup adjustments throughout the year:

- a. **In the Winter**, increase the panel's angle by 10°.
- b. **In the Summer**, decrease the angle by up to 10°.
- c. **In Spring and Fall**, keep the angle recommended in Step #2.

## Operating Instructions



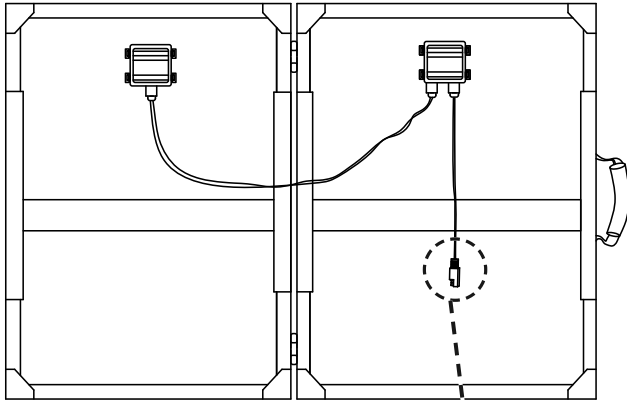
Read the **ENTIRE IMPORTANT SAFETY INFORMATION** section at the beginning of this manual including all text under subheadings therein before set up or use of this product.

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

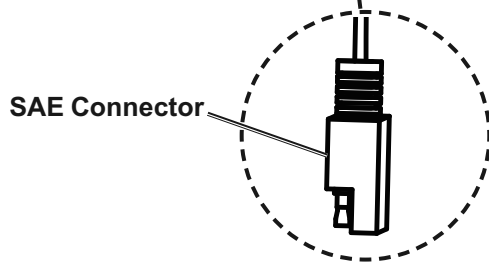
## Operation

1. Connect the output cable with SAE connector to a charge controller/regulator you want to power.

**Note:** If needed, use the included 8mm adapter cable, or 6pc Solar Power Connection Cable Kit 63981 (sold separately).



2. When charging is complete, disconnect the Solar Panel output. Clean and store Solar Panel in a dry, indoor area out of reach of children.



**Record Product's Serial Number Here:**

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

**Note:** Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts. Specify UPC 193175429957 when ordering parts.

## 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. Close briefcase.
- 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 Mono-crystalline solar panel performance within the first 6 months before the Mono-crystalline stabilizes.

## Cleaning, Maintenance, and Lubrication

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

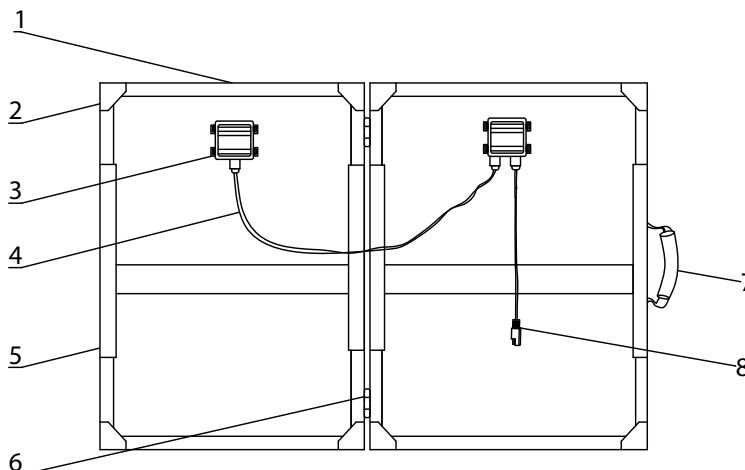
1. **Wear electrically insulated gloves and ANSI-approved safety goggles.** Dry Solar Panels and outdoor wiring thoroughly.
2. **Close briefcase.**
3. **Disconnect all solar panels and batteries.**
4. Clean solar panels and connectors with damp soft cloth. Dry thoroughly. Do not clean with brushes, soap or solvents.
5. Inspect general condition of Solar Panel 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.

## PLEASE READ THE FOLLOWING CAREFULLY

THE MANUFACTURER AND/OR DISTRIBUTOR HAS PROVIDED THE PARTS LIST AND ASSEMBLY DIAGRAM IN THIS MANUAL AS A REFERENCE TOOL ONLY. NEITHER THE MANUFACTURER OR DISTRIBUTOR MAKES ANY REPRESENTATION OR WARRANTY OF ANY KIND TO THE BUYER THAT HE OR SHE IS QUALIFIED TO MAKE ANY REPAIRS TO THE PRODUCT, OR THAT HE OR SHE IS QUALIFIED TO REPLACE ANY PARTS OF THE PRODUCT. IN FACT, THE MANUFACTURER AND/OR DISTRIBUTOR EXPRESSLY STATES THAT ALL REPAIRS AND PARTS REPLACEMENTS SHOULD BE UNDERTAKEN BY CERTIFIED AND LICENSED TECHNICIANS, AND NOT BY THE BUYER. THE BUYER ASSUMES ALL RISK AND LIABILITY ARISING OUT OF HIS OR HER REPAIRS TO THE ORIGINAL PRODUCT OR REPLACEMENT PARTS THERETO, OR ARISING OUT OF HIS OR HER INSTALLATION OF REPLACEMENT PARTS THERETO.

## Parts List and Diagram

Part	Description	Qty
1	Solar Panel	2
2	Corner Guard	8
3	Junction Box	2
4	Connecting Cable	1
5	Stand	2
6	Hinge	2
7	Handle	1
8	SAE Cable	1
9	SAE to 8mm Adapter Cable (not shown)	1



## 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.

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