

Owner's Manual & Safety Instructions

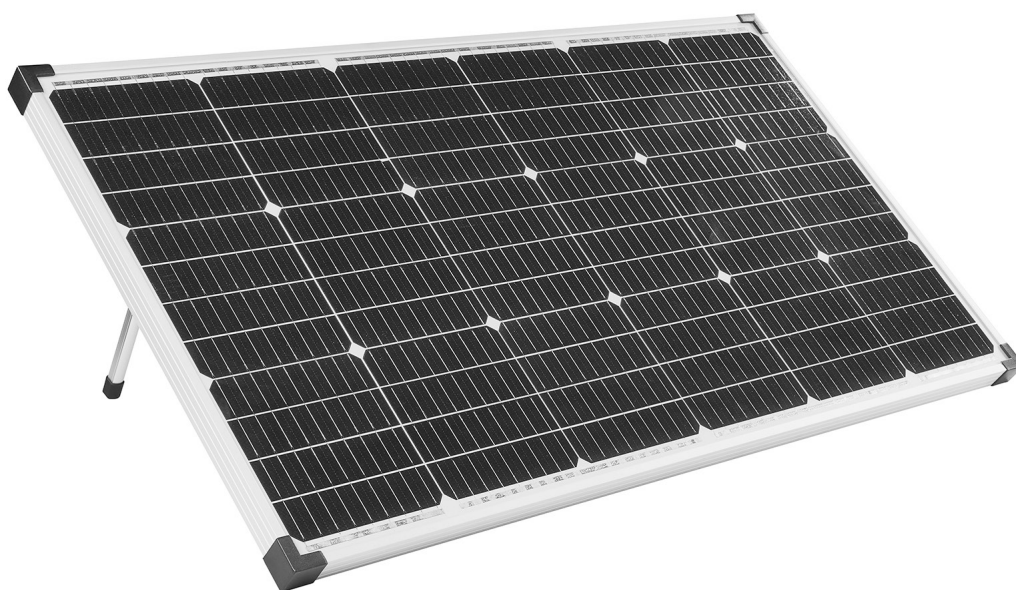
Save This Manual Keep this manual for the safety warnings and precautions, assembly, operating, inspection, maintenance and cleaning procedures. Write the product's serial number in the back of the manual near the assembly diagram (or month and year of purchase if product has no number). Keep this manual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

24h

THUNDERBOLT™ SOLAR

71049

100 WATT SOLAR PANEL



Visit our website at: <https://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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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 exceed maximum input voltage of controller when connecting multiple panels in series.** Sum of panel(s) open circuit voltage must not exceed maximum input voltage rating of controller.
- Do not stand on or otherwise apply pressure to panel.**
- 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.
- Handle solar panel with care, edges may be sharp.**
- Install components with enough space to allow proper cooling.**

8. **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.

9. 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								
20	18	16	14	12	10			
22-24			12					
30	16	14	10					
40		12	10		8			
50	14		4			2		
100	12	10					6	4
150	10	8						
200	8	6						
	Minimum Wire Gauge							

Minimum Wire Gauge

10. Keep bystanders out of the area during installation.

Battery Precautions

1. **Wear splash-resistant ANSI-approved safety goggles and electrically insulated gloves while working near batteries.**
2. **Use an appropriate charge controller (sold separately) 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	19VDC / 5.3A / 100W
Open Circuit Voltage	24.5VDC
Short Circuit Current	5.7A

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:



Wear ANSI-approved splash-resistant safety goggles and heavy-duty rubber work gloves whenever connecting, disconnecting, or working near battery. Battery acid can cause permanent blindness.

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

Location

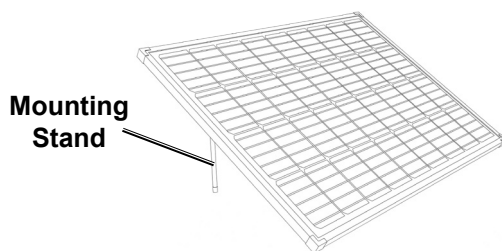
Locate Solar Panel where it will receive full, unobstructed sunlight, especially during midday. Nearby trees or tall plants will drop debris, requiring the panel to be cleaned more frequently.

WARNING! TO PREVENT SERIOUS INJURY: Setup location for Solar Panel must be inaccessible to children to prevent electric shock or cuts from broken glass. Build a childproof enclosure if needed.

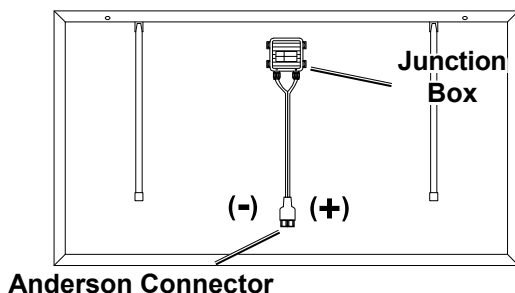
Installation

Temporary Setup

1. Pull out Mounting Stands on rear of panel. Avoid temporary setup on windy or stormy days. Angle face of Solar Panel towards sun.



2. Connect Anderson Connector to extension cables, solar panel, power station, or controller (all sold separately) depending on application.



Note: Some connection types (e.g. solar panels in parallel) will require additional adapters and/or cables (sold separately).

WARNING! TO PREVENT SERIOUS INJURY: Do not exceed maximum input voltage of controller when connecting multiple panels in series. Sum of panel(s) open circuit voltage must not exceed maximum input voltage rating of controller.

3. If setting up Solar Panel temporarily and charging is complete, disconnect Solar Panel. Store Solar Panel in a dry, indoor area out of reach of children.

Permanent Setup

Permanent installations must be weatherproof and meet all building and electrical codes and standards for your area.

1. Select mounting surface for solar panel brackets or frame (sold separately) that will allow Solar Panel(s) to face towards true south at correct vertical angle for your latitude as much as possible.

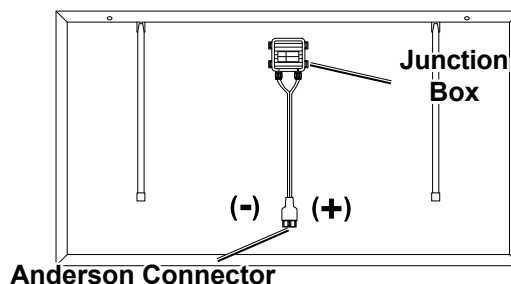
Note: Correct vertical angle for all year use is the same as your latitude.

2. Using appropriate mounting hardware, brackets and/or frame (all sold separately), attach Solar Panel(s) using predrilled holes on back of panel.

Note: For maximum efficiency, brackets or frame should be adjustable:

- a. **For Winter applications**, increase panel vertical angle by 10° - 15° .
- b. **For Summer applications**, decrease panel vertical angle by 10° - 15° .
- c. **For Spring, Fall, and All Year applications**, keep panel vertical angle the same as your latitude.

3. Connect Anderson Connector to extension cables, solar panel, power station, or controller (all sold separately) depending on application.



Note: Some connection types (e.g. solar panels in parallel) will require additional adapters and/or cables (sold separately).

WARNING! TO PREVENT SERIOUS INJURY: Do not exceed maximum input voltage of controller when connecting multiple panels in series. Sum of panel(s) open circuit voltage must not exceed maximum input voltage rating of controller.

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.

Operation

Reference power station or controller manual for information on how to use your solar powered system to charge batteries, power appliances, etc.

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.
- d. Disconnect all 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.

Cleaning and Maintenance

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

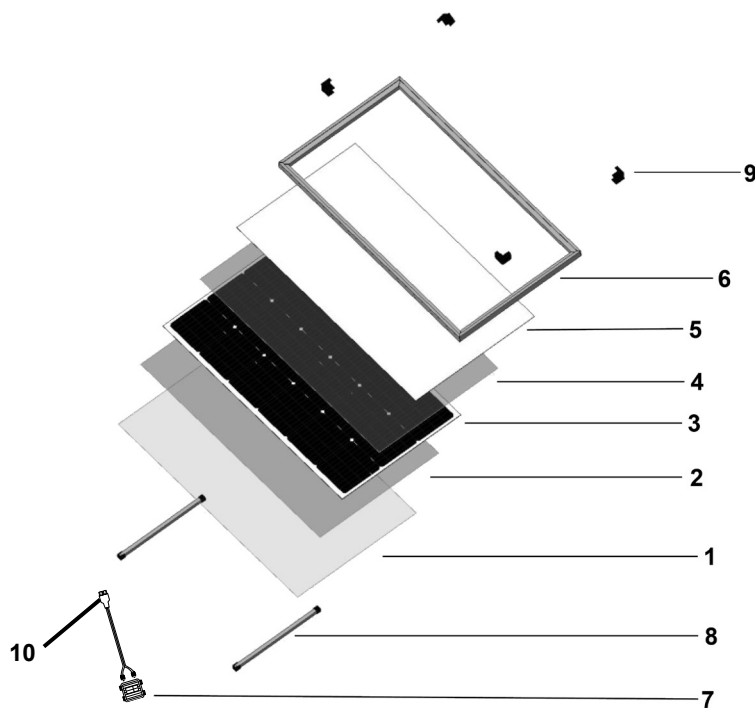
1. **Wear electrically insulated gloves and ANSI-approved safety goggles.** Dry Solar Panels and outdoor wiring thoroughly.
2. **Cover solar panels with opaque cover.**
3. **Disconnect all solar panels and batteries.**
4. Clean Solar Panels and connectors with damp soft cloth. Dry thoroughly. Do not 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.

Part	Description	Qty
1	Ultra-White Tempered Glass	1
2	EVA	1
3	Cell	72
4	EVA	1
5	Back Sheet	1

Part	Description	Qty
6	Solar Panel Frame	1
7	Junction Box	1
8	Mounting Stand	2
9	Corner Guard	4
10	Anderson Connector	1



Record Product's Serial Number Here: _____

ablete: 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. Visit harborfreight.com/parts for a list of in stock parts. Reference UPC 193175526311.

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.

**THUNDERBOLT™
SOLAR**

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