Wanco® Solar Power Trailers

User's Manual

April 2021

WANCO® The industry leader.

Contents

List of Figures

1 Introduction

1.1 Read before using

This is the owner's manual for Wanco Solar Power Trailers. These trailers are a platform for installing electronics and technologies such as surveillance cameras, antennas, and radio transmitters. This manual describes how to deploy and maintain the trailer. For information about using devices that may be installed on the trailer, refer to the device manufacturer's documents.

For your safety and protection from injury, carefully read, understand, and observe all instructions in this manual. Always read all instructions before performing a procedure.

Keep this manual or a copy of it with the trailer. Additional and replacement manuals are available from the factory (see Section 1.5, "Where to obtain service," page 3).

Illustrations in this document are representative of common power trailer models, but may differ in detail from your trailer.

If you have questions regarding this product, please contact Wanco Service or Sales using the information in Section 1.5.

1.2 Trailer models

All Wanco Solar Power Trailers are covered by this manual. All models are operationally similar. Base models are illustrated in Figure 1-1, page 2. Primary differences between models are:

- Type and number of batteries
- Output (wattage) of solar-panel array
- Deployment of solar array
- Functional equipment installed on the trailer
- Control system

Figure 1-1. Solar power trailer models

Mini models

260-watt solar

390-watt solar

520-watt solar

Medium models

600-watt solar

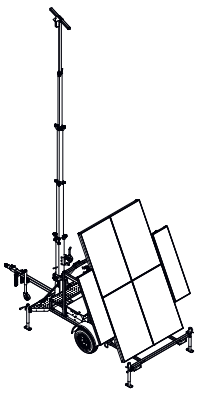
900-watt solar

1050-watt solar

Large models

900-watt solar

1200-watt solar



1500-watt solar

1.3 Getting the best performance

The solar trailer is powered by batteries that are charged by an automated solar-based charging system. To get the best performance from the trailer's power system, the solar panels must be exposed to bright sunlight during the day.

Optimal positioning of the solar panels is critical. Before using your solar power trailer, review Section 5.2, "Power system," page 38.

1.4 Applications

Wanco Solar Power Trailers provide a platform for installing devices and technologies that support your particular application. The particular advantage provided by a solar trailer is that it operates silently. No engine or external power supply is needed. For applications where noise is an issue, silent power is the only option.

Common uses of the Solar Power Trailer include video surveillance, portable lighting, and wireless communications in locations where commercial power may not be available or convenient.

1.5 Where to obtain service

Before calling for service, please have the solar trailer model number and VIN ready. This information is displayed on the vehicle identification tag (see Figure 1-2).

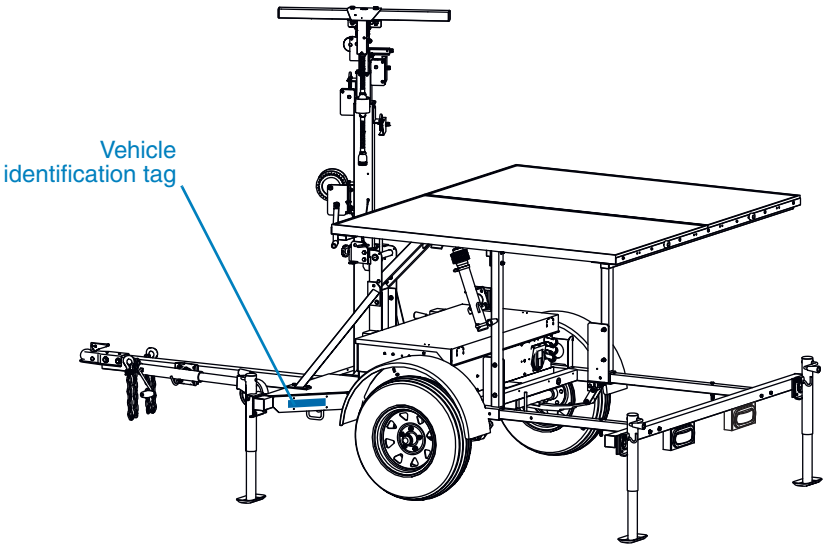
Contact our service department using the following information:

Wanco Inc.
5870 Tennyson Street
Arvada, Colorado 80003 USA

303-427-5700
fax 303-427-5725

www.wanco.com
info@wanco.com

Figure 1-2. Vehicle identification tag



2 Safety

2.1 Safety statements in this manual

This manual contains the following types of callouts, which must be followed to reduce the possibility of personal injury, damage to the equipment, or improper service. Each alert has a specific meaning, as described below:

⚠ The safety alert symbol alerts you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.

⚠ WARNING

Indicates an imminently hazardous situation which, if not avoided, COULD result in death or serious injury.

⚠ CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

CAUTION

Used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, could result in property damage.

IMPORTANT!

Indicates information that is of particular importance when transporting, operating, or servicing the equipment.

2.2 General safety

⚠ WARNING

Improper use of equipment could cause serious injury or death.

Prior to using this product, carefully read, understand, and observe all instructions in this manual.

⚠ CAUTION

Crush hazard.

When operating or working on the trailer, keep hands and body parts clear of pinch points.

2.3 Forklift safety

⚠ WARNING

Loose equipment can cause severe injury or death.

Use a forklift ONLY if the trailer has "FORK LIFT" decals adhered to it.

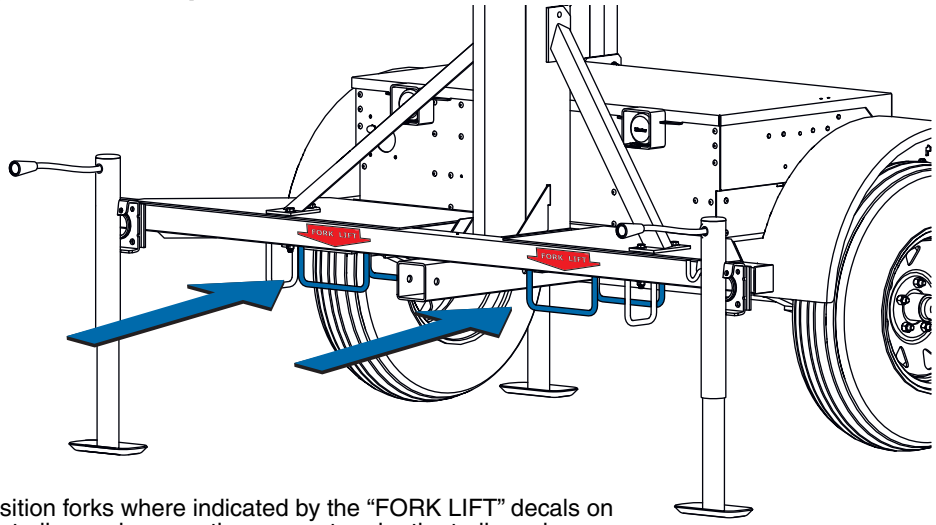
Some solar trailer models are too large or unwieldy for a forklift (for example, large trailers, models with two battery boxes, and models with two axles). To prevent an accident, DO NOT use a forklift to move these models.

If the trailer can be moved with a forklift, it will have two "FORK LIFT" decals on the trailer frame, indicating where the forklift tines, or forks, should be positioned.

When using a forklift to move the trailer, refer to Figure 2-1 and follow these requirements:

- Position the forks so they will fit into the forking pockets under the trailer frame, as indicated. Each pocket consists of two loops. The forks must extend through both pairs of loops.
- Ensure the forks extend past the battery box and fully support the trailer frame. Use fork extenders if necessary.
- Do not place the forks under the trailer axle.
- Ensure the forklift does not contact the solar trailer other than where the forks touch the frame. The solar panels are particularly susceptible to damage if the forklift touches them.

Figure 2-1. Forklift position



Position forks where indicated by the “FORK LIFT” decals on the trailer, and ensure they are not under the trailer axle

2.4 Operating safety

⚠ DANGER

Electric shock hazard.

Contact with overhead electrical power lines will cause serious injury or death.

Do not position solar trailer under power lines.

⚠ WARNING

Falling equipment could cause severe injury or death.

Before using the solar trailer, stabilize and level the trailer.

- The solar trailer mast can be extended to over 20 or 30 feet (6.10 or 9.14 meters) in height, depending on the trailer model. Ensure the area above the trailer is clear of obstructions.
- To reduce the risk of personal injury, ensure the surrounding area is in good order and free of debris.
- To reduce the risk of shifting, rolling, or overturning, locate the solar trailer on a firm, level surface.
- If your solar trailer has an extendable rear frame, ensure there is enough space to deploy it. Some trailer models do not have an extendable rear frame.
- Always stabilize and level the trailer before raising the mast. To improve stability, extend the rear frame prior to raising the mast.

- Never move the trailer while the mast is extended.
- Do not allow water to accumulate around the base of the trailer.
- Take the weather into account: do not raise the mast in high winds or during an electrical storm.
- For grounding and bonding requirements, consult a qualified electrician or your local Authority Having Jurisdiction (AHJ). For more information, see Section 2.5.
- Ensure the solar trailer is in good operating condition. Never use any equipment that is damaged or in need of repair.

2.5 Grounding

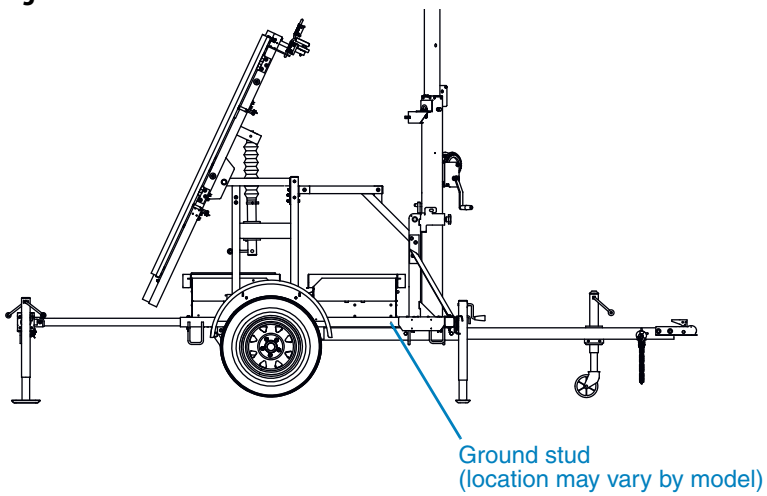
The solar trailer is a negative-ground system.

The trailer includes a ground stud (see Figure 2-2) for electrically grounding the trailer when necessary to comply with the National Electrical Code (NEC) and other regulations. Depending on the trailer model, the ground stud location may vary.

For grounding and bonding requirements that apply to your deployment of the Wanco Solar Power Trailer, consult a qualified electrician or refer to applicable regulations. Agencies and organizations that regulate electrical compliance may include, but are not limited to:

- Your local authority having jurisdiction (AHJ)
- National Fire Protection Association (NFPA), which publishes the NEC
- U.S. Occupational Safety and Health Administration (OSHA)
- U.S. Mine Safety and Health Administration (MSHA)

Figure 2-2. Ground stud



2.6 Service safety

⚠ WARNING

Fire hazard.

When working with the solar trailer batteries, never allow positive wiring to short to ground.

⚠ CAUTION

During servicing, adverse weather conditions can cause equipment damage and injury.

Whenever possible, perform maintenance indoors or in calm, dry weather.

- Always take precautions to ensure the safety of service personnel. Whenever possible, perform maintenance indoors, out of the weather.
- Never perform any service unless all electrical components are shut down. Ensure all power circuits are shut off.
- Observe battery safety precautions. See Section 5.2.4, page 40.
- If disconnecting the solar trailer's battery cables, always disconnect the positive (+) cable first.* Do not allow the positive power cable to short to ground.
- If the ground under or around the trailer is damp or wet, move the trailer to a dry location and allow it to dry before servicing.
- Do not service the solar trailer if your clothing or skin is wet.
- Keep the trailer and all its components clean.

2.7 California Proposition 65

⚠ WARNING

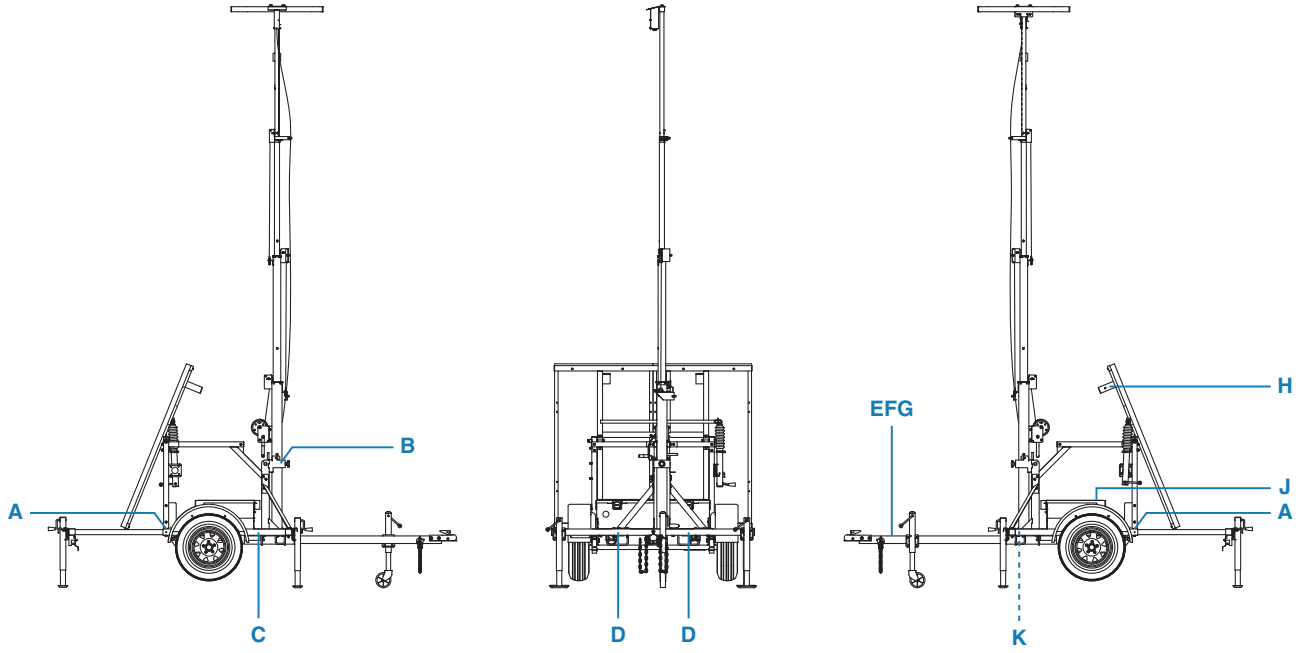
Batteries and battery components can expose you to lead and lead compounds, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

**Removing the positive cable first is a requirement for negative-ground systems.*

2.8 Labels

Labels provide instructions and information. They also warn of hazards. For convenience and safety, keep all labels in legible condition, replacing them when damaged or missing. Replacement labels are available from the factory.

Figure 2-3. Label locations



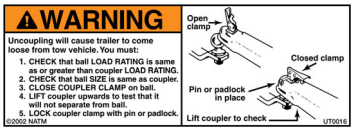
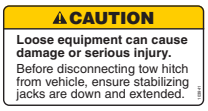
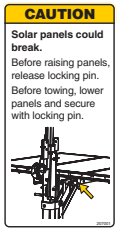
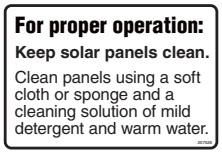
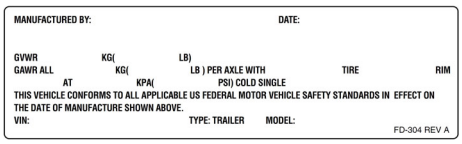
Label locations may vary by solar trailer model

Table 2-1. Label samples and descriptions

Ref.*	Label (not to scale)	Description
A	⚠ CAUTION Loose equipment can be damaged and could cause severe injury. Ensure locking pin is fully engaged and fastened.	Caution: engage locking pin
B	CAUTION Prevent transport damage. Before towing, ensure tower and solar panels are down. Secure with locking pins and rotation-lock knob.	Caution: secure solar and tower
C	M10–1.50 STUD	Electrical ground
D	FORK LIFT	Fork lift
E	CAUTION Solar panels could break during transport. Before towing, ensure solar panels are down and secured with locking pin.	Caution: secure solar panels

**Reference Figure 2-3 for label location.*

Table 2-1. Label samples and descriptions *continued*

Ref.*	Label (not to scale)	Description
F		Warning: towing connection
G		Caution: extend stabilizing jacks
H		Caution: solar panels locking pin
J		Keep solar panels clean
K		Vehicle identification tag

**Reference Figure 2-3 for label location.*

3 Assembly

3.1 Using a forklift

Before using a forklift to move the solar trailer, see Section 2.3, “Forklift safety,” page 6.

3.2 Drawbar

Before using the trailer for the first time, it might be necessary to install the drawbar.

3.2.1 Removable drawbar

Some solar trailer models have a removable drawbar, which may be removed before shipment from the factory.

To install the drawbar, follow these steps:

1. The drawbar includes wiring for the trailer lights. Before installing the drawbar, ensure the wiring cable and harness are hanging out of the drawbar, as indicated in Figure 3-1.
2. Refer to Figure 3-2 and install the drawbar and wiring:
   a. Ensure the front leveling jacks are down and locked, and firmly seated on the ground.
   b. Locate the receiving sleeve, centered under the trailer frame.
   c. Carefully insert the wiring and harness into the sleeve, followed by the drawbar.
   d. Align the holes in the sleeve and drawbar.
   e. Attach the drawbar to the trailer with two sets of bolts, washers, and nuts. Tighten the nuts fully.
   f. Connect the wiring harness to the receptacle under the trailer frame. Before towing, ensure the trailer brake lights, taillights, and directional/turn indicators are functioning properly.

Figure 3-1. Wiring and harness

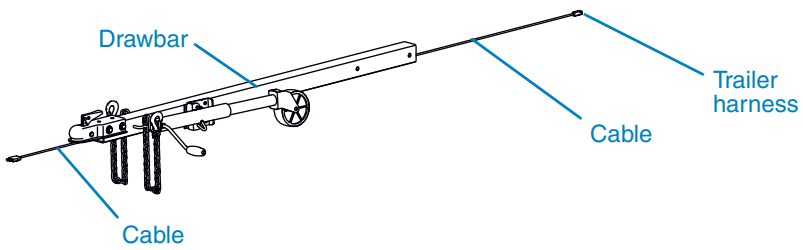
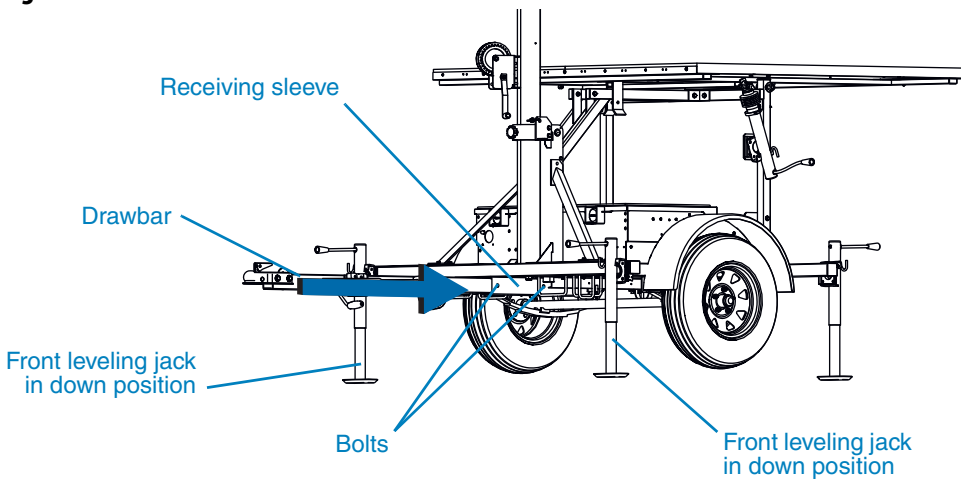


Figure 3-2. Drawbar installation



3.2.2 Folding drawbar

Some solar trailer models include a folding drawbar, which may be folded up before shipment from the factory. For towing and transport, the drawbar must be lowered so that it is horizontal, parallel with the ground.

To lower the drawbar down to the horizontal position, refer to Figure 3-3 and follow these steps:

1. Remove the cotter pin from the locking pin located in the bracket in front of the drawbar.

⚠ WARNING

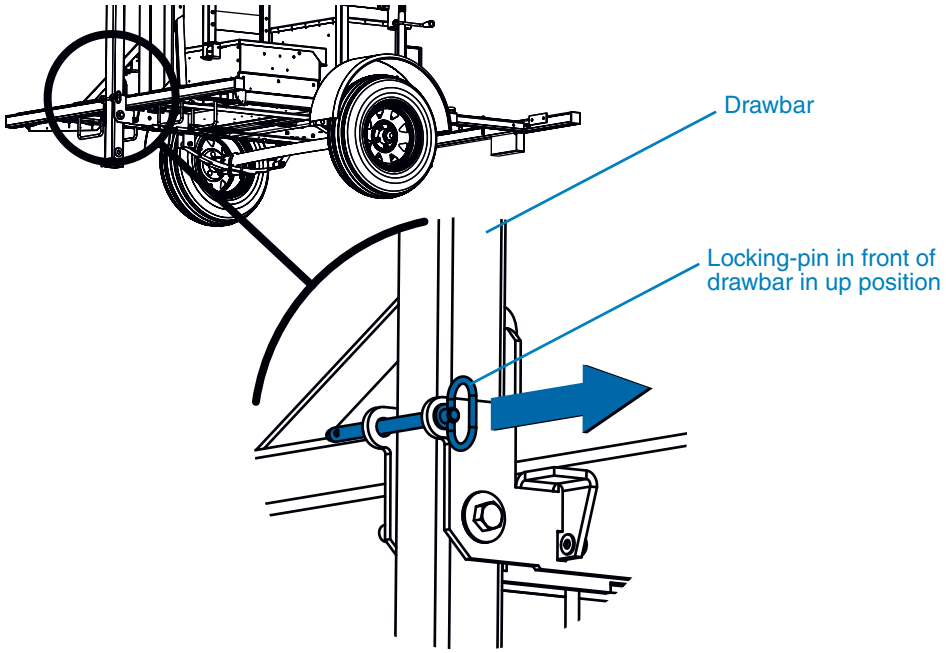
Falling equipment could cause severe injury or death.

When removing the drawbar locking pin, hold onto the drawbar so that it cannot fall.

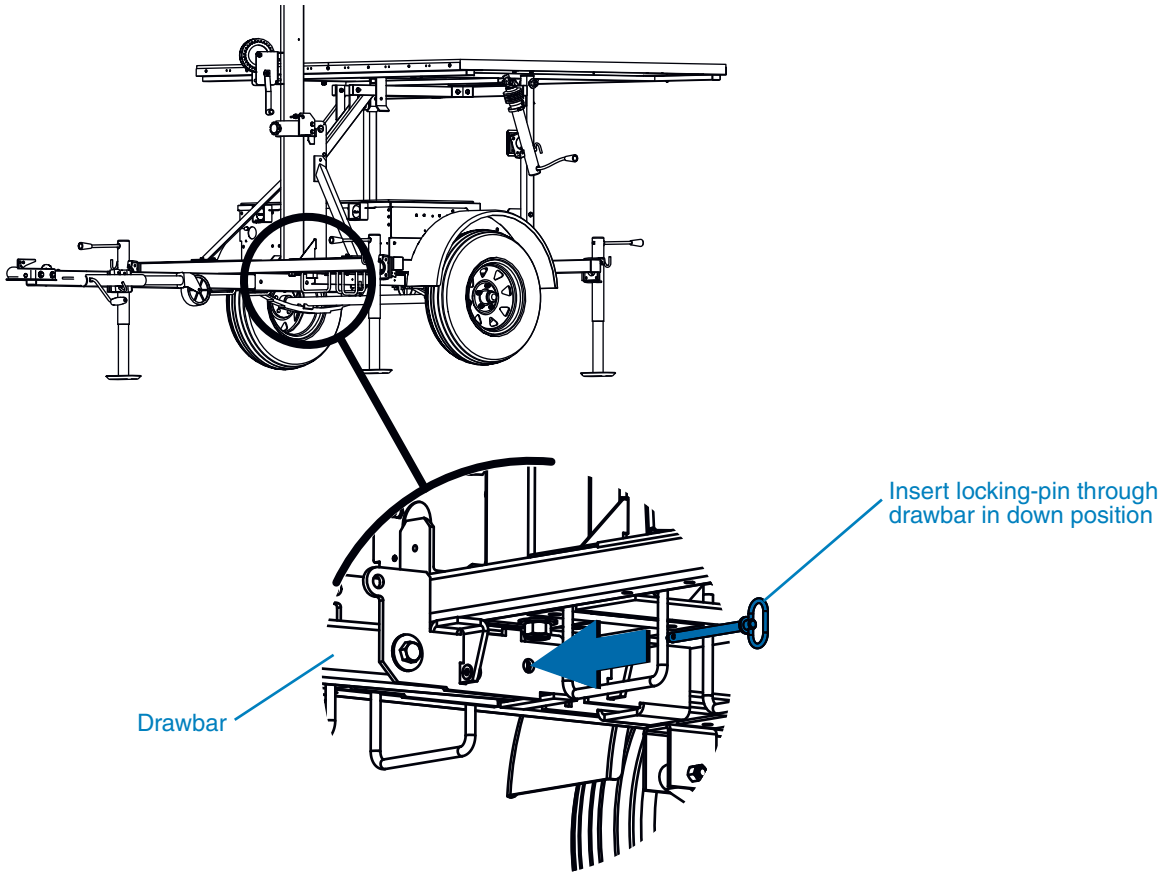
2. While holding onto the drawbar to keep it from falling, carefully remove the locking pin from in front of the drawbar, and then carefully lower the drawbar by hand into the horizontal position.
3. Insert the locking pin through the bracket and drawbar under the trailer, then reinsert the cotter pin through the locking pin. Ensure the cotter pin is well and properly seated.

Figure 3-3. Folding drawbar locking-pin

Drawbar folded up in vertical position



Drawbar folded down in horizontal position



4 Operation

4.1 Overview

A typical deployment of the Wanco Solar Power Trailer includes the following steps:

1. Towing the trailer to its destination (Section 4.3)
2. Deploying the trailer:
   a. Locating and positioning the trailer (Section 4.4.1, page 25)
   b. Leveling the trailer (Section 4.4.2, page 26)
   c. Determining grounding requirements (Section 4.4.3, page 28)
   d. Raising the mast (Section 4.4.4, page 29)
   e. Deploying the solar array (Section 4.4.5, page 31)
3. Using the control panel to operate the trailer (Section 4.5, page 35)

4.2 Safety

Before operating your solar trailer, read and follow all safety instructions (see Section 2, page 5).

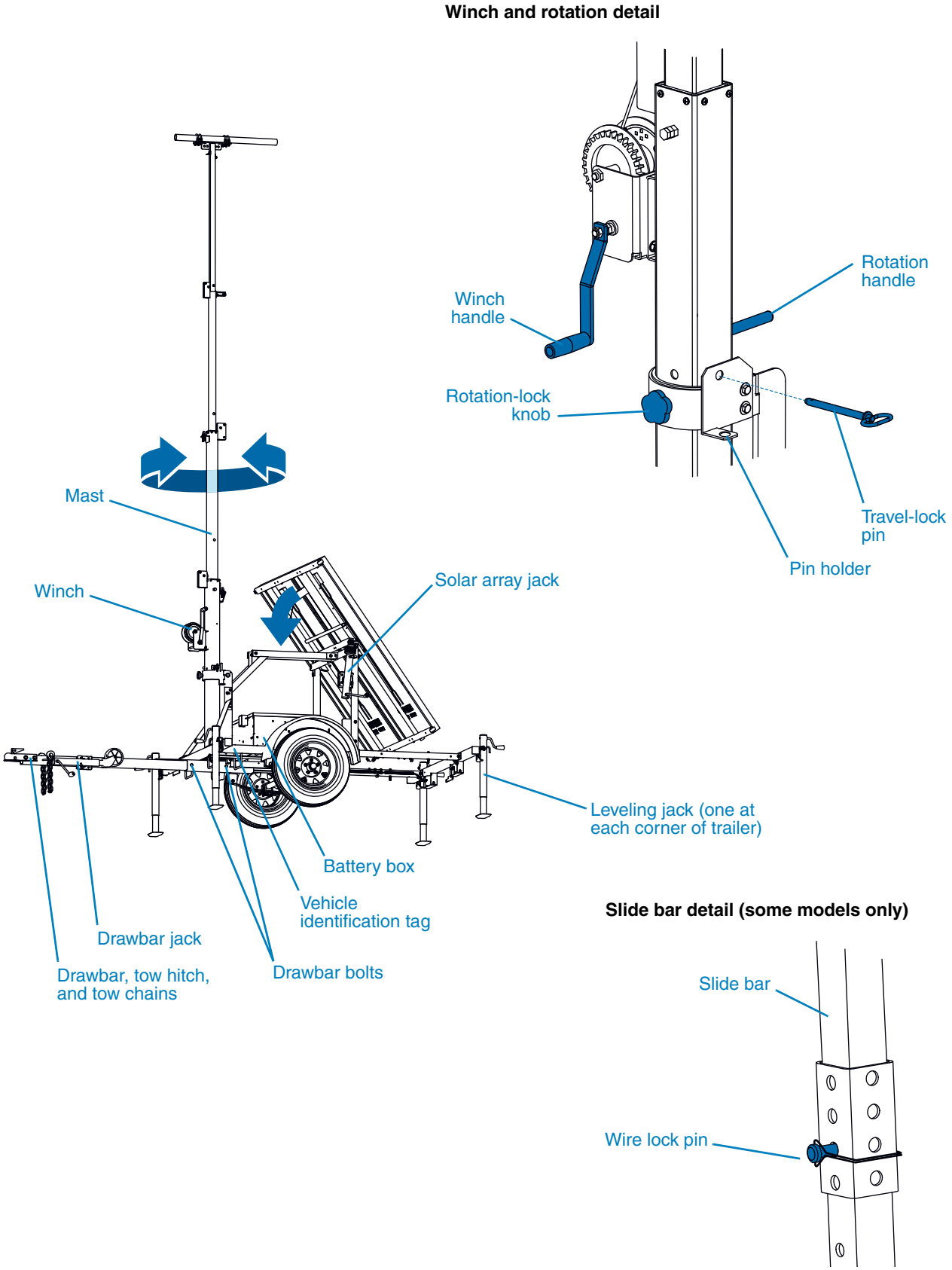
4.3 Towing

4.3.1 Before towing

Before towing, refer to Figure 4-1 and prepare the solar trailer as follows:

1. Access the control panel and shut off all power to devices.
2. If towing the solar trailer to a work site prior to using it, ensure the batteries are fully charged. See Section 5.2.4, page 40.
3. To protect batteries from theft, the battery box lid is either secured with two heavy-duty locks (included) or it is bolted in place.
   - If the lid is hinged and has locks, close and lock the lid.
   - If the lid has no hinges or locks, ensure all bolts are in place and fully tightened.

Figure 4-1. Before towing



4. The solar panel array must be all the way down (horizontal) before towing. If the array is tilted upward:

   a. Ensure the winch on the mast is not obstructing the solar panels from being lowered. If necessary, rotate the mast (see Step 9) before lowering the solar array.

   b. If the trailer has slide bars holding the solar array in place, one on either side of the trailer, unlock each bar by removing the wire lock pin that is holding it in place. If necessary, gently jiggle the array by hand in order to pull the pin.

   c. Use the solar array jack to lower the array until it is all the way down. If the array has power-operated tilt jacks, use the solar-array-tilt switch located on the control panel.

5. Lock the solar array in the horizontal (travel) position using the wire lock pin (or pins, if the trailer has more than one). For pin locations, see Figure 4-2.

6. For transport and storage, the solar array may have hinged side panels that fold down and a rear panel that slides under the large panels.

■ If the solar array has hinged side panels, refer to Figure 4-3 and follow these steps:

   a. While holding the left or right side panel with one hand, use your other hand to pull the lock-pin handle and release the panel. If the pin does not move, gently pull downward on the solar panel while pulling the pin.

   b. Pivot the panel downward on its hinges. Although the panel is supported by pneumatic cylinders, you should use care not to let the panel fall and break.

   c. When the panel is all the way down, release the spring-loaded pin and ensure it engages to lock the panel in place. When the pin is fully engaged, the panel cannot be raised.

Figure 4-2. Wire lock pin

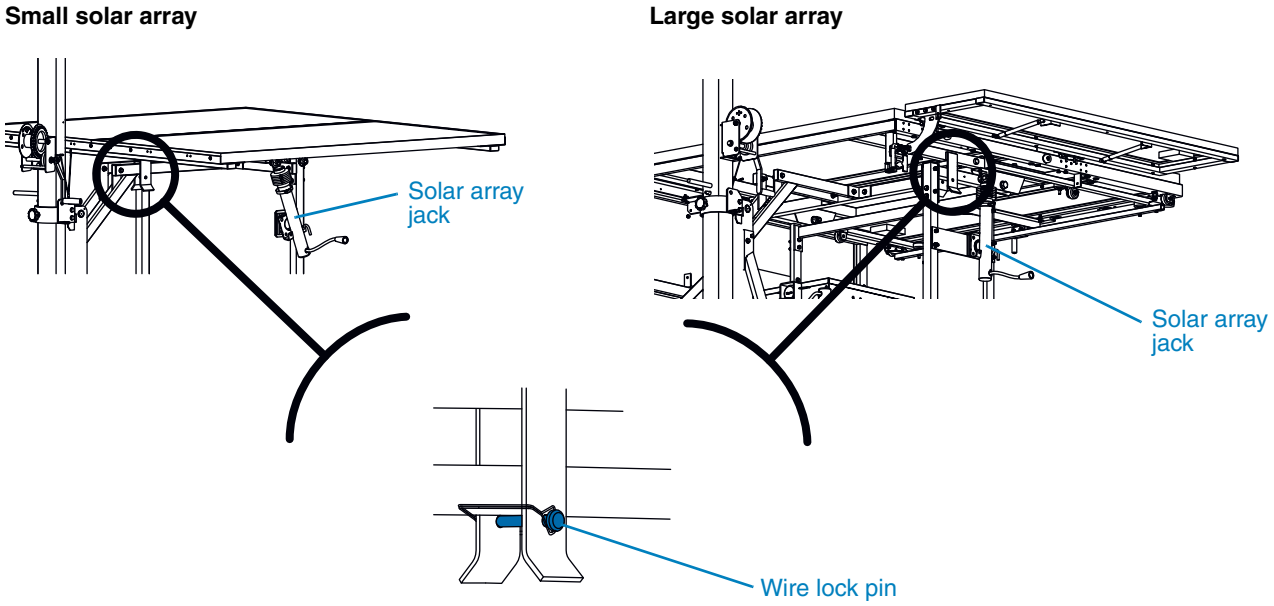
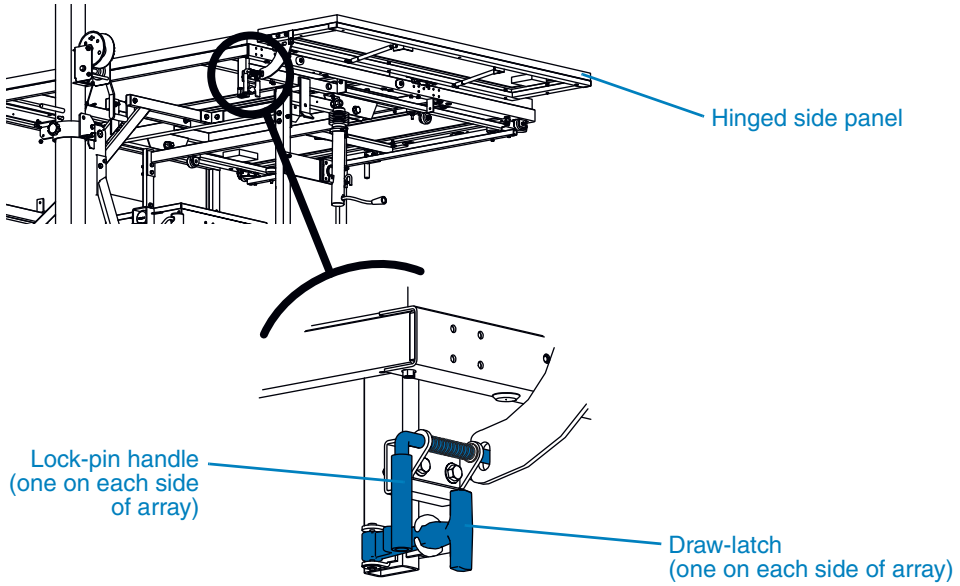


Figure 4-3. Side panel lock-pin and draw-latch



d. Use the rubber draw-latch to secure the panel. Without the draw-latch secured, the solar panel may unexpectedly come free during transport and rise up into the deployed position. Ensure the draw-latch is fully engaged.

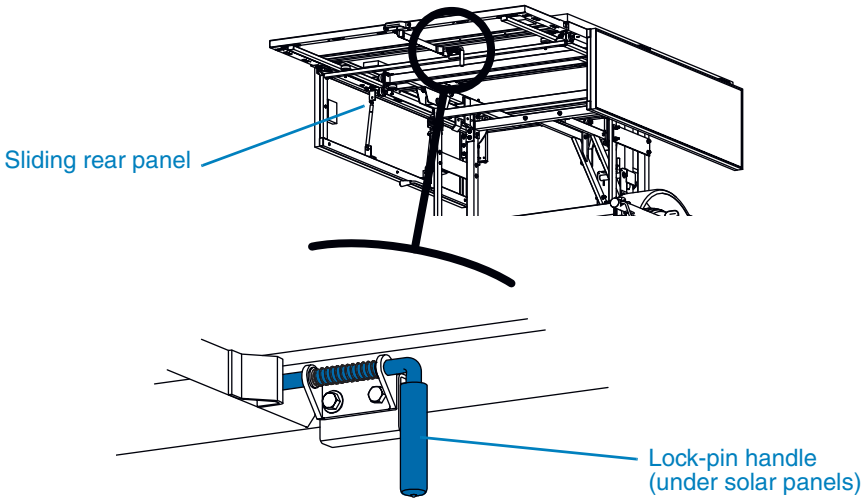
e. Repeat the procedure for the other side panel.

- If the solar array has a sliding rear panel:

f. Pull the lock-pin handle at the rear of the trailer (see Figure 4-4) and push the rear solar panel forward, under the large panels, toward the front of the trailer.

g. Keep pushing the rear panel until it stops. A loud "click" sound indicates the spring-loaded locking-pin has reengaged. When the pin is engaged, the rear panel cannot be pulled out toward the rear of the trailer.

Figure 4-4. Rear panel lock-pin



7. Some solar trailer models require the rear frame to be telescoped into the trailer before transporting the trailer. To telescope the rear frame, refer to Figure 4-5 and follow these steps:

    a. Ensure the front leveling jacks are down and firmly on the ground. To lower a jack, pull the jack locking pin and rotate the jack downward. Release the pin and continue rotating the jack until it is vertical. When the jack is properly set, the locking pin snaps into position with an audible "click." Turn the jack handle to extend the jack foot downward until it rests firmly on the ground.

    b. Ensure the rear corner leveling jacks are in the up position and secured with their locking pins. To raise a jack, use the hand-crank on the jack to raise its foot off the ground, then pull the jack locking pin and rotate the jack upward. Release the pin and continue rotating the jack until it is horizontal and the pin reengages with an audible "click."

    c. Remove the wire lock pins that hold the rear frame in place, one pin on each side of the trailer.

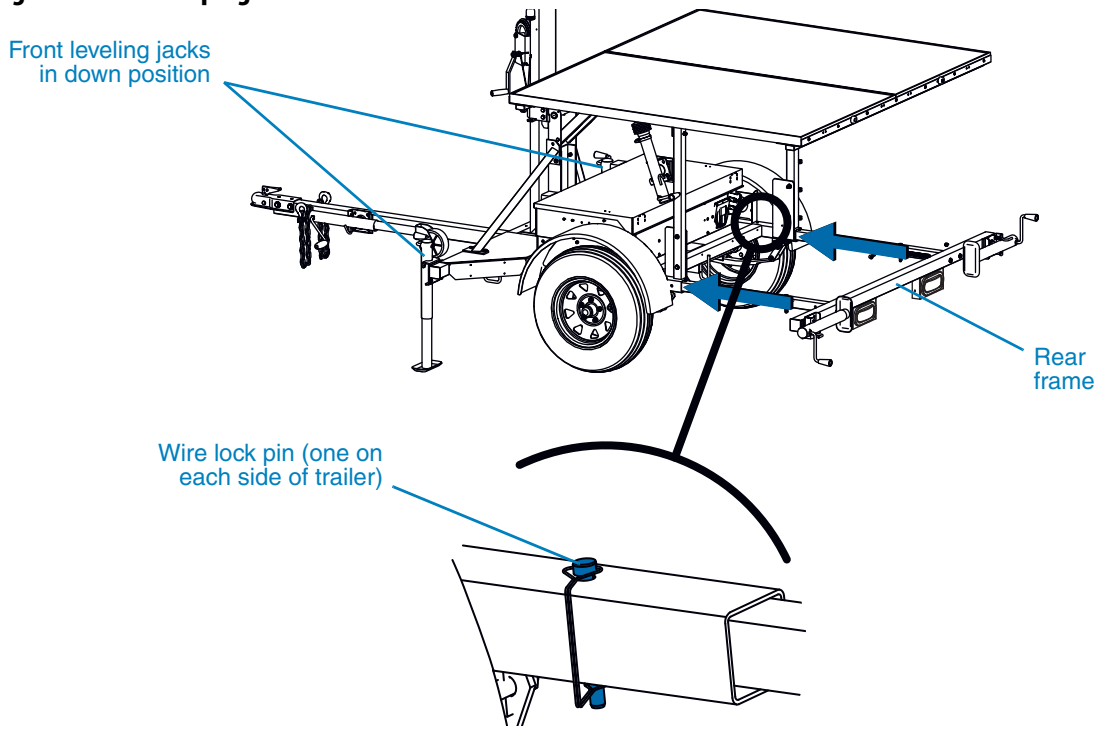
    d. If the trailer has taillights mounted on the rear frame, remove the straps that hold the taillight wiring to the frame.

    e. Push the rear frame into the trailer all the way, then adjust its position until the holes in the rear frame align with the holes in the trailer frame.

    f. Secure the frame in place by inserting the wire lock pins through the holes and locking the pins in place.

    g. If the trailer taillights are mounted on the rear frame, secure the loose taillight wiring using the straps you removed in Step 7d.

Figure 4-5. Telescoping the rear frame



8. Lower the solar trailer mast using the hand-operated or power winch. If the hand-operated-winch handle is obstructed, it might be necessary to rotate the mast (see Step 9) before using the winch.
9. Position the mast in the travel position:
    a. Loosen the rotation-lock knob (or knobs, if the mast has more than one), then use the rotation handle to rotate the mast into the travel position.
    - In the travel position, the crossbar at the top of the mast (if equipped) is parallel to the trailer tires.
    - With the mast properly oriented in the travel position, holes in the frame and mast line up so that the travel-lock pin can be inserted, which locks the mast in place.

    b. With the mast properly aligned, insert the pin into the hole through the frame and mast, then lock it in place with the attached cotter pin.
    c. Tighten the rotation-lock knob (or knobs).
10. If the trailer is connected to earth ground, disconnect it.
11. Check the drawbar, tow hitch, and safety chains:
    a. If the trailer has a removable drawbar, ensure the drawbar is attached securely to the trailer frame with two sets of bolts and nuts (see Section 3.2.1, page 13). The bolts should engage the drawbar and the nuts should be tight.
    b. If the trailer has a folding drawbar and the drawbar is up, lower it into the horizontal position using the procedure in Section 3.2.2, page 14. Ensure the drawbar is properly secured in the horizontal position.
    c. Ensure the tow hitch and coupling on the tow vehicle are rated for weight equal to or greater than the solar trailer's gross vehicle weight rating (GVWR). The GVWR is listed on the vehicle identification tag.
    d. Ensure the tow hitch on the trailer and the tow vehicle are compatible.
    e. Inspect the tow hitch and coupling for wear and damage. Replace or repair if necessary.
    f. Lower the drawbar jack into the down position by pulling the jack locking pin and rotating the jack downward. Release the pin and continue rotating the jack until it is vertical. When the jack is properly set, the locking pin snaps into position with an audible "click." Use the hand-crank on the jack to lower the wheel to the ground.
    g. Verify the four corner leveling jacks are in the up position and secured with their locking pins. To raise the leveling jacks, use the hand-crank on each jack to raise the jack foot off the ground, then pull the jack locking pin and rotate the jack upward. Release the pin and continue rotating the jack until it is horizontal and the pin reengages with an audible "click."
    h. Use the drawbar jack to raise the front of the trailer and set the drawbar hitch on the tow vehicle hitch. Ensure the coupling is properly engaged and locked.

i. Ensure the drawbar is within five degrees (±5°) of parallel with the ground. A greater angle will change the tongue weight and may cause the trailer to whip or sway while towing.

j. Raise, rotate, and lock the drawbar jack in the up position.

k. Verify approved safety chains are attached properly to both the trailer and tow vehicle, as illustrated in Figure 4-6.

12. Check tires, wheels, and axle lock:

    a. Check tires for wear. Replace worn tires.

    b. Ensure tires are inflated to the proper pressure.

    c. Verify all wheel lugs are in place and tightened. Do not tow the trailer if a wheel lug is missing.

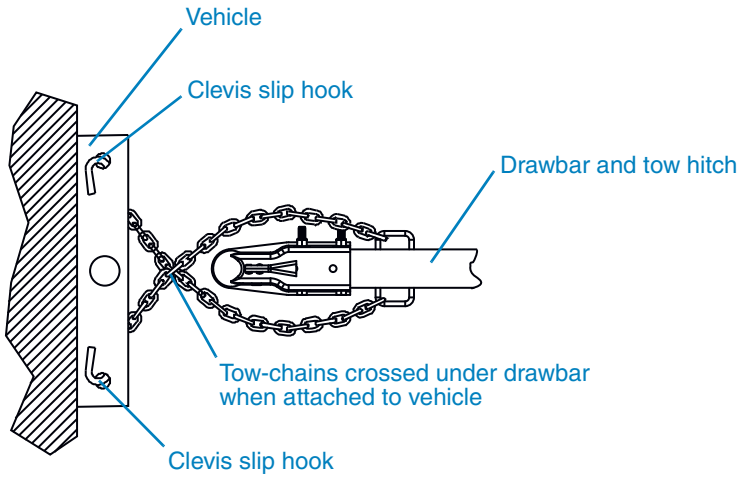
    d. If the optional wheel-lock bar is installed, remove it from the wheels and place it in the holder brackets on top of the rear frame.

    e. Remove blocks or chocks from wheels, if present.

13. Ensure the trailer brake lights, taillights, and directional (turn) indicators are hooked up and functioning properly.

14. Follow the towing requirements in Section 4.3.2.

Figure 4-6. Tow-chain hook-up



4.3.2 During towing

- Do not tow the trailer with any people, parts, supplies, or additional equipment attached to the trailer or loaded onto it.
- Do not tow additional trailers or other equipment in tandem with the solar trailer.
- The recommended maximum speed for highway towing is 65 mph (105 km/h). For off-road towing, the recommended maximum speed is 15 mph (25 km/h) or less, depending on terrain.
- Adhere to applicable transportation department regulations when towing the trailer.
- If whipping or swaying occurs, do not attempt to correct it by turning the steering wheel, do not apply the brakes, and DO NOT speed up. Instead, release the gas pedal and hold the steering wheel in a straight-ahead position until the whipping or swaying stops. Whipping and swaying can be caused by excessive speed, crosswinds, and many other conditions.

4.3.3 After towing

- After towing, unhook the tow chains from the tow vehicle, then use the drawbar-mounted jack to raise the drawbar and release the drawbar hitch from the tow vehicle. Pull the vehicle away from the trailer when ready.
- If the trailer has a removable drawbar, the drawbar may be detached from the trailer if desired:
  - Before removing the drawbar, level the trailer as instructed in Section 4.4.2, page 26.
  - To remove the drawbar, loosen and remove the two bolts that connect it to the trailer, then remove the drawbar by sliding it out of the trailer frame.
  - To prevent the nuts, washers, and bolts from becoming lost, insert the bolts into the holes on the trailer and the washers, and secure them in place with the nuts.
- If the trailer has a folding drawbar, the drawbar may be folded upward into the vertical position if desired:
  - Before folding up the drawbar, level the trailer as instructed in Section 4.4.2, page 26.
  - To fold up the drawbar, raise, rotate, and lock the drawbar jack so it is parallel to the drawbar, then reverse the procedure described in Section 3.2.2, page 14.

4.4 Deployment

4.4.1 Locating and positioning the trailer

⚠ DANGER

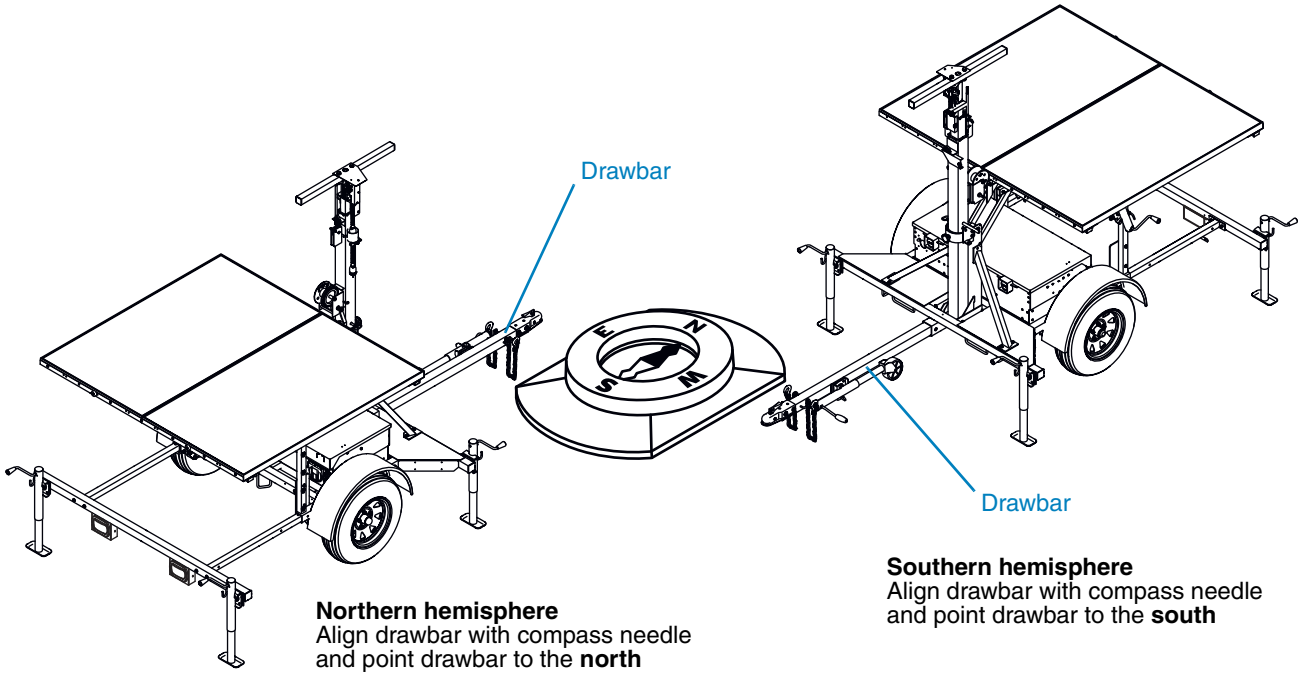
Electric shock hazard.

Contact with overhead electrical power lines will cause serious injury or death.

Do not position solar trailer under power lines.

- When deployed, the solar trailer mast rises to a height of about 20 or 30 feet (6 or 9 meters), depending on the trailer model and devices installed on the mast. When choosing a location, ensure the area above the trailer is clear of overhead wires and other obstructions.
- To reduce the risk of personal injury, ensure the surrounding area is in good order and free of debris.
- To reduce the risk of shifting, rolling, or overturning, locate the solar trailer on a firm, level surface.
- If the trailer has an extendable rear frame, ensure there is enough space to deploy it. Some solar trailer models do not have an extendable rear frame.
- If necessary, ensure convenient access to earth ground. See Section 4.4.3, page 28
- For the solar trailer's solar charging system to function properly, locate the trailer where it will be exposed to full sunlight during daylight hours. Do not locate the trailer where the sun will be obstructed, such as under a tree or in the shadow of a building.
- Angle the trailer so that its solar panels face the sun: use the compass (included) to point the drawbar north in the northern hemisphere or south in the southern hemisphere. See Figure 4-7.
  - ☐ To avoid interference, hold the compass well away from any steel. While using the compass, do not put it on the drawbar or set it anywhere on the trailer.
  - ☐ The solar trailer mast rotates so the devices installed on it can face any direction, independent of the trailer's position.

Figure 4-7. Using the compass to position the trailer



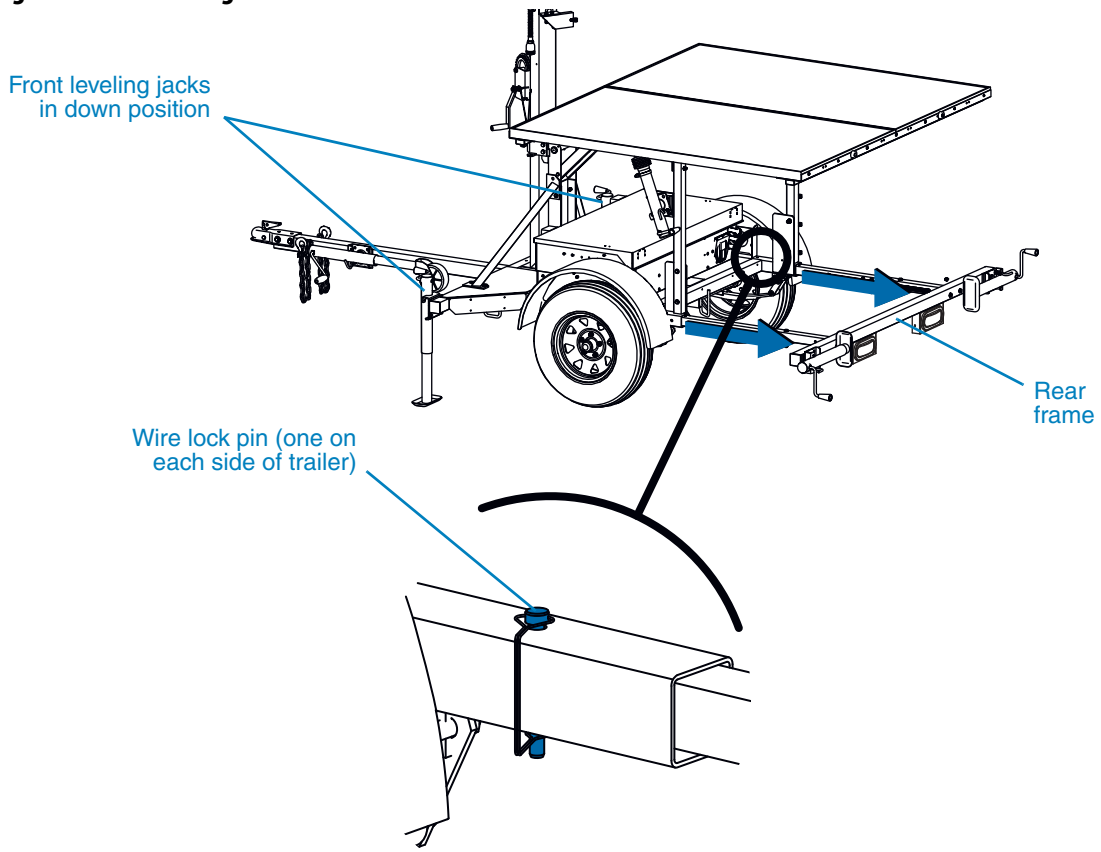
4.4.2 Leveling the trailer

Prior to raising the solar trailer mast, the trailer must be level for increased stability.

To level the trailer, follow these steps:

1. To ensure the solar trailer does not move while you are leveling it, block or chock the trailer wheels.
2. Some solar trailer models require the rear frame to be extended before using the solar trailer. Refer to Figure 4-8 and extend the rear frame as follows:
   a. Ensure the front corner leveling jacks are in the down position and are firmly on the ground, the rear corner jacks are up, and all are secured with their locking pins.
   b. Remove the wire lock pins that hold the rear frame in place, one pin on each side of the trailer.
   c. If the trailer has taillights mounted on the rear frame, remove the straps that hold the taillight wiring to the frame.
   d. Pull the rear frame away from the trailer until the second set of holes appear. If the trailer taillights are mounted on the rear frame, use care not to extend it too far, but just far enough so the taillight wiring is drawn out and not under tension. If you pull the frame too far or too hard, the taillight wiring might be damaged.
   e. Align the holes in the rear frame align with the holes in the trailer frame, then secure the frame in place by inserting the wire lock pins through the holes.
   f. Lock the wire pins in place.
   g. If the trailer taillights are mounted on the rear frame, secure the loose taillight wiring on both sides of the rear frame using the straps you removed in Step 2c.

Figure 4-8. Extending the rear frame



3. Refer to Figure 4-9 and use the jacks to level the trailer as follows:

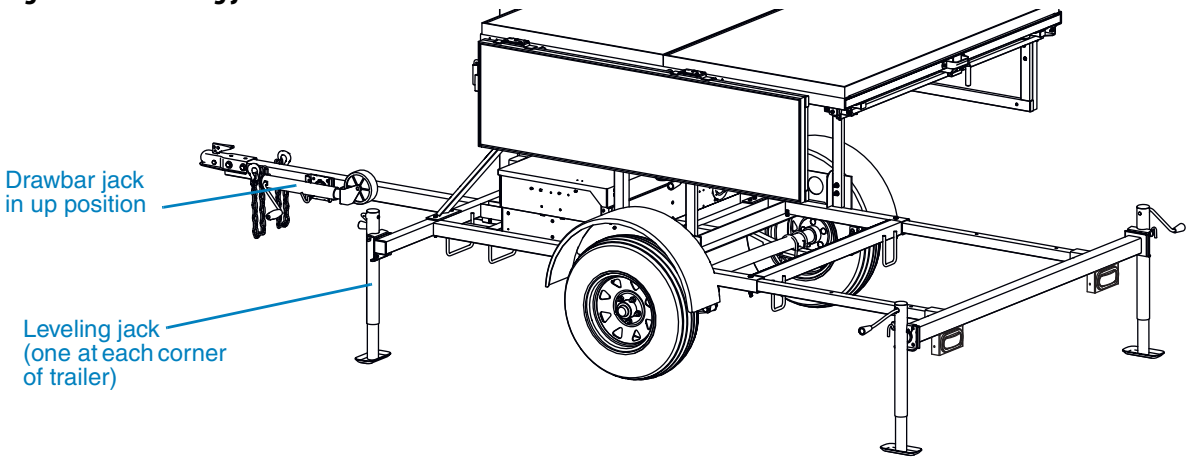
   a. Ensure the leveling jacks at the front corners of the trailer are down, firmly on the ground, and secured in place with their locking pins.

   b. Ensure the drawbar jack is in the up position and secured with its locking pin. The drawbar jack wheel should not be touching the ground.

   c. Determine which corner of the trailer is highest, and turn the jack handle to extend the jack foot on that corner downward until it rests firmly on the ground. Then, level the trailer with the remaining three corner jacks.

4. If desired, use the optional wheel-lock bar and a padlock to secure the trailer. With the lock bar inserted through the wheels and trailer frame, the trailer cannot be moved. The wheel-lock bar might not be included with your solar trailer.

Figure 4-9. Leveling jacks



4.4.3 Grounding the trailer

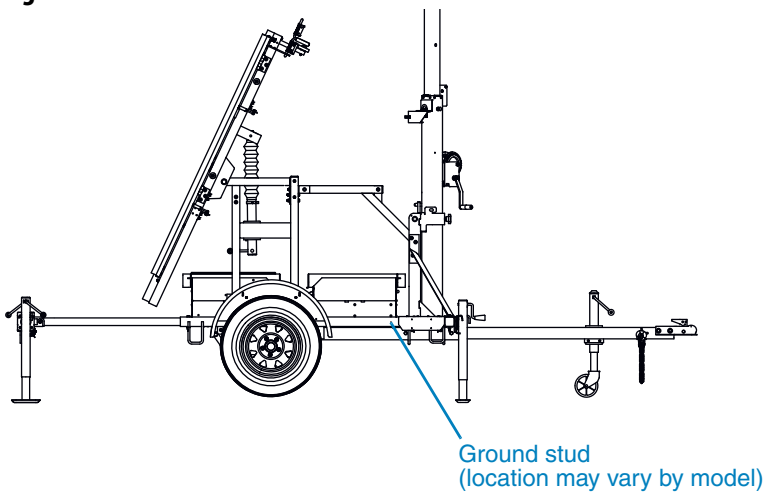
The solar trailer is a negative-ground system.

The trailer includes a ground stud (see Figure 4-10) for electrically grounding the trailer when necessary to comply with the National Electrical Code (NEC) and other regulations. Depending on the trailer model, the ground stud location may vary.

For grounding and bonding requirements that apply to your deployment of the Wanco Solar Power Trailer, consult a qualified electrician or refer to applicable regulations. Agencies and organizations that regulate electrical compliance may include, but are not limited to:

- Your local authority having jurisdiction (AHJ)
- National Fire Protection Association (NFPA), which publishes the NEC
- U.S. Occupational Safety and Health Administration (OSHA)
- U.S. Mine Safety and Health Administration (MSHA)

Figure 4-10. Ground stud



4.4.4 Raising the mast

After positioning the trailer (Section 4.4.1) and leveling the trailer (Section 4.4.2), adjust installed devices if necessary and then raise the mast by referring to Figure 4-11 and following these steps:

1. Connect, adjust, and position (as needed) any devices that are installed on the mast.
2. Rotate the mast:
   a. If the travel-lock pin is secured with a padlock, zip tie, or similar means, disengage it from the travel-lock pin.
   b. Disengage the travel-lock pin from the mast by removing the cotter pin that holds it in place, then pulling the pin sideways, out of the holes in the mast and trailer frame. Store the pin vertically in the pin holder next to the mast.
   c. Loosen the rotation-lock knob (or knobs, if the mast has more than one), then use the rotation handle to rotate the mast and attached devices to the desired position. Ensure that any devices installed on the mast do not strike the solar panels. For a hand-operated winch, ensure the winch handle does not strike the solar panels.
3. Tighten the rotation-lock knob(s).
4. Raise the mast using the hand-operated winch or the power winch switch on the control panel.

⚠ DANGER

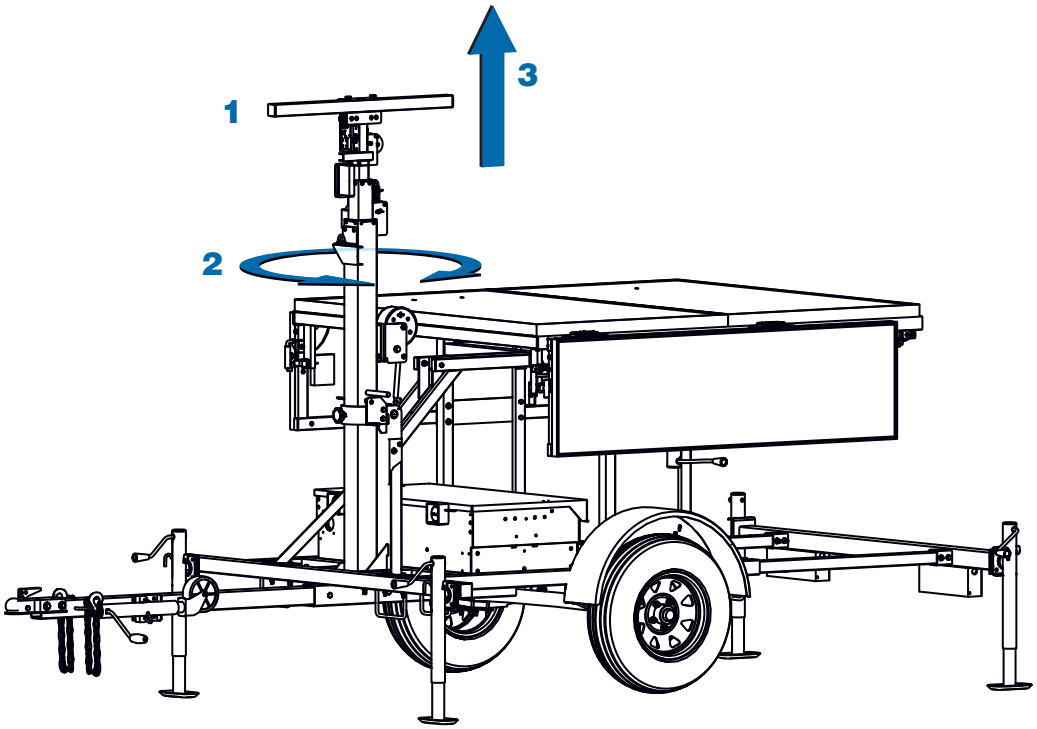
Electric shock hazard.

Contact with overhead electrical power lines will cause serious injury or death.

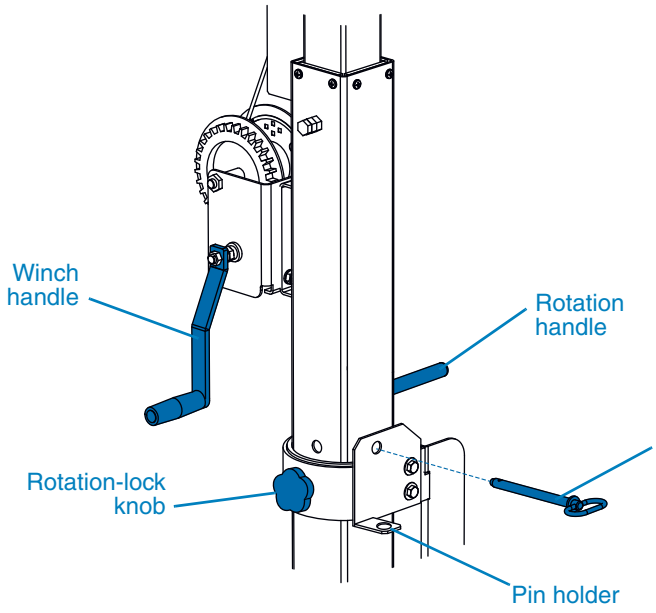
Do not raise the mast when it is near or under overhead power lines.

5. Adjust the mast rotation as needed.

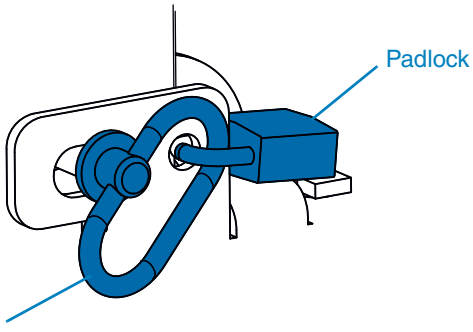
Figure 4-11. Raising and rotating the solar trailer mast



Hand-operated winch and rotation detail



Small and medium trailers only



4.4.5 Deploying the solar array

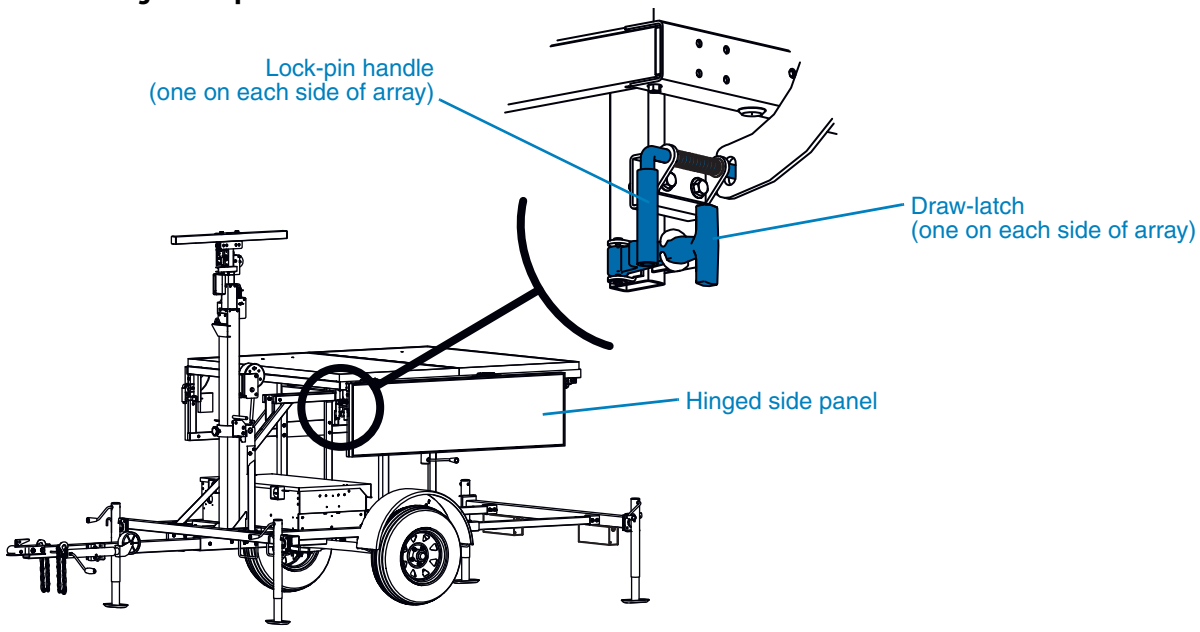
The solar array may have hinged side panels that fold down and a rear panel that slides under the large panels when stored. For deployment, this type of solar array should be fully expanded. Additionally, for optimal solar charging, the entire array may be tilted for greater sun exposure.

For an overview of the solar charging system, see Section 5.2, page 38.

After positioning the trailer (Section 4.4.1) and leveling the trailer (Section 4.4.2), deploy the solar array as described below.

1. If the solar array has hinged side panels, refer to Figure 4-12 and follow these steps:
   a. Pull the rubber draw-latch to disengage it. Until the draw-latch is disengaged, the solar panel cannot move.
   b. While holding the left or right side panel with one hand, use your other hand to pull the lock-pin handle and release the panel. If the pin does not move, gently push inward on the solar panel while pulling the pin.
   c. Pivot the panel upward on its hinges. The panel is supported by pneumatic cylinders and may go up by itself; or, depending on the pneumatic pressure, you may need to aid the cylinders by gently pushing the panel upward. Use care not to let the panel fall and break.
   d. When the panel is all the way up, release the spring-loaded pin and ensure it engages to lock the panel in place. When the pin is fully engaged, the panel cannot be lowered.
   e. Repeat the procedure for the other side panel.

Figure 4-12. Hinged side panels



2. If the solar array has a sliding rear panel:

   a. Pull the lock-pin handle at the rear of the trailer (see Figure 4-13) and use the rear-panel handle to pull the rear solar panel out from under the large panels.

   b. Keep pulling the rear panel out until it stops. A loud "click" sound indicates the spring-loaded locking-pin has reengaged. When the pin is engaged, the rear panel cannot be pushed inward, under the large panels.

3. Refer to Figure 4-14 and determine the optimal angle for the solar array:

   - With the sun high in the sky (e.g., at lower latitudes and during summer), the solar panels should be flat.
   - With the sun low in the sky (e.g., at higher latitudes and during winter), the solar panels should be angled toward the sun.
   - Whenever possible, always position the solar panels so the sun's rays are essentially perpendicular to the panels.
   - You can use the interactive display on the solar charge controller for optimizing the angle of the solar array. See Figure 4-15. The solar controller is located inside the control box or, on models with a hinged battery box lid, inside the battery box. For controller display screens and navigation controls, see Appendix A, page 77.

4. If necessary, tilt the solar array:

CAUTION

Tilting the solar array with wire lock pins engaged will damage the solar panels.

Disengage wire lock pins before tilting solar array or using the solar-array-tilt switch.

   a. Release and remove the solar array wire lock pin (see Figure 4-16).

   b. If the solar trailer has slide bars (Figure 4-17), one on either side of the solar array, release and remove the lock-pins holding them in place. If necessary, gently jiggle the array by hand in order to pull the pin.

   c. Ensure the winch and any devices installed on the mast will not obstruct the solar array from tilting upward. If necessary, rotate the mast (see Section 4.4.4, page 29).

   d. Use the solar-array jack (Figure 4-16) to tilt the solar panels. If the array has power-operated tilt jacks, use the solar-array-tilt switch located on the control panel.

   e. If the solar trailer has slide bars, raise the solar array to approximately the desired angle, then adjust the angle so the nearest hole in one of the slide bars aligns with a hole in the pivot bracket (Figure 4-17). Insert the wire lock pin through the holes and lock it in place. If necessary, gently jiggle the array by hand in order to insert the pin. Repeat this step for the second slide bar.

5. Rotate the mast back to the desired position and, if needed, secure the travel-lock pin with a padlock, zip tie, or similar means (small and medium trailers only; see Figure 4-11, page 30).

Figure 4-13. Sliding rear panel

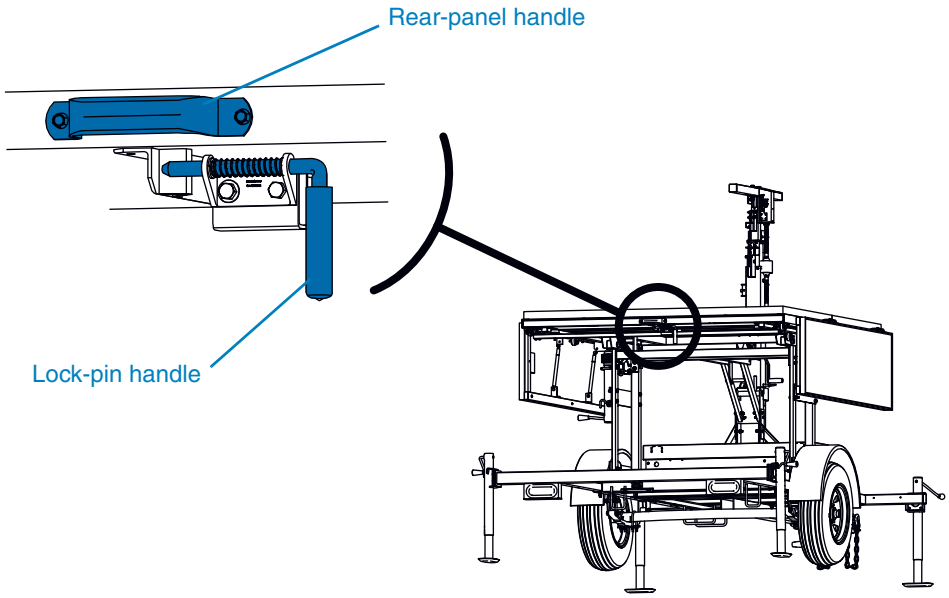


Figure 4-14. Optimal solar panel angle

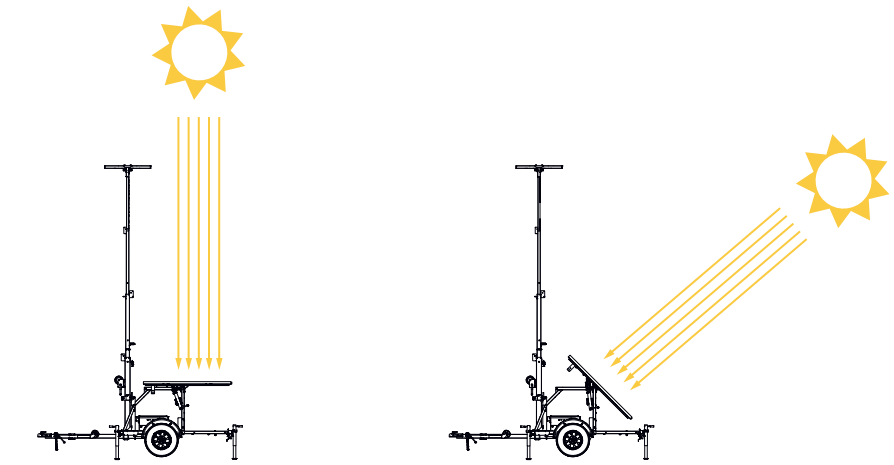


Figure 4-15. Charge value on solar controller display

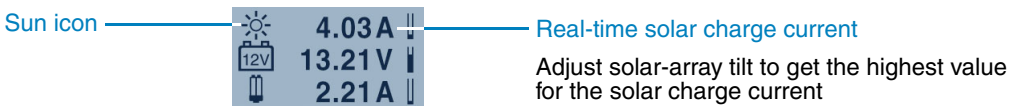


Figure 4-16. Wire lock pin

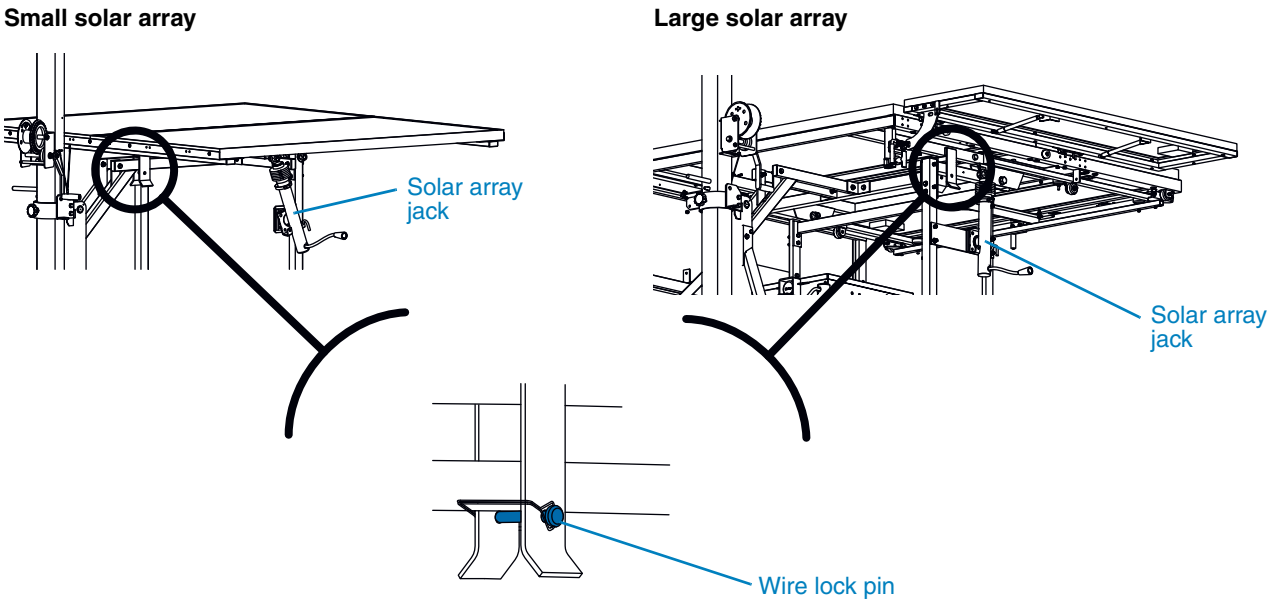
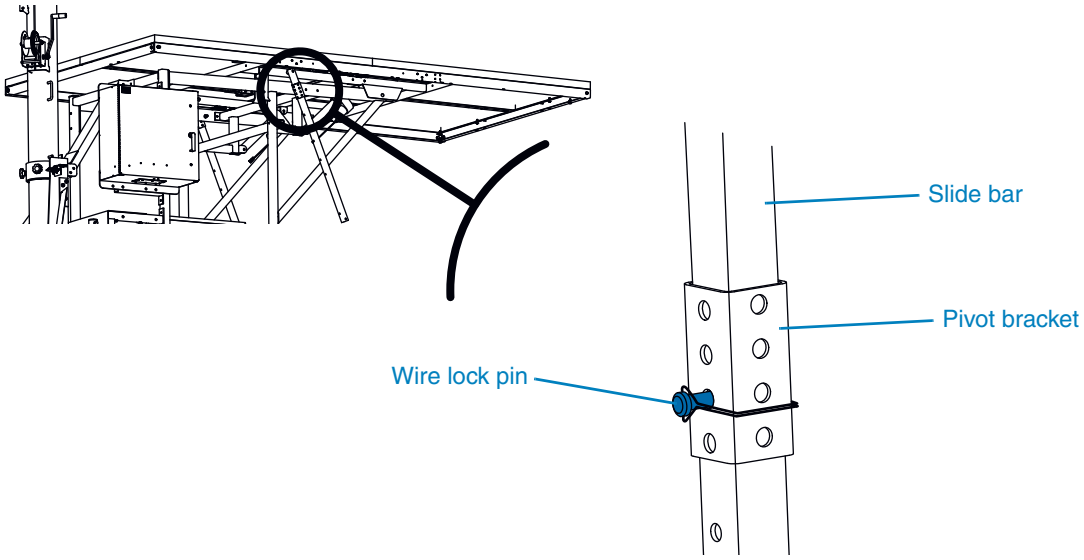


Figure 4-17. Slide bars with lock pins (some models only)



4.5 Control panel

The solar trailer is equipped with an integrated controller that allows you to manage the behavior of electronic devices installed on the trailer. The design, layout, and functions of the controller vary depending on the solar trailer model and installed devices.

The control panel is located inside a weathertight enclosure on the left side of the trailer or inside the battery box.

IMPORTANT!

Control panel features and functions vary depending on the solar trailer model and installed devices. The following sections describe controls that may or may not be included on your trailer's control panel.

4.5.1 Main power switch

Use the main power switch during servicing. When set to off (O), the main power switch disconnects the batteries and solar panels, effectively shutting down all power to the control system and connected devices for servicing and maintenance.

Devices installed on the solar trailer will not function with the main power switch set to off (O). Before using devices on the trailer, ensure the main power switch is set to on (I).

Solar charging is disconnected with the main power switch set to off (O). Ensure the batteries are charged before using devices on the trailer.

4.5.2 Toggle switches

Toggle switches for installed devices allow you to turn the devices on or off.

If the control panel includes a main power switch, and that switch is in the off (O) position, the installed devices controlled by that switch cannot be turned on. For more information, see Section 4.5.1.

Your solar trailer control panel might not include toggle switches for installed devices.

4.5.3 Tower switch

If the solar trailer is equipped with a power-operated winch, the control panel includes a tower switch for raising and lowering the mast (tower).

- Before raising the mast, ensure the travel lock-lock pin is disengaged (see Section 4.4.4, page 29). Trying to raise the mast with the pin engaged will damage the equipment.
- Rotate and hold the switch lever to operate the power winch. Release the lever when the mast is at the desired height.
- When the mast reaches its maximum height, the winch will make a slipping noise, which indicates you should release the switch. No damage to the winch, mast, or switch occurs when you hear this sound.

Your solar trailer control panel might not include a tower switch.

4.5.4 Solar switch

Solar trailer models with 1200 watts of solar power or greater are equipped with a power-operated actuator for tilting the solar array. On these models, the control panel includes a solar-array-tilt switch for raising and lowering the array.

CAUTION

Tilting the solar array with wire lock pins engaged will damage the solar panels.

Disengage wire lock pins before using the solar switch.

- Before tilting the array up or down, ensure all tilt-lock pins are disengaged (see Step 4 on page 32). Tilting the array with a pin engaged will damage the equipment.
- Rotate and hold the switch lever to operate the actuator and tilt the array. Release the lever when the array is at the desired angle.

  Your solar trailer control panel might not include a solar switch.

4.6 Batteries

4.6.1 General battery health

- To ensure battery health, follow these requirements:
  - ☐ Do not allow batteries to fully discharge. To check battery charge using the solar controller, see "Charging" on page 41.
  - ☐ Ensure batteries are fully charged before using the solar trailer.
  - ☐ Check battery voltage once a week, or more often when sunlight is less intense—during winter and in locations that are far from the Equator.
  - ☐ Charge batteries after each period of use
  - ☐ To lengthen battery life and prevent freezing, always keep batteries fully charged.
- To check battery charge, and for charging information, see "Charging" on page 41.
- For an overview of the solar trailer power system, see Section 5.2.1, page 38.

4.6.2 Between deployments

- When storing the solar trailer, do not allow batteries to fully discharge.
- Charge batteries before putting the solar trailer into temporary storage. See "Storing" on page 45.
- Before putting the solar trailer into long-term storage, see Section 5.3, page 45.

5 Maintenance

5.1 Periodic maintenance

When performing any type of service or maintenance on the system, follow all safety instructions in Section 2, page 5.

⚠ CAUTION

During maintenance, adverse weather conditions can cause equipment damage and injury.

Whenever possible, perform maintenance in calm, dry weather.

- Repair or replace worn and damaged components immediately. Never use any equipment that is damaged or in need of repair.
- All components in the battery box will operate more efficiently and have a longer lifespan if they are free of dirt and dust. Keep the interior of the battery box and components inside the battery box clean. Observe battery safety requirements when working on or around batteries. See “Safety” on page 40.
- When necessary, clean the solar panels with a squeegee, soft cloth, or sponge and a cleaning solution of mild detergent and warm water. See Section 5.2.2, page 38.

5.2 Power system

5.2.1 Overview

Devices installed on the solar trailer are powered by batteries, which are charged using an array of solar panels and an automated charging system. The solar charging system runs continuously, keeping the batteries charged.

The solar charge controller automatically detects when the battery bank is fully charged and will not overcharge the batteries (see Section 5.2.3).

Under optimal conditions, the batteries will remain charged and the solar trailer can be used every day without having to use an external charger. The solar charging system's capacity to keep the batteries fully charged is dependent on the power draw of the installed devices, the solar panels' exposure to the sun, and various environmental conditions. If the power draw exceeds the solar yield from the solar panels, then the solar charging system will not be able to keep the batteries charged sufficiently.

If there is not enough sunlight to keep the batteries fully charged, then you will need to charge the batteries using the AC-powered charger, located inside the battery box.

The low-voltage-disconnect circuit detects when the battery charge falls below 22.4 volts DC, and automatically shuts down power. If a shutdown occurs, the load value on the solar controller display is replaced by "LVD" (see "Checking batteries with solar controller" on page 41) and the installed devices will not function until the batteries are charged.

5.2.2 Solar charging

For the solar trailer charging system to function properly, the solar panels must be exposed to full sunlight during daylight hours. The amount of solar charge has a direct effect on power system performance (see Figure 5-1).

If the location where the solar trailer will be used is not a sunny location, the trailer may be moved to a sunny location while it is not in use, so that its batteries will be charged by the solar charging system, then returned to the desired work area when the batteries are fully charged.

Figure 5-1. Solar yield versus energy demand

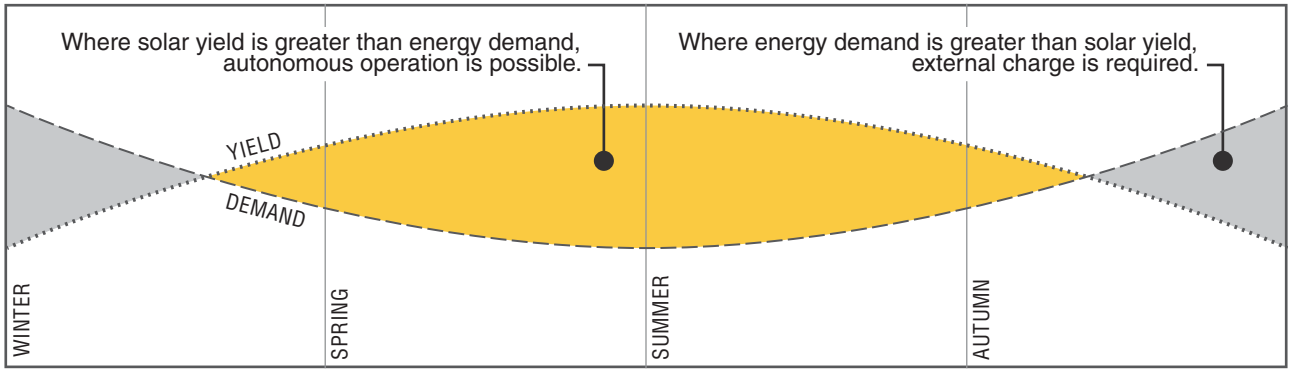


Chart is representative of typical performance but is not accurate for any solar trailer model.

To optimize solar charging:

- Position the trailer so its solar panels face the sun (see Section 4.4.1, page 25).
- Angle the solar panels to obtain the greatest possible sun exposure (see Section 4.4.5, page 31).
- The solar panels must be kept clean and completely unobstructed.
  - When necessary, clean the solar panels with a squeegee, soft cloth, or sponge and a cleaning solution of mild detergent and warm water.
  - If a shadow or any obstruction blocks even a portion of any of the solar panels, charging will be negatively affected and a significantly longer charge time will be necessary.
  - Leave the solar trailer mast raised while charging, to prevent installed devices from casting a shadow on the solar panels.

5.2.3 Solar charge controller

The solar charge system includes a solar charge controller with interactive features. A display screen and navigation buttons on the front of the controller (Figure 5-2) allow you to view real-time charge system data, explore data history, and make adjustments.

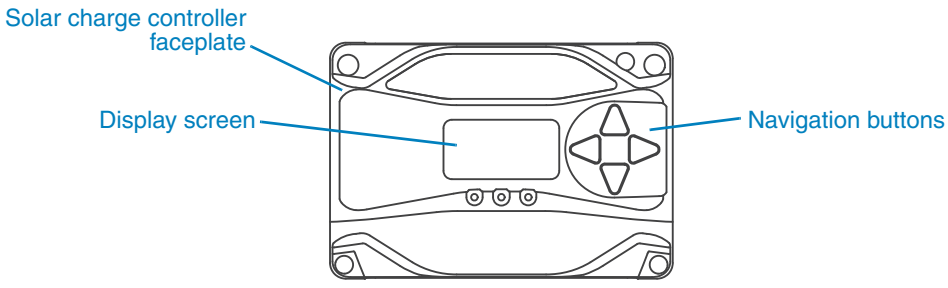
The solar charge controller regulates the power flow from the solar panels to the battery bank. As the batteries approach their charge capacity, the charge controller limits the power flow, preventing damage to the batteries due to overcharging.

On some solar trailer models, the solar charge controller also regulates the load output (power output to equipment installed on the trailer) and can automatically stop the load output if the battery voltage drops below a low-voltage setpoint.

The solar charge controller is located inside the control box or, on models with a hinged battery box lid, inside the battery box.

For an explanation of solar charge controller display screens, menus, and alarms, see Appendix A, page 77.

Figure 5-2. Solar charge controller



5.2.4 Batteries

Although the solar trailer charging system helps maintain battery health by keeping batteries charged when there is sufficient sunlight, and by shutting down power automatically before full discharge, regular maintenance is necessary for the batteries to function properly and for long battery life.

Safety

⚠ DANGER

Explosive gases can cause blindness and severe injury.

When working on or near batteries:

- Wear eye protection
- Prevent sparks and open flames
- No smoking anywhere in the vicinity
- Keep children clear of the area

⚠ DANGER

Sulfuric acid can cause blindness and severe burns.

- Use caution when working on or near batteries
- Avoid contact with skin, face, and eyes
- Upon contact, seek medical help immediately
- Keep out of reach of children

⚠ WARNING

Fire hazard.

When working with the solar trailer batteries, never allow positive wiring to short to ground.

- Even when the batteries are not in operation, self-discharge generates hydrogen gas that can explode. Always store and work on batteries in a well-ventilated area.
- Always wear proper eye, face, and hand protection when working on or near batteries.
- Keep all sparks, flames, and cigarettes away from batteries at all times.
- Never lean over batteries when testing or charging.
- To prevent short circuits and sparks, exercise caution when working with metallic tools or conductors near batteries.
- To reduce the risk of sparks, ensure connectors make good contact with battery terminals.
- Replace cables that you suspect might be worn or damaged. Replace cables that have visible fraying, cracks, or bare wires.

- Always set main power switch to off (**O**) before disconnecting battery cables. See Section 4.5.1, page 35.
- If disconnecting solar trailer battery cables, always disconnect the positive (+) cable first.* Do not allow the positive power cable to short to ground.
- At least once every three months, coat battery cable connections with a protective spray, non-metallic grease, or petroleum jelly (such as Vaseline® brand) to prevent corrosion. Keep battery hold-down brackets painted.
- To lengthen battery life and prevent freezing, always keep the batteries fully charged, and keep cable connections clean and tight.
- Visually inspect batteries for physical damage, including cracks and leaking. Always replace damaged batteries immediately. Dispose of old batteries in accordance with local regulatory codes.
- Keep the battery box lid closed unless you are performing maintenance, charging the batteries, or using controls or devices that are inside the battery box.

Charging

Battery voltage should be checked once a week, to ensure the solar charging system is keeping the batteries charged. Battery voltage should be checked more often when sunlight is less intense—during winter and in locations that are far from the Equator.

For an overview of the solar charging system, see Section 5.2.1, page 38.

Checking batteries with solar controller

The solar charge controller includes an interactive display (see Figure 5-2, page 39).

- If the batteries are charged and charging, the display shows current, voltage, and load. See Figure 5-3.
- If the battery charge is low and the low-voltage-disconnect circuit activates, the load value on the display is replaced by LVDW or LVD. See Figure 5-3.

For solar charge controller display screens and navigation controls, see Appendix A, page 77.

The solar controller is located inside the control box or, on models with a hinged battery box lid, inside the battery box.

Figure 5-3. Battery voltage and low-voltage disconnect

Sun icon	Real-time solar charge current
Battery icon	Real-time battery voltage
Load icon	Real-time load current draw—displays "LVD" for Low Voltage Disconnect and "LVDW" for Low Voltage Disconnect Imminent Warning

**Remove the positive cable because the solar trailer is a negative-ground system.*

Checking batteries with built-in voltmeter

A voltmeter on the front of the battery box or on the control panel provides a quick—though sometimes not completely accurate—indication of the battery charge.

IMPORTANT!

If all installed devices are off and the solar charging system is actively charging, the voltmeter will register a surface charge, which is not an accurate measure of the battery charge.

You should use the voltmeter to check the battery charge when the solar charging system is not active, after sunset and before sunrise, or when one or more installed devices are powered and functioning. This measure will be more representative of the actual charge level.

- To activate the voltmeter, press and hold the button next to the meter.
- The voltmeter will light up when the button is pressed.

If the battery voltage is low:

- One or more batteries may have reached its end of life. Use the AGM battery life-testing procedure below to check all batteries.
- The charging system may not able to fully charge the batteries. Use the AC-powered charger when the batteries need charging. See "Charging batteries with external charger" on page 43.

Life-testing AGM batteries

Because the solar trailer's maintenance-free batteries are sealed, an open-circuit voltage test is the only method for determining the state of charge.

Perform a voltage test as described below using a DC voltmeter or multimeter. For accurate voltage readings, batteries must remain idle for 6 to 24 hours, which allows the voltage to equalize between the battery cells.

1. Observe battery safety precautions (see "Safety" on page 40).
2. Turn off all electrical loads and then charge the entire battery bank for 24 hours using the external AC-powered charger (see "Charging batteries with external charger" on page 43). Follow the next steps immediately after charging.
3. Halt battery charging from the solar panels and then disconnect the black cables from the negative battery terminals, which isolates each battery. Ensure cables are disconnected and terminals are clean.
4. For each battery, use a DC voltmeter or multimeter to measure the DC voltage across the positive and negative battery terminals. Record the voltage, making note of which battery it belongs to. Repeat the procedure until you have recorded the voltages for all batteries in the battery bank.
5. Let the batteries sit idle for 6 to 12 hours, which allows the battery voltage to stabilize.

6. For each battery, use a DC voltmeter or multimeter to measure the DC voltage again. Record the new voltages.
7. For each battery, compare the two voltages you recorded. Each battery's voltage should hold to at least 12.7 volts. If the value for any battery drops significantly, that battery is nearing its end of life.
8. Reconnect battery cables (see Section 5.4, page 46).

Charging batteries with external charger

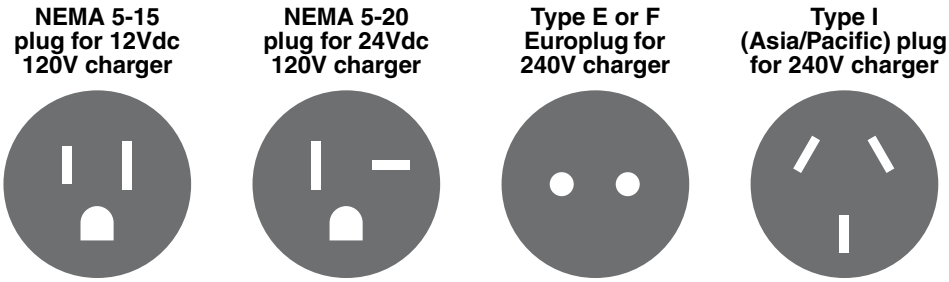
If the battery voltage is low because the solar charging system is not able to fully charge the batteries, use the AC-powered charger (located in the battery box) when the batteries need charging.

The power cord for the charger is accessible behind a latching panel on the back of the battery box. It is not necessary to open the battery box to access the charger.

If necessary, you may connect the charger to an extension cord to reach the nearest commercial-power outlet. Use a contractor-type, heavy-duty extension cable of 12/3 wire. To obtain an extension cable from the factory, contact Wanco customer service (see Section 1.5, "Where to obtain service," page 3).

- Observe battery safety precautions (see "Safety" on page 40).
- Avoid charging batteries at temperatures above 120°F (49°C).
- Never charge a frozen battery. Thaw batteries completely before charging.
- Always charge batteries fully. Undercharging causes stratification.
- Depending on the charger power rating:
  - Connect the standard 120V charger to a standard 120-volt commercial power outlet using an extension cord with a 15-amp NEMA 5-15 plug or 20-amp NEMA 5-20 plug (see Figure 5-4). If the line voltage is lower than 115 volts, the charger may not operate properly. Contact the power utility or an electrician for line testing and correction.
  - Connect the optional 240V charger to a standard 240-volt commercial power outlet using an extension cord with a Type E or F Europlug or Type I plug (see Figure 5-4). If the line voltage is lower than 220 volts, the charger may not operate properly. Contact the power utility or an electrician for line testing and correction.
- The charger is sized to fully recharge the entire battery bank in 12 hours.
- If the charger appears not to be working, the fuse on the charger may be blown, or the power outlet may not be switched on.
- The Wanco battery charger will not overcharge the batteries, even if left unattended for an extended period.

Figure 5-4. Extension cord for battery charger



Cleaning

- Observe battery safety precautions (see "Safety" on page 40).
- Keep batteries clean to avoid accumulation of dust, dirt, and grime.
- To clean batteries, use a solution of 50% baking soda and 50% water.
- Clean battery terminals, particularly if they are warm, hot, or corroded. Scour the terminals and the inside of the cable clamps using a battery post or clamp cleaner, or wire brush, until they have a bright metallic shine.
- At least once a year, visually inspect terminals and cables for signs of corrosion, especially in hot temperatures.

Replacing

Follow these steps to replace a battery:

1. Observe battery safety precautions (see "Safety" on page 40).
2. Set main power switch to off (O) (see Section 4.5.1, page 35).
3. For the battery you are removing:
   a. Disconnect the cable from the positive (+) battery terminal.*
   b. Disconnect the cable from the negative (–) battery terminal.
   c. Remove the battery hold-down straps.
   d. Taking care to prevent injury, lift the battery out of the battery box. A battery is heavy (over 100 pounds or 50 kilograms), and you may need assistance to lift it.
4. Inspect the bottom of the battery box for corrosion and other damage. Clean the bottom of the battery box and any other components in the battery box that need cleaning.
5. Inspect the battery cables for corrosion and damage. Clean or replace the cables as necessary for ensuring a good connection.
6. Install the new battery and secure it with the hold-down brackets. Replace the old battery with a new battery of the same type.

**Remove the positive cable because the solar power trailer is a negative-ground system.*

7. Reconnect wiring, taking care not to over-tighten the cable clamps. For wiring diagrams, see Section 5.4, page 46.
   a. Connect the negative (–) cable to the replacement battery.
   b. Connect the positive (+) cable to the replacement battery.

Storing

- Observe battery safety precautions (see "Safety" on page 40).
- Before storing the solar trailer or batteries:
  - ☐ Clean the batteries as described in "Cleaning" on page 44.
  - ☐ To prevent freezing, ensure all batteries are fully charged.
- Store batteries in a cool, dry, well-ventilated location. The storage temperature should remain as low as possible without dropping below 32°F (0°C), and should not exceed 80°F (27°C).
- Store batteries safely out of reach of children and pets.
- Check battery charge every week.
- Charge stored batteries every 30 days.
- If storing for more than a month without active solar charging, do at least one of the following:
  - ☐ Connect the battery charger to shore power (see "Charging batteries with external charger" on page 43).
  - ☐ Set the main power switch to off (O) (see Section 4.5.1, page 35).
  - ☐ Disconnect the cable from the positive (+) battery terminal.*

  To check battery charge and for charging instructions, see "Charging" on page 41.

5.3 Storing the solar trailer

Before storing the solar trailer, take the following steps to prevent damage to electrical components:

1. Set main power switch to off (O) (see Section 4.5.1, page 35).
2. Observe battery storage requirements to ensure battery health and longevity (see "Storing" above).

**Remove the positive cable because the solar power trailer is a negative-ground system.*

5.4 Wiring and replacement parts

Before performing any type of service or maintenance, read and observe all service safety instructions. See Section 2.6, page 9.

For wiring diagrams and replacement parts, contact the Wanco Service Department (see Section 1.5, “Where to obtain service,” page 3).

Appendix

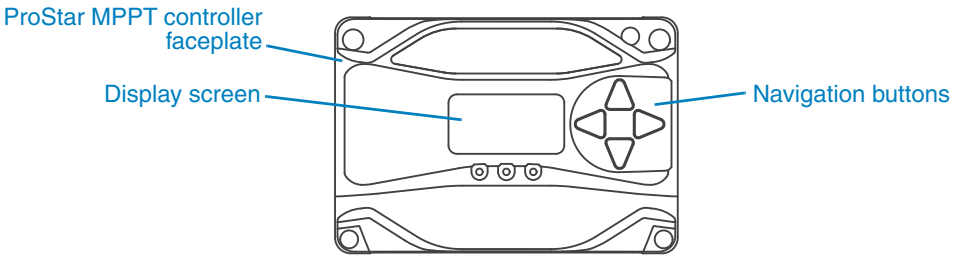
A Solar Charge Controller

A.1 Overview

The ProStar MPPT solar charge controller provides power tracking for the solar power trailer charging system. The interactive controller display (Figure A-1) is designed for ease of use, with lighted buttons that let you navigate the menus.

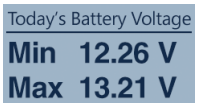
- The main menu screens are described in Section A.2.
- A menu map is provided in Section A.5, page 80.

Figure A-1. ProStar MPPT solar charge controller

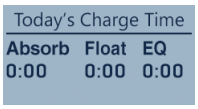


A.2 Main status screens

4.03 A 13.21 V 2.21 A	**Sun icon**	Real-time solar charge current
	Moon icon	Night state (no solar-array voltage)
	Battery icon	Real-time battery voltage
	Load icon	Real-time load current draw—displays LVD for Low Voltage Disconnect and LVDW for Low Voltage Disconnect Imminent Warning
-11.64A 36.9C Absorp	**Net icon**	Real-time net current into or out of the battery
	T battery icon	Real-time battery temperature as measured by the remote temperature sensor (if no RTS is present, displays local temperature)
	Charge icon	Real-time charging stage (bulk, absorption, float)
Today's Energy 12.2 Ah 0.0 Ah	**Battery icon**	Cumulative amp-hours delivered to the battery during today's charge cycle
	Load icon	Cumulative amp-hours delivered to the load today



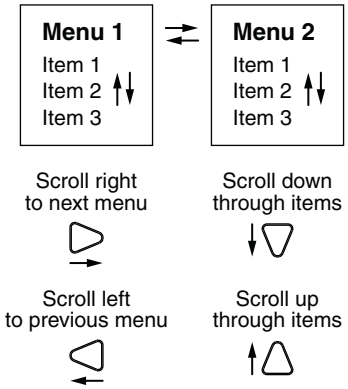
Min	Minimum battery voltage recorded today
Max	Maximum battery voltage recorded today



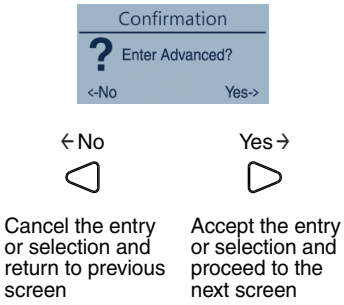
Absorb	Cumulative time spent in the absorption stage during today's charge cycle
Float	Cumulative time spent in the float stage during today's charge cycle
EQ	Cumulative time spent in the equalization stage during today's charge cycle

A.3 How to navigate

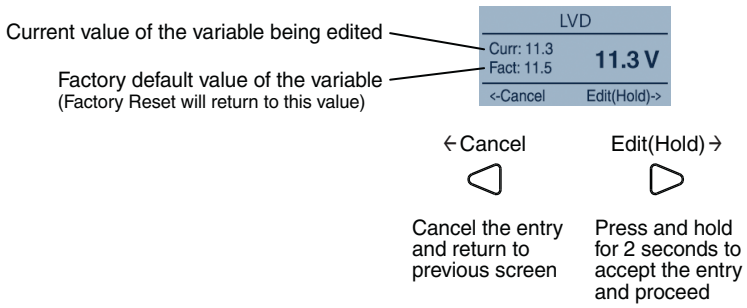
Menus



Confirmation screens



Edit variable screens



A.4 Faults and alarms

Array faults

Output overcurrent	Output current too high
FET short	Possible power MOSFET damage
Software	Software fault
Batt HVD	Battery voltage exceeded high-voltage disconnect threshold
Array HVD	Array voltage exceeded high-voltage disconnect threshold
Settings	Custom settings changed
Batt TS Short	Remote temperature sensor shorted
Batt TS Discon	Remote temperature sensor disconnected
THS failed	Heat sink temperature sensor failure
Batt LVD	Battery voltage too low for charging

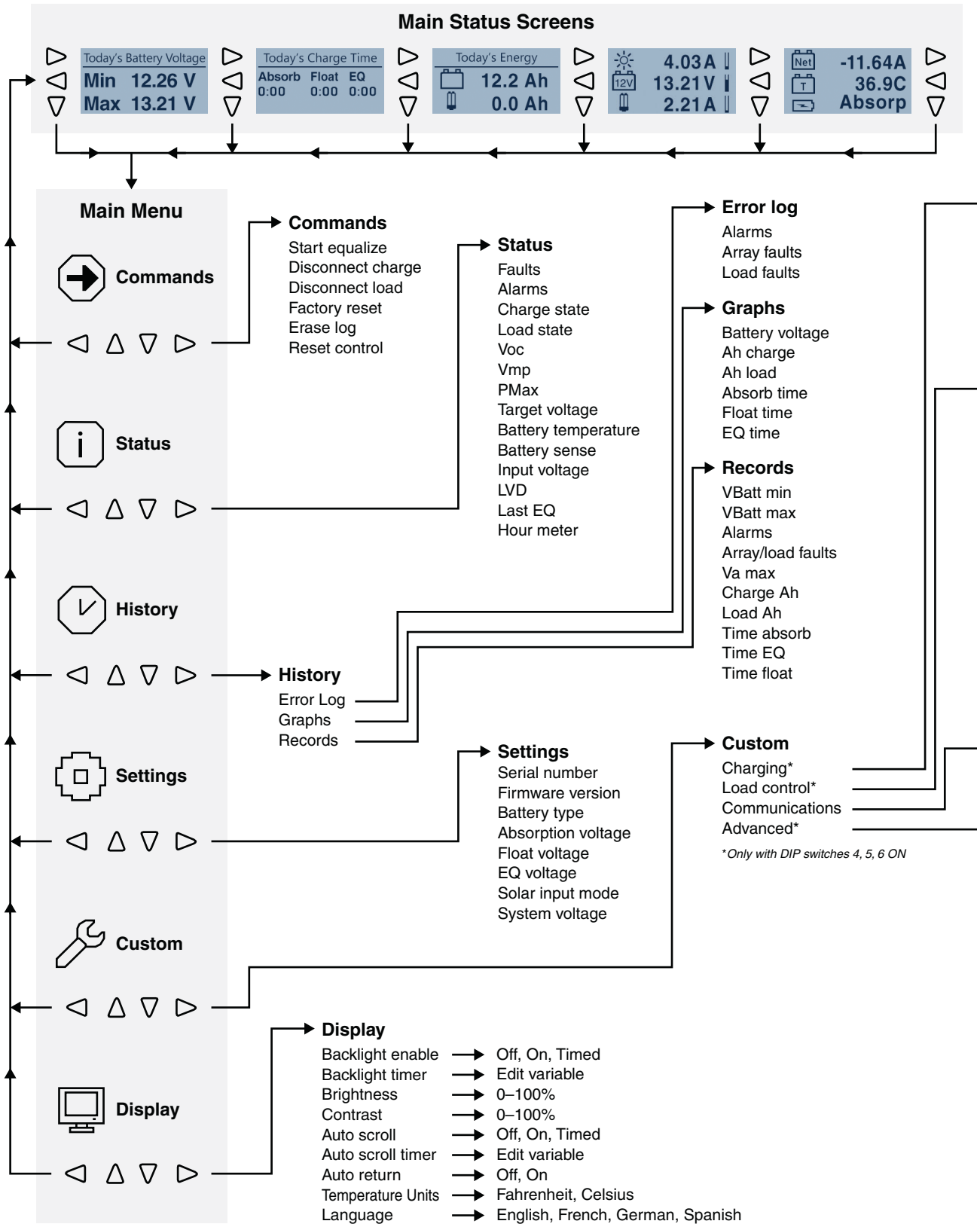
Load faults

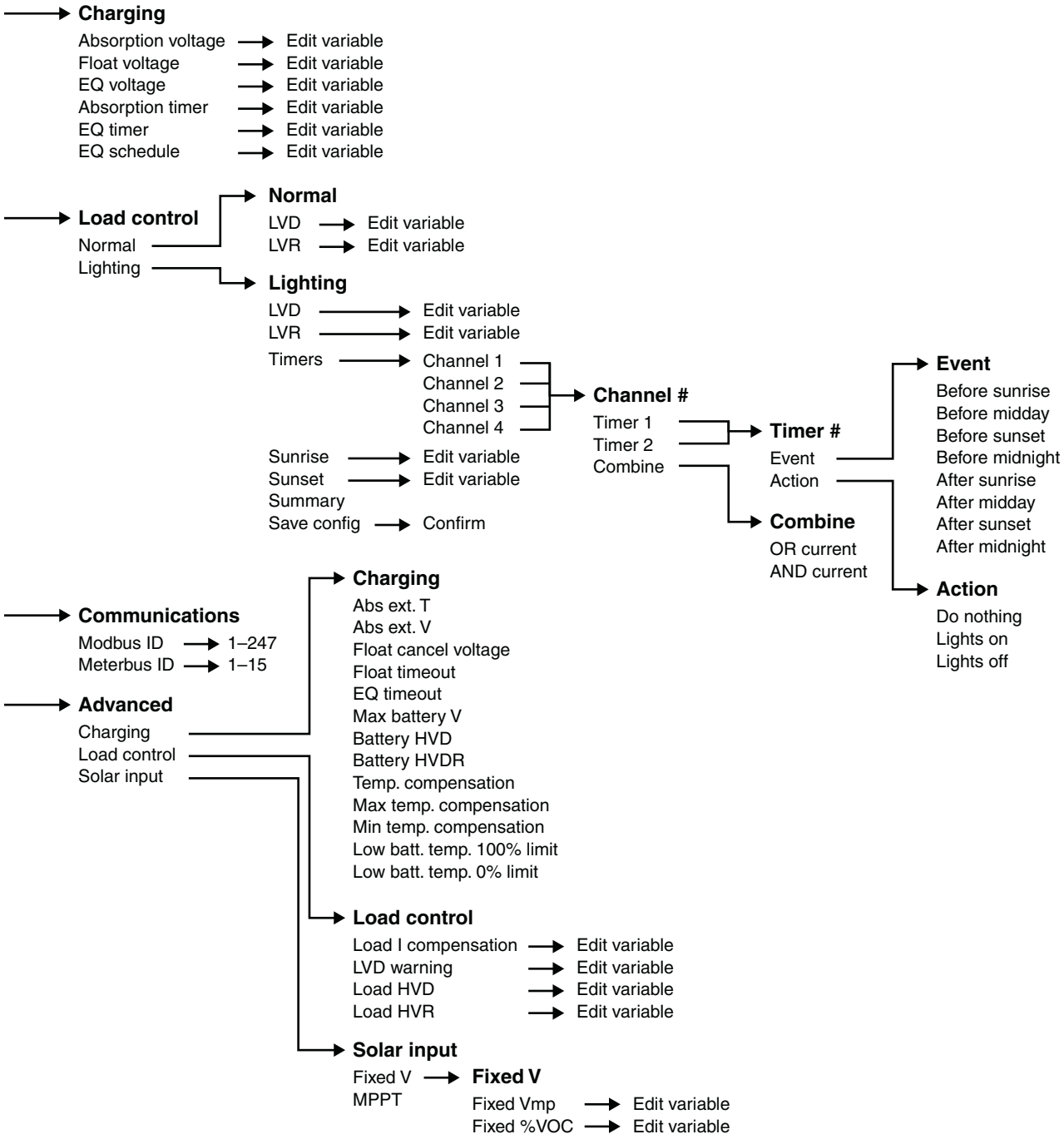
Ext Short	Wiring error
Overcurrent	Load draw exceeded current rating
FET Short	Possible power MOSFET damage
Software	Software fault
HVD	Battery voltage exceeded load high-voltage disconnect threshold
HS Overtemp	Heat sink temperature too hot
DIP Switch	DIP switch settings changed
Settings	Custom settings changed

Alarms

Batt TS Open	Remote temperature sensor open
Batt TS Short	Remote temperature sensor shorted
Batt TS Discon	Remote temperature sensor disconnected
THS Open	Heat sink temperature failure
THS Short	Heat sink temperature shorted
THS Hot	Heat sink temperature too hot
TIND Open	Inductor temperature sensor open
TIND Short	Inductor temperature sensor shorted
TIND Hot	Inductor temperature too hot
Current Limit	Battery charge current limit exceeded
Current Offset	Current measurement error
Batt Sense	Battery sense voltage out of range
Batt Sense Discon	Battery sense voltage disconnected
Uncalibrated	Voltage and/or current measurement uncalibrated
TB5v	5-volt supply out of range
FP10	Floating 10-volt supply out of range
Miswire	External wiring error
FET Open	Possible power MOSFET damage
Ia offset	Current measurement error
Il offset	Current measurement error
P3	3-volt supply out of range
P12	12-volt supply out of range
High VA	Array voltage too high
Reset	Controller was reset
LVD	Voltage dropped below low-voltage-disconnect threshold
Log Timeout	Log entry write timeout

A.5 Menu map


Main Status Screens
Today's Battery Voltage
Min 12.26 V
Max 13.21 V
Today's Charge Time
Absorb Float EQ
0:00 0:00 0:00
Today's Energy
12.2 Ah
0.0 Ah
4.03 A
13.21 V
2.21 A
Net
-11.64A
36.9C
Absorp
Main Menu
Commands
Start equalize
Disconnect charge
Disconnect load
Factory reset
Erase log
Reset control
Status
Faults
Alarms
Charge state
Load state
Voc
Vmp
PMax
Target voltage
Battery temperature
Battery sense
Input voltage
LVD
Last EQ
Hour meter
Error log
Alarms
Array faults
Load faults
Graphs
Battery voltage
Ah charge
Ah load
Absorb time
Float time
EQ time
Records
VBatt min
VBatt max
Alarms
Array/load faults
Va max
Charge Ah
Load Ah
Time absorb
Time EQ
Time float
History
Error Log
Graphs
Records
Settings
Serial number
Firmware version
Battery type
Absorption voltage
Float voltage
EQ voltage
Solar input mode
System voltage
Custom
Charging*
Load control*
Communications
Advanced*
*Only with DIP switches 4, 5, 6 ON
Display
Backlight enable → Off, On, Timed
Backlight timer → Edit variable
Brightness → 0–100%
Contrast → 0–100%
Auto scroll → Off, On, Timed
Auto scroll timer → Edit variable
Auto return → Off, On
Temperature Units → Fahrenheit, Celsius
Language → English, French, German, Spanish


Charging
Absorption voltage → Edit variable
Float voltage → Edit variable
EQ voltage → Edit variable
Absorption timer → Edit variable
EQ timer → Edit variable
EQ schedule → Edit variable
Load control
Normal
Lighting
Normal
LVD → Edit variable
LVR → Edit variable
Lighting
LVD → Edit variable
LVR → Edit variable
Timers → Channel 1
Channel 2
Channel 3
Channel 4
Channel #
Timer 1
Timer 2
Combine
Timer #
Event
Action
Event
Before sunrise
Before midday
Before sunset
Before midnight
After sunrise
After midday
After sunset
After midnight
Action
Do nothing
Lights on
Lights off
Combine
OR current
AND current
Sunrise → Edit variable
Sunset → Edit variable
Summary
Save config → Confirm
Communications
Modbus ID → 1–247
Meterbus ID → 1–15
Advanced
Charging
Load control
Solar input
Charging
Abs ext. T
Abs ext. V
Float cancel voltage
Float timeout
EQ timeout
Max battery V
Battery HVD
Battery HVDR
Temp. compensation
Max temp. compensation
Min temp. compensation
Low batt. temp. 100% limit
Low batt. temp. 0% limit
Load control
Load I compensation → Edit variable
LVD warning → Edit variable
Load HVD → Edit variable
Load HVR → Edit variable
Solar input
Fixed V → Fixed V
MPPT
Fixed Vmp → Edit variable
Fixed %VOC → Edit variable

WANCO INC.
5870 Tennyson Street
Arvada, Colorado 80003
800-972-0755
303-427-5700
303-427-5725 fax
www.wanco.com