

# SILENT SENTINEL

## SOLAR POWERED ADVANCE WARNING ARROW PANEL

OPERATION & MAINTENANCE MANUAL  
(P/N 550-025-100)



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*Harness the Power of the Sun*

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# INSTALLATION & OPERATION

Advance warning arrow panels are intended to supplement other traffic control devices in diverting or channelizing traffic around and through highway work zones. Detailed description of how they are to be placed and utilized in the work zone is presented in the Federal Highway Administration Manual on Uniform Traffic Control Devices and also in many individual state D.O.T. specifications. These publications include detailed instructions on where to place the arrow panel, particularly in situations where visibility may be limited due to a curved approach to the work zone or where the work zone is near an on ramp or other traffic merging point. If one of these manuals or specifications is not available, you should consult with local traffic safety officials before placing the arrow panels in the work zone. Proper installation is essential to the effectiveness of any traffic safety device.

A safety check of the arrow board should be made before transporting the unit over the road. The Safe Operating Procedures form included in the back of this manual should be used as a safety check sheet by the operator of the arrow board to make sure that nothing has been overlooked.

Before transporting the unit to the work zone, make certain that the battery bank is fully charged. This can be done by checking the **BATTERY LEVEL** indicator on the control module. Switch the unit on and observe the **BATTERY LEVEL** indicator. It should indicate **NORMAL** or **FULL** depending on location and available sunlight. If the battery bank is not fully charged a few hours of bright sunlight should be adequate to prepare the unit for field operation. If adequate sunlight is not available the battery bank can be recharged using any automatic-type battery charger of adequate capacity; a 12 Volt, 40

to 60 Amp charger will recharge the batteries in a few hours. Check the service & repair section of the manual for additional information on battery bank charging.

On trailer mounted units, make sure that the trailer coupler, safety chains, clevis pins, bolts, and latches are all properly installed and secured. Connect trailer wiring harness to tow vehicle and check for proper operation of stop, turn, and tail lights. Make sure that the tongue jack has been placed and locked in the up position before moving the unit. Make sure all four jack stands are pinned and locked in the up position. Check for proper inflation of tires. The correct tire pressure is 26 psi (175 kPa). Close and secure the cover on the battery compartment with a padlock.

On truck mounted units, make sure that the frame is securely fastened to the bed or deck of the truck. Make sure that the arrow panel is in the down position for high speed travel.

Upon arriving at the work site, check the area for overhead obstructions that might interfere with the safe and effective operation of the **SILENT SENTINEL**. Be aware of overhead items such as wires, tree branches, or any other overhead or nearby tall object that might shade the solar array and interfere with proper operation of the solar electric charging system.

Once the appropriate location has been selected, the unit can be positioned and set up for operation. Block the trailer wheels before disconnecting coupler from the tow vehicle. It is best to position the trailer before raising the sign panel, since the tongue weight is substantially greater with the sign panel vertical. The jack stands must be extended to provide a more stable platform for the unit.

Lower the tongue, using the tongue jack, to its lowest position. Then lower the rear jack stands and install and secure the locking pins. Now raise the tongue, while periodically sighting through the sight tubes located on the left side frame uprights. Stand approximately four feet from the front sight tube, line up the rear sight tube until it is centered inside the front sight tube. Adjust position of unit until the line of sight is directly into oncoming traffic. Then lower the front jack stands and install and secure the locking pins. At this point the trailer tongue or the optional removable combination coupler, if so equipped, can be removed for additional security.

The sign panel can now be raised to the operation position. Pull and turn the latch pins located just below the pivot point for the arrow panel support frame to lock them in the retracted position. Raise the arrow panel to the full upright position using the winch located on the right hand side of the trailer. Turn and release the locking pins to secure the arrow panel in the upright position.

Select the desired **SIGNAL PATTERN** on the control module and check the **BATTERY LEVEL** indicator. If adequate sunlight is available, the **VOLTAGE OK** and the **CHARGING** indicators will also be on.

***Check immediately to make sure the unit is displaying the correct pattern!***

The **AUTO TRACK LAMP INTENSITY** indicator should also be on. If **HIGH** or **LOW LAMP INTENSITY** is selected manually, the **LAMP INTENSITY** will automatically return to **AUTO TRACK** during the first night cycle.

Install padlocks on all battery compartment and control module covers to prevent tampering with the controls and batteries.

Periodically check the solar array for dust and dirt buildup and check the fluid level in the batteries. Every 30 days should be adequate except in extreme conditions of dirt or low ambient temperature or low sunlight. Clear snow buildup from the solar array as soon as possible!

Check the **BATTERY LEVEL** indicator every few days to make sure that the unit is receiving an adequate amount of solar energy to maintain the battery bank at an acceptable charge level. In the event that the **BATTERY LEVEL** display indicates **RECHARGE**, the battery bank should be charged by a line-powered auxiliary battery charger as soon as possible. If the battery bank is allowed to discharge to a very low level in extremely cold weather the electrolyte may freeze and cause permanent damage to the batteries.

The battery bank may require a few recharge cycles before it reaches its full energy storage capacity. New lead acid type batteries usually do not reach their full energy storage capacity until they have gone through several (10 to 15) charge/discharge cycles. Consult the **BATTERY CHARGING** section of the **SERVICE, REPAIR & TROUBLESHOOTING** manual for the **SILENT SENTINEL** for additional information on battery bank charging and maintenance.

The solar array and lamp lenses should be cleaned as required for safe and effective operation.

To prepare unit for transport, simply reverse the setup procedure. Pull and turn the latch pins to lock them in the retracted position. Slowly turn the winch handle in a counter-clockwise direction to lower the arrow panel. The automatic brake will safely control the descent. Make sure that jack stands, sign panel and all pins are securely locked in the proper position before transporting. Raise and lock the tongue jack in a horizontal

position. Carefully check the hitch and coupler integrity, the safety chain installation, tire

inflation, and the trailer stop, turn, and tail light functions before transporting unit.

## MAINTENANCE

Except for a few simple routine procedures the **SILENT SENTINEL** is practically maintenance free. The three most important aspects of insured trouble-free operation are:

1. Cleaning the upper surface of the solar array (mild soap and water or window cleaner is all that is required).

2. Cleaning the lamp lenses and photocell lens (located on the lower surface of the arrow panel frame, near the control cable connector).

3. Maintaining the proper electrolyte level in the batteries.

The lamp lenses and the solar array should be checked and cleaned as required. Normal rainfall will usually keep the solar array clean except in very dry, dusty conditions or following a snowfall.

The batteries should be checked every one to three months, adding distilled water only as required. It is not unusual for the batteries to provide up to one year of continuous service without requiring added water. It is, however, very important to never allow the electrolyte level in the batteries to drop below the plates. Exposure of the plates will cause irreversible damage to the batteries.

**CAUTION:** *Batteries produce hydrogen gas while being charged. Hydrogen gas is extremely flammable and sparks, open flame, or lit cigarettes should be avoided.*

*Also, batteries can produce intense heat or explosion if the terminals are shorted. Skin and eye protection should be used when working around batteries to prevent contact with battery electrolyte.*

In addition to these basic maintenance steps, the following procedures should also be performed to insure that the **SILENT SENTINEL** will continue to provide trouble-free service for years to come.

Periodically check tires for proper inflation. The recommended tire inflation pressure for the **SILENT SENTINEL** is 26 PSI (175 kPa). Check tires for tread wear and sidewall cracking. Tires that exhibit tread depth of less than 3/32 inch or excessive side wall cracking should be replaced to insure safe operation while towing. Replace worn out tires with tires of the same size and rating as the original factory equipped tires.

Periodically lubricate all pivot points and locking pins to provide smooth reliable performance and to prevent excessive rust formation in critical areas. Use a setting type spray lubricant that will provide good penetration and resist washing out.

Inspect the lanyards that secure the locking pins to the frame. Replace any missing lanyards or any lanyards that show signs of excessive wear.

Periodically lubricate the swivel jack on the tongue with a setting-type spray lubricant. Apply lubricant to the swivel mounting bracket

as well as the crankshaft to help minimize the effects of corrosion and to insure smooth, troublefree operation.

Remove, clean, and repack the wheel bearings and spindles at least once each year with a good grade of wheel bearing grease. Make sure that the bearings are installed properly, the spindle nuts are properly torqued, the cotter keys are installed, the bearing dust caps are installed, and the wheel lugs are properly tightened.

Lubricate the winch pivot points with motor oil or silicone lubricant as needed. Do not lubricate the brake disks and pads located on the crank shaft. Check the cable and clamps periodically for wear or fraying. Service or replace as required.

Any special maintenance concerns should be addressed directly to the factory. We are always there to help you make sure that the quality that was designed and built into your **SILENT SENTINEL** remains there!

**NOTE:** **SOLAR TECHNOLOGY** has taken every precaution to ensure that the **SILENT SENTINEL** is a safe and effective piece of traffic safety equipment. **SOLAR TECHNOLOGY**, however, cannot be held responsible for any injuries, accidents, or other mishaps resulting from the use, misuse, or abuse of the **SILENT SENTINEL** or any other **SOLAR TECH** product. It is the user's sole responsibility to ensure that the manner in which the **SILENT SENTINEL** is used is consistent with safe practices and that the user understand that he/she is the only liable party.

# MAINTENANCE CHART

## PERIODICALLY AS REQUIRED:

Clean solar panels

Clean photocell lens

Clean lamp lenses and shrouds

Check tire pressure

## EVERY ONE TO THREE MONTHS:

Check and replenish battery water

## ONCE EACH YEAR:

Clean and repack wheel bearings

Check and lubricate winch or lift jack

Check and lubricate pivot points

Check and service coupler

Check and lubricate tongue jack

Check fasteners and locking pins

Check wires, cables, clamps & supports