

geotech

Solar Sipper

Installation and Operation Manual



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DOCUMENTATION CONVENTIONS

This manual uses the following conventions to present information:



WARNING

An exclamation point icon indicates a **WARNING** of a situation or condition that could lead to personal injury or death. You should not proceed until you read and thoroughly understand the **WARNING** message.



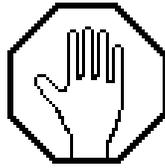
CAUTION

A raised hand icon indicates **CAUTION** information that relates to a situation or condition that could lead to equipment malfunction or damage. You should not proceed until you read and thoroughly understand the **CAUTION** message.



NOTE

A note icon indicates **NOTE** information. Notes provide additional or supplementary information about an activity or concept.



In order to ensure that your Solar Sipper has a long service life and operates properly, adhere to the cautions below and read this manual before use.

- **Controller power input source must not exceed maximum ratings.**
- **Controller may not operate properly with excess wiring not supplied by manufacturer.**
- **Avoid spraying fluid directly at controller.**
- **Never submerge controller.**
- **Avoid pulling on wires to unplug controller wiring.**
- **Avoid using controller with obvious physical damage.**
- **To prevent controller damage, avoid dropping controller.**

Chapter 1: System Description

Function and Theory

Geotech's Solar Sipper is a unique hydrocarbon recovery system for operating an active, down well skimmer and remediation pump in remote locations where line voltage is not readily available. When a fully charged external 12 VDC, 104 Amp hour or better, AGM deep cycle battery is connected, the internal compressor is capable of producing up to 20-inches Hg vacuum and 100 psi pressure. This alternating vacuum/pressure process allows the user to recover very viscous products or lighter products from depths as deep as 180 ft. below ground surface.

The controller is integrated with a variable cycle timer for controlling the internal compressor vacuum, the pressure and the time between cycles. This allows the user to calibrate the Sipper to run at its most efficient rate based on the downwell canister depth, and product viscosity. While the vacuum timer is on, vacuum is applied to the down well canister and tubing, helping product to flow through the oleophilic/hydrophobic mesh screen, down the tubing and into the canister cavity. When the programmed vacuum time has expired, the system goes into the pressure mode. While the pressure timer is on, air is pushed into the discharge tubing, evacuating the product from the canister. When the programmed pressure time has expired, the compressor shuts down and the system waits until the programmed delay time has expired. When the delay time expires, the process is repeated.



The oleophilic/hydrophobic mesh screen only discriminates between water and product when it is properly "seasoned". To season a cartridge, use a soft brush and coat the mesh screen with the same or a like product found in the well.

Chapter 2: System Installation



CAUTION

Solar Sipper installation should be performed only by qualified persons. If you are not familiar with electrical power equipment, contact a trained electrician to assist you with your installation.



WARNING

Because the solar array and battery have live voltage, caution should be exercised when dealing with either item.

Mount the controller enclosure to a 2.5" diameter pole with the pole brackets provided or mount controller to a vertical surface.

New units are supplied with 25' of 4 conductor 14 AWG cable. Make sure that the power switch is off, and make the following connections:

Wire	Connection
Red	battery +
Black	battery –
White	solar panel + (red)
Green	solar panel – (black)

The battery must be 12 V AGM, and should be deep cycle with a minimum rating of 75 amp hour. **A brand new battery may not be fully charged and might cause the Solar Sipper to go into low voltage shutdown. Fully charge battery for immediate operation.**

Connect the ¼" OD tubing from the down well canister pump to the Solar Sipper's controller (rear connection). Lower the skimmer and down well canister into the well until the middle of the skimmer cartridge's travel is at the oil/water interface.

Connect the discharge hose from the canister to the recovery tank. Connect the sipper exhaust (front connection) to the recovery tank. Install the tank full probe into the recovery tank and connect the tank full probe connector to the header on the controller.

Before installing the solar panel, cover the array with an opaque material before making your wiring connections. This will prevent the modules from producing electricity while making the connections and reduce the risk of sparks. Observe safe electrical practices at all times. Make connections in well-ventilated areas free from flammable gas vapors and open flames.

Pick a location with a maximum exposure to sunlight. Avoid shadows, especially during the middle of the day. Orient the module so that the surface will receive the maximum sun exposure over the year for your particular site. Typically this is achieved by tilting the module toward the equator at an angle equal to the latitude of the site plus 10 degrees. Example: Denver, CO is approximately located on the 40th parallel. $40 + 10^\circ = 50^\circ$ tilt angle. To increase winter performance, use a steeper tilt angle.

Figure 2 – Installation Diagram



Chapter 3: System Programming

When all wiring is completed, turn on main power switch.

MAIN MENU 1GO
2VAC, 3PRES, 4DELAY

Press 2 to setup the vacuum time. For about 1 second the display reads:

GOING TO VACUUM
TIMER SETUP MENU

Then the display reads:

VACUUM, 1 TO GO BACK
10 SECS 2SET 3DN 4UP

Press 3 or 4 to adjust the seconds portion of the vacuum time, down or up, respectively, as desired. 1 returns to the main menu. Press 2 to advance to the minutes setting:

VACUUM, 1 TO GO BACK
0 MINS 2SET 3DN 4UP

Once again, press 3 or 4 to change the value. Either 1 or 2 returns to the main menu. In the main menu, press 3 to set the pressure time, which is set the same way, then press 4 to set the delay time between cycles. This is similar, except that there is an hours setting as well as seconds and minutes. Delay time can be set up to 240 hours.

NOTE: THE MINIMUM TIME FOR PRESSURE IS 5 SECONDS.

When the cycle times are set as desired, press 1. This brings up the reset cycle counter option:

RESET CYCLE COUNTER?
3 YES 4 NO

The cycle counter increments every time the vacuum cycle starts. Press 3 or 4 as desired and the low temperature shut down option menu appears:

LOW TEMP SHUT DOWN
3 ON 4 OFF

Press 3 to protect the system from low temperatures (shuts down if the ambient temperature falls below 32° F). Press 4 to run regardless of temperature. When either key is pushed, the compressor starts evacuating the system, and pumping is underway.

During operation the top line of the display changes periodically to display system parameters such as battery voltage, number of cycles, and run time since installation. **Press one at any time to stop pumping and return to the main menu.**

The bottom line displays the operation and the time remaining to complete that operation.

Chapter 4: System Operation

Optimizing the Sipper System is one of the most overlooked steps, but also the most crucial to ensure the system operates properly. It is important that the operator sets the cycle times correctly to ensure maximum product recovery. Incorrect settings could lead to a reduction in the amount of time the system operates per day, or even cause equipment damage. The default vacuum time and default pressure time are each set at 15 seconds. These times will need to be adjusted by the operator to optimize recovery and minimize the risk of equipment failure or damage of the Sipper System.

The goal of optimizing the sipper is to recover the most amount of product per cycle possible, then allow the well to recover before the next cycle. In the vacuum cycle, the sipper compressor applies up to 20-inches of mercury vacuum to the canister and floating intake. The vacuum cycle pulls the product into the canister filling it. The standard down well canister is capable of holding 750 ml of fluid per cycle. The system compressor then will switch to pressure mode. The compressor is capable of providing up to 100 PSIG pressure to the canister and discharge line. The pressure cycle pushes the intake valve shut and forces the product past the discharge valve and up the discharge line to the surface. It is important to make sure all the product is pushed out of the canister before the next vacuum cycle begins. If the vacuum time is set for too long of a period, or the pressure cycle too short of a period, it is possible for the canister to overfill and product be pulled up the air line to the safety float switch. If this happens, set the vacuum time to 0-seconds and the pressure to 30-seconds and evacuate all the fluid from the float switch housing. After the system is clear of excess fluid, try setting the vacuum time to a lower setting and slightly increase your pressure time to a higher setting.

Chapter 5: System Maintenance

Controller must be returned to Geotech for any service.

In order to provide a full and long service life, keep the Solar Sipper's solar array clean and the product skimming cartridge clear of debris. The floating intake cartridge is the heart of the Solar Sipper system. Therefore, the intake cartridge (oleophilic/hydrophobic screen, float, float shaft, flexible intake hose and clamps) should receive periodic thorough inspections. The floating height of the intake screen above the waterline is minimal. The cartridge will not pass water unless: (1) The intake cartridge has risen to the top of its travel allowing water to rise above the top of the cartridge (thus indicating that the system should be raised to a height at which the intake is floating within its 1' of working travel), (2) an inordinate amount of debris is allowed to build up on the surface of the screen, or (3) a detergent (surfactant) contacts the screen. A detergent will "wet" the screen and allow water to pass.

If the screen is found to be clogged with debris or has been submerged in water, a gentle rinsing in kerosene or gasoline is recommended. When the presence of detergents is suspected, samples should be taken and tested.

Since the pump/intake assembly must be removed from the well to perform maintenance on the intake screen, such occasions should be used to carry out a general inspection of the entire assembly. It is particularly important that the flexible product hose be carefully checked. This hose should be replaced if leaks or major kinks are discovered.

Clean the front surface of the Solar panel as needed with mild soap and water. Do not use abrasive cleaners or solvents.

Chapter 6: System Troubleshooting

Problem:

System cycles and gauge indicates vacuum and pressure generation, but no product is being recovered.

Solution:

Inspect product hose for kinks and blockage. Replace if needed.

Problem:

System cycles but gauge does not indicate vacuum or pressure generation.

Solution:

Inspect product hose for abrasion, cuts, open connections. Replace if needed.

Note: Make sure the rear connection goes to the pump, and the front connection (the exhaust) is plumbed to the recovery tank.

Problem:

Nothing showing on the display.

Solution:

By pressing the 1 button you can see if the control panel has gone in to a low voltage shut down. The display will read low voltage shut down on at 12.1V. Check the fuse is not blown. If this does not happen check the battery voltage with a DC volt meter. If it is less than 10VDC replace the battery. We recommend using Geotech part number 16550253 which is an AGM, 104 AH, 12V battery.

Call Geotech Environmental Equipment Inc. at 1-800-833-7958 for expert troubleshooting advice.

Chapter 7: System Specifications

Applications	2" (5.8cm) or larger recovery wells
Recovery Rate	.2 gallons (.750 ml) per cycle
Max. Operating Depth	180 feet (60.96m)
Power Requirements	12-15 Volts DC input @ up to 7.5 Amps 90 ~105 Watts usage
Max. Pressure	100 PSIG
Max. Vacuum	20" Hg @ MSL
Oil/Water Separation	Oleophilic/hydrophobic mesh screen

Controller

Size	7" D x 17.4" L x 14" W (18cm D x 44.2cm L x 35.6cm W)
Approximate Weight	18.4 lbs
Rating	NEMA 4

Down Well Collection Canister

Size:	23.5" L x 1.75" OD
Weight:	4.5 lbs.
Materials:	303 and 304 Stainless Steel, flexible tubing PVC and Brass

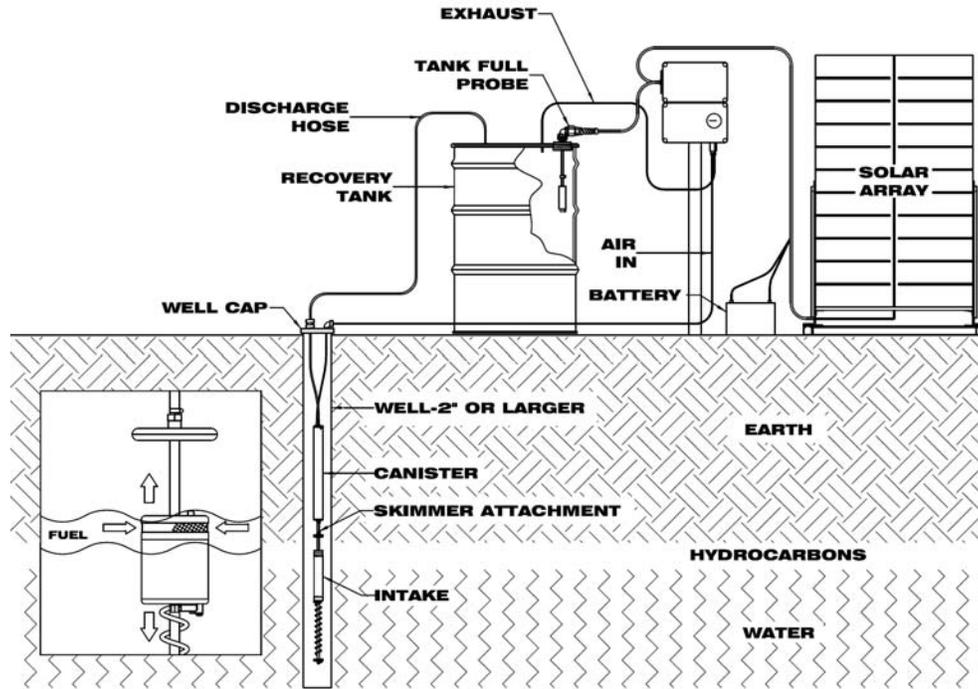
Skimmer Assembly

	2" Model	4" Model
Effective travel range:	12"	24"
Size:	35.5" L x 1.75" OD	35.5" L x 3.75" OD
Weight:	1.75 lbs.	2.25 lbs.
Operating Temperature:	32° to 100° F	
Materials:	304 Stainless Steel, Polyethylene, PVC, Polypropylene, Brass	
Tubing Sizes: Air:	.17" ID x .25" OD (4.318mm ID x .35mm OD)	
Discharge:	3/8" ID x 1/2" OD (9.525mm ID x 12.7mm OD)	

Solar Panel:

Rated Power	64 watts
Operating Voltage	16.5 V dc
Operating Current (Amps)	3.88
Size:	51.8" H x 59.0" W
Approx. Weight:	40.2 lbs.

Chapter 8: System Schematic



Chapter 9: Replacement Parts List

Solar sipper w/2" skimmer, 64 W	PN	86600063
Solar sipper w/4" skimmer, 64 W	PN	86600064
Solar sipper control panel	PN	86550008
4 conductor/14 AWG power cord	PN	10014
2 conductor/12 AWG power cord	PN	11200479
Tank full Probe	PN	2390073

Sipper Pump and skimmer Assembly

Canister (pump)	PN	56600050
Product Discharge Check Valve	PN	26600157
PVC Check Disc	PN	26600017
Viton O-ring #208	PN	16600023
5/8" SS Worm Clamp	PN	16600063
Viton O-ring #128	PN	16600030
SS Ear Clamp	PN	16600004
Skimmer, 2"	PN	56600003
Skimmer, 4"	PN	56600004
2" skimming cartridge	PN	56650309
4" skimming cartridge	PN	56650310
3/8 x 5/8 Product Discharge Tubing	PN	16600019
Manual	PN	16550176

Solar Panel

60W solar panel with frame	PN	86550007
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AGM Battery

Battery, Solar, AGM, 104 AH, 12V	PN	16550253
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Air Intake Float Switch Assembly

Solar Sipper Intake Float Switch	PN	86600095
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The Warranty

For a period of one (1) year from date of first sale, product is warranted to be free from defects in materials and workmanship. Geotech agrees to repair or replace, at Geotech's option, the portion proving defective, or at our option to refund the purchase price thereof. Geotech will have no warranty obligation if the product is subjected to abnormal operating conditions, accident, abuse, misuse, unauthorized modification, alteration, repair, or replacement of wear parts. User assumes all other risk, if any, including the risk of injury, loss, or damage, direct or consequential, arising out of the use, misuse, or inability to use this product. User agrees to use, maintain and install product in accordance with recommendations and instructions. User is responsible for transportation charges connected to the repair or replacement of product under this warranty.

Equipment Return Policy

A Return Material Authorization number (RMA #) is required prior to return of any equipment to our facilities, please call our 800 number for appropriate location. An RMA # will be issued upon receipt of your request to return equipment, which should include reasons for the return. Your return shipment to us must have this RMA # clearly marked on the outside of the package. Proof of date of purchase is required for processing of all warranty requests.

This policy applies to both equipment sales and repair orders.

FOR A RETURN MATERIAL AUTHORIZATION, PLEASE CALL OUR SERVICE DEPARTMENT AT 1-800-833-7958

Model Number: _____

Serial Number: _____

Date: _____

Equipment Decontamination

Prior to return, all equipment must be thoroughly cleaned and decontaminated. Please make note on RMA form, the use of equipment, contaminants equipment was exposed to, and decontamination solutions/methods used. Geotech reserves the right to refuse any equipment not properly decontaminated. Geotech may also choose to decontaminate equipment for a fee, which will be applied to the repair order invoice.

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