SitePro Telemetry System

Installation and Operation Manual

Rev 5/6/2020 Part # 22350001

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DOCUMENTATION CONVENTIONS

This 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.

Section 1: System Description

Function and Theory

Geotech's SitePro Telemetry Systems use cellular networks to provide data from remote sites. The use of Geotech's SiteView cloud-based data acquisition and data management software enables the collection, analysis, reporting, and storage of data to any computer or smart phone with internet connectivity. Data is stored locally on an SD card and on a web server. Data will be stored as long as the system has power. In the case of network connectivity loss, data will be stored locally and transmitted to the web server upon network connection restoration. Data can also be retrieved locally from the onboard micro SD card.

SiteView by Geotech is a cloud-based software-as-a-service (SaaS) that streamlines the data management process. SiteView can be accessed from any computer or smartphone with internet connectivity. SiteView manages data from multiple locations reducing the need for localized data management software and data collection hardware.

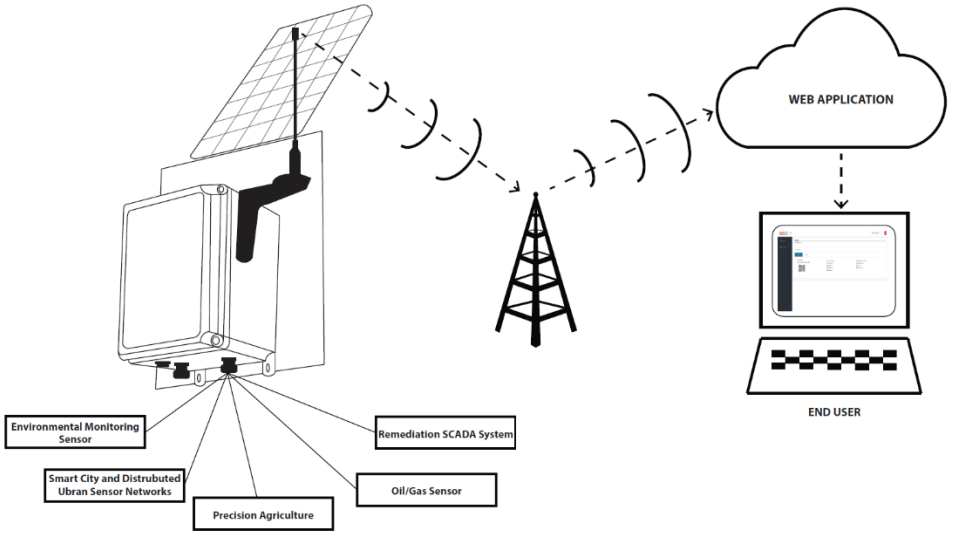

Figure 1-1: Site to End User

System Components

Enclosure

The SitePro Telemetry System is built within a Geotech engineered NEMA 4 enclosure with access to sensors and AC and/or Solar inputs. The enclosure includes mounting tabs for panel mount installation. Pole mounting options are also available through Geotech. See *Section 8: Parts and Accessories.*

Antenna

Mounted to the enclosure is a 915MHz flexible antenna. The antenna reads Omni-directional patterns allowing for large coverage ranges for installations.

SD Card

The PCB board includes 32GB Micro SD memory card to store data locally. The Micro SD memory card can be switched or removed as needed. See *Section 4: System Maintenance* on instructions for removal.

Solar Panel

Included with the SitePro Telemetry System is a lightweight, 10.8" X 15.5" X .2" (27.4 cm X 39.3 cm X 0.5 cm) monocrystalline solar panel. The panel includes an aluminum 50° vertical mounting bracket for panel or pole mounting. The UV and scratch resistant coating on the panel allows for long-term outdoor use in any environment.

Larger panels and panel arrays are also available to accommodate specific global location requirements. Contact Geotech for more information.

AC Power

If solar power options are not feasible for your site, Geotech offers an AC Power option for SitePro systems. The AC Power option utilizes the internal 12V 9AH battery as the main power source.

Sensors

A variety of sensors can be used with the SitePro Telemetry System:

- Environmental Monitoring Sensors
    - Water Quality Instruments
    - Water Level / Pressure
    - Weather
- GECM Remediation SCADA (Supervisory Control and Data Acquisition) systems
- Geotech Buoy Platform
- Oil/Gas Sensors
- Precision Agriculture
- Smart Building and Smart Site Systems
- Smart City and Distributed Urban Sensor Networks

Section 2: System Installation

Solar Panel Location

The annual average solar resources vary from region to region. Geotech is available to assist in a solar energy analysis per site location. Analysis will be based on publicly available US National Labs databases.

https://www.nrel.gov/gis/assets/images/nsrdb-v3-ghi-2018-01.jpg

https://www.ncdc.noaa.gov/data-access/land-based-station-data/land-based-datasets/solar-radiation

Site-specific information must be considered for the solar panel installation location. Large objects like trees or building structures can prevent sunlight from reaching the solar panel. When considering solar panel location, other scenarios must be taken into consideration when planning solar capacity requirements. For example, more or less cloud coverage, local weather patterns, and other circumstances that could inhibit sun exposure.

Select a location with maximum exposure to sunlight. Avoid shadows, especially during mid-day. Orient the module so that the surface will receive the maximum sun exposure over the year for your particular site. As a general guideline for solar panel placement, position the solar panel facing south if located in the northern hemisphere or position the solar panel facing north if located in the southern hemisphere.

For example, Denver, Colorado's latitude is around 39 degrees. In winter, the panel should be raised to 54 degrees (from 0°) for optimum sun. In most cases the fixed 50° mount is sufficient. For permanent installations at extreme latitudes, setting the panel angle equal to your latitude will suffice.

The Geotech SitePro Telemetry System has a nominal back up battery life of 4 days using the built in 9AH battery. Longer back up times are possible using larger solar panels and batteries.

Solar Panel Mounting

Each solar panel from Geotech comes with a .1" (2.5mm) aluminum 50° vertical mounting bracket (mounting hardware not included) for use as a pole mount or as a panel mount.

Pole Mounting Solar Panel

Hardware is not included.

Geotech recommends using a worm clamp or a U-bolt to mount the solar panel to a pole mount. Below are examples on how to mount the solar panel using a worm clamp and a how to mount the solar panel with a U-bolt.

Figure 2-1: Fastened panel with Worm Clamp

Figure 2-2: Fastened Panel with U-bolt

Panel Mounting Solar Panel

If pole-mounting options are not available on the site, the solar panel will need to be panel mounted. When panel mounting, ensure the panel is mounted securely.

Figure 2-3: Mounted Panel Installation

Mounting the SitePro

The enclosure comes with mounting tabs for panel mounting the enclosure. Pole mounting hardware is available through Geotech. See *Section 8: Parts and Accessories*.

Never drill mounting holes from, or through, the inside of the enclosure when attaching the controller to any surface. Ensure the enclosure is mounted to a sturdy back panel.

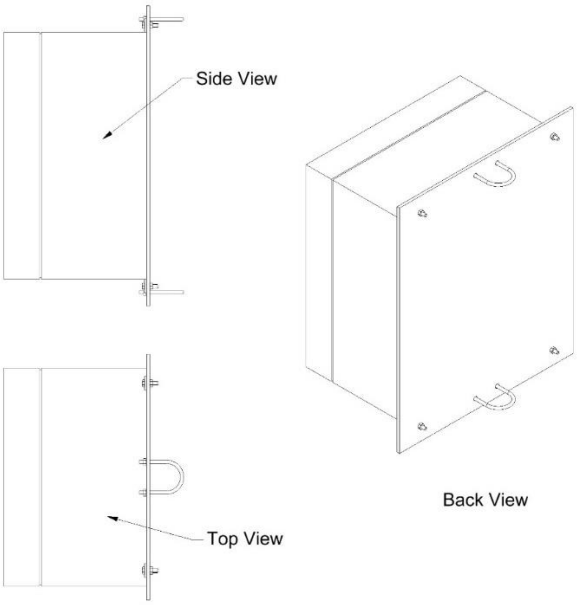

Figure 2-4: Example of pole mounting enclosure

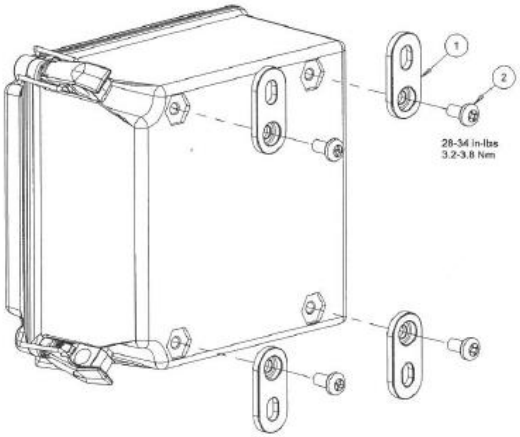

Figure 2-5: Example of panel mounting enclosure

Wiring the SitePro

Ensure the power switch is in the OFF position before terminating any field wiring connections.

Solar panel wiring

Before installing the solar panel to the SitePro enclosure, cover the array with an opaque material before making any wiring connections. This will prevent the modules from producing electricity when making the connections and reduce the risk of sparks. Use safe electrical practices at all times. Make connections in a well-ventilated area free of flammable gas vapors or open flames.

Each solar panel comes with a 10’ (1 m) length of SJOOW rated cable.

After the solar panel and enclosure have been mounted, run the solar panel cable into the enclosure.

Ensure the power switch for the SitePro Telemetry System is set to OFF. Connect wires to the power in the terminal strip as seen in Figure 2-6.

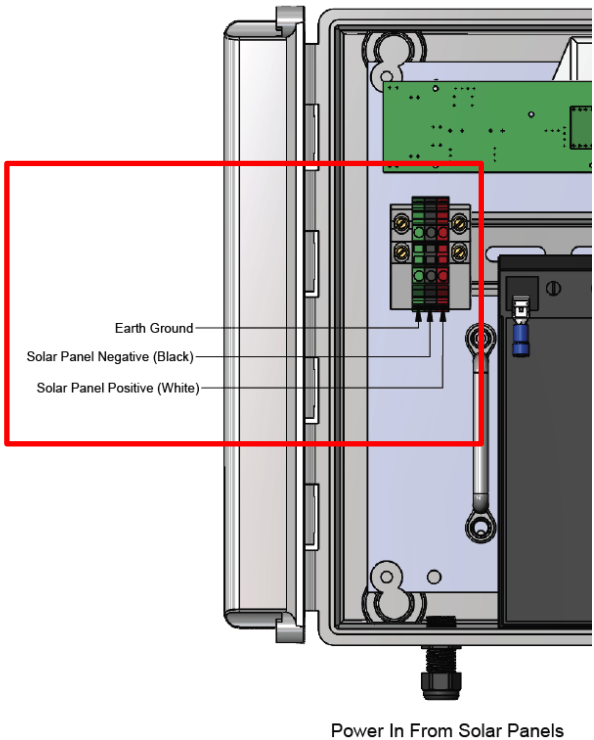

Figure 2-6: Power connections to terminal strip

Grounding

If an earth ground terminal is not available, then a ground spike must be installed. Connect all non-current carrying metal parts to the common ground.

Sensor Wiring

Wire the sensors to the designated ports on the “Sensor In” terminal strip as seen in Figure 2-7.

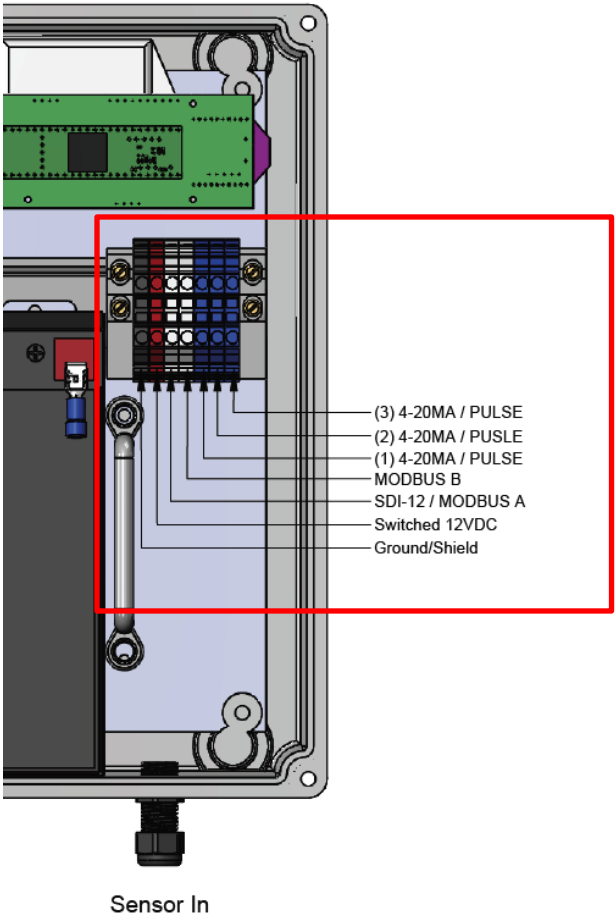

Figure 2-7: Sensor connections to terminal strip

Section 3: System Operation

When the system is mounted and wiring is complete, move the power switch to the ON position.

When powered on, an orange LED light and blue LED lights on the PCB board will illuminate; the system is now functional.

Detailed indicator light patterns can be used for troubleshooting if errors occur. Contact Geotech Technical Support for assistance, (800) 833-7958.

Web Application

An email with a temporary password will be sent to the email address provided to Geotech. Log in to http://telemetry.geotechenv.com using the provided email address and auto generated password. Geotech recommends that you change your password after you log in.

Additional information and instructions on how to navigate the website will be available in the Help menu within the web application.

The Station Name will be the 6-digit order number followed by a dash and the last 4 digits of the Device ID (Radio ID number). This information is located inside the front cover of the enclosure.

In the “Settings” tab on the SiteView website, select the relevant sensor input for your system. Review RS-485 specifications for the device you are using.

There are no locally configurable settings to be made using a direction connection to the SitePro. All configurations are changed using the SiteView web application.

Sensor Parameter Configuration

Consult the user manual and software information particular to the type of sensor being used. Modbus RTU and SDI-12 parameters will be configured using the sensor OEM software tools.

Section 4: System Maintenance

Solar Panel

Rinse solar panel with water to remove abrasive materials that might scratch or damage the surface. To remove more stubborn, caked on materials, it is best to use a soft brush, and to avoid wiping with a cloth. Scratching the surface of the solar panel will reduce performance.

Enclosure

Clean faceplate and case with mild soaps as needed.

Battery

Charge the battery before long-term storage. Replace battery every 2 years.

Sensors

Follow cleaning instructions in the manufacturer user manual.

SD Card Removal

If the SD card needs to be removed for any reason:

1. Ensure the SitePro power switch is in the OFF position.

"Hot swapping" SD card will result in data sequencing tag disruption. For best results, power the system down before removing SD card for data transfer.

2. Open the SitePro enclosure by removing the 2 screws on the door of the enclosure with a flat-head screwdriver
3. Locate the SD card on the PCB board.

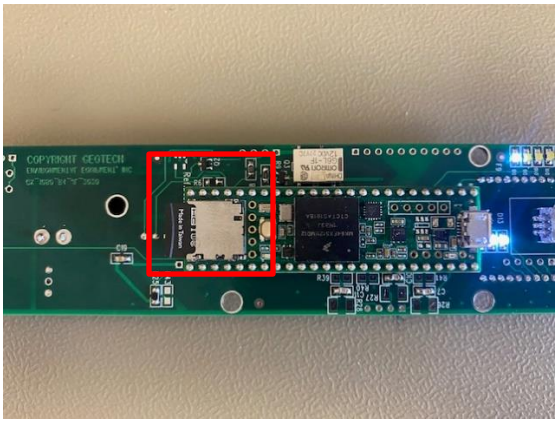

Figure 4-1: SD Card on PCB

4. Remove the SD Card.
5. Re-install SD Card after data has been extracted or replace with a new SD Card.
6. Close the enclosure door and re-install screws.
7. Turn the unit power switch back to the ON position to restore data collection.

Section 5: System Troubleshooting

Problem: Data not populating on web app.

Solution:

- Verify the Device Version and Cloud Version date and times stamps match. If not, wait up to 24 hours for system to update.
- Verify sensor input settings are entered to match serial network parameters per device.
    - For example: Modbus RTU parameter addressing.

Problem: Data is populating but values are not scaled properly.

Solution: Under the settings tab on the web app, verify the Unit, Scale, Offset are all properly entered for the sensor(s).

Problem: Battery is not charging.

Solution:

- Verify wire connections are secure and wires are not crimped or damaged.
- Ensure the solar panel is in position for maximum sun exposure.
- Verify AC power source is on and reliable.
- Ensure battery is not expired. Replace battery if used for more than 2 years.

If you are experiencing other problems than mentioned above, please call Geotech Technical Support for immediate assistance, (800) 833-7958.

Section 6: System Specifications

General

Cellular Network	2G to 4G LTE, NB-IoT, 5G, CAT-M, and eSIM (All global cellular networks available) 4FF Nano
End Device Certified (LTE-M)	AT&T, Verizon, Bell, Telus
Compatible with other carriers offering LTE-M and NB-IoT services	Bands 1, 2, 3, 4, 5, 8, 12, 13, 18, 19, 20, 25, 26, 28 and 39
FCC certified and carrier end-device certified	
Regulatory Approvals	FCC (USA) MCQ-XB3M1 IC (CANADA) 1846A-XB3M1 CE / RED (EUROPE) Complete RCM (AUSTRALIA/NEW ZEALAND) Complete
BTLE (Configuration access only)	
Long Range Radio:	1 Watt/900MHz (-110 dBm @9600 bps) standalone network outdoor line of sight rage up to 40 miles (Requires separate radio hardware and network hub to access data via web interface)
Operating Temperature Range	-4 to 122 degrees F (-20 to 50 degrees C)
Storage Temperature Range	-40 to 140 degrees F (-40 to 60 degrees C)
Onboard Digital Storage	Removable 32 GB standard (10+ years @ full data rate)
Cloud Storage	Infinite (data storage rates vary)
Logging interval	1 second to 24 hours (logarithmic logging supported)
SitePro to Cloud upload interval	NB-Iot 2 to 10 seconds (not configurable) LTE-CAT-M 50 to 100mS (not configurable)

Power

Internal	9 Ah SLA Battery (Larger battery and charge systems available to accommodate specific global location requirements)
External	12VDC to 24VDC
Power draw	1.2Watts (nominal)

AC mains power supply battery charger

Input	100~240Vac 50/60Hz
Output	13.8VDC @ 0.8A
Power	10Watts (nom)

Solar Panel Array

Dimensions	10.8” X 15.5” X .2” (27.4 cm X 39.3 cm X 0.5 cm)
Open Circuit Voltage	22.4V
Peak Voltage	18.9V
Peak Current	930mA
Peak Power	17.6W

For maximum power output, orient panel towards the sun	
Waterproof (IP67)	
UV resistant	
High-efficiency monocrystalline cells	
Wind up to 2,400 Pascal, or approximately 140 MPH	

**Larger panels and panel arrays available to accommodate specific global location requirements*

Solar Panel Bracket

Material	Rugged 2.5mm aluminum

**Mount to any horizontal or vertical pole/pipe. Mount to any flat surface*

Sensor Input

Analog input	3 x 4-20mA
Pulse	5 x 0.1Hz to 1kHz
SDI-12 Input	Version 1.4 *(ASCII '0' through ASCII '9' standard addresses. More than 10 sensors ASCII 'A' through ASCII 'Z' (decimal 65 through 90) and ASCII 'a' through ASCII 'z' (decimal 97 through 122).* *Regulated Switched 12VDC sensor supply (not a switching power supply))*
R485	10Mbit/s or lower speeds up to 4000' (1200m) -7V to +12V Common-Mode Input Voltage Range Driver Output Short-Circuit Protection Allows up to 32 transceivers on the serial bus Modbus RTU protocol support via web app.
RS-232	Up to 19.2k baud *(Full speed is possible with short cables - lower rates may need to be used for cable lengths over 50 feet)*
I2C qwiic	Sensors cannot be field integrated. Platform is not open source. Sensors and devices must be added at time of purchase.

Enclosure

Dimensions	10." x 8." x 6." (254 mm X 203 mm X 152mm)
Mounting	10.94" x 6" (278 mm X 152 mm) *Wall brackets included (pole mount not included)*
Materials	Compression Molded Fiberglass 316 Stainless Steel Hinge Pin
Access	Corner Latch Design
Rating	NEMA 4

Data Rate

Number of messages/hr.	60
Number of fields/message	32 fields
Size of field	4 floats for every field
Total size	128 Bytes/message
Bytes/day	180 kB

Section 7: System Schematics

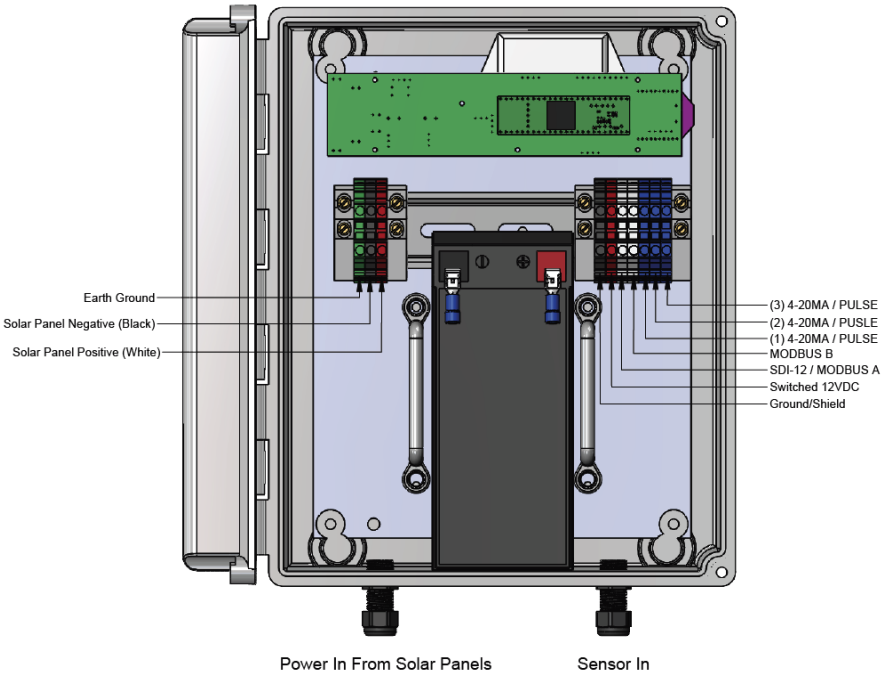

Figure 7-1: Solar Panel and Sensor Input Wiring

Section 8: Parts and Accessories

Part Description	Part Number
Site Pro Telemetry System (includes set up and activation)	
GEOTECH TELEMETRY,SOLAR READY	82350000
GEOTECH TELEMETRY,AC	82350001
GEOTECH,SITEPRO,TELEMETRY, BOARD ONLY, NEEDS POWER &BOX	52350002
Replacement Parts	
AC POWER,TELEMETRY	52350001
SOLAR PANEL,17W,18V	12350001
BATTERY,12VDC,9.00AH,AGM	17250010
ANTENNA,CYCLOPS,3G/2G,WALL MT	12050954
MOUNTING BRACKET,LARGE,SOLAR	12350010
MOUNTING FOOT KIT	16110181
MANUAL,GEOTECH TELEMETRY UNIT	22350001

Appendix A: Customer Device Information

Sales order # _____

Model # _____

AC Power or **Solar Power**

Modem Name _____

Serial number _____

Sensor Name _____

Serial Number _____

Sensor Name _____

Serial Number _____

Sensor Name _____

Serial Number _____

Revision History		
Project #	**Description**	**Date**
1849	Release - StellaR	<date>

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 of Purchase: _____

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 the equipment for a fee, which will be applied to the repair order invoice.

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email: sales@geotechenv.com website: www.geotechenv.com