

# Geotech Environmental Control Module

## Installation and Operation Manual





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## DOCUMENTATION CONVENTIONS

This manual uses the following conventions to present information:



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.



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.



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

## **Section 1: System Description**

### **Overview**

The Geotech Environmental Control Module (GECM) is a specifically designed, microprocessor based, industrial control panel for the operation of remediation and industrial equipment including, but not limited to Geotech branded equipment.

The GECM is designed for installation in an unclassified location, with Intrinsically Safe (IS) circuit extensions into hazardous (classified) locations.

The GECM has also been designed for ease of use and installation and can accommodate a wide variety of equipment control needs. A variety of equipment combinations can be controlled from just one control panel. A basic panel is capable of controlling up to 8 devices from 24 IS probe inputs. Devices can vary from small signal relays to 75 HP motor starters. A panel can be easily expanded to accommodate up to 32 additional outputs and 96 additional IS probe inputs. This equipment should be installed in accordance with NEC NFPA 70.

### **How the GECM works**

The GECM uses highly flexible microprocessor based electronics to provide a wide spectrum of capabilities that range from basic motor control to complex and sophisticated multi-panel networking. This built in versatility allows the GECM to be configured to match the unique requirements of a vast variety of industrial and remediation equipment control.

Basic motor control is achieved by use of magnetic motor starters. All standard motor starters have built in over current protection. More sophisticated motor control techniques can be achieved by use of a Variable Frequency Drive (VFD) that can interface directly with the GECM.

### **General Description**

The GECM has a wide variety of capabilities for automatically controlling electrical environmental remediation equipment. Site-specific needs can be met on an individual basis from a single flexible platform.

Panels include a varied configuration to operate the following equipment:

- Geotech Small Diameter Filter Scavenger (SDFS) with 12VDC product pump
- Geotech Small Diameter Probe Scavenger (PSCAV) with 12VDC product pump
- Water Table Depression Pumps (WTDP) up to 75 HP
- LOPRO II and III Air Stripper blowers up to 75 HP
- Soil Vapor Extractor (SVE) blowers up to 75 HP
- Air Sparge Compressors up to 75 HP
- Transfer Pumps up to 75 HP
- Miscellaneous equipment up to 75 HP

## **Specifications**

### **Electrical:**

10 Watts 115VAC or 230VAC input power. (See individual device manuals for detailed electrical specifications).

### **Environmental Conditions:**

0-104° F (-17.8 - 40° C)

A normal barometric pressure of one atmosphere.

(Enclosure heaters and cooling fans available can extend the temperature range to -30 to 110° F (-34 to 43° C)

Main enclosure: NEMA 4X (IP66)

Enclosure material: Fiberglass

External height: 18" (45.7 cm)

External width: 16" (40.6 cm)

External depth: 10" (25 cm)

Weight: 15 to 45 lbs (6.8 to 20 kgs) (depending on installed options)

## **Features and Options**

The GECM is available with a host of options to suit site needs and customer preference.

- All components are housed in an easy to install weatherproof NEMA 4X (IP66) enclosure.
- A bright 16 x 2 character Liquid Crystal Display (LCD) shows users exactly what is happening with each individual component within the system. For example, a probe's float position or an output device's ON/OFF status can easily be viewed on the display day or night.
- An optional four button key pad can be used to scroll through menus and status displays.
- Hand-Off-Auto (HOA) switch controls for direct control over individual system devices.
- The design incorporates circuitry for wiring extensions into hazardous (classified) locations.
- Optional pre-wired circular connectors are available for probe connections to make installation fast and simple.
- Optional alarm lighting can also be added so that a GECM's operational status can be seen from a distance.

In addition, each GECM will come with an Installation and Operation Manual containing wiring and device specifications unique to the unit's application. A GECM Field Wiring Diagram is also included with each manual. The GECM Field Wiring Diagram illustrates the internal layout of the GECM panel and also contains wiring information pertinent to device installation.

## **User Interface**

Each GECM is equipped with a 16 x 2 character extended temperature LCD and an optional 4 button keypad. Information is displayed showing probe and device status.

If the GECM operates one type of device then the keypad will normally be left off the unit. The display status will then relate only to the most resent system status or the current fault description which halted system operation.

When the GECM controls more than one device (with probes) the keypad is normally added so that the field tech may scroll between the various displays for each device set.

Custom panel application displays may vary according to customer requirements. Any custom display definitions will be included within the GECM manual. Equipment status and alarm condition displays are specific to each panel and its required control application.

A list of all standard displays and their descriptions can be found in Appendix B of this manual. A description of the abbreviated display responses and fault types can be found in Appendix A.

## **RESET Button**

Each GECM is designed to automatically shutdown the system and associate devices whenever a fault or condition occurs. Once the fault or condition has been corrected the system can be easily turned back on by depressing the RESET button. This will clear the fault and automatically turn on any equipment still set to AUTO. If you do not want a given device to turn back on, then set the appropriate switch to OFF prior to using the RESET button.

Momentarily pressing the RESET button may also restore a blank or faulty display. However, contact Geotech should display problems occur that will not clear up with this method.

## **Section 2: System Installation**

### **Inspection**

Inspect all components for physical damage. Installing and operating damaged equipment is dangerous and should not be performed. Verify that all components have arrived as per the Sales Order or packing list.

### **GECM Panel Installation**

Even though the GECM electronics are enclosed within a NEMA 4 rated weatherproof box, it is advised that you place your GECM within a sheltered area, protecting the unit from direct exposure to water and sunlight.

### **Input Power Guidelines**

All wiring must be carried out by a qualified electrician and be in accordance with the state and local codes. Conduit runs must conform to current U.S. National Electrical Code (NEC). Do not run any power wires within 2 inches (5 cm) of intrinsically safe (IS) wires or terminals (NEC Article 508 for relevant codes.) All equipment and controls are to be installed in accordance with Article 430 and 504 of the NEC.

See also the GECM Field Wiring Diagram for specific connections to the back panel and Printed Circuit Board (PCB). Geotech provides a detailed Field Wiring Diagram with every GECM built. Copies of these diagrams can be obtained from Geotech when needed.

### **Access Ports and Conduit Hubs**

To facilitate wiring, Geotech installs access ports and conduit hubs to the GECM enclosures that are hard mounted to the system being manufactured, i.e., a LOPRO or SVE. A GECM enclosure will not have this wiring option when built and shipped separately.

When installing a GECM enclosure ensure that ports installed for IS wiring are placed within the upper sides of the enclosure (close to the PCB) and that all conduit hubs for main power, blowers, and pumps are installed along the bottom. To maintain the NEMA 4 weatherproof characteristics of your panel use weatherproof conduit hubs.

### **Install Chassis Ground**

Before beginning the panel hookup procedures, run a wire from the bottom ground lug on the GECM back panel to a good earth ground, i.e., the circuit breaker panel enclosure.

### **Install IS Ground**

Connect IS ground wires to the upper ground lug on the GECM back panel.



## Wire Main Power

The GECM is built to run with single phase 115VAC or 230VAC. Incoming power leads are normally connected to either a terminal strip or fused disconnect labeled HOT and NEUTRAL (for 115VAC) or L1, L2 and L3 (for 230VAC and/or three phase applications). When a fused disconnect is installed for three phase power to the motor starters, Geotech will complete all wiring on the GECM side of the components.

The following wiring descriptions are for standard GECM configurations. In conjunction with the GECM Field Wiring Diagram, always refer to the system diagrams and labels found within the device User Manuals, including those diagrams provided with custom built panels.

## Install Incoming Power to Motor Starters

Most motor driven devices controlled by the GECM (LOPRO, SVE, Sparge, WTDP, Transfer Pump) require the use of a motor starter. Motor starters are installed to the back panel when the GECM is built. Run main power for the individual motor starters through the bottom of the enclosure. Each motor starter is labeled for the device they support. Single phase power leads are wired to terminals L1 and L2. Three phase power leads are attached to terminals L1, L2, and L3. Attach all ground wires to the ground lug at the bottom of the panel.



**DO NOT run power wires within two inches of IS wiring or terminals.**

## Installing Blower Thermals

The GECM incorporates thermal overload protection for those motors which have it. When a motor manufacturer provides thermal overload protection there will typically be two additional wires within the motor's electrical box labeled "J". These wires will run through the same port used for the motor power and are connected to a terminal strip labeled THERMALS.

## Installing an 115VAC/230VAC to 12VDC Power Supply

Geotech provides 115VAC and 230VAC Power Supply's which are needed to operate the 12VDC product pump motors contained within SDFS and PSCAV systems. Power requirements and control are dependent upon the GECM and are probe activated.

The GECM back panel will contain labeled relays or terminal strips (labeled PRODUCT PUMP) from which hot leads will be connected. These leads will then go to a designated power supply box and be converted to 12VDC for product pump operation.



**Power supply boxes should be installed as near to the well as possible to reduce DC line loss in the cable connecting the product pump to the box.**

Use the GECM Field Wiring Diagram to complete all wire connections between the GECM and the power supply box.

## IS Wiring Installation Guidelines

The GECM incorporates circuitry for IS circuit extensions into hazardous locations. All IS wiring must be at least two inches from all other non-IS wiring. All IS wire terminations must be securely tightened in screw terminals on the GECM PCB.

It is recommended that you use only Geotech supplied probe cable (P/N ORS418005) for IS wiring and Geotech supplied IS float probes with jacketed cable. The maximum length of a Geotech probe cable that can be connected to IS circuitry is 500 ft. (152 m).

### Wiring Reservoir, Tankfull, Sump and Water Pump Probes

These devices are wired to designated ports on the GECM PCB and are defined on the GECM Field Wiring Diagram provided. Wiring diagrams for the various equipment probes and devices can be found within the user manuals for the device they support. Common probes built by Geotech support the operation of the following devices:

Reservoir Probe	SDFS
Water Pump Probe	WTDP Motors and Transfer Pumps
Tankfull Probe	SDFS and PSCAV
Sump Probe	LOPRO II and III Air Strippers
3 Position Probe	SVE and Custom Devices

### Using a MeLabs Field Programmer

If for any reason the GECM needs to undergo a firmware update, Geotech will provide the new software on a MeLabs Field Programmer. Follow the instructions below to successfully update the GECM.

1. Verify SD card is properly inserted into card slot. Press the back of the SD card to ensure it is inserted as far as it will go. There will be a click to release or lock the card in. Do this a couple time to verify the card is in proper position. A small portion of the card will stick out from the end of the programmer housing.
2. Open GECM door and inner panel to gain access to controller board.
3. Remove the PCB Enclosure using a 5/16" wrench/nut driver or #2 Philips screwdriver.
4. At the top near the middle will be a 6 pin jack (black phone jack like housing.)
5. Plug the cable of field programmer into the jack.
6. With power applied to the unit the LED will be lit up GREEN.
7. Press the program button on the face of the field programmer.
8. During programming LED will be a solid RED.
  - a. If LED Flashes RED call Geotech at 1-800-833-7958 or 303-320-4764.
9. When programming is completed the LED will return to a solid GREEN.
10. Remove cable from controller board, reinstall the PCB enclosure and close up the GECM. Unit is now ready for use.

# Section 3: Display Definitions

The following pages describe status and fault displays used in a common GECM configuration. Status and fault displays generated for unique GECM/system configurations will be further detailed within the customer's Logic Description Document.

The following displays are common to the equipments shown. System status, condition and fault messages are shown on Line 1 of the display preceded by the system name and unit # (when there are two or more of the same device.) A device status will then be displayed on Line 2.

Fault and condition messages will require a system inspection and that the device be reset at the GECM. Use this section, in conjunction with the device's User Manual, to troubleshoot any fault or condition messages.



**GECMs controlling more than one system configuration will require the installation and use of the up/down arrow buttons to review individual system displays.**

## SDFS/PSCAV Displays –

Line 1 messages:

HAND:Px H2Ox ORx	
AUTO:Px H2Ox ORx	
AUTO: TANKFULL	(condition)
AUTO: H2O IN RES	(fault - SDFS only)
AUTO: OVERRIDE	(fault)
AUTO:PROBE FAULT	(fault)

Line 2 messages:

PRODnnnn H2Onnnn

Where        x = H (high), M (middle), or L (low)  
              nnnn = ON, OFF or HAND

## Multiple SDFS/PSCAV Systems -

Line 1 messages:

SDFS SYSTEM #	or	PSCAV SYSTEM #	
SDFS#: TANKFULL	or	PSCV#: TANKFULL	(condition)
SDFS#:H2O IN RES			(fault - SDFS only)
SDFS#: OVERRIDE	or	PSCV#: OVERRIDE	(fault)
SDFS#:PROBEFAULT	or	PSCV#:PROBEFAULT	(fault)

Line 2 messages:

PRODnnnn H2Onnnn

Where # = 1, 2, 3 or 4 (SDFS/PSCAV number)  
nnnn = ON, OFF or HAND

## Additional Messages for Multiple SDFS/PSCAV Systems -

SDFS#: LEVELS	or	PSCAV #: LEVELS	(fault)
OVERRIDE	or	OVERRIDE	
SDFS#: LEVELS	or	PSCAV #: LEVELS	(fault)
PROBE FAULT	or	PROBE FAULT	
SDFS#: LEVELS	or	PSCAV #: LEVELS	
Px H2Ox ORx	or	Px H2Ox ORx	

Where # = 1, 2, 3 or 4 (SDFS/PSCAV number)  
x = H (high), M (middle), or L (low)

## WTDP Displays –

Line 1 messages:

WTDP: H2Ox ORx	
WTDP: OVERRIDE	(fault)
WTDP: PROBEFAULT	(fault)

Line 2 messages:

WATER PUMP nnnn

Where x = H (high), M (middle), or L (low)  
nnnn = ON, OFF or HAND

## LOPRO Displays -

Line 1 messages:

LOPRO: HI VACUUM	(fault)
LOPRO: LO VACUUM	(fault)
LOPRO: Lx Hx	
LOPRO: PROBEFAULT	(fault)
LOPRO: HI SUMP	(fault)

Line 2 messages:

BLWRnnnnnXFERnnnn

Where        x = H (high), M (middle), or L (low)  
              nnnn = ON, OFF or HAND

## SVE Displays –

Line 1 messages:

SVE: SYSTEM OFF	(SVE is OFF but can be run in HAND)
SVE: SYSTEM AUTO	(SVE running in AUTO)
SVE: HI VACUUM	(fault)
SVE: WATER HI	(condition)
SVE: PROBE FAULT	(fault)

Line 2 messages:

BLOWER nnn

Where        nnn = ON or OFF

## SVE Displays (system with 3 position probe) –

Line 1 messages:

SVE: Lx Hx	
SVE: HIHI	(condition)
SVE: HI VACUUM	(fault)
SVE: PROBE FAULT	(fault)
SVE: DRY CONTACT	(fault)

Line 2 messages:

BLWRnnnnnXFERnnnn

Where        x = H (high), M (middle), or L (low)  
              nnnn = ON, OFF or HAND

## SVE with Sparge Displays –

Line 1 messages:

SVE: SYSTEM OFF	(SVE <b>and</b> Sparge are OFF, either unit can be run in HAND)
SVE: SYSTEM AUTO	(SVE is running in AUTO – with or without Sparge)
SVE: HI VACUUM	(fault)
SVE: WATER HI	(condition)
SVE: PROBE FAULT	(fault)

Line 2 messages:

BLWRnnnnnSPRGnnnn

Where nnnn = ON, OFF or HAND

## Sparge Displays –

Line 1 messages:

SPRG:SYSTEM OFF	(Sparge is OFF but can be run in HAND)
SPRG:SYSTEM AUTO	(Sparge running in AUTO)
SPRG:HI PRESSURE	(fault)
SPRG:HI TEMP	(fault)
SPRG:DRY CONTACT	(fault)

Line 2 messages:

BLOWER nnn

Where nnn = ON or OFF

HAND indicates that a device is in manual operation.

Once corrected, the RESET button must be pressed to clear any occurring faults or conditions.

## Section 4: Troubleshooting Guide

Use this section, in conjunction with the Display Definitions found in Appendix B, to troubleshoot any occurring system problems.



**The RESET button must be depressed to clear a system fault or condition. This will also automatically restart any devices still set to AUTO.**

### No Apparent Power to the GECM –

- Check all incoming wire connections.
- Check fuses and breakers at power source. (Fuses can also be found on the GECM PCB. These can blow from a voltage spike or incorrect voltage applied to the GECM. Allow a Geotech technician to service these fuses.)

### No Display –

- Press RESET button (also used to clear up garbage on screen).
- Fuse is blown in the GECM PCB or faulty electronics. Return to Geotech for service.

### Blower Will Not Run –

- Check device status at GECM.
- Check for blown fuses.
- Check wire connections between device and GECM.
- Check motor for over-heating.
- HI or LO vacuum switches preventing unit from starting up.

### Transfer Pump Will Not Run –

- Check device status at GECM.
- Check for blown fuses.
- Check wire connections between device and GECM.
- Check motor for over-heating.
- Check sump and/or three position probe floats and verify that nothing is obstructing their movement.
- Check probe wiring to GECM.
- Pump may have over-amped due to obstruction in flow line. Clear line and restart pump.

### Transfer Pump Will Not Shut Off –

- Check sump and/or three position probe floats and verify that nothing is obstructing their movement.
- Check probe wiring to GECM.

### **Product Pump Will Not Run –**

- Check device status at GECM.
- Check for blown fuses (especially at power supply).
- Check for a bad relay connection between GECM and power supply.
- Check wire connections between device and GECM.
- Check reservoir probe floats and verify that nothing is obstructing their movement.
- Check that hydrocarbons are still present in well and that the SDFS/PSCAV unit is correctly positioned on the hydrocarbon/water interface.
- Check probe wiring to GECM.

### **Water Pump Will Not Run –**

- Check device status at GECM.
- Check for blown fuses.
- Check wire connections between device and GECM.
- Check reservoir probe floats and verify that nothing is obstructing their movement.
- Check water level probe floats (when separate water pump in use).
- Check that hydrocarbons are still present in well and that the SDFS/PSCAV unit is correctly positioned on the hydrocarbon/water interface.
- Check probe wiring to GECM.
- Pump may have over-amped due to obstruction, dry running, or damage. Inspect pump and flow route.

### **High Vacuum Message or Switch Not Working –**

- Verify wiring connections between GECM and switch.
- See Troubleshooting Procedures for HI Vacuum conditions in the LOPRO or SVE User Manual.

### **Low Vacuum Message or Switch Not Working –**

- Verify wiring connections between GECM and switch.
- See Troubleshooting Procedures for LO Vacuum conditions in the LOPRO or SVE User Manual.

### **High Temp Message (Sparge) –**

- Verify wiring connections between GECM and switch.
- See Troubleshooting Procedures in Sparge User Manual.

### **High Pressure Message (Sparge) –**

- Verify wiring connections between GECM and switch.
- See Troubleshooting Procedures in Sparge User Manual.

### **Dry Contact Message –**

- Check for circuit conflicts between GECM and other devices or switches.
- Have the logic statements and operation of any custom built devices checked.



**Probe Fault –**

- This error will occur when the HHH float is in the up position and the HI/LO float is in the down position. Check for free movement on all floats.
- A switch wire may have become disconnected or broken.

**Override Message (SDFS/PSCAV) –**

- Water override float is down and the HI/LO float is up (PSCAV). Check for free movement on all floats.
- Water override float is down and the intake float cartridge is up (SDFS). Check for free movement on all floats.
- A switch wire may have become disconnected or broken.

**Tankfull Message –**

- Product recovery tank is full.
- A switch wire may have become disconnected or broken.

**H2O In RES Message (SDFS) -**

- Water in reservoir. Set Product Pump switch to hand to clear reservoir of water.
- Intake cartridge screen needs to be re-primed to prevent water from entering the screen.
- Unit is being placed below the intake cartridge travel.

## Appendix A – Customer and Device Information

Customer Name:

Sales Order Number:

Build Date:

GECEM Serial Number:

Device Name:	Serial Number:	Model Number:

## Appendix B - Terminal Connections

### Terminal A – IS Inputs

Lower Tier (1 thru 20)

1		IS +5VDC
2		IS +5VDC
3		IS +5VDC
4		IS +5VDC
5		IS Input
6		IS Input
7		IS Input
8		IS Input
9		IS Input
10		IS Input
11		IS Input
12		IS Input
13		IS +5VDC
14		IS +5VDC
15		IS +5VDC
16		IS +5VDC
17		IS +5VDC
18		IS +5VDC
19		IS +5VDC
20		IS +5VDC

Upper Tier (21 thru 40)

21		IS Input/SDFS Water Sensor Input
22		IS Input/SDFS Water Sensor Input
23		IS Input/SDFS Water Sensor Input
24		IS Input/SDFS Water Sensor Input
25		IS Input
26		IS Input
27		IS Input
28		IS Input
29		IS Input
30		IS Input
31		IS Input
32		IS Input
33		IS Input
34		IS Input
35		IS Input
36		IS Input
37		
38		
39		
40		

**Terminal B – Analog/Non-IS Inputs**

Lower Tier (1 thru 10)

1		Analog/non-IS Input
2		Analog/non-IS Input
3		Analog/non-IS Input
4		Analog/non-IS Input
5		Analog/non-IS Input
6		Analog/non-IS Input
7		Analog/non-IS Input
8		Analog/non-IS Input
9		External 24-36VDC Power Supply Pos.
10		External 24-36VDC Power Supply Pos.

Upper Tier (11 thru 20)

11		Analog/non-IS Input
12		Analog/non-IS Input
13		Analog/non-IS Input
14		Analog/non-IS Input
15		Analog/non-IS Input
16		Analog/non-IS Input
17		Analog/non-IS Input
18		Analog/non-IS Input
19		External 24-36VDC Power Supply Neg.
20		External 24-36VDC Power Supply Neg.

**Terminal C - Relay/Motor Starter Control Outputs**

(1 thru 8)

1		Relay/Motor Starter Control Output
2		Relay/Motor Starter Control Output
3		Relay/Motor Starter Control Output
4		Relay/Motor Starter Control Output
5		Relay/Motor Starter Control Output
6		Relay/Motor Starter Control Output
7		Relay/Motor Starter Control Output
8		Relay/Motor Starter Control Output

## Appendix C – System Specifications and Test Information

### SDFS Specifications and Test Form

SDFS serial number:	
Reservoir probe serial number:	
Intake cartridge serial number:	
Intake cartridge mesh type:	
Product only unit or WTDP:	
4" or 6" unit:	
Unit cable length in feet:	
Product pump serial number:	
Polyamide or Kevlar gear set:	
Open flow of product pump:	
Flow of product pump at 65 PSI:	
Product pump decoupling PSI:	
<b>For WTDP ready units -</b>	
Water motor serial number:	
Water motor model number:	
Nameplate volts:	
Nameplate amps:	
HP:	
PH:	
Water pump serial number:	
Water pump model or type:	

## PSCAV Specifications and Test Form

PSCAV serial number:	
Probe serial number:	
2 <sup>nd</sup> probe serial number:	
Product only unit or WTDP:	
Standard cable or Tefzel:	
Unit cable length in feet:	
Product pump serial number:	
Polyamide or Kevlar gear set:	
Open flow of product pump:	
Flow of product pump at 65 PSI:	
Product pump decoupling PSI:	
<b>For WTDP ready units -</b>	
Water motor serial number:	
Water motor model number:	
Nameplate volts:	
Nameplate amps:	
HP:	
PH:	
Water pump serial number:	
Water pump model or type:	

## LOPRO 2 Specifications and Test Form

LOPRO serial number:	
Blower model:	
Blower serial number:	
Nameplate volts:	
Nameplate amps:	
HP:	
PH:	
Voltage unit was tested with:	
Number of trays on unit:	
Amp draw at open flow:	
(L1) amps:	
(L2) amps:	
(L3) amps:	
CFM at open flow (detached from lid):	
System vacuum (in inches of water) at open flow:	
System vacuum (in inches of water) at max amps:	
HI vacuum switch set to (in inches of water):	
Amp draw at high vacuum setting:	
(L1) amps:	
(L2) amps:	
(L3) amps:	
LO vacuum switch set to (in inches of water):	
Ambient air temp at time of test (degrees):	
Air open flow output temp after 1 hour (degrees):	

## Transfer Pump Specifications

Pump model:	
Pump serial number:	
Nameplate volts:	
Nameplate amps:	
HP:	
PH:	
Operational voltage unit is wired for:	

### LOPRO 3 Specifications and Test Form

LOPRO serial number:	
Blower model:	
Blower serial number:	
Nameplate volts:	
Nameplate amps:	
HP:	
PH:	
Voltage unit was tested with:	
Number of trays on unit:	
Amp draw at open flow:	
(L1) amps:	
(L2) amps:	
(L3) amps:	
CFM at open flow (detached from lid):	
System vacuum (in inches of water) at open flow:	
Maximum vacuum (in inches) when blocked:	
HI vacuum switch set to (in inches of water):	
Amp draw at high vacuum setting:	
(L1) amps:	
(L2) amps:	
(L3) amps:	
LO vacuum switch set to (in inches of water):	
Ambient air temp at time of test (degrees):	
Air open flow output temp after 1 hour (degrees):	

### Transfer Pump Specifications

Pump model:	
Pump serial number:	
Nameplate volts:	
Nameplate amps:	
HP:	
PH:	
Operational voltage unit is wired for:	



### SVE Specifications and Test Form

SVE serial number:	
Blower model:	
Blower serial number:	
Nameplate volts:	
Nameplate amps:	
HP:	
PH:	
Voltage unit was tested with:	
Amp draw at open flow:	
(L1) amps:	
(L2) amps:	
(L3) amps:	
CFM at open flow:	
Amp draw at high vacuum setting:	
System vacuum (in inches of water) at open flow:	
System vacuum (in inches of water) at max amps:	
HI vacuum switch set to (in inches of water):	
Amp draw at high vacuum setting:	
(L1) amps:	
(L2) amps:	
(L3) amps:	
CFM at high vacuum setting:	
Ambient air temp at time of test (degrees):	
Air open flow output temp after 1 hour (degrees):	

### Transfer Pump Specifications

Pump model:	
Pump serial number:	
Nameplate volts:	
Nameplate amps:	
HP:	
PH:	
Operational voltage unit is wired for:	

## Sparge Specifications and Test Form

Sparge serial number:	
Motor model:	
Motor serial number:	
Pump model:	
Pump serial number:	
Nameplate volts:	
Nameplate amps:	
HP:	
PH:	
Voltage unit was tested with:	
High pressure switch setting:	
High temp switch setting:	
Amp draw at open flow:	
(L1) amps:	
(L2) amps:	
(L3) amps:	
Pressure at open flow:	
Temp at open flow:	
CFM at open flow:	

### Test range data up to either maximum amps, pressure, or temp

Amp draw:		PSI:		Temp:		CFM:	
Amp draw:		PSI:		Temp:		CFM:	
Amp draw:		PSI:		Temp:		CFM:	
Amp draw:		PSI:		Temp:		CFM:	
Amp draw:		PSI:		Temp:		CFM:	

### Maximum range

Amp draw:		PSI:		Temp:		CFM:	
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## Appendix D - Glossary of Acronyms

BLWR	Blower
ECM	Electronic Control Module
GECM	Geotech Environmental Control Module
H2O	Water (when on 1st line of display on SDFS system)
H2O	Water pump (2 <sup>nd</sup> line of message on SDFS/PSCAV system))
H2OL	Water level low (SDFS intake cartridge or PSCAV water HI/LO float)
H2OM	Water level middle (SDFS intake cartridge or PSCAV water HI/LO float)
H2OH	Water level high (SDFS intake cartridge or PSCAV water HI/LO float)
HI	High
HOA	Hand-Off-Auto (switch)
HP	Horse Power
IS	Intrinsically Safe
JB	Junction Box
LCD	Liquid Crystal Display
LH	HI/LO float high (Sump probe, 3 position probe)
LL	HI/LO float low (Sump probe, 3 position probe)
LM	HI/LO float middle (Sump probe, 3 position probe)
LO	Low
LOPRO	Low Profile Air Stripper
ORH	Override float (water) high (SDFS/PSCAV probe)
ORL	Override float (water) low (SDFS/PSCAV probe)
ORS	Oil Recovery Systems
PCB	Printed Circuit Board
PH	Phase (electrical term)
PH	Product float high (SDFS/PSCAV probe)
PL	Product float low (SDFS/PSCAV probe)
PM	Product float middle (SDFS/PSCAV probe)
PSCV	Probe Scavenger (4" Small Diameter PSCAV)
PSCAV	Probe Scavenger (4" Small Diameter PSCAV)
PSI	Pressure per Square Inch
PROD	Product pump
RES	Reservoir (SDFS)
SDFS	Small Diameter Filter Scavenger
SN	Serial Number
SPRG	Air Sparge unit
SVE	Soil Vapor Extractor (Extraction)
VAC	Voltage Alternating Current
VDC	Voltage Direct Current
VFD	Variable Frequency Drive, or Vacuum Fluorescent Display
WTDP	Water Table Depression Pump
XFER	Transfer Pump

DOCUMENT REVISIONS		
EDCF#	DESCRIPTION	REV/DATE
-	Previous Revision	11/7/2011
1544	Added WTDP Display Definitions in Section 3	3/13/2013
1544	Added Field Programmer Instructions in Section 2	10/1/2013

## Engineering Document Compilation Check List

- \_\_\_\_\_ Project file created and assigned number (SO number).
- \_\_\_\_\_ Written logic description approved by sales person and customer.
- \_\_\_\_\_ System schematic approved by sales person and customer.
- \_\_\_\_\_ Control panel wiring diagram (GECM Field Wiring Diagram).
- \_\_\_\_\_ High level program and hex file saved to SO project directory.
- \_\_\_\_\_ PDF wiring diagrams/system schematic created and saved to SO project directory.
- \_\_\_\_\_ Test procedures and travelers complete, copies scanned into PDF and stored in electronic project file. Original and copies put into hardcopy project manual. Original filed in engineering library. Copy with equipment to ship to customer.
- \_\_\_\_\_ Purchased equipment User Manuals and specifications gathered and organized. Original and copies put into hardcopy project manual.

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



**Geotech Environmental Equipment, Inc**  
2650 East 40th Avenue Denver, Colorado 80205  
(303) 320-4764 • **(800) 833-7958** • FAX (303) 322-7242  
email: [sales@geotechenv.com](mailto:sales@geotechenv.com) website: [www.geotechenv.com](http://www.geotechenv.com)