earth safe
Fuel Systems for Critical Power

VERSION: ENGLISH—GLOBAL

Model C900
CentraPlex Control Module

INSTRUCTION MANUAL
EMERGENCY POWER FUEL SYSTEMS

Earthsafe Systems, Inc.
7320 S. Madison
Willowbrook, IL 60527

T: (630) 794-5100
F: (630) 794-5106

info@earthsafe.com
www.earthsafe.com

Updated: October 2012

The information contained herein is proprietary and is provided for the sole purpose of the owner's installation, operation, and maintenance of the system. Reproduction of this information for other purposes is prohibited without the prior consent of Earthsafe Systems, Inc.

Notice

Earthsafe makes no warranty of any kind with regard to this publication, including but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Earthsafe shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance or use of this publication. Earthsafe reserves the right to change system options or features, or the information contained in this publication. This publication contains proprietary information which is protected by copyright. All rights reserved. No part of this publication may by photocopied, reproduced, or translated to another language without the prior written consent of Earthsafe.

Damage Claims

Thoroughly examine all components and units as soon as they are received. If damaged, write a complete and detailed description of the damage on the face of the freight bill. The carriers agent must verify the inspection and sign the description. Immediately notify the delivering carrier of damage or loss. This notification may be given either in person or by telephone. Written confirmation must be mailed within 48 hours. Risk of loss, or damage to merchandise belongs with the buyer. It is the buyers responsibility to file a claim with the carrier involved. Immediately advise Earthsafe of the problem so that we may assist you.

Safety Information

UL Listed. The Earthsafe CentraPlex Control Module is UL listed.

Intended Use. The Earthsafe CentraPlex Control Module is intended for use with diesel fuel systems for emergency power generators. The control module and any connected sensors or devices are intended for operation only within ordinary electrical areas. Use of the module and connected sensors or devices within hazardous electrical areas is prohibited.

Intellectual Property

The equipment and software described herein are the property of Earthsafe Systems, Inc. and are protected by various trademarks and patents.

Table of Contents

Title Page 1
Notices 2
Table of Contents 3
General Description 4
Specifications / Physical 5
Display of System Information 6
Software Versions 7
Installation Instructions 9
Functional Descriptions 10
- Day Tank Level Control
- Duplex Pump Control
- Fuel Filtration / Polishing Control
- Multi-Tank Selection Control
- Tank Fill Control
- Dual Tank Fill Control

Operation Instructions 19
- Day Tank Level Control
- Duplex Pump Control
- Fuel Filtration / Polishing Control
- Multi-Tank Selection Control
- Tank Fill Control
- Dual Tank Fill Control

Troubleshooting 25
Maintenance Instructions 26
- Spare Parts

Technical Support 27
- Warranty Information

General Description

The C900 CentraPlex Multi-Function Control Module is designed to monitor and control diesel fuel transfer for emergency power applications. The CentraPlex Module is customized with operating software to provide required operating functions for over 6 common applications:

- Generator Tank Level Control
- Duplex Pump Control
- Fuel Filtration / Polishing
- Multi-Tank Selection Control
- Remote Tank Fill Systems

The CentraPlex Module receives inputs from operating systems including: (a) tank level sensors, (b) leak detection sensors, (c) flow sensors, (d) pressure sensors, (e) pump current sensors, (f) filter water sensors, (g) filter differential pressure sensors, (h) valve position sensors.

The CentraPlex Module operates output devices for the fuel system including: (a) solenoid valves, (b) fuel supply pumps, (c) fuel return pumps, (d) actuated ball valves, (e) actuated butterfly valves.

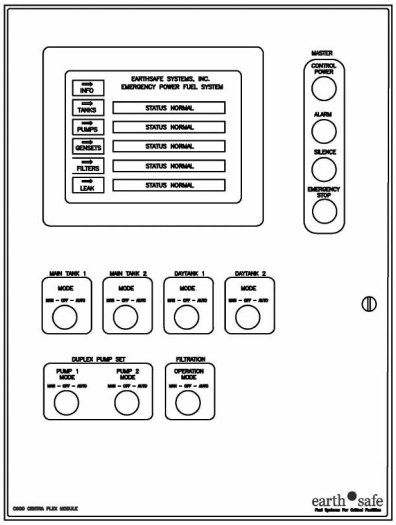
The control module includes MAN.-OFF-AUTO selector switches for the fuel transfer pump / valves. The manual mode allows the pump / valve to be activated for manual operation or testing. In the auto mode the pump / valve are activated by the conditions of the input sensors.

The CentraPlex Module includes the following elements:

1. Programmable Controller
   The programmable controller provides the control logic for the system and operates system elements with limited current capabilities.
2. Output Control Relays
   The unit includes relays to operate valves, pumps, remote alarms, and to isolate the Controller from these devices.
3. Mode Selector Switches
   The module includes dual MAN.-OFF-AUTO mode selector.
4. Display Screen
   The module includes a display to communicate the operating status of the unit. Different screens are presented based on the specific operating function of the unit. See the operating section of the manual for additional information.
5. Alarm Horn
   The module includes an audible alarm which operates on a auto-shutoff adjustable timer.
6. Emergency Stop
   The module includes an emergency stop button which interrupts the function of the output relays to stop pumps and close valves. The emergency stop button is mechanically maintained with a twist to release function.
7. Communications Link
   The module includes a communication link to allow operating status data to be transferred to other control and monitoring systems.

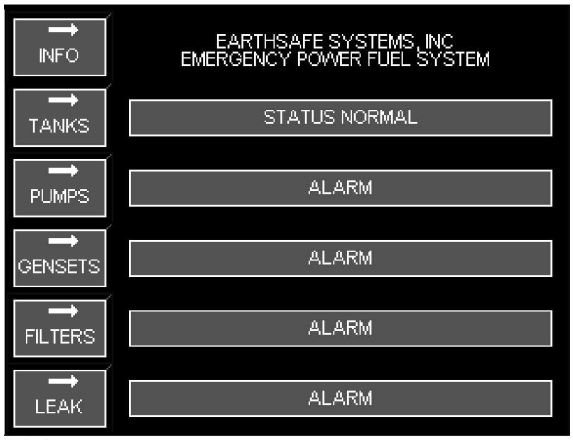
The control module is operationally tested at the factory. However additional inspection and testing i s required at installation to ensure that the unit has not been adversely affected by shipment.

Model C900
CentraPlex Control Module

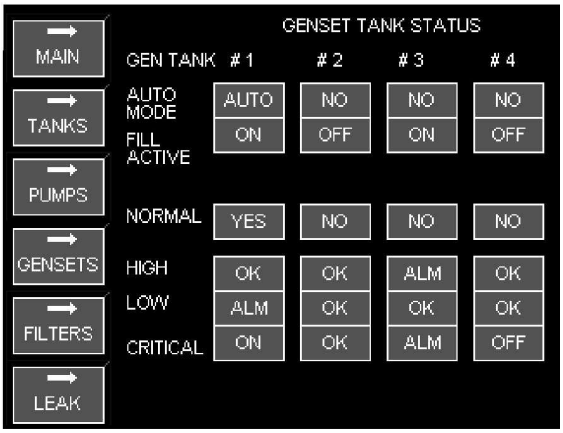


OmniPlex Module	
Dimensions	136" H x 24" W x 8" D
Approval	UL
Power	120 VAC / 5 A / 60 Hz Single or Dual Source 24 VDC Control Circuits
Enclosure	NEMA 4 Color RAL 7035 (Light Gray)
Environmental	32 to 131 F (0-55 C) -20 to 130 F with heater
Communication	BACnet, Modbus, LON, Metasys
Processor	AB ML1100
Other	Isolated Inductive Loads 5 Amp Output Relays (Typ)
Options	50 Hz Power CE Approval Intrinsic Safety Barriers Enclosure Heater

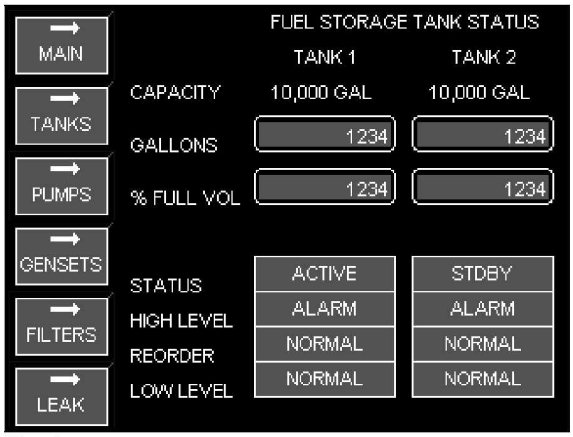
ORDERING INFORMATION	
PART	DESCRIPTION
PPC910.04	Control Module: 1-4 Functional Units
PPC910.08	Control Module: 5-8 Functional Units
PPC910.12	Control Module: 9-12 Functional Units
PPC910.16	Control Module: 13-16 Functional Units
PPC910.20	Control Module: 17-20 Functional Units
	Calculate the Functional Elements as follows: + Number of Fuel Transfer Pumps + Number of Generator Day Tanks + Number of Bulk Storage Tanks + Number of Filtration / Polishers + Number of Fill Stations = Total Functional Elements



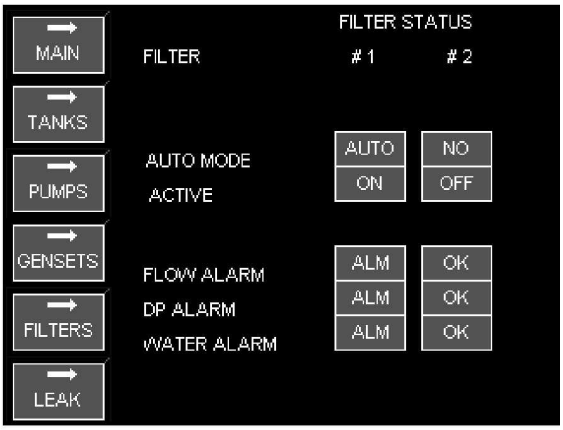
Main



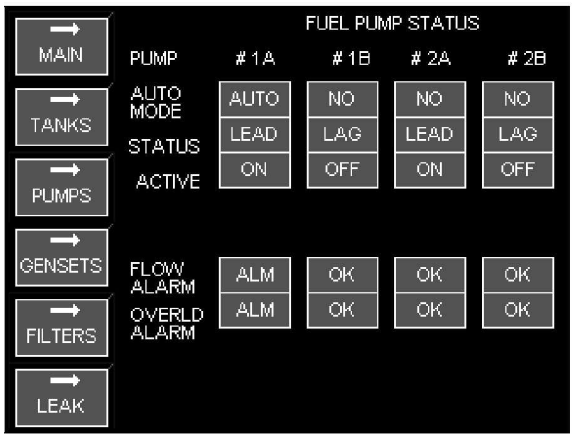
Gensets



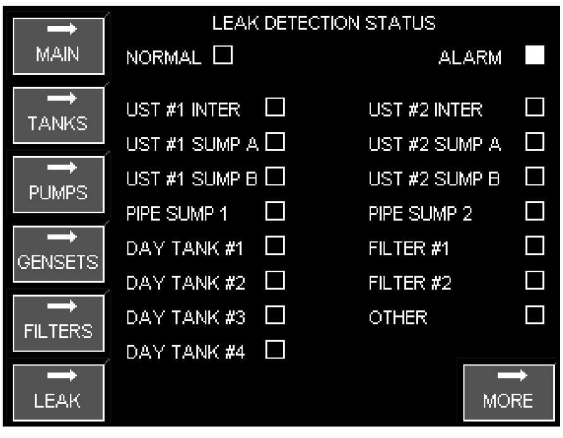
Tank



Filters



Pumps



Leak

Software Versions

The CentraPlex Controller is programmed to operate in a wide variety of fuel system control configurations. The software is selected at the time of purchase and is factory configured, but can be field modified by an Earthsafe technician. The modular software is designed to integrate a variety of operating elements.

Standard Software Element

ELEMENT	TYPE	GENERAL DESCRIPTION
OS100.01	Gen Tank Refill	Single or Twin Inlet Valve High Stop Valve or Return Flow Pump Pump Start Signal to Remote Pumps Critical Low Output Relay Common Alarm Output Relay: Leak-High-Low
OS200.01	Duplex Pump	Start Pump From Day Tank Signal Submersible or Standard Pumps Alternate Pump Starts Monitor Pump Current / Flow and Switch on Fail
OS300.01	Filter / Pump	Programmable Timer for Filtration Cycle Start – Stop Pump on Time Cycle Monitor Filter Pressure and Water
OS400.01	Single Tank Fill	Single Tank Fill Station Monitor Tank High Level Sensors Audible – Visual Alarm Close Fill Valve at High Level
OS400.10	Dual Tank Fill	Dual Tank Fill Station Select Tank To be Filled Monitor Tank High Level Sensors Audible – Visual Alarm Close Fill Valve at High Level
OS450.01	Multi-Tank Select Dual Tanks	Select Tank for Supply – Return Operate Supply Pump or Valves Operate 3 Way Return Valve or Dual FOR Valves Switch Tanks on Low Level

Enhanced Software Elements

Enhanced Software Versions are available for the CentraPlex Controller. Project Specific documents include detailed information on the specialized operating sequence, wiring diagrams, and operating instructions associated with each version.

ELEMENT	TYPE	MODIFICATIONS FROM STANDARD
OS100.02	Gen Tank Refill % Fill Display	Level Control from Analog Sensor % Fill Display
OS100.03	Gen Tank Refill Dual Inlet	Duplex Inlet Valve or Duplex Supply Pumps Alternates Valve-Pump each Start or Low Level
OS100.04	Gen Tank Refill Actuated Valves	Dual Inlet Actuated Ball Valves instead of Solenoids Monitor Feedback from Valve and Switch on Fail
OS100.05	Gen Tank Refill Duplex Supply Pumps	Single or Twin Inlet Valve Operation Operate Duplex Fuel Supply Pumps Alternate Pumps on Start Monitor Pump Flow / Current and Switch on Fail
OS200.10	Duplex Pump Dual Tank	Operate Duplex Pumps Select Tank for Supply – Return Operate Supply Valves Operate 3 Way Return Valve or Dual FOR Valves
OS300.02	Pump / Filter Dual Tank	Operate Filter / Pumps on Timed Cycle Select Tank to be Filtered on Alternate Cycles Operated Supply and Return Valves for Selected Tank
OS300.03	Dual Filter	Operate Remote Pumps for Dual Filter Monitor Dual Filter Status
OS450.02	Multi-Tank Select 3-Tanks	Select Tank for Supply – Return Operate Supply Pump or Valves Operate Return Flow Valves Switch Tanks on Low Level
OS450.03	Multi-Tank Select 4-Tanks	Select Tank for Supply – Return Operate Supply Pump or Valves Operate Return Flow Valves Switch Tanks on Low Level
OS400.02	Single Tank Fill % Fill Display	Operate Single Tank Fill Operation Display Tank % Fill
OS400.03	Single Tank Fill Pump Flow	Operate Single Tank Fill Operation Operate Pump for Fuel Transfer
OS400.04	Single Tank Fill % Fill Display Pump Flow	Operate Single Tank Fill Operation Display Tank % Fill Operate Pump for Fuel Transfer
OS410.02	Dual Tank Fill % Fill Display	Operate Dual Tank Fill Station Display Tank % Fill
OS410.03	Dual Tank Fill Pump Flow	Operate Dual Tank Fill Operation Operate Pump for Fuel Transfer
OS450.02	Multi-Tank Select 3-Tanks	Select Tank for Supply – Return Operate Supply Pump or Valves Operate Return Flow Valves Switch Tanks on Low Level
OS450.03	Multi-Tank Select 4-Tanks	Select Tank for Supply – Return Operate Supply Pump or Valves Operate Return Flow Valves Switch Tanks on Low Level

Installation Instructions

A. General

1. The system including the control panel, sensors, and devices is designed for ordinary electrical areas, and shall not be installed in hazardous electrical areas.

2. The control panel, external devices, and wiring should be installed by a competent electrician in accordance with National Electric Code requirements and all applicable local regulations.

B. Control Panel

1. Select an appropriate location for the control panel installation. The location should be indoors in a dry and temperature controlled environment. The operating temperature for the control panel is 32 to 104 degrees F (0 to 40 degrees C). The control panel must be protected from severe vibration, extremes in temperature and humidity, rain, and other conditions that could harm computerized electronic equipment.

2. Remove all packaging material. Inspect the control module for damage. Install the panel on a wall or bracket and secure with (4) bolts at the corners. Provide 120 VAC power supply to the control module from a dedicated circuit breaker. Provide conduit openings in the panel suitable for the input and output wiring to external devices.

3. Always disconnect power at the external circuit breaker, using approved lock out / tag out procedures prior to terminating wiring inside the control panel.

C. External Devices

1. The control panel is designed to receive inputs from external sensors, operate external valves and pumps, and supply on/off signals to remote systems. Install external sensors, valves, and pumps per their manufacturers recommendations. Install wiring junction boxes where required to make wiring connections to the devices. Junction boxes should be rain tight where exposed to weather.

D. Conduit Systems

1. The system can be installed using a variety of conduit systems as applicable for the environment and code requirements, including PVC, EMT, IMC, and RGS.

2. Wiring should be separated in conduit systems in conformance with code requirements, and in conformance with the following:
   (a) separate fuel system wiring from wiring for other building systems.
   (b) separate DC wiring from AC wiring in conduits.
   (c) separate AC signal wires from AC power for motor loads.
   (d) separate data wiring for networks from other wiring
   (e) separate Intrinsically Safe wiring for tank gauge sensors.

E. Wiring

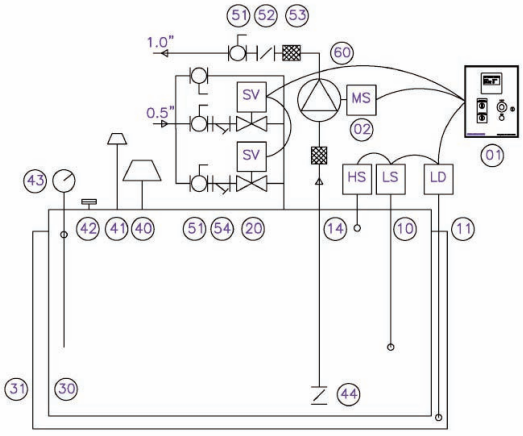
1. Use only stranded THHN wiring. Use #14 AWG wiring for signal wining unless noted otherwise. Use sequential numbering to identify wiring in each conduit to assist in connection and troubleshooting.

2. Network data wiring shall be 8 conductor, minimum 24 gauge wiring with RJ45 connectors.

Model C900
CentraPlex Control Module

Functional Description:

Generator Tank Level Control – Dual Inlet



Day Tank with Dual Inlet Valves

The control panel monitors the tank level sensors, which are approximately 90% High Level, 85% Fill Stop, 75% Fill Start, 50% Low Level, and 25% Critical Low level. Upon receipt of the Fill Start signal, the control panel closes an output relay to send a pump on / fuel request signal to the remote fuel transfer pump. Simultaneously the lead inlet solenoid valve is energized to open. Upon receipt of the Fill Stop signal, the pump on / fuel request signal ceases, and the inlet solenoid valve de-energizes to close. At Low Level the control panel energizes the lag inlet solenoid valve. The inlet solenoid valves automatically alternate upon starts.

High. Low, and Critical Low Level signals activate and alarm signal and message. The High Level alarm disables the operation of the system in the MAN mode. The system monitors independent Critical High Level, and Tank Leak sensors. Activation of these sensors disable to tank fill operation in either MAN or AUTO mode.

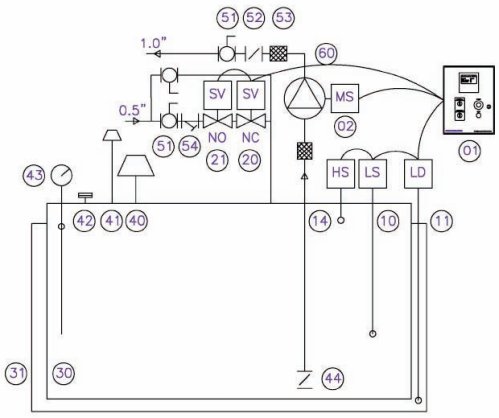
The display indicates: (a) normal or alarm condition, (b) fill active status, (c) alarm indication for critical high, high, low, critical low, and leak alarms, (d) optional % full or gallons. A common alarm output relay and a serial data interface are provided for BMS integration.

Optional Return Flow Pump: In the AUTO mode the pump is activated by the high level signal. The pump operates until the high level signal ceases, plus a 60 second stop delay to prevent short cycling.

Day Tank – Dual Inlet Valves		
Item	Qty	Description
1	1	OmniPlex Control Panel
10	1	Tank Level Sensor
11	1	Leak Sensor
14	1	High Level Sensor
20	2	Solenoid Valve NC
30	1	Day Tank UL 142
31	1	Tank Containment
40	1	Emergency Vent
41	1	Standard Vent
42	1	Inspection Port
43	1	Direct Read Gauge
51	3	Ball Valve
54	2	Strainer
	Add for Return Flow Pump Option	
2	1	Pump Control Panel
44	1	Foot Valve
51	1	Ball Valve
52	1	Check Valve
53	2	Flex Connector
60	1	Pump – Return Flow

Functional Description:

Generator Tank Level Control – High Level Stop Valve



Day Tank with High Stop Valve

The control panel monitors the tank level sensors, which are approximately 90% High Level, 85% Fill Stop, 75% Fill Start, 50% Low Level, and 25% Critical Low level. Upon receipt of the Fill Start signal, the control panel closes an output relay to send a pump on / fuel request signal to the remote fuel transfer pump. Simultaneously the inlet solenoid valve is energized to open. Upon receipt of the Fill Stop signal, the pump on / fuel request signal ceases, and the inlet solenoid valve de-energizes to close.

High. Low, and Critical Low Level signals activate and alarm signal and message. The High Level alarm disables the operation of the system in the MAN mode, and energizes the Normally Open Fill solenoid valve to close. The system monitors independent Critical High Level, and Tank Leak sensors. Activation of these sensors disable to tank fill operation in either MAN or AUTO mode, and energizes the Normally Open Fill solenoid valve to close.

The display indicates: (a) normal or alarm condition, (b) fill active status, (c) alarm indication for critical high, high, low, critical low, and leak alarms, (d) optional % full or gallons. A common alarm output relay and a serial data interface are provided for BMS integration.

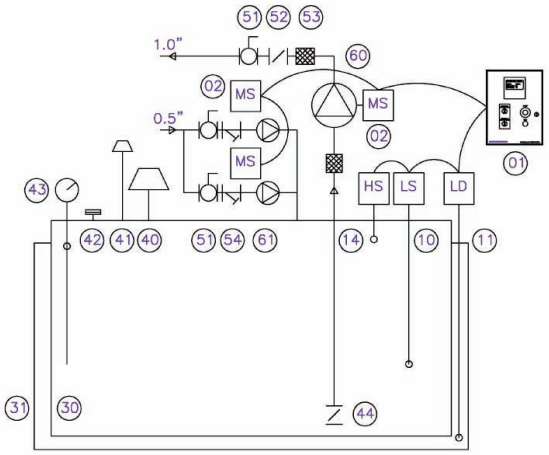
Optional Return Flow Pump: In the AUTO mode the pump is activated by the high level signal. The pump operates until the high level signal ceases, plus a 60 second stop delay to prevent short cycling.

Day Tank – Inlet Valve with High Stop		
Item	Qty	Description
1	1	OmniPlex Control Panel
10	1	Tank Level Sensor
11	1	Leak Sensor
14	1	High Level Sensor
20	1	Solenoid Valve NC
21	1	Solenoid Valve NO
30	1	Day Tank UL 142
31	1	Tank Containment
40	1	Emergency Vent
41	1	Standard Vent
42	1	Inspection Port
43	1	Direct Read Gauge
51	2	Ball Valve
54	2	Strainer
		Add for Return Flow Pump Option
2	1	Pump Control Panel
44	1	Foot Valve
51	1	Ball Valve
52	1	Check Valve
53	2	Flex Connector
60	1	Pump – Return Flow

Model C900
CentraPlex Control Module

Functional Description:

Generator Tank Level Control – Duplex Transfer Pumps



Day Tank with Dual Fuel Supply Pumps

The control panel monitors the tank level sensors, which are approximately 90% High Level, 85% Fill Stop, 75% Fill Start, 50% Low Level, and 25% Critical Low level. Upon receipt of the Fill Start signal, the control panel closes an output relay to activate the lead fuel transfer pump. Upon receipt of the Fill Stop signal, the pump on / fuel request signal ceases, and the fuel transfer pump stops. At Low Level the control panel energizes the lag fuel transfer pump. The fuel transfer pumps automatically alternate upon starts.

High. Low, and Critical Low Level signals activate and alarm signal and message. The High Level alarm disables the operation of the system in the MAN mode. The system monitors independent Critical High Level, and Tank Leak sensors. Activation of these sensors disable to tank fill operation in either MAN or AUTO mode.

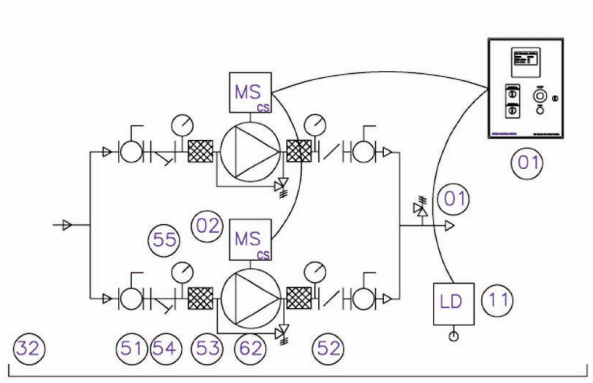
The display indicates: (a) normal or alarm condition, (b) fill active status, (c) alarm indication for critical high, high, low, critical low, and leak alarms, (d) optional % full or gallons, (e) pump status. A common alarm output relay and a serial data interface are provided for BMS integration.

Optional Return Flow Pump: In the AUTO mode the pump is activated by the high level signal. The pump operates until the high level signal ceases, plus a 60 second stop delay to prevent short cycling.

Day Tank – Dual Transfer Pumps		
Item	Qty	Description
1	1	OmniPlex Control Panel
2	1	Pump Control Panel
10	1	Tank Level Sensor
11	1	Leak Sensor
14	1	High Level Sensor
30	1	Day Tank UL 142
31	1	Tank Containment
40	1	Emergency Vent
41	1	Standard Vent
42	1	Inspection Port
43	1	Direct Read Gauge
51	2	Ball Valve
54	2	Strainer
61	1	Pump – Day Tank Supply
	Add for	Return Flow Pump Option
2	1	Pump Control Panel
44	1	Foot Valve
51	1	Ball Valve
52	1	Check Valve
53	2	Flex Connector
60	1	Pump – Return Flow

Functional Description:

Duplex Pump



Duplex Pump Set		
Item	Qty	Description
1	1	OmniPlex Control Panel
2	2	Pump Control Panel
11	1	Leak Sensor
33	1	Pump / Filter Containment
51	4	Ball Valve
52	2	Check Valve
53	4	Flex Connector
54	2	Strainer
55	4	Pressure / Vacuum Gauge
62	2	Pump – Main Transfer
72		Pressure Relief Valve

Duplex Pump:

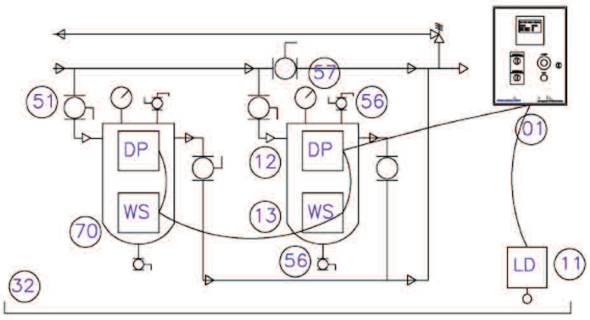
The control panel monitors day tanks, gensets, or other systems for a pump on / fuel request signal. The primary / lead pump is started and is monitored for a current sense signal from the motor starter indicating operation. When the pump on / fuel request signal ceases, then the pump shuts down after a 20 second delay that prevents short cycling.

The first pump selected from OFF to AUTO mode is the lead pump and the other pump is the lag pump. Pumps automatically alternate on consecutive starts. The lag pump will start, after a 20 second delay, if the lead pump has on overload alarm or a current sense failure. The 20 second standard delay can be increased to accommodate the operation of line leak detection systems. The audible alarm operates for 60 seconds, or until reset. Alarms are reset by placing the pump selector in the OFF position and returning to AUTO.

The display indicates for each pump: (a) lead / lag status, (b) normal / alarm status, (c) overload alarm condition, (d) current sense fail condition, (e) not-in-auto status, (f) pump run time meter. A common alarm output relay and a serial data interface are provided for BMS integration.

Functional Description:

Filtration / Polishing



Filter / Polishing Unit

The control panel operates the pump on a programmable timed cycle to circulate fuel from the storage tank through the filter and returning to the storage tank. The unit can be operated with a tank selection system to provide filtration for multiple tank units.

The programmable timer allows setting of the start time / date, the ON cycle time, and the OFF cycle time for the AUTO mode. The programmable timer allows setting of the cycle duration for the MAN mode, to start the pump upon manual initiation and stop it after the defined cycle.

The control panel monitors the filter unit for high differential pressure indicating a need for filter change, and water accumulation. The leak sensor is also monitored and disables the unit from operation in MAN or AUTO mode.

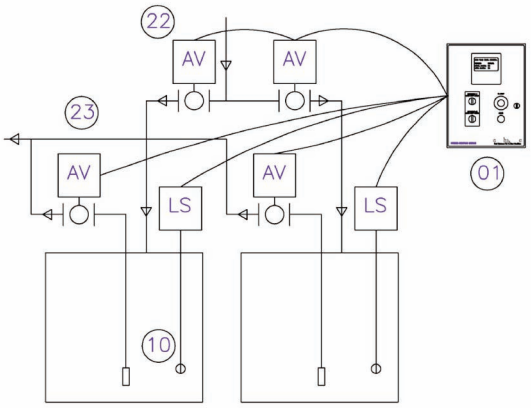
The display indicates: (a) normal or alarm condition, (b) cycle active status, (c) time to start / stop cycle, (d) alarm indication for differential pressure, water accumulation, or leak, (e) pump status. A common alarm output relay and a serial data interface are provided for BMS integration.

Filter – Pump Set

Item	Qty	Description
1	1	OmniPlex Control Panel
2	1	Pump Control Panel
12	1	Filter DP Sensor
13	1	Filter Water Sensor
33	1	Pump / Filter Containment
51	2	Ball Valve
52	1	Check Valve
53	2	Flex Connector
54	1	Strainer
55	2	Pressure / Vacuum Gauge
56	2	Valve – Filter Drain-Vent
57	1	Gauge - Filter
64	1	Pump - Filtration
70	1	Filter Vessel / Cartridges

Functional Description:

Multi-Tank Selection



Tank Selection Control		
Item	Qty	Description
1	1	OmniPlex Control Panel
10	1	Tank Level Sensor
22	2	Actuated Ball Valve - FOR
23	2	Actuated Ball Valve - FOS

Dual Tank Selection:

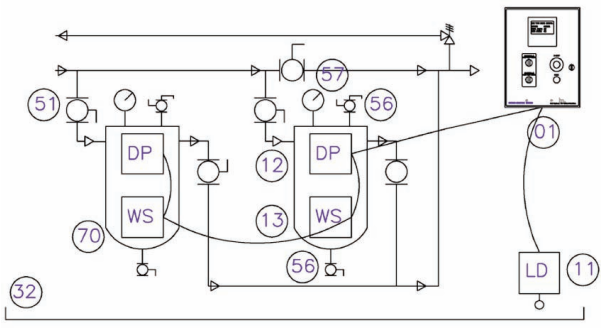
The control panel monitors pump sets for a pump on signal. The panel energizes the FOS and FOR valves from the primary fuel supply tank, and receives an open limit switch signal to prove operation. When the pump on signal ceases, then the FOS and FOR valves from the primary tank are closed.

The first tank selected from OFF to AUTO mode is the lead tank and the other tank is the lag tank. The operation will switch to the alternate tank if a low level signal is received for the primary tank. The low level signal can be generated by an independent sensor, or from a tank level gauge output signal.

The display indicates for each tank: (a) lead / lag status, (b) normal / alarm status, (c) valve open / close status, (d) not-in-auto status. A common alarm output relay and a serial data interface are provided for BMS integration.

Functional Description:

Duplex Filter



Duplex Filter Set		
Item	Qty	Description
1	1	OmniPlex Control Panel
12	2	Filter DP Sensor
13	2	Filter Water Sensor
33	1	Pump / Filter Containment
51	5	Ball Valve
56	4	Valve – Filter Drain-Vent
57	2	Gauge - Filter
70	2	Filter Vessel / Cartridges
71	1	Back Pressure Regulator

Dual Filter Unit

The control panel operates the remote pump on a programmable timed cycle to circulate fuel from the storage tank through the filter and returning to the storage tank. The unit can be operated with a tank selection system to provide filtration for multiple tank units.

The programmable timer allows setting of the start time / date, the ON cycle time, and the OFF cycle time for the AUTO mode. The programmable timer allows setting of the cycle duration for the MAN mode, to start the pump upon manual initiation and stop it after the defined cycle.

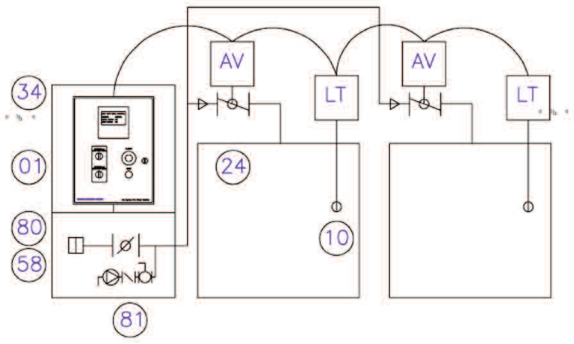
The control panel monitors the filter unit for high differential pressure indicating a need for filter change, and water accumulation. The leak sensor is also monitored and disables the unit from operation in MAN or AUTO mode.

The display indicates: (a) normal or alarm condition, (b) cycle active status, (c) time to start / stop cycle, (d) alarm indication for differential pressure, water accumulation, or leak, (e) filter status, (f) pump status. A common alarm output relay and a serial data interface are provided for BMS integration.

Model C900
CentraPlex Control Module

Functional Description:

Tank Fill — Standard



Tank Fill System		
Item	Qty	Description
1	1	OmniPlex Control Panel
10	2	Tank Level Sensor
24	2	Actuated Butterfly Valve
34	1	Fill Station Cabinet
58	1	Butterfly Valve
80	1	Hose Adapter / Cap
81	1	Hand Pump Assembly

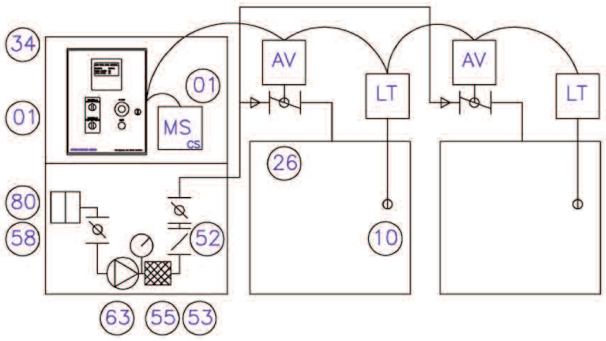
Tank Fill Control:

The control panel monitors a high level sensor in the fuel tank and controls the opening of the actuated valve in the fill pipe. The tank to be filled is selected at the control panel. The fill line valve is energized to open, as long as the tank level is less than 85%. The fill valve limit switch provides feedback to the panel, so that when filling multiple tanks only one valve is open at any one time.

Fuel is transferred into the tank until the 85% tank level is reached and an audible alarm is activated. The audible alarm operates for 60 seconds, or until reset. Alarms are reset by placing the tank selector in the OFF position. At 90% fill level the alarm is re-activated and the fill pipe valve is closed. The valve may be opened in the manual mode up to 95%, at which point the valve is closed and disabled.

Functional Description:

Tank Fill — Transfer Pump



Tank Fill Control with Pump:

The control panel monitors a high level sensor in the fuel tank and controls the opening of the transfer pump and actuated valve in the fill pipe. The tank to be filled is selected at the control panel. The pump is enabled and the fill line valve is energized to open, as long as the tank level is less than 85%. The fill valve limit switch provides feedback to the panel, so that when filling multiple tanks only one valve is open at any one time.

The transfer pump is operated by placing its motor starter in the AUTO position. Fuel is transferred into the tank until the 85% tank level is reached and an audible alarm is activated. The audible alarm operates for 60 seconds, or until reset. Alarms are reset by placing the tank selector in the OFF position. At 90% fill level the alarm is re-activated, the transfer pump is disabled, and the fill pipe valve is closed. The transfer pump and fill pipe valve may be operated in the manual mode up to 95%, at which point the pump and valve are closed and disabled.

-

Tank Fill System - Pump

Item	Qty	Description
1	1	OmniPlex Control Panel
2	1	Pump Control Panel
10	2	Tank Level Sensor
24	2	Actuated Butterfly Valve
35	1	Fill Station Cabinet - Pump
52	1	Check Valve
53	1	Flex Connector
55	1	Pressure / Vacuum Gauge
58	2	Butterfly Valve
63	1	Pump – Fill station
80	1	Hose Adapter / Cap

Generator Tank Level Control

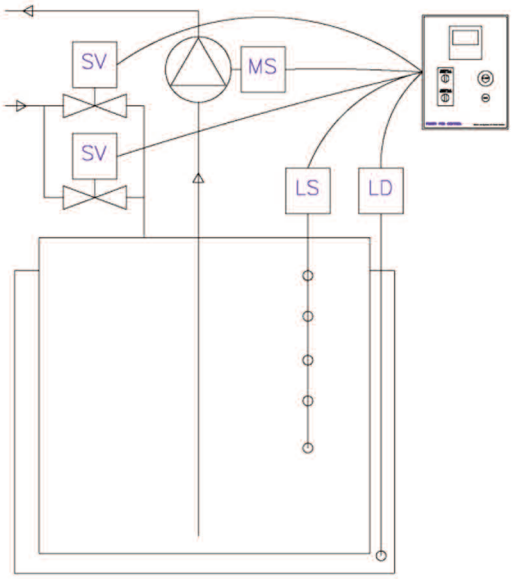
Refer to Standard Operating Procedures for detailed description of inputs, outputs, and operating logic.

Manual Mode

Place the switch in the manual mode to (a) energize and open the inlet solenoid valves, and (b) generate an output signal for remote pump on request. High level in tank disables this function.

Auto Mode

Place the switch in the auto mode to operate based on inputs from the tank level sensor. (a) Critical Low Level and Low Level activates panel alarm and output relay. (b) Fill Start Level energizes inlet valves to open and generates and output signal for remote pump on request. (c) Fill Stop Level de-energizes to close inlet solenoid valve and ends remote pump on signal. (d) High Level activates panel alarm and remote output relay, disables manual fill mode, and activates relay for high level stop valve or overflow pump.



Operation Instructions

Duplex Pump Control

Duplex Pump Control

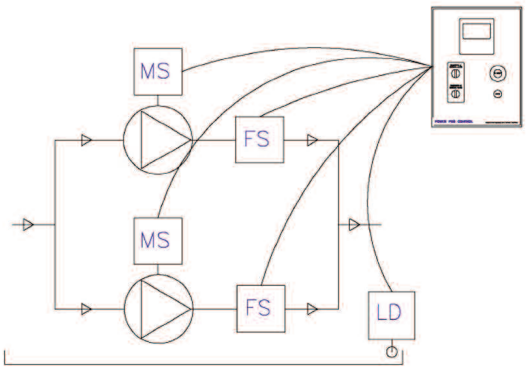
Refer to Standard Operating Procedures for detailed description of inputs, outputs, and operating logic.

Manual Mode (Pump 1 or 2)

Place the switch in the manual mode to (a) energize pump motor starter and start pump.

Auto Mode (Pump 1 or 2)

Place the switch in the auto mode to operate pumps based on remote inputs. (a) Start pump when input active from day tank requesting refill, and stop pump when signal ceases. (b) Alternate pumps on successive starts. (c) Monitor input from pump flow or pump current sensor to prove pump, and auto switch to second pump if no signal after 30 second time delay. (d) Monitor pump motor starter for not-in-auto state and indicate alarm.



Operation Instructions

Filter Polisher Control

Filter Polisher Control

Refer to Standard Operating Procedures for detailed description of inputs, outputs, and operating logic.

Filter Pump Manual Mode

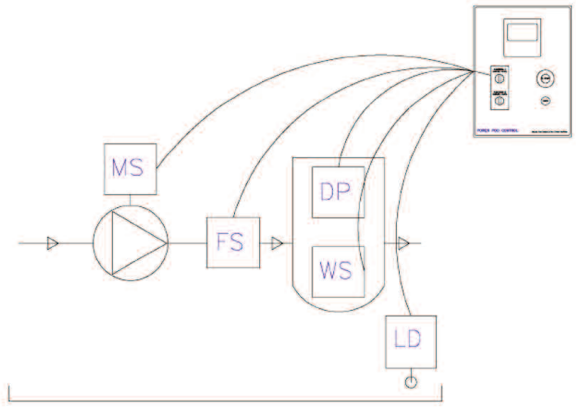
Place the switch in the manual mode to energize pump motor starter and start pump. (a) When timer selector switch is in OFF mode the pump will continue until removed from MAN mode. (b) When timer selector switch is AUTO mode, the pump will run through the on cycle set time, and then stop until reset.

Filter Pump Auto Mode

Timer Auto Mode (Lower Selector Switch)
Place the switch in the auto mode, with timer in auto mode, to operate pumps based on timer settings for on/off cycle.

Timer Reset Mode (Lower Selector Switch)

When the selector switch is moved to the OFF position, the timer is reset.



Tank Fill Control

Refer to Standard Operating Procedures for detailed description of inputs, outputs, and operating logic.

Auto Mode

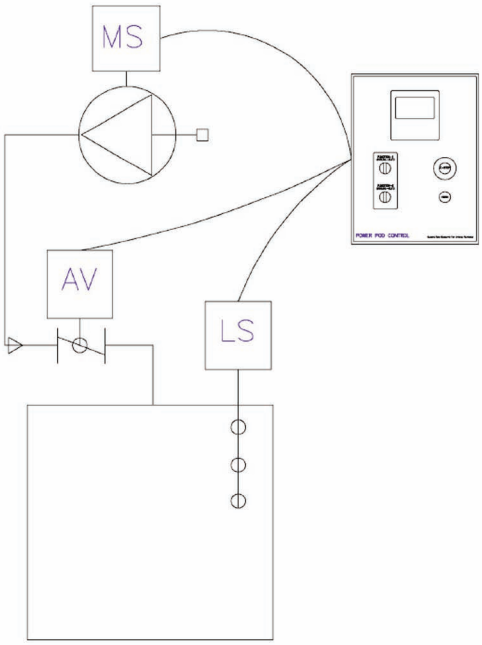
Place the switch in the auto mode to operate based on inputs from the tank level sensor and fill selection switch.

Fill Start Mode

Energizes to open the inlet actuated valve and generates output signal to enable fill pump if used. At 85% fill level, audible alarm is activated. At 90% fill level function is disabled.

Fill Jog Mode

Energizes to open the inlet actuated valve and generates output signal to enable fill pump if used. Resets to OFF position after 10 seconds. At 95% fill level function is disabled.

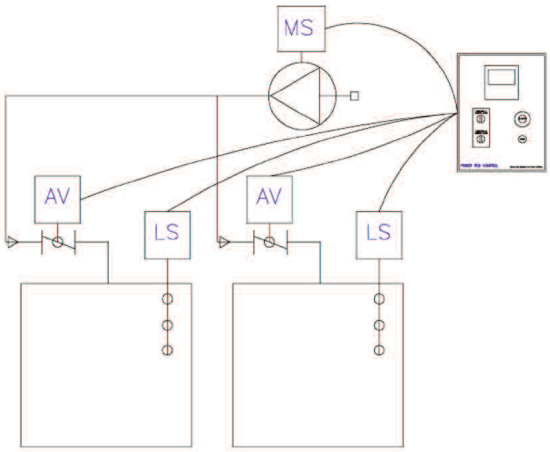


Dual Tank Fill Control
Refer to Standard Operating Procedures for detailed description of inputs, outputs, and operating logic.

Tank Select Mode (Top Selector Switch)
Select the Tank to be filled.

Fill Start Mode (Mode Selector Switch)
For the selected tank, energizes to open the inlet actuated valve and generates output signal to enable fill pump if used. At 85% fill level, audible alarm is activated. At 90% fill level function is disabled.

Fill Jog Mode (Mode Selector Switch)
For the selected tank. energizes to open the inlet actuated valve and generates output signal to enable fill pump if used. Resets to OFF position after 10 seconds. At 95% fill level function is disabled.



Multi-Tank Selection Control

Refer to Standard Operating Procedures for detailed description of inputs, outputs, and operating logic.

Tank Manual Mode

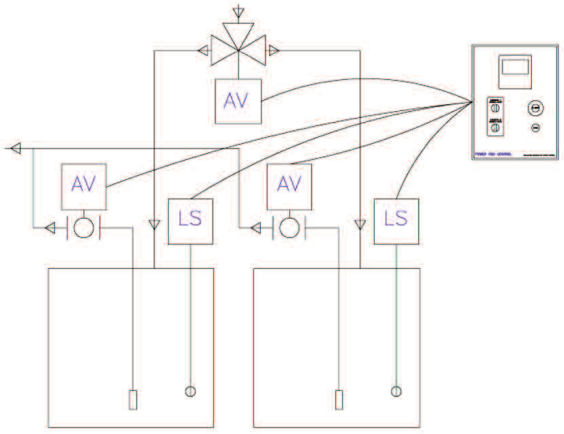
(a) Energizes to open the FOS supply valve for the selected tank, and (b) energizes the 3 way return flow valve (or dual 2-way return flow valves) to open to the selected tank. First tank in manual mode disables the function for the second tank.

Tank Off Mode

Closes the FOS supply valve for the selected tank

Tank Auto Mode

Enables the automatic selection of the tank. Upon receipt of remote pump on signal: (a) energizes to open the FOS supply valve for the selected tank, and (b) energizes the 3 way return flow valve (or dual 2-way return flow valves) to open to the selected tank. (c) switches to alternate tank upon receipt of low level signal.



Troubleshooting

MODE	ITEM	DESCRIPTION	RESPONSE
General	1.01	Display not Active	Check circuit breaker status Check panel internal breaker Check display latch to processor
	1.02	No outputs active	Check Emergency Stop position
	1.03	Select outputs not active	Check wire terminations at panel Check wire terminations at device Check output relay continuity
Gen Tank Refill	2.01	Low Level Alarm Critical Low level Alarm	Check auto mode selected Check emergency stop position Check for closed manual inlet valves Check inlet solenoids energized Check pump active signal Check low sensor input
	2.02	High Level Alarm	Check inlet solenoid closed Check inlet solenoid not leaking Check fill stop sensor input
	2.03	Leak Alarm	Visually inspect for source
Duplex Pump	3.01	Pump did not start	Check auto mode selected Check emergency stop position Check motor starter power on. Check motor starter auto position Check motor starter overload Check on request input
	3.02	Pump start but no flow	Check for closed manual valves Check pump prime
Filter Polisher	4.01	Pump did not start or Pump start but no flow	Check pump items above
	4.02	Filter pressure alarm	Confirm high pressure / change filter Check pressure sensor
	4.03	Filter water alarm	Open valve to drain filter water Check water sensor
	4.04	On/Off cycle error	Check selector switch positions Check emergency stop position Check set points for start and cycles
Tank Fill	5.01	Valve does not open	Check wire terminations at panel Check wire terminations at valve Check selector switch positions Confirm no high level Check emergency stop position Check output relay for continuity
	5.02	Valve or level position error	Check wire terminations at panel Check wire terminations at sensors
Multi-Tank Select	6.01	Valve does not open	Check wire terminations at panel Check wire terminations at valve Check selector switch positions Confirm no high level Check emergency stop position Check output relay for continuity
	6.02	Valve or level position error	Check wire terminations at panel Check wire terminations at sensors

Maintenance Instructions / Spare Parts

Maintenance Instructions

ITEM	MAINTENANCE	SCHEDULE
1	Operate selector switches to manual or test position	30 day intervals
2	Open panel and check for water seepage or excessive condensation	30 day intervals
3	Remove sensors and activate to confirm system function	Annually

Spare Parts

Spare parts are available worldwide from local Allen Bradley parts distributors. Locate local distributor information at www.ab.com

Technical Support / Warranty Service

Technical Support

Contact Earthsafe at

(630) 794-5100
(630) 794-5106 Fax

www.earthsafe.com

7320 S. Madison
Willowbrook, IL 60527

Warranty Statement

Earthsafe Systems, Inc. warrants the tank level controls to be the kind and quality described in specification provided herein and to be free from defects in material or workmanship under normal service for a period of 1 year after shipment. Earthsafe obligations under this warranty shall be limited to repair or replacement, at the option of Earthsafe, of parts deemed to be defective upon inspection by Earthsafe. User is responsible for transportation of parts or assemblies to Earthsafe or its authorized repair location where the repairs are to be performed.

The provisions of the warranty shall not apply to any equipment, part, or accessory which (a) has been improperly specified by buyer, (b) has been improperly stored or handled prior to placing in service, (c) has been damaged or loosened during shipment, (d) has been improperly mounted or connected, (e) has not been operated within the equipment specifications, or (f) has been improperly maintained.

Earthsafe reserves the right to reject warranty claims of any kind for equipment for which it has not received full payment.

This warranty is in lieu of all other warranties, express or implied, and all other obligations or liabilities on the part of Earthsafe. Earthsafe assumes no responsibility or liability for any special, incidental, or consequential damage.