earth safe
Fuel Systems for Critical Power

Model C810
OmniPlex Control Module
Generator Day Tank Operation

INSTRUCTION MANUAL
EMERGENCY POWER FUEL SYSTEMS

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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 OmniPlex Control Module is UL listed.

Intended Use. The Earthsafe OmniPlex 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

General Description

The C800 OmniPlex Multi-Function Control Module is designed to monitor and control diesel fuel transfer for emergency power applications. The OmniPlex 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
- Dual Tank Full Systems

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

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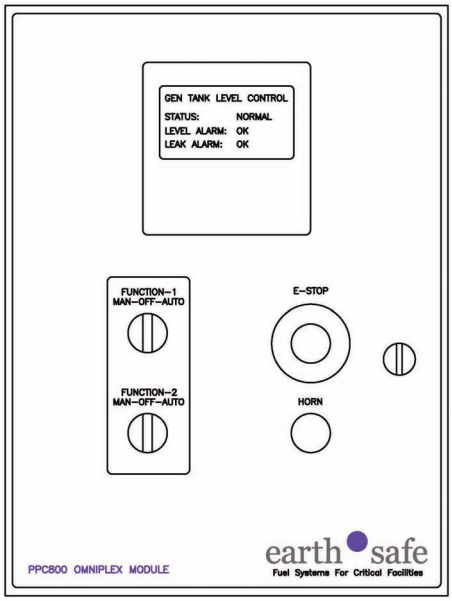

OmniPlex Module	
Dimensions	12" H x 10" W x 8" D
Approval	UL
Power	120 VAC / 5 A / 60 Hz Single or Dual Source 24 VDC Control Circuits
Enclosure	NEMA 4 Color RAL 7035 (Light Gray)
Environmental	32 to 131 F (0-55 C) -20 to 130 F with heater
Communication	AB DeviceNet
Communication	AB PICO GFX-70
Other	Isolated Inductive Loads 5 Amp Output Relays (Typ)
Options	50 Hz Power CE Approval Intrinsic Safety Barriers Enclosure Heater

ORDERING INFORMATION	
PART	DESCRIPTION
C810	Control Module: Day Tank Level

Software Versions

The OmniPlex Multifunction 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. The software can be changed after installation by installing a new memory module into the controller and re-starting the device.

Standard Software Versions

VERSION	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

Enhanced Software Versions

Enhanced Software Versions are available for the OmniPlex Controller. Detailed information on the Versions is available at www.earthsafe.com including the specialized operating sequence, wiring diagrams, and operating instructions associated with each version.

Standard Software Versions

VERSION	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

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.

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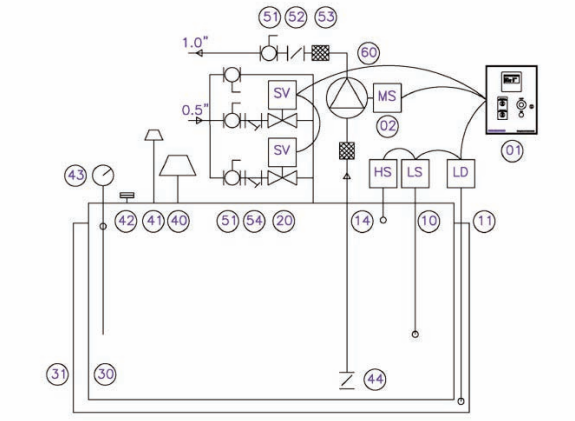
Functional Description:
Generator Tank Level Control – Dual Inlet



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.

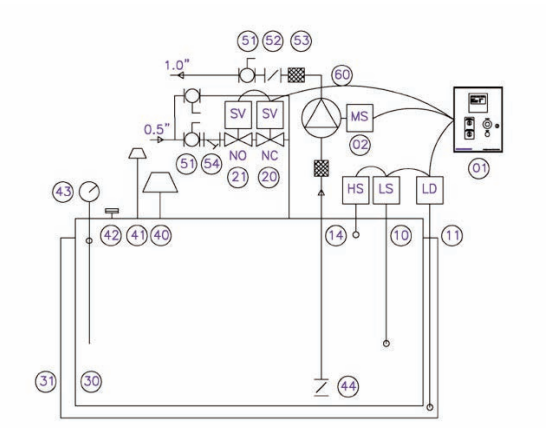
The display indicates: (a) normal or alarm condition, (b) fill active status, (c) alarm indication for critical high, high, low, critical low, and leak alarms, (d) optional % full or gallons. A common alarm output relay and a serial data interface are provided for BMS integration.

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

Model C810
OmniPlex Control Module
Generator Day Tank Operation

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

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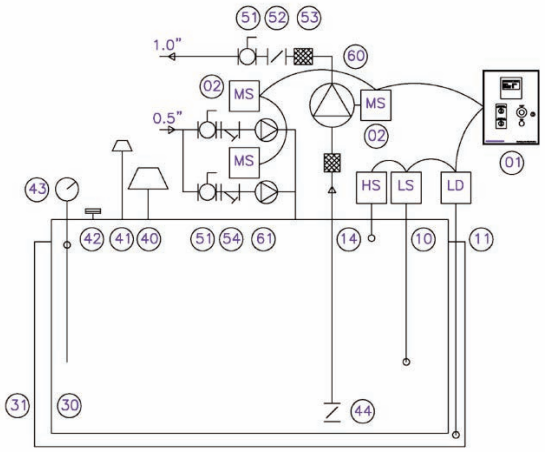
Functional Description:
Generator Tank Level Control – Duplex Transfer Pumps



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

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Generator Day Tank Operation

Operation Instructions
Gen Tank Level Control

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

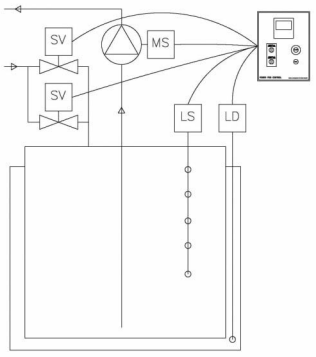
Manual Mode (Top Selector Switch)
Place the switch in the manual mode to (a) energize and open the inlet solenoid valves, and (b) generate an output signal for remote pump on request. High level in tank disables this function.

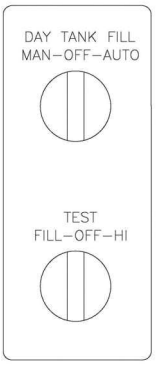
Auto Mode (Top Selector Switch)
Place the switch in the auto mode to operate based on inputs from the tank level sensor. (a) Critical Low Level and Low Level activates panel alarm and output relay. (b) Fill Start Level energizes inlet valves to open and generates and output signal for remote pump on 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.

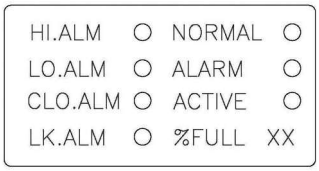
Test Mode – Fill (Lower Selector Switch)
Energizes to open inlet solenoid valves and generates output signal for remote pump on request. Resets after 5 seconds.

Test Mode – Hi (Lower Selector Switch)
Energizes output relay for high level stop valve or overflow pump. Resets after 5 seconds.

Display
Indicates operating status and alarm conditions.







Troubleshooting

Maintenance Instructions

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

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

Contact Earthsafe at

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

www.earthsafe.com

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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.