earth safe
Fuel Systems for Critical Power

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

Model M400

Fuel Tank Fill Station

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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 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

Safety notices – General Safety Rules – Symbols (danger-warning-caution)

SAFETY INFORMATION AND INSTRUCTIONS

Danger — Failure to follow the indicated instruction may result in serious injury or death.
Warning — In addition to possible serious injury or death, failure to follow the indicated instruction may cause damage to pump and/or other equipment.

IMPROPER INSTALLATION, OPERATION OR MAINTENANCE MAY CAUSE SERIOUS INJURY OR DEATH AND/OR RESULT IN DAMAGE TO UNIT AND/OR OTHER EQUIPMENT. EARTHSAFE'S WARRANTY DOES NOT COVER FAILURE DUE TO IMPROPER INSTALLATION, OPERATION OR MAINTENANCE.

THIS INFORMATION MUST BE FULLY READ BEFORE BEGINNING INSTALLATION, OPERATION OR MAINTENANCE OF EQUIPMENT AND MUST BE KEPT WITH EQUIPMENT. EQUIPMENT MUST BE INSTALLED, OPERATED AND MAINTAINED ONLY BY SUITABLY TRAINED AND QUALIFIED PERSONS.

THE FOLLOWING SAFETY INSTRUCTIONS MUST BE FOLLOWED AND ADHERED TO AT ALL TIMES.

Symbol Legend:

Danger — Failure to follow the indicated instruction may result in serious injury or death
Warning — In addition to possible serious injury or death, failure to follow the indicated instruction may cause damage to pump and/or other equipment.

BEFORE opening any pipe system, pump, or valve be sure that:

- Any pressure in the chamber has been completely vented through the suction or discharge lines or other appropriate openings or connections.
- The electrical system system means has been "locked out" or otherwise been made non-operational so that it cannot be started while work is being done on the equipment.
- You have obtained appropriate material safety data sheet (MSDS) and understand and follow all precautions appropriate for the safe handling of the material.

INSTALL pressure gauges/sensors at piping and pump connections to the equipment to monitor pressures.

USE extreme caution when lifting the pump. Suitable lifting devices should be used when appropriate.

THE equipment must be installed in a matter that allows safe access for routine maintenance and for inspection during operation to check for leakage and monitor operation.

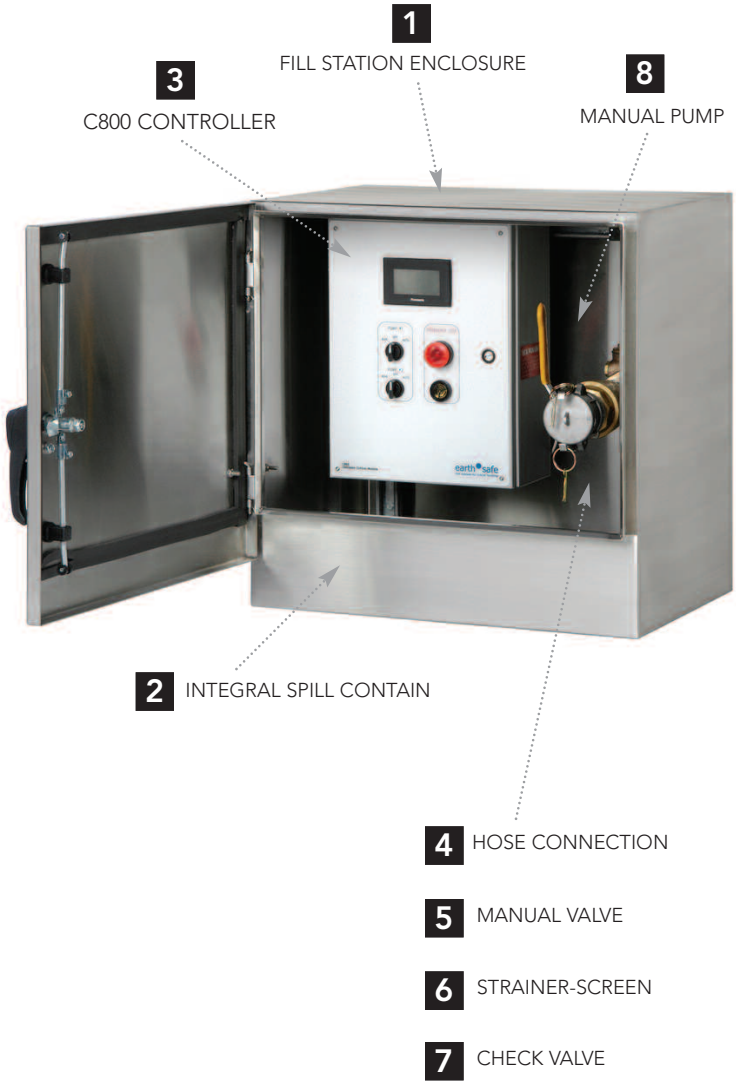
General Description

Fill System for Tanks in Buildings.
The Earthsafe M400 Compact Fill Station is designed for the safe filling of fuel tanks located inside buildings. The system is designed to install outside the building to accept fuel from delivery trucks and safely transfer fuel to the fuel tank in the building.

Overfill Prevention Safety.
The system is designed with overfill prevention safety. The electronic controller at the fill station monitors the fuel level in the tank as a continuous level reading (0-100%) or as a set of high level sensors (85-90-95%). The controller provides audible and visual high level warning at 85%, high level alarm at 90%, and critical high level at 95%. The controller monitors the position of actuated fill pipe valves, and closes the valve upon high level.

Single or Multi-Tank Systems.
The Earthsafe Compact Fill Station will provide safe filling for a single or multiple fuel storage tanks. In multiple tank systems the controller monitors level sensors in each tank and operates an actuated valve to allow filling of the selected tank.

Passive or Pump Equipped.
The fill station is most commonly used with pump equipped fuel delivery trucks. Where facility based pumps are required, the fill station can be equipped with pumps from 30 to 300 GPM capacity.



Physical Description

1. Enclosure: Welded stainless steel enclosure
2. Integral Spill Containment
3. Control Panel: PLC based control panel
4. Hose Connection
5. Manual Shutoff Valve
6. Strainer / Screen
7. Check Valve
8. Manual Cleanup Pump: for handling spilled fuel

Planning the Installation

Location

1. Location — locate the fill station where it will be accessible by fuel delivery trucks.
2. Accessibility — Actuated valve should bbe visible to confirm position, and accessible for servicing.

Piping

Before starting layout and installation of your piping system, consider the following points:

1. Size the fuel supply piping to allow adequate flow for the size of the tank to be filled. A 2" pipe will flow up to 100 GPM. So if greater flow rates are required then increase the line size.
2. Where the fuel tank is below the fill point, slope the piping continuously toward the tank without traps to allow drainage.
3. Install gravity overflow pipe so that it slopes continuously from the day tank back to the main storage tank.
4. Be sure the inside of the pipe is clean before connecting to the main tank and fill station.
5. Be sure allowance is made for expansion and contraction of the piping so the fill station and main tank connections are not stressed by the piping.
6. The fill station should not be used to support the piping. The weight of the pipe should be carried by hangers and supports.

Pipe, Conduit, Anchor Penetrations

1. The fill station bottom and lower 6" of wall surface forms a spill containment. Do not drill or otherwise penetrate the fill station enclosure within the containment area.

Installation

1. Remove packaging and inspect for shipping damage. Note any shipping damage on the shipping ticket and notify Earthsafe within 24 hours of receipt.
2. Confirm the size of the wall opening for flush mounted units. For surface mount units confirm the wall construction will support the fill station installation.
3. Set unit at installation location. Use proper handling procedures to avoid damage to the unit.
4. For surface mounted units, install anchor bolts at 4 corners. Use 3/8" diameter expansion anchors with 3" embedment or as required for local code compliance.
5. For flush mounted units, block the unit into the wall opening and provide secure mounting.
6. Connect power to controller. Reference specific installation instructions and wiring diagrams for the controller and motor starter panels.
7. Check tightness of all bolt, which may have loosed during shipment.
8. Pressure test the fill piping to 50 PSI or in accordance with project design requirements. Correct any loose bolts or threaded joints if required.
9. Clean field installed piping. Clean all dirt and debris from field installed piping prior to connecting to the fill station and main tank.
10. Connect piping to the fill station outlet piping. Confirm that field piping is independently supported to avoid stress on the pump set piping.
11. Where a fuel transfer pump is provided, check pump rotation. Energize the pump momentarily to observe direction of motor fan rotation
12. Install actuated valves in fill piping and wire to controller.
13. Install high level sensors in main tank and wire to controller.

Startup

1. Check that the piping from the fill station to the main tank is complete and tested.
   Confirm that all manual valves in the fill pipe, outside the fill station, are in an open position.
2. Check that all wiring is completed to the actuated valves and main tank sensors.
3. Turn on power to the controller,
4. Check the closed status of the actuated valves.
5. Operate the control panel test function to check the high level alarm audible signal.
6. Operate the controller to open each actuated valve and check accuracy of the panel display.
7. Operate the fill station in accordance with the tank fill procedure.

Testing

Perform the testing procedure in accordance with the startup checklist.

Fill Station Startup and Test Checklist				
Item	Description	Check	Date	Comments
1	Power to control panel			
2	Initial display is accurate			
3	High Warning level input and display			
4	High Alarm level input and display			
5	High stop level input and display			
6	Valve open input and display			
7	Valve close input and display			
8	Test Mode Valve Cycle open and close			
9	Select tank to fill			
10	Confirm valve open			
11	Confirm valve close on OFF select			
12	Confirm valve close on estop			
13	Alarm and display on High Warning level			
14	Alarm, display and valve close on High Alarm			
15	Alarm, display, and valve close on High Stop			
16	Confirm % Fill display accurate			

Operation

1. Fill Station controller operation.

   Refer to Controller manual for details of fill station operations.

Fuel Oil Fill Station Operating Procedure

1. Calculate the free volume in the tank to be filled to the 85% fill level. Use the electronic gauging system at the main fuel system controller. Use the clock gauge on the tank to check the existing tank level.
2. The fill operation shall be at all times supervised by facility personnel.
3. Open the cabinet. Remove the fill pipe cover. Slowly open the ball valve to confirm that the fill pipe is vented. Close the ball valve. Connect the fuel delivery hose using a tight fill connection.
4. Using the selector switch on the fill station panel, select the tank to be filled. This will open the actuated valve in the fill pipe at the tank room.
5. Examine the display and confirm that the tank has been properly selected and that the tank level is indicated to be below 85%.
6. Open the ball valve at the fill station and begin the fuel transfer.
7. Monitor the fuel meter on the truck to deliver only the volume calculated to a maximum 85% tank fill level. Monitor the fill station display to assure that the tank level does not exceed 85%.
8. Stop the fuel transfer immediately if the high level 85% warning is activated. Inspect the tank levels and transfer the remaining fuel delivery only if the volume is less than 5% of the tank volume. At 90% tank level, an additional audible – visual alarm will activate, and the actuated valve in the fill pipe will close.
9. After the 90% tank level alarm has been activated, the fill pipe valve can be opened momentarily to allow draining of the fuel delivery hose. At the 95% tank level the fill pipe actuated valve is closed and disabled until the tank fuel level is reduced.
10. At the completion of the fuel transfer, close the ball valve and disconnect the fuel delivery hose.
11. Place the control panel selector switch in the OFF position. Close the valve and re-install the fill connection cap.
12. Use the manual valve to transfer any spilled fuel, either back into the fill pipe or to a portable container. Clean all spilled fuel from the fill station enclosure.
13. Close and lock the fill station enclosure.

Maintenance

1. Inspect the fill station for damage or vandalism periodically
2. After each fill operation, visually inspect the fill piping for leaks

Troubleshooting — General

1. **Valve Position not indicated correctly on the controller.**
   Check valve actual position versus position indicated on panel.
   Check for loose wiring
   Check valve position switch settings

2. **Valve does not open with tank level less than 85%**
   Check fuse in controller
   Check level sensor for proper signals
   Check emergency stop
   Check controller PLC operating status

Spare Parts

1. **Controllers / Motor Starters**
   See Earthsafe Controller manuals for specific information.
2. **Actuated Valves**
   RCI Actuators are available from local distributers worldwide.
3. **Level Sensors**
   Gems level sensors are available from Gems worldwide.

Technical Support / Warranty Service

Technical Support

Contact Earthsafe at

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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.

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