SIMPLEX®
Insight Onsite

LC2011
FUEL LEVEL CONTROLLER

1 TANK

Last Revision Date: June 8, 2021

For the most up-to-date information for this product and others, please contact Simplex, Inc. at (800) 637-8603 or visit us on the web at http://www.simplexdirect.com.

Many of the illustrations and instructions in this manual refer to the standard configuration for this product. If you have requested customizations, the drawings provided with your order take precedence; please refer to them for details specific to your order. If you have any questions, please contact Simplex at 800-637-8603.

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1 WARNINGS AND CAUTIONS

Safety Information Symbols

The following images indicate important safety information:

This General warning symbol points out important information that, if not followed, could endanger personal safety and/or property.

This Explosion warning symbol points out potential explosion hazards.

This Fire warning symbol points out potential fire hazards.

This Electrical warning symbol points out potential electrical shock hazards.

Cautions

- Improper operation of this equipment such as neglecting its maintenance or being careless can cause possible injury or death. Permit only responsible and capable persons to install, operate, and/or maintain this equipment.
- Potentially lethal voltages and amperages are present in these machines. Ensure all steps are taken to render the machine safe before attempting to work on the equipment.
- All hardware covered by this manual have dangerous electrical voltages and can cause fatal electrical shock. Avoid contact with bare wires, terminals, connections, etc., on the hardware, if applicable. Ensure all appropriate covers, guards, grounds, and barriers are in place before operating the equipment. If work must be done around an operating unit, stand on an insulated dry surface to reduce shock hazard.
- Do not handle any kind of electrical device while standing in water, while barefoot, or while hands or feet are wet. DANGEROUS ELECTRICAL SHOCK MAY RESULT.
- If trained personnel must stand on metal or concrete while installing, servicing, adjusting, or repairing this equipment, place insulative mats over a dry wooden platform. Work on the equipment only while standing on such insulative mats.
- The National Electrical Code (NEC), Article 250 requires the frame of the equipment to be connected to an approved earth ground and/or grounding rods. This grounding will help prevent dangerous electrical shock that might be caused by a ground fault condition or by static electricity. Never disconnect the ground wire.
- Wire gauge sizes of electrical wiring, cables, and cord sets must be adequate to handle the maximum electrical current

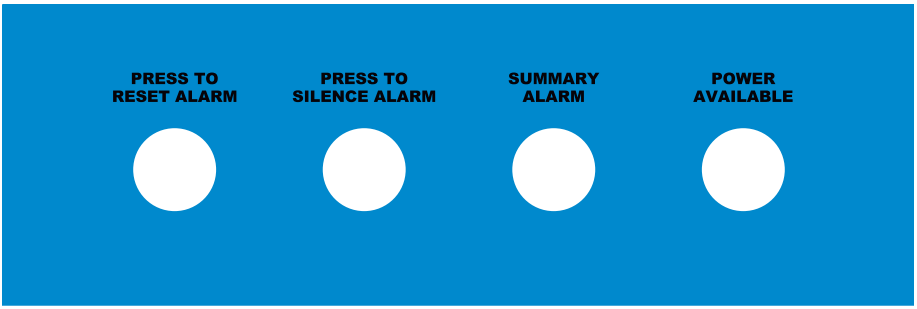
(ampacity) to which they will be subjected.

- Before installing or servicing this (and related) equipment, make sure that all power voltage supplies are completely turned off at their source. Failure to do so will result in hazardous and possibly fatal electrical shock.
- In case of accident caused by electric shock, immediately shut down the source of electrical power. If this is not possible, attempt to free the victim from the live conductor. AVOID DIRECT CONTACT WITH THE VICTIM. Use a nonconducting implement, such as a dry rope or board, to free the victim from the live conductor. If the victim is unconscious, apply first aid and seek immediate medical attention.
- Never wear jewelry when working on this equipment. Jewelry can conduct electricity resulting in electric shock or may get caught in moving components causing injury.

- Keep a fire extinguisher near the hardware at all times. Do NOT use any carbon tetra-chloride type extinguisher. Its fumes are toxic, and the liquid can deteriorate wiring insulation. Keep the extinguisher properly charged and be familiar with its use. If there are any questions pertaining to fire extinguishers, please consult the local fire department.

- The illustrations in this manual are examples only and may differ from your unit.

2 NAMEPLATES AND PLACARDS



SIMPLEX®
(800) 637-8603
www.simplexdirect.com

W.O.#: XXXXX
MODEL: LC2011
SHORT CIRCUIT RATING: 5 kA
ENCLOSURE: TYPE 3R
LARGEST MOTOR FLA: -
CONTROL POWER CIRCUIT:
VOLTAGE: 115VAC, 1-PH, 60HZ
FULL LOAD AMPS: 2A

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W.O.#: XXXXX
MODEL: LC2011
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3 UNPACKING

Included Components and Parts

The following items are included with your LC2011 Fuel Level Controller. If any of the following are not included, please contact your Simplex representative or call Simplex Direct, Inc., at 800-637-8603.

1. Fuel Level Controller
2. Float Assembly(s)
3. Manual
4. Drawings package

Figure 1 Fuel Level Controller

Figure 2 Float Assembly

Primary Inspection

Preventative visual inspection of the shipping crate and the fuel level controller is advised. Never apply power to a fuel level controller before performing this procedure. The following four-point inspection is recommended before installation and as part of a 6-month maintenance schedule:

If any problems are observed during Primary Inspection, call Simplex 24 hours a day at 800-637-8603

1. If the crate shows any signs of damage, examine the fuel level controller in the corresponding areas for signs of initial problems.
2. Check the entire outside of the cabinet for any visual damage, which could cause internal electrical or mechanical problems due to reduced clearance.
3. Check electrical connections for tightness.
4. Examine all accessible internal electrical components.

4 DESCRIPTION AND SPECIFICATION

Overview of Use

The LC2011 Fuel Level Controller provides intelligent control and monitoring of fuel level for day tanks and other storage tanks.

The LC2011 monitors the fuel level in a tank, keeping it at least half full in standard configurations. When the fuel level drops to to the Fill Start level, it calls for fuel. When the fuel level reaches Full level, it cancels the call for fuel and can optionally return fuel to the main storage tank, if needed. With optional equipment, the fuel level controller can also display the fuel level in real time.

With optional equipment, the fill controller can also shut down the generator if the fuel level reaches a critical low level and request a fill-up when the generator stops running.

A touch screen provides control and monitoring, while communication options allow for central monitoring from a building management system (BMS/BAS).

The Fuel Level Controller is network compatible with the entire Simplex Fuel System line and many other fuel systems.

Capabilities

The LC2011 Fuel Level Controller is capable of monitoring and controlling round or rectangular tanks up to 100,000 gallons. The LC2011 can optionally control two ball valves - one to accept fuel, and another to return it to the main storage tank.

Safety

The controller's main goal is to prevent overfilling of a tank and starving the generator's fuel injectors. To that end, the controller has three float level switches to ensure the fuel level remains in normal operating range. If the fuel level rises past the full level to the high fuel level, the controller will register an error.

The controller can also monitor a leak sensor. When a leak is detected, the controller ceases to ask for fuel until the error is cleared.

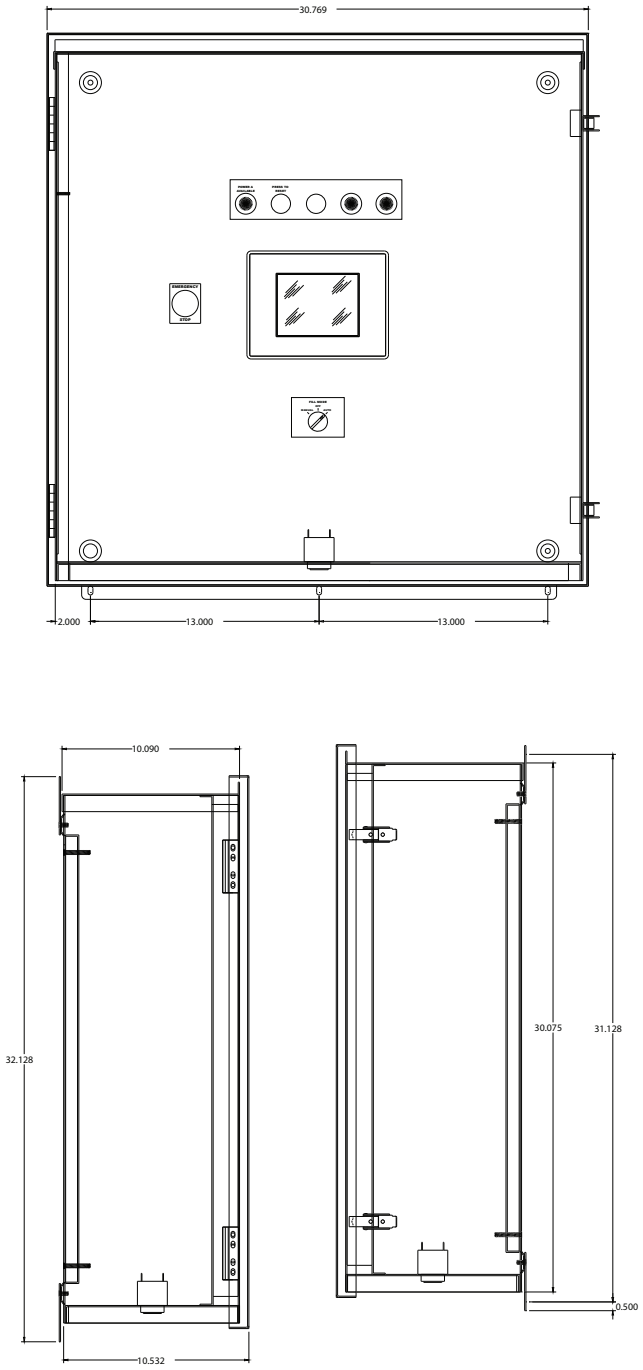


Figure 3 Controller dimensions

5 INSTALLATION

The Fuel Level Controller should be mounted at the tank it is monitoring, then wired to the power source, float assemblies, valves, and any other sensors or system integration connections.

Installing Wiring

The controller must be completely wired prior to applying power. Failure to follow the wiring information and guide may result in product damage and loss of warranty coverage. If requested, startup services can be provided by Simplex Onsite, Inc. or Simplex, Inc. to check field wiring prior to applying power as well as assuring proper operation.

Installing Cable Access

To bring cabling into the fuel level controller, pull a hole into the cabinet at a location of your choosing and install a 3R-rated conduit connector for access.

Installing Float Assemblies

If there are any questions about wiring the controller, please contact Simplex Inc. Simplex Inc. is not responsible for damage due to incorrect wiring installation.

To install the float assembly, push the latch handles on the assembly down and slide the coupler off.

Apply an appropriate threadlocker to the threads on the coupler and screw it into the appropriate fitting.

Slide the assembly into the coupler and lift the latching arms until the assembly is locked into place.

Figure 4 Float Assembly Cable

Connect:

1. Common wire to TB-B-2
2. Low Level Float wire to TB-B-12
3. Fill Start Float wire to TB-B-11
4. Full Level Float wire to TB-B-10
5. High Level Float wire to TB-B-9

Installing BMS monitoring

If Modbus RTU-RS485 monitoring is desired, connect:

1. Wire Shielding to TB-C-1.
2. RS485+ to TB-C-2
3. RS485- to TB-C-3

Installing Modbus TCP (If ordered)

To install Modbus TCP:

1. Connect an Ethernet cable to the Ethernet jack on the Modbus controller.

Installing the Leak Sensor

To install the Leak Sensor, connect it to TB-B as follows:

1. Sensor common to TB-B-2
2. Sensor signal to TB-B-15

Installing Dry Contact Alarms (If ordered)

To connect the controller to external alarms, connect TB-R-1-8 to your system as follows:

For Summary alarm annunciation:

1. Common to TB-R-1
2. Normally Closed to TB-R-2
3. Normally Open to TB-R-3

For Leak alarm annunciation :

1. Common to TB-D-4
2. Normally Closed to TB-R-5
3. Normally Open to TB-R-6

For Not in Auto alarm annunciation:

1. Sensor common to TB-D-7
2. Normally Closed to TB-R-8
3. Normally Open to TB-R-9

For Low Level alarm annunciation:

1. Sensor common to TB-D-10
2. Normally Closed to TB-R-11
3. Normally Open to TB-R-12

For Critical Low Level alarm annunciation:

1. Common to TB-R-13
2. Normally Closed to TB-R-14
3. Normally Open to TB-R-15

For Critical High Level alarm annunciation:

1. Common to TB-R-16
2. Normally Closed to TB-R-17
3. Normally Open to TB-R-18

6 OPERATING INSTRUCTIONS

Once installed, the Fuel Level Controller will not normally require further interaction to maintain the fuel level in the tank. In the event that you do need to use the interface, read the following section closely to avoid errors that may interfere with proper operation.

When idle for a couple of seconds, the touch screen will go to sleep. To wake the fuel level controller from sleep mode, touch the screen to activate it.

System Check

Before filling the tank, check to see if any alarms (displayed in red) or warnings (displayed in yellow) have been registered. Alarms are indicated with red labels while warnings are indicated with yellow labels. Each active alarm or warning will appear one by one at the bottom of the screen no matter which screen is active.

Figure 5 Alarm History

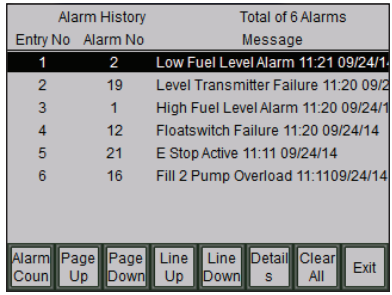
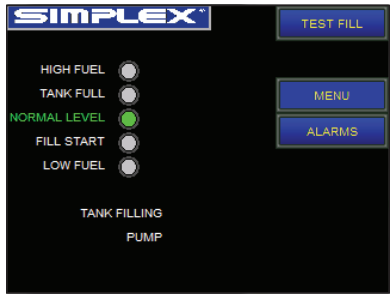


Figure 6 Main Screen



To view all of the alarms and warnings in list form, press the "Alarms" button, which is found on the main screen. From this screen, you can delete the inactive alarms one by one or clear them all by pressing the "Clear All" button. If an alarm or warning is still active, it will not clear. Press the "Exit" button to return to the main screen. All alarms are also indicated via an audible horn and light on the panel below the touch screen. To silence the horn, push the "Silence Horn" button above the touch screen.

If there are any active alarms, contact the site supervisor immediately.

Test Fill

The Test Fill button allows you to confirm that the panel is communicating with the fill pump correctly.

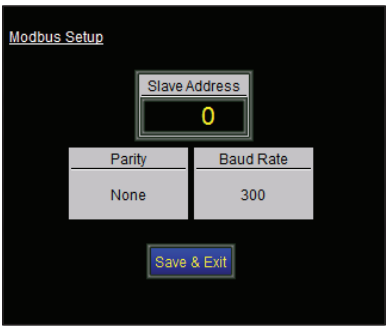
While the day tank's fuel level is below the fill stop/tank full level, pressing the Test Fill button will cause the fuel level controller to send a call for fuel to the pump controller. Once the day tank's fuel level increases to the fill stop/tank full level, the call for fuel signal is terminated.

If the filling operation is completed successfully, you can be assured the fuel level controller will operate correctly when needed.

Modbus Setup

If you need to change the Modbus options to get the fuel level controller communicating with the rest of your system, press the "Menu" button on the Main Screen, then press "Modbus Setup." A numeric keypad will pop up for the password. Enter 4831600 to access the Modbus setup screen (Figure 7).

Figure 7 Modbus Setup



Return Pump (If ordered)

The Fuel Level Controller can be equipped with a return pump floatswitch, which readies the return pump when the fuel level rises to halfway between the Fill Start and Fill Stop levels. When the fuel reaches this level, the control panel will display "Return Pump Armed."

If the fuel reaches the High Fuel level, the lead return pump will activate, reducing the fuel level to the Return Pump Armed level. If the fuel reaches the Critical High level, the lag return pump will also activate.

Sequence of Operations

The Fuel Level Controller allows automatic fuel level monitoring and maintenance. As fuel is consumed and drops to the fill start level, the base tank controller generates a call for fuel signal to the master pump control panel to activate the lead fill pump. When the base tank reaches the tank full/fill stop level, the call for fuel signal is terminated.

If the fuel level reaches the High level, the controller will activate the lead return pump (if ordered). If the fuel level reaches

the optional Critical High level, the controller will activate the lag return pump as well.

If the fuel drops below the fill start level to the low level, the controller will activate the lag fill pump. If the fuel level drops to the optional Critical Low level, the controller will shut down the generator immediately to prevent the equipment damage.

7 ALARMS AND WARNINGS

Normally equipped, the Fuel Level Controller registers two alarms and two warnings.

Alarms

1. Low Fuel: The fuel level has fallen below the Fill Start level.
2. High Fuel: The fuel level has risen above the Tank Full level.

Warnings

The Fuel Level controller presents warnings for situations that are noteworthy but not necessarily in need of immediate attention. Active warnings are displayed only on the touch screen by yellow indicators.

1. Tank Full: The tank has reached the full level and cannot be filled any further.
2. Fill Start: The tank fuel has fallen to the low level and is sending a call for fuel to the fuel system.

8 MAINTENANCE/TROUBLESHOOTING

Preventative Maintenance

The Fuel Level Controller is designed to require minimal maintenance. On a yearly schedule, the unit should be fully opened and cleaned out. At this time, it would be a good idea to disconnect power and tighten all connections to ensure proper operation. This would also be a good time to tighten any mounting hardware.

Trouble Shooting

To troubleshoot the Fuel Level Controller, a full set of drawings is required. Any electrical work should be performed by trained personnel. Simplex, Inc. is not liable for any damage or bodily harm. If additional help is required, contact Simplex or your local Simplex Onsite Branch for troubleshooting and onsite assistance.

If there is a chance of power loss, add Panasonic CR2354 3V batteries to the PLC in order to retain the internal memory. Without batteries, the PLC will only retain its memory for a minimum of 4 days and a maximum of 3 weeks.

Remove all power before servicing the Fuel Level Controller. Never operate or service a fill controller that is not grounded.

To install or replace the PLC battery:

1. Press the retaining clip on the battery door down and open the battery door.
2. Place the battery into the coin–type slot with the +, or larger, side out.
3. Close the battery door making sure that it locks securely in place.
4. Make a note of the date the battery was installed.

The following table (**Table 1**) contains some common scenarios which you may face while operating the Fuel Level Controller.

Table 1 Troubleshooting Table

Problem	Cause	Resolution
Screen is blank	Screen has gone to sleep	Tap it to wake it up
	Control power isn't available	Ensure that the control power switch is in the on position. If so, contact your facility's manager for power issues.
	The fuses are blown	Replace fuses
Panel does not respond when a button is pressed	The RUN mode light on the PLC is off	Enable PLC run mode
	The stop-term RUN switch on the PLC isn't in term	Check PLC and put it in term

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