Door Lock Monitoring System
Quick Guide

C. E. Electronics
(419) 636-6705

System Overview

Introduction

The C. E. Electronics Door Lock Monitoring System (DLMS) was developed to enhance elevator passenger safety. When properly overlaid with existing elevator controller, the DLMS system prevents the elevator from operating (while on normal mode) with a malfunction contact. When properly installed, the DLMS allows elevators to meet all requirements of (A17.3 – 2015) 3.10.12

How the System Works

The CE DLMS uses given inputs to determine the current operational state of the elevator, as well as the integrity of the safety circuit. The state of operation can be viewed on the DLMS Main Board (dual cube display) shown as two digit “Phases”. Outputs are set based on the current “Phase”. LED indicators on corresponding output board indicate the state of the output relay (LED ON = Relay Active).

A door sensor is provided for elevator controllers that do not have a DCL signal and to provide redundancy for controllers that do have a DCL signal.

When a fault occurs, the elevator will be held at the landing (using OUT1-R1) and strobe alert within the machine room space.

Understanding the Phases

Operational Phases are viewed on the “Dual Cube” display on the CE DLMS Main Board. Understanding the phases is the key to understanding our system.
Our system operates by monitoring all inputs. When specific inputs are triggered we transition into correlating phases. Transitions are determined by the CE DLMS software.

PHASE LISTING BELOW:
0K == Normal Operation. No issue detected.
1A == Error within Door lock or Gate circuit detected. Door Open outputs active.
1B == Error Mode. Stop operation, Door Open, and Light outputs active.
1C == Double Check Part 1, waiting for doors closed. Error was cleared.
1D == Double Check Part 2, waiting for doors open. Door open output active.
2A == Inspection Operation
2B == Fire Phase 2 Operation

Resetting the Hardware

Faults are often triggered during installation, locking the unit in error mode. The hardware may need to be reset to continue the installation and testing. Reset is achieved by depressing the green “Reset Button” on the Main Board. The Reset Button must be depressed until the dual cube displays the letters “**RB**” (*reset button active*). If the fault has been rectified the elevator will now return to normal mode, signified by display letters “**OK**” (*normal mode*) on the dual cube display.

Once installation is complete, the unit will automatically clear faults that have been rectified.

NOTE: <u>REMOVING POWER WILL NOT RESET THE STATE OF OPERATION</u>.

Loading New Code

Different elevator control systems will sometimes require slight modifications for special conditions. In these cases, our engineers will adjust code remotely and e-mail an update that can be loaded into the CE DLM via USB stick.

Instructions:

1. Download the “.bfo” file that was emailed to you
2. Move the file to the main directory of a USB.
3. Insert the now loaded USB into the DLM main board
4. Wait for dual cube to display LC or ND.
5. Remove the USB stick
    a. If “LC” was displayed, the load was complete and the DLMS system will reboot.
    b. If “ND” was displayed, no data was read and you should try again. If the problem persists, there may be something wrong with the file or USB.
        i. Make sure the main directory only has one file with the “.bfo” file type
        ii. Make sure the USB is not password protected
        iii. USB must be formatted as FAT or FAT32

Installation

What's in the Box

The four boards are already connected to each other and all inputs and outputs should be prewired to a 24 conductor cable.
The four boards are as follows:

- (1) Main Board CE3924. This board has a cube to display each phase, a USB port to update the processor if needed, and a green reset button to clear software.
- (2) Input Boards CE3700. These boards have 2 switches. Switch S1 for the address and switch S2 to invert active low inputs.
- (1) Output Board CE3699. This board has 8 relays on it. Relays can be set-up to be NO or NC.

Use the diagram on the back side of the panel to connect our unit to your controller. DLMS wires are colored RED and in parenthesis.

The warning light needs to be connected to existing wires in the unit. These wires come with butt-splices and are the same colors as the warning light. Match up red with red and black with black. The light will need to be mounted to the box. This can be done at any time.

The door sensor kit consists of a box with green connectors, two magnetic reed switches on "L" brackets, and two magnets on straight brackets. A switch and magnet pair need to be mounted on the doors so the switch activates when the doors are fully closed. The magnets will need to be close to work every time. Make sure there is no mechanical interference when they are attached. If the DLMS unit is mounted in the machine room, 2 to 3 spares in the traveler will be needed to connect the sensor(s) to the DLMS unit. **The sensor is required on all installations.**

If your controller does not have a Door Close Limit signal, use the DMC plug. This will use the DFC sensor you mounted as the DCL and DFC signal. Otherwise use the STANDARD plug.

The manila envelope contains parts to mount the light and door sensor along will stickers to help mark-up prints and a note card. Read the note care and quick facts before proceeding with the installations.

After all the wires are connected, you can run through the checklist to make sure everything is connected.

Then proceed with the final testing found on the notecard.

C. E. Electronics
(419) 636-6705

Quick Facts

- All boards use a switch **(S1)** for an address. This must match the label next to it.
- Inputs can take a range of voltages
- All inputs need a common. Box is prewired for this.
    - Gates and door locks share a common (IN2-1 included)(9)
    - DFC sensor uses the DLMS unit common
    - All other inputs share a common()
- All input signals are assumed active high
- All input boards use a switch **(S2)** to invert active low signals.
    - Example: If input 5 is active low, S2-5 must be switched ON.
- Inputs boards have an LED status for each input signal (ON = HIGH, OFF = LOW)
- To not cause an error?
    - **(IN 1)**Inputs 1, 2, 5, 6 need to match up
    - **(IN 1)**Inputs 3, 4, 7, 8 need to match up*
        - *If not using rear doors, **S2-3, 4, 7, 8** must be in the ON position.
    - **(IN 2)**Input 1 must be low when any doors are open
- Errors can only occur when in the door zone
    - **(IN 2)**Input 3 or 4 is high
- Errors cannot occur if in CTI or Access/Inspection or Fire Phase 2
    - **(IN 2)**Input 5, 6, or 7 is high
- R1 is active in all states except 1B
- R2 and R3 are active whenever IN1-1 or IN1-3 is low.
- R4 and R5 are active in 1B and 1D
- R6 is always active in 1B
    - Intermittent in 2A or 2B

Checklist

1. Check that all boards are addressed correctly.
    a. S1 of all boards should be the same as the picture on the labels next to the switches
2. Check that test code is not still installed.
    a. **(Input Board 1)** turn on **S2-8**
        i. If relay 8 turns on/off with the change of the switch, the test code is still installed. Call CE for a USB file update.
    b. **(Input Board 2)** slowly toggle **S2-5**
        i. If the correct code is installed, the cube should switch between 2A and OK or 2A and 1D depending on the state of the other inputs.
            1. If this does not work, check the address of the board before calling CE for support.
    c. **(Input Board 2)** return **S2-5** to the correct state for your controller.
        i. **ON** if Car Top Inspection is active low.
        ii. **OFF** if Car Top Inspection is active high.

3. Confirm that input signals are being read and inverted properly.
    a. Turn OFF Car Top Inspection

C. E. Electronics
(419) 636-6705

        i. **(Input Board 2)**Input status LED 5 should be OFF.
            1. If the LED is ON and the CTI signal is active low, flip **S2 – 5** to the ON position.
    b. Turn ON Car Top Inspection
        i. **(Input Board 2)**Confirm that input status LED 5 changes state.
        ii. The cube should say 2A.
        iii. Leave CTI ON until instructed otherwise.
    c. Move the elevator to a floor
        i. **(Input Board 2)**Input status LED 3 or 4 should be ON when at a floor.
        ii. **(Input Board 2)**Input status LED 3 and 4 should be OFF when not at a floor.
        iii. If your CTI mode removes power to the Door Zone signal, temporarily take the car off CTI to confirm the door zone inputs.
    d. Close the front doors.
        i. **(Input Board 1)**Input status LEDs 1, 2, 5, 6 should be ON.
            1. If any of these are off and the signal is active low, use **S2** to invert the corresponding input.
        ii. **(Input Board 2)**Input status LED 1 should be ON (assuming rear doors are also closed).
    e. Open the front doors.
        i. **(Input Board 1)**Confirm that inputs 1, 2, 5, 6 changed state from when the doors were closed
        ii. **(Input Board 2)**Input status LED 1 should be OFF.
    f. Close the rear doors.
        i. **(Input Board 1)**Input status LEDs 3, 4, 7, 8 should be ON.
            1. If any of these are off and the signal is active low, use **S2** to invert the corresponding input.
        ii. **(Input Board 2)**Input status LED 1 should be ON (assuming front doors also closed).
    g. Open the rear doors.
        i. **(Input Board 1)**Confirm that inputs 3, 4, 7, 8 change state from when the doors were closed
        ii. If there are no rear doors, the status should stay OFF and **S2** 3, 4, 7, 8 should be in the ON position.
        iii. **(Input Board 2)**Input status LED 1 should be OFF.
    h. Turn ON Fire Phase 2 Key Switch
        i. **(Input Board 2)**Input status LED 7 should be ON.
            1. If the LED is on and the signal is active low, flip **S2 – 7** to the ON position.
    i. Turn OFF Fire Phase 2 Key Switch
        i. **(Input Board 2)**Confirm that inputs status LED 7 changes state.