



ECI 103109-5 LCD Closed Loop Door Board Installation Manual

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109-5 LCD Installation Manual

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Revision Table

REV	DATE	DESCRIPTION
1.0	12/15/2010	Initial release
2.0	12/31/2010	Added troubleshooting guide
3.0	2/19/2013	Added Open PL speed and Open PL Position
4.0	8/29/2013	Logo Change
5.0	9/28/2017	Complete rewrite of manual adding more detail and illustrations. Unreleased
5.1	3/28/2018	Updated logo, added wiring diagram



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1 Warning and Disclaimer

Thank you for purchasing equipment from ECI America, INC. We want your new equipment to operate safely. Anyone who installs or uses this equipment should read this publication (and any other relevant publications) before installing or operating the equipment.

To minimize the risk of potential safety problems, you should follow all applicable local and national codes that regulate the installation and operation of your equipment. These codes vary from area to area and usually change with time. It is your responsibility to determine which codes should be followed, and to verify that the equipment, installation and operation is in compliance with the latest revision of these codes.

At a minimum, you should follow all applicable sections of the National Fire Code, National Electrical Code, ASME A17.1 Safety code for Elevators and Escalators and the codes of the National Electrical Manufacturer's Association (NEMA). There may be local regulatory or government offices that can also help determine which codes and standards are necessary for safe installation and operation. Equipment damage or serious injury to personnel can result from failure to follow all applicable codes and standards. We do not guarantee the products described in the publication are suitable for your particular application, nor do we assume any responsibility for your product design, installation or operation.

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2 Introduction

This manual is intended to help facilitate the installation of ECI 109-5 LCD Closed Loop Door Operator board made by Electronic Controls, Inc. The audience of the material included in this manual is for the certified installation personnel. The ECI 109-5 LCD control board complies with modern performance specifications and meets or exceeds code requirements. Installation and adjustments must meet local, state and national codes.

3 System Overview

The ECI 109-5 LCD door controlled is a microprocessor-based board that controls all aspects of the door motion including direction, velocity, deceleration and force.

The ECI 109-5 LCD replaces the Montgomery 108 door board fit, form and functions and will replace the old MAC 3 board system.

The motor controller is a unique design for simple installation and reliable performance. It provides for total control and adjustment through the entire door cycle and includes nudging. The door are held under power while standing closed, running and while standing open. There are no potentiometers to adjust speeds. All adjustments are performed by changing settings displayed on the LCD screen.

4 Point of Contact

Information

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5 109-5 LCD Board Overview

5.1 Board Illustration

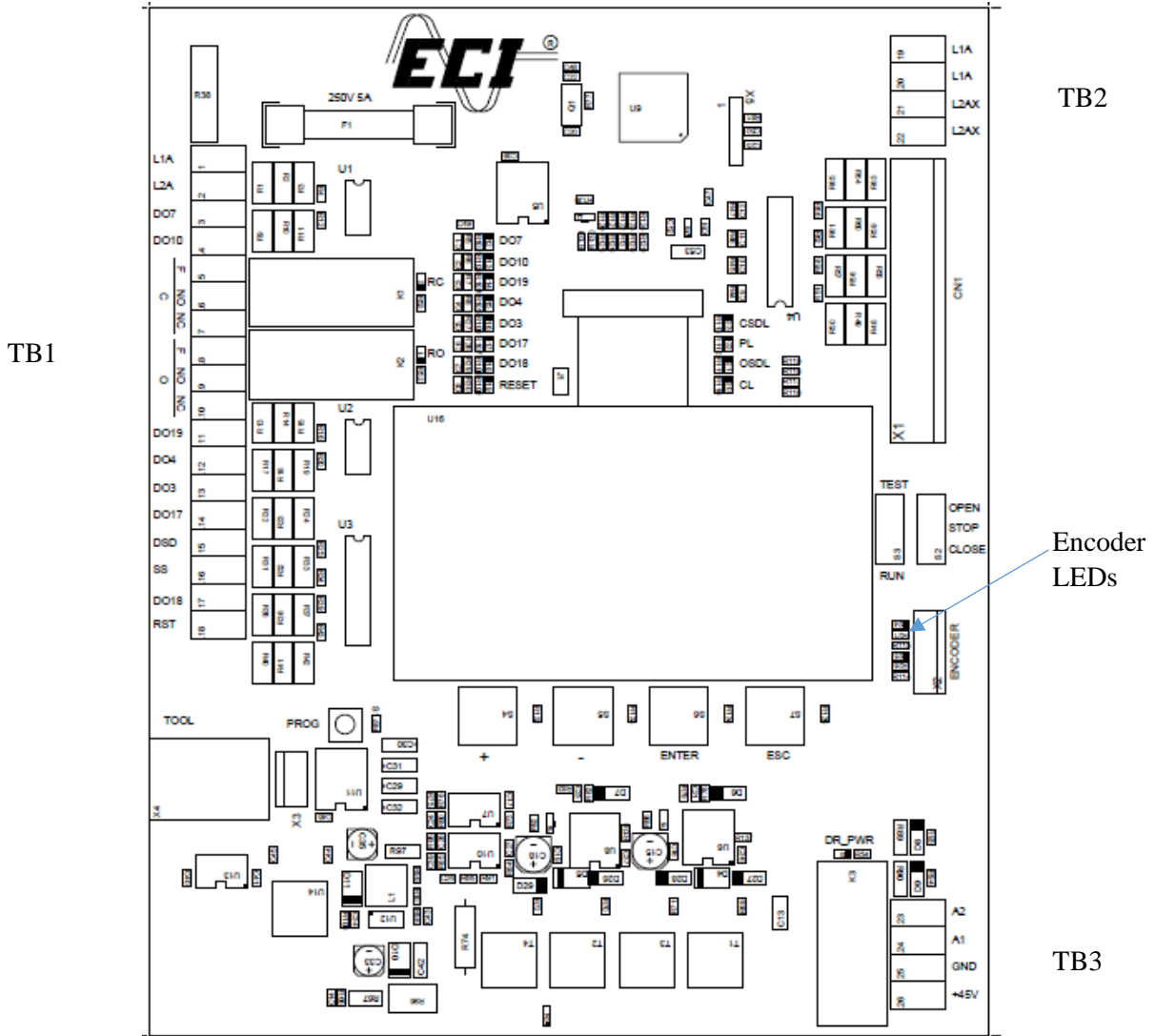


Figure 1

5.2 Connections

5.2.1 TB1 Connections

L1A – 120VAC common input.

L2A – 120vac line input @ 500VA.

DO7 – 120VAC CLOSE input signal. A relay contact between L1A and DO7 will perform a close operation

DO10 – 120VAC OPEN input signal. A relay contact between L1A and DO7 will perform an open operation



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C-F – COMMON of auxiliary C relay.

C-NO – Normally open contact of auxiliary C relay

C-NC – Normally closed contact of auxiliary C relay

O-F - COMMON of auxiliary O relay.

O-NO - Normally open contact of auxiliary O relay

O-NC - Normally closed contact of auxiliary O relay

DO19 - Not used

DO4 – 120VAC nudge input. A relay contact between L1A and DO4 will slow the door speed to the N parameter setting, during a close operation.

DO3 – 120VAC output. A relay between DO3 and DO10 will be energized during an open operation.

DO17 – 120VAC output. A relay between DO17 and DO7 will be energized during a close operation.

DSD -

DO18 – 120VAC Door Close Force input. A relay contact between L1A and DO18 will apply closing force on the door set by the Door Closing Force parameter

RST

5.2.2 TB2 Connections

L1A – 120VAC common output to transformer of operator

L2AX – Fused 120VAC line output to transformer of operator

5.2.3 TB3 Connections

A1 – Motor RED wire

A2 – Motor BLACK wire

GND - ground input to door board from operator

+45V - +45 Volt DC input to door board from operator

CN1 - Connection to cam switch assembly.

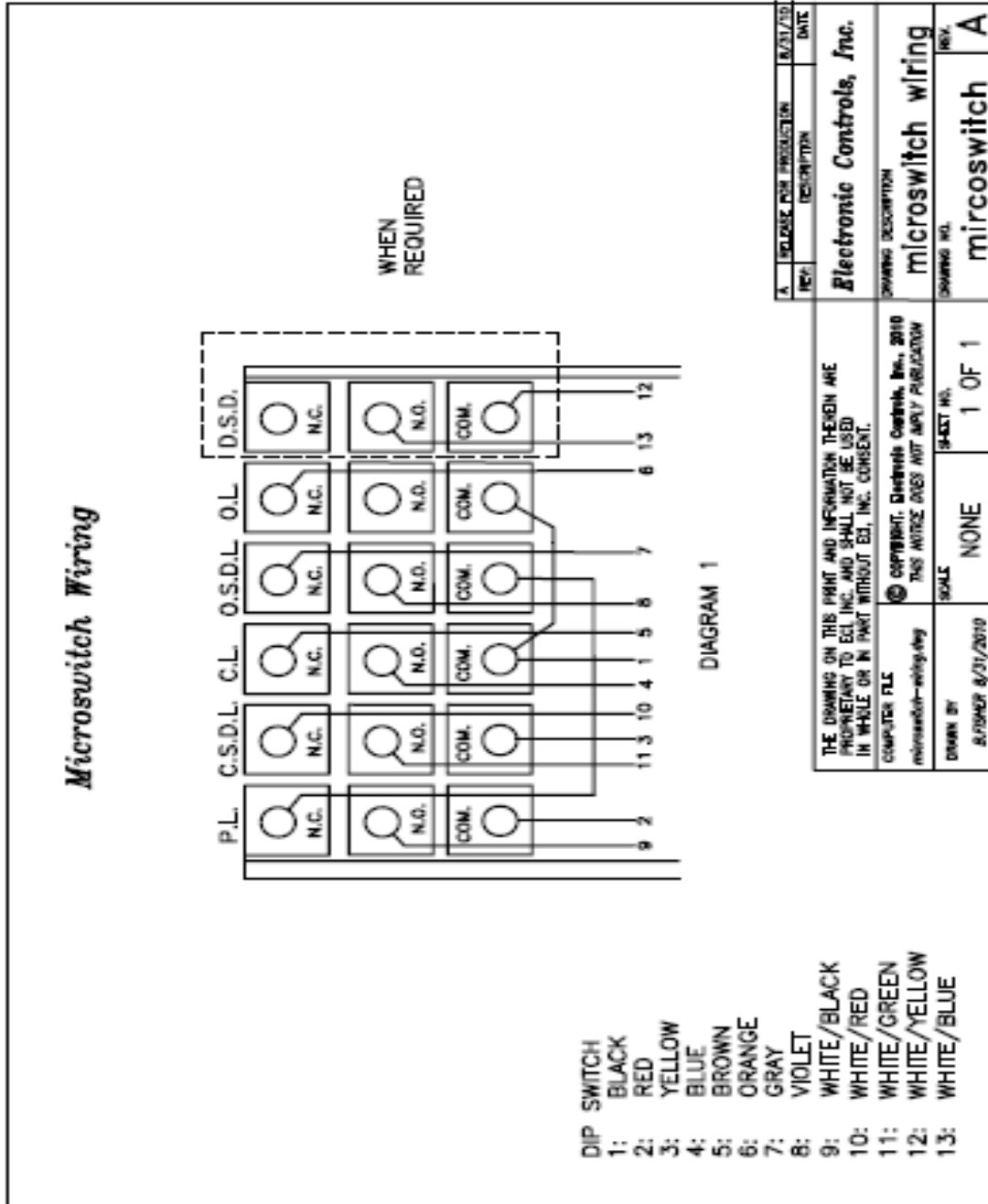


Figure 2 CAM switch wiring



5.3 User Interface

5.3.1 LCD Display

5.3.1.1 Main Menu

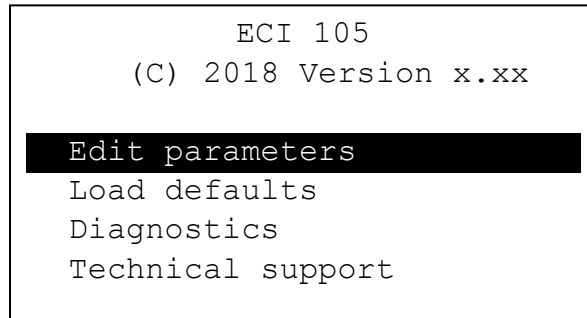


Figure 3 Main Menu

Figure 3 shows the top of the main menu. Pressing the “-“ button moves the cursor/hi-light down to reveal other menu options

Edit parameters – Pressing ENTER with the Edit Parameters hi-lighted will enter the parameters menu.

Load Defaults – Pressing ENTER with Load defaults hi-lighted will load the default settings for all parameters. See section 5.3.1.2 for default settings

Diagnostics – Pressing ENTER with Diagnostics hi-lighted will display the diagnostics screen. See section 5.3.1.3 for more details.

Technical Support – Pressing ENTER with Technical support hi-lighted will display the technical support screen. See section 5.3.1.4

Rotate screen – (Not shown above) Pressing ENTER with Rotate Screen hi-lighted will flip the screen 180°

5.3.1.2 Edit Parameters Screen

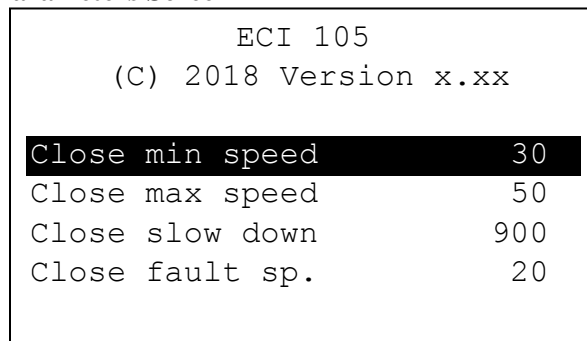


Figure 4 Parameters Menu



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Figure 4 shows the top of the edit Parameters menu. Pressing the “-“ button moves the cursor/ hi-light down to reveal other parameter settings. Pressing ENTER will enable changing of the hi-lighted parameter using the “+” or “-“ buttons.

Close min speed – Range 1 – 100. Default setting is 30.

NOTE : Close min setting should not be set higher than Close Max

Close max speed – Range 1 – 100. Default setting is 50.

Close slow down – This setting is the encoder position from fully closed where the Close min speed is enabled. Increasing this setting will cause the door to slow down earlier in the close direction. Range is 1 – 1500. Default is 900.

Close fault sp – This is the speed setting should the board lose the encoder signal. Range is 1-100. Default setting is 20

Cl torque limit – This setting controls the amount of current out to the motor. Used to set the closing force. A lower number puts less force to the door while closing. The default setting is 60. The range is from 1 - 200

Open min speed – Range 1 – 100. Default setting 30

NOTE : Open min setting should not be set higher than Open Max

Open max speed – Range 1 – 100. Default setting 50

Open slow down – This setting is the decoder position from fully open where the Open min speed is enabled. Range is 1-1500. Default setting is 900.

Open fault sp – This is the speed setting should the board lose the encoder signal. Range is 1 – 100. Default setting is 20

Acceleration – This sets the acceleration rate of the motor. A higher setting produces a slower acceleration. Default setting is 10.

Deceleration – This sets the deceleration rate of the motor. A higher setting produces a slower deceleration. The default setting is 30.

Nudge speed – Range is 1 – 100. Default setting is 30

Open PL position – This setting is the encoder position from fully open where the board runs the PL zone speed. Default setting is 100.

Open PL zone sp – This is the speed of the PL zone at the start of an open cycle. The range is 1 -100. The default is 20.

5.3.1.3 Diagnostic Screen



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```
ECI 105
(C)2018 Version x.xx
VBUS :    xx.xV
DRIVE:    xx%   16s
TEMP :    xxC/xxxF
MOTOR:    x.xA
SPEED:    xx POS:  xxxx
Cycle:    xxxxxx   (ESC)
```

Figure 5 Diagnostic Menu

VBUS – Displays the current voltage of the +45V input

DRIVE – The drive to the motor is pulse width modulate. This number reflects the percentage of drive to the motor. 0% will be no power to the motor and 100% will be max drive.

16s – This is the present count of the 16 second stall timer. Should an open or close cycle time out the door board will stall the motor until the open/close command is cycles off/on.

TEMP – Displays the current temp in °C/°F of the output driver transistors.

MOTOR – Displays the current amperage to the motor.

SPEED – Displays the current speed of the open or close cycle.

POS – Displays the current encoder position. 0 is fully open.

CYCLE – Displays the number of cycles the door board has performed since manufacture. One cycle is an open and close.

5.3.1.4 Technical Support Screen

Displays software version and phone number for technical service

5.3.2 Switches

TEST/RUN - This is a 3 position switch. The center position has no function. In TEST, open and close operations are controlled by the OPEN/CLOSE switch.

In RUN position the door operation is controlled through the controller inputs DO7, DO10, DO4 etc. The open/close switch is disabled.

OPEN/CLOSE – This is a 3 position switch. The center position has no function. This switch is operational only with the TEST/RUN switch in the TEST position. In the Close position the door will perform a close operation. Open position will cause the door to open.



5.3.3 Buttons

+ Button - This button moves the cursor up in the screen for selecting menus or parameters and increases the number of the setting being programmed

– Button - This button moves the cursor down in the screen for selecting menus and decreases the number of the setting being programmed

Enter Button - The ENTER button selects the menu or parameter indicated by the cursor and enters the current number of the parameter being programmed.

ESC Button - The ESC button is used to move back to the previous menu

5.3.4 LED indicators

DO7 - On indicates Close command present at DO7 input

DO10 – On indicates Open command present at DO10 input

DO19 – NOT USED

DO4– On indicates Nudge command present at DO4 input

DO3 – On indicates open limit switch is OFF the open limit cam

DO17 – On indicates close limit switch is OFF the close limit cam

DO18 – On indicates Close Holding Force command present at DO18 input

RESET – On indicates RESET command present at RESET input. This will reset the processor on the door board

CSDL – On indicates the CSDL cam switch in closed

PL – On indicates the PL cam switch in closed

OSDL – On indicates the OSDL cam switch is closed

CL – On indicates the Close Limit switch is closed

RC – On indicates the RC relay is energized. Energizes during the close operation

OC – On indicates the OC relay is energized. Energizes during an open operation

DR_PWR – On indicates DR_PWR relay is energized providing +45VDC to output driver circuit

6 Installing ECI 109-5 LCD Closed Loop Door Operator Board

6.1 Old MAC and 104 Conversions

1. Turn off all power to the door operator
2. Remove the cover(s) from the operator
3. Remove and tag all wires at terminal strips TB1, TB2. And TB3 (See Figure 1)



WARNING: TB3 must have these wires connected

• **A1 – Motor red wire**

• **A2 – Motor Black wire**

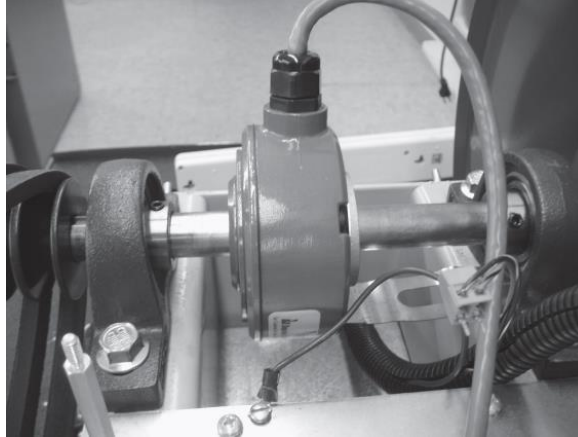
• **COM – Power Supply common Black Wire**

• **+45V – Power supply red wire (See Figure 1)**



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4. Unplug the cam switch cable from CN1. (See Figure 1)
5. Unbolt and remove old board(s)
6. Mount encoder on shaft with 1.7 inch double sheave. Encoder can be mounted in either direction.
7. Bolt the ECI 109-5 LCD board into place



Install all tagged wired into the correct locations on TB1, TB2, TB3.

7 Initial Power up and Adjustment



WARNING: Before applying power be sure the RUN/TEST and OPEN/CLOSE switches are in the center positions.

1. Set door position so the OPEN and CLOSE LIMIT cams are off the limit switches
2. Apply Power to door operator

The LCD display should show the following:

```
ECI 105
© 2018 Version x.xx

Please run learning
cycle first!

<ENTER> to start
```

Figure 6 Start-up Menu



NOTE: If LCD has nothing displayed refer to section 8.1 NO LCD Display

7.1 Learning Cycle

With the LCD showing “Please run learning cycle first” press the ENTER button. The operator should start the learning cycle and the LCD will display when the cycle is complete. If learning cycle does function refer to section 8.4 *No Learning Cycle*

When cycle is complete press ESC button.

7.2 Testing Operation

Set the RUN/TEST switch to the TEST position

7.2.1 Open Test

Set the OPEN/CLOSE switch to the OPEN position. The doors should fully open. If the doors do not move refer to section 8.2 *Doors do not Move in Open*

7.2.2 Close Test

Set the OPEN/CLOSE switch to the CLOSE position. The doors should fully close. If the doors do not move refer to section 8.3 *Doors do not Move in Close Direction.*

7.3 Door Adjustments

7.3.1 Adjustment notes

This equipment is to be installed, adjusted and maintained to conform to code requirements. Parameters must be set to conform to kinetic energy code limitations for both maximum and average kinetic energy for ALL doors/all floors (specialty or otherwise heavy doors taken into account).

Parameters must be set to conform to closing force limitations. The closing force may not exceed 135N (30lbs). During the closing, the kinetic energy may not exceed 10 joules (7.4lb/ft)

Refer to Figure 7 for an example of OPEN and CLOSE cycles

7.3.2 Door Speed Adjustments

Move the cursor to EDIT PARAMETERS and press ENTER button.

At this time adjustments can be made to open and close speeds by moving the cursor to the desired setting and pressing the ENTER button. Any changes happen in real time so there is no need to press enter for each change. When complete press the ENTER button and move to the next parameter.

NOTE: If there is no speed adjustment in the close direction make sure the DO4 LED is not lit. If lit the door board will be in NUDGE mode even with the board in TEST mode.

7.3.3 Closing Force adjustment

1. With the RUN/TEST switch in the TEST position set the doors to the mid-point of the close direction.
2. Go to the Edit Parameters screen and select CI torque limit parameter and set it to 1.



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3. Set the OPEN/TEST switch to the CLOSE position then adjust the CI torque limit until you achieve desired door close operation. This should put the door closing force below the 30lb maximum limit allowed by code.
4. To insure less than the 30lb limit use an approved gauge per manufacture's specifications and directions to verify closing force is to code. If over 30lbs you will have to adjust CI torque limit lower.
5. Perform several open/close cycles with the board in TEST mode then recheck closing force to insure they are still to code

7.3.4 Nudge adjustment

1. Set TEST/RUN and OPEN/CLOSE switches to center positions
2. Set doors to fully open position
3. Place a jumper between L2A and DO4 of TB1 (See Figure 1). The DO4 LED should light with jumper in place
4. Go to Edit Parameters menu and select Nudge parameter
5. Put TEST/RUN switch in TEST position
6. Put Open/Close switch to the Close position. Adjust speed of door to desired Nudge speed.
7. When complete press ENTER to set parameter then ESC to return to main menu.
8. Set TEST/RUN and OPEN/CLOSE switches to center positions
9. Remove jumper between L2A and DO4
10. Set the TEST/RUN switch to RUN position to test system operation of doors

When all parameters are set press ESC to return to main menu when all entries are complete.

NOTE: Must press ESC button to save all changes into permanent memory. Failing to do so will result in parameters reverting to default settings in the event of a power loss.

Set the RUN/TEST switch in the RUN position.

Replace door operator cover.

NOTE: Refer to any and all code installation questions to Elevator and Escalator Electrical Equipment Standard CAN/CSA-B44.1/ASME 17.5



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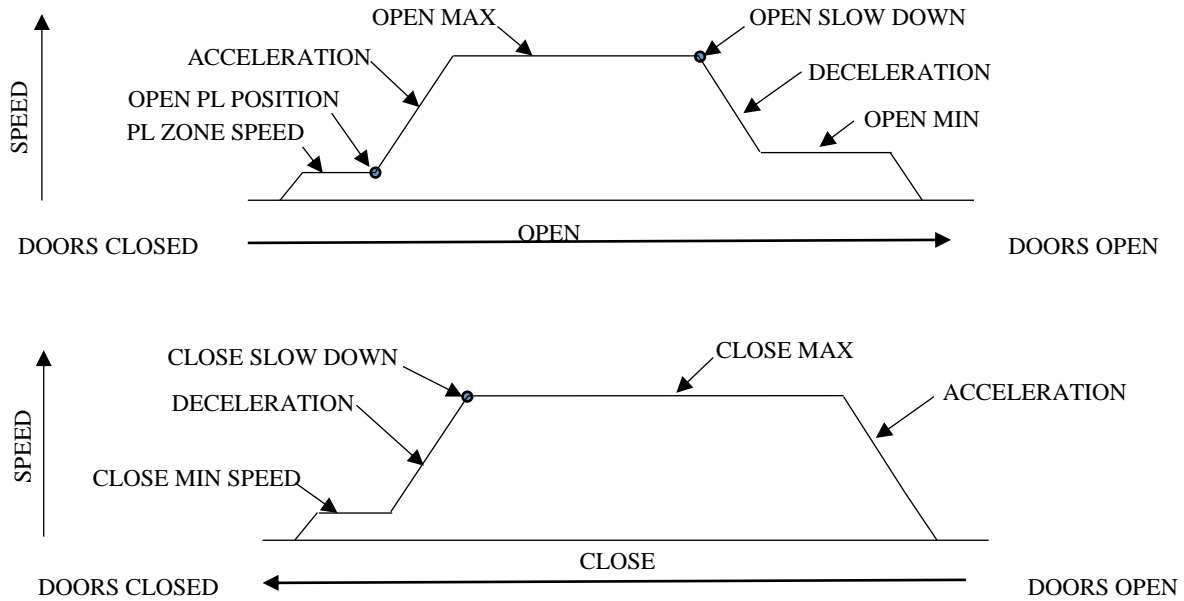


Figure 7 OPEN and CLOSE Cycle

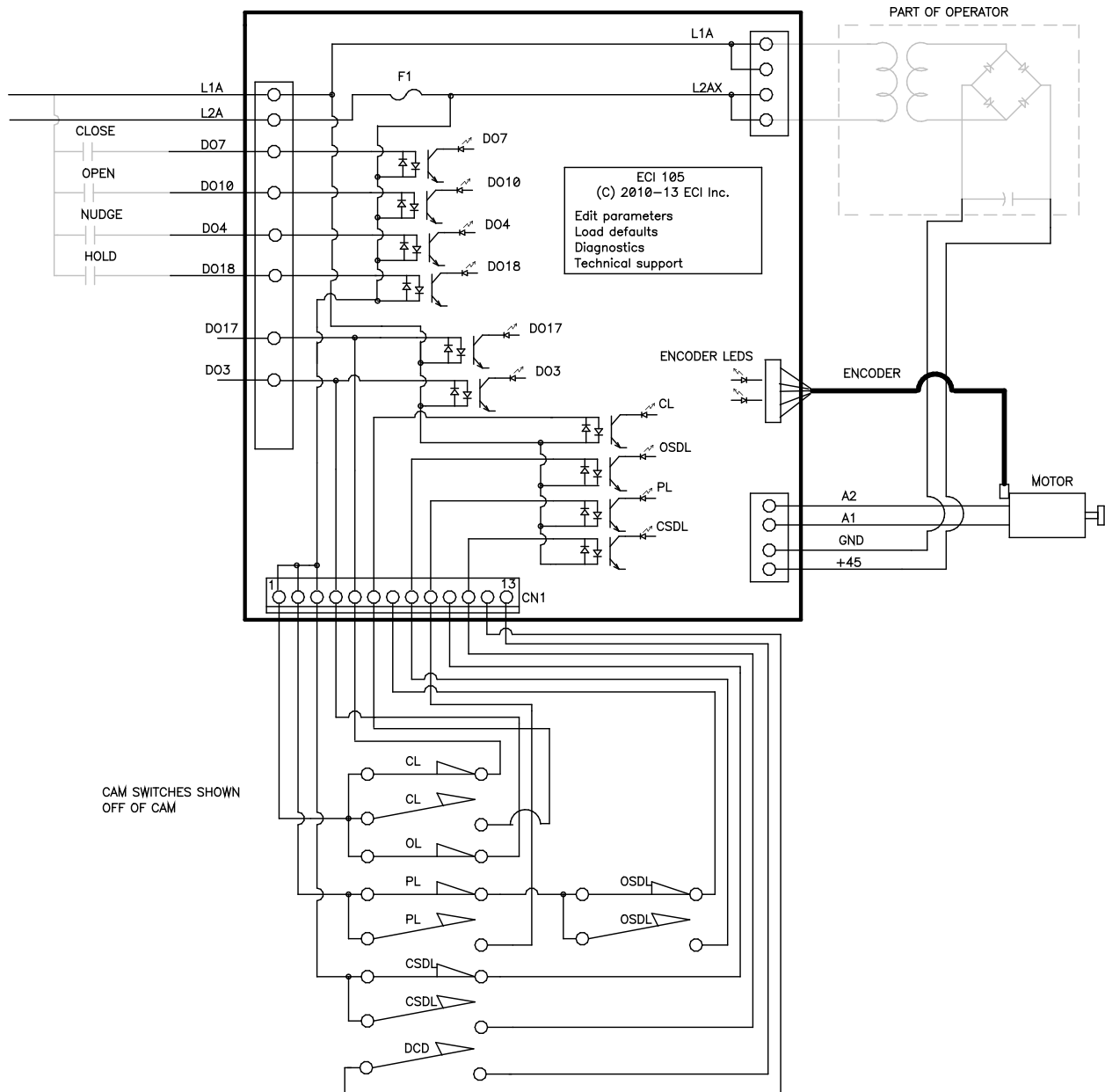


Figure 8 - 109-5 LCD Wiring diagram

8 Troubleshooting

8.1 NO LCD Display

1. Using a Digital Voltmeter (DVM) set on DC check for 45VDC between +45V and GND. If present go to step 5



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2. Check for 120VAC at L1A and L2AX at TB2. If 120VAC present and there is no +45VDC at TB3, recheck connections then check transformer mounted under mounting plate for door board.
3. If no 120VAC at L1A and L2AX check fuse on board.
4. If fuse good check for 120VAC at L1A and L2A of TB1.
5. With your DVM set to AC VOLTS measure the voltage between +45V and GND pins. *This will measure the AC ripple on the +45VDC*

There should be less than 1 volt AC on this line. If greater than 1 VAC the capacitor located under the mounting plate (the 109-5 LDC board mounts to) needs to be replaced.

6. If replacing Capacitor does not correct the problem, call Technical Service.

8.2 Doors do not Move in Open Direction

RUN/TEST switch in TEST position

1. With doors half open check that DO3 LED (open limit) on the door board is lit. It should be lit with the cam OFF the Open Limit switch. If DO3 LED is lit proceed to step 3. Check cam switch and wiring if DO3 LED not lit.
2. If DO3 is off and wiring is correct, remove any connection from DO3 at TB1

CAUTION: 110VAC may be present

- If DO3 does not light after removing connection. Replace connection and call customer service
 - If DO3 lights after removing connection try using the test switch to open door. Set OPEN/CLOSE switch to OPEN. If door moves then find the cause for the connection to DO3 preventing DO3 LED to light and exit trouble shooting.
3. If DO3 is lit, select DIAGNOSTIC menu.
 4. Monitor the DRIVE % on the DIAGNOSTIC screen while trying to OPEN or CLOSE the doors using the OPEN/CLOSE switch.
 - If DRIVE % changes and doors do not move check connection to the motor.
 - If DRIVE % remains 0 call Technical Service

8.3 Doors do not Move in Close Direction

1. With doors half open check that DO17 LED (close limit) on the door board is lit. It should be lit with the cam OFF the Close Limit switch. If DO17 LED is lit proceed to step 3. Check cam switch and wiring if DO17 not lit
2. If DO17 is off and wiring is correct, remove any connection from DO17 at TB1

CAUTION: 110VAC may be present

- If DO17 does not light after removing connection. Replace connection and call customer service
 - If DO17 lights after removing connection try using the test switch to open door. Set OPEN/CLOSE switch to CLOSE. If door moves then find the cause for the connection to DO17 preventing DO17 LED to light and exit trouble shooting.
3. If DO17 is lit, select DIAGNOSTIC menu



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4. Monitor the DRIVE % on the DIAGNOSTIC screen while trying to OPEN or CLOSE the doors using the OPEN/CLOSE switch.
 - a. If DRIVE % changes and doors do not move check connection to the motor.
 - b. If DRIVE % remains 0 call Technical Service

8.4 No Learning Cycle

1. Check that the TEST/RUN switch and OPEN/CLOSE switch are both in the center positions.
2. With doors half open check that DO17 LED and DO3 LED are lit.
 - If they are both off then check that the CAMs are not 180° out.
3. If CAMs are good then remove any connections to DO3 and DO17 and see if LEDs light with connections removed.
 - If LEDs light then check why connections are holding signals off.
 - If LEDs remain off call Technical Service



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Cl torque limit	11	OC	13
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Close max speed	11	Open max speed	11
Close min speed	11	Open min speed	11
Close slow down	11	Open PL position	11
CSDL	13	Open PL zone sp	11
CYCLE	12	Open slow down	11
Deceleration	11	OSDL	13
DO10	13	PL	13
DO17	13	POS	12
DO18	13	RC	13
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