Complete Installation Manual for the ECI 109-4 LCD Board

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Revision Sheet

Revision Number	Date	Revision Description
1.0	11/11/2010	New Manual.
2.0	12/10/2010	Added safety information and changed the design of the manual.
3.0	1/3/2011	Added trouble shooting page.
4.0	2/21/2011	Added information for Canadian Code holding force.
5.0	8/11/2011	Added a blank page.
6.0	8/29/2013	New design.

Table of Contents

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 the failure to follow all applicable codes and standards. We do not guarantee the products described in this publication are suitable for your particular application, nor do we assume any responsibility for your product design, installation, or operation.

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Conventions Used

When you see the “notepad” icon in the left-hand margin, the paragraph to its immediate right will be a **special note**. Notes represent information that may make your work quicker or more efficient. The word **NOTE**: in boldface will mark the beginning of the text.

When you see the “exclamation point” icon in the left-hand margin, the paragraph to its immediate right will be a **warning**. This information could prevent injury, loss of property, or even death in extreme cases. Any warning in this manual should be regarded as critical information that should be read in its entirety. The word **WARNING:** in boldface will mark the beginning of the text.

Safety Information

Knowing the saftey hazards related to any procedure you are about to perform, know what equipment has been specifed for each specific contact, and know what tools and materials you should plan to have available beforehand. Before connecting electrial wiring, take precautions to prevent accidents from happening to yourself and other people around you.
Always consider safety first!

❖Wear a hard hat when working in the hoistway.
❖Wear safety glasses or goggles when using power tools.
❖Always wear protective gloves when installing or removing access covers, conduits, wire way or electrical devices.
❖When working on car canopy, always be aware of where the sides of the car are located.

❖Use properly grounded cords and power equipment (ground fault circuit interrupters).
❖Make sure there are proper clearances in hoistway between the car and other devices.
❖Before connecting wiring, cover sharp edges to keep hands and arms from being cut.
❖Always assume that a circuit is live, disconnect power from all related circuits before proceeding with wiring.
❖Clear wiring sites of any unnecessary materials or equipment.

❖Always know where other people are and how the elevator wiring can affect their satety.
❖Safety lock and tag out procedures are always required before performing any kind of service, repair, adjustment, lubrication or inspection of power driven equipment. These procedures help to prevent injury or death caused by power driven equipment.
❖To reduce the danger of electrical shock, always make sure electical connections are secure. Also, make sure no bare wires are exposed after pulling electrical cable.

Introduction:

This board is deisgned to replace the Montogomery 104 door board in all applications.This manual is intended to help facilitate the installation of Electronic Controls, Inc, ECI 109-4 LCD door board. The audience of the material included in this manual is the installation personnel. The ECI 109-4 LCD door board complies with modern performance specifications and meets or exceeds code requirements. Installation and adjustment must meet local, state and national codes.

System Overview:

The **ECI 109-4 LCD** door controller is a microprocessor-based elevator door control board that controls all aspects of the door motion including direction, velocity, acceleration and force.
The **109-4LCD** replaces the Montgomery 104 door board fit, form and functions and will replace the old MAC, 3 board system.
The motor controller (MC) is a unique design for simple installation and reliable performance. The motor controller (MC) provides for total control and adjustment through the entire door cycle and includes nudging. The doors are held under power while standing closed, during running and while standing open.

Point of Contact

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For 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 the wires connected
A1 - Motor red wire
A2 - Motor black wire
COM - Power supply common black wire
+45V - Power supply red wire. (See figure 1.)

4. Unplug the cam switch cable from CN1. (See figure 1.)
5. Unbolt and remove old board(s).

After all hardware is back in place and adjusted:

6. Bolt the ECI 109-4 LCD board in place.

7. Install all the tagged wires into the correct locations on TB1, TB2 and TB3. (See figure 1.)

8. Connect the cam switch cable to CN1. (See figure 1.)

NOTE: The CN1 connector is a 13 pin male connector and some operators only have an 11 pin female connector. In this case connect the 11 pin female starting with the pin 1 which is the pin closest to the TEST/RUN switch S4. (See Figure 1)

LCD Display Menu Structure:

Edit Parameters

Displays the parameters that can be adjusted.

PL
OS
OF
CS
CF
N
CCL
Motor direction
CL

Load Defaults

Loads default parameters.

Diagnostics

Displays information about the output section of the board.

Technical Support

Displays company information.

Rotate Display

Flips the display to be viewed from the other side of the operator.

Electric Wiring of the Control Board:

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

NOTE: Before applying power verify that the RUN/TEST switch is in the TEST position, the OPEN/OFF/CLOSE is in the OFF, center position and the doors are half way open.

Board Provides the Following Features:

Enter Button: This button has three (3) uses.

1: Pressing the Enter button moves the user into the highlighted menu field.
2:When in the parameter adjustment field pressing the Enter button while on the highlighted parmenter to be adjusted will cause the highlight to be removed. Now adjustments (+ or -) can be made.
3:When finished adjusting a parameter pressing the Enter button will highlight that parameter again allowing the user to move to a different parameter using + or- or escape (ESC) back to the previous menu.

Plus (+) Button: This button has two (2) uses.

1: Pressing the + button when on a hightlighted menu item causes the hightlight to move in the up direction in the menu.
2: Pressing the + button when adjusting parameters will cause an increase in thaat parameter. For increasing the parameter values and moving the curser in the up direction in the display menu.

Minus (-) Button: This button has two (2) uses.

1: Pressing the - button when on a hightlighted menu item causes the hightlight to move in the down direction in the menu.
2: Pressing the - button when adjusting parameters will cause an decrease in that parameter.

ESC Button: Pressing the ESC button returns the dispaly to the previous menu.

TEST/RUN Toggle Switch: This allows normal operation or manual mode for programming and adjusting.

OPEN/CLOSE Toggle Switch: This allows for open or close operation when in the manual position.

Com Port: For initial programming of the board.

Microprocessor with a flash program and data ram allows field reprogramming if it is required.

Programmable CPU for adjustments.

Built in fuse on the voltage side for board protection. (5 amp)

LCD screen for field adjustments and display operating status.

Parameters and there Functions

PL:	Open Slow Start
OS:	Open Slow Speed
OF:	Open Fast Speed
CS:	Close Slow Speed
CF:	Close Fast Speed
N:	Close Nudging Speed
CCL:	Closing Force Limit
Motor direction	Changes Motor Direction
CL:	Changes Holding Force (Canadian Code)

NOTE: Before applying power verify that the RUN/TEST switch is in the TEST position, the OPEN/OFF/CLOSE is in the OFF, center position and the doors are half way open.

103109-4 LCD Control Board Adjusting Procedures:

A. Manually Move the Doors

1. Apply power.
2. Use the - button to scoll the display to **LOAD DEFAULTS** and press the **ENTER** button.
3. Place the **OPEN/OFF/CLOSE** switch to the **OPEN** or **CLOSE** position for an instant and back to the **OFF** to verify the doors direction of movement.

NOTE: If the door moves the wrong direction go to edit parameters (Motor Direction) and change the parameter.
1: Forward
2: Reverse

4. Use the **OPEN/OFF/CLOSE** switch and observe operation of the doors.
5. Once you see the door movement and you feel that changes are needed; go to section B, Adjusting Operating Paramenters.
6. Once the parameters are set to give proper door operation place the **OPEN/OFF/CLOSE** switch to the **OFF** position.

B. Parameter Ranges and Functions:

NOTE: Increasing the value of a parameter will cause an increase in that parameter. Example; Increasing CF from 30 to 40 will cause the Close Fast Speed to be faster.

NOTE: Decreasing the value of a parameter will cause a decrease in that parameter. Example; Decreasing OF from 60 to45 will cause the Open Fast Speed to slow down.

PL	Open Slow Start	1-100
OS	Open Slow Speed	1-100
OF	Open Fast Speed	1-100
CS	Close Slow Speed	1-100
CF	Close Fast Speed	1-100
CCL	Closing Force Limit	1-100
N	Close Nudging Speed	1-100
Motor Direction		1 Forward; 2 Reverse
CL	Holding Force	1-100

C. Adjusting Operating Parameters: (Editing Parameters)

NOTE: Use the (+) button to raise the number and (-) button to lower the number. (+) Button scrolls up and (-) Button scrolls down.

NOTE: At any time during these adjustments and the TEST/RUN switch in the TEST position you can manually open and close the door with the OPEN/OFF/CLOSE switch to observe your changes.

1. Place the **OPEN/OFF/CLOSE** toggle switch in the **OFF** position.
2. Scroll down to edit parameters and hit **ENTER**.
3. Scroll down to the setting that you want to change, and hit the **ENTER** button.
4. Adjust the number to the desired setting, hit **ENTER** to save the new setting.
5. Once you have adjusted the parameters that you want to hit the **ESC** button.
6. Then check that your changes were proper by using the manual move the door section and verify your adjustments. If they are not ok then go back to section **B** (manually move the doors).
7. Once the parameters are set to give proper door operation place the **OPEN/OFF/CLOSE** switch to the **OFF** position.
8. Place the **TEST/RUN** toggle switch to run.
9. Observe door operation for serveral complete cycles.

D. Door Closing Force Adjustment

1. Now that the doors are running at the desired speed and the **RUN-TEST** switch is still in the **TEST** position, stop the doors at the mid-point in the closing direction by toggling the **OPEN-STOP-CLOSE** to the **STOP** position (center).
2. Adjust the **CCL** parameter to **0**.
3. Toggle the **OPEN-STOP-CLOSE** to the **CLOSE** position and increase the **CCL** paramerter until you have achieved desired door close operation. This should put your door closing force below the **thirty pound maximum allowed by code**.
4. To insure you are below thirty pounds, use an approved pressure gauge per manufacturer's specifica tions and directions to verify door closing force is to code. (If closing force is over the thirty pound maximum allowed by code adjust the **CCL** paramerter until the closing force is within code.)
5. Open and close the doors with the **OPEN-STOP-CLOSE** switch several times.
6. Recheck the door closing force again, to insure it is still to code, by physically stalling the doors in the dosing direction with your approved pressure gauge.

E. Nudging Adjustment

1. With the doors open, the **OPEN-STOP-CLOSE** switch in the **STOP** position and the **RUN-TEST** switch in the **TEST** position simulate a nudge signal by placing a jumper between **L1A** and **D04**. The **D04 LED** should light up.
2. Toggle the **RUN-TEST** switch to the **RUN position.**
3. Adjust the **N** parameter to the desired speed.
4. Toggle the **RUN-TEST** switch to the **TEST** position.
5. Remove the jumper between **LA1** and **D04**.
6. Verify the jumper between **LA1** and **D04** is removed.
7. Toggle the **RUN-TEST** switch to the **RUN** position.
8. Replace door operator cover.

F. Adjustments Notes

1. This equipment must be installed, adjusted and maintained to confirm to code requirements.
2. 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).
3. Parameters must be set to conform to closing force limitations. The closing force may not exceed 135 N (30 lbs). During the closing, the kinetic energy may not exceed 10 joules (7.4 lbs. Ft.).

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

G. Board Fuses

Board Location	Fuse Type
F1	AGC5

H. Diagnostics Screen

The Diagnostics screen displays the following information:

VBUS = 45V input voltage.
DRIVE = % of total power being used and the Stall Timer.
TEMP = Temperature of the output FETs.
MOTOR = Current the motor is using.
CYCLE = Total of full cycles of the door operation since being programed.
DOOR STALL TIMER= 17 seconds in either direction once the door is stalled.

NOTE: A complete cycle starts at the Full Close, Full Open then back to Full Close.

I. Door Stall Timer

If movement of the door is stopped in either direction, for 17 seconds, the operator will quit running. The door stall timer can be reset in one of the following ways:

1. A change of direction command from the direction it stalled in from the main controller.
2. Removal of the 45V.
3. Placing the TEST/RUN switch into the TEST position and give the board a direction change with the OPEN/OFF/CLOSE switch then return the OPEN/OFF/CLOSE to the OFF position and the TEST/RUN to the RUN position.

J. Input & Output Terminals

The PM/SSC door operator control requires an input of single phase 115 VAC. When this power is supplied by a transformer, the transformer must have a rating of at least 500 VA. Input and output terminal signals are shown below.

L1A to L2A L1A.	120VAC @ 500 VA. If one of the input lines is grounded, it should be connected to
D03 to L1A	Open limit signal. A relay across these terminals will be de-energized when the open limiit micro switch is actuated. Relay will be energized at all other times.
D07 to L1A	Signal to close. When a relay contact across these terminals is made up, the doors will close.
D010 to L1A	Signal to open. When a relay contact across these terminals is made up, the doors will open.
D017 to L1A	Close limit signal. A relay across these terminals will be de-energized when the close limit micro switch is actuated. Relay will be energized at all other times.
D03 to D010	Auxiliary to "O" relay. A relay across these terminals will be energized only when the doors are opening.
D07 to D017	Auxiliary to "C" relay. A relay across these terminals will be energized only when the doors are closing.
D04 to D07	Reduced speed closing signal. When the doors have a signal to close, and a relay contact across these terminals are made up, the door speed is controlled by **N** param eter.
F NC NO C	Auxiliary C relay switching contact. Designates a form "C" contact on 1-C relay.
F NC NO O	Auxiliary O relay switching contact. Designates a form C contact on 1-0 relay.
OPTION	
DSD to SS	Used on some projects for load balancing or other customer requirement.
L1A to DO18	Signal to power motor in the close direction which the elevator is running (Canadian Code).

Microswitch Wiring

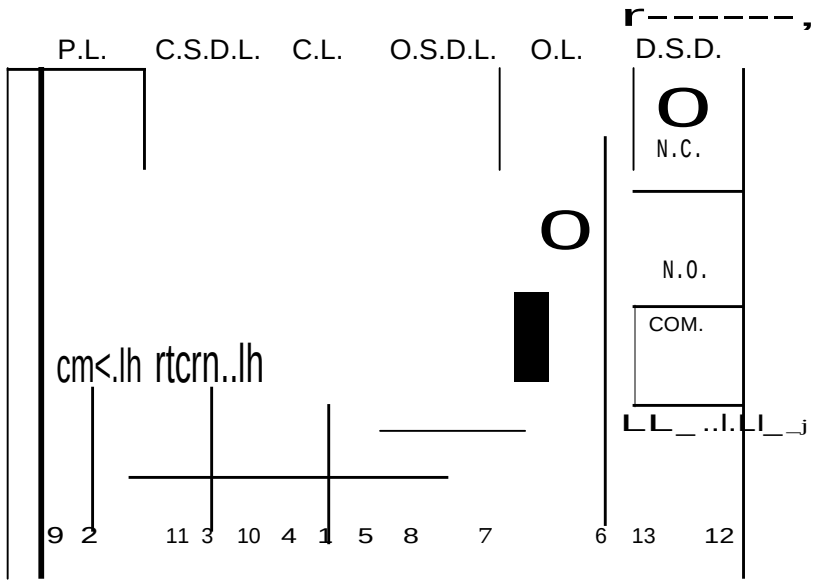


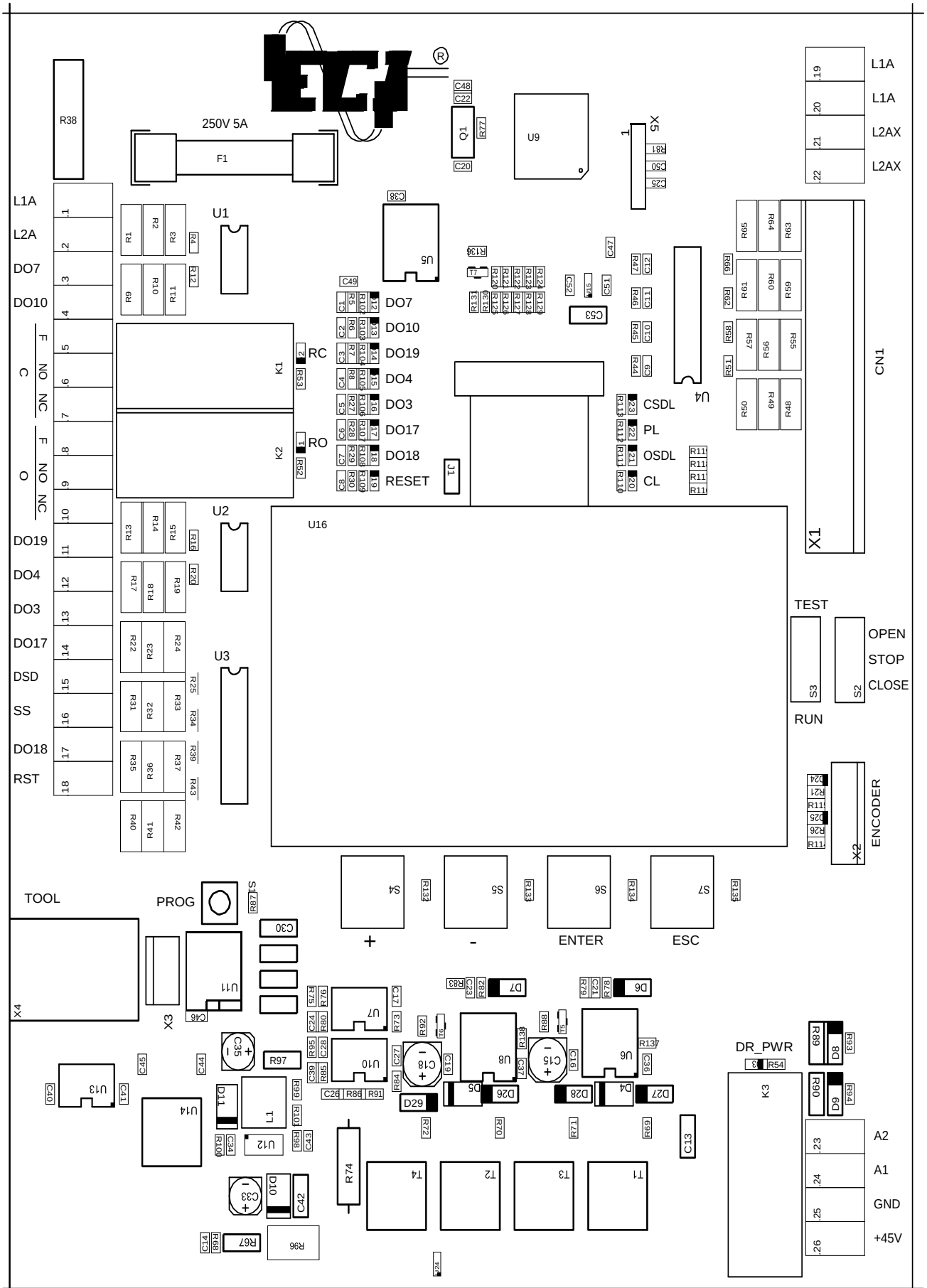
DIAGRAM 1

DIP SWITCH
1: BLACK
2: RED
3: YELLOW
4: BLUE
5: BROWN
6: ORANGE
7: GRAY
8: VIOLET
9: WHITE/BLACK
10: WHITE/RED
11: WHITE/GREEN
12: WHITE/YELLOW
13: WHITE/BLUE

REV:	DESCRIPTION	DATE
A	RELEASE FOR PRODUCTION	8/31/10

Electronic Controls, Inc.

COMPUTER FILE: microswitch-wiring.dwg		DRAWING DESCRIPTION: microswitch wiring
DRAWN BY: B.FISHER 8/31/2010	SCALE: NONE SHEET NO.: 1 OF 1	DRAWING NUMBER: microswitch


L1A
L2A
DO7
DO10
C
NC
NO
F
O
NC
NO
F
DO19
DO4
DO3
DO17
DSD
SS
DO18
RST
250V 5A
F1
U1
U2
U3
K1
K2
RC
RO
DO7
DO10
DO19
DO4
DO3
DO17
DO18
RESET
CSDL
PL
OSDL
CL
U16
U9
X5
U4
CN1
X1
L1A
L1A
L2AX
L2AX
TEST
OPEN
STOP
CLOSE
RUN
S3
S2
ENCODER
X2
TOOL
PROG
X4
X3
S4
S5
S6
S7
+
-
ENTER
ESC
DR_PWR
K3
A2
A1
GND
+45V

Troubleshooting Guide

Closing Speed too Slow:
- Check for binds in the door system.
- Increase the Closing Max Speed.
- Increase the Closing Torque Limit.
- Increase the Acceleration Speed.

Opening Speed too Slow:
- Check for binds in the door system.
- Increase the Opening Max Speed.
- Increase the Opening Torque Limit.
- Increase the Acceleration Speed.

Door not fully Closed:
- Check for binds in the door system.
- Decrease the Close Slow Down.
- Move the limit switch.

Door not fully Open:
- Check for binds in the door system.
- Decrease the Open Slow Down.
- Move the limit switch.

Doors are Slamming Open:
- Decrease the Opening Max Speed.
- Increase the Open Slow Down.
- Move the Limit Switch.

Doors are Slamming Close:
- Decrease the Closing Max Speed.
- Increase the Close Slow Down.
- Move the Limit Switch.

Door Operator not working in Automatic Mode:
- Toggle switch is either in the test or middle position.

Door Operator not working in Test Mode:
- Toggle switch is either in the run or middle position.

No power on the board:
- Check the incoming voltage.
- Check the fuse on the board.

Nudging Speed to Slow:
- Increase the Nudging Speed.

Nudging Speed to Fast:
- Decrease the Nudging Speed.

Door Closing Force is to High:
- Decrease the CL Torque Limit.

Warranty Policy

Electronic Controls, Inc warrants this product to be free from manufacturing and workmanship defects under normal use for a period of twelve months (12) from the date on which the product was shipped. In the event this product or any other component part is found to be defective within the warranty period, the purchaser must notify Electronic Controls, Inc within the warranty period and the product or component must be returned to Electronic Controls, Inc within thirty (30) days after notice of the warranty claim.

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