

# **SURLOCK 2000EE TROUBLESHOOTING DOCUMENTATION**



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## **I. Problem: The unit beeps, but the door will not open**

- 1) Unplug the unit for 15 seconds and plug it back in. You should hear 2 beeps when you plug it in.
  - a) If that does not resolve the problem, move to step 2.
- 2) Is the unit turned on? The tube key switch should be turned to the on position inside the building.
  - a) If a tube key is needed, overnight one to the store (14000006).
  - b) If it is turned on, move to step 3.
- 3) Visually inspect the unit. Is there any apparent physical damage?
- 4) After the combination is entered, how many times does the keypad beep, and what light comes on? Make sure to hit # after the code is entered.
  - a) 1 long beep and red keypad light: The wrong combination has been entered.
    - i) Check to see if the keypad beeps when they push in all of the numbers in their code.
      - (1) If it does beep when each button is pushed, change the combination.
        - (a) If changing the combination does not work, a new board is needed (14001003). Move to step 5.
      - (2) If it does not beep when each button is pushed, change the combination to a code that does not contain the number(s) that did not sound
        - (a) If the second combination works, dispatch a technician to check the connections. One of the wires is likely loose or the pins are bent/broken on the connector. Dispatch a technician and send a keypad (part # 8440-01) and wire harness (part # 14001002).
        - (b) If the second combination does not work, dispatch a technician to troubleshoot the unit and send a keypad (part # 8440-01), board (part # 14001003) and wire harness (part # 14001002). Have the technician start at step 7.
    - (3) Note: if you get multiple beeps when hitting one number, it is likely a loose connection on the back of the keypad or a bent pin in the connector. Dispatch a technician to remove the keypad and check the connection to ensure that it is secure. (Figure 6)

- b) 3 beeps and a green keypad light: The correct combination has been entered.
  - i) Make sure that the tube key switch is turned ON.
  - ii) Make sure that they are turning the handle.
  - iii) Listen for mechanical operation.
    - (1) If you hear the solenoid firing, go to step 2 under the problem “The unit unlatches without entering the code.”
    - (2) If you do not hear the solenoid firing, go to step 5.
- 5) Open the unit and visually inspect the unit. Check the fuse, connections, red varistor, red jumper, gray door monitor wire, etc. (Figure 3.1-3.6) Visually check the transformer and wire.
- 6) Measure the voltage where the transformer meets the board (figure 3.9). It should measure between 12-16.5 VDC.
  - a) If it doesn't measure properly, measure the voltage coming out of the transformer at the transformer connection leads. (figure 8)
    - i) If the transformer voltage doesn't measure properly, a new transformer is needed (part # 14001001).
    - b) If the transformer does measure properly, ensure that the black and red wires are connected tightly to the board on the actual wire and not the insulation. (figure 3.9) If they are, and the voltage still is not correct, a new armored cable is needed (8445-01 for 4', 14001015 for 15').
- 7) Measure voltage at keypad connection on the right side of board, and at the Red and White wires. (Figure 3.7) The voltage should read around 3.4 VDC. This confirms that there is power leaving the board.
  - a) If the voltage does measure correctly, there is an issue with the keypad or wiring harness.
    - i) Dispatch a technician and send a new keypad (part # 8440-01) and wiring harness (part # 14001002).
      - (1) Measure the voltage entering the keypad at the end of the wiring harness (figure 6) and visually inspect the pins.

- (a) If the pins are in proper condition and the voltage measures correctly, the issue is with the keypad. The wiring harness is in proper working order.
  - (b) If the pins are not in proper condition and/or if the voltage does not measure correctly at the end of the wiring harness, there is an issue with the wiring harness, and potentially with the keypad.
- b) If the voltage isn't correct or if there is no sound/light, check the connection of wires (figure 3.6) to ensure that the terminal block connectors are tight on the actual wire and not on the insulation. If all of the connections are good and all components in steps 5 and 6 were ok, there is a problem with the board. Dispatch a technician and ship a new board (part # 14001003). Once the board is installed, use the program button and program a new code (the old code will not work as memory is stored in the board and not the keypad).
- c) If a new code does not work, try replacing the keypad.
- 8) Check to make sure that the key switch (Figure 2.1) is getting power at the key switch connection leads. (Figure 2.3) When the correct code is entered, it should get around 12-16.5 VDC power. If it isn't and you have checked steps 1-7, the key switch is bad. (part # 8435-01)
- 9) Check the voltage to the solenoid. (Figure 2.2) Be sure to disconnect the wire nuts and not the wires. After an operational code has been entered, there should be approximately 11 VDC at the solenoid when energized.
  - a) If the voltage is not correct and you have checked steps 1-8, the board is bad. The rest of the unit still needs to be checked. Go to step 2 of "Problem III: The door can be opened without entering the code/ The unit will not latch or secure" to check the rest of the unit.
  - b) If the voltage is not correct, first check to see if the solenoid is functional by using a 9V battery. Disconnect the wire nuts and the wires (Figure 2.2) and ensure that you connect the battery only to the solenoid leads to see if the solenoid fires. Ensure that power is only being applied to the solenoid.
    - i) If the battery does work but the unit still doesn't unlock, the solenoid is not the problem. A mechanical issue is part of the problem. Go to step 3 under "Problem III: The door can be opened without entering the code/ The unit will not latch or secure."
    - ii) If the battery does work and the unit mechanically functions as it should, the problem is prior to the solenoid.
    - iii) If it did not work and the wiring is secure, the solenoid is also bad.

- c) If the voltage is correct, there is a mechanical issue. Go to step 3 under the problem "The unit unlatches without entering the code."
- 10) Check the rod connector (figure 4.11) to ensure that it is not worn. Remove the nut (figure 4.1) and cotter pin on the trip arm (figure 4.12) and inspect the rod connector. It should be in the shape of a D (figure 8). If it is worn, a new rod connector is needed. Note that the rod connectors are handed (3224-02-A RHR, 3224-01-A LHR). A primary symptom of this problem is a sagging handle.

## **II. Problem: The unit does not beep, and the door will not open**

- 1) Unplug the unit for 15 seconds and plug it back in. You should hear 2 beeps when you plug it in.
  - a) If that does not resolve the problem, move to step 2.
- 2) Is the unit turned on? The tube key switch should be turned to the on position inside the building.
  - a) If it is not turned on and they don't have a tube key, send them one (14000006).
  - b) If it is turned on, move to step 3.
- 3) Visually inspect the unit. Is there any apparent physical damage?
- 4) Make sure the unit is plugged in.
  - a) If it is not plugged in, have them plug it in and see if that resolves the problem. If not, proceed to the next step.
  - b) If it is plugged in, have them plug another electrical device into the outlet that they can see working (fan, clock, etc).
    - i) If the other electrical device works go to step 5.
    - ii) If the other electrical device does not work, have them unplug everything from the outlet and check the circuit breaker.
      - (1) If the circuit breaker is on, have them run an extension cord from another outlet to see if the unit gets power.
        - (a) If this does work, they have an electrical issue and need an electrician.
        - (b) If this does not work, see if it will operate something else (clock, fan, etc.).
          - (i) If you cannot get anything else to operate, they need an electrician.
          - (ii) If you can get something else to operate, dispatch a technician and send a transformer (part # 14001001), board (part # 14001003) and wire harness (part # 14001002).
      - (2) If the circuit breaker is off, have them turn it on and retest.

- 5) Make sure the unit is turned on.
  - a) If it is turned on, proceed to step 6.
  - b) If it is not turned on, have them turn it on and see if that fixes the problem. If they do not have a tube key, you can send them one (14000006). If this does not fix the problem, proceed to step 6.
- 6) Check to see if the keypad beeps when they push in all of the numbers in their code.
  - a) If it does, proceed to step 7.
  - i) If it does not, try changing the combination to something that does not contain the number that would not cause the keypad to beep.
    - (1) If the second combination works, dispatch a technician to check the connections. One of the wires is likely loose or the pins are bent/broken on the connector. Dispatch a technician and send a keypad (part # 8440-01) and wire harness (part # 14001002).
    - (2) If the second combination does not work, dispatch a technician to troubleshoot the unit and send a keypad (part # 8440-01), board (part # 14001003) and wire harness (part # 14001002). Have the technician start at step 7.
    - (3) Note: if you get multiple beeps when hitting one number, it is likely a loose connection on the back of the keypad or a bent pin in the connector. Dispatch a technician to remove the keypad and check the connection to ensure that it is secure. (Figure 6)
- 7) Open the unit and visually inspect the unit. Check the fuse, connections, red varistor, red jumper, gray door monitor wire, etc. (Refer to figures 3.1-3.6) Visually check the transformer and wire.
- 8) Measure the voltage where the transformer meets the board (figure 3.9). It should measure between 12-16.5 VDC.
  - a) If it doesn't measure properly, measure the voltage coming out of the transformer at the transformer connection leads (figure 8). It should also read between 12-16.5 VDC.
    - i) If the transformer voltage doesn't measure properly, a new transformer is needed (part # 14001001).
    - ii) If the transformer does measure properly, ensure that the black and red wires are connected tightly to the board on the actual wire and not the

- insulation. If they are, and the voltage still is not correct, a new armored cable is needed (8445-01 for 4', 14001015 for 15').
- 9) Measure voltage at keypad connection on the right side of board, and at the Red and White wires. (Figure 3.7) The voltage should read around 3.4 VDC. This confirms that there is power leaving the board.
    - a) If the voltage does measure correctly, there is an issue with the keypad or wiring harness.
      - i) Dispatch a technician and send a new keypad (part # 8440-01) and wiring harness (part # 14001002).
        - (1) Measure the voltage entering the keypad at the end of the wiring harness at the red and white wires. It should also read around 3.4 VDC. (figure 6) Visually inspect the pins.
          - (a) If the pins are in proper condition and the voltage measures correctly, the issue is with the keypad. The wiring harness is in proper working order.
          - (b) If the pins are not in proper condition and/or if the voltage does not measure correctly, there is an issue with the wiring harness, and potentially with the keypad.
      - b) If the voltage isn't correct or if there is no sound/light, check the connection of wires (figure 3.6) to ensure that the terminal block connectors are tight on the actual wire and not on the insulation. If all of the connections are good and all components in steps 7 and 8 were ok, there is a problem with the board. Dispatch a technician and ship a new board (part # 14001003). Once the board is installed, use the program button and program a new code (the old code will not work as memory is stored in the board and not the keypad).
      - c) If a new code does not work, try replacing the keypad.
    - 10) Check to make sure that the key switch (Figure 2.1) is getting power at the key switch connection leads. (Figure 2.3) When the correct code is entered, it should get around 12-16.4 VDC power. If it isn't and you have checked steps 1-9, the key switch is bad
    - 11) Check the voltage to the solenoid. (Figure 2.2) Be sure to disconnect the wire nuts and not the wires. After an operational code has been entered, there should be approximately 11 VDC at the solenoid when energized.
      - a) If the voltage is not correct and you have checked steps 1-10, the board is bad. The rest of the unit still needs to be checked. Go to step 2 under "Problem III:

The door can be opened without entering the code/ The unit will not latch or secure” to check the rest of the unit.

- b) If the voltage is not correct, first check to see if the solenoid is functional by using a 9V battery. Disconnect the wire nuts (Figure 2.2) and ensure that you connect the battery *only* to the solenoid leads to see if the solenoid fires.
  - i) If the battery does work but the unit still doesn’t unlock, the solenoid is not the problem. A mechanical issue is part of the problem. Go to step 3 under “Problem III: The door can be opened without entering the code/ The unit will not latch or secure.”
  - ii) If the battery does work and the unit mechanically functions as it should, the problem is prior to the solenoid.
  - iii) If it did not work and the wiring is secure, the solenoid is also bad.
- c) If the voltage is correct, there is a mechanical issue. Go to step 3 under “Problem III: The door can be opened without entering the code/ The unit will not latch or secure.”

### **III.Problem: The door can be opened without entering the code/ The unit will not latch or secure.**

- 1) Unplug the unit for 15 seconds and plug it back in. You should hear 2 beeps when you plug it in.
  - a) If that does not resolve the problem, move to step 2.
  - b) If it does resolve the problem, move to step 7 under “The unit does not beep and the door will not open.”
- 2) Check for physical damage.
- 3) Use a lubricant like WD40 to lubricate the bearings and any place where moving parts can potentially wear against each other.
- 4) Check to make sure that the nut on the trip arm is not too tight. (figure 4.1) There needs to be play in the inner lever, otherwise, the arm will either engage and stay engaged, or it will not engage at all. In order to gauge if the nut is set to the proper tightness, place a business card between the bushing and the bearing. Tighten the nut until you can't remove the business card, and then loosen it up so that you can just barely remove the card without tearing it. You should be able to move the solenoid with your finger to engage the trip arm.
  - a) If the nut is too tight, loosen it until there is free play on the inner lever.
  - b) If it is not too tight, or if loosening it does not resolve the issue, move to step 5.
- 5) Check the nut on the pivot plate (figure 5.5) to ensure it is secure but still allows the plate to pivot.
- 6) Check the nut on the threaded rod connecting the female rod ends to the pivot plate (figure 5.6). Tighten the nut if necessary or the threaded rod could back out of the female rod ends.
- 7) Visually inspect the latch:
  - a) Check for broken springs or anything that may be dangling. If anything is dangling, a new latch is needed.
  - b) Ensure that the lock bolt rod fully engages in both claws of the latch and aligns with the middle of the latch. It may be out of alignment and/or coming in too high or low. The latch can move on the frame so that the lock bolt rod won't engage fully into the claws. If this happens, adjust the latch forward or backward and/or up and down as necessary. If this does not work, move to step 8.

- i) Check the condition of the door and frame. If any repairs are needed, make them before re-aligning the latch.
  - ii) Note: if there is a door issue that cannot be overcome, new holes may need to be drilled into the latch so that it is not re-installed into old/bad holes.
- 8) Check to make sure that the trip arm is not bypassing the contact plate. (Figure 4.2-4.3) If it is, remove the arm from the device, bend it in just far enough that it engages the contact plate, and reinstall it. Note: it is important that you remove the trip arm completely before bending it.
- a) If this does not resolve the issue, move to step 11.
- 9) Check to make sure that the screw in the collar on the lock bolt rod (figure 4.4) is tight and that the rod collar is up against the outside of the contact plate. (figure 4.3) If it is loose, tighten the screw. (figure 4.6)
- 10) Check behind the red bar between the bar and the door to make sure that debris hasn't fallen behind it to depress the bar.

## IV. Tech Checklist for EE Unit

I verify that I have inspected the items listed below:

X \_\_\_\_\_ (Name) X \_\_\_\_\_ (Date)

### Damage (if present, please describe)

• <u>Water Damage:</u>	Yes	No
• <u>Physical Damage:</u>	Yes	No
• <u>Burned out Components:</u>	Yes	No
• <u>Frayed/Broken Wires:</u>	Yes	No
• <u>Additional Comments:</u>		

### Electrical Components (Circle appropriate option and add comments as necessary)

• <u>Connections:</u>		
○ <u>Wire harness firmly seated into back of keypad: (fig 6)</u>	Was Secure	Re-Secured
○ <u>Connections are secured to the wire (not insulation) at the point of connection on the keypad (fig 4.6):</u>	Was Secure	Re-Secured
○ <u>Connection from keypad to key switch is secure (fig 2.3):</u>	Was Secure	Re-Secured
○ <u>Connection from keypad to the solenoid is secure (fig 2.2):</u>	Was Secure	Re-Secured
• <u>Fuse (fig 3.3):</u>	Not Blown	Replaced
• <u>Red Varistor (fig 3.1):</u>	Was In Place	Replaced
• <u>Red Jumper (fig 3.2):</u>	Was In Place	Replaced
• <u>Gray Door Monitor Wire (fig 4.4):</u>	Was In Place	Replaced
• <u>Transformer:</u>	Meets Specs	Does Not Meet Specs-ordered new one from LockNet
○ <u>Specifications: Model AD-121A2, Input 120VAC 60Hz 20.8W, Output. 12VDC 1.2A, WHT/BLK = (+) BLK + (-)</u>		
• <u>Additional Comments:</u>		

### Voltage Measurements

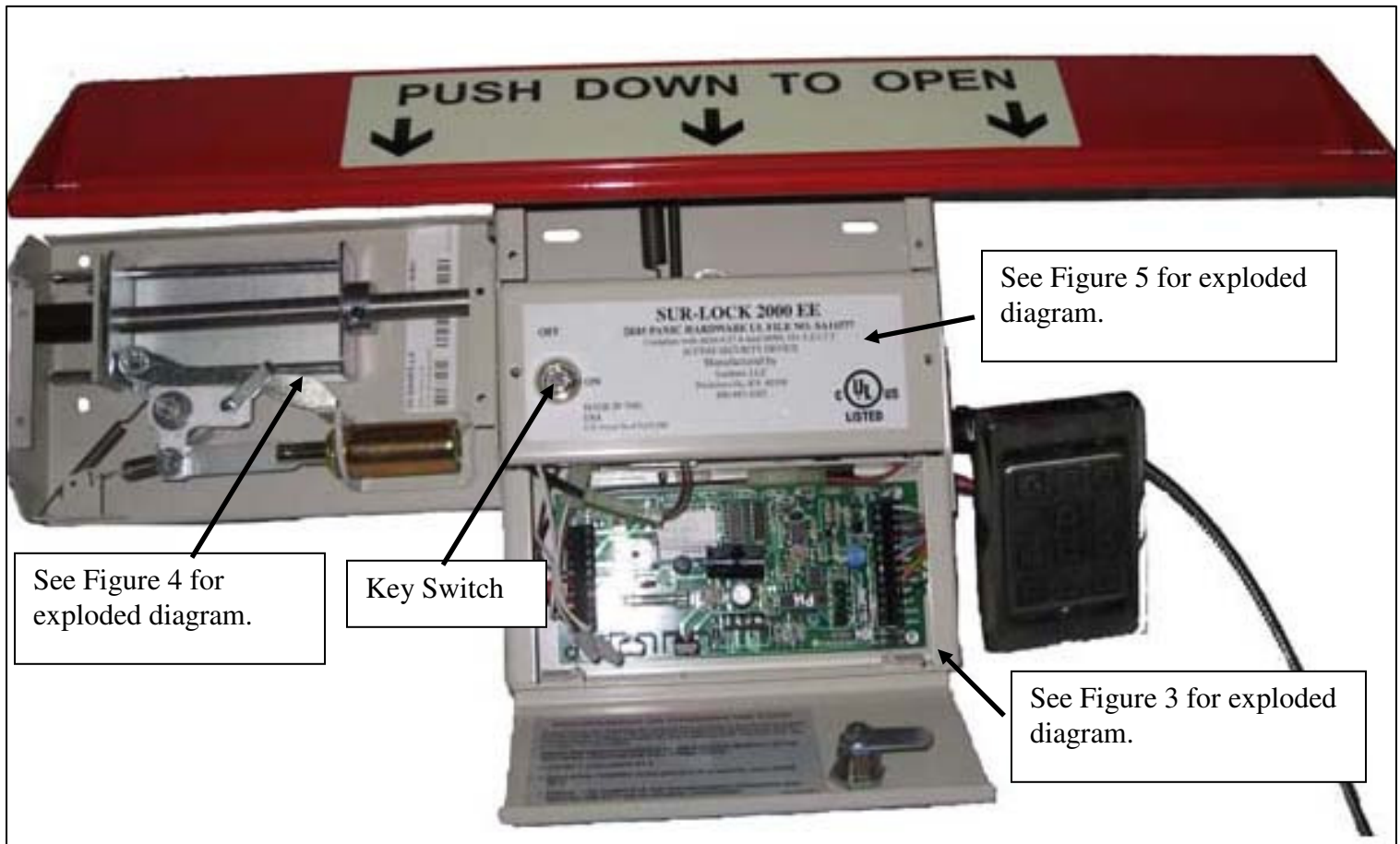
• <u>Wire Nuts to the Solenoid (fig 2.2) measure 11 VDC</u>	Yes	No
• <u>Key switch connection leads (fig 2.3) measure 12-16.5 VDC</u>	Yes	No
• <u>Black and red wires leading to the transformer on the left terminal block (fig 3.9) measure 12-16.5 VDC</u>	Yes	No
• <u>Transformer leads that connect to the armored cable (fig 8) measure 12-16.5 VDC</u>	Yes	No
• <u>Keypad connections at the right terminal block (fig 3.7) measure 3.4 VDC</u>	Yes	No
• <u>Red and White wires at the end of the wiring harness (fig 6.1) measure 3.4 VDC</u>	Yes	No

### Mechanical Components (Circle appropriate option and add comments as necessary)

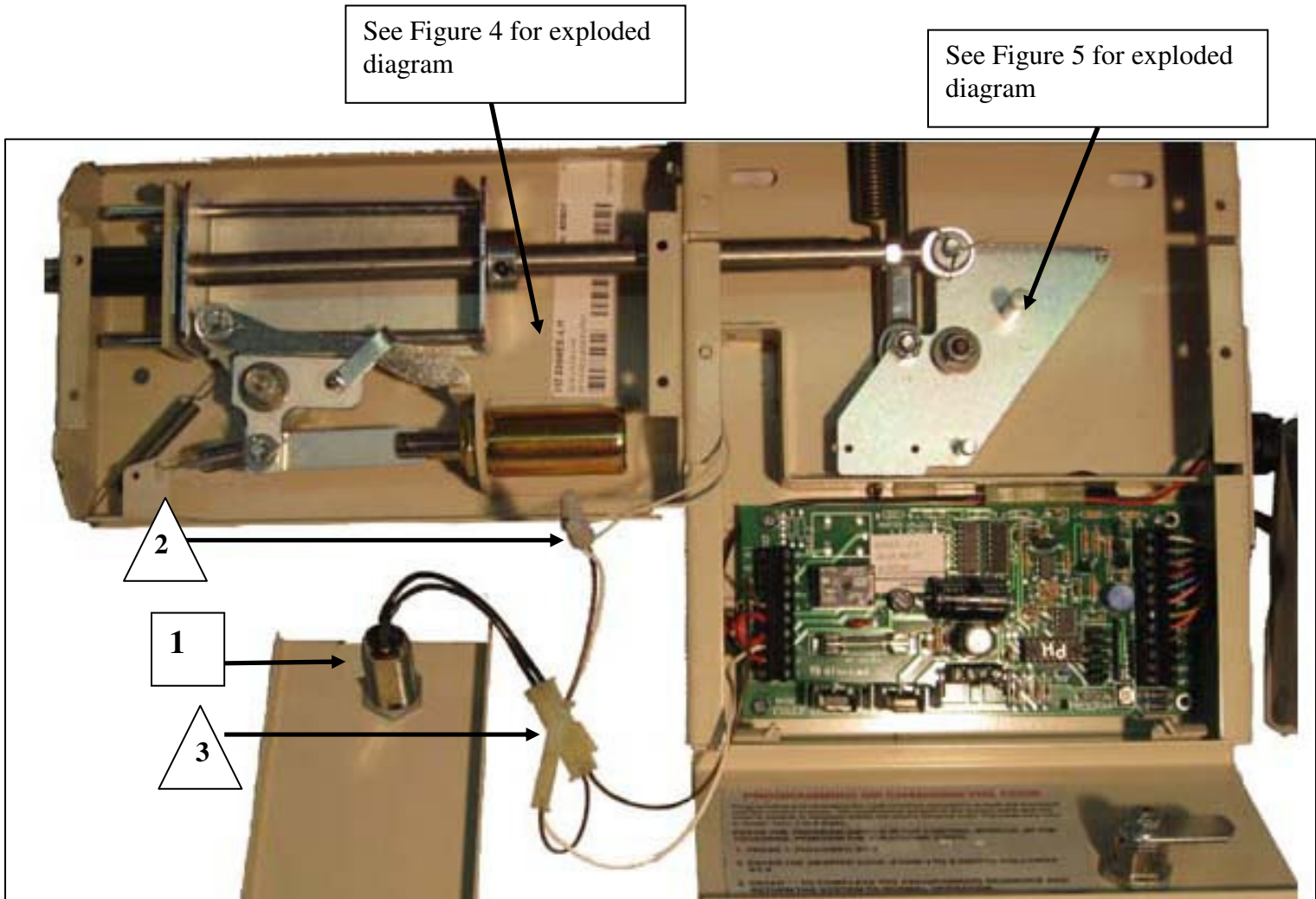
• <u>There is free play in the trip arm (fig 4.2):</u>	Free Play	Loosened Nut
• <u>No broken parts/springs in the latch:</u>	Nothing Broken	Broken-ordered new one from LockNet
• <u>Lock bolt rod engages in the latch properly:</u>	Engages Properly	Realigned
• <u>No debris behind the red bar:</u>	No Debris	Removed Debris
• <u>Trip arm is not bypassing the contact plate (fig 4.2, 4.3):</u>	Not Bypassing	Bent in to Repair Tightened Nut
• <u>Screw (fig 4.6) in the collar on lock bolt rod (4.4) is tight and rod collar is up against outside of the contact plate (fig 4.3)</u>	In Proper Condition	Repaired to Proper Condition
• <u>There are no problems with the door itself:</u>	No Problems	Repaired Problems Reported Problems To LockNet
• <u>Additional Comments:</u>		

## V. FIGURES

Figure 1

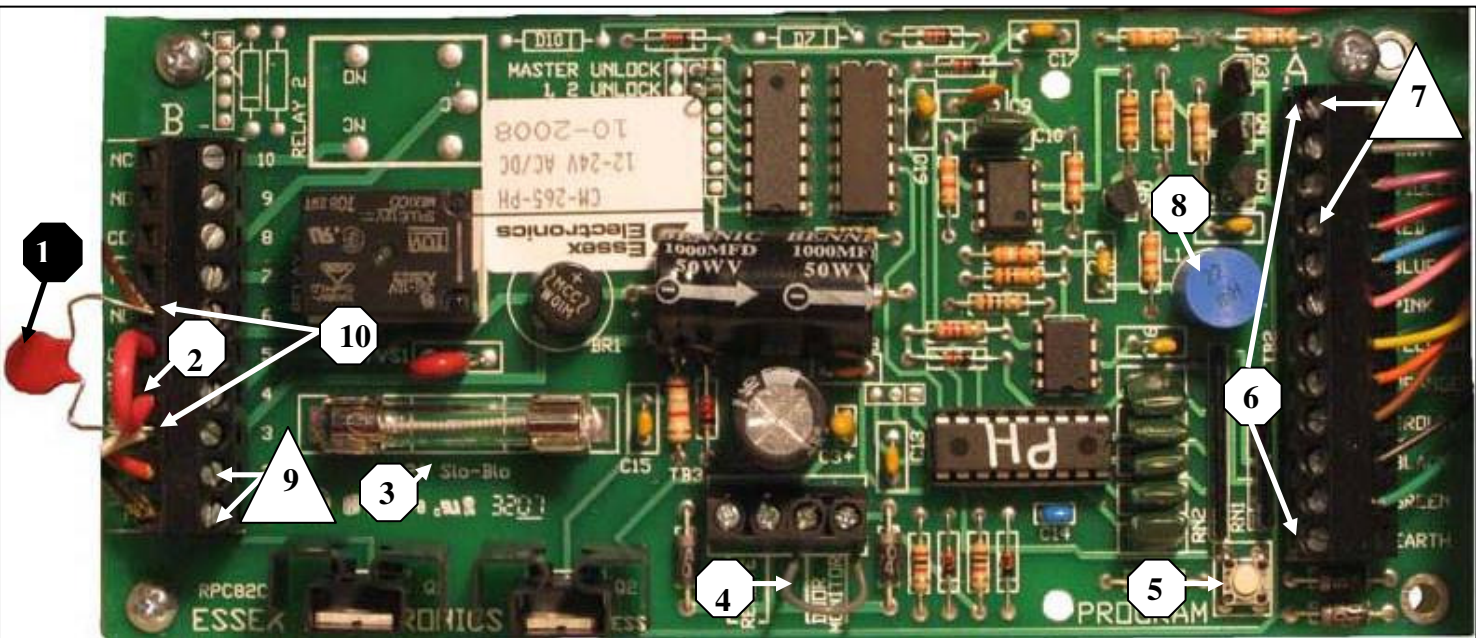


**Figure 2**



1	Key Switch
2	Wire Nuts to Solenoid – Voltage Measurement Point (11 VDC)
3	Key Switch Connection Leads – Voltage Measurement Point (12-16.5VDC)

**Figure 3**

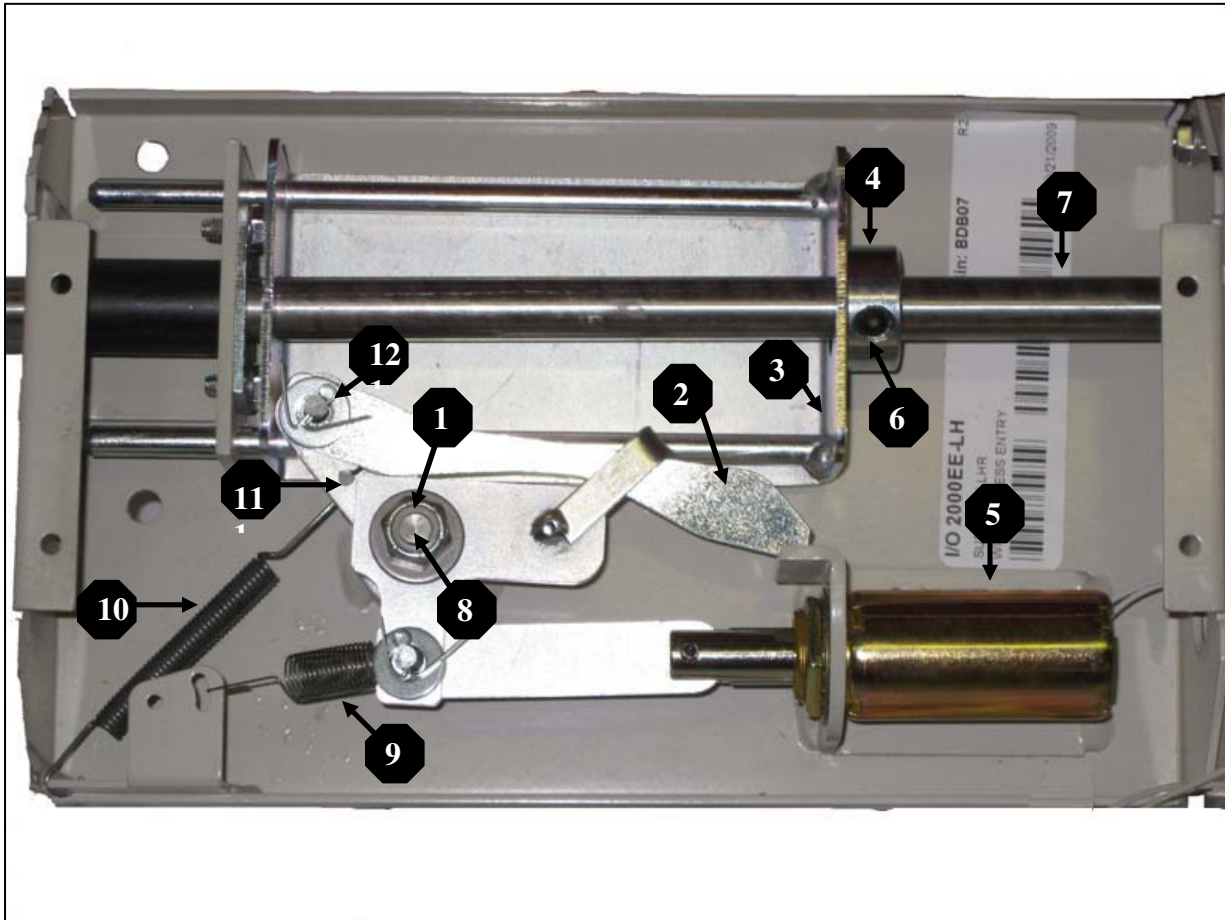


1	Red Varistor
2	Red Jumper
3	Fuse
4	Gray Door Monitor Wire
5	Program Button
6	Keypad Connections / Terminal Block
7	Keypad Connection - Red & White Wire Voltage Measurements (3.4 VDC)
8	Blue Post – not a button – do NOT push
9	Armored Cable/Transformer Connection – Black (bottom) & Red (top) Voltage Measurements (12-16.5 VDC)
10	Brown (top) and White (bottom) wires leading to panic bar (brown) and key switch (white)

Disconnected keypad wires “at the point of connection on the control board” can cause the following:  
(note that colors are listed in order that they appear on the board from top to bottom)

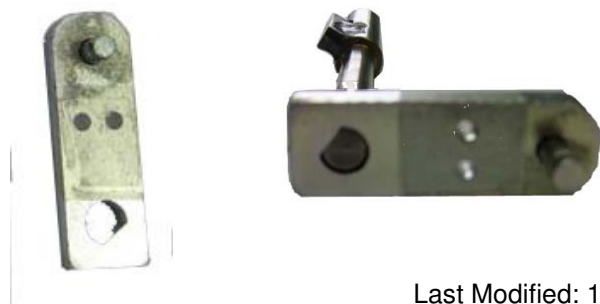
1. White: Operates, has sound, but NO green light
2. Gray: Operates, has sound, but NO red light
3. Violet: No sound, but has lights and operates
4. Red: Kills the keypad, no operations
5. Blue: Seems to have No effect on the lock but kills the # 9 button
6. Pink: Unit has sound, but will NOT open and kills the # 7 button
7. Yellow: Unit has sound, but will NOT open and kills the # 5 button
8. Orange: Seems to have No effect on the lock but does kill the # 3 button
9. Brown: Unit has sound, but will NOT open, disables the #1 button
10. Black: Kills the keypad, no operations
11. Green: Seems to have No effect
12. Earth: unused

**Figure 4**

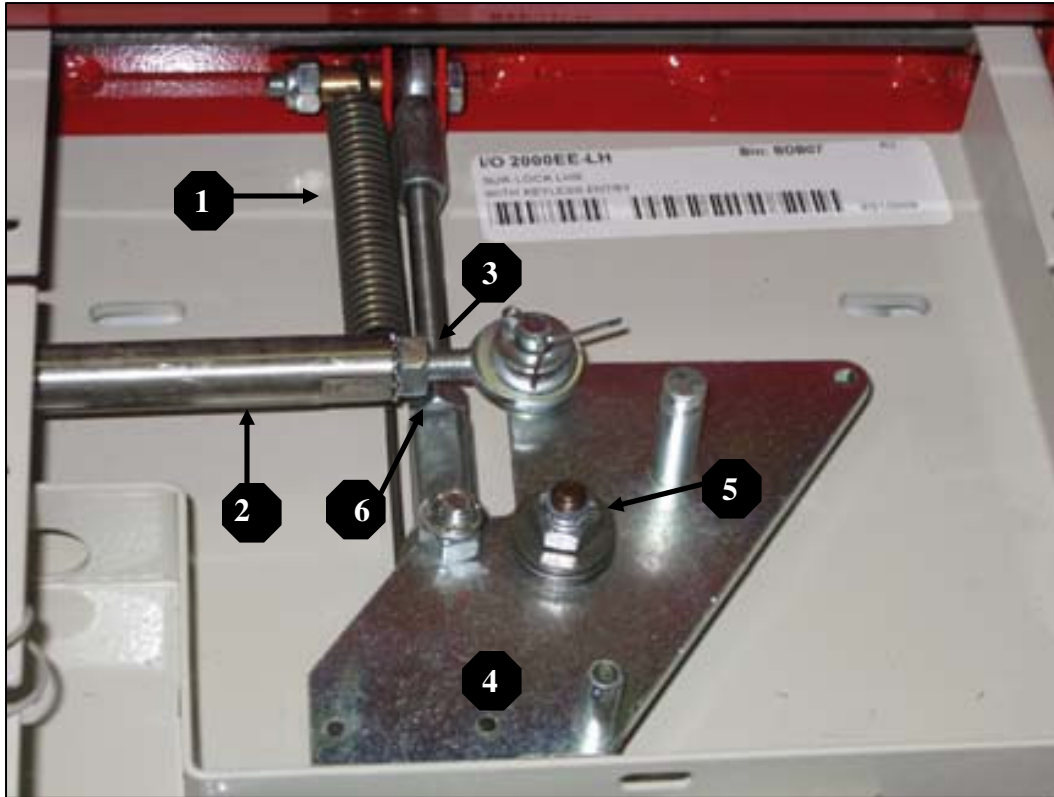


1	Nut on Welded Shaft/Lift Cam
2	Welded Shaft/Lift Cam
3	Contact Plate – Release Block
4	Collar on Lock Bolt Rod
5	Solenoid
6	Screw on Lock Bolt Rod Collar
7	Lock Bolt Rod
8	Welded Shaft for Outside Handle
9	Lift Cam Spring
10	Handle Return Spring
11	Rod Connector
12	Cottar Pin on Trip Arm

**Figure 4a – Rod Connectors**



**Figure 5**

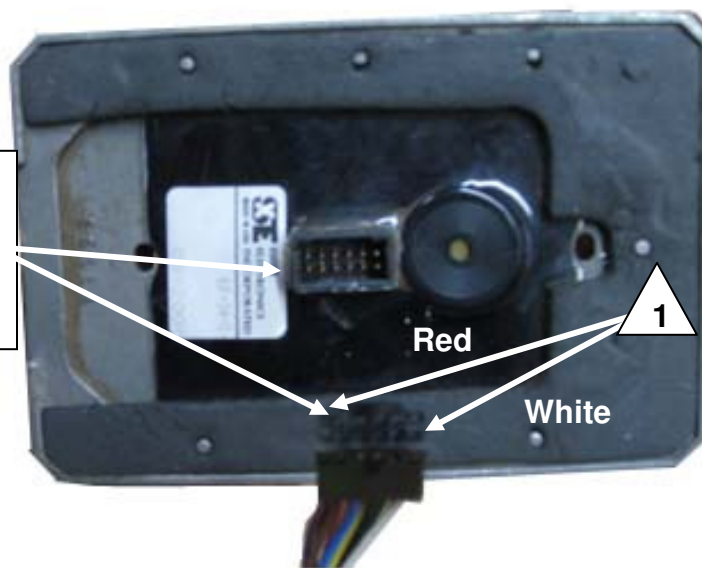


1	Push Bar Return Spring
2	Lock Bolt Rod
3	Lock Bolt Rod Adjustment Point
4	Pivot Plate
5	Nut on Pivot Plate
6	Threaded Rod Lock Nut

Figure 6



Connection must be firmly seated on pins. You will hear a click when connected properly.



1	Keypad Connection at End of Wiring Harness – Voltage Measurement Point (3.4 VDC at Red and White wires)
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**Figure 7**

Front View



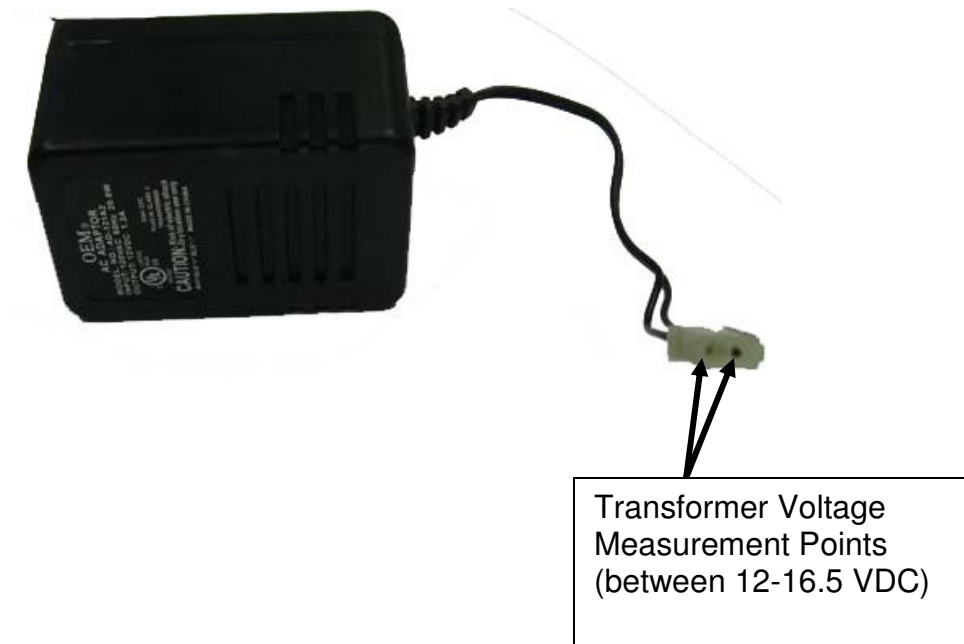
Side View



Back View



**Figure 8**



## VI. Table of Part Numbers

<b>Part #</b>	<b>Description</b>
1008-01	Latch (Strike) Assembly Packaged
1025-01	Handle Modified & Packaged Hardware
3224-01-A	Rod Connector Assembly - Left Hand
3224-02-A	Rod Connector Assembly - Right Hand
14001003	Essex Control Module
14001006	Tube Key
8436-01S	Solenoid
14001001	Transformer
8445-01	4' Electronic Cable (Armored)
14001015	15' Electronic Cable (Armored)
14001002	Standard Cable - Keypad to Essex Board
14001026	Long Cable - Keypad to Essex Board
8440-01	Essex Normally Open 3x4 Stainless Steel Keypad