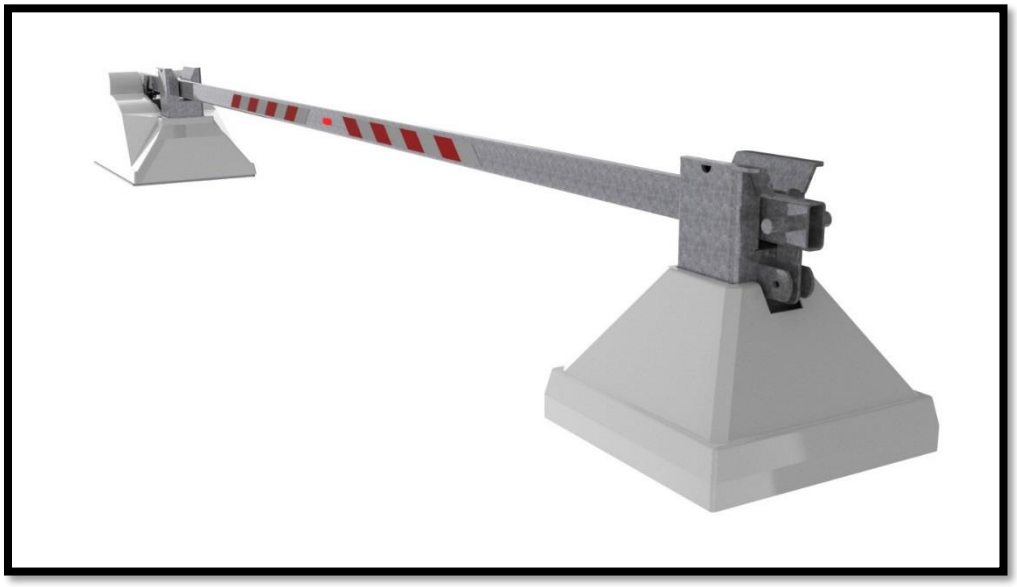
# Maintenance Manual

RSS-3000 Series Electric Drop Beam Vehicle Barrier



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# Contents



## Attachments

## INTRODUCTION

This manual provides Maintenance Procedures for the RSS-3000 series Drop Beam vehicle barrier system. It is **NOT** intended to be all encompassing and personnel are highly encouraged to review this manual prior to performing maintenance on RSSI Barriers.

## GENERAL

The RSS-3000 Drop Beam Barrier is a modern "best-of-breed" electrically operated, retractable, Drop Beam vehicle barrier that, when properly configured, can operate with a continuous duty cycle in all climates with minimal maintenance and expense. An Allen-Bradley MPAI series IP-67 servo electromechanical actuator with manual override and rapid reverse smoothly and quietly rotates an arresting element to an above ground position of 28" without obstructing line-of-sight vision.

## BEFORE YOU BEGIN

- Read and understand all instructions and procedures before you begin to maintain the barriers.
- Read and observe all Warning hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.
- Follow your company's safety guidelines, to include lockout procedures.
- Use the proper tools when required to help avoid serious personal injury and damage to components.
- After review of this manual, recommend a conference call with the RSSI factory to discuss any questions regarding procedures we may not have addressed or that require further clarification.

## HOW TO OBTAIN ADDITIONAL FACTORY SUPPORT

If you have any issues or questions, on-site personnel are highly encouraged to contact RSSI's Service department. **WE CAN HELP YOU!** Normal office hours are 7:00 AM Central Standard Time to 3:30 PM Central Standard Time, Monday - Friday. After hours support is available with prior coordination.

| Telephone | Email |
|---|---|
| +1 (850) 871-9300 | service@rssi.com |

## HAZARD ALERT MESSAGE AND SYMBOLS

**WARNING**
A Warning alerts you to an instruction or procedure that you must follow exactly to avoid serious personal injury and damage to components.

**CAUTION**
A Caution alerts you to an essential installation or maintenance procedure or statement, which, if not strictly observed, could result in damage to the system, equipment or injury.

**NOTE**
A Note alerts you to an essential installation or maintenance procedure, condition, or statement.

## GENERAL SAFETY

Personnel MUST comply with the following important safety instructions DURING installation activities for the RSS-3000 series drop beam vehicle barrier system.

- Read and comply with all safety rules in this manual.
- A fully trained maintenance person must perform all work.
- Never operate this equipment when a vehicle, person or any obstruction is in the way of full operation of the RSS-3000.
- Prior to start-up of the RSS-3000 series electric Drop Beam vehicle barrier system, all electrical connections to the barrier will be isolated (disconnected) IAW local Lock Out Procedures.
- Understand and comply with the use of the Safety Prop Bar.

## EMERGENCY MANUAL OPERATION

Tools needed: Always have these tools readily available

1. Cordless impact wrench or ratchet wrench with TORX 45 bit
2. Cordless drill with adapter for 15/16 socket
3. Flashlight and gloves

## BEFORE YOU INITIATE MAINTENANCE OPERATIONS

All Maintenance Operations must be coordinated with site personnel

**WARNING**

- **Place traffic cones and block roadway from traffic to ensure worker safety**
- **Use the proper tools when required to help avoid serious personal injury and damage to components.**
    - **Never operate this equipment when a vehicle, person or any obstruction is in the way of full operation of the RSS-2000.**

## Lowering Barrier (Close Roadway)

1. Remove Fiberglass Cowling from barrier


*Fiberglass Cowling, RSS-3000*

2. Visually inspect for debris that could interfere with operation

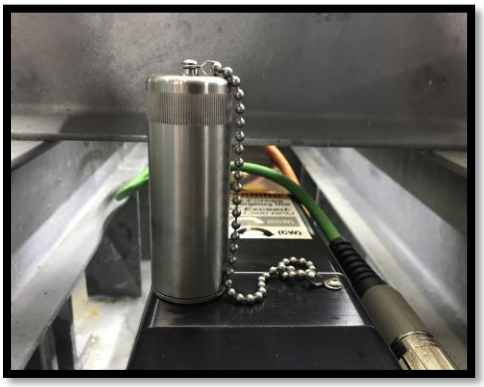
**WARNING**

**Remove power from barrier (Barrier Control Panel)**

3. Disconnect power to the barrier by turning off the Main Disconnect and lock out with a wire tie or IAW local lockout procedures.

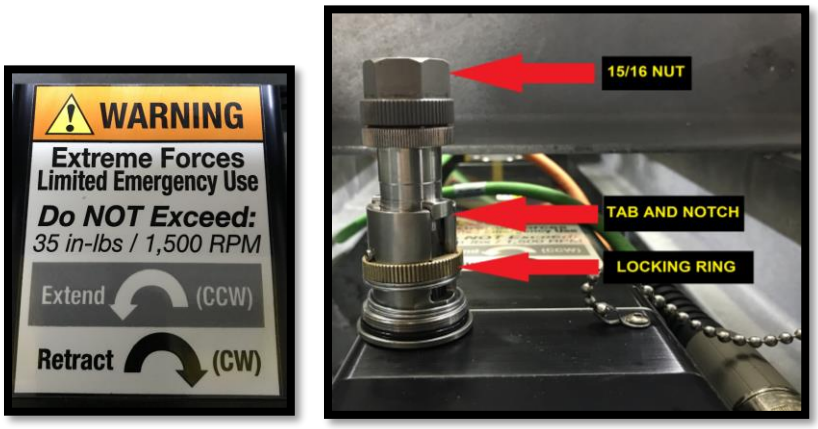

*Main Disconnect*

4. Remove metal cylinder cover from Manual Brake Overdrive (counterclockwise).



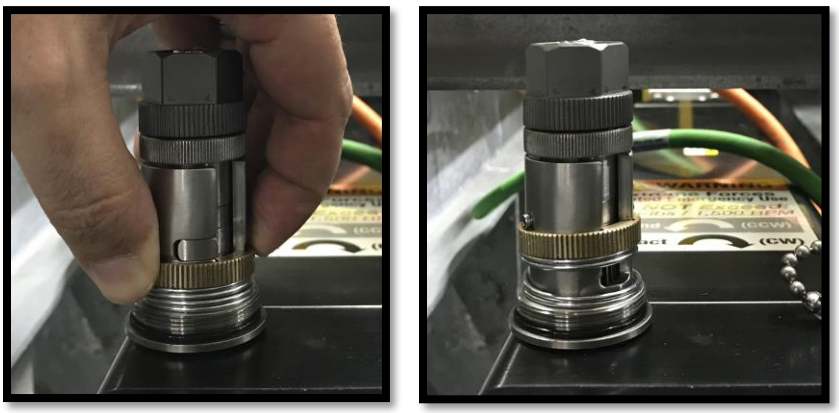
*Cylinder Cover*

5. Hand turn the 15/16 nut clockwise while applying light pressure to engage the manual drive downward, tabs inside the notch goes down to Locking Ring. The Brass Ring will lower as you screw down revealing the notch to lock in Manual Drive.




*Manual Drive*

6. Once tab and bottom notch are lined up and Manual Drive is down, turn locking nut (right below 15/16 nut) clockwise to Lock Manual Brake Overdrive in place. Brass ring will pop up into place once locked.



*Lock Manual Drive*

**WARNING**

**NEVER use impact wrench or drill to rotate manual screw (Standard Drill only)**

7. Then switch to a cordless drill and set the drill on the slowest RPM setting. Lower the barrier by using the drill (no pressure) and operating it on reverse setting (counterclockwise) until it reaches the full down position. DO NOT OVERDRIVE.


*Warning Label*

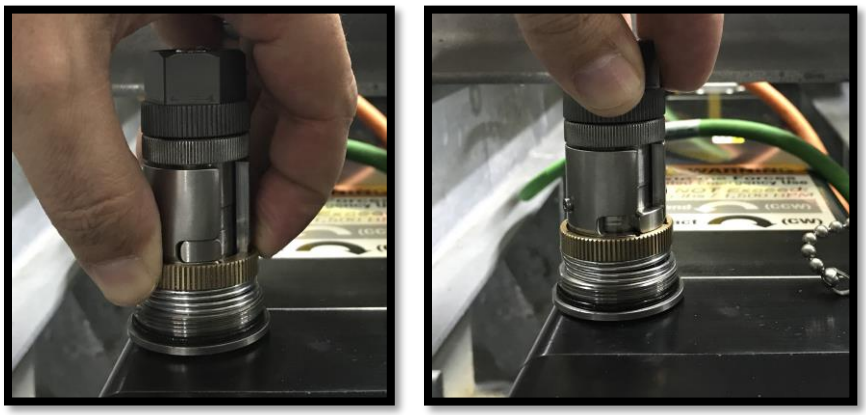
**NOTE**

The Manual Nut is equipped with an internal clutch. It will engage at max physical limits or if the load is too great.

**WARNING**

**Improper operation of manual screw will damage actuator**

8. To release Manual Drive, slide the brass ring down and turn locking nut (counterclockwise) out of notches. Then turn 15/16 nut counterclockwise to disengage Manual Drive. Manual Drive will move upward and pop when fully disengaged. DO NOT OPERATE BARRIER UNTIL MANUAL BRAKE OVERDRIVE IS FULLY DISENGAGED. Screw metal cylinder back onto Manual Drive careful not to damage O-Ring or cross-thread.



*Release Manual Drive*

**BEFORE YOU INITIATE MAINTENANCE OPERATIONS**

All Maintenance Operations must be coordinated with site personnel

**WARNING**

- **Place traffic cones and block roadway from traffic to ensure worker safety**
- **Use the proper tools when required to help avoid serious personal injury and damage to components.**
- **Never operate this equipment when a vehicle, person or any obstruction is in the way of full operation of the RSS-2000.**

## Raising Barrier (Close Roadway)

1. Remove metal cylinder cover from Manual Drive (counterclockwise).
2. Hand turn the 15/16 nut clockwise while applying light pressure to engage the manual drive downward, tabs inside the notch while going down. Brass Ring will lower as you screw down.
3. Once tabs and notches are lined up and Manual Drive is down, turn locking nut (right below 15/16 nut) clockwise to Lock Manual Brake Overdrive in place. Brass ring will pop up into place.
4. Then switch to a cordless drill and set the drill on the slowest RPM setting. Raise the barrier by using the drill (no pressure) and operating it forward (clockwise) on the slowest RPM setting until it reaches the full up position.
5. To release Manual Drive slide the brass ring down and turn locking nut (counterclockwise) out of notches. Then turn 15/16 nut counterclockwise to disengage Manual Drive. Manual Drive will

move upward and pop when fully disengaged. DO NOT OPERATE BARRIER UNTIL MANUAL BRAKE OVERDRIVE IS FULLY DISENGAGED.


*Warning Label*

6. Place top plate back in place and install screws, start all screws before tightening (anti-seize)
7. After condition requiring Emergency Manual Operation has been corrected (power restored or components repaired, reinstate power to the barrier by turning on the Main Disconnect

*Main Power Disconnect*

8. Push in drive fuse(s) in BCP
9. Return barrier to service.

## Troubleshooting Procedures.

The following Table contains the most common Trouble Shooting items for the barrier systems. If you encounter an issue not listed or want to discuss with a technician, please contact the factory.

*Table 1, Trouble Shooting Procedures*

| STEP | Condition (Problem) | Cause (Possible Reason) | Corrective Action | Verify Corrective Action |
|---|---|---|---|---|
| **1** | E01 on Active Alarm Screen with Servo Drive fuse pushed in<br><br>***Drive at Barrier** | Loss of communication to Servo Drive<br><br>Note- It is normal to get an E01 with Fuse pulled (drive has no power) | Check Ethernet cable from servo drive inside of barrier to the Ethernet switch inside the BCP with Ethernet cable tester. Re-terminate the RJ45 connections and test cable again. Listen for servo drive to power up, use long screwdriver for stethoscope. | If the Condition still exists, go to step #2. |
| **2** | E01 on Active Alarm Screen with Servo Drive fuse pushed in<br><br>***Drive at Barrier** | Loss of communication to Servo Drive | Use known good spare Ethernet cable above ground and bypass existing cable in ground and test.<br><br>(Advanced method)<br>Use windows laptop and DOS command prompt and use PING command to isolate Ethernet network connectivity, Laptop can be plugged directly into servo drive box inside barrier. | If the Condition still exists but Ethernet cables all check good, go to step #3 |
| **3** | E01 on Active Alarm Screen with Servo Drive fuse pushed in<br><br>***Drive at Barrier** | Loss of power to Servo Drive | At the BCP, check for Red light at Fuse holder; if red light is lit, replace fuse.<br>Check for 220vac at top and bottom contacts of; find A/C power source issue at CB1 or Main rotary cutoff switch. | If the Condition still exists, go to step #4. |
| **4** | E01 on Active Alarm Screen with Servo Drive fuse pushed in<br><br>***Drive at Barrier** | Loss of power to Servo Drive | Test 220 vac power to Servo Drive inside cabinet with Volt Meter – works with Servo Drive fuses in step 3 | If the Condition still exists, and you've checked steps 1-4, replace Servo Drive Panel inside barrier.<br><br>Refer to Attch 10, Replace the Servo Drive in Barrier or call RSSI |
| **5** | E14 trending in Alarm History with Servo Drive fuse pushed in<br><br>***Drive at Barrier** | Intermittent Loss of communication to Servo Drive | Check Ethernet cable from Ethernet switch to servo drive in BCP, replace if bad. Replace Waterproof Ethernet connector on Servo Drive. Replace Servo Drive Box | Contact RSSI if conditions still exist. |
| **6** | E01 on Active Alarm Screen with Servo Drive fuse pushed in<br><br>***Drive in Panel** | Loss of power to Servo Drive from | At the BCP, check for Red light at Fuse holder; if red light is lit, replace fuse. Check for 220vac at top contacts of; check A/C power source issue at CB1 or Main rotary cutoff switch. Visually watch servo drive power up | If the Condition still exists, contact RSSI. |

| | | | | |
|---|---|---|---|---|
| **7** | General Fault in Active Alarm Screen and Alarm History | Encoder Communications bad to actuator (Green Cable). Internal Encoder in Actuator bad. | Go to drive status and see if the position number is **** (no number) inspect the green encoder cable/wires and then replace actuator- if there is a position number, command the barrier to move and then see detailed alarm in drive status - E31 and E07 = replace actuator. | If the Condition still exists, contact RSSI |
| **8** | Loss of Power Alarm on active alarm screen | BBP has experienced Loss of normal power | Test incoming power to BBP at CB1, if good, check battery output at inverter (24-26vdc) then clear active alarm by pressing ALARM RESET on maint touch screen main menu. | Alarm should clear (Green No Alarms) on maint touch screen main menu.<br>If the Condition still exists, call RSSI |
| **9** | E09 – Bus under voltage on active alarm page or in alarm history.<br><br>Barrier stops in mid Motion | Incoming main power too low for load | Check voltage (208-240v) while running barrier at BBP at CB1. If less than 208v, incoming power is too low.<br><br>Contact Electric provider to provide 208-240v | Confirm Electrical voltage<br><br>If confirmed and condition still exists, Call RSSI |
| **10** | E10 Bus overvoltage | Servo Drive Resistor Bad in BCP or Drive Box in Barrier | Replace Resistor inside BCP or replace Servo Drive Box inside barrier vault. | If the Condition still exists, contact RSSI |
| **11** | E19 in Active or Alarm History page | Physical stoppage of Motion. Did not reach preset position due to high amps or increase in load. | Check for broken springs or misalignment. Remove the load from actuator and run barrier from Maint touch screen (barrier control) if the actuator rod extends and retracts normally with very low amps, there is a mechanical issue, if the amps stay very high, then replace actuator. | If the Condition still exists, contact RSSI |
| **12** | Barrier has slowed down moving to up position, hesitates, jerky motion | Possible broken spring(s) | Check spring assembly for broken springs; if found replace | Refer to Component Repair Section for Spring Replacement Procedures |
| **13** | The barrier safety loops don't detect vehicles | Loop detector tuning | Retune loop detector by removing and inserting front plug with no vehicle on loop. Indicator lights should display solid green when tuned. | Retest loop detector, if the Condition still exists, check item #14. |
| **14** | The barrier safety loops don't detect vehicles | Bad loop detector | Replace loop detector. | Retest, if the Condition still exists, check item #15. |
| **15** | The barrier safety loops don't detect vehicles | Bad safety loop in roadway | Inspect roadway for cracks through Safety Loop wires. Replace if bad. | Safety Loop Installation can be found in the Installation Manual,<br>Retest safety loop, if the Condition still exists after checking items #13, #14 & #15, call RSSI |
| **16** | Touchscreens hard to operate or touchscreen area controls seem out of alignment | Touchscreen mount clips too tight | On back of touchscreen locate 4 black mount clips and loosen excessively tight clips, reposition clips evenly. | Check operation of touchscreen<br><br>If condition still exists, check item #17 |
| **17** | Touchscreens hard to operate or touchscreen area controls seem out of alignment | Bad Touchscreen | Replace touchscreen | Check operation of touchscreen<br>Refer to Atch 16, Replace and Setup Touch Screen<br>If condition still exists, after checking item #16 & #17, Call RSSI |
| **18** | Actuator heat pad not heating up | Thermostat not set properly | Confirm thermostat is set to 50% on dial. | Retest heat, if the Condition still exists, check item # 19. |

| | | | | |
|---|---|---|---|---|
| **19** | Actuator heat pad not heating up | Wiring | Verify voltage on Heat wires in Power J-box | Retest heat, if the Condition still exists Call RSSI. |

**NOTE**
If you encounter an issue not listed or want to discuss with a technician, please contact the factory. See page 3, HOW TO OBTAIN ADDITIONAL FACTORY SUPPORT.

# *Battery Backup Panel (BBP) Recovery/Restart Procedures*

The BBP is designed to automatically switch to battery power when normal power is lost and to switch back when normal power is restored. The BBP will also fully charge the batteries after an outage. The system will provide approximately 200 cycles of backup power to operate the barriers during a power outage (2 each 12-volt batteries). Should the power outage last longer than the battery life, the power inverter will shut down when the batteries voltage drops below approximately 20VDC.

**TO RECOVER WHEN MAIN POWER RETURNS**

1. Perform visual check on panel and pull check all wires to make sure they are secured in screw terminals and pressure terminals.

2. Ensure all breakers are off. (Green)

3. Verify (red rocker) power switch on top of the Inverter is OFF and breaker switch is in the (OFF) left position.

4. Ensure Low Voltage Relay (LVR) settings - HYS is set to 0, Level is set to 40, and Delay is set to 4, dip switches inside relay door set 1 and 5 to "on". (level and delay may be fine-tuned onsite). *See notes 1-3 below if you have an older system without a LVR.

5. Ensure Battery Cables are secured to power inverter and to both 12V batteries in series (24vdc). The Inverter battery input should be 24-26vdc.

6. Turn ON main 208-240vac power source to CB1 and power on. Verify voltage on top of CB1 (L1 & L2: 208 - 240vac)

7. Turn ON CB1 you will see that the Low Voltage Relay and TBR2 green lights come on, within 5 seconds you will see the red light start flashing on the voltage relay and within 4-6 seconds the amber light on the voltage relay will come on as the relay times in, green light on TBR1 will come on and C1 contactor will energize and pull in.

8. Verify voltage between (L1 & L2: 208- 240vac) on top of CB3 and CB4 and then turn ON CB3 (Battery Charger) and verify unit powers up, you may see the amp meter in the battery charger indicate charging. The battery input to the inverter should now be 26-28vdc.

9. Turn ON red rocker power switch located on top left-hand side of Inverter (beeps) and then turn ON breaker switch on the top right of the inverter (to the right). Turn ON CB2 and verify voltage on the top of C2 (emergency contactor) (EL1 & EL2: 245vac)

**FUNCTIONAL CHECKOUT**

1. Turn OFF CB1 and Contactor C1 should de-energize (pop out) and Contactor C2 should energize (pull in) simultaneously.

   Note: if BBU is connected and powering BCP from CB 4, check to see if power stayed on during the switchover and that the PLC generates "Loss of normal power" alarm on maintenance touchscreen. Reset alarms to test again.

2. Re-check voltages at the bottom of CB4 (3L1 & 3L2: 245vac) Inverter power.

3. Turn on CB1, Step 7 above will repeat as the low voltage relay times in again.

4. Re-check voltages at bottom of CB4 (3L1 & 3L2: 208-240vac) Main power source.

5. Battery Charger should be powered up again and showing charging amps to batteries. As the batteries return to fully charged state, charging amps should return to near zero.

NOTE 1: In step 4, For models with TDR (Timer Delay Relay) the DIP switch settings are - top switch is to the right and the last 3 to the left. Rotary dial is factory set to 4 second but can be tuned on site to match power recovery. The TDR times in the same way (C1 and C2 switching) as the LVR but doesn't monitor the incoming voltage.

NOTE 2: For DOS/Overseas models with L1 and Neutral, measure all voltages L1 to N (neutral) factory testing may use L1 and L2 (N). There is no 110vac in the system.

NOTE 3: For models with transformer and 110vac, during voltage checks make sure to measure across L1 - L2 - 3 - to N or ground. 5 power wires must be run to BCP. Incoming power Neutral (N) may not be the same as (2) after the transformer as it terminates to the BCP. Circuit breaker numbers may not be the same - refer to prints when testing.

- # Ethernet and Device Testing Procedures

The following table identifies all devices in the RSSI Barrier Network.

| IP ADDRESS | DEVICE/LOCATION |
|---|---|
| 192.168.1.10 | PLC in BCP |
| 192.168.1.11 | Servo Drive Inside Barrier |
| 192.168.1.12 | Maintenance Touch Screen in BCP |
| 192.168.1.13 | Point I/O in Primary Touch Screen Controls |
| 192.168.1.22 | Primary Touch Screen |

***Table 1, IP Address Listing***

If you receive a loss of communications Alarm or have to change out a device, you may have to conduct Ethernet tests of connectivity to all the nodes/devices (PLC, Touchscreen, Servo Drive ).

1. Using a laptop, connect your Ethernet cable to an empty port on the Ethernet switch in the BCP.
2. Set the static TCP/IP address on your laptop to 192.168.1.200 with subnet mask 255.255.255.0
3. Go to a DOS PROMPT and type PING 192.168.1.10 you should get replies from the PLC.
4. Go to a DOS PROMPT and type PING 192.168.1.11 you should get replies from the Servo Drive.
5. Go to a DOS PROMPT and type PING 192.168.1.12 you should get replies from the Maintenance Touchscreen in the BCP.
6. Go to a DOS PROMPT and type PING 192.168.1.22 you should get replies from the Primary Touchscreen.
7. If you do not get replies from the devices, ensure your laptop is on the correct subnet again and troubleshoot connectivity problems to any device. Test Ethernet cabling end to end with an Ethernet cable tester.

# Component Repair/Replacement Procedures

If there is a component to repair/replace that is not covered in this manual, contact the RSSI Service Manager for assistance (see page 3, HOW TO OBTAIN ADDITIONAL FACTORY SUPPORT).

- Repairs should only be performed by a factory trained technician.
- Most repairs (LED lights, fuses, bolts or screws, and sump pump) will be simple remove and replace and traditional skill sets (electrical, plumbing, and mechanical) can easily handle these tasks.
- Critical electrical components, Servo Drive, Actuator, PLC, and Communication Systems require more specialized skill sets. With this manual, and the phone support of a RSSI factory technician, these tasks can be easily performed.

Detailed Component Repair and Replacement Procedures are outlined in Attachments 4-17

## 16 Attachments

1. Barrier Control From Maintenance Touch Screen
2. Initiate Advanced Maintenance Operations (From Maintenance Touch Screen in BCP)
3. Preventative Maintenance Checklist
4. Replace Actuator
5. Replace Safety Loop Sensor
6. Replace IR Sensor
7. Replace Spring
8. Replace Servo Drive Fuse
9. Replace LED Traffic Light
10. Replace Servo Drive in Barrier
11. Replace Servo Drive in Panel
12. Replace Post Assembly LED Lights
13. Replace Surge Protection Module in BBP
14. Replace Time Delay Relay in BBP
15. Replace Low Voltage Monitor in BBP
16. Replace 24 VDC Power Supply in BCP
17. Replace and Setup Touchscreens

* * END OF SECTION * *

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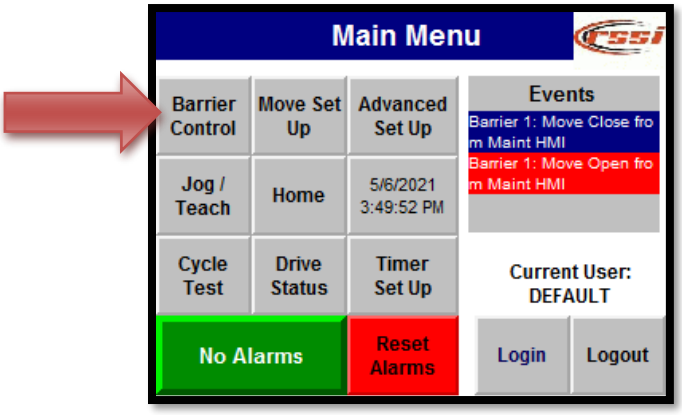
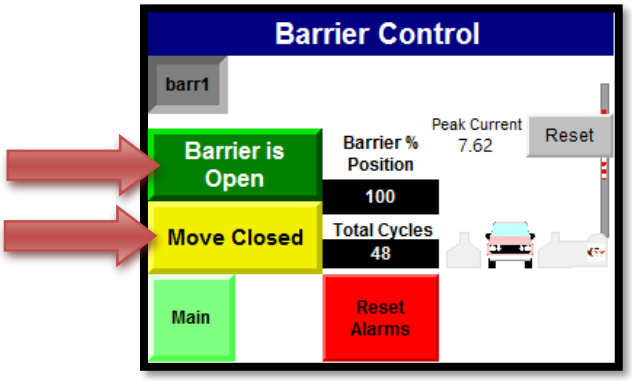
# ATTACHMENT 1- BARRIER CONTROL FROM MAINTENANCE TOUCH SCREEN

1. From the MAIN MENU, press the BARRIER CONTROL button.




*Main Menu*

2. Inside the BARRIER CONTROL menu use the MOVE CLOSED/OPEN buttons to operate the barrier a few cycles, Ensure the Beam is resting firmly in the Receiving Buttress in the CLOSED (DOWN) and ensure the OPEN(UP) position is all the way out of the traffic lane. Locking Tab at end of Beam isn't in traffic lane.




*Barrier Control Menu*

**NOTE**
If the Peak Current is higher than 20 Amp, it may indicate that the barrier position needs to be adjusted. Refer to Step 5 in Attachment 2.

**NOTE**
If the barrier post assembly is not flush with the roadway (protruding from barrier), refer to Step 5 in Attachment 2.

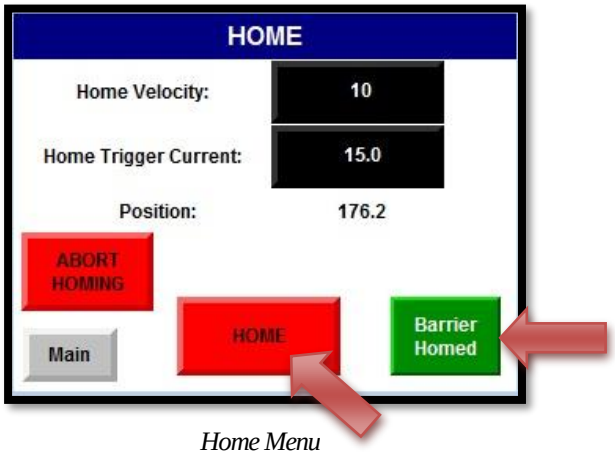
## FROM THE MAINTENANCE TOUCH SCREEN IN THE BCP

### *Homing the Barrier*

1. Turn on Servo Drive Fuse. On the maintenance touch screen in the BCP, go to the main screen and check for any alarms and reset or clear.
2. At the Main Screen, go to the LOGIN box and login: "**RSSI"** password: "**32404"**.
3. Once you have logged in at the Main screen, select the HOME box and then at the HOME menu press the red HOME button. The Home button will flash while homing, once it has completed the process the green BARRIER HOMED button will appear. The barrier is now homed, select Main to return to main screen.

**WARNING**

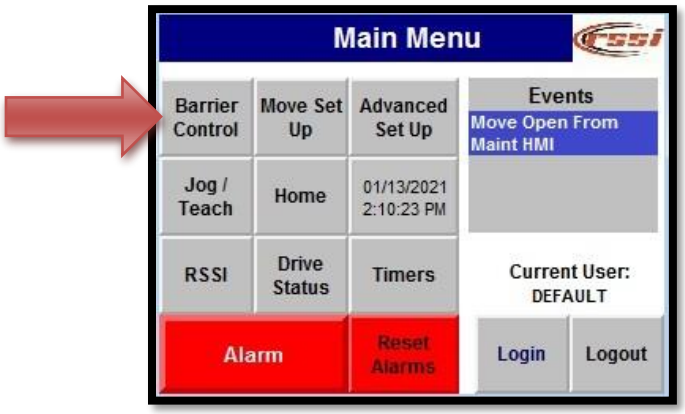
If the barrier is not in the CLOSED position it will start moving Down when HOMING button is pressed.




*Home Menu*

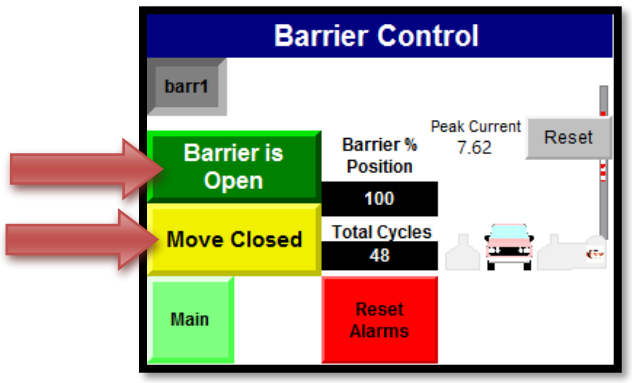
### *Barrier Control*

1. From the MAIN MENU, press the BARRIER CONTROL button (See Fig 10).




*Main Menu*

2. Inside the BARRIER CONTROL menu use the MOVE CLOSED/OPEN buttons to operate the barrier a few cycles, Ensure the Beam is resting firmly in the Receiving Buttress in the CLOSED (DOWN) and ensure the OPEN(UP) position is all the way out of the traffic lane. Locking Tab at end of Beam isn't in traffic lane.




*Barrier Control Menu*

**NOTE**
If the Peak Current is higher than 25 Amps, it may indicate that the barrier position needs to be adjusted. Refer to Step 5 in Attachment 2.

**NOTE**
If the barrier is slamming into the Receiving Buttress or does not land all the way down into the Receiving Buttress refer to Step 5 in Attachment 2.

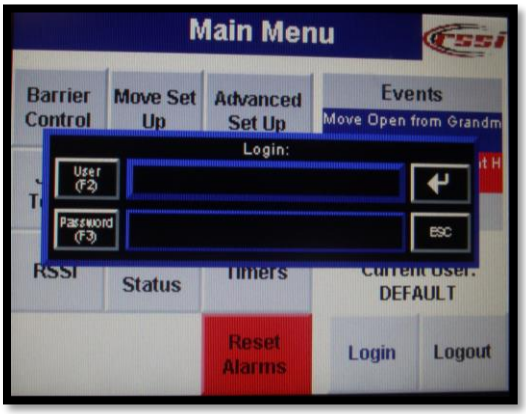
# ATTACHMENT 2 - INITIATE ADVANCED MAINTENANCE OPERATIONS (FROM MAINTENANCE TOUCH SCREEN IN BCP)

The Maintenance Touchscreen located in the BCP is located in a mechanical room and many maintenance tasks can be accomplished from the Secondary Operator Controls. However, there are tasks that can only be performed from this touch screen.

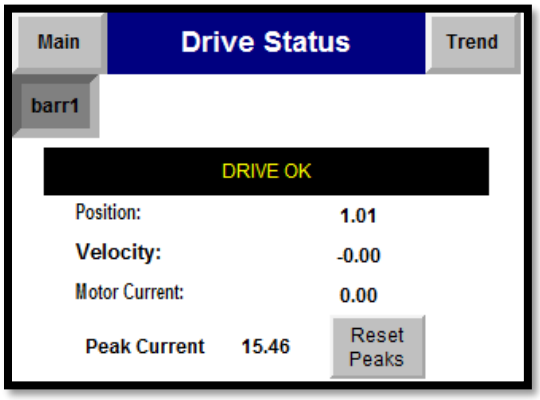
**NOTE**
If you're unsure of the impact of changing a setting, please contact RSSI. See page 3, HOW TO OBTAIN ADDITIONAL FACTORY SUPPORT.

1. ALARM Screen: Clear Active alarms before proceeding) Primary/Secondary Touch Screens must be connected before alarms can be cleared.

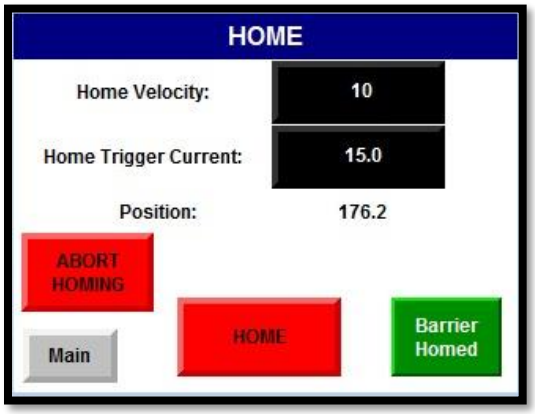

2. LOGIN Screen User: RSSI, PW=32404



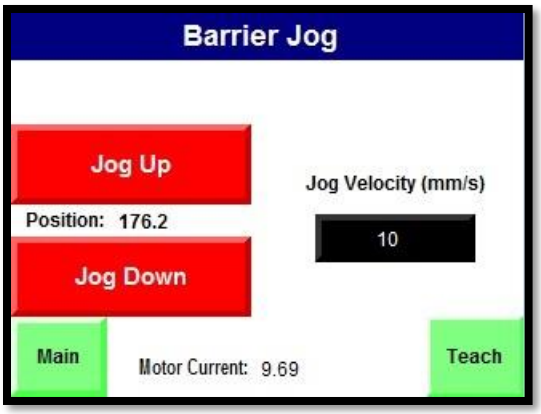
3. DRIVE STATUS screen: Drive Status must be DRIVE OK – if it is not resolve by checking trouble shooting table on page 9.

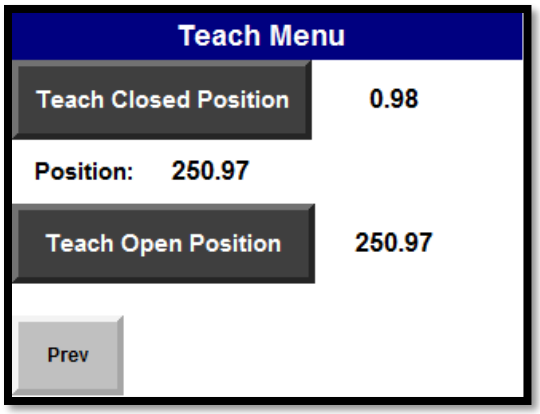



4. HOME Screen: Technician can HOME barrier or abort HOMING, if barrier gets out of HOME again, the touchscreen will show message and direct technician to re-home. If barrier doesn't complete Homing in 30-45 seconds, verify Drive Status in Item 3 above. If Drive is OK, attempt to HOME again. If it doesn't complete Homing a 2nd time, pressing the abort homing button will stop HOMING procedure. Contact RSSI for assistance.




5. JOG/TEACH screens: use JOG to position barrier–then TEACH open/closed lane positions. Closed position should read around 3.5 and open position should read 290 depending on roadway.

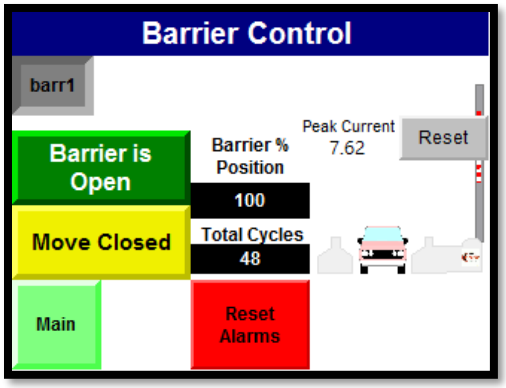


**CAUTION**
DO NOT change any other settings on this screen without FIRST contacting RSSI. Doing so may change the operating characteristics of your barrier.

6. MOVE screen: using accel/decel to select speed of barrier


7. Barrier Control Screen: run barrier through a series of open/close movements while monitoring the AMP indicator. T/shoot high amp movements before proceeding. Recheck Manual Screw, must be Disengaged.



# ATTACHMENT 3 - PREVENTATIVE MAINTENANCE CHECKLIST

Make copies of this checklist for maintenance activity for each barrier and maintain a copy in the maintenance binder for the Warranty/Historical Record. For assistance, please call RSSI's service department at (850) 871-9300 or email service@rssi.com.

| | |
|---|---|
| Name of Person Performing Maintenance: | |
| Barrier Location: | Barrier Model No: |
| Barrier Serial No: | Voltage: |
| Barrier Cycle Count: | Date: |

**BEFORE YOU INITIATE MAINTENANCE OPERATIONS**

All Maintenance Operations must be coordinated with site personnel.

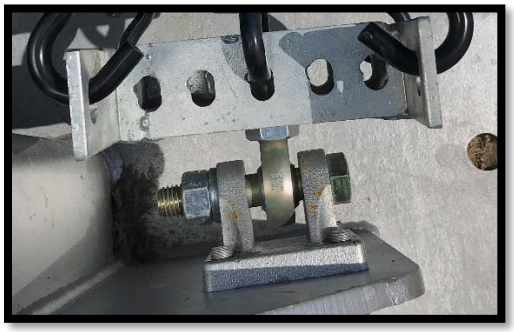
**WARNING**

**Place traffic cones and block roadway from traffic to ensure worker safety**

1. ☐ Turn power on to unit check for proper voltage.
2. ☐ Check operation of unit. Operate 5 to 6 times. Ensure that the Drop Beam operates smoothly (8 seconds).
3. ☐ Make sure the Drop Beam Barrier is in the OPEN (Drop Beam Up) position and power is turned off.
4. ☐ Remove Cowling Cover.

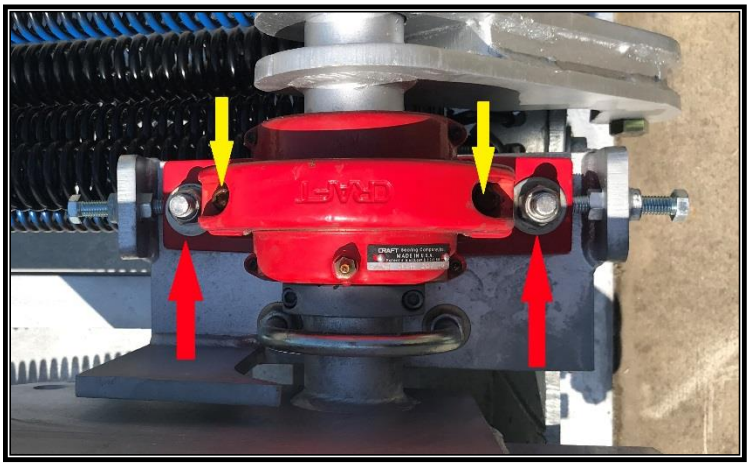

5. ☐ Check Actuator brackets. If these connections are not kept tight, it might cause loose motion that could result in excessive wear.


6. ☐ Inspect Spring and Actuator Clevis Brackets, Bolts, and Retaining Bolt for improper wear or damage. Lubricate all clevis' and bolts.

7. ☐ Check reflectorized tape and safety lights. Look for damage or improper operation.

8. ☐ Check Roller Bearing Bolts. Make sure these are tight. A loose fit might cause excessive wear and improper Drop Beam operation.



9. ☐ Check and Grease Roller Bearings. Use a standard bearing grease in a grease gun applying grease until it is visible at any point along either edge of the bushing and the shaft.
10. ☐ Replace the Cowling Cover and remove traffic safety cones.
11. ☐ Report any deficiencies to the onsite supervisor.
12. ☐ Complete this checklist, maintain a copy in files and forward a copy to RSSI for Warranty purposes.
13. ☐ Return barrier to NORMAL Operations.

NOTES:

# ATTACHMENT 4 - REPLACE ACTUATOR

Tools needed: Always have these tools readily available

1. Cordless drill with adapter for 15/16 socket

**BEFORE YOU INITIATE MAINTENANCE OPERATIONS**

All Maintenance Operations must be coordinated with site personnel.

**WARNING**

- **Place traffic cones and block roadway from traffic to ensure worker safety.**
- **Use the proper tools to avoid serious personal injury and damage to components.**
- **If changing actuator in the DOWN position, Install safety pin in Receiving Buttress.**
- **Never operate this equipment when a vehicle, person or any obstruction is in the way of full operation of the RSS-3000.**

**CAUTION**

Review Emergency Manual Operation Procedures on page 8

1. Disconnect power to the barrier by turning off the Main Disconnect and lock out with a wire tie or IAW local lockout procedures.


2. Disengage Servo Drive fuses (FU1)

3. Remove Fiberglass Cowling


4. Disconnect the power (orange) and control (green) cables from actuator, taking care not to contaminate connectors with dirt, debris and water. Protect if necessary.

5. Engage and adjust the manual adjustment screw (review Manual Operating Procedures on Page 8) on top of actuator until you can easily remove the connecting bolt at the actuator rod end. You may have to drill the manual screw on the actuator UP putting pressure on the safety pin.

**WARNING**

**DO NOT hammer out bolts, this will damage the actuator**

6. Remove actuator mount bolts, taking care not to let actuator fall. Remove actuator.
7. Inspect all bolts and mounting hardware for excessive wear and replace if necessary.
8. Install new actuator in reverse order, adjust manual adjustment screw by hand until rod eye can be slipped back into clevis and easily pinned.

**WARNING**

**(DO NOT FORCE). MANUAL ADJUSTMENT LOCKOUT MUST BE DISENGAGED BEFORE ACTUATOR IS MOVED ELECTRICALLY AGAIN OR DAMAGE WILL OCCUR. (review manual screw lockout adjustment instructions on page 8)**

9. Re-connect power and control connectors, taking great care to line up keyways and hand tightening connectors back onto the actuator. Inspect connector's ends for dirt and water.

**WARNING**

**DO NOT OVER-TIGHTEN, DAMAGE TO SEAL MAY OCCUR.**

**WARNING**

**MANUAL ADJUSTMENT LOCKOUT SCREW MUST BE DISENGAGED BEFORE ACTUATOR IS MOVED ELECTRICALLY AGAIN OR DAMAGE WILL OCCUR.**

10. Clear barrier of any tools.
11. Lubricate all clevis bolts and hardware.
12. Reinstate power to the barrier by turning on the Main Disconnect

13. Push in Servo drive fuses (FU1)
14. Home the barrier then set positions from the Maintenance Touchscreen (see Attachments 1&2)
15. Reinstall Fiberglass Cowling
16. Run the barrier up and down from barrier control menu.
17. Return barrier to service.

# ATTACHMENT 5 – REPLACE SAFETY LOOP SENSOR

## TOOLS NEEDED

1. Phillips Head Screw Driver

**BEFORE YOU INITIATE MAINTENANCE OPERATIONS**

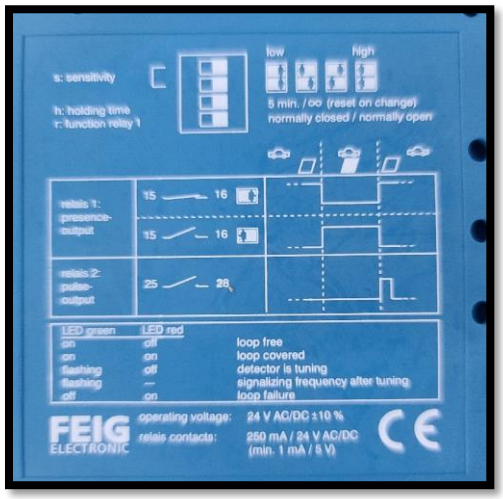
All Maintenance Operations must be coordinated with site personnel

1 Turn off the power to the barrier you're working on (24v power supply).

2 Remove the frequency plug with the wires from the safety loops.


3 Make note of the sensitivity settings on Safety Loop Sensor.
4 Disconnect the terminations from the defective Safety Loop Sensor.
5 Remove safety loop sensor from Din Rail and replace with new one.
6 Reattach terminations for Safety Loop Sensor and set dip switches for sensitivity.

- Factory settings are to the left, reset bottom two dipswitches to the right (train to infinity and normally open).
- Top two dipswitches are sensitivity settings. Factory settings are to the left (low sensitivity), reset sensitivity to high (top two dipswitches to the right). Test safety loop sensitivity and make adjustments as needed.




**NOTE**
Sensitivity settings are Low, Medium Low, Medium High, High

7 Replace frequency plug and restore power to the barrier. Loop detector should flash red/green and then go to solid green indicator light.

**NOTE**

Ensure safety loops are clear before powering safety loop detectors.

8 Conduct a test of safety loops for functionality.
9 Return barrier to operation.

# ATTACHMENT 6 – REPLACE IR SENSOR

TOOLS NEEDED:

1. 1 1/2 inch open end wrench or crescent wrench

**BEFORE YOU INITIATE MAINTENANCE OPERATIONS**

All Maintenance Operations must be coordinated with site personnel.

**NOTE**

Before replacing, clean the IR Sensor lens and recheck for operation

Replace IR Sensor

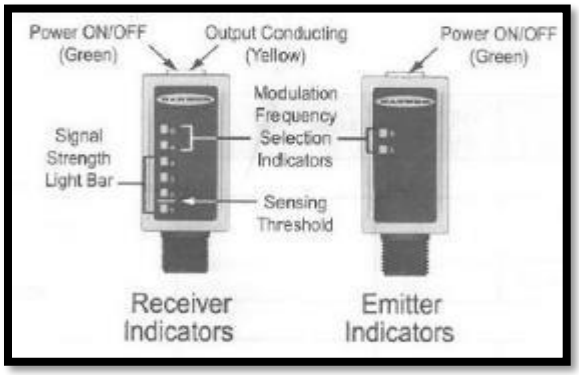
1. Verify which set of IR Sensors are defective.
2. Disconnect power to the barrier by turning off the Main Disconnect and lock out with a wire tie or IAW local lockout procedures.

3. Turn off the power to the barrier controls you're working on (24v power supply).
4. Disconnect the IR Sensor cable connector and the 1-1/2" retaining nut, holding sensor to the bracket.

5. Install new IR Sensor and tighten the cable connector and retaining nut.
6. Reinstate power to the barrier by turning on the Main Disconnect

7. Once the sensors are in place, ensure 24v power supply is on (CB5).
8. Conduct a IR Sensor functional check.
9. If required, realign the IR Sensors.

- Each sensor has a green Power ON/OFF indicator and yellow indicators for the selected modulation frequency. In addition, receivers have a yellow LED that lights when the outputs are conducting, plus a 4-element light bar that indicates signal strength, relative to the switch point (the higher the number lit, the more light is received).




- Adjust the emitter first, then the receiver. Adjust the emitter's position until the receiver signal strength light bar indicates its highest amount of signal received (the highest number lit). Tighten the emitter mounting hardware, then repeat the process for the receiver.

10. Return barrier to service.

# ATTACHMENT 7 – REPLACE SPRING

TOOLS NEEDED:

1. One electric or air impact drill
2. 1-1/8th inch socket and 1-1/8th inch open or boxed end wrench.
3. Swivel socket adapter

**BEFORE YOU INITIATE MAINTENANCE OPERATIONS**

All Maintenance Operations must be coordinated with site personnel

**WARNING**

- **Place traffic cones and block roadway from traffic to ensure worker safety.**
- **Use the proper tools to avoid serious personal injury and damage to components.**
- **Never operate this equipment when a vehicle, person or any obstruction is in the way of full operation of the RSS-3000.**
- **It is not necessary to remove clevis bolts from spring assembly during spring replacement**
- **Use Safety Prop Bar when working on Barrier in the UP position.**

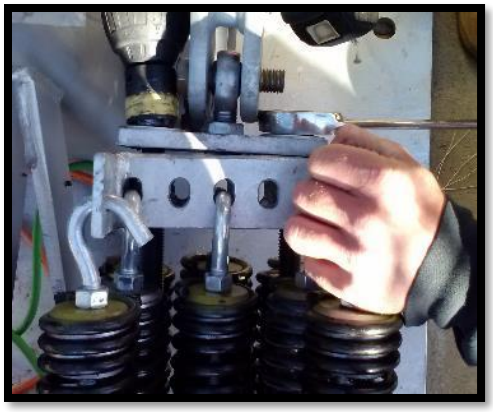
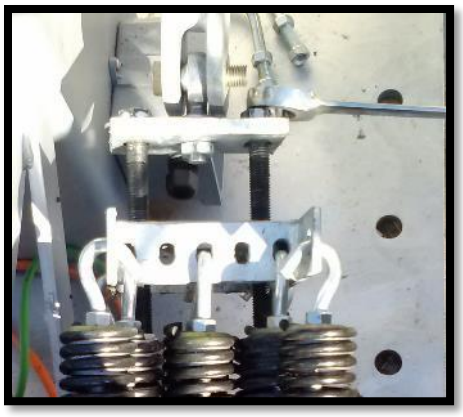
1. Using the Barrier Controls, raise the barrier to the UP position. This will take the tension off the spring assembly.

2. Disconnect power to the barrier by turning off the Main Disconnect and lock out with a wire tie or IAW local lockout procedures.


3. Turn off the power to the barrier you're working on (Turn off Fuse FU1 in BCP).

4. Remove Fiberglass Cowling.


5. Loosen tension bolts evenly to release tension on the springs.

6. Once all tension is off of the springs, un-hook broken spring from bracket then replace with new spring.


7. Once new spring is installed, tighten tension bolts until plates are touching.

8. Reinstate power to the barrier by turning on the Main Disconnect

9. Open the Barrier Control Panel and turn ON the Servo Drive of the affected barrier by re-engaging the Servo Drive fuse.
10. Conduct an operational test…exercise barrier 8-10 cycles while observing spring assembly functionality. Note any change in amperage.
11. Replace Fiberglass Cowling.
12. Return barrier to service.

# ATTACHMENT 8 - REPLACE SERVO DRIVE FUSE

TOOLS NEEDED: None

**BEFORE YOU INITIATE MAINTENANCE OPERATIONS**

All Maintenance Operations must be coordinated with site personnel

1. Servo Drive Fuse closed

2. Disconnect power to the barrier by turning off the Main Disconnect and lock out with a wire tie or IAW local lockout procedures.


3. Dis-engage Servo Drive Fuse Holder

4. Remove old Fuse and replace with new one


5. Reinstate power to the barrier by turning on the Main Disconnect

6. Re-engage Servo Drive Fuse Holder (FU1)
7. Servo Drive should power up
8. Return barrier to service.

# ATTACHMENT 9 – REPLACE LED TRAFFIC LIGHT

TOOLS NEEDED

1. Phillips Head Screwdriver
2. Pliers

**BEFORE YOU INITIATE MAINTENANCE OPERATIONS**

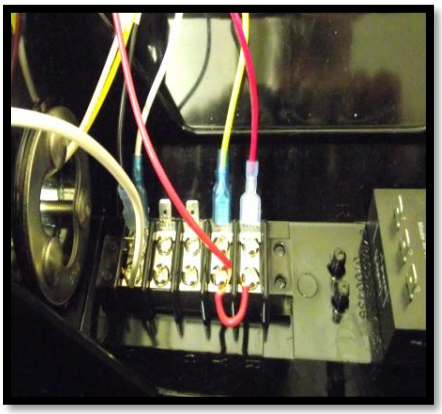
All Maintenance Operations must be coordinated with site personnel. Turn off the power to the barrier you're working on (24v power supply is on CB5).

1. Loosen exterior Traffic Lens Cover wing screws (use pliers if not hand tight)

2. Open hinged cover to access LED light and interior terminal connections.

3. Loosen Tabs holding lens in place with a Phillips Head Screw Driver.

4. Remove wires for old LED Light from interior terminal block.



5. Remove old LED light and replace with new LED light.
6. Rewire new LED light to interior terminal block.
7. Tighten Tabs holding lens in place with a Phillips Head Screw Driver.
8. Close hinged cover and tighten cover wing screws.
9. Turn power back on (24v power supply is on CB5) and conduct an operational test to verify Traffic Light functionality.
10. Return barrier to service.

# ATTACHMENT 10 - REPLACE SERVO DRIVE PANEL AT BARRIER

The Servo Drive Panel is a waterproof housing and can be easily removed and replaced as a sealed unit. Do not remove sealed actuator cable connectors from the Servo Drive Panel, remove the connectors at the actuator; remove sealed unit and cables together. The replacement unit will include the cables and can be easily reconnected. The Power and Ethernet connectors are removed at the sealed servo Panel unit and reconnected to the new Servo Drive Panel unit.

**WARNING**

**The Servo Drive Panel should ONLY be opened at the RSSI factory. It is considered a "LRU" Line Replacement Unit. Opening this box VOIDS THE WARRANTY.**

TOOLS NEEDED

1. 3/4 inch wrench
2. 7/16 inch wrench

**BEFORE YOU INITIATE MAINTENANCE OPERATIONS**

All Maintenance Operations must be coordinated with site personnel

**WARNING**

- **Place traffic cones and block roadway from traffic to ensure worker safety.**
- **Use the proper tools to avoid serious personal injury and damage to components.**
- **Never operate this equipment when a vehicle, person or any obstruction is in the way of full operation of the RSS-3000.**

1. Disconnect power to the barrier by turning off the Main Disconnect and lock out with a wire tie or IAW local lockout procedures.


2. Remove fiberglass cowling then remove cowling from buttress.


**CAUTION**
DO NOT FORCE CONNECTORS TOGETHER, they are keyed in and must be aligned correctly, hand tighten only.

3. Disconnect actuator cables taking care not to drop into dirt or debris (protect connectors)
4. Remove any plastic ties that hold the actuator cables to barrier
5. Disconnect power cable from sealed drive unit taking care not to contaminate with dirt or debris
6. Disconnect Ethernet cable from sealed drive unit taking care not to contaminate with dirt or debris.
7. Remove the 4 nuts that secure the sealed Servo Drive Panel to the side of the barrier (3/4)
8. Disconnect small ground wire from Servo Drive Panel to frame of barrier (7/16)
9. Remove Servo Drive from barrier, taking care to guide the actuator cables out also.
10. Install new Servo Drive Panel taking care to guide the actuator cables in carefully
11. Install the 4 nuts that secure the sealed Servo Drive Panel to the inside of the barrier
12. Reconnect small ground wire from Servo Drive Panel to frame of barrier

**NOTE**
Use dielectric grease to protect connectors.

13. Install Ethernet cable to sealed unit –
14. Install power cable to sealed unit (tighten then push connector in and tighten again) it may take a few times to FULLY SEAT the power connector to seal unit
15. Run the actuator cables back the same way and secure to barrier beams with zip ties.
16. Reconnect actuator connectors to actuator.
17. Reinstate power to the barrier by turning on the Main Disconnect
18. Clear barrier of tools and Push in Servo drive fuse.
19. Home the barrier and set positions from the BCP Maintenance Touchscreen (see Attachments 1&2)
20. Reinstall Fiberglass Cowling

21. Run the barrier up and down from barrier control menu.
22. Return barrier to service.

# ATTACHMENT 11 - REPLACE SERVO DRIVE IN PANEL

TOOLS NEEDED

3. Phillips Head Screw Driver
4. Small Electronics (Flathead) Screw Driver

## BEFORE YOU INITIATE MAINTENANCE OPERATIONS

All Maintenance Operations must be coordinated with site personnel

**WARNING**

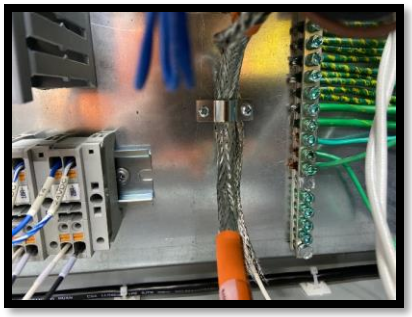
- **Place traffic cones and block roadway from traffic to ensure worker safety when operating barriers.**
- **Use the proper tools to avoid serious personal injury and damage to components.**
- **Never operate this equipment when a vehicle, person or any obstruction is in the way of full operation of the RSS-2000.**

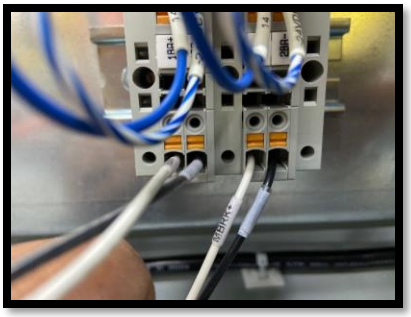
1. Disconnect power to the Servo Drive by turning off the Main Disconnect and lock out with a wire tie or IAW local lockout procedures.


**NOTE**

Ensure not to damage cables or connectors while removing and installing Drive.

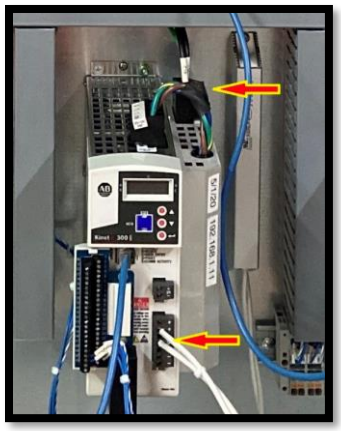
2. Carefully remove Orange (Power) Cable from Drive by first disconnecting bonding plate from cable then pulling U/V/W Wiring Harness. Disconnect Brake wires (MBRK+ and MBRK-) from Terminal Block. Place Cable securely to the side.





3. Carefully remove Green (Encoder) Cable from Drive by unscrewing 2 small screws on connector then unplugging from Drive. Place Cable securely to the side.

4. Unplug Ethernet Cable from Drive.
5. Remove L1 and L2 harness from top of Servo Drive. Also Remove Shunt wire harness from front of Drive.



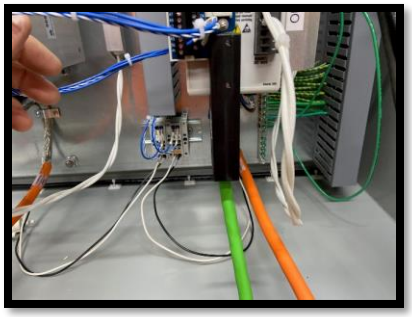
6. Remove 2 screws holding Servo Drive to backplate then take damaged Drive from Panel.

7. Install new Drive in place of old Drive then attach Screws to hold the new Drive to backplate.

8. Connect Shunt harness, L1/L2 wire harnesses, and Ethernet Cable back to new Drive.

9. Install Orange Cable back to drive by placing cable under bonding plate then securing. Then connect U/V/W wiring harness and terminate MRBK + and – wires back to Terminal Block.

10. Connect Green cable back to front of Drive. Be careful not to damage connectors. Secure connection by tightening two screws.



11. Reinstate power to the barrier by turning on the Main Disconnect.
12. Ensure Roadway is clear of Traffic and Tools before moving barriers.
13. Home the barrier and set positions from the Maintenance Touchscreen (see Attachments 1&2)
14. Run the barrier up and down from barrier control menu.
15. Return barrier to service.

# ATTACHMENT 12 - REPLACE POST ASSEMBLY LED LIGHTS

TOOLS NEEDED:

1. Phillips Head Screw Driver
2. Wire Cutters/Stripper
3. Water proof Butt Splices and Electrical Tape (in Spare Parts Kit)
4. Heat Gun

**BEFORE YOU INITIATE MAINTENANCE OPERATIONS**

All Maintenance Operations must be coordinated with site personnel

**WARNING**

- **Place traffic cones and block roadway from traffic to ensure worker safety.**
- **Use the proper tools to avoid serious personal injury and damage to components.**
- **Never operate this equipment when a vehicle, person or any obstruction is in the way of full operation of the RSS-2000.**

1. Disconnect power to the barrier by turning off the Main Disconnect and lock out with a wire tie or IAW local lockout procedures.


2. Turn off the power to the barrier you're working on (24v power supply).
3. Remove screws holding LED in place.

4. Remove tape and cut wires on the inside of the water proof butt splices.

5. Rewire LED Lights, terminate with a waterproof butt splice and tape connection.
6. Reinstate power to the barrier by turning on the Main Disconnect

7. Conduct a test to verify LED Lights are functioning properly.
8. Return barrier to operation.

# ATTACHMENT 13 - REPLACE SURGE PROTECTION MODULE IN BBP

TOOLS NEEDED: None

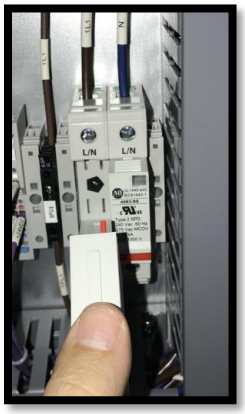
**BEFORE YOU INITIATE MAINTENANCE OPERATIONS**

All Maintenance Operations must be coordinated with site personnel.

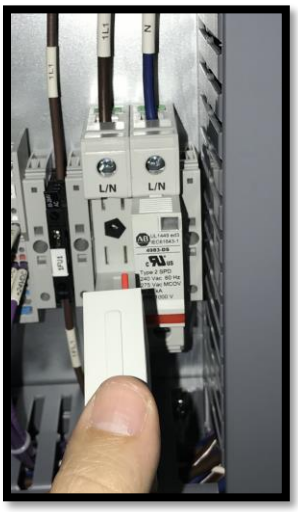
**NOTE**
Surge Protection Module is equipped with RED indicators on the front of device to inform you if the device has Failed. Please ensure the Module has Failed before replacing.

1. Turn off ALL Circuit Breakers

2. Locate the Surge Protection Module, then using your thumb and finger pull out pluggable center module from device.


3. Install new pluggable module into Surge Protection Device. Ensure tabs are lined up and module is seated securely.




4. Turn ON CB1, wait 4 seconds for transfer switch, then turn on CB2, & CB3. Then monitor Surge Protection Module to ensure it does not Fail once power is turned on. Return barrier to normal operation

# ATTACHMENT 14 - REPLACE TIME DELAY RELAY IN BBP

TOOLS NEEDED: None

**BEFORE YOU INITIATE MAINTENANCE OPERATIONS**

All Maintenance Operations must be coordinated with site personnel.

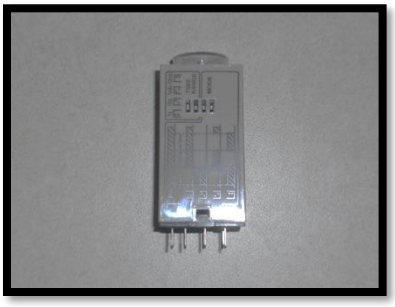
1. Disconnect power to the barrier by turning off the Main Disconnect and lock out with a wire tie or IAW local lockout procedures.


2. Turn off red top switch on inverter.

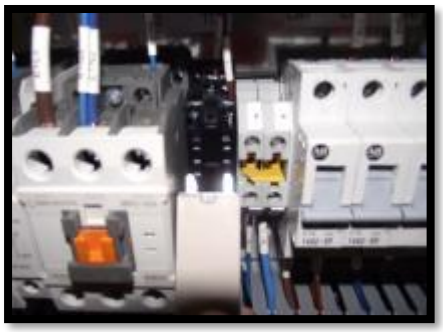
3. Turn off main incoming power to BBP (CB1).

4. Grasp Time Delay Relay with thumb and finger then pull straight out.

5. Ensure Time Delay Relay dip switches are set properly (out of the box, all dip switches are set to the left; adjust the top dip switch to right and leave the remaining three to the left)



6. Install new Time Delay Relay, be cautious as you line up the pins. Ensure dial on the relay is set to 4 seconds.




7. Return main incoming power to BBS by turning on CB1. Ensure Contactor C1 engages.
8. Turn Inverter switch back to the ON position.
9. Reinstate power to the barrier by turning on the Main Disconnect
10. Return barrier to normal operation.

# ATTACHMENT 15 - REPLACE LOW VOLTAGE MONITOR IN BBP

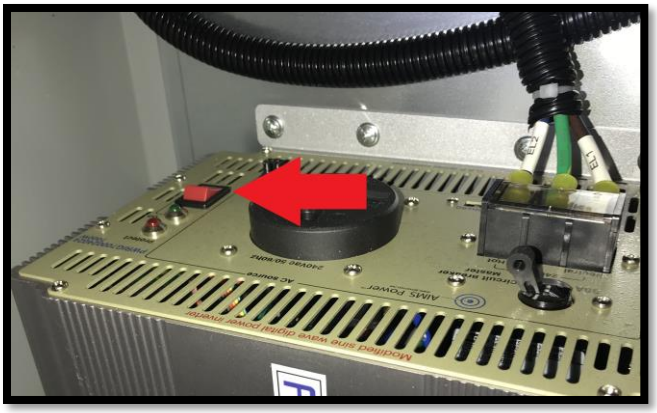
TOOLS NEEDED: None

**BEFORE YOU INITIATE MAINTENANCE OPERATIONS**

All Maintenance Operations must be coordinated with site personnel.

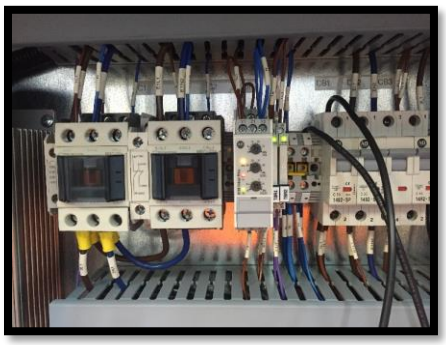
11. Disconnect power to the barrier by turning off the Main Disconnect and lock out with a wire tie or IAW local lockout procedures.


12. Turn off top switch on inverter.

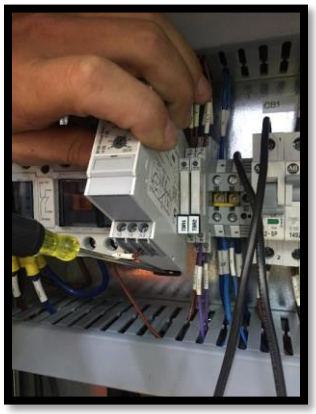


13. Turn off main incoming power to BBP (CB1).

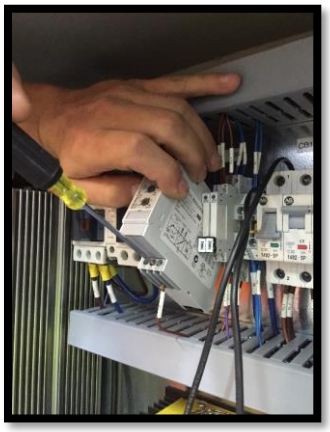
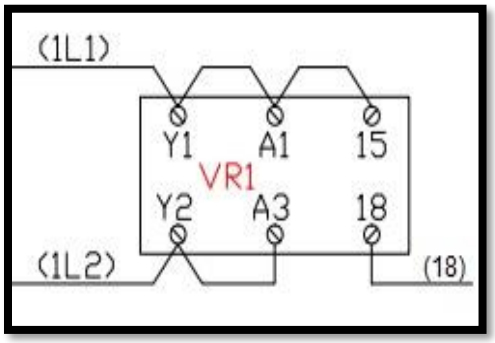
14. Note and Diagram existing wiring for installation of new Relay.




15. Grasp Voltage Monitor Relay while releasing from Dinrail with small screwdriver.



16. Disconnect all wires and discard defective unit.


17. Reconnect existing wires on new unit then attach to Dinrail by reversing procedure in step 5.
18. Return main incoming power to BBS by turning on CB1. Ensure Contactor C1 engages.
19. Turn Inverter switch back to the ON position.
20. Reinstate power to the barrier by turning on the Main Disconnect
21. Return barrier to normal operation.

# ATTACHMENT 16 - REPLACE 24 VDC POWER SUPPLY IN BCP

TOOLS NEEDED:

1. Small Phillips Head Screwdriver
2. Small Straight Head Screwdriver
3. Volt Meter

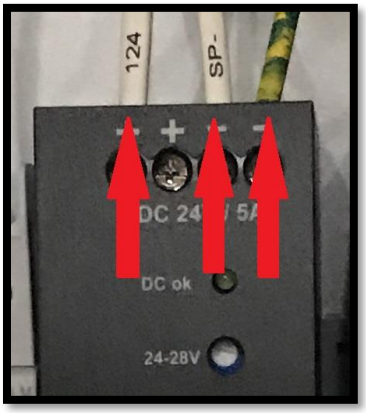
**BEFORE YOU INITIATE MAINTENANCE OPERATIONS**

All Maintenance Operations must be coordinated with site personnel.

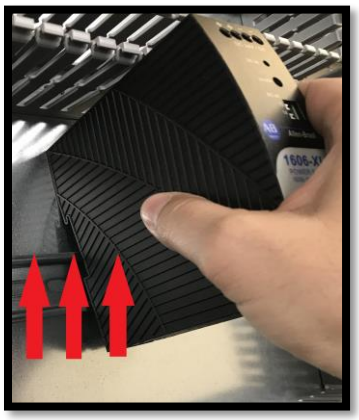
1. Disconnect power to the barrier by turning off the Main Disconnect and lock out with a wire tie or IAW local lockout procedures.


2. Turn the 24V breaker to the OFF position (refer to site control drawings for CB number).


3. Remove the 3 wires on the TOP and BOTTOM of the affected 24VDC Power Supply. (note wire locations for re-termination)




4. Remove Power Supply from the Panel railing by pulling down tab on the bottom of the Power Supply, then pulling out and up from the bottom of the Power Supply.



5. Install the new Power Supply onto Panel railing by reversing step 4 above.
6. Re-terminate the three wires on the TOP and BOTTOM of the new Power Supply.
7. Reinstate power to the barrier by turning on the Main Disconnect

8. Then turn on the affected 24VDC breaker.
9. Ensure 24VDC devices have powered up (check for 24 VDC with Voltmeter).
10. Return barrier to normal operation.

# ATTACHMENT 17 – REPLACE AND SETUP TOUCHSCREENS

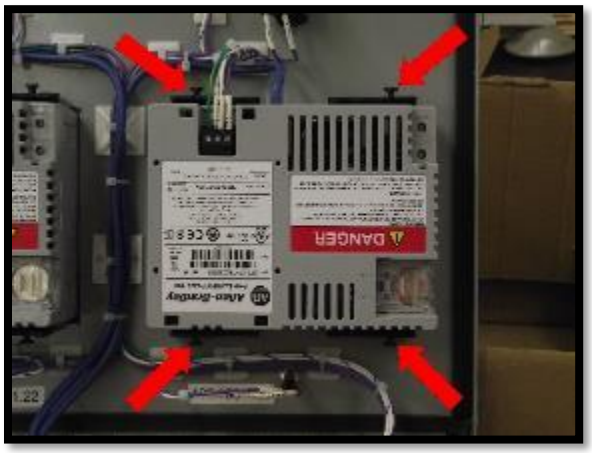
Replace Touchscreens

**BEFORE YOU INITIATE MAINTENANCE OPERATIONS**

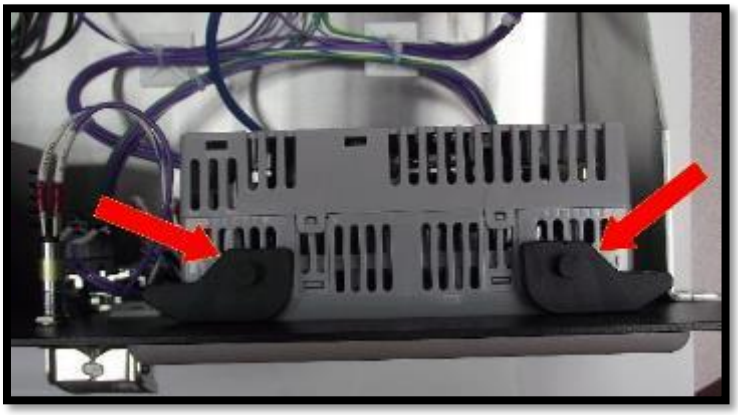
All Maintenance Operations must be coordinated with site personnel

1. Remove (unplug) 24vdc power and Ethernet patch cable

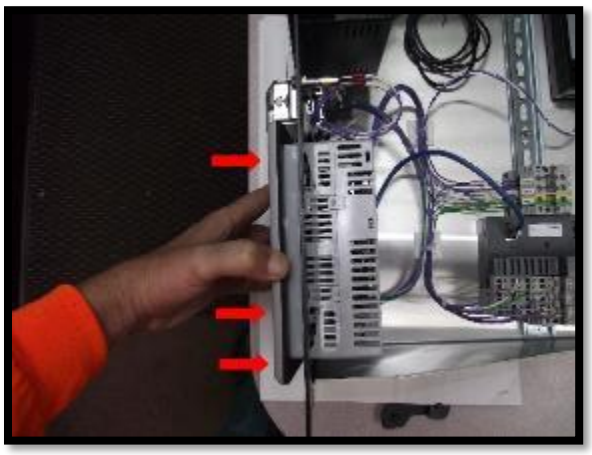

2. Locate 4 black plastic locking clips on rear of screen



3. Remove by rotating plastic clips until they release



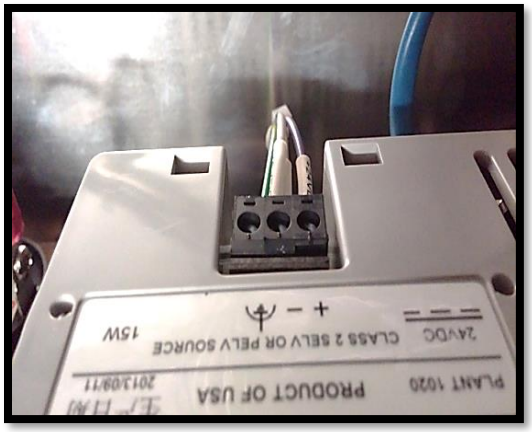
4. Replace with new touchscreen



5. Attach 4 black plastic locking clips by rotating until snug against faceplate

**CAUTION**
Do not over tighten clips, this will cause sensitivity issues on touchscreen

6. Replace (plug in) the 24vdc and Ethernet patch cable




7. Complete steps below “Changing IP address and choose program” section

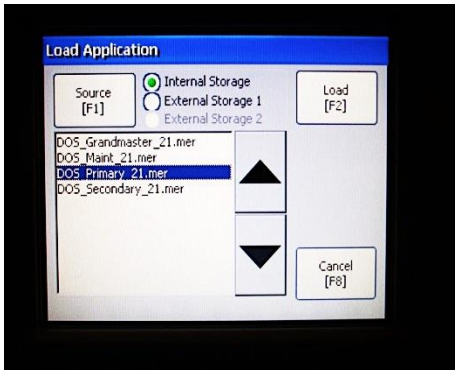
Setup Replacement Touchscreen

*Set IP Address*

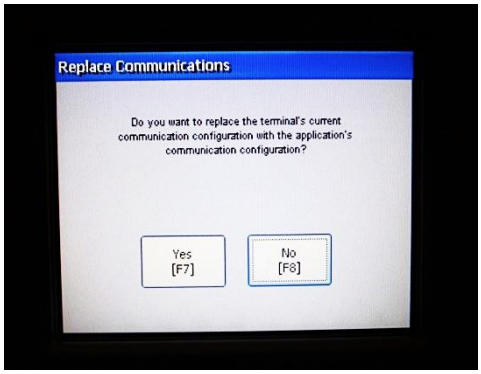
1. Power up replacement touchscreen and it will boot to the menu screen
2. Drill down to this path: terminal settings - networks and communications - network connections - network adaptors and find the option for "USE DHCP" - select NO
3. Go to the IP ADDRESS button and enter 192.168.1.12 for maintenance touchscreen; 192.168.1.22 for primary touchscreen. Simply choose which touchscreen you are replacing. The Subnet mask is 255.255.255.0
4. Use the back button to return to the main menu and select reset touchscreen.
5. You will now be at the menu again and in the lower left corner you should see the new IP address you just set.

1. Choose Touchscreen Program and From menu, select Load Application [F1].


2. Then choose desired program from the list and press Load [F2].



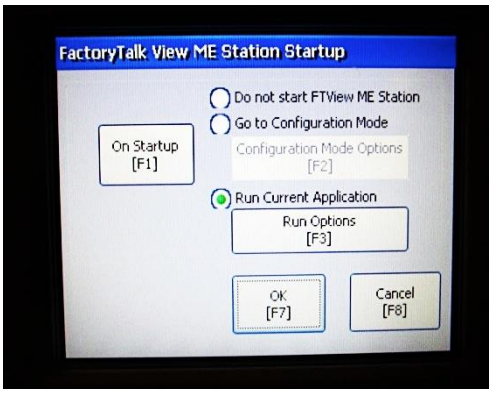

3. If asked "Do you want to replace the terminal's current communication…configuration?", select Yes [F7].



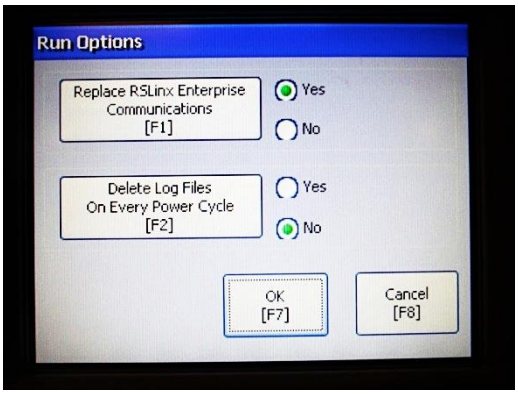
4. After a few moments the run program button and other buttons will light up on Main menu. Select, Terminal Settings [F4]


5. Next, select Startup Options

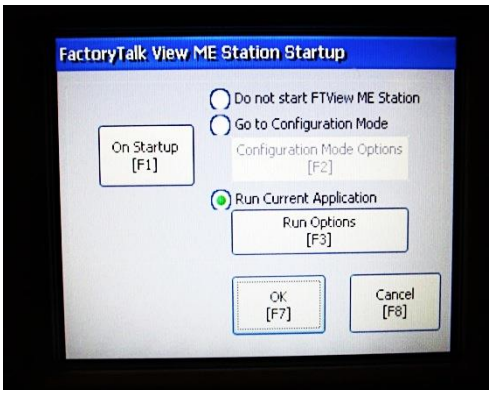

6. Then select Run Current Application and press the Run Options [F3] button.



7. In the Run Options Menu.
   a. Set Replace RSLinx Enterprise Communications [F1] to Yes.
   b. Set Delete Log Files On Every Power Cycle [F2] to NO and Press Ok [F7].




8. Press OK [F7]




9. Press Close [F8]

10. Press Reset [F7] to reboot touchscreen.


11. Return barrier to service.