Installation Manual

RSS-2000 Series Electric Finger Wedge Vehicle Barrier

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Contents

INTRODUCTION

This manual provides Installation Procedures for the RSS-2000 series electric finger wedge vehicle barrier system for the US Department of State. It is **NOT** intended to be all encompassing and is based on "typical" installations. After review of this manual, we recommend a conference call with the RSSI factory to discuss questions regarding procedures that may require further clarification. RSSI is a barrier manufacturer; on questions related to civil issues specific to a particular jobsite, Integrators/Contractors should refer to the Architectural Firm that designed the project or a licensed Civil Engineer familiar with the local site conditions and requirements.

GENERAL

The RSS-2000 series finger wedge barrier is a modern "best-of-breed" electrically operated, retractable, shallow foundation, anti-ram vehicle barricade that, when properly configured, can operate with a continuous duty cycle in all climates with minimal maintenance and expense. The barrier is DoD approved and certified to meet DOS impact condition designation K12, L3 or ASTM F2656 impact condition designation M50, P1. The barrier is capable of stopping and destroying a 15,000 lbs vehicle traveling at speeds of up to 50 mph. The barrier was independently tested and certified to operate 1,000,000+ cycles with zero failure, downtime or maintenance. The barrier's vault assembly is constructed of hot dip galvanized structural steel requiring a shallow below-grade foundation depth of 24 inches and a rebar reinforced concrete casing around the barrier vault measuring 12 inches on 3 sides and 24 inches on the front. When properly installed the barrier rests completely flush with the existing roadway surface in the retracted position. An Allen-Bradley MPAI series IP-67 servo electromechanical actuator with manual override and rapid reverse smoothly and quietly rotates an arresting element, constructed of tubular steel with a "safety yellow" powder coat finish and supported by self-lubricating non-grease type bearings, to an above ground position of 36" without obstructing line-of-sight vision. Removable skid resistant roadway plates provide easy access to service points without the use of heavy equipment or special tools. The barrier ships assembled, tested and ready for installation.

BEFORE YOU BEGIN

- Read and understand all instructions and procedures before you begin to install components.
- 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.

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.

HOW TO OBTAIN ADDITIONAL FACTORY SUPPORT

If you have any issues or questions, on-site integrator/contractor personnel are highly encouraged to contact RSSI's Service department. **WE CAN HELP YOU!** Normal office hours are 7:00 AM CST - 3:00 AM CST Monday -- Friday. After hour support is available with prior coordination. Additionally, we have several how-to videos on our website.

Telephone	Email	Training Videos
+1 (850) 871-9300	service@rssi.com	www.rssi.com/support/videos

GENERAL SAFETY

Personnel MUST comply with the following important safety instructions DURING installation activities for the RSS-2000 series electric finger wedge vehicle barrier system.

- Read and comply with all safety rules in this manual.
- A fully trained installation person must perform all start-up work.
- Do not operate this equipment when you are distracted or under the influence of drugs, alcohol or medication causing diminished control.
- Prior to start-up of the RSS-2000 series electric finger wedge vehicle barrier system, all electrical connections to the barrier will be isolated (disconnected) IAW local Lock Out Procedures.
- Use special care when removing any inspection plates as these plates are very heavy.
- Never operate this equipment when a vehicle, person or any obstruction is in the way of full operation of the RSS-2000.

BARRIER DESCRIPTION

- The RSS-2000 Series Electric Finger Wedge Vehicle Barrier consists of a shallow steel vault assembly that is hot dip galvanized with a skid resistant top plate and a 4 inch x 4 inch removable post assembly.

Figure 1, RSS-2000

- The Removable Post Assembly Height is 35 ½ to 36 inches at deployment. All barriers are shipped fully operational, self-contained for easy installation. The weight of the barrier depends upon the unit purchased. Refer to the DOS Typical Embassy Drawings 2014, Page 3, 5, and 7.

Description	**Dimensions(W x L x H)**	**Weight**
RSS-2000 - 4 Post	6.5' x 10.5' x 2'	6,720 lbs
with heat system		7,620 lbs
RSS-2000V - 5 Post	6.5' x 12.5' x 2'	8,260 lbs
with heat system		9,385 lbs
RSS-2000VI - 6 Post	6.5' x 15' x 2'	9,800 lbs
with heat system		11,150 lbs

Table 1 – RSS-2000 Series Dimension Chart

- Before you begin, you will need the following available on site prior to installation:
  - Equipment for excavation, soil compaction, removal and disposal of spoils
  - Concrete placing and finishing tools
  - #5 steel re-bar
  - 3000 PSI (minimum) Mix Concrete
  - Equipment capable of lifting and setting the RSS-2000 series barrier in place
  - DOS Typical Embassy Drawings 2014 provided separately.

BARRIER INSTALLATION – A Five Step Process

Step One – Excavate

- The first step is to excavate the existing roadway to a dimension of the appropriate barrier size.

Figure 2, Excavation

Barrier Size	Excavate Area (W x L x H)	Rebar Type #5	Concrete (3000 PSI min.)
RSS-2000 4 Post	9’ x 12’ x 2’	Approx. 100 feet	Approx. 4 yards
RSS-2000 5 Post	9’ x 14.5’ x 2’	Approx. 120 feet	Approx. 4.55 yards
RSS-2000 6 Post	9’ x 17’ x 2’	Approx. 140 feet	Approx. 5.1 yards

Table 2, Excavation Details

NOTE:

Ensure barrier placement according to the approved site plan to ensure road crown, underground utilities and tie into associated passive knee walls or bollards is taken into account.

- Attention should be paid toward diverting surface run off and debris around barrier surface as much as possible. This will reduce the amount of cleaning of the barrier vault in the future.

Step Two – Place The Barrier

- Once the soil is compacted (to local standard), place the RSS-2000 box into the pit leaving 2 feet of the area for concrete on the approach side and a 1 foot area for concrete on the other 3 sides. If the barrier is placed in a new roadway, be sure that the barrier foundation is constructed with the same base and compaction as the roadway design requirements. If installation is in a new roadway, place the barrier and form the foundation perimeter with ½ inch slope away from the barrier. The barrier is typically installed ½ inch above grade to allow water to flow around the barrier. Local conditions may dictate installing the barrier flush to the existing roadway.

Figure 3, Barrier Placement

Step Three – Barrier Conduit Connections

- RSS-2000 barriers are self-contained shipped from the factory ready to install. Connect the appropriate PVC conduit to the power, control and sump pump PVC sleeves in the metal stub outs located on the front (attack) side of the barrier. If the job site requires rigid conduits, the PVC sleeve in the stub outs will have to be replaced.

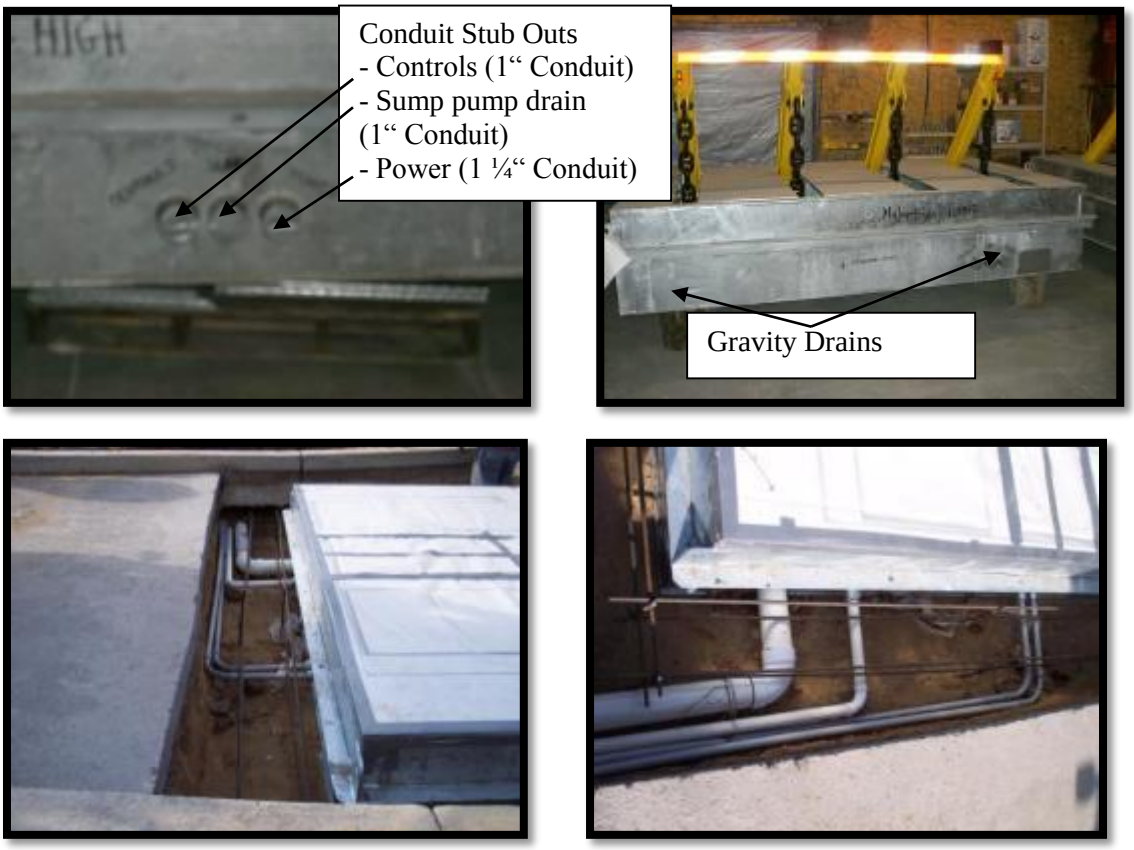


Figure 4, Stub-Out Connections

NOTE

RSSI ***requires*** at least one of the 5” gravity drains be installed (4” PVC) to each barrier. Additionally, the Sump Pump discharge (1” PVC) should be “separate” from and “not” tie into the Gravity Drain. This prevents recycling of the discharge water in the vault. The 4” gravity drains should be on the downhill side of the barrier. If necessary, Drain holes can be added on the backside of the barrier and the holes in the front can be covered and poured over (concrete). If the site conditions do not allow for gravity drains, contact RSSI regarding a modification at the factory to add a second sump pump in the barriers.

CAUTION

Failure to add a second sump pump when no gravity drains are connected could void the warranty. Contact the factory for assistance.

Step Four – Rebar & Concrete

WARNING

ENSURE ALL OPENINGS ARE COVERED BEFORE CONCRETE IS POURED. FAILURE TO DO SO WILL RESULT IN EQUIPMENT MALFUNCTION.

- Place the #5 re-bars and pour the concrete (3,000psi minimum) around the RSS-2000 unit. Be careful not to damage the electrical or drainage conduit when vibrating concrete. A light broom surface finish is recommended. Allow sufficient time for concrete to harden before driving over barrier.

Figure 5, Rebar & Concrete

Step Five – Conduit, Wire, And Termination Of Controls

Conduit And Wire

- PVC and Metallic Conduit is included in the Installation Kit. Rigid Metallic should be used when penetrating the foundation for the BCP and where exposed to the elements.
- Electrical and Control J-box (quazite box) are included in the Installation Kit.
- Electrical and Control Conduits will be run from the barrier into and out of Electrical and Control J-box (quazite box) to the BCP.
- After conduit has been installed, move on to controls. BCP's and BBP's arrive complete from the factory. Ensure all control wire and power wires from the barrier, to the BCP, to the operator controls are labeled to expedite termination to the BCP. A label maker and labels are included in the Installation Kit.
- Fiber. The Fiber may need to be run from the BCP to the Fiber Converter Panel (located in room near post 1). Ensure a qualified technician that can install, terminate, test, and certify Fiber is used. A Fiber termination kit is included in the Installation Kit.
- Electrical Power Cables should be sized by a Master Electrician or EE per N.E.C. Code based on distance from BCP's and BBP's to barriers. RSSI provides a Shielded Ethernet Cable (300 feet) inside the barrier to terminate between the barriers and the BCP. A Cat5e RJ45 Termination Toolkit is included in the Installation Kit.

WARNING

ENSURE A QUALIFIED ELECTRICIAN TERMINATES THE ELECTRICAL CONNECTIONS ACCORDING TO NATIONAL ELECTRIC CODE AND ANY APPLICABLE LOCAL CODES.

Terminations

- All Ethernet terminations should be tested with Ethernet cable tester (TIA/EIA 568A standard).
- All Multi-mode Fiber Optic cable should be terminated (Type ST Connectors) and tested by a qualified fiber optic technician. A Corning OptiSnap Fiber Termination Kit is included in the Installation Kit, including a DVD that contains full instructions and videos.
- Refer to page 11-12 of the DOS Typical Embassy Drawings 2014 for a System overview and Wire and Conduit Legend.
- Refer to INTERCONNECT DIAGRAM PAGE 6 in DOS System Controls 2013 for detailed INPUTS and OUTPUTS to Barrier Control Panel refer to page 4-5.
- Refer to BBP electrical diagram page 1 in DOS System Controls 2013 for detailed electrical termination for INCOMING COMMERCIAL POWER.
- Refer to DOS Operator Controls 2013 for detailed electrical termination for the Secondary, Primary, and Grand Master (if installed) Operator Control Panels.

Electrical Terminations

1. Local commercial power (220/240 Vac) single-phase is wired to Battery Backup Panel (BBP) at MAIN CB-1 (L1 - Neutral - Ground).

2. BBP transfers power to Barrier Control Panel (BCP) MAIN Disconnect Switch.

3. The Servo Box is inside the barrier powered through the BCP fuses FU1 and terminals 4L1 - 4N1 – Ground and wired to the Barrier Power J-box (splices).

4. The Barrier Heat Grid is powered through the BCP terminals 1H1 and 1H2 and wired to the Barrier Power J-box (splices).

5. The 24Vdc Sump Pump is powered through the BCP terminals SP+ and SP- and wired to the Barrier Control J-box (splices).

6. The 24Vdc Traffic Lights are powered through the BCP PLC outputs Red = O:2/11 and Amber = O:2/12 to traffic lights at poles (terminals in light housing).

7. The 24Vdc Barrier Warning LED Lights are powered through the BCP PLC output O:2/0 to the Barrier Control J-box (splices).

8. The IR Beams are powered through the BCP +24Vdc (Red wire)/-24Vdc (Black wire) power terminal blocks to each IR Beam (splices in stands) Connect the Red wire to Brown and Gray wires of IR pigtail and Black wire to Blue wire of IR pigtail. IR Beam PLC inputs are I: 1/11 (HIGH) and I: 1/12 (LOW).

9. The Barrier Heat Thermostat (mounted outside) is connected at BCP terminals +24Vdc and PLC input I:0/15 (splices at thermostat); if applicable.

10. The Secondary Operator Control panel is powered through the BCP +24Vdc and -24Vdc output terminal blocks to termination blocks in 19" rack mount.

11. Video Monitor mounted in the 19” rack mount Secondary Operator Control panel is powered by DC to DC converter +24, -24 Vdc power terminals.

12. The Primary Operator Control panel is powered through the BCP +24Vdc and -24Vdc output terminal blocks through power terminal blocks in the Fiber Converter Panel and on to the 19” rack mounted Primary Operator Control Panel.

13. The Grand Master Operator Control panel (if installed) is powered through the BCP +24Vdc and -24Vdc power terminal blocks through the power terminal blocks in the Fiber Converter Panel and on to the 19” rack mounted Grand Master Operator Control Panel.

Control Terminations

1. The Servo Box inside the barrier communicates with the BCP via shielded twisted pair Ethernet cable (Cat5e) from a Ethernet switch to servo box (Tech will be required to terminate and label RJ45 connector on cable end at Ethernet switch in the BCP) Servo Box is pre-terminated at factory.

2. The Secondary Operator Control panel communicates with the BCP via shielded twisted pair Ethernet cable (Cat5e) from Ethernet switch to Point I/O Module in 19" rack mount panel. (Tech will be required to terminate and label RJ45 connector on both Ethernet cable ends).

3. The Primary Operator Control communicates with the BCP via Multi-mode Fiber Optic cable from the Media Converter in the Barrier Control Panel to the Media Converter located in the Fiber

Converter Panel. A Shielded twisted pair Ethernet cable (Cat5e) will connect the Media Converter in the Fiber Converter Panel to the Point I/O module in 19" rack mount Primary Operator Panel.

4. The Grand Master Operator Control panel (if installed) communicates with the BCP via shielded twisted pair Ethernet cable (Cat5e) from the Media Converter in the Fiber Converter Panel to the 19" rack mount Grand Master Operator Control panel.

5. BCP receives vehicle presence indications from the LOOPS in the roadway to the front of the LOOP DETECTORS in the BCP. (Bottom DIP switch must be set to right position at this point).

6. BCP receives INPUTS from IR Sensor (black wire on sensor pigtails) the black wire are connected to blue wire connected on PLC inputs I;1/11 (HIGH) and I: 1/12 (LOW). (See Sheet 4 PLC inputs)

7. BCP controller receives a contact closure from the thermostat (mounted outside) to the BCP PLC inputs. This activates the barrier heat grid system.

8. BCP receives INPUT from Battery Backup Panel (BBP) when commercial power is lost. BBP terminations are marked 13 and 14 and BCP terminations are terminals I:1/0 and +24Vdc (Loss of Commercial Power ALARM).

9. All Operator Touchscreens are prewired and terminated in the 19" rack mount (or desk console) operator panels (Ethernet also already terminated).

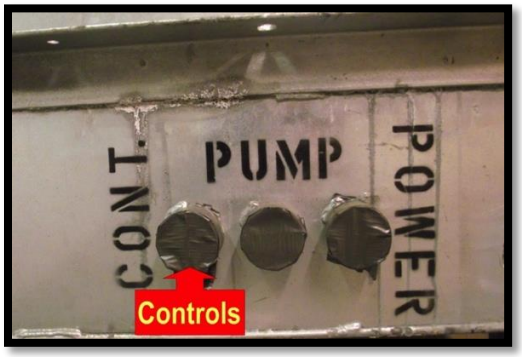
10. Video Monitor in the 19" rack mount (or desk console) Secondary Control Panel requires BNC video cable from external camera to monitor.

Installation of Ethernet Cable

CAUTION

The Ethernet cable is designed to be a straight run with no splices or severe bends or stretching. Splicing this cable will lead to premature failure of the network communication to the Servo Drive

- Unroll 300 foot Ethernet cable rolled up inside barrier.
- Feed Ethernet cable end into Barrier Control J-Box and then down into conduit and pull all the way to the BCP.



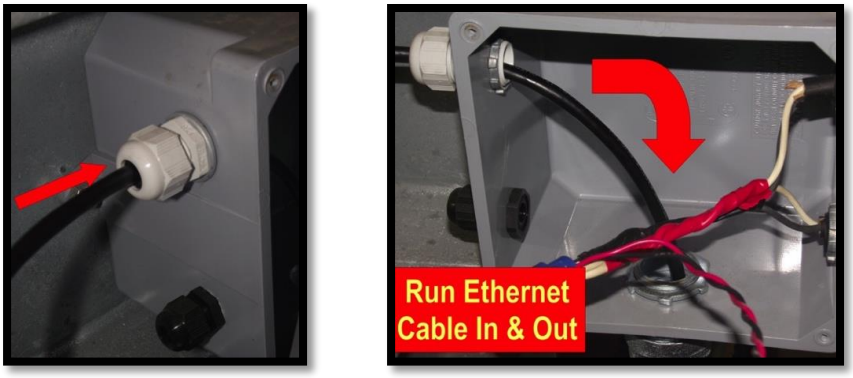


Figure 6, Controls Conduit, Ethernet Run Into J-box.

- Inside the barrier control panel, terminate Ethernet Cable with RJ-45 connector provided. Use the TIA/EIA 568A Wiring diagram in the below Figure.

Figure 7, Ethernet Wiring Diagram

- Once termination had been made, plug the cable into the Ethernet Switch.

Figure 8, Ethernet Connection at BCP

- Connect Ethernet shield wire to (Earth Ground) on top of switch

Figure 9, Ethernet Connection and Ground

WARNING

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

Figure 10, Servo Drive Box Inside Barrier

NOTE

It is highly recommended to use experienced technicians trained to install shielded twisted pair terminations. After installing, test with a network cable tester.

Installation, Termination, and Testing of Fiber Cable

- Fiber converters are located in the BCP and in the Fiber Converter Panel (located in communication room near Post 1).

Figure 11, Fiber Converter Panel

- Fiber must be run in locations where the distance from the BCP to the Fiber Convertor Panel is more than 300 feet.
- A Corning Fiber Optic Termination Kit including a DVD that contains full instructions and videos is included in your shipment.
- Using the kit, a technician terminates the fiber and conducts a BASIC go/no go indication test. At this point the fiber terminations could be connected up and possibly even work, however without further testing with an OTDR, Ethernet errors could occur. Power meters are also used by fiber technicians to measure Power/Loss through the run and certify the fiber installation. It is highly recommended that this certification be done after termination.
- Connecting the fiber terminations (ST) to the fiber convertors

  1. Line up pegs with slots, push in and turn clockwise to lock
  2. There is a (TX) transmit and (RX) receive (marked on convertor)
  3. Take each pair of fiber cables (already terminated and tested) and connect to TX and RX
  4. Connect other end of fiber optic cable and termination to RX and TX (opposite)
  5. You should get LINK light indication on fiber convertor, if not, reverse connectors

- Cleaning the fiber terminations before, during and after the termination kit procedures is a key to success, preview and follow the instructions on the DVD in the Fiber Termination Kit.

NOTE

It is highly recommended to use experienced technicians trained to install, terminate, test, and certify fiber. After installing, at a minimum test connection with an OTDR tester.

CAUTION

The Fiber cable is designed to be a straight run with no splices or severe bends or stretching.

6 Attachments

1. Commissioning Checklist
2. Safety Loop Set-Up
3. IR Sensor Installation and Set-up
4. Servo Drive Set-up
5. Vehicle Detector Loop Installation
6. Traffic Light Installation
7. List of Changes

3 Supporting Data Files Provided Separately:

1. DOS Typical Civil Drawings 2014
2. DOS Systems Controls 2013
3. DOS Operator Controls 2013

* * END OF SECTION * *

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ATTACHMENT 1 – COMMISSIONING CHECKLIST

Start-Up/Turn-Over Test Procedures - RSS-2000, 4-Post Barrier System:

A. Visual Check:

1. Verify that all field wiring and cables are connected as per System Interconnect Drawings (From barrier to BCP). ☐
2. Insure that all terminal screws and cables are tight. ☐
3. Insure there are no loose or naked wires. ☐
4. Insure that all circuit breakers are turned OFF, and fuse holders are open. ☐
5. Insure all loop wiring is securely plugged in their sockets. ☐

B. Voltage and Phase Test: Normal Power

1. Verify the Customer Supplied Electrical Power to the RSSI Battery Backup Panel "CB1" (Located in the BBP) should be 220-240VAC, between L1 and Neutral.
2. Turn on main power circuit breaker, "CB1". Contactor "C1" should energize after approximately 4 seconds. ☐
3. Turn ON "CB3 then verify battery charger energizes (Red Power ON light is on) and the battery charging status meter indicates between 0 and 15 DC Amps. Please allow batteries to charge at least 24 hours; before conducting any barrier tests using the BBP. ☐
4. Verify the voltage at the DC input lugs on the inverter (should be approximately 26-28VDC) ☐
5. Turn on the on/off switch located at the top of the Inverter. Verify 240VAC at the top of CB2 ☐

C. Battery Backup Operational Check:

1. Turn off the Normal Power source DISCONNECT.
   a. Contactor C1 de-energizes and contactor C2 energizes (switches to Inverter power) ☐
2. Verify voltage at input of Main Disconnect (located in the control panel). Should be approximately 240VAC between L1 and Neutral. ☐
3. Turn on normal power. ☐

D. Barrier Control Panel Check:

1. In the BCP, ensure all breakers are off. Then turn on Main Disconnect and verify 208-240V at the bottom of Disconnect. ☐
2. Turn on CB1 then verify the Sump 24V Power Supply has a green LED ☐.
3. Turn on CB2 then verify 208-240V across 5L1 and Neutral on contactor H1. ☐
4. Turn on CB3 then verify the Controls 24V Power Supply has a green LED ☐
5. Turn-on CB4 then verify 24V across SP+ and SP- at Power Supply. ☐

6. Turn on CB5 then verify the following devices power up: ☐
   a. Loop Detectors
   b. PLC
   c. Maintenance Touch Screen
   d. Ethernet Switch
   e. Fiber Converter
7. Verify 208-240V at the top of FU1 across 3L1 to Neutral. ☐

NOTE

When powering up Loop Detectors ensure all metal objects are at least 3 feet away from the safety loops. Failure to do this may affect the operation of the safety loops

E. Safety Loop Check:

1. Position a person at the RSSI BCP and drive a vehicle slowly over the safety loops and the barriers. The RED LED (detects presence) will light as the vehicle travels over the safety loops and will turn off as the vehicle clears them. ☐

2. Additionally, anytime a vehicle travels over a safety loop or something passes by an IR Beam, a RED "Vehicle Detected" Block is displayed along the bottom of the screen. This message displays on the Secondary, Primary and Grand Master Operator Controls. ☐

NOTE

If the barrier is moving to the Up (roadway closed) position and a safety loop or IR Sensor is activated, the barrier will reverse to the Down (roadway open)

3. With the Barrier in the DOWN position, pull a vehicle forward on the front edge of the front safety loop and stop. The LED indicator on the safety loop detector in the RSSI BCP should indicate RED (detects presence). Additionally, a RED "Vehicle Detected" Block is displayed along the bottom of the screen on the Secondary, Primary and Grand Master Operator Controls. ☐
4. Move the Slider on the Secondary or Primary Touch screen to the CLOSED position. Barrier should not operate. ☐

NOTE

If the barrier is left in the DOWN (roadway open) position for 60 seconds (configurable by maintenance personnel), it creates an ALARM.

- The Alarm consists of the Alarm Horn sounding and a RED Border flashing on the Secondary barrier display.
- The Red Border displays on the Primary and Grand Master Controls
- To silence or reset the Alarm, the operator just RAISES the barrier to the CLOSED (roadway closed) position.

5. Back the vehicle off the safety loop. Move the Slider on the Secondary or Primary Touch screen to the CLOSED position and as the barrier starts to raise pull the vehicle onto the front edge of the safety loop. The barrier should stop and lower to the down position. ☐

WARNING

Ensure to use extreme caution when pulling the vehicle forward as the barrier is rising. We recommend placing wheel chocks to prevent vehicle from traveling onto the barrier.

6. Repeat steps 3 through 5 for the back safety loop. ☐

F. IR Sensor Check:

1. Position a person at the Secondary Operator Controls and have a person walk into the path of the IR Sensors. Anytime something passes by an IR Beam, a RED "Vehicle Detected" Block is displayed along the bottom of the screen Secondary, Primary and Grand Master Operator Controls. ☐
2. With the Barrier in the DOWN position, pull a vehicle forward to the IR Sensors and stop. The RED "Vehicle Detected" Block is displayed along the bottom of the screen on the Secondary, Primary and Grand Master Operator Controls. ☐
3. Move the Slider on the Secondary or Primary Touch screen to the CLOSED position. Barrier should not operate. ☐

NOTE

If the barrier is left in the DOWN (roadway open) position for 60 seconds (configurable by maintenance personnel), it creates an ALARM.

- The Alarm consists of the Alarm Horn sounding and a RED Border flashing on the Secondary barrier display.
- The Red Border displays on the Primary and Grand Master Controls
- To silence or reset the Alarm, the operator just RAISES the barrier to the CLOSED (roadway closed) position.

4. Back the vehicle away from the IR Sensors. Move the Slider on the Secondary or Primary Touch screen to the CLOSED position and as the barrier starts to raise pull the vehicle into the front edge of the IR Sensors. The barrier should stop and lower to the down position. ☐

WARNING

Ensure to use extreme caution when pulling the vehicle forward as the barrier is rising. We recommend placing wheel chocks to prevent vehicle from traveling onto the barrier.

5. Repeat steps 2 through 4 for the back IR Sensors. ☐

Repeat For Additional Barriers.

G. Verify Sequence of Operation using DOS Operator Manual

SECONDARY CONTROL (MCAC/SCAC) PROCEDURES

- Step by Step run through the following items using the DOS Operator Manual using the Secondary Control (MCAC/SCAC) Procedures

Normal Operations

1. Lower (roadway open) Barrier using the Slider Controls ☐
2. Raise (roadway closed) Barrier using the Slider Controls ☐
3. Verify Operator can see the position of the barrier on the touch screen. ☐
4. Lower (roadway open) Barrier and verify RED timer located above the slider starts counting up to 60 seconds. ☐
5. Verify Alarm Horn sounds and a RED Border flashes on the Secondary barrier display after 60 seconds. ☐
6. Verify Raising the barrier to the CLOSED (roadway closed) position resets Alarm. ☐
7. Verify vehicle traveling over a safety loop or something passing an IR Sensor, initiates a RED "Vehicle Detected" Block on the Secondary Controls. ☐

Emergency Fast Operations (EFO)

1. Activate EFO by raising cover and depressing the Red Push Button. ☐
2. Verify barrier raises to roadway closed position in less than 1 second. ☐
3. Verify Red Push Button illuminates. ☐
4. Verify the Slider Controls disappear from touchscreen. ☐

NOTE
The RED LED will remain lighted and the slider controls unavailable until an EFO Reset is performed at the Primary or Grand Master Controls. EFO Reset procedures will be covered in the next section.

PRIMARY CONTROL (POST 1) PROCEDURES

- Step by Step run through the following items using the DOS Operator Manual using the Primary Control (Post 1) Procedures

Normal Operations

1. Lower (roadway open) Barrier using the Slider Controls ☐
2. Raise (roadway closed) Barrier using the Slider Controls ☐
3. Verify Operator can see the position of the barrier on the touch screen. ☐
4. Lower (roadway open) Barrier and verify RED timer located above the slider starts counting up to 60 seconds. ☐
5. Verify the RED Border flashes on Primary touch screen after the barrier Alarm activates after 60 seconds. ☐
6. Verify Raising the barrier to the CLOSED (roadway closed) position resets Alarm. ☐

7. Verify vehicle traveling over a safety loop or something passing an IR Sensor, initiates a RED "Vehicle Detected" Block on the Primary Controls. ☐

Emergency Fast Operations (EFO)

1. Activate EFO by raising cover and depressing the Red Push Button. ☐
2. Verify barrier raises to roadway closed position in less than 1 second. ☐
3. Verify Red Push Button illuminates. ☐
4. Verify the Slider Controls disappear from touchscreen. ☐

NOTE
The RED LED will remain lighted and the slider controls unavailable until an EFO Reset is performed at the Primary or Grand Master Controls.

Secondary Control Over-Ride

1. Verify Secondary OP Station OFF/ON function of turning OFF/ON the Secondary Operator Controls ☐
2. Verify Secondary Operator Touch Screen slider controls disappear when Secondary OP Station is turned OFF ☐
3. Verify the Secondary EFO push button remains active when Secondary OP Station is turned OFF ☐
4. Verify Secondary EFO OFF/ON function of turning OFF/ON the Secondary EFO ☐
5. Verify Secondary Maint. Disable function of DIS/EN the Secondary Maintenance functions ☐
6. Verify Primary EFO Reset function of resetting a Secondary initiated EFO ☐

ATTACHMENT 2 – SAFETY LOOP SET-UP

Safety Loop Set-up

1. Ensure 24v power supply is on (CB5), refer to page 2 of DOS Systems Controls 2013.
2. Install the frequency plug with the wires from the safety loops. 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.

Figure 1, Safety Loop Detector

3. Ensure the dipswitches are in the correct position; Factory settings are to the left, reset bottom two dipswitches to the right (train to infinity and normally open).
4. 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.

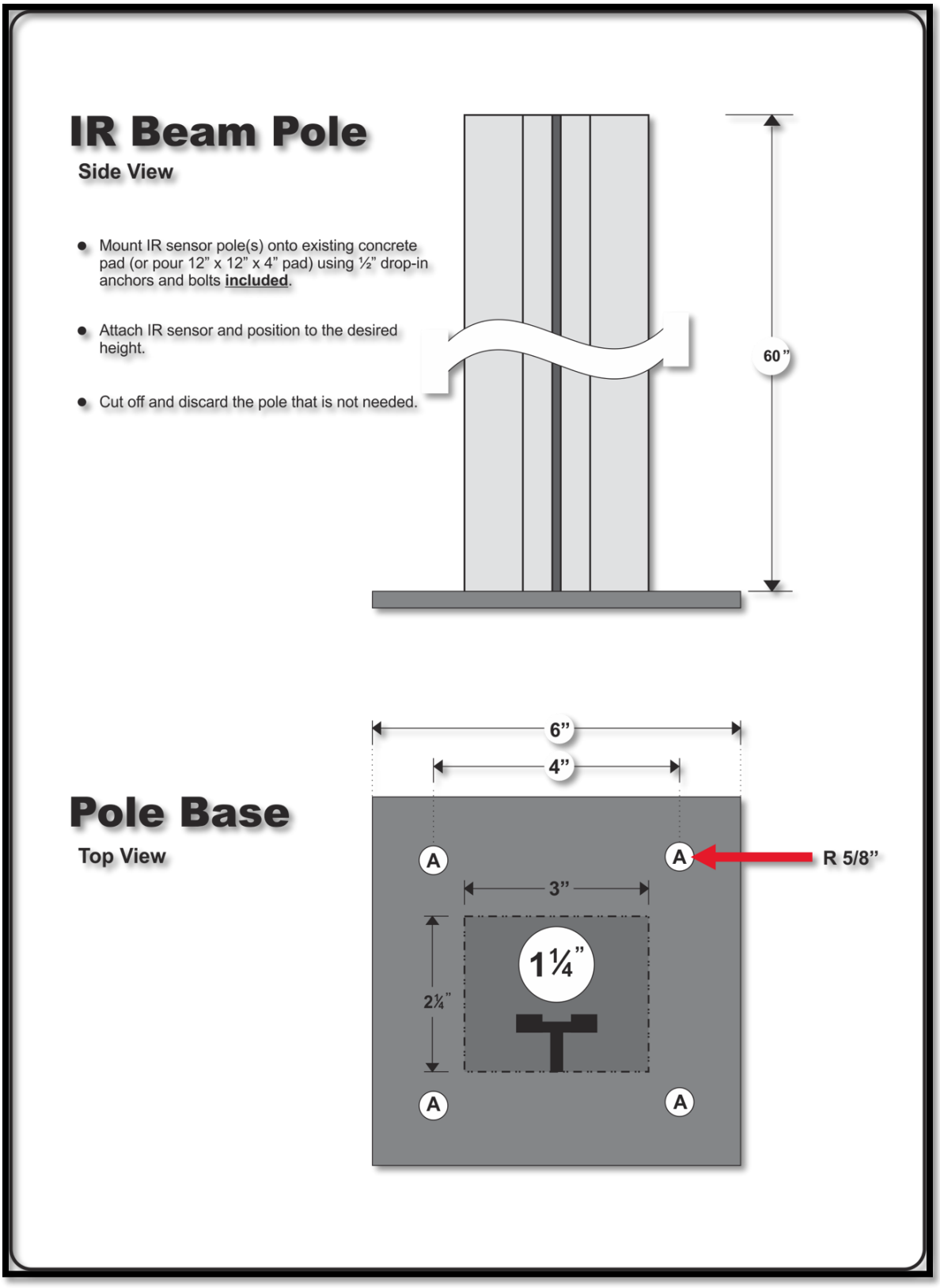
Figure 2, Side of Safety Loop Detector

NOTE

Sensitivity settings are Low, Medium Low, Medium High, High

ATTACHMENT 3 – IR SENSOR INSTALLATION AND SET-UP

IR Sensor Pole Installation



IR Sensor Installation and Set-up

1. Using 1-1/2” retaining nut, attach the IR sensor to the mounting bracket.

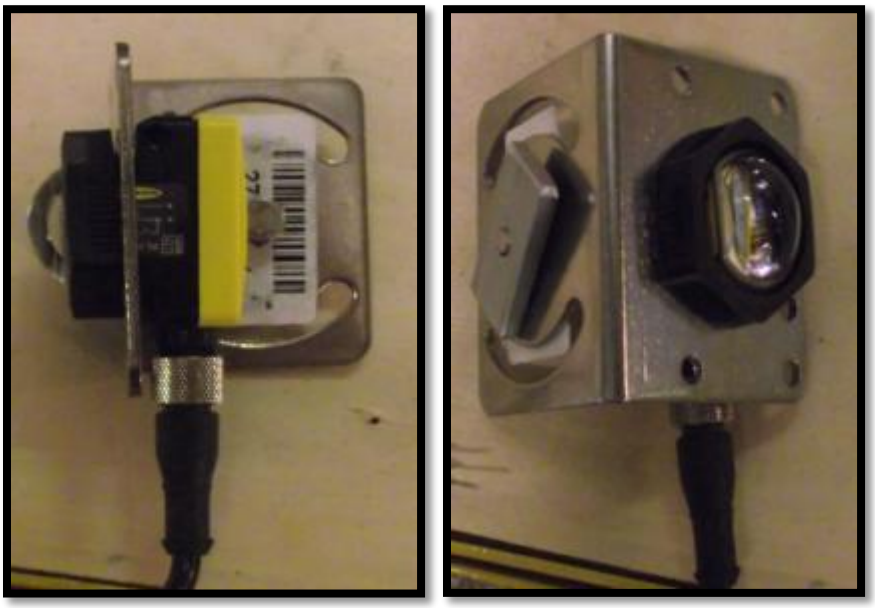


Figure 1, IR Sensor and Mounting Bracket

2. Using provided Allen wrench, remove top cover from the pole.

Figure 2, IR Pole Top

3. Slide mounting bracket with IR sensor attached onto pole. Please identify the Transmit and Receive sensors then alternate on each pole. You should have one of each on opposite poles. Re-install top cover onto the pole using the Allen wrench.

Figure 3, Mounting IR Sensor

4. Once you have your sensor in place tighten using 7/16" nut driver/wrench/socket. Please note your vertical measurements to match sensors on the pole on the opposite side of roadway.

Figure 4, IR Sensor Mount Alignment

5. Once you have tightened the sensors in place, you can either drill holes into the pole or run additional conduit to route the sensor's wire through for termination.

Figure 5, IR Sensor Wiring

6. Once the sensors are in place and wires are terminated, ensure 24v power supply is on (CB5), refer to page 2 of DOS Systems Controls 2013.
7. Align 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).

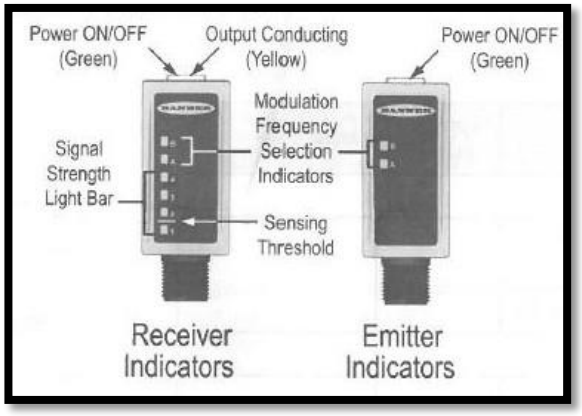


Figure 6, IR Sensor

- Adjust the emitter first, then the receiver. Verify that both sensors are wired for the same modulation frequency, then 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.
- To achieve the best crosstalk immunity, position a single matched emitter within the receiver's field of view (15 degrees). When it is necessary to position an alternate emitter in the receiver's field of view, sensor alignment is required to ensure the matched frequency emitter provides the stronger signal to its receiver, and the alternate frequency emitter does not reduce the signal strength of the receiver (as indicated by the 4-element signal strength light).

ATTACHMENT 4 - SERVO DRIVE SET-UP

FROM THE SECONDARY OPERATOR CONTROL PANEL AT GATE

Maintenance Operations

The Primary Control Main Screen in Post 1 functions and operates the same as the Secondary Controls at the gate, with the exception of a BLUE Menu Button below the slider.

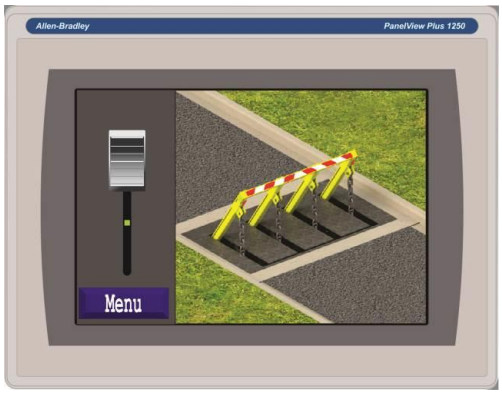


Figure 1, Primary Main Screen (Post 1)

Secondary Control Over-Ride

When you press the BLUE Menu Button, the Options Menu for the following Secondary Controls are displayed:

- Secondary OP Station OFF/ON
- Secondary EFO OFF/ON
- Maint. Disable DIS/EN
- EFO RESET
- HOME

Maint. Enable Switch. This switch places the Secondary Touch Screen in Maintenance Mode to allow a trained maintenance person to test and adjust barrier settings. Placing your finger on the switch toggles the switch from DIS (disabled) to EN (enabled).

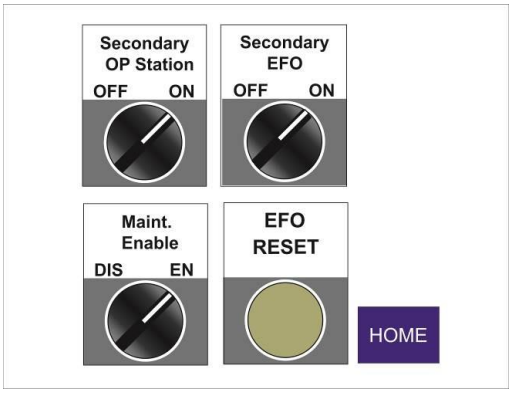


Figure 2, Maint. Enable Switch - EN

When maintenance enabled switch is activated, both the Primary and Grand Master barrier controls are disabled. The Slider button on both controls disappear.

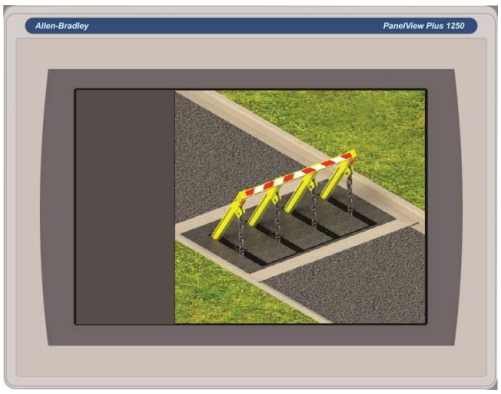


Figure 3, Primary/Grand Master Main Screens when Maint. Switch Enabled

Additionally, Enabling the Maintenance Switch adds a Blue Menu button to the Secondary Control Main Screen.

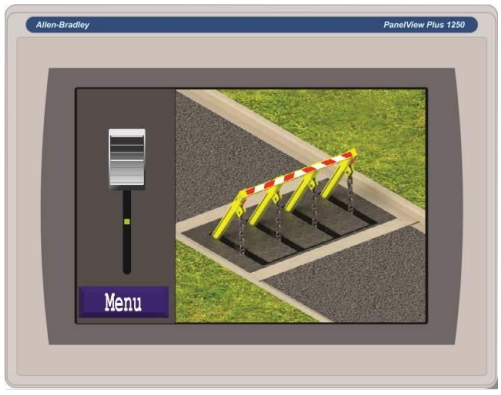


Figure 4, Secondary Main Screen, Maintenance Menu Button

Pressing the Blue Menu button on the Secondary Controls displays the Maintenance Screen.

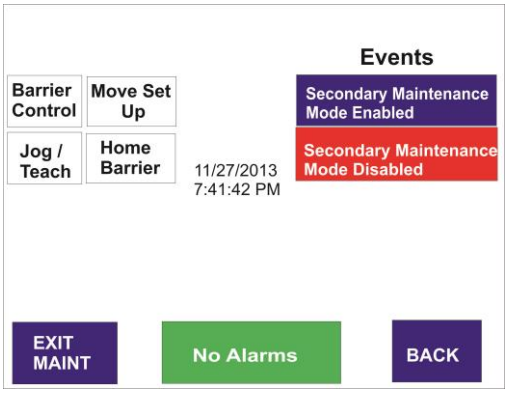


Figure 5, Secondary Maintenance Screen

NOTE
If after 30 seconds (configurable by maintenance personnel) a maintenance technician takes no action, the Maint. Enable Switch automatically resets to DIS (disable).

When maintenance personnel are finished, pressing the Blue EXIT MAINT button resets the Secondary Controls. Simultaneously, the Primary and Grand Master Controls Maint. Enable Switch resets to DIS (disabled).

Homing the Barrier

1. At the Secondary Maintenance 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.

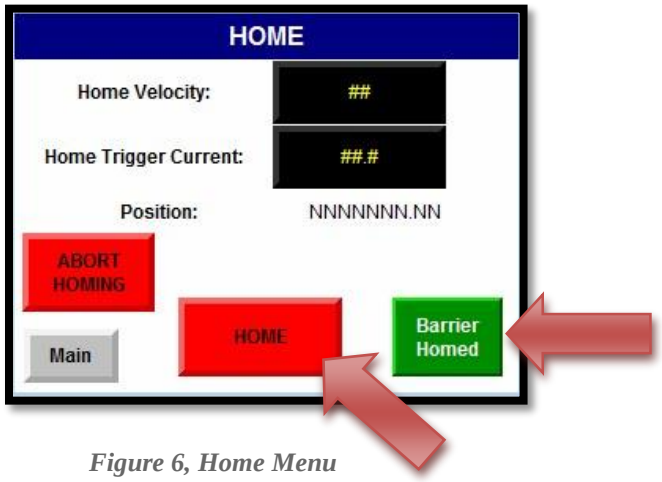


Figure 6, Home Menu

Barrier Control

1. From the MAIN MENU, press the BARRIER CONTROL button (See Fig 7).

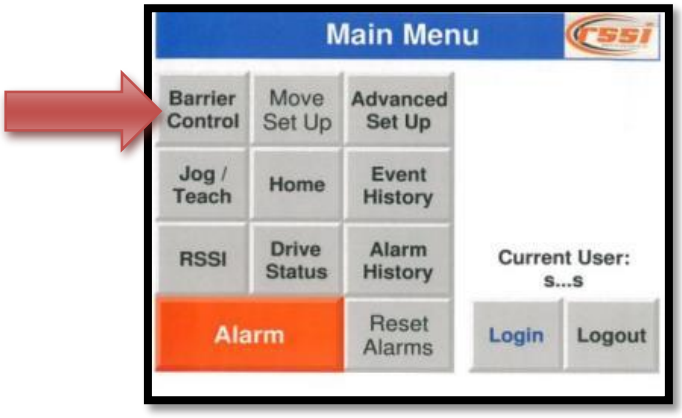


Figure 7, Main Menu

2. Inside the BARRIER CONTROL menu use the MOVE CLOSED/OPEN buttons to operate the barrier a few cycles, measure the post assembly in the CLOSED (UP) position to ensure it reaches 35-36 inches and ensure the OPEN(DOWN) position is all the way down and out of roadway. (See Fig 8)

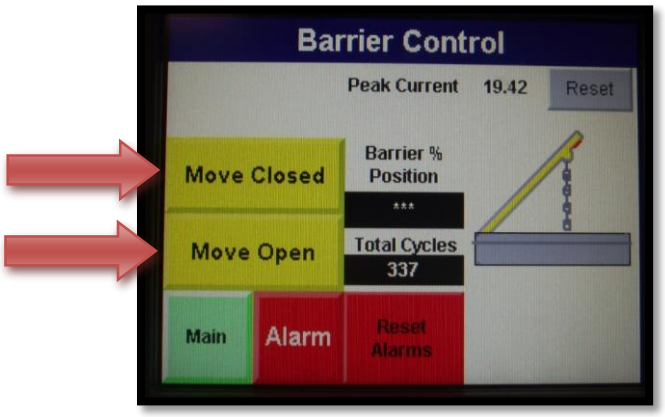


Figure 8, Barrier Control Menu

NOTE
If the Peak Current is higher than 20 Amp, it may indicate that the barrier position needs to be adjusted. Refer to Position Adjustment in the Maintenance Manual.

NOTE
If the barrier post assembly is not flush with the roadway (protruding from barrier), refer to Position Adjustment in the Maintenance Manual.

FROM THE MAINTENANCE TOUCH SCREEN IN THE BCP

Homing the Barrier

1. Turn on Fuse FU1. 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.

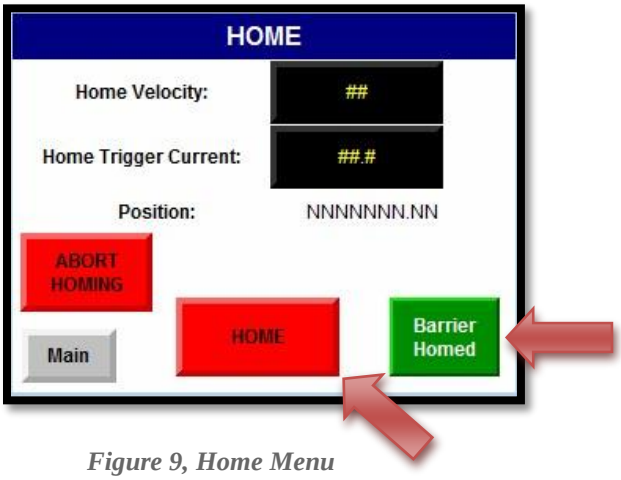


Figure 9, Home Menu

Barrier Control

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

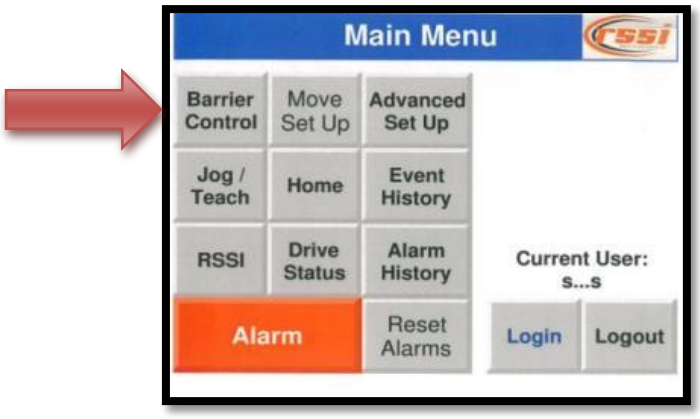


Figure 10, Main Menu

2. Inside the BARRIER CONTROL menu use the MOVE CLOSED/OPEN buttons to operate the barrier a few cycles, measure the post assembly in the CLOSED(up) position to ensure it reaches 35-36 inches and ensure the OPEN(down) position is all the way down and out of roadway. (See Fig 11)

Figure 11, 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 Position Adjustment in the Maintenance Manual.

NOTE
If the barrier post assembly is not flush with the roadway (protruding from barrier), refer to Position Adjustment in the Maintenance Manual.

ATTACHMENT 5 - VEHICLE DETECTOR LOOP INSTALLATION GUIDE

INTRODUCTION

This loop installation guide is intended to illustrate the steps involved in installing a "saw cut type" vehicle detector loop. Loop sizes shown in the figures and illustrations vary according to the detection requirement being accommodated. The photographs are for typical loops used in conjunction with traffic signals. Refer to page 8-10 of the DOS Typical Embassy Drawings 2014 for Barrier Loop Sizes.

Figure 1

Figure 2

Figure 3

INSTALLATION INSTRUCTIONS:

1. Mark the loop outline on the pavement surface using either a string or rigid frame and aerosol spray paint as shown in figures 1 & 2. Note that corners are diagonally cut to prevent damage to wire insulation during placement of the wire in the slot (see figure 3).
2. Place a mark on the concrete saw blade to insure the saw cut depth is 2" deep. The saw blade should be 1/4" wide at the lead cable slot and 1/8 inch wide for the loop slot.
3. Saw loop outline in pavement as shown in figure 4.

Figure 4

Figure 5

4. Clean debris from saw slot with compressed air, as shown in figure 5, and allow surface and slot to completely dry.
5. After the loop size has been determined, refer to illustration 1 to determine the number of turns of loop wire to be placed in the loop slot. It is important that the proper number of turns are used.
6. Carefully install a continuous piece of the provided Loop Wire in the saw slot. Use Loop Installation Roller to insure that the wires are in the bottom of the saw slot (see figure 7). Do not use metal objects with pointed or sharp edges for this purpose!

NOTE
NO WIRE SPLICES ARE PERMITTED IN THE SAW SLOT!

Figure 6

Figure 7

7. Install backer rod in 4 inch segments in the saw slot as needed (see figure 6) to insure that the wires are held tightly in the bottom of the slot.
8. Twist the two wires at least five turns per foot where they exit the saw slot.

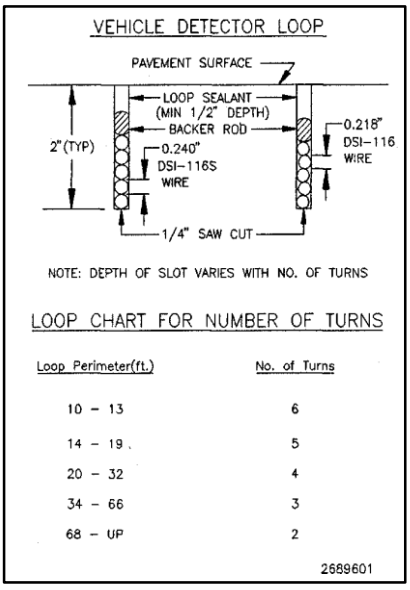


Illustration 1

NOTE
If the backer rod is not pressed down firmly on top of the wires and the wires fully encapsulated, the detector loop may false call due to the wires being loose and vibrating under the backer rod. The loop wires should be continuous from the electronic control panel, around the loop and back.

Figure 8

Figure 9

9. When installing the loop sealant material, insert the tip of the applicator in the saw cut and confirm the material is being pumped completely around the wires or firmly on top of the backer rod. After pouring the loop sealant in the saw cut as shown in figure 8, level the material using a "v"-shaped piece of cardboard or a special tool (figure 9) to remove any high spots of material in the saw cut. Avoid overfilling the saw cut as it may cause premature failure of the loop sealant.

ATTACHMENT 6 – TRAFFIC LIGHT INSTALLATION

1. Run Conduit up where Traffic Light will be located.
2. Pour concrete pad 16" W X 16" L X 24" D – Square base is 13 ¾ inches X 13 ¾ inches.
3. You can make a mounting template by tracing the bottom of the square base on cardboard. This provides location where the anchor bolt holes can be drilled.

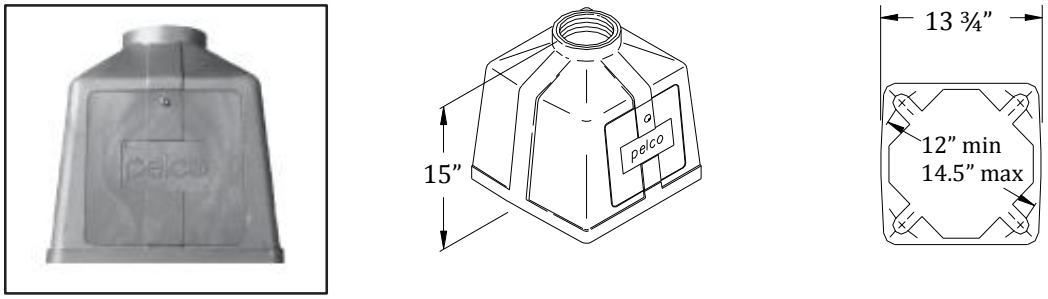


Figure 1, Traffic Light Pole Base

4. Use 1/2 inch X 5 ½ inch wedge anchor bolts (threaded on one end) to secure Square Base in place.
5. Place square base over the anchor bolts and shim base as necessary to make level. Remove the maintenance door cover on the base to allow access for securing base to anchor bolts. Secure base to bolts with 1/2 inch Nuts and 5/8 inch washers.
6. Pull wires for light through the top of the base
7. Run wires through the Traffic Light Pole and screw pole into the base.
8. Attach the Pedestal Adaptor to the Traffic Light Assembly.
9. Attach the Tunnel Visors to the traffic lights.
10. Run the wires into the traffic Light assembly through the Pedestal adaptor and mount the traffic light to the pole.
11. After securing the pedestal adaptor/traffic light assembly to the pole, terminate wires in the traffic light.

Figure 2, Traffic Light Configurations – 2 & 3 Lights

ATTACHMENT 7 – LIST OF CHANGES

The following changes were made to the Installation Manual DS_1-10-2014.

Page 11 – Electrical Terminations number 6; Changed Traffic Light Color from "Green" to "Amber"

Page 11 – Number 8 reworded to read "The IR Beams are powered through the BCP +24Vdc (Red wire)/-24Vdc (Black wire) power terminal blocks to each IR Beam (splices in stands) Connect the Red wire to Brown and Gray wires of IR pigtail and Black wire to Blue wire of IR pigtail. IR Beam PLC inputs are I: 1/11 (HIGH) and I: 1/12 (LOW)."

Page 12 – Number 6 Reworded sentence to read "BCP receives INPUTS from IR Sensor (black wire on sensor pigtails) the black wire are connected to blue wire connected on PLC inputs I;1/11 (HIGH) and I: 1/12 (LOW). (See Sheet 4 PLC inputs)."

Page 17 – Attachment 1, Item B3, added ";before conducting any barrier tests using the BBP." to the end of last sentence.

Page 19 – Attachment 1, renamed Section F. to IR Sensor Check and added procedures to test IR Sensors.

Page 19 – Attachment 1, renumbered Section F. to Section G. and renamed "Verify Sequence of Operation using DOS Operator Manual" to test all functions of the Secondary and Primary Operator Controls to include EFO, EFO Reset, and disengaging the Secondary Controls from the Primary Control location.

Page 20 – Attachment 2, Loop & IR Sensor Set-up. Separated Safety Loop and IR Sensor into separate Attachments; Attachment 2, Safety Loop Set-up; Attachment 3 IR Installation and Set-up.

Page 25 – Renumbered Attachment 3 to Attachment 4

Page 31 – Renumbered Attachment 4 to Attachment 5

Page 34 – Attachment 5, IR Beam Pole Installation. Deleted and added it to beginning of Attachment 3, IR Installation and Set-up.

Page 35 – Added an Attachment 7, List of Changes, Revision 1 after Attachment 6

Note: The page numbers referred to in this attachment refer to the original document, Installation Manual DS_1-10-2014, not this revised version.