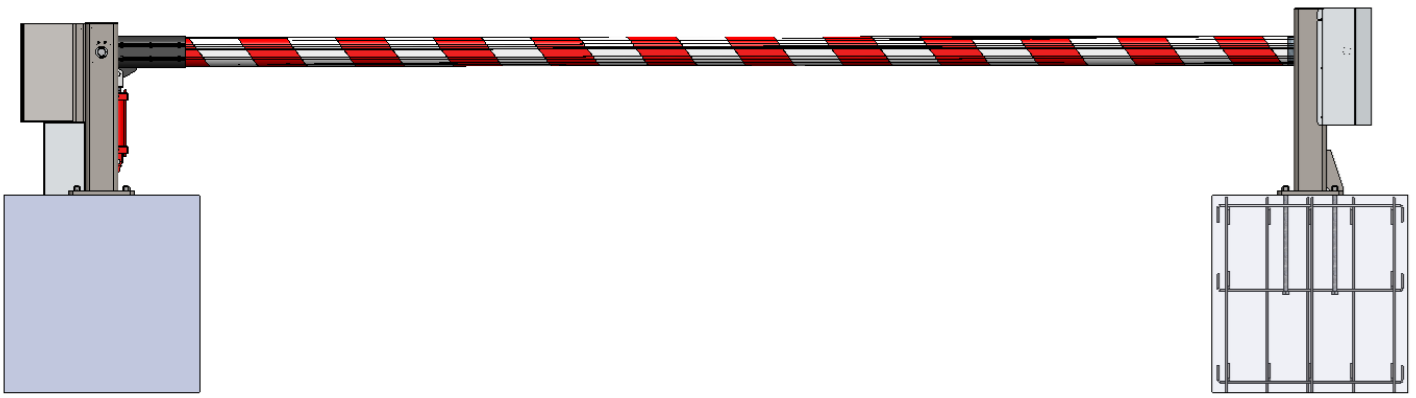


INSTALLATION MANUAL

MODEL 775

Reinforced Crash Arm Vehicle Barrier



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MADE IN THE USA

Contents

System Installation Record	4
1. INTRODUCTION	5
1.1. Preface	5
1.2. Safety Considerations	5
1.3. Safety Symbols	6
1.4. Acronyms	6
1.5. How to Contact Us	8
2. ORIENTATION	8
2.1. Overview	8
2.4. Drive System	11
2.4.1. Electric	11
2.4.2. Hydraulic	11
2.4.3. Manual	12
2.5. Options	12
3. INSTALLATION	12
3.1. Introduction	12
3.2. Pre-Installation Considerations	13
3.3. Installation Instructions	13
3.3.1. Step 1 – Excavation	14
3.3.2. Step 2 –Conduit and Rebar Installation	14
3.3.3. Step 3 – Concrete Emplacement	18
3.3.4. Step 4 – Stanchion Installation	18
3.3.5. Step 5 - Hydraulic Unit Installation (For models 775HD/HR only)	19
3.3.6. Step 6 – Control System Installation (For model series 775Ex or 775Hx only)	19
3.3.7. Step 7 – Arm Installation	19
3.3.8. Step 8 – Final Assembly	23
3.3.9. Final Pre-operation Checklist	26
4. INITIAL STARTUP PROCESS	26
4.1. Startup Sequence	27
5. TROUBLESHOOTING	28
5.1. Model 775 Troubleshooting Guide	28
6. APPENDIX	29
6.1. Drawings	29



INSTALLATION MANUAL

MODEL 775 SERIES
REINFORCED CRASH ARM

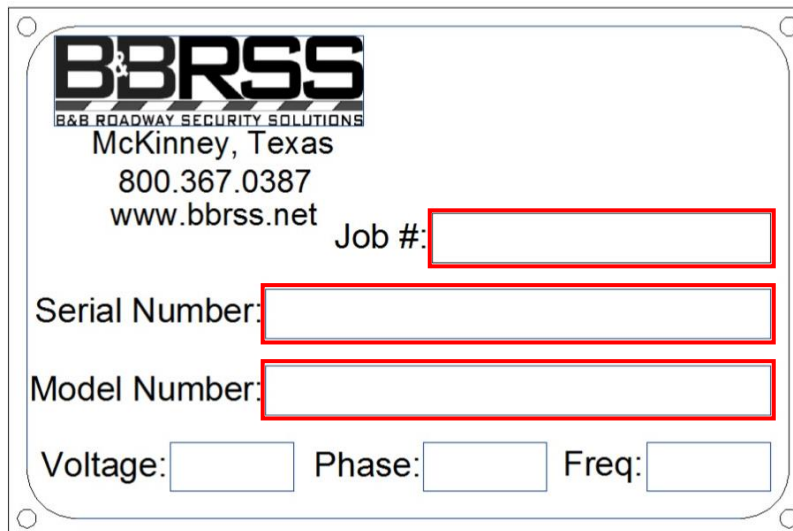
6.1.1. General Layout.....	29
6.1.2. Foundation and Conduit Details	30
6.2. Specifications	31
Limited Warranty	32

System Installation Record

To assist in documenting the products installed in your system, please take a minute to record the following reference information. This information can be located on the blue B&B ARMR model number plate found on the 775 drive unit.

Additional columns are added for your convenience in documenting other components in the system.

	Model 775 Barrier		
Site:			
Job #:			
Date:			
Installer:			
Serial Number:			
Model Number:			
Voltage:			
Phase:			



Label 1 - B&B ARMR Blue Product Label with important product data

DO NOT DISCARD THIS MANUAL!

1. INTRODUCTION

1.1. Preface

Welcome!

Congratulations on your purchase of a B&B ARMR vehicle barrier. In addition to providing detailed operating instructions, this manual describes how to install, start-up and troubleshoot your vehicle barrier. This manual should be fully reviewed in advance of any actual work being done on the equipment.

If you require additional assistance with any aspect of your vehicle barrier's installation or operation, please contact B&B before proceeding.

With years of experience in all aspects of perimeter security and related disciplines, our products are used throughout the world to control access and to protect people, equipment, and facilities. We offer a broad range of vehicle barrier and related perimeter security services:

- Turnkey installations.
- Routine barrier preventative maintenance or emergency repairs (including work on non-B&B products).
- Spare or replacement parts.
- Custom designs or special installations.
- Equipment upgrades or modernization.
- Ancillary security equipment such as security guard enclosures, access control points, security lighting, and many other security related products.
- Technical support via telephone and possible on-site support with advanced scheduling.

The equipment covered by this manual is available with a vast variety of options and accessories. See the Specification Chart at the end of this manual for general unit specifications. Consult the unit labels, approved submittal package, order acknowledgment and other manuals for details on the options, accessories and related specifications provided with the equipment on each project.

The instructions pertaining to the Model 775 Reinforced Crash Arms are intended as a guide and do not supersede local or national codes. Consult local codes before installation.

1.2. Safety Considerations

B&B does not assume responsibility for injury to persons or property during installation, operation, or maintenance. As the installer, you are responsible for correct, safe installation and first operation of this equipment. You must follow the specific instructions and safety precautions located in this manual. In addition, you shall:

- Follow the safety standards of the Occupational Safety and Health Administration (OSHA), as well as other applicable federal, state, and local safety regulations and industry standards and procedures.
- For installation outside the United States, installers must also follow applicable international, regional and local safety standards.
- Engage only trained and experienced staff to install and operate the equipment.
- Ensure that any modifications or repairs are performed correctly, using the correct tools and equipment, by properly trained technicians.

1.3. Safety Symbols

The following symbols are used in this document to alert the reader to areas of potential hazard:



DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION identifies a hazard which could lead to damage to the machine, damage to other equipment and/or environmental pollution. Usually an instruction will be given, together with a brief explanation.



NOTE is used to highlight additional information which may be helpful to you.



TIP indicates time saving information.



LIGHTNING FLASH with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of “dangerous voltage” within product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

1.4. Acronyms

The following is a list of acronyms common to the industry and used throughout this manual.

- **ASTM** – American Society for Testing and Materials: A voluntary leader in the development of consensus standards for product definition, testing and certification. Most perimeter security products are tested by 3rd party testing/engineering agencies, using ASTM standards.
- **BBU** – Battery Backup Unit: An optional enclosure containing components and batteries necessary to run control electronics and/or barrier actuators.
- **CO** – Clear Opening: The opening distance of a barrier that is unimpeded or “clear” of any obstructions. For wedge barriers, this typically refers to the width of the attack plate/assembly size. For arm barriers, this commonly refers to the distance between stanchions that is clear to traffic. Clear opening does not mean overall size or in the case of arm barriers, arm length.

- **DCA** – Drive Clevis Assembly: A group of components (assembly) specific to the 828 Series of products used to interface the actuator with the barrier. This assembly includes bolts, pins, blocks and other components.
- **DOS** – Department of State: An abbreviation commonly used to refer to Department of State crash ratings such as, K4, K8 and K12. Most DOS requirements have been replaced with newer ASTM standards for crash rating.
- **EFO** – Emergency Fast Operation: A term used to describe a situation where a barrier operates at an emergency maximum speed. Not all products are capable of EFO. EFO is typically achieved by using specialty electro-linear actuators or pressure accumulators for hydraulically driven systems. EFO is normally activated by an “Emergency” button on a control panel or through software.
- **EPU** – Electric Power Unit: A control enclosure used to house the various control devices for an electrically actuated barrier. This enclosure is typically mounted remotely, away from the barrier and is connected via underground conduit. Some units may attach the enclosure directly to the barrier, as seen on the 77X series. Typically the control systems operate an electro-linear actuator on the barrier.
- **Ft-lbs.** – Foot Pounds: A unit of work equal to a force of one pound-force through a linear displacement of one foot. This is often used to express torque required to secure fasteners, such as bolts and is commonly represented as Lb-ft (Pound-Feet) to eliminate confusion between torque and work units.
- **HPU** – Hydraulic Pumping Unit: A control enclosure used to house the various control and pumping components for a hydraulically actuated barrier. This enclosure is typically mounted remotely, away from the barrier and is connected to the barrier via underground conduit and hydraulic high pressure hoses. Some enclosures may attach directly to the barrier, as seen on the 77X series. The control systems operate a hydraulic pump and valve system used to drive hydraulic cylinders on the barrier.
- **IM** – Installation Manual: Is an instructional manual that explains the installation requirements and steps for a product series.
- **LED** – Light Emitting Diode: A type of light that consumes low energy and is typically low voltage (below 12V).
- **MLB** – Maintenance Lock Bar: A device used to mechanically lock the linkage arms of an 828 Series Wedge Barrier during maintenance work.
- **O&M** – Operation and Maintenance: Refers to a type of instructional manual used to explain the operation and maintenance requirements of a product series.
- **PLC** – Programmable Logic Controller: A programmable solid state electronic control device that controls machinery by using predetermined program logic.
- **PSF** – Pounds Force per square foot: A unit of measure for pressure over a given area.
- **UL** – Underwriters Laboratory: A 3rd party standards development, testing and certification agency.

1.5. How to Contact Us

If you have any questions or experience any problems with your vehicle barrier, or if we can help you with any other facility security issues, please contact us:

Tech Support:

B&B ARMR

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2. ORIENTATION

2.1. Overview

The B&B ARMR Model 775 Reinforced Crash Arm Vehicle Barrier is an arm-type barrier hinged at one side such that the arm can be raised and lowered to restrict and control vehicle access. The arm is reinforced with an interior energy absorption material to increase the barrier's vehicle stopping capability.

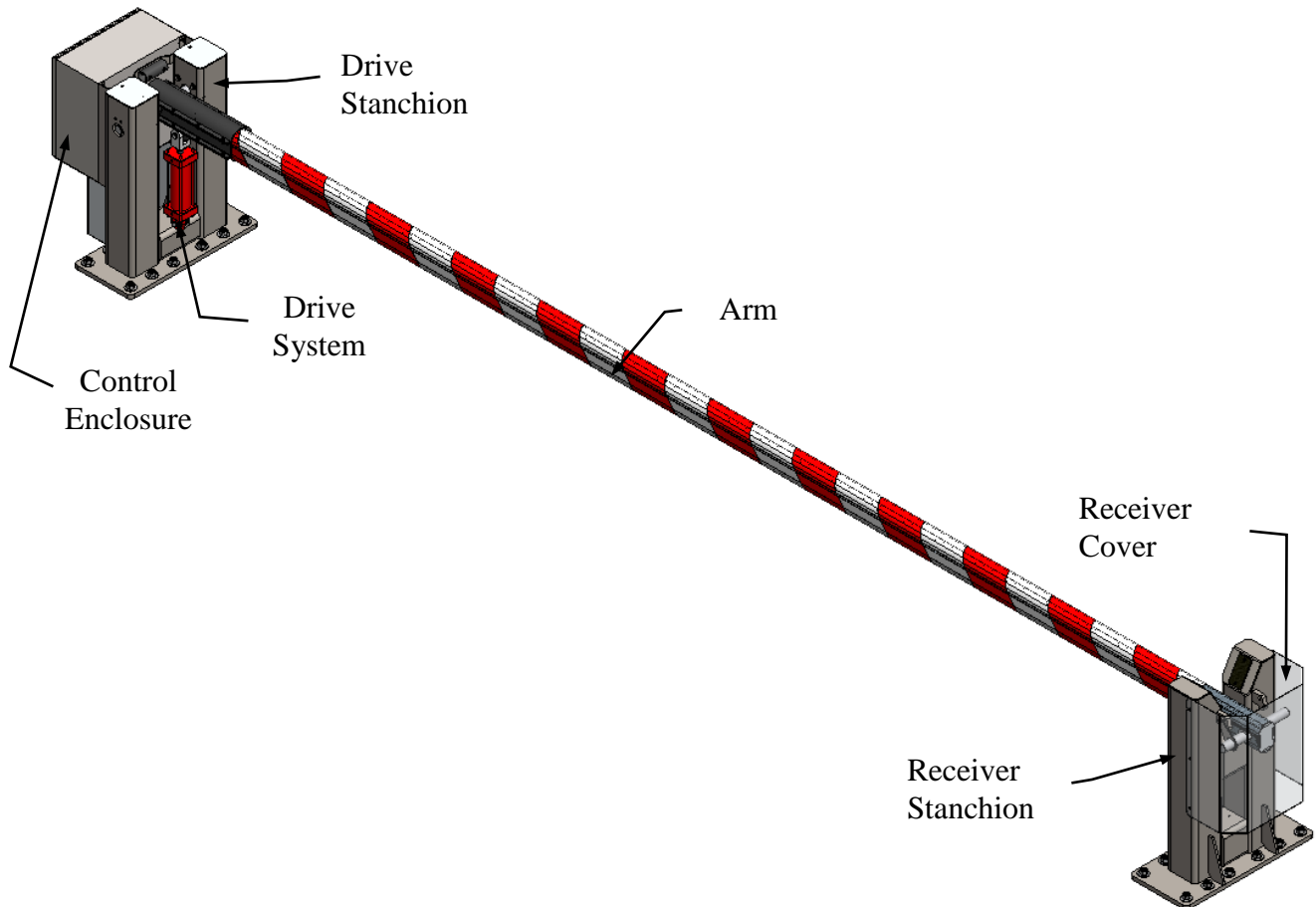


Figure 1- Model 775HD Reinforced Crash Arm Barrier

2.2. Arm

The arm is an aluminum extrusion and is marked with red and white safety tape (alternate colors available). The energy absorption material is contained inside the arm and anchored with retention pins at either end. The impact energy is absorbed by the internal material and transferred to the foundation through the drive and receiver stanchion assemblies.

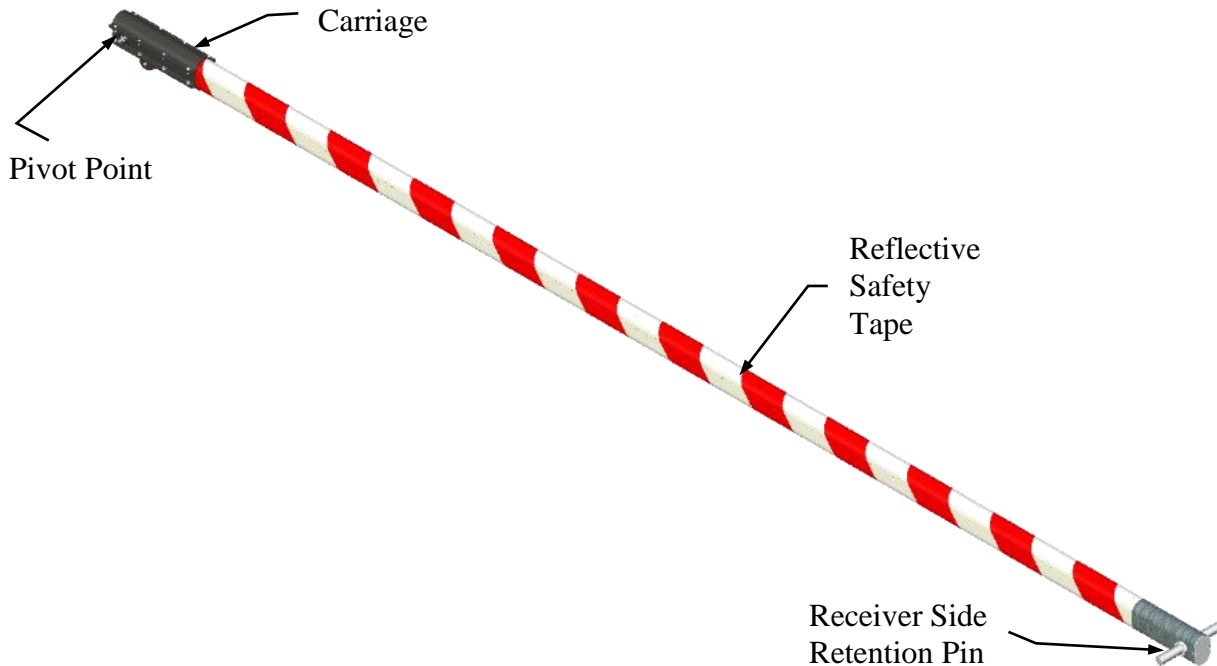


Figure 2 – Arm Assembly

2.3. Stanchion

The drive and receiver stanchions are constructed using heavy gauge steel.

The drive stanchion **Figure 3 - Drive Stanchion (Model 775HD Shown)** operates with internal bearings on a steel hinge pin that allows the arm to open vertically.

The receiver stanchion **Figure 4 - Receiver Stanchion** directs and captures the arm when it is lowered. The receiver stanchion has a removable security latching device to prevent unauthorized operation when the barrier is unattended.



Do not attempt to operate the barrier when the latch device is installed.

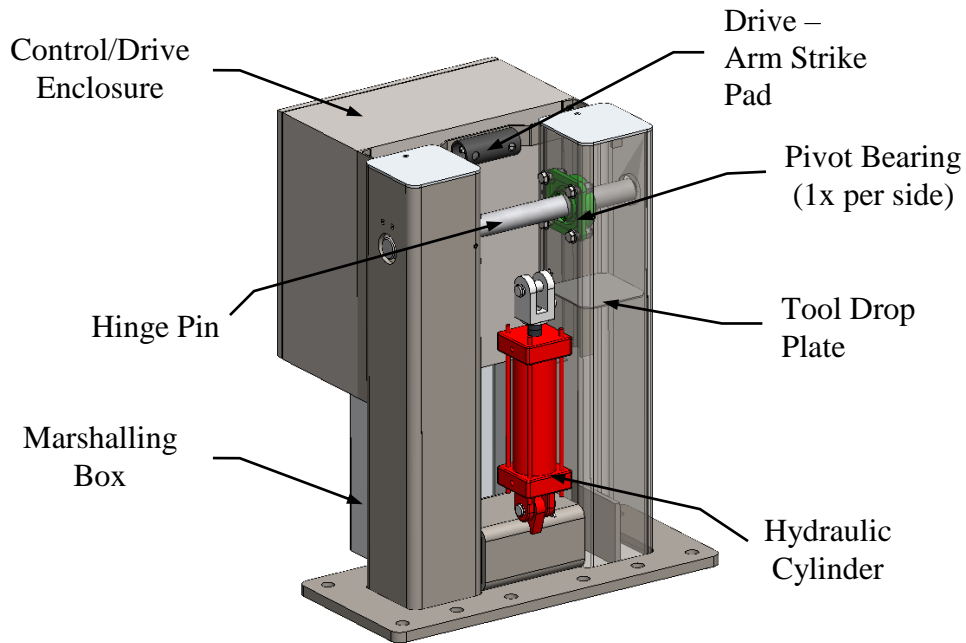


Figure 3 - Drive Stanchion (Model 775HD Shown)

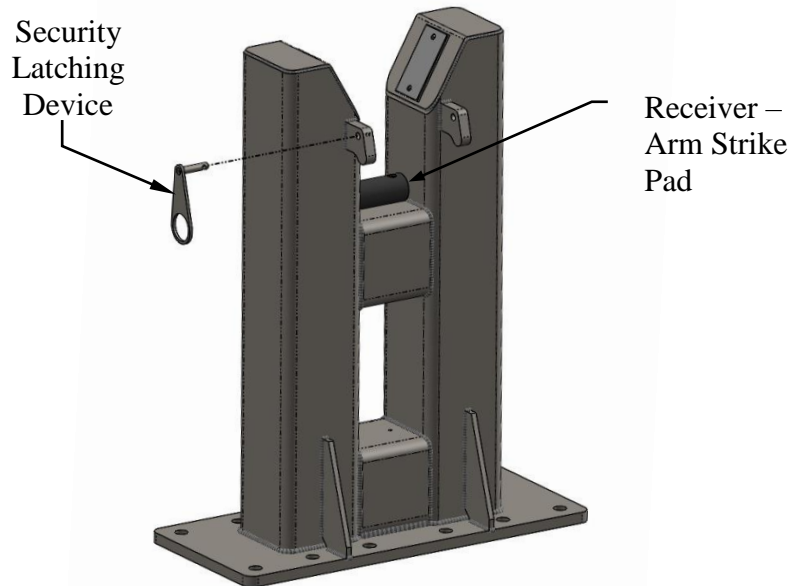


Figure 4 - Receiver Stanchion

The barrier has an exterior-mounted, dampening strike pad. When the barrier operates at the design speed, this damper reduces any whipping action by the arm as it comes to the full, raised position.

Both the drive and receiver stanchion are bolted to an anchor assembly cast into a subterranean concrete pour (see **Figure 5 – Subterranean Foundations**).

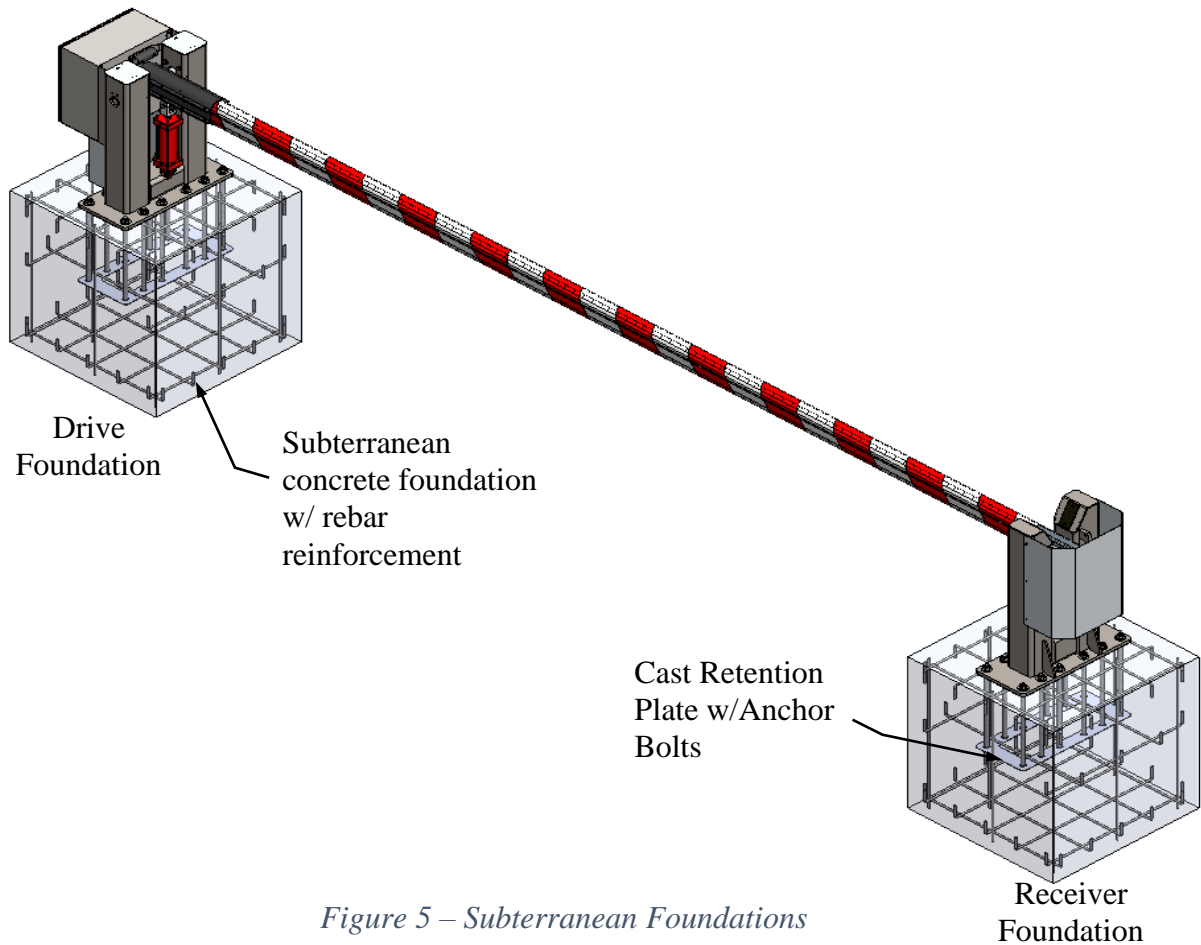


Figure 5 – Subterranean Foundations

2.4. Drive System

The drive system options are:

2.4.1. Electric

The 775ED, or remote mount version 775ER, barrier operates with a self-contained electric drive actuator. A 775ED/ER contains the actuator components, the electrical components and a programmable logic controller pre-programmed with the barrier's operating logic.

The unit includes a manual operation override so the arm can be raised and lowered during power outages.

Refer to the separate Installation (IM) and Operation and Maintenance (O&M) manual for specifics on the Electric drive.

2.4.2. Hydraulic

The 775HD, or remote version 775HR, barrier operates with a self-contained hydraulic pumping (HPU) unit. A 775HD/HR contains the hydraulic pump, control valves and

connections and the programmable logic controller pre-programmed with the barrier's operating logic. Miscellaneous electrical components power the HPU and control circuits.

The system includes a manual operation override so the arm can be raised and lowered during power outages.

Refer to the separate Installation (IM) and Operation and Maintenance (O&M) manual for specifics on the Hydraulic drive unit.

2.4.3. Manual

The 775MD barrier is manually operated by designated personnel. A standard 775MD contains no electrical components, but may include options or accessories that require electrical connections (e.g., led lights, electromagnetic lock).

Consult the unit labels, approved submittal package or order acknowledgment on the options and accessories related to each project.

2.5. Options

The Model 775 *Reinforced Crash Arm Vehicle Barrier* is available with the following options. Consult your approved submittal package or purchase order to determine whether your unit has any optional equipment.

- Various control panel options (touch screen panels, multiple panels, remote mounting)
- Integrated LED Lights to increase the arm's visibility
- Cold weather package (includes stanchion heaters)
- Electromagnetic Lock
- Battery Back Up System
- Custom Painted Finish

Additional system safety devices may be required with this barrier system:

- In-ground loop detector.
- Pole mounted traffic lights.
- IR beams.
- Safety Edge Strips.

3. INSTALLATION

3.1. Introduction

The section describes the procedure to set-up and configure a generic Model 775 vehicle barrier for first-time operation. Model 775 is designed for quick and easy installation; however, every site is different and each Model 775 varies due to the choice of options or special design features. Accordingly, the instructions below may have to be varied slightly for your particular installation.

Please refer to the unit label, approved project submittal package, order acknowledgment, or other manuals for details on the options and accessories provided on your Model 775. If you need help, or are unclear about any of these instructions, please contact B&B prior to installation for assistance.

3.2. Pre-Installation Considerations

Before beginning site excavation and barrier installation, note the following important considerations.

- Inspect the site and verify there are no underground utilities or overhead wires or obstructions in the excavation area.
- If possible, locate the installation away from routine foot traffic to reduce the chance for pedestrian injury from the barrier's moving arm.
- Soil compression strength around the barrier shall be a minimum of 1600 PSF or per submittal guidelines. Compact and add gravel where necessary to ensure solid soil base. Consult B&B Technical Support if soil compressive strength does not meet this minimum requirement.
- The barrier operates best when installed on a level surface. Both drive and receiver stanchions should be plumb and level. Level site side-to-side prior to barrier installation.
- Excavate install site to accommodate a minimum concrete pad dimension shown to match size of the barrier you have purchased. If site excavation cannot be completed per these minimum dimensions, please contact B&B Technical Support.

Before you begin installation, you will need the following available on site prior to installation:

- Equipment for excavation, soil compaction, removal and disposal of spoilage
- Concrete placing and finishing tools
- Steel re-bar (can be ordered in optional installation kit)
- Lifting equipment capable of moving and setting the Model 775 components into place
- Mix Concrete
- Demolition tools and/or equipment.
- Various hand tools for tightening screws, nuts and other fasteners
- Marking flags/paint and construction leveling string

3.3. Installation Instructions

Installing a Model 775(Ex, Hx, MD) is an eight (8) step process. Refer to **Table 1 - Excavation Summary** for a quick overview of installation specifications.

A more in-depth list of specifications and drawings can be found in Section 6.

3.3.1. Step 1 – Excavation

The excavation dimensions detailed in **Table 1 - Excavation Summary** are the minimum requirements needed to maintain Model 775(Ex, Hx, MD) specified crash rating as defined by the submittal package.

The drawing titled **Drawing 2 - 775 Series Foundation and Conduit Details** (see Section 6 at the end of this manual) details GENERIC foundation pads, clear opening and other critical dimensions. Refer to the submittal package drawings for project specific dimensioning.

3.3.1.1. Measure and mark the area to be excavated with flags or marking paint as indicated by the project submittal package.



Final pad positioning should be within ½” dimensional tolerance to assure proper alignment of the arm with the stanchions.

3.3.1.2. Excavate the hole for the Drive and Receiver Stanchion.

3.3.1.3. Compact the soil on all sides of each hole.



To support the concrete foundations of the 775 Barrier and to ensure the barrier can properly stop vehicles at the designed rating, make sure surrounding soil is capable of withstanding the minimum compaction requirements.

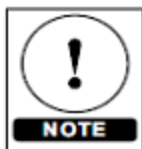
STANCHION	EXCAVATION (L x W x H)	REBAR Type #4 Deformed, Grade 60	SOIL Min Compaction	CONCRETE 4000 PSI min.
Drive	72 in. x 72 in. x 72 in.	Approx. 80 ft.	1,600 PSF	Approx. 8 yards
Receiver	72 in. x 72 in. x 72 in.	Approx. 80 ft.	1,600 PSF	Approx. 8 yards

Table 1 - Excavation Summary

3.3.2. Step 2 –Conduit and Rebar Installation

Perform the following steps, to install the conduit for the power and control circuits, referring to the Project Submittal or generic drawing titled **Drawing 2 - 775 Series Foundation and Conduit Details** (see Section 6 at the end of this manual).

3.3.2.1. The installation requires a minimum of two conduits. One minimum ¾ in. diameter PVC conduit for the power cables, and one minimum ¾ in. diameter PVC conduit for the control cables.



All conduits, fittings, sweeps, and couplings must be electrical grade (gray color); do not use plumbing type (white color). Additional conduits may be required for traffic lights, loop detectors and other options.

Contact B&B if you are unclear about the conduit requirements for your installation.

- 3.3.2.2. Rebar cage – Construct two (2) rebar cages. Build cages using rebar as specified in **Table 1 - Excavation Summary** and found in Section 6 specifications. Tie the rebar with #4 ties as specified in section 6 Specifications.



An Installation Kit containing partially assembled rebar cages is available from B&B as an option. Please refer to the submittal package for details on ordered options. If you have questions on Installation Kits, please contact B&B for assistance.

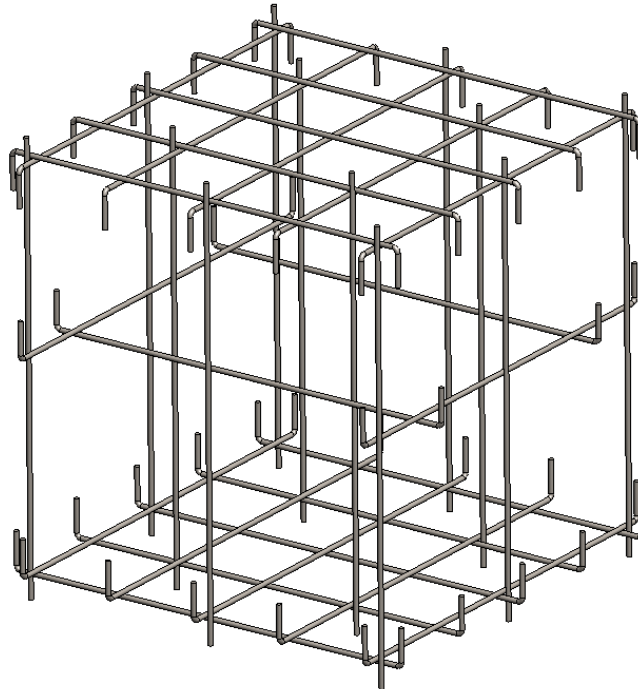


Figure 6 - Rebar Cage Representation

- 3.3.2.3. Retention Placement – Place Supplied Retention plates and bolts **Figure 7 - Retention Plate and Anchor Bolts** into rebar cage. Align the bolts such that they do not interfere with the rebar cage. Tie the plate to the middle side bars to hold firmly in place.

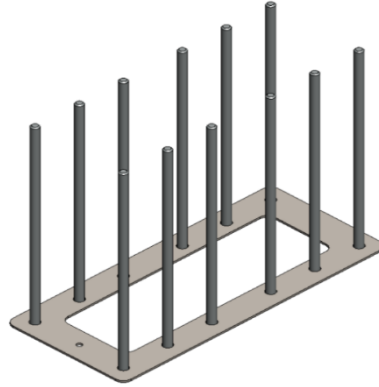


Figure 7 - Retention Plate and Anchor Bolts

3.3.2.4. Place the rebar cage containing the anchor bolts with retention plate into the center of each excavated hole.



The rebar cage should fit approximately 2.75 in. above the lower surface of the finished foundation and approximately 2.25 in. below the uppermost surface of the finished foundation.



The anchor bolts must protrude 2.5 in. above the upper level of the finished foundation to ensure enough thread is available to secure the stanchions.

3.3.2.5. There are two (2) remaining retention plates. These plates are meant to be attached to field supplied 2x4 or 4x4 boards. These boards will span across the foundation excavation and will hold the cage and attached anchor bolts in place during the concrete pour. Place one (1) on top of each anchor bolt assembly to act as a template. Use the supplied 1”-8 anchor nuts to hold the anchor bolts in place during the pour.

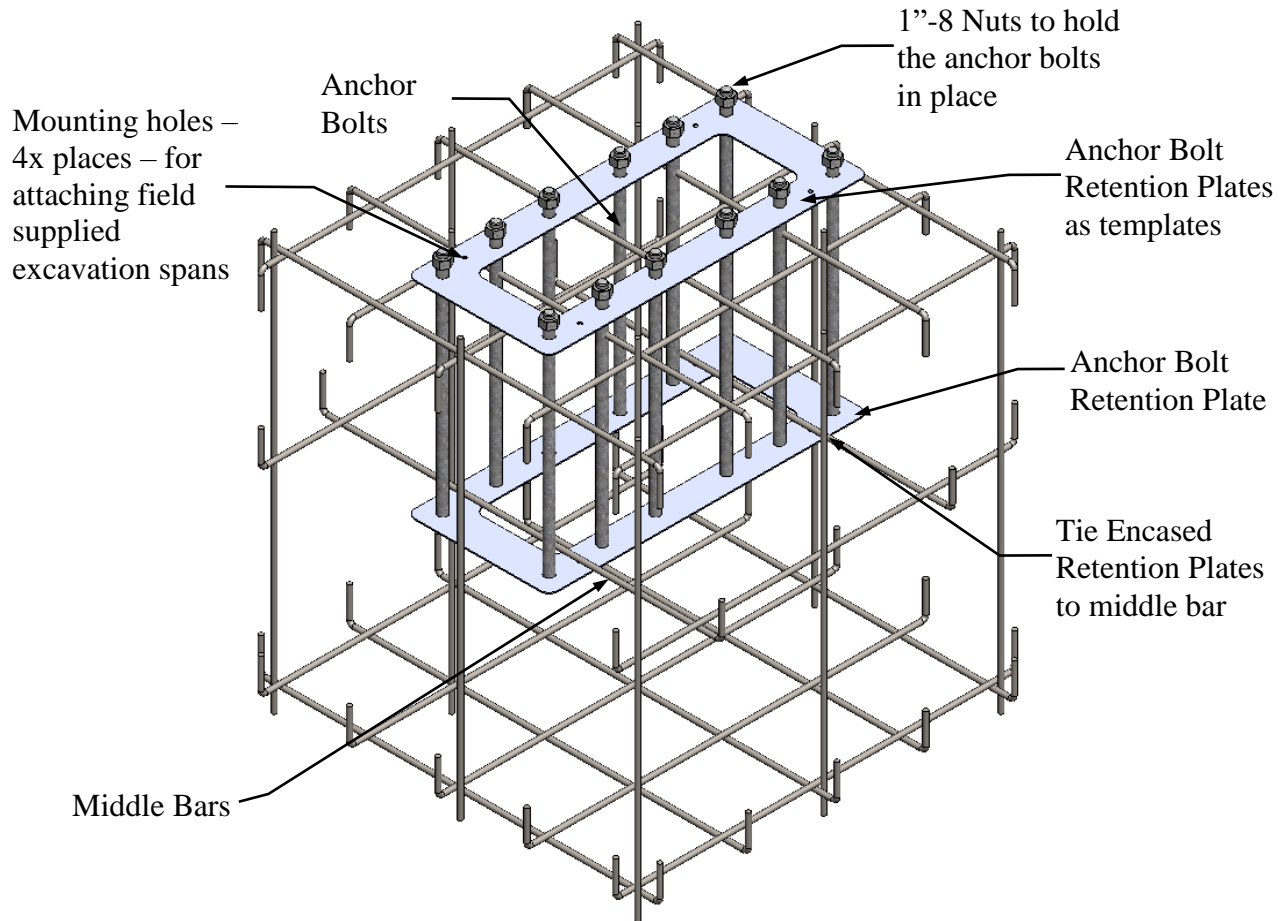


Figure 8 - Anchor Bolt Template layout

- 3.3.2.6. See *Drawing 2 - 775 Series Foundation and Conduit Details* in Section 6 for details on Retention Plate, Anchor Bolt and Conduit placement within the foundation.
- 3.3.2.7. Place string lines on either side of the Drive Foundation and run the lines across the roadway to determine the Receiver stanchion's location. Keep the string lines parallel and accurately measure the clear opening length. This length is the distance between the inside (side facing the road) faces of the Drive stanchion and the Receiver stanchion.
- 3.3.2.8. Adjust the Receiver mounting bolts and supplied templates by measuring between the anchor bolts and ensure both sides are positioned correctly per submittal.
- 3.3.2.9. Pull a string from the center of the Drive stanchion anchor plate and perpendicular to the axle and verify it falls directly on the center of the Receiver stanchion anchor plate.
- 3.3.2.10. Verify the distance between the two bolt anchors measures the specified clear opening length for your barrier. Refer to the submittal package details for these dimensions.

3.3.3. Step 3 – Concrete Emplacement

3.3.3.1. Fill the Drive and Receiver Stanchion excavations with specified concrete and finish the concrete surface.

3.3.3.2. Remove any splattered concrete from the above grade anchor bolts and conduits.



Add plastic wrap to the above grade portion of the anchor bolts or conduits to protect them from concrete splatter. Avoid plastic wrap below concrete grade.

3.3.3.3. Verify the mounting bolts are properly positioned by repeating Section 3.3.2.7.-3.3.2.10. Verify the anchor bolts protrude 2.5 in. above the final foundation grade. Quickly adjust the bolts and the supplied template if necessary.

3.3.3.4. Allow the concrete to cure, account for environment and in compliance with foundation requirements.

3.3.4. Step 4 – Stanchion Installation

3.3.4.1. After the concrete has cured, remove any templates and any other alignment tools.

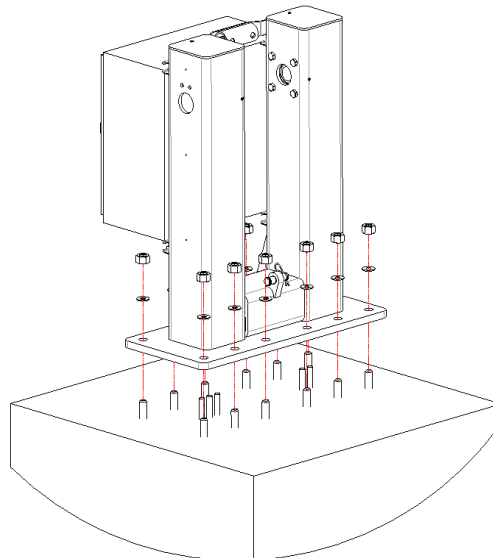
3.3.4.2. Lift the Drive stanchion into position. Lower the stanchion onto the anchor bolts.



Bolts should extend 1.5 in. above the stanchion once installed.

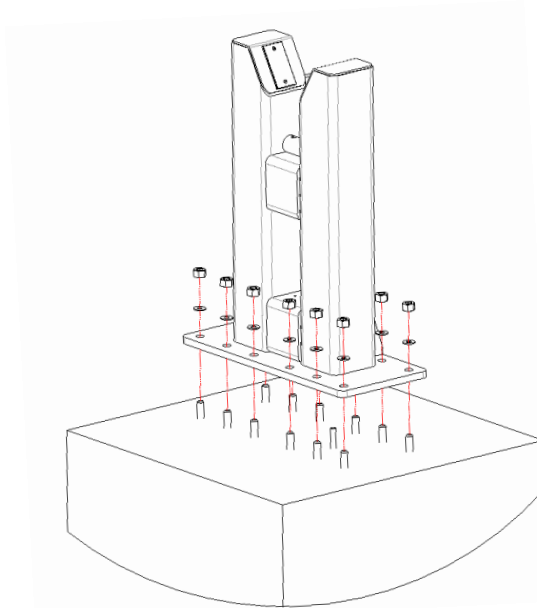
3.3.4.3. Install the supplied flat washers, and 1”-8 nuts onto the protruding bolts.

3.3.4.4. **Torque nuts to 150 FT-LBS.**



*Figure 9 - Drive Stanchion Installation
Tighten to 150 FT-LBS*

3.3.4.5. Repeat process for Receiver Stanchion.



*Figure 10 - Receiver Stanchion Installation
Tighten to 150 FT-LBS*

3.3.5. Step 5 - Hydraulic Unit Installation (For models 775HD/HR only)

Refer to the HPU Installation manual.

3.3.6. Step 6 – Control System Installation (For model series 775Ex or 775Hx only)

For this section, refer to the Electric or Hydraulic Drive Installation and O&M manual that came with the unit for more details.

3.3.7. Step 7 – Arm Installation

Arm should be installed in the horizontal (closed) position.

3.3.7.1. Lift barrier arm with crane or hoist and lower into position over drive stanchion.

3.3.7.2. Align the pin holes in the arm with the bearing holes in the Drive Stanchion.

3.3.7.3. Insert hinge pin from one side of the Drive stanchion thru limit sensor pack, both bearings (interior of stanchion uprights) and arm. Do not tighten any screws, bolts or bearings at this point.



Installed hinge pin should NOT extend beyond the Drive stanchion on either side.

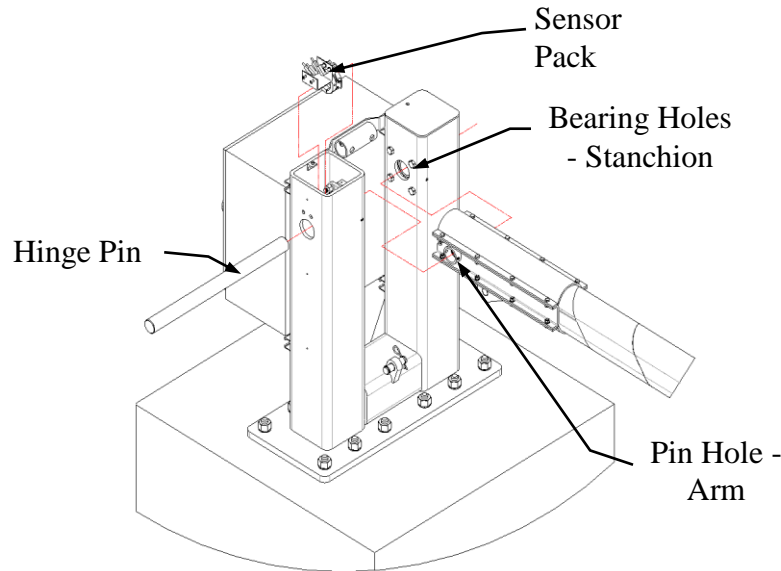


Figure 11 - Arm installation process

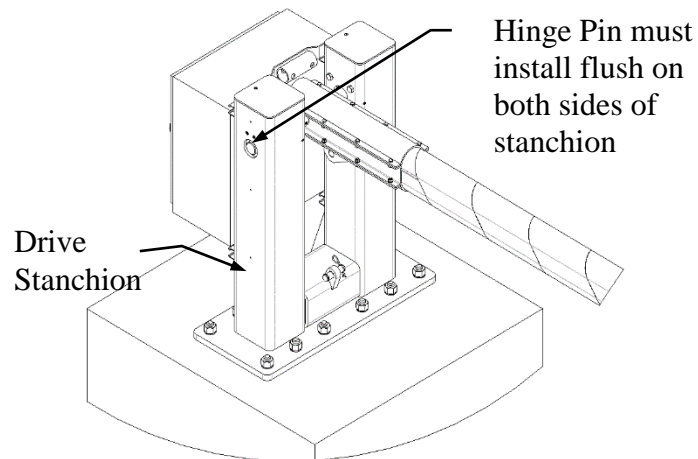


Figure 12 - Installed Arm

3.3.7.4. Verify arm aligns with the receiver stanchion and there is no interference or binding on the shaft bearings.

3.3.7.5. **IF** binding occurs, loosen the drive stanchion bearing bolts (4x per weldment) and use the adjustment screws (2x per weldment) in the stanchion to adjust the position of both bearings.

Align the arm such that it does not strike or touch the receiver stanchion when in the closed position. The arm alignment should be centered as closely as possible between the receiver stanchion weldments.

Snug adjustment screws.



There are two adjustment screws per bearing. Always adjust both screws in unison. Tightening one adjustment screw against the other, could result in damage to the bearing.

Verify alignment; snug bearing bolts.

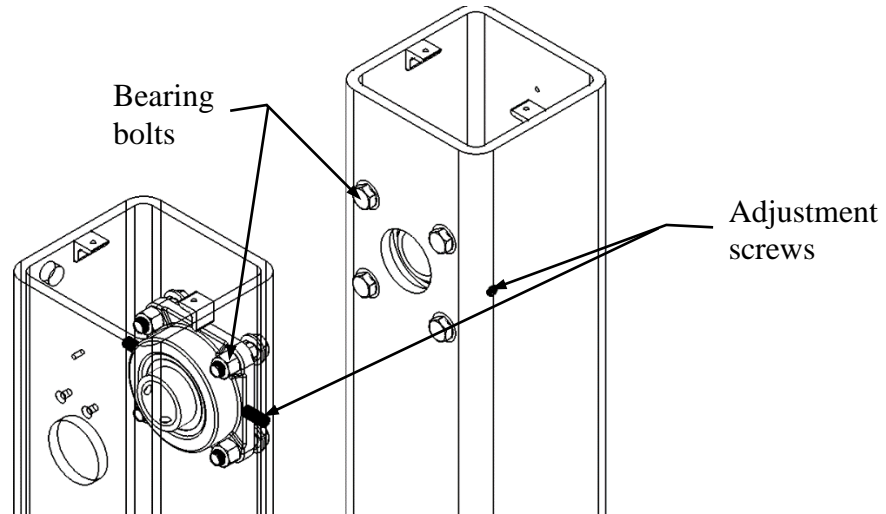


Figure 13 - Bearing bolts and Adjustment bolts



Snug all adjustment screws on both bearings **BEFORE** final tightening. This helps to ensure each bearing stays aligned before final tightening of bearing bolts.

- 3.3.7.6. Verify the hinge pin is flush to the stanchions sides. Tighten the set screws on the bearing, locking the hinge pin to the bearings – 2x total, 1x per bearing.
- 3.3.7.7. Slide the arm along the hinge pin and center the arm between the drive stanchion weldments.
- 3.3.7.8. Once centered, tighten the arm cradle set screws. (4x total).

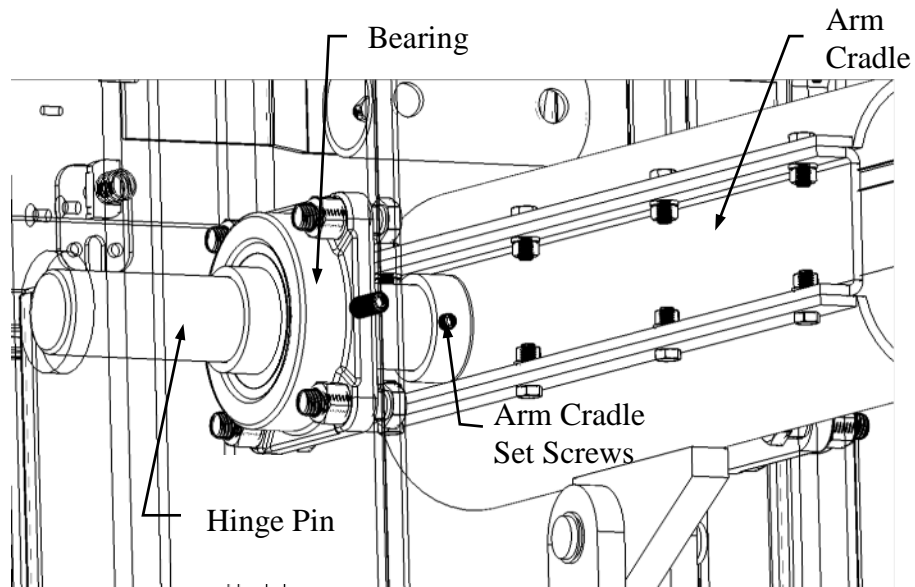


Figure 14 - Arm Cradle Set Screws (4x total)

3.3.7.9. Connect the hydraulic cylinder (model 775HD/HR) or electric actuator (model 775ED/ER) to the Drive stanchion and the arm using the provided clevis and lock pins.

If a manual unit (model 775MD) skip this step.

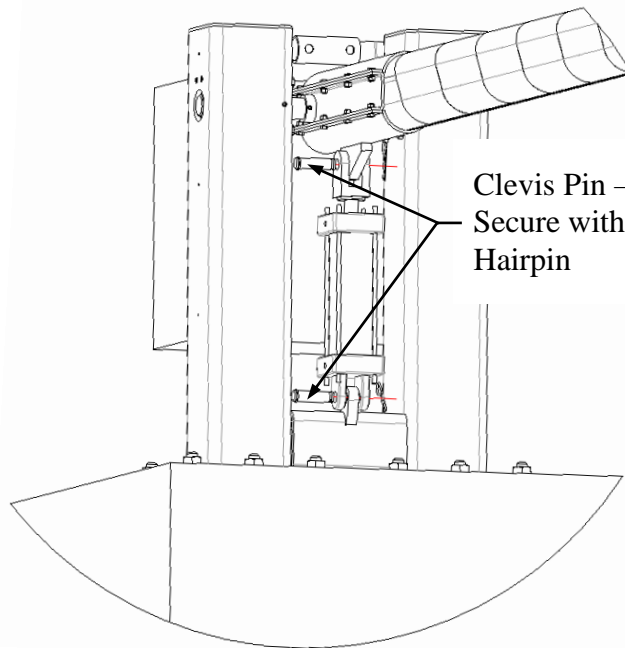


Figure 15 - Drive Installation (775HD Shown)

3.3.8. Step 8 – Final Assembly

3.3.8.1. Limit Switch Alignment

- 3.3.8.1.1. The limit switch should be installed within the drive stanchion. The switch is meant to attach to the hinge pin and contains two (2) flags that interact with four (4) sensors. **See *Figure 16 - Limit Switch Sensor Pack***

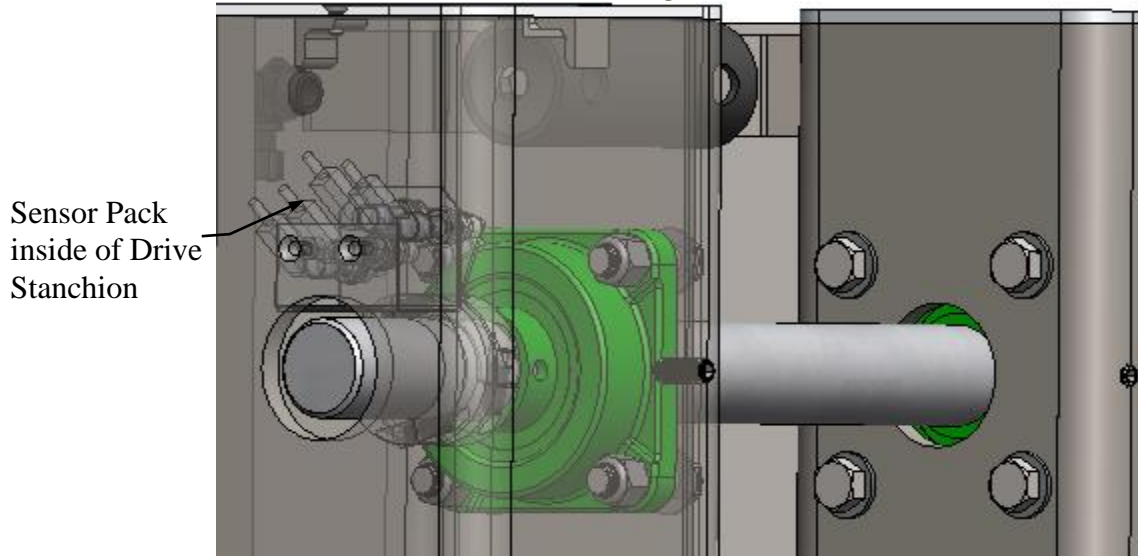


Figure 16 - Limit Switch Sensor Pack

- 3.3.8.1.2. There are four (4) sensors, Up Slowdown, Up Stop, Down Stop and Down Slowdown. The two flags are sized differently. The larger flag is for controlling the up position and the smaller flag for the down position. See *Figure 17 - Limit Switch Sensor Components (View looking outward from center of barrier)*.

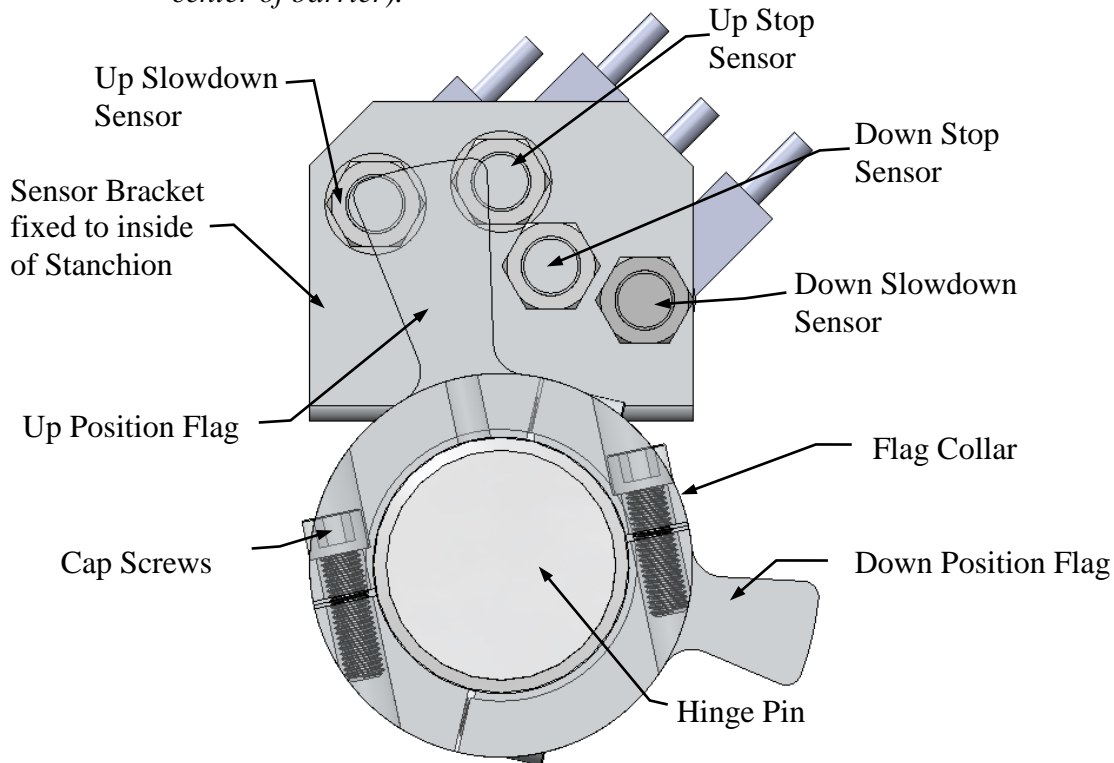


Figure 17 - Limit Switch Sensor Components (View looking outward from center of barrier)

- 3.3.8.1.3. The sensor mounting bracket is connected to the drive stanchion and locks the sensors in place. The flag collar secures to the hinge pin and allows the flags to rotate with the hinge pin as the barrier traverses up and down.
- 3.3.8.1.4. Adjust the Flag collar to match the position as illustrated in the “FULL DOWN” position. See *Figure 18 - Sensor UP/DOWN Positioning*. Tighten the cap screws.
- 3.3.8.1.5. Manually move the barrier arm to the full upright position. IF needed, adjust the flag collar to match the position as illustrated in the “FULL UP” diagram. See *Figure 18 - Sensor UP/DOWN Positioning*. Tighten the cap screws.



The UP and DOWN flags must be set to within ¼ in. (.25 in.) MAX distance of the sensors for proper operation. See *Figure 19 - Sensor Tolerance Diagram (Side View)*. Failure to set the limits could result in damage to the unit upon initial startup. See Section 6 for detailed installation drawings.

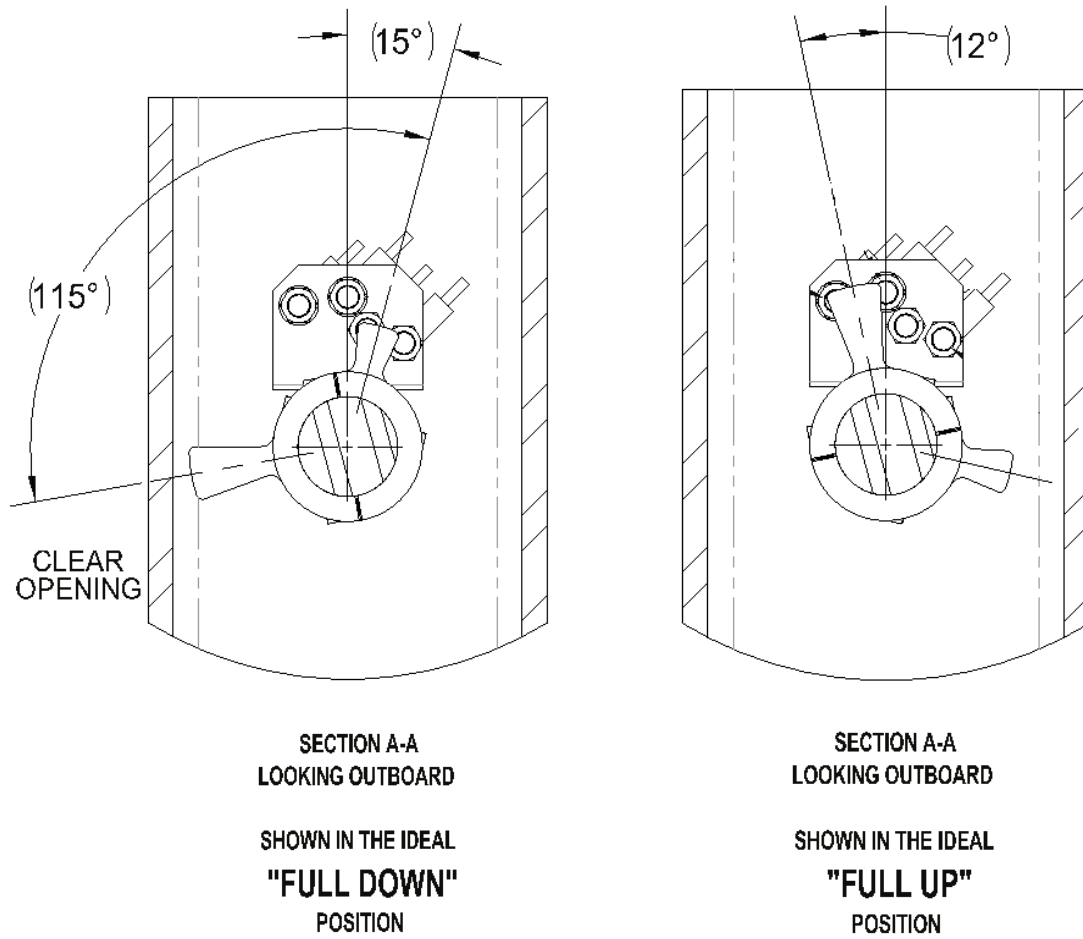


Figure 18 - Sensor UP/DOWN Positioning

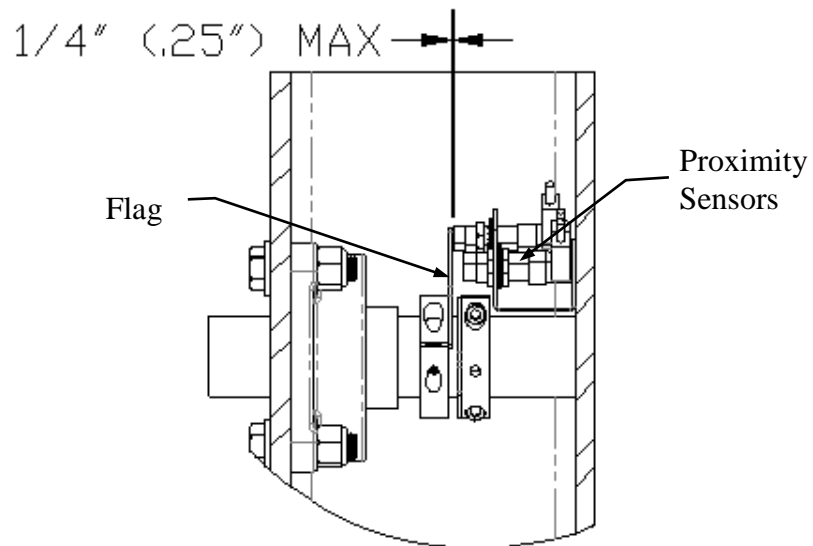


Figure 19 - Sensor Tolerance Diagram (Side View)

3.3.8.2. (775ED/ER and 775MD)

Depending on the options ordered, install the sheetmetal covers on the barrier. Assure covers do not come in contact with arm during operation. Do not pinch electrical lines with covers.

3.3.8.3. (775HD/HR)

Connect hydraulic lines through control enclosure to cylinder connection using appropriate fittings.

As a reference, use environmentally safe oil Mobil EAL 224 or equivalent when adding hydraulic oil to the HPU. Please reference the HPU Installation and O&M that came with the unit to verify connection points.

3.3.8.4. Lock the arm to the receiver stanchion using the supplied security pin.

3.3.9. Final Pre-operation Checklist

Before operating the Model 775 vehicle barrier, go through the following checklist and verify that each of these steps has been completed.

- The gate arm is attached to the Drive Stanchion with the hinge pin, and the setscrews securing the pin to the bearings are tight.
- The electric actuator (775Ex) or hydraulic cylinder (775Hx) is securely attached to the Drive Stanchion and the gate arm with clevis pins.
- Verify unit has hydraulic fluid (775Hx) to recommended level.
- Verify control unit is plugged in and cable is routed clear of barrier operation.
- Verify area is clear of personnel and other obstructions.
- Verify electrical hookups are completed per electrical wiring diagram matching submittal documents.

4. INITIAL STARTUP PROCESS



On initial startup, it is **MANDATORY** to close off the roadway and clear the Barrier area of nonessential personnel. When the 775(Ex, Hx) Barrier is powered for the first time, all personnel should be located safely away from the roadway, drive and receiver stanchion. Barrier movement might be very erratic during initial startup and could result in injury or death if not located safely away from unit.

For model 775Ex or 775Hx, see the appropriate supplementary Install Manual for electrical connections, option details and troubleshooting.

Each time the 775(Ex, Hx) is restarted or maintenance is performed, the roadway and personnel should again be cleared to guard against unexpected movement.

4.1. Startup Sequence

- 4.1.1. Disable safety devices and project specific options, such that the unit will be able to cycle up and down without system interference.
- 4.1.2. Check that all remaining electrical or hydraulic connections (if applicable) are tight and correct.
- 4.1.3. Block all roadway traffic. Nonessential personnel should not be located in the Barrier area.
- 4.1.4. Verify the arm is unlocked from the receiver stanchion.
- 4.1.5. Using the manual operator of the electric or hydraulic drive, cycle the system enough times to move the arm upward until it clears the top of the receiver stanchion.
- 4.1.6. Verify there is no binding or alignment issues. Refer to section 3 for adjustment instructions if necessary.
- 4.1.7. Reverse the operation of the electric or hydraulic drive and move the arm downward until it sits firmly in the closed position.
- 4.1.8. Verify the arm is centered in the receiver stanchion as it closes.
- 4.1.9. Turn on power to the unit. Turn on internal circuit breaker.
- 4.1.10. Allow electronic controls to cycle.
- 4.1.11. Provide **OPEN** command for the system.
- 4.1.12. Observe the arm open. If the arm does not open, makes a noise when doing so or is slow, consult the troubleshooting guides below for possible causes.
- 4.1.13. Provide **CLOSE** command for the system.
- 4.1.14. Observe the arm close. If the arm does not close, makes a noise when doing so or is slow, consult the troubleshooting guides below for possible causes.
- 4.1.15. Make adjustments, if necessary.
- 4.1.16. After adjustments, cycle the unit three (4) more times.

If at any time the unit acts erratically or a problem arises not detailed in the troubleshooting guide, please contact B&B technical support before proceeding.

- 4.1.17. Enable the safety devices and any installed project specific options.
- 4.1.18. Verify the complete sequence of operation per the approved project submittal package.
- 4.1.19. Check that all electrical or hydraulic connections (if applicable) are tight and correct, not pinched or leaking.
- 4.1.20. Commission the unit with appropriate customer.

If any additional support or service is needed during the commissioning, please contact B&B.

5. TROUBLESHOOTING

5.1. Model 775 Troubleshooting Guide

The tables below provide guidance on identifying and correcting any problems with your Model 775 Series vehicle barrier. For model 775Ex or 775Hx, please refer to respective manual for more detailed troubleshooting guides referring to the electric actuator or hydraulic pumping unit.

If you encounter problems that you cannot fix, contact B&B ARMR and we will work with you to correct them.

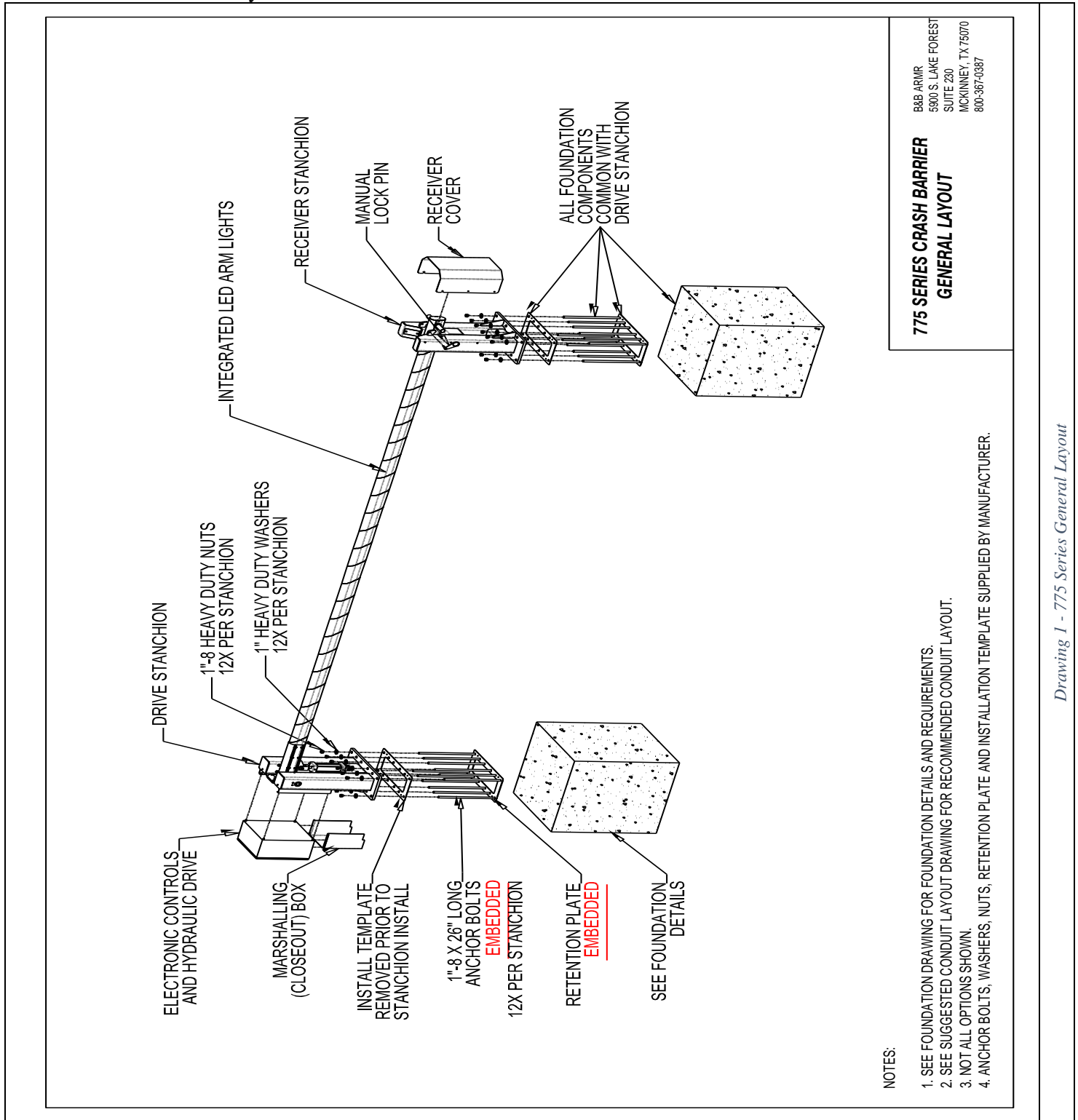
MODEL 775	
Symptom	Actions
Barrier does not raise up when commanded	<ol style="list-style-type: none"> 1. Verify power is supplied to the unit and the circuit breaker is set. 2. Verify the arm is unlocked from the receiver stanchion. 3. Check electrical connections are correct and tight. 4. Check for binding between arm and stanchions. Check connection of linkage between arm and drive unit. 5. Cycle circuit breaker or check fuse(s). 6. If using the onboard controls confirm the correct sequence is followed. 7. Verify safety devices are not missing or have activated.
Barrier does not close when commanded	<ol style="list-style-type: none"> 1. Verify power is supplied to the unit. 2. Verify safety devices have not activated. 3. Cycle circuit breaker or check fuse(s). 4. Check electrical connections are correct and tight. 5. If using the onboard controls confirm the correct sequence is followed. (see EPU/HPU Installation or O&M manual).
Barrier makes noise during operation	<ol style="list-style-type: none"> 1. Check linkage between arm and drive unit. Be sure it is secure and properly lubricated. 2. Check hinge area for debris and proper lubrication. 3. Check drive unit clevis pins for lubrication. 4. Check bearing grease.
Barrier moves too slowly	<ol style="list-style-type: none"> 1. Check for mechanical binds. 2. Check flow control valve (775Hx Series). 3. In extreme cold temperatures, a different hydraulic fluid may be required to keep viscosity constant (775Hx Series). 4. If using onboard controls, confirm the correct sequence is followed. (see EPU/HPU Installation or O&M manual).

Table 2 – 775(Ex, Hx, MD) Troubleshooting

6. APPENDIX

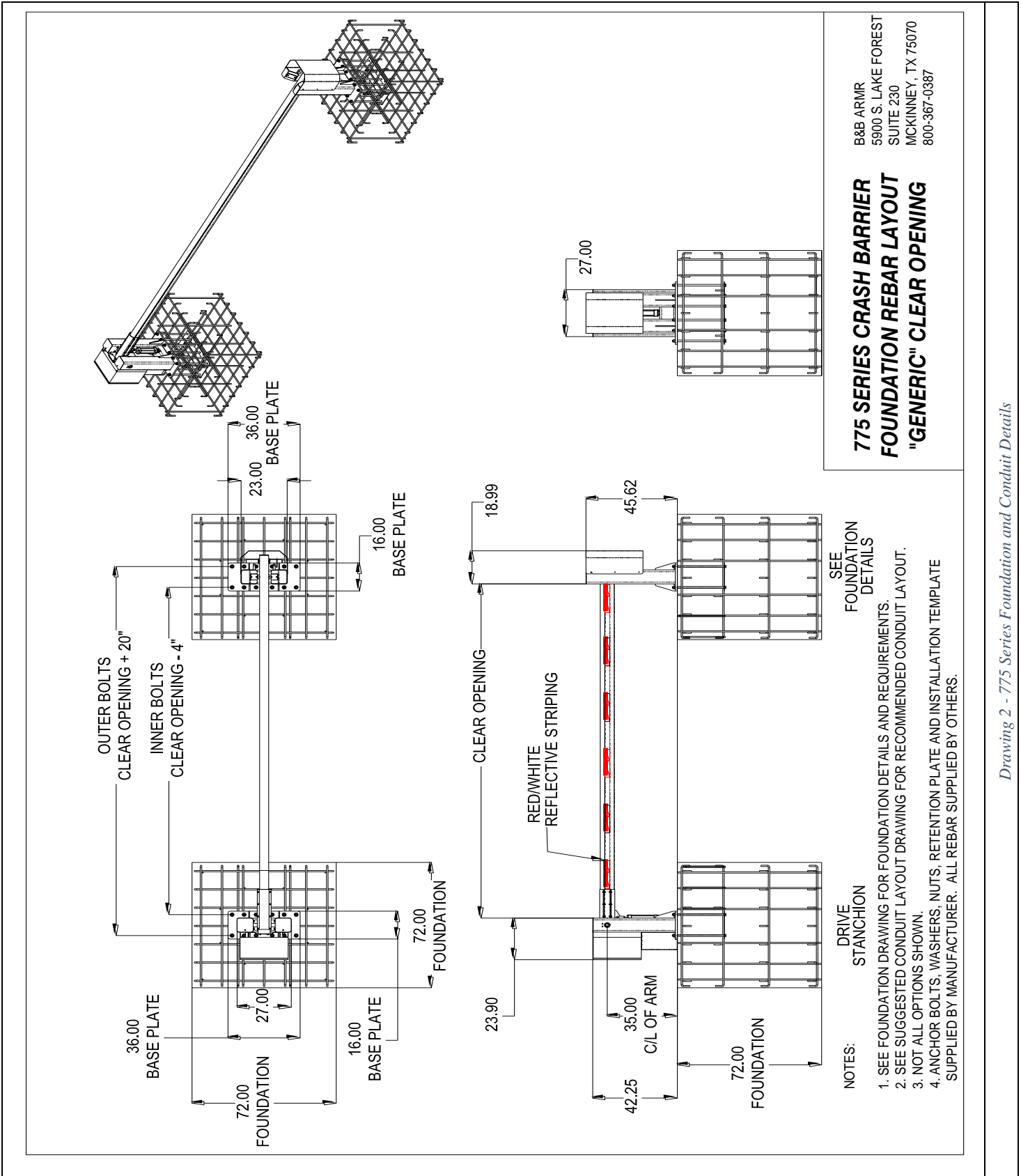
6.1. Drawings

6.1.1. General Layout



Drawing 1 - 775 Series General Layout

6.1.2. Foundation and Conduit Details



Drawing 2 - 775 Series Foundation and Conduit Details

6.2. Specifications

GENERAL		
TYPE:		Cable Reinforced Vehicle Arresting Barrier
CRASH RATING:		Engineered to ASTM F2656-15, M50-P1 15,000 lbs. @ 50 mph (6,803 kg @ 80.5 km/h)
DRIVE SYSTEM:		Electromechanical, Hydraulic or Manual
INSTALLATION		
EXCAVATION:		Minimum 6 ft. x 6 ft. x 6 ft. excavation per stanchion
SOIL COMPACTION:		1,600 PSF Minimum
CONCRETE:		<ul style="list-style-type: none"> • Concrete must develop a minimum compressive strength of 4000 PSI. • Concrete must conform to American Concrete Institute (ACI) standards. • Cement shall be per ASTM C150. • Maximum aggregate size is 1 in. • Approximate 8.0 cubic yards per stanchion
REBAR:		<ul style="list-style-type: none"> • Rebar shall be #4 deformed billet steel per ASTM A615, Grade 60. • Cages shall be tied together using #4 ties.
DESIGN		
CLEAR VEHICLE OPENING:		Ranges from 12 to 30 ft. (144 – 360 in. / 3.7 – 9.1 m)
CYCLE TIME:	ELECTRIC	STD. Operation 7-15 sec; Field Configurable
	HYDRAULIC	STD. Operation 7-15 sec; Field Configurable
DUTY CYCLE:		Continuous
OPERATING:	TEMPS	-20 – 140° F (-29 - 60° C)
	ANGLE	90° ± 5°
MATERIALS:	STANCHION	Hot dip galvanized Steel
	ARM	6061 aluminum extrusion
ELECTRICAL REQUIREMENTS:	775Ex	• 115-240 VAC 1Ø; 208-480VAC 3Ø
	775Hx	• 115-240 VAC 1Ø; 208-480VAC 3Ø
	775MD	• N/A
DIMENSIONS:		Project Specific – reference Submittal package
OIL:	775Hx	<ul style="list-style-type: none"> • General use: Mobil EAL 224H or equivalent • Cold Climate (below 0 F): EnviroLogic® 132 or equivalent • Capacity: 1.5 qt. (1.4 L)
FINISH:		Project specific colored Macropoxy® 646, finished with Acrolon™ 218 acrylic polyurethane

Limited Warranty

B&B ARMR warranties for a period of one (1) year FOB manufacturing facility, unless otherwise specified by B&B ARMR in writing, from defects due to faulty material or workmanship. Damage due to handling during shipment and installation are not covered under warranty. B&B ARMR assumes no responsibility for service at customer site. B&B ARMR is in no event responsible for any labor costs under the warranty. Subject to the above limitation, all service, parts, and replacements necessary to maintain the equipment as warranted shall be furnished by others. B&B ARMR shall not have any liability under these specifications, other than for repair or replacement as described above for faulty product material or workmanship. Equipment malfunction or equipment failure of any kind, caused for any reason, including, but not limited to unauthorized repairs, improper installation, installation not performed by B&B ARMR authorized personnel, incoming supply power is outside the tolerance for the product, failure to perform manufacturer's suggested preventative maintenance, modifications, misuse, accident, catastrophe, neglect, natural disaster, are not under warranty.

The exclusive remedy for breach of any warranty by B&B ARMR shall be the repair or replacement at B&B ARMR's option, of any defects in the equipment. **IN NO EVENT SHALL B&B ARMR BE LIABLE FOR CONSEQUENTIAL OR SPECIAL DAMAGES OR ANY KIND OF PERSONAL DAMAGES.** Except as provided herein, B&B ARMR makes no warranties or representations to consumer or to anyone else and consumer hereby waives all liability against B&B ARMR as well as any other person for the design, manufacture, sale, installation, and/or servicing of the Products.

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INSTALLATION MANUAL

MODEL 775 SERIES
REINFORCED CRASH ARM
