

OPERATIONS & MAINTENANCE MANUAL

MODEL 828

Shallow Mount Wedge Vehicle Barrier



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MADE IN THE USA



OPERATIONS & MAINTENANCE MANUAL

MODEL 828 SERIES
SHALLOW MOUNT
WEDGE BARRIER

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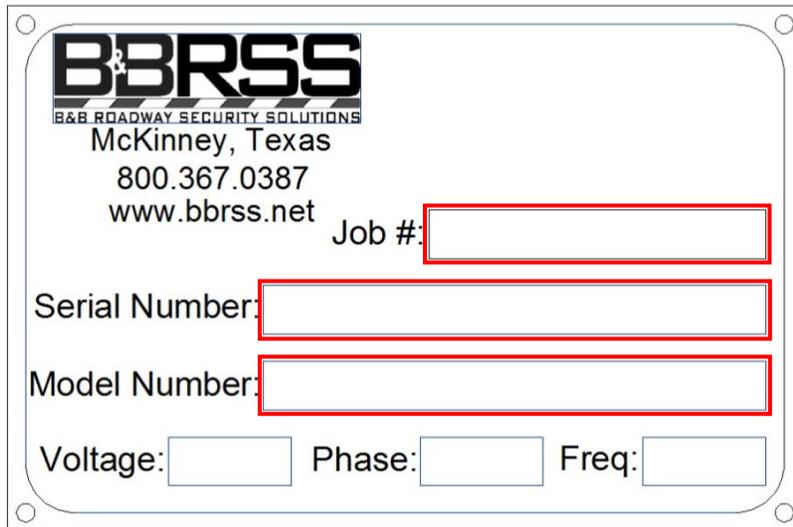
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System Installation Record

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 inside the 828 service tray and should also be recorded in the Installation Manual.

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

	Model 828 Barrier		
Site:			
Job #:			
Date:			
Installer:			
Serial Number:			
Model Number:			
Voltage:			
Phase:			



Label 1 - B&B ARMR 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 wedge 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 828 Shallow Mount Wedge Barrier 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 wedge barrier, or if we can help you with any other facility security issues, please contact us:

Tech Support:

B&B ARMR

5900 South Lake Forest Drive, Suite 230

McKinney, TX 75070 USA

Telephone: 800.367.0387

Fax: 972.385.9887

E-mail: info@bb-armr.com

E-mail2: techsupport@bb-armr.com

2. ORIENTATION

2.1. Overview

The B&B ARMR Model 828 *Shallow Mount Wedge Barrier* is a wedge-type barrier hinged at one side such that the wedge can be raised and lowered to restrict and control vehicle access. The wedge is constructed of heavy steel engineered weldments, connected by an attack plate to increase the barrier's vehicle stopping capability. See *Figure 1- Model 828(X#) Shallow Mount Wedge Barrier*.

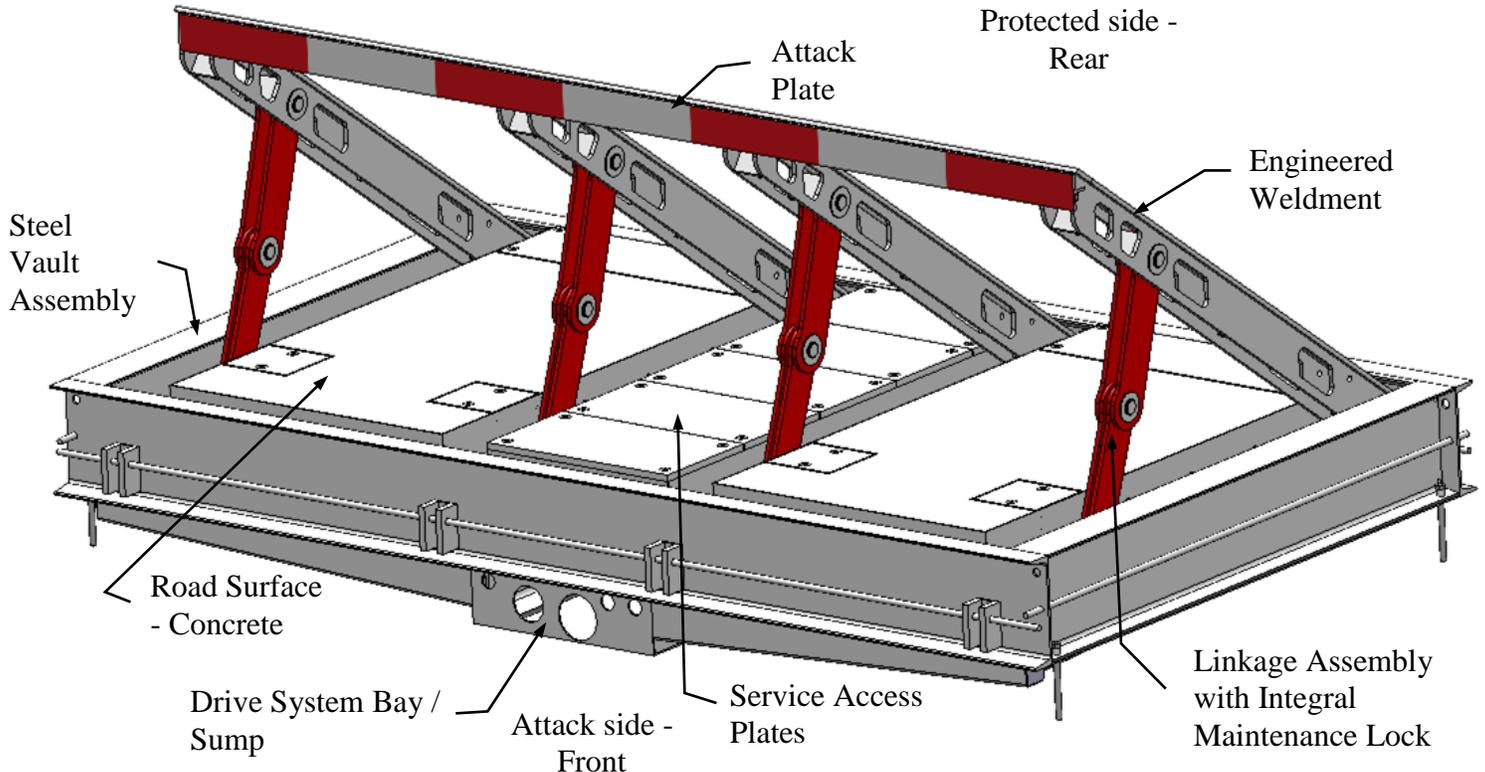


Figure 1- Model 828(X#) Shallow Mount Wedge Barrier

2.2 Unit Internals

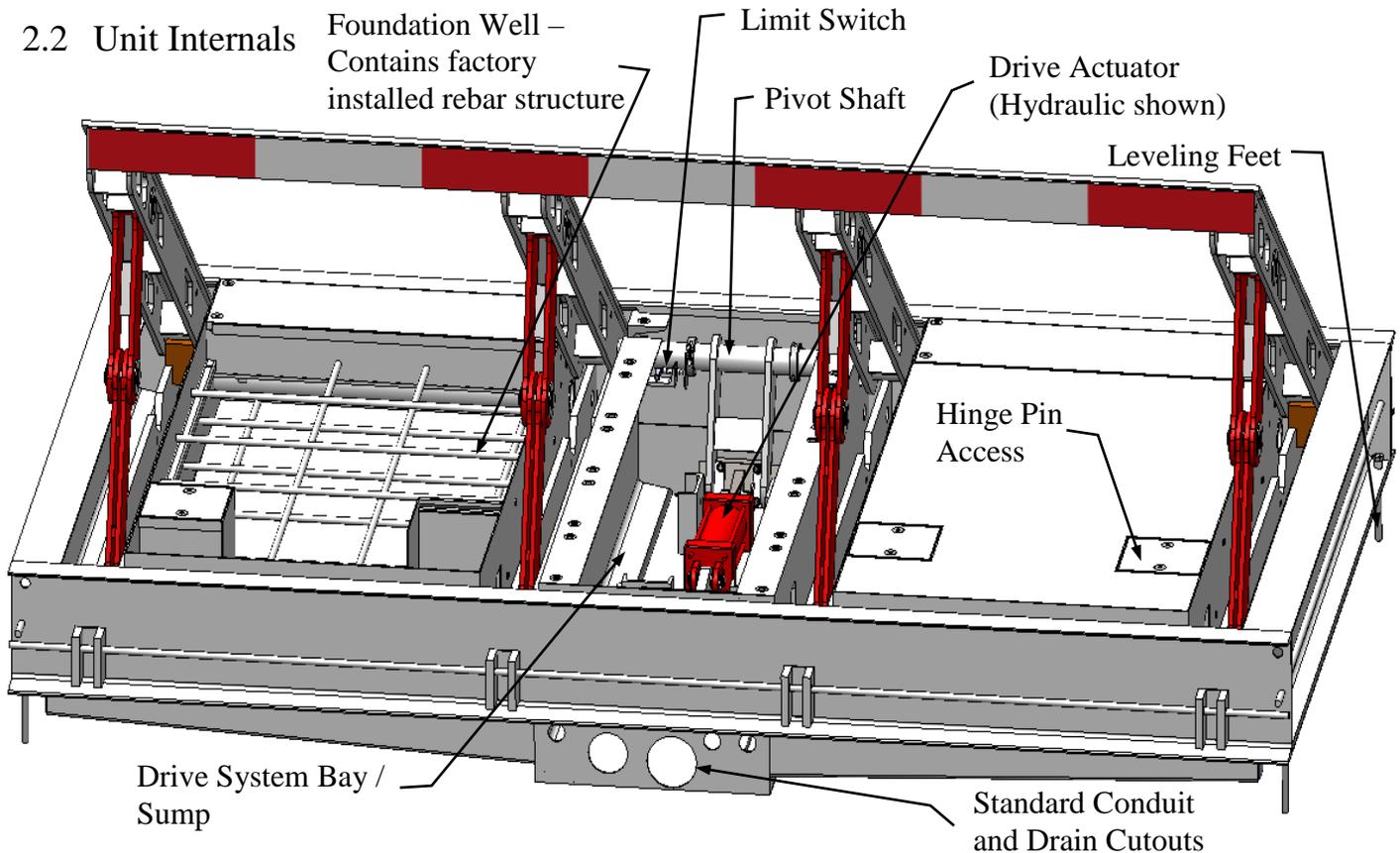


Figure 2 - Internals (Model 828H# Shown)

2.3 Drive System

The drive system options are:

2.3.1. Electric

The 828E# barrier operates with a self-contained electric drive actuator. An 828E# 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 barrier 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 Power Unit (EPU).

2.3.2. Hydraulic

The 828H# barrier operates with a remotely mounted hydraulic pumping (HPU) unit. An 828H# 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 barrier can be raised and lowered during power outages.

Refer to the separate model 6120, 6119, 6118 or 6117 Installation (IM) and Operation and Maintenance (O&M) manual for specifics on the Hydraulic Power Unit (HPU).

2.3.3. Manual

The 828M# barrier is manually operated by designated personnel. A standard 828M# contains no electrical components, but may include options or accessories that require electrical connections (e.g., led lights, sensors).

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

2.4. Options

The Model 828 Shallow Mount Wedge 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 visibility
- Cold weather package
- 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.
- Pedestrian Detection.
- Tailgating Detection.

3. OPERATION

3.1. Introduction

The section describes the procedure to operate a generic Model 828 *Shallow Mount Vehicle Wedge Barrier* for first-time and continuous operation. Model 828 is designed for quick and easy installation; however, every site is different and each Model 828 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 828.

If you need help, or are unclear about any of these instructions, please contact B&B prior to operation or maintenance for assistance.

3.1.1. Pre-operation Checklist

Before operating the Model 828 vehicle barrier, go through the following checklist and verify that each of these steps has been completed.

- The master power switch is turned off on the control circuit box.
- Maintenance lock bars are not installed into any link arm assemblies.
- Items are not loosely lying about on, or in, the barrier.
- All bearing caps, link arm pins and drive clevis bolts are installed, tight and in good working order.
- The electric actuator (828E# Series) or hydraulic cylinder (828H# Series) is securely attached to the Drive Clevis Assembly (DCA) and electrical cables or hydraulic hoses are securely attached.
- Verify control cables or hydraulic hoses are properly routed clear of barrier operation, cannot be pinched or severed, including around the DCA.
- Verify unit has hydraulic fluid (828H# Series) to recommended level.
- Verify EPU/HPU control unit is plugged in and cables or hydraulic hoses are routed properly.
- Verify area is clear of personnel and other obstructions.
- Verify electrical hookups are completed per electrical wiring diagram matching submittal documents.
- Verify proximity sensors, if equipped, are installed and set to the appropriate positions.

3.2. Initial Startup Process



On initial startup, it is **MANDATORY** to close off the roadway and clear the Barrier area of nonessential personnel. When the 828(E#, H#) Barrier is powered for the first time, all personnel should be located safely away from the roadway and barrier. 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 828E# or 828H#, see the appropriate supplementary Operation and Maintenance (O&M) Manual for electrical connections, operation details, programming options and troubleshooting.

Each time the 828(E#, H#) is restarted or maintenance is performed, the roadway and personnel should again be cleared to guard against unexpected movement.

3.3. Initial Operation

Perform the following steps the first time you operate the vehicle barrier and also after any major repairs.

- 3.3.1. Ensure the actuator/pump disconnect switch is turned to the OFF position.

- 3.3.2. Turn on the power at the master power switch located on the control circuit box. Have someone remain at the power switch during the initial operation in the event there is a malfunction and the unit must be shut down.



The motor disconnect must be in the OFF position before applying power to the control panel. Energizing the control panel will energize the motor if not disconnected with the supplied disconnect. This may result in damage to the control system and/or bodily injury or death.

- 3.3.3. Using the manual drive for the system, raise the barrier. (The procedure for doing this will vary depending on the design of your particular unit.)
- 3.3.4. Carefully observe the barrier and make sure it is operating correctly.
- 3.3.5. For the 828E# see the EPU O&M manual for setting home position.
- 3.3.6. For the 828H# follow the below steps for setting the open and close sensors.
- 3.3.6.1. The barrier needs to stop once the attack assembly has reached the UP (deployed) position. Check the indicator LEDS on the appropriate open stop limit, light up when the barrier is in the fully deployed position.
- 3.3.6.2. If necessary, adjust the UP stop limit flag so the proximity sensor activates and the attack assembly stops at the correct deployed position.
- 3.3.6.3. Using the manual drive for the system, lower the attack assembly. (The procedure for doing this will vary depending on the design of your particular control panel.)
- 3.3.6.4. Carefully observe the attack assembly and make sure it is operating correctly.
- 3.3.6.5. The attack assembly needs to stop once the assembly has reached the DOWN (stowed) position. Check the indicator LEDS on the appropriate closed stop sensor light up when the attack assembly is in the fully stowed position.
- 3.3.6.6. Turn on the motor power at the motor disconnect located in the HPU control circuit box. Have someone remain at the power switch during the initial operation in case there is a malfunction and the unit must be shut down.
- 3.3.6.7. Working from the HPU control panel, deploy the attack assembly. (The procedure for doing this will vary depending on the design of your particular control panel.)
- 3.3.6.8. Carefully observe the attack assembly and make sure it is operating correctly. The finger attack assembly will stop when the limit switch is tripped or if the control unit times out.
- 3.3.6.9. If necessary, adjust the UP (deployed) limit switch so the switch activates and the attack assembly stops at the correct deployed position.



Turn off the motor power when adjusting any limit switches, by using the motor disconnect.

- 3.3.6.10. Working from the HPU control panel, stow the attack assembly. (The procedure for doing this will vary depending on the design of your particular control panel.)
- 3.3.6.11. Make sure the attack assembly stops smoothly into the barrier vault and does not bounce, contact hard, or make excessive noise.
- 3.3.7. For the nominal 10' shallow mount wedge barrier, the attack assembly will cycle in 5 seconds or less.
- 3.3.8. The electric actuator (828E# Series) and hydraulic pump (828H# Series) is adjusted at the factory for typical operating conditions. To obtain optimum performance of your barrier, you may have to make a field adjustment to the EPU or the hydraulic pump's flow control valve, (refer to the EPU or HPU O&M manual supplied with the unit).

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.

- 3.3.9. Verify the complete sequence of operation per the approved project submittal package.
- 3.3.10. Check that all electrical or hydraulic connections (if applicable) are tight and correct, not pinched or leaking.

If any additional support or service is needed for operation or maintenance, please contact B&B.

3.4. Typical Operation

828E# and 828H# Series:

The system receives a LOWER input signal, typically from the barrier down button, a card reader, a loop detector or a radio remote. The actuator/hydraulic pump then starts and the barrier begins to lower. When the barrier reaches the full down position (less than 5 seconds) the close limit switch (encoder on 828 E# and proximity sensor on 828H#) is activated and the motor/actuator turns off.

The barrier holds this position until an RAISE input signal is received. The actuator/hydraulic pump then starts and the barrier begins to raise. When the barrier reaches the full open position (less than 5 seconds) the open limit switch (encoder on 828 E# and proximity sensor on 828H#) is activated and the motor turns off.

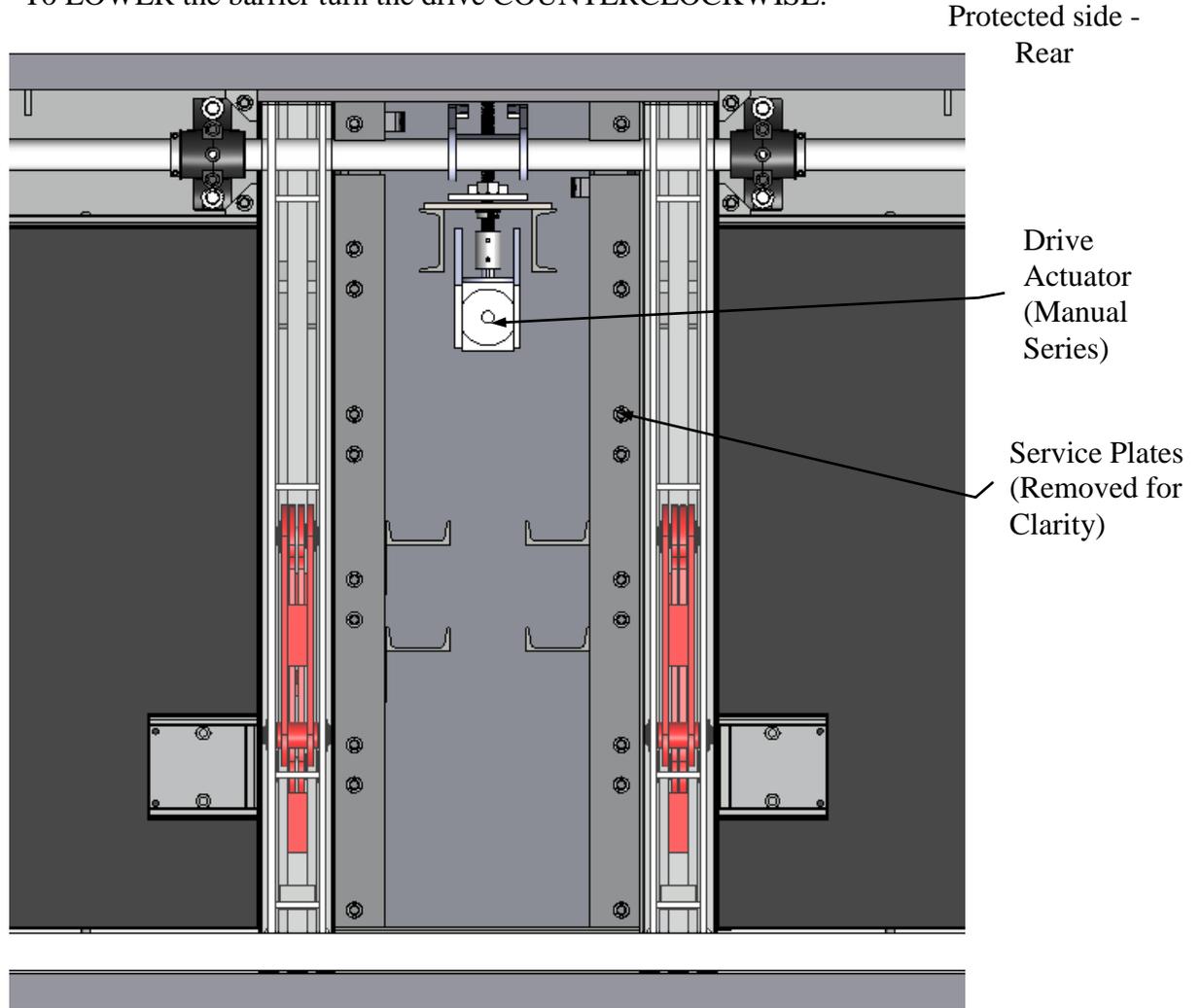
828M# Series:

The system is raised and lowered manually by using the supplied speed wrench. Optionally an electric powered drill, fitted with a 15/16" socket, maybe used to speed the process.

Steps for raising or lowering the 828M# Series barrier:

- 3.4.1. Locate the drive hole in the 2nd to last Service Plate at the rear of the unit.
- 3.4.2. Remove the stainless steel plug covering access to the drive sprocket.

- 3.4.3. Using the supplied speed wrench, insert the socket end into the drive hole.
- 3.4.4. Firmly install the socket onto the drive lug.
- 3.4.5. Turn the drive **CLOCKWISE** to **RAISE** the barrier.
- 3.4.6. To **LOWER** the barrier turn the drive **COUNTERCLOCKWISE**.



Attack side -
Front

Figure 3 - 828M# Manual Drive series

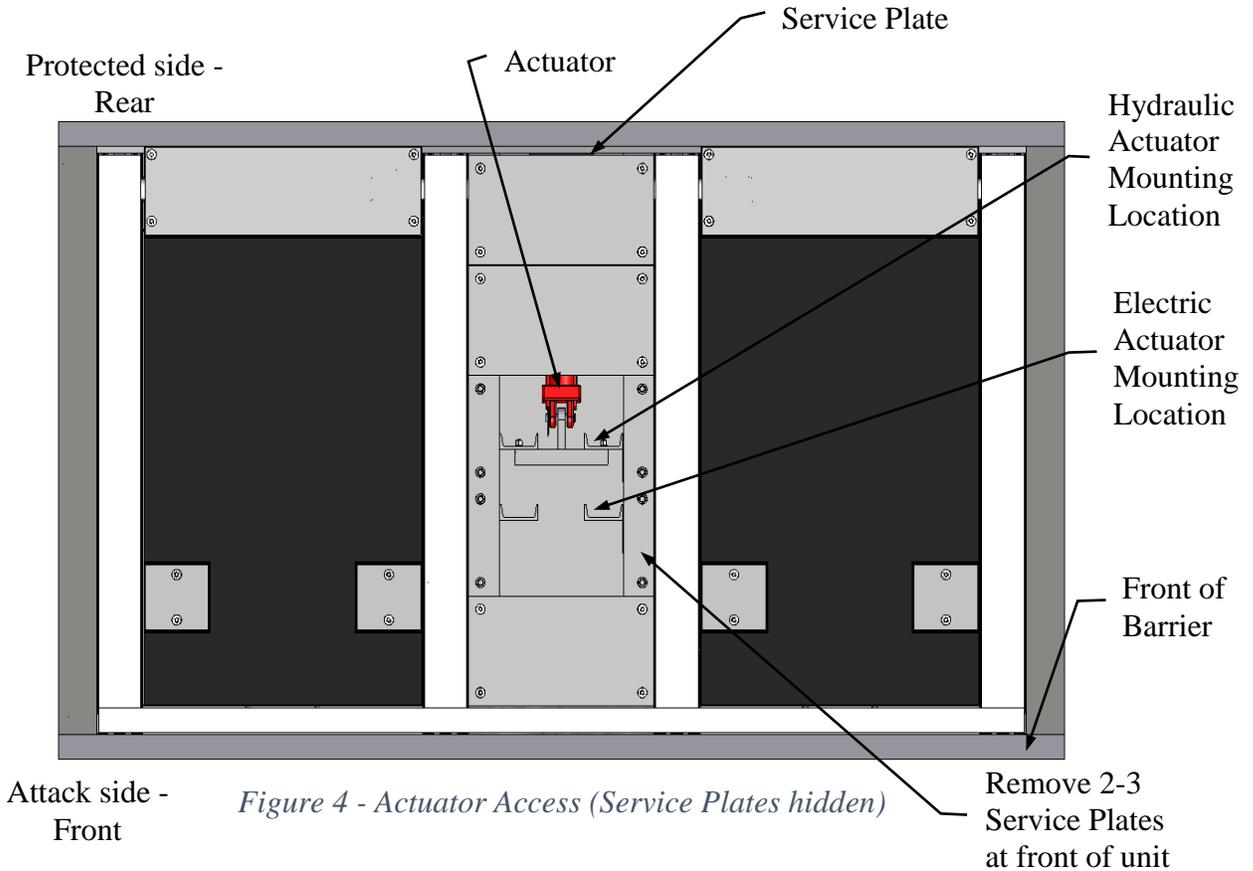
3.5. Barrier Operation during a Power Outage

You can raise and lower the barrier manually during a power outage. In both the 828E# and 828H# Series, the barrier will fail in place. Until power is restored you can raise or lower the barrier as follows:

3.5.1. The 828E# Series:

- 3.5.1.1. Disconnect the actuator power by using the supplied motor disconnect located in the EPU control panel.
- 3.5.1.2. Turn the EPU OFF by pulling the main power fuse switch out, towards the door (in case power is suddenly restored).

- 3.5.1.3. Remove service plate(s) over the actuator/sump well. Typically the 2nd and 3rd plates, as counted from the front of the barrier, are sufficient. See **Figure 4 - Actuator Access**.



- 3.5.1.4. Unscrew (counterclockwise) the protective cover over the manual drive system.
- 3.5.1.5. By hand, turn the 15/16" screw **CLOCKWISE**, until the internal brass locking ring is seated at the bottom of the screw.
- 3.5.1.6. Using your fingers, or a screwdriver, turn the brass locking ring clockwise a quarter turn until it seats into place. The manual drive is now engaged.
- 3.5.1.7.** Attach a 15/16" socket to a battery powered drill. Use the drill to drive the manual drive sprocket **CLOCKWISE** to **DRIVE OPEN** the barrier or **COUNTERCLOCKWISE** to **RETRACT** the barrier. See **Figure 5 - Manual Drive Sprocket on 828E#** series. Alternatively, a speed wrench with a 15/16" socket may be used. Estimated time with the speed wrench is 10 minutes to drive the barrier fully open or closed.

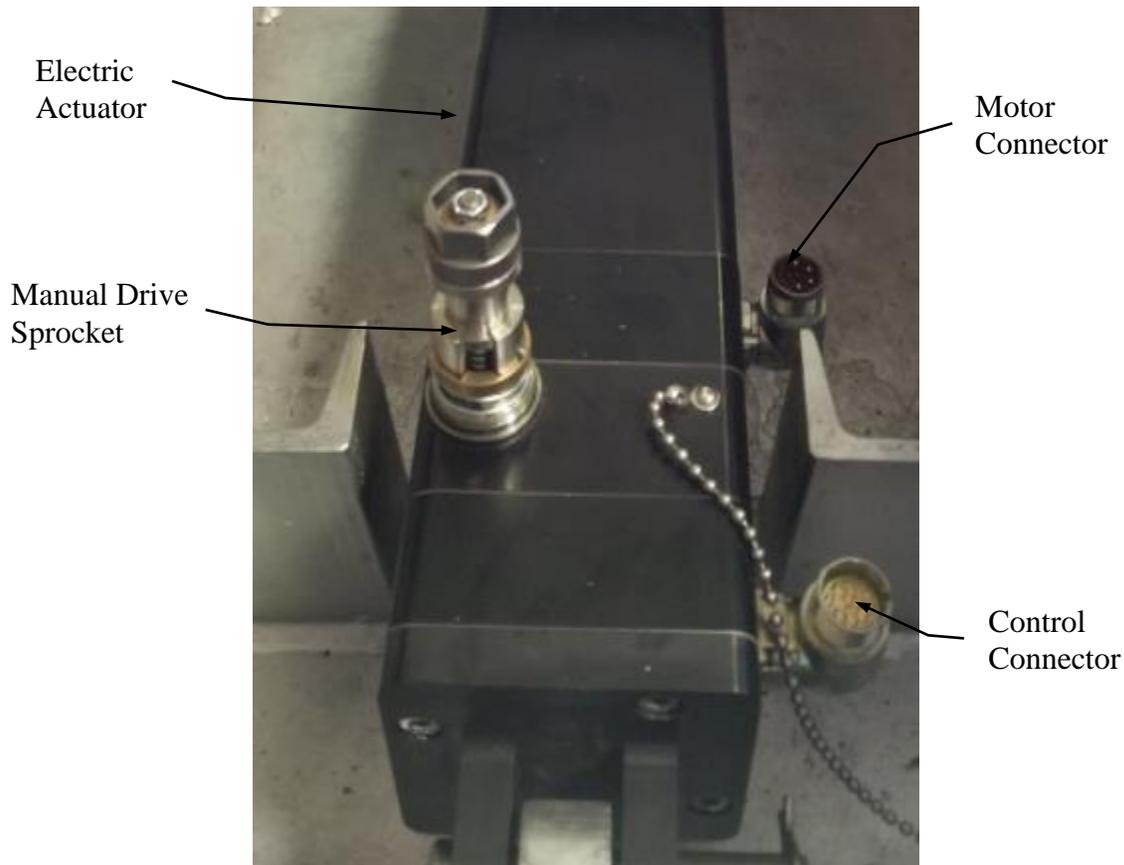


Figure 5 - Manual Drive Sprocket on 828E# series (Front looking towards back of barrier.)



Do not use an impact driver for manually raising or lower the 828 barrier. Impact drivers will damage the drive gears in the electro servo. Use a battery powered drill or speed wrench.

3.5.2. 828H# Series:

(6119, 6118 or 6117 HPU Series, reference the appropriate Install or O&M manual)

The Model 611X series pumps are equipped with a manual hand pump to pressurize the accumulator and operate the barriers in case of power failure. The following lists out the recommended sequence to operate the pump in a manual mode:

- 3.5.2.1. Open door to HPU cabinet and identify the power switch, pressure gauge, manual hand pump and control valve(s). Your pumping unit may vary slightly from these illustrations. Consult technical assistance if unsure of locations of these components. See **Figure 6 - Generic HPU**.

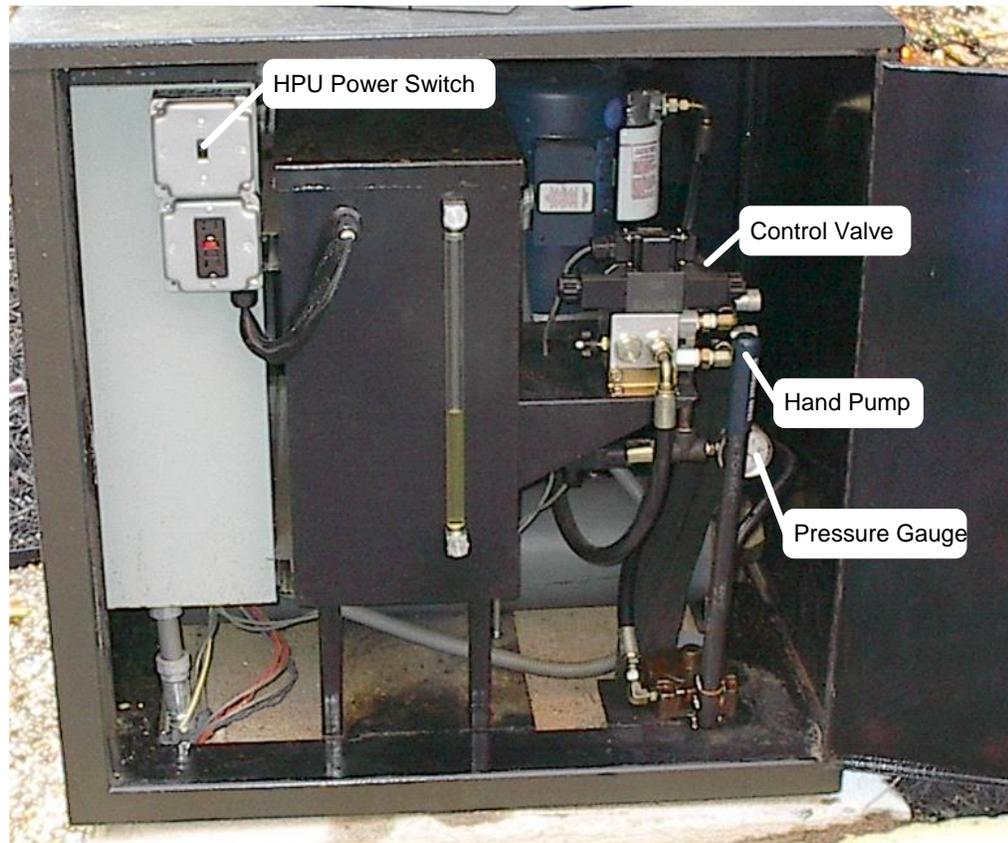


Figure 6 - Generic HPU

- 3.5.2.2. Turn the power switch off to the unit to ensure pump system does not inadvertently turn on without warning on power restore.
- 3.5.2.3. Verify area surrounding the barrier is clear of pedestrian traffic or other obstacles.



Manual operation of the pump to raise and lower the barrier by-pass all safety lockouts and switches. Use extreme care when operating any barrier in the manual mode.

- 3.5.2.4. Check pressure gauge on pump to determine if accumulator system has adequate pressure to raise the barrier (1500-1900 psi or greater).
- 3.5.2.5. If pressure is less than barrier requirements, operate the manual hand pump until pressure reaches the desired level.
- 3.5.2.6. Manually shift desired control valve by placing a small screwdriver or other pointed instrument on the solenoid end and push.
The “B” side of the valve deploys (raises) the barrier.
The “A” side of the valve stows (lowers) the barrier.
See *Figure 7- HPU control valve*

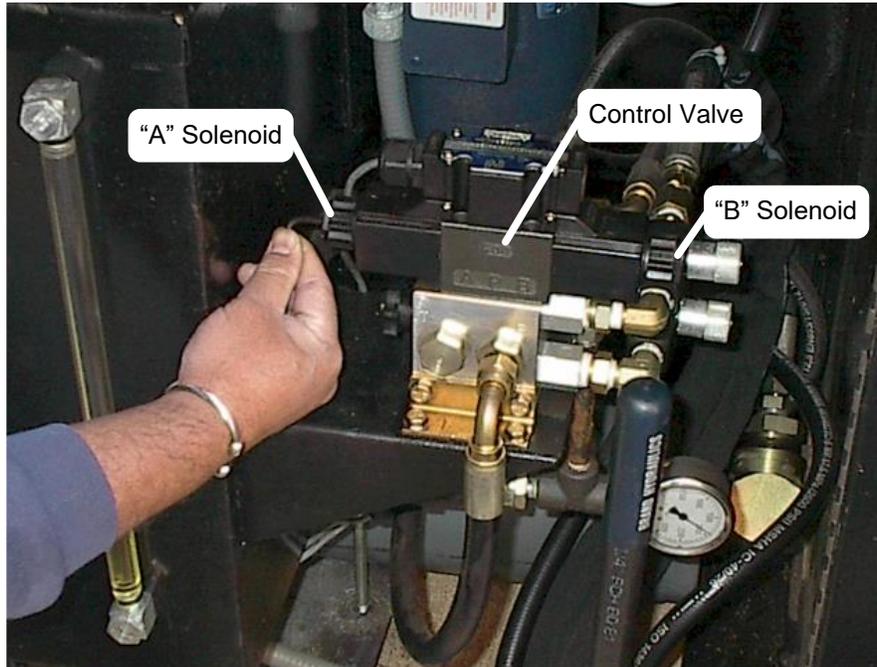


Figure 7- HPU control valve

- 3.5.2.7. Multiple operations may require additional hand pumping to increase accumulator pressure.
- 3.5.2.8. After power is restored, turn pumping unit power back to the on position. No additional changes are required.

4. MAINTENANCE

4.1. Introduction

The B&B ARMR Model 828 *Shallow Mount Wedge Vehicle Barrier* is designed to be largely maintenance free. As with any complex electromechanical device however, it must be regularly inspected to ensure it is operating correctly. We recommend a simple monthly visual inspection and a more thorough biannual inspection as described below. Remember, you may contact B&B ARMR for assistance with inspections, maintenance, or repairs.

Component damage is likely if a vehicle strikes the barrier. If an impact occurs, contact B&B ARMR. We will help you assess the damage and make sure there is no hidden damage that will compromise safety or effectiveness. We will help you determine which components should be replaced and will provide guidance on the repairs.

4.2. Monthly Inspections

We recommend you perform the following maintenance and inspections monthly. An equipment maintenance log is supplied in the appendix to assist in the logging.

- 4.2.1. Remove at least two (2) service plates, preferably the ones located at opposite ends. See *Figure 8 - Service Plates and Link Arm Selection*.

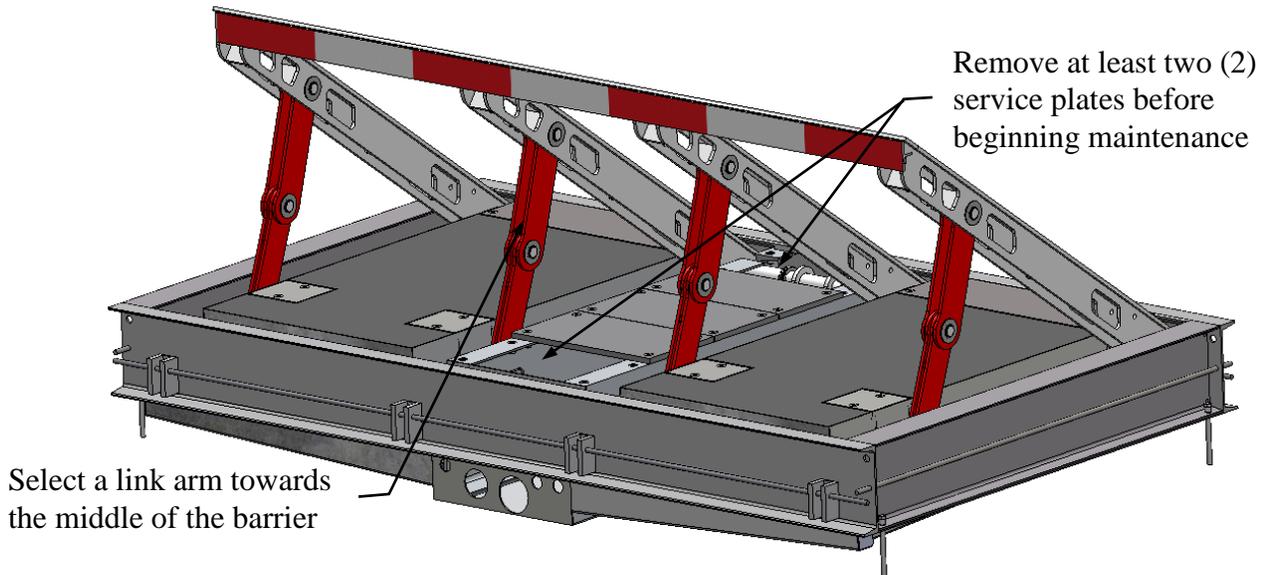


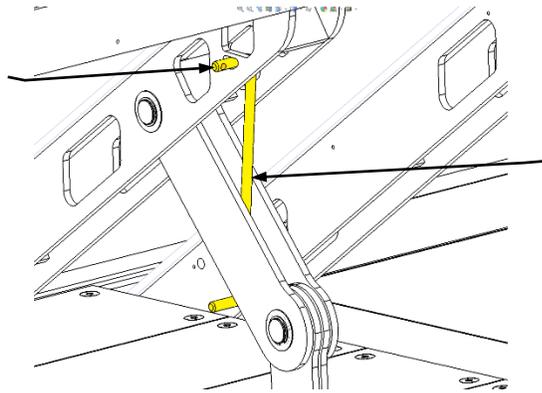
Figure 8 - Service Plates and Link Arm Selection

- 4.2.2. Place the barrier into Maintenance mode using the control panel on the 828 E# or 828H# series. For detailed instructions on how to access maintenance mode, see the EPU/HPU O&M manual. For the 828M#, drive the unit almost entirely open, with a slight bit of slack in the link arms.
- 4.2.2.1 Choose a link arm, preferably one towards the middle of the unit. Using the hook end of the supplied maintenance lock bar (MLB) See *Figure 9 - Maintenance Lock Bar*, over travel the selected link arm.
- 4.2.2.2 Install the bar into the link arm. Padlock the maintenance lock bar to secure the unit into maintenance mode. See *Figure 10 - Install the Maintenance Lock Bar*.



Figure 9 - Maintenance Lock Bar (MLB)

Padlock Here



Install the Maintenance Lock Bar (MLB):
 -Thread through the links
 -Place through the lock bar hole
 -Place a padlock through the lock bar padlock hole

Figure 10 - Install the Maintenance Lock Bar

- 4.2.3. Remove large pieces of debris from the sump/drive and finger wells. Remove any additional small debris with a vacuum or leaf blower.



Do not use high pressure washer on barrier, actuator or anti-skid surface.

- 4.2.4. Visually inspect the sump/drive well, actuator, electrical/hydraulic connections, Drive Clevis Assembly (DCA) and link arms for wear, corrosion or damage. Make any repairs as necessary.
- 4.2.5. Inspect and lubricate the acetyl plastic hinge bearing areas with a dry graphite powder, white lithium grease or marine grade grease if necessary. Excessive grease is not required on the acetyl bearings.
- 4.2.6. Inspect and lubricate any brass bearing areas with white lithium grease or marine grade grease if necessary.
- 4.2.7. Inspect and lubricate the cylinder clevis pin area with white lithium grease or marine grade grease if necessary.
- 4.2.8. Inspect the condition of the finish. If rust is present, wire brush and sand the area then paint with a primer and a matching color. Paint is available from B&B. Contact Tech Support techsupport@bb-armr.com or call 800.367.0387.
- 4.2.9. For 828H# units, check oil for level, pressure, and condition in the HPU (Recommended oil: Mobil EAL 224). If oil is contaminated, report and recommend replacement immediately.
- 4.2.10. Remove the padlock and maintenance lock bar.
- 4.2.11. Cycle the unit out of maintenance mode. Refer to the 828E# or 828H# Series EPU/HPU O&M manual for detailed instructions. For the 828M# series, raise the attack assembly to the highest level. The link arm(s) should return to their normal position.
- 4.2.12. Raise and lower the barrier and observe its motion. Verify the speed is within the normal range (3-5 second cycle time for a standard 10' unit, proportionally longer

for larger units). To adjust the speed, see the instructions in the *Operation* section of the appropriate O&M manual.

- 4.2.13. During the opening and closing cycles, verify the barrier operates smoothly and does not bind. Also verify that the barrier does not hit with excessive force when it contacts its full-open or full-closed positions. If necessary, adjust the barrier's speed and opening/closing position. See EPU/HPU O&M for detail instructions.
- 4.2.14. Visually inspect the electrical contacts, including any lights, wires or connectors. Tighten electrical contacts if required.
- 4.2.15. Check, adjust, and tighten all sensors (limit switches, proximity switches).
- 4.2.16. If included, check traffic lights and replace any burned bulbs or LEDs.
- 4.2.17. Check safety devices (loop, pedestrian detectors, etc.) for proper operation and report any anomalies (if applicable).
- 4.2.18. Check the EPU/HPU PLC for normal operation of all logic and functions.
- 4.2.19. Check the control panel's buttons and lights for proper operation and replace if necessary.
- 4.2.20. Update the operation and maintenance log.

4.3. Six-Month Inspections

We recommend you perform the following visual inspections every six months.

- 4.3.1. Repeat the visual inspections in the monthly inspection list, steps 4.2.1 through 4.2.20.
- 4.3.2. Measure the resistance in any traffic loops and log the measurements and report anomalies (if applicable).
- 4.3.3. For 828H# Series:
 - 4.3.3.1. Complete all maintenance steps above.
 - 4.3.3.2. Inspect the hydraulic unit for signs of oil leaks. Check the hoses for wear or abrasion. Check all fittings for tightness. Inspect the oil level visually on the tank; the level should be at the marked line on the tank. Add oil as necessary. We recommend using environmentally safe oil such as Mobil EAL 224.



If you replace a hydraulic hose you must make sure the pressure has been relieved before disconnecting the hose fittings. To do this you must turn the power back on and activate the lower control on the control panel. Verify that the hydraulic cylinder extends completely. If it does not fully extend, the hose is still under pressure and must not be serviced. You can manually relieve the pressure by releasing the cartridge valve and verifying that the cylinder moves to its fully extended position. Turn the power **OFF** before continuing.

- 4.3.3.2. Open the hydraulic oil tank and inspect the oil for dirt or water. If oil replacement is necessary, see HPU O&M manual.
- 4.3.3.3. Update the operation and maintenance log.



Safety Note: After any major repairs, repeat the *Preliminary Steps* (see section 3.1) and the *Initial Operation* sequence (see section 3.2) before returning the barrier to service.

4.4. Annual Inspections

We recommend you perform the following inspections annually.

- 4.4.1. Repeat the inspections in steps 4.2.1. through 4.2.8. above.
- 4.4.2. Remove all remaining service plates.
- 4.4.3. Locate the rear bearing. Your barrier may have two (2) or more depending on size. Remove the grease plug. Fill the bearing with a marine grade grease. Reinstall the grease plug. Ensure the plug is flush with the bearing journal cap.
- 4.4.4. Inspect the Journal cap screws. Tighten to 25 in-lbs. if loose.

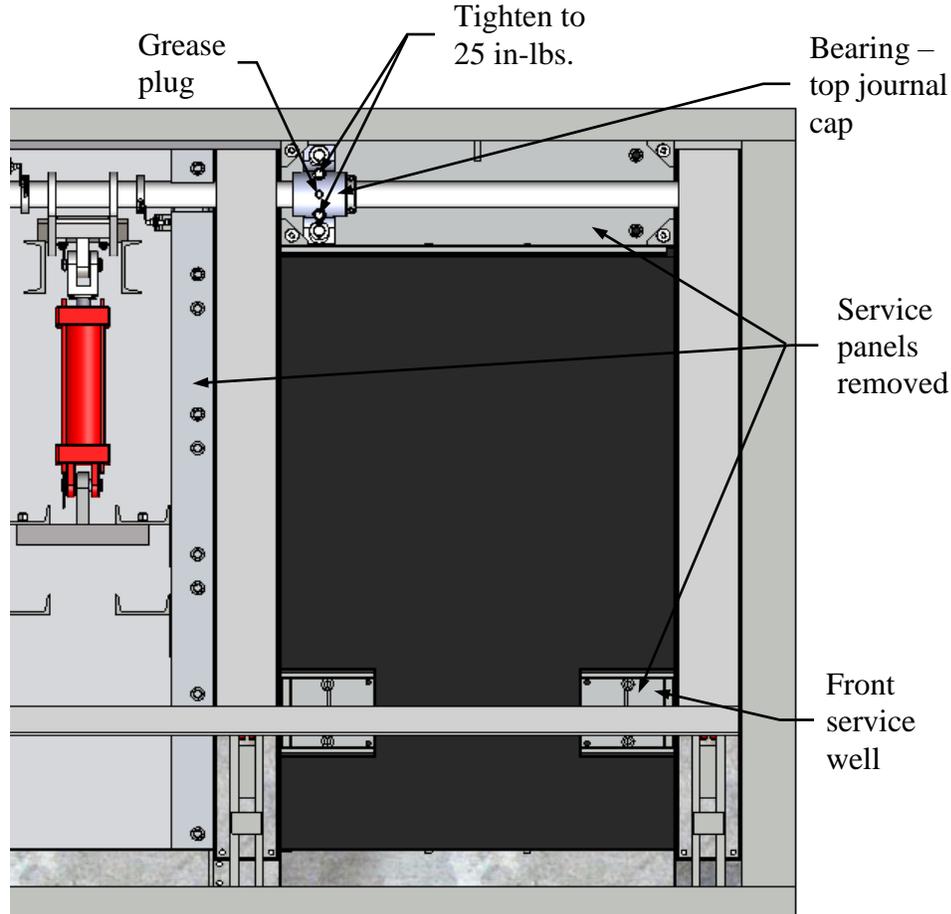


Figure 11 - Annual inspection (828H# Series shown)

- 4.4.5. Visually inspect the linkage pins for excessive wear or oxidation. Replace if needed.
- 4.4.6. Complete maintenance steps 4.2.9. through 4.2.20.
- 4.4.7. For 828H# Series:
 - 4.4.7.1. Complete all maintenance steps above.
 - 4.4.7.2. Replace the hydraulic oil and filter in the HPU. See HPU O&M manual for instruction
- 4.4.8. Sump pump Maintenance:
 - 4.4.8.1. Turn OFF electrical power to the sump pump.
 - 4.4.8.2. Remove the electric sump pump from the sump well.
 - 4.4.8.3. Visually check the pump is in working order.
 - 4.4.8.4. Remove the intake grille from the pump bottom. Clear any debris in the grille.
 - 4.4.8.5. Put pump back together and then reinstall into the sump well.
 - 4.4.8.6. Refer to the EPU or HPU O&M manual for procedure on check testing the sump pump.

4.5. 2,500,000 cycle inspection

We recommend you perform the following inspections and service when the barrier reaches 2,500,000 cycles.

- 4.5.1. Repeat the inspections in steps 4.2.1. through 4.2.8. above.
- 4.5.2. Remove all remaining service plates.
- 4.5.3. Remove the top journal of the pillow block bearing assemblies. See **Figure 11 - Annual inspection.**
- 4.5.4. Check the top journal for wear. If excessive wear, replace unit.
- 4.5.5. Grease with a marine grade grease.
- 4.5.6. Replace top journal cap and tighten cap screws to 25 in-lbs.
- 4.5.7. Select a linkage without a MLB installed. Remove the middle pin from the linkage. Inspect the pin, bushings, thrust washers and linkage hole for wear or damage. If excessive wear or damage, replace. See **Figure 13 - Linkage Pin Assembly** for breakdown.



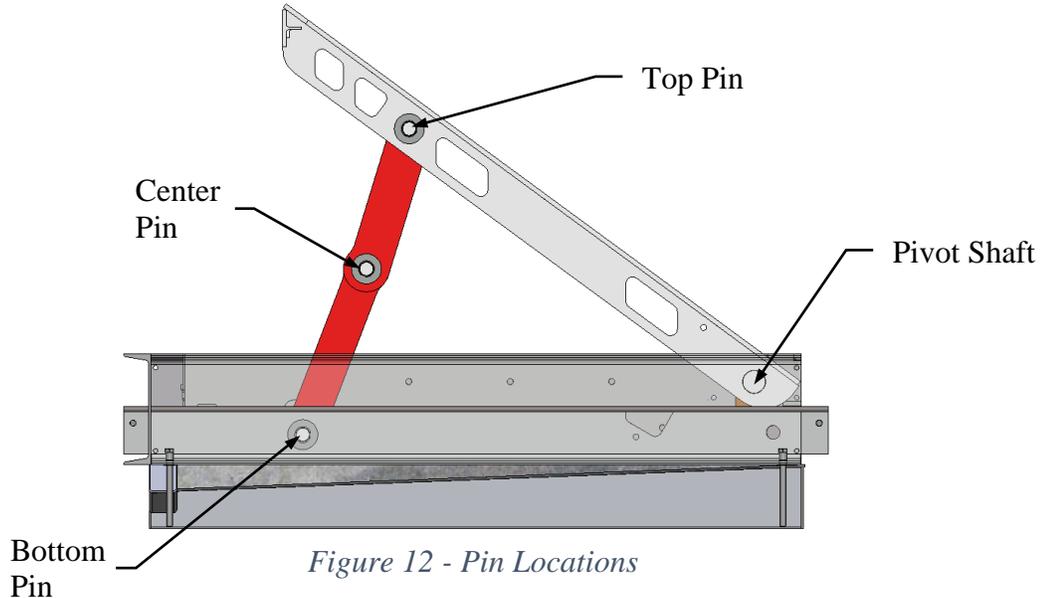
Never remove pins from a linkage with a Maintenance Lock Bar (MLB) installed. Service other linkages first.

- 4.5.7.1. Grease pin and bushing with lithium grease. Replace middle pin.



Always install new C-Rings. DO NOT REUSE C-rings!

- 4.5.8. Remove lower pin and inspect for wear or damage. Use front service wells for pin access. Replace as needed.



- 4.5.9. Remove the top pin. Repeat the pin, bushing and thrust washer inspection.
 4.5.10. Continue inspection on linkages without MLB's installed.
 4.5.11. Move the MLB to a recently inspected or serviced linkage. See EPU/HPU O&M for placing unit into and out of Maintenance mode.
 4.5.12. Inspect last linkage assembly for wear or damage.



Each pin is sized for the appropriate top, center or bottom location. Do not install the incorrect pin into the wrong location!

- 4.5.13. Complete maintenance steps 4.2.9. through 4.2.20. above.
 4.5.14. For 828H# Series:
 4.5.14.1. Complete all maintenance steps above.
 4.5.14.2. Replace the hydraulic oil and filter in the HPU. See HPU O&M manual for instruction.

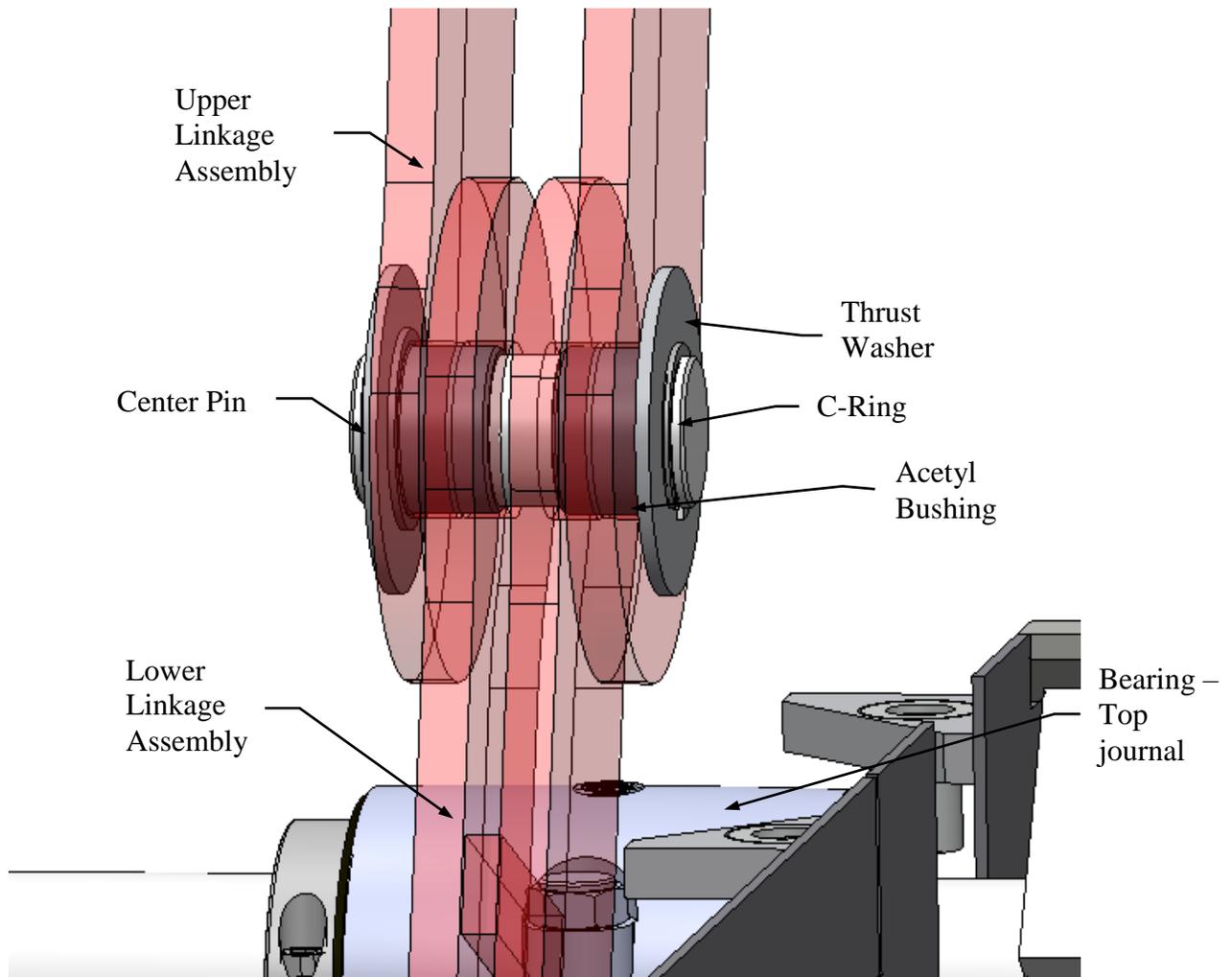


Figure 13 - Linkage Pin Assembly

5. TROUBLESHOOTING

5.1. Model 828 Troubleshooting Guide

The tables below provide guidance on identifying and correcting any problems with your Model 828 Series wedge vehicle barrier. For model 828E# or 828H#, 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.



OPERATIONS & MAINTENANCE MANUAL

MODEL 828 SERIES
SHALLOW MOUNT
WEDGE BARRIER

MODEL 828	
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. Check electrical connections are correct and tight. 3. Cycle circuit breaker or check fuse(s). 4. Verify safety devices are not missing or have activated. 5. Check for binding between weldment structures and foundation vault. 6. If using the onboard controls confirm the correct sequence is followed.
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 bearing grease.
Barrier moves too slowly	<ol style="list-style-type: none"> 1. Check for mechanical binds. 2. Check flow control valve (828H# Series). 3. In extreme cold temperatures, a different hydraulic fluid may be required to keep viscosity constant (828H# Series). 4. If using onboard controls, confirm the correct sequence is followed. (see EPU/HPU Installation or O&M manual).
Sump pump does not start	<ol style="list-style-type: none"> 1. Check the pump circuit breaker inside the EPU/HPU has not tripped. Depending on the model, this may be a set of fuses. 2. If low line voltage is measured, check wiring size from EPU/HPU to the barrier.
Pump operates but pumps little or no water.	<ol style="list-style-type: none"> 1. Check that the bottom base of the pump, the mud pack, is not clogged or obstructed. If so, turn OFF power to the pump, remove screws and clean. 2. Check involute shaft for obstructions. To check, turn OFF power to the pump. Remove the discharge hose and look into the discharge shaft with a flashlight. Remove debris and put back into service. 3. Line voltage to the unit needs to be checked for proper operating range. If the line voltage is too low the unit may not function at full capacity.



OPERATIONS & MAINTENANCE MANUAL

MODEL 828 SERIES
SHALLOW MOUNT
WEDGE BARRIER

Pump has stopped operating.	<ol style="list-style-type: none">1. Check the operating water level is high enough to cover the pump intake.2. If the water temperature is too hot, the pump may overheat. Allow the pump to cool, or add cooler water to the barrier. Cycle the circuit breaker and check for operation.
-----------------------------	---

Table 1 – 828(E#, H#, M#) Troubleshooting



OPERATIONS & MAINTENANCE MANUAL

MODEL 828 SERIES
SHALLOW MOUNT
WEDGE BARRIER

6. APPENDIX

6.1. Drawings

6.1.1. Unit Details

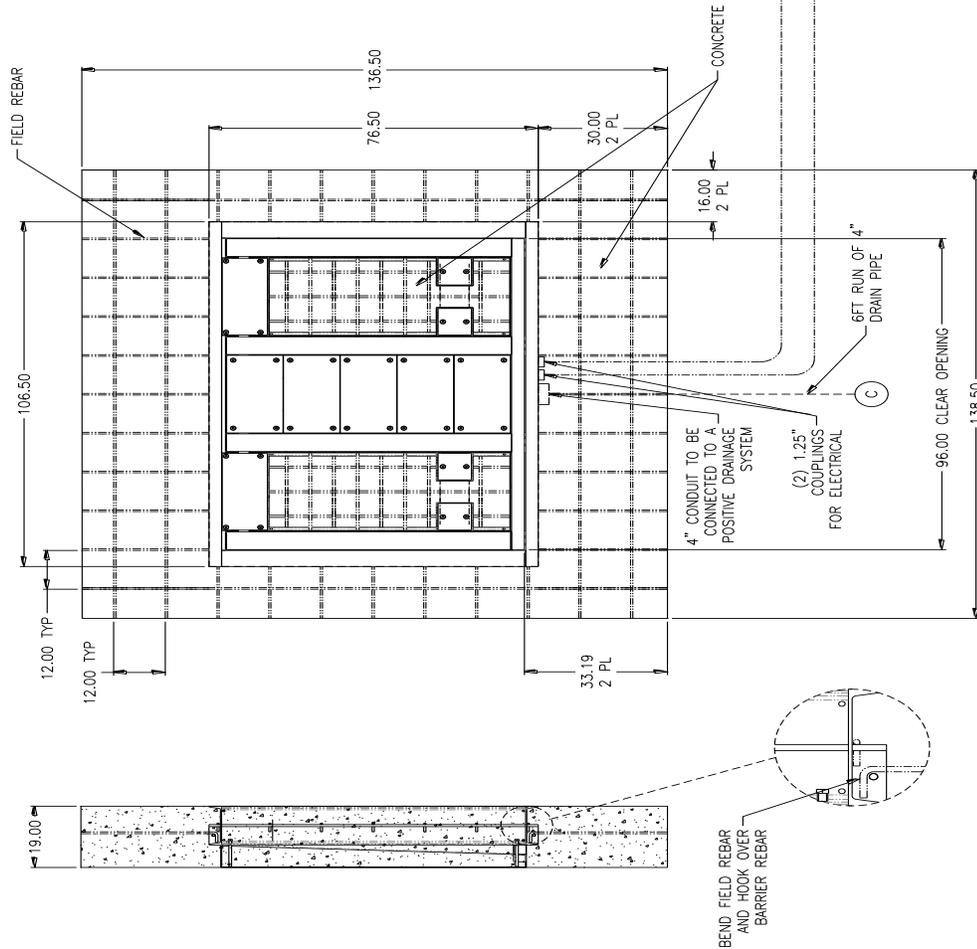
6.1.1.1. 8 ft. Typical Unit

Rev 081516

- NOTES:
1. THE CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI IN 28 DAYS. THE CEMENT SHALL BE AS PER ASTM C150. THE MAXIMUM AGGREGATE SIZE SHALL BE 1 INCH. CONCRETE UNDER THE BARRIER TO BE FULLY VIBRATED TO FILL VOIDS.
 2. REINFORCING STEEL SHALL BE #4 (1/2") MINIMUM AND SHALL CONFORM TO ASTM SPECIFICATION A-615, GRADE 60 OR BETTER.
 3. THE FOUNDATIONS SHALL BE POURED ON SOIL CAPABLE OF SUPPORTING A MINIMUM COMPACTION OF 1600 PSF.
 4. CONCRETE LEVEL INSIDE BARRIER TO BE FLUSH WITH TOP OF STEEL BOX FRAME.
 5. FOUNDATION DIMENSIONS AND STRUCTURE ARE CONSIDERED AS A MINIMUM REQUIREMENT. ADDITIONAL STRUCTURE MAY BE ADDED TO CONFORM TO LOCAL APPLICATION REQUIREMENTS.
 6. WIRE SIZE IS DEPENDANT ON ELECTRICAL RUN. IT IS NOT RECOMMENDED COMBINING WIRES IN DIFFERENT WIRE CONDUITS. ALL CONDUITS SUGGESTED IN TABLE ARE MINIMUMS. ALL CONDUITS ARE FIELD INSTALLED BY OTHERS.
 7. NOT ALL OPTIONS SHOWN.

REF	CONDUIT FOR	CONDUIT SIZE	RUN	VOLTAGE
A	SENSORS AND CONTROLS	1.25"	12X 18AWG	24VDC
B	POWER FOR ELECTRIC DRIVE	1.25"	2X 10AWG	230VAC
C	GRAVITY DRAIN	4"	-	-

PROTECTED SIDE



B&B ARMR
4900 South Lake Forest Dr
Ste. 230
Mckinney, TX, 75070
800-367-0387

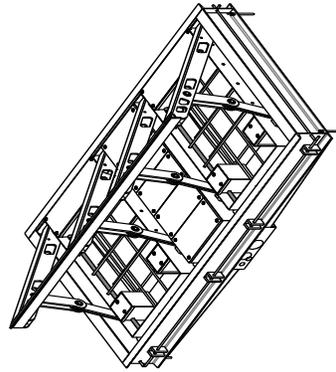
**MODEL 828 BARRIER
8FT CLEAR OPENING
LAYOUT/FOUNDATION**

Drawing 1 - Typ. 8 ft. Foundation and Rebar Layout

6.1.1.2. 10 ft. Typical Unit

Rev 081516

- NOTES:**
1. THE CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI IN 28 DAYS. THE CEMENT SHALL BE AS PER ASTM C150. THE MAXIMUM AGGREGATE SIZE SHALL BE 1" INCH. CONCRETE UNDER THE BARRIER TO BE FULLY VIBRATED TO FILL VOIDS.
 2. REINFORCING STEEL SHALL BE #4 (1/2") MINIMUM AND SHALL CONFORM TO ASTM SPECIFICATION A-615, GRADE 60 OR BETTER.
 3. THE FOUNDATIONS SHALL BE POURED ON SOIL CAPABLE OF SUPPORTING A MINIMUM COMPACTION OF 1600 PSF.
 4. CONCRETE LEVEL INSIDE BARRIER TO BE FLUSH WITH TOP OF STEEL BOX FRAME.
 5. FOUNDATION DIMENSIONS AND STRUCTURE ARE CONSIDERED AS A MINIMUM REQUIREMENT. ADDITIONAL STRUCTURE MAY BE ADDED TO CONFORM TO LOCAL APPLICATION REQUIREMENTS.
 6. WIRE SIZE IS DEPENDANT ON ELECTRICAL RUN. ALL CONDUITS SUGGESTED IN TABLE ARE MINIMUMS AND FIELD INSTALLED BY OTHERS.
 7. NOT ALL OPTIONS SHOWN.



SITE SUPPLIED POWER
230V, 1-PHASE
30 AMP

ELECTRIC CONTROL BOX
W/ INTEGRATED CONTROL PANEL

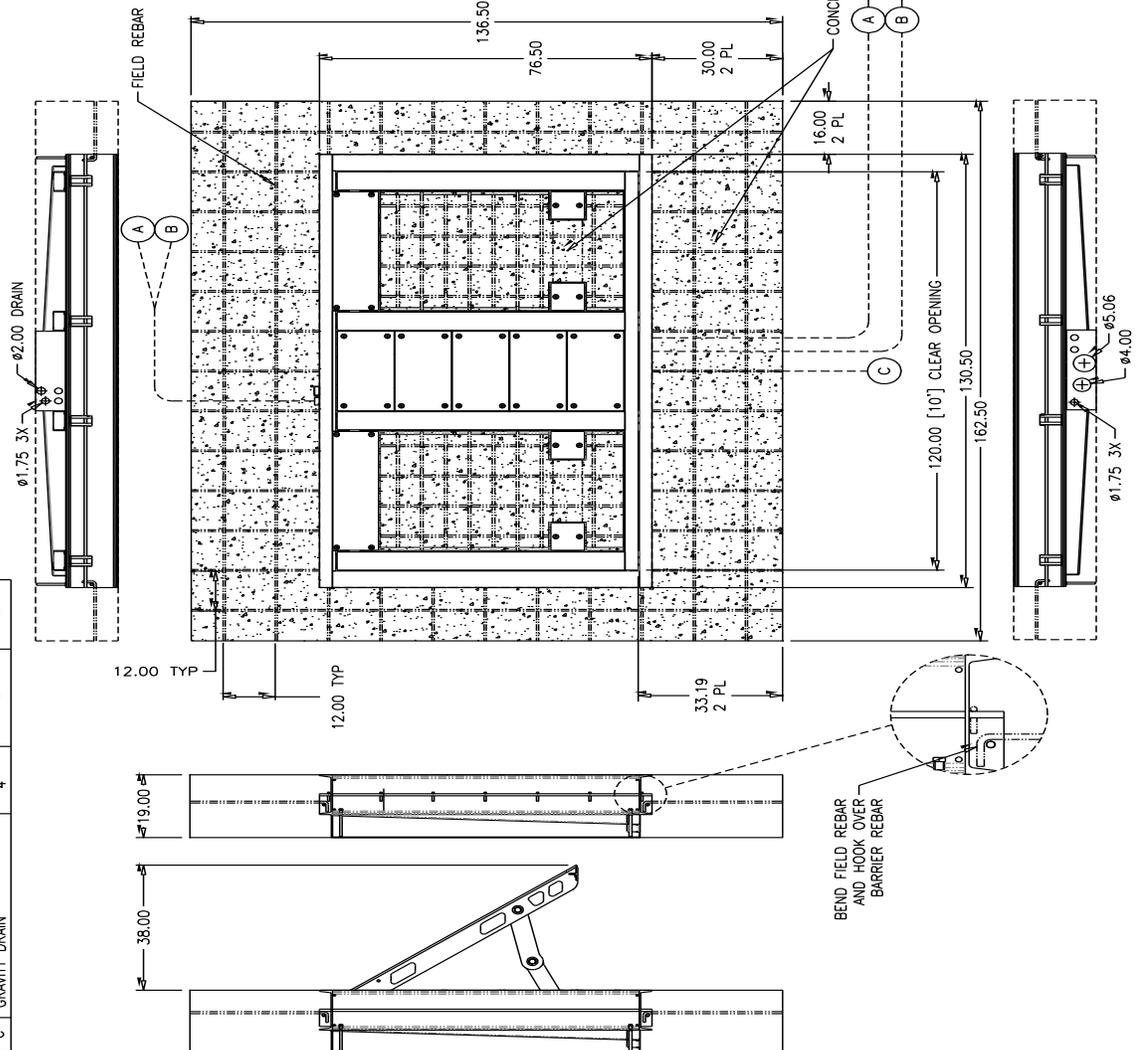
MODEL 828 BARRIER
10FT CLEAR OPENING
LAYOUT/FOUNDATION

B&B ARMR
5900 South Lake Forest Dr
Ste. 230
McKinney, TX 75070
800-367-4387

PROTECTED SIDE

ATTACK SIDE

REF	CONDUIT FOR	CONDUIT SIZE	RUN	VOLTAGE
A	SENSORS AND CONTROLS	1.25"	12X 18AWG	24VDC
B	POWER FOR ELECTRIC DRIVE	1.25"	2X 10AWG	230VAC
C	GRAVITY DRAIN	4"	-	-

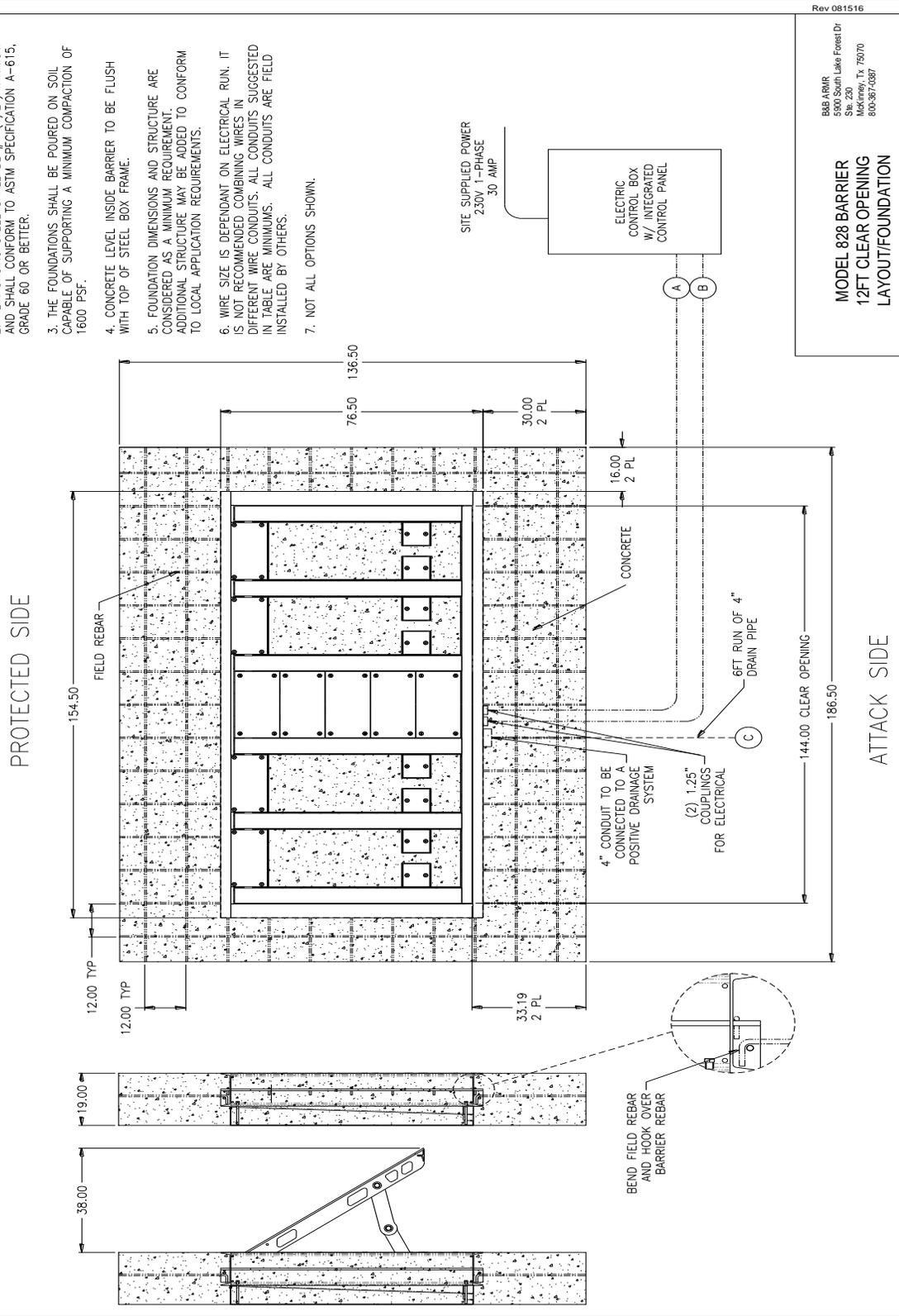


Drawing 2 - Typ. 10 ft. Foundation and Rebar Layout

6.1.1.3. 12 ft. Typical Unit

- NOTES:
1. THE CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI IN 28 DAYS. THE CEMENT SHALL BE AS PER ASTM C150. THE MAXIMUM AGGREGATE SIZE SHALL BE 1 INCH. CONCRETE UNDER THE BARRIER TO BE FULLY VIBRATED TO FILL VOIDS.
 2. REINFORCING STEEL SHALL BE #4 (1/2") MINIMUM AND SHALL CONFORM TO ASTM SPECIFICATION A-615, GRADE 60 OR BETTER.
 3. THE FOUNDATIONS SHALL BE POURED ON SOIL CAPABLE OF SUPPORTING A MINIMUM COMPACTION OF 1600 PSF.
 4. CONCRETE LEVEL INSIDE BARRIER TO BE FLUSH WITH TOP OF STEEL BOX FRAME.
 5. FOUNDATION DIMENSIONS AND STRUCTURE ARE CONSIDERED AS A MINIMUM REQUIREMENT. ADDITIONAL STRUCTURE MAY BE ADDED TO CONFORM TO LOCAL APPLICATION REQUIREMENTS.
 6. WIRE SIZE IS DEPENDANT ON ELECTRICAL RUN. IT IS NOT RECOMMENDED COMBINING WIRES IN DIFFERENT WIRE CONDUITS. ALL CONDUITS SUGGESTED IN TABLE ARE MINIMUMS. ALL CONDUITS ARE FIELD INSTALLED BY OTHERS.
 7. NOT ALL OPTIONS SHOWN.

REF	CONDUIT FOR	CONDUIT SIZE	RUN	VOLTAGE
A	SENSORS AND CONTROLS	1.25"	12X 18AWG	24VDC
B	POWER FOR ELECTRIC DRIVE	1.25"	2X 10AWG	230VAC
C	GRAVITY DRAIN	4"	-	-

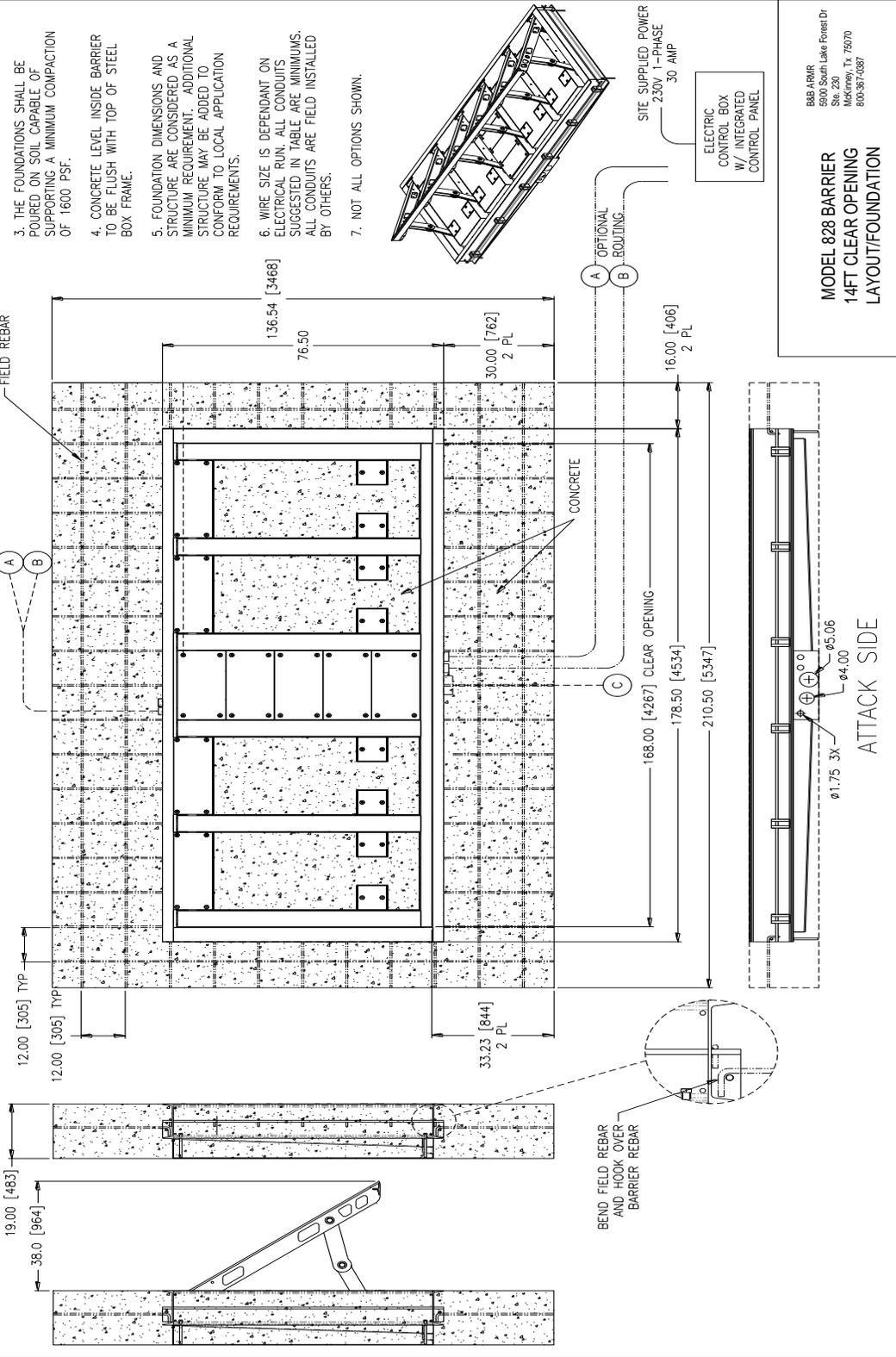


Drawing 3 - Typ. 12 ft. Foundation and Rebar Layout

6.1.1.4. 14 ft. Typical Unit

Rev 052417

- NOTES:
1. THE CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI IN 28 DAYS. THE CEMENT SHALL BE AS PER ASTM C150. THE MAXIMUM AGGREGATE SIZE SHALL BE 1 INCH. CONCRETE UNDER THE BARRIER TO BE FULLY VIBRATED TO FILL VOIDS.
 2. REINFORCING STEEL SHALL BE #4 (1/2") MINIMUM AND SHALL CONFORM TO ASTM SPECIFICATION A-615, GRADE 60 OR BETTER.
 3. THE FOUNDATIONS SHALL BE POURED ON SOIL CAPABLE OF SUPPORTING A MINIMUM COMPACTION OF 1600 PSF.
 4. CONCRETE LEVEL INSIDE BARRIER TO BE FLUSH WITH TOP OF STEEL BOX FRAME.
 5. FOUNDATION DIMENSIONS AND STRUCTURE ARE CONSIDERED AS A MINIMUM REQUIREMENT. ADDITIONAL STRUCTURE MAY BE ADDED TO CONFORM TO LOCAL APPLICATION REQUIREMENTS.
 6. WIRE SIZE IS DEPENDANT ON ELECTRICAL RUN. ALL CONDUITS SUGGESTED IN TABLE ARE MINIMUMS. ALL CONDUITS ARE FIELD INSTALLED BY OTHERS.
 7. NOT ALL OPTIONS SHOWN.



B&B ARMOR
5900 South Lake Forest Dr
Ste. 230
McKenny, TX 75070
800-367-0387

MODEL 828 BARRIER
14FT CLEAR OPENING
LAYOUT/FOUNDATION

PROTECTED SIDE

ATTACK SIDE

REF	CONDUIT FOR	CONDUIT SIZE	RUN	VOLTAGE
A	SENSORS AND CONTROLS	1.25"	12X 18AWG	24VDC
B	POWER FOR ELECTRIC DRIVE	1.25"	2X 10AWG	230VAC
C	GRAVITY DRAIN	4"	-	-

Drawing 4 - Typ. 14-ft. Foundation and Rebar Layout

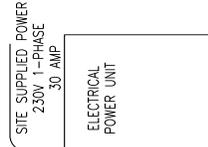
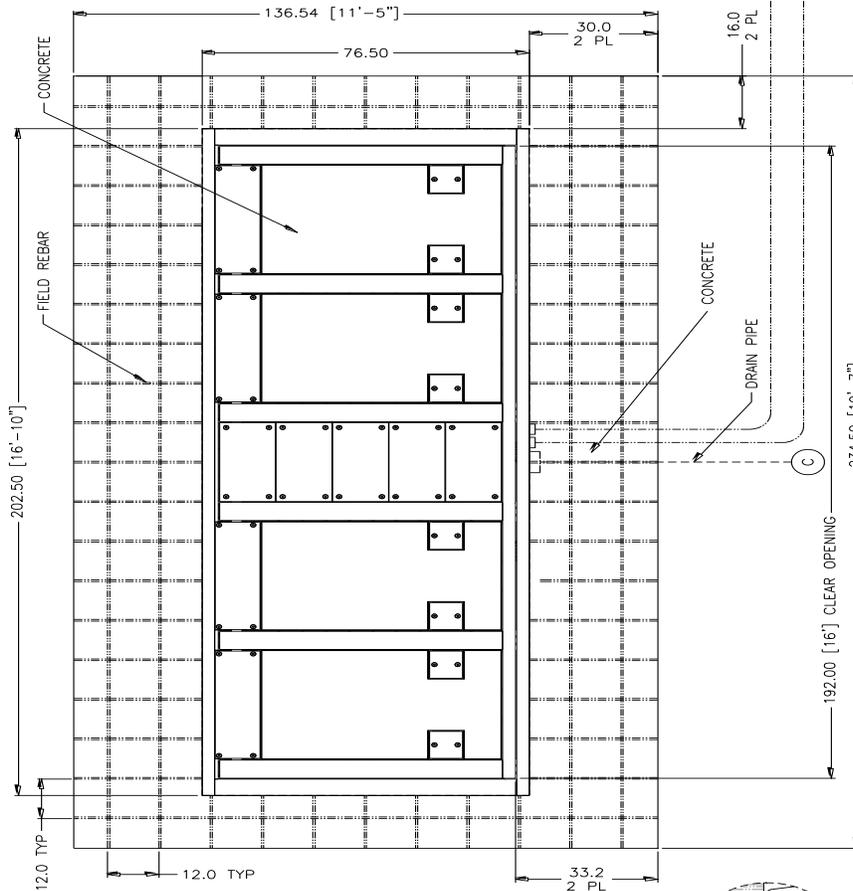
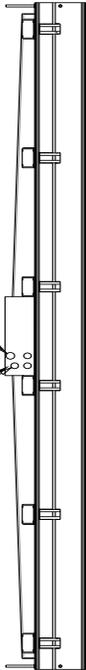
6.1.1.5. 16 ft. Typical Unit

Rev 071917

- NOTES:
1. CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI IN 28 DAYS. THE CEMENT SHALL BE PER ASTM C150. THE MAXIMUM AGGREGATE SIZE SHALL BE 1 INCH. CONCRETE UNDER THE BARRIER TO BE FULLY VIBRATED TO FILL VOIDS.
 2. REINFORCING STEEL SHALL BE #4 (1/2") MINIMUM AND SHALL CONFORM TO ASTM SPECIFICATION A-615, GRADE 60 OR BETTER.
 3. THE FOUNDATIONS SHALL BE POURED ON SOIL CAPABLE OF SUPPORTING A MINIMUM COMPACTION OF 1600 PSF.
 4. CONCRETE LEVEL INSIDE BARRIER TO BE FLUSH WITH TOP OF STEEL BOX FRAME.
 5. FOUNDATION DIMENSIONS AND STRUCTURE ARE TO BE CONSIDERED A MINIMUM REQUIREMENT. ADDITIONAL STRUCTURE MAY BE ADDED TO CONFORM TO LOCAL APPLICATION REQUIREMENTS.
 6. WIRE SIZE IS DEPENDANT ON ELECTRICAL RUN. IT IS NOT RECOMMENDED COMBINING WIRES IN DIFFERENT WIRE CONDUITS. ALL CONDUITS SUGGESTED IN TABLE ARE MINIMUMS. ALL CONDUITS ARE FIELD INSTALLED BY OTHERS.
 7. NOT ALL OPTIONS SHOWN.

PROTECTED SIDE

ø1.75 3X
ø2.00 DRAIN



B&B ARMOR
5800 South Lake Forest Dr
St. Louis, MO 63120
800-867-0387

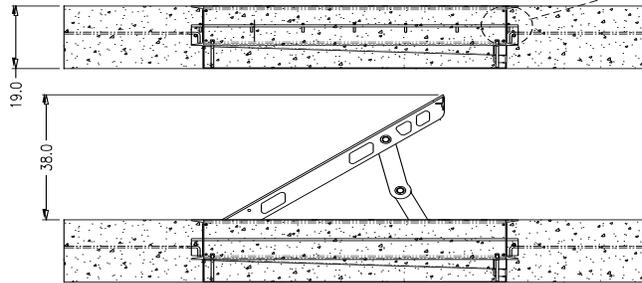
**MODEL 828 BARRIER
16FT CLEAR OPENING
LAYOUT/FOUNDATION**

ATTACK SIDE

ø1.75 3X
ø45.06
ø44.00



REF	CONDUIT FOR	CONDUIT SIZE	WIRE	VOLTAGE
A	SENSORS AND CONTROLS	1.25"	12X 18AWG	24VDC
B	POWER FOR ELECTRIC DRIVE	1.25"	2X 10AWG	230VAC
C	GRAVITY DRAIN	4"	-	-



Drawing 5 - Typ. 16 ft. Foundation and Rebar Layout

6.1.2. Conduit Details

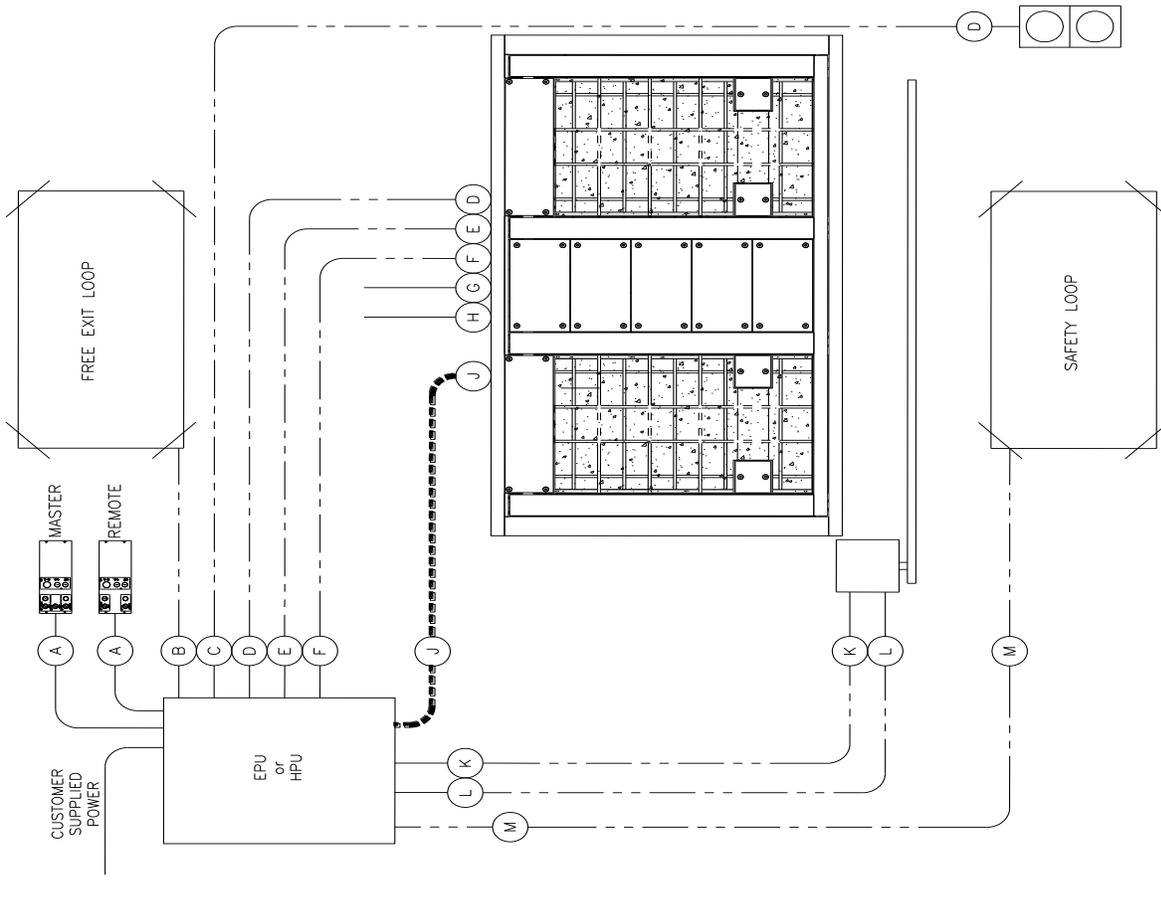
REF	CONDUIT FOR	CONDUIT SIZE	RUN	VOLTAGE
A	CONTROL PANEL (OPT.)	3/4"	12X 18AWG PER LANE	24VDC
B	FREE EXIT LOOP (OPT.)	3/4"	2X 16AWG	-
C	TRAFFIC SIGNAL (OPT.)	3/4"	2X 18AWG PER LIGHT	120VAC
D	HEAT TRACE CABLE (OPT.)	3/4"	2X 16AWG	120VAC
E	SENSORS AND CONTROLS	1 1/4"	12X 18AWG	24VDC
F	POWER FOR ELECTRIC DRIVE (-E# Series)	1 1/4"	2X 10AWG	220VAC
G	GRAVITY DRAIN	4"	-	-
H	SUMP PUMP DRAIN	1 1/4"	-	-
J	HYDRAULIC HOSE (-H# Series)	3"	2X 3/4 HOSE	-
K	WARNING GATE POWER (OPT.)	3/4"	2X 10AWG	220VAC
L	WARNING GATE CONTROLS (OPT.)	3/4"	12X 18AWG	24VDC
M	SAFETY LOOP	3/4"	2X 16AWG	-

- NOTES:
1. TIE CONDUIT TOGETHER AND LAY IN TRENCH DUG FROM PUMP TO BARRIER EXCAVATION.
 2. AVOID 90 DEGREE BENDS IN CONDUITS.
 3. WIRE SIZE IS DEPENDANT ON ELECTRICAL RUN. B&B ARMR DOES NOT RECOMMEND COMBINING WIRE CONDUITS DUE TO SIZE.
 4. OPTIONAL BARRIER HEATER E. SEPARATE POWER CIRCUIT REQUIRED. TERMINATION INSIDE BARRIER COMPARTMENT.
 5. DRAWING SHOWS OPTIONAL COMPONENTS THAT MAY NOT BE INCLUDED IN ORDER.

828-Conduit RevA.DWG

B&B ARMR
5900 South Lake Forest
Ste. 230
McKinney, Tx, 75070
800-367-4387
WWW.B&B-ARMR.COM

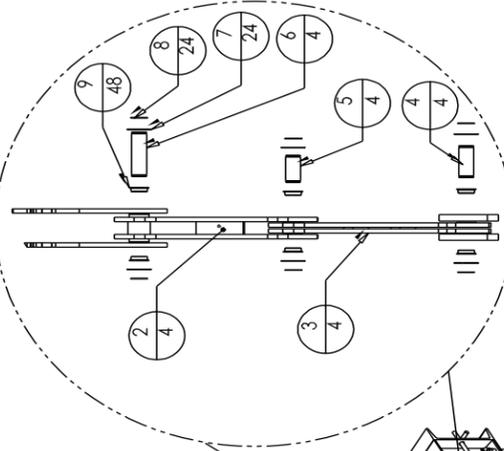
828 SHALLOW MOUNT BARRIER
CONDUIT LAYOUT



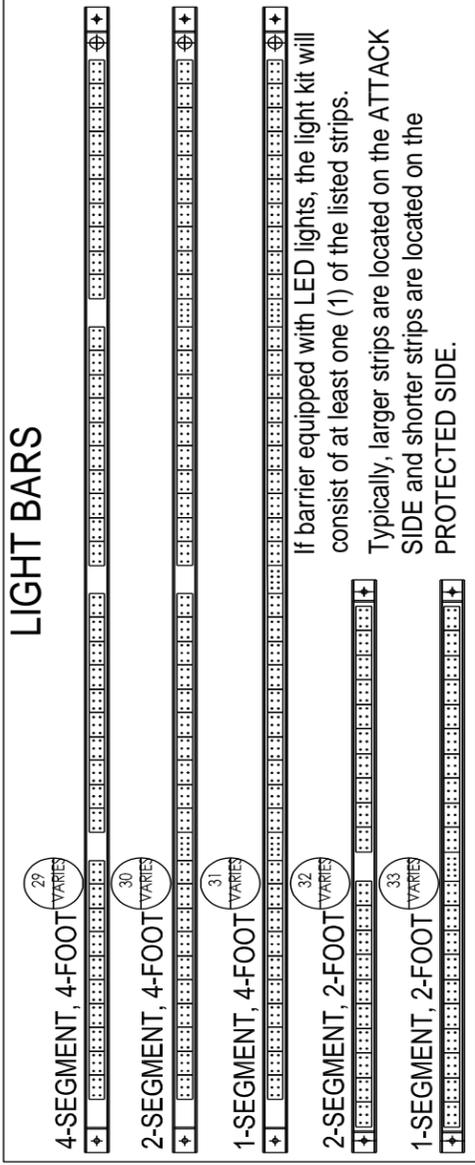
Drawing 6 - Typ. Conduit Requirements

6.1.3 Exploded View – Size 10

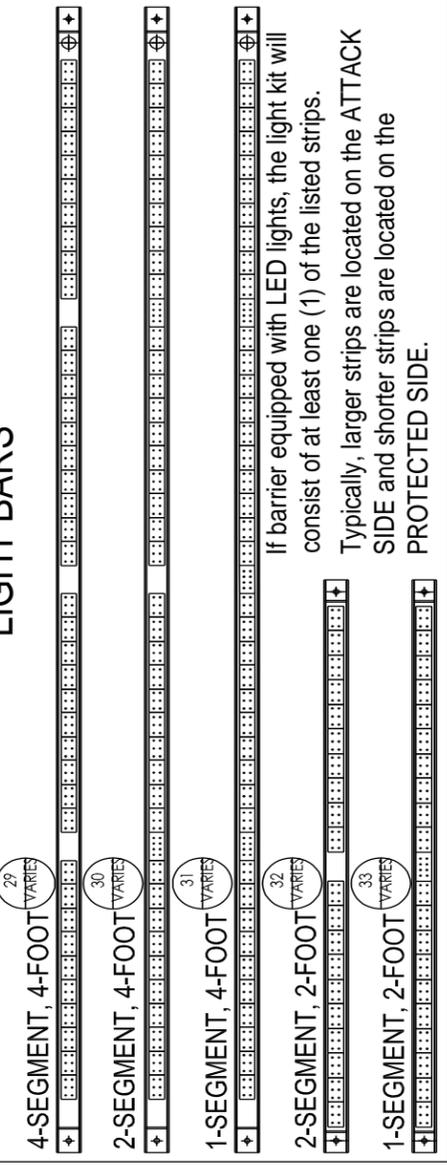
ATTACK PLATE



BARRIER VAULT

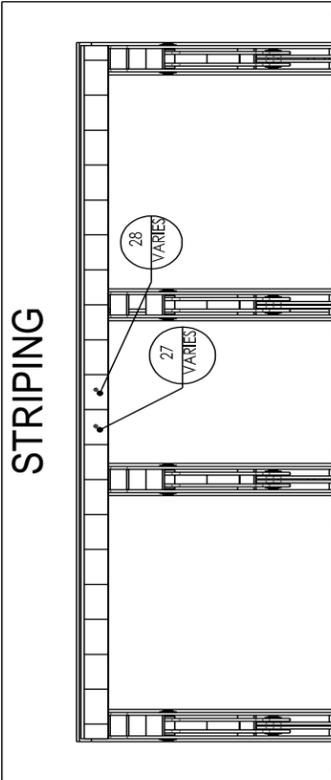


LIGHT BARS

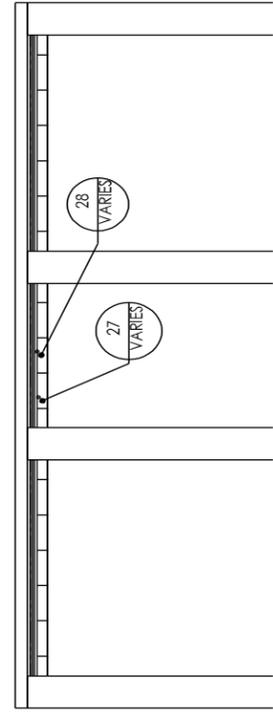


IN	PART NUMBER	DESCRIPTION	QTY.
33	XLED-CLB2-1	KIT, LED, 828, 1-SEGMENT, 2 FT.	VARIES
32	XLED-CLB2-2	KIT, LED, 828, 2-SEGMENT, 2 FT.	VARIES
31	XLED-CLB4-1	KIT, LED, 828, 1-SEGMENT, 4 FT.	VARIES
30	XLED-CLB4-2	KIT, LED, 828, 2-SEGMENT, 4 FT.	VARIES
29	XLED-CLB4-4	KIT, LED, 828, 4-SEGMENT, 4 FT.	VARIES
28	PRS-39##-##X	REFL. SHEETING (PROJECT SPECIFIC COLOR)	VARIES
27	PRS-39##-##X	REFL. SHEETING (PROJECT SPECIFIC COLOR)	VARIES
26	0828-2003	FLAG INDICATOR, 2.7/16 IN. (HYD. UNIT ONLY)	2
25	XPROX-FCM2-1204C	PROX SENSOR, 2 WIRE (HYD. UNIT ONLY)	2
24	0828-2322	CHOCK LOCK, WEDGE BARRIER	1
23	BLTSS-62-11X1.5CS	BOLT, 5/8-11 X 1.5 FHCS 18-8 SS	36
22	0828-3006-120	COVER PLATE, 10 FT. SHAFT BEARINGS	2
21	0828-3004	COVER PLATE, ACTUATOR	5
20	0828-3005	COVER PLATE, PIN TROUGH	4
19	CALL FACTORY	COLLAR BOLT	4
18	CALL FACTORY	BRG. JOURNAL BOLT	4
17	LKWSS.62	LOCK WASHER, 5/8, 18-8 SS	4
16	FLWSS.62	FLAT WASHER, 5/8 USS, SS	4
15	BLTSS.62-11X2	BRG. MOUNTING BOLT, 5/8-11 X 2, HHCS, SS	4
14	PIPLSS.37-HEX	PIPE PLUG, 3/8 NPTF, 302 SS	2
13	BRG2.50-2P-SB	BEARING, JOURNAL, SPLIT, 2 1/2	2
12	0828-3016	WASHER, SPLIT, 2-3/4 ID X 1 THK, DEL	2
11	XCOLLAR-6436K163	COLLAR, SPLIT, 2 7/16, ALUM	2
10	0828-3505	BEARING SUPPORT	2
9	XBUSH-GF+2426-8	BUSHING, FLANGED, 1.5 ID X .5 LG	48
8	XRING-FSE-0160-S02	RING, SNAP, EXTERNAL 1.5 OD, SST	24
7	FLWSS1.5X2.5	FLAT WASHER SS 1.5 ID X 2.5 OD	24
6	0828-3003	PIN, 1.5 OD, 5.23 LG	4
5	0828-3002	PIN, 1.5 OD, 3.20 LG	4
4	0828-3011	PIN, 1.5 OD, 3.75 LG	4
3	0828-2030	WELDMENT, LINKAGE, LOWER	4
2	0828-2020	WELDMENT, LINKAGE, UPPER	4
1	0828-2100-120	WELDMENT, ATTACK PLATE, 4 FINGER	1

STRIPING



ATTACK SIDE



PROTECTED SIDE

828 SERIES 10 FT. BARRIER



OPERATIONS & MAINTENANCE MANUAL

MODEL 828 SERIES
SHALLOW MOUNT
WEDGE BARRIER

6.2. Specifications

GENERAL		
TYPE:		Shallow Mount Wedge Type Vehicle Arresting Barrier
CRASH RATING:		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:		(CO + 42.5")W x 136.5"H x 19"D
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" • Cubic yards vary per size – refer to submittal package
REBAR:		<ul style="list-style-type: none"> • Rebar shall be #4 deformed billet steel per ASTM A615, Grade 60. • All joints shall be tied together using #4 ties.
DESIGN		
CLEAR VEHICLE OPENING:		Ranges from 8 to 16 ft. (96 – 192 in. / 2.4 – 4.9 m)
CYCLE TIME:	ELECTRIC	STD. Operation 3-5 sec; Field Configurable
	HYDRAULIC	STD. Operation 3-5 sec; Field Configurable
DUTY CYCLE:		Continuous
OPERATING:	TEMPS	-20 – 140° F (-29 - 60° C)
	HEIGHT	36" – 38" (914 – 965 mm) Field Adjustable
MATERIALS:	VAULT	Hot dip galvanized Steel
	ATTACK WELDMENT	Hot dip galvanized Steel
ELECTRICAL REQUIREMENTS:	828E#	• 115-240 VAC 1Ø; 208-480VAC 3Ø
	828H#	• 115-240 VAC 1Ø; 208-480VAC 3Ø
	828M#	• N/A
DIMENSIONS:		Project Specific – reference Submittal package
FINISH:		Project specific colored Macropoxy® 646, finished with Acrolon™ 218 acrylic polyurethane All exposed road surfaces include anti-slip aggregate.



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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