



Model 712 Cable Crash Beam Vehicle Barrier

INSTALLATION AND OPERATIONS MANUAL



B&B ARMR

**209 Chenault Dr. Suite 114
Carrollton, TX 75006**

1-800-367-0387

WWW.BB-ARMR.COM

INTRODUCTION

Welcome

Congratulations on your purchase of a B&B ARMR vehicle barrier. We have years of experience in all aspects of perimeter security and related disciplines, and our products are used throughout the world to control access and to protect people, equipment, and facilities. Your vehicle barrier is designed to give you years of smooth, trouble-free operation.

In addition to providing detailed operating instructions, this manual describes how to install, maintain, and troubleshoot your vehicle barrier. To make it easy to locate the information you need, we've included a detailed Table of Contents immediately following this Introduction. All of this is important information, so be sure to keep the manual available for reference.

If you need help with any aspect of your vehicle barrier's installation or operation, please contact us. We offer a broad range of vehicle barrier and related security services, so you can also call on us for:

- Turnkey installations
- Routine barrier preventative maintenance or emergency repairs (including work on non-B&B ARMR products)
- Spare or replacement parts
- Custom designs or special installations
- Equipment upgrades (modernize your old equipment with state-of-the-art hydraulics and control systems)
- Ancillary security equipment (such as security guard enclosures, card readers, security lighting, and so on)

Safety

Your safety is important to us. If you have any questions or are in doubt about any aspect of the equipment, please contact us. While B&B ARMR does not assume responsibility for injury to persons or property during installation, operation, or maintenance, we can provide verbal guidance, additional written instructions, or the services of a factory engineer. We're here to help you operate your vehicle barrier safely and effectively.

As the user, you are responsible for correct and safe installation, operation, and maintenance of this equipment. Users must follow the specific instructions and safety precautions located in this manual. In addition they must:

- Be aware of and 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, users must also follow applicable international, regional, and local safety standards.
- Engage only experienced staff, properly trained, to install, operate, and maintain the equipment.
- Ensure that all repairs are performed correctly, using properly trained staff and the right tools and equipment.

Warranty

B&B ARMR vehicle barriers are guaranteed against defects in materials and workmanship for one year. The warranty applies when the barrier is installed, operated, and maintained according to the instructions in this manual, and when it is operated within the service conditions for which it was specifically sold. The user must prevent potentially damaging conditions, such as mechanical overloading or unauthorized modifications. In the event of a malfunction during the warranty period, contact B&B ARMR and we will pursue prompt corrective action.

This is a warranty summary only. The specific warranty supplied with your equipment is the governing document.

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 directly at:

B&B ARMR
8301 Arlington Boulevard, Suite 206
Fairfax, VA 22031 USA
Telephone: (703) 876-9844
Fax: (703) 876-0427
E-mail: armrserv@aol.com

Table of Contents

INTRODUCTION.....	ii
<i>Welcome</i>	<i>ii</i>
<i>Safety</i>	<i>ii</i>
<i>Warranty.....</i>	<i>iii</i>
<i>How To Contact Us</i>	<i>iii</i>
1. ORIENTATION	1
1.1 <i>Overview.....</i>	<i>1</i>
1.2 <i>Options</i>	<i>5</i>
1.3 <i>Specifications</i>	<i>5</i>
2. INSTALLATION	6
2.1 <i>Introduction.....</i>	<i>6</i>
2.2 <i>Preliminary Considerations</i>	<i>6</i>
2.3 <i>Installing the Hinge and Receiver Posts.....</i>	<i>6</i>
2.4 <i>Installing the Conduit.....</i>	<i>7</i>
2.5 <i>Emplacement</i>	<i>8</i>
2.6 <i>Hydraulic Unit Installation</i>	<i>8</i>
2.7 <i>Control System Installation</i>	<i>9</i>
2.8 <i>Final Installation Steps</i>	<i>10</i>
3. OPERATION	11
3.1 <i>Preliminary Steps</i>	<i>11</i>
3.2 <i>Initial Operation.....</i>	<i>11</i>
3.3 <i>Typical Operation.....</i>	<i>13</i>
3.4 <i>Barrier Operation During a Power Outage.....</i>	<i>13</i>
3.5 <i>General Comments on the Hydraulic System</i>	<i>13</i>
4. MAINTENANCE	15
4.1 <i>Introduction.....</i>	<i>15</i>
4.2 <i>Monthly Inspections</i>	<i>15</i>
4.3 <i>Six-Month Inspections</i>	<i>16</i>
4.4 <i>Hydraulic Oil Changing Procedure.....</i>	<i>17</i>
5. TROUBLESHOOTING	18

1. ORIENTATION

1.1 Overview

The formal name for this vehicle barrier—illustrated on the cover of this manual—is the *B&B ARMR Model 712 Cable Crash Beam*. It is a beam-type barrier hinged at one side so that the beam can be raised and lowered to restrict and control vehicle access. The beam is reinforced with an interior steel cable, which significantly increases the barrier's vehicle stopping power (see specifications below).

1.1.1 Beam

The beam is a rectangular aluminum extrusion. The beam retains its mill aluminum finish and is marked with red and white safety tape. The steel cable is contained inside the beam and anchored with two stainless steel rods at either end. These rods hold the cable during vehicle impact. The cable and its anchor rods substantially increase the barrier's stopping power compared to a beam barrier without these components. The impact energy is absorbed first by stretching the cable, then the energy is transferred to the foundation through the hinge and receiver assemblies.

1.1.2 Posts

The hinge and receiver posts are steel. The hinge post operates with internal bearings on a stainless steel axle that allows the beam to move in an arc of 85°-87°. The receiver post has a stanchion constructed of two steel weldments. The weldments direct and capture the beam when it is lowered, and securely contain the beam during a vehicle impact. The receiver post has a security latching pin that can be padlocked to prevent unauthorized operation when the barrier is unattended (see Figure 1-1 below).

The barrier has a self-contained, exterior-mounted, automatic damping device. When the barrier operates at the design speed, this damper reduces any whipping action by the beam as it comes to the full, raised position.

Figure 1-1: Receiver Post Stanchion and Security Latching Pin

Both the hinge post and receiver post are cast in place in a subterranean concrete pour. Both posts have elevation grade locators to aid the installation. The installation requires no above-grade concrete. The portions of the hinge and receiver posts that are imbedded are coated to prevent deterioration due to cement contact. The aboveground portions of the posts are primed and finish painted in black.

1.1.3 Hydraulic System & Controls

The barrier operates with a complete, self-contained hydraulic unit. It contains not only the hydraulic components, but also the electrical components and a programmable logic controller that is pre-programmed with the barrier's operating logic. The unit has a minimum 1.5 horsepower, 208 / 240-480 volt, three-phase motor. (A single-phase motor is available on special order.) An overload circuit protects the motor in the event of power fluctuations. The control unit is 120-volt, single-phase with 24-volt dc output. The key components of the hydraulic unit are shown in Figures 1-2a through 1-2c.

The motor powers a hydraulic pump that delivers oil through a series of valves as directed by the control unit. If the beam is in the up position for extended periods, the control circuit monitors

any drift in the beam's position and automatically corrects the position. The unit includes a manual operation override so the beam can be raised and lowered during power outages.

The hydraulic unit is in an aesthetically pleasing round enclosure with built-in environmental controls, including a heater and cooling fan. (An optional heating unit for extreme winter conditions is available.) The unit has a built-in 120-volt convenience outlet and a master switch turns off all the power to the unit for maintenance and repairs.

Figure 1-2a: Hydraulic Unit and Control System Electrical Box

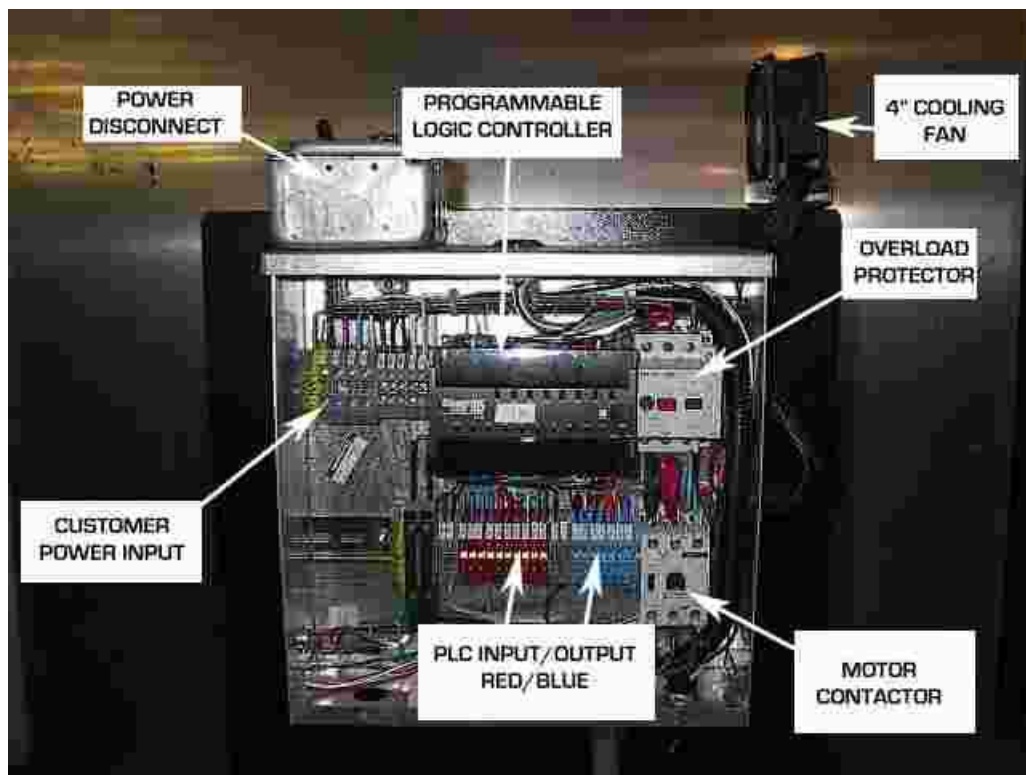


Figure 1-2b: Hydraulic Unit Top View

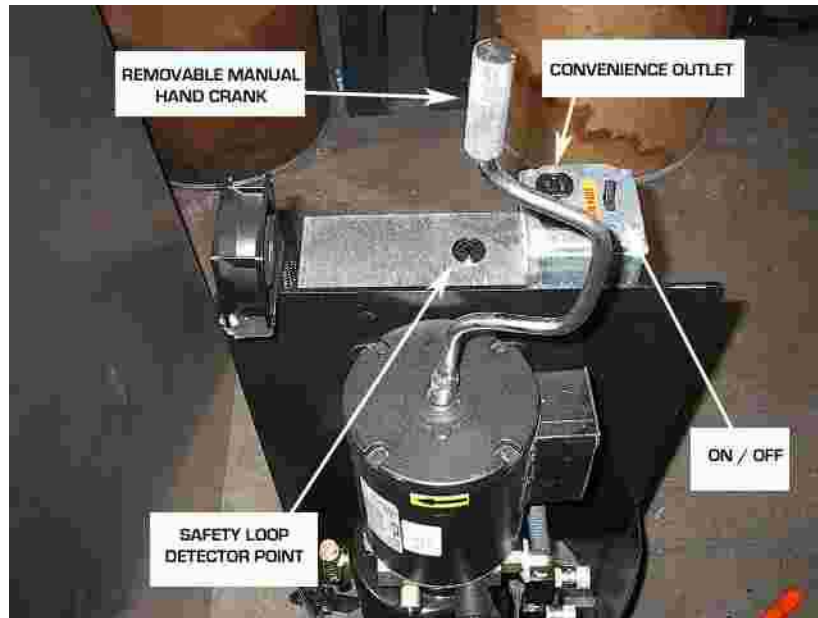


Figure 1-2c: Hydraulic Unit Side View



1.2 Options

The *B&B ARMR Model 712 Cable Crash Beam* is available with the following options. Consult your purchase order or other ordering documentation to determine whether your unit has the optional equipment.

- Manually operated hydraulic unit (these units are designated as Model 714)
- Single-phase hydraulic pump motor
- Hydraulic unit heater for extreme cold weather operation
- Various control panel options (touch screen panels, multiple panels, and so on)
- In-ground loop detector to detect the presence of a vehicle and prevent accidental lowering of the beam onto the vehicle
- Traffic lights (red and amber stop/go lights to signal the vehicle)
- Lights (LEDs) on the beam to increase the beam's visibility
- Receiver post heater
- Steel crash arm
- Electromagnetic Lock

1.3 Specifications

Key specifications for the *B&B ARMR Model 712 Cable Crash Beam* are as follows.

- Meets or exceeds US Navy Specification OR098-09-88
- Certified vehicle-stopping power is 10,000 pounds at 15 mph.

2. INSTALLATION

2.1 Introduction

We designed the Model 712 for quick and easy installation. However, every site is different and each Model 712 will vary due to the choice of options or special design features. Accordingly, the instructions below may have to be varied slightly for your particular installation. If you need help, or are unclear about any of these instructions, please contact B&B ARMR for assistance.



Your safety is extremely important to us. Be sure to follow the specific instructions presented below. You are responsible for the correct and safe installation, operation, and maintenance of this equipment.

2.2 Preliminary 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.
- If your site layout requires the hydraulic pumping unit be placed more than 4' from the barrier's hinge post, the hydraulic hose supplied will be too short. Contact B&B ARMR and we will help you determine the correct hose length.

2.3 Installing the Hinge and Receiver Posts

Perform the following steps.

- 2.3.1 Excavate the hole for the hinge post as shown in the engineering drawing titled *Model 712 General Layout* (see the Engineering Drawings section at the end of

this manual). Place supporting timbers over the excavation and parallel to the roadway. Place the hinge post in the excavation supported by these timbers, using the grade locators on the post to ensure the hinge post is set to the proper depth. There are 3/8" nuts welded to the grade locators. Insert all-thread in these nuts and through the supporting timbers and use the all-thread to adjust the hinge post so it is plumb and level.

- 2.3.2 Place string lines on either side of the hinge post and run the lines across the roadway to determine the receiver post's location. Keep the string lines parallel and accurately measure the *clear opening length*. This length (see *Model 712 General Layout* drawing) is the distance between the inside (side facing the road) faces of the hinge post and the receiver post. Once the receiver post location is determined, excavate the receiver post's hole and position and plumb the receiver post as described above.
- 2.3.3 Verify the posts are positioned correctly by running a string line between the two. Pull the string from the center of the hinge post and perpendicular to the axle and verify it falls directly on the center of the receiver post, and the distance between the two is exactly the specified clear opening length for your barrier.

2.4 Installing the Conduit

Perform the following steps, to install the conduit for the power, hydraulic lines, and control circuits, referring to the drawing titled *Interconnect Diagram* (see the Engineering Drawings section at the end of this manual).

- 2.4.1 The installation requires a minimum of three conduits. One 2" diameter PVC conduit for the hydraulic lines, one 3/4" diameter PVC conduit for the power cables, and one 3/4" diameter PVC conduit for the control cables. One 3" diameter PVC conduit for the hydraulic lines would be required if the runs exceed 25'. 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 ARMR if you are unclear about the conduit requirements for your installation.
- 2.4.2 All conduits are run to the hydraulic pump unit, where they will enter the unit through a common 17" diameter opening. Accordingly, run all the conduits for your installation to the location where the hydraulic unit's concrete pad will be located. This pad is typically placed so that the centerline of the hydraulic unit is 4' from the back of the hinge post, though your installation may require that the pad be located a different distance from the hinge post. (Not closer than 3' unless the unit is off to one side.) Run the conduits together and be sure the

conduits are long enough to extend above the anticipated height of the hydraulic unit's pad.

- 2.4.3 After installing the conduits, verify that the hinge and receiver posts have not moved by repeating step 2.3.3 above.

2.5 Emplacement

- 2.5.1 Fill the hinge post and receiver post excavations with concrete and finish the concrete surface. Remove any splattered concrete from the posts. Verify the posts did not move out of alignment during the pour by repeating step 2.3.3 above. Allow the concrete to cure.
- 2.5.2 Pour the pad for the hydraulic unit, and finish the concrete surface. Remove any concrete that might have splattered inside the exposed conduits. Allow the concrete to cure.

2.6 Hydraulic Unit Installation

Refer to the drawing titled *Assembly Drawing (120-2001)* as needed (see the Engineering Drawings section at the end of this manual).

- 2.6.1 Place the hydraulic unit on the pad over the exposed conduits and bolt the unit in place. (The feet on the unit will accept standard concrete anchors.) If you mount the unit to an intermediate steel structure, make sure that structure is securely fastened to the pad.
- 2.6.2 Terminate the electrical conduits in the electrical box and the hydraulic hose conduit onto the JIC fittings. The hydraulic conduit should not extend above the height of the unit's internal ring. This will allow the hydraulic hose to move slightly when pressure is applied without rubbing against any sharp edges on the conduit.
- 2.6.3 Install the hose by pulling it into the conduit, making sure to protect the hose from any sharp edges. When you cut the hose to length do not cut it too short, as the hose will shrink slightly in length when under pressure.
- 2.6.4 Connect the “up” hose fitting to the bottom of the flow control valve and connect the “down” hose fitting to the left side of the pump at the tank breather (see Figure 1-2c).
- 2.6.5 After connecting the hose at the pump you must purge air from the lines. **Verify the motor power is OFF.** Hand-crank the motor clockwise until oil comes out of the hose. Stop cranking and terminate the hose on the bottom fitting of the hydraulic cylinder. Terminate the breather line on the top fitting of the hydraulic cylinder.

2.7 Control System Installation

For this section, refer to Figure 1-2a (*Hydraulic Unit and Control System Electrical Box*) and to the engineering drawing titled *712 Electrical Layout* at the end of this manual.

Install three-phase or single-phase power (as appropriate to your Model 712) to the upper left corner of the electrical box. For three-phase systems use the terminals marked L1, L2, L3, Neutral, and Ground. For single-phase 220-volt systems use the terminals marked L1, L2, Neutral, and Ground. And for single-phase 120-volt systems use the terminals marked L1, Neutral, and Ground.

All devices that require ac power (such as the loop detector, radio remote, traffic light, and infrared beam) can get 120-volt ac from the upper left side of the electrical box.

Most other wiring is low-voltage (24-volt dc). Terminate all low-voltage inputs on the red terminal blocks at the bottom of the electrical box. Wire all switching devices (barrier up, barrier down, limit switch, and so on) so that each device gets 24-volt dc positive power from the left side of the red terminal blocks. Attach each device's input termination point wire to the appropriate X terminal block (X0, X1, X2, etc.) and the device's output termination point wire to the appropriate Y terminal block (Y0, Y1, Y2, etc.). (The X and Y termination point lists are shown on the drawing titled *712 Electrical Layout* at the end of this manual, and termination point tables are located there as well.) A summary of key control wiring terminations is as follows.

Traffic Lights (120-volt ac)	common to 120-volt Neutral red light to Y6 amber light to Y7
Panel Indicator Lights (24-volt dc)	common to 24-volt dc Negative red to Y4 green to Y5
LED Lights on Arm (24-volt dc)	common black to 24-volt dc Negative red LED red wire to Y4 amber LED white wire to Y5
Gate Up Limit Switch	switch must be wired for the arm to work switch common to 24-volt dc+ switch point to X2

Two Loop Detectors come pre-wired for use.

Loop A is typically in front of the gate arm. Loop A can also be used as a “free exit.” A jumper must be installed from the Loop A base terminal #3 to X0, and dip switch #6 and #7 on the back of the detector must be in the OFF position.

Loop B is typically located just past the gate arm and can be used as a “reset.” A jumper must be installed from Loop B base terminal #3 to X1, dip switch #6 must be OFF and dip switch #7 must be ON.

2.8 Final Installation Steps

- 2.8.1 Attach the beam to the hinge post using the stainless steel axle, sliding the axle through the flange-mounted bearing, through the bronze bushing on the beam, and into the second bearing. Use the setscrews on the bearings to lock the axle in place. In addition, there are shaft collars on either side of the beam. Tighten these collars to lock the beam in place.
- 2.8.2 Attach the hydraulic cylinder to the hinge post and the beam using the clevis pins provided.
- 2.8.3 The hydraulic unit's oil tank is shipped with the required amount of oil. (The tank holds 2 gallons.) If it becomes necessary to add hydraulic oil, add the oil through the oil vent assembly. (See the *Maintenance* section for oil specifications and additional details.)

3. OPERATION

3.1 Preliminary Steps

Before operating the barrier, go through the checklist below and verify that each of these steps has been completed.



For your safety, complete each of these steps before operating the barrier!

- The master power switch on the control circuit box is turned off.
- All traffic and pedestrians are clear of the barrier.
- The hydraulic pump unit is filled with oil and the oil level is correct.
- The beam is attached to the hinge post with the axle, and the setscrews securing the axle to the bearings are tight.
- The hydraulic cylinder is securely attached to the hinge post and the beam with clevis pins.
- If the barrier has a three-phase motor, verify that the motor is turning in the proper direction.
- Bleed the hydraulic lines by loosening the “up” hose fitting at the hydraulic cylinder end (see Figure 1-2c, *Hydraulic Unit Side View*). Fill the hose by turning the hand crank until oil leaks from the loosened fitting. Tighten the fitting and clean up the oil residue.

3.2 Initial Operation

Perform the following steps the first time you operate the vehicle barrier, and also after replacing the hydraulic oil or after any major repairs.

- 3.2.1 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 case there is a malfunction and the unit must be shut down.
- 3.2.2 Working from the control panel, raise the beam arm. (The procedure for doing this will vary depending on the design of your particular control panel.)

- 3.2.3 Carefully observe the beam and make sure it is operating correctly. The arm will stop when the beam contacts the limit switch or if the control unit times out. The beam arm motion may not be smooth for the first several operations due to air in the hydraulic lines.
- 3.2.4 If necessary, adjust the limit switch so the switch activates and the beam arm stops at the correct position.
- 3.2.5 Make sure the beam arm stops smoothly in the up position and there is minimal oscillation or whipping action. If necessary, adjust the position of the damping plunger by screwing it in or out. The plunger must strike the beam while the beam is still in motion, but the plunger must not bottom out when the beam arm is fully up. After adjustment, lock the position of the damping plunger by tightening the lock nut.
- 3.2.6 Make sure the beam arm stops smoothly in the receiver post and does not oscillate, contact hard, or make excessive noise.
- 3.2.7 You can adjust the up and down speed of the beam arm by turning the speed control valves located to the right of the electric motor. The upper valve controls the beam arm's rise while the lower valve controls its descent. Turning clockwise will slow the motion while turning counterclockwise will speed up the motion. For the nominal 12' beam arm, the beam will rise and fall in 8-10 seconds. Longer arms can take up to 20 seconds.
- 3.2.8 The hydraulic pump 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 pump's pressure relief valve, as described below.

Note: When making the adjustments below, be sure not to unscrew and remove the pressure relief valve assembly.

- a. The pump is set at the factory on the low (conservative) end of the operating range. Thus, the field adjustments usually involve turning the pressure relief valve adjustment screw clockwise.
- b. Near the top of the pump on the right-hand side is a hex-shaped cap. Turn the cap counterclockwise and remove it; this will expose an allen-head screw. This allen-head screw controls the pressure relief valve. Turn the screw clockwise to raise the pressure and counterclockwise to lower the pressure.
- c. There are two ways to adjust the pressure relief valve; you may use either one. The preferred method is to adjust the setting until the beam arm just starts to move as the motor is running. Replace the hex-shaped cap to lock and hold the setting. Failing to replace the cap will result in a system leak.
- d. The second method is to use an ammeter and slowly adjust the setting until the relief valve opens at the full load amp rating listed on the side of the motor. Replace the hex-shaped cap to lock and hold the setting. Failing to replace the cap will result in a system leak.

- e. After either method, use an ammeter to verify that the motor does not exceed the full load amp rating when the barrier operates.

3.3 Typical Operation

The system receives an OPEN input signal, typically from the barrier up button, a card reader, a loop detector, infrared beam, or a radio remote. The motor then starts and the beam arm begins to lift. When the beam arm reaches its full up position (less than 20 seconds) the limit switch is activated and the motor turns off.

The beam arm holds this position until a CLOSE input signal is received. The hold cartridge valve is then energized and opens causing the beam arm to lower. After 30 seconds the valve will de-energize and close.

3.4 Barrier Operation During a Power Outage

You can raise and lower the beam arm manually during a power outage as follows.

- 3.4.1 Turn the power switch to the OFF position (in case the power is suddenly restored).
- 3.4.2 Place a speed wrench on the screw head located on the top of the electric motor and turn it in the direction of the arrow. This drives the hydraulic pump and raises the beam arm.
- 3.4.3 To speed up raising the beam arm you can drive the screw head on the motor with a cordless drill and socket.

NOTE: Do not turn or spin the motor in the reverse direction, as this will damage the hydraulic pump!

- 3.4.4 To lower the beam arm, use the electric valve with the red knob that is located on the front of the pump below the motor and above the reservoir. To lower the beam arm, push in the red knob and turn it counterclockwise. This action must be reversed to operate in normal condition.

3.5 General Comments on the Hydraulic System

The hydraulic unit for the *B&B ARMR Model 712 Cable Crash Beam* is called a *Model 6120 Hydraulic Pumping Unit*. It is designed to operate for long periods with very little maintenance. It is a single-acting system that operates at relatively low-pressure and low-flow. The electric motor operates the gear-type hydraulic pump, which only operates on a command signal. Hydraulic oil

is drawn through a filter and into the speed control valves. A cartridge valve controlled by the operating logic controls the barrier beam's position.

4. MAINTENANCE



Do not attempt repairs unless you are trained and qualified. This vehicle barrier can cause equipment damage and severe injury if it is operated or maintained improperly.

4.1 Introduction

The *B&B ARMR Model 712 Cable Crash Beam* 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. Also described below is the procedure for draining and changing the hydraulic oil, should this ever be required. 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 this 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 visual inspections monthly.

- 4.2.1 Raise and lower the barrier and observe its motion. Verify the speed is within the normal range (8-10 seconds rise time for the standard 12' beam, proportionally longer for longer beams). Verify the beam does not hit with excessive force when lowered. To adjust the speed, see the instructions in section 3.2.7 in the *Operation* section of this manual.
- 4.2.2 Raise and lower the barrier and observe its motion. Verify the damping device is working properly and there is minimal whipping or oscillating action as the beam

stops in its raised position. If the damping device requires adjustment, see the instructions in section 3.2.5 in the *Operation* section of this manual. The damping cylinder is sealed, so if the adjustment procedure does not eliminate the problem, contact B&B ARMR for a replacement.

- 4.2.3 Inspect the condition of the paint. If rust is present, wire brush and sand the area then paint with a primer and the matching color.
- 4.2.4 Inspect the nylon pads on the beam arm and the receiver post for damage or excessive wear. Replace the individual pads as necessary.

4.3 Six-Month Inspections

We recommend you perform the following inspections every six months.

- 4.3.1 Repeat the visual inspections in steps 4.2.1 through 4.2.4 above.
- 4.3.2 Inspect the brushes that protect the hinge-side of the vehicle barrier. If they are worn to the point they have lost their function they should be replaced. The original brushes are held by rivets, which will have to be removed.
- 4.3.3 Turn the master power switch on the control circuit box to the **OFF** position.
- 4.3.4 Through the top of the hinge post, access the pillow block bearings that hold the stainless steel axle. Grease these bearings through their zerk fittings using a high quality, multi-purpose bearing grease.
- 4.3.5 Setscrews on the bearings hold the stainless steel axle in place. Verify these setscrews are tight.
- 4.3.6 Inspect the clevis pins holding the hydraulic cylinder that raises and lowers the beam. Lubricate the pins with high-quality, multi-purpose bearing grease. If the clevis pins show signs of wear, replace them. The clevis mountings have bronze bushings pressed into the steel housing. These bushings can also be replaced if they show signs of excessive wear.
- 4.3.7 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 by opening the tank; the level should be 5" – 6" below the top of the tank.. Add oil as necessary. We recommend using environmentally safe oil such as Mobil EAL 224.

Safety Note: 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 down control on the control panel. Verify that the hydraulic cylinder retracts completely. If it does not fully retract, the hose is still under pressure and must not be serviced. You can manually relieve the pressure by releasing the pop-it valve and verifying that the cylinder moves to its fully retracted position. Turn the power back off before continuing.

- 4.3.8 Open the hydraulic oil tank and inspect the oil for dirt or water. If oil replacement is necessary, see section 4.4 below.

- 4.3.9 When the inspection is complete, turn the master power switch on the control circuit box to the ON position.

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 Hydraulic Oil Changing Procedure

Follow the steps below to drain and refill the oil tank. We recommend using environmentally safe oil such as Mobil EAL 224. Refer to the drawing titled *Assembly Drawing (120-2001* see the Engineering Drawings section at the end of this manual).

- 4.4.1 Remove the four hex screws holding the reservoir to the aluminum adapter plate below the motor. Pull the reservoir down from the adapter plate to remove it.
- 4.4.2 Remove the old, used oil and clean the tank thoroughly. In the bottom of the tank is a magnet to trap metallic debris. Remove, clean, and then replace the magnet.
- 4.4.3 Add new oil until the oil level is 5" - 6" from the top of the tank. Reattach the tank to the adapter plate and reinstall the hex screws.

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

5. TROUBLESHOOTING

The table below provides guidance on identifying and correcting any problems with your B&B ARMR Model 712 Cable Crash Beam vehicle barrier. If you encounter problems that you cannot fix, contact B&B ARMR and we will gladly work with you to correct them.

Model 712 Troubleshooting Guide

Symptom	Actions
Beam arm does not go up	<ol style="list-style-type: none"> 1. Check power 2. Check overload protector 3. Check PLC input 4. Check that safeties are clear 5. Check PLC output 6. Check push button operation
Beam arm does not go down	<ol style="list-style-type: none"> 1. Check power 2. Check overload protector 3. Check PLC input 4. Check that safeties are clear 5. Remove manual clock 6. Check cartridge valve operation 7. Check PLC output 8. Check push button operation
Beam arm whips excessively	<ol style="list-style-type: none"> 1. Check limit switch adjustment 2. Check that dampening piston works and is adjusted properly
Beam arm makes noise	<ol style="list-style-type: none"> 1. Check that bearings are greased 2. Check that beam arm is not moving too fast

Symptom	Actions
Unit is excessively hot	<ol style="list-style-type: none">1. Check that cooling fan is working2. Check that the cover is on properly3. Check that the limit switch is turning the motor off (not time)4. Check the heater element
Beam arm moves slowly	<ol style="list-style-type: none">1. Check that heater element is working2. Check flow control valve
Traffic indicator light does not change	<ol style="list-style-type: none">1. Check proper limit switch operation2. Check bulbs3. Check PLC outputs
Beam arm strikes receiver post	<ol style="list-style-type: none">1. Check that strike pads are present2. Check that hinge and receiver post are aligned correctly