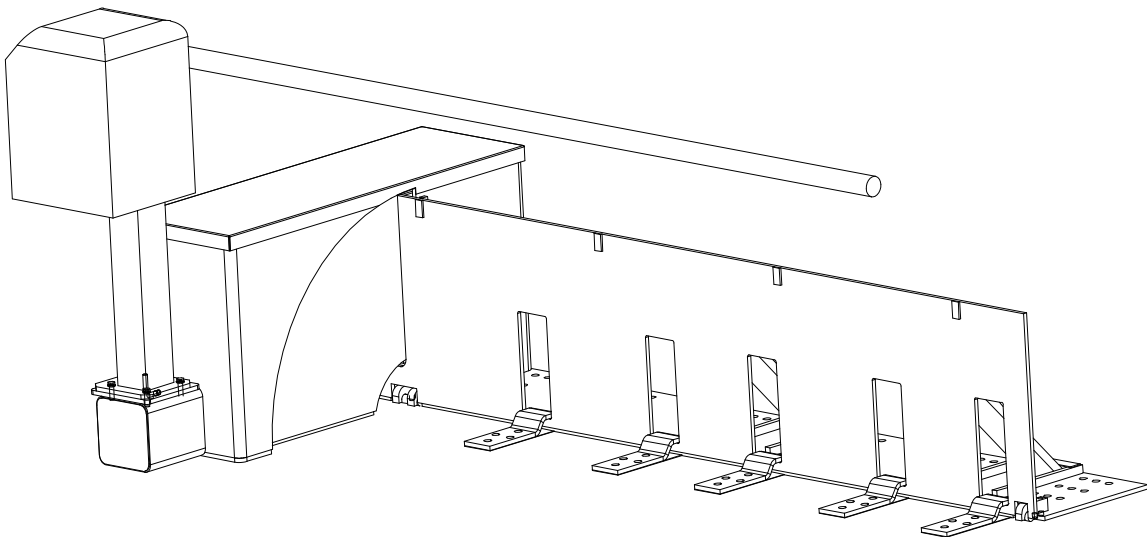




# MODEL 890 SERIES SURFACE MOUNTED VEHICLE BARRICADE

## INSTALLATION MANUAL



### **B&B ARMOR**

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**MADE IN THE USA**

## INTRODUCTION

### 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, maintain, and troubleshoot your vehicle barrier. If you require additional assistance with any aspect of your vehicle barrier's installation or operation, please contact us.

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 security services:

- 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 many other security related products.
- Technical support via telephone and possible on site support with advanced scheduling.

## Safety

## How to Contact Us

B&B ARMR works with an extensive list of value added resellers to best support our customers. Our resellers offer not only our superior products, but provide excellent support. If you should need advanced assistance with your vehicle barrier or would like further information on any physical security applications please contact us at:

### **Corporate/Tech Support:**

#### **B&B ARMR**

2009 Chenault Drive Suite 114

Carrollton, TX 75006 USA

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## Table of Contents

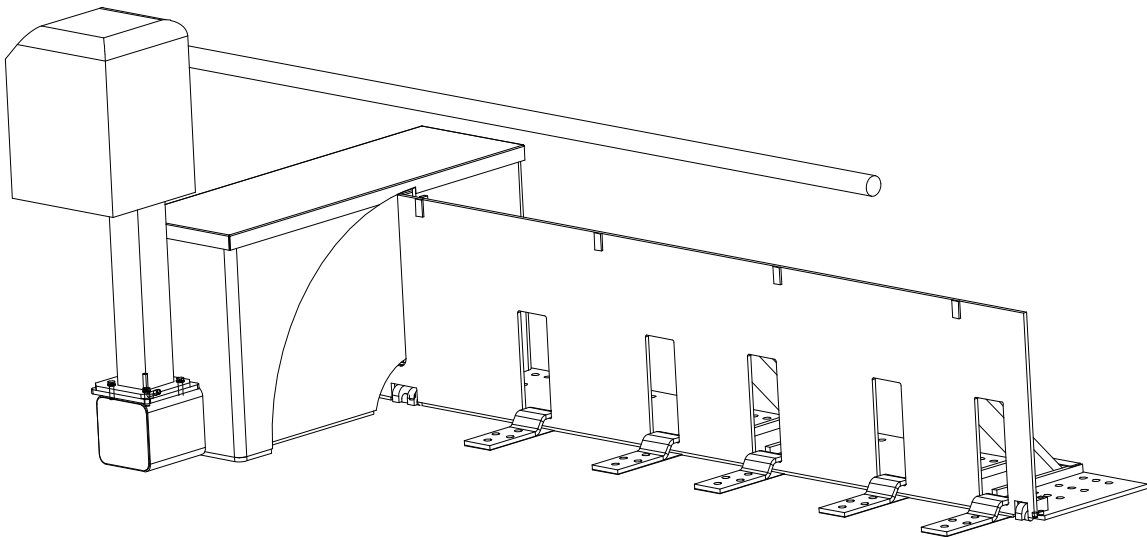
<b>1</b>	<b>ORIENTATION .....</b>	<b>4</b>
1.1	<i>Overview .....</i>	4
1.1.1	Attack plate .....	4
1.1.2	Buttress .....	5
1.1.3	Base Plate .....	5
1.1.4	Hinge shims .....	5
1.1.5	Brace Arms .....	5
1.1.6	Traffic Control Gate .....	5
1.1.7	Cabinet Lock Tabs .....	5
1.1.8	Options .....	6
<b>2</b>	<b>INSTALLATION .....</b>	<b>6</b>
2.1	<i>Introduction.....</i>	6
2.2	<i>Site Preparation .....</i>	7
2.3	<i>Component Inspection.....</i>	9
2.4	<i>Physical Installation.....</i>	9
2.5	<i>Pre-Operation .....</i>	11
2.5.1	Hydraulic Fluid Check.....	11
2.5.2	Electrical Hook-up.....	11
2.5.3	Control Hook-up.....	11
2.5.4	Pump Pressure Relief Valve Adjustment.....	11
2.5.5	Flow Control Valve Adjustment.....	13
2.5.6	Hydraulic Circuits.....	13
2.5.7	Pre-Operation Checklist.....	13
<b>3</b>	<b>TROUBLESHOOTING .....</b>	<b>14</b>
3.1	<i>Model 890 Troubleshooting Guide.....</i>	14
3.2	<i>Hydraulic Pumping Unit.....</i>	14
3.3	<i>Electrical Control Unit .....</i>	15
<b>4</b>	<b>WARRANTY.....</b>	<b>16</b>
<b>5</b>	<b>APPENDIX.....</b>	<b>17</b>
5.1	<i>Electrical Schematic with Mega Arm.....</i>	17
5.2	<i>Electrical Schematic without Mega Arm.....</i>	18
5.3	<i>Hydraulic Diagram .....</i>	19
5.4	<i>Standard Wire Gage Chart .....</i>	20

# 1 ORIENTATION

## 1.1 Overview

The model 890 surface mounted vehicle barrier is designed to contain a medium speed vehicle impact and prevent that vehicle from entering a restricted access control area. The barrier consists of a bolt down foundation frame, raising plate with locking linkage, and associated hardware to allow the plate to move from a horizontal position to a raised, secure position with the aid of a hydraulic cylinder. The unit is designed for bolting to an existing concrete slab or roadway, and includes all necessary accesses for the required hydraulic conduits and electrical services.

The barrier is provided with safety pins, which are used during servicing to prevent the barrier from accidentally lowering. The safety locks are contained in a locked housing so the plate can be locked into the secure position for extended periods of time.



**Figure 1 Model 890 Surface Mounted Barrier Basic Components**

Figure 1 orients you to the basic components of the Model 890 vehicle barrier:

### 1.1.1 Attack plate

The attack plate is the structural component that transfers the vehicle impact energy to the base.



**DANGER:** This vehicle barrier is made of extremely heavy metal. Extreme care should be given to ensure all personnel are clear of the product during operation.

### 1.1.2 Buttness

The buttness houses the hydraulic and electric components that drive the attack plate. The top cover can be unscrewed and lifted off for maintenance. The side cover is held on with optional padlocks.



**DANGER:** High voltage electrical components are located in cabinet. Service by qualified technicians only.



**CAUTION:** Hydraulic linkages are located in cabinet. Do not operate barrier with cabinet door open.

### 1.1.3 Base Plate

The base plate is bolted to the concrete surface to hold the barrier in position during impact.

### 1.1.4 Hinge shims

Hinge shims are provided and required to be installed during assembly to provide a smooth hinge surface.

### 1.1.5 Brace Arms

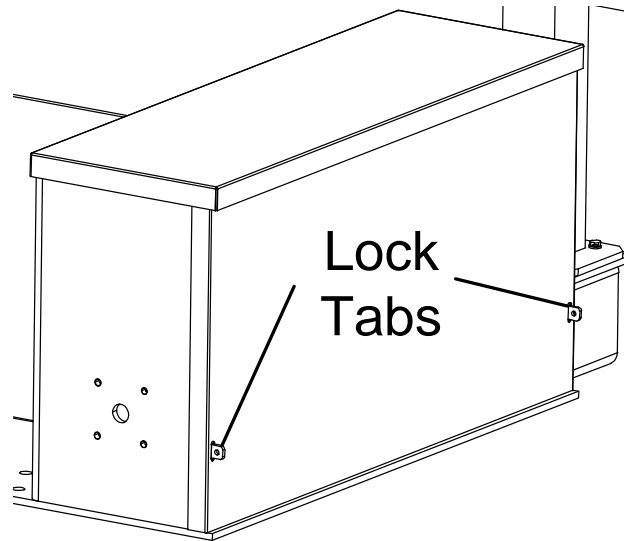
The power brace arms are engineered to structurally transfer the impact energy to the base plate.

### 1.1.6 Traffic Control Gate

The included traffic control gate cycles with the barrier to give a visual and physical sign the barrier is in the up or down position. This arm is positioned in front of the gate and does not rise until the gate is fully open, and it closes before the gate starts to close. The barrier gate is installed in the field.

### 1.1.7 Cabinet Lock Tabs

Cabinet lock tabs are located on the bottom outside edges of the cabinet door. Locks are customer supplied.



**Figure 2 Model 890 Surface Mounted Barrier Lock Tabs**

### 1.1.8 Options

The Model 890 vehicle barrier is available with a broad array of options. Consult your ordering documentation to determine whether your unit has the optional equipment.

- Red/amber traffic lights. The light remains red if the gate is in any position except fully open.
- Infrared safety beams to detect pedestrian traffic or as an additional vehicle sensing device.
- Heater for the electric/hydraulic system.
- Battery backup system.

## 2 INSTALLATION

### 2.1 Introduction

This section of the manual describes the procedure to set-up and configures the Model 890 Surface Mount vehicle barrier for first-time operation. The product ships from the factory tested and ready for deployment following these steps.



**DANGER:** High voltage electrical components are located in cabinet. Service by qualified technicians only.



**CAUTION:** Heavy components and pinch points are present in this product. Use extreme care when servicing this unit.

**NOTE: The hydraulic hoses are constructed with JIC fittings to allow removal and installation without sealant. Care should be used when disconnecting the pressure side of the hose to insure the pressure has been released prior to disconnecting the fitting. The pressure can be relieved by activating the down control button and visually watching the cylinder close. If the hydraulic cylinder does not fully close, the hose is still under pressure and must not be serviced until the directional control valve has been manually released and the cylinder can be verified to be in a fully released position and the attack plate in the lower position.**

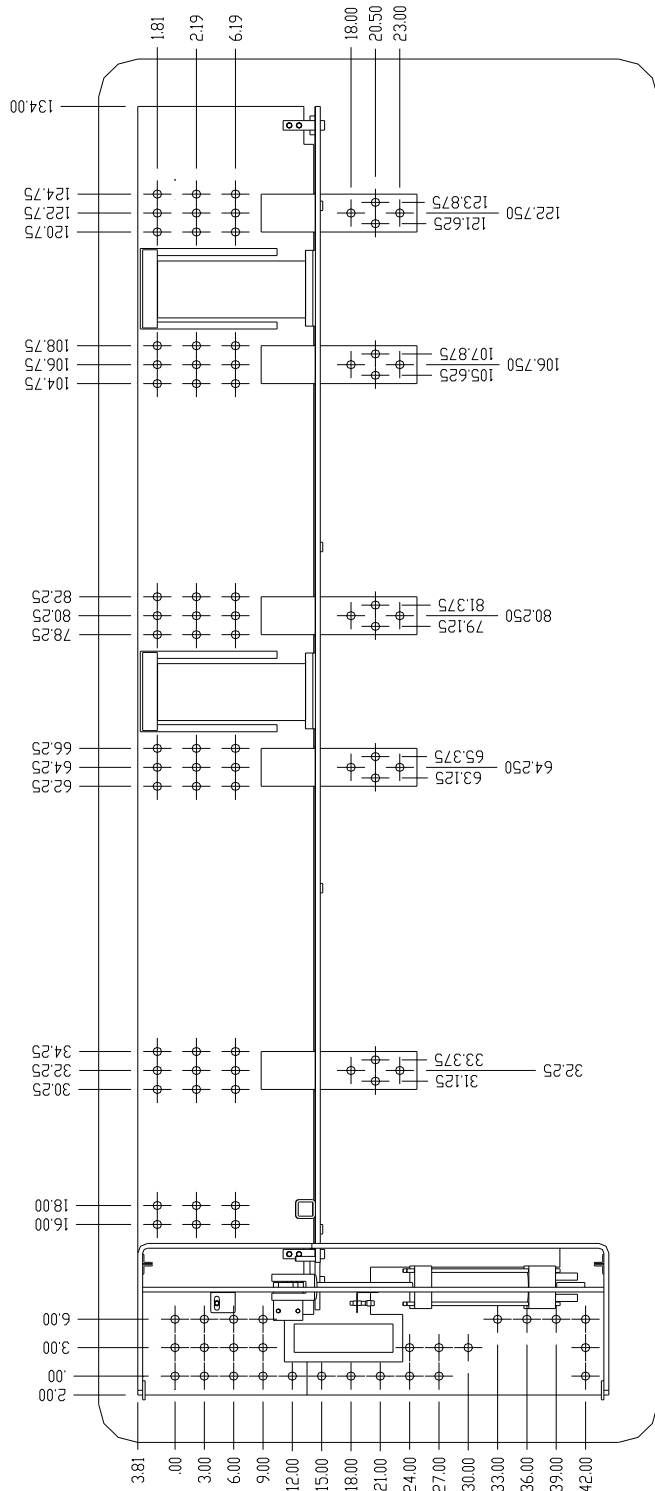
Prior to working on unit in UP position, insert supplied Safety Lock Pin to ensure attack plate does not move inadvertently.

## 2.2 Site Preparation

The 890 Surface Mount Barrier's performance is influenced by the surrounding mounting surface conditions and grade. Please consult with B&B ARMR Technical Support if there are questions in regards to the installation site conditions.

The following lists some requirements and recommendations related to site choice and preparation:

1. The barrier requires a level surface to operate on. Slight inclines from attack side are acceptable, but inclines left and right may degrade barrier operational performance when opening and closing. The site needs to be level side to side within .25" prior to barrier installation.
2. Installation of electric heat cables in the installation slab keeps snow and ice from accumulating on the barrier.
3. Install the 890 on a concrete slab with a minimum thickness of eight inches (8"). Attach the barrier to the concrete slab using 3/4" x 6" long corrosion resistant steel studs with a tensile strength greater than 7800 PSI. The studs are required to stick out of the concrete a minimum of 1.25". For anchor location placement, refer to the 890 anchor detail drawing. We recommend the use of at least 70% of the anchor points distributed evenly across the base frame. The anchors may be match drilled and installed after barrier is in place to eliminate possible misalignment.
4. Install barrier in area that has adequate drainage. Barrier's operational performance when opening and closing may be affected when there is inadequate drainage.
5. Surface of concrete should be completely clean and free of dirt, rocks, and other debris.



FOUNDATION BOLT PATTERN - 10 FOOT BARRIER

Figure 3 Model 890 Surface Mounted Barrier Bolt Pattern



## 2.3 Component Inspection

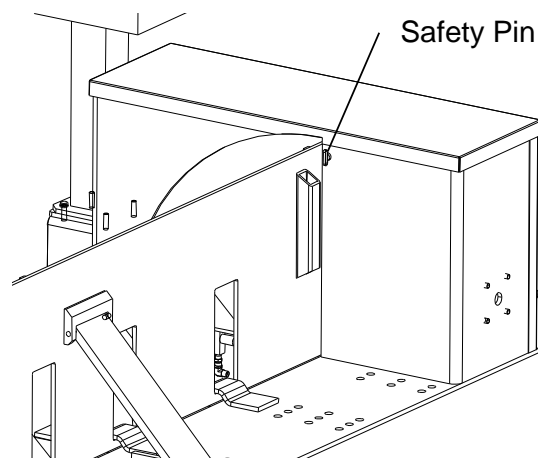
Your model 890 Surface Mount vehicle barrier is shipped from the factory with the following standard components (See table). It is recommended these items are inspected upon receipt to ensure installation and deployment time is minimized. Refer to shipping documents for other optional items that may have been included. Please contact B&B ARMR support if any items are missing or damaged.

Item Number	Part Number	Description	Quantity
1		Main Assembly	1
2	XPIN-91594A325	Safety Lock pin	1
3		Gate Arm Assembly	1
4		Gate Arm Pole Assembly	1
5	0890-3101	Hinge Shim Plates	5 (1 per hinge)
6	0890-9001	User Manual	1
7		Manual Lift Bar	1

## 2.4 Physical Installation

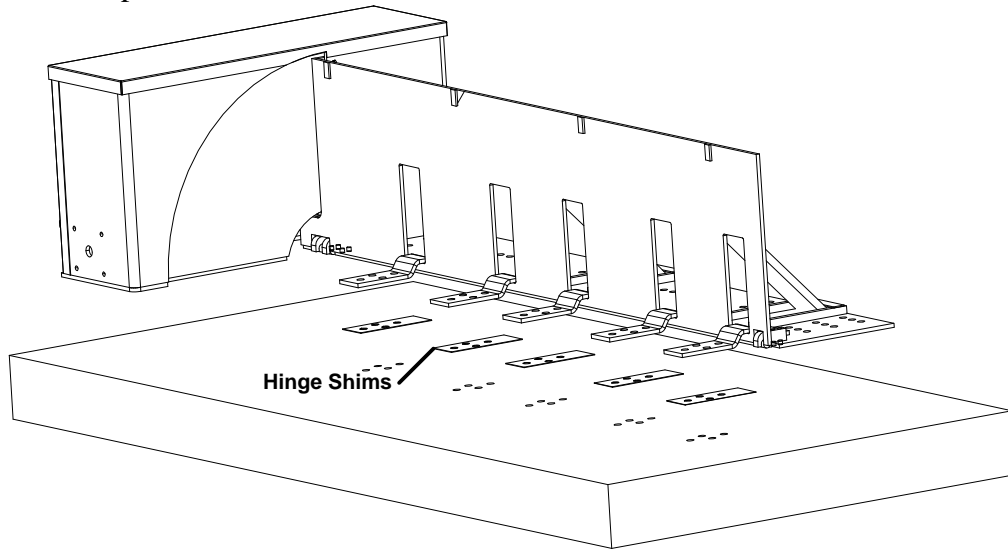
Installation of the 890 barrier should be completed by a qualified technician. Please contact B&B ARMR Technical Support if assistance is required. The following outlines the physical installation procedure:

1. Verify site preparation is complete. Anchors may be match drilled at assembly to the pad.
2. Lift unit with fork lift or crane ensuring adequate support so base plate does not bend or warp during movement.
3. If optional heater kits have been purchased, ensure they are mounted correctly.
4. It is recommended that the safety lock pin is installed in the barrier at anytime during installation when attack plate is in the raised position.



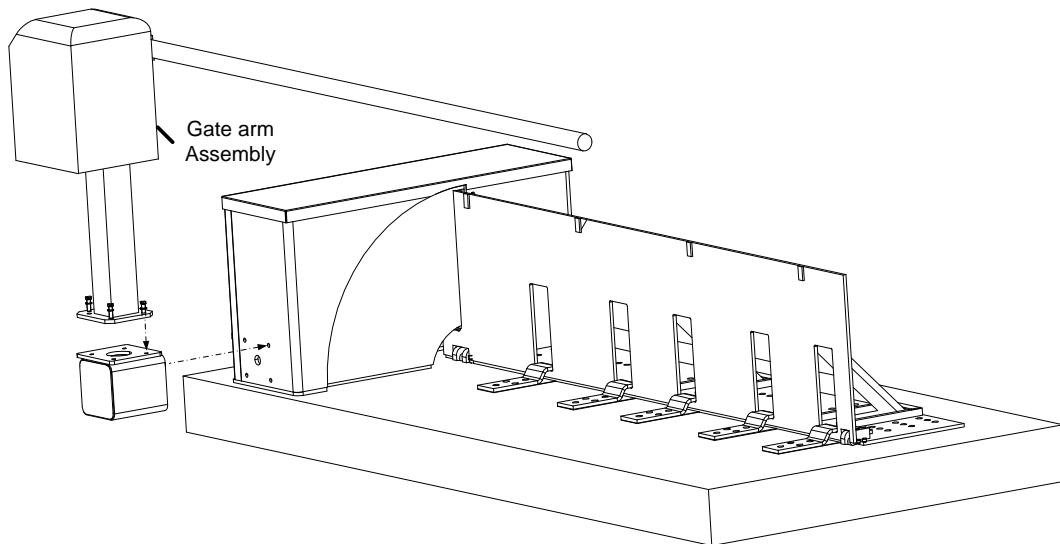
**Figure 4 Safety Lock Pin Location**

5. Position Hinge Shim Plates under hinge areas prior to setting barrier. Set barrier and assure base plate is level. Verify attack plate lays flat on concrete pad when in down position.



**Figure 5 Hinge Shim Plate Installation**

6. If anchors have not been pre-installed, match drill and install anchors to conform to recommendations in the site preparation section of this manual.
7. Torque anchor nuts to 100 ft-lbs minimum and ensure barrier is rigidly secured to concrete pad. Verify base plate and attack plate are level.
8. Install gate arm assembly kit to side of buttress as shown in figure 6. Mounting bolts are installed from inside the buttress.



**Figure 6 Gate Arm Installation**

9. Verify all mounting hardware is tight and barrier is not warped or twisted.

## 2.5 Pre-Operation

### 2.5.1 Hydraulic Fluid Check

**Prior to initial operation, exchange breather plug and shipping plug in hydraulic reservoir.**

The product is normally shipped from the factory ready for deployment. In some situations the fluids have been drained to accommodate shipping methods. Prior to electrical hook-up, verify the hydraulic fluid levels. If required, add hydraulic fluid. We recommend using environmentally safe oil Mobil EAL 224 or equivalent.

### 2.5.2 Electrical Hook-up

The hydraulic pumping unit is a complete assembly which not only contains the mechanical components, but also the electrical components and logic necessary to make the unit operate. The electrical components are located in a metal box which includes a motor starter, motor overload protector, and the necessary logic to control the barrier.

Do not power the unit until all traffic and pedestrians have been cleared from harms way.

Please refer to the appropriate wiring diagram that matches your specific product. The wiring diagrams are located in the appendix.

### 2.5.3 Control Hook-up

This barrier is remotely controlled by standard dry contact signals. Please refer to system documentation for control interface.

### 2.5.4 Pump Pressure Relief Valve Adjustment



**CAUTION:** Incorrect adjustment of the pressure relief valve will cause the motor and valves to overheat resulting in permanent damage. Adjustment by qualified technician only.

The hydraulic pump can be tuned to your specific installation by adjusting the pressure relief valve on the hydraulic pump. The pumps are adjusted at the factory based on normal and expected conditions and this adjustment should not be necessary when you receive your product. However, some factors can influence the performance and may require field adjustment. Care must be used not to fully remove the pressure relief valve assembly.

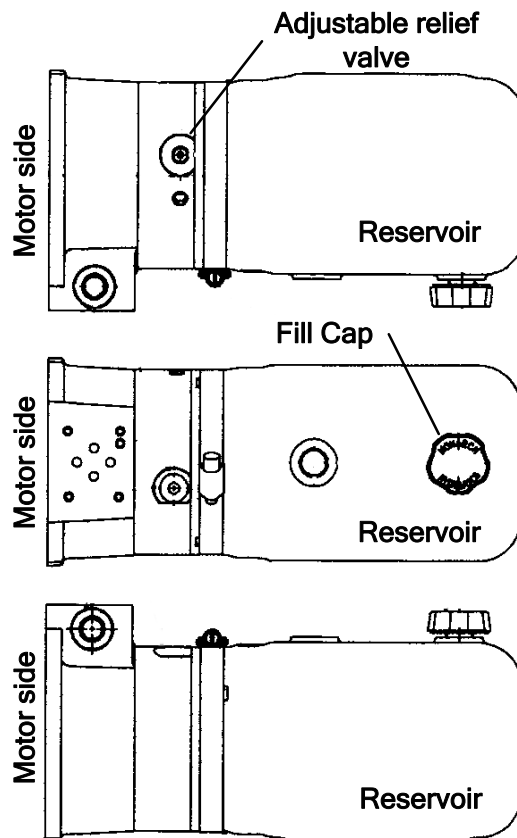
Normally the pump is set on the low or conservative side of the normal operating range. Therefore, any field adjustments require the turning in of the pressure relief valve by turning the screw clockwise.

There are two ways of adjusting the pressure relief valve:

The first method is to use an electrical amp meter and adjust the pressure switch until the relief opens at the FLA (full load amps) rating found on the side of the motor.

The second method is to adjust the pressure switch so the plate just starts to move as the motor is running.

The pressure switch is built into the hydraulic pump under a hex shaped cap near the top of the pump (see figure 7). The hex cover is removed by turning counter clockwise exposing a hex lock nut and an allen head set screw. The hex nut must be turned counter clockwise to allow for the adjustments of the allen screw. The allen screw controls the pressure relief and can be turned counter clockwise to lower the pressure and clockwise to raise the pressure. The screw should be turned slowly to achieve the desired relief setting using either the meter or movement procedure. After the relief is set, hold the allen screw stationary and tighten the lock nut. Check the operating system to confirm that the motor does not exceed the FLA rating.



**Figure 7: Pump and Reservoir**

### 2.5.5 Flow Control Valve Adjustment

The speed of operation can be controlled by adjusting the flow control valve (see figure 8). This is adjusted in the factory and shouldn't require field adjustment. The flow control valve is mounted to the cylinder and restricts the down speed only. The proper speed can best be determined by watching the motion of the plate.




**Figure 8: Hydraulic layout**

### 2.5.6 Hydraulic Circuits

The hydraulic hoses are constructed with JIC fittings to allow removal and installation without sealant. Care should be used when disconnecting the pressure side of the hose to insure the pressure has been released prior to disconnecting the fitting. Pressure should be released by shifting the directional control valve manually with the power off.

### 2.5.7 Pre-Operation Checklist

Before operating the Model 890 vehicle barrier, go through the checklist below and verify that each of these steps has been completed.

	<b>CAUTION:</b> For your safety, complete each of these steps before operating the barrier!
---	---

- Verify pad site is flat.
- Verify unit has hydraulic fluid 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.
- Ensure supplied power matches product requirements.
- Verify electrical hookups are completed per electrical wiring diagram matching particular product.
- It is recommended the unit be cycled 4 complete cycles prior to vehicle traffic.

## 3 TROUBLESHOOTING

The table below provides guidance on identifying and correcting any problems with your Model 890 Series vehicle barrier. If you encounter problems that you cannot fix, contact B&B ARMR and we will gladly work with you to correct them.

### 3.1 Model 890 Troubleshooting Guide

Symptom	Actions
Barrier does not open	<ul style="list-style-type: none"> <li>Check power</li> <li>Check overload protector</li> <li>Control unit contacts</li> <li>Check that safeties are clear</li> </ul>
Barrier does not close	<ul style="list-style-type: none"> <li>Check power</li> <li>Check overload protector</li> <li>Check that safeties are clear</li> <li>Check push button operation</li> </ul>
Barrier makes noise during operation	<ul style="list-style-type: none"> <li>Check that barrier is not moving too fast</li> </ul>
Hydraulic unit is excessively hot	<ul style="list-style-type: none"> <li>Check that cooling fan on motor is working</li> <li>Check that the cover is on properly</li> <li>Check that the limit switch is turning the motor off, and/or motor is off when barrier is not moving.</li> <li>Check the heater element</li> </ul>
Barrier moves too slowly	<ul style="list-style-type: none"> <li>Check that heater element is working</li> <li>Check flow control valve</li> </ul>
Traffic indicator light does not change	<ul style="list-style-type: none"> <li>Check proper limit switch operation</li> <li>Check bulbs</li> </ul>

### 3.2 Hydraulic Pumping Unit



This device should only be operated and maintained by qualified individuals with experience. These units should not be serviced with vehicle or pedestrian traffic in the vicinity. After being serviced, all required safety tests must be completed before it is returned to operation.

The hydraulic pumping unit is designed to operate a double acting hydraulic system, which requires relatively low pressure and low flow. The electric motor is connected directly to a gear hydraulic pump, which operates only when a signal command is given to operate the cylinder. The oil from the pump is drawn through a filter and directed into a speed control valve, which monitors the operational speed of the vehicle barrier.

The pumping unit is designed to operate continuously with very little maintenance. The unit is equipped with a heater to ensure proper operating conditions. B&B ARMR recommends the use of environmentally friendly oil such as Mobil EAL 224 in all of our

hydraulic systems. The oil should be replaced whenever it appears to contain contaminants such as water or dirt. All applications vary due to site conditions and temperature, so the amount and type of contamination will need to be monitored at each site. The oil should be replaced whenever a hydraulic part is replaced due to a mechanical failure, or there is a failure of the heating element.

### **3.3 Electrical Control Unit**

The hydraulic pumping unit is a complete assembly containing all electrical components and logic necessary to operate the unit. The electrical components are mounted in a metal box, which include a motor starter, motor overload protector, and a programmable logic controller (PLC). The program installed in the PLC will vary based on the barrier style and application. If the controller should require replacing, please be sure to specify the model, location and type of application.

The control circuit box has a switch mounted externally to turn off power to the barrier. The switch should be turned off any time the unit is serviced. Do not restore power to the unit until all traffic and pedestrians have been cleared from the area.

## 4 WARRANTY

B&B-ARMR warranties for a period of one year, after delivery F.O.B. plant, unless otherwise specified by Supplier, from failure of operation in ordinary use and against defects due to faulty material or workmanship. Any defective equipment in the Barrier shall be returned to the factory, at Supplier's option, for repair or replacement, and Supplier assumes no responsibility for service at any consumer site. Supplier 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 the end user. Supplier shall not have any liability under these specifications, other than for repair or replacement as described above for 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 Supplier personnel, nor by Supplier authorized personnel, failure to perform manufacturer's suggested routine maintenance, modifications, misuse, accident, catastrophe, neglect, natural disaster, act of God or if at any time the power supplied to any part of the Security Barrier falls short or exceeds the rate of tolerance for the equipment.

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

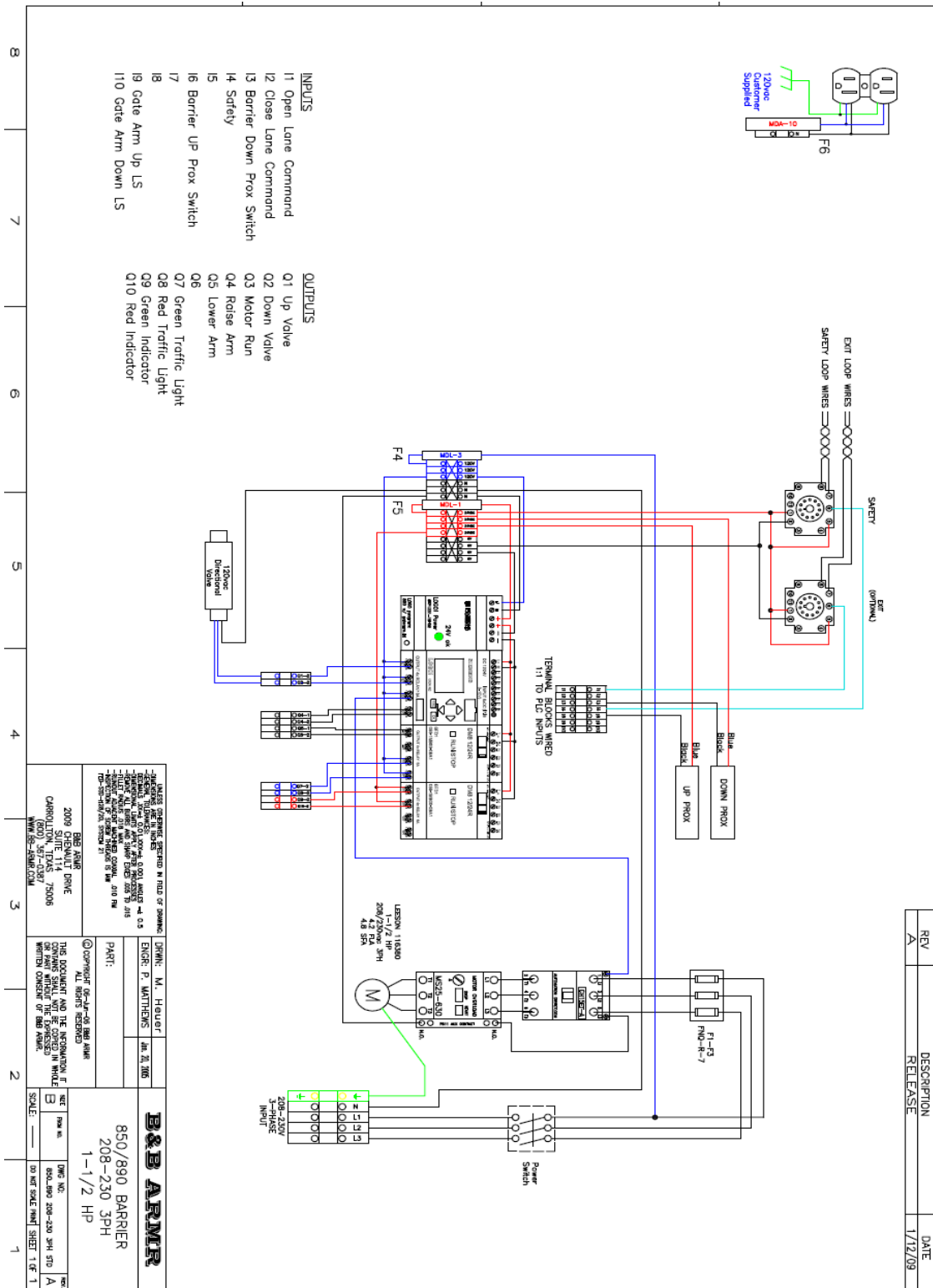
**THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. NO OTHER WARRANTIES EXIST.**

Any modification or alteration by anyone other than B&B-ARMR will render the warranty herein as null and void.

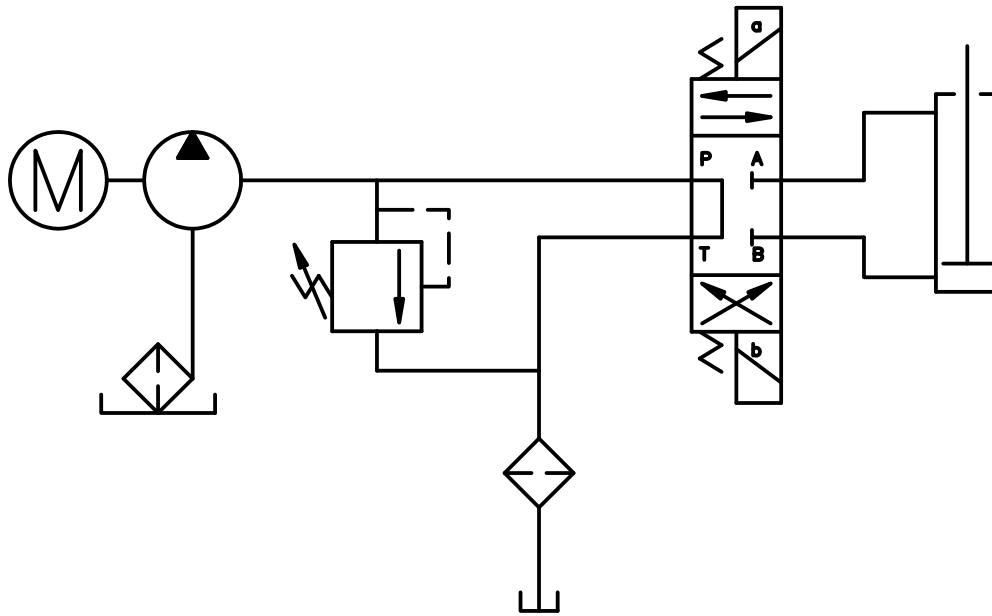




## 5.2 Electrical Schematic without Mega Arm



### 5.3 Hydraulic Diagram



### 5.4 Standard Wire Gage Chart

1 Ø Power Wiring				
HP	Voltage Amps	Wire Gage	mm <sup>2</sup>	Max Distance
1/2	115 V 7.5 A.AC	12	3.309	70
		10	5.261	110
		8	8.366	180
		6	13.302	290
1/2	208 V 3.9 A.AC	12	3.309	250
		10	5.261	390
		8	8.366	630
		6	13.302	1010
1/2	230 V 3.7 A.AC	12	3.309	290
		10	5.261	470
		8	8.366	750
		6	13.302	1190
1	115 V 12 A.AC	12	3.309	50
		10	5.261	70
		8	8.366	120
		6	13.302	200
1	208 V 6.4 A.AC	12	3.309	160
		10	5.261	260
		8	8.366	420
		6	13.302	680
1	230 V 6 A.AC	12	3.309	200
		10	5.261	310
		8	8.366	500
		6	13.302	800
1 1/2	115 V 15 A.AC	12	3.309	40
		10	5.261	60
		8	8.366	100
		6	13.302	160
1 1/2	208 V 8.3 A.AC	12	3.309	130
		10	5.261	210
		8	8.366	340
		6	13.302	540
1 1/2	230 V 7.5 A.AC	12	3.309	160
		10	5.261	260
		8	8.366	410
		6	13.302	660
2	208 V 13.2 A.AC	12	3.309	80
		10	5.261	140
		8	8.366	220
		6	13.302	350
2	230 V 12 A.AC	12	3.309	100
		10	5.261	170
		8	8.366	270
		6	13.302	430
3	208 V 18.7 A.AC	12	3.309	60
		10	5.261	100
		8	8.366	160
		6	13.302	250
3	230 V 17 A.AC	12	3.309	70
		10	5.261	120
		8	8.366	190
		6	13.302	310

3 Ø Power Wiring				
HP	Voltage Amps	Wire Gage	mm <sup>2</sup>	Max Distance
1/2	208 V 2 A.AC	12	3.309	400
		10	5.261	630
		8	8.366	1010
		6	13.302	1610
1/2	230 V 2 A.AC	12	3.309	450
		10	5.261	730
		8	8.366	1160
		6	13.302	1850
1/2	460 V 1 A.AC	12	3.309	1830
		10	5.261	2920
		8	8.366	4650
		6	13.302	7410
1	208 V 3.5 A.AC	12	3.309	270
		10	5.261	430
		8	8.366	690
		6	13.302	1100
1	230 V 3.2 A.AC	12	3.309	330
		10	5.261	520
		8	8.366	830
		6	13.302	1330
1	460 V 1.6 A.AC	12	3.309	1320
		10	5.261	2100
		8	8.366	3350
		6	13.302	5330
1 1/2	208 V 6.2 A.AC	12	3.309	170
		10	5.261	270
		8	8.366	430
		6	13.302	690
1 1/2	230 V 5.6 A.AC	12	3.309	210
		10	5.261	330
		8	8.366	530
		6	13.302	850
1 1/2	460 V 2.8 A.AC	12	3.309	840
		10	5.261	1340
		8	8.366	2140
		6	13.302	3420
2	208 V 6.2 A.AC	12	3.309	80
		10	5.261	140
		8	8.366	220
		6	13.302	350
2	230 V 5.6 A.AC	12	3.309	100
		10	5.261	170
		8	8.366	270
		6	13.302	430
2	460 V 2.8 A.AC	12	3.309	140
		10	5.261	230
		8	8.366	370
		6	13.302	590

3 Ø Power Wiring (Continued)				
HP	Voltage Amps	Wire Gage	mm <sup>2</sup>	Max Distance
3	208 V 7.8 A.AC	12	3.309	140
		10	5.261	220
		8	8.366	360
		6	13.302	570
3	230 V 7.4 A.AC	12	3.309	160
		10	5.261	260
		8	8.366	420
		6	13.302	670
3	460 V 3.7 A.AC	12	3.309	660
		10	5.261	1060
		8	8.366	1690
		6	13.302	2690
5	208 V 15 A.AC	12	3.309	80
		10	5.261	140
		8	8.366	220
		6	13.302	350
5	230 V 13.2 A.AC	12	3.309	100
		10	5.261	170
		8	8.366	270
		6	13.302	430
5	460 V 6.6 A.AC	12	3.309	140
		10	5.261	230
		8	8.366	370
		6	13.302	590

Control Wiring				
Voltage	Wire Gage	mm <sup>2</sup>	Max Distance (ft)	Voltage Drop
24 V	28	0.081	450	6V
24 V	26	0.129	710	6V
24 V	24	0.205	1140	6V
24 V	20	0.518	2890	6V
24 V	18	0.823	4600	6V

Notes	
1	Maximum distance is measured from Power Source to Operator.
2	Maximum distance for controls is measured from Operator to Pushbutton or Other device.
3	If distance to power Source is greater than value shown use a higher voltage or three phase unit or contact utility company for a service feeder.
4	If distance to Remote Control device is greater than 2000ft use a range extender device.
5	Power Tables are based on stranded copper wires and allows up to 2% voltage drop.
6	Control Table is based on stranded copper wires and allows up to 25% Connect Power per local codes.
7	Connect Power per local codes.
8	Run Power and Control wiring seperately.
9	Ampere rating is motor full load; Startup up current may be higher.
10	250 VA Allowed for Controls & Heater
11	0.1 Amps for control current, these may vary for different models.