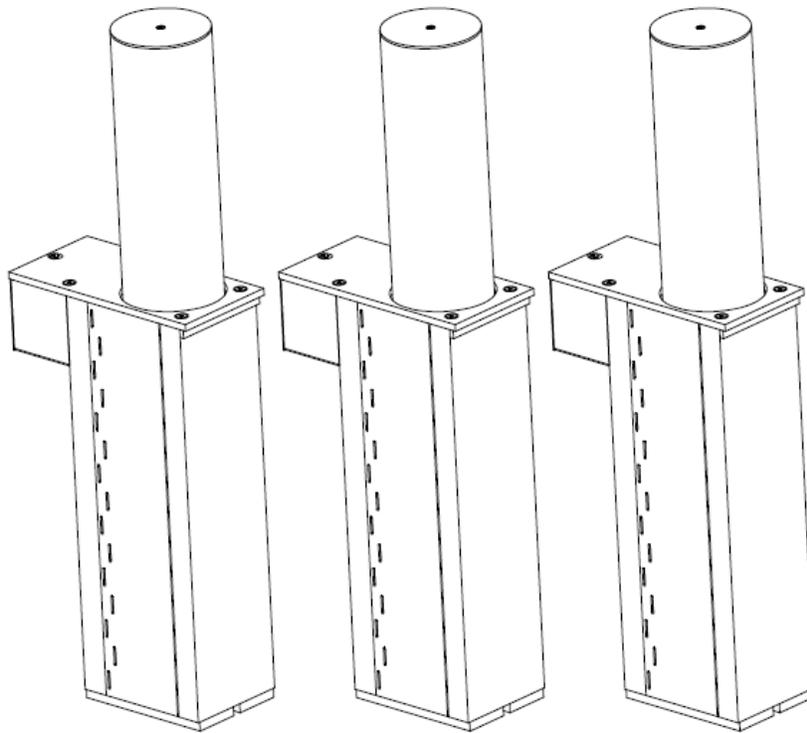




MODEL B3X SERIES HYDRAULIC BOLLARD

INSTALLATION AND OPERATIONS MANUAL



B&B ARMR

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MADE IN THE USA



Your safety is extremely important to us. If you have any questions or are in doubt about any aspect of the equipment, please contact us.

INTRODUCTION

Welcome!

Congratulations on your purchase of a B&B ARMOR 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 ARMOR 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



SYMBOL MEANING:



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of non-insulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instruction in the literature accompanying the product.

B&B ARMR does not assume responsibility for injury to persons or property during installation, operation, or maintenance. 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. B&B encourages customers to 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, follow applicable international, regional, and local safety standards. Engage only trained and experienced staff to install, operate, and maintain the equipment and ensure that all repairs are performed correctly, using properly trained technicians and the correct tools and equipment.

Additional safety devices may be included with this barrier system:

- Vehicle loop detector(s) – Safety loop
- Traffic arms and lights
- IR beams and Safety edges

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

5900 S. Lake Forest Drive, Suite 230

McKinney, TX 75070 USA

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1 ORIENTATION

1.1 Overview

The model B3X Hydraulic Bollard system is designed to act as a vehicular deterrent for perimeter security and traffic control purposes. Engineered for simple installation, fast service and easy relocation, the Model B3X is constructed of high strength steel cylindrical units guided by an offset flange assembly with precision machined anti-

friction surfaces. The Model B3X is offered in a variety of drive solutions: Automatic (HPU Driven), Semi-automatic (Manual) and fixed are the standard drive options available.

The bollard system has been tested to Department of State specifications STD 02.01.

The bollard system is designed to stop a 15,000-pound vehicle traveling at 40 mph.

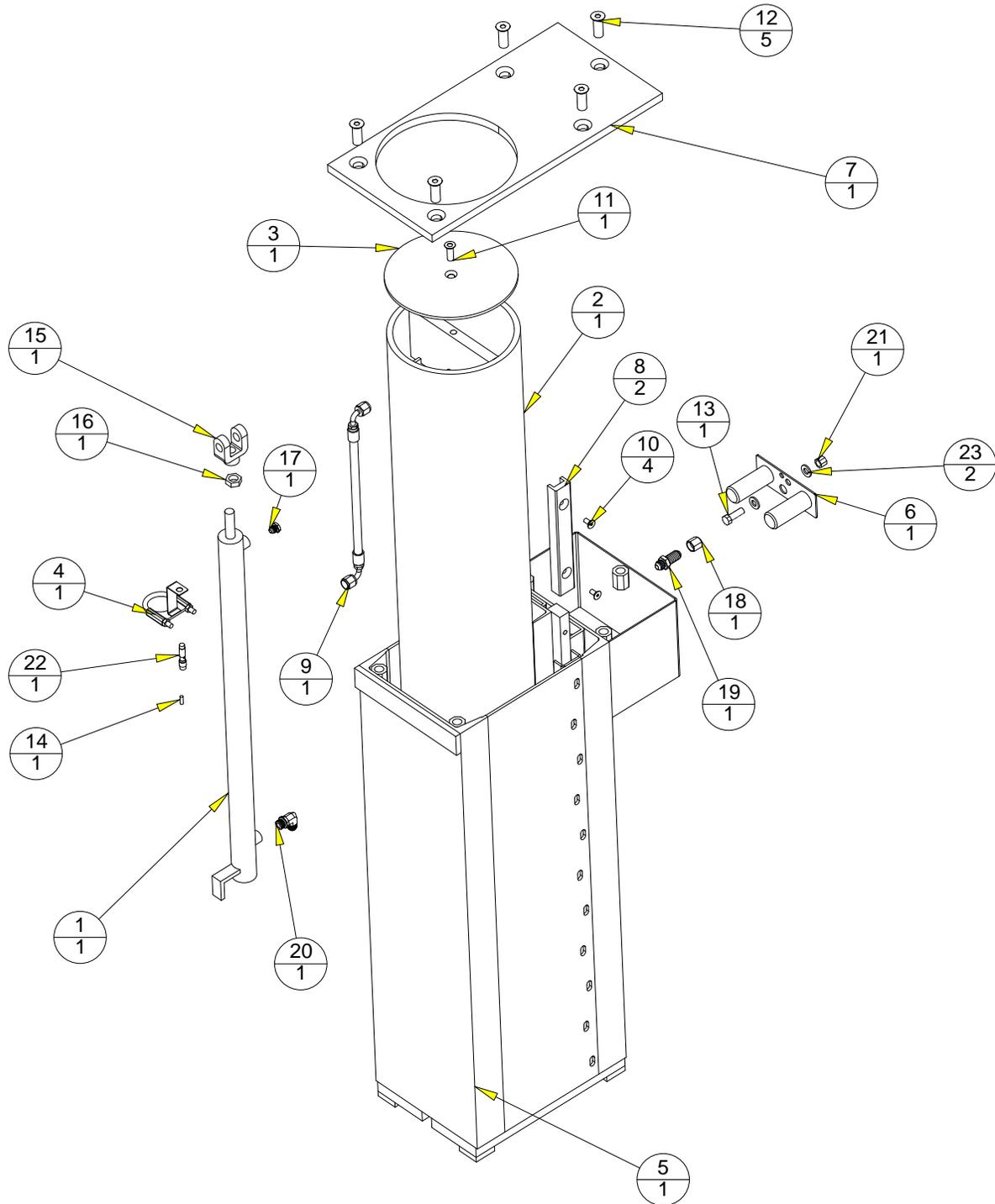


Figure 1: Model B3X Bollard Frame (Automatic Product Shown)

2	23	XWASH-98023A033, MCMaster	WASHER, 1/2", 1.062" X .532" X .122"	
1	22	XPROX-FCM2-1204, HTM FCM2-1204C-AR S4	PROXIMITY SWITCH	
1	21	XNUT-9561A210, MCMaster	HEX NUT, NYLON, 1/2"-13	
1	20	XFTI-8-C5OX-S	90 ELBOW, #8 SAE TO #8 JIC	
1	19	XFIT-8_WTX-S	BULKHEAD UNION, 3/7 FLARE 87 FLARE, 1/2	
1	18	XFIT-8-FNTX-S	CAP, FEMALE, 1/2 JIC	
1	17	XFIT-6-P50N, PARKER HANNIFIN 6-P50N	PLUG, MALE, 3/8 SAE	
1	16	XCLEVIS-NUT, MCMaster 94846A640	HEX NUT 3/4-16UNC	
1	15	XCLEVIS-1A347	CLEVIS MOUNT, AUTO	
1	14	XCABLE-4-FS4TZ, HTM RFS4TZ-V072	PROXIMITY CABLE	
1	13	XBOLT-92865A716, MCMaster	HEX BOLT, GRADE 5, 1/2"-13 X 1.5" LG	
5	12	XBOLT-1215, 3/4-10 X 1.5" LNG, FSH	3/4-10 X 1.5" LONG, FLATHEAD, SOCKET DRIVE	
1	11	XBOLT-0815, 1/2-13 X 1.5" LNG, FSH	1/2-13 X 1.5" LONG, FLATHEAD, SOCKET DRIVE	
4	10	XBOLT-0607, 3/8-16 X .75" LNG, SST	3/8-16 X .75" LONG, FLAT, SOCKET DRIVE SST	
1	9	B30-2008	UP LINE HOSE B30-BOLLARD	
2	8	B30-3129	GUIDE STRIP DELRIN B0-BOLLARD	
1	7	B30-3126	COVER PLATE AUTOMATIC B0-BOLLARD	
1	6	B30-2147	COLLISION PIN ASSEMBLY B30-BOLLARD	
1	5	B30-2141	HOUSING WELDMENT AUTOMATIC B0-BOLLARD	
1	4	B30-2120	PROXIMITY SWITCH HOLDER ASSEMBLY B30-BOLLARD	
1	3	B30-2110	TUBE COVER PLATE ASSEMBLY B30-BOLLARD	
1	2	B30-2106	CYLINDER WELDMENT ASSEMBLY B0-BOLLARD	
1	1	B30-2006	HYDRAULIC CYLINDER B0-BOLLARD	
QTY	PART NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	NOTES

1.1.1 Hydraulic Cylinder

On the automatic system, the hydraulic cylinder provides the force when pressurized to raise or lower the bollard by a hydraulic pumping unit. On the semi-automatic product, this is a pre-pressurized gas cylinder to allow the bollard to be manually lifted and lowered.

1.1.2 Cylinder Weldment Assembly

The main structural element of the B3X Bollard is the cylinder. This 10 inch schedule 80 steel cylinder raises and lowers to provide the obstruction during impact. When raised, the tube protrudes 30-36 inches of grade (depending on the model).



CAUTION: This barrier is made of heavy steel components. Ensure all personnel are cleared of area during operation.

1.1.3 Tube Cover Plate

The cover plate seals the top of the cylinder to provide a functional and aesthetic bollard. This cover plate is used to access the hydraulic cylinder and other maintenance items.

1.1.4 Proximity Switch Bracket

This bracket positions the proximity switch in the correct location to provide a feedback signal when the bollard is in the lowered position. The optional raised proximity switch is on the outside of the tube next to the fittings.

1.1.5 Housing Weldment

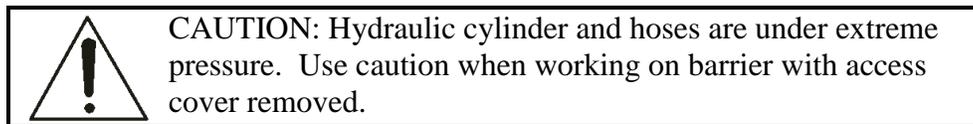
The housing provides the necessary structure to hold the bollard cylinder and position it when raising and lowering.

1.1.6 Collision Pins

The collision pins are used as the elements to hold the bollard cylinder into the housing during impact. These pins are easily removed to allow the entire bollard cylinder to be removed for maintenance and inspection.

1.1.7 Cover Plate

The access cover allows maintenance access to the system without physically removing the structure. Access to hydraulic cylinder, fittings, hoses and collision pins can be made by removal of this cover.



1.1.8 Guide Strip

The acetyl (Delrin) guide strips ensure the bollard cylinder can move freely with minimum maintenance required.

1.1.9 Up Line Hose

This hydraulic hose allows hydraulic fluid to be pressurized in the cylinder to raise or lower the bollard cylinder.

1.1.10 (Item 14) Proximity Cable

The proximity cable connects the proximity switch to the electrical system.

1.1.11 (Item 22) Proximity Switch

The proximity switch is used to provide an electrical signal back to the HPU to signify the bollard is in the lowered position. An optional proximity switched for the fully raised position is available.

1.1.12 Options

The B3X Bollard System is available with a broad array of options and field installed kits. Consult your ordering documentation to determine whether your system has the optional equipment.

- Concrete Heater Kit. This optional kit includes the necessary components to add field installed heat trace cables around the support frame prior to installation. This is highly recommended for areas where ice or snow may inhibit the performance of the barrier.

- ❑ A traffic control gate arm to warn the vehicle operator. This gate arm is positioned on the attack side of the barrier and does not open to allow traffic until the barrier is fully lowered (stowed), and the gate lowers to block traffic before the barrier starts to rise (deploy).
- ❑ Red/amber traffic lights.
- ❑ Infrared safety beams to detect pedestrian traffic or as an additional vehicle sensing device.

2 OPERATION

2.1 Introduction

On the automatic version of the B3X, the bollards are moved to the up (or protective) position with a single, center mounted hydraulic cylinder. When the bollards are in the raised position, the cylinder is maintained at the system pressure. The speed of operation is determined by the amount of pressurized hydraulic fluid able to pass to the bollards in a given amount of time. This can be controlled by the flow control valves which are located in the hydraulic pumping unit.

2.2 Control

The automatic B3X Bollard System is controlled by the flow of hydraulic fluid under pressure from the HPU to the cylinder. All control components are connected to the HPU.

2.3 Operating Time

The operating time for the bollard system is field adjustable at the HPU by varying the hydraulic fluid flow from the HPU as required. Normal operation cycles range from 6-10 seconds for both up and down. Emergency fast Operation (EFO) is approximately 1.5-2 seconds. The following table illustrates the estimated required flow rates required to operate. These values are to use only for pump sizing and initial set-up. Actual times and pressures will vary in field level tests.

Pressure required to raise the bollard: 250 psi. (Does not include hose loss)

Time (Sec)	Actual Required Flow per Bollard (in ³ /sec)	Actual Required Flow per Bollard (gal/min)
1	53	13.8
2	27	6.9
3	18	4.6
4	13	3.4
5	11	2.8
6	9	2.3
7	8	2.0
8	7	1.7
9	6	1.5
10	5	1.4
11	5	1.3
12	4	1.1

3 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.

3.1 Introduction

The B3X Bollards are designed to be largely maintenance free. As with any complex electromechanical device, they must be regularly inspected to ensure they are operating correctly. A monthly visual inspection and a more thorough biannual inspection as described below are recommended. Please contact B&B ARMOR Technical Service Support for assistance with inspections, maintenance, or repairs if needed.

Component damage is likely if a vehicle strikes the barrier. If this occurs, contact B&B ARMOR. We can help you assess the damage to make sure there is no hidden damage that will compromise safety or effectiveness and help you determine which components should be replaced.

3.2 Spare Parts

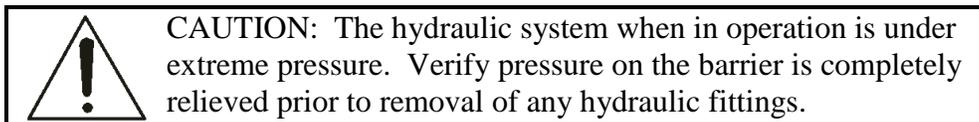
There are few failure and wear items in the B3X design. The following table shows several suggested spare parts based on wear and environmental (lightening) failure modes.

Qty	Part Number	Description	Failure Mode	MTBF Cycles
1	XPROX-FCM2-1204	Proximity Switch	Electrical	n/a
1	XCABLE-R-FA4TZ	Proximity Switch Cable	Electrical	n/a
2	B30-3129	Guide Strip, Delrin	Wear	200,000
1	B30-2006	Hydraulic Cylinder	Wear	200,000

3.3 Monthly Inspections

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

- Verify and inspect the drains to make sure they are clear of obstructions.
- Inspect the guide rails for signs of uneven wear or contamination.
- Check all hydraulic fittings to make sure they are not leaking and are at the proper torque.



- Lubricate acetyl plastic bearing areas with a dry graphite powder.
- 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.
- Vacuum and clean the pumping unit area.
- Check oil for level, pressure, and condition in the HPU. The level should be 1-1.5 inches below the top of the tank when bollards are in the lowered position (Recommended vegetable based oil: Mobil EAL 224).
- If oil is contaminated, investigate source of contamination and replace immediately (Recommended oil: Mobil EAL 224).
- Check barrier for operation through normal cycles.
- Adjust barrier speed to ensure proper operation.
- 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.
- Check the hydraulic pumping unit for leaks at all points.
- Visually inspect the operation and electrical contacts.
- Tighten electrical contacts if required.
- Check, adjust, and tighten all sensors (limit switches, proximity switches).
- If applicable, check traffic lights and replace any burned bulbs or LEDs.
- Check safety devices (loop, IR, etc.) for proper operation and report any anomalies (if applicable).
- Lubricate all pivot points and the clevis pin.
- Inspect the cylinder.

- Check hoses for wear.
- Check the operation of the control panel(s).
- Check the control panel's buttons and lights for proper operation and replace if necessary.
- Update the operation and maintenance log.

3.4 Six-Month Inspections

We recommend you perform the following inspections every six months.

- Repeat the visual inspections in the monthly inspection list.
- Inspect the hydraulic system for signs of oil leaks.



CAUTION: The hydraulic system when in operation is under extreme pressure. Verify pressure on the barrier is completely relieved prior to removal of any hydraulic fittings.

- Measure the resistance in any traffic loops and log the measurements.
- When the inspection is complete, turn the power on and test cycle the barrier to verify operation and control.
- Check the PLC for normal operation of all logic and functions.

3.5 Annual Maintenance Inspections

We recommend you perform the following inspections annually.

- Perform all quarterly maintenance steps.
- Replace the hydraulic filter & fluid.

4 TROUBLESHOOTING

The table below provides a general guidance on identifying and correcting any problems with your B3X bollard system. If you encounter problems that you cannot fix, contact your local value added reseller or B&B ARMR and we will gladly work with you to correct them.

4.1 B3X Troubleshooting Guide

The table below provides guidance on identifying and correcting any problems with your B3X Bollard system. Please refer to the HPU O&M manual for more detailed troubleshooting guides referring to the pumping unit. If you encounter problems that you cannot fix, contact B&B ARMR and we will gladly work with you to correct them.

Symptom	Actions
Bollard does not raise	<ol style="list-style-type: none"> 1. Check power 2. Check overload protector 3. Check pressure gauge 4. Manually raise the bollard by depressing the

Symptom	Actions
	<p>directional control valve to see if problem is mechanical or electrical.</p> <p>Q. If mechanical:</p> <ol style="list-style-type: none"> 5. Check for binding between moving plate and frame. Check connection of linkage between frame and plate. Check for foreign debris. <p>Q. If not:</p> <ol style="list-style-type: none"> 6. Check PLC input 7. Check that safeties are clear 8. Check PLC output 9. Check push button operation
Bollard does not close	<ol style="list-style-type: none"> 1. Check power 2. Check overload protector 3. Check pressure gauge 4. Manually close the bollard by depressing the directional control valve to see if problem is mechanical or electrical. <p>Q. If mechanical:</p> <ol style="list-style-type: none"> 5. Check for binding between moving plate and frame. Check connection of linkage between frame and plate. Check for foreign debris under bollard cylinder. <p>Q. If not:</p> <ol style="list-style-type: none"> 6. Check PLC input 7. Check that safeties are clear 8. Check PLC output 9. Check push button operation
HPU pump will not build up pressure but is running	<ol style="list-style-type: none"> 1. Check power 2. Close pressure relief valve 3. Motor is running backwards (counter-clockwise). <i>Motor should be running clockwise.</i>
HPU pump will not turn on	<ol style="list-style-type: none"> 1. Check incoming power & power to motor 2. Check motor overload, press <i>start</i> 3. Check motor starter 4. Check low level switch 5. Check pressure switch
Bollard makes noise during operation	<ol style="list-style-type: none"> 1. Check delrin guides and properly lubricated (dry graphite spray). 2. Check hydraulic cylinder clevis pins for

Symptom	Actions
	lubrication (multi-grade grease).
Hydraulic unit is excessively hot	<ol style="list-style-type: none"> 1. Check that the pressure relief valve is closed (fully clockwise) 2. Check that the pressure switch is adjusted to shut the motor off before 1900 PSI 3. Check for correct voltages
Bollard moves too slowly	<ol style="list-style-type: none"> 1. Check for mechanical binds 2. Check flow control valve 3. Extremes cold temperatures
Traffic indicator light does not change	<ol style="list-style-type: none"> 1. Check proper limit switch operation 2. Check bulbs 3. Check PLC outputs

5 WARRANTY

BBRSS warranties for a period of one (1) year FOB manufacturing facility, unless otherwise specified by BBRSS in writing, from defects due to faulty material or workmanship. Damage due to handling during shipment and installation are not covered under warranty. BBRSS assumes no responsibility for service at customer site. BBRSS 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. BBRSS 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 BBRSS 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 BBRSS shall be the repair or replacement at BBRSS's option, of any defects in the equipment. **IN NO EVENT SHALL BBRSS BE LIABLE FOR CONSEQUENTIAL OR SPECIAL DAMAGES OR ANY KIND OF PERSONAL DAMAGES.** Except as provided herein, BBRSS makes no warranties or representations to consumer or to anyone else and consumer hereby waives all liability against BBRSS as well as any other person for the design, manufacture, sale, installation, and/or servicing of the Products.

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 BBRSS will render the warranty herein as null and void.