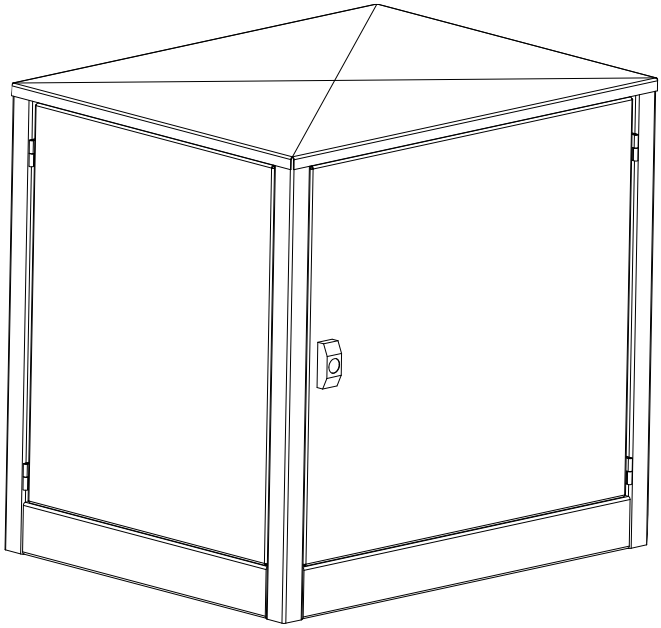
MODEL 611x SERIES Sliding Gate Barriers Hydraulic Pumping Unit (HPU)

INSTALLATION MANUAL



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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 ARMR Hydraulic Pumping Unit (HPU). In addition to providing detailed operating instructions, this manual describes how to install, maintain, and troubleshoot your HPU. If you require additional assistance with any aspect of your installation or operation, please contact us.

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. 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.

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. In addition they must: 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 trained and experienced staff to install, operate, and maintain the equipment. Ensure that all repairs are performed correctly, using properly trained technicians and the correct tools and equipment.

This HPU comes with a power ON/OFF switch. Although this switch does cut the power to the motor and various other devices, always use correct lock-out and safety procedures when servicing the unit. This unit is designed to be operated with the covers in place. Extreme caution should be used when operating without covers.

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

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

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:

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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 located on the product.

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

Site:			
Job #:			
Date:			
Serial Number:			
Model Number:			
Voltage:			
Phase:			

Table of Contents

1 ORIENTATION

1.1 Overview

The model 611X hydraulic pumping unit is designed to operate hydraulic barriers that require medium pressure and high flow. The electric motor comes on any time the system pressure drops below the set point and the level of fluid is adequate. It is connected directly to a hydraulic pump which operates independently from the signal command. The oil from the pump is drawn through a filter and directed into a directional control valve. The flow control valve monitors the operational speed of the barrier.

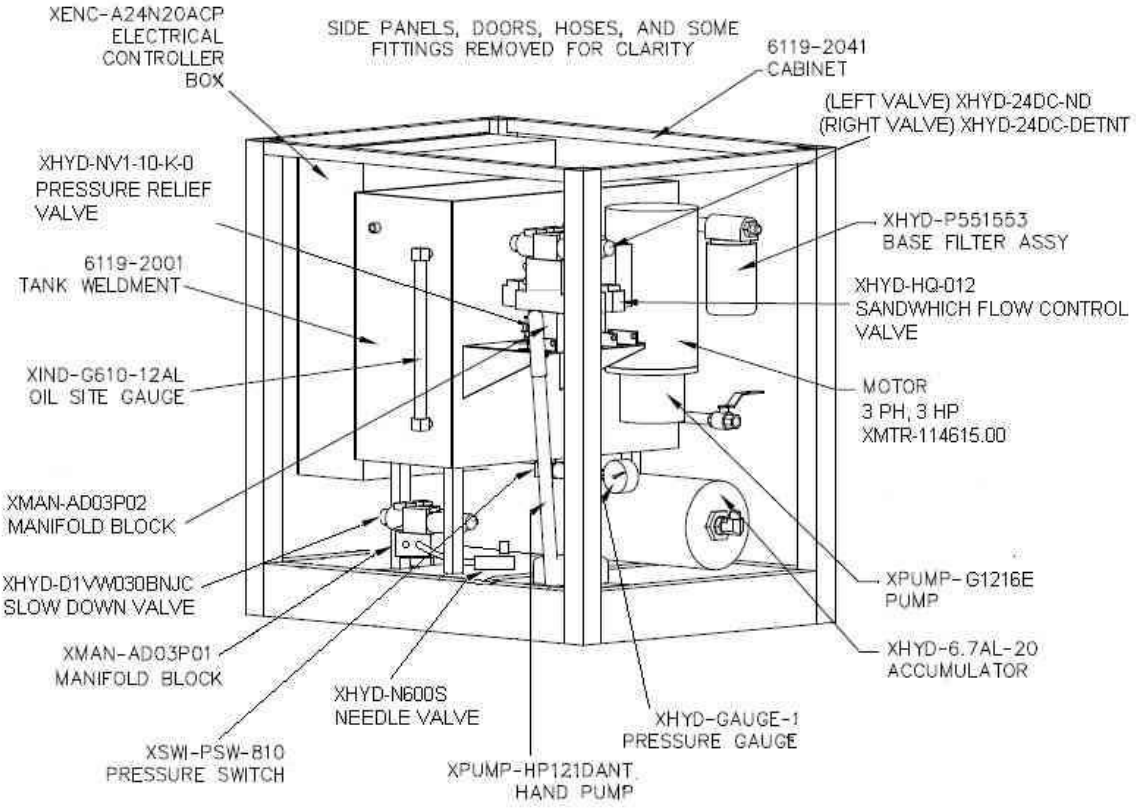


Figure 1 orients you to the basic components of the 611x series HPU:

The HPU contains HIGH VOLTAGE components that can cause serious injury or death. Only trained service technicians should attempt any repair. Ensure at all times that proper safety lock-outs, barrier safety braces and all other safety systems are in place prior to any maintenance or service.

The HPU is a hydraulic system that can be under extreme pressure. Caution should be used when working in and around unit without proper covers in place.

1.1.1 Electrical Control Box

The control box houses the electronic controls in the HPU. The program installed in the PLC varies based on the barrier style and application.

The power 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 harm's way.

1.1.2 Flow Control Valve

The flow control valve(s) are located on the manifold and are used to control the amount of flow of hydraulic fluid both to and from the barrier under control. This in turn sets the speed of operation of the barrier. The lower flow control valve controls how fast the gate travels, while the upper control valve restricts how fast the barrier is opened.

1.1.3 System relief Valve

The system relief valve enables the system to be de-pressurized during maintenance and service operations. It is located on the rear of the valve manifold.

1.1.4 Tank Weldment

The tank reservoir holds the hydraulic fluid that is not under pressure. The nominal capacity of the tank is 20 gallons. B&B ARMR recommends the use of environment-friendly oil such as Mobil EAL 224 in all of our hydraulic systems.

1.1.5 Oil Site Gage

The oil site gauge gives an easy indication of the fluid level in the reservoir tank without requiring the removal of the top cover.

1.1.6 Manifold Block

The main manifold block routes the pressurized hydraulic fluid to the various locations in the hydraulic system via control valves.

1.1.7 Pressure Switch

Adjustment of the pressure switch determines the system pressure. This switch controls the motor to maintain the system pressure. See pressure switch adjustment process to ensure proper system pressure.

1.1.8 Hand Pump

In case of electrical failure, a manual hand pump is provided to enable the system to be pressurized to operate the unit once the directional control valve is shifted. The valve should be shifted and then manually stroke the hand pump until the barrier has closed the roadway.

NOTE: the manual pump is used in case of power loss when the barrier must be moved.

1.1.9 Pressure gage

The pressure gage shows the actual HPU system pressure. Standard operations should be less than 2000 PSI. If higher pressure is required, please verify operation with B&B ARMR technical support.

1.1.10 Accumulator

The accumulator acts as a pressure reservoir to store pressurized fluid. The electric pump pressurizes the accumulator and the accumulator provides a high volume of pressurized fluid in a short period of time.

1.1.11 Pump

The pump is mechanically connected to the electric motor and provides the required pumping pressure to charge the accumulator. The pump typically provides fluid at a rate of 2 GPM.

1.1.12 Electric Motor

The electric motor drives the hydraulic pump. The 611x series HPUs are provided with a variety of motor voltages. Ensure correct voltages prior to initial operation.

1.1.13 Base Filter Assembly

The filter assembly is used to filter contaminants from the hydraulic oil during operation. Routine maintenance is required to replace the filter and ensure system is kept free of contamination. The strainer and spin on filter should be replaced as part of normal maintenance whenever the oil is serviced. B&B ARMR recommends the use of environment-friendly oil such as Mobil EAL 224 in all of our hydraulic systems.

1.1.14 Directional Control Valve

The directional control valve is shifted to either open or close the barrier, based on the input. With no command, it springs to center, and no fluid passes through it to either hydraulic motor.

1.1.15 Emergency Close Operation (ECO)

The Emergency Close Operation (ECO) function bypasses the safety controls and allows the system to close the gate in an emergency situation.

*All safety inputs are ignored during ECO operation.

1.1.16 Slow Down Valve

The slow down valve is used to reduce the fluid flow to the hydraulic motor when starting or stopping to reduce unwanted stress on the mechanical parts.

1.1.17 Cabinet

The pump cabinet houses the pumping unit components. The hydraulic pump enclosure is weather-tight and lockable. Typical environmental operation is between 0 F and 110 F. Typical enclosure is designed to provide a NEMA level 3R rating.

1.1.18 Options

The 611x series HPUs are available with a broad array of options and field installed kits. Consult your ordering documentation to determine whether your system has the optional equipment.

- ❑ Multiple manifolds to drive multi-lane solutions.
- ❑ Multi-loop detection components for a variety of programmable modes of operation.
- ❑ A traffic control gate arm to warn the vehicle operator. 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.
- ❑ 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.

2 INSTALLATION

2.1 Introduction

This section of the manual describes the procedure to set-up and configure a 611x Series HPU 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 the Hydraulic Pumping Unit (HPU) 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 barrier is in the lowered (no pressure) position.

2.2 Site Preparation

The hydraulic pumping unit should be securely fastened prior to operation. The feet are designed to accept a standard concrete anchor for mounting. If the unit is put on a steel structure, it should be mechanically connected to prevent unnecessary vibration. The unit is designed with a large open area to allow the positioning of conduits. Normal construction sequence would have the electrical, control and hose conduit running together before turning up out of the concrete slab. The pumping unit is then positioned over the conduits and anchored into place. The power and control conduits terminate into the electrical box. The hydraulic conduit should not extend beyond the height of cabinet base. This conduit elevation will allow the hose freedom to move during the application of pressure, without scraping the sides of the hose against a sharp top edge of the conduit.

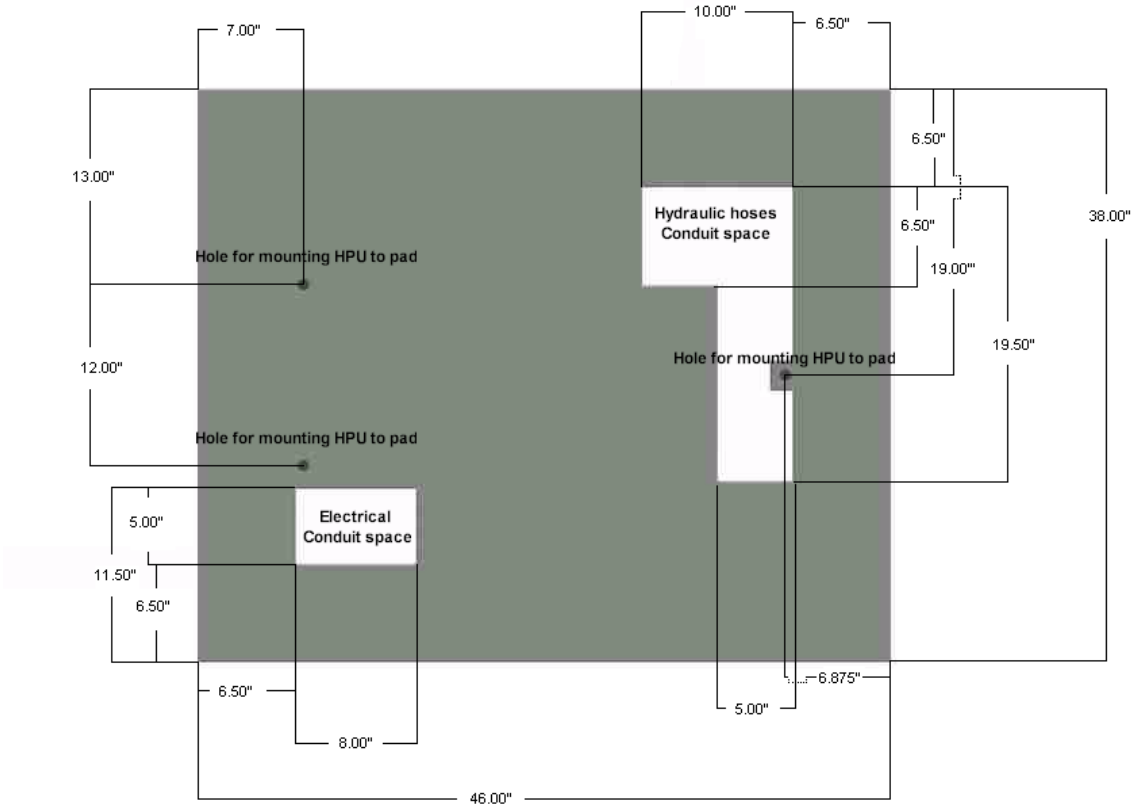


Figure 1 Dimensions of concrete pad with conduit spaces for 6118 & 6119

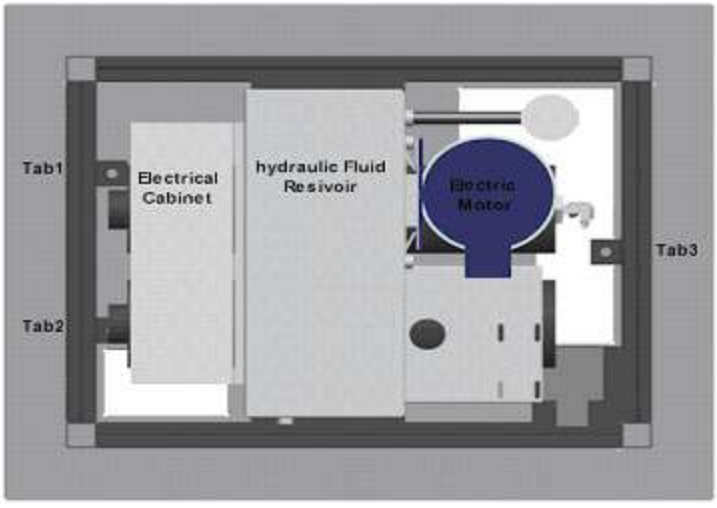


Figure 2 Top view of 6118 & 6119 HPU showing mounting tabs

2.3 Hydraulic Connections

Connect hydraulic lines through conduit to cylinder connection using JIC fittings. As a reference, use environmentally safe oil Mobil EAL 224 or equivalent when adding hydraulic oil to the HPU.

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.

Hydraulic field connections may be made to either port A or port B on the main manifold. Figure 3 shows a typical 2 lane manifold and locations of connection points. Use care in tightening hydraulic fittings. Extreme torque is usually not required and will damage fitting if done improperly.

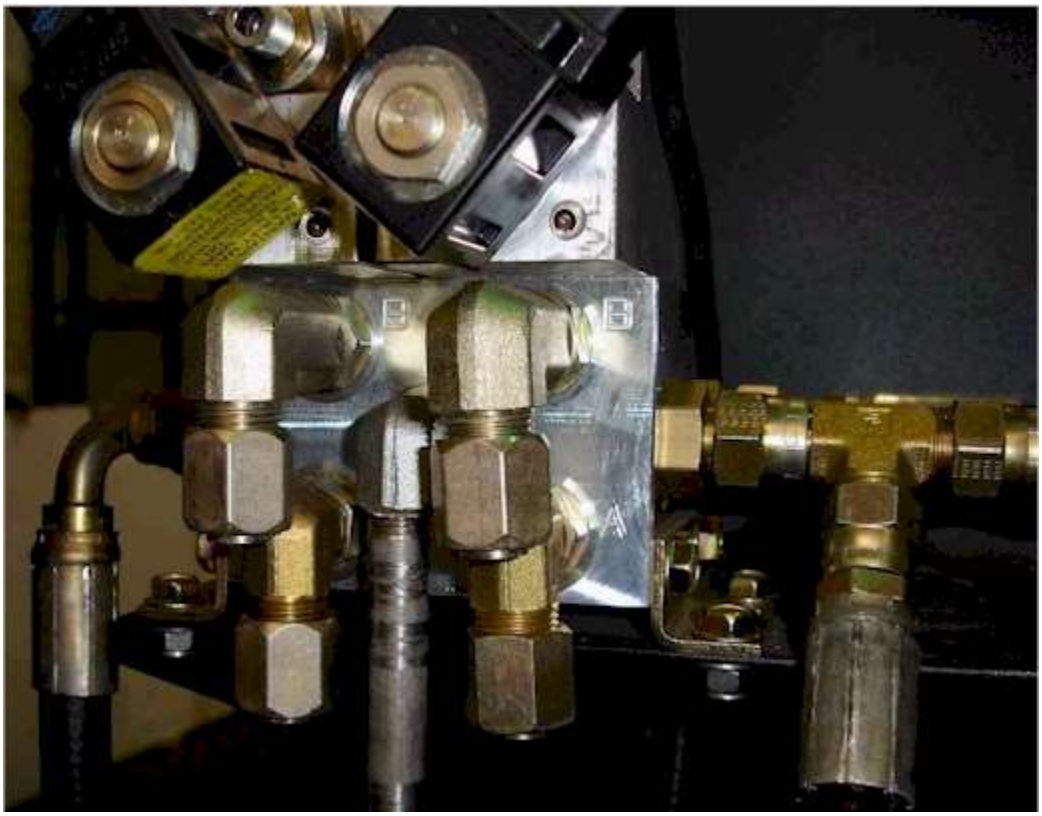
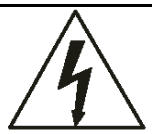


Figure 2 Hydraulic Connections

2.4 Electrical Connections



DANGER: High voltage electrical components are located in the Hydraulic Pumping Unit (HPU) cabinet. Service by qualified technicians only.

The electrical connections required for proper operation include power and control. The power is required to drive the motor and power the PLC while the control voltage is 24VDC and is used to power the inputs. All of the electrical wiring should be fed through conduits in the hydraulic pumping unit into the electrical control box mounted in the front of the hydraulic unit. The power feed is connected to terminals L1, L2, L3, Neutral and Ground. Specific control connections may be found by referencing the control circuit drawing supplied in the HPU.

The motor will run any time the fluid level is adequate and the system pressure is below its set point, to charge the accumulator. The motor drives the hydraulic pump directly through a coupling and transports the oil to the manifold and into the directional control valve. Depending on the command, the flow will either run the hydraulic motor to open or close the gate.

2.5 Final Pre-operation Checklist

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

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

- ❑ 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 to HPU matches product requirements.
- ❑ Verify electrical hookups are completed per electrical wiring diagram matching particular product.

2.5.1 Start up procedure of Hydraulic Pumping units

1. Close all the flow control valves completely.
2. Shift all directional control valves manually to the left.
3. Confirm the reservoir is clean and clear of debris.
4. Install clean, filtered oil into the reservoir.
5. Confirm that the draw line ball is open (below motor)
6. Turn overload protection devices off by pushing the stop button (red)

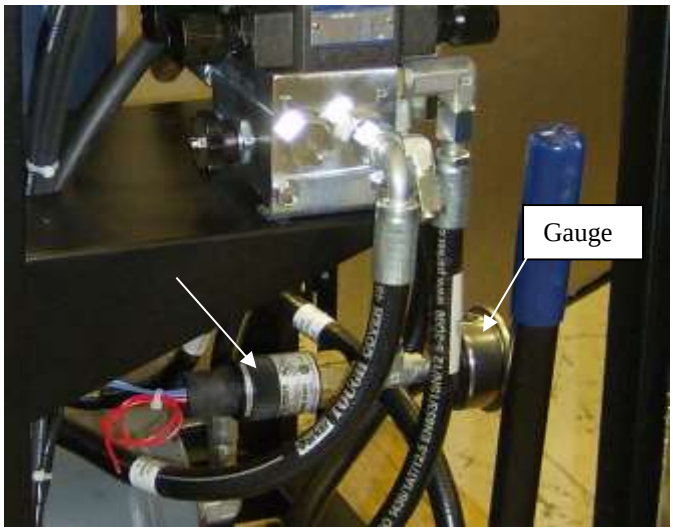
7. Check the motor rotation by turning the power on at the disconnect switch and manually pushing the motor starter in. (The motor needs to rotate clockwise looking down on motor) Correct if necessary.
8. Turn the unit on by pushing the "START" button on the overload protector.
9. Stop the unit at 500-700PSI via "START/STOP" button.
10. Look for leaks and correct, if necessary.
11. Restart unit and allow it to build pressure. One the pressure is achieved the unit will cut off automatically.
12. Check for leaks and correct, if necessary.

2.5.2 Line Purging Procedure after Start-up

1. With all the Flow Control Valves closed, give Lane #1 a *close/up* Command.
2. At each device in Lane #1, attach a small piece of hose (2'-3') to the *close/up* hydraulic line and place open end in a 5 gallon bucket
3. Slowly open the flow control valve for that device. (Oil will begin to flow. Allow approximately 1 quart to flow into the bucket)
4. Close that flow control valve and reconnect the hose to the device.
5. Repeat for all the devices on that directional control valve
6. Repeat for all Lanes of traffic

2.5.3 Pressure Adjustment

The system pressure is adjusted by turning the adjustment ring on the pressure switch assembly counterclockwise to increase pressure and clockwise to decrease pressure. With power on and oil in the reservoir, press the start button on the motor starter and monitor the system pressure on the gauge. Standard operation is 1500psi. Adjust using adjustment ring as necessary. See photo below.



TROUBLESHOOTING

The table below provides a general guidance on identifying and correcting any problems with your 611x Series HPU. If you encounter problems that you cannot fix, contact B&B ARMR and we will gladly work with you to correct them.

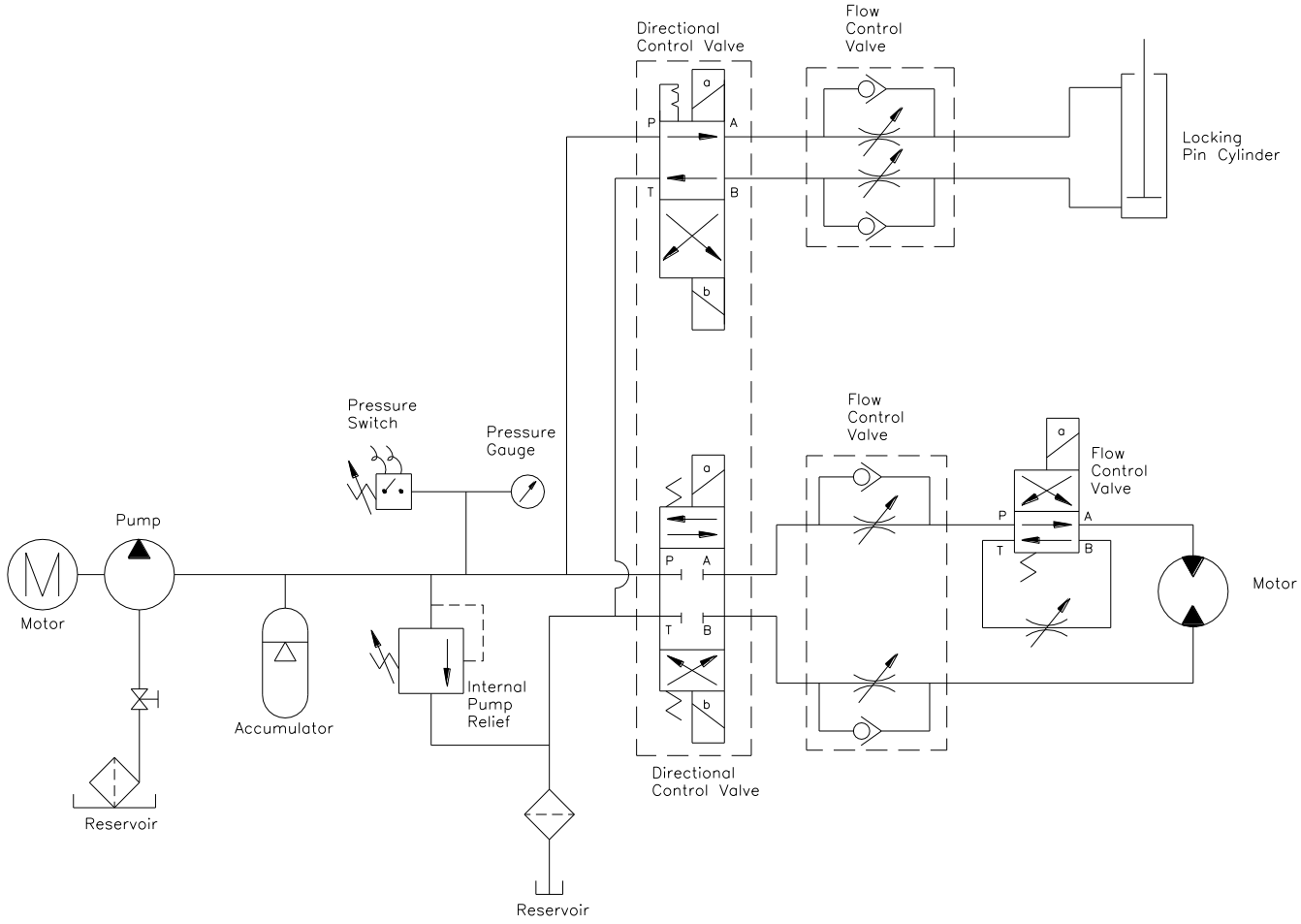
2.6 611x Series HPU Troubleshooting Guide

The table below provides guidance on identifying and correcting any problems with your 611x series HPU. Please refer to the barrier manual for more detailed troubleshooting guides. If you encounter problems that you cannot fix, contact B&B ARMR and we will gladly work with you to correct them.

Symptom	Actions
Barrier does not open when commanded on control panel	1. Check power 2. Check for binding between moving plate and frame. Check connection of linkage between frame and plate. Check for foreign debris. 3. Check pressure gauge 4. Check overload protector 5. Manually open the barrier by depressing the directional control valve to see if problem is mechanical or electrical. 6. Check PLC input on pumping unit. 7. Check that safeties are clear. 8. Check PLC output on pumping unit 9. Check push button operation
Barrier does not close when commanded on control panel	1. Check power 2. Check for binding between moving plate and frame. Check connection of linkage between frame and plate. Check for foreign debris. 3. Check pressure gauge 4. Check overload protector 5. Manually close the barrier by depressing the directional control valve to see if problem is mechanical or electrical. 6. Check PLC input on pumping unit. 7. Check that safeties are clear. 8. Check PLC output on pumping unit 9. Check push button operation
HPU pump will not build up pressure but is running	1. Check power 2. Close pressure relief valve 3. Check for fluid leaks

Symptom	Actions
HPU pump will not turn on	1. Check power 2. Check motor overload, press start. 3. Check low level switch. 4. Check pressure switch.
Hydraulic unit excessively hot	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.
Barrier moves too slowly	1. Check for mechanical binds. 2. Check flow control valve. 3. In extreme cold temperatures, a higher grade hydraulic fluid may be required to keep viscosity constant.
Traffic light does not change	1. Check proper limit switch operation. 2. Check bulbs.

3 Typical 450 Hydraulic Schematic



4 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.