



Upswung Bollard Systems Corp.

**Upswung Bollard Systems  
Installation Instructions and Scheduled  
Maintenance  
Automatic Bollard**

ver.0609



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## **WARNING**

Improper use of this equipment constitutes negligence and may result in serious injury or death.

## **CAUTION**

Warranty requires that the operation and maintenance requirements and instructions described in this manual be followed and records of all maintenance activities be kept. Records should be available upon request and may be required for warranty claims.

Failure to operate and maintain the equipment constitutes improper use and may void the warranty. Failed components and/or damaged parts requiring warranty service must be returned to Upswung Bollard Systems as requested.

## **1.0 Introduction:**

- 1.1** Upswung pneumatic bollard systems are very simple in operation and the components that make up the system are commonly available parts. The pneumatic bollard system has the great advantage of using food-grade lubricating tool oil which is bio-degradable. The bollard itself is powered by a simple pneumatic cylinder with an airline that pushes the cylinder up and another airline that pulls and holds the cylinder down. The bollards can be operated by remote transmitters, push button, keypad or any access control system of your choice. The pneumatic bollard system is comprised of a control panel in an enclosure which has a compressor, electronic controller, electric valves, lubricating system and pressure regulator. Two airlines run from each bollard to the control panel enclosure via 2' schedule 40 conduit or equivalent. A ½ inch schedule 40 electric conduit or equivalent. may be added for LED illumination. All conduit is stubbed up through the bottom of the control panel enclosure.
- 1.2** Bollards shall generally be spaced at approximately 3.5 to 4.5 feet) center to center. Operation will be by a pneumatic system in which compressed air will be used to power the bollards movements

## **2.0 Site Planning Considerations:**

### **2.1 Water Drainage**

Pneumatic Retractable Bollards can be erected in vehicular laneways and access points supplied mechanically via pneumatic force retract below finished pavement level to allow vehicular traffic to pass over unobstructed.

In any installation water drainage is very important.

First, the bollards must be located in a raised area where water drains away from the bollards. This can be created by placing bollards in a slightly raised concrete pad which directs water away from the bollards.

Second, the bollards must be drained at the bottom of the bollard casing into a drain pipe which can direct water into a storm drain or into a French Drain/ leach field which is located a least 10 feet away from the bollard(s). The soil for the leach field must be able to percolate the volume of water that may fall into the bollard.

### **2.2 Excavation**

All drainage and foundations for bollards must be BELOW the published frost line for the region where they are to be installed to avoid freeze lifting of the bollard foundation and freezing the drainage system below the bollard.

### **2.3 Cold Climates**

All in-ground mechanical devices including bollards are subject to freezing of the interior components by water falling into the bollard as a liquid by day and freezing to a solid by night when it is colder. The accumulated ice will interfere with the operation of the bollard's retraction. Heating of the bollard(s) may be accomplished by using a commonly available heating tape normally used for roof ice damming and roof downspouts. Heating tape can be installed inside the bollard and to any drain pipe exiting the bollard if the drain outlet is above the frost line.

## 3.0 SAFETY WARNINGS AND CAUTIONS:

### 3.1 SAFETY WARNING AND CAUTION OVERVIEW

Recognize safety precautions at all times, including during operation, servicing and/or repairing bollard equipment. Warnings will be provided in this manual and will precede the text that is applicable. Failure to comply to these safety precautions can result in injury and/or damage to bollard equipment.

Comprehension of safety precautions is to be considered **mandatory**. Personnel associated with operation and/or maintenance of equipment must be familiar with the **system**. For safety, and damage protection on bollard equipment, all of the safety devices must be properly maintained.

The following safety precautions are in **accordance** with normal operating conditions. **supervisors or others in authority may find it necessary to issue supplementary or special precautions in order to cover local conditions and/or unusual circumstances**. Furthermore, if a supervisor deems conditions to be “unusual” such conditions creates the equipment to be unsafe, none of the safety precautions provided are to be understood as authorization for work to continue using these systems.

All **Caution** and **WARNING** notices that may appear throughout this manual are essential for safe use of bollard equipment.

**WARNING** notices are meant to protect personnel. Failure to comply can result in injury or death.

**Caution** notices are meant to warn personnel, intending to protecting the Barrier System equipment.

### 3.2 MAINTENANCE, SERVICE AND REPAIR WARNINGS

A trained and qualified Service Technician is required for all activities regarding maintenance, service, repair and/or adjustment is required and/or if the equipment is malfunctioning/non-operational.

### 3.3 PEDESTRIAN AND PERSONNEL SAFETY WARNINGS

**The Operator and/or Service Technician is responsible for the safe operation of bollards at all times.**

***Do not operate bollards when pedestrians or personnel are in close proximity to the equipment,***

Do not operate if persons are standing, or close in contact with equipment, serious injury or death can occur. Operation includes, raising and lowering of the bollard equipment.

When operating, specifically lowering equipment, multiple pinch points are present. All persons must maintain a safe distance away from the equipment in prevention of serious injury or death.

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### 3.4 VEHICLE SAFETY WARNINGS

**The Operator and/or Service Technician is responsible for the safe operation of bollards at all times.**

Do not operate bollards in the presence of oncoming vehicle or pedestrian traffic, especially if a vehicle is in contact, or directly over bollard equipment.

Vehicle passengers can sustain serious injury or death, if a vehicle makes contact or impacts bollard equipment at any speed. Also, damage can occur on vehicles striking the bollards, or if bollard equipment rises up making contact with the vehicle.

When raising bollard equipment, powerful lifting forces are at use. Vehicles cannot not be on and/or over the bollards when the bollards are raised. Substantial damage can occur to the vehicle and bollard equipment.

### **3.5 INTRUSION INCIDENT DAMAGE CAUTION**

Bollards are deliberately created to prevent vehicle intrusion.

Vehicles can crash into or impact bollards equipment. *Depending on the speed and weight of the vehicle, the bollards may sustain from little to severe damage.* In some scenarios, the bollards can be ruined, or so damaged that it is rendered inoperable after being struck.

Upswung Bollard Systems Corp, states that bollards **must** be thoroughly approved by a trained and qualified Service Technician before use and reset of equipment post incident, even if visible damage is not evident.

### **3.6 GENERAL SAFETY PRECAUTIONS**

The following safety precautions are not specific to any procedure, but should be recognized when operating, maintaining, repairing bollard equipment. All applicable safety precautions relative to the equipment supported by this manual must be adhered to prevent accidental injury to the Operator and/or the Service Technician. These are the minimum precautions that personnel must understand and apply at all times.

#### **High Voltage Electrical Supply**

Personnel must observe all safety regulations at all times. Do not replace components nor make mechanical adjustments with electrical power turned on. To avoid injury to personnel, always remove electrical power and then use test equipment to confirm that an electrical circuit is at ground potential or zero volts before performing maintenance, service and/or repair.

#### **Do Not Service or Adjust Alone**

Under no circumstances shall any person perform potentially dangerous maintenance, service and/or repair tasks, except in the presence of someone who is capable of rendering aid.

## Equipment Lock-Out/Tag-Out

Prior to performing maintenance, service and/or repair on the equipment, ensure that the system has been properly locked-out and tagged-out at the Facility.

Lockout shall include the blocking the flow of energy from a power source to the equipment. Power sources on the Barrier System include, but are not limited to:

1. Switching off compressor at compressor switch
2. Draining air pressure from compressor tank at drain valve
3. Cycle the up and down controls to bleed air lines
4. Cutoff Electrical Power at panel main breaker
5. Cutoff power at main breaker panel

Lockout must be accomplished by installing a lockable device, such as a padlock, at the energy source, so that equipment cannot be powered-up, started, moved and/or operated. The lock and key must be controlled, and assigned to authorized personnel.

Tag-out shall include the placing of an identification tag on the power source, preferably directly on the lockout. The tag must indicate a warning not to restore power and clearly indicate **Do Not Operate Equipment**. Identification of the person and/or group applying the tag-out is highly recommended.

Both the lock-out and tag-out must be strong enough to prevent unauthorized removal, and to withstand the environment in which it is applied, without damage.

Personnel performing the lockout and tag-out of equipment must know how to properly shutdown the equipment, isolate the equipment, and locate and apply lock-out/tag-out devices. Personnel must also know how to safely release any stored energy, properly check and ensure that all energy and power has been removed, such that a safe state exists for maintenance and/or service activities. Upon completion of maintenance or service, the service personnel must know how to remove lock-out/tag-out devices, properly and safely re-apply energy and power sources, check and ensure that equipment is clear and ready to safely run and then finally safely start-up the equipment

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## **4.0 General Installation Guidelines**

### **Bollard Drainage**

#### **4.1 Bollard Location**

Determine bollard locations and prepare excavation and foundation for insertion of the bollards.

#### **4.2 Drainage:**

Once installation configuration is determined and the foundation excavation is prepared, adequate drainage must be installed. Foundation drainage options:

- A. Route drainage from bollards to approved storm drain.
- B. Install sump pit and sump pump to eject water run off from each bollard. Eject into a storm drain or gutter.
- C. Install "French drain" or dry well in the bollard foundation. Use only in extremely dry climates.
  - A. Adequate drainage is required!
  - B. A 2-inch minimum drain line is recommended. Local precipitation may require a larger drainage capacity.
  - C. Consideration should be given to special drainage conditions during winter months.

## 5.0 Installation of Bollards

### **Bollard Foundations- concrete work**

Install the bollard in an area where there is no running water. Otherwise, make sure that the bollard is protected by a draining channel connected to a drainage system.

It is important to set the barriers at 90 degrees to the surface or premature wear may occur. Bollards must be placed plumb by checking the sides of the bollard with a hand level. The Main Control panel is hereby referred to as the pneumatic power unit “**PPU**” in the following instructions

### 5.1 Excavation of Bollards

Excavate bollard depth

The depth of the bollard excavation will vary. When calculating the depth of the excavation, determine the finish grade of the bollard **allowing for the proper drainage away from the bollard.**

1. add the actual length of the bollard.
2. add the thickness of the concrete slab
3. add the thickness of the compacted gravel base rock
4. add any additional excavation cut necessary to make sure that the slab is below the frostline.

### 5.2 Slab Sizing:

Non roadway traffic- light vehicle traffic paths:

Pour a 24” X 24”X 6” slab on grade for each bollard

Roadway traffic- light vehicle traffic paths:

Pour a 24” X 24”X 8” slab on grade for each bollard

A long 24” or 36” continuous slab can be poured for multiple bollards placed in a row with the slab extending 18 inches on each side of the first and last bollard’s center.

### 5.3 Slab Rebar:

Place #4 rebar at 8” O.C. or less in both directions in slab.

Stub up #4 rebar at 12” O.C. or less at the perimeter of the slab to reinforce wall concrete. Keep stub up rebar 3” in from the perimeter of the slab concrete-rebar coverage rule) and 12” bent into the slab and at least 20” vertically out of the slab (40 diameter splice rule).

### 5.4 Place Drainpipe:

Make sure to place in any drainpipe or conduit that must be placed through the slab now.

### 5.5 Slab Pour:

**Slab is ready to pour with 4000 PSI or better concrete- 6” or 8” thick.**

### **5.6 Wall Rebar:**

Splice #4 vertically on to stubbed out rebar to a height of 3" below the finish grade of the concrete and place horizontal rebar at 12" O.C. or less on to the vertical rebar

### **5.7 Install Drainage:**

Install drain lines, connecting to the 2 inch female connector at bollard base. Run drain line to storm water sewer. Maintain an adequate fall for water in the drain lines.

### **5.8 Install Airlines:**

The airline conduit can be routed from bollard to bollard or "home-run" from each bollard to the PPU which is the preferred method. Install a 2" airline conduit and LED 12VDC power if used. Secure all conduit to make sure that it is not dislodged or damaged during the pour.

**Review sections 6,7 & 8 for more details**

### **5.9 Pull Airlines:**

Pull the airline in the conduits and connect to the PPU.

**Review sections 6,7 & 8 for more details.**

### **5.10 Test Bollards**

**Thoroughly test the bollards using the PPU before pouring the concrete to finish grade.** Cycle at least 30 times, check for air leaks and check all connections. Take care not to damage conduit(s) when pouring concrete.

### **5.11 Concrete Bollards:**

Weight down the bollards with sandbags to avoid the risk of the bollard floating up when concrete is poured around the bollard. The wetter the concrete mix the more risk to floating the bollard. The weight of the sandbags must exceed the weight of the concrete displaced to avoid floating of the bollard.

### **5.12 Concrete Bollards**

Bollard is ready to pour to grade with 4000 PSI or better concrete 6" or 8" thick.

## **6.0 Installation of Bollards**

### **Bollard Conduit**

It is important to set the barriers at 90 degrees to the surface or premature wear may occur. Bollards must be placed plumb by checking the sides of the bollard with a hand level. The Main Control panel is hereby referred to as the pneumatic power unit “**PPU**” in the following instructions.

#### **6.1 Install conduits**

Install conduits (airlines, LED power, Heater Power conduits) to connect each bollard to the PPU electrical enclosure. Trench from the PPU site to each bollard for the conduit. Lay in the conduit following local building codes. It better to home-run the conduit to the PPU from each bollard for easier pulling of the airlines, but 2-3 bollards can be interconnected in series from bollard to bollard. The conduits are normally stubbed up through the bottom of the PPU.

#### **6.2 Install conduits**

Install 2 inch PVC conduit with long sweep elbows to accommodate airlines and low voltage LED wiring for up to 3 automatic bollards per homerun conduit run to PPU. Also run a separate ½ inch conduit for heating bollards if necessary.

#### **6.3 Install conduits**

Maximum distance of bollards from PPU is 100ft. Distances can be increased with the use of larger diameter airlines, but a larger diameter conduit may be necessary.

## **7.0 Installation of Pneumatic Power Unit**

### **PPU Placement**

The Pneumatic Power Unit “**PPU**” is the control panel enclosure used to power the Main Control Panel is hereby referred to as the pneumatic power unit “**PPU**” in the following instructions.

#### **7.1 Determine PPU Location:**

Determine location of electro-pneumatic power unit “PPU” (100 ft maximum distance for connection between the vehicle barrier and the PPU). The PPU must be located at a grade where surface water flooding will not reach the PPU.

#### **7.2 Install PPU Conduit:**

Install 2 inch PVC conduit with long sweep elbows to accommodate airlines and low voltage LED wiring for up to 3 automatic bollards per homerun conduit run to PPU. Also run a separate ½ inch conduit for heating bollards if necessary.

#### **7.3 Electrical Conduit:**

Also run a separate ½ to ¾ inch conduit for heating bollards if necessary for cold climates. Calculate proper wire size for heater load and voltage drop (usually 14awg wire with ground)

#### **7.4 PPU Location:**

Locate the PPU in an adequately ventilated location. The standard footprint for the PPU is approximately 22 inches x 32 inches. If a concrete foundation is required be sure that consideration is given for freezing conditions (i.e. pad must extend below frost line). Pore a minimum 25 inch X 36 inch X 4 inch pad for the PPU. Set in stub ups for PVC conduit (airlines/ LED & Line Voltage) and finish smooth. When cured, set and secure the HPU with minimum 5/16” X 3 1/2” anchor bolt.

#### **7.5 PPU Weather Resistance:**

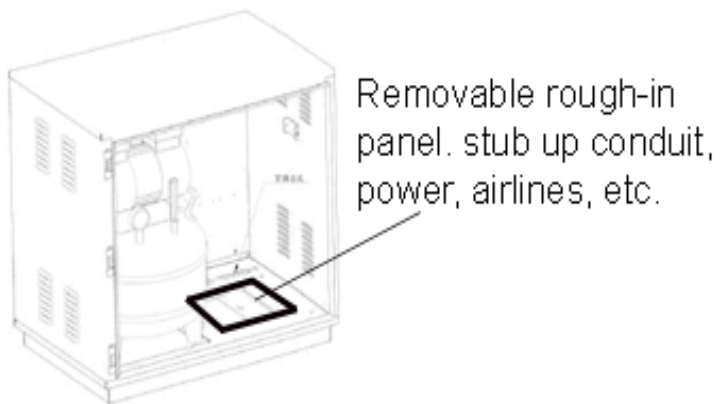
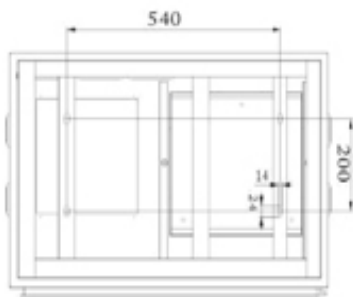
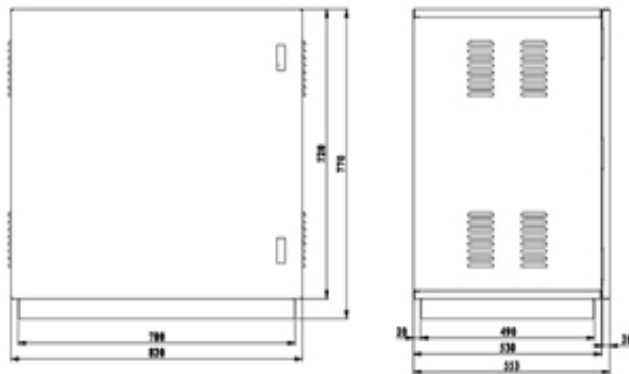
The PPU can be located outside with its weather-resistant enclosure away from any ground water.

#### **7.6 Conduit Routing:**

Route all conduits from the bollards to the PPU.

#### **7.7 Main electrical power for the bollards must be connected at the PPU.**

#### **7.8 Be sure to connect all conduits for control stations (i.e. push button panels; limit switch; heaters; stop/go traffic) homerun to the PPU. Review section 9 for more Wiring Details**



### Control Cabinet Installation

Control cabinet can be installed up to 100ft from the bollards in a secured location. Larger distances are possible however will require design input from Upswung Bollard Systems Corp. to ensure correct operation.

## 8.0 Installation of Pneumatic Air Lines

### Airline connections

The Pneumatic Power Unit “**PPU**” is the control panel enclosure used to power the Main Control Panel. Connected to the PPU are two airlines for every bollard, a **white airline that raises the bollard** and a **black airline that lowers and secures the bollard**. The PPU may have 1, 2 or 3 pairs of black and white airline fittings depending on the model of the PPU.

*It is important to note that Tee fittings can be added to the black and white lines to increase the number of bollards. The resulting effect is to slow the speed of the bollard movement, but locking pressure remains the same.*

#### 8.1 PPU Stub:

Make note of the Stub-Up drawing in the preceding page. The removable plate at the bottom of the PPU. This is the convenient location for stubbing up conduit connections to the PPU.

#### 8.2 Airline Black Connections:

Connect the each black airline from each bollard to the black airline valve inside the PPU. The connection is made by firmly pushing the tube into the valve body. The tube can also be released by pushing the valve coupler ring towards the valve and pulling the tube out. Install the tubes into the valves in a left to right order so that it is easier to keep track of where the airlines go and also label each airline so it can be determined which bollard it supplies.

#### 8.3 Airline White Connections:

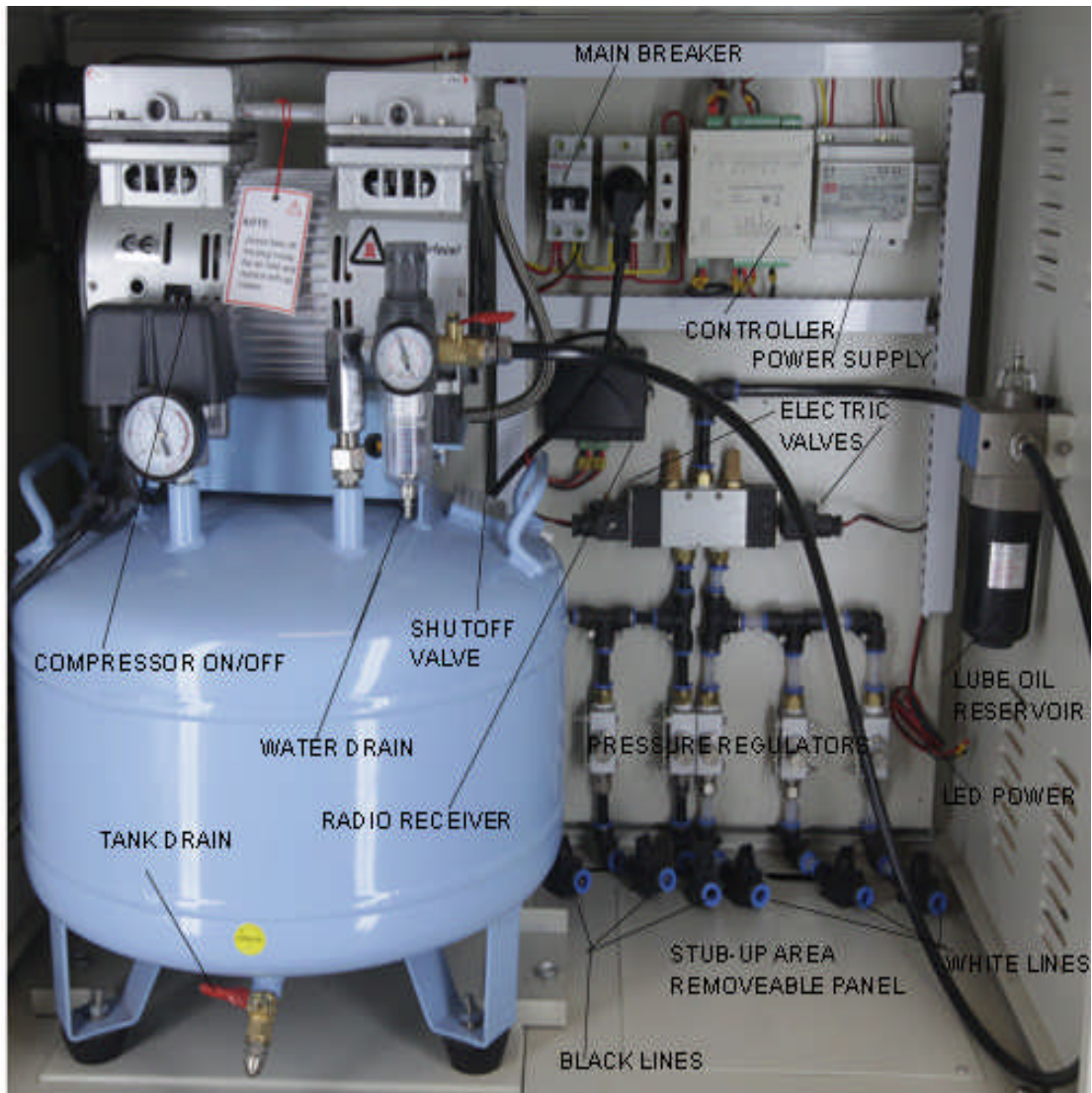
Connect the each white airline from each bollard to the white airline valve inside the PPU. The connection is made by firmly pushing the tube into the valve body. The tube can also be released by pushing the valve coupler ring towards the valve and pulling the tube out. Install the tubes into the valves in a left to right order so that it is easier to keep track of where the airlines go and also label each airline so it can be determined which bollard it supplies.

#### 8.4 Airline Shutoff:

Note that each black or white airline valve can be shut off independently to shut down individual bollards.

#### 8.5 Bollard Pressure Regulators:

Also each bollard can be fine-tuned for activation speed by adjusting the pressure regulator for each valve. Clockwise increases speed and counterclockwise decreases speed.



## **9.0 Wiring Instructions**

### **PPU and Bollard wiring**

Most wiring is done at the factory.

#### **Basic Field Wiring:**

Line voltage, up input signal, down input signal

#### **Safety Device Field Wiring**

Warning Alarm/ buzzer output, Safety Loops

### **9.1 Types of control devices:**

Types of control devices normally used:

Handheld transmitters, keypads, key switches, card readers and access control systems.

Hardwired control devices must be connected directly to the PPU. Normally, a (1)  $\frac{1}{2}$  to  $\frac{3}{4}$  inch PVC conduit is adequate for control wiring. Refer to the manufacturer's instructions for details about individual products and wiring size requirements.

Be sure to connect all conduits for control stations (i.e. push button panels; limit switch; heaters; stop/go traffic) homerun to the PPU.

## **NOTES:**

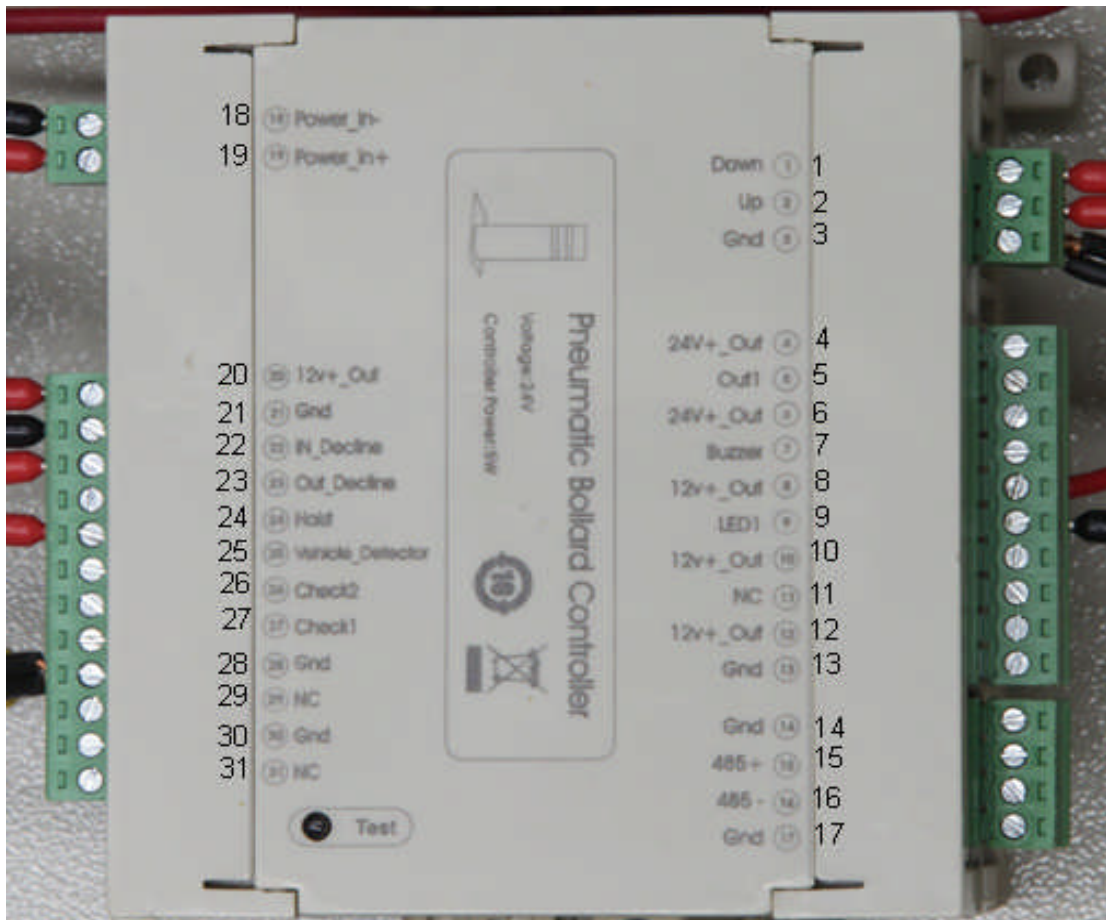


## 9.2 Line Voltage Wiring:

**Terminals L & N:** 110-120VAC- L (line) connect Black wire, N (neutral connect White wire  
Line Voltage input at PPU Circuit Breaker

**Terminal Ground Lug:**G (ground) Green or bare copper wire

**Compressor Plug-in:** Plug in Compressor power cord.  
110-120VAC



### 9.3 Control Device Wiring:

**Terminals 22 & 30:** Down input, N.O., connect keypads, radio receivers, keyswitches, pushbuttons and any normally open contact device

**Terminals 28 & 30:** Up input, N.O., connect keypads, radio receivers, keyswitches, pushbuttons and any normally open contact device

### 9.4 Safety Device Wiring:

**Terminals 25 & 30 common:** Safety Loops(s) Will override bollards UP signal when vehicle or ferrous metal object is on loop.

Connect to a loop detector output relay N.O. at the common and normally open terminals. If more than one loop detector is used connect the detector relays in parallel to terminals 25 & 30.

**Terminals 26,27 & 30 common** Safety Devices (s) Will override bollards UP signal when device jumps terminals. Connect to a safety device output relay N.O. at the common and normally open terminals.

## 9.5 Power to Accessories:

**Terminals 3 (+24VDC) & 4 (ground) Accessory power output. Limit load to 0.25Amps. Use only for low power accessories. If more power is needed attach a plug-in power strip to the line voltage and use plug-in 12 or 24VDC transformers to supply power to accessories.**

**The power strip must incorporate surge protection to protect the accessories**

## 9.5 Wiring Chart:

**\*\*\* Denotes wiring already done by factory  
(do not change)**

No.	Terminal	Use	No.	Terminal	Use
1	Down	Lower Signal***	17	Ground	Ground
2	Up	Rising Signal ***	18	Power in-	GND
3	Ground	24VDC- Accessory Output Common	19	Power in+	24V+ Input
4	24V+Out	24VDC+ Accessory Output	20	12V+ Out	12V+ Output***
5	Out	NC	21	Ground	Ground***
6	24V+Out	Alarm 24V+ Output	22	Bollard Down	DOWN Signal Input 1***
7	Buzzer	Alarm OC Output	23	Down_dirction2	Lower Signal Input 2
8	12V+Out	LED 12V+ Output***	24	Bollard Up	UP Signal Input***
9	LED1	LED OC Output***	25	Vehicle Detector	Safety Loop(s)
10	12V+Out	12V+ Output	26	Safety 1	Safety 1
11	NC	NC	27	Safety 2	Safety 2
12	12V+Out	12V+Output	28	Ground	Ground***
13	Ground	Ground	29	NC	NC
14	Ground	Ground	30	Ground	Ground
15	485+	485+	31	NC	NC
16	485-	485-			

## 10.0 Installation of Control Accessories

### Bollard Control Accessories

#### **WARNING:**

*All bollard remote control devices must be in direct line of sight or the person operating the bollard controls to ensure that no pedestrians or vehicles are near the bollard when operating. This is usually from a guardhouse or an area near the bollards.*

#### **10.1 Types of control:**

Types of control devices normally used:  
Handheld transmitters, keypads, key switches, card readers and access control systems.

Hardwired control devices must be connected directly to the PPU. Normally, a (1) ½ to ¾ inch PVC conduit is adequate for control wiring. Refer to the manufacturer's instructions for details about individual products and wiring size requirements.

Be sure to connect all conduits for control stations (i.e. push button panels; limit switch; heaters; stop/go traffic) homerun to the PPU.

#### **10.2 Control Devices:**

All control devices must Normally Open relay output will dry contacts. No voltage output.

# 11.0 Loops and Photoeyes

## Bollard and PPU airline connections

### 11.1 Vehicle Loop Detectors (*Optional*)

- A. When used, the Loop Detection Module is installed inside the PPU. Use N.O. relay output.
- B. Customer/End-user is responsible for the in-ground loops, conduit and wiring back to the HPU.
- C. All loop wiring must be in PVC conduits. (Metallic conduits introduce higher than acceptable inductive noise levels to the loop detection modules).

### 11.2 Loop Placement

Place loops as close to the bollards as possible, but do not encircle the bollard(s)

### 11.3 Photoeye(s)

Place the Photoeye as close to the bollard(s) as possible, but make sure that the rising Photoeye does not inadvertently block the Photoeye beam.

## 12.0 Initial Time Startup and Test

*Test all control accessories added one by one to make sure that they are functioning properly.*

*Test all safety devices added one by one to make sure that they are functioning properly*

*Always use N.O. (normally open) relay output for any device or safety device connected to PPU*

### 12.1 Control Devices:

Types of control devices normally used:

Handheld transmitters, keypads, key switches, card readers and access control systems. Always use N.O. outputs for any device.

### 12.2 Hardwired Devices:

Hardwired control devices must be connected directly to the PPU. Normally, a (1) ½ to ¾ inch PVC conduit is adequate for control wiring. Refer to the manufacturer's instructions for details about individual products and wiring size requirements.

### 12.3 Connection of Devices:

Be sure to connect all conduits for control stations (i.e. push button panels; limit switch; heaters; stop/go traffic) homerun to the PPU.

### 12.4 Power Up Procedure:

1. Power up the breaker to the PPU
2. Turn the PPU breaker to ON position
3. Close compressor drain valve
4. Turn ON the compressor power switch
5. Set the compressor regulator to 60PSI
6. When compressor stops at cutoff pressure open Shutoff valve slowly.
7. Check all air connections in the PPU for leaks.
8. Open all white and black supply valves that are connected to bollards.
9. Check all airline connections from PPU to the bollards and listen for leaks.
10. Use one of the control devices connected to the PPU to cycle the bollards up and down. Check for any new leaks at the bollards.
11. Adjust the "bollard air regulators" to set there individual up and down speed.
12. Lock up PPU cabinet

### **12.5 Power Down Procedure:**

1. Switch off compressor at compressor switch
2. Drain air pressure from compressor air tank by opening compressor drain valve.
3. Cycle the bollards to drain any residual air pressure
4. Power Down the breaker to the PPU, lockout and tag breaker.
5. Turn the PPU breaker to OFF position
6. Turn OFF the compressor power switch
7. Lock up PPU cabinet

### **Notes:**

# **13.0 Bollard Monthly Maintenance**

**13.1 Power Down PPU as per section 12.5**

**13.2 Monthly Maintenance**

**Check all airlines for air leaks. This can be checked by physical inspection of airlines and noting if the compressor cycles to build pressure due to air leaks**

**13.3 Add tool oil to the Air Tool Oil to the “Lube Oil Reservoir” by unscrewing the oil container and adding oil. If the “Lube Oil Reservoir” is empty add oil on a weekly basis.**

**USE ONLY FOOD GRADE BIO-DEGRADABLE AIR TOOL OIL to ensure that no environmental damage can occur. If the “Lube Oil Reservoir” is empty**

**13.4 The air compressor is an “oil less” compressor- no oil to add or check.  
Check compressor air regulator- reset to 60-70 PSI if needed.**

**13.5 Adjust the “bollard air regulators” to set their individual up and down speeds if needed to sync bollard speeds.**

## **14.0 Bollard Bi-annual Maintenance**

- 14.1 Power Down PPU as per section 12.5**
- 14.2 Bi-annual Maintenance**  
**Check all airlines for air leaks. This can be checked by physical inspection of airlines and noting if the compressor cycles to build pressure due to air leaks**
- 14.3 Un-bolt the bollard top cover and check for air or oil leaks**
- 14.4 Add tool oil to the Air Tool Oil to the “Lube Oil Reservoir” by unscrewing the oil container and adding oil. If the “Lube Oil Reservoir” is empty add oil on a weekly basis.**  
  
**USE ONLY FOOD GRADE BIO-DEGRADABLE AIR TOOL OIL to ensure that no environmental damage can occur. If the “Lube Oil Reservoir” is empty**
- 14.5 The air compressor is an “oil less” compressor- no oil to add or check.  
Check compressor air regulator- reset to 60-70 PSI if needed.**
- 14.6 Adjust the “bollard air regulators” to set their individual up and down speeds if needed to sync bollard speeds.**