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Operating Manual

Pneumatic Auto Bollard

Please read the instructions prior to performance any task!

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Copyright Statement

Respected customer:

Thank you for choosing Polite Security Products bollard. This is a product with high technology, so please read this manual carefully before operation.

The appearance and technologies involved in this product belong to Polite Security Products.

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All rights to improve and perfect our products are reserved. We can't promise this manual is in full accord with the product you receive, but we will check and revise the manual at regular interval. No further notification will be sent in the case of any modifications to the manual.

Warranty Service Statement

We provide free maintenance and technical support within warranty period from the day of purchasing. This commitment will automatically terminate when any of the following actions occur.

1. User makes modification, dismantlement or anything else which may possibly impair the completeness of software and hardware.
2. User fails to operate correctly according to this manual and causes damage to the equipment completely or partly.

Safety Attentions

Pneumatic automatic bollard contains many mechanical and electronic parts. Any assembly or operation carelessness may threat your security.

Any person or agency which sell and install Polite Security Products should take corresponding responsibility and comply with the following requirements:

All the bollard moving positions should be clearly marked (such as audio and/or optical signal ground sign) to make sure that every passer-by notice the existence of bollard. You have compelling obligation to these signal signs and system.

Warnings:

This manual introduces correct use information and important cautions to prevent accidents from happening. Please read it carefully and use the product correctly. Any actions disobeying safety attentions or misusing the bollard will

possibly threat people's life.

Only professionals who are technically trained and know well about the electronic and mechanical risks of bollard are qualified to install and operate automatic bollard so as to avoid unnecessary dangers caused by incorrect operations.

We are not responsible for results caused by the followingkinds of operations:operations unmentioned in this manual, vicious destructive operation, unprofessional operation by untrained technician.

Please keep this manual for future reference.

If you need more information and training, please contact the following E-mail:

info@polite.com.au

Catalogue

1 System Introduction

1.1 Introduction

Pneumatic automatic bollard is usually installed in the vehicle entrance/exit and control point. Commands are sent by remote control or other control system to make bollard automatically back to ground level to realize barrier-free passing.

Pneumatic automatic bollard system is the very choice for present access control. Its high-strength anti-collision performance can effectively stop illegal vehicle intrusion and protect the area divided by bollard. With a distance of 1.5m between bollards, it offers barrier-free passing for pedestrians and realizes pedestrian-vehicle division function which road barrier doesn’ t have.

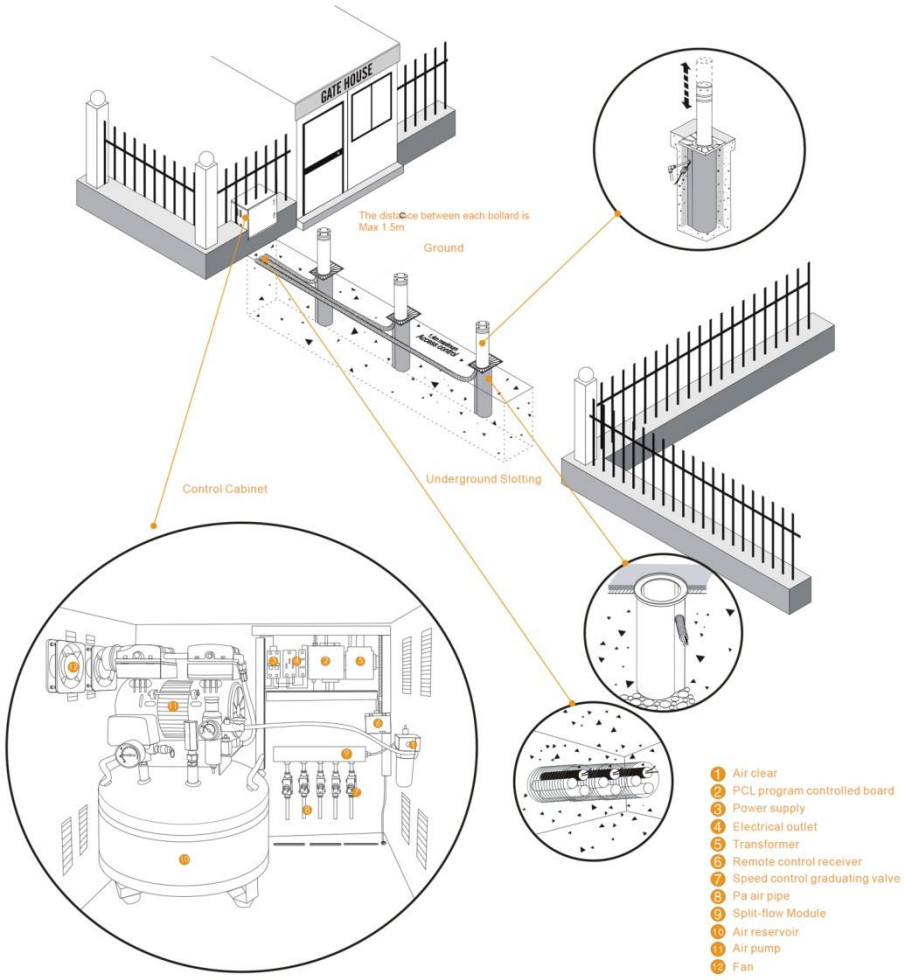
Bollard system is suitable for custom, port, wharf, high-class estate, pedestrian street, government building, prison, airport, military base and other places in need of control.

1.2 System Composition

Pneumatic automatic bollard mainly consists of cylinder and control cabinet. It uses air pressure as dynamic to realize the rise/fall of bollard.

As a moving device, bollard is usually installed at vehicle entrance/exit. It rises to block the vehicle and falls to the ground level to authorize free passing.

Control cabinet contains dynamic system and logic control system and it is normally installed within 50m of the bollard.



- Above picture shows standard control cabinet. Each can control 4 bollards.
- Nonstandard control cabinet can be customized (optional). It is possible for 1 control cabinet to connect with 7 bollard

1.3 Function Features

- Pedestrian-vehicle division control and 1.5m bollard spacing can effectively control vehicle entrance/exit and make sure pedestrian passes freely at the same time.
- Use control system which makes system performance stable and reliable, and can be easily integrated to user's system.
- Optional cylinder materials. With elegant overall appearance, it can be integrated with all kinds of environment.
- Optional temperature control system ensures stable operation with high/low temperature.
- Automatic fall/rise in the case of outage (optional) :
    1) Automatic fall: bollard falls automatically when electricity is cutoff (default setting).
    2) Automatic rise: bollard rises automatically when electricity is cut off (optional setting, used in places with high security requirements).
- Various control methods: manual button control, wireless remote control and other system control.
- Can be connected with road barrier, ticket dispenser, card reader and other systems to realize automatic control function.
- Can use traffic lights to control the access.
- Grounding to activate valid anti-collision function, leaving drivers no worries.
- 4 kinds of working modes for your choice.
- Bollard rise/fall time can be adjusted freely.

1.4 Model

KVS-APB-D.H.T-0/4/6

KVS----KAVASS Bollard

A---Automatic **P**---Pneumatic B--- bollard

D-Diameter H-900-Height T-Thickness

0/4---0 stands for iron ; 4 stands for 304 stainless steel

D	168	220	275
H	600	700	900
T	5	6	7

2 Product Introduction

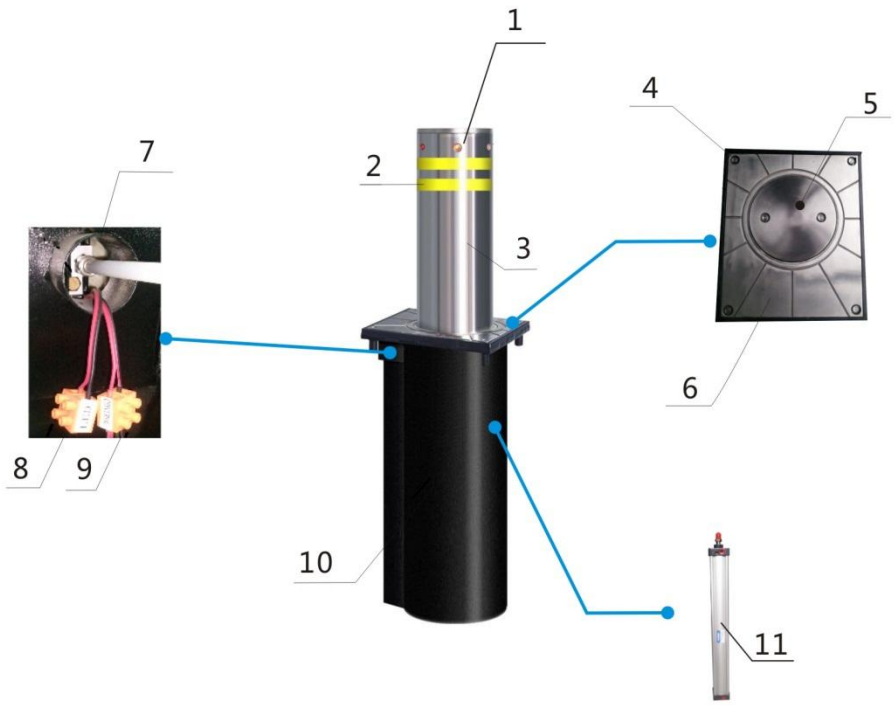
2.1 Main technical parameters

Basic Parameter										
Model		**168/600**	**168/750**	**168/900**	**220/600**	**220/750**	**220/900**	**275/600**	**275/750**	**275/900**
Weight		86 Kg	94 Kg	103 Kg	116 Kg	128 Kg	141 Kg	146 Kg	162 Kg	178 Kg
Diameter		168mm	168mm	168mm	220mm	220mm	220mm	275mm	275mm	275mm
Block Height		600mm	750mm	900mm	600mm	750mm	900mm	600mm	750mm	900mm
Embedded Height		837mm	987mm	1137mm	837mm	987mm	1137mm	837mm	987mm	1137mm
Rise_Speed Fall_Speed		≤30cm/s（Adjustable）			≤25cm/s（Adjustable）			≤20cm/s（Adjustable）		
		≤20cm/s（Adjustable）			≤20cm/s（Adjustable）			≤20cm/s（Adjustable）		
Impact Resistance（J）		200,000	200,000	200,000	250,000	250,000	250,000	300,000	300,000	300,000
Lift（Kg）		106~168	103~165	100~162	95~157	90~152	86~148	163~213	157~207	151~201
Thick -ness	**Iron**	6mm	6 mm	6 mm	7 mm	7 mm	7 mm	7 mm	7 mm	7 mm
	Stainless	5mm	5mm	5mm	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm
Drive Mode		Pneumatic Type								
Voltage Input		AC 220V air pump(AC 110V Optional)								
Material		304 Stainless steel /316 stainless steel Optional				Iron				
Surface Finish		brushed finish				Plastic coating; black/yellow/other color optional				
Emergency Power off		Down automatically （Up automatically Optional）								
Power		AC 220V / 1000W								
Frequency		High working frequency; service life>2,000,000 times &2,000 daily operations								
IP Class		IP67								
Temperature		-5~70℃. Heating system is available if the temperature is too low (optional)								

2.2 Bollard Structure

Pneumatic Bollard
Bollard Structure

Figure No. P_2-1



Composition

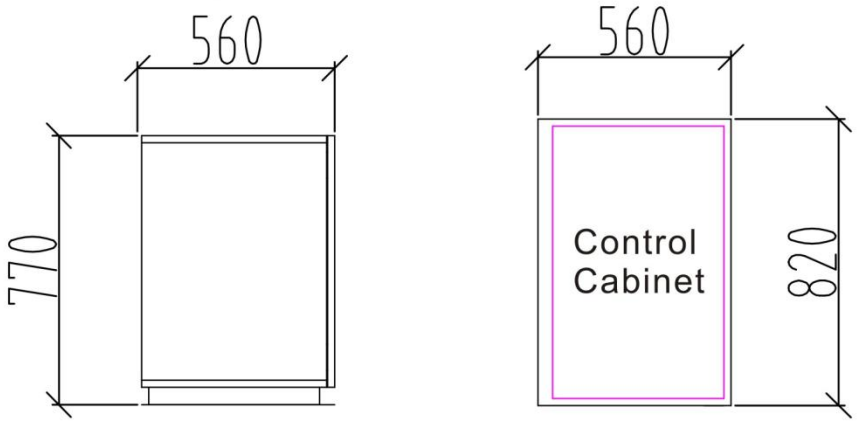
1	Hightlight LED Light	7	Solenoid Valve
2	3M Diamond Level Reflective Stripe	8	LED Power Wiring port
3	Stainless Steel Inner Cylinder	9	Solenoid Valve Wiring Port
4	Anti-theft Bolt	10	Pre-buried outer Cylinder
5	Inner Cylinder Top Cover	11	Air Cylinder
6	Outer Cylinder Flange		

Function Instructions		
NO.	**Accessory Name**	**Instructions**
1	Highlight LED light	Alarm light: normally on after bollard rises, indicating that access is under control, not allowed to pass; twinkle during rise/fall, indicating that bollard is in process of operation and warning vehicle/pedestrian to be careful.
2	3M diamond grade reflective stripe	Have strong reflective effect when shined by certain light, providing the most efficient and secure protection for pedestrians in darkness and night workers.
3	Stainless steel inner tube	Bollard moving part used for blocking vehicles.
4	Anti-theft bolt	Protect the security of accessories inside the cylinder.
5	Inner tube top cover	Convenient for bollard maintenance.
6	Outer tube flange	Anti-skid flange; can be opened during maintenance.
7	Solenoid valve	Rise/fall control switch.
8	LED power line port	Port used for connect control cabinet with bollard LED light.
9	Solenoid valve wiring port	Port used for connect control cabinet with bollard solenoid valve.
10	Pre-buried outer tube	Cylinder fixed part, buried under the ground.
11	Air cylinder	Moving parts, controlled by air pressure

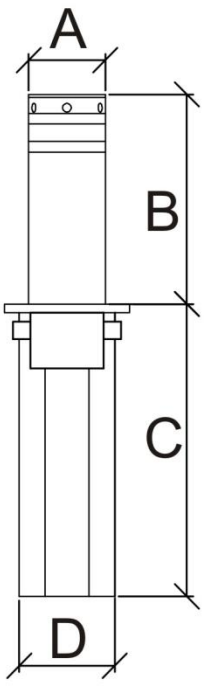
2.3 Control Cabinet & Bollard Size

Pneumatic Bollard
System Dimension

Figure No. P_2-2

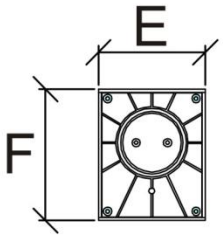


Stand
Control Cabinet



Pneumatic Bollard

A	D	E	F
168	219	306	376
220	273	357	427
275	325	408	478



B	C
600	837
750	987
900	1137

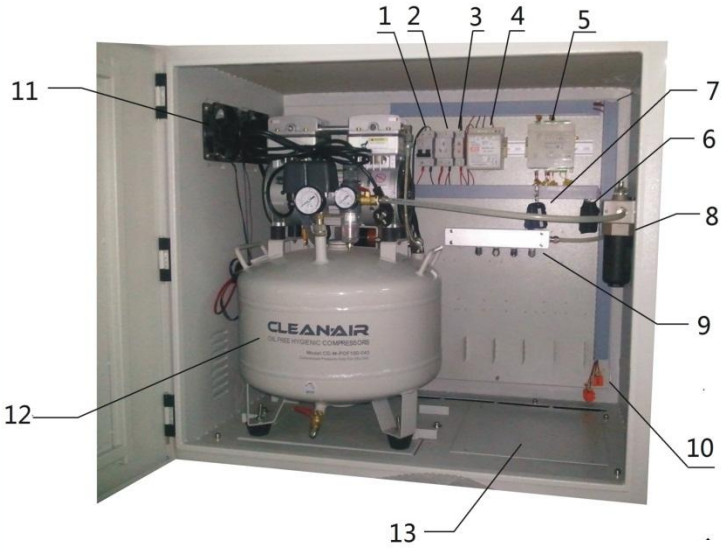
2.4 Pneumatic Control System

Pneumatic control system is the dynamic of the whole system and logic control part. It provides dynamic and signal to the rise/fall of bollard.

See standard version control cabinet in Fig. P_2-3.

Pneumatic Bollard
Control Cabinet

Figure No.: P_2-3



Composition

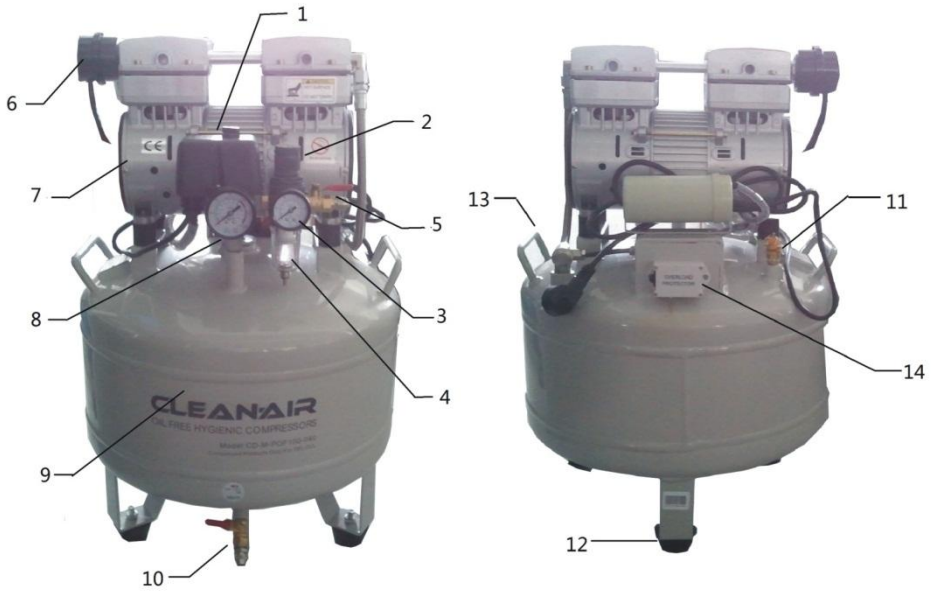
1	Air Switch
2	Three-pole socket
3	Two-Pole socket
4	Switch Power Supply
5	Control Panel
6	Wireless Signal Strengthening module
7	Wireless Controller
8	Oil Filler
9	Shunt
10	Terminal Block
11	Cooling Fan
12	Air Pump
13	Threading Hole

Important Accessory Instructions		
NO.	**Accessory Name**	**Instructions**
1	Air switch	Circuit on-off control; Protect electronic equipment form short circuit, severe overload and under voltage conditions.
2	Three-Pole socket	Used for air pump power supply.
3	Two-Pole socket	Used for cooling fan power supply.
4	Switch power supply	Convert AC 220V into DC 24V to supply pneumatic control panel.
5	Control panel	Control module of the whole system.
6	Wireless signal strengthening module	This wireless module can strengthen infinite remote control with a distance from 15-30m.
7	Wireless controller	Used for control the rise/fall of bollards.
8	Oil feeder	Feed oil in the form of mist spray which can effectively prolong service life. Use ISO VG32 oil. Turn anticlockwise to fill oil.
9	Shunt	Used to shunt the air when connected with several bollards.
10	Terminal Block	One LED connector used for connecting bollard LED light One Control connector used for bollard solenoid valve
11	Cooling fan	Cooling fan automatically works when the temperature inside of the control cabinet reaches 35℃
12	Air pump	Dynamic unit, providing dynamic to bollard rise
13	Wiring hole	Wring hole at the bottom, used for putting through wires and air pipe

2.5 Detailed Instructions of Air Pump

Pneumatic Bollard Compressor

Figure No. P_2-2



Facade Reverse

Composition

1	Power Switch	8	Gasholder Pressure Gate
2	Output Pressure Regulating valve	9	Gasholder
3	Output Pressure Gate	10	Blowdown Valve 1
4	Filter Regulating Valve	11	Blowdown Valve 2
5	Air Outlet Switch	12	Footing
6	Air Filter	13	Handle
7	Compressor	14	Overload Protector

Main Accessory Instructions		
NO.	**Name**	**Instructions**
1	Power Switch	There’ re 2 choices: 0 and 1. Turn to 1: air pump is electrified to work; Turn to 0: electricity is cut off and air pump stop working.
2	Output pressure regulating valve	Used for regulating the air pressure outputted to the bollard by the pump: ① Firstly lift the regulating valve ② Increase/Decrease the pressure by turning the regulating valve clockwise/anticlockwise to adjust to a suitable pressure value (from 4-6kg) ③Press down the regulating valve
3	Output pressure gage	Display pressure value outputted to bollard.
6	Air filter	Used for filtering the impurities in the air and reducing the noise.
8	Gasholder pressure gage	Used for displaying the total pressure value inside the gasholder. Default settings: when air pump is electrified and total pressure is less than 5kg, compressor works; when total pressure reaches 8kg, compressor stops working.
9	Gasholder	Gasholder volume of standard control cabinet is 38L.
10/11	Blow-down valve	Water and impurities in the air will be brought into the gasholder when pump is working. Open the blow-down valve to drain the water off.
14	Overload protector	Current is possibly too large when compressor working voltage is less than 200V. In this case, overload protector will automatically cut off and stop working. Manually press the button on the overload protector to restart the equipment.

Blowdown operation: drain the water off at regular interval (such as once a week) according to use frequency and air humidity on spot. Use blowdown valve 1(10) to drain the water off under normal circumstances. When thers' s enough air pressure in the gasholder, open blowdown valve gate and make sure it is parallel with the blowdown outlet. Close the valve when finished.

Attention: compressor temperature will get high after working for some time. Please don' t touch it directly, especially when you need to press the emergency release valve at the back of the air pump. Notice you arm and keep it away from the compressor surface, otherwise you will possibly be burned.

3 System Installation

3.1 Bollard Installation

Tool list:

You may need the following tools except conventional tools:

- Stick
- Bandage which can withstand 200kg
- PA air pipe cutter
- Road smash hammer
- Small size forklift
- Small size excavator about 40kw (according to construction size and installation geological conditions)

Preparations:

1） Transport: Use small size forklift to transport bollard to installation spot. Keep bollard vertical or horizontal.

2） Package: Cylinder and control cabinet are packaged by wooden boxes separately.

3） Distance measurement: Measure the distance between bollard installation place and control cabinet referring to blueprint. Too long distance may cause unwanted results such as wire & pipe winding and squeezing.

Geological Survey:

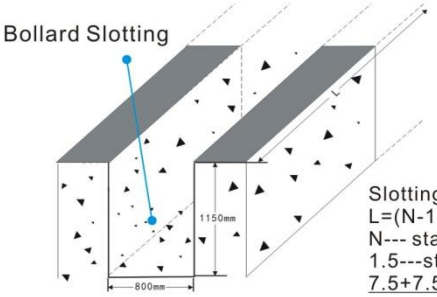
Try to install bollard in places without rainwater deposition, otherwise you may need to excavate drainage channel connecting with existed or additional drainage system.

Construction Illustration: (Take DBO-168P-600 for example)

1. First-phase preparations: affirm construction site, excavate channels and custom drainage system

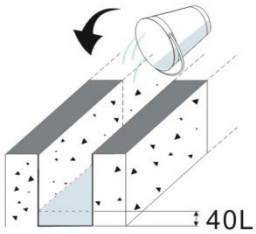
Construction Diagram
First Phase Preparation

Figure No. : P_3-1



Slotting Length Computational Formula
L=(N-1)*1.5+7.5+7.5=1.5N m
N--- stands for bollards amount
1.5---stands for the central spacings of each bollard
7.5+7.5---stands for the distance sum between the 2 bollards on the very sides.

①Excavate a slot with depth 1150mm,width 800mm and length L



Pour about 40L water

If the water are drained within 30 minutes, select gravel drainage system.

If only a few water or even none is drained, select drainage pipe system.

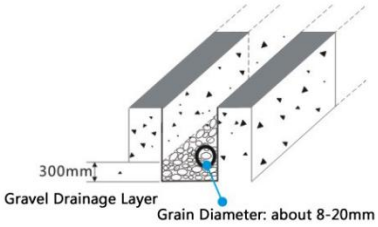
②Soil drainage ability test

First phase preparation: confirm pre-bury slot dimension,excavation and drainage system

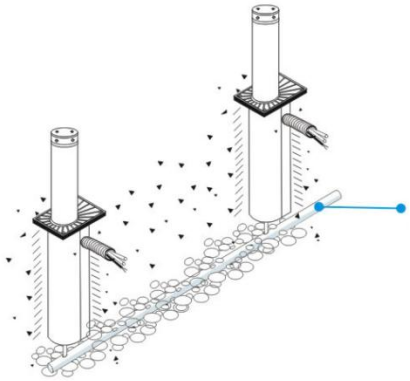
2. Drainage System

Construction Diagram
Drainage System

Figure NO.: P_3-2



③ Select 300mm gravel porous layer as drainage layer
a. lay 300mm gravel layer used for seepage
b. cover a piece of tarpaulin on the surface of gravel layer to prevent cement infiltration
c. break the tarpaulin at the bottom of bollard installation site to make sure water inside the bollard can flow through drainage hole and sink into gravel layer



③ Select drain pipe drainage system
a. Use cement, brick or gravel to bottom the tunnel for 100mm.
b. Place a Φ110 PVC pipe or galvanized pipe for drainage. Use three-way joint to connect PVC pipe with bollard bottom.
c. Fasten the drainage pipe with cement, brick, gravel or cement block 840mm away from the ground.

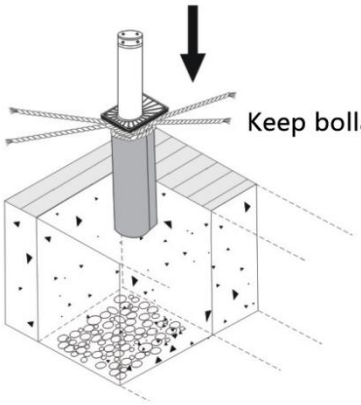
Drainage: gravel layer drainage & PVC pipe drainage

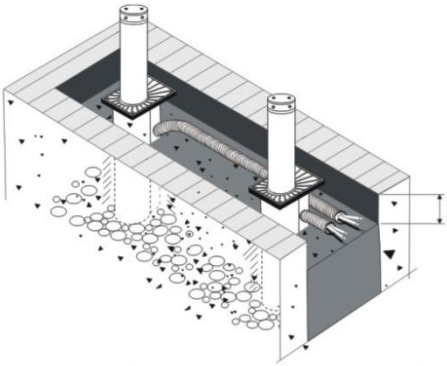
3. Bollard Location and Fixing

Construction Diagram
Bollard Plcaement and Fixture

Figure NO. : P_3-3

④ Place the bollards at a spacing of 1.5 m each.
Placing requirements:
a. Spacing between bollards: 1.5m.
b. All bollards keep the same height after installation and are horizontal with the ground.
c. Drainage hole at the bottom of the bollard must align with drainage pipe.





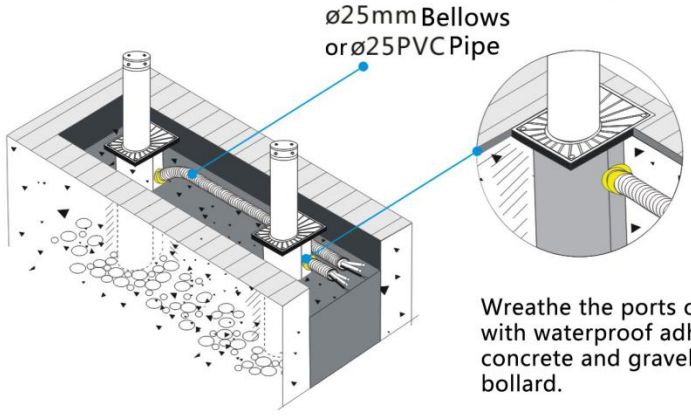
Fix bollards and cast concrete
a. Make sure bollards keep vertical and horizontal and drainage system works well. Then cast concrete.
b. To prevent bollard from inclining or moving, you can fix the footing first and then cast concrete for the whole construction.
c. Stop casting when concrete surface is 200mm from the ground.
d. Use concrete above BS 8110-2.

Bollard Placement & Fixture: lacation, horizontal adjustment and casting concrete

4. Wiring Connection

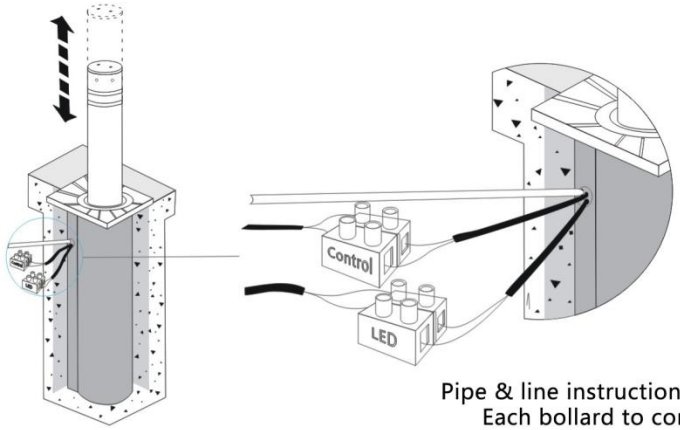
Construction Diagram
Pipe & Line Connection

Figure NO.: P_3-4



Wreathe the ports of bellows and bollard with waterproof adhesive tape to prevent concrete and gravel fromentering into the bollard.

⑥ Pre-bury and connect pipe & line
a. Use a Φ25 bellows or PVC pipe for connection.
Place a RVV4*0.5 lead and a Φ10 air pipe in each pipe.
b. It is suggested to use galvanized pipe for wire threading in industrial park and other places with large vehicle passage.



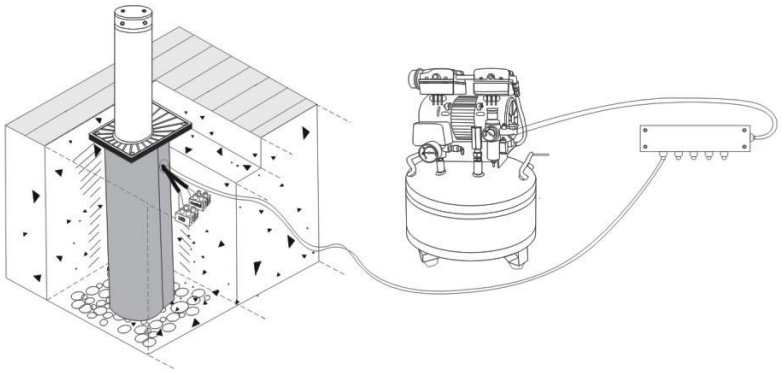
Pipe & line instructions:
Each bollard to control cabinet requires to pre-bury
1. a Φ10 air pipe connected to air pump
2. a RVV4*0.75 lead or 2 RVV2*0.75 leads for connecting with solenoid valve (Control) and LED lights

Bollard wiring instructions: pipe & line connection instructions between bollard and control cabinet

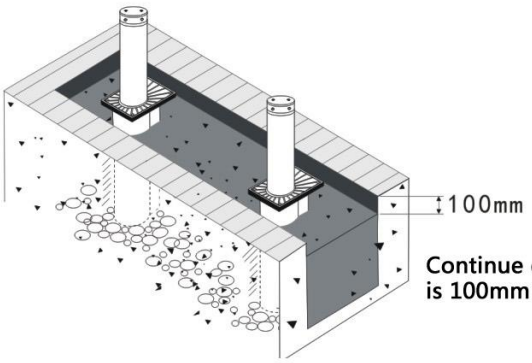
5. Function Detection and Ground Process

Construction Diagram
Function Detection and Ground Process

Figure NO. : P_3-5



After pipes and lines are connected, electrify the equipment to test its air impermeability (function condition).



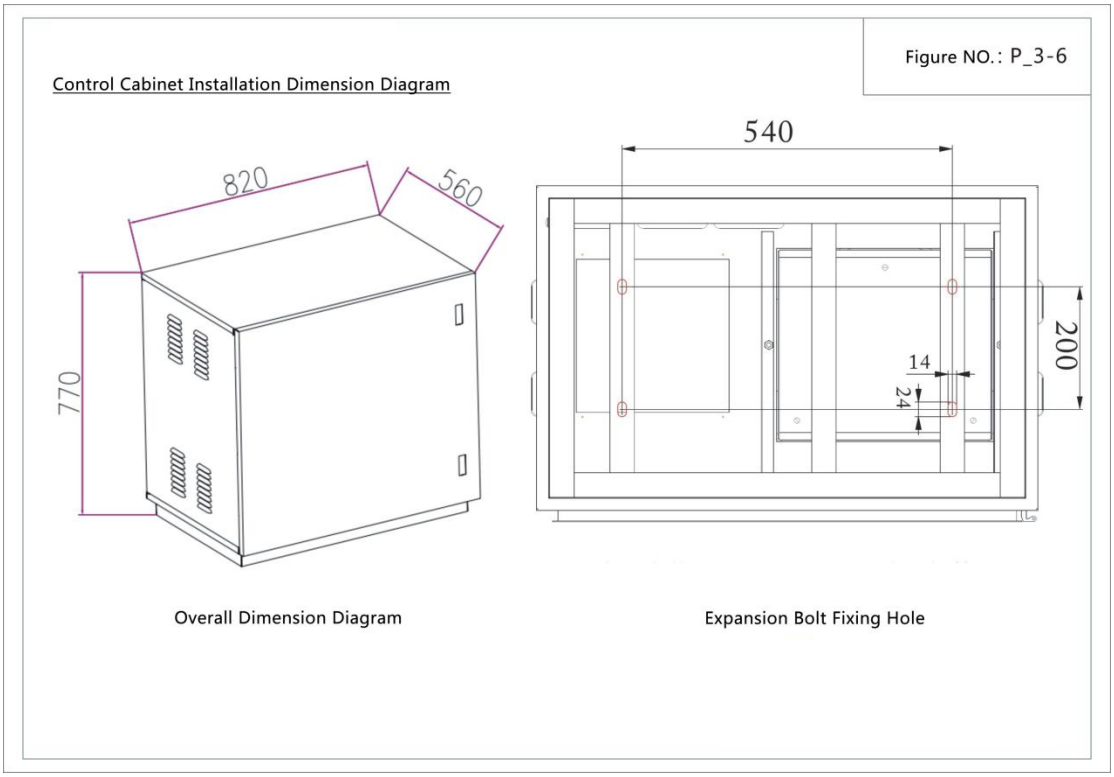
Continue casting concrete till its surface is 100mm from the ground.

⑦ Ground process
After air impermeability and function tests are finished, continue casting concrete till its sureface is 100mm from the ground. Landscape and ground construction department will use the same material as the ground to lay on the upper part after bollards are installed.

Function detection & ground process: check equipment working status and lay surface material

3.2 Control Cabinet Installation

Fixed size diagram



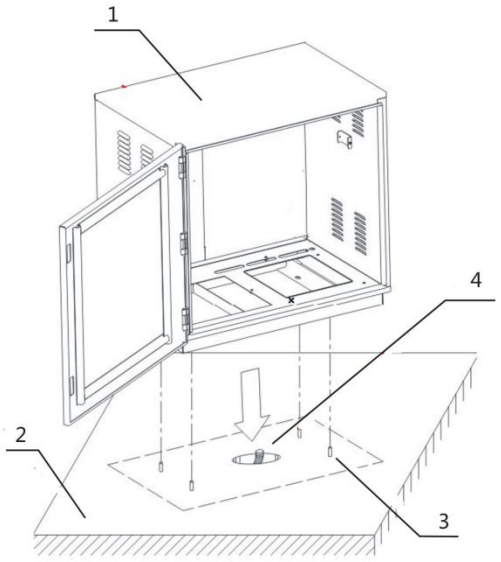
Placing requirements of control cabinet

- This system has precise running status requirement. The ground must be horizontal without any bumpiness.
- Necessary wiring and civil work must be done before construction.
- To install control cabinet, you need to make a basic platform. Pre-bury the bollard in the basic platform and lift it to the pre-buried pipe and inlet of 220V power supply. Place the control cabinet on the basic platform and fasten it with 4 metal expansion bolts M12. Choose a suitable installation site (such as somewhere near the security guard room or some places with suitable landscape). It is suggested to place it within 50m distance away from the bollard. Or the sensitivity of bollard will be harmed.
- If the distance between bollard and control cabinet < 100m, gasholder room must be buried in the central position.

Install the base

Figure NO.: P_3-7

Control Cabinet Installation Base



1	Control Cabinet
2	Basic Platfrom
3	Pipe & Line Inlet
4	Expansion Bolt

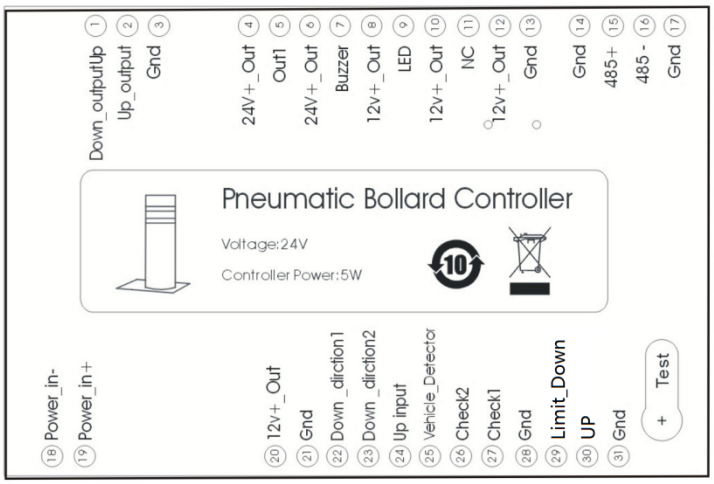
Instructions:
Normal size of basic platform should be larger than 900 (L) * 600 (W) * 200 (H) mm. It can be placed in secirity guard room, green belt and wayside within 50m from the bollards.

Lay a basic platform where the control cabinet is placed. Make the control cabinet 200-300mm higher than the ground to prevent unwanted influence caused by rainwater. The center part of the platform must be hollow for wiring and other work. Finally fasten it on the platform with 4 expansion bolts.

3.3 Port Instruactions

Bollards Controller
Port Instructions

Figure NO.: P_3-8(a)

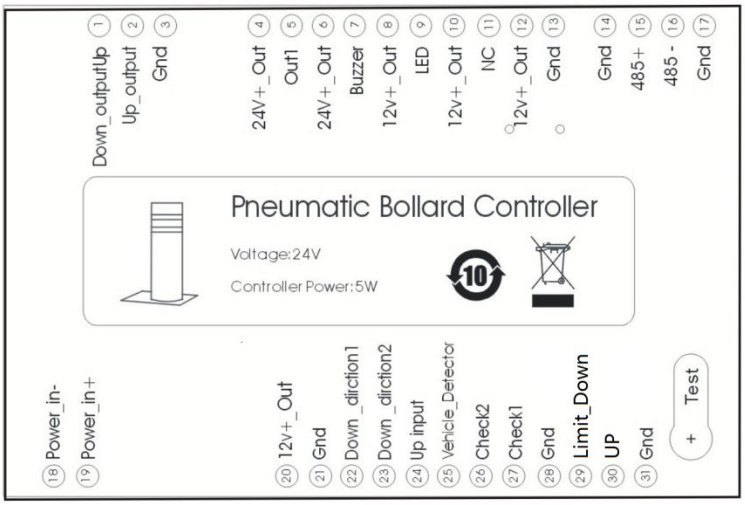


Upper port instructions:

Solenoid valve control output	① Down_outputUp	Solenoid valve FALL signal outlet
	② Up_outputUp	Solenoid valve RISE signal outlet
	③ GND	Common port
Traffic light control output	④ 24V+_Out	Traffic light signal output positive port
	⑤ Out1	Traffic light signal output negative port
Buzzer control output	⑥ 24V+_Out	Buzzer alarm output positive port
	⑦ Buzzer	Buzzer alarm output negative port
LED signal light control output	⑧ 12V+_Out	LED signal light output positive port
	⑨ LED	LED signal light output negative port
Expansive function	⑩ 12V+_Out	DC12V + output
	⑪ NC	Undefined, enpansive port
12V output	⑫ 12V+_Out	DC12V + output
	⑬ GND	Common port
485 Communication Port	⑭ GND	Common port
	⑮ 485+	485 + PC communication port
	⑯ 485-	485 - PC communication port
	⑰ GND	Common port

Bollards Controller Port Instructions

Figure NO.: P_3-8(b)



Lower Port Instructions:

Power input	⑱ Power_in-	DC24V power negative input
	⑲ Power_in+	DC24V power positive input
	⑳ 12V+_Out	DC12V output
Control signal input	㉑ GND	Common port
	㉒ Down_direction1	FALL signal input (direction 1)
	㉓ Down_direction2	FALL signal input (direction 2)
	㉔ Up input	RISE signal input
Ground sensor signal input	㉕ Vehicle_Detector	Anti-collision signal input
	㉖ Check2	Direction 2 ground sensor signal access
	㉗ Check1	Direction 1 ground sensor signal access
	㉘ GND	Common port
Approach switch signal input	㉙ Limit_Down	Approach switch signal input
Expansive function	㉚ UP	UP_Limit Switch signal input
	㉛ GND	Common port
Debugging button	+ Test	Debugging button: used to control bollard rise/fall in emergency

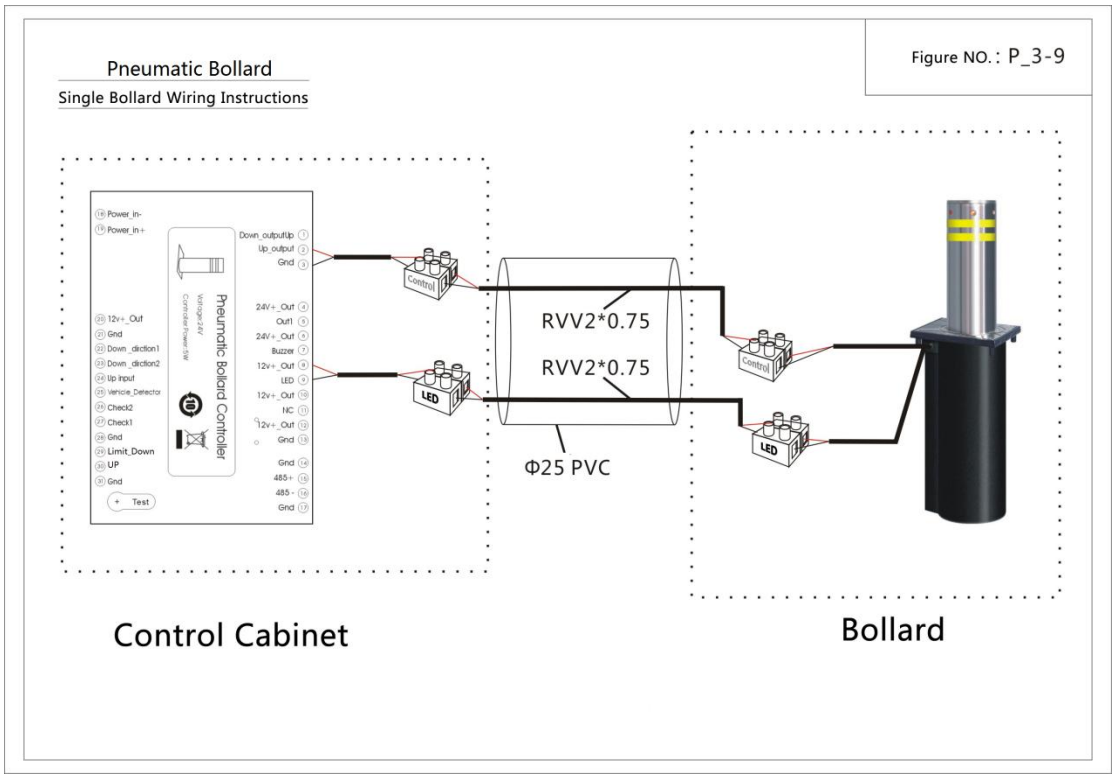
3.4 Bollard Wiring Instructions

The default configuration of standard control cabinet is a control module which can control the rise/fall of all the bollards in one passage. You can also add more control modules to realize separate control, that is, to divide bollards into multiple groups.

Fig. P_3-9 shows the wiring between single bollard and control module.

a)Rise/Fall simultaneously: Connect all the bollards to the same control module according to the wiring method in Fig. P_3-9.

b)Separate control: For example, there’ re 4 bollards in one passage, 2 for vehicle entrance control defined as group A, another 2 for vehicle exit control defined as group B. Connect group A to NO.1 control module and group B to NO.2 control module according to the wiring method in Fig. P_3-9. Then you can make group A/B rise simultaneously.



Instructions: Φ25 PVC pipe pre-buried as shown in the above diagram contains 2 lines and 1 air pipe Φ10. Air pipes of each bollard should be connected to the shunt inside the control cabinet.

3.5 Wiring of Control Part

Standard configuration has 2 kinds of control methods:

a) Control by manual control box

b) Control by wireless controller

1) Manual control box installation:

① Confirm the position of control room

② Connect the manual box with control module according to Fig. P_3-10

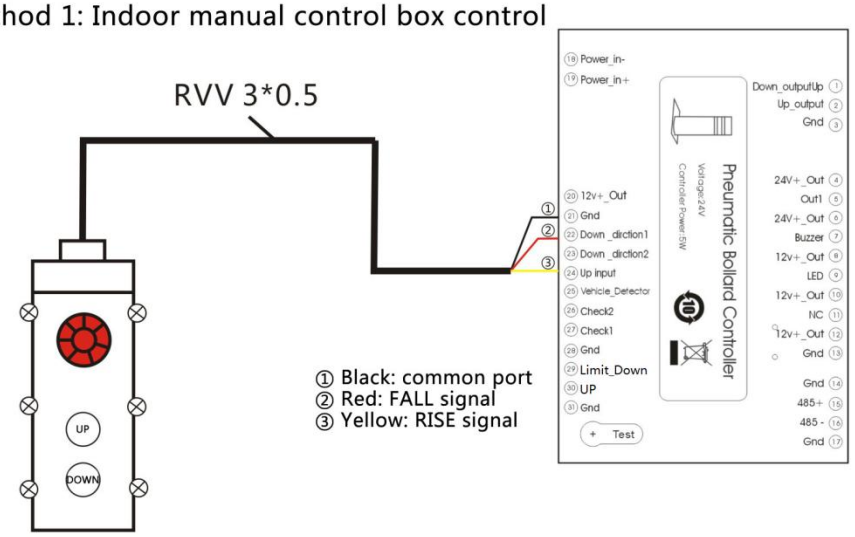
2)Wireless remote control module

All is settled before delivery. Refer to Fig. P_3-10 for wiring. Wireless remote controller is put inside the control cabinet for direct use. Wireless remote control distance is from 15-30m.

Pneumatic Bollard
Wiring of Control Part

Figure NO.: P_3-10

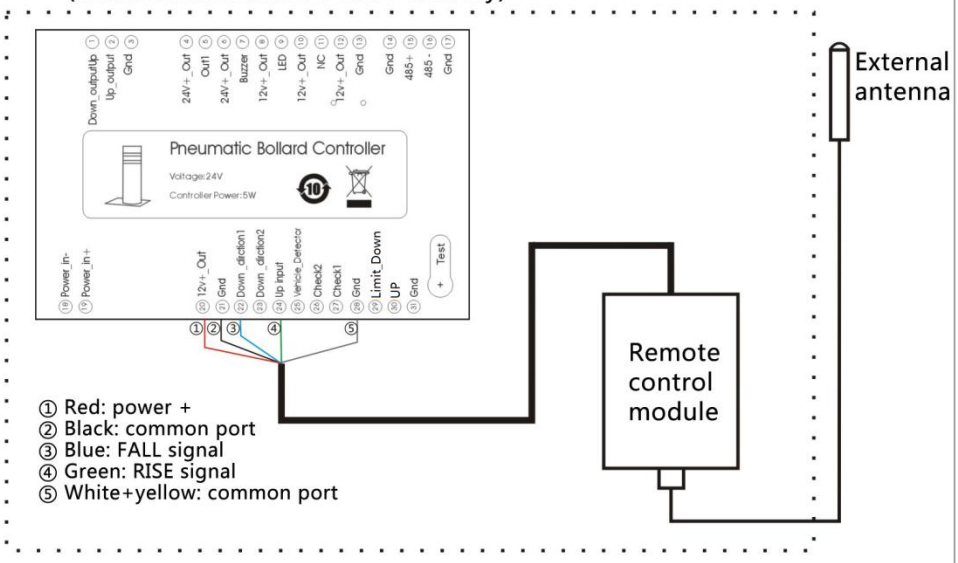
Method 1: Indoor manual control box control



Manual control box
(installed in the control room)

control module
(in the control cabinet)

Method 2: outdoor wireless remote controller control
(connection finished before delivery)



3.6 Lead In External Power

Lead-in external power: Pull standard power line (above RVV2*1.0) to the air switch inside the control cabinet.

In order to ensure long and stable working of the system, **external power must be stable between 220V-230V**. It is suggested to use 10A air switch.

If the voltage is unstable, pump may stop working because of overload protection. In this case, please confirm the stability of external power, and then reset the equipment according to steps in 8.2.

3.7 Entire Machine Debugging and Detection

After the installation is finished, please detect and debug the equipment according to the following steps.

1. Make sure all the wire & pipe connection is correct

2. Make sure external power 220V is stable

3. Make sure air pump switch is turned to “1”, blowdown valve is closed and air outlet switch is on.

4. Enable the power supply and turn on the air switch inside the control cabinet to make sure pump is working well. In normal condition, air pressure gage displays from 0kg to 8kg gradually.

5. Make sure the green indicator light of control module is normally on.

6. Make sure the rise/fall function of manual control box works correctly.

7. Make sure the rise/fall function of wireless controller works correctly.

8. Make sure bollards keep the same rise/fall speed. If not, please debug them referring to 7.5.

9. Make bollard rise/fall for several times to check the change of air pressure gage. In normal case: pressure value decreases from 8kg to 5kg, air pump works automatically, and then pressure value reaches 8kg again.

Attention: passage must be closed during bollard rise/fall test to prevent accidents.

4 Extended Functions

4.1 Traffic Lights Control

Traffic lights can be added to assist bollards in access control according to actual requirements.

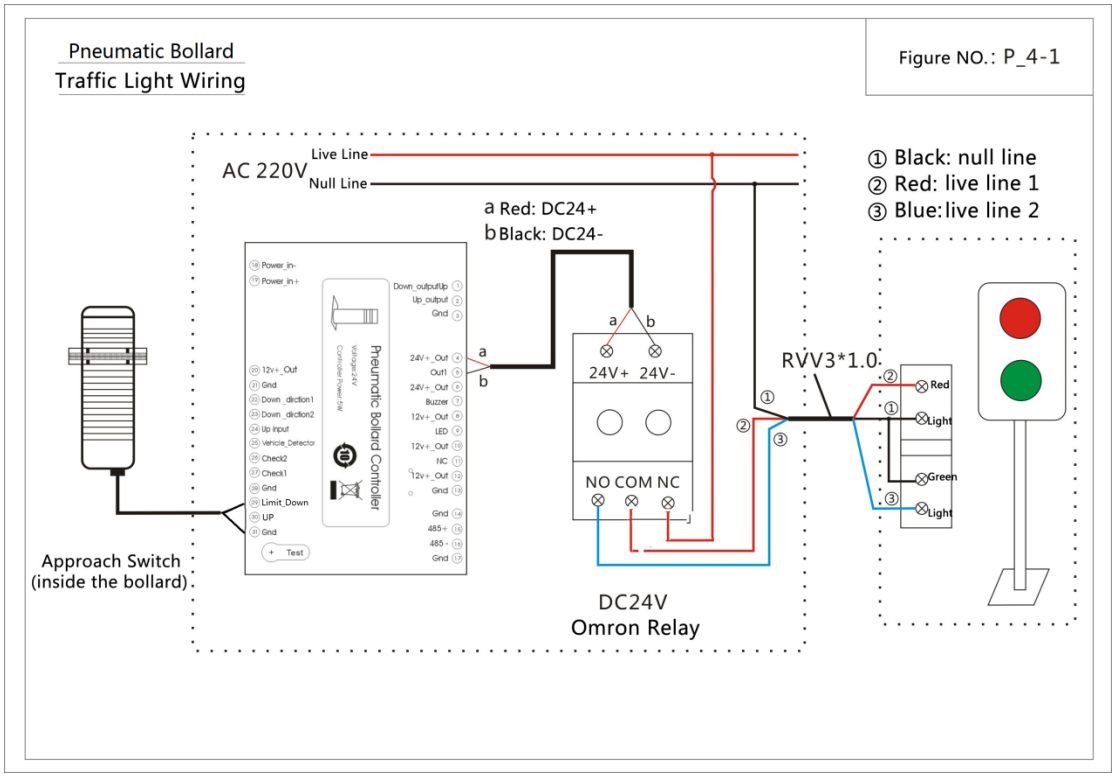
This function requires an accessory to be added in the bollard before delivery. So if you need this function, please mention it specifically in early requirements.

Traffic lights control function:

① Traffic light is red during rise/fall and after rising to the full. Vehicle entrance is forbidden.

② Traffic light becomes green after all bollards fall to the ground level. Vehicle entrance is allowed.

Fig. P_4-1 shows traffic lights connection instructions:



4.2 Lead In Anti-collision Ground Sensor

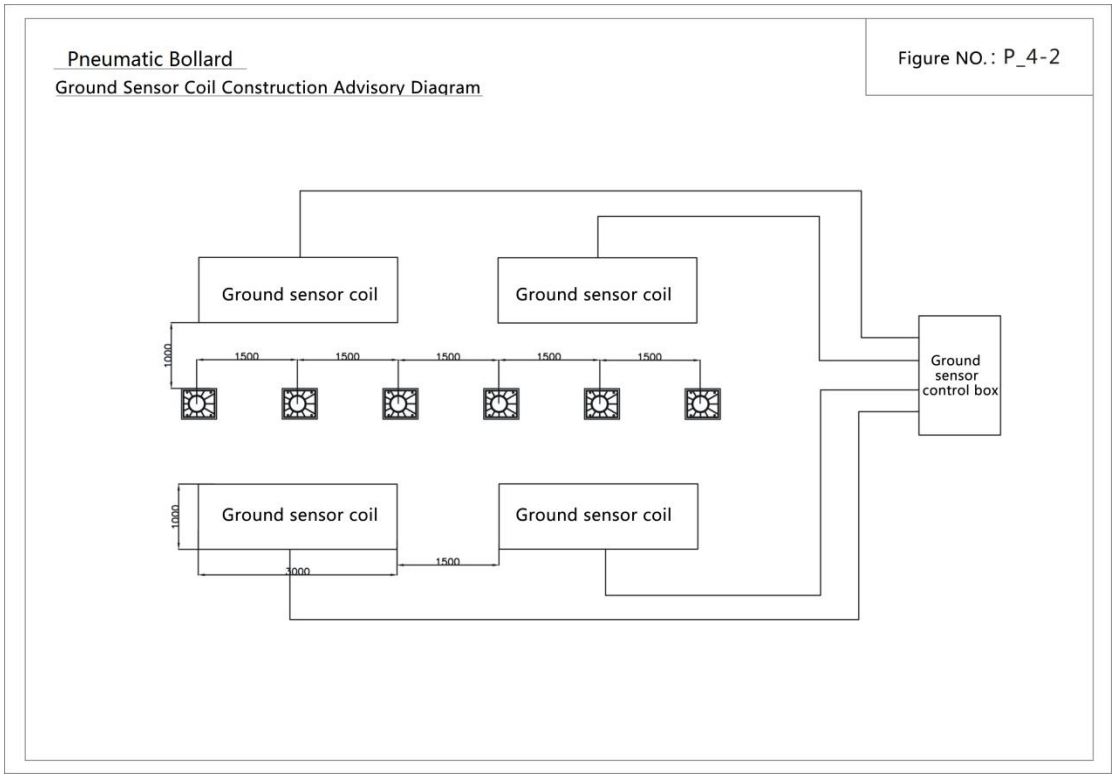
This is a kind of high security equipment. Incorrect use may cause injury to people.

Improper operation by managing personnel, accidental touching the controller by kids and other conditions may cause sudden bollard rise/fall and threat the safety of passing vehicles.

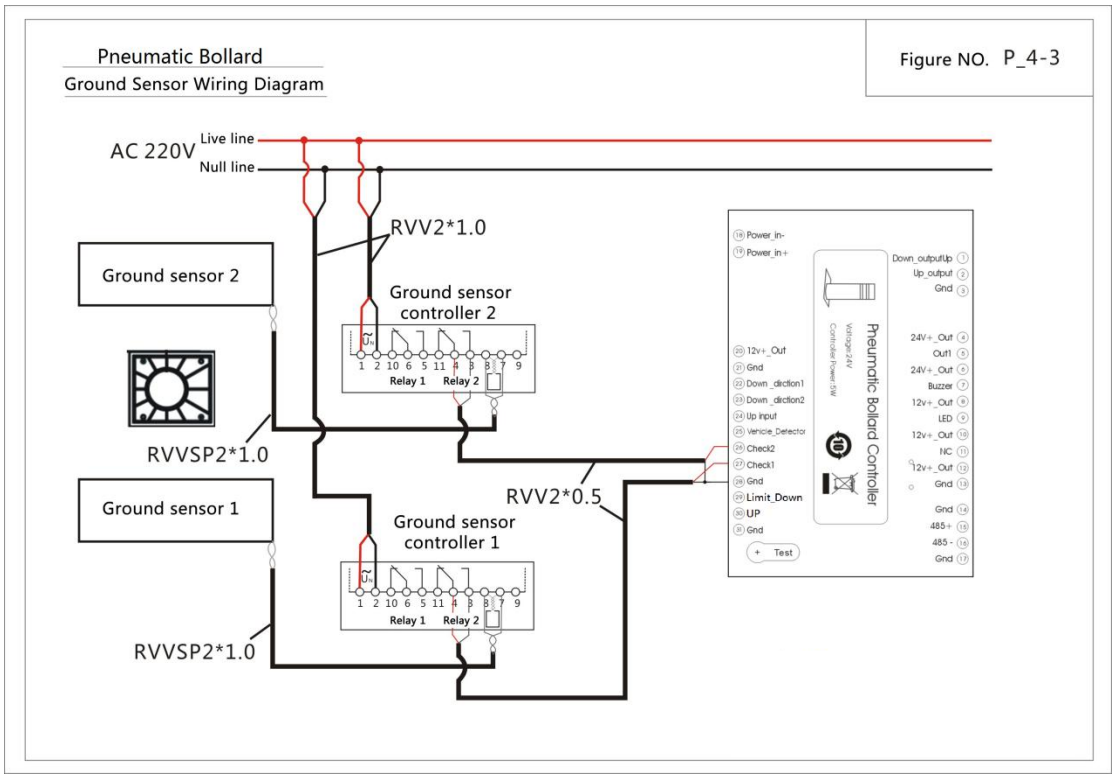
In order to avoid vehicle damage caused by improper operation, you can connect bollard system with vehicle detection system such as ground sensor. When ground sensor detects vehicles, bollard can’ t rise. Only when vehicles leave the detection range can bollard rises normally.

It is suggested to detect vehicles with ground sensor coil. Coil should be neither too large nor too small.

Refer to Fig. P_4-2 for detailed construction.



Refer to Fig. P_4-3 for ground sensor wiring instructions:



Instructions:

1) This wiring diagram is suitable for all control modes;

2) When flow control mode is not in use, you can connect the relay output signals of all the ground sensors in parallel, and then connect to 25 (or any one between 26 and 27) and common port.

5 Working Modes

5.1 Working Modes Introduction

Bollard have the following 4 working modes:

- Command control mode
- Delayed control mode
- Anti-collision control mode
- Flow control mode

Instructions:

1) Relay signal (AKA dry contact signal) can be directly used as the rise/fall signal of this system or cascaded with ticket dispenser, road barrier, card reader and other systems.

2) X,Y as delayed waiting time: after connecting control module with upper computer through 485 protocol converter, this value can be adjusted through the debugging tool provided by us. Detailed operations are as follows.

3) The following instructions are based on the configuration of ground sensor.

5.1.1 Command Control Mode

In this mode, it is necessary to input signal both for bollard rise/fall.

Scene: vehicle needs to **enter into/exit** controlled passage → operator authenticates and sends fall signal→vehicle **passes/fails to pass** the controlled passage →operator sends rise signal.

5.1.2 Delayed Control Mode

In this mode, you need to input signal to make bollard fall. To make it rise, you can input signal or just wait some time for the bollard to rise automatically.

Scene 1: vehicle needs to **enter into/exit** controlled passage → operator authenticates and sends fall signal→vehicle **passes/fails to pass** the controlled passage

→operator sends rise signal.

Scene 2: vehicle needs to **enter into/exit** controlled passage → operator authenticates and sends fall signal→vehicle **passes** the controlled passage→bollard rises automatically after **Y seconds**.

Scene 3: vehicle needs to **enter into/exit** controlled passage → operator authenticates and sends fall signal→vehicle **fails to pass** the controlled passage→ bollard rises automatically after **X seconds**.

5.1.3 Anti-collision Control Mode (default mode)

In this mode, you need to input signal to make bollard fall. To make it rise, you can input signal or just wait X seconds after passing the controlled area for the bollard to rise automatically.

Scene 1: vehicle needs to **enter into/exit** controlled passage → operator authenticates and sends fall signal→vehicle **passes/fails to pass** the controlled passage →operator sends rise signal.

Scene 2: vehicle needs to **enter into/exit** controlled passage → operator authenticates and sends fall signal→vehicle **passes** the controlled passage→bollard rises automatically after **X seconds**.

5.1.4 Flow Control Mode

In this mode, controlled passage has 2directions (entrance & exit) and there’ re 2 kinds of ground sensors (inner ground sensor & outer ground sensor). Strictly follow Fig. P_4-3 as wiring instructions. NO. 26 & 27 ports both need to be connected. NO.22 & 23 ports both needs control part wiring,

Scene 1: vehicle needs to **enter into** controlled passage→operator authenticates and sends **entrance direction**fall signal→vehicle **passes** the controlled passage from **entrance direction**→bollard rises automatically.

Scene 2: vehicle needs to **enter into** controlled passage→operator authenticates and sends **entrance direction**fall signal→vehicle **fails to pass** the controlled passage and leaves directly→bollard rises automatically after **X seconds**.

Scene 3: vehicle needs to **enter into** controlled passage→operator authenticates and sends **entrance direction** fall signal→v **triggers one ground sensor** and leaves **without** passing the controlled passage→bollard rises automatically after **Y seconds**.

Scene 4: vehicle needs to **enter into** controlled passage→operator authenticates and sends **exit direction** fall signal→vehicle passes controlled passage from entrance direction→bollard won’ t rise and the control module **outputs a reverse entrance alarm signal** simultaneously.

Ground Sensor Anti-collision Function

All modes have anti-collision function after connectingwith ground sensor.

Scene 1: bollard falls automatically when vehicle enters into the detection range of ground sensor during bollard rise process.

Scene 2: any rise signal input is invalid when there’ s vehicle with the detection range of ground sensor.

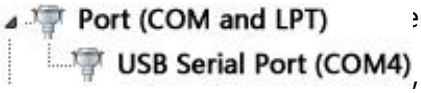
5.2 Mode Modification

System mode, delayed rise time X, Y and other parameters can be modified according to Fig. P_5-1.

Attention: enable the software and select “Pneumatic Bollard” first to make configuration.

Notice:

1) Control panel and protocol converter should be electrified to communicate normally.

2) Finish the connection work and right click “My Computer” →Management→ Chec 

er. In the following case , serial port is COM4.

3) If communication is not successful, please check the connection line and serial port number. If it still doesn’ t work, please contact us.

6 Daily Maintenance

Basic maintenance (once every half year):

- Clean the pit. Use pump/suction pump to clean up settlings.
- Clean the drainage facilities at the bottom of the pit.
- Clean and oil main slide track.
- Check air leakage condition of the pipe.
- Make sure the screws on the bollard are fastened.

Check the following questions during running:

- Check flash light function on the top of the bollard.
- Check wireless remote control device function.
- Check electronic control panel function.

Regular maintenance

- Daily cylinder surface cleaning and maintenance: **once a day**
- Clean around the bollard (sand, gravel, etc.). Avoid gravel dropping into the bollard through tiny gaps which may cause stuck condition: **once a day**
- Blowdown maintenance shown in Fig. P_6-1: **once a week**

Pneumatic Bollard
Blowdown Maintenance

Figure NO.: P_6-1

Air pump blowdown maintenance

Maintenance Period	Suggest: once a week
Maintenance Reason	Water and other substances will be brought into the gasgolder while pump is working
Maintenance Steps	① Make all bollards fall ② Turn off power switch ③ Turn on blowdown valve and start blowing down ④ Turn off the valve when finished ⑤ Turn on power switch to make airpressure reaches 8kg ⑥ If the water hasn' t been drained completely, repeat step 2-5

- Clean and change air filter shown in Fig. P_6-2: **once every half year**

Pneumatic Bollard
Air Filter Maintenance

Figure NO.: P_6-2

Turn the air filter clockwise with left hand

Air Filter Maintenance

Maintenance Period	Suggest: once half a year
Maintenance Reason	Air filter effectively filtrates most of the dust in the air while pump is working. If it hasn' t been cleaned for a long time, it will possibly be blocked, make noise, and the service life of the equipment will be affected.
Maintenance Steps	① Take down the air filter ② Clean or change it ③ Install it back

Check oiler **every 3 months**. AddISOVG32 or similar oil when it is running out of oil. Normally once every year. Add the oil as shown in Fig. P_6-3: **once a year**

Pneumatic Bollard
Oiler Maintenance

Figure NO.: P_6-3

Pull out the oiler after turning it clockwise

Air pump blowdown maintenance

Maintenance Period	Suggest: once a year
Maintenance Reason	Oil of the oiler enters into air cylinder through air pipe. It not only lubricates pipe wall but also prolongs service life of the equipment.
Maintenance Steps	① Cut off the equipment power ② Discharge all the air inside the pump by blowdown of making bollards rise/fall for several times ③ Take down the oiler as shown in the photos ④ Add oil ISOVG32 ⑤ Install oiler back ⑥ Electrify the euipment

7 Common Failure Analysis

7.1 Bollard Fails to Rise

If bollard fails to rise, check the following possible conditions:

1.Open control cabinet and check whether power supply is enabled and switch power indicator light is on.

2. Make sure the green indicator light is normally on and red indicator light twinkles. If not, you should change the control panel.

3. Press the black Test button on control panel; check whether it can control rise/fall. If not, you need to change control panel.

4.Make sure air pump pressure is normal (in normal condition, gasholder pressure gage value is among 4-8 and working pressure gage value is among 4-6), working valve is open and it is parallel with air pipe during open process.

5. Check whether manual control wiring in Fig. 3-1 is loose or there' s any disconnection.

6. When remote control makes RISE command, measure the voltage between port ② and ③ (wiring ports marked "Control" inside the control cabinet) on control panel with multimeter and check whether the value is DC 24V and wire connection is fastened. Change the wiring panel if there' s no voltage output.

7. Check whether there' re stone stuck between the cylinder and flange. If so, clean them up and try again.

7.2 Air Pump Fails to Work

If gasholder pressure gage value is less than 5kg but it still fails to activate automatically, you need to check up.

1. Whether it is normally electrified.

2. Whether the power switch of air pump turns to 1.

3. Whether working voltage is lower than 215V. If working voltage isn' t stable, air pump will enable self-protection when the value is lower than 215V. In this case, press the overload protector on the backside of the air pump to restart it. If the

temperature of air pump is too high, please wait 20 minutes for the device to cool down before enabling overload protector.

If the problem reoccurs, please check whether its power supply also connects with high-power devices such as air conditioner. If so, change the wiring to make sure external voltage AC 220V is stable at any time.

7.3 Air Pump Continues working

Scene:

Air pump continues working, but gasholder pressure gage value is less than 8kg.

Solutions:

Check whether the blowdown valve is closed. Turn off air outlet switch and check the change of gasholder pressure gage.

If the value reaches 8kg and pump stops working, that means there' s air leakage in the pipe. Carefully check whether the air circuit connection (air pipe) is broken. Once air leakage failure is removed, this problem is solved.

If pump still continues working while gasholder pressure gage value is less than 8kg, that means the pump has a problem of air leakage and needed to be replaced.

7.4 LED Light Is Unlit

Scene 1:

All LED lights are unlit.

Solution:

Check whether the voltage of ⑧⑨ LED output port is DC 12V and the wiring is fine. If output is abnormal, change control module.

Scene 2:

LED lights of some bollards are unlit.

Solution:

Check whether the wiring of LED lights are correct and input voltage is DC 12V. If output is normal but lights still fail to work, change LED lights.

7.5 Different Rise/Fall Speed

Scene:

Bollard rise/fall speed is different, which is not elegant.

Solution:

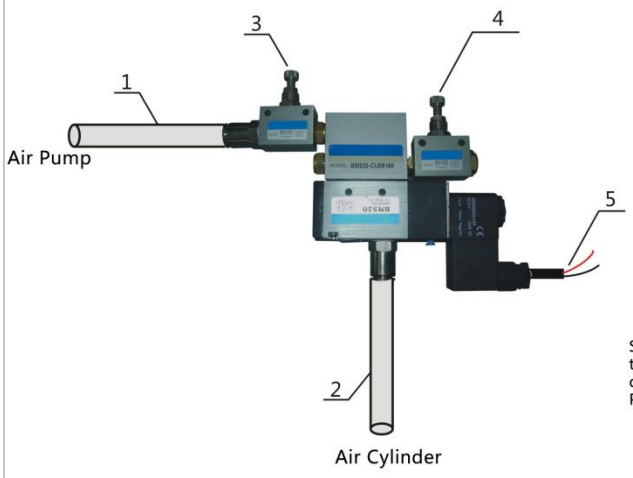
Adjust the speed by adjusting solenoid valve to uniform the bollards:

1） Open flange cover and you can see solenoid valve

2） Referring to Fig. P_7-1, adjust “rise speed adjusting valve” and “fall speed adjusting valve” to change and uniform the speed.

Pneumatic Bollard
Solenoid Valve Brief Introduction

Figure NO.: P_7-1



1	External air pipe	Φ10 PA air pipe, used for connecting solenoid valve and the pump inside control cabinet
2	Internal air pipe	Φ10 PA air pipe, used for connecting solenoid valve and internal air cyliner
3	Rise speed regulating valve	Turning it to regulate bollard rise speed
4	Fall speed regulating valve	Turning it to regulate bollard fall speed
5	Solenoid valva connector	Electronic control wiring part of solenoid valve

Solenoid valve is an important part inside the bollard to control its rise/fall. Make sure air pipe connection is correct without any leakage.
Pipe & line connection: ① Insert the air pipe into the connector directly.
② To dismantle it, Press the connector with hand and pull out the air pipe

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