3xLOGIC

VISIX PTZ Network Camera

VSX-PTZ-2MP-EXT20, VSX-PTZ-2MP-EXT, VX-2M-OP-PTZ20X and VX-2M-OP-PTZ30X

Installation Manual

Thank you for purchasing our product. If there are any questions, or requests, please do not hesitate to contact the dealer.

This manual applies to VSX-PTZ-2MP-EXT20,VSX-PTZ-2MP-EXT, VX-2M-OP-PTZ20X and VX-2M-OP-PTZ30X 5-Inch Speed dome PTZ network cameras.

This manual may contain technical inaccuracies or printing errors. The content is subject to change without notice. The manual will be amended if there are any hardware updates or changes.

DISCLAIMER STATEMENT
"Underwriters Laboratories Inc. ("UL") has not tested the performance or reliability of the security or signaling aspects of this product. UL has only tested for fire, shock or casualty hazards as outlined in UL's Standard(s) for Safety, UL60950-1. UL Certification does not cover the performance or reliability of the security or signaling aspects of this product. UL MAKES NO REPRESENTATIONS, WARRANTIES OR CERTIFICATIONS WHATSOEVER REGARDING THE PERFORMANCE OR RELIABILITY OF ANY SECURITY OR SIGNALING RELATED FUNCTIONS OF THIS PRODUCT."

Regulatory Information

FCC Information

FCC compliance: This equipment has been tested and found to comply with the limits for a digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Conditions

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operation.

EU Conformity Statement

This product and - if applicable - the supplied accessories too are marked with "CE" and comply therefore with the applicable harmonized European standards listed under the Low Voltage Directive 2006/95/EC, the EMC Directive 2004/108/EC, the RoHS Directive 2011/65/EU.

2012/19/EU (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info.

2006/66/EC of as unsorted specific battery lettering to return the battery see:

(battery directive): This product contains a battery that cannot be disposed municipal waste in the European Union. See the product documentation for information. The battery is marked with this symbol, which may include indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, to your supplier or to a designated collection point. For more information www.recyclethis.info.

Safety Instruction

These instructions are intended to ensure that the user can use the product correctly to avoid danger or property loss.

The precaution measure is divided into 'Warnings' and 'Cautions':

Warnings: Serious injury or death may be caused if any of these warnings are neglected.

Cautions: Injury or equipment damage may be caused if any of these cautions are neglected.

⚡	⚠
Warnings Follow these safeguards to prevent serious injury or death.	**Cautions** Follow these precautions to prevent potential injury or material damage.

⚡ **Warnings:**

- Please adopt the power adapter which can meet the safety extra low voltage (SELV) standard. And source with 12 VDC or 24 VAC (depending on models) according to the IEC60950-1 and Limited Power Source standard.
- If the product does not work properly, please contact your dealer or the nearest service center. Never attempt to disassemble the camera yourself. (We shall not assume any responsibility for problems caused by unauthorized repair or maintenance.)
- To reduce the risk of fire or electrical shock, do not expose this product to rain or moisture.
- This installation should be made by a qualified service person and should conform to all the local codes.
- Please install blackouts equipment into the power supply circuit for convenient supply interruption.
- Please make sure that the ceiling can support more than 50(N) Newton gravities if the camera is fixed to the ceiling.
- If the product does not work properly, please contact your dealer or the nearest service center. Never attempt to disassemble the camera yourself. (We shall not assume any responsibility for problems caused by unauthorized repair or maintenance.)

⚠️ **Cautions:**

- Make sure the power supply voltage is correct before using the camera.
- Do not drop the camera or subject it to physical shock.
- Do not touch sensor modules with fingers. If cleaning is necessary, use a clean cloth with a bit of ethanol and wipe it gently. If the camera will not be used for an extended period of time, put on the lens cap to protect the sensor from dirt.
- Do not aim the camera lens at the strong light such as sun or incandescent lamp. The strong light can cause fatal damage to the camera.
- The sensor may be burned out by a laser beam, so when any laser equipment is being used, make sure that the surface of the sensor not be exposed to the laser beam.
- Do not place the camera in extremely hot, cold temperatures (the operating temperature should be between -30°C ~ 60°C, or -40°C ~ 60°C if the camera model has an "H" in its suffix), dusty or damp environment, and do not expose it to high electromagnetic radiation.
- To avoid heat accumulation, good ventilation is required for a proper operating environment.
- Keep the camera away from water and any liquid.
- While shipping, the camera should be packed in its original packing.
- Improper use or replacement of the battery may result in hazard of explosion. Please use the manufacturer recommended battery type.

NOTES:

For cameras that supports IR, you are required to pay attention to the following precautions to prevent IR reflection:

- Dust or grease on the dome cover will cause IR reflection. Please do not remove the dome cover film until the installation is finished. If there is dust or grease on the dome cover, clean the dome cover with clean soft cloth and isopropyl alcohol.
- Make certain the installation location does not have reflective surfaces of objects too close to the camera. The IR light from the camera may reflect back into the lens causing reflection.
- The foam ring around the lens must be seated flush against the inner surface of the bubble to isolate the lens from the IR LEDS. Fasten the dome cover to camera body so that the foam ring and the dome cover are attached seamlessly.

Table of Contents

1 Installation

Please make sure that the device in the package is in good condition and all the assembly parts are included.

NOTE: Do not drag the speed dome with its waterproof cables as shown in Figure 1-1, otherwise the waterproofing can be damaged and rendered ineffective.
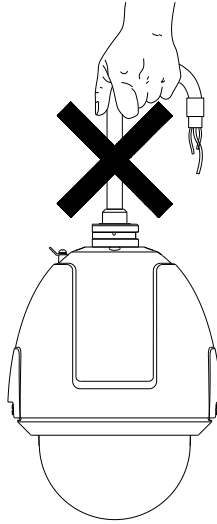

Figure 1-1 Do Not Drag the Cables

1.1   INSTALLATION AND CABLING

Installing the Speed Dome

Steps:

1)   Loosen the two lock screws on the both side of the speed dome. Pull the lower dome to separate it from the back box as shown in Figure 1-2.

NOTE: Please do not remove the lock screws from the dome.

2)   Remove the protective foam, sticker and lens cover from the dome drive.

3)   Align the cuts on the lower dome with the lock screws on the back box to reinstall the lower dome. Tighten the lock screws.
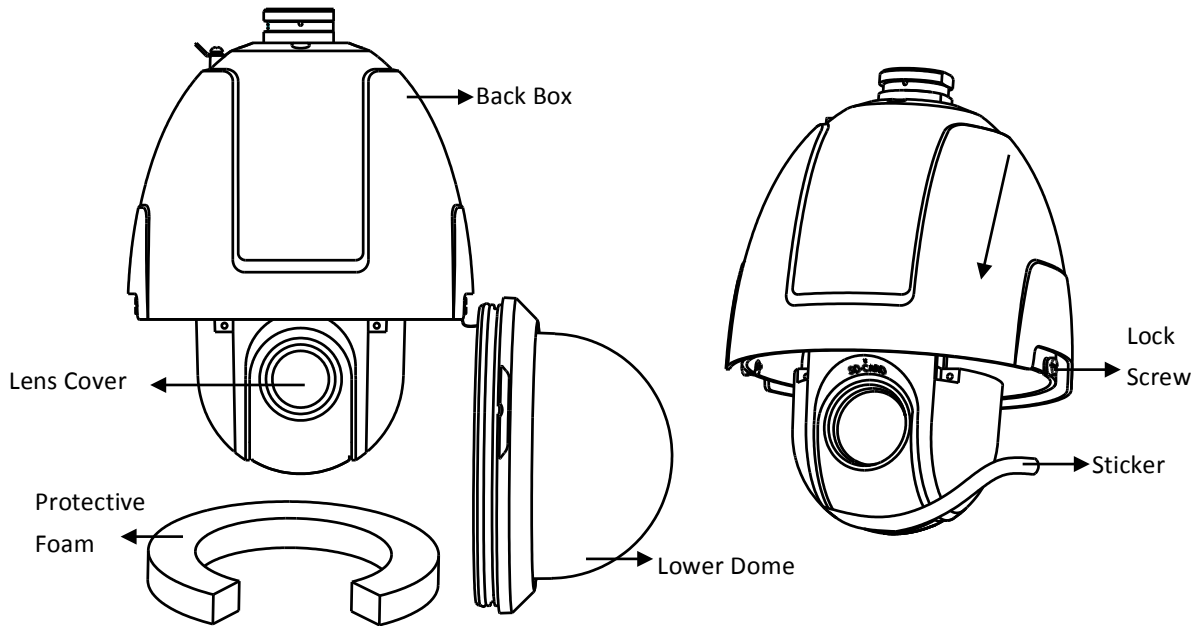
Figure 1-2 Remove the Lower Dome

4) Install the dome mount. Please refer to the related sections in *Section 2* and *Section 3* for specific installation methods with different mounts.

NOTES:

■ For cement wall, you need to use the expansion screw to fix the mount. The mounting hole of the expansion pipe on the wall should align with the mounting hole on the mount.

■ For wooden wall, you can just use the self-tapping screw to fix the mount.

■ Please make sure that the wall is strong enough to withstand more than 8 times the weight of the dome and the mount.

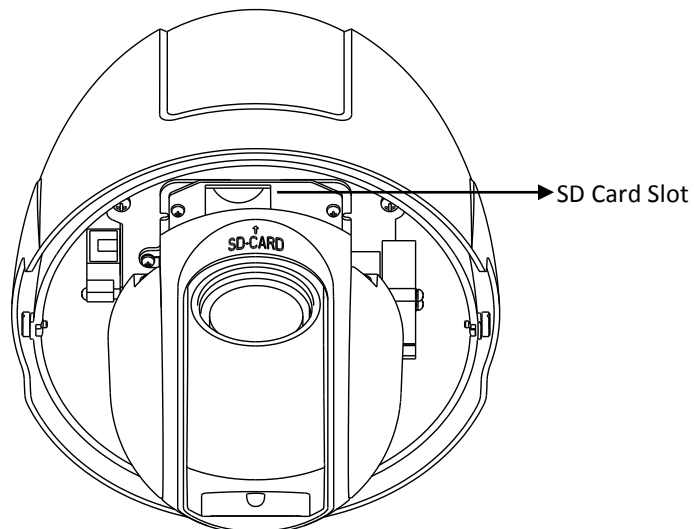**NOTE:** The SD card slot of network speed dome is shown in Figure 1-3.

Figure 1-3 SD Card Slot for Network Dome

5) Mount the speed dome.

Steps:

1) Apply thread tape to the thread of the pendant adapter and rotate the pendant adapter to the mount. Secure the pendant adapter to the mount with a set screw (supplied).

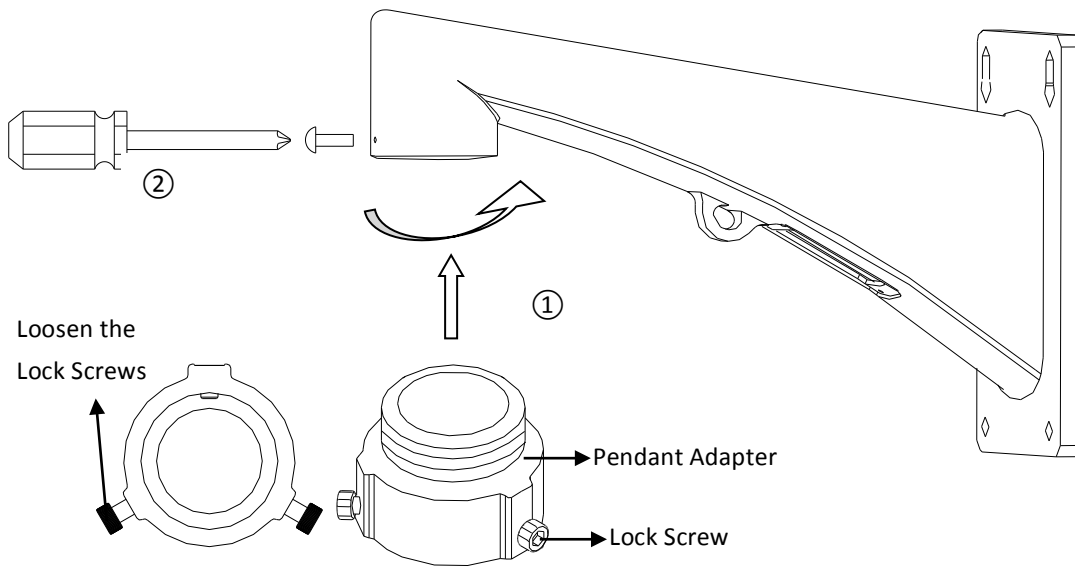2) Loosen the lock screws of the adapter, as shown below:

Figure 1-4 Install the Pendant Adapter

NOTE: The dimension of pendant adapter is $G1\frac{1}{2}$.

3) Hook the back box of the speed dome to the mount with the safety rope. Route the cables through the mount.

4) Align the direction label of pendant adapter with the label of the back box to install the speed dome. Rotate the back box counterclockwise or clockwise tightly. Secure the back box and the pendant adapter with two lock screws.

NOTE: Please remove the protective film on the lower dome after the installation is finished.
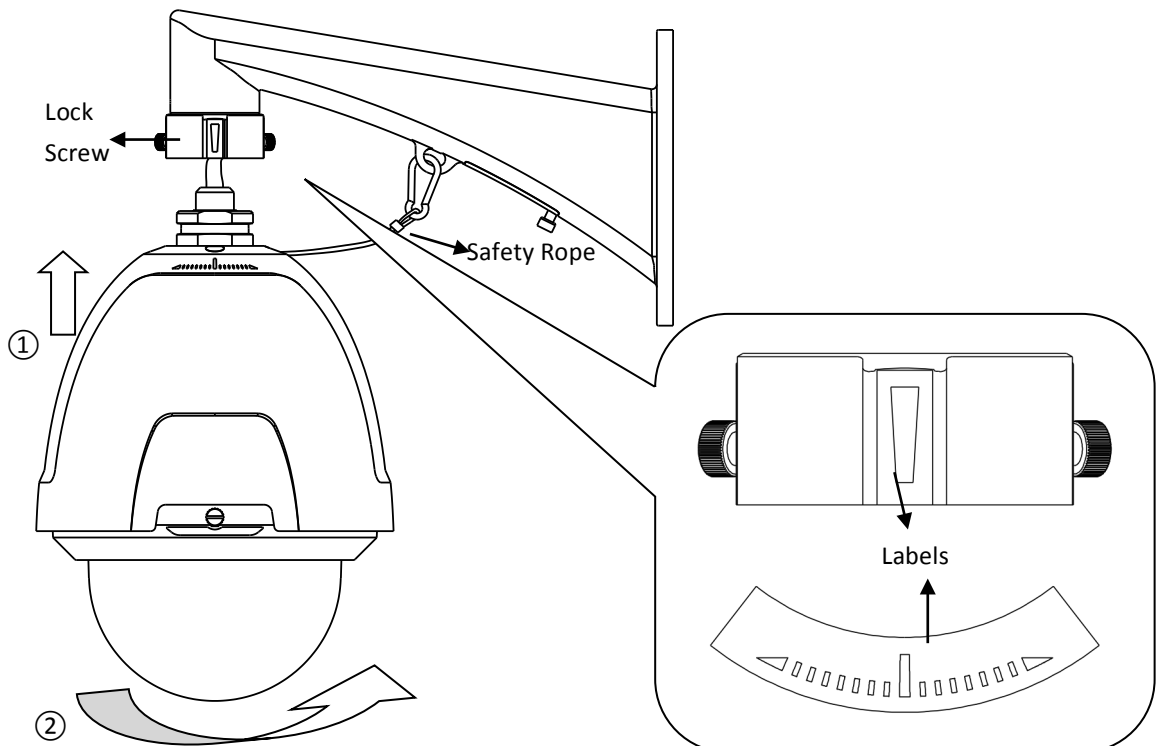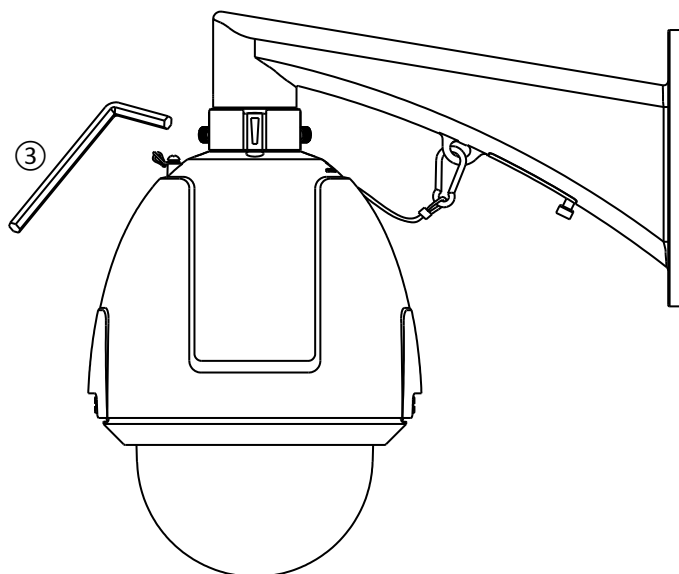
Figure 1-5 Align the Direction Label

Figure 1-6 Mount the Dome

Connecting the Cables

Before you start:

Please make sure the power of the dome is off before connecting the cables.

The cable interfaces of speed dome are shown in the following figures. Please refer to the following figure to connect the cables.
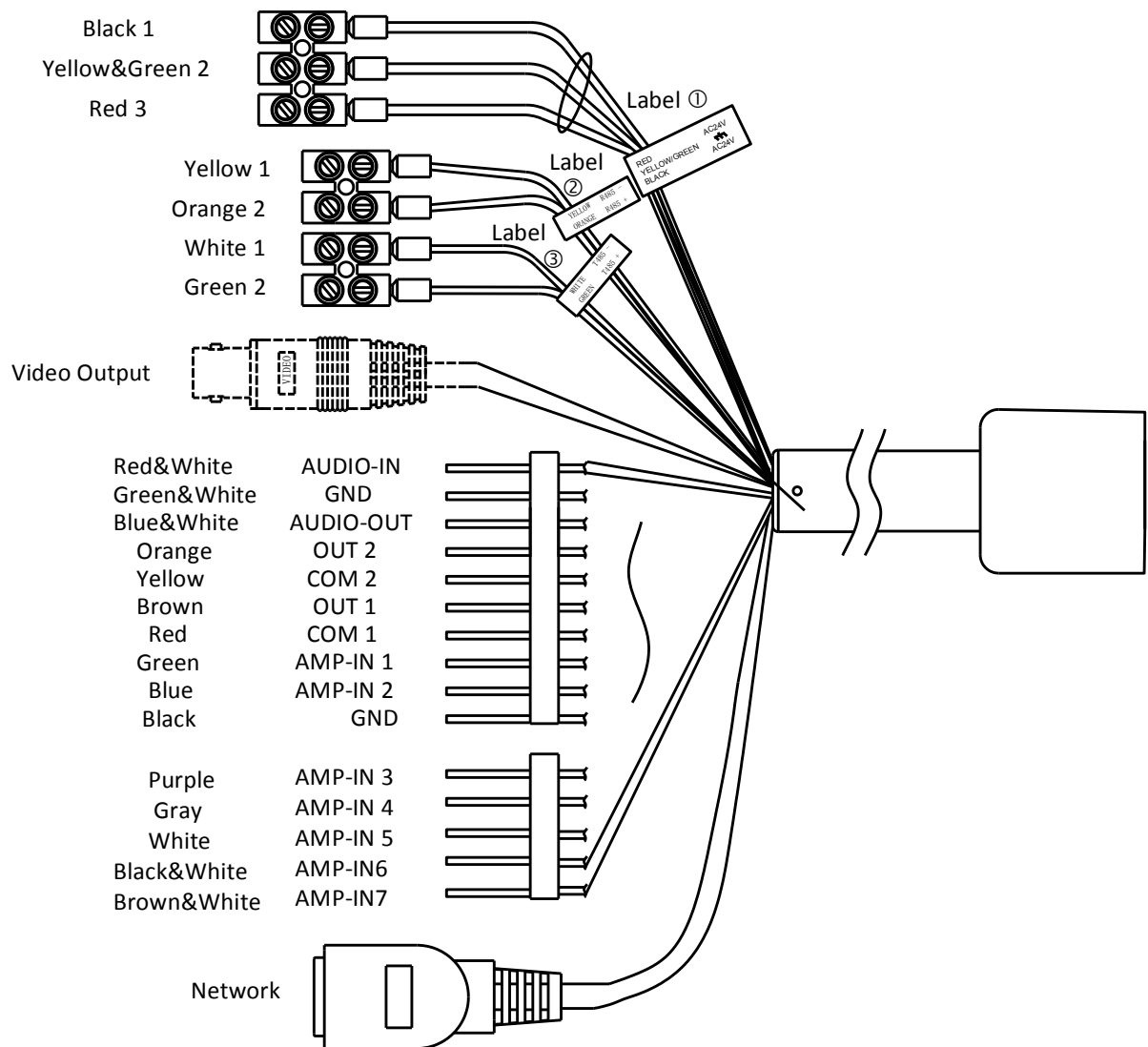

Figure 1-7 Cables of Network Speed Dome

Alarm In/Out Connections

- The network speed dome can be connected with alarm inputs (0~5VDC).
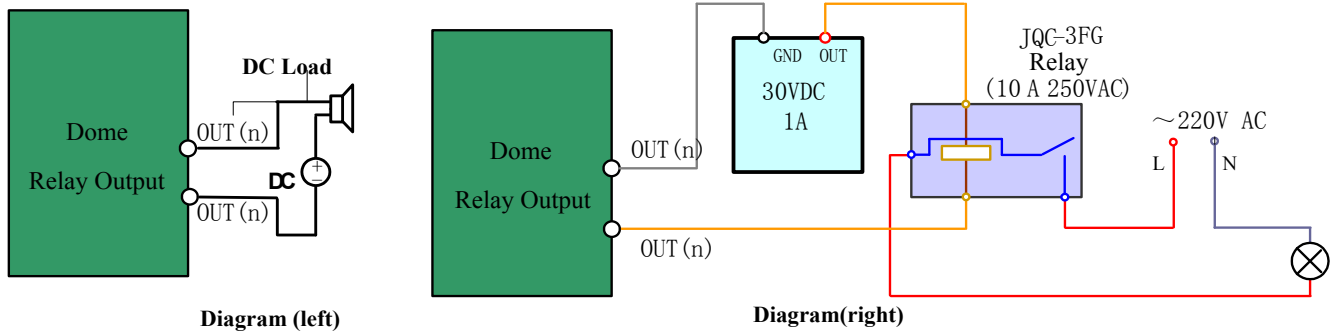- Refer to the following diagrams for alarm output:

Figure 1-8 Alarm Out Connections

The alarm provides the relay output, and the external power supply is required when it connects to the alarm device.

- For DC power supply (left diagram), the input voltage must be no more than 30VDC, 1A.
- For AC power supply, the external relay must be used (right diagram) to prevent damages to the speed dome and avoid risk of electric shock.

2   Mounting Applications

Before you start:

■   For cement wall, you need to use the expansion screw to fix the mount. The mounting hole of the expansion pipe on the wall should align with the mounting hole on the mount.

■   For wooden wall, you can just use the self-tapping screw to fix the mount.

1.2   WALL MOUNTING APPLICATIONS (3XLOGIC PRODUCT#: VX-WM-PTZ)

This mount must be purchased separately.

3xLOGIC Product Number: VX-WM-PTZ (Wall Mount)

Mounting Components

■   **Wall Mount -** VX-WM-PTZ
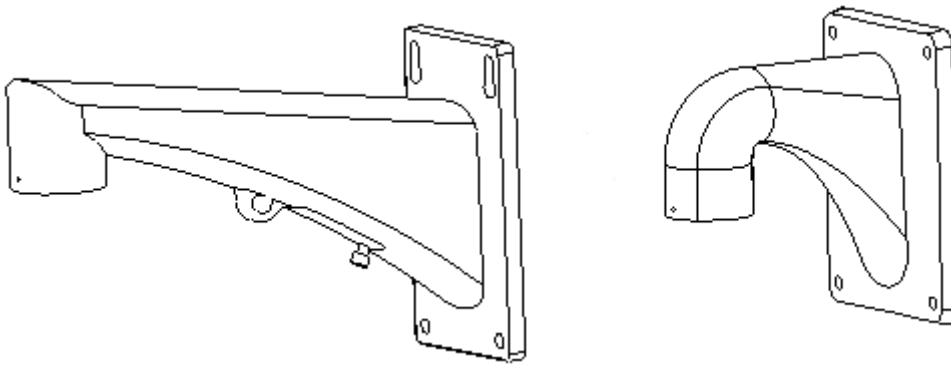
Applicable to indoor/outdoor pendant domes.
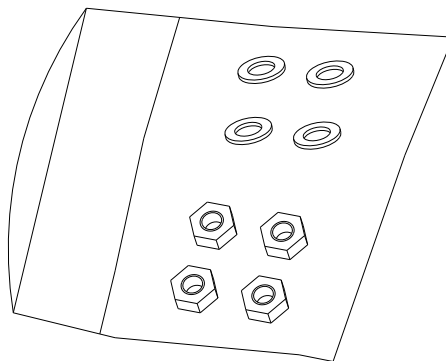

Figure 2-1 Wall Mount

■   **Mounting Accessories**

Figure 2-2 Nuts and Flat Washers

Wall Mounting

Before you start:

Wall mounting is dependent on indoor/outdoor solid wall construction. The following are the mandatory preconditions for wall mounting:

- The wall must be thick enough to install the expansion screws.
- Please make sure that the wall is strong enough to withstand more than 8 times the weight of the dome and the mount.

Steps:

1) Drill 4 screw holes in the wall according to the holes of the mount, and then insert M8 expansion screws (not supplied) into the mounting holes.
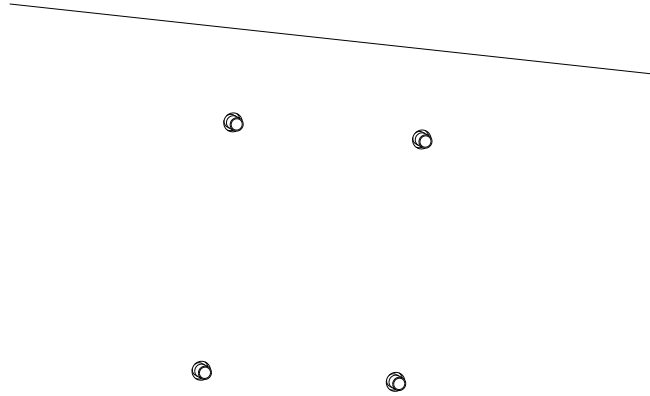
Figure 2-3 Drill Mounting Holes

2) Attach the gasket(not supplied) then wall mount to the wall by aligning the 4 screw holes of the mount with expansion screws on the wall.
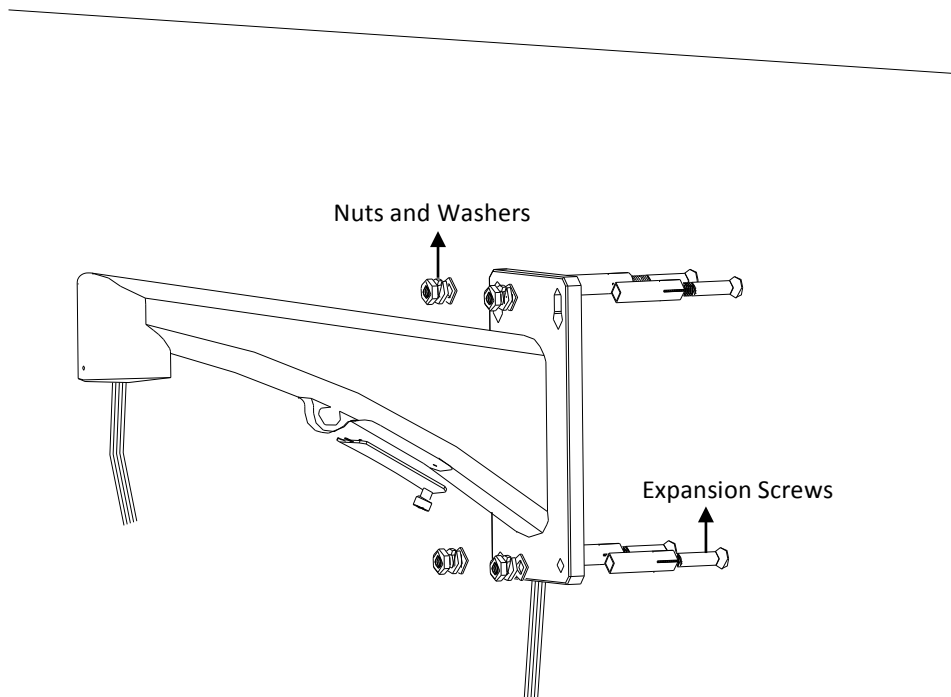3) Secure the wall mount with 4 hex nuts and washers.

Nuts and Washers

Expansion Screws

Figure 2-4 Secure the Mount

4) Install the speed dome on the mount. Please refer to *Section **1.2 Installation and Cabling*** for installation details.

Note: Follow the same instructions described above for the short-arm wall mounting. For outdoor applications, please adopt the water-proof measures. The short-arm wall mount is not recommended for outdoor applications.

1.3 CORNER MOUNTING APPLICATIONS

This mount and adapter must be purchased separately.

3xLOGIC Product Number: VX-WM-PTZ (Wall Mount), VX-CM-PTZ (Corner Mount Adapter)

Mounting Components

■ **Wall Mount -** VX-WM-PTZ

You can use the wall mount with corner adapter or pole adapter according to different installation environments.
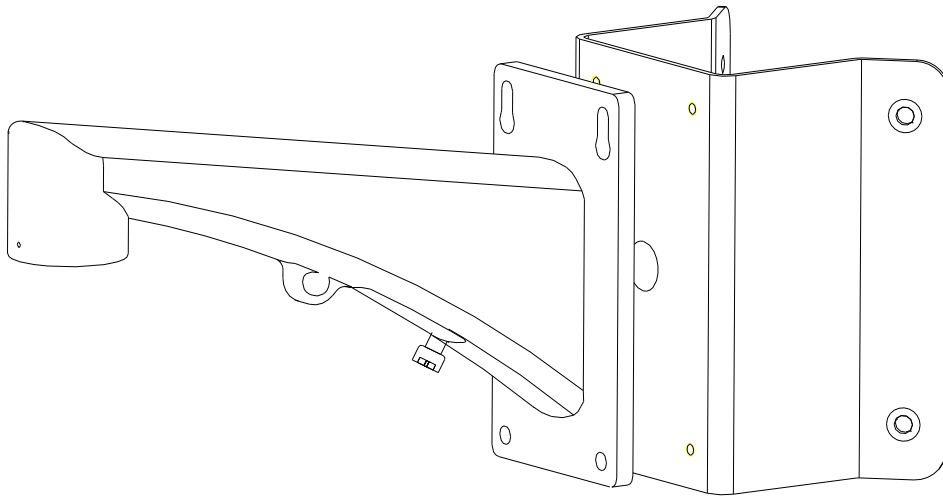

Figure 2-5 Wall Mount

■ **Corner Adapter -** VX-CM-PTZ

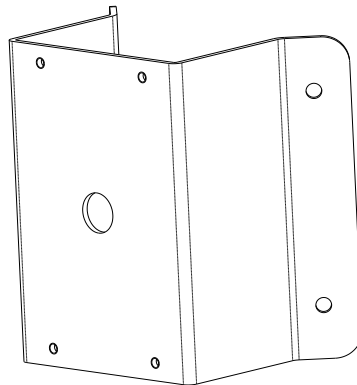Please use the corner adapter with the wall mount in the corner mounting applications.

Figure 2-6 Corner Adapter

■   **Mounting Accessories**
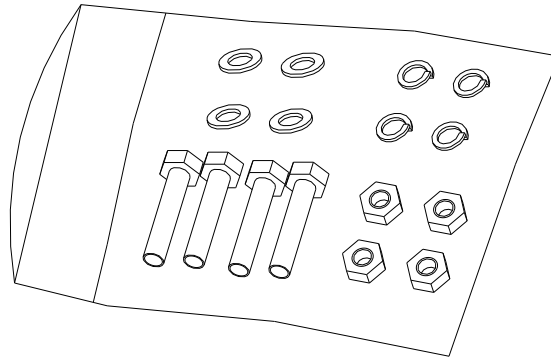

Figure 2-7 Hex Screws (M8×30), Nuts, Spring Washers and Flat Washers

Corner Mounting

Before you start:

The corner mounting is dependent on the indoor/outdoor 90° solid corner construction. The following are the mandatory preconditions for corner mounting:

■   The wall must be thick enough to install the expansion screws.

■   The wall must be strong enough to withstand more than 8 times the weight of the dome and its accessories.

Steps:

1)   Install the corner adapter.

2)   Drill four holes in the corner according to the screw holes of the corner adapter, and then insert M8 expansion screws (not supplied) into the holes.

3)   Pull the cables through the center hole of the corner adapter.

4)   Attach the corner adapter to the corner by aligning the 4 screw holes of the corner adapter with expansion screws on the corner.

5)   Secure the corner adapter to the corner with the nuts and washers to tighten the four expansion screws.
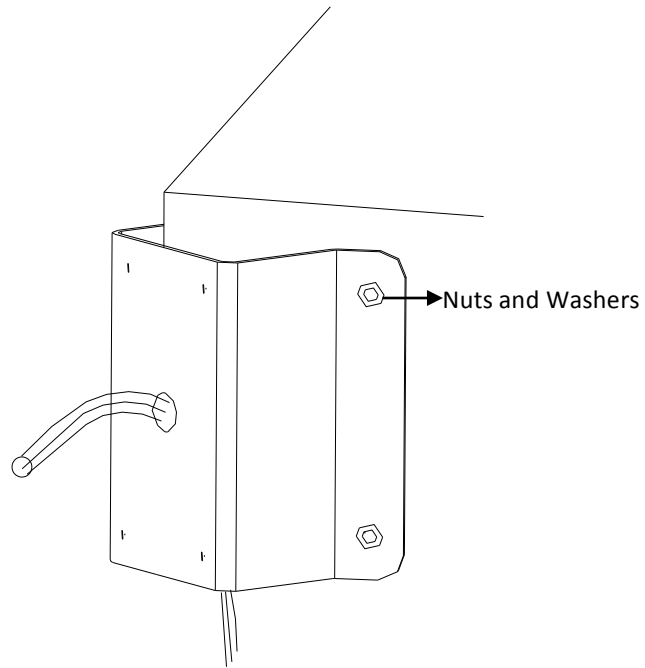
Nuts and Washers

Figure 2-8 Pull the Power Line

NOTE: Make sure that the cables have enough length. For outdoor applications, please apply the sealant around the center hole for waterproof.

1) Attach the gasket then the wall mount to the corner adapter.
2) Secure the wall mount to the corner adapter with 4 hex screws and spring washers.

NOTE: When tightening the screw, it is better to compress the spring washer tightly first and then rotate it half-turn for water-proof without damaging the threads.
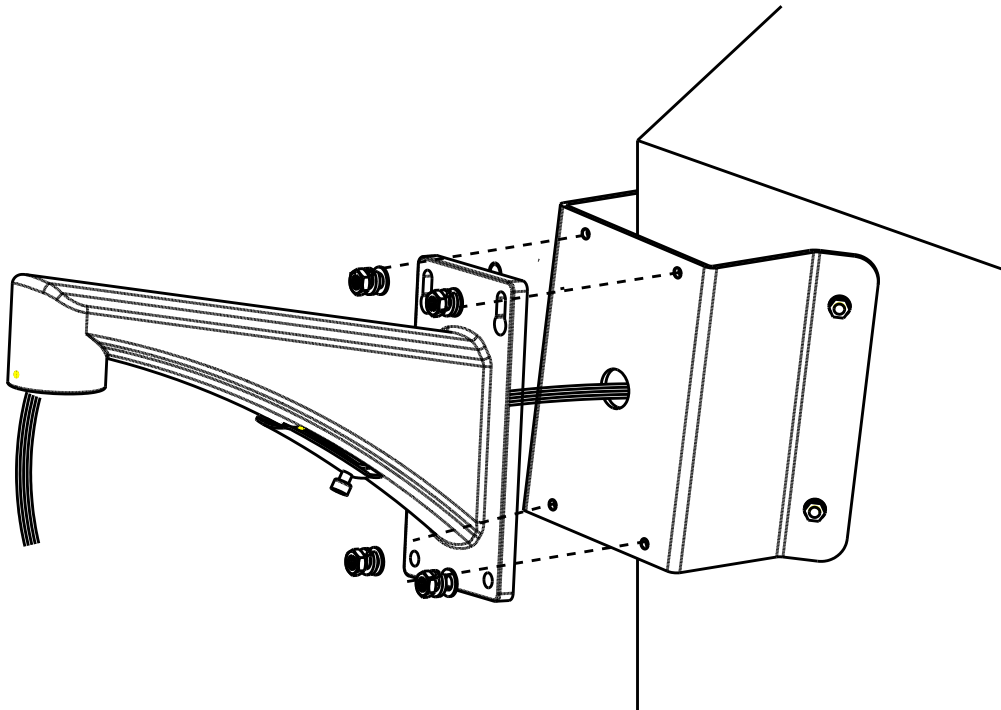

Figure 2-9 Secure the Wall Mount to the Corner

3) Install dome to the mount. Please refer to Section **1.2 Installation and Cabling** for installation details.

NOTE: Follow the same instructions described above for the short-arm wall mounting. For outdoor applications, please adopt the water-proof measures. The short-arm wall mount is not recommended for outdoor applications.

1.4   POLE MOUNTING APPLICATIONS

This mount and adapter must be purchased separately.

3xLOGIC Part Number: VX-WM-PTZ (Wall Mount), VX-POLE-PTZ (Pole Mount Adapter)

Mounting Components

■   **Wall Mount -** VX-WM-PTZ

Please use the wall mount with corner adapter or pole adapter according to different installation environments.
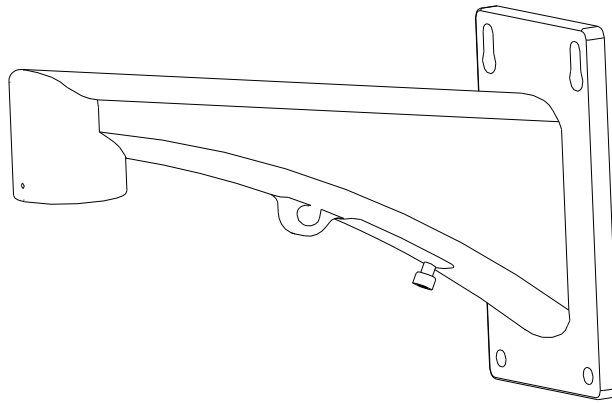

Figure 2-10 Wall Mount

■   **Pole Adapter -** VX-POLE-PTZ

Please use the pole adapter with the wall mount in the pole mounting applications.

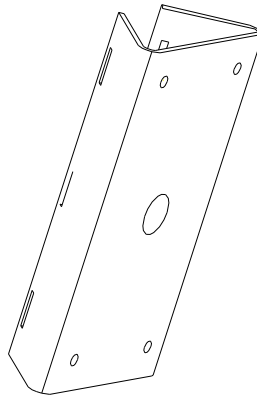
Figure 2-11 Pole Adapter

■   **Pole Mounting Hoops**

Please use the with the pole adapter. The following dimensions of stainless steel hoop are optional:

ϕ59-82mm, ϕ84-108mm, ϕ103-127mm, ϕ130-152mm, ϕ155-178mm, ϕ180-203mm, ϕ194-216mm.

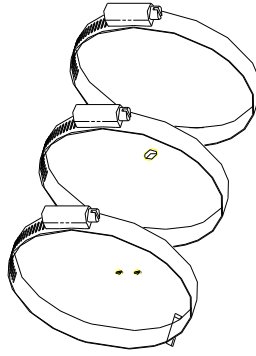1) **NOTE:** The dimensions of the pole mounting hoop must match with the diameter of the pole adapter.

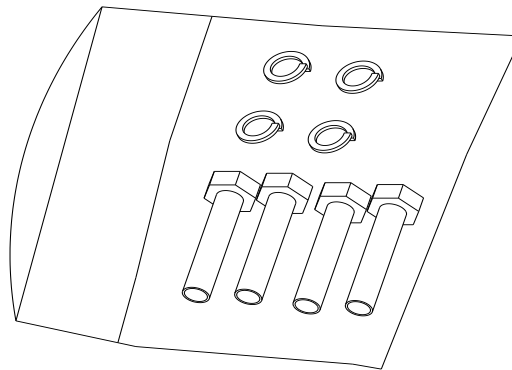Figure 2-12 Stainless Steel Hoops

■ **Mounting Accessories**

Figure 2-13 Hex Screws (M8×30) and Spring Washers

Pole Mounting

Before you start:

The pole mounting is dependent on the indoor/outdoor solid pole construction. The following are the mandatory preconditions for mounting:

■ The mounting dimensions of the stainless steel hoops must meet the diameter of pole.

■ The pole construction must be strong enough to withstand more than 8 times the weight of the dome and its accessories.

Steps:

Assemble the pole adapter.

1) Loosen the three stainless steel hoops with a screwdriver.

2) Insert them through the rectangle holes of the pole adapter.
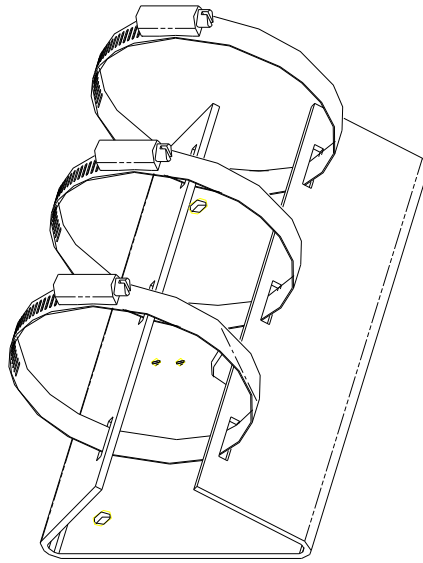
Figure 2-14 Assemble the Pole Adapter

Install the pole adapter.

1) Pull the cables through the center hole.

2) Secure the three stainless steel hoops to the pole, and tighten the screws of the hoops with a screwdriver.

Figure 2-15 Install the Pole Adapter

NOTE: For outdoor applications, please adopt the water-proof measures.

Install the wall mount.

1) Attach the gasket then wall mount to the pole adapter.

2) Secure the wall mount to the pole adapter with 4 hex screws and the spring washers.

Figure 2-16 Install the Wall Mount

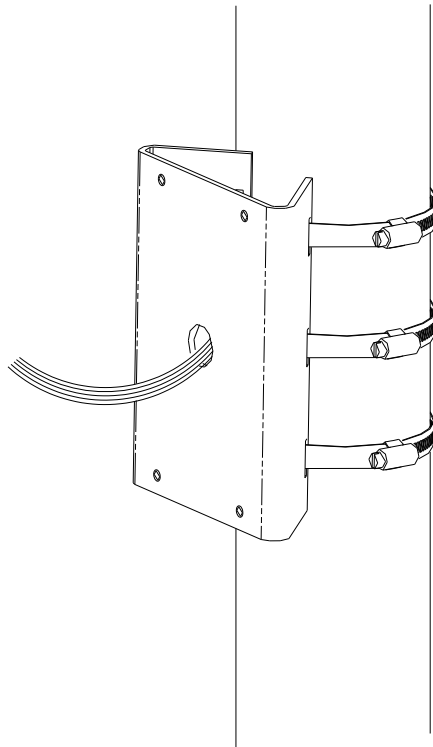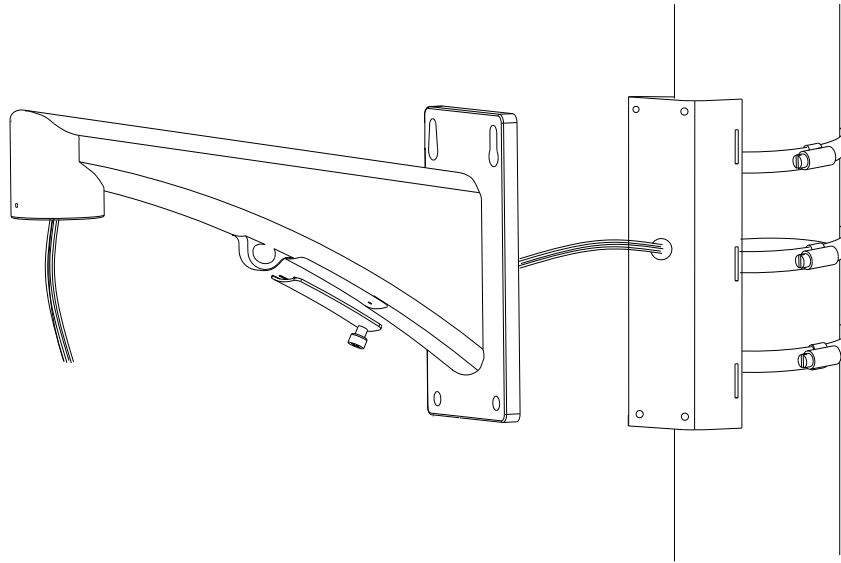3) Install the speed dome to the mount. Please refer to *Section **1.2 Installation and Cabling*** for installation details.

NOTE: Follow the same instructions described above for the short-arm wall mounting. For outdoor applications, please adopt the water-proof measures. The short-arm wall mount is not recommended for outdoor applications.

1.5   IN-CEILING MOUNTING APPLICATIONS

Installation Conditions

Before you start:

The in-ceiling mounting is applicable to the indoor ceiling construction. The following are the mandatory preconditions for mounting:

- The height of the space above the ceiling must be more than 250mm.
- The thickness of the ceiling must range from 5 to 40mm.
- The ceiling must be strong enough to withstand more than 4 times the weight of the dome and its accessories.

In-ceiling Mounting

Steps

1) Rotate the lower dome counterclockwise to separate it from the back box as shown in Figure 2-17.
2) Remove the protective lens cover, foam and sticker from the dome drive.
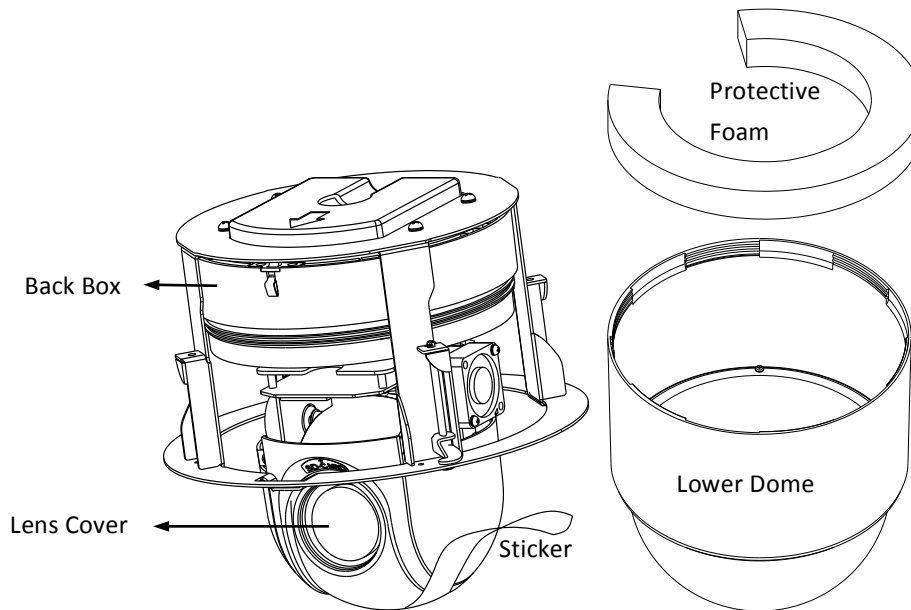3) Attach lower dome to the back box, and rotate clockwise to secure it.

Protective

Foam

Back Box

Lens Cover

Sticker

Lower Dome

Figure 2-17 Remove the Protective Accessory

4) Drill a hole on the ceiling according to the drill template (supplied).

NOTE: ±2mm of the diameter of the circle is tolerable.

φ224
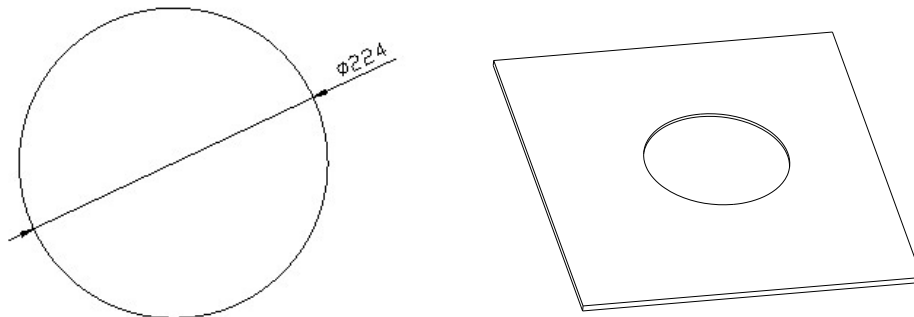
Figure 2-18 Draw and Cut Hole on the Ceiling

5) Connect the cables.

The cables have been connected to the corresponding interfaces. Connect the power cable and the red LED indicator turns on when the power is on.

NOTE: Please turn the power off after checking the speed dome.

6) Install the speed dome.

Steps:

1) Loosen the two lock screws on both sides of the back box and make the locks in internal position, as shown in the following figure:
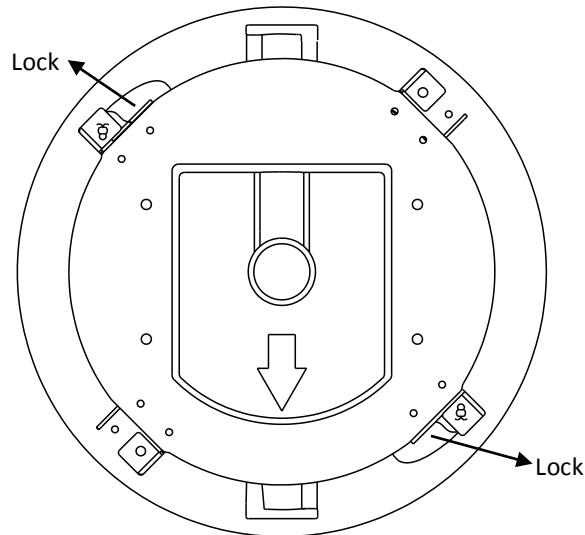
Figure 2-19 Locks and Lock Screws

2) Push the back box into the mounting hole in the ceiling

3) Tighten the lock screws with the screwdriver and the locks will automatically rotate outwards to secure the in-ceiling mount to the ceiling.
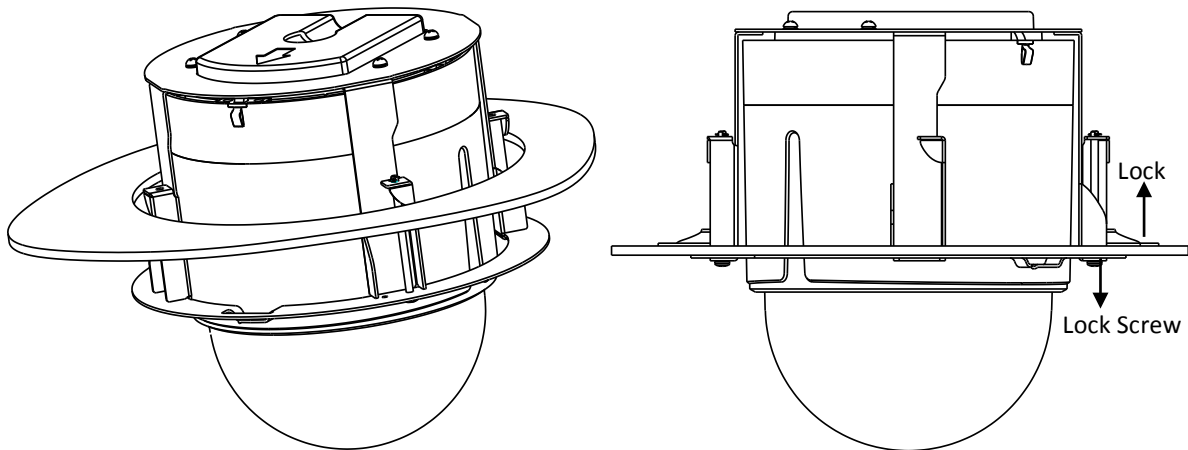
Figure 2-20 Install the back box

4) Install the trim ring.

Steps:

1) Attach the trim ring to the lower dome and align the triangular notch of the trim ring with the arrow label on the in-ceiling mount.

2) After having firmly placed the trim ring to the ceiling, rotate the trim ring in the direction of arrow to secure the trim ring in place.

NOTE:

■ Please remove the protective film on the lower dome after the installation is finished.

■ In order to obtain clear video images, please wear the anti-static gloves when you install the speed dome.
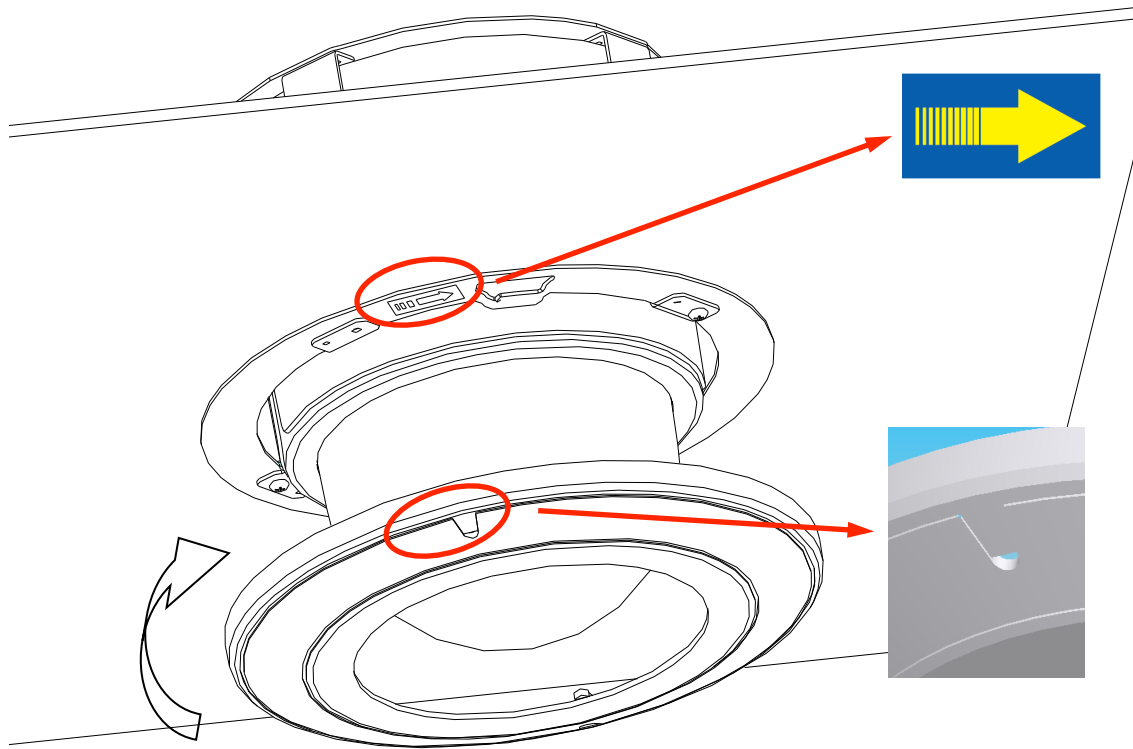
Figure 2-21 Install the Trim Ring

1.6   CEILING MOUNTING APPLICATIONS

Before you start:

The ceiling mounting is dependent on the indoor/outdoor solid ceilings construction. The following are the mandatory preconditions for ceiling mounting:

- ■   The thickness of the ceiling must ranges from 5mm to 40mm.
- ■   The ceiling must be strong enough to withstand more than 4 times the weight of the dome and its accessories.

Removing the In-ceiling Mount

The speed dome is installed with an in-ceiling mount by default. Before you mount the speed dome on the ceiling, you need to remove the in-ceiling mount first.

Steps:

1)   Loosen and remove the 4 screws as shown in Figure 2-22.

Figure 2-22 Remove the Screws

2) Remove the in-ceiling mount.

Figure 2-23 Remove the Mount

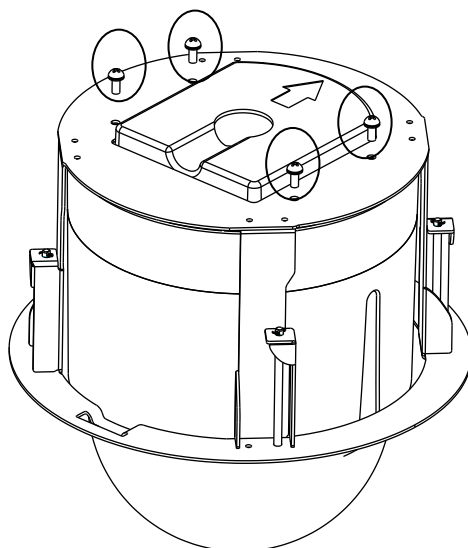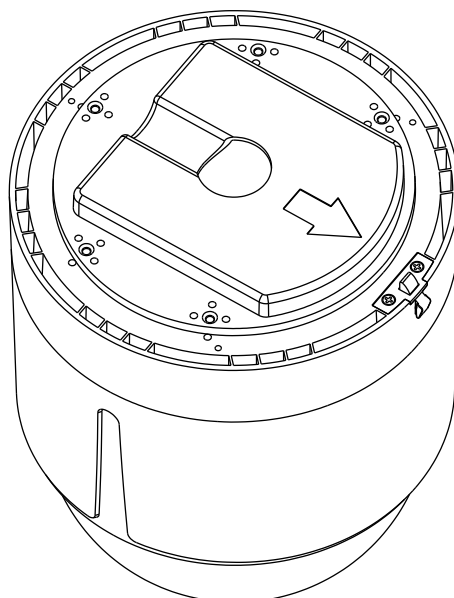3) Install 4 bolts to the screw holes as shown in Figure 2-24.
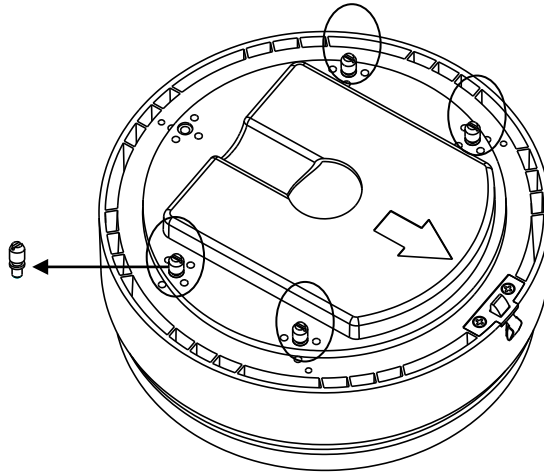
Figure 2-24 Install the bolts

Wiring For Ceiling Mounting Applications

The cables of dome can be routed either from the top or the side of the back box, as shown in Figure 2-25. For the cables routed from the top of the back box, it is required to drill a cable hole in the ceiling.
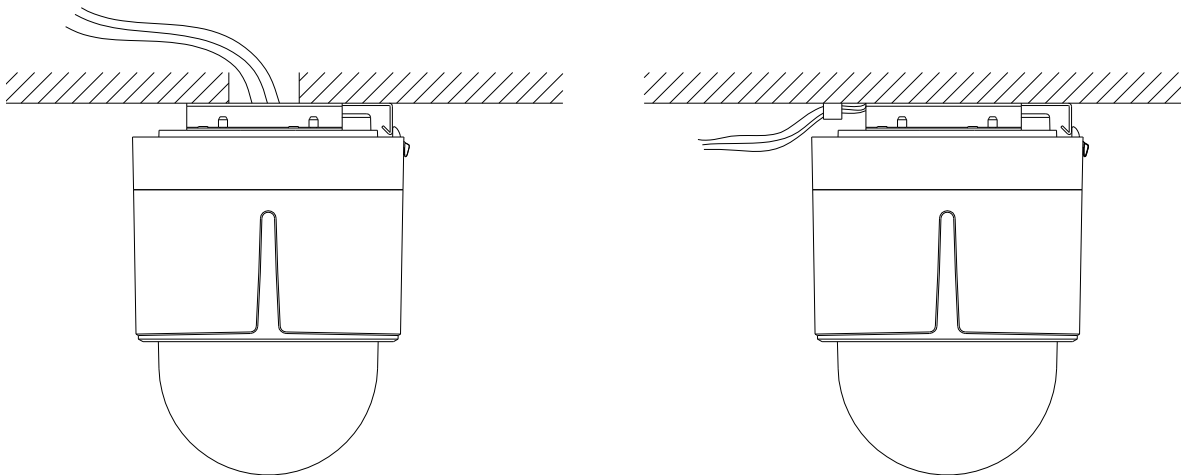
Figure 2-25 Cabling for Ceiling Mounting

Ceiling Mounting

Steps:

1) Rotate the lower dome counterclockwise to separate it from the back box. Refer to the Figure 2-17.
2) Remove the protective lens cover, foam and sticker from the dome drive.
3) Attach lower dome to the back box, and rotate clockwise to secure it.
4) Use the mounting base as a template to mark four screw holes onto the ceiling.
5) If you route cables from the top of the back box, mark the cable hole on the ceiling and drill a hole.
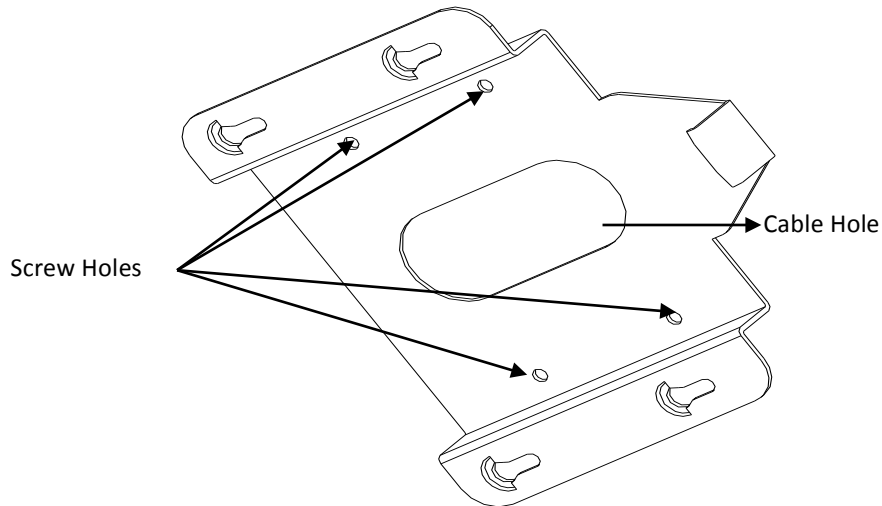
Figure 2-26 Mark the Screw Positions

6) Secure the mounting base to the ceiling with set screws.
■ If the speed dome is installed on a wooden wall, use the self-tapping screws to secure the mounting base.
■ If the dome is installed to the cement wall, drill three Φ5 mounting holes onto the wall according to the hole locations, and then insert the cement screws into the holes and finally use self-tapping screws to secure the mounting base to the wall.
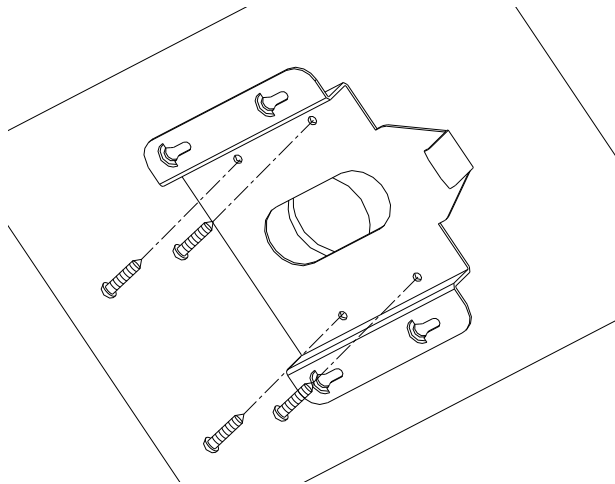
Figure 2-27 Secure the Mounting Base

7) Install the speed dome to the mounting base.

Steps:

1) Route the cables for the speed dome. Align the bottom of the speed dome with the mounting base.
2) Line up the direction of arrow with the spring end of the mounting base.
3) Push the speed dome upwards and then forwards in the direction of arrow. When the speed dome is placed in position, the spring will automatically snap into the lock clip firmly. Refer to the following figure.

②Push forwards

①Push upwards

Line up

Spring

Lock clip
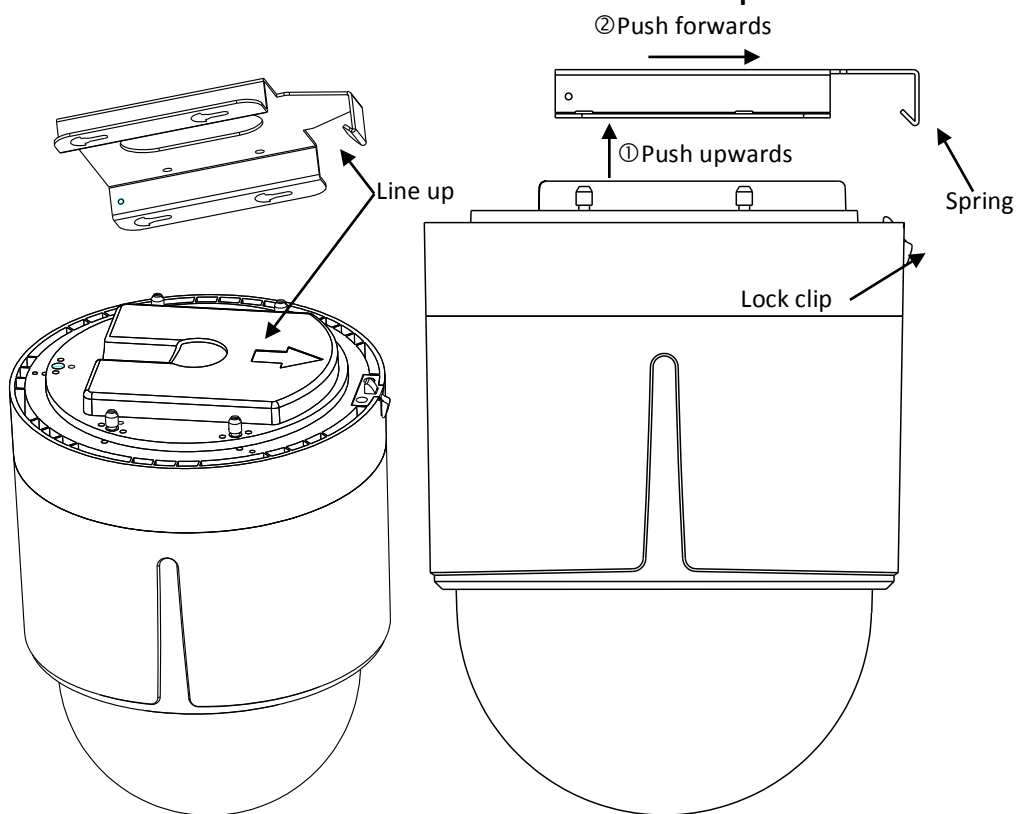
Figure 2-28 Attach the Back Box to the Mounting Base

NOTES:

- Please remove the protective film on the lower dome after the installation is finished.
- Do not touch the bubble of the lower dome directly by hand. The image blurs otherwise.

Appendix

Appendix 1 Statics, Interference Lightning and Surge Protection

This product adopts TVS plate lightning protection technology to avoid damage caused by pulse signal that is below 3000W, like instantaneous lighting stroke, surging, etc. According to the actual outdoor situation, necessary protection measures must be taken, besides ensuring the electrical safety.

■ The distance between signal transmission wires and High-voltage equipment or high-voltage cable is at least 50m.

■ Outdoor wiring should better be routed under eaves as much as possible.

■ In the open field, wiring should be buried underground in sealed steel pipe, and the steel-pipe should be one-point grounding. Overhead routing method is forbidden.

■ In strong thunderstorm area or high induction voltage areas (such as high-voltage transformer substation), high power lightning protection apparatus and lightning conductor are necessary to be added.

■ The design of lightning protection and grounding of the outdoor devices and cables should be considered together with the lightning protection demand of buildings. It also must conform to the related national standards and industrial standards.

■ The system should be equipotential grounded. The grounding equipment must conform to the demands of system anti-jamming and electrical safety both and it must not appear short circuit or mixed circuit with the zero conductor of strong grid. When the system is grounded alone, the resistance should be no more than 4Ω. The sectional area of the grounding cable should be no less than 25mm2. For grounding instructions, please refer to the Installation Manual of Speed Dome.
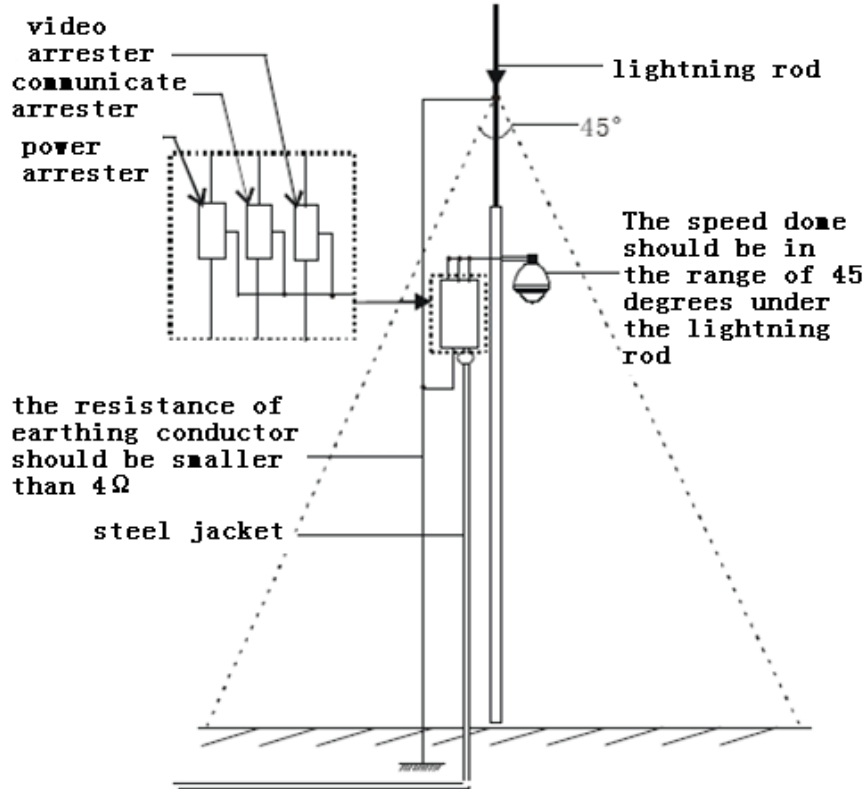
Figure A-1 Lightning & Surge Protection

Grounding for Cement Pole/Wall Installation:

When the speed dome is installed in environment where is relatively insulating to the earth, e.g., cement pole or cement wall, then only the control center requires proper grounded locally. Refer to the following figure.
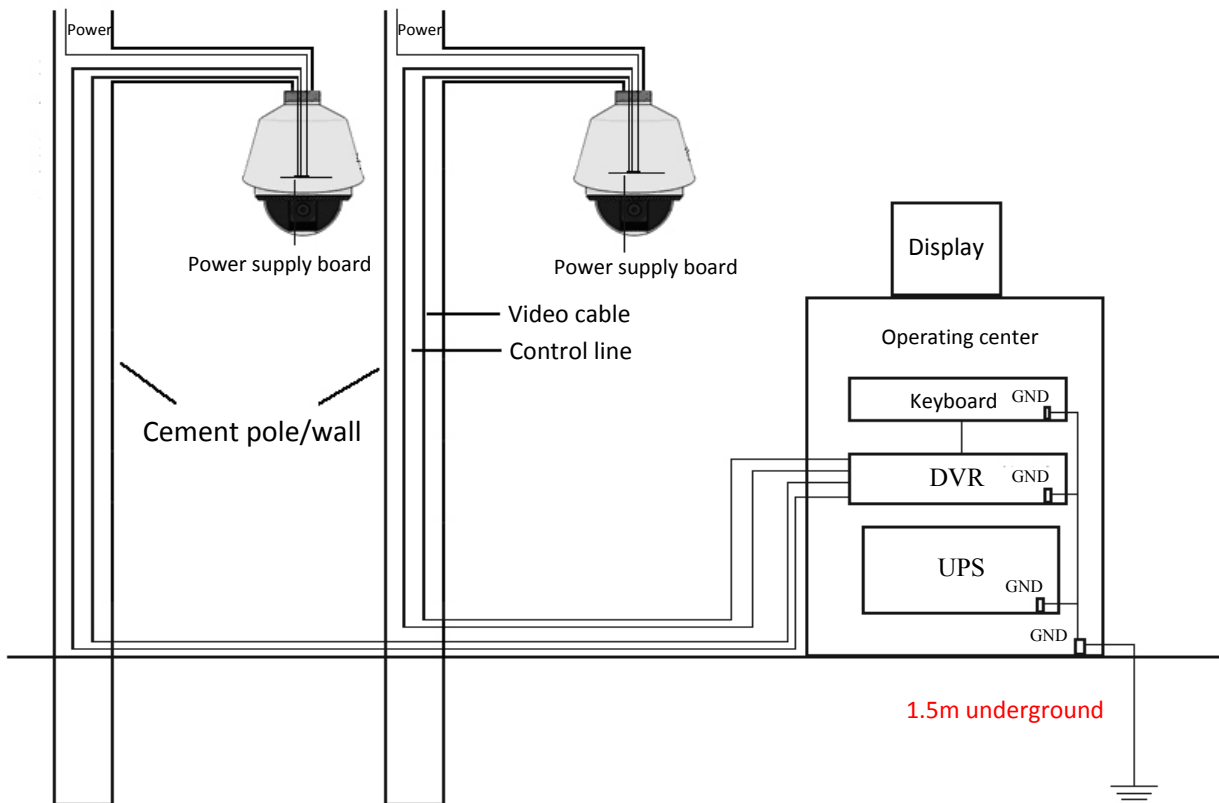
Figure A-2 Grounding in Cement Pole/Wall Installation

NOTES:

- Because the signal transmission media of fiber optical speed dome and network speed dome are isolated from the control center, they must be grounded locally to protect dome against damages.
- If the dome is installed in strong thunderstorm area, it must be grounded locally to release lightening or suchlike high energy to protect dome against damages. Refer to the following figure.
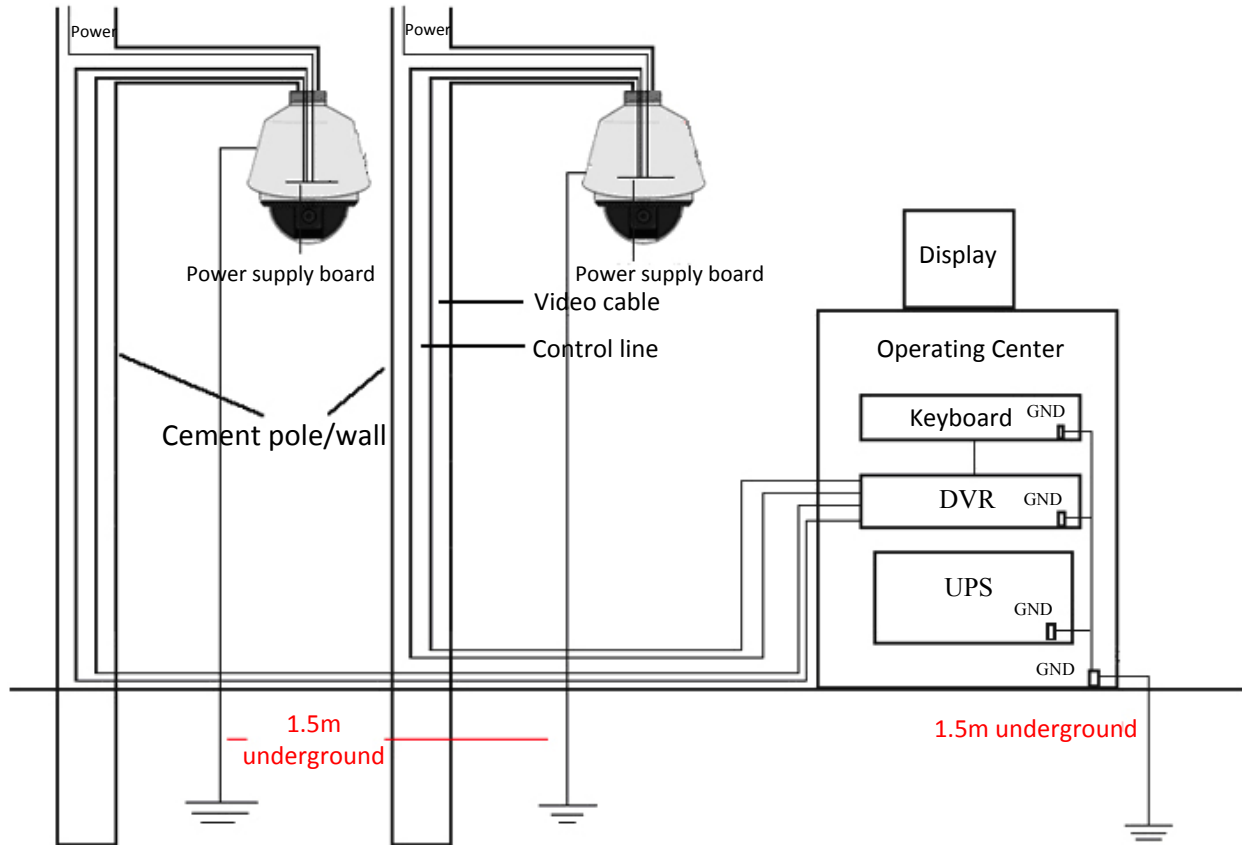
Figure A-3 Lightening-protection Grounding in Cement Pole/Wall Installation

Grounding for Metal Pole Installation:

When the speed dome is installed in environment where is conductive to the earth, e.g., metal pole, then the grounding of dome can be achieved by the properly grounded metal pole, meanwhile, the control center must be grounded locally as well. Refer to the following figure.

Figure A-4 Grounding in Metal Pole Installation

NOTE: If the fiber optics, lightening protector or other device are applied during the transmission of speed dome, such devices as well as the video cables routing through must be proper grounded.

Appendix 2 Waterproof

NOTES:

- The long-arm wall mount is recommended for the outdoor application of speed dome.
- You cannot use the short-arm wall mount or pendant mount for outdoor application, because it is not water-proof.
- It is recommended to use the mount with inner threaded interface and good waterproof performance.
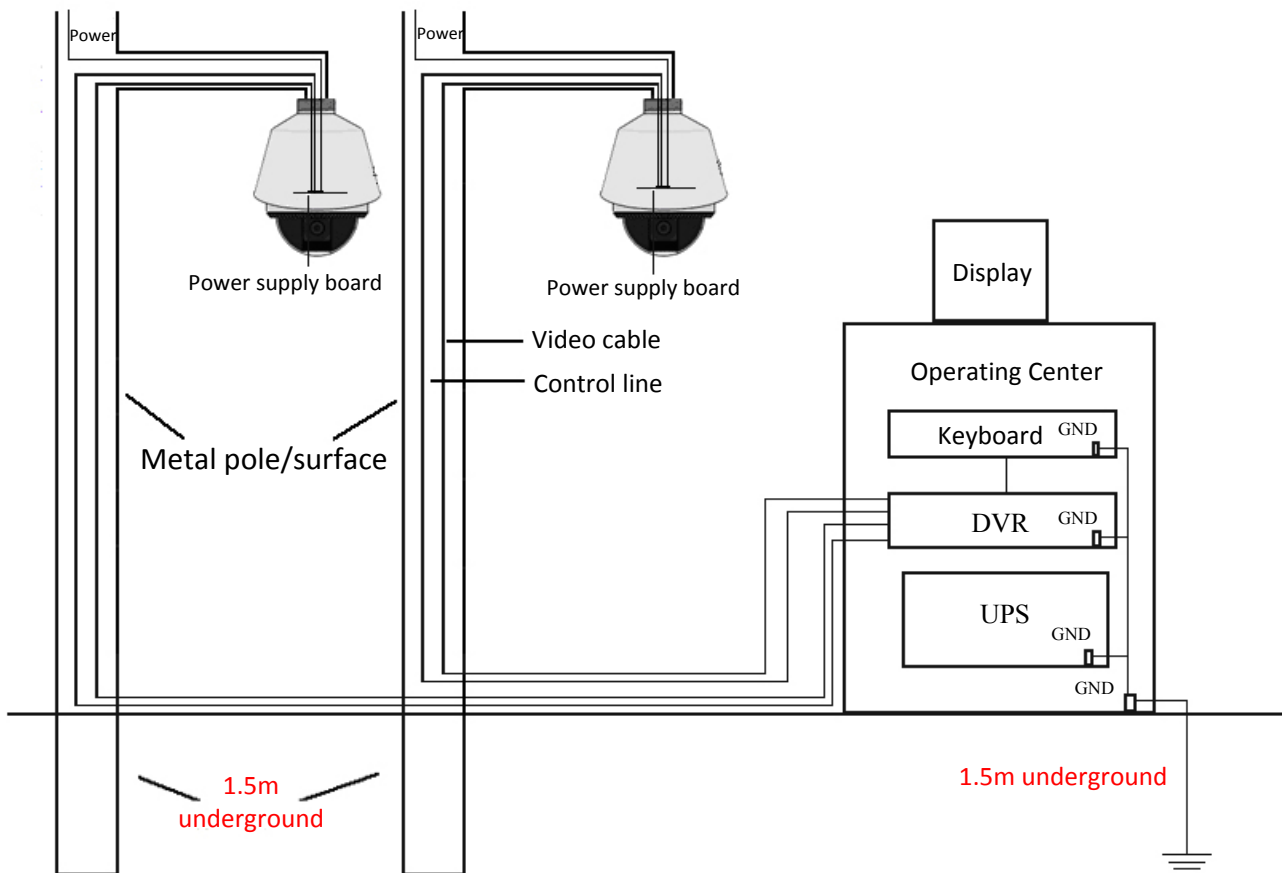- If you use a mount with outer threaded interface, please adopt waterproof measures to the adapter applied between the mount and the dome.
- Do not install indoor speed dome to the outdoor environment.

L-shape Pole Mount

Make sure that the L-shape pole mount is designed with a certain inclination angle as shown in following figure. Water won't flow from the pole into the speed dome with the inclination angle.
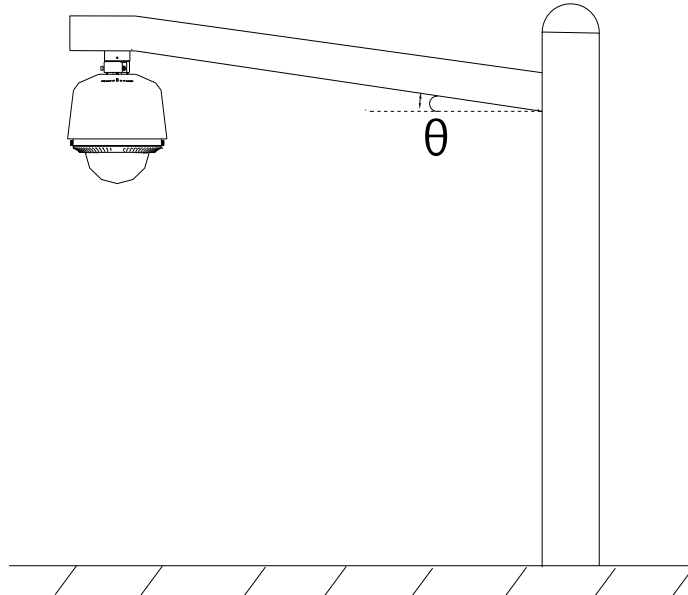
Figure A-5 Customized Mount

Long-arm Wall Mount

The long-arm wall mount is recommended for the outdoor application. The arm of wall mount is designed with a certain inclination angle to prevent incoming water, as shown in Figure A-6. During outdoor application, the long-arm wall mount can be used with the pole mount adapter or the corner mount adapter.
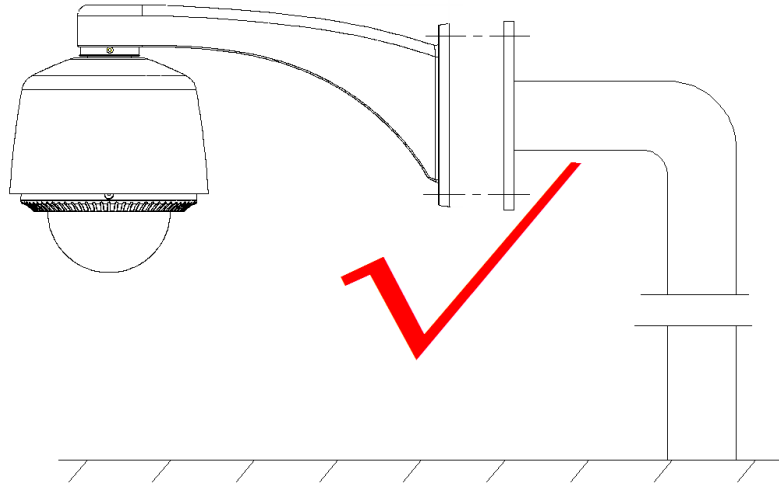
Figure A-6 Long-arm Wall Mount

Appendix 3 Bubble Maintenance

The bubble is a transparent plastic. The dust, oil and finger print, etc. will cause scratch or image blur. Please refer to the following method to clean the bubble.

6)   Handling dust

Use oil free soft brush or blowing dust ball to clean the dust.

7)   Handling oil

Steps:

1)   Wipe off the water-drop or oil by soft cloth and dry the bubble.

2)   Use oil free cotton cloth to wipe the bubble with alcohol or detergent.

3)   Change the cloth to wipe the bubble until the bubble is clean.

Appendix 4 RS485 Bus Connection

■ General Property of RS485 Bus

According to RS485 industry bus standard, RS485 is a half-duplex communication bus which has 120Ω characteristic impendence, the maximum load ability is 32 payloads (including controller device and controlled device).

■ RS485 Bus Transmission Distance

When using 0.56mm (24AWG) twisted-pair line, according to different baudrate, the maximum transmission distance theory table is shown as below:

Max. Distance of RS485 Transmission	
Baudrate	**Max Distance**
2400BPS	1800m
4800BPS	1200m
9600BPS	800m

The transmission distance will be decreased if we use the thinner cable, or use this product under the strong electromagnetic interference situation, or there are lots of devices are added to the bus; on the contrary, the transmission distance will be increased.

■ Connection Methods

RS485 industry bus standard require daisy-chain connection method between any devices, both sides have to connect a 120Ω terminal resistance (show as Diagram 1), the simplified connection method is shown as diagram 2, but the distance of "D" should not be too long.
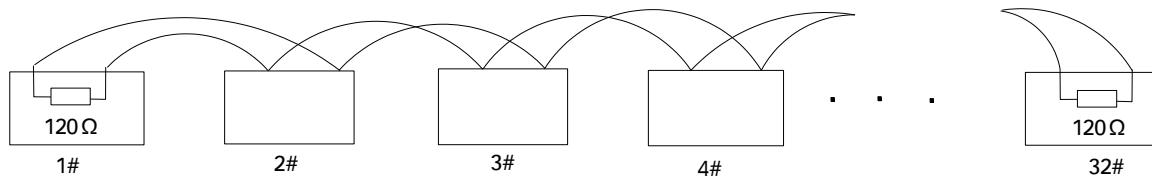
Figure A-7 RS485 Connection 1
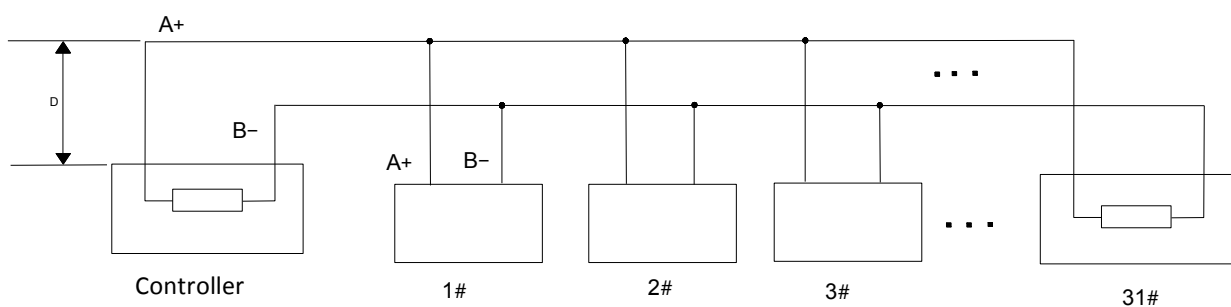
Figure A-8 RS485 Connection 2

■ Problems in the Practical Application

Normally, users adopt star-shape connection method in construction, under this situation, the terminal resistors must be connected between two farthest devices (as Figure A-9, 1# and 15#), but this connection method is not satisfy the requirement of the RS485 industry standard so that it will lead to some problems such as signal reflection, anti-jamming ability decline when the devices are faraway. At this time, the dome will be uncontrollable, or self-running, etc.

Figure A-9 Star Shape Connection

For such case, the best way is adding a RS485 distributor. This product can effectively change the star-shape connection to which satisfies the requirement of RS485 industry standard, in order to avoid those problems and improve the communication reliability. Refer to the following figure.
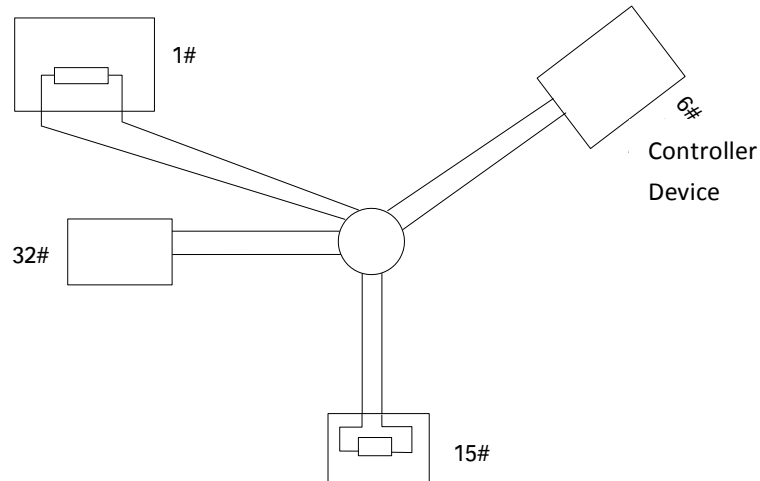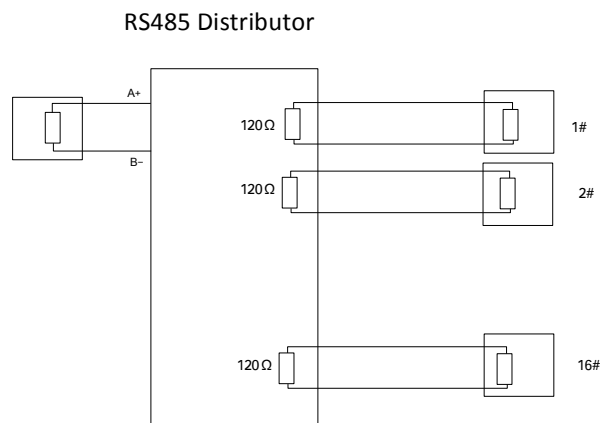

Figure A-10 RS485 Distributor

■ Troubleshooting of RS485 communication

Problem	Possible Reasons	To Solve the Problem
The speed dome does the self-test action but cannot be controlled remotely.	1. The address or baudrate of the speed dome does not match with those of remote control device.	1. Adjust the address and baudrate of the remote control device to match with those of the speed dome.
	2. The wire RS485+ connects to the interface RS485- and wire RS485- connects to the interface RS485+.	2. Connect the wire RS485+ to the interface RS485+ and wire RS485- to the interface RS485-.
	3. The RS485 wire is disconnected.	3. Reconnect the RS485 wire tightly.
	4. RS485 wire is broken.	4. Change a RS485 wire.
The speed dome can be controlled but not smoothly.	1. The connection is loose.	1. Reconnect the RS485 wire tightly.
	2. RS485+ or RS485-wire is broken.	2. Change a RS485 wire.
	3. The speed dome is too far away from the remote control device.	3. Add a terminal resistor.
	4. Too many speed domes are connected.	4. Add a RS485 distributor.

Appendix 5 24VAC Wire Gauge & Transmission Distance

The following table describes the recommended max. distance adopted for the certain wire gauge when the loss rate of 24VAC voltage is less than 10%. For the AC driven device, the maximum voltage loss rate is 10% allowable. For example, for a device with the rating power of 80VA which is installed at a distance of 35 feet (10m) away from the transformer, then 0.8000mm is required as the minimum wire gauge.

Distance (feet) / Power (va) \ Wire Gauge (mm)	0.8000	1.000	1.250	2.000
10	283 (86)	451 (137)	716 (218)	1811 (551)
20	141 (42)	225 (68)	358 (109)	905 (275)
30	94 (28)	150 (45)	238 (72)	603 (183)
40	70 (21)	112 (34)	179 (54)	452 (137)
50	56 (17)	90 (27)	143 (43)	362 (110)
60	47 (14)	75 (22)	119 (36)	301 (91)
70	40 (12)	64 (19)	102 (31)	258 (78)
80	35 (10)	56 (17)	89 (27)	226 (68)
90	31 (9)	50 (15)	79 (24)	201 (61)
100	28 (8)	45 (13)	71 (21)	181 (55)
110	25 (7)	41 (12)	65 (19)	164 (49)
120	23 (7)	37 (11)	59 (17)	150 (45)
130	21 (6)	34 (10)	55 (16)	139 (42)
140	20 (6)	32 (9)	51 (15)	129 (39)
150	18 (5)	30 (9)	47 (14)	120 (36)
160	17 (5)	28 (8)	44 (13)	113 (34)
170	16 (4)	26 (7)	42 (12)	106 (32)
180	15 (4)	25 (7)	39 (11)	100 (30)
190	14 (4)	23 (7)	37 (11)	95 (28)
200	14 (4)	22 (6)	35 (10)	90 (27)

Appendix 6 Table of Wire Gauge Standards

Bare Wire Gauge(mm)	American Wire Gauge AWG	British Wire Gauge SWG	Cross-sectional Area of Bare Wire(mm2)
0.750	21		0.4417
0.800	20	21	0.5027
0.900	19	20	0.6362
1.000	18	19	0.7854
1.250	16	18	1.2266
1.500	15	17	1.7663
2.000	12	14	3.1420
2.500			4.9080
3.000			7.0683