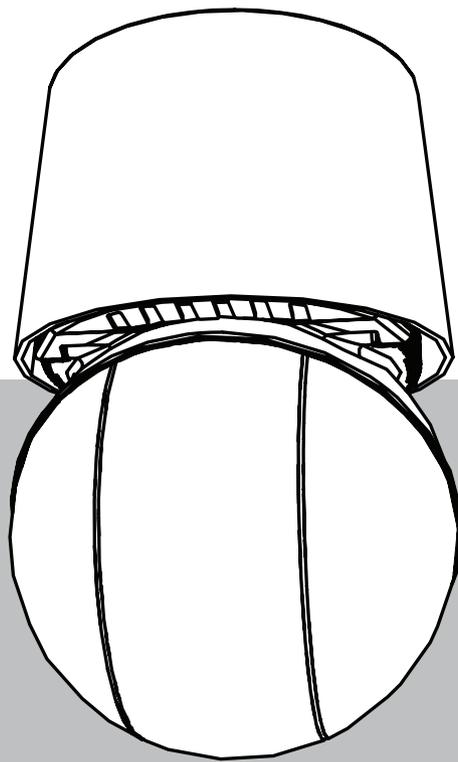


# **AUTODOME 7100i | AUTODOME 7100i IR**

NDP-7602-Z40 | NDP-7602-Z40L | NDP-7604-Z12L





## Table of contents

<b>1</b>	<b>Safety</b>	<b>4</b>
1.1	About this Manual	4
1.2	Legal Information	4
1.3	Safety Precautions	4
1.4	Important Safety Instructions	5
1.5	Important Notices	8
1.6	Connection in Applications	10
1.7	Use latest software	10
1.8	Important Notices - Illumination Safety	11
1.9	Customer Support and Service	12
<b>2</b>	<b>Unpacking</b>	<b>13</b>
2.1	Parts List	13
2.2	Tools Required	13
<b>3</b>	<b>Product description</b>	<b>14</b>
<b>4</b>	<b>Planning information</b>	<b>15</b>
<b>5</b>	<b>Configuring the camera before installation</b>	<b>16</b>
<b>6</b>	<b>Installing the camera outdoors</b>	<b>17</b>
<b>7</b>	<b>Preparing the bubble</b>	<b>20</b>
<b>8</b>	<b>(Optional) Installing an SD card</b>	<b>21</b>
<b>9</b>	<b>Installing a pendant arm mount</b>	<b>23</b>
<b>10</b>	<b>Installing a pipe mount</b>	<b>28</b>
10.1	Installing a pipe mount onto a NDA-U-RMT with grounded conduit	32
<b>11</b>	<b>Connection</b>	<b>34</b>
11.1	Connecting the AUTODOME camera to the PC	34
11.2	Connecting 24 VAC / 36 VDC Power	36
11.3	Recommendations for third-party IEEE 802.3bt PoE Power Supply	37
11.4	Recommendations for 24 VAC Power Supply	38
11.5	Connecting liquid tight, electrically grounded metal conduit to Bosch Outdoor Midspans	38
11.6	(Optional) Support for Fiber optic cable installation	39
11.7	Connecting the Alarm Inputs and Alarm Relay Output	40
11.8	Connecting the Audio Input and Output Wires	40
<b>12</b>	<b>Troubleshooting</b>	<b>41</b>
12.1	Rebooting the unit	44
<b>13</b>	<b>Maintenance</b>	<b>45</b>
<b>14</b>	<b>Technical data</b>	<b>46</b>
<b>15</b>	<b>Support services and Bosch Academy</b>	<b>47</b>

# 1 Safety

## 1.1 About this Manual

This manual has been compiled with great care and the information it contains has been thoroughly verified. The text was complete and correct at the time of printing. Because of the ongoing development of products, the content of the manual may change without notice. Bosch Security Systems accepts no liability for damage resulting directly or indirectly from faults, incompleteness, or discrepancies between the manual and the product described.

## 1.2 Legal Information

### Copyright

This manual is the intellectual property of Bosch Security Systems, and is protected by copyright. All rights reserved.

### Trademarks

All hardware and software product names used in this document are likely to be registered trademarks and must be treated accordingly.

## 1.3 Safety Precautions



### Danger!

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.



### Warning!

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



### Caution!

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



### Notice!

Indicates a situation which, if not avoided, could result in damage to the equipment or environment, or data loss.

## 1.4 Important Safety Instructions

Read, follow, and retain for future reference all of the following safety instructions. Follow all warnings before operating the device.

1. Clean only with a dry cloth. Do not use liquid cleaners or aerosol cleaners.
2. Do not install device near any heat sources such as radiators, heaters, stoves, or other equipment (including amplifiers) that produce heat.
3. Never spill liquid of any kind on the device.
4. Take precautions to protect the device from power and lightning surges.\*
5. Adjust only those controls specified in the operating instructions.
6. Operate the device only from the type of power source indicated on the label.
7. Unless qualified, do not attempt to service a damaged device yourself. Refer all servicing to qualified service personnel.
8. Install in accordance with the manufacturer's instructions in accordance with applicable local codes.
9. Use only attachments/accessories specified by the manufacturer.
10. Protect all connection cables from possible damage, particularly at connection points.

\* Refer to chapter "Installing the camera outdoors" in the Installation Manual.

**Caution!**

To reduce the risk of electric shock and damage to the product, only connect any power source when the device is fully installed.

---

**Caution!**

Installation must be made by qualified personnel and conform to ANSI/NFPA 70 (the National Electrical Code® (NEC)), Canadian Electrical Code, Part I (also called CE Code or CSA C22.1), and all applicable local codes. Bosch Security Systems accepts no liability for any damages or losses caused by incorrect or improper installation.

---

**Warning!**

INSTALL EXTERNAL INTERCONNECTING CABLES IN ACCORDANCE TO NEC, ANSI/NFPA70 (FOR US APPLICATION) AND CANADIAN ELECTRICAL CODE, PART I, CSA C22.1 (FOR CAN APPLICATION) AND IN ACCORDANCE TO LOCAL COUNTRY CODES FOR ALL OTHER COUNTRIES. BRANCH CIRCUIT PROTECTION INCORPORATING A 20 A, 2-POLE LISTED CIRCUIT BREAKER OR BRANCH RATED FUSES ARE REQUIRED AS PART OF THE BUILDING INSTALLATION. A READILY ACCESSIBLE 2-POLE DISCONNECT DEVICE WITH A CONTACT SEPARATION OF AT LEAST 3 mm MUST BE INCORPORATED.

---

**Warning!**

ROUTING OF EXTERNAL WIRING MUST BE DONE THROUGH A PERMANENTLY EARTHED LIQUID TIGHT METAL CONDUIT.

---

**Notice!**

Outdoor installation

For details about the proper configuration for installing your camera outdoors with surge and lightning protection, refer to the chapter "*Installing the camera outdoors, page 17.*"

---

**Notice!**

Bosch recommends the use of surge/lightning suppression devices (sourced locally) to protect network and power cables and the camera installation site. Refer to NFPA 780, Class 1 & 2, UL96A, or the equivalent code appropriate for your country/region, and to local building codes. Refer also to the installation instructions of each device (midspan, camera, and surge suppression device installed where the cable enters the building).

**Notice!**

Always use one of the following types of shielded network connection cable and a shielded RJ45 network cable connector: F/UTP overall screened cable with unscreened twisted pairs (often referred to as FTP), S/UTP overall braided shield with unscreened twisted pairs (often referred to as STP), or with better shielding, and that meets the minimum bend radius of 30mm, and maximum diameter of 6mm.

Always use shielded cables/connectors in demanding indoor electrical environments where the network cable is located in parallel with electrical mains supply cables, or where large inductive loads such as motors or contactors are near the camera or its cable.

**Notice!**

Ancillary power (UPS) required

To meet the Mains Supply Voltage Dips and Short Interruptions requirements per EN 50130-4 Alarm Standard, ancillary equipment (for example, an Uninterruptible Power Supply (UPS)) is necessary. The UPS must have a Transfer time between 2-6 ms and Backup Runtime of greater than 5 seconds for the power level as specified on the product data sheet.

**Warning!**

THE CAMERA MUST BE MOUNTED DIRECTLY AND PERMANENTLY TO A NON-COMBUSTIBLE SURFACE.

- Make sure that the installation conditions comply with the specified stresses of vibration and shock as mentioned in the datasheet.
- Use on mobile platforms is not recommended. Refer to the warranty statement for more information.

**Notice!**

Risk of water ingress

If you:

- remove a camera from its mount but do not replace it promptly, or
  - install the mount but do not install the camera immediately,
- then you must remove the PCB from the mount to avoid moisture or water ingress and potential corrosion.

**Notice!**

Before adding or removing an SD card from the camera, disconnect all power sources (including POE) from the device.

**Notice!**

Before adding or removing an SFP module from the camera's mount, disconnect all power sources (including POE) from the mount (NDA-7100-PENF and NDA-7100-PIPEF).



**Notice!**

Risk of permanent damage to the camera

The interface board connects only one way to the camera. Make sure that when you install it in the mount (arm or pipe mount), you install it the correct way.

---

## 1.5 Important Notices



**Accessories** - Do not place this unit on an unstable stand, tripod, bracket, or mount. The unit may fall, causing serious injury and/or serious damage to the unit. Use only with mounting solutions specified by the manufacturer. When a cart is used, use caution and care when moving the cart/unit combination to avoid injury from tip-over. Quick stops, excessive force, or uneven surfaces may cause the cart/unit combination to overturn. Mount the unit per the installation instructions.

**Adjustment of controls** - Adjust only those controls specified in the operating instructions. Improper adjustment of other controls may cause damage to the unit.

**Camera signal** - Protect the cable with a primary protector if the camera signal is beyond 140 feet, in accordance with *NEC800 (CEC Section 60)*.

**Environmental statement** - Bosch has a strong commitment towards the environment. This device has been designed to respect the environment as much as possible.

**Electrostatic-sensitive device** - Use proper ESD safety precautions when handling the camera to avoid electrostatic discharge.

**Fuse rating** - For security protection of the device, the branch circuit protection must be secured with a maximum fuse rating of 16A. This must be in accordance with *NEC800 (CEC Section 60)*.

### Grounding:

- Connect outdoor equipment to the unit's inputs only after this unit has had its ground terminal connected properly to a ground source.
- Disconnect the unit's input connectors from outdoor equipment before disconnecting the grounding terminal.
- Follow proper safety precautions such as grounding for any outdoor device connected to this unit.

U.S.A. models only - *Section 810* of the *National Electrical Code, ANSI/NFPA No.70*, provides information regarding proper grounding of the mount and supporting structure, size of grounding conductors, location of discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.

Refer to the chapter "*Installing the camera outdoors, page 17*" in the installation manual for more information on outdoor installations.

**Outdoor signals** - The installation for outdoor signals, especially regarding clearance from power and lightning conductors and transient protection, must be in accordance with *NEC725* and *NEC800 (CEC Rule 16-224 and CEC Section 60)*.

Refer to the chapter "*Installing the camera outdoors, page 17*" in the installation manual for more information on outdoor installations.

**Permanently connected equipment** - Incorporate a readily accessible disconnect device in the building installation wiring.

**Power disconnect** - Units have power supplied to the unit whenever the power cord is inserted into the power source, or when IEEE 802.3bt, type 3/4 (60W/90W) power is provided over the Ethernet Cat5e/Cat6e cable. The power cord is the main power disconnect device for switching off the voltage for all units. When IEEE 802.3bt, type 3/4 (60W/90W) is used to power the unit, the power is provided over the Ethernet cable, which is then the main power disconnect device for switching off the voltage for all units.

**Power lines** - Do not locate the camera near overhead power lines, power circuits, or electrical lights, nor where it may contact such power lines, circuits, or lights.

**Damage requiring service** - Unplug the device from the main AC/DC/PoE power source and refer servicing to qualified service personnel when any damage to the equipment has occurred, such as:

- the power supply cord or plug is damaged;
- exposure to moisture, water, and/or inclement weather (rain, snow, etc.);
- liquid has been spilled into or on the device;
- an object has fallen into the device;
- the device has been dropped or its enclosure or the equipment cabinet in which it is located is damaged;
- the device exhibits a distinct change in performance;
- the device does not operate normally when the user follows the operating instructions correctly.

**Servicing** - Do not attempt to service this device yourself. Refer all servicing to qualified service personnel.

This device has no user-serviceable internal parts.

### FCC information

This equipment has been tested and found to comply with the limits for a Class 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.

Intentional or unintentional modifications, not expressly approved by the party responsible for compliance, shall not be made. Any such modifications could void the user's authority to operate the equipment.



### Notice!

This is a **class A** product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

### FCC suppliers Declaration of Conformity

NDP-7602-Z40	<b>PTZ, 1080p (2 MP), 40X</b>
NDP-7602-Z40L	<b>PTZ, 1080p (2 MP), 40X</b>
NDP-7604-Z12L	<b>PTZ, 2160p (8MP), 12X</b>

### Responsible party

Bosch Security Systems, LLC  
 130 Perinton Parkway  
 14450 Fairport, NY, USA  
[www.boschsecurity.us](http://www.boschsecurity.us)

### UL Disclaimer

Underwriter Laboratories Inc. ("UL") has not tested the performance or reliability of the security or signaling aspects of this product. UL has only tested fire, shock and/or casualty hazards as outlined in Standard(s) for Safety for Information Technology Equipment, UL 62368-1. 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.

## 1.6 Connection in Applications

**24VAC / 36VDC power source:** This unit is intended to operate at 24 VAC or 36 VDC power if IEEE 802.3bt type 3 60W (non IR models), type 4 90W (IR models) is not available. User-supplied wiring must be in compliance with electrical codes (Class 2 power source) and shielded wire must be used.

**PoE:** Use only approved PoE (IEEE 802.3bt) devices: Type 3 60W for non IR models and Type 4 90W for IR models. Power-over-Ethernet can be connected at the same time as 24VAC or at the same time as 36VDC power supply. If auxiliary power (24 VAC or 36 VDC) and PoE (IEEE 802.3bt) are applied simultaneously, the camera selects PoE over the auxiliary input. For full feature support of the AUTODOME 7100i camera, an IEEE 802.3bt Type 3 60W midspan from Bosch should be used for non IR models and the IEEE 802.3bt Type 4 90W midspan should be used for IR models.

## 1.7 Use latest software

Before operating the device for the first time, make sure that you install the latest applicable release of your software version. For consistent functionality, compatibility, performance, and security, regularly update the software throughout the operational life of the device. Follow the instructions in the product documentation regarding software updates.

The following links provide more information:

- General information: <https://www.boschsecurity.com/xc/en/support/product-security/>
- Security advisories, that is a list of identified vulnerabilities and proposed solutions: <https://www.boschsecurity.com/xc/en/support/product-security/security-advisories.html>

Bosch assumes no liability whatsoever for any damage caused by operating its products with outdated software components.



### Notice!

Bosch strongly recommends upgrading to the latest firmware for the best possible functionality, compatibility, performance and security.

Check <http://downloadstore.boschsecurity.com/> regularly to see if there is a new firmware version available.

## 1.8 Important Notices - Illumination Safety

The text in this section applies only to cameras that have illuminators.



### Notice!

This product has been tested according to standard IEC 62471:2006 “Photobiological safety of lamps and lamp systems”. The product emissions exceed the EXEMPT Group limit for both Retinal Blue Light and Cornea/Lens infrared hazard as defined by IEC 62471:2006. The product was found to meet the Risk Group 1 exposure limits for IR LEDs.

The IEC 62471 provides the methods to determine the risk group of any lamp or any product incorporating a lamp. The risk groups in IEC 62471 indicate the degree of risk from potential optical radiation hazards. The risk groups were developed based upon decades of lamp use experience and the analysis of accidental injuries related to optical radiation emission.

**EXEMPT Group** - no optical hazard is considered reasonably foreseeable, even for continuous, unrestricted use. Typical examples are most frosted incandescent lamps and fluorescent lamps used in domestic applications.

**Risk Group 1** - products are safe for most use applications, except for very prolonged exposures where direct ocular exposures may be expected. An example of Risk Group 1 is a domestic battery operated torch (flashlight).

**Exposure Hazard Value (EHV)** is a ratio of the Exposure Level (distance, exposure time) to Exposure Limit Value (ELV). When EHV is greater than 1, the device has exceeded the Exposure Limit Values for a particular Risk Group. The ELV is the level where optical radiation to the eye or skin is not expected to result in adverse biological effects.

The **Hazard Distance (HD)** is the distance from the source at which the Exposure Level equals the appropriate ELV. In other words, when EHV=1 for a particular Risk Group.

Regarding the Cornea / Lens infrared hazard of this product, the Exposure Hazard Value (EHV) at a test distance of 200mm is 2.19 based on EXEMPT Group exposure limits. The EHV based on Risk Group 1 limits is 0.386. The HD for the Exempt Group is 297 mm.

These values have been summarized in the table below:

Hazard	EXEMPT Group Limits			Risk Group 1 Limits		
	t, duration	d, distance	EHV	t, duration	d, distance	EHV
Cornea / Lens Infrared Hazard	1000 s	200 mm	2.19	100 s	200 mm	0.386
	Hazard Distance	279 mm				

## 1.9 Customer Support and Service

If this unit needs service, contact the nearest Bosch Security Systems Service Center for authorization to return and shipping instructions.

### **USA and Canada**

Telephone: 800-289-0096, option 5

Fax: 800-366-1329

Email: [repair@us.bosch.com](mailto:repair@us.bosch.com)

### **Customer Service**

Telephone: 800-289-0096, option 3

Fax: 800-315-0470

Email: [orders@us.bosch.com](mailto:orders@us.bosch.com)

### **Technical Support**

Telephone: 800-289-0096, option 4

Fax: 800-315-0470

Email: [technical.support@us.bosch.com](mailto:technical.support@us.bosch.com)

### **Europe, Middle East, Africa, and Asia Pacific Regions**

Contact your local distributor or Bosch sales office. Use this link: <https://www.boschsecurity.com/xc/en/where-to-buy/>

### **More Information**

For more information, please contact the nearest Bosch Security Systems location or visit [www.boschsecurity.com](http://www.boschsecurity.com).

## 2 Unpacking

- This equipment should be unpacked and handled with care. Check the exterior of the packaging for visible damage. If an item appears to have been damaged in shipment, notify the shipper immediately.
- Verify that all the parts listed in the Parts List below are included. If any items are missing, notify your Sales or Customer Service Representative from Bosch Security Systems.
- Do not use this product if any component appears to be damaged. Please contact Bosch Security Systems in the event of damaged goods.
- The original packing carton (if undamaged) is the safest container in which to transport the unit and must be used if returning the unit for service. Save it for possible future use.
- To protect the PCBA on the mount against ESD, do not remove the anti-static foam covering the PCBA until after you install the mount.



### Notice!

Risk of damage to the camera

Do not change the camera orientation while the camera is still in the box. The camera head must be free to rotate.

### 2.1

#### Parts List

Quantity	Component
1	AUTODOME 7100i   AUTODOME 7100i IR camera
1	Quick Installation Guide
1	Safety instructions
4	MAC address labels

### 2.2

#### Tools Required

The table that follows is a list of additional products, sold separately by Bosch or other manufacturers, necessary to install AUTODOME cameras.

Quantity	Product	Size	Part Number
1	SD card	Full-sized SD card	(user-supplied)
---	Watertight, grounded metal conduit	20 mm (0.75 in.)	(user-supplied)
--	UL-listed liquid-tight strain reliefs		(user-supplied)
--	Weatherproof sealant (for example, PTFE thread seal tape)		(user-supplied)
4	Studs, stainless steel, corrosion-resistant	6.4 mm (0.25 in.) to 8 mm (5/16 in.)	(user-supplied)
1	Hex wrench	5 mm	(user-supplied)
1	Torque wrench with torque range of 10-12 Nm (90-105 in.-lb)		(user-supplied)

### 3 Product description

With starlight imaging technology for excellent low-light sensitivity, Intelligent Video Analytics, and video streaming, the AUTODOME 7100i camera supports superior intelligence and imaging at the edge. The design gives undistorted, high-resolution video above the horizon, which is helpful in city landscapes that are not flat.

The camera has been designed for quick and easy installation, a key feature from Bosch IP video security products.

All housings feature recessed screws and latches for increased tamper resistance.

In an enclosed installation area, still air can cause the operating temperature of the camera to go above the maximum. If you install a camera in an enclosed area, make sure that the operating temperature of the camera does not go above the maximum temperature. The maximum operating temperature is:

- +60°C (+140°F) for non-IR models
- +50°C (+122°F) for IR models

Make sure that air circulates around the camera to supply cooling.

## 4 Planning information

The table that follows has a list of additional tools and accessories that may be necessary to complete installation.

Tool / Accessory	Purpose	Available from Bosch?
Full-size SD card	Record video.	Yes (SD-064G, SD-128G, or SD-256G)
Small tool (2-3mm in diameter)	Install an SD card.	No
Ground screw	Complete the Earth-ground connection on a pendant arm mount.	No
Torx wrench	Install the ground screw on a pendant arm mount.	No
Fiber optic cable	Transmit video and data over an extended range.	No
SFP module	<p>Connect a fiber optic cable to the fiber port on the pendant arm mount or on the pipe mount (-F models only). Must use 1Gbps SFP modules. The fiber used must be compatible with the SFP modules in mode (single-mode or multi-mode), wavelengths (850nm or 1310nm) and termination (duplex LC). The SFP modules used at both the camera/mount end and at the head-end media converter must be compatible, if not the same exact brand and part number.</p> <p>Notes:</p> <ul style="list-style-type: none"> <li>- SFP manufacturer is responsible for reaching the distance claimed for module.</li> <li>- SFP modules must meet the following temperature specifications that occur inside the AUTODOME 7100i mount: +85°C (+185°F) case temp.</li> </ul>	No
Copper power wire	Make connections for 24VAC +/- 10%/36VDC. +/- 10%	No
Belden cable or similar (with twisted pairs and a foil shield with a drain wire)	Make connections for audio and/or alarm inputs/outputs.	No

## 5 Configuring the camera before installation

**Notice!**

Risk of damage to the camera

Do not change the camera orientation while the camera is still in the box. The camera head must be free to rotate.

**Notice!**

Risk of damage to the camera

When you are configuring the camera in its packaging and you plan to install it on a pipe mount, you must use a complete Bosch pipe mount (NDA-7100-PIPE or NDA-7100-PIPEF) to supply power to the camera. It is the only way to make sure the board within the pipe mount is installed in the correct way.

**Notice!**

Risk of permanent damage to the camera

The interface board connects only one way to the camera. Make sure that when you install it in the mount (arm or pipe mount), you install it the correct way.

1. Connect Ethernet with POE or Ethernet without POE and power wires to a NDA-7100-PIPE or NDA-7100-PIPEF BOSCH Pipe Mount. For wiring requirements, refer to the Connection chapter.
2. Connect the Pipe mount to the camera. Refer to Installing a pipe mount.
3. Supply power to the camera and connect the camera to the computer. Refer to Connection chapter.
4. Configure the camera. Refer to the separate User Manual for details.
5. Disconnect the wires/ cables from the connectors in the base of the camera.
6. Disconnect the Pipe mount from the base of the camera.

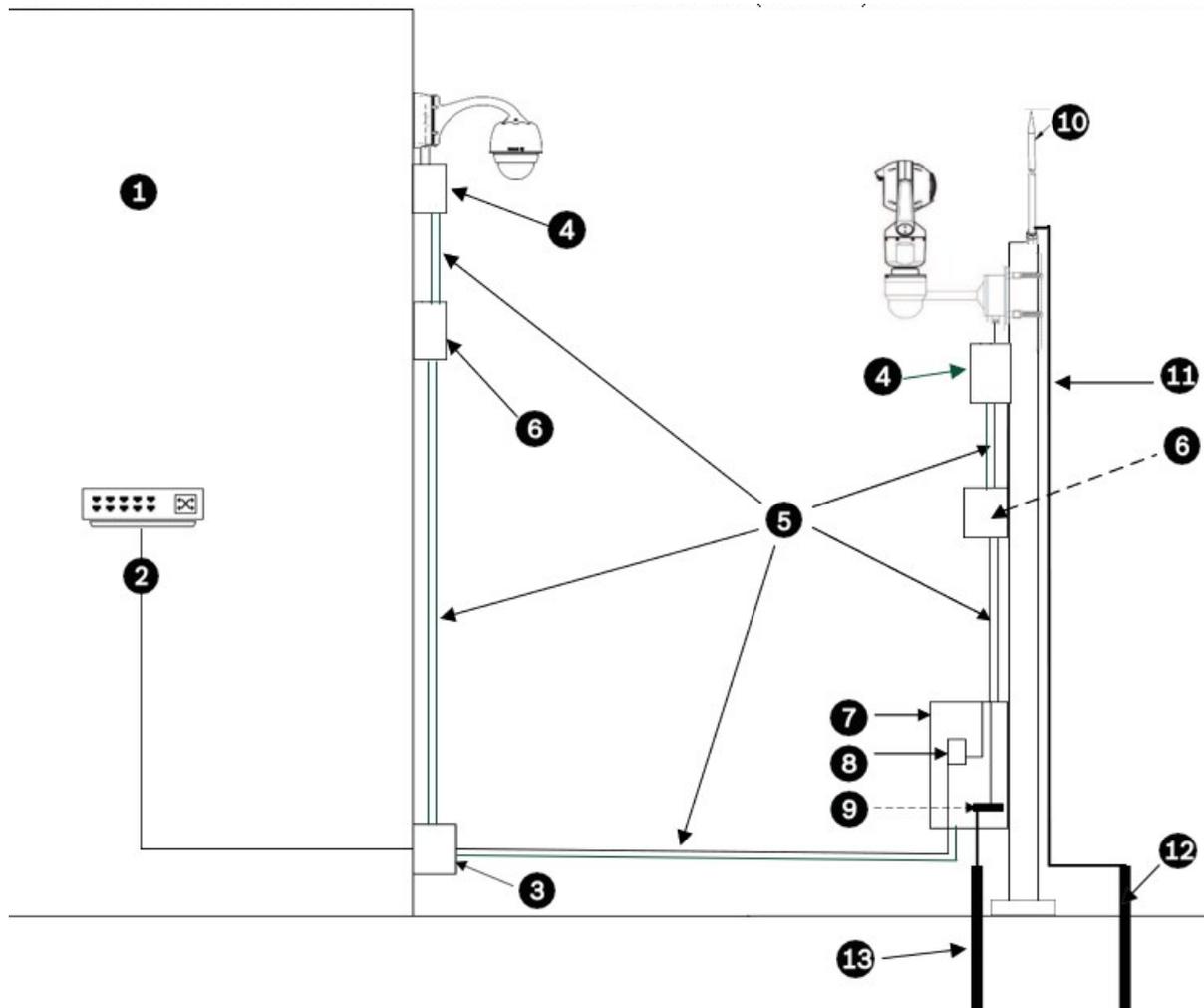
## 6 Installing the camera outdoors

Cameras installed outdoors are typically exposed to surges, transients, and lightning. The details for wiring and installation are based on common practices for proper surge and lightning suppression.

The figure that follows is an illustration of the best practices for installing IP cameras outdoors with surge and lightning suppression.

Note that the illustration has an AUTODOME camera and a MIC camera and does not include representations of all models of IP cameras, including AUTODOME and MIC.

The illustration can represent any IP camera. Mounting hardware varies between units.



**Figure 6.1:** Correct outdoor installation with proper surge/lightning suppression

1	Indoor main building	2	Network switch with shielded ports and grounding as recommended by the manufacturer. All network cables must be terminated with shielded RJ45 connectors.
3	Surge suppression for indoor equipment at cable entry	4	Outdoor rated surge suppressor with shielded RJ45 connections that must be mounted as close to the camera as possible. Connect the ground per the manufacturer’s installation manual.
5	Install Cat5e/Cat6 shielded Ethernet cable such as F/UTP shielded cable with twisted pairs (often referred to as FTP) or S/UTP braided shield with twisted pairs (often referred to as STP) with shielded RJ45 connectors. The cable must be routed through a permanently earthed liquid tight metal conduit that is Earth-grounded across the entire span. The cables must be a maximum length of 100 m (328 ft). Power and signal cables must be in separate conduits with the correct physical separation distance between them. (Refer to the section <b>Additional wiring guidelines</b> .)		
6	Outdoor-rated midspan with shielded RJ45 connections. Ground the metal conduit to the midspan per the installation instructions of the camera/ midspan.	7	Equipment enclosure with AC power source for the midspan
8	Optional outdoor-rated network switch or patch panel	9	Connect the Bus Bar to the Equipment Grounding Electrode. All equipment must be bonded to this common bus bar.
10	Lightning Rod (Refer to the section <b>Lightning rod, down conductor, and electrode</b> .)	11	Down Conductor (Refer to the section <b>Lightning rod, down conductor, and electrode</b> .)
12	Lightning Rod Grounding Electrode (Refer to the sections <b>Lightning rod, down conductor, and electrode</b> and <b>Separate grounding electrodes</b> .)	13	Equipment Grounding Electrode (Refer to the section <b>Separate grounding electrodes</b> .)

**Additional wiring guidelines**

Maintain the physical separation distance between the Cat5e/Cat6 shielded Ethernet cable and high voltage/EMF sources. These are typical recommendations, but also refer to local electrical codes.

Voltage range	Minimum separation distance
For <600 VAC	50 mm (2 in.)
For >600 VAC and <3 kV	1.5 m (5 ft)
For >3 kV	3 m (10 ft)

Use shielded cables for alarms, audio, or any other connections when applicable.

**Lightning rod, down conductor, and electrode**

- Note that the lightning rod down conductor connects directly to the grounding electrode.
- Refer to NFPA 780, Class 1 & 2, UL96A, and to the equivalent code appropriate for the country/region.
- Follow the installation instructions of the lightning rod manufacturer.

**Separate grounding electrodes**

Some standards call for a common electrode for the equipment bus bar and the lightning rod. Refer to NFPA 780, Class 1 & 2, UL96A, and to the equivalent code appropriate for the country/region.

**Metal pole grounding**

If a metal pole is used, refer to NFPA 780, Class 1 & 2, UL96A, and to the equivalent code appropriate for the country/region.

**Camera Housings and Mounts**

- Use only Bosch mounts listed on the datasheet of the specific camera.
- Follow all grounding for the camera housings and mounts per the installation manual.

## 7 Preparing the bubble

### Bubble Handling

The bubble may be packaged with a protective plastic sheet. It is recommended that the bubble remain stored this way until it is ready to install. Limit handling the bubble, as any scratches can quickly affect visibility.

### After you remove the bubble

- ▶ Visually examine the inner and the external surfaces of the bubble for debris, dirt, or residue. If you must clean the bubble, refer to the steps that follow for instructions.



### Notice!

Risk of damage to the bubble

Handle the bubble with care. Do not scratch the inside of the bubble which doesn't have a hard coating.



### Notice!

To avoid excessive moisture saturation inside the housing, limit the amount of time that the bubble is disconnected from the housing. Bosch recommends that the bubble be removed from the housing for no more than five (5) minutes.

### Bubble Cleaning

If cleaning the bubble is required, use the following procedures and comply with all the warnings listed below.

#### Cleaning the Bubble Interior

The extremely soft interior surface should not be cleaned by rubbing or dusting with a cloth. Use clean dry compressed air, preferably from a spray can, to remove any dust from the interior surface.



### Warning!

Do not use alcohol-based solutions to clean the bubble. This will cause the surface to cloud and, over time, cause stress aging, which makes the bubble brittle.

#### Cleaning the Bubble Exterior

The exterior of the bubble is hard-coated for extra protection. If cleaning becomes necessary, only use cleaning solutions and cloths suitable for cleaning safety glass lenses. Dry the bubble thoroughly with a dry nonabrasive cloth to prevent water spots. Never scrub the bubble with any abrasive material or cleaners.

Bosch recommends cleaning the exterior of the bubble with NOVUS "No. 1" Plastic Clean & Shine (or equivalent), according to manufacturer's instructions. Refer to [www.novuspolish.com](http://www.novuspolish.com) to order or to find a local distributor.

### Cautions

- Do not clean bubbles in the hot sun or on very hot days.
- Do not use abrasive or highly alkaline cleaners on the bubble.
- Do not scrape the bubble with razor blades or other sharp instruments.
- Do not use Benzene, Gasoline, Acetone, or Carbon Tetrachloride on the bubble.

### Refer to

- *Maintenance, page 45*

## 8 (Optional) Installing an SD card



### Notice!

Risk of damage to the bubble

Handle the bubble with care. Do not scratch the inside of the bubble which doesn't have a hard coating.



### Notice!

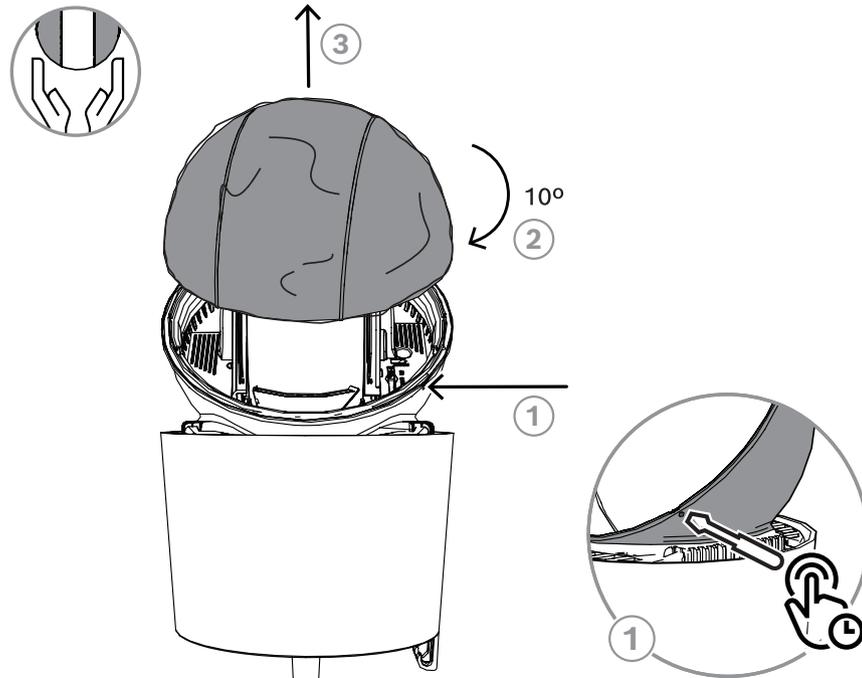
Use full size SD cards for maximum reliability. Bosch doesn't recommend the use of microSD cards or of microSD to SD adapters.



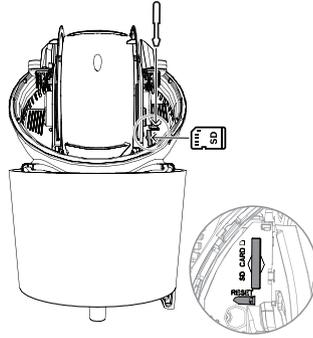
### Notice!

Before adding or removing a full size SD card from the camera, disconnect all power sources (including PoE) from the device.

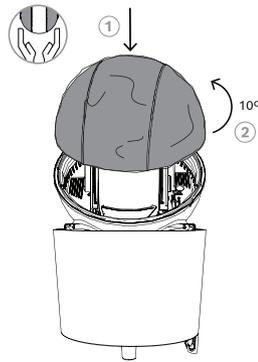
1. Disconnect power to the camera while adding or removing an **SD** card.
2. Push the compliant beam using a small tool (less than 3 mm) through the hole on the tilt body. Note: The mentioned tool is not included.
3. Hold and twist on the space on the camera that releases the latch to hold the bubble to the housing until the bubble starts to rotate, as in number one in the graphic that follows.
4. Turn the bubble clockwise 10 degrees while pressing the tool against the button.
5. Remove the tool once bubble starts to rotate.
6. Lift the bubble off the camera.



7. Insert the card into the slot. Note: Do not force the card into the slot. If the card isn't going in, it may be backwards.
8. Using a flathead screwdriver, push down on the SD card until it locks into position.



9. Replace the bubble.
10. Turn the bubble counterclockwise 10 degrees until it locks into position.



## 9 Installing a pendant arm mount

**Notice!**

Risk of water ingress

If you:

- remove a camera from its mount but do not replace it promptly, or
  - install the mount but do not install the camera immediately,
- then you must remove the PCB from the mount to avoid moisture or water ingress and potential corrosion.

**Notice!**

Risk of damage to the camera

When you install the camera, you must attach the camera to the mount and tighten all screws before you apply power (PoE and/or 24 VAC +/- 10%/ 36 VDC +/- 10%) to the mount (pendant arm mount or pipe mount).

When you want to disconnect a camera from the mount, you must disconnect all live power (PoE and/or 24 VAC +/- 10%/ 36 VDC +/- 10%) from the mount before you remove the camera from the mount.

**Notice!**

Risk of permanent damage to the camera

The interface board connects only one way to the camera. Make sure that when you install it in the mount (arm or pipe mount), you install it the correct way.

**Notice!**

Risk of permanent damage to the camera

The interface board connects only one way to the camera. Make sure that when you install it in the mount (arm or pipe mount), you install it the correct way.

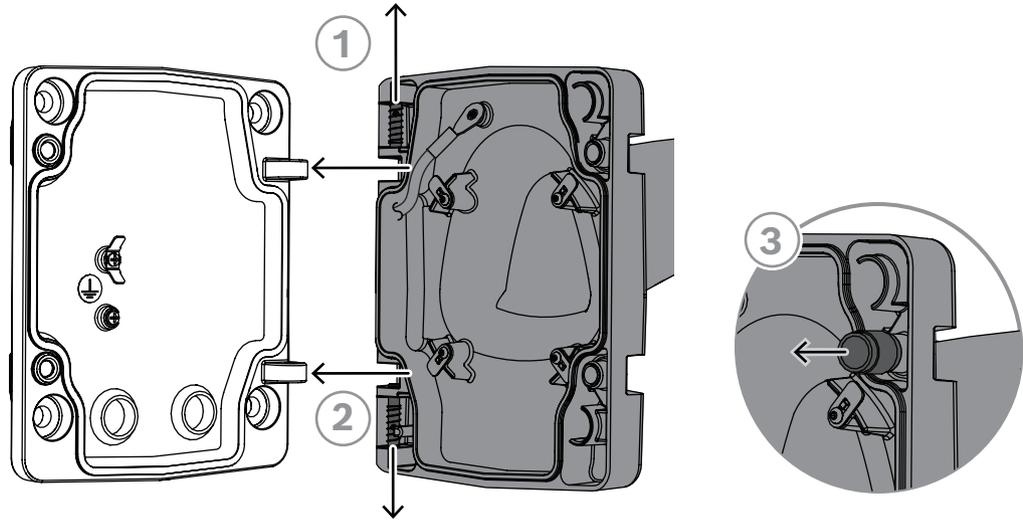
**Notice!**

Risk of leakage

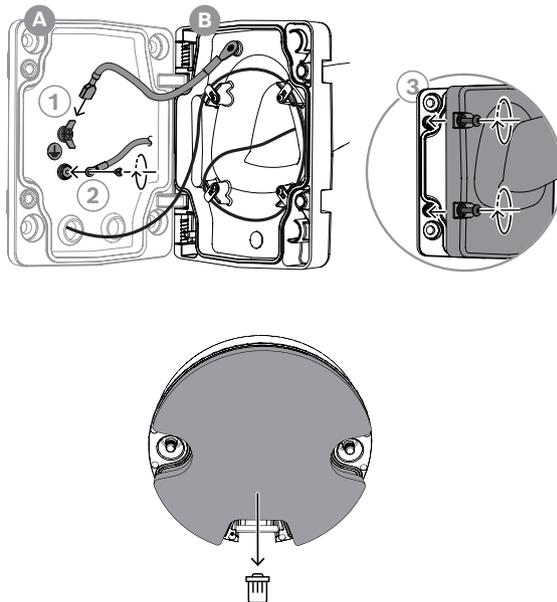
When you place back the top cap of the wall arm, make sure the safety tether is attached and well placed inside the product. For the product to be fully IP66, the tether needs to be completely placed inside.

**To the NDA-PEND-WPLATE mounting plate:**

1. Connect the NDA-PEND-WPLATE mounting plate to the back of the pendant arm, as in the figure that follows.
2. Remove the two (2) pieces of protective plastic at the outer edges of the mount. Note: Liquid tight electrically grounded conduit must be used so that the IP66 rating is maintained, and the metal conduit is electrically connected to the NDA-PEND-WPLATE.



3. Put the appropriate cables for power, video, alarms, and audio through one of the access holes in the wall mounting plate. Note: Use of proper grommets is needed, to guarantee IP66.
4. Use a Torx wrench to install a grounding screw on the grounding connection point on the wall mount plate, then connect the ground wire, as in the figure that follows.
5. Tighten the screws to 10-12 Nm.



6. Make the appropriate connections for PoE, 24VAC +/- 10%/36VDC +/- 10%, alarms, audio. Note: If you connect fiber to the camera, then connect only 24VAC +/- 10% or 36VDC +/- 10% power input to the camera. Do not connect PoE.

**For audio and/or alarm inputs/outputs (I/O):**

1. On the mount on the camera side, connect the drain wire of the Belden cable (or similar cable) to chassis ground and grounded metal box.

**Notice!**

Notice

Use shielded twisted pair wire for all the connections such as a Belden cable with a foil shield:

One shielded cable for:

- 24VAC or 36VDC and GND

2nd shielded cable for

- ALARM1 and DGND

- ALARM 2 and DGND

- RELAY-NO and RELAY-COM

- RELAY-NC and RELAY-COM

- AUDIO-IN+ and AUDIO-IN-

- AUDIO-OUT+ and AUDIO-OUT-



**Notice!**

Notice

The foil shield of the above two cables should be connected to the chassis ground



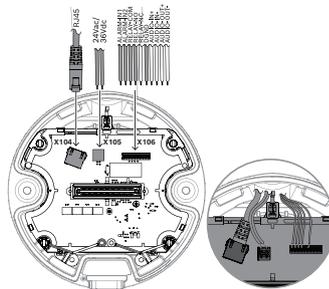
**Notice!**

Notice

The Ethernet cable should be CAT 5E, CAT 6 or better.



2. Connect the other end of the drain wire to a grounded metal box that supports electrically grounded conduit.



**Notice!**

The following type of CAT 5E, CAT 6 or better Ethernet cable should be used:

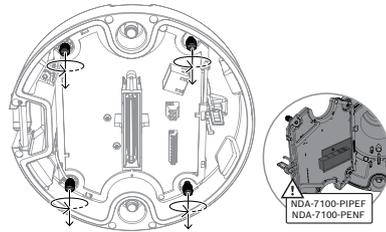
F/UTP overall screened cable with unscreened twisted pairs (often referred to as FTP),

S/UTP overall braided shield with unscreened twisted pairs (often referred to as STP),

or with better shielding, and that meets the minimum bend radius of 30mm, and maximum diameter of 0.24”(6mm).



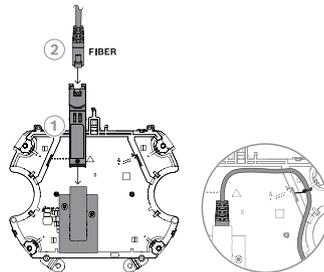
3. If you do not install fiber, skip to step 16.  
To install fiber, complete the 8 steps that follow.
4. Remove the three (3) screws from the top cap to access the fiber connection.
5. Pull the top cap off the mount.



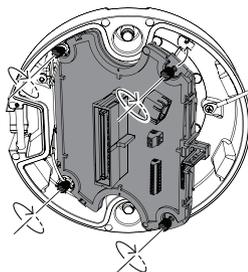
6. Install the SFP module into the fiber port on the top of the mount. Push the SFP module into the port until you hear the catch engage.  
Note: Ethernet communication is disabled when an SFP module is plugged into a fiber mount (NDA-7100-PENF, or NDA-7100-PIPEF).
7. Connect fiber optic cable to the SFP module.

**Notice!**

Hotplugging is not allowed for SFP fiber module. Power must be removed from the camera before plugging in an SFP module.



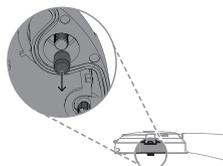
8. Put the top cap onto the mount.
9. Put the three (3) screws back into the top cap.
10. Tighten the screws.

**Notice!**

Risk of permanent damage to the camera

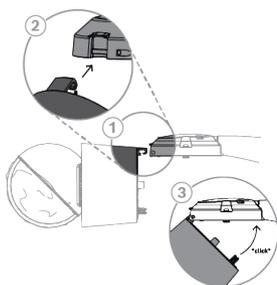
The interface board connects only one way to the camera. Make sure that when you install it in the mount (arm or pipe mount), you install it in the correct way like shown in the above picture.

11. Remove the protective caps, as in the figure that follows.



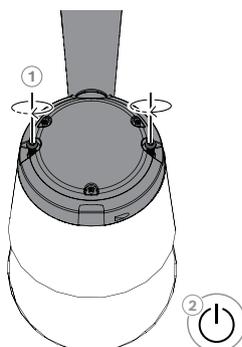
12. Attach the hook of the camera to the pin on the mount.

13. Tilt the camera until you connect the camera to the mount.

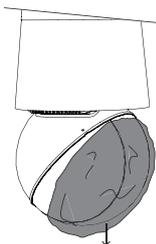


14. Tighten the screws to 10-12 Nm.

15. Apply power.



16. Remove the protective plastic sheet from the bubble. Installation is complete.



## 10 Installing a pipe mount

---

**Notice!**

Risk of water ingress

If you:

- remove a camera from its mount but do not replace it promptly, or
  - install the mount but do not install the camera immediately,
- then you must remove the PCB from the mount to avoid moisture or water ingress and potential corrosion.
- 

**Notice!**

Risk of damage to the camera

When you install the camera, you must attach the camera to the mount and tighten all screws before you apply power (PoE and/or 24 VAC +/- 10%/ 36 VDC +/- 10%) to the mount (pendant arm mount or pipe mount).

When you want to disconnect a camera from the mount, you must disconnect all live power (PoE and/or 24 VAC +/- 10%/ 36 VDC +/- 10%) from the mount before you remove the camera from the mount.

---

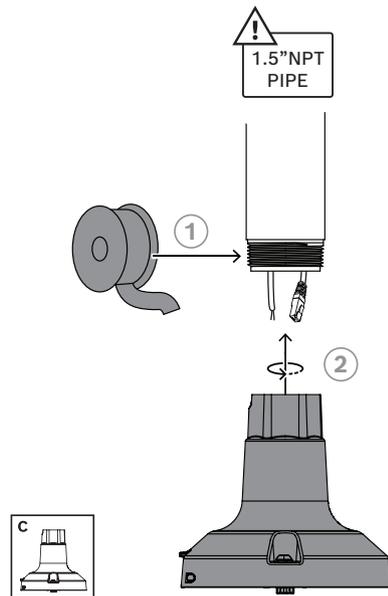
**Notice!**

Risk of permanent damage to the camera

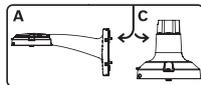
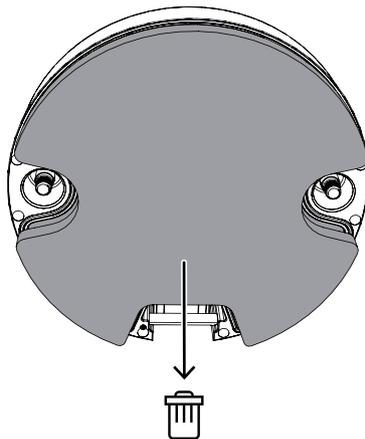
The interface board connects only one way to the camera. Make sure that when you install it in the mount (arm or pipe mount), you install it the correct way.

---

1. To make a watertight seal, wrap PTFE tape (user-supplied) four times around the threads at the end of the mount.



2. Put the appropriate cables for power, video, alarms, and audio through one of the access holes in the wall mounting plate. Note: Use of proper grommets is needed, to guarantee IP66.

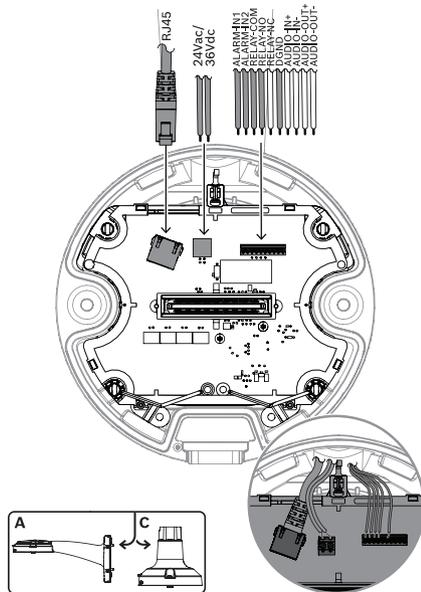


3. Make the appropriate connections for PoE, 24VAC +/- 10%/36VDC +/- 10%, alarms, audio. Note: Add a tie wrap between the Ethernet cable and 24VAC +/- 10%/36VDC +/- 10% wires to prevent the black plastic hook pressing the sun shield.

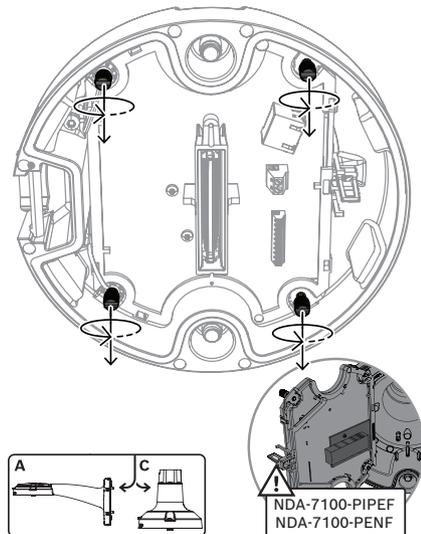
If you connect fiber to the camera, then connect only 24VAC +/- 10% or 36VDC +/- 10% power input to the camera. Do not connect PoE.

For audio and/or alarm inputs/outputs (I/O):

1. On the mount on the camera side, connect the drain wire of the Belden cable (or similar cable) to chassis ground and grounded metal box.
2. Connect the other end of the drain wire to a grounded metal box that supports electrically grounded conduit.



3. If you do not install fiber, skip to step 16.  
To install fiber, complete the 8 steps that follow.
4. Remove the screws from the bottom of the pipe mount.

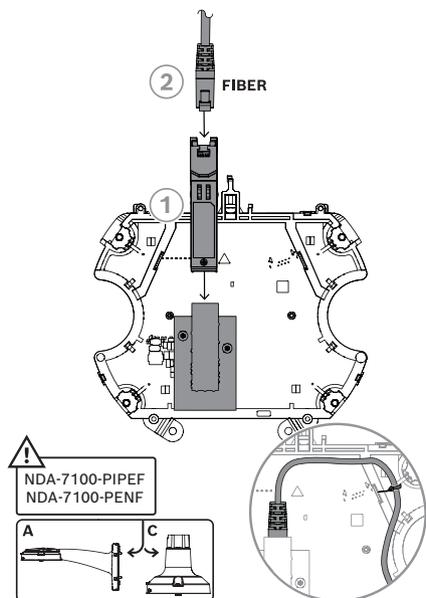


5. Install the SFP module into the fiber port in the mount. Push the SFP module into the port until you hear the catch engage. Note: Ethernet communication is disabled when an SFP module is installed in a fiber mount (NDA-7100-PENF, or NDA-7100-PIPEF).
6. Connect fiber optic cable to the SFP module.

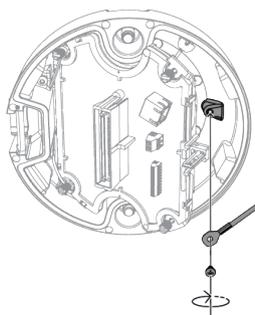


**Notice!**

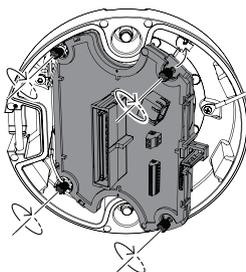
Hotplugging is not allowed for SFP fiber module. Power must be removed from the camera before plugging in an SFP module.



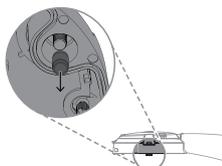
7. Use a Torx wrench to install a grounding screw (user-supplied) on the grounding connection point on the bottom of the pipe mount, as in the figure that follows.



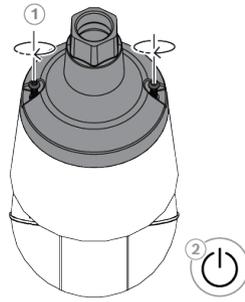
8. Tighten the screws.



9. Remove the protective caps, as in the figure that follows.



10. Attach the hook of the camera to the pin on the mount.
11. Tilt the camera until you connect the camera to the mount.
12. Tighten the top cap screws.
13. Tighten the screws to 10-12 Nm.
14. Apply power.



15. Remove the protective plastic sheet from the bubble. Installation is complete.

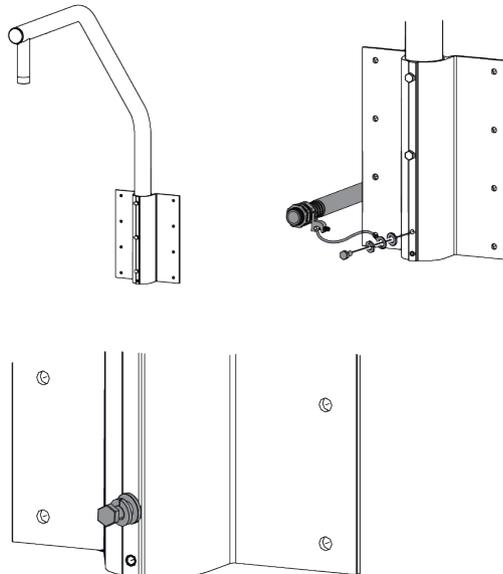


## 10.1

### Installing a pipe mount onto a NDA-U-RMT with grounded conduit

Note: When installing the NDA-U-RMT mount, electrically grounded, liquid tight metal conduit must be used with extra grounding.

1. Make ground wire using a 12 AWG stranded wire that is soldered to a 3/8" ring terminal on one end and is bare copper on the other end. Note: The length of the wire should be 15 to 20 cms (5.9 to 7.9") long.
2. Add the 3/8" flat washer, ring terminal of the custom ground wire and the 3/8" split washer to the bottom most bolt on the NDA-U-RMT.



3. Pull all the wires that need to connect to the AUTODOME through the NDA-U-RMT pipe and then through 3/4" electrically conductive, liquid tight metal conduit. Note: To minimize the amount of unprotected cables, make sure the conduit is 5 to 10 cm (2 to 3.9") from the open end of the pipe at the bottom of the NDA-U-RMT.
4. Add a liquid tight, 3/4" metal conduit adapter fitting with a grounding lug to the end of the grounded conduit near the NDA-U-RMT.

5. Add a cable gland to seal around all the cables that exit the grounded conduit and enter the open pipe at the bottom of the NDA-U-RMT.
6. Seal the bottom of the NDA-U-RMT pipe around the cables as liquid tight as possible.
7. Attach the bare copper end of the ground wire to the grounding lug on the conduit fitting adapter
8. Unscrew the bolt at the bottom of the NDA-U-RMT and add the 3/8" washer and the 3/8" ring terminal on the ground wire.
9. Make sure there is a low resistance measurement between the metal of the bolt head and the grounded metal conduit so that the electrical ground is connected between the NDA-U-RMT and the grounded metal conduit.
10. Make sure the installation is liquid tight.

**Notice!**

Do not rely on the ground wire to support the weight of the grounded conduit  
Use a separate mounting hardware that supports the grounded conduit.

# 11

## Connection

### 11.1

### Connecting the AUTODOME camera to the PC

**Note:** For simplicity, the graphic in this section is only of the camera. The graphic does not depict a mount that you may have installed already.

**Note:** Consult the National Electrical Code (NEC) or other regional standards for cable bundling requirements and limitations.

Note: the non IR camera model requires IEEE 802.3bt Type 3 (60W). The IR camera models require IEEE 802.3bt Type 4 (90W).

The camera connects to a network either directly or through a hub. Video, optional audio input, optional audio output, and control are transmitted over a standard TCP/IP network using the built-in Web server. In addition, power can be supplied over the Ethernet cable using a midspan from Bosch (IEEE 802.3bt Type 3/4 (60W/90W)) (sold separately). Power can also be supplied over the Ethernet cable and using PoE+ PSEs (midspans or switches) compliant with the IEEE 802.3bt, Type 3/4 (60W/90W) standard.

**24 VAC / 36 VDC power source:** This unit is intended to operate at 24 VAC or 36 VDC (if PoE is not available or if redundant power operation is desired). User-supplied wiring must be in compliance with electrical codes (Class 2 power levels).

**PoE:** Use only approved PoE (IEEE 802.3bt, Type 3/4 (60W/90W)) devices. Power-over-Ethernet can be connected at the same time as a 24 VAC / 36 VDC power supply. If auxiliary power (24 VAC / 36 VDC) and PoE are applied simultaneously, the camera selects PoE and stops auxiliary input.



#### Warning!

Use only approved PoE devices that meet the IEEE 802.3bt, Type3/4 (60W/90W) standard. Use only approved PoE devices to provide power to the camera, if not using 24 VAC. When powering the camera via PoE or a midspan device, additional surge suppression is required. Use only IEEE 802.3bt, Type 3/4 (60W/90W) devices that support electrically grounded conduit with liquid tight seals unless the midspan is included in a electrically grounded cabinet that supports this capability.

- ▶ Install the camera according to the instructions in the appropriate Installation section of this manual.

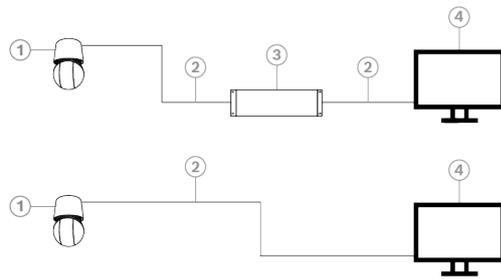


#### Caution!

Cat5e/Cat6 shielded Ethernet cables must be routed through earth-grounded, liquid-tight conduit capable of withstanding the outdoor environment.

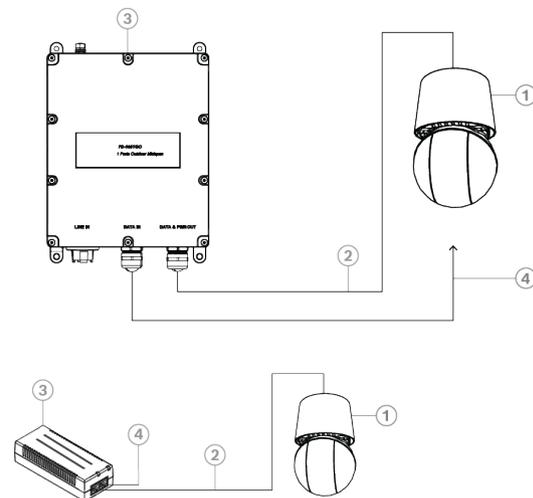
- ▶ Connect an Ethernet cable from the RJ45 connector on the camera to any of the following:
  - a dedicated IEEE 802.3 1000Base-T, or 100Base-TX Ethernet network switch, and then connect the dedicated network switch to the RJ45 connector on the PC, to bypass the Local Area Network (LAN). (See the top graphic in the first figure that follows.)
  - a PC, using an Ethernet crossover cable with RJ45 connectors. (See the bottom graphic in the first figure that follows.)
  - a midspan from Bosch that meets the IEEE 802.3bt, Type 3/4 (60W/90W) standard (See the second figure that follows.)

Note: midspans from Bosch with IEEE 802.3at or IEEE 802.3af are **not** compatible.)



**Figure 11.1:** System Configuration with AUTODOME camera

1	AUTODOME camera
2	IP Connection
3	Network Switch
4	Computer

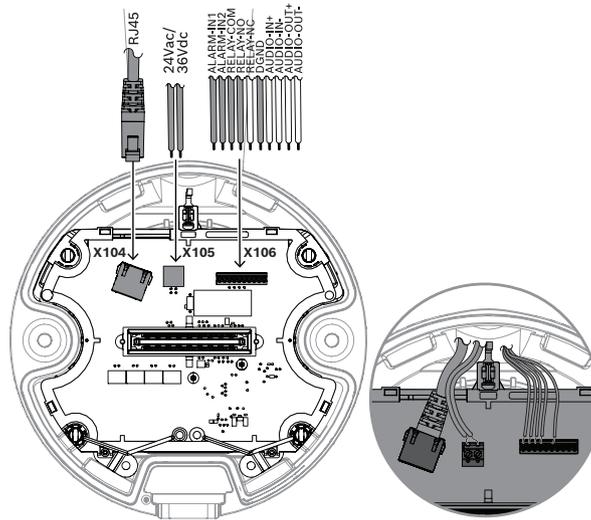


**Figure 11.2:** System Configuration: AUTODOME 7100i camera to midspan

1	AUTODOME camera
2	Midspan DATA & PWR OUT
3	IEEE 802.3bt Type 3/4 (60W/90W) midspan
4	Midspan DATA IN (to Ethernet switch or test PC)

## 11.2 Connecting 24 VAC / 36 VDC Power

Connect 24VAC +/- 10%, 50/60Hz or 36VDC +/- 10% to Connector X105 pins 1 and 2 as in the figure that follows.



X105 Connector	24 VAC Application	36 VDC Application
Pin 1	24 VAC Line	36VDC (+)
Pin 2	24 VAC Neutral	36VDC (-)

Note: The AUTODOME camera will generally work with either polarity of 24VAC line/neutral, and 36VDC (+) and 36VDC (-) as long as these lines are not connected to more than one AUTODOME camera.



### Caution!

Compliance with EN50130-4 Alarm Standard - CCTV for Security Applications

To meet the requirements of the EN50130-4 Alarm Standard, an ancillary uninterruptable power (UPS) supply is necessary. The UPS must have a **Transfer Time** between 2-6 ms and a **Backup Runtime** of greater than 5 seconds for the power level as specified on the product datasheet.

The following wire gauges and lengths are recommended for the power connection in the AUTODOME camera.

Wire size		24 VAC		36 VDC	
AWG	mm	Meters	Feet	Meters	Feet
14	1.63	40	131	138	452
16	1.29	25	82	86	282
18	1.02	15	49	54	177

**Table 11.1:** Wire gauge and maximum distance, 24 VAC, 36 VDC (2MP non-IR model)

Wire size		24 VAC		36 VDC	
AWG	mm	Meters	Feet	Meters	Feet
14	1.63	27	89	97	318
16	1.29	17	56	60	197
18	1.02	10	33	38	125

**Table 11.2:** Wire gauge and maximum distance, IR models

## 11.3

### Recommendations for third-party IEEE 802.3bt PoE Power Supply

Bosch recommends the use of one of the IEEE 802.3bt Type 3 (60W) midspans for use with the non-IR AUTODOME camera model and one of the IEEE 802.3bt Type 4 (90W) midspans for use with the AUTODOME IR camera models. By using them, you make sure to meet all AUTODOME specifications and access to all features.

In general, you can use a third-party IEEE 802.3bt Type 3 (60W) compliant midspan or PSE with the non-IR AUTODOME camera model and a third-party IEEE 802.3bt Type 4 (90W) compliant midspan or PSE with the AUTODOME IR camera models, as long as it meets the power requirements as in the table that follows.

Model	Minimum current output required (Amps)			Minimum power output required (Watts)		
	24 VAC, 50/60 Hz	PoE 54 VDC	36 VDC	24 VAC, 50/60 Hz (PF = 0.6)	PoE 54 VDC	36 VDC
2MP (non-IR)	3	0.9	1.3	43.2	48.6	46.8
2MP IR, 4K IR	4.5	1.2	1.85	64.8	64.8	66.6

It must be a UL Class 2 Power supply in an electrically Earth-grounded metal box with a liquid-tight, electrically grounded metal conduit that is connected between the box and the AUTODOME camera.

The power redundancy feature is only guaranteed to work with the Bosch supplied midspans mentioned on the AUTODOME camera datasheet since it depends on other power supply features beyond the IEEE 802.3bt standard.

It is recommended that any third-party IEEE 802.3bt midspan support a retry feature if there is a momentary over-current.

## 11.4 Recommendations for 24 VAC Power Supply

Bosch does not offer a 24VAC power supply accessory with enough power for the AUTODOME camera.

A 24VAC, 50/60Hz power supply must meet the following requirements to be used with the AUTODOME camera.

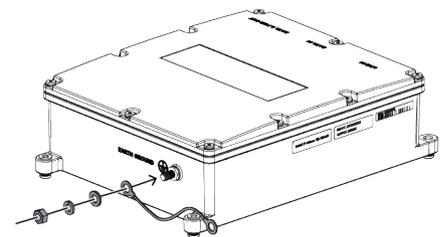
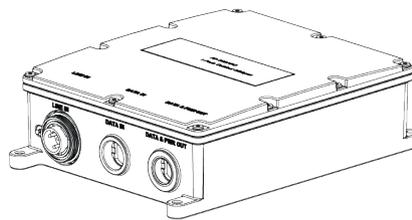
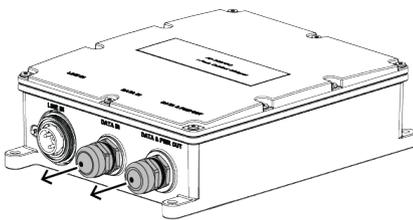
The power supply must provide 24VAC +/-10% voltage at the camera after any voltage drop across the cable, and for the following current and power loads as in the table that follows.

Model	Minimum current output required (Amps)			Minimum power output required (Watts)		
	24 VAC, 50/60 Hz	PoE 54 VDC	36 VDC	24 VAC, 50/60 Hz (PF = 0.6)	PoE 54 VDC	36 VDC
2MP (non-IR)	3	0.9	1.3	43.2	48.6	46.8
2MP IR, 4K IR	4.5	1.2	1.85	64.8	64.8	66.6

It must be a UL Class 2 Power supply in an electrically Earth-grounded metal box with a liquid-tight, electrically grounded metal conduit that is connected between the box and the AUTODOME camera.

## 11.5 Connecting liquid tight, electrically grounded metal conduit to Bosch Outdoor Midspans

1. Unscrew and remove the fittings from the DATA & PWR OUT and DATA IN ports of the Bosch Outdoor midspan.
2. Find electrically conductive liquid tight metal conduit with PG16 threads to screw into the two holes, or find an appropriate liquid tight fitting to adapt a PG16 male thread to the conduit of your choice such as ½ " NPT while maintaining its IP rating.
3. Add 4 wraps of PTFE tape to the threads to ensure IP66.
4. Connect the braided ground wire on the metal housing of the outdoor midspan to earth ground of the system installation.



## 11.6 (Optional) Support for Fiber optic cable installation

The AUTODOME camera supports 1Gbps fiber optic cable output using 1.25Gbps Small Form-factor Pluggable (SFP) modules, when used with either the NDA-7100-PENF or the NDA-7100-PIPEF mount.

The following requirements to the system apply when using fiber optics:

- The NDA-7100-PENF or NDA-7100-PIPEF mounts must be used.
- Only 24VAC or 36VDC power are supported. PoE is not supported.
- Only 1.25Gbps SFP modules are supported.
- The SFP modules and media converter must meet the requirements that follow:
  - When using the NDA-7100-PIPEF, refer to see the figure that follow to see how to route the fiber optic cable to minimize the risk of bending the fiber too tightly and possibly damaging it.
  - SFP modules cannot be hot plugged. The power to the AUTODOME and NDA-7100-PENF and NDA-7100-PIPEF mounts must be removed before installing or removing an SFP module.

**Warning!**

The AUTODOME camera does not support BOSCH 100Mbps SFP fiber modules.

---

**Warning!**

If an SFP module is added to the NDA-7100-PENF or NDA-7100-PIPEF mount and connected to an AUTODOME camera, the Ethernet port in the camera will automatically be disabled, even if no fiber is connected to the SFP module.

---

**Warning!**

SFP modules cannot be hot plugged. The power to the AUTODOME camera and NDA-7100-PENF and NDA-7100-PIPEF mounts must be removed before installing or removing an SFP module.

---

Note: 24VAC or 36VDC power must be used when using the fiber optic interface.

Requirements for the SFP modules and Media converter:

- Must use 1.25GBps SFP modules.
- Ensure the SFP modules on both sides of the fiber optic line are compatible, and it is recommended that they be the same brand and model.
- Ensure the fiber optic cable used is compatible with the SFP modules - single-mode fiber (SMF) or multi-mode fiber (MMF) and wavelength compatible.
- Ensure that the media converter which converts fiber back to Ethernet supports the SFP module and fiber optic cable type used.
- The SFP module should support an operational (case) temperature of at least +85°C
- The SFP should comply to the SFP Multi-Source Agreement (MSA)

Note: The length of the fiber optic cable used to be determined from the specifications of the chosen SFP modules, fiber optic cables and media converter.

## 11.7 Connecting the Alarm Inputs and Alarm Relay Output

The Alarm Inputs and Alarm Output lines should use twisted pair wires with a foil shield where the drain wire of the foil shield is connected to the chassis/housing ground in the mount (NDA-7100-PIPE, NDA-7100-PIPEF, NDA-7100-PEN, NDA-7100-PENF) as described below.

- ALARM Input 1 (X106.10) should be twisted with DGND (X106.5)
- ALARM Input 2 (X106.9) should be twisted with DGND (X106.5)
- RELAY-NC (X106.6), or RELAY-NO (X106.7) should be twisted with RELAY-COM (X106.8)

To connect the drain wire of the foil shield of the alarm input and alarm outputs shielded twisted pair cables to the chassis ground of the NDA-7100-PIPE or NDA-7100-PIPEF mount:

To connect the drain wire of the foil shield of the alarm input and alarm outputs, and audio input and output twisted pair cables to the chassis ground of the NDA-7100-PEN, , NDA-7100-PENF, or NDA-7100-PIPEF mounts:

Wire size		Alarm inputs - Maximum distance		Alarm output - Maximum distance	
AWG	mm	Meters	Feet	Meters	Feet
22	0.643	152.4	500	N/A at maximum current	N/A at maximum current
20	0.811	243.8	800	18	72

These numbers assume maximum relay load. If switching less than this, re-calculate with the exact switching load for your particular use case to increase the allowed distances.

**Table 11.3:** Wire gauge and maximum distance, alarm inputs and outputs (2MP model)

Note: Install all Alarm and Audio Equipment in a liquid-tight, metal enclosure that supports liquid-tight, electrically grounded metal conduit.

## 11.8 Connecting the Audio Input and Output Wires

Wire Specifications

Wire Type	Shielded twisted pair (recommended)
Distance	Typically 10 m (33 ft), but depends on the signal level, noise and quality of audio required
Gage	Typically 22 AWG to connector (X106)
Shield	Bare copper braid: 95% coverage
Twisted pair wires	Stranded bare copper. Connect to AUTODOME metal chassis ground

# 12

## Troubleshooting

### Table of Troubleshooting Issues

The table below identifies issues that could occur with the camera, and how to resolve them.

Problem	Questions to Ask/Actions to Resolve the Problem
No camera control, but there is a web page and video.	<ul style="list-style-type: none"> <li>- Ensure that the LAN cable has good connection and is secured.</li> <li>- Refresh the browser and ensure that video is updated.</li> <li>- Issue a soft reset through the menus (In the camera WebGUI: Configuration, Camera, Installer Menu, Reboot Device).</li> <li>- If using PoE, check that the PoE midspan or PSE Ethernet switch support IEEE 802.3bt Type 3 (60W) for Non-IR AUTODOME models, and IEEE 802.3bt Type 4 (90W) for IR AUTODOME models. If a non-compliant midspan is used it may not be able to provide adequate power for the AUTODOME and some features like motor control may be disabled.</li> <li>- Cycle the camera's power off and on.</li> </ul>
No video, but there is a web page displayed.	<ul style="list-style-type: none"> <li>- Refresh the web browser.</li> <li>- Close and reopen the web browser.</li> <li>- Try a different web browser.</li> <li>- Check that the lens IRIS isn't closed down all the way by manually attempting to open it.</li> <li>- If there is no STREAM1 or STREAM2 display check to see if there is a M-JPEG display. If there is M-JPEG but not a STREAM1 or STREAM2 display in H.264 or H.265 then the problem might be with the BOSCH VideoSDK software version.</li> <li>- Check that there is adequate light in the video scene. If it is an IR model make sure that the illuminator is turned on.</li> </ul>
Video is rolling, noisy, or distorted.	<ul style="list-style-type: none"> <li>- Check the integrity of all connectors and splices of the Ethernet cable.</li> <li>-Reset the camera to factory defaults to ensure that the camera settings are not corrupted (In the camera WebGUI: Configuration, Camera, Installer menu, Factory Defaults).</li> </ul> <p><b>If O.K., then:</b></p> <ul style="list-style-type: none"> <li>- Contact Bosch Technical Support.</li> </ul>
Camera moves when attempting to move other cameras.	<ul style="list-style-type: none"> <li>- Check that the camera's IP address is properly set.</li> </ul> <p><b>If camera's IP address is not set, then:</b></p> <ul style="list-style-type: none"> <li>- Use Configuration Manager to confirm that two cameras do not have the same IP address. If they do, change the address of one of the cameras.</li> </ul>

Problem	Questions to Ask/Actions to Resolve the Problem
No Network Connection.	<p><b>If Ethernet output is used:</b></p> <ul style="list-style-type: none"> <li>- If using an NDA-7100-PENF or NDA-7100-PIPEF mount, check that an SFP module isn't plugged into the mount since that will disable Ethernet even if a fiber optic cable isn't connected to it.</li> <li>- Check all network connections including any connections through Ethernet couplers.</li> <li>- Ensure that the maximum distance between any two Ethernet connections is 100 m (328 ft) or less.</li> <li>- Check the LINK and transmission LEDs on any Ethernet switch used.</li> </ul> <p><b>If O.K., then:</b></p> <ul style="list-style-type: none"> <li>- If you are behind a firewall, ensure that the Video Transmission mode is set to UDP.</li> <li>- Try to power off then power on the camera.</li> <li>- Trying pressing the Factory Default button.</li> </ul> <p><b>If Fiber optic output is used with NDA-7100-PIPEF or NDA-7100-PENF:</b></p> <ul style="list-style-type: none"> <li>- Check that a BOSCH 100Mbps SFP module isn't being used since it is not supported.</li> <li>- Check that the SFP module supports 1.25Gbps.</li> <li>- Check compatibility between the SFP modules on both sides of the fiber optic, to the fiber optic cable type, and to the media converter.</li> <li>- Check that the fiber optic cable is plugged into the SFP module on both sides of the network.</li> <li>- Check that the fiber optic cable is not damaged and is terminated properly.</li> <li>- Check that there is a fiber link on the media converter.</li> <li>- Ensure that the fiber optic cable distance specified by the SFP modules used hasn't been exceeded.</li> <li>- Cycle the camera's power off and on.</li> <li>- Cycle the media converters power off and on.</li> </ul>
Camera does not operate at all, or does not operate as expected, after being subjected to extreme low temperatures (below -40 ° (-40 °F)).	<ul style="list-style-type: none"> <li>- The AUTODOME cold start temperature is -35°C (-31°F). If it is colder than this outside, then warm-up the camera inside at a temperature of -35°C (-31°F) or higher and while it is still warm install it outside and power it up.</li> <li>- If the temperature is -35°C (-31°F) or warmer, then allow the camera to warm up. The camera requires a 60-minute warm-up prior to PTZ operations.</li> <li>- If camera does not operate after this warm-up period, then reset the camera. In the URL line of your web browser, type "/reset" at the end of the IP address of the camera.</li> </ul>

Camera reboots frequently or intermittently	Your camera has an improper network connection. Test your camera with another power supply. Check the Bosch website for a software update that might address the issue.
---	---

## 12.1 Rebooting the unit

### Reboot the unit

After a Factory Default or firmware update, reboot the unit if:

- You cannot connect to the unit in the Web browser.

OR

- Configuration Manager or BVMS or similar software identifies the unit as “Videojet Generic”.

- ▶ Reboot the unit using one of the following methods:

- In the web browser, type the IP address and then */reset* (without any punctuation). Press the **Enter** key.

OR

- In Configuration Manager, right-click the IP address and click **Restart**.

- ▶ Wait two minutes for the process to complete.

If you cannot control the unit after the firmware upgrade, then cycle the power to the unit. If a power reset does not solve the problem, or if Configuration or video management software identifies the unit as “Videojet Generic,” then contact your Bosch Service Center for an RMA for the unit.

## 13 Maintenance

All bubbles require special care when handling and cleaning to avoid scratches.

**Notice!**

Risk of damage to the bubble

Handle the bubble with care. Do not scratch the inside of the bubble which doesn't have a hard coating.

**Notice!**

To avoid excessive moisture saturation inside the housing, limit the amount of time that the bubble is disconnected from the housing. Bosch recommends that the bubble be removed from the housing for no more than five (5) minutes.

**Bubble Handling**

The bubble may be packaged with a protective plastic sheet. It is recommended that the bubble remain stored this way until it is ready to install. Limit handling the bubble, as any scratches can quickly affect visibility.

**Bubble Cleaning**

If cleaning the bubble is required, use the following procedures and comply with all the warnings listed below.

**Cleaning the Bubble Interior**

The extremely soft interior surface should not be cleaned by rubbing or dusting with a cloth. Use clean dry compressed air, preferably from a spray can, to remove any dust from the interior surface.

**Warning!**

Do not use alcohol-based solutions to clean the bubble. This will cause the surface to cloud and, over time, cause stress aging, which makes the bubble brittle.

**Cleaning the Bubble Exterior**

The exterior of the bubble is hard-coated for extra protection. If cleaning becomes necessary, only use cleaning solutions and cloths suitable for cleaning safety glass lenses. Dry the bubble thoroughly with a dry nonabrasive cloth to prevent water spots. Never scrub the bubble with any abrasive material or cleaners.

Bosch recommends cleaning the exterior of the bubble with NOVUS "No. 1" Plastic Clean & Shine (or equivalent), according to manufacturer's instructions. Refer to [www.novuspolish.com](http://www.novuspolish.com) to order or to find a local distributor.

**Cautions**

- Do not clean bubbles in the hot sun or on very hot days.
- Do not use abrasive or highly alkaline cleaners on the bubble.
- Do not scrape the bubble with razor blades or other sharp instruments.
- Do not use Benzene, Gasoline, Acetone, or Carbon Tetrachloride on the bubble.

## 14 Technical data

For product specifications, see the datasheet for your camera, available on the appropriate product pages of the Online Product Catalog at [www.boschsecurity.com](http://www.boschsecurity.com).

# 15

## Support services and Bosch Academy



### Support

Access our **support services** at [www.boschsecurity.com/xc/en/support/](http://www.boschsecurity.com/xc/en/support/).



### Bosch Building Technologies Academy

Visit the Bosch Building Technologies Academy website and have access to **training courses**, **video tutorials** and **documents**: [www.boschsecurity.com/xc/en/support/training/](http://www.boschsecurity.com/xc/en/support/training/)









**Bosch Security Systems B.V.**

Torenallee 49

5617 BA Eindhoven

Netherlands

**[www.boschsecurity.com](http://www.boschsecurity.com)**

© Bosch Security Systems B.V., 2023

**Building solutions for a better life.**

202302272040