BOSCH

AUTODOME 7100i | AUTODOME 7100i IR

NDP-7602-Z40 | NDP-7602-Z40L | NDP-7604-Z12L | NDP-7602-Z40-CA | NDP-7602-Z40L-CA | NDP-7604-Z12L-CA
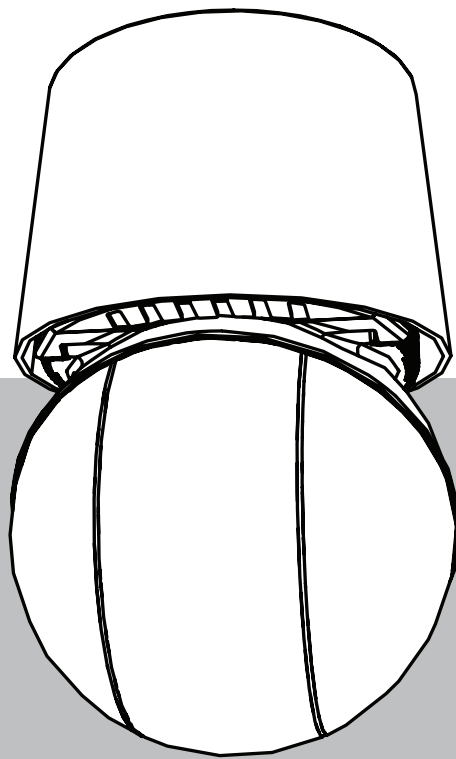
en Installation Manual

Table of contents

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 19*."

> **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.

> **(i) 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).

> **(i) 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 19*" 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 19*" 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!
i	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	PTZ 2MP HDR 40x IP66 pendant
NDP-7602-Z40L	PTZ 2MP HDR 40x IP66 pendant IR
NDP-7604-Z12L	PTZ 8MP 12x IP66 pendant IR

FCC Compliance Statement

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, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

Responsible party

Bosch Security Systems, LLC

130 Perinton Parkway

14450 Fairport, NY, USA

www.boschsecurity.us

Notice!

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to EN 55032. 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.

Canadian Compliance Statement

CAN ICES-003(A) / NMB-003(A)

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 and UL 60950-22. 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.

Old electrical and electronic equipment
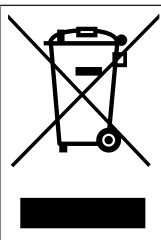
This product and/or battery must be disposed of separately from household waste. Dispose such equipment according to local laws and regulations, to allow their reuse and/or recycling. This will help in conserving resources, and in protecting human health and the environment.

1.6   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.

1.7   Important Notices - Illumination Safety

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

RISK GROUP 1
NOTICE - IR EMITTED
FROM THIS PRODUCT
REMARQUE!
GROUPE DE RISQUE 1
AVIS - IR EMIS PAR
CE PRODUIT

> **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 Hazard Distance	200 mm 279 mm	2.19	100 s	200 mm	0.386

1.8   Customer Support and Service

If this unit needs service or if you need technical support, contact Bosch Security Systems
Technical Support for instructions.

USA and Canada

Telephone: 800-289-0096, option 4

Fax: 800-315-0470

Email: 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.

2   Unpacking

–   This equipment should be unpacked and handled with care. Check the exterior of the packaging for visible damage. If an item appears 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 from 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   Additional Products Required

Quantity	Component
100 m maximum	Ethernet cable (Cat5e or better)
*	Power cable (24 VAC)
*	Alarm wiring as needed
*	Audio wiring as needed

* Refer to the chapter Preparing Wiring in the installation manual.

2.3   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)

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
Screwdriver	Install the ground screw on a pendant arm mount.	No
Ethernet cable (Cat5e, Cat6, or better)	Transmit video and data Note: Use one of the following types: – 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) – Cable with better shielding that meets the minimum bend radius of 30mm, and maximum diameter of 0.24 inches (6 mm)	No
Fiber optic cable	Transmit video and data over an extended range.	No
SFP module	Connect a fiber optic cable to the fiber port on the pendant arm mount or on the pipe mount (-F models only).	No

Tool / Accessory	Purpose	Available from Bosch?
	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. Notes: – SFP manufacturer is responsible for reaching the distance claimed for module. – SFP modules must meet the following temperature specifications that occur inside the AUTODOME 7100i mount: +85°C (+185°F) case temp.	
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

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   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 Pipe Mount by Bosch. For wiring requirements, refer to the *Connection, page 47* chapter.
2. Connect the Pipe mount to the camera. Refer to *Installing a pipe mount, page 39*.
3. Supply power to the camera and connect the camera to the computer. Refer to the *Connection, page 47* 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.

5   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.
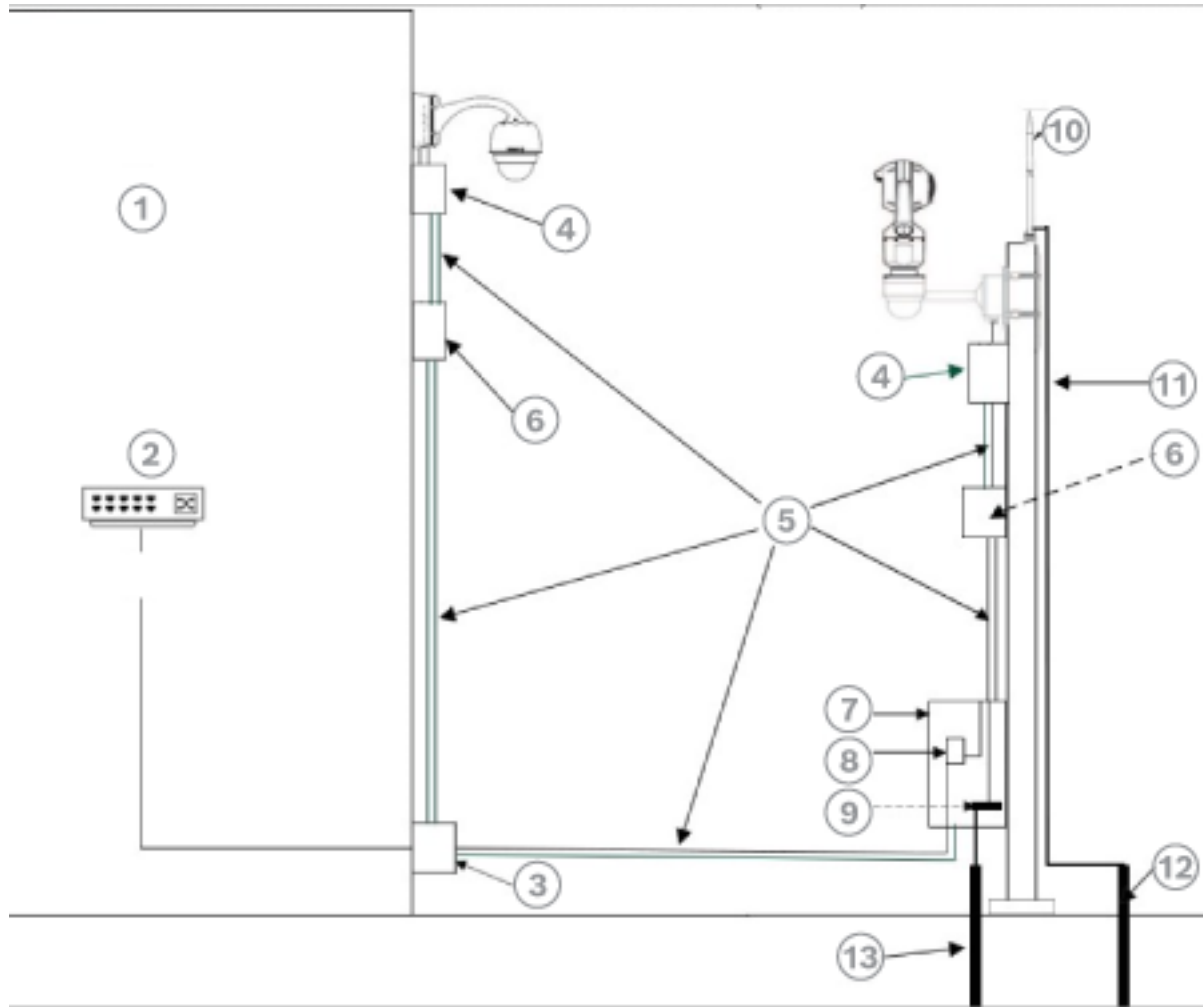

Figure 5.1: Correct outdoor installation with proper surge/lightning suppression

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 **Additional wiring guidelines**.)		
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 **Lightning rod, down conductor, and electrode**.)	11	Down Conductor (Refer to the section **Lightning rod, down conductor, and electrode**.)
12	Lightning Rod Grounding Electrode (Refer to the sections **Lightning rod, down conductor, and electrode** and **Separate grounding electrodes**.)	13	Equipment Grounding Electrode (Refer to the section **Separate grounding electrodes**.)

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.

6   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 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 81*

7   (Optional) Installing an SD card

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

|	**Notice!**
i	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.
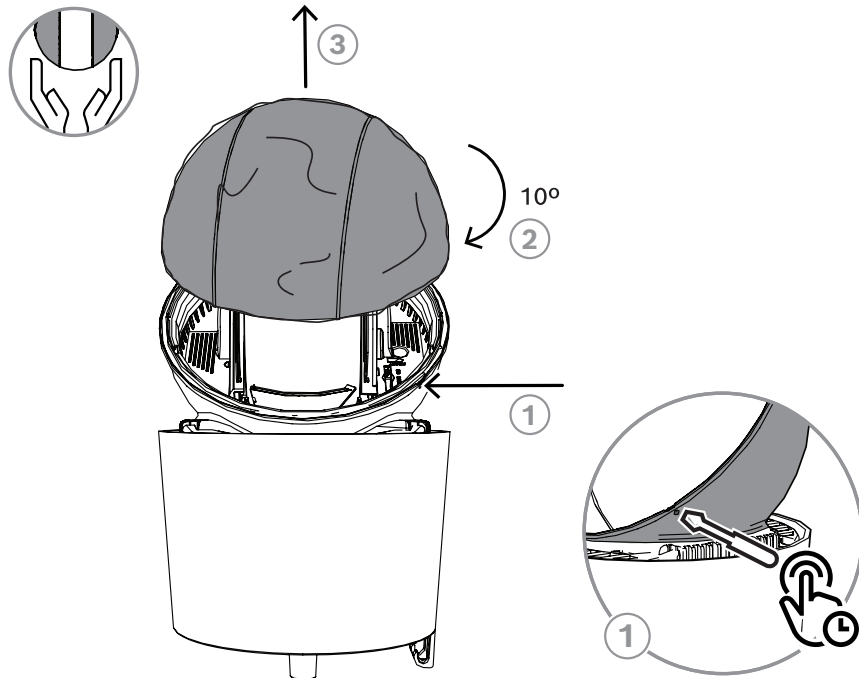
7. Insert the card into the slot. Note: Do not force the card into the slot. If the card isn't going in, it may be backwards.
8. Using a non-metal tool (not supplied) with a flat edge, push down on the SD card until it locks into position.
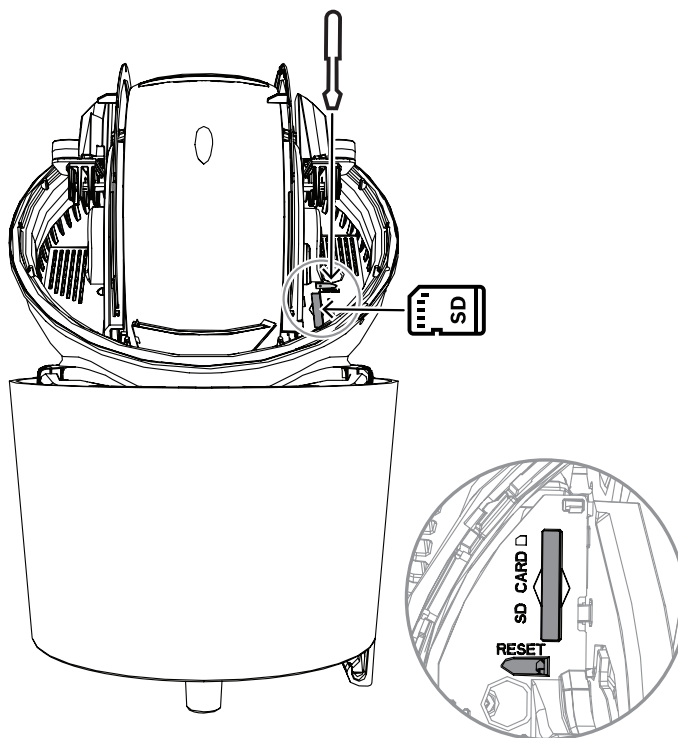
9. Replace the bubble.
10. Turn the bubble counterclockwise 10 degrees until it locks into position.
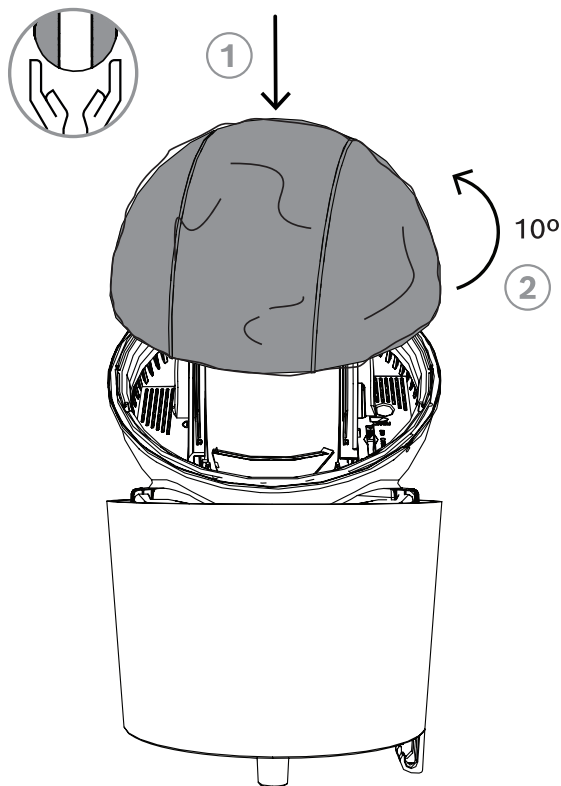
8 Installing a mount power supply box (wall, mast (pole), and corner mounts) - (for non-IR NDP-7602-Z40 camera models)

See sections Recommendations for 24VAC Power Supply and Compatible 24VAC Power Supplies

Note: Bosch Wall, mast (pole) and corner mounts are only guaranteed to work with Bosch power supplies.

Before mounting the Power Supply Box, decide if you should wire the box through the holes in the bottom or back of the box. If wiring the box through the back, move the two (2) seal plugs to the bottom through the holes before mounting.

ⓘ **Notice!**
Use ¾ inch (20 mm) NPS fittings for the holes on the bottom and back of the box. Use ½ inch
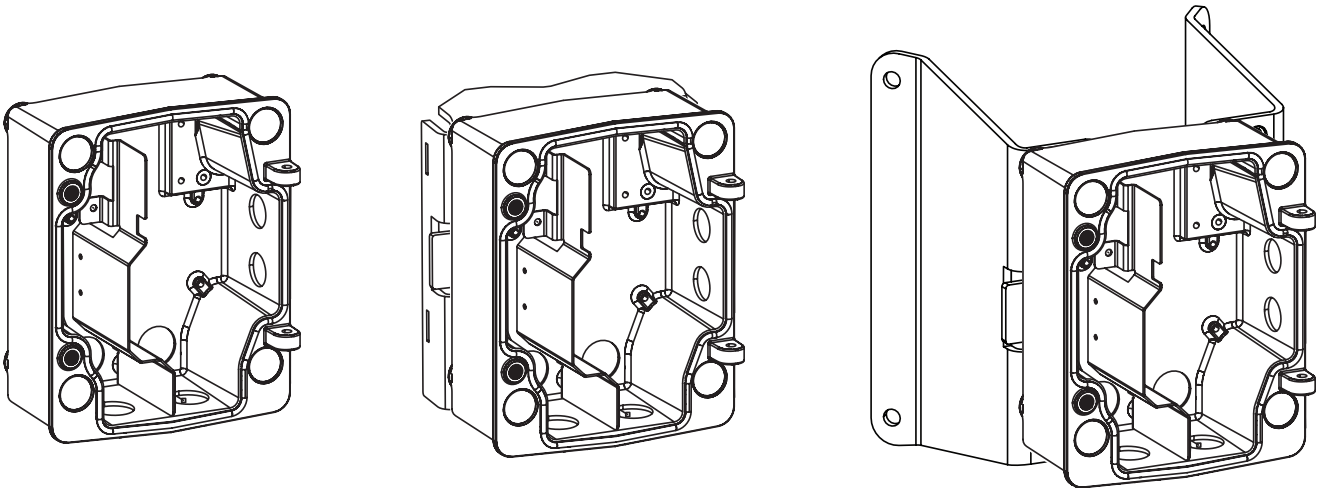(15 mm) NPS fittings for the side holes.

Figure 8.1: Power Supply Wall, Mast (pole), and Corner Mounts

1. Use the wall mount template supplied in the packaging box to locate the four (4) mounting holes for the power supply box.
2. Drill four holes for the mounting anchors. If installing outdoors, apply a weatherproof sealant around each hole at the mounting surface.

⚠ **Warning!**
A stud diameter of 6.4 mm (1/4 inch) to 8 mm (5/16 inch) able to withstand a 120 kg (265 lb) pull-out force is recommended. The mounting material must be able to withstand this pull out force. For example, 19 mm (3/4 inch) minimum for plywood.

---

3. Secure the Power Supply Box to the mounting surface.
   – For a Wall installation: Use four (4) corrosion-resistant, stainless steel studs (not supplied). Then proceed to Step 5 below.
   – For a Corner installation: Secure the Corner Plate to the wall corner using four (4) studs (not included). Then proceed to Step 5 below.

---

26 en | Installing a mount power supply box (wall, mast (pole), and corner mounts) - (for non-IR NDP-7602-Z40 camera models)

AUTODOME 7100i | AUTODOME 7100i IR

- For a Mast or a pole installation: The metal straps included with the Mast mount accommodate a pole with a diameter of 4-15 inch (100-380 mm). You must use a banding tool (sold separately) for a mast or pole installation. Follow the instructions provided with the banding tool to mount the Mast Plate to the pole. Contact your Bosch Sales Representative to order Banding Tool P/N TC9311PM3T.

4. Secure the Power Supply Box to the Corner Plate or Mast Plate using the four (4) 3/8 x1-3/4-inch bolts and split lock washers (supplied).

5. Attach 3/4-inch (20-mm) NPS watertight, earth-grounded conduit pipe fittings (not supplied) to the bottom or back holes of the Power Supply Box through which you will run the power, video, and control data wires.

⚠	**Warning!** Type and source of hazard For units intended to be installed outdoors: All wiring (power and I/O cabling) connecting to the units must be routed separately inside different permanently earthed metal conduits (not supplied).

9   Installing a pendant arm mount

i

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.

i

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.

i

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.

i

Notice!
Risk of leakage
When you put the top cap onto the mount again, make sure that the safety tether is
attached and put completely inside the product. For the product to be fully IP66-rated, the
tether must be put completely inside.

To the NDA-PEND-WPLATE mounting plate:

1. Connect the back of the pendant arm to the NDA-PEND-WPLATE mounting plate, as in the figure that follows.
   Note: Use liquid-tight, electrically grounded conduit in order to maintain the IP66 rating, and so that the metal conduit is connected electrically to the NDA-PEND-WPLATE mounting plate.
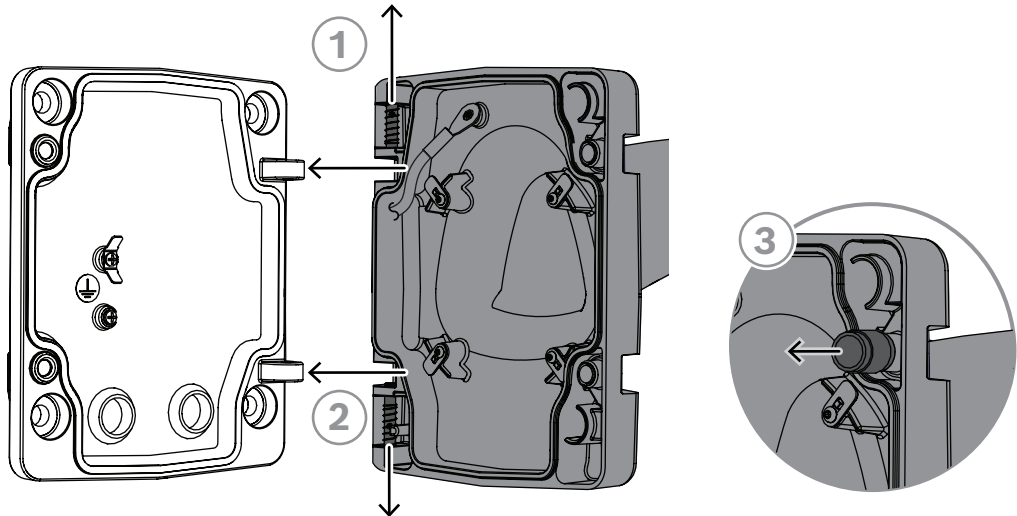
2. Put the appropriate cables for power, video, alarms, and audio through one of the access holes in the wall mounting plate.
   Note: Use the proper grommets in order to guarantee an IP66 rating.
3. Use a screwdriver to install a grounding screw on the grounding connection point on the wall mount plate, then connect the ground wire, as in the figure that follows.
4. Tighten the screws to 10-12 Nm.
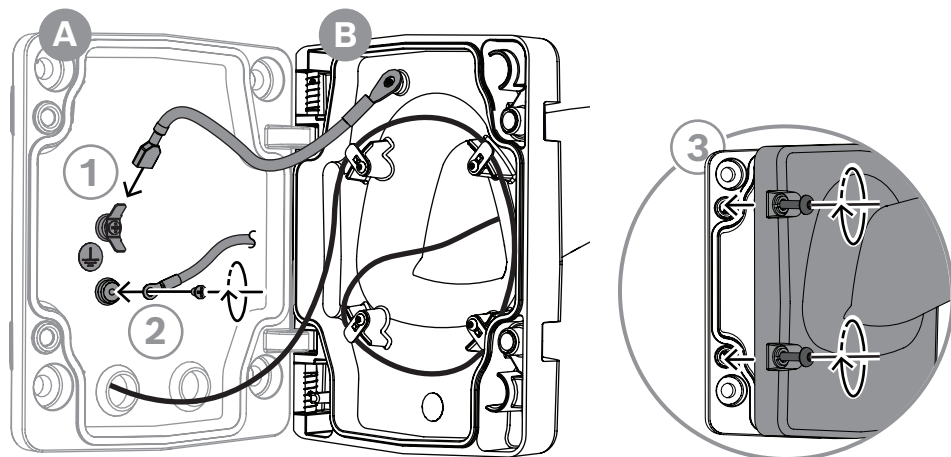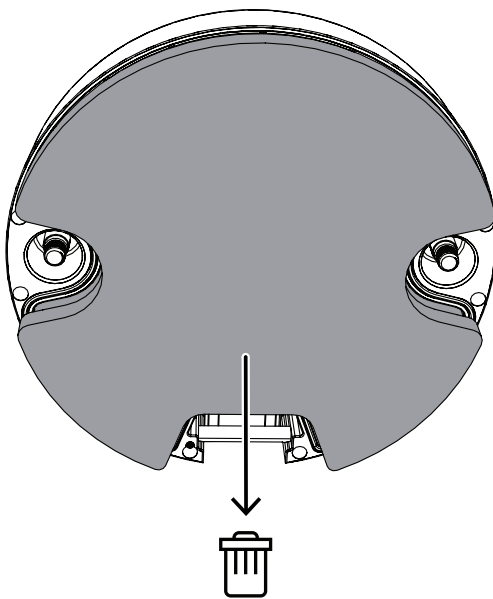
5.   Make the appropriate connections for PoE, 24VAC ± 10%/36VDC ± 10%, alarms, audio. For IR models: If you connect fiber to the camera, then connect only 24VAC ± 10% or 36VDC ± 10% power input to the camera. Connect PoE, but do not connect the Ethernet cable.

To Connect the AUTODOME 7100i Non-IR NDP-7602-Z40 to the Wall arm and 24VAC PSU Kits (NDA-7100-PA0(F), NDA-7100-PA1(F) and NDA-7100-PA(F):

1. Connect the PSU to the back of the pendant wall arm, as in the figure that follows. Note: Use liquid-tight, electrically grounded conduit in order to maintain the IP66 rating, and so that the metal conduit is connected electrically to the power supply box.
2. The bottom hinge pin of the Pendant wall arm is provided with a Hinge Pin Stop to hold the hinge open while attaching the wall arm to the power supply box. Compress the bottom hinge pin by pushing the pin lever downward and rotating it behind the Hinge Pin Stop.
3. Open the top hinge by pushing its pin level up and holding it.
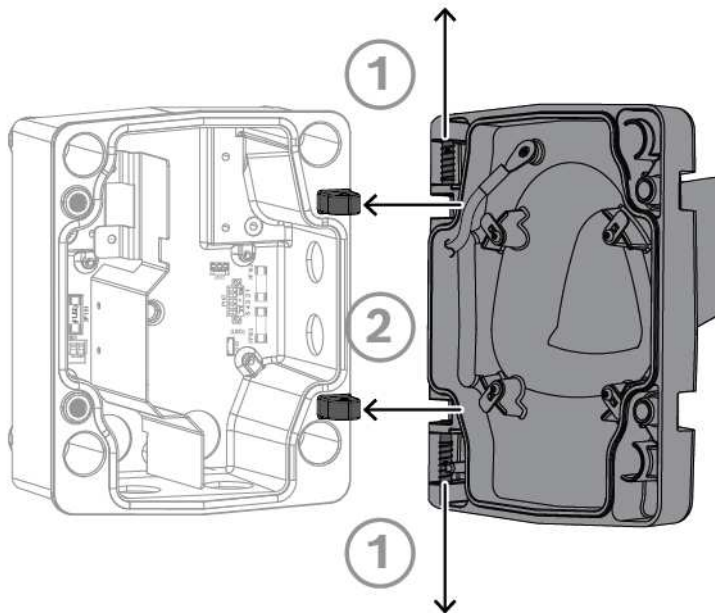
Danger!

For the power supply models with 120VAC or 230VAC transformers (VG4-A-PSU1, VG4-A-PSU2, NDA-U-PSU1 and NDA-U-PSU2): Route only 120VAC / 230VAC wiring and Earth ground through the conduit holes in the high-voltage section of the power supply. Do not route any other wires through the high-voltage section of the power supply.
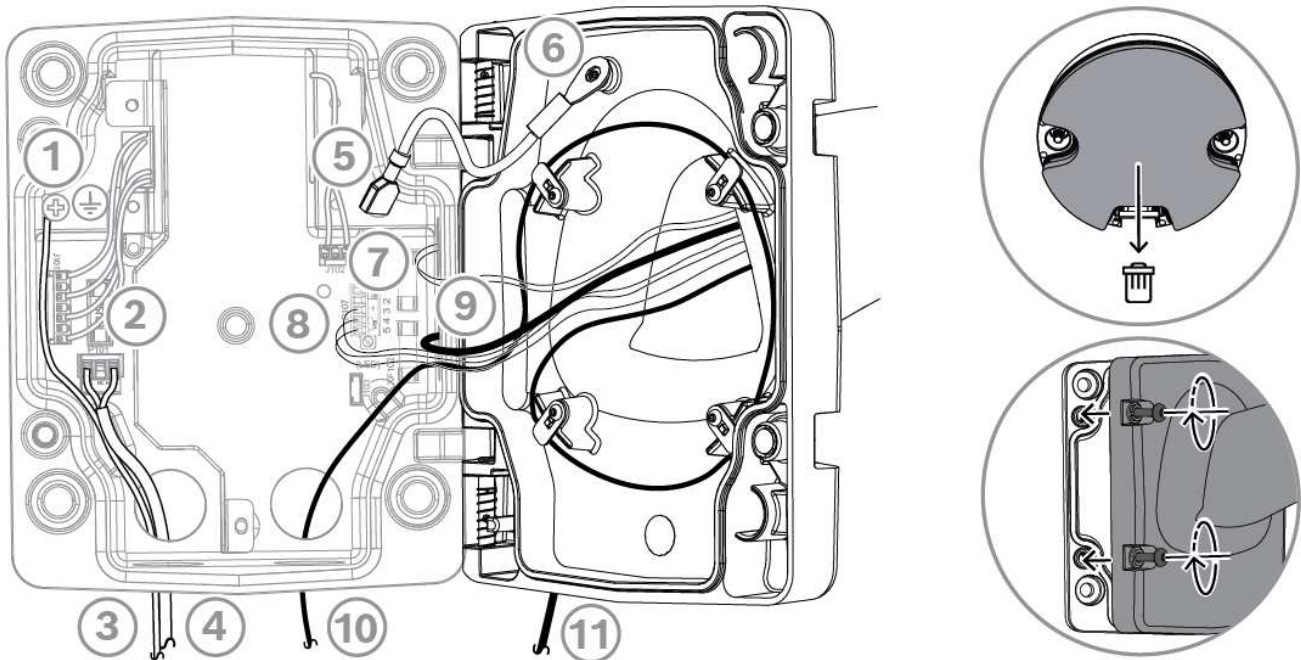
Notice!

Both Hinge Pins must be fully compressed to open (unlock) the hinges of the Pendant Arm and before proceeding to the next step.

4. While continuing to hold the top hinge pin open, align the top and bottom hinges of the Pendant Arm to their mating points on the Power Supply Box. See graphic.
5. Once the hinges are aligned, release the top hing pin to engage its mating hinge on the power box.
6. Release the bottom hinge pin from the Hinge Pin Stop to lock the Pendant Arm to the Power Supply Box.

> **Warning!**
> Serious injury or death can occur if the hinge pins of the Pendant Arm are not fully engaged (locked) to the Power Supply Box. Exercise caution before releasing the Pendant Arm.

7. Put the appropriate cables for power, video, alarms, and audio through one of the access holes in the power suply box. Note: Use the proper grommets in order to guarantee an IP66 rating.
8. Use a screwdriver to install a grounding screw on the grounding connection point in the power supply box, then connect the ground wire, as in the figure that follows.
9. Tighten the screws to 10-12 Nm.

1	Ground screw	6	Ground wire to wall arm mount
2	P101 Connector; Power In (120 VAC / 230 VAC, 50/60 Hz)	7	P107 Connector; 24 VAC (pins 4, 5) and ground (pin 3) to camera through the wall arm mount Note: Must use P107 pins 4, 5 for 24VAC power since that uses the 3.15 A fuse in the power supply.
3	Ground wire connects to external Earth Ground	8	P107 Connector; 24 VAC (pins 4, 5) and ground (pin 3) to camera through the wall arm mount Note: Must use P107 pins 4, 5 for 24VAC power since that uses the 3.15 A fuse in the power supply.
4	Power In; 3/4 in. (20mm) NPS Fitting to electrically grounded metal conduit Note: The cable should remain on the high voltage side of the metal divide that separates high voltage from low voltage in the power supply.	9	(Optional pass-through) Audio input+/-, Audio Output+/-, Alarm IN 1, Alarm IN 2, Relay NO, Relay NC, Relay COM, DGND to a low voltage; 1/2 in. (15 mm) NPS Fitting from the camera, through the arm mount to electrically grounded metal conduit. Note: Audio and alarm I/Os pass through the Power supply box.

5	Ground wire metal spade- Ground wire of wall arm mount connects here by plugging into the metal spade attached to the screw Note: Only applies to wall arm + PSU mounts.	10	Ethernet cable 3/4 in. (20mm) NPS Fitting to electrically grounded metal conduit. Continues inside the Power box through the arm mount to the camera

10. Make the appropriate connections for PoE, 24VAC ±10%/ 36VDC ± 10%, alarms, audio.
Note: For non-IR models: 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 IR models: If you connect fiber to the camera, connect PoE, but do not connect the Ethernet cable. Alternately power the camera with 36VC ± 10% power or 24VAC ± 10% from a non Bosch power supply. See Recommendations for 24 VAC Power Supply.

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
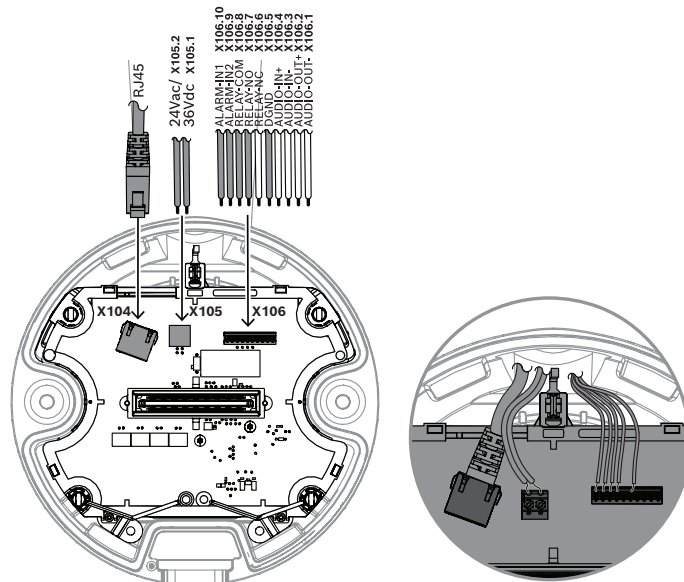
> **Notice!**
> Notice
> The Ethernet cable should be CAT 5E, CAT 6 or better.

2. Connect the other end of the drain wire to a grounded metal box that contains the audio and alarm equipment 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 next steps.
4.   Remove the three (3) screws from the top cap to access the fiber connection.
5.   Pull the top cap off the mount.

NDA-7100-PIPEF
NDA-7100-PENF
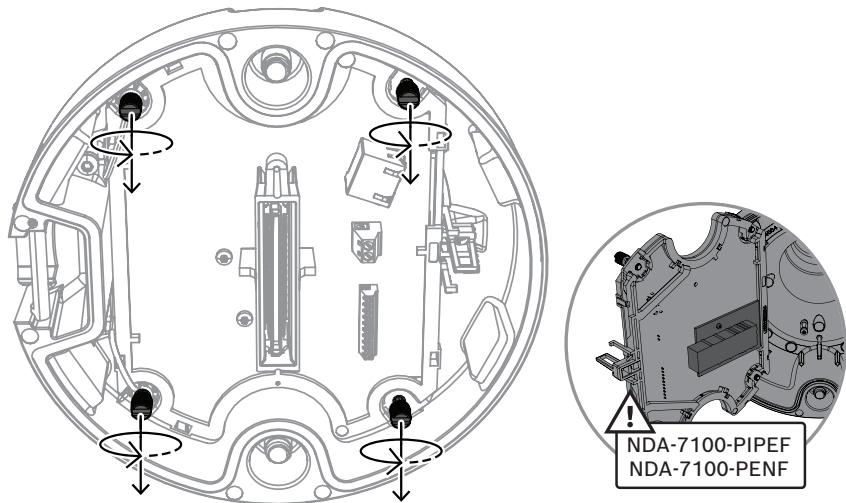
6.   Install the SFP module into the fiber port on the top of the mount. Push the SFP
     module into the port until you hear the catch engage.
     Note: Ethernet communication is disabled when an SFP module is plugged into a fiber
     mount (NDA-7100-PENF, or NDA-7100-PIPEF).
7.   Connect fiber optic 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.
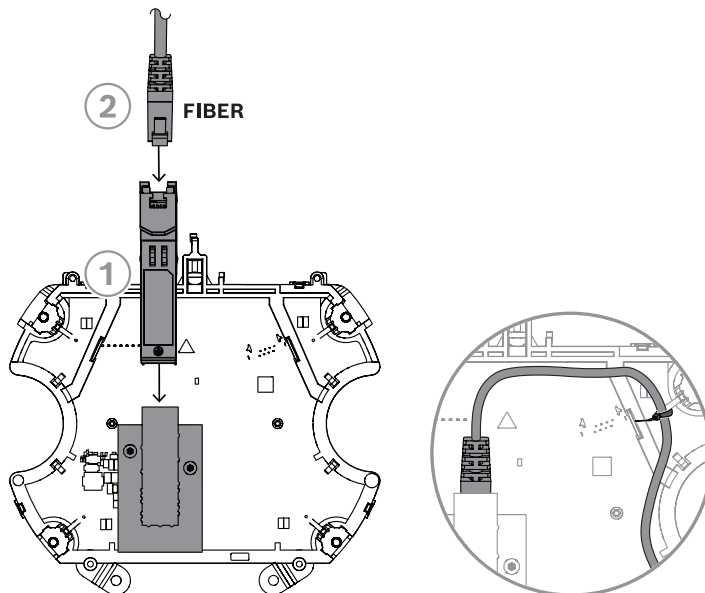
8.   Put the top cap onto the mount.
9.   Put the three (3) screws back into the top cap.
10. Tighten the screws.
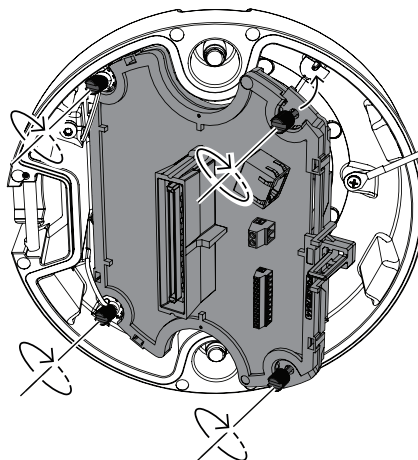
ⓘ	**Notice!** Risk of permanent damage to the camera The interface board connects only one way to the camera. Make sure that when you install it in the mount (arm or pipe mount), you install it in the correct way like shown in the above picture.

11. Attach the hook of the camera to the pin on the mount.
12. Tilt the camera until you connect the camera to the mount.

13. Tighten the screws to 10-12 Nm.
14. Perform all the connections mentioned in the Connection section.
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
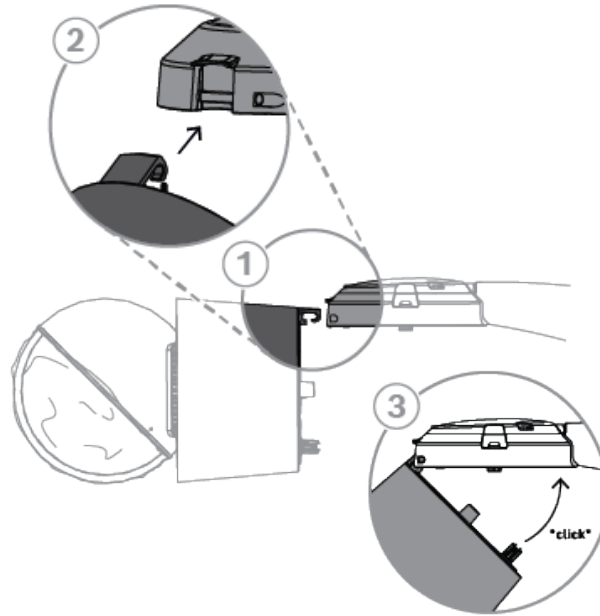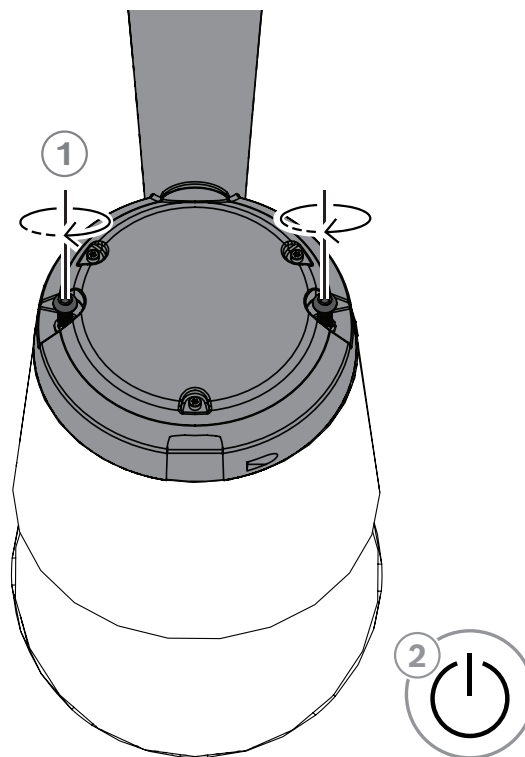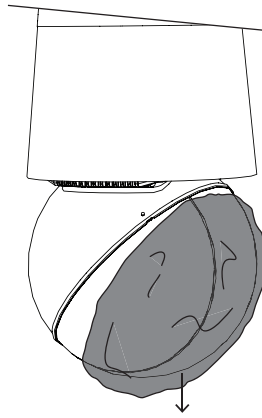from the mount.

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 (supplied with the pipe mount) four (4) times around the threads at the end of the mount.
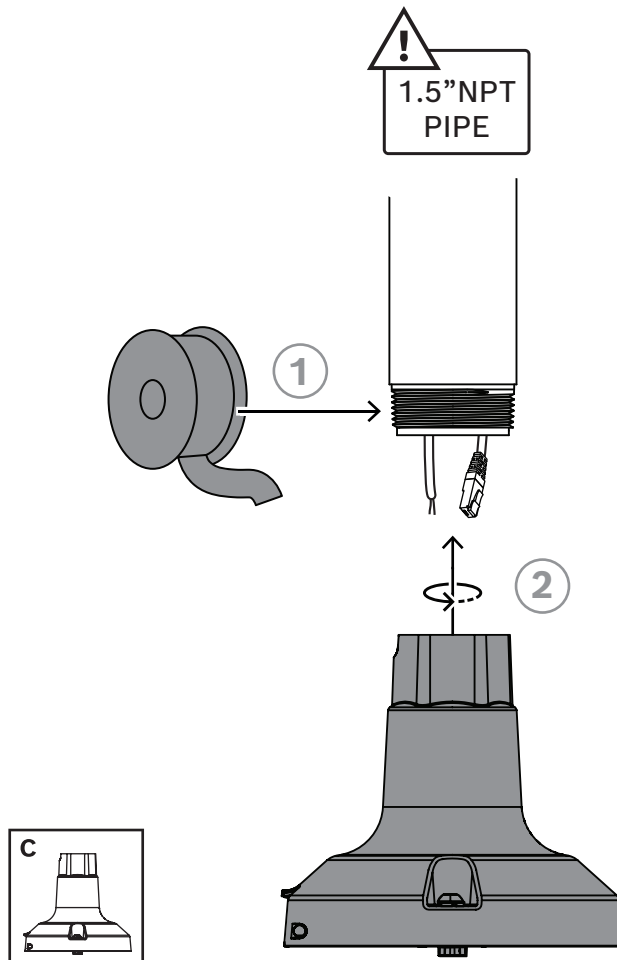
⚠ 1.5"NPT PIPE

2. Put the appropriate cables for power, video, alarms, and audio through one of the access holes in the wall mounting plate.
   Note: Use the proper grommets in order to guarantee an IP66 rating.
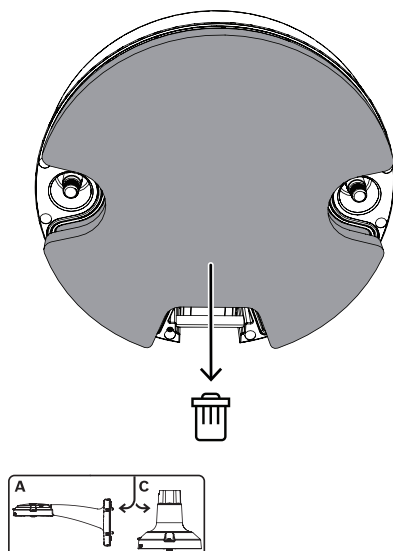
3. Make the appropriate connections for PoE (only if **not** using fiber), 24VAC ± 10%/36VDC ± 10%, alarms, and audio. If you connect fiber to the camera, then connect only 24VAC/36VDC power input to the camera. Do not connect PoE.
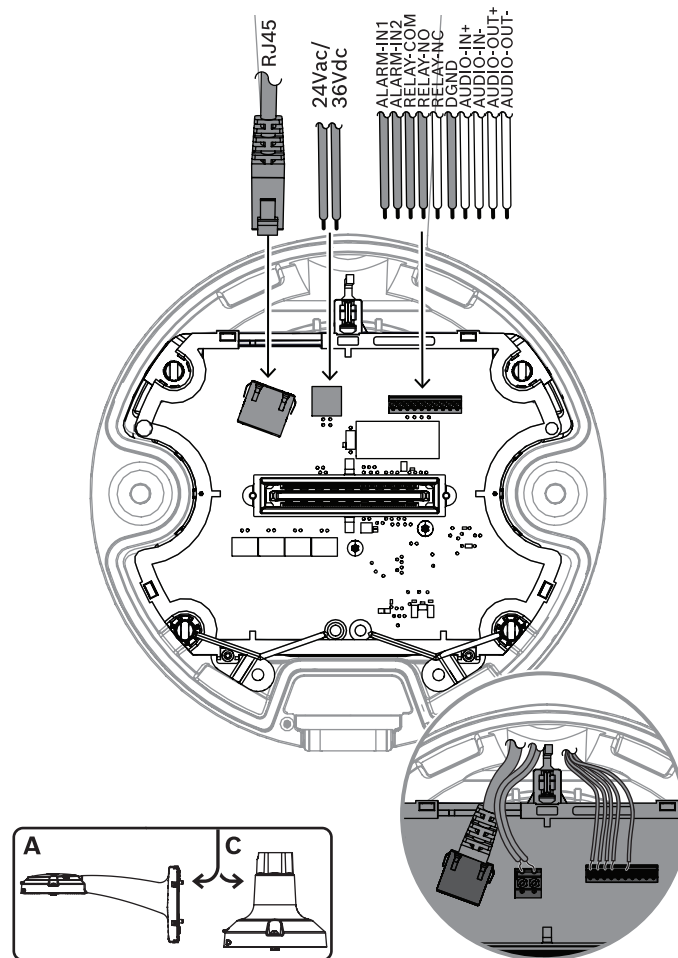
Note: Add a tie wrap between the Ethernet cable and 24VAC/36VDC wires to prevent the black plastic hook from pressing on the sun shield.
For audio and/or alarm inputs/outputs (I/O):
–   On the mount on the camera side, connect the drain wire of the Belden cable (or similar cable) to chassis ground and grounded metal box.
–   Connect the other end of the drain wire to a grounded metal box that supports electrically grounded conduit.

4. To install fiber, complete the four (4) steps that follow. For all other installations, skip to step 8. First, remove the screws from the bottom of the pipe mount.
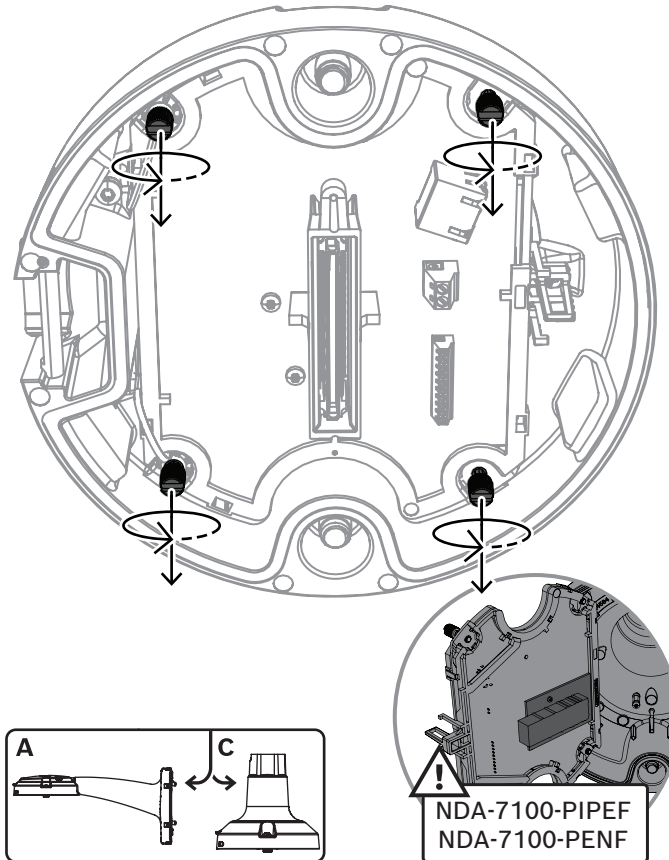
5. Install the SFP module into the fiber port in the mount. Push the SFP module into the port until you hear the catch engage. Note: Ethernet communication is disable when an SFP module is installed in a fiber mount (NDA-7100-PENF or NDA-7100-PIPEF).

6.   Connect fiber optic cable to the SFP module.
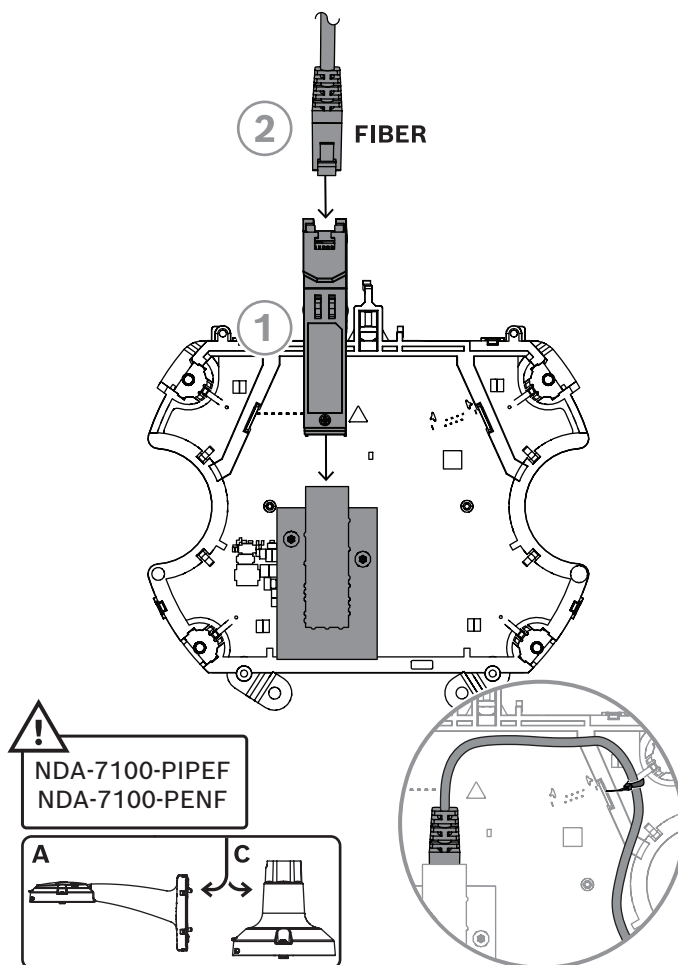
Notice!

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

7.   Tighten the screws.
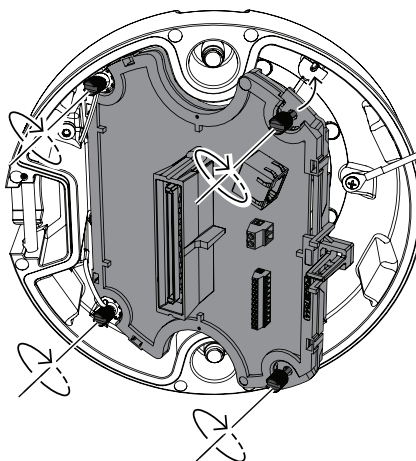
8.   Attach the hook of the camera to the pin on the mount.

9. Tilt the camera until you connect the camera to the mount.
10. Tighten the top cap screws.
11. Tighten the screws to 10-12 Nm.
12. Apply power.
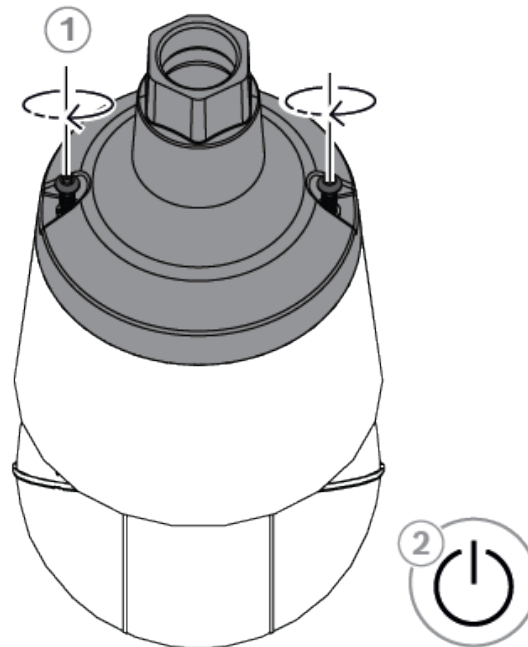
13. Remove the protective plastic sheet from the bubble. Installation is complete.
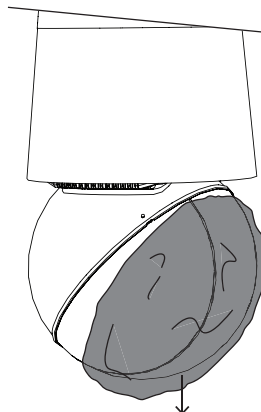
10.1 Installing a pipe mount onto a NDA-U-RMT with grounded conduit

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-inch (9.5 mm) ring terminal on one end and is bare copper on the other end. Note: The length of the wire should be 150 to 200 mm (6 to 8 inches) long.
2. Add the 3/8-inch (9.5 mm) flat washer, ring terminal of the custom ground wire and the 3/8-inch (9.5 mm) split washer to the bottommost bolt on the NDA-U-RMT.
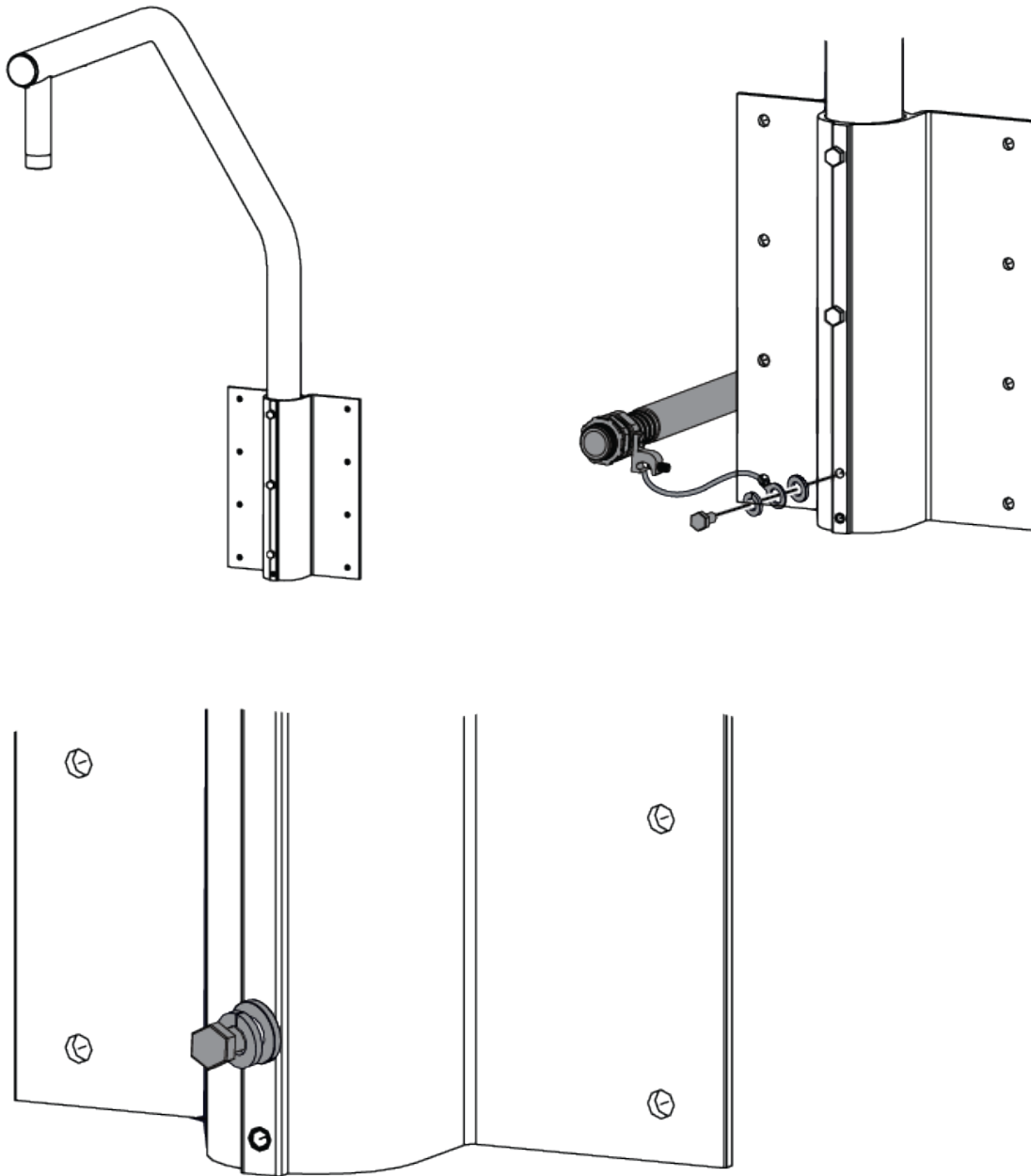
3. Pull all the wires that need to connect to the AUTODOME camera through the NDA-U-RMT pipe and then through ¾-inch (19 mm) electrically conductive, liquid tight metal conduit. Note: To minimize the amount of unprotected cables, make sure the conduit is 50 to 100 mm (2 to 4 inches) from the open end of the pipe at the bottom of the NDA-U-RMT.
4. Add a liquid tight, ¾-inch (19 mm) 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" (9.5 mm) washer and the 3/8" (9.5 mm) 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.

Note: The length of wires that are exposed outside the grounded metal conduit and outside the NDA-U-RMT should be kept as short as possible.

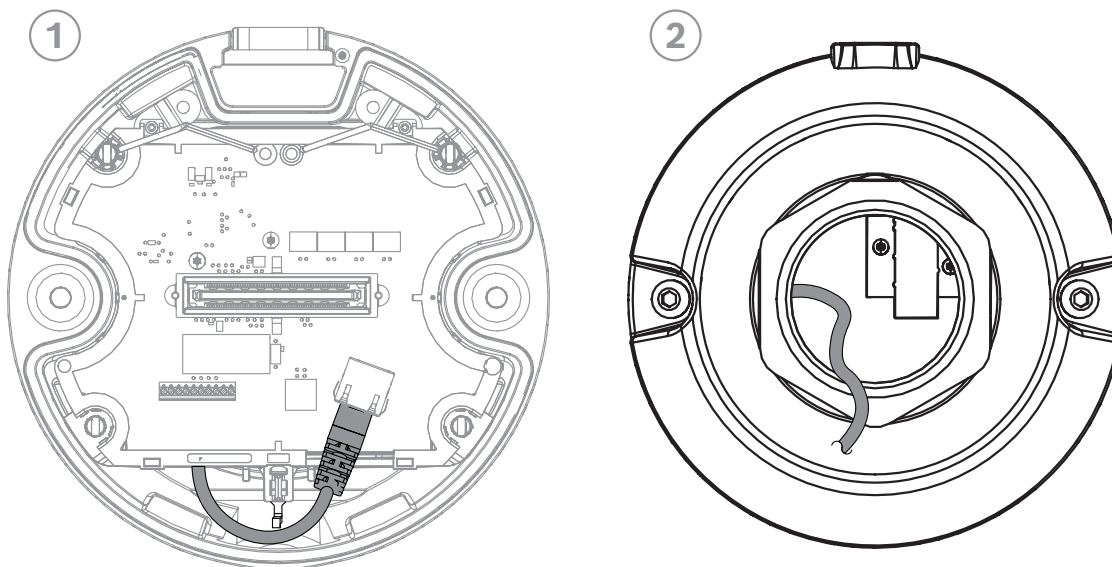| ⚠	**Warning!** DO NOT RELY ON THE GROUND WIRE TO SUPPORT THE WEIGHT OF THE GROUNDED CONDUIT. The grounded conduit must be adequately supported by separate mounting hardware and not by the grounding wire.

10.2   Recommended routing of Ethernet cable through Pipe Mount

1	Bottom view of the pipe mount	2	Top view of the pipe mount

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 show 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:
–   AUTODOME 7100i non-IR: PoE midspan IEEE 802.3bt Type 3, Class 6, 4 Pair Power (4PPOE) 60W at PSE (POE midspan or POE Ethernet switch) side, (51W at AUTODOME 7100i also known as PD side) using a single-signature PD.
–   AUTODOME 7100i IR: PoE midspan IEEE 802.3bt Type 4, Class 8, 4 Pair Power (4PPOE) 90W at PSE (POE midspan or POE Ethernet switch) side, (71.3W at AUTODOME 7100i also known as PD side) using a single-signature PD.

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 (Class 6/8)) (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 (Class 6/8) 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.

PoE: Use only approved PoE (IEEE 802.3bt, Type 3/4 (Class 6/8) 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!**
> The product should be supplied only by an external power supply that is a certified Class 2 or Limited Power Source (LPS) supply.

> **Warning!**
> Use only approved PoE devices that meet the IEEE 802.3bt, Type3/4 (Class 6/8) 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 (Class 6/8) devices that support electrically grounded conduit with watertight seals unless the midspan is included in an 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.)
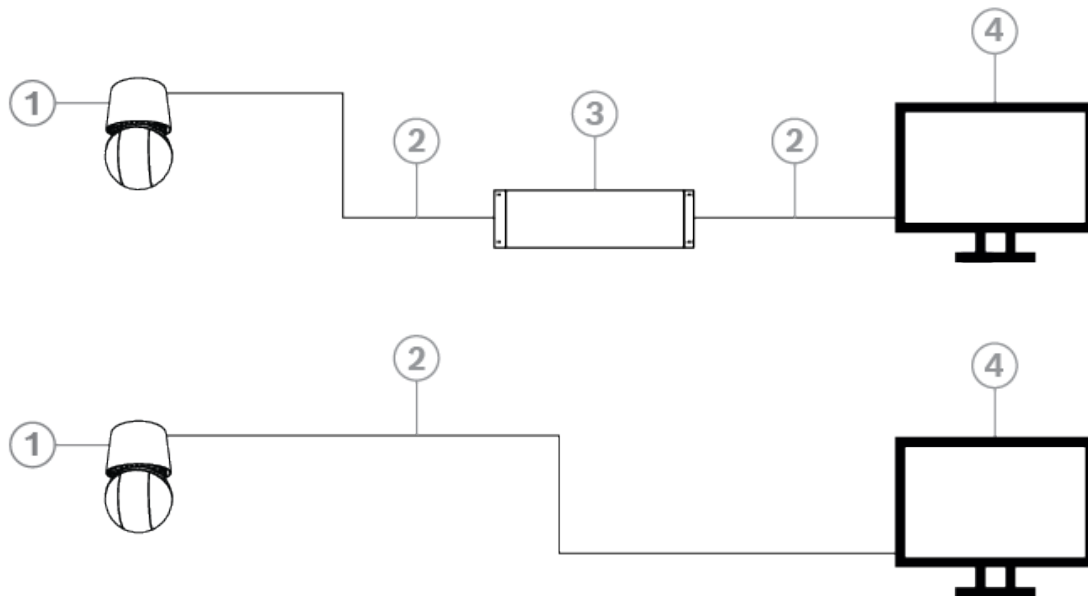
Figure 11.1: System Configuration with AUTODOME camera

1	AUTODOME camera
2	IP Connection
3	Network Switch
4	Computer
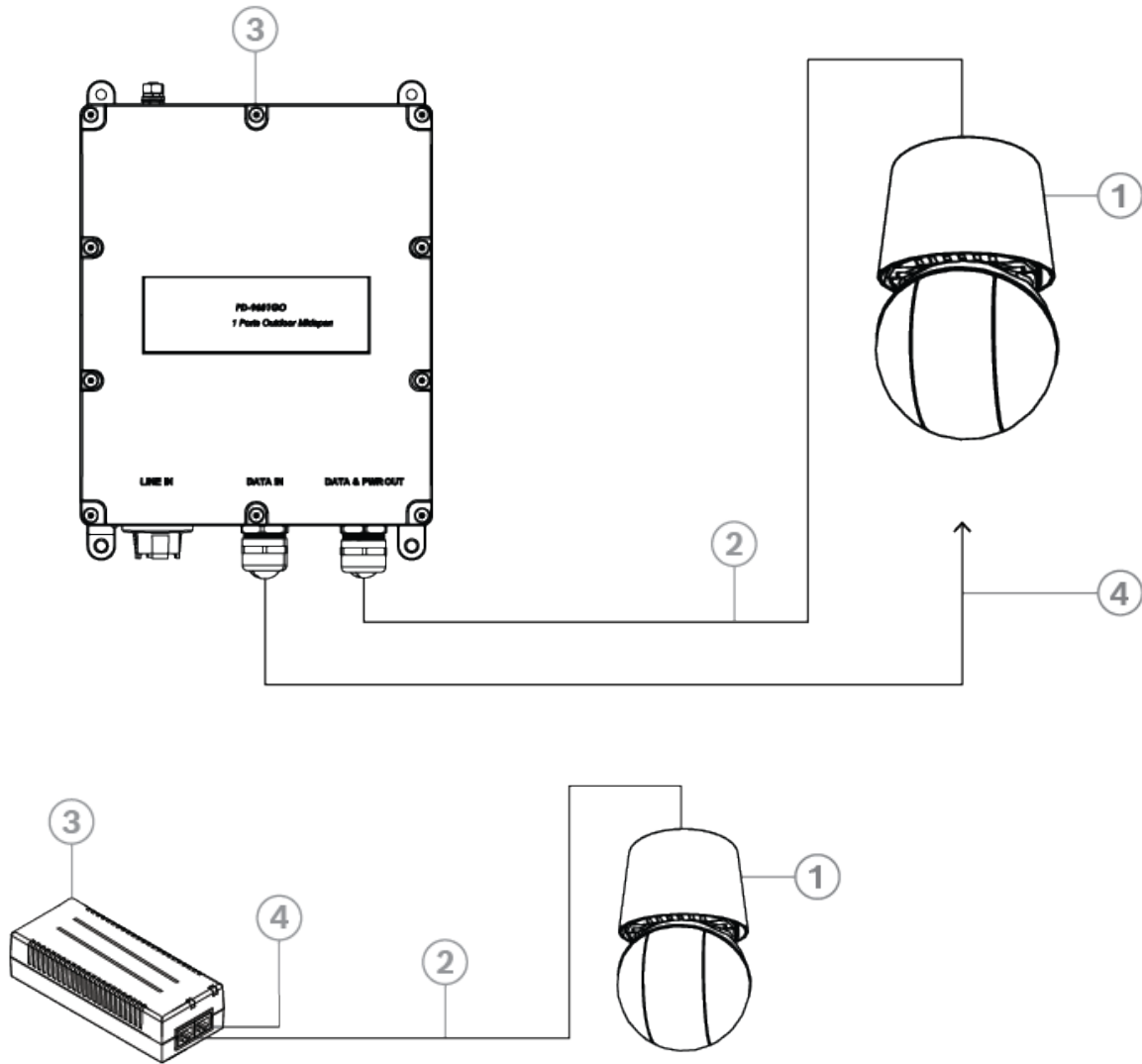
Figure 11.2: System Configuration: AUTODOME 7100i camera to midspan

1	AUTODOME camera
2	Midspan DATA & PWR OUT
3	IEEE 802.3bt Type 3/4 (Class 6/8) midspan
4	Midspan DATA IN (to Ethernet switch or test PC)

11.2   Power by midspan

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

Bosch recommends the use of one of the IEEE 802.3bt Type 3, Class 6 midspans (Refer to the subchapter Connecting the AUTODOME camera to the PC in the Installation Manual) for use with the non-IR AUTODOME camera model and one of the IEEE 802.3bt Type 4, Class 8 midspans (Refer to the subchapter Connecting the AUTODOME camera to the PC in the Installation Manual) 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, Class 6 compliant midspan (Refer to the subchapter Connecting the AUTODOME camera to the PC in the Installation Manual) or PSE with the non-IR AUTODOME camera model and a third-party IEEE 802.3bt Type 4, Class 8 compliant midspan (Refer to the subchapter Connecting the AUTODOME camera to the PC in the Installation Manual) 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	3.5	1.2	1.85	53	64.8	66.6

> ⚠ **Warning!**
> The product should be supplied only by an external power supply that is a certified Class 2 or Limited Power Source (LPS) supply.

It must be an electrically Earth-grounded metal box with a watertight, electrically grounded metal conduit that is connected between the box and the AUTODOME camera.

The power redundancy feature is only guaranteed to work with Bosch 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.

Note: For the system of the AUTODOME camera and the chosen power device (third-party IEEE 802.3bt midspan or 24 VAC) to meet all of the AUTODOME certifications and specifications, the midspan/power supply must meet the same certifications and requirements.

11.2.2   **Connecting watertight, 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.
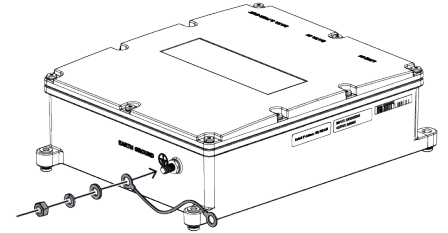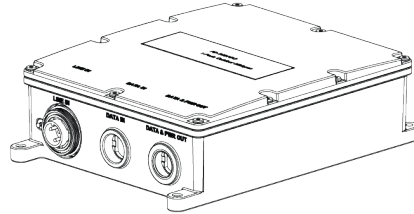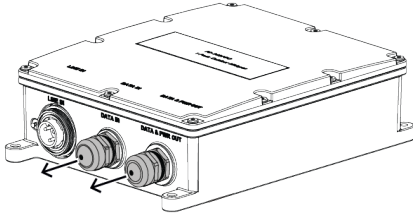
11.3   Power by 24 VAC/36 VDC

11.3.1   Recommendations for 24 VAC Power Supply

Bosch recommends operating the AUTODOME 7100i IR camera models (NDP-7602-Z40L, NDP-7604-Z12L) by IEEE 802.3bt PoE Type 4, 90W. You can also use a third-party 24 VAC, 50/60Hz power supply that meets the stated requirements.

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

The power supply must provide 24 VAC +/-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	3.5	1.2	1.85	53	64.8	66.6

Warning!

The product should be supplied only by an external power supply that is a certified Class 2 or Limited Power Source (LPS) supply.

It must be an electrically Earth-grounded metal box with a watertight, electrically grounded metal conduit that is connected between the box and the AUTODOME camera.

Note: For the system of the AUTODOME camera and the chosen power device (third-party IEEE 802.3bt midspan or 24 VAC) to meet all of the AUTODOME certifications and specifications, the midspan/power supply must meet the same certifications and requirements.

11.3.2   Compatible 24 VAC Power Supplies

Danger!
The NDA-U-PA0, NDA-U-PA1 and NDA-U-PA2 surveillance cabinet PSUs by Bosch are NOT compatible with the AUTODOME 7100i.

The AUTODOME 7100i non-IR model (NDP-7602-Z40) cameras support the following 24VAC power supplies by Bosch:

Bosch Part Number	Description	Description
NDA-U-PSU0*	PSU with flat lid	24VAC 50/60Hz input, 24VAC 50/60Hz output
NDA-U-PSU1*		120VAC 50/60Hz input, 24VAC 50/60Hz output
NDA-U-PSU2*		230VAC 50/60Hz input, 24VAC 50/60Hz output
NDA-7100-PA0	Wallarm and PSU for AD7100i	24VAC 50/60Hz input, 24VAC 50/60Hz output
NDA-7100-PA1		120VAC 50/60Hz input, 24VAC 50/60Hz output
NDA-7100-PA2		230VAC 50/60Hz input, 24VAC 50/60Hz output
NDA-7100-PA0F	Wallarm and PSU for AD7100i fiber	24VAC 50/60Hz input, 24VAC 50/60Hz output
NDA-7100-PA1F		120VAC 50/60Hz input, 24VAC 50/60Hz output
NDA-7100-PA2F		230VAC 50/60Hz input, 24VAC 50/60Hz output
*In an upgrade from an earlier AUTODOME, the VG4-A-PSU0, VG4-A-PSU1, VG4-A-PSU2 can be used instead of the NDA-U-PSU0, NDA-U-PS1, NDA-U-PS2 respectively but the wiring will need to be redone (as described in this manual) For earlier AUTODOME arm mount installation, the VG4-A-PSU0, VG4-A-PSU1, VG4-A-PSU2 can be used, but will need to replace with new AUTODOME 7100i arm and wire properly. Please note that the paint will not match in both of the cases mentioned previously.		
Warranty may have elapsed when using reused VG4-A-PSU0, VG4-A-PSU1, VG4-A-PSU2.		

Warning!
The IR models of the AUTODOME 7100i (NDP-7602-Z40L and NDP-7602-Z12L) cannot be use with any of the above PSUs, due to the IR models rating of 24VAC @ 3.5A that will exceed the 3.15A output of these PSUs.

Bosch recommends operating the AUTODOME 7100i IR camera models (NDP-7602-Z40L, NDP-7604-Z12L) by IEEE 802.3bt PoE Type 4, 90W. You can also use a third-party 24 VAC, 50/60Hz power supply that meets the stated requirements.
Refer to the subchapter *Recommendations for 24 VAC Power Supply, page 52* for details.

11.3.3   Fuse specifications and power wire gauges

⚠️ **Warning!**
Fuse replacement by qualified service personnel only. Replace with same type fuse.

Fuse Specifications			
Volts	**XF101 Mains**	**XF102**	**XF103**
24 VAC	T 5.0 A (5A, 250V, 5mm x 20mm, time delay)	T 2.0 A (2.0A, 250V, 5mm x 20mm, time-delay)	T 3.15 A (3.15A, 250V, 5mm x 20mm, time delay)
120 VAC	T 1.6 A (1.6A, 250V, 5mm x 20mm, time delay)	T 2.0 A (2.0A, 250V, 5mm x 20mm, time-delay)	T 3.15 A (3.15A, 250V, 5mm x 20mm, time delay)
230 VAC	T 0.8 A (0.8A, 250V, 5mm x 20mm, time delay)	T 2.0 A (2.0A, 250V, 5mm x 20mm, time-delay)	T 3.15 A (3.15A, 250V, 5mm x 20mm, time delay)

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

Wire Size		24 VAC				36 VDC			
		IR models Maximum Distance		Non-IR models Maximum Distance		IR models Maximum Distance		Non-IR models Maximum Distance	
AWG	mm	feet	meters	feet	meters	feet	meters	feet	meters
14	1.63	89	27	131	40	318	97	452	138
16	1.29	56	17	82	25	197	60	282	86
18	1.02	33	10	49	15	125	38	177	54

11.3.4   Connecting 24 VAC / 36 VDC power to the camera

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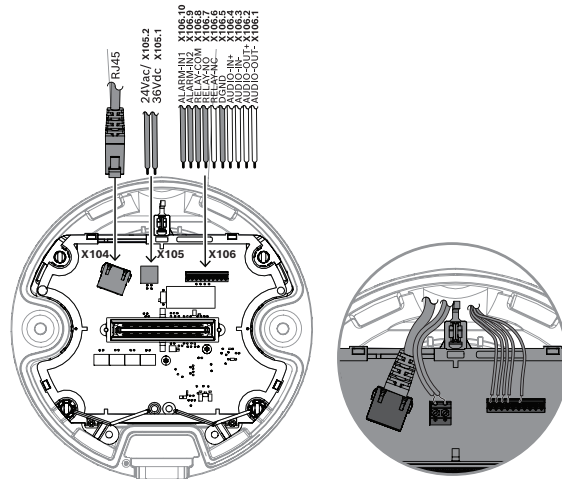
X105 Connector	24 VAC Application	36 VDC Application
Pin 1	24 VAC Line	+36VDC
Pin 2	24 VAC Neutral	36VDC_return

Note: The AUTODOME camera will generally work with either polarity of 24VAC line/neutral, and +36VDC and 36VDC_return 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.

11.3.5   Making connections in the power supply with wall arm (NDA-7100-PA0(F), NDA-7100-PA1(F), NDA-7100-PA2(F))

Warning!
If you reuse a VG4-A-PSU0, VG4-A-PSU1 and VG4-A-PSU2 (from an earlier Bosch AUTODOME camera) to provide power to an AUTODOME 7100i/AUTODOME 7100i IR camera:
a) You must redo the cable wiring as illustrated.
b) Do not connect any wires to connectors P106 and P105 of the PSU.

Warning!
Because the IR models of the AUTODOME 7100i (NDP-7602-Z40L, NDP-7602-Z12L) are rated to 24VAC @ 3.5A, which will exceed the current output of the 3.15A fuse (labeled XF103 in the power supply), you cannot use the IR models of the AUTODOME 7100i camera with the following power supplies:
VG4-A-PSU0, VG4-A-PSU1, VG4-A-PSU2, NDA-U-PSU0, NDA-U-PSU1, NDA-U-PSU2

Warning!
All wiring (power and I/O cabling) connecting to the unit must be routed separately inside permanently earthed metal conduits (not supplied).

Danger!
For the power supply models with 120VAC or 230VAC transformers (VG4-A-PSU1, VG4-A-PSU2, NDA-U-PSU1 and NDA-U-PSU2): Route only 120VAC / 230VAC wiring and Earth ground through the conduit holes in the high-voltage section of the power supply. Do not route any other wires through the high-voltage section of the power supply.
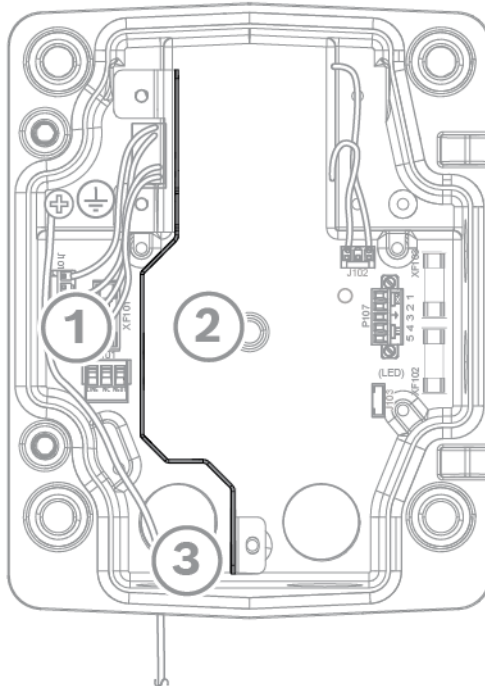
Figure 11.3: 24VAC power supply with (1) the high-voltage section (120VAC, 230VAC), (2) the low-voltage section (24VAC), and (3) the metal barrier that separates the two sections
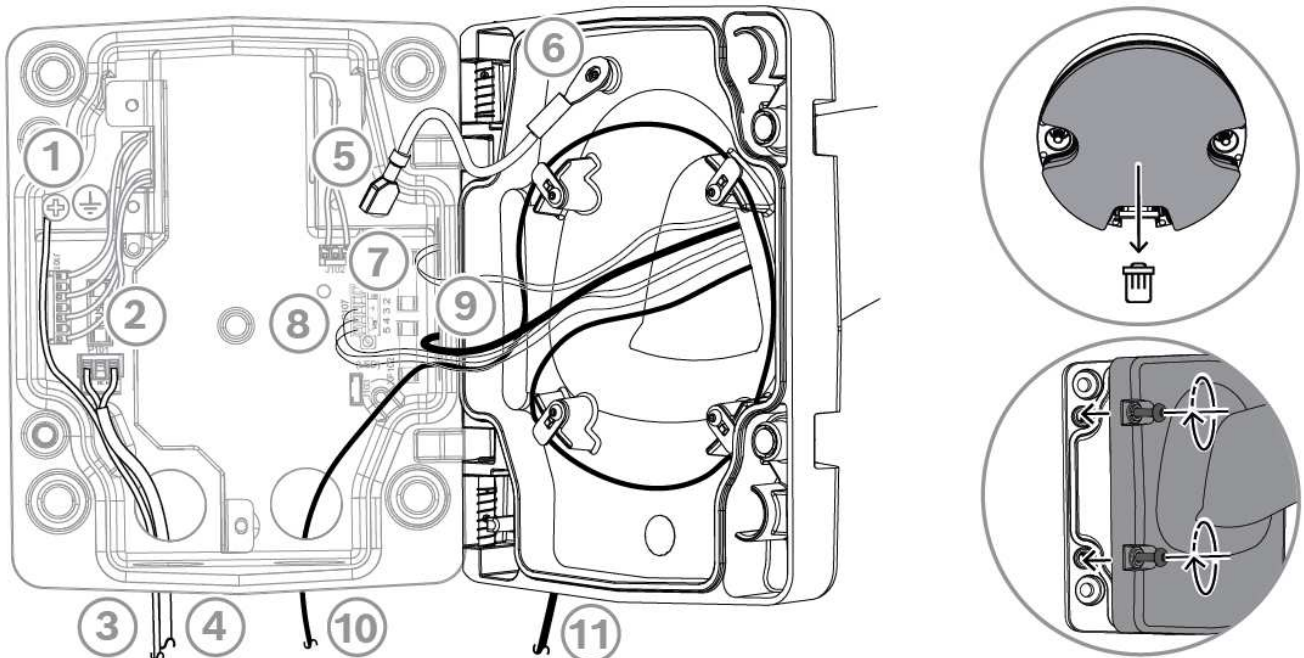
Figure 11.4: Connections with the power supply with wall arm

1	Ground screw	6	Ground wire to wall arm mount
2	P101 Connector; Power In (120 VAC / 230 VAC, 50/60 Hz)	7	P107 Connector; 24 VAC (pins 4, 5) and ground (pin 3) to camera through the wall arm mount Note: Must use P107 pins 4, 5 for 24VAC power since that uses the 3.15 A fuse in the power supply.
3	Ground wire connects to external Earth Ground	8	P107 Connector; 24 VAC (pins 4, 5) and ground (pin 3) to camera through the wall arm mount Note: Must use P107 pins 4, 5 for 24VAC power since that uses the 3.15 A fuse in the power supply.
4	Power In; 3/4 in. (20mm) NPS Fitting to electrically grounded metal conduit Note: The cable should remain on the high voltage side of the metal divide that separates high voltage from low voltage in the power supply.	9	(Optional pass-through) Audio input+/-, Audio Output+/-, Alarm IN 1, Alarm IN 2, Relay NO, Relay NC, Relay COM, DGND to a low voltage; 1/2 in. (15 mm) NPS Fitting from the camera, through the arm mount to electrically grounded metal conduit. Note: Audio and alarm I/Os pass through the Power supply box.

5	Ground wire metal spade- Ground wire of wall arm mount connects here by plugging into the metal spade attached to the screw Note: Only applies to wall arm + PSU mounts.	10	Ethernet cable 3/4 in. (20mm) NPS Fitting to electrically grounded metal conduit. Continues inside the Power box through the arm mount to the camera

The table that follows lists the Power Supply Box connectors:

No.	Connector	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6
	Ground	Grounding Screw - External Earth ground connection					
	Ground	Grounding metal spade - Earth ground condition to the optional arm mount					
P101	120/230 VAC, 50/60Hz or 24 VAC , 50/60Hz, Power In	Line	NC	Neutral	N/A	N/A	N/A
P107	24 VAC, 50/60Hz power to the camera	Not used for AUTODOME 7100i		Earth Ground	24 VAC Line (3.15A FUSE)	24 VAC Neutral	N/A
					24VAC to AUTODOME 7100i NDP-7602-Z40 camera		N/A
P105	Serial Communi-cations	Not used for AUTODOME 7100i					
P106	Serial Communi-cations						
J103	Older Fiber Connection						

To wire the incoming high-voltage and the outgoing low-voltage lines properly, refer to this table:

No.	Connector	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6
	Ground	Grounding Screw - External Earth ground connection					
	Ground	Grounding metal spade - Earth ground condition to the optional arm mount					
P101	120/230 VAC, 50/60Hz or 24 VAC , 50/60Hz, Power In	Line	NC	Neutral	N/A	N/A	N/A
P107	24 VAC, 50/60Hz power to the camera			Earth Ground	24 VAC Line (3.15A FUSE)	24 VAC Neutral	N/A
					24VAC to AUTODOME 7100i camera (NDP-7602-Z40)		N/A

1. Route the high voltage 120/230 VAC lines and ground wire through the 3/4 in. (20mm) NPS earth-grounded metal conduit fitting on the left side of the box. The Power Supply Box with a transformer comes with a barrier (see *, page 56* of this subchapter) that separates the high voltage side on the left, from the low voltage 24 VAC side on the right. The high voltage lines must remain to the left of this barrier.
   Note: Use proper grommets to guarantee an IP66 rating.
2. Cut and trim the high voltage 120/230 VAC power and ground wires with sufficient slack to reach their connector terminal in the box, but not so long as to be pinched by or to obstruct closing the cover door.
3. Attach the supplied 3-pin power plug to the incoming high voltage power wires in the box. Refer to connector P101 in the table above and to the image below for an illustration of these connections:

4. Attach the ground wire to the grounding screw.
5. Connect three wires to the P107 Power Out connector to route the 24 VAC power supply to the camera (NDP-7602-Z40 models only). Refer to connector P107 in the table above and to the graphic below for an illustration of the connections.

6. Connect the first wire to pin 5 (24VAC Neutral) connector.
7. Connect the second wire to pin 4 (24VAC Line) connector. (Note: the 3.15A fuse is in this line).
8. Connect the third wire to pin 3 (Earth Ground) connector.
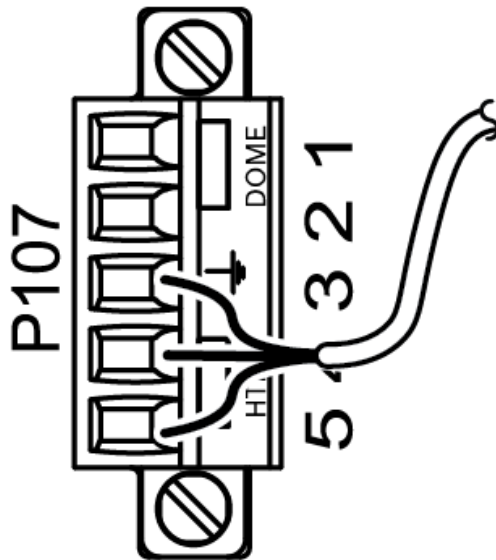
> ⚠ **Warning!**
> Make sure that you connect the outgoing power supply wires to the P107 connectors (pin 4: 24VAC Line, and pin 5: 24VAC Neutral). Power supply fuse XF103 can handle a higher amperage (3.15 A) than fuse XF102 (2.0A).

9. For the AUTODOME 7100i non-IR model (NDP-7602-Z40), complete the three substeps that follow, and then proceed to further steps. For IR models, skip to the next step.
    a. Route the 24 VAC outgoing power supply wires to the camera through the wall arm.
    b. Cut and trim the 24 VAC power with sufficient slack to reach their connector terminal X105 in the camera, but not so long as to be pinched by or to obstruct closing the cover door.
    c. Attach the 24VAC lines to AUTODOME 7100i User Interface connector X105, as illustrated below.
10. Route the Ethernet cable through the points mentioned in the list that follows, in sequence:
    a. From the User Interface connector X104 in the arm mount (as shown below)
    b. Through the arm to the PSU box.
    c. Out 3/4 in. (20mm) NPS metal conduit fitting in the PSU box
    d. Through electrically grounded, liquid tight metal conduit
    e. To the computer.
    Note: Use proper grommets to guarantee an IP66 rating.
    Refer to *Tools Required, page 14* for a list of the appropriate types of Ethernet cable to use.
11. Connect the ground wire attached to the arm mount to the metal spade shown in number 5 of Figure 2 of this subchapter to electrically connect the arm mount to the power supply housing.
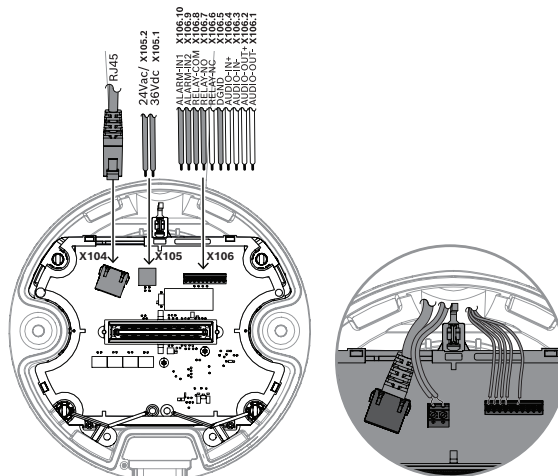
To connect audio I/O and/or alarm inputs or alarm relay output from the AUTODOME 7100i User Interface connections through the arm to the PSU box:

1. Route the audio inputs, audio outputs, and/or alarm inputs and alarm relay output from connector X106 (see figure above) in the User Interface board in the arm mount through the arm to the power supply box. Then out a ¾" (20mm) or ½" (15mm) NPS metal conduit fitting through metal conduit to a metal box that will hold this equipment.
    Note: Refer to "Connecting the Alarm Inputs and Alarm Relay Output" and "Connecting the Audio Input and Output Wires" for additional requirements.
2. Follow the instructions in Installing a mount power supply box (wall, mast (pole), and corner mounts) to continue the installation.

11.3.6   Attaching the pendant arm to the power supply box

Note: Refer to the figure that follows as you complete the steps to attach the pendant arm
to the power supply box.
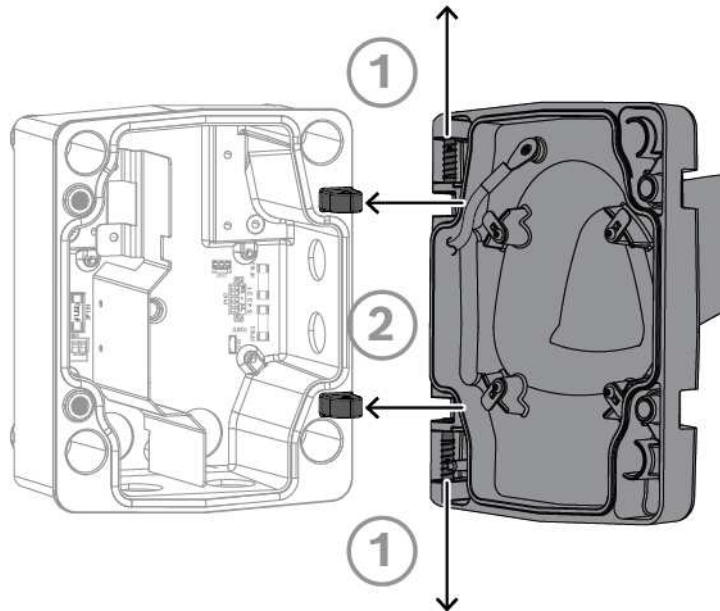
	Notice!
(i)	You must compress both hinge pins fully to open (unlock) the hinges of the pendant arm.

1.   Push down the lever of the bottom hinge pin on the pendant arm and then rotate the
     lever behind the hinge pin stop. The hinge pin stop holds the hinge open while
     attaching the pendant arm to the power supply box.
2.   Push up the lever of the top hinge and hold it. Compress both hinge pins completely to
     open (unlock) the hinges of the pendant arm before proceeding to the next step.
3.   While holding the top hinge pin open, align the top and bottom hinges of the pendant
     arm to their mating points on the power supply box.
4.   After you have aligned the hinges, release the top hinge pin to engage its mating hinge
     on the power supply box.
5.   Release the bottom hinge pin from the hinge pin stop to lock the pendant arm to the
     power supply box.

	Warning!
⚠	Risk of injury or death
	Serious injury or death can occur if the hinge pins of the pendant arm are not fully engaged (locked) to the power supply box. Exercise caution before releasing the pendant arm.

11.3.7   **Making connections in the 24VAC power supply with lid (NDA-U-PSU0, NDA-U-PSU1, NDA-U-PSU2) - (for non-IR NDP-7602-Z40 camera models)**

Bosch recommends operating the AUTODOME 7100i IR camera models (NDP-7602-Z40L, NDP-7604-Z12L) by IEEE 802.3bt PoE, Type 4, 90W. You can also use a third-party 24 VAC, 50/60Hz power supply that meets the stated requirements.

Refer to the subchapter **Recommendations for 24 VAC Power Supply** for details.

⚠	**Danger!** The NDA-U-PA0, NDA-U-PA1, and NDA-U-PA2 surveillance cabinet PSUs by Bosch are not compatible with the AUTODOME 7100i.

⚠	**Warning!** Because the IR models of the AUTODOME 7100i (NDP-7602-Z40L, NDP-7602-Z12L) are rated to 24VAC @ 3.5A, which will exceed the current output of the 3.15A fuse (labeled XF103 in the power supply), you cannot use the IR models of the AUTODOME 7100i camera with the following power supplies: VG4-A-PSU0, VG4-A-PSU1, VG4-A-PSU2, NDA-U-PSU0, NDA-U-PSU1, NDA-U-PSU2

⚠	**Danger!** For the 120VAC and 230VAC models of the 24VAC VG4 power supply (VG4-A-PSU1 and VG4-A-PSU2) and for the 120VAC and 230VAC models of the 24VAC power supply (NDA-U-PSU1 and NDA-U-PSU2), route only the 120VAC and 230VAC cables and Earth ground in the high voltage section of the power supply. Do not route any other wires through the high voltage section of the power supply.

⚠	**Warning!** All wiring (power and I/O cabling) connecting to the unit must be routed separately inside permanently earthed metal conduits (not supplied).
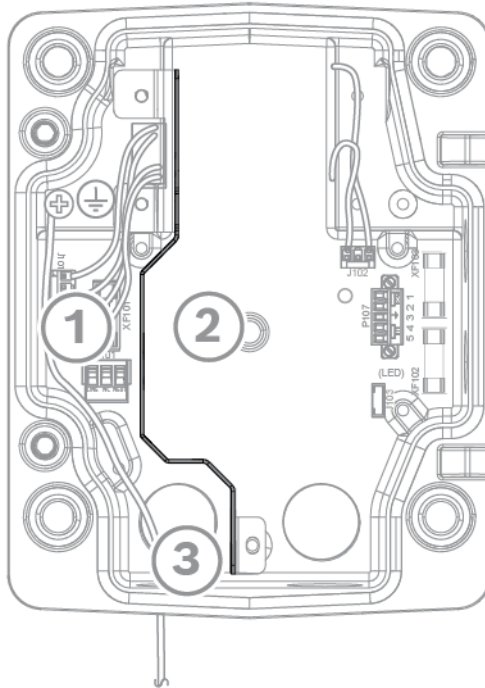
Figure 11.5: 24VAC power supply with (1) the high-voltage section (120VAC, 230VAC), (2) the low-voltage section (24VAC), and (3) the metal barrier that separates the two sections

The graphic that follows shows the connections for the power supply with wall arm (120 VAC, 230VAC models). Note: optional audio input and output cables and alarm input and relay output cables are not shown. Those cables also come from the camera through the wall arm mount and exit through one of the grounded conduit holes on the low-voltage side of the power supply,

Figure 11.6: Connections for power supply with wall arm (or is it for PSU + lid?) (120 VAC, 230VAC models)

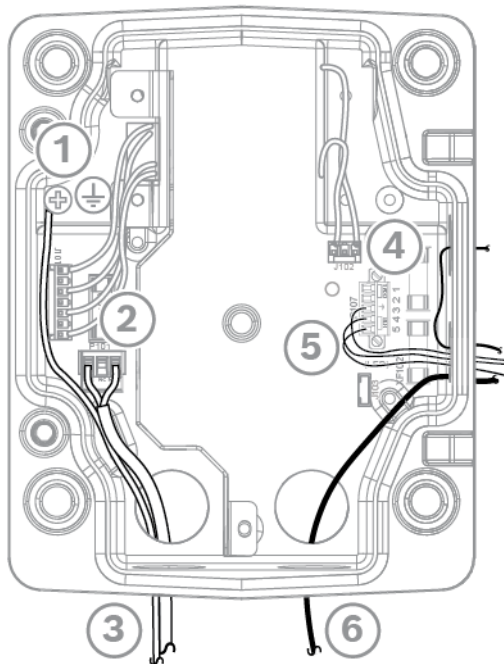| 1	Ground screw	4	(Optional Pass-through) Audio input+/-, Audio Output+/-, Alarm IN 1, Alarm IN 2, Relay NO, Relay NC, Relay COM, DGND to a low voltage; 1/2 in. (15 mm) NPS Fitting Note: Audio and alarm I/Os pass through the power supply box.as it connects from the camera to the alarm, audio test equipment which should be placed in an IP66 rated grounded metal box. Ground wire connection for the camera is the screw terminal above number 4.
2	P101 Connector; Power In (120 VAC / 230 VAC, 50/60 Hz) to a high voltage side conduit hole 3/4 in. (20mm) NPS fitting to electrically grounded metal conduit to the power source.	5	P107 Connector; 24 VAC (pins 4, 5) and ground (pin 3) to a conduit hole 3/4 in. (20mm), or 1/2 in. (15mm) NPS fitting to electrically grounded metal conduit to the camera through its mount. Note: Must use P107 pins 4, 5 for 24VAC power since that uses the 3.15 A fuse in the power supply.
3	Ground wire connects to external Earth Ground and Power In; 3/4 in. (20mm) NPS Fitting to electrically grounded metal conduit Note: The cable should remain on the high voltage side of the metal divide that separates high voltage from low voltage in the power supply.	6	Ethernet cable from Camera through a conduit hole 3/4 in. (20mm), or 1/2 in. (15mm) NPS Fitting to electrically grounded metal conduit Note: The Ethernet cable passes through the Power Supply box as it connects from the camera to the test PC

> ⚠ **Warning!**
> If reusing a VG4-A-PSU0, VG4-A-PSU1 and VG4-A-PSU2 from an earlier Bosch AUTODOME camera, the cable wiring will need to be redone as shown and should not be plugged into connectors P106 and P105 of the Power Supply Unit.

The table that follows lists the power supply box connectors:

No.	Connector	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6
	Ground	Grounding Screw - External Earth ground connection					
	Ground	Grounding metal spade - Earth ground condition to the optional arm mount					
P101	120/230 VAC, 50/60Hz or 24 VAC , 50/60Hz, Power In	Line	NC	Neutral	N/A	N/A	N/A
P107	24 VAC, 50/60Hz power to the camera	Not used for AUTODOME 7100i		Earth Ground	24 VAC Line (3.15A FUSE)	24 VAC Neutral	N/A
					24VAC to AUTODOME 7100i NDP-7602-Z40 camera		N/A
P105	Serial Communications	Not used for AUTODOME 7100i					
P106	Serial Communications						
J103	Older Fiber Connection						

Warning!
All wiring (power and I/O cabling) connecting to the unit must be routed separately inside permanently earthed metal conduits (not supplied).

To wire the incoming high voltage and the outgoing low voltage lines properly, refer to the table that follows:

No.	Connector	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6
	Ground	Grounding Screw - External Earth ground connection					
	Ground	Grounding metal spade - Earth ground condition to the optional arm mount					
P101	120/230 VAC, 50/60Hz or	Line	NC	Neutral	N/A	N/A	N/A

P107	24 VAC, 50/60Hz power to the camera		Earth Ground	24 VAC Line (3.15A FUSE)	24 VAC Neutral	N/A
	24 VAC , 50/60Hz, Power In					
				24VAC to AUTODOME 7100i NDP-7602-Z40 camera		N/A

1. Route the high voltage 120/230 VAC lines and ground wire through the 3/4 in. (20mm) NPS earth-grounded metal conduit fitting on the left side of the box. The power supply box with a transformer comes with a barrier (see graphic 10.4) that separates the high voltage side on the left, from the low voltage 24 VAC side on the right. The high voltage lines must remain to the left of this barrier.
   Note: Use of proper grommets is needed to guarantee IP66.
2. Cut and trim the high voltage 120/230 VAC power and ground wires with sufficient slack to reach their connector terminal in the box, but not so long as to be pinched by or to obstruct closing the cover door.
3. Attach the supplied 3-pin power plug to the incoming high voltage power wires in the box. Refer to connector P101 in the table above and to the image below for an illustration of these connections:

4. Attach the ground wire to the grounding screw.
5. Connect three wires to the P107 Power Out connector to route the 24 VAC power supply to the AUTODOME 7100i non-IR model (NDP-7602-Z40). Refer to connector P107 in the table above and to the image below for an illustration of these connections.
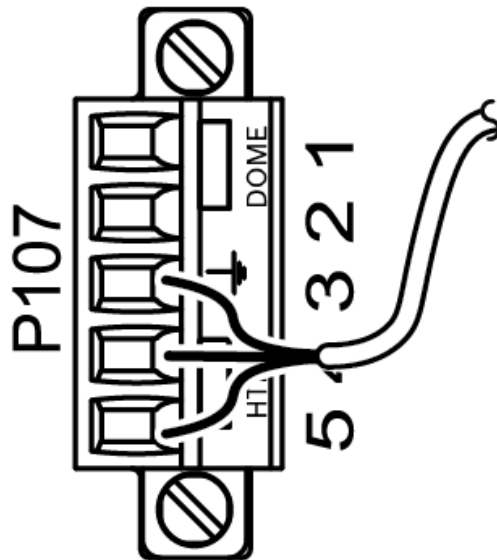
⚠️ **Warning!**

Make sure that you connect the outgoing power supply wires to the appropriate pins as described. Power supply fuse XF103 can handle a higher amperage (3.15 A) than fuse XF102 (2.0A).

---

6. Connect the first wire to pin 5 (24VAC Neutral) connector.
7. Connect the second wire to pin 4 (24VAC Line) connector. (Note: the 3.15A fuse is in this line.)
8. Connect the third wire to pin 3 (Earth Ground) connector.
9. For the AUTODOME 7100i non-IR model (NDP-7602-Z40) only, complete the three sub steps that follow, and then proceed to further steps. For IR models, skip to the next step.
   a. Route the 24 VAC outgoing power supply wires through a conduit hole to electrically grounded conduit, through a mount that supports grounded conduit (like NDA-U-WMP) to the pipe mount and to the camera, or through the Arm Mount and WPLATE to the camera.
   b. Cut and trim the 24 VAC power with sufficient slack to reach their connector terminal X105 in the camera, but not so long as to be pinched by or to obstruct closing the cover door.
   c. Attach the 24VAC lines to AUTODOME 7100i User Interface connector X105, as illustrated below.
   Note: Use of proper grommets is necessary to guarantee an IP66 rating.
   Note: Refer to *Tools Required, page 14* for a list of the appropriate types of Ethernet cable to use.
10. Route the Ethernet cable through the points mentioned in the list that follows, in sequence:
    a. From the User Interface connector X104 in the pipe or ARM mount (as shown below)
    b. Into a 3/4 in. (20mm) NPS metal conduit fitting in the NDA-U-WMP (for instance) when using a pipe mount or in the WPLATE when using the arm mount.
    c. Through electrically grounded, liquid tight metal conduit
    d. To a 3/4 in. (20mm) NPS metal conduit fitting in the PSU box, and
    e Out another 3/4 in. (20mm) NPS metal conduit fitting in the PSU box
    f. Through electrically grounded, liquid tight metal conduit

g. To the computer.

Note: Use proper grommets to guarantee an IP66 rating.

Note: Refer to *Tools Required, page 14* for a list of the appropriate types of Ethernet cable to use.

11. To electrically connect the arm or pipe mount and the camera housing to the power supply housing, connect the ground wire attached to the arm mount or pipe mount from the camera to the metal spade, as shown in number 4 of the figure *, page 64* in this subchapter.

12. (Optional step) Connect audio I/O and, or alarm inputs or alarm relay output from the AUTODOME 7100i User Interface connections in one conduit hole and out the other, through one of the two conduit holes in the PSU box, into a ¾" (20mm) or a ½" (15mm) NPS metal conduit fitting, through metal conduit, to a metal box that will hold this equipment. Refer to "Connecting the Alarm Inputs and Alarm Relay Output" and "Connecting the Audio Input and Output Wires" for additional requirements.
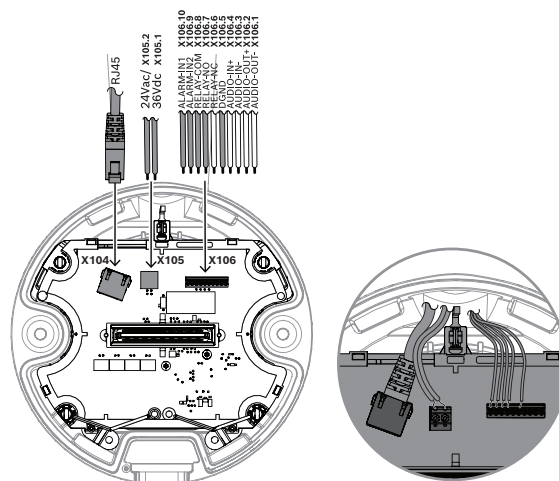
Refer to

– *Recommendations for 24 VAC Power Supply, page 52*

11.4 (Optional) Support for Fiber optic cable installation

The AUTODOME camera supports 1 Gbps fiber optic cable output using 1 Gbps 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 1 Gbps SFP modules are supported.
– The SFP modules and media converter must meet the requirements that follow:
    – When using the NDA-7100-PIPEF, refer to 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 100Mbps SFP fiber modules by Bosch.

⚠️ **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. For the IR models PoE is required when using fiber but only to provide power. Ethernet data should not be hooked up.

Requirements for the SFP modules and Media converter:

– Must use 1 GBps 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).
– QSFPs are not supported.

Note: The specifications of the chosen SFP modules, the fiber optic cables, and the media converter determine the length of the fiber optic cable.

Typical connection configuration
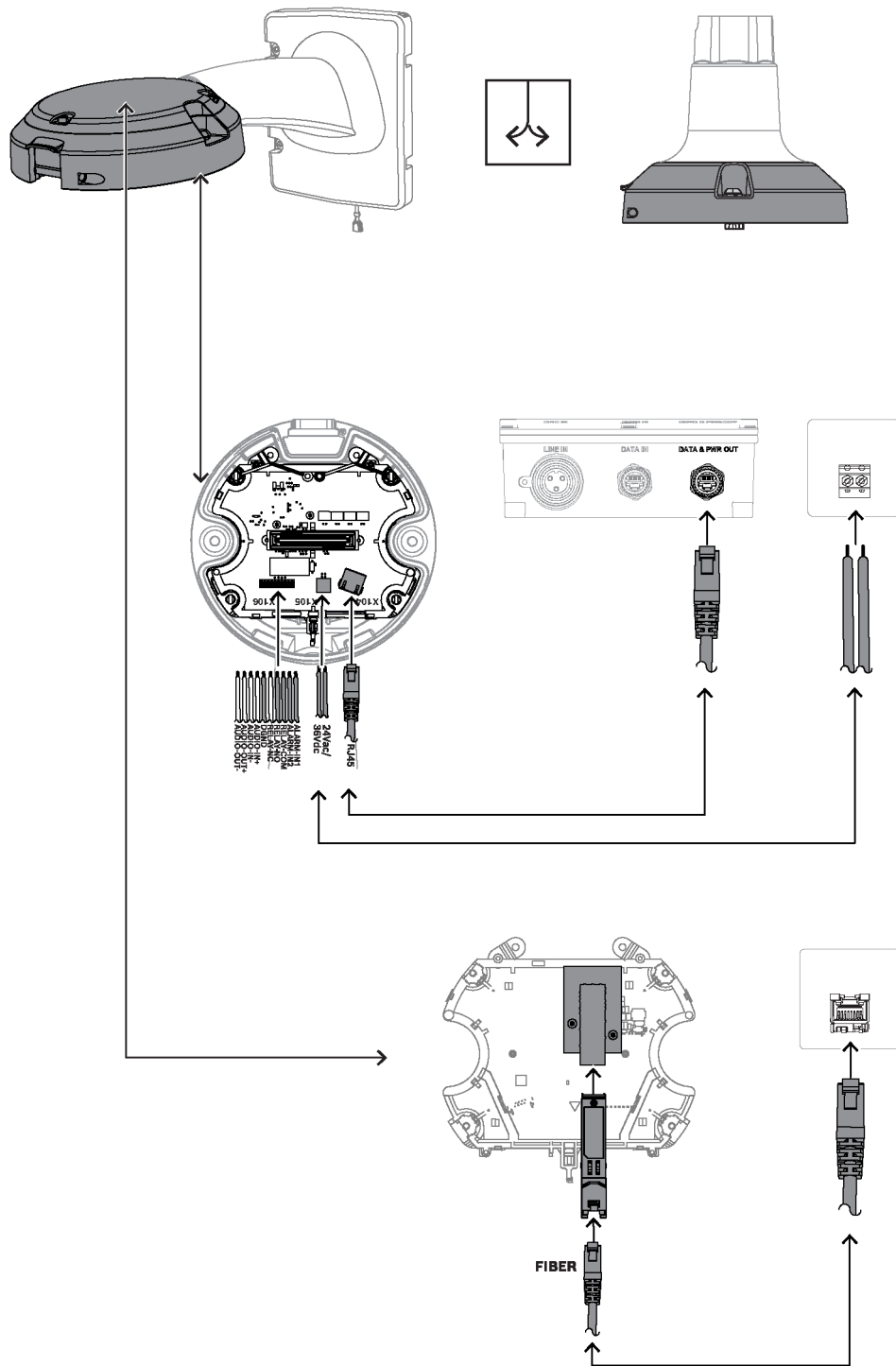
11.5 Connecting the Alarm Inputs and Alarm Relay Output

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:
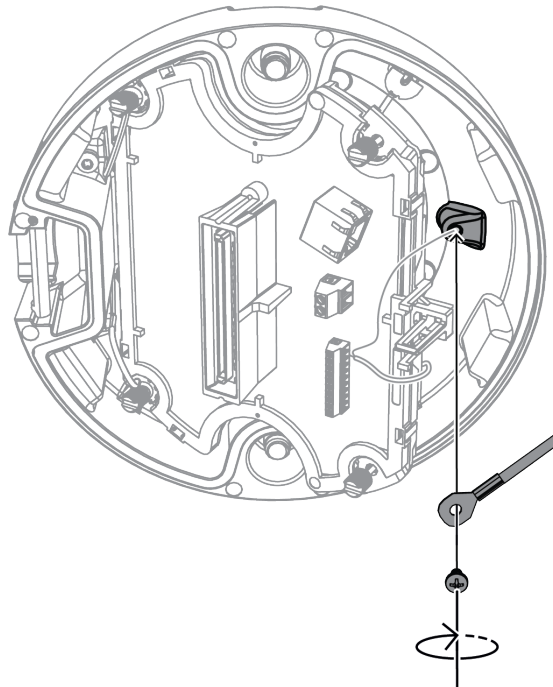
To connect the drain wire of the foil shield of the alarm input and alarm outputs, and audio input and output twisted pair cables to the chassis ground of the NDA-7100-PEN, , NDA-7100-PENF, or NDA-7100-PIPEF mounts:
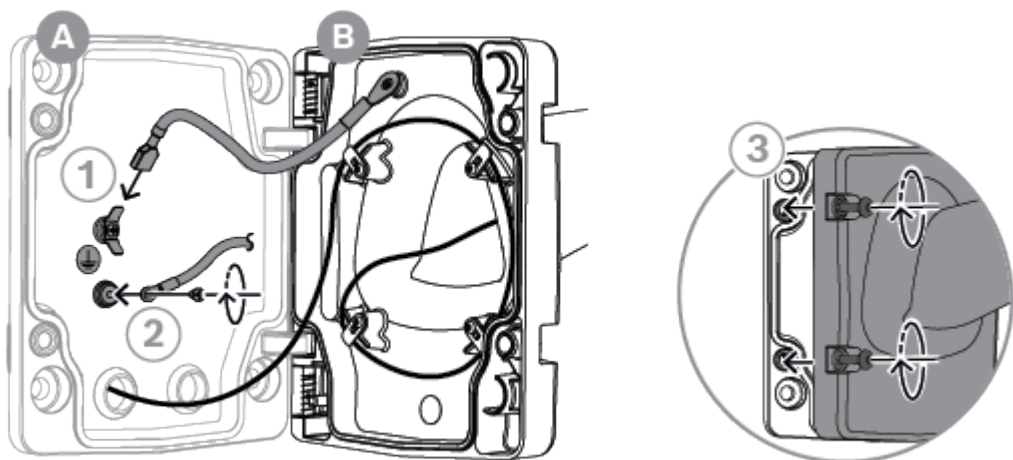
Wire size		Alarm inputs - Maximum distance		Alarm output - Maximum distance	
AWG	**mm**	**Meters**	**Feet**	**Meters**	**Feet**
22	0.643	152.4	500	N/A at maximum current	N/A at maximum current
20	0.811	243.8	800	18	72
These numbers assume maximum relay load. If switching less than this, re-calculate with the exact switching load for your particular use case to increase the allowed distances.					

Table 11.1: Wire gauge and maximum distance, alarm inputs and outputs (2MP model)

Note: Install all alarm and audio equipment in a watertight, metal enclosure that supports watertight, electrically grounded metal conduit.

11.6   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

This section identifies issues that could occur with the camera, and how to resolve them.

12.1   Background too bright

Problem

The background is too bright to see a subject or any details of the scene.

Possible root causes

–   **Backlight compensation** is **Off**.
–   The **Iris** of the camera is open too much.

Solutions

1.   Turn on **Backlight compensation** by:
      –   Using the camera GUI path: **Configuration** > **Camera** > **Scene Mode** > **Picture Settings** > **Backlight compensation**
      –   Using **AUX on** 20 on the keyboard
2.   Check if the **Iris** is in **Manual** mode and if it is too open. Select **Configuration** > **Camera** > **Lens Settings** > If yes, then close the **Iris** by:
      –   Using the **Live** page, in the **PTZ** section, click **Iris close** to close the **Iris** incrementally.
      –   Using the camera GUI: Adjust the **Manual** field as needed.

12.2   Built-in illuminators will not operate

Possible root cause

The operating temperature of the camera exceeded +74 °C (+165 °F) (the maximum temperature for NEMA TS2).

By design, the illuminators will not operate if the operating temperature exceeds +74 °C (+165 °F). this design protects the hardware of the illuminators.

Solution

1.   Operate the camera (and the illuminators) at temperatures below +74 °C (+165 °F).
2.   Let the camera (and the illuminators) cool before you try to operate it again.

12.3   Camera moves when operator tries to move other cameras

Possible root cause

The camera's IP address is not set, or not set correctly.

Solution

If camera's IP address is not set, then 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.

12.4   Camera reboots frequently or intermittently

Possible root causes

–   The camera has an improper network connection.
–   The camera has the wrong power supply.

Solutions

–   Test the camera with another power supply.
–   Check the Bosch website for a software update that might address the issue.

12.5   Dark picture

Possible root causes
–   The camera iris is closed.
–   The camera bubble still has its protective plastic sheet.
–   The Ethernet cable exceeds the maximum length (100 m (328 ft)).
–   The illuminators (for certain camera models only) are not operating (correctly).
–   Camera settings are not correct for the scene.

Solutions
–   Check that the **Gain control** (from **Configuration** > **Camera** > **Scene Mode** > **Picture Settings**) is set high.
If OK, then:
–   Check that the **Auto iris level** (from **Configuration** > **Camera** > **Lens Settings**) is set to an appropriate level, and/or that the Iris is open.
If OK, then:
–   Check that the protective plastic sheet is removed from the bubble.
If OK, then:
–   If it is dark outside, then check if the illuminators are set to **Auto**, with appropriate day/night threshold, or forced into monochrome in picture settings.
–   If the illuminators (**IR mode**) are set to **Auto**, then check if the temperature specification has been exceeded. If so, the camera will automatically turn the illuminators to **Off** to prevent damage to the unit.
If OK, then:
–   Check if the **Iris** is in **Manual** mode and is too closed for the scene.
If OK, then:
–   Check that the maximum length of the Ethernet cable does not exceed 100 m (328 ft).
If OK, then:
–   Restore all camera settings.

12.6   Dim image on screen

Possible root causes
–   The camera bubble is dirty.
–   The camera lens is dirty.

Solutions
–   For the bubble exterior: use only cleaning solutions and cloths suitable for cleaning safety glass lenses. Dry the bubble thoroughly with a dry, nonabrasive cloth to prevent water spots.
–   For the bubble interior: use clean dry compressed air, preferably from a spray can, to remove any dust from the interior surface.
Note: Never scrub the bubble with any abrasive material or cleaners.
–   Clean the camera lens with a cloth suitable for cleaning safety glass lenses.

12.7   Image flickers, streaks, or flares

Possible root cause
The camera is facing directly into the sun,
The camera is facing directly into fluorescent lighting

Solution
Change the position of the camera so that it has less light exposure.

12.8   No camera control

Possible root cause(s)
1.   The camera was "back driven" manually.
2.   (more)
Solution
Provide power to the camera.

12.9   No camera operation, or operation not as expected (after exposure to extreme low temperatures)

Possible root causes
–   The outside temperature where the camera is installed is below -35 °C (-31 °F).
–   The camera has not had enough of a warm-up period (60 minutes or more).
–   The camera needs a hardware reset.

Solutions
–   The cold start temperature of the camera is -35 °C (-31 °F). If it is colder than this outside, then let the camera warm up inside at a temperature higher than -35 °C (-31 °F). While the camera is still warm, install it outside and apply power to it.
–   If the temperature is -35 °C (-31 °F) or warmer, then let the camera warm up. The camera requires a 60-minute warm-up before PTZ operations.
–   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.

12.10   No network connection

Possible root cause
–   Issues with your equipment
–   Issues with your network

Solution
–   Check all network connections.
If OK, then:
–   If you are behind a firewall, make sure that the **Video transmission** mode is set to **UDP**. Select **Network** > **Network Access** > **Video transmission** > **UDP**. Then click **Set**.
If Ethernet output is used:
–   If using an NDA-7100-PENF or NDA-7100-PIPEF mount, check that an SFP module is not plugged into the mount since that will disable Ethernet even if a fiber optic cable is not connected to it.
–   Check all network connections including any connections through Ethernet couplers.
–   Make sure that the maximum length between any two Ethernet connections is 100 m (328 ft) or less.
–   Check the LINK and transmission LEDs on any Ethernet switch used.
If OK, then:
–   Try to power off then power on the camera.
–   Trying pressing the Factory Default button.
If Fiber optic output is used with NDA-7100-PIPEF or NDA-7100-PENF:
–   Check that a Bosch 100Mbps SFP module is not being used since it is not supported.
–   Check that the SFP module supports 1 Gbps.

- Check compatibility between the SFP modules on both sides of the fiber optic, to the fiber optic cable type, and to the media converter.
- Check that the fiber optic cable is plugged into the SFP module on both sides of the network.
- Check that the fiber optic cable is not damaged and is terminated properly.
- Check that there is a fiber link on the media converter.
- Make sure that the fiber optic cable distance specified by the SFP modules used has not been exceeded.
- Power off then power on the camera.
- Power off then power on the media converters.

12.11   No video

Possible root causes
- The camera does not have power.
- The midspan does not support the correct IEEE standard for the camera model.
- The camera uses the wrong type of SFP module.
- The camera has the wrong IP address.
- Wires in the power cable to the camera may be damaged.
- The camera needs a hardware reset.

Solutions
- Check that the mains power to the power supply is on.
- Check that the PoE switch or midspan supports IEEE 802.3bt Type 3, Class 6 (60W), for non-IR models, and IEEE 802.3bt Type 4, Class 8 (90W), for the IR models.
- Check that the same SFP module is used on both ends of the fiber, and that it supports the type of fiber being used. Also make sure that the SFP module supports 1 Gbps.
- Check to see if you have a web page.
  If you do not, then you may have the wrong IP address. Use Configuration Manager to identify the correct IP address.

If OK, then:
- Check that there is 24 V output from the transformer.

If OK, then:
- Check the integrity of all wires and mating connectors to the camera.

If OK, then:
Reset the camera to factory defaults. (Refer to the Troubleshooting section "Completing a hardware reset.")

12.12   Privacy mask misaligned

Possible root cause

Solution
- Web browsers or BVMS
  - Press the **Find home button** on the **Special Functions** menu to align the mask to the original position.
- IntuiKey (when keyboard is connected to BVMS)

Issue a **SetScene 110** command to align the mask to the original position.

12.13   Rolling, noisy, or distorted video

Possible root causes
–   Too much vibration on the camera.
–   The Ethernet cable has damage.
–   The camera settings are corrupted.

Solutions
–   Check that there is not too much vibration in the application.
–   Check the frequency. In the **Sensor mode** field (from **Configuration** > **Camera** > **Installer Menu** > **Sensor mode**, choose either 25 ips or 30 ips.
–   Check the integrity of all connectors and splices of the Ethernet cable.
–   Reset the camera to factory defaults to make sure that the camera settings are not corrupted (In the camera WebGUI: **Configuration** > **Camera** > **Installer Menu** > **Factory defaults**).

If OK, then:
Contact Bosch Technical Support.

12.14   Weak contrast on screen

Possible root causes
–   The camera has too much light exposure.
–   The contrast of the computer monitor is too low.

Solutions
–   Change the position of the camera so that it has less light exposure.
–   Adjust the contrast feature of the monitor.

12.15   Web page but no video

Possible root causes
–   The camera web browser needs a refresh.
–   The iris is closed.
–   There is a problem with the version of the Bosch VideoSDK software.
–   The scene does not have adequate light.

Solutions
–   Refresh the web browser.
–   Close and reopen the web browser.
–   Try a different web browser.
–   Try to open the lens iris manually to check that it is not closed all the way.
–   If there is no **Stream 1** or **Stream 2** display, check to see if there is an **M-JPEG** display. If there is **M-JPEG** but not a **Stream 1** or **Stream 2** display in H.264 or H.265, then the problem might be with the version of the Bosch VideoSDK software.
–   Check that there is adequate light in the video scene. If it is an IR model, make sure that the illuminator is active.

12.16   Completing a hardware reset

You may need to complete a hardware reset if you have the following issues:
–   You can power up the camera but cannot log on to the camera using the web browser.
–   The camera does not start up, or fails to power up via PoE.
–   The camera cannot search an IP address.
–   The camera's firmware crashed.

- You forgot the password to access the camera.
- The image becomes frozen.
- You cannot update the firmware.
- The camera disconnects from the network at random and needs a reboot.
- The camera no longer finds pre-positions (preset positions).
- You cannot configure the camera using the web browser.
- The camera has no video out.

Notice!
A factory default deletes all camera settings including passwords, network settings, and image settings.
Complete the following sequence of steps only if you have no other option to restore operation to the camera.

**Steps to complete a hardware reset for all camera models**
1. Apply power to the camera.
2. Find the IP address of the camera.
3. Log on to the camera using the web browser. (**Note**: You can use Configuration Manager to identify the IP address.)
4. Find the hardware reset area on the camera. (Refer to the figure below to find the reset button or terminal for your camera model.)
5. Push and hold the reset button for more than 8 seconds.

Caution!
Make sure to use a non-electrical conductive tool to push the reset button. There is a risk of electric shock.

6. Let the camera complete a self-check.
7. Find the IP address again.
8. Access the camera using the web browser.
9. Set the initial **service**-level password for the camera.
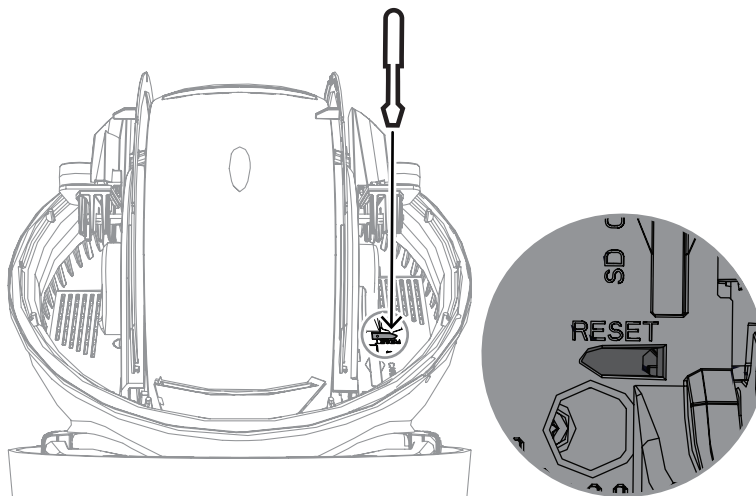
12.17 Rebooting the unit

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.

> **i** **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.

> **i** **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 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   Support services and Bosch Academy

Support

Access our **support services** at 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/

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