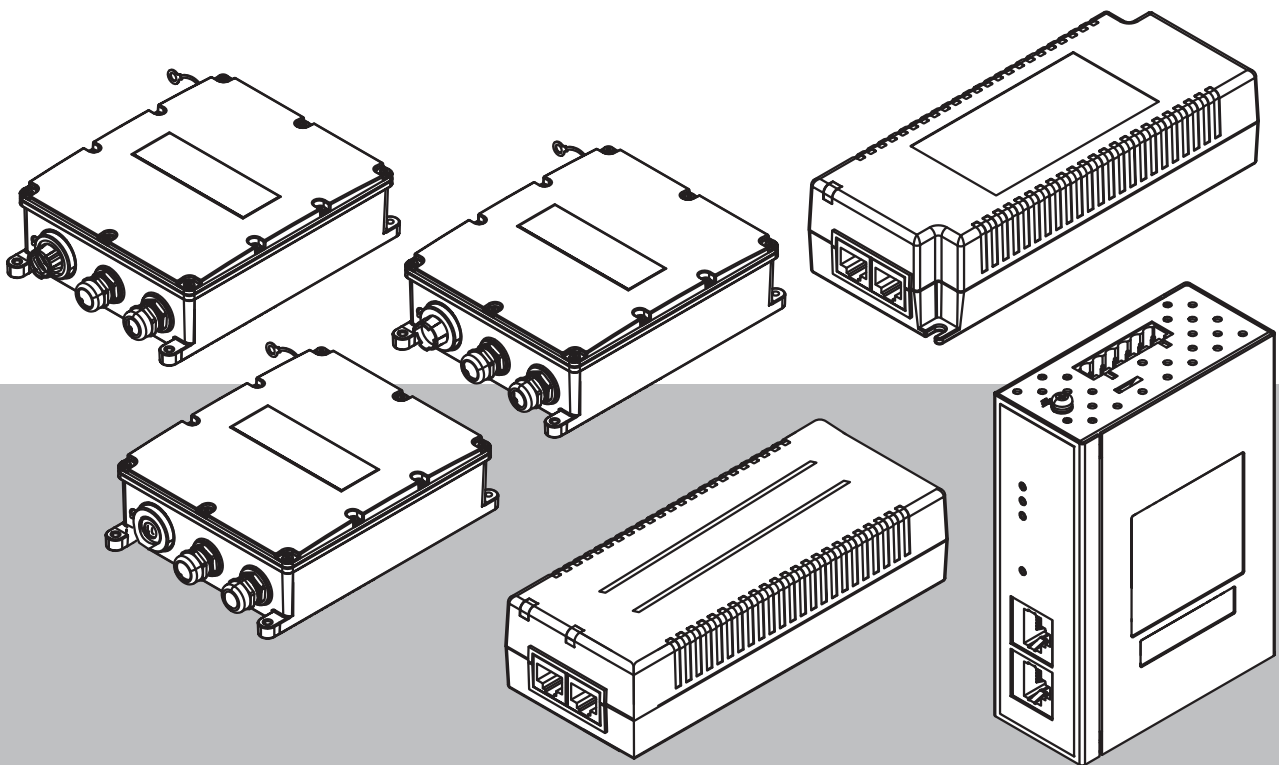# Bosch Midspans

NPD-6001B | NPD-9501A | NPD-9501-E | NPD-6001C |
NPD-6001C-BT | NPD-6001C-E | NPD-6001C-EBT | NPD-6001-I |
NPD-6001-IBT | NPD-9001-E | NPD-9001-EBT | NPD-9501A-G

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

In this manual, the following symbols and notations are used to draw attention to special situations:

⚡	**Danger!** High risk: This symbol indicates an imminently hazardous situation such as "Dangerous Voltage" inside the product. If not avoided, this will result in an electrical shock, serious bodily injury, or death.
⚠	**Warning!** Medium risk: Indicates a potentially hazardous situation. If not avoided, this may result in minor or moderate injury.
⚠	**Caution!** Low risk: Indicates a potentially hazardous situation. If not avoided, this may result in property damage or risk of damage to the unit.
ⓘ	**Notice!** This symbol indicates information or a company policy that relates directly or indirectly to the safety of personnel or protection of property.

1.4 Important Safety Instructions

– The unit should be connected to PoE networks only, without routing to the outside plant.
– Only qualified personnel can install or remove the unit.
– Follow basic electricity safety measures whenever connecting the unit to its power source.
– A voltage mismatch can cause equipment damage and may pose a fire hazard. If the voltage indicated on the label is different from the power outlet voltage, do not connect the unit to this power outlet.
– Read the installation instructions before connecting the unit to its power source.
– Installation and removal of the midspan must be carried out by qualified personnel only.
– Follow basic electricity safety measures whenever connecting the midspan to its power source.
– A voltage mismatch can cause equipment damage and may pose a fire hazard. If the voltage indicated on the label is different from the power outlet voltage, do not connect the midspan to this power outlet.
– The PoE injector "Data In" and "Data & Power Out" ports are shielded RJ45 data sockets. They cannot be used as Plain Old Telephone Service (POTS) telephone sockets. Only RJ45 data connectors can be connected to these sockets.
– The Data In and Data & Power Out interfaces are qualified as SELV (Safety Extra-Low Voltage) circuits according to IEC 60950-1. These interfaces can only be connected to SELV interfaces on other equipment.
– This product is not intended to become a permanent part of the building structure.
– Do not attach the power supply cord to the building surface.
– Do not run the power supply cord through walls, ceilings, floors, or similar openings in the building structure.
– Take appropriate measures to prevent physical damage to the power supply cord, including proper routing.
– This device is not suitable for installation in corrosive environments with salt water. Installers must make sure that the installation location does not expose the device housing directly to salt water.
– This device is not suitable for installation or operation in an environment with SO_2.

For more information, refer to the installation manual, available at http://www.boschsecurity.com/catalog_overview.htm

Important safety information

EMC compliance
– FCC Part 15 class A/B and EN 55032 class A/B
– EN55035
– VCCI
– ICES-003

Safety compliance
– UL/cUL per 62368-1

2   Unpacking

2.1   Parts List

The package containing the midspan should include the following items:

NPD-6001B, NPD-9501A, NPD-9501A-G

Quantity	Component
1	PoE midspan
1	120 VAC power plug
1	230 VAC power plug
1	Quick Installation Guide

NPD-9501-E

Quantity	Component
1	High PoE Midspan 95 W, outdoor model
1	120 -240 VAC power plug
2	Waterproof cap covers for male RJ45 port plugs
1	Quick Installation Guide

NPD-6001C, NPD-6001C-E, NPD-6001C-EBT, NPD-9001-E, NPD-9001-EBT

Quantity	Component
1	PoE Midspan
1	Power cord, 110 VAC
1	Power cord, 230 VAC
1	Quick installation guide

NPD-6001-I, NPD-6001-IBT

Quantity	Component
1	PoE Midspan
1	DIN-mount bracket set
1	Quick installation guide

2.2   Additional Parts Required

The following table lists additional parts (not supplied by Bosch) required to install the midspan:

NPD-6001B, NPD-9501A, NPD-9501A-G

Quantity	Part	Size	Notes
2	Mounting screws; Select either size (but not both).	Head diameter: 5.8 mm (0.23 in.)	1.5 mm (0.059 in.) clearance from mounting surface
		Head diameter: 7 mm (0.27 in.) Head height: 2 mm (0.08 in.)	2.5 mm (0.098 in.) clearance from mounting surface
2	CAT5 cables	Not to exceed 100 m (328 ft) total cable length	1 cable to connect to the "Data & Power Out" port. 1 cable to connect to the "Data In" port.

NPD-9501-E

Quantity	Part	Size	Notes
4	Mounting screws		
2	CAT5 cables	Not to exceed 100 m (328 ft) total cable length	1 cable to connect to the "Data & Power Out" port. 1 cable to connect to the "Data In" port.
2	RJ45 connectors, male		

2.3   Tools Required

Screwdriver

2.4   Additional Parts Recommended But Not Required

The following table lists additional parts (not supplied by Bosch) recommended to install the midspan:

Quantity	Part
1	Surge suppressor
1	Splitter
1	Universal Power Supply (UPS)

3   System overview

NPD-6001B

60 W Midspan

The 60 W midspan enables remote High Power over Ethernet (High PoE) for various Bosch IP/HD PTZ cameras. Generating a maximum of 60 W, it complies to the IEEE 802.3af standard, while doubling the available power.

NPD-9501A

+

NPD-9501A-G

The 95 W midspan is a high-power PoH (Power Over HDBase T) device that provides data and power between an Ethernet switch and an IP camera.

NPD-9501-E

The 95W outdoor midspan NPD-9501-E is a high-power PoH (Power Over HDBase T) device that suitable for outdoor applications. Robust design helps for a critical installation environment.

NPD-6001C, NPD-6001C-BT

The PoE Midspan enables remote PoE power for various Bosch IP PTZ cameras. The PoE Midspan generates a maximum of 60 W and complies to the IEEE 802.3 bt type 3 standard.

NPD-6001C-E, NPD-6001C-EBT

The PoE Midspan for outdoor installations enables remote PoE power for various Bosch IP PTZ cameras. The PoE Midspan generates a maximum of 60 W and complies to the IEEE 802.3 bt standard.

NPD-6001-I, NPD-6001-IBT

The PoE Midspan for industrial applications enables remote PoE power for various Bosch IP cameras. The PoE Midspan generates a maximum of 60 W and complies to the IEEE 802.3 bt type 3 standard.

The industrial model also has three key features:

Compact size: The compact size of the midspan allows installers to put the midspan into an outdoor casing (for example, for a traffic application).

Wide operating temperature range: With a wide operating temperature range (-40 °C to +75 °C (-40 °F to +167 °F)), the NPD-6001C-E midspan is suitable for an outdoor environment, and can support installation on a DIN-mount rack.

Two separate DC input power connections: With two separate DC input sources connected to the midspan, a power redundancy feature can be created.

NPD-9001-E, NPD-9001-EBT

The PoE Midspan for outdoor installations enables remote PoE power for compatible IP PTZ cameras from Bosch. The PoE Midspan generates a maximum of 90 W and complies to the IEEE 802.3bt type 4 standard.

Compatibility

Note: Refer to the product page of the camera on the online catalog to identify the midspans compatible with your camera.

4   Installation (Indoor models)

4.1   Install the NPD-6001B │ NPD-6001C │ NPD-9501A │ NPD-9501A-G

NPD-6001B, NPD-6001C, NPD-9501A, NPD-9501A-G

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!
FOR INDOOR USE ONLY

Notes
Note: Do NOT use cross-over cable between the Data & Power Out port and the camera!
Note: The midspan is not a repeater and does not amplify the Ethernet data signal.
Note: The total length of Cat5e/Cat6 Shielded Twisted Pair (STP) cable must be less than 100 m (328 ft) between the camera and the head-end system.
Before mounting the midspan to a fixed location, note the following:
–   Do not cover the midspan or block the airflow to the PoE with any foreign objects.
–   Keep the midspan away from excessive heat and humidity and free from vibration and dust.
–   Ensure that the cable length from the Ethernet network source to the terminal does not exceed 100 meters (328 feet). The midspan is not a repeater and does not amplify the Ethernet data signal.
–   No "on-off" switch exists; simply plug the midspan into an AC power source.
Place the midspan on a desktop, or mount it to a wall, a bench, or a shelf using the mounting holes in the bottom of the device.

Mount the Unit Directly to a Flat Surface
1.   Select the mounting location and surface. Ensure that the selected surface will be able to support the weight of the unit (400 g (0.88 lb) for NPD-9501A and NPD-9501A-G; 340 g (0.75 lb) for 60 W models). Note that this unit is intended only for installation in a Restricted Access Location.
2.   Install two mounting screws (user-supplied) in the selected mounting surface, at the appropriate distance apart from the center of each screw (9.17 cm / 91.7 mm (3.61 in.) for NPD-9501A and NPD-9501A-G).
3.   Align the mounting holes on the unit to the screws.
4.   Slide the unit into place.

NPD-6001B

NPD-9501A | NPD-9501A-G

3.8
[1-½]

9.17
[3-39/64]
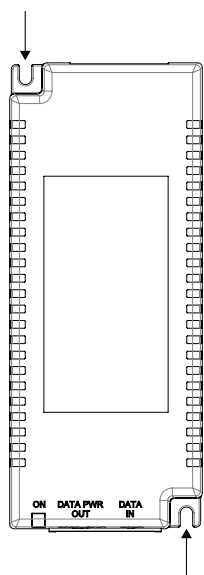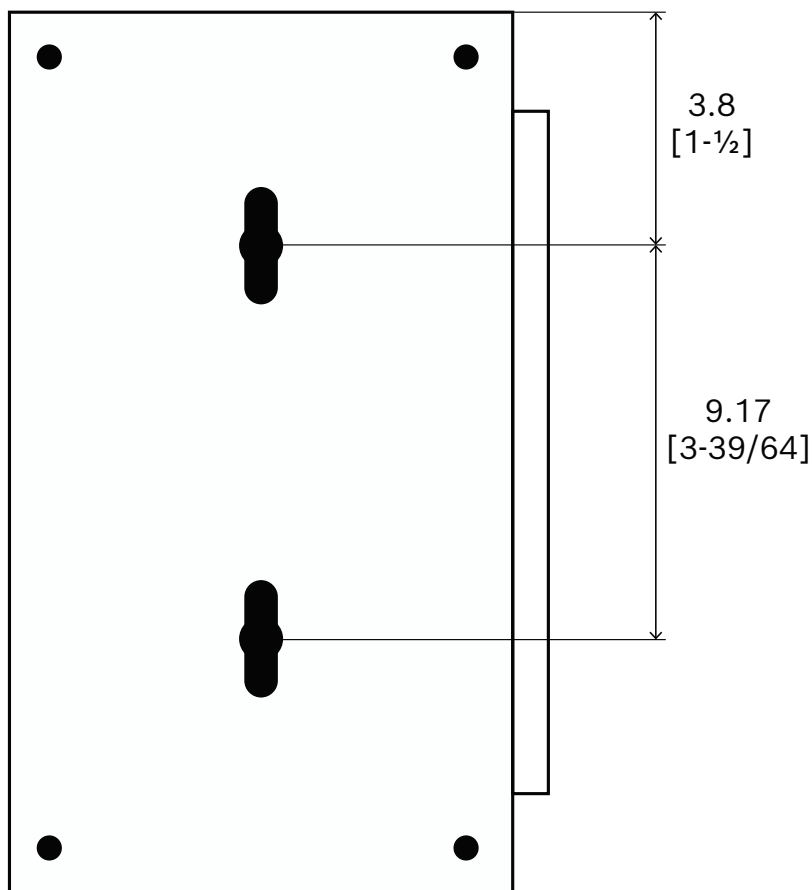
Screw/nail dimensions
5.8-7.0
[0.23-0.27]

1.5-2.0
[0.059-0.08]
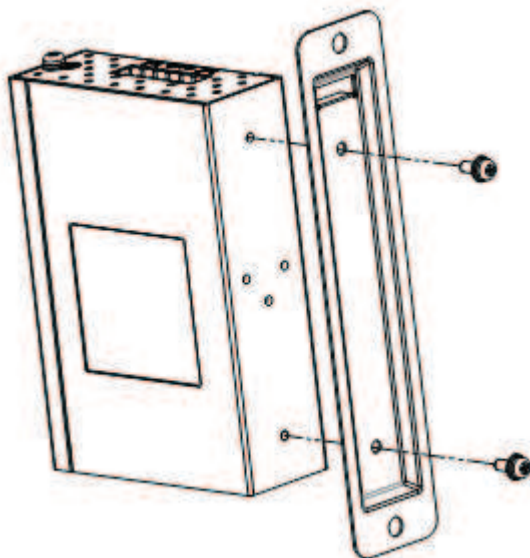
1.5-2.5
[0.059-0.098]

3.0
[0.12]
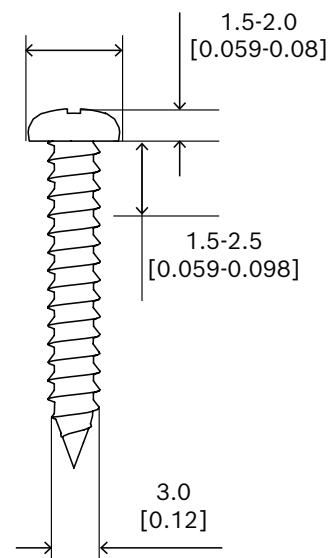
mm [in]

Stack One Unit on Top or on the Side of Another Unit (95 W models only)
Slide the rail on the right side (when facing the ports) of one unit to the left side (when facing the ports) of a second unit.

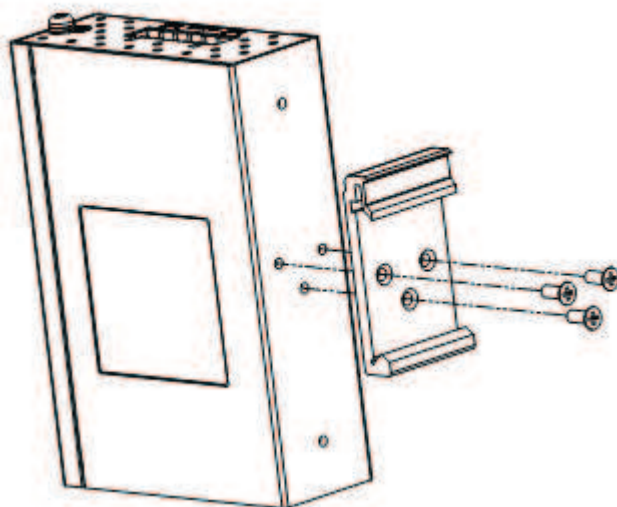## 4.2   Install the NPD-6001-I ⎪ NPD-6001-IBT directly to a wall

1. Attach the wall bracket to the side of the midspan, as in the graphic that follows.

2. Install the bracket to the wall.

4.3   Install the NPD-6001-I ⎪ NPD-6001-IBT to a DIN rail

1. Attach the DIN rail bracket to the side of the midspan, as in the graphic that follows.

2. Install the bracket to the DIN rail.

5   Installation (Outdoor models)

5.1   Installation overview

NPD-6001C-E, NPD-6001C-EBT, NPD-9001-E, NPD-9001-EBT, NPD-9501-E

> **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.

> **Caution!**
> Risk of electrostatic discharge
> Connect the Earth ground screw to Earth ground in all types of installations.

Notes

Note: Do NOT use cross-over cable between the Data & Power Out port and the camera!

Note: The midspan is not a repeater and does not amplify the Ethernet data signal.

Note: The total length of Cat5e/Cat6 Shielded Twisted Pair (STP) cable must be less than 100 m (328 ft) between the camera and the head-end system.

1. Select a secure installation location for the midspan. Ideally, this is a location where no one can interfere with the device, either intentionally or accidentally.
2. Connect the midspan to ground.
3. Install the midspan. You have these options to install the midspan:
– To a wall directly.
– To a wall or to a pole with the pole mount adapter for your midspan (NDA-9501-PMA or NDA-6090-PMA, sold separately).
4. Connect the AC cable.
5. Connect the RJ45 cable.

5.2   Connect the outdoor midspan to ground

1.   Connect the chassis bolt to the Earth ground point on the rear of the midspan.

1.1 Nm - 1.7 Nm
(10 - 15 Lb-in.)
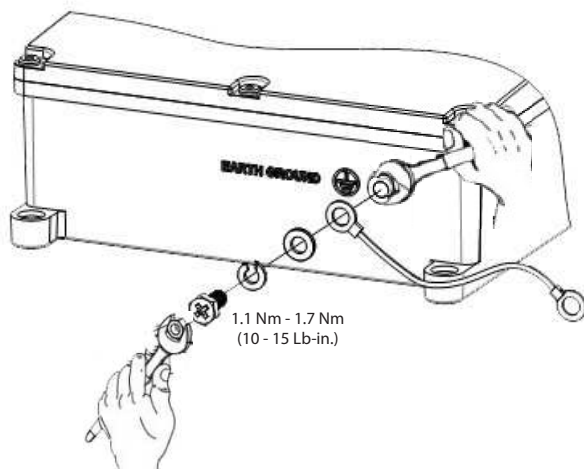
2.   Tighten the screw to 1.1 N m to 1.7 N m (0.83 lbf ft to 1.25 lbf ft/10 lbf in. to 15 lbf in.) to prevent water ingress.
3.   Connect the other end of the ground wire to Earth ground at your installation point.

1.1 Nm - 1.7 Nm
(10 - 15 Lb-in.)
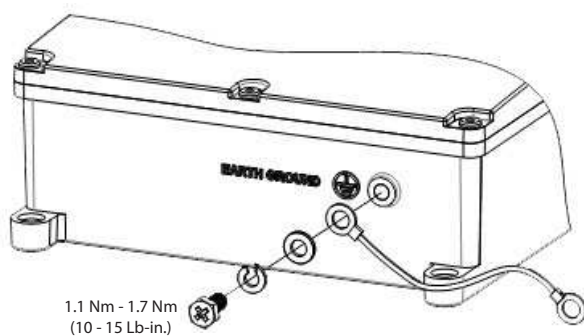
5.3   Install the outdoor midspan directly to a wall

1.   Using the screw holes of the midspan as a template, put marks on the mounting surface (a wall of wood, brick, or concrete) to show where to drill holes to install the midspan.
2.   Drill the four (4) holes.
3.   Insert four mounting screws (not supplied) into the screw holes (items 1 through 4 in the figure that follows).
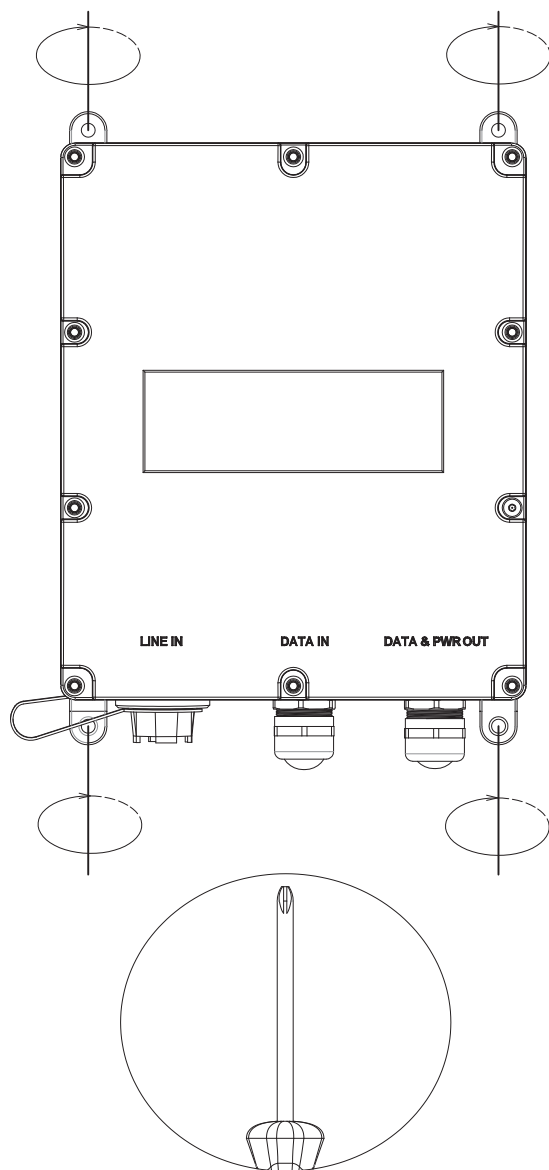
4.   Tighten each screw until the midspan is attached safely to the mounting surface.

5.4   Install the outdoor midspan to a pole mount adapter

Before you start installation, make sure 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.

Parts List, NDA-9501-E pole mount adapter

| Quantity	Component
1	Mounting bracket
2	Worm clamp [to install on a pole of 3 in. to 8 in.]
2	Omega clamp [to install on a pole of 1 in. to 3 in.]
6	Screw with pan head, M5 mm x 16 mm [to attach the midspan to the metal bracket]
4	Screw with hex head, M6 mm x 110 mm [to install on a pole of 1 in. to 3 in.]
4	Hex nut, M6 [to use with the Screw with hex head, M6 mm x 110 mm]
8	Flat washer, M6 [to use with the Screw with hex head, M6 mm x 110 mm]
6	Flat washer, M5 [to connect the ground cable and/or to attach the midspan to the metal bracket]
4	Spring lock washer, M6 [to use with the Screw with hex head, M6 mm x 110 mm]
6	Washer lock tooth, M5

Parts List, NDA-6090-PMA pole mount adapter

Quantity	Component
1	Midspan outdoor pole mount
2	Worm clamp
2	Omega
6	M5/16 Flat screw
2	M5 Lock tooth washer
2	M5 Flat washer
4	M6/110 Hex screw
8	M6 Flat washer
4	M6 Spring washer
4	M6 Nut

> **ⓘ**   **Notice!**
> Earth grounding necessary for lightening suppression
> When using a pole mount adapter, make sure to ground the pole to earth for lightning suppression.

1. Install the midspan onto the mounting bracket of the pole mount adapter, using four (4) pan head screws.
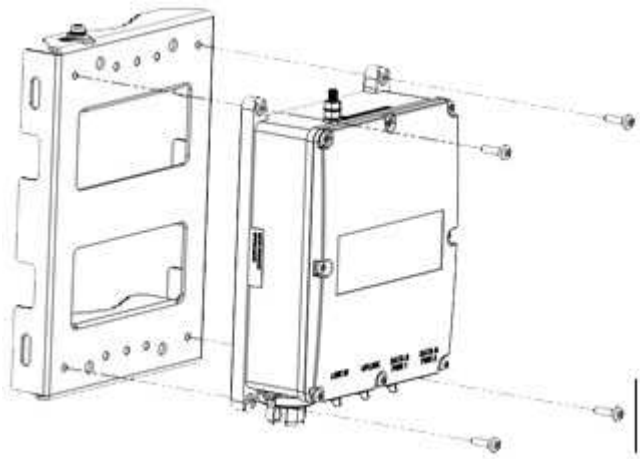
2. Install the mounting bracket onto the wall or onto the pole. Use the appropriate components depending on the diameter of the pole.

Pole of small diameter

The table that follows identifies the components to install the metal bracket on a pole with a diameter of 25 mm to 76 mm (1 in. to 3 in.).

| Quantity		Component	Function
2		Omega clamp	To install the midspan on a pole
4		Screw with hex head, M6 mm x 110 mm	To install the midspan on a pole
8		Flat washer, M6	To use with the Screw with hex head
4		Spring lock washer, M6	To use with the Screw with hex head
4		Hex nut, M6	To use with the Screw with hex head
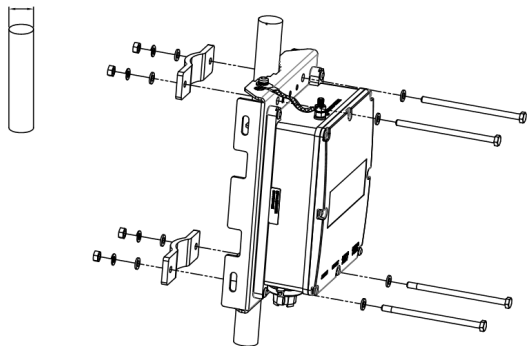
Pole of large diameter

The table that follows identifies the components to install the metal bracket on a pole with a diameter of 76 mm to 203 mm (3 in. to 8 in.).

Quantity		Component	Function
2		Worm clamp	To install the midspan on a pole

Note: Make sure to tighten the worm clamps, but do not overtighten.

Note: No figure is available of installing the adapter on a pole with a large diameter.

1. For poles of both small and large diameter, connect the ground wire from the midspan to the bracket. Use the components identified in the table that follows.

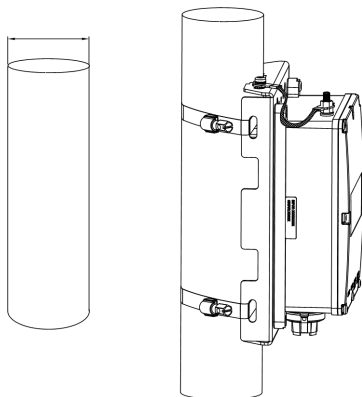| Quantity		Component	Function
6		Screw with pan head, M5 mm x 16 mm	To connect the ground wire
6		Flat washer, M5	To use with the pan head screw
6		Washer lock tooth, M5	To use with the pan head screw
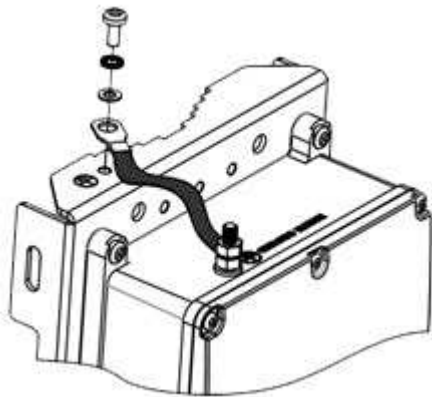
1. Refer to the two figures that follow for illustration of final installation of the bracket.
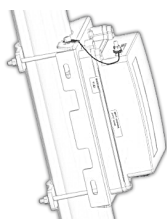
Figure 5.1: Midspan on pole mount adapter installed on pole with small diameter

Figure 5.2: Midspan on pole mount adapter installed on pole with large diameter

Figure 5.3: Midspan on pole mount adapter NDA-6090-PMA installed on pole

5.5   Connect the AC cable

1.   Assemble the AC cable, using the figure that follows as a guide.
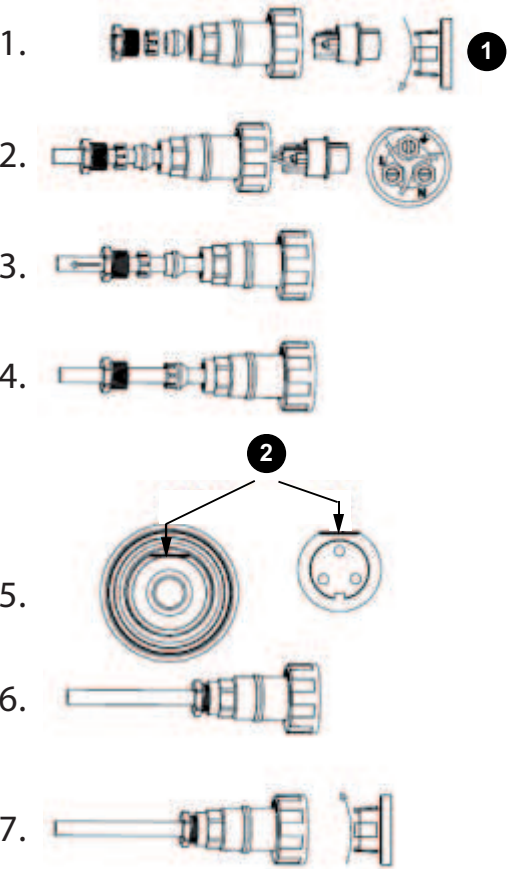
1	Use the AC outer ring cap to open the AC cable connector.
2	Verify that the slots are parallel.

5.6   Connect the RJ45 cable

1.   Assemble the RJ45 cable, using the figure that follows as a guide.

2.   Make sure that the rubber gasket is closed tightly around the cable.

6   Connection

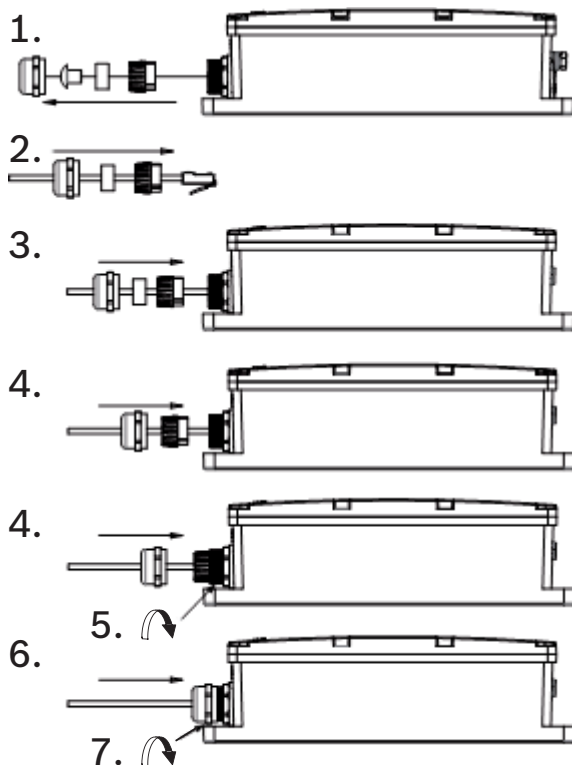**Note**: No "on-off" switch exists; simply plug the midspan into an AC power source.

Notice!

The PoE ports "Data In" and "Data & Power Out" are shielded RJ45 data sockets. They cannot be used as "Plain Old Telephone Service" (POTS) telephone sockets. Connect only RJ45 data connectors (EIA 568A and 568B) to these ports.

The "Data In" and "Data & Power Out" interfaces are qualified as "Safety Extra Low Voltage" (SELV) circuits according to IEC 60950-1. These interfaces can be connected only to SELV interfaces on other equipment.

6.1   Connect the NPD-6001B | NPD-6001C | NPD-9501A | NPD-9501A-G

1. Connect the midspan to an AC power outlet (100 - 240 VAC) using one of the two power cords supplied or a power cord that has the appropriate ratings and specifications. (Refer to the Safety chapter.)
    Note: The voltage of the power outlet must match the voltage indicated on the midspan label.
2. Connect the Data In (input) port to the remote Ethernet network switch.
3. Connect the Data & Power Out (output) port to the Ethernet port on the camera.
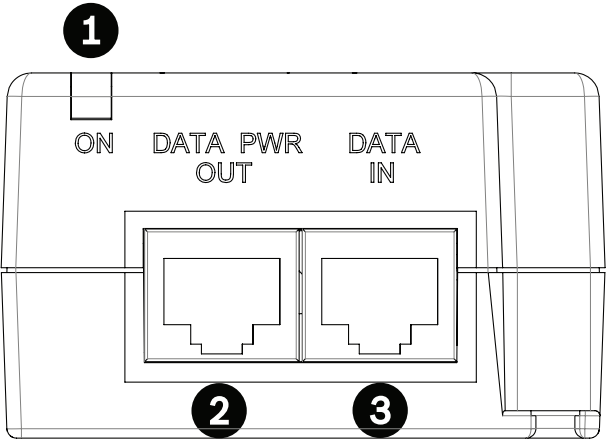   **Note:** Do NOT use cross-over cable!

Figure 6.1: Midspan connections

1	Power connectivity indicator
2	Connection to camera
3	Connection to Ethernet switch

6.2   Connect the NPD-6001C-E ┃ NPD-6001C-EBT ┃ NPD-9001-E ┃ NPD-9001-EBT ┃ NPD-9501-E

1. Connect the Ethernet cable from the remote Ethernet network to the "DATA IN " (input) jack (item 2 in the following figure).
2. Connect the terminal to the "DATA & PWR OUT" (output) jack (item 3 in the following figure).
3. Connect the midspan to a weather-proof AC power source box that meets outdoor waterproof rating.
4. Connect the AC power lines from the "LINE IN" terminal (item 1 in the following figure) to main AC power. Make sure that the power outlet is nearby and easily accessible. Make sure that the 'N', 'L,' and 'Ground' terminals have the correct polarity. (Ground is the bottom pin.)
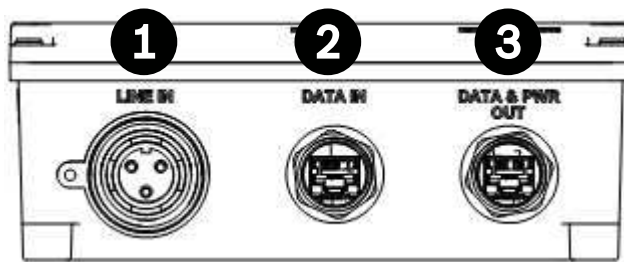
Number	Label	Description
1	LINE IN	Power input, 100 to 240 VAC
2	DATA IN	Data in to the Ethernet (network) switch
3	DATA & PWR OUT	Data and power out to the Ethernet port on the camera

6.3   Connect the NPD-6001-I ┃ NPD-6001-IBT

1. Connect the midspan to a DC power outlet (20-60 VDC).
Note: The voltage of the power outlet must match the voltage indicated on the midspan label. The power inlet cables (not included) must be rated for current capacity of 4 amps (stranded tinned copper 16 AWG for each terminal).
1. After inserting an inlet to the connector terminals (from 1 input power source), tightly fasten the 2 connector screws. If you use a two-input power supply, fasten all 4 connector screws (see figure 2 for instructions).
2. Make sure you don't mix up inlet power pins with alarm pins (see figure 2 for reference).
3. For improved EMI performance, connect chassis ground connection to "Earth/Ground" connection at the working area.
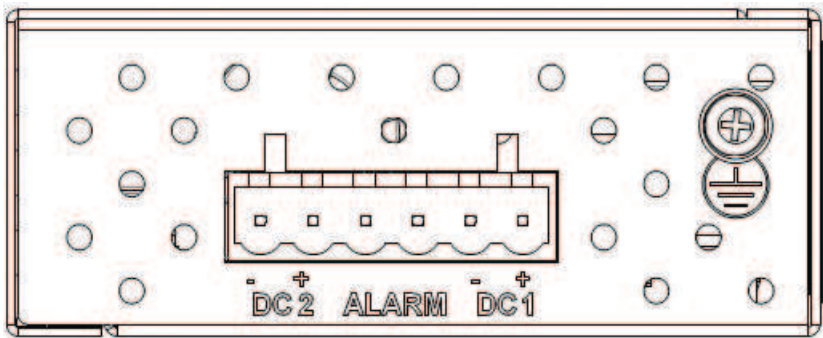
Figure 6.2: NPD-6001-I | NPD-6001-IBT power, alarm, and ground connections

4.   Connect the Data In (input) port to the remote Ethernet network switch.

5.   Connect the PoE Data & Power Out (output) port to the Ethernet port on the camera.
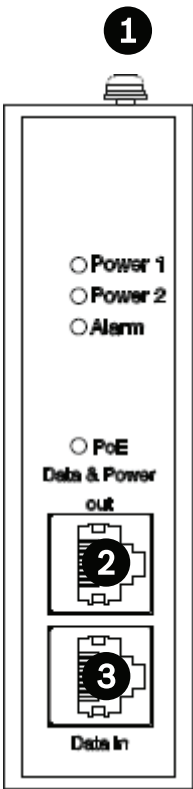
Note: Do NOT use cross-over cable!

Figure 6.3: NPD-6001-I | NPD-6001-IBT connections

1	Power input (24-48 VDC)
2	Data and power to the Ethernet port of the camera
3	Data to the network switch

7   Troubleshooting

The following tables identify the LED indicators on the top of the midspan.

AC (Main) LED Indicator (95 W)

AC (Main) LED	OFF	Green
Green	Power off indicator	Power on indicator (power is active)

Port LED Indicator (NPD-6001B, NPD-6001C)

Port LED	Behavior
– OFF	– No detection or disconnected or no load is connected.
– Yellow ON	– Power is supplied over the data pair or over the spare pair.
– Green ON	– Power is supplied over the data and spare pairs together.
– Blinking yellow at 1 Hz rate	– Over current or short circuit condition at one of the 2 pairs (the other pair is OFF) - data or spare, (PD or cable fault)
– Blinking yellow and green at 1 Hz rate	– Over current or short circuit condition at one or both pairs - data or/and spare, (PD or cable fault)
– Blinking yellow or green at 4 Hz rate	– Internal fault condition

Port LED Indicator (95 W)

Port LED	Behavior
– OFF	– Nothing is connected to the port.
– Yellow ON	– Power is supplied over the data pair or over the spare pair.
– Green ON	– Power is supplied over the data and spare pairs together.
– Blinking green at 0.5 Hz rate	– Port was powered at four pairs, then a short circuit condition or an over voltage limit (OVL) event occurred.
After AC voltage is supplied, the green LED will blink, and then the yellow LED will blink, each for one second.	

NPD-6001-I | NPD-6001-IBT

Port LED	Behavior
Power 1	If this LED emits (green), then there is a working power source connected to power 1 control circuit.
Power 2	If this LED emits (green), then there is a working power source connected to power 2 control circuit.

Port LED	Behavior
Alarm	If this LED emits (red), then there is a problem with one of the power sources.
POE	if this LED emits (green), then there is power delivered to the PD device via 4-Pair. if this LED emits (yellow), then there is power delivered to the PD device via 2-Pair If this LED blinks (green), then there is a failure with the PD device.

Troubleshooting steps

Symptom	Corrective Steps
– The midspan does not operate.	1. Verify that a reliable power cord is used. 2. Verify that the voltage at the power inlet is between 100 and 240 VAC. 3. Remove and re-apply power to the device and then check the indicators during power up sequence.

Symptom	Corrective Steps
– The midspan does not operate, but no port indicator is lit.	1. Verify that the midspan detects the camera. 2. Verify that you are using a standard Category 5/5e/6, straight-wired cable, with four pairs. 3. If an external power splitter is used, replace it with a splitter known to operate. 4. Verify that the input Ethernet cable is connected to the Data In port. 5. Verify that the camera is connected to the Data & Power Out port. 6. Try to reconnect the camera to a different midspan. If the camera works, then there is probably a faulty port or RJ45 connection on the midspan. 7. Verify that there is not a short over any of the twisted pair cables or over the RJ45 connectors.

| Symptom	Corrective Steps
– The camera operates, but there is no data link.	1. (Indoor models only) Verify that the port indicator on the front panel is continuously lit. 2. If an external power splitter is used, replace it with a splitter known to operate. 3. Verify that for this link, you are using STP Cat5e/Cat6 straight (non-crossover) cabling, with all four pairs. 4. Verify that the Ethernet cable length is less than 100 meters (328 ft) from the Ethernet source to the camera. 5. Try to reconnect the camera to a different midspan. If the camera works, then there is probably a faulty port or RJ45 connection on the midspan.

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Symptom	Corrective Steps
– The midspan does not operate.	1. Verify that the terminal block was assembled properly. 2. Verify that the power source voltage is between 20 and 60 VDC and can carry power of 40 W. 3. Verify that you are using a standard Cat5e/6, straight-wired (non-crossover) cable, with four pairs. 4. Verify that the camera is connected to the Data & Power Out port.

Symptom	Corrective Steps
– The camera operates, but there is no data link.	1. (Indoor models only) Verify that the port indicator on the front panel is continuously lit. 2. If an external power splitter is used, replace it with a splitter known to operate. 3. Verify that for this link, you are using STP Cat5e/Cat6 straight (non-crossover) cabling, with all four pairs. 4. Verify that the Ethernet cable length is less than 100 meters (328 ft) from the Ethernet source to the camera. 5. Try to reconnect the camera to a different midspan. If the camera works, then there is probably a faulty port or RJ45 connection on the midspan.

8   Disposal

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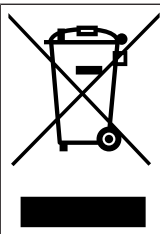
	This product and/or battery must be disposed of separately from household waste. Dispose such equipment according to local laws and regulations, to allow their reuse and/or recycling. This will help in conserving resources, and in protecting human health and the environment.

9   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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