Power-Video-Data CCTV Product Installation Manual

Models NV-216A-PV, NV-218A-PVD, NV-704J-PVD and NV-716J-PVD

IMPORTANT SAFETY INSTRUCTIONS

1) Read these instructions.

2) Keep these instructions.

3) Heed all warnings.

4) Follow all instructions.

5) Do not use this apparatus near water.

6) Clean only with a dry cloth.

7) Do not block any ventilation openings.

8) Install in accordance with the manufacturer's instructions.

9) Do not install near any heat sources such as radiators, heat registers, stoves or other apparatus (including DVRs) that produce heat.

10) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wider blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

11)Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

12) Only use attachments/accessories specified by the manufacturer.

13) Use only with cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tipover.

14) Unplug this apparatus during lightning storms or when unused for long periods of time.

15) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as a power supply cord or plug is damaged, liquid has been spilled, or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT REMOVE COVER OR BACK. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

WARNING: TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.

⚠ **This installation should be made by a qualified service person and should conform to all local codes.**

⚠ **WARNING - Do not install the unit in an environment where the operating ambient temperature exceeds 120° F (50° C). The ventilation should not be impeded by covering the ventilation openings with items, such as newspapers, table-cloths, curtains, etc. No naked flame sources, such as lighted candles should be placed on the apparatus.**

⚠ ⚠ **WARNING - Do not interconnect multiple outputs.**

⚠ **WARNING - The apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus.**

⚠ **WARNING - Use only a Certified power cord and plug (coupler / mains) assemblies for location installed.**

⚠ **WARNING - Power cord is regarded as main disconnect.**

⚠ **WARNING - The appliance coupler (power cord/mains) shall remain readily operable.**

⚠ **WARNING - For safety, never put NVT signals in the same conduit as high-voltage wiring.**

⚠ **WARNING - Do not restrict airflow around any active powered NVT products.**

Wire Type

The PVD system operates well with Category Unshielded Twisted-Pair (UTP) wire, 24-22 AWG (0,5-0,6mm). NVT signals may reside near electromagnetic fields (in accordance with National Electrical Code, and other local safety requirements).

Low voltage camera power, video and RS-422 or RS485 may be sent within same wire bundle as datacom signals not telecom.

Do NOT use shielded twisted-pair wire unless it is Category rated. Multi-pair wire with an overall shield (6 or more pairs) is OK.

Do NOT use un-twisted wire.

Wire in underground conduit or wet locations must be polyethylene-jacketed, gel-filled.

Do not run 24/28 VAC within same wire bundle with telecom or other datacom signals.

NVT recommends the use of factory-crimped RJ45 patch cables rather than unreliable field-crimped RJ45s to connect between the NVT device and an adjacent female RJ45 jack.

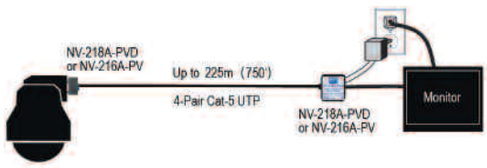
Measure Your Wire Distance

All NVT quoted distance specifications include any coax in the run. It is recommended that the wire distance be measured to ensure that the capability of the NVT product is correct.

Video Distance: Recommended wire distances for best resolution is shown in **Figure 1**. Wire resistance may be measured with an ohm-meter by shorting the two conductors together at the far end, and measuring the loop-resistance out and back. See **Figure 2**.

Power-Video Fixed camera single channel application

Power and Video at the Camera End



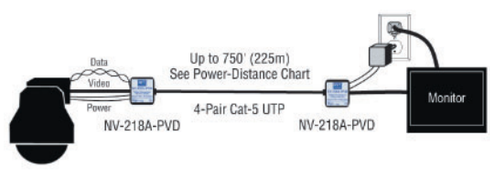
1. Connect the baseband Video signal output from the camera to the male BNC on the NV-216A-PV or NV-218A-PVD.
2. Connect the camera's Power input to the 18AWG Power wires on the NV-216A-PV or NV-218A-PVD. Verify wire distance, camera load and wire resistance limit for the maximum distance that Power can travel using **Figure 3**.
3. Connect the 4-pair Cat-5 using the NV-216A-PV's or NV-218A-PVD's 8-pin RJ45 connector on the UTP run to the Equipment Room as shown in **Figure 4**.

Connecting the Power-Video at the Equipment Room End

1. Connect the baseband Video input twisted pair to the screwless terminals adjacent to the RJ45 connector of the NV-218A-PVD, or using the 8-pin RJ45 connector on the NV-216A-PV or NV-218A-PVD as shown in **Figure 4**.
2. Connect the baseband Video signal output from the BNC pigtail on the NV-218A-PVD or the BNC of the NV-216A-PV directly to the Video monitor, multiplexer, or DVR.
3. Connect Power via a Class II (SELV) low-voltage Power supply. NVT recommends the use of 18AWG solid wire. NVT also recommends Power supplies with individually floating outputs.

Power-Video-Data P/T/Z camera single channel application

Connecting Power-Video-Data at the Camera End



1. Connect the baseband Video signal output from the camera to the Male BNC pigtail connector on the NV-218A-PVD.
2. Connect the camera's Power input to the screwless terminals marked Power on the NV-218A-PVD. Verify wire distance, camera load and wire resistance limit for the maximum distance that Power can travel using **Figure 3**.
3. If the camera supports P/T/Z telemetry over RS-422 or RS-485, connect the camera's Data terminals to the Data screwless terminals on the NV-218A-PVD.
4. Connect the 4-pair Cat-5 using the 8-pin RJ45 connector on the UTP run to the Control end as shown in **Figure 4**.

Connecting the Power-Video-Data at the Equipment Room

1. Connect the 4-pair Cat-5 from the camera end to the RJ45 connector on the NV-218A-PVD.
2. Connect the baseband Video signal output from the BNC pigtail on the NV-218A-PVD directly to the Video monitor, multiplexer or DVR.
3. Connect the control equipment data port to the screwless terminals marked data on the NV-218A-PVD.
4. Connect the Power screwless terminals to a Class II (SELV) low-voltage Power supply. NVT recommends the use of 18AWG solid wire. NVT also recommends Power supplies with individually floating outputs.

Figure 1 Video Distance Recommendations

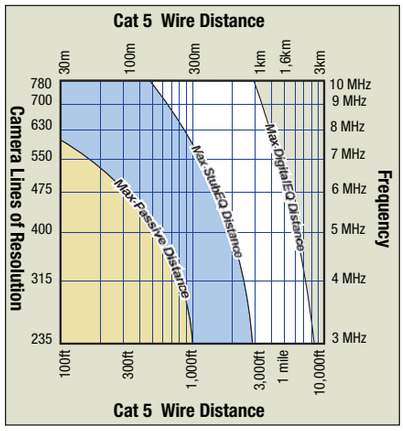


Figure 2 Resistance per 1,000 ft (300 m) out and back

24AWG (0,5mm)	=	52 Ohms	per 300m
22AWG (0,6mm)	=	32 Ohms	per 300m
20AWG (0,7mm)	=	20 Ohms	per 300m
19AWG (0,8mm)	=	16 Ohms	per 300m
18AWG (1,0mm)	=	13 Ohms	per 300m
16AWG (1,3mm)	=	8.2 Ohms	per 300m

Camera Power Distance: Different cameras draw different amounts of current. It is important to make sure that the voltage-drop on the wire allows sufficient voltage for the camera to operate properly. A camera voltage of 21VAC or greater is usually acceptable. **Figure 3** shows typical wire distances for standard camera configurations.

Figure 3 Power Distance Charts

Fixed Camera 24VAC only, used with **NV-216A-PV**		
Power Supply Voltage	24 VAC	28 VAC
Minimum Voltage at Camera	21 VAC	21 VAC
B&W Camera, 2.4 W		
2-pair 24 AWG	789ft (240m)	1,840ft (561m)
2-pair 23 AWG	994ft (303m)	2,320ft (707m)
Color Camera, 4.8 W		
2-pair 24 AWG	393ft (120m)	916ft (279m)
2-pair 23 AWG	495ft (151m)	1,155ft (352m)
Color Camera, 7.2 W		
2-pair 24 AWG	262ft (80m)	612ft (186m)
2-pair 23 AWG	331ft (101m)	771ft (235m)

Fixed Dual Voltage 24VAC/12VDC Camera with **NV-216A-PV**		
Power Supply Voltage	24 VAC	28 VAC
Minimum Voltage at Camera	14 VAC	14 VAC
B&W Camera, 2.4 W		
2-pair 24 AWG	1,753ft (534m)	2,454ft (748m)
2-pair 23 AWG	2,210ft (674m)	3,094ft (943m)
Color Camera, 4.8 W		
2-pair 24 AWG	874ft (266m)	1,223ft (373m)
2-pair 23 AWG	1,102ft (336m)	1,542ft (470m)
Color Camera, 7.2 W		
2-pair 24 AWG	583ft (178m)	816ft (249m)
2-pair 23 AWG	735ft (224m)	1,029ft (314m)

P/T/Z 24VAC Camera used with **NV-218A-PVD**		
Power Supply Voltage	24 VAC	28 VAC
Minimum Voltage at Camera	21 VAC	21 VAC
P/T/Z Camera, 21 W		
2-pair 24 AWG	90ft (27m)	210ft (64m)
2-pair 23 AWG	113ft (35m)	265ft (81m)

Fixed 12VDC Camera used with **NV-226J-PV**		
Power Supply Voltage	24 VAC	28 VAC
B&W Camera, 2.4 W		
2-pair 24 AWG	1,586ft (748m)	2,220ft (677m)
2-pair 23 AWG	1,999ft (609m)	2,799ft (853m)
Color Camera 4.8 W		
2-pair 24 AWG	795ft (242m)	1,113ft (339m)
2-pair 23 AWG	1,002ft (306m)	1,403ft (428m)

Figure 4 Transceiver Pinouts & UTP Wire Colors

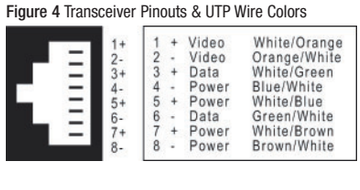


Figure 5 Control End Pinouts (NV-704J-PVD)

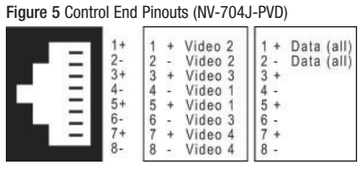
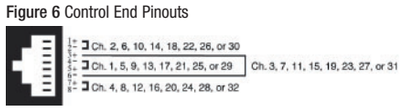


Figure 6 Control End Pinouts



Limited Lifetime Warranty

NVT warrants that the product conforms to NVT's applicable published specifications and is free of defects and workmanship, for the life of the product.

There shall be no other warranties, express, statutory or otherwise, including any implied warranty of merchantability of fitness or any other obligation on the part of NVT with respect to any of the products.

In the event that any product is damaged or altered or modified without the express written consent of NVT, any warranty for those products will cease and NVT will have no further liability as it pertains to those products. NVT assumes no responsibility for damages or penalties incurred resulting from the use of this product in a manner or location other than for which it is intended.

NVT's liability under any warranties shall be discharged by replacing or repairing any part or parts which do not conform to the applicable warranty under normal and proper use. NVT's liability with respect to any product shall not exceed a refund of the price received by NVT for that product, and in no event shall NVT have any liability for any incidental, consequential, special, or indirect damages.

Some states do not allow the exclusion or limitation of special, incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Customer Support

If you are experiencing problems, attempt to simplify your setup. Test each cable segment separately. For example, test the camera and monitor together without the other equipment. Then add in the NVT transceivers, back-to-back. Test each segment of a long cable-run independently. Attempt to isolate the problem.

NVT customer support is available for consultation from 8:00 AM to 5:30 PM PST Monday through Friday. In addition, emergency after-hours callback support is available.

US Office:	(+1) (650) 462-8100
US Fax:	(+1) (650) 326-1940
UK Office:	(+44) (0)20 8977 6614
UK Fax:	(+44) (0)20 8973 1855
Email USA:	www.nvt.com/email
Email UK:	www.nvt.com/email
Web home page:	www.nvt.com

Returns

Please call before returning units to NVT. Returned materials must have a "Returned Materials Authorization" (RMA) number from NVT marked on the outside of the shipping carton.

Agency

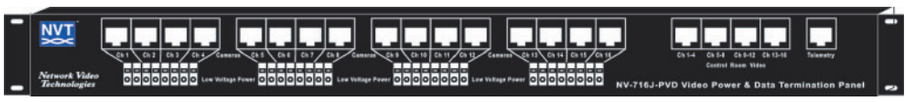
These NVT products are listed and/or conform to the following certifications and directives:

UL Listed to UL2044 or UL/IEC 60065.
cUL Listed to CAN/CSA22.2 No. 1 for Canada.
CE Mark under EMC and low voltage
Complies with FCC part 15B limits
Directives for the European Union.

Camera Connections

NV-716J-PVD Wiring Diagram

Figure 7 Control End Pinouts (NV-716J-PVD)



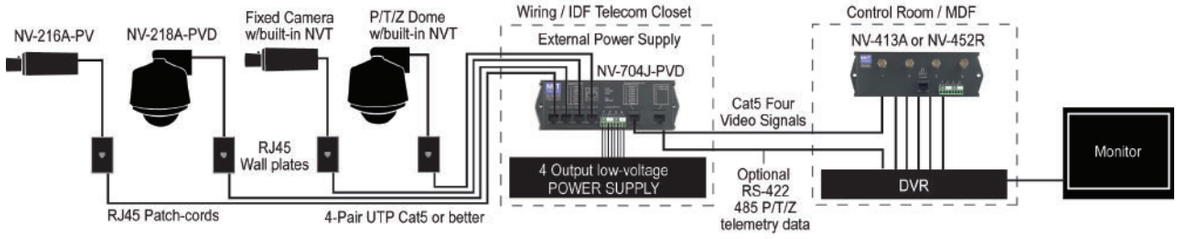
Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Channel 7	Channel 8
1 Video 1+	1 Video 2+	1 Video 3+	1 Video 4+	1 Video 5+	1 Video 6+	1 Video 7+	1 Video 8+
2 Video 1-	2 Video 2-	2 Video 3-	2 Video 4-	2 Video 5-	2 Video 6-	2 Video 7-	2 Video 8-
3 Data A +	3 Data A +	3 Data A +	3 Data A +	3 Data B +	3 Data B +	3 Data B +	3 Data B +
4 Power 1-	4 Power 2-	4 Power 3-	4 Power 4-	4 Power 5-	4 Power 6-	4 Power 7-	4 Power 8-
5 Power 1+	5 Power 2+	5 Power 3+	5 Power 4+	5 Power 5+	5 Power 6+	5 Power 7+	5 Power 8+
6 Data A -	6 Data A -	6 Data A -	6 Data A -	6 Data B -	6 Data B -	6 Data B -	6 Data B -
7 Power 1+	7 Power 2+	7 Power 3+	7 Power 4+	7 Power 5+	7 Power 6+	7 Power 7+	7 Power 8+
8 Power 1-	8 Power 2-	8 Power 3-	8 Power 4-	8 Power 5-	8 Power 6-	8 Power 7-	8 Power 8-

Channel 9	Channel 10	Channel 11	Channel 12	Channel 13	Channel 14	Channel 15	Channel 16
1 Video 9+	1 Video 10+	1 Video 11+	1 Video 12+	1 Video 13+	1 Video 14+	1 Video 15+	1 Video 16+
2 Video 9-	2 Video 10-	2 Video 11-	2 Video 12-	2 Video 13-	2 Video 14-	2 Video 15-	2 Video 16-
3 Data C +	3 Data C+	3 Data C+	3 Data C+	3 Data D +	3 Data D+	3 Data D+	3 Data D+
4 Power 9-	4 Power 10-	4 Power 11-	4 Power 12-	4 Power 13-	4 Power 14-	4 Power 15-	4 Power 16-
5 Power 9+	5 Power 10+	5 Power 11+	5 Power 12+	5 Power 13+	5 Power 14+	5 Power 15+	5 Power 16+
6 Data C -	6 Data C -	6 Data C -	6 Data C -	6 Data D-	6 Data D-	6 Data D-	6 Data D-
7 Power 9+	7 Power 10+	7 Power 11+	7 Power 12+	7 Power 13+	7 Power 14+	7 Power 15+	7 Power 16+
8 Power 9-	8 Power 10-	8 Power 11-	8 Power 12-	8 Power 13-	8 Power 14-	8 Power 15-	8 Power 16-

Control Room Connections

Channel 1-4	Channel 5-8	Channel 9-12	Channel 13-16	Data/Telemetry
1 Video 2+	1 Video 6+	1 Video 10+	1 Video 14+	1 Data B+
2 Video 2-	2 Video 6-	2 Video 10-	2 Video 14-	2 Data B-
3 Video 3+	3 Video 7+	3 Video 11+	3 Video 15+	3 Data C+
4 Video 1-	4 Video 5-	4 Video 9-	4 Video 13-	4 Data A-
5 Video 1+	5 Video 5+	5 Video 9+	5 Video 13+	5 Data A+
6 Video 3 -	6 Video 7 -	6 Video 11 -	6 Video 15-	6 Data C-
7 Video 4+	7 Video 8+	7 Video 12+	7 Video 16+	7 Data D+
8 Video 4-	8 Video 8-	8 Video 12-	8 Video 16-	8 Data D-

Power-Video-Data 4-Channel Application using the NV-704J-PVD at the Telecommunications Closet or IDF



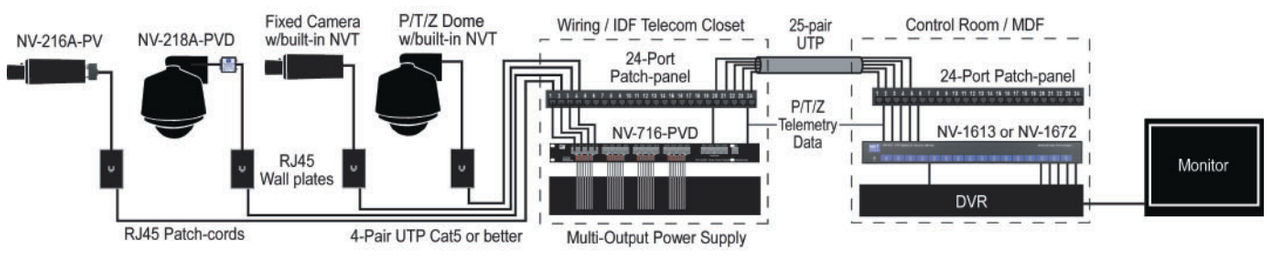
Power-Video-Data at the Camera End

1. Connect the NV-216A-PV or the NV-218A-PVD as shown in the examples on the other side.
2. Connect the 4-pair Cat5 UTP cables coming from the cameras into the appropriate camera port on the NV-704J-PVD using the RJ45 connector as shown in **Figure 4** (previous page).
3. Connect the outputs of your independent power supply into the appropriate Camera Power terminals on the NV-704J-PVD. Torque to 2 in-lbs (0.22 Nm). NVT recommends the use of 18AWG (1,0 mm) solid conductor wire. NVT also recommends that the external power supply have individually floating outputs.

Power-Video-Data at the Equipment Room End

4. Connect the NV-704J-PVD's Control Room outputs to the NV-413A or NV-452R via UTP using RJ45 connectors and Cat5 cable. The control end pinouts are listed in **Figure 5** (previous page). If P/T/Z telemetry is required, connect a second RJ45 Cat5 cable from the data port to the DVR's RS-422 or RS-485, control output.

Power-Video-Data 16-Channel Application using the NV-716J-PVD at the Telecommunications Closet of IDF



Power-Video-Data at the Camera End

1. Connect the NV-216A-PV or the NV-218A-PVD as shown in the examples on the other side.
2. Connect the 4-pair Cat5 UTP cables coming from the cameras into the appropriate camera port on the NV-716J-PVD using the RJ45 connector as shown in **Figure 4** (previous page).
3. Connect the outputs of your independent power supply into the appropriate Camera Power terminals on the NV-716J-PVD. Torque to 2 in-lbs (0.22 Nm) **Figure 5** (previous page). NVT recommends the use of 18AWG (1,0 mm) solid conductor wire. NVT also recommends that the external power supply have individually floating outputs.

Power-Video-Data at the Equipment Room End

4. Connect the NV-716J-PVD's Control Room outputs to the NV-1613, NV-1613S, NV-1662 or NV-1672 via UTP using RJ45 connectors and Cat5 cable. See the NV-716J-PVD wiring diagram above. If P/T/Z telemetry is required, connect additional RJ45 Cat5 cable(s) from the data port(s) to the DVR's RS-422 or RS-485 Code Converter (alternately known as a data distribution unit or fan-out unit.) Additional details can be found at www.nvt.com.