




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.


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


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.


 **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, tablecloths, 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.

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. Wire should be Category UTP cable. Low-voltage camera Power, Video, and RS-422 or RS-485 may be sent within the same wire bundle. Do not run 24VAC or 28VAC in the same wire bundle with other Telecom or Datacom signals.

Video Distance: 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 1.

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 2 shows typical wire distances for standard camera configurations.

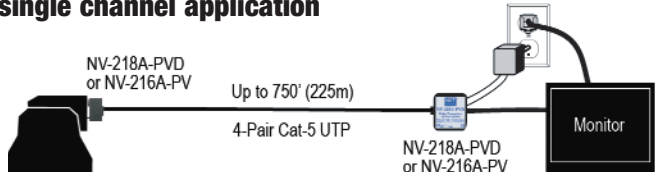
Figure 1 Resistance per 1,000 ft (300 m) out and back

24AWG (0,5mm)	=	52 Ohms	per 1000ft (300m)
22AWG (0,6mm)	=	32 Ohms	per 1000ft (300m)
20AWG (0,7mm)	=	20 Ohms	per 1000ft (300m)
19AWG (0,8mm)	=	16 Ohms	per 1000ft (300m)
18AWG (1,0mm)	=	13 Ohms	per 1000ft (300m)
16AWG (1,3mm)	=	8.2 Ohms	per 1000ft (300m)

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 2 below.
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 3 below.



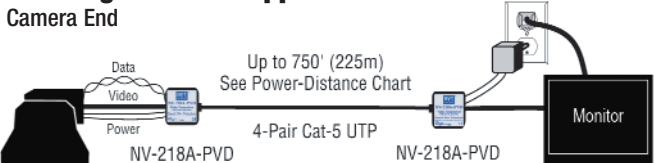
Connecting the Power-Video at the Equipment Room End

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 3 below.
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 2 below.
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 3 below.



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.

Power-Video-Data 4 or 16-Channel application

Connecting Power-Video-Data at the Camera End

1. Connect the baseband Video signal output from the camera to the male BNC on the NV-216A-PV or, in the case of a Data application, to the NV-218A-PVD male BNC pigtail.
2. Connect the camera's Power input to the 18AWG Power wires on the NV-216A-PV or the NV-218A-PVD. Verify wire distance, camera load and wire resistance limit for the maximum distance that Power can travel. Verify the wire/Power distance against Figure 2.
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 UTP using the 8-pin RJ45 connector on the UTP run to the Control end as shown in Figure 3 below.



Figure 2 Power Distance Charts

Fixed 24VAC Camera		NV-216A-PV	
Power Supply Voltage		24 VAC	28 VAC
Minimum Voltage at Camera		21 VAC	21 VAC
B&W Camera 100 mA, 2.4 W			
2-pair 24 AWG	899ft (274m)	2,098ft (640m)	
2-pair 23 AWG (Cat6)	1,134ft (346m)	2,645ft (807m)	
Color Camera 200 mA, 4.8 W			
2-pair 24 AWG	450ft (137m)	1,049ft (320m)	
2-pair 23 AWG (Cat6)	567ft (173m)	1,323ft (403m)	
Color Camera 300 mA, 7.2 W			
2-pair 24 AWG	300ft (91m)	699ft (213m)	
2-pair 23 AWG (Cat6)	378ft (115m)	862ft (269m)	

Fixed 12VDC Camera		NV-216A-PV	
Power Supply Voltage		12 VDC	
Minimum Voltage at Camera		11.5 VDC	
B&W Camera 200 mA, 2.4 W			
2-pair 24 AWG		75ft (23m)	
2-pair 23 AWG (Cat6)		94ft (29m)	
Color Camera 400 mA, 4.8 W			
2-pair 24 AWG		37ft (11m)	
2-pair 23 AWG (Cat6)		47ft (14m)	
Color Camera 600 mA, 7.2 W			
2-pair 24 AWG		25ft (8m)	
2-pair 23 AWG (Cat6)		31ft (10m)	

P/T/Z 24VAC Camera		NV-218A-PVD	
Power Supply Voltage		24 VAC	28 VAC
Minimum Voltage at Camera		21 VAC	21 VAC
P/T/Z Camera 1,000 mA, 24 W			
2-pair 24 AWG	90ft (27m)	210ft (64m)	
2-pair 23 AWG (Cat6)	113ft (35m)	265ft (81m)	

Figure 3 Transceiver Pinouts & UTP Wire Colors

1+	1 + Video	White/Orange
2-	2 - Video	Orange/White
3+	3 + Data	White/Green
4-	4 - Power	Blue/White
5+	5 + Power	White/Blue
6-	6 - Data	Green/White
7+	7 + Power	White/Brown
8-	8 - Power	Brown/White

Figure 4 Control End Pinouts (NV-704J-PVD)

1+	1 + Video 2	1 + Data (all)
2-	2 - Video 2	2 - Data (all)
3+	3 + Video 3	3 +
4-	4 - Video 1	4 -
5+	5 + Video 1	5 +
6-	6 - Video 3	6 -
7+	7 + Video 4	7 +
8-	8 - Video 4	8 -

Figure 5 Control End Pinouts (NV-716J-PVD)

1+	1 + Video	White/Orange
2-	2 - Video	Orange/White
3+	3 + Data	White/Green
4-	4 - Power	Blue/White
5+	5 + Power	White/Blue
6-	6 - Data	Green/White
7+	7 + Power	White/Brown
8-	8 - Power	Brown/White

Power-Video-Data connection to the NV-704J-PVD or NV-716J-PVD at the Telecommunications Closet or IDF

1. Connect the baseband Video signal output from the camera to the male BNC on the NV-216A-PV or the NV-218A-PVD.
2. Connect the outputs of the independent power supply into appropriate camera power terminals on the NV-704J-PVD as shown in Figure 4 or NV-716J-PVD as shown in Figure 5. Torque to 2in.-lbs. NVT recommends the use of 18AWG solid conductor wire. NVT also recommends power supplies with individually floating outputs.
3. Connect the control end outputs via UTP using the 8-pin RJ45 connectors for the NV-704J-PVD as shown in Figure 4 or NV-716J-PVD as shown in Figure 5 (details on page 2).

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: (800) 959-9870 or (+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: info@nvt.com
Email UK: uksales@nvt.com
Web home page: 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:

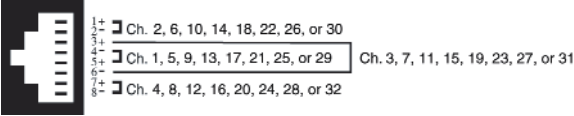


UL Listed to UL2044 or UL/IEC 60065.
cUL Listed to CAN/CSA22.2 No. 1 for Canada.
CE Mark under EMC and low voltage Directives for the European Union.

Connecting the Control End Equipment

- If the receiver is a model NV-413A, NV-652R, NV-813, NV-1613 or NV-3213, connect the ground screw to the same earth ground as the rest of receive-end equipment.
- If the receiver is a model NV-452R, NV-652R, NV-862, NV-872, NV-1662, NV-1672, NV-3262 or NV-3272 connect power, as specified in that product’s installation manual. The blue “Power” LED should light.
- When connecting video to the NV-813, NV-813S, NV-862, NV-1613, NV-1613S, NV-1662, NV-3213, NV-3213S, or NV-3262, connect UTP using 8-pin RJ45 connector as shown in Figure 7.

Figure 7 Control End Pinouts



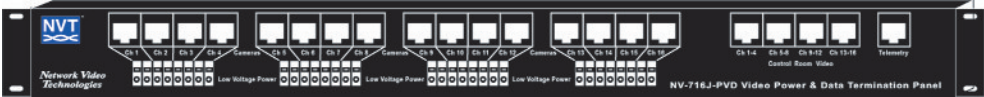
Once the video signals are connected, the green “Active” LED should have a steady light, indicating that video is present. A flickering light typically means that there is something wrong with the cabling.

- Connect the baseband video signal from the receiver to the video monitor (or other video equipment, multiplexer, quad, etc.) using a 75 Ohm coax cable with a BNC connector, or directly to video equipment if using the NV-208A-M, NV-214A-M, NV-216A-PV or NV-218A-PVD.
- Confirm that your monitor or other receiving equipment is correctly terminated with a single 75 Ohm terminator.
- For best pictures using the NV-452R, NV-652R, NV-862, NV-1662 or NV-3262, adjust the distance equalization controls, as follows:

Turn both controls to their minimum counter-clockwise position. Next, turn brightness/LF control clockwise until desired degree of brightness is achieved. Then turn sharpness/HF control until picture is crisp and clear, but not “grainy.”

- Connect the data pair(s) directly to the data output of the control end equipment. Connections to multiple cameras may be paralleled, or connected to individual ports of the RS-422 or RS-485 fan-out unit, sometimes called a “code converter”.

NV-716J-PVD Wiring Diagram



Camera Connections

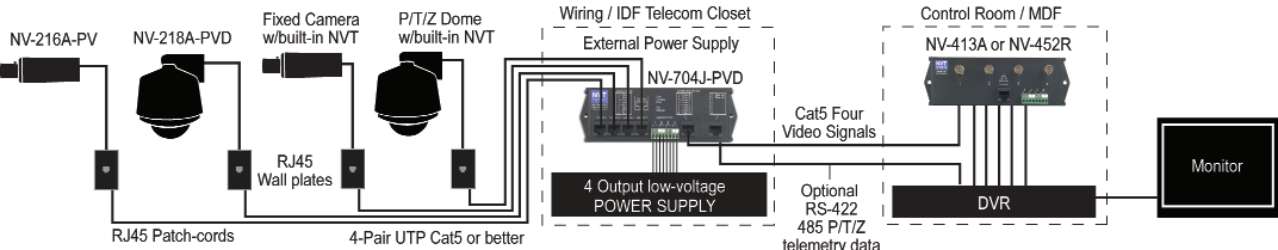
Channel 1 1 Video 1+ 2 Video 1- 3 Data A + 4 Power 1- 5 Power 1+ 6 Data A - 7 Power 1+ 8 Power 1-	Channel 2 1 Video 2+ 2 Video 2- 3 Data A + 4 Power 2- 5 Power 2+ 6 Data A - 7 Power 2+ 8 Power 2-	Channel 3 1 Video 3+ 2 Video 3- 3 Data A + 4 Power 3- 5 Power 3+ 6 Data A - 7 Power 3+ 8 Power 3-	Channel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

Channel 1-4 1 Video 2+ 2 Video 2- 3 Video 3+ 4 Video 1- 5 Video 1+ 6 Video 3 - 7 Video 4 + 8 Video 4-	Channel 5-8 1 Video 6+ 2 Video 6- 3 Video 7+ 4 Video 5- 5 Video 5+ 6 Video 7 - 7 Video 8 + 8 Video 8-	Channel 9-12 1 Video 10+ 2 Video 10- 3 Video 11+ 4 Video 9- 5 Video 9+ 6 Video 11 - 7 Video 12+ 8 Video 12-	Channel 13-16 1 Video 14+ 2 Video 14- 3 Video 15+ 4 Video 13- 5 Video 13+ 6 Video 15- 7 Video 16+ 8 Video 16-	Data/Telemetry 1 Data B+ 2 Data B- 3 Data C+ 4 Data A- 5 Data A+ 6 Data C- 7 Data D+ 8 Data D-
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Power-Video-Data 4-Channel Application using the NV-704J-PVD at the Telecommunications Closet or IDF



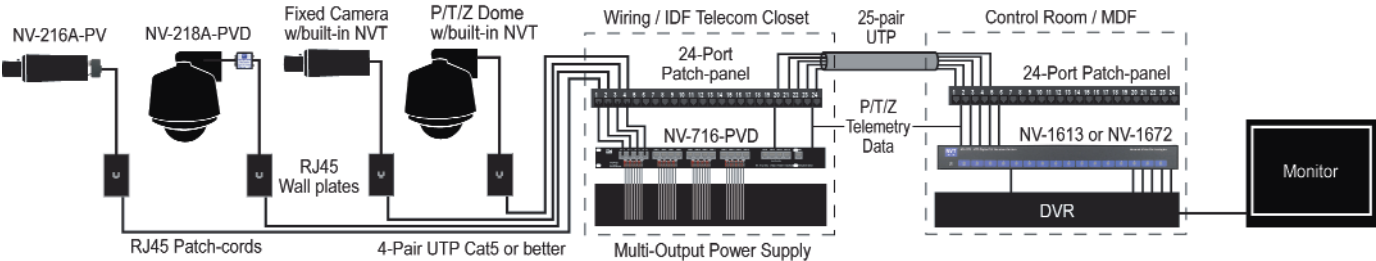
Power-Video-Data at the Camera End

- Connect the NV-216A-PV or the NV-218A-PVD as shown in the examples on the other side.
- 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 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

- 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 4. 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

- Connect the NV-216A-PV or the NV-218A-PVD as shown in the examples on the other side.
- 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 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 4. 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

- 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 in the NV-716J-PVD installation manual, or at www.nvt.com.