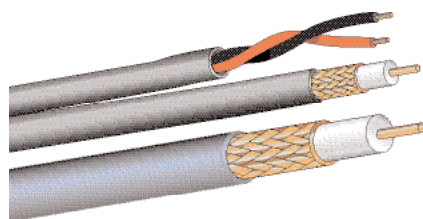


WEST PENN WIRE

***CLOSED CIRCUIT TELEVISION
SYSTEM CABLES***

***CLOSED CIRCUIT TELEVISION
SYSTEM CABLES***

CCTV



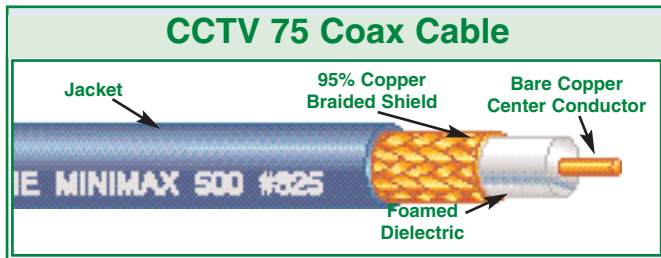
CCTV Cables List:

APPLICATION	Minimax	RG59/U	RG6/U	RG11/U	PTZ Cables	UTP (V/CAT)
INDOOR CM CMR CL2	HD825 825 CM	815 CM 815R 815R CMR 819 CMR AQC819 CM AQC815	806 CM 806R 6350 CMR AQC806 CM AQC2806 CM	811 CL2	PTZ825 PTZ815	CC2418 CC2416
INDOOR CMP CL2P	25HD825 25825 CMP	25815 CMP 25819CMP	25806 CMP 256350 CMP	25811 CL2P	PTZ25825 PTZ25815	CC252418 CC252416
SIAMESE Coax + 1 pair	825182 45825 CM	A2815 CM 2815B CM A2815 CM 252815 CMP	2806B	--	--	--
OUTDOOR Direct Burial Flooded Burial	--	5990 4815 AQC819 AQC815	--	1130 4811	--	--
ECONOMY	--	815E 2815E 25815E	--	--	--	--

WEST PENN WIRE

WEST PENN WIRE is one of the leading manufacturers of Coaxial cables in the world. Our innovative lines of coaxial cables include Closed Circuit Television (CCTV) System cables, Community Antenna Television (CATV) System Cables, Pro-Video System Cables, and Broadcast System Coaxial cables. Our CCTV System cables include our industry original Minimax. The Minimax is a 25 AWG miniature 75Ω cable for distances of up to 500ft. for Color video transmission and further for monochrome video transmission. West Penn Wire can be recognized for the RG59/U type 20AWG. CCTV cable 815.

A **CCTV SYSTEM CONSISTS OF** many components and each is critical to the quality of video picture that is produced. Many system designers specify very specific criteria for the hardware; however, when it comes to the transmission media, only general information is given.



Selecting the correct transmission media for CCTV is one of the most vital aspects of designing a quality system and yet it is the least understood topic in system design. You can have the highest quality hardware components in a system but if the video signal is not transmitted by the proper media, your whole system will suffer. Many of the common video problems with picture quality can be avoided by selecting the proper transmission media and following proper installation techniques and procedures.

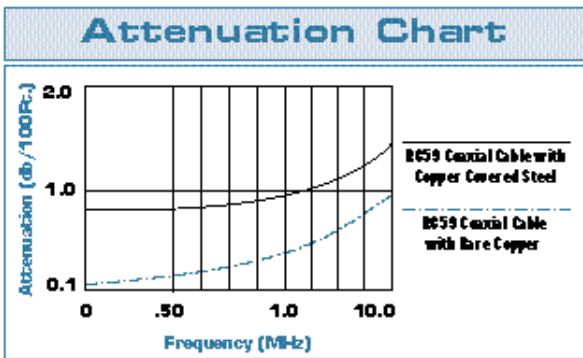
CCTV VIDEO SIGNALS are commonly transmitted using coaxial cable. Coaxial cable is designed to transmit the complete video frequency range with minimum distortion or attenuation, making it an excellent choice for CCTV. However, choosing the incorrect coaxial cable can degrade the overall signal transmission and/or allow outside EMI/RFI interference to be induced into the signal causing high noise levels. This in turn can result in poor picture quality. There are various construction types for coaxial cable. Understanding the various parameters of coaxial cable and selecting the proper cable for a CCTV system will eliminate wasted time, money, and aggravation. A CCTV video signal is comprised of both low frequency components (horizontal and vertical sync pulse information) and high frequency components (video information). In order to transmit this full spectrum of frequencies with little distortion or attenuation, it is important to select the correct coaxial cable that meets the specifications for CCTV transmission. The parameters to consider are mechanical characteristics such as the center conductor material, dielectric material, shield type and material, and jacket material. The electrical characteristics such as resistance, capacitance, impedance and attenuation are critical for proper transmission. The following explains each component:

CENTER CONDUCTOR material made of bare copper is recommended for optimum performance in CCTV signal transmission. Because a CCTV video signal is a baseband composite video with fairly low frequency components compared to a CATV video signal, the low D.C. resistance that copper provides will greatly improve the video signal transmission.

Gauge	Material	Resistance
20AWG	Copper	10 n D.C.R.
20AWG	Copper-Covered Steel	40 n D.C.R.

Coaxial cable is also available with a copper-covered steel center conductor. The steel core of a copper-covered steel center conductor provides extra cable strength, while it's copper coating provides a path for the RF signal. This construction technique is used due to the fact that the higher the frequency of an electronic signal transmission the more the signal travels on the outer surface of a conductor. This phenomena is known as "skin effect".

A copper-covered steel center conductor has a much higher D.C. resistance than bare copper and greatly attenuates the lower frequency components of a CCTV video signal (refer to table on front page). Although it may be less expensive than pure copper, it is not suitable for CCTV and is not recommended. Coaxial cable that utilizes a copper-covered steel center conductor is usually designed for, and more suitable for use in CATV and other RF applications because of the skin effect transmission characteristics at higher frequencies. The attenuation chart below clearly shows the difference between copper and copper-covered steel. Especially take note of the lower frequency range where the sync pulse information is transmitted.



Notice the big difference in attenuation between the two materials. If a cable is chosen with copper-covered steel the sync pulse information will be attenuated causing distortion of the video signal. Another guideline used in the selection of center conductor construction is the cables installation as to fixed or pan and tilt applications. If the cable is going to be used on a CCTV camera that will be in a fixed position, then a solid conductor is acceptable. However, if the cable will be used in a pan and tilt application, then you should choose a stranded conductor because a solid conductor construction will eventually break under the constant strain being placed on the cable at the same point.

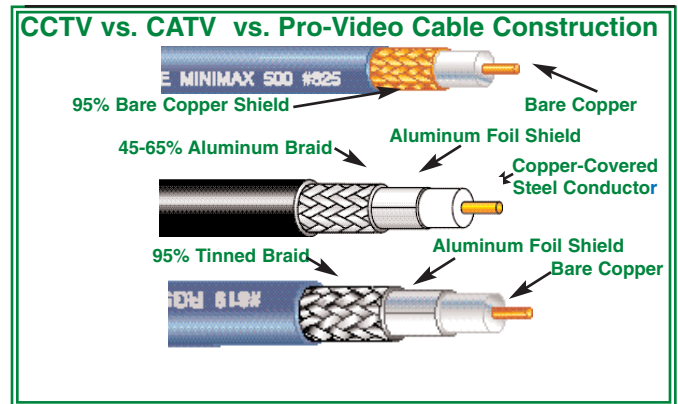
DIELECTRIC MATERIAL of a coax cable is also another key area that should be addressed. The dielectric material and it's composition is critical as it sets up the electrical characteristics such as capacitance, velocity of propagation, impedance, and attenuation of the cable. These parameters will determine signal strength and transmission distance. It is recommended to choose a dielectric with excellent electrical properties such as polyethylene or FEP. Such material will give you lower capacitance and a higher velocity of propagation. This results in a cable with low-loss characteristics and reduced attenuation of the signal. To improve the electrical properties even further, a chemical

expansion foam or gas injected foamed composition of these materials is recommended (see chart below).

A BRAIDED SHIELD is the proper type of shield for CCTV and has two key purposes. One is to provide a low D.C. resistance ground path and the second is to provide shielding of outside interference from distorting the video signal. The shielding should be constructed of bare copper to provide a low D.C.R. return path. It should have a 95% or better braid coverage in order to provide adequate shielding from outside electrical interferences. Anything less is usually not acceptable for CCTV. To provide increased shielding in the RFI range, a construction of an aluminum foil tape is acceptable as long as a high percentage copper braid is still used to provide the low D.C.R. return paths.

Dielectric Electrical Comparison					
Dielectric	Nom. Capacitance	Vel. of Prop.	Nom. Imp.	Nom. Attenuation	
				MHZ	db/100ft.
Solid Polyethylene	22 pf/ft	66%	75 Ω	50 MHZ	2.9 Ω
				100 MHZ	3.3 Ω
Foam Polyethylene	16.2 pf/ft	83%	75 Ω	50 MHZ	2.0 Ω
				100 MHZ	2.8 Ω

A cable with a combination aluminum foil shield and a low coverage aluminum braid (see above diagram) commonly used for CATV is not acceptable! Because aluminum shields have a much higher D.C. resistance return path and the braided portion of these type of cables provide only a low percentage of coverage, and do not provide the type of shielding required for CCTV video transmission.



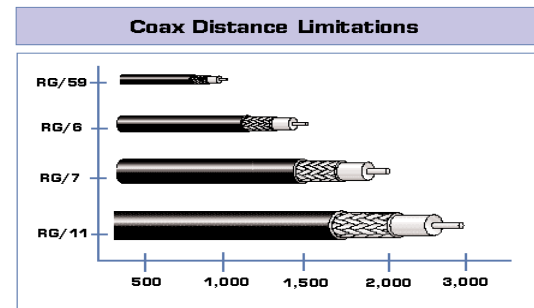
JACKET CHOICE is mainly determined by the environment where the cable will be installed. The cable jacket provides two major functions. One is to provide protection from the elements a cable may be subjected to and the second is to provide solid termination. PVC is a good choice for most applications inside buildings. Plenum rated cables are required for use in ducts, plenums and other space used for environmental air without conduit as per the NEC. Polyethylene is recommended for outdoor applications where the cable may be subjected to the elements and a high degree of moisture, sunlight, and abrasion resistance is required. Do not install indoor rated cable in aerial, direct burial or underground pipe, unless our indoor/outdoor cable AQC819 is installed. An indoor rated cable is not designed for these harsh environments and the electrical and mechanical characteristics will degrade over a period of time and will need to be replaced. Always follow the NEC code for the proper cable type for your installation.

COAXIAL CABLE PARAMETERS vary depending on the type of coax construction. All coax cables have a characteristic impedance. The impedance of CCTV equipment is 75 ohms; therefore, in order to have minimum losses, it is important to choose a cable with a matching impedance of 75 ohms. If a coax cable of another impedance (50 ohm or 93 ohm) is chosen, then you will experience signal loss and reflections resulting in short distance transmission and poor picture quality. See the installation page for the correct choice of connectors.

Coaxial cables are also available in different RG types. RG stands for Radio Guide, or Radio Grade and is a term that is used when sending Radio Frequency (RF) signals down a coaxial cable. 75 ohm coaxial cable comes in several sizes with the most common types being RG-179, RG-59, RG-6, RG-7, and RG-11.

An RG-179 & RG-59 cables are the most commonly used coax because they are small in diameter and easy to work with. The RG-11 cable is the largest in diameter and harder to work with. The RG-6 and RG-7 sizes are between the RG59 and RG11. The difference between the RG types are not just size, but also the attenuation characteristics and therefore the transmission distance. Typically, the coax cable transmission limitations for CCTV will be as follows: The RG-179 (minimax) has the highest attenuation of all. The 25 AWG cable can expect distances up to 500 ft. colored video.

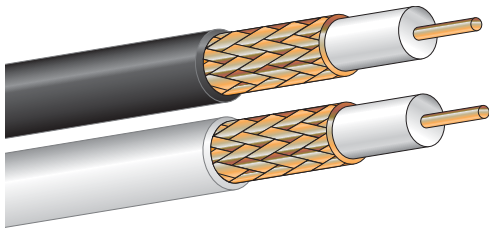
The RG-59 has the highest attenuation of the three other types and you can expect to get a distance of about 750 - 1,000 ft. The RG-6 has lower attenuation characteristics than RG-59 and you can expect distances of about 1,000 - 1,500 ft. The RG-7 type has lower attenuation characteristics than RG-59 and RG-6, and you can expect distances of about 1500 ft. to 2200 ft. The RG-11 type has the lowest attenuation characteristics and you can expect distances of 2200 ft-3000 ft.



These distances are based on the fact that all cable parameters described earlier are adhered to. If you need to go beyond 3,000 ft., then you need to use amplifiers or use fiber optic cable as a method of transmission (see chart above).

CCTV Coaxial Cables

CCTV/ Security Video Minimax Miniature



Applications:

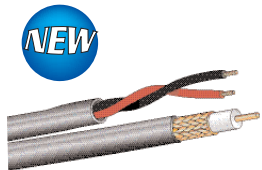
- CCTV - Up to 500ft.
- Security Baseband Video

Standard spool size 1000ft.

Catalog No.	NEC Type	Conductor Type & Nom. D.C.R	Insulation Type & Thickness Inches	Shielding & % Coverage	Jacket Type	Nom. O.D.	Nom. Capacitance	Nom. VP	Nom. Imp. Ω	Jacket Colors
						Inches				
825	CM	25 AWG (Solid) BC 30Ω/M'	Gas Injected PE+ .085	Bare Copper Braid 95%	PVC	.146	16.2 pf/ft	82%	75Ω	Colors See Below
										Connector Type 75Ω 3 Pc. Crimp BNC 75Ω Compression BNC
25825	CMP	25 AWG (Solid) BC 30Ω/M'	Foam FEP .078	Bare Copper Braid 95%	Flex Plenum	.146	16.2 pf/ft	82%	75Ω	Colors See Below
										Connector Type 75Ω 3 Pc. Crimp BNC 75Ω Compression BNC
45825	CM	25 AWG (Solid) BC 30Ω/M'	Gas Injected PE+ .085	Bare Copper Braid 95%	PVC	.146 x .302	16.2 pf/ft	82%	75Ω	Black
						Connector Type 75Ω 3 Pc. Crimp BNC 75Ω Compression BNC				Connectors CN-BM74-18 CN-BNCP-825
825182	CM	25 AWG (Solid) BC 30Ω/M'	Gas Injected PE+ .085	Bare Copper Braid 95%	PVC		16.2 pf/ft	82%	75Ω	Black, White
										Connector Type 75Ω 3 Pc. Crimp BNC 75Ω Compression BNC

Note:
This cable contains 1 coax unit plus
1 pair 22 Awg. Shielded

Note:
This cable contains 1 coax unit plus
1 pair 18 Awg. Unshielded



Jacket Colors for 825 and 25825
• Black • Red • Green • Blue • White • Yellow

825 Series- Installer's Choice

CCTV Accessories
See pages 85-90

Electrical Specifications

Catalog No.	Return Loss 100kHz- 1GHz	Attenuation (db/100ft)								
		1 Mhz	10 Mhz	50 Mhz	100 Mhz	200 Mhz	400 Mhz	700 Mhz	900 Mhz	1 Ghz
Non-Plenum	>23dB	.5	1.8	3.12	4.19	5.79	8.59	11.14	13.22	14.41
Plenum	>23dB	.5	1.8	3.12	4.40	6.41	9.66	12.61	14.95	16.18

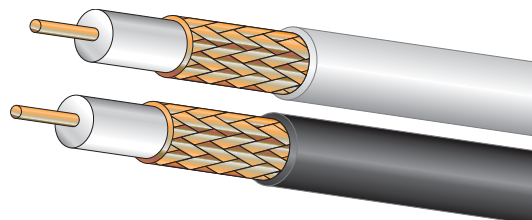
CCTV Coaxial Cables

CCTV/ Security Video

RG59/U Type

Applications:

- CCTV- Up to 1200ft.
- Security Baseband Video



Standard spool size 1000ft.

Catalog No.	NEC Type	Conductor Type & Nom. D.C.R	Insulation Type & Thickness Inches	Shielding & % Coverage	Jacket Type	Nom. O.D. Inches	Nom. Capacitance	Nom. VP	Nom. Imp. Ω	Jacket Color
815	CMR	20 AWG (Solid) BC 10.1 Ω/M'	Gas Injected PE† .142 + Tape Barrier	Bare Copper Braid 95%	PVC	.232	16.2 pf/ft	82%	75Ω	Black, White
815E	CM	20 AWG (Solid) BC 10.1 Ω/M'	Gas Injected PE† .142	Copper Alloy 95%	PVC	.232	16.2 pf/ft	82%	75Ω	Black
AQC815 Aquaseal® Indoor/ Outdoor	CM	20 AWG (Solid) BC 10.1 Ω/M'	Gas Injected PE† .142 + Tape Barrier	Bare Copper Braid 95% + Aquaseal Tape	Sunlight Resistant PVC	.242	16.2 pf/ft	82%	75Ω	Black
4815 Direct Burial	--	20 AWG (Solid) BC 10.1 Ω/M'	Gas Injected PE† .142 + Tape Barrier	Bare Copper Braid 95%	Inner Jkt. PVC	.242	16.2 pf/ft	82%	75Ω	Black
					Outer Jkt. PE					

CCTV Accessories

See pages 85-90

Notes:
Standard Spool size 1000ft, spools are one piece, but lengths may vary +/- 10%
†- Gas Injected Polyethylene
100% Sweep Tested

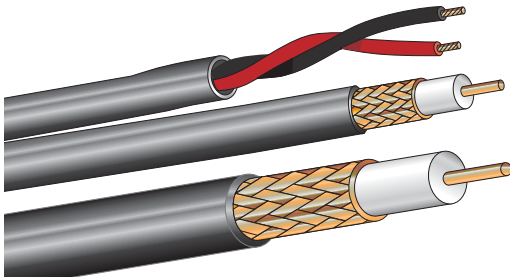
Electrical Specifications

Catalog No.	Return Loss 100kHz- 1GHz	Attenuation (db/100ft)								
		1 Mhz	10 Mhz	50 Mhz	100 Mhz	200 Mhz	400 Mhz	700 Mhz	900 Mhz	1 Ghz
RG59/U	>23dB	.29	.68	1.8	3.0	3.54	4.71	6.40	7.33	7.80
815E	>23dB	.45	.9	1.9	3.2	4.0	4.9	8.6	9.8	10.70

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CCTV Coaxial Cables

CCTV/ Security Video RG59/U Type



Applications:

- CCTV
- Security Baseband Video
- Economy CCTV - Up to 750ft.

Standard spool size 1000ft.

Catalog No.	NEC Type	Conductor Type & Nom. D.C.R	Insulation Type & Thickness Inches	Shielding & % Coverage	Jacket Type	Nom. O.D. Inches	Nom. Capacitance	Nom. VP	Nom. Imp. Ω	Jacket Color
2815B	CM	20 AWG (Solid) BC 10.1 Ω/M'	Gas Injected PE† .142 + Tape Barrier	Bare Copper Braid 95%	PVC	.232 x .465	16.2 pf/ft	82%	75Ω	Black, White
<p style="text-align: center;">Siamese Construction This cable contains 1 coax unit plus 1 pair 18 Awg.(7x26) Unshielded</p>										
2815E	CM	20 AWG (Solid) BC 10.1 Ω/M'	Gas Injected PE† .142	Copper Alloy 95%	PVC	.232 x .465	16.2 pf/ft	82%	75Ω	Black
<p style="text-align: center;">NEW Siamese Construction This cable contains 1 coax unit plus 1 pair 18 Awg.(7x26) Unshielded</p>										

Connectors and Tools

Connector Type	Connectors	Strip Tool	Crimp/Comp Tool
75Ω 3 Pc. Crimp BNC	CN-BM74-32	TL-7503	TL-104
75Ω Compression BNC	CN-CSBNC-59	TL-CSST	TL-SNSA

CCTV Accessories

See pages 85-90

Electrical Specifications

Catalog No.	Return Loss 100kHz-1GHz	Attenuation (db/100ft)								
		1 Mhz	10 Mhz	50 Mhz	100 Mhz	200 Mhz	400 Mhz	700 Mhz	900 Mhz	1 Ghz
RG59/U	>23dB	.29	.68	1.8	3.0	3.54	4.71	6.40	7.33	7.80
Economy RG59/U	>23dB	.45	.9	1.9	3.2	4.0	4.9	8.6	9.8	10.70

Notes:

Standard Spool size 1000ft, spools are one piece, but lengths may vary +/- 10%
†- Gas Injected Polyethylene
100% Sweep Tested

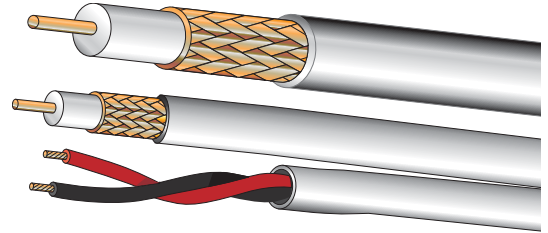
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CCTV Coaxial Cables

CCTV/ Security Video RG59/U Type Plenecon® PLENUM Cables

Applications:

- CCTV
- Security Baseband Video



Standard spool size 1000ft.

Catalog No.	NEC Type	Conductor Type & Nom. D.C.R	Insulation Type & Thickness Inches	Shielding & % Coverage	Jacket Type	Nom. O.D. Inches	Nom. Capacitance	Nom. VP	Nom. Imp. Ω	Jacket Color
25815	CMP	20 AWG (Solid) BC 10.1 Ω/M'	Foam FEP .138 + Tape Barrier	Bare Copper Braid 95%	Flex. Plenum	.198	16.2 pf/ft	82%	75Ω	Ivory
252815	CMP	20 AWG (Solid) BC 10.1 Ω/M'	Foam FEP .138 + Tape Barrier	Bare Copper Braid 95%	Flex. Plenum	.198 x .465	16.2 pf/ft	82%	75Ω	Ivory Black
		Siamese Construction This cable contains 1 coax unit plus 1 pair 18 Awg.(7x26) Unshielded Fluoropolymer								
NEW 25815E	CMP	20 AWG (Solid) BC 10.1 Ω/M'	Foam FEP .138 + Tape Barrier	Copper Alloy 95%	Flex. Plenum	.198	16.2 pf/ft	82%	75Ω	Ivory
NEW 252815E	CMP	20 AWG (Solid) BC 10.1 Ω/M'	Foam FEP .138 + Tape Barrier	Copper Alloy 95%	Flex. Plenum	.198 x .465	16.2 pf/ft	82%	75Ω	Ivory
		Siamese Construction This cable contains 1 coax unit plus 1 pair 18 Awg.(7x26) Unshielded Fluoropolymer								

Connectors and Tools

Connector Type	Connectors	Strip Tool	Crimp/Comp Tool
75Ω 3 Pc. Crimp BNC	CN-BM74-32	TL-7503	TL-104
75Ω Compression BNC	CN-FS59BNCPL4	TL-CSST	TL-SNSA

Electrical Specifications

CCTV Accessories

See pages 85-90

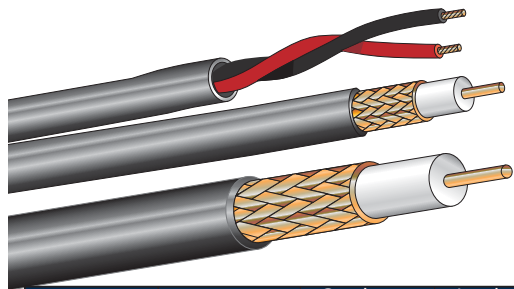
Catalog No.	Return Loss 100kHz-1GHz	Attenuation (db/100ft)								
		1 Mhz	10 Mhz	50 Mhz	100 Mhz	200 Mhz	400 Mhz	700 Mhz	900 Mhz	1 Ghz
Plenum RG59/U	>23dB	.30	.68	1.80	3.00	3.91	5.30	7.24	8.29	8.76
Economy Plenum RG59/U	>23dB	.45	.9	1.9	3.2	4.0	4.9	8.6	9.8	10.70

Notes:

Standard Spool size 1000ft, spools are one piece, but lengths may vary +/- 10%
†- Gas Injected Polyethylene
100% Sweep Tested

CCTV Coaxial Cables

CCTV/ Security Video RG6/U Type



Applications:

- CCTV- Up to 1600ft.
- Security Baseband Video

Standard spool size 1000ft.

Catalog No.	NEC Type	Conductor Type & Nom. D.C.R	Insulation Type & Thickness Inches	Shielding & % Coverage	Jacket Type	Nom. O.D. Inches	Nom. Capacitance	Nom. VP	Nom. Imp. Ω	Jacket Color
806	CMR	18 AWG (Solid) BC 6.5 Ω/M'	Gas Injected PE† .180 + Tape Barrier	Bare Copper Braid 95%	PVC	.270	16.2 pf/ft	82%	75Ω	Black
2806B	CM	18 AWG (Solid) BC 6.5 Ω/M'	Gas Injected PE† .180 + Tape Barrier	Bare Copper Braid 95%	PVC	.280 x .580	16.2 pf/ft	82%	75Ω	Black
Siamese Construction This cable contains 1 coax unit plus 1 pair 16 Awg. Stranded Unshielded										
AQC806 Aquaseal Indoor/Outdoor	CM	18 AWG (Solid) BC 6.5 Ω/M'	Gas Injected PE† .180 + Tape Barrier	Bare Copper Braid 95% Aquaseal Tape	Sunlight Resistant PVC	.280	16.2 pf/ft	82%	75Ω	Black
AQC2806 Aquaseal	CM	18 AWG (Solid) BC 6.5 Ω/M'	Gas Injected PE† .180 + Tape Barrier	B.C Braid 95% Aquaseal Tape	Sunlight Resistant PVC	.280 x .580	16.2 pf/ft	82%	75Ω	Black
Siamese Construction This cable contains 1 coax unit plus 1 pair 16 Awg. Stranded Unshielded Aquaseal Tape										

Connectors and Tools

Connector Type	Connectors	Strip Tool	Crimp/Comp Tool
75Ω 3 Pc. Crimp BNC	CN-BM73-5	TL-7503	TL-107
75Ω Compression BNC	CN-CSBNC-6	TL-CSST	TL-SNSA

CCTV Accessories

See pages 85-90

Electrical Specifications

Catalog No.	Return Loss 100kHz-1GHz	Attenuation (db/100ft)								
		1 Mhz	10 Mhz	50 Mhz	100 Mhz	200 Mhz	400 Mhz	700 Mhz	900 Mhz	1 Ghz
RG6/U Non-Plenum	>23dB	.24	.52	1.18	1.83	2.73	3.95	5.38	6.13	6.45

Notes:

Standard Spool size 1000ft, spools are one piece, but lengths may vary +/- 10%
†- Gas Injected Polyethylene
100% Sweep Tested

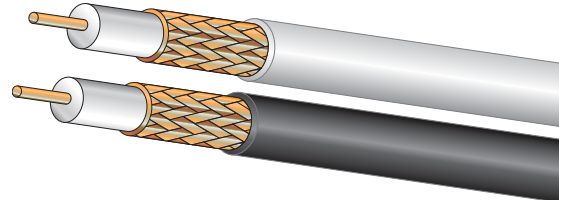
CCTV Coaxial Cables

CCTV/ Security Video

RG6/U Type Plenecon® PLENUM Cables

Applications:

- CCTV
- Security Baseband Video



Standard pool size 1000ft.

Catalog No.	NEC Type	Conductor Type & Nom. D.C.R	Insulation Type & Thickness Inches	Shielding & % Coverage	Jacket Type	Nom. O.D. Inches	Nom. Capacitance	Nom. VP	Nom. Imp. Ω	Jacket Color
25806	CMP	18 AWG (Solid) BC 6.5 Ω/M'	Foam FEP .170"	Bare Copper Braid 95%	Flex. Plenum	.230"	16.2 pf/ft	82%	75Ω	Ivory
						Connector Type	Connectors	Strip Tool	Crimp/Comp Tool	
						75Ω 3 Pc. Crimp BNC	CN-BM73-4	TL-7503	TL-107	
						75Ω Compression BNC	CN-FS6BNCPL2	TL-CSST	TL-SNSA	

Electrical Specifications

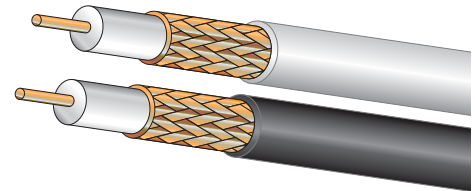
Catalog No.	Return Loss 100kHz-1GHz	Attenuation (db/100ft)								
		1 Mhz	10 Mhz	50 Mhz	100 Mhz	200 Mhz	400 Mhz	700 Mhz	900 Mhz	1 Ghz
Plenum RG6/U	>23dB	.24	.52	1.18	1.93	3.02	4.45	6.09	6.93	7.24

CCTV/ Security Video

RG6/U Type Outdoor- Burial

Applications:

- CCTV
- Security Baseband Video



Direct Burial RG6/U Cables

Catalog No.	NEC Type	Conductor Type & Nom. D.C.R	Insulation Type & Thickness Inches	Shielding & % Coverage	Jacket Type	Nom. O.D. Inches	Nom. Capacitance	Nom. VP	Nom. Imp. Ω	Jacket Color
4806	--	18 AWG (Solid) BC 6.5 Ω/M'	Gas Injected PE† .180	Bare Copper Braid 95%	Inner Jkt. PVC Outer Jkt. PE	.280 .330	16.2 pf/ft	82%	75Ω	Black
6325	--	18 AWG (Solid) BC 6.5 Ω/M'	Gas Injected PE† .180	Bare Copper Braid 95%	Sunlight Resistant PE	.270	16.2 pf/ft	82%	75Ω	Black

Electrical Specifications- See Page 78

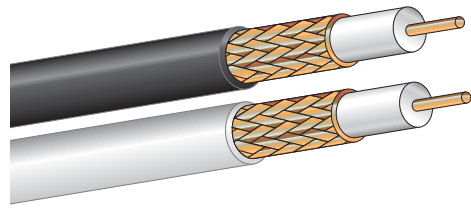
Connectors and Tools

Connector Type	Connectors	Strip Tool	Crimp/Comp Tool
75Ω 3 Pc. Crimp BNC	CN-BM73-5	TL-7503	TL-107
75Ω Compression BNC	CN-CSBNC-6	TL-CSST	TL-SNSA

CCTV Accessories

See pages 85-90

CCTV Coaxial Cables



CCTV/ Security Video RG11/U Type Non-Plenum & Plenum

Applications:

- CCTV - Up to 2000ft.
- Security Baseband Video

Non-Plenum

Standard pool size 1000ft.

Catalog No.	NEC Type	Conductor Type & Nom. D.C.R	Insulation Type & Thickness Inches	Shielding & % Coverage	Jacket Type	Nom. O.D. Inches	Nom. Capacitance	Nom. VP	Nom. Imp. Ω	Jacket Color
811	CM	14 AWG (Solid) BC 2.6 Ω/M'	Gas Injected PE† .280	Bare Copper Braid 95%	PVC	.405	16.2 pf/ft	82%	75Ω	Black
4811 Direct Burial	--	14 AWG (Solid) BC 2.6 Ω/M'	Gas Injected PE† .280	Bare Copper Braid 95%	Inner Jkt. PVC Outer Jkt. PE	.405 .455	16.2 pf/ft	82%	75Ω	Black

Connectors and Tools

	Connectors	Strip Tool	Crimp/Comp Tool
75Ω 3 Pc. Crimp BNC	CN-BM53-26	TL-124	TL-113
75Ω Compression BNC	CN-CSBNC-11	TL-PS11	TL-CSBNC11

Plenum

Catalog No.	NEC Type	Conductor Type & Nom. D.C.R	Insulation Type & Thickness Inches	Shielding & % Coverage	Jacket Type	Nom. O.D. Inches	Nom. Capacitance	Nom. VP	Nom. Imp. Ω	Jacket Color
25811 Plenum	CL2P CMP	14 AWG (Solid) BC 2.6 Ω/M'	Foam FEP .280	Bare Copper Braid 95%	Copolymer	.352	16 pf/ft	82%	75Ω	Natural

Electrical Specifications

Catalog No.	Return Loss 100kHz-1GHz	Attenuation (db/100ft)								
		1 Mhz	10 Mhz	50 Mhz	100 Mhz	200 Mhz	400 Mhz	700 Mhz	900 Mhz	1 Ghz
RG11/U Non-Plenum	>23dB	.16	.35	.87	1.38	1.98	2.95	4.00	4.54	4.77
RG11/U Plenum	>23dB	.16	.35	.87	1.44	2.19	3.32	4.53	5.14	5.35

PTZ Coaxial Cables

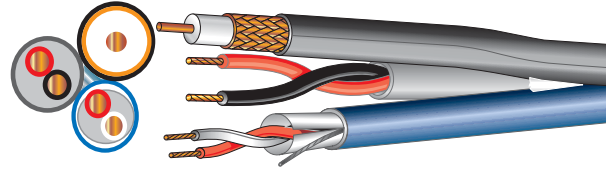
PTZ Security Video

Minimax & RG59/U Type Composite PTZ (Pan Tilt Zoom)

Plenum

Applications:

- CCTV/ Data/ Power
- Security Baseband Video



Standard spool size 1000ft.

Catalog No.	Cable Types	Conductor Type & Nom. D.C.R	Insulation Type & Thickness Inches	Shielding & % Coverage	Jacket Type	Nom. O.D. Inches	Nom. Capacitance	Nom. VP	Nom. Imp. Ω	Jacket Color
PTZ25825	CCTV Coaxial Minimax	25 AWG (Solid) BC 30 Ω/M	Foam FEP .078	Bare Copper Braid 95%	Plenum PVC	.146	16.2 pf/ft	82%	75Ω	Black
	Data Control Cable	1 Pair 22 AWG (7x30) TC	FEP .010	Al. Foil 100% with drain wire	Plenum PVC	.120	25 pf/ft* 45 pf/ft**	69%	55Ω	Blue
CMP	Power Control Cable	1 Pair 18 AWG (7x26) BC	Plenum PVC .008	None	Plenum PVC	.154	--	--	--	Gray

PTZ25825 - Nom. O.D. .342"

Catalog No.	Cable Types	Conductor Type & Nom. D.C.R	Insulation Type & Thickness Inches	Shielding & % Coverage	Jacket Type	Nom. O.D. Inches	Nom. Capacitance	Nom. VP	Nom. Imp. Ω	Jacket Color
PTZ25815	CCTV Coaxial RG59/U	20 AWG (Solid) BC 10.1 Ω/M'	Foam FEP .138 +Tape Barrier	Bare Copper Braid 95%	Plenum PVC	.207	16.2 pf/ft	82%	75Ω	Black
	Data Control Cable	1 Pair 18 AWG (7x26) TC	FEP .010	100% Al. Foil with drain wire	Plenum PVC	.148	30 pf/ft* 54 pf/ft**	69%	45Ω	Blue
CMP	Power Control Cable	1 Pair 18 AWG (7x26) BC	Plenum PVC .008	None	Plenum PVC	.154	--	--	--	Gray

PTZ25815 - Nom. O.D. .362"

Cable Types	Conductor Colors	Jacket Colors
CCTV Coaxial	--	Black
Data Control Cable	1.Black, 2. Red	Blue
Power Control Cable	1. Black, 2. Red	Gray

Notes:

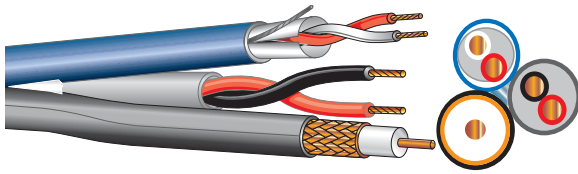
Standard Spool size 1000ft, spools are one piece, but lengths may vary +/- 10%
100% Sweep Tested



PTZ Coaxial Cables

PTZ Security Video

Minimax & RG59/U Type Composite PTZ (Pan Tilt Zoom)



Applications:

- CCTV/ Data/ Power
- Security Baseband Video

Standard spool size 1000ft.

Catalog No.	Cable Types	Conductor Type & Nom. D.C.R	Insulation Type & Thickness Inches	Shielding & % Coverage	Jacket Type	Nom. O.D. Inches	Nom. Capacitance	Nom. VP	Nom. Imp. Ω	Jacket Color
PTZ825	CCTV Coaxial Minimax	25 AWG (Solid) BC 30 Ω/M'	Gas Inj. PE† .085	Bare Copper Braid 95%	PVC	.146	16.2 pf/ft	82%	75Ω	Black
	Data Control Cable	1 Pair 22 AWG (7x30) TC	PP† Insulation .008	Al. Foil 100% with drain wire	PVC	.135	34 pf/ft* 67 pf/ft**	67%	55Ω	Blue
	Power Control Cable	1 Pair 18 AWG (7x26) BC	PVC .008	None	PVC	.155	--	--	--	Gray
PTZ825 - Nom. O.D. .375"										

Catalog No.	Cable Types	Conductor Type & Nom. D.C.R	Insulation Type & Thickness Inches	Shielding & % Coverage	Jacket Type	Nom. O.D. Inches	Nom. Capacitance	Nom. VP	Nom. Imp. Ω	Jacket Color
PTZ815	CCTV Coaxial RG59/U	20 AWG (Solid) BC 10.1 Ω/M'	Gas Inj. PE† .142 +Tape Barrier	Bare Copper Braid 95%	PVC	.232	16.2 pf/ft	82%	75Ω	Black
	Data Control Cable	1 Pair 18 AWG (7x26) TC	PE† Insulation .018	Al. Foil 100% with drain wire	PVC	.222	24 pf/ft* 44 pf/ft**	66%	50Ω	Blue
	Power Control Cable	1 Pair 18 AWG (7x26) BC	PVC .008	None	PVC	.155	--	--	--	Gray
PTZ815 - Nom. O.D. .451"										

Cable Types	Conductor Colors	Jacket Colors
CCTV Coaxial	--	Black
PTZ825 Data Control Cable	1.Black, 2. Red	Blue
PTZ815 Data Control Cable	1.Black, 2. Clear	Blue
Power Control Cable	1.Black, 2. Red	Gray

Notes:

Standard Spool size 1000ft, spools are one piece, but lengths may vary +/- 10%

†- Gas Injected Polyethylene

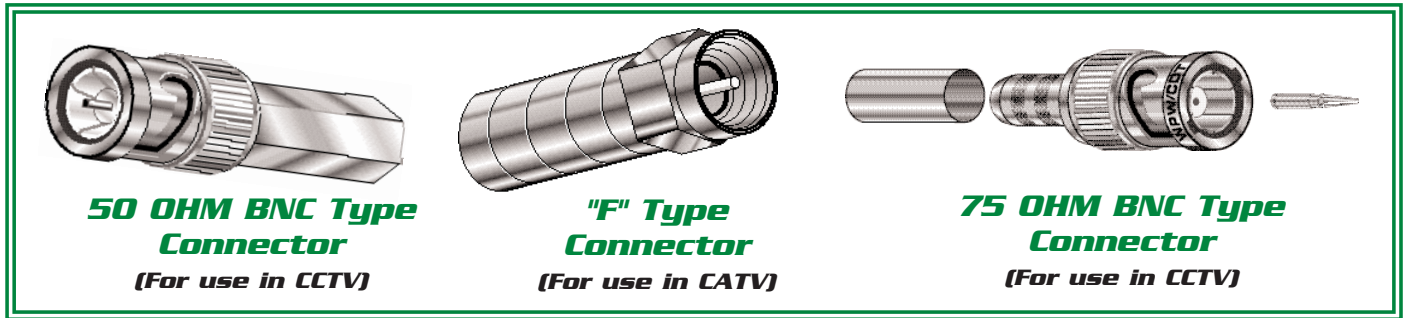
100% Sweep Tested

PE- Polyethylene

PP- Polypropylene



INSTALLATION



INDOOR ENVIRONMENT S are the most common for coaxial cable installations. A few tips on installing coaxial cable are as follows:

1. First and foremost, follow all NEC requirements when installing coaxial cables.
2. Distribute the pulling tension evenly over the cable and do not exceed the minimum bend radius. Exceeding the maximum pulling tension or the minimum bend radius of a cable can cause permanent damage both mechanically and electrically to the cable.
3. When pulling cable through conduit, clean and debur the conduit completely and use proper lubricants in long runs.

OUTDOOR INSTALLATIONS require special installation techniques that will enable the cable to withstand harsh environments. When using cable in an aerial application, lash the cable to a steel messenger wire. This will help support the cable and reduce the stress on the cable during wind, snow, and ice storms. When direct burying a cable, lay the cable without tension so it will not be stressed when earth is packed around it. When burying in rocky soil, fill the trench with sand. Lay the cable and then place pressure-treated wood or metal plates over the cable. This will prevent damage to the cable from rocky soil settling. In cold climate areas, bury the cable below the frost line.

THE SOLDER METHOD offers several advantages for connectorization. This type of connector can be used on solid or stranded conductors. It allows for both solid mechanical and electrical connections. The disadvantage is that it takes more time to terminate than other methods and "cold" solder joints can cause problems if the connector is not soldered to the cable properly.

THE CRIMP METHOD is probably the most popular method of terminating BNC connectors on coax cable. Like the solder method, it can be used on solid or stranded conductors and provides a good mechanical and electrical connection. This method is the most popular way to terminate because there is no need for soldering; therefore, installation time is reduced. Some important points to remember when using the crimp method is to use the proper size connector for the size coax you are using. A tight fit on the cable is important. When crimping the connector, use the proper tool! Don't use pliers! Pliers are not designed to place the pressure of the crimp evenly around the connector. Pliers will

only crush the cable and can degrade the cables electrical properties.

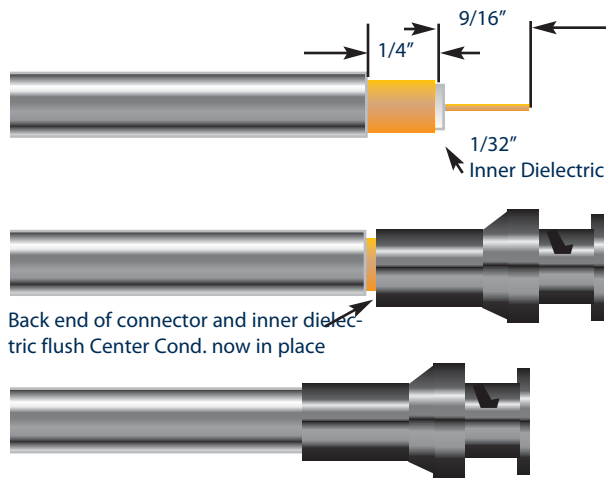
THE TWIST-ON METHOD is the quickest way of terminating a coaxial cable; however, it does have some drawbacks. When terminating the cable with this type of connector the center conductor is cut into by the center pin on the connector, thus too much twisting can cause damage to the center conductor. In pan and tilt installations the constant movement of the cable may work the connector loose and it is not recommended for this application. Because there is no mechanical or electrical crimp or solder connection, this connector is not as reliable as the other methods.

75Ω BNC vs. 50Ω BNC

The traditional use of a 50Ω BNC connector with a 75Ω coax cable in a analog video system operating at frequencies below 300MHz will have little distortion to the signal. However, digital video applications and analog applications above 300MHz requires the use of a 75Ω connector with a 75Ω coax cable (this matches the impedance).

DESIGNING A CCTV SYSTEM takes quality components, engineering, and installation practices. Remember, the coax cable specified for a CCTV system is a key component of the system and is critical to the proper operation of the system. Do not install anything less than cable specifications suitable for CCTV. By following the parameters covered in this technical paper, you should have much success with your CCTV cabling.

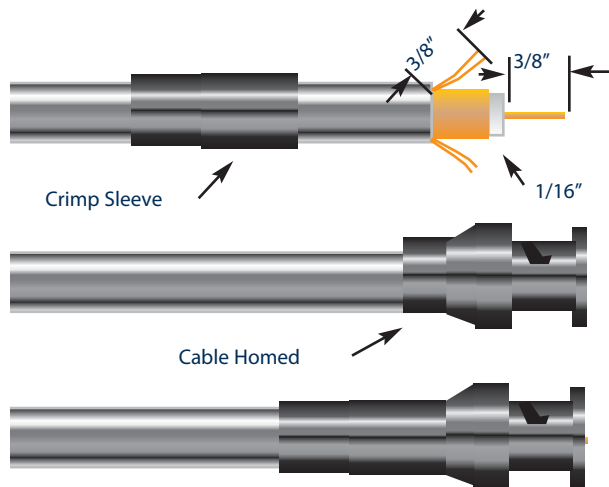
BNC - Crimp Connector Termination



Twist On BNC Connector

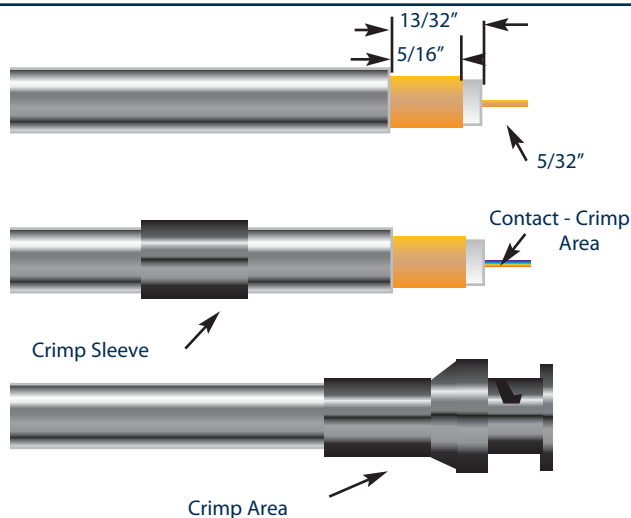
1. Trim cable as shown, taking care not to nick the center conductor or outer braid.
2. Twist the outer braid in a clockwise direction in such a manner that at least $1/32$ " of the inner dielectric is bared, and the braid is left flat. (Stray or loose braid can cause shorts).
3. Gently insert the center conductor down into the back end of the connector, feeling it into the guide hole. When the center conductor is not in place approx. $1/8$ " of center conductor will show.
4. Firmly push the cable home as far as possible. Then screw the connector on the cable in a clockwise direction until it stops.

2 Piece BNC Connector



1. Run crimp sleeve down cable.
2. Trim cable as shown. Taking care not to nick the center conductor or outer braid
3. Gently insert the center conductor into the guide hole, in the rear of the connector, and firmly push the cable home.
4. Push crimp sleeve into place. Sandwiching the braid between the connector and sleeve.
5. Crimp the sleeve into place with the proper crimp tool.

3 Piece BNC Connector



1. Trim cable as shown. Taking care not to nick the center conductor or outer braid. For Miniature Coaxial Cable we recommend - TL-KLEIN
2. Slip crimp sleeve over cable. Place inner conductor into contact, note that the end of the contact and inner dielectric must be butting and square. Crimp with proper crimp tool.
3. Flair outer braid, and gently but firmly push the contact into the connector housing until a gentle snap is felt. Indicating the contact is in place. Slip the crimp sleeve in place, butting the flange against the connector body, and crimp with proper tooling.

Compression- Connector Termination



Using TL-SNSA Adjustment of the tool for BNC, RCA, & "F" Connector Types

BNC

BNC- Compression for Window Style Connectors

- Set tool at 3
- CN-BNCP-RGB
- CN-BNCP-825
- CN-BNCP-59
- CN-BNCP-6

BNC- Compression for Longer Style Connectors

- Set tool at 10
- CN-FS1BNC
- CN-FS59BNCPL4
- CN-FS6BNCPL2

RCA

RCA- Compression for Window Style Connectors

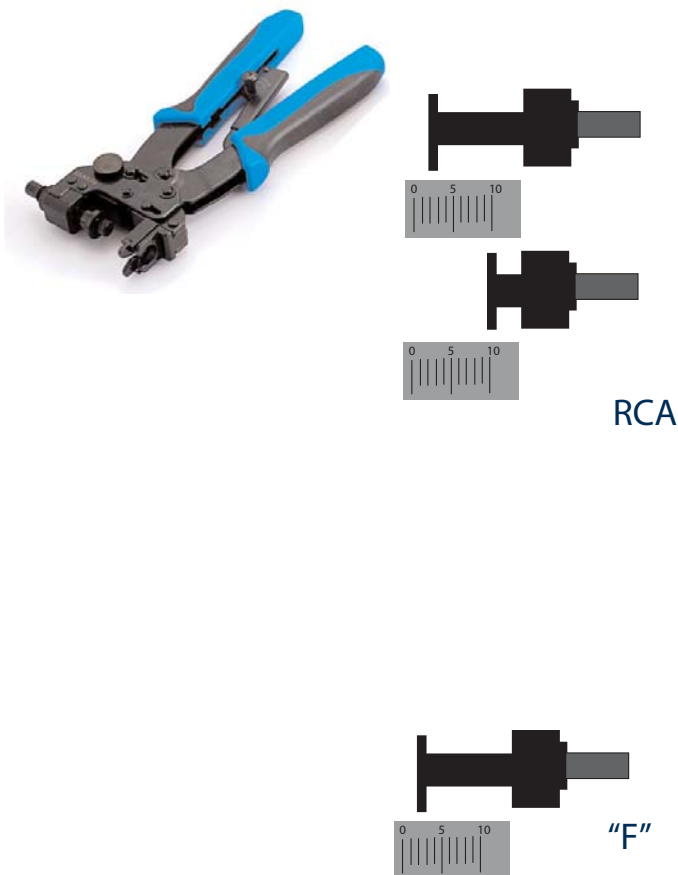
- Set tool at 3
- CN-RCP-RGB
- CN-RCP-825
- CN-RCP-59
- CN-RCP-6

RCA- Compression for Longer Style Connectors

- Set tool at 1
- CN-FS1RCA
- CN-FS59RCAPL4
- CN-FS6RCAPL2

"F" Compression for both types of compression connectors:
Set tool at 0.

NOTE: THERE MAYBE IN THE FIELD ADJUSTMENTS TO THE TOOLS FOR COMPLETE FUNCTIONING.





UTP Video Cables

WEST PENN WIRE Introduces its new line of UTP security cables, V/CAT. The V/CAT (Video over Category 5E) is designed for the video over UTP applications. The cables are constructed with two pairs of UTP Category 5E type cables, and two conductors of either 18 or 16 Awg. cables.

- Pair 1 - Category 5E Type 100Ω
The first pair is used for video transmission.
- Pair 2 - Category 5E Type 100Ω
The second pair is for video transmission or data transmission, such as RS-422 or RS-485 or PTZ for the cameras.
- Two Conductors - The 18 or 16 Awg. solid bare conductors are used to carry power to the cameras.

The V/CAT Unshielded twisted pairs are 100 Ω balanced cables. The UTP's are tightly twisted to prevent outside interference (EMI/RFI) and internal interference from the other pair, and conductors.

The V/CAT power carrying conductors are available in either 18 Awg. or 16 Awg. The 16 Awg. conductors are used for extremely long video over UTP runs.

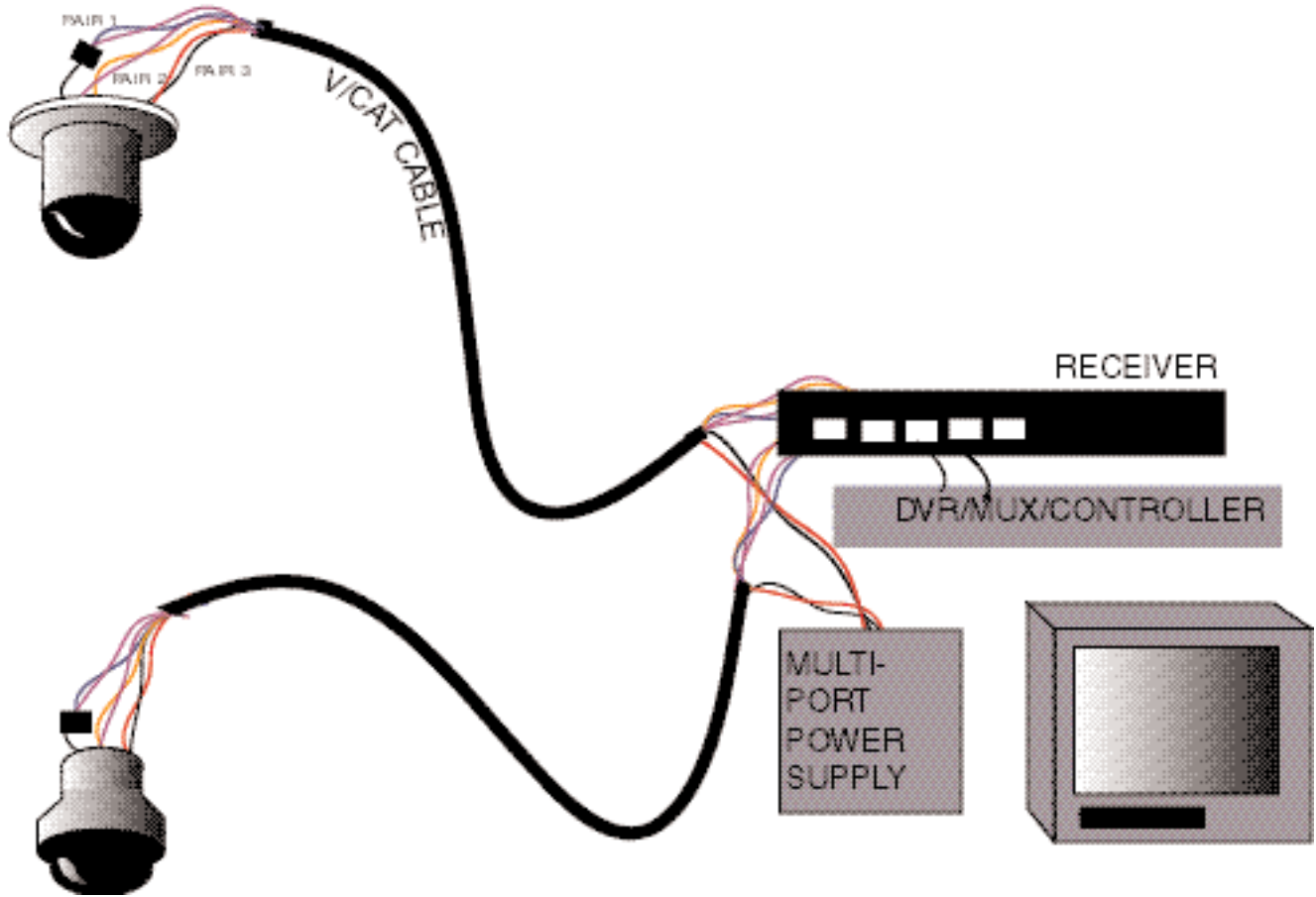
The V/CAT cables are available in Plenum or Riser constructions. The cables carry UL and C(UL) listing CMR and/or CMP.

V/CAT Characteristics:

- Send power and video signals over the same shared sheath.
- Supports: Video/ PTZ/ Power
Two video / Power
- Plenum and Riser constructions

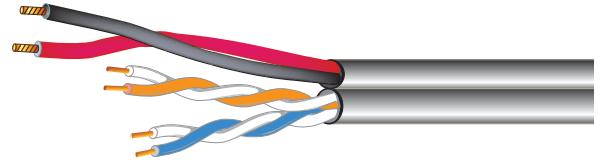
RS-422 TYPE P/T/Z CONTROL

PAIR 1 VIDEO CATEGORY 5E TYPE - 24 AWG.
PAIR 2 P/T/Z CATEGORY 5E TYPE - 24 AWG
PAIR 3 POWER 2 COND. 16AWG OR 18 AWG



CCTV Coaxial Cables

V-Cat- Video Over UTP Cables 2 Pair + 2 Conductors - Siamese Construction Non-Plenum and Plenum



Applications:

- Video Over UTP

Standard spool size 1000ft.

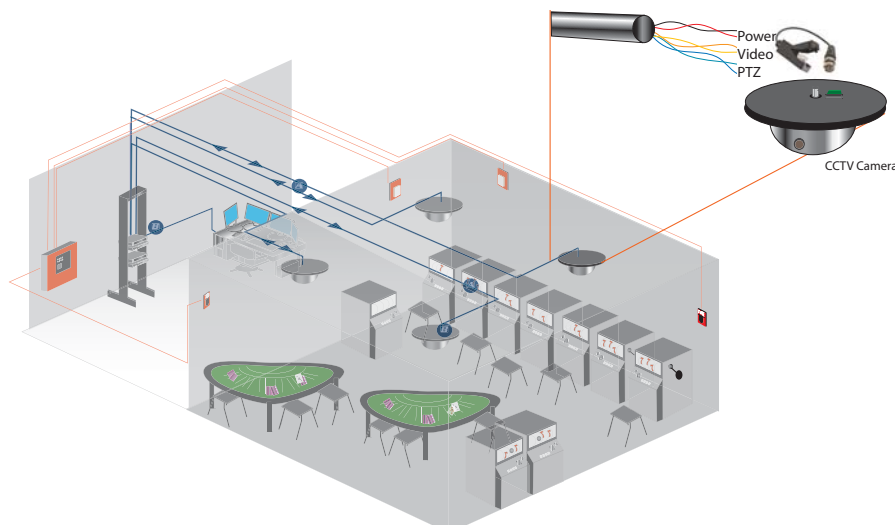
Catalog No.	NEC Type	Cable Type & Description	Dielectric Type	Jacket Type	Nom. O.D.	Nom. Capacitance 2 Pair	Nom. VP 2 Pr.	Nom. Imp.Ω 2 Pair	Jacket Color
					Inches				
CC2418	CM	2 Pair 24 Awg Solid Cat 5E Type UTP + 2 Cond. 18 Awg unshielded	Thermo-Plastic	PVC	.180 x .340	14 pf/ft	66%	100Ω	Gray
CC252418 Plenum	CMP	2 Pair 24 Awg Solid Cat 5E Type UTP + 2 Cond. 18 Awg Unshielded	Plenum Thermo-Plastic	Plenum PVC	.185 x .345	14 pf/ft	72%	100Ω	Gray
CC2416	CM	2 Pair 24 Awg Solid Cat 5E Type UTP + 2 Cond. 16 Awg Unshielded	Thermo-Plastic	PVC	.192 x .355	14 pf/ft	66%	100Ω	Gray
CC252416 Plenum	CMP	2 Pair 24 Awg Solid Cat 5E Type UTP + 2 Cond. 16 Awg Unshielded	Plenum Thermo-Plastic	Plenum PVC	.190 x .350	14 pf/ft	72%	100Ω	Gray

Applications:

- Pair 1 - Category 5E type 100Ω - Used for Video Transmission
- Pair 2- Category 5E type 100Ω - Used for Video Transmission or Data Transmission, such as RS-422 or RS-485 or PTZ (Pan, Tilt, Zoom Controls)
- Two Conductors- 18 or 16 Awg. Solid bare copper conductors- Used for Power to the camera

Note:

A complete product offering of Baluns are available from West Penn Wire- Pages 156-158



800-245-4964 • www.westpenn-wpw.com

Security CCTV Accessories

Security - CCTV Accessories Baluns



CCTV Passive Device	
CN-BNCJ	BNC Female to RJ45

Category 5 or Better UTP
Distance: 2230ft

CCTV Passive Device	
CN-BNCJKS	BNC Female to RJ45 Keystone Mount

Category 5 or Better UTP
Distance 2230ft



CCTV Passive Device	
CN-MTL	Miniature - BNC Male to IDC Clamp Down
CN-MTL2	Miniature - BNC Male to screw terminals- Sold in Pairs

CN-MTL2- Economy- Category 5 or Better UTP
Distance: 2230ft

CCTV Passive Device	
CN-RJ45PT	BNC Male to RJ45 IDC Clamp Down Pigtail
CN-STPT2	BNC Male to Screw Terminal Pigtail- Sold in Pairs

Category 5 or Better UTP
Distance: 2230ft



CCTV Passive Device	
CN-TL	BNC Male to IDC Clamp Down
CN-50VB10	Economy BNC Male to Spring Clamps- Sold in Pairs up to 1250ft.

Category 5 or Better UTP
Distance: 2230ft

CCTV Passive Device	
CN-PVRJ45	BNC Male to RJ45 - Power Thru and Video

Category 5 or Better UTP: Distance: 2230ft
Power: 3 Pair - 24VDC.
5VA: 519ft. (170mm), 10VA: 258ft. (85mm),
20VA: 130ft. (43mm), 30VA: 86ft



CCTV Passive Device	
CN-RJ45	BNC Male to RJ45
CN-50VBRJ45	Economy BNC Male to RJ45 - Sold in Pairs - Up to 1250ft.

CCTV Passive Device	
CN-VPDRJ45	BNC Male to RJ45 - Power Thru , Video, and Data



CCTV Passive Patch Panel	
CN-H16PRJ45BNC	16 Port RJ45 to 16 Port BNC PatchPanel
CN-H16STRJ45	16 Port RJ45 With Power and Control Screw Terminal
CN-H16PRJ45	16 Port RJ45 to RJ45 PatchPanel

CCTV Active Receiver Hub	
CN-AH16PRJ45BNC	16 Port Active Receiver Hub
CN-AH32PRJ45BNC	32 Port Active Receiver Hub



Complete listing of Baluns In the LAN Cable Accessories
pgs. 156-158



