



Understanding Coaxial Cables & Connectors for CCTV

- Installing coaxial cable designed for CCTV is essential to minimize video loss and maximize video quality.
- Terminate coaxial cables with properly installed BNC type connectors to reduce signal loss and ensure connection points are durable.
- Be aware of existing AC power cables and install coaxial cabling far enough away to avoid signal interference (see details next page).

Selecting Coaxial Cable for CCTV

Choosing the right coaxial cable for any CCTV application is critical to ensuring overall system performance. Most Industrial grade CCTV hardware available today is capable of producing and transmitting high resolution images. However cabling requirements are often overlooked during system planning which can result in degraded video quality due to signal loss.

CCTV equipment is designed to operate at an impedance of 75 ohms. Therefore the coaxial cable installed must also match this impedance. RG59 is the most common coaxial cable used in CCTV since the lower frequency analog signals can travel further on smaller cable than is the case with CATV signals. The smaller diameter RG59 cable is also easier to handle and reduces installation time. Larger diameter coaxial cables such as RG6 or RG11 should be installed for very long runs between cameras and processing equipment. Alternatively video amplification devices can be used to increase signal strength if installing cable runs that exceed transmission capability. For example, an amplifier could be installed on an RG59 cable run of 1,000 feet to provide adequate signal strength.

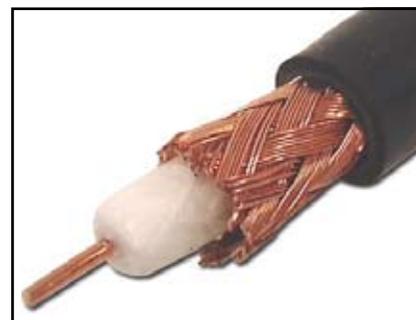
Coaxial Cable Transmission Distance in Feet*		
Type	Typical	Maximum
RG59	750	1,000
RG6	1,000	1,500
RG11	2,000	2,500

*Based on point-to-point connection with no amplification

Most cable manufacturers supply coaxial cable specifically designed for CCTV applications. The recommended construction includes a solid bare copper (SBC) conductor and a bare copper (BC) braid shield with coverage of 90–95% to minimize signal loss.

Plenum Cable

In many industrial and commercial facilities CCTV systems are installed or upgraded long after initial construction. Where conduit is not available plenum coaxial cables can be installed. Plenum cable is approved by Underwriters Laboratories for installation without conduit. Although technically required only for "plenum" air spaces such as suspended ceilings and return air passages, it is often simpler to install plenum type cable throughout the system rather than use it only in certain areas.



Standard Coaxial Cable for CCTV



Video Installation Tips

Issue #2
Published Monthly

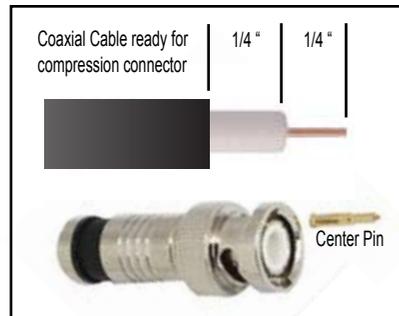
Selecting and Installing Connectors

Since the overall performance of any CCTV system is dependent on the weakest link in the system, selecting and correctly installing cable connectors is essential to achieve the highest video quality.

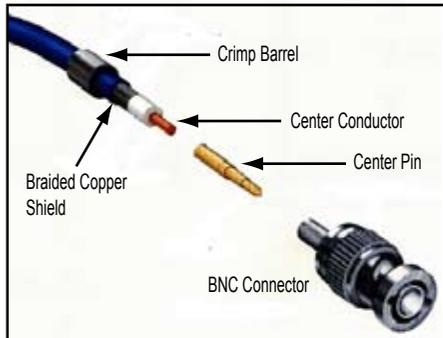
The BNC (Bayonet Neill–Concelman) connector is the standard for CCTV. BNC connectors lock together to prevent unintentional disconnection. Only compression or crimp-on style connectors should be used to terminate cables. Twist-on type BNC connectors, although easy to install, should never be used as they can easily work loose due to cable tension with resulting video loss.

BNC Compression Connector Installation Steps:

1. Prepare the coaxial cable by removing 1/2" of the outer insulation and braided shield; then expose 1/4" of the center conductor as shown.
2. Make sure the center conductor is not bent and slide into the center pin. (Note: One-piece compression connectors are also available which eliminate this step.)
3. Slide the center pin fully into the BNC connector and twist the connector on firmly in a clockwise direction.
4. Use a compression tool to complete the installation being sure to follow the tool manufacturer's instructions.



Cable Termination with BNC Compression Connector



Cable Termination with BNC Crimp-On Connector

BNC Crimp-On Connector Installation Steps:

1. Slide crimp barrel onto cable.
2. Trim cable sheathing back as shown taking care not to cut or nick the braided shield.
3. Pull braided shield back and inset center pin onto conductor. Crimp using the center pin hole on a coax crimping tool.
4. Slide the center pin fully into the BNC connector and twist the connector on in a clockwise direction.
5. Pull the braided shield forward to cover the BNC sleeve and slide the crimp barrel forward to cover it. Crimp into place with the crimping tool.

Cable Installation Tips

Cables should always be cut to measure for each camera run to minimize signal loss. Excess cable that is spooled or wrapped up and tucked away can degrade picture quality due to magnetic induction.

Keep CCTV cabling away from strong sources of radio frequency or electromagnetic radiation by following TIA (Telecommunications Industry Association) and EIA (Electronic Industries Association) structured cabling guidelines as outlined in the TIA/EIA 568 standard. CCTV cables should be installed at least:

- a) 5" away from power lines of 2 kVA or less.
- b) 12" away from fluorescent lighting & power lines between 2 & 5 kVA.
- c) 36" away from power lines greater than 5 kVA.
- d) 40" away from transformers & motors.

Look for the next issue of Video Installation Tips: Lens Selection for Industrial Applications

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