ControlNet™ Installations

Overview and Cabling Tips

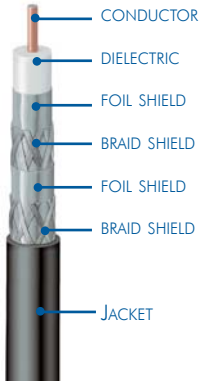
ControlNet™ is a real-time, 10 Mb/sec network that permits both I/O data communications and upload/download of programming and configuration data over the same link. A ControlNet network may consist of up to five **trunk segments** of up to 3280 ft/1000 meters in length. Segments may be linked with active repeaters to form a total network length of 16400 ft/5000 meters. ControlNet also supports a fiber optic option for even longer distances.

Depending on network length, a ControlNet system connects up to 99 nodes (with a maximum of 48 devices per single segment). A node is a connection via a tap and drop cable to any of a variety of ControlNet-compatible components. ControlNet also supports redundant links so that the network will continue to operate despite a break in one of the cables.

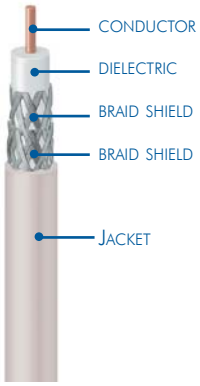
ControlNet uses a low-loss **quad-shielded coaxial cable** as a trunkline. **CommScope's 5060/5061 series of coax cables** is based on a time-tested design and are engineered to meet or exceed ControlNet standards. The 5060 series is available in several configurations, including those intended for armored, aerial, burial, hi-flex, plenum, riser and limited distance and special application installations.

ControlNet uses a double-braid shielded coaxial cable as a dropline. **CommScope's 5065 coaxial cable** is used in ControlNet droplines. Installers can also use CommScope's 5065 coaxial cable in shorter (limited) distance droplines that can be supported by this 24 AWG cable. In addition, the smaller size of CommScope's 5065 coaxial cable allows for easier installations in limited space areas such as control cabinets.

5060/5061 SERIES CONTROLNET CABLE



5065SERIES CONTROLNET CABLE



ControlNet Cable Connection and Termination

All connections to the ControlNet trunk cable are made by taps, which may be installed anywhere along the trunk cable and have the drop cables already attached. BNC connectors are used to connect the taps to the trunk and link ControlNet cable segments. Only one unconnected drop cable (usually for maintenance purposes) is permitted. If you are planning a node but have not installed the device to which it will be attached, use a bullet connector on the trunk to reserve its location.

The number of taps on a segment will determine its maximum length. For instance, a segment with only two nodes can run the full 3280 ft/1000 meters. However, a segment supporting the maximum number of 48 nodes may only run 820 ft/250 meters. Repeaters count as devices, but not as nodes. 75Ω terminators must be attached to the ends of the trunk cable.

Taps, BNC connectors and terminators are available from several quality manufacturers.

ControlNet Cable Installation Tips

CommScope 5060 series cables are designed to deliver optimum electrical and mechanical performance under real-world conditions. In order to minimize electromagnetic interference (EMI), manufacturers offer some specific wiring recommendations:

- ControlNet cables are isolated from earth and MUST be protected from inadvertent grounding - do not let connectors touch grounded surfaces
- Keep ControlNet cable at least 5 ft/1.5 meters from any high-voltage enclosures or sources of RF/microwave radiation
- If you must cross power feed lines, do so at right angles
- If used, the entire length of the conduit/wireway must be grounded back to the enclosure.

Cabling Environment	Noise Source	Min. Safe distance
in an enclosure	Category-1 conductors <20A AC lines 20A to 100KVA AC lines >100KVA	3 in/0.08 m 6 in/0.15 m 24 in/0.60 m
in wireway/conduit	Category-1 conductors <20A AC lines 20A to 100KVA AC lines >100KVA	3 in/0.08 m 6 in/0.15 m 12 in/0.30 m
outside of conduit	Category-1 conductors <20A AC lines 20A to 100KVA AC lines >100KVA	6 in/0.15 m 12 in/0.30 m 24 in/0.60 m

Manufacturers also recommend routing around category-1 conductors such as AC power lines, high-power AC and DC digital I/O lines and motion drive/motor power connections (see the above chart).

ControlNet™

for general, riser, plenum, burial and special applications

Quad-shielded RG6-styled cables engineered for ControlNet systems
Meets ControlNet International specifications
Available in a variety of configurations to meet your specific application
Cable-in-conduit (CIC) versions are available

Approved by Allen-Bradley as Encompass Program Products

Part Number	Conductor Size & Type Nom DCR kft / km	Dielectric Type Nom OD in / mm	Shields Type & Coverage Nom DCR kft / km	Jacket Type & Thickness in / mm	Cable Color & OD in / mm.	Nominal Capacitance pF/ft pF/m	Nom Vel. of Prop.	Nom Imp.	Nom Attenuation MHz	dB/100′	dB/100m
5060 **general purpose**  **NEC/CEC CMG**	18 AWG Copper-covered steel 28.6Ω/93.8Ω	Foam PE .180/4.57	AL foil, 60% AL braid, AL foil and 40% AL braid 3.9Ω/12.8Ω	PVC .034/.864	Black .300/7.62	16.0 52.5	82%	75Ω	1 2 5 10 20 50	0.36 0.38 0.45 0.59 0.86 1.38	1.18 1.25 1.48 1.94 2.82 4.53
5060D **dual conductor**  **NEC/CEC CMG**	(2) 18 AWG Copper-covered steel 28.6Ω/93.8Ω	Foam PE .180/4.57	AL foil, 60% AL braid, AL foil and 40% AL braid 3.9Ω/12.8Ω	PVC .034/.864	Black .300/7.62 by .617/15.67	16.0 52.5	82%	75Ω	1 2 5 10 20 50	0.36 0.38 0.45 0.59 0.86 1.38	1.18 1.25 1.48 1.94 2.82 4.53
5060R **riser**  **NEC/CEC CMR**	18 AWG Copper-covered steel 28.6Ω/93.8Ω	Foam PE .180/4.57	AL foil, 60% AL braid, AL foil and 40% AL braid 3.9Ω/12.8Ω	PVC .034/.864	Black .300/7.62	16.0 52.5	82%	75Ω	1 2 5 10 20 50	0.36 0.38 0.45 0.59 0.86 1.38	1.18 1.25 1.48 1.94 2.82 4.53
5061/5061V **plenum**  **NEC/CEC CMP**	18 AWG Copper-covered steel 28.6Ω/93.8Ω	Foam FEP .170/4.32	AL foil, 60% AL braid, AL foil and 40% AL braid 3.9Ω/12.8Ω	Kynar (5061) .014/.355 PVC (5061V) .016/.406	Clear .264/6.69 White 2.67/6.78	16.0 52.5	85%	75Ω	1 2 5 10 20 50	0.34 0.37 0.44 0.57 0.83 1.38	1.12 1.21 1.44 1.87 2.72 4.53
5060B **direct burial** 	18 AWG Copper-covered steel 28.6Ω/93.8Ω	Foam PE .180/4.57	AL foil, 60% AL braid, AL foil and 40% AL braid 3.9Ω/12.8Ω	PE .032/.813 floodant	Black .297/7.54	16.0 52.5	82%	75Ω	1 2 5 10 20 50	0.36 0.38 0.45 0.59 0.86 1.38	1.18 1.25 1.48 1.94 2.82 4.53
5060IS **intrinsically safe**  **NEC/CEC CMG**	18 AWG Copper-covered steel 29.0Ω/95.1Ω	Foam PE .180/4.57	AL foil, 60% AL braid, AL foil and 40% AL braid 3.9Ω/12.8Ω	PVC .034/.863	Lt. Blue .300/7.62	16.0 52.5	82%	75Ω	1 2 5 10 20 50	0.36 0.38 0.45 0.59 0.86 1.38	1.18 1.25 1.48 1.94 2.82 4.53
5065 **limited distance** **special applications**  **NEC/CEC CMR**	24 AWG Solid Copper 26.3Ω/86.3Ω	Foam PE .095/2.41	95% TC braid and 95% TC braid 3.2Ω/10.5Ω	PVC .013/.33	Lt. Gray .155/54.1	16.0 52.5	82%	75Ω	1 5 10 25 50	0.37 0.88 1.26 1.95 2.98	1.21 2.89 4.13 6.40 9.78

Other colors subject to minimum order of 48,000 ft.

Industrial