

DH™ Data Highway Installations

Overview and Cabling Tips for DH+™ and Remote I/O™



DH™ Data Highway is one of the most popular methods of connecting an industrial control network. Up to 64 stations (programmable controller/adapters or a computer) may be joined over a Data Highway.

The Data Highway uses a twinaxial cable as both a **trunk** cable (the network backbone) and as a **drop** cable (which connect the trunkline to the station). A trunk cable may total up to 10,000 ft/3,048 meters) in overall length, while a drop cable may not exceed 100 ft/30 meters in length.

CommScope's 9022/4022 series twinaxial cables meet or exceed specific performance and construction standards established by manufacturers. The standard PVC-jacketed twinax is complemented by a broad range of other styles, including those intended for armored, aerial, burial, hi-flex, plenum and limited distance special application installations.

Data Highway Cable Connection and Termination

Two styles of connectors are offered for the Data Highway. If you frequently move stations or reconfigure your network, use **connector kits**, which use soldered jacks and plugs to attach station droplines and connect segments of trunkline. You will also need at least one terminator set, as unterminated connections will cause signal reflection and degrade system performance.

If you rarely reconfigure your network, use **station connectors**, which are grounded boxes with a screw-type terminal block for attaching the conductors.

The 1770-SC connector set comes with a 15-pin connector to attach the dropline to the controller.

Data Highway Cable Installation Tips

CommScope 9022 series cables are designed to deliver optimum electrical and mechanical performance under real-world conditions. However, manufacturers recommend that the cable be isolated as much as possible from electromagnetic interference(EMI), oils and chemicals, excessive heat/flame and physical movement, vibration and physical damage.

Electromagnetic interference can be avoided by:

- keeping the cable at least 3 ft/1 meter from electrical motors, transformers, arcs and microwave radiation
- running DH cables at a 90° angle to all power lines
- preventing the connectors from touching conductive surfaces
- if running in conduit, making sure the conduit is well grounded along its entire length.

Chemical and thermal problems can be avoided by:

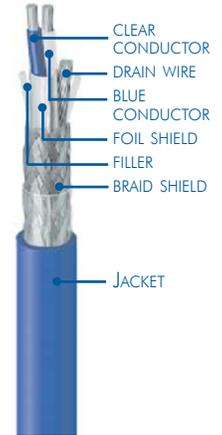
- keeping the cable away from oil, grease, acids, strong chemicals, open flame, steam and steam lines, boilers and equipment hotter than 60° C that might damage the cable
- water, steam or other liquids that might corrode the connectors.

Physical damage can be avoided by:

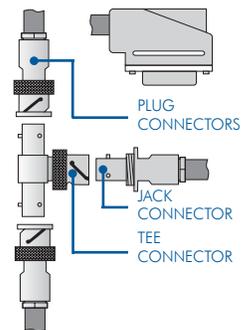
- routing the cable away from foot or vehicle traffic
- keeping away from abrasive surfaces such as concrete which may erode the cable
- not pulling the cable through undersize conduit.

Special note: Exerting tension on the cable at any time may damage the shielding or connectors. Always allow sufficient slack during installation so as to avoid any excessive tension.

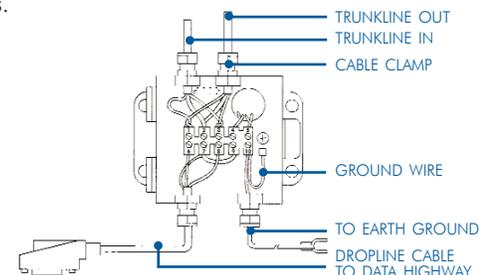
9022/4022 SERIES DATA HIGHWAY CABLE



1770-XG CONNECTOR SET



1770-SC STATION CONNECTOR



CommScope Blue Highway™ DH™, DH+™ Data Highway Plus™ Remote I/O for general, riser, plenum, burial and special applications



Twinaxial cables specifically engineered for DH™, DH+™ and Remote I/O™ systems
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	Conductors Size & Type Nom DCR kft / km	Insulation Type & Color Conductor OD in / mm	Shields Type & Coverage Nom DCR kft / km	Jacket Color & Type Cable OD in / mm	Nominal Capacitance		Nom Vel. of Prop.	Nom Imp.	Nom Attenuation									
					pF/ft	pF/m			MHz	dB/100'	dB/100m							
9022 Blue Highway™ general purpose  NEC/CEC CM	20 AWG (7x28 AWG) Tinned copper 9.5Ω/31.2Ω	PE Clear/blue .078/1.98	AL foil and 57% TC braid 4.1Ω/13.4Ω	Blue PVC .242/6.15	19.7/64.6		66%	78Ω	1	0.77	2.54							
	Drain wire: 7x28 AWG Tinned copper				10	1.76			5.80	50	3.81	12.50	100	5.56	18.26	200	8.69	28.53
9024 limited distance and special applications  NEC/CEC CM	24 AWG (7x32 AWG) Tinned Copper 24.6Ω/80.6Ω	PE Clear/Blue .052/1.32	AL foil and 57% TC braid 6.65Ω/21.8Ω	Gray PVC .200/5.08	19.7/64.6		66%	78Ω	1	0.93	3.05							
	Drain wire: 7x32 AWG Tinned Copper				10	3.09			10.14	50	6.43	21.09	100	10.65	34.93	200	11.65	38.21
9022D dual conductor  NEC/CEC CM	2x20 AWG (7x28 AWG) Tinned copper 9.5Ω/31.2Ω	PE Clear/blue .078/1.98	Each leg AL foil and 57% TC braid 4.1Ω/13.4Ω	Blue PVC .242/6.15 by .500/12.7	19.7/64.6		66%	78Ω	1	0.77	2.54							
	Drain wire: 7x28 AWG Tinned copper				10	1.76			5.80	50	3.81	12.50	100	5.56	18.26	200	8.69	28.53
4022K plenum  NEC/CEC CMP	20 AWG (7x28 AWG) Tinned copper 9.5Ω/31.2Ω	FEP Clear/blue .075/1.90	AL foil and 85% TC braid 2.7Ω/8.9Ω	Clear Kynar .216/5.49	16.9/55.4		66%	78Ω	1	0.80	2.62							
	Drain wire: 7x28 AWG Tinned copper				10	2.10			6.89	50	5.00	16.41	100	7.50	24.61	200	11.00	36.09
9022B direct burial  Burial	20 AWG (7x28 AWG) Tinned copper 9.5Ω/31.2Ω	PE Clear/blue .078/1.98	AL foil and 57% TC braid 4.1Ω/13.4Ω	Black PE .242/6.15	19.7/64.6		66%	78Ω	1	0.77	2.54							
	Drain wire: 7x28 AWG Tinned copper				10	1.76			5.80	50	3.81	12.50	100	5.56	18.26	200	8.69	28.53

Unless specified, blue is the standard outer jacket color. Other colors subject to minimum order of 48,000 ft.

CommScope Blue Highway™ DH™, DH+™ Data Highway Plus™ Remote I/O for physically demanding applications



Twinaxial cables specifically engineered for DH™, DH+™ and Remote I/O™ systems
Armored, hi-flex and messengered constructions
Cable-in-conduit (CIC) versions are available

Approved by Allen-Bradley as
Encompass Program Products

Part Number	Conductors Size & Type Nom DCR kft / km	Insulation Type & Color Conductor OD in / mm	Shields Type & Coverage Nom DCR kft / km	Jacket Color & Type Cable OD in / mm	Nominal Capacitance		Nom Vel. of Prop.	Nom Imp.	Nom Attenuation		
					pF/ft	pF/m			MHz	dB/100'	dB/100m
9022AI interlocked aluminum armor  NEC/CEC CM	20 AWG (7x28 AWG) Tinned copper 9.5Ω/31.2Ω Drain wire: 7x28 AWG Tinned copper	PE Clear/blue .078/1.98	AL foil and 57% TC braid 4.1Ω/13.4Ω Protective Armor: Interlocked aluminum	Inner: Blue PVC .242/6.15 Outer: Blue PVC .597/15.2	19.7	64.6	66%	78Ω	1	0.77	2.54
									10	1.76	5.80
9022SI interlocked galvanized steel armor  NEC/CEC CM	20 AWG (7x28 AWG) Tinned copper 9.5Ω/31.2Ω Drain wire: 7x28 AWG Tinned copper	PE Clear/blue .078/1.98	AL foil and 57% TC braid 4.1Ω/13.4Ω Protective Armor: Interlocked galvanized steel	Inner: Blue PVC .242/6.15 Outer: Blue PVC .597/15.2	19.7	64.6	66%	78Ω	1	0.77	2.54
									10	1.76	5.80
9022F hi-flex  NEC/CEC CM	20 AWG (42x36 AWG) Tinned copper 9.5Ω/31.2Ω Drain wire: 7x28 AWG Tinned copper	PE Clear/blue .078/1.98	AL foil and 85% TC braid 2.7Ω/8.9Ω	Blue PVC .242/6.15	19.7	64.6	66%	78Ω	1	0.82	2.68
									10	2.05	6.74
9022M messengered  NEC/CEC CM	20 AWG (7x28 AWG) Tinned copper 9.5Ω/31.2Ω Drain wire: 7x28 AWG Tinned copper	PE Clear/blue .078/1.98	AL foil and 57% TC braid 4.1Ω/13.4Ω	Black PVC .242/6.15 by .298/7.57 galvanized steel messenger is .051/1.29	19.7	64.6	66%	78Ω	1	0.77	2.54
									10	1.76	5.80

Unless specified, blue is the standard outer jacket color. Other colors subject to minimum order of 48,000 ft.