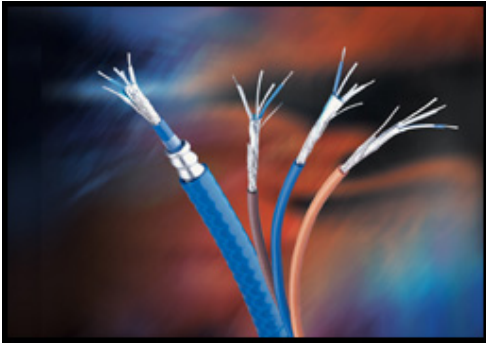


## DATA HIGHWAY

Data Highway (DH) and Data Highway Plus (DH+) are industrial bus protocols developed by Rockwell Automation/Allen Bradley.



The interconnection between the nodes is accomplished over the DH or DH+ link. DH and DH+ allow 64 nodes and the communications protocol used to interconnect the Network link and a PC is called DF1.

DH uses a trunk cable that runs up to 10,000 ft., and drop cables to each node that extend to 100 ft. This system uses peer-to-peer communication in which each node bids on being the Floating Master.

DH+ is appropriate for smaller networks. It uses peer-to-peer communication implementing Token passing. Nominal voltages on the bus are 8 to 12 volts peer-to-peer; and the bus is +/- 200mV sensitive over the two differential lines. Each node on the bus is transformer coupled onto the bus. The bus should be terminated to 150 ohms at each end of the bus. All messages on the bus are either a command or a reply.

Also developed by Rockwell Automation/Allen Bradley is the Data Highway 485 protocol – a local area network design for factory-floor applications. DH-485 allows for the connection of up to 32 devices, including controllers, color graphics systems and PCs.

### Belden Blue Hose® Cable Applications

Belden Blue Hose cable is a proven, robust physical media for Data Highway transmission across the factory floor. And to meet the various applications and environments that the cable serves, a wide variety of constructions are available. Blue Hose cables are typically utilized in the Control Layer, handling a wide range of automation and control data on the same cable. Examples include:

- PLC Processor Interlocking
- Peer-to-peer Messaging
- Remote Programming
- Troubleshooting
- I/O Updates

The needs of real-time, high-throughput industrial applications such as automotive transfer lines, paint shops, assembly lines, sectional conveyors, water/wastewater processing, food processing and pharmaceutical production can be routinely met by the control network and the use of Belden Blue Hose cable.

### Blue Hose Cable – Features and Benefits

Backed by years of research and development, each Belden Blue Hose cable is manufactured to exacting quality standards. Some standard cable attributes include the following:

- Blue PVC Jacket
- NEC CM CL2, UL 2464, 300V, C(UL) CM
- P-7K-SC-182141-MSHA

- Allen-Bradley Part No. 1770 CD
- Conductor: 20 AWG (7x28) tinned copper
- Insulation: Polyethylene, colored Clear & Blue
- Insulation: O.D.: 0.076"
- Shield: Overall Beldfoil® with tinned copper drain wire and 55% tinned copper braid shield
- Jacket: PVC, 80°C
- Nominal Cable O.D.: 0.238"
- Nominal Impedance: 78 ohms
- Nominal Velocity of Propagation: 66%
- Nominal Capacitance: 19.7 pF/ft, 64.6 pF/m
- Nominal Attenuation:

MHz	dB/100 ft.	dB/100m
1	.6	2.0
10	2.1	6.9
50	5.0	16.4
100	7.5	24.6
200	11.0	36.1
400	16.0	52.5

The following table gives full descriptions of both standard and special-construction Blue Hose cables. These cables can also be supplied with CPE jackets. The minimum purchase requirement for a cable with a CPE jacket is 5,000 ft. For more detailed information on each cable within this table, click on the Belden Part No.

#### Belden Blue Hose Selection Guide for PLC and DCS Applications

Part No.	Description	Specifications
<a href="#">9463</a>	Blue Hose Standard Data Highway Cable A Standard Data Highway Cable that is sometimes referred to as Blue Hose. Designed to be used in light industrial environments. Available in Blue, Brown or Orange up to 10,000 ft. special lengths.	1-pair, 20 AWG stranded (7x28) tinned copper, polyethylene insulation (color coded Blue, Clear), Beldfoil® + 55% tinned copper braid and drain wire, Blue sunlight-resistant PVC jacket. Nominal diameter: .238".
<a href="#">3072F</a>	600V Data Highway Cable â€™ UL Type TC A DataTray® cable designed for cable tray use in industrial applications. Cable can occupy same tray or conduit as 600V power cables.	1-pair, 18 AWG stranded (7x26) tinned copper, flame-retardant polyolefin insulation (color coded Blue, White), Beldfoil + 55% tinned copper braid and drain wire, Blue sunlight-resistant PVC jacket. Nominal diameter: .324". UL-1277 600V TC/PLTC/ITC/CMG.
<a href="#">9463F</a>	High-Flex Cable A highly flexible version of the standard Blue Hose cable. The cable also has heavier braid coverage for better noise immunity.	1-pair, 20 AWG stranded (42x36) tinned copper, polyethylene insulation (color coded Blue, Clear), Beldfoil + 85% tinned copper braid, Blue sunlight-resistant PVC jacket. Nominal diameter: .243".
YR28826*	Dual Blue Hose Cable Dual Data Highway/Remote I/O cable has two Twinax pairs individually shielded with an overall braid. Designed for use in daisy chain applications or applications requiring two Blue Hose cables.	2-pair, 20 AWG stranded (7x28) tinned copper, polyethylene insulation (color coded Blue, Clear), each pair Beldfoil shielded (1 pair Blue tape and 1 pair Green tape), 85% tinned copper braid and drain wire, Blue PVC jacket. Nominal diameter: .382".

YC39151*	<p>Dual Armored Data Highway Cable Features two twinax pairs individually shielded with an overall braid, an inner PVC jacket, aluminum interlocked armor, with an outer PVC jacket. Designed for use in daisy chain applications or applications requiring two Blue Hose cables, with the extra mechanical protection and electrical shielding provided by the armor.</p>	<p>2-pair, 20 AWG stranded (7x28) tinned copper, polyethylene insulation (color coded Blue, Clear), each pair Beldfoil shielded, 55% tinned copper braid and drain wire, Blue PVC inner jacket, aluminum interlocked armor, Blue sunlight-resistant PVC outer jacket. Nominal diameter: .820".</p>
<a href="#">9463DB</a>	<p>Gel-Filled Direct Burial Cable A gel-filled Blue Hose cable featuring a low-density polyethylene (LDPE) jacket. Especially suited for high-moisture environments and burial applications.</p>	<p>1-pair, 20 AWG stranded (7x28) tinned copper, polyethylene insulation (color coded Blue, Clear), Beldfoil + 55% tinned copper braid and drain wire, CoreGuard® flooding compound, Blue sunlight-resistant low density polyethylene jacket. Nominal diameter: .240".</p>
<a href="#">89463</a>	<p>Plenum Cable A plenum, 200°C grade cable that is suitable for installations where high and low temperatures, as well as corrosive environments, are encountered.</p>	<p>1-pair, 20 AWG stranded (7x28) tinned copper, FEP insulation (color coded Blue, Clear), Beldfoil + 76% tinned copper braid and drain wire, Blue FEP jacket. Nominal diameter: .203".</p>
YR28764*	<p>Thick-Wall, Heavy-Duty Cable â€™ UL Type PLTC A rugged, heavy-duty cable specially designed for abusive environments. A .069â€™ thick jacket provides extra protection against cuts and abrasion.</p>	<p>1-pair, 20 AWG stranded (7x28) tinned copper, polyethylene insulation (color coded Blue, Clear), Beldfoil + 55% tinned copper braid and drain wire, Blue sunlight-resistant PVC jacket. Nominal diameter: .380".</p>
YR41104*	<p>Low Smoke, Zero Halogen Cable For applications concerned with smoke emissions, toxicity and electronic component corrosion.</p>	<p>1-pair, 20 AWG stranded (7x28) tinned copper, polyethylene insulation (color coded Blue, Clear), Beldfoil + 55% tinned copper braid and drain wire, Blue Haloarrest® jacket. Nominal diameter: .256".</p>
<a href="#">129463</a>	<p>Aluminum Interlocked Armor Blue Hose Cable Features interlocked aluminum armor combined with a PVC jacket and is an ideal alternative to conduit installation. Provides both mechanical protection and electrical shielding. Up to 25 Data Highway cables can be bundled under one sheath.</p>	<p>1-pair, 20 AWG stranded (7x28) tinned copper, polyethylene insulation (color coded Blue, Clear), Beldfoil + 55% tinned copper braid and drain wire, Blue PVC inner jacket, aluminum interlocked armor, Blue PVC sunlight-resistant outer jacket. Nominal overall diameter: .563".</p>
<a href="#">139463</a>	<p>Steel Interlocked Armor Blue Hose Cable Features interlocked galvanized steel armor combined with a PVC jacket. Provides mechanical protection and electrical shielding, as well as prevention against the low-frequency 60 Hz magnetic noise from power lines. Up to 25 cables can be bundled under one sheath.</p>	<p>1-pair, 20 AWG stranded (7x28) tinned copper, polyethylene insulation (color coded Blue, Clear), Beldfoil + 55% tinned copper braid and drain wire, Blue PVC inner jacket, steel interlocked armor, Blue sunlight-resistant outer PVC jacket. Nominal overall diameter: .563".</p>
<a href="#">189463</a>	<p>Continuously Corrugated Aluminum Armor Blue Hose Cable Features continuously corrugated aluminum armor combined with a PVC jacket. Provides mechanical protection, electrical shielding and is impervious to moisture.</p>	<p>1-pair, 20 AWG stranded (7x28) tinned copper, polyethylene insulation (color coded Blue, Clear), Beldfoil + 55% tinned copper braid and drain wire, Blue PVC inner jacket, continuously corrugated aluminum armor, Blue sunlight-resistant PVC outer jacket.</p>

YR29565\* Colored Blue Hose  
When your application calls for multiple Blue Hose cables you can rest assured that Belden has the solution. This special construction is available in Red, Yellow, Green, White or Pink.

Nominal overall diameter: .500".  
1-pair, 20 AWG stranded (7x28) tinned copper, polyethylene insulation (color coded Blue, Clear), Beldfoil + 55% tinned copper braid and drain wire, sunlight-resistant PVC jacket. Nominal diameter: .238".

\*Custom made product. Minimum order quantity may apply.

Custom cables are available upon request which can utilize any number of construction features such as:

- Armoring: Aluminum Interlock, Steel Interlock, and Continuous Corrugated Aluminum
- Armor Tapes: Corrugated Copper, Aluminum, and Steel
- Jackets: PVC, CPE, LDPE, TPE, HDPE, Fluorocopolymer, Oil Res II, Low Smoke Zero Halogen (LSZH), Haloarrest®, and Polyurethane
- Shielding: Overall Beldfoil®, Duofoil®, TC Braid, TC Double Braid, Individual Beldfoil Copper Tape Shields, and "French Braid"
- Insulations: Datalene® XLPE, FEP, Polypropylene, Foam FEP, HDPE, PVC, TPE, and PVC-Nylon
- Conductors: Solid BC, Stranded BC, Solid Bare Copper-covered Steel, and Stranded TC

#### Hirschmann Active Devices

Representing experience and expertise in automation technology, Hirschmann products have been designed to ensure hassle-free data communication under even the toughest conditions.

For Data Highway 485, Hirschmann provides the OZD 485 G12 series of industrial-grade fiber optic repeaters. This series offers both ring redundancy and predictive maintenance for DH-485 communications.

See also [Hirschmann](#).

For information on other protocols see our [Industrial PLC/DCS Cable Cross-reference](#).