



402186044 DataGuard® (GSWB) LSZH FireFighter®  
DataGuard® (SWA) LSZH FireFighter®  
ControlNet 402186044 LSZH FireFighter®

Cable excellence engineered through quality

# ControlNet

## Cables for Industrial Automation







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Descriptions are correct at time of publication, however these may be reviewed at any time and are subject to change without notice. E&OE (Errors and Omissions Excepted) which means that whilst every effort has been made to ensure that the information contained within this publication is accurate, specifications may vary or be subject to change at Belcom's discretion. As such, this publication should be used as a guide only. Exact details can be confirmed at point of enquiry. All cable renders are indicative of the product specified.

**There are two major differences that separate Belcom from any other source of Fieldbus cables.**

The first is stock, available cut to length and with a next day delivery across the UK or standard 2 day delivery to EIRE. The second is an unwavering commitment to providing the best quality Fieldbus cables available, this has been achieved by using the latest in cable manufacturing technology from carefully chosen expert European manufacturers who adopt performance standards critical to the performance of today's high speed data transfer requirements in the industrial network.

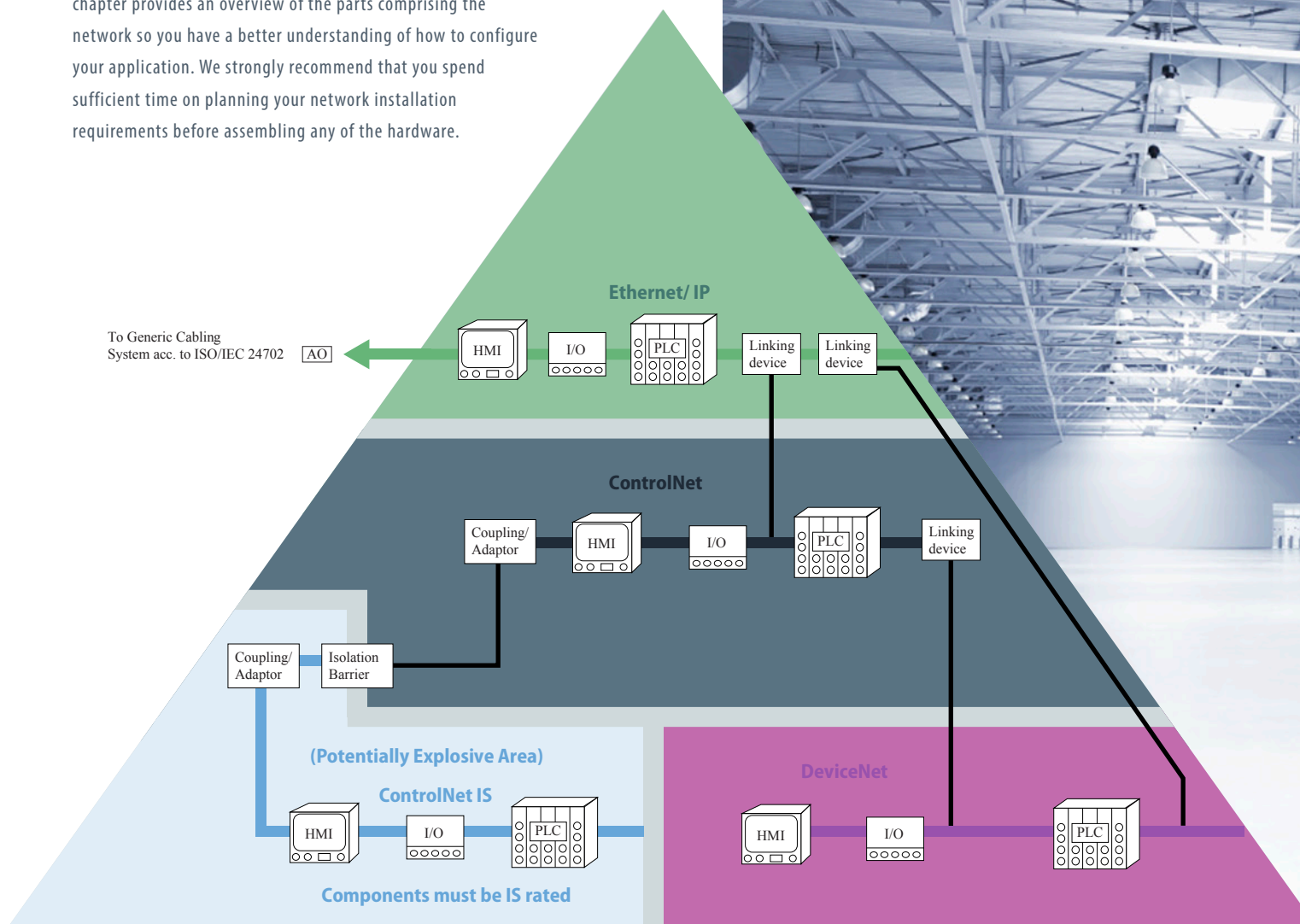
Cable is often an afterthought in the development of new technology process development, which often belies the time, research and testing that goes into producing specific cables for specific applications. With Belcom's range of Fieldbus cables you have the assurance and confidence that the best cable will be maintaining the integrity of your industrial network.





# Fields of Application

The ControlNet cable system gives you the flexibility to design a communication network for your particular application. This chapter provides an overview of the parts comprising the network so you have a better understanding of how to configure your application. We strongly recommend that you spend sufficient time on planning your network installation requirements before assembling any of the hardware.



The illustration provides an overview of NetLinX architecture, including the ControlNet network, that operates in conjunction with international standards.

Item	Term	Description	Item	Term	Description
—	Trunk Line	The trunk cable is the bus or central part of a cable system, with a trunk-cable section being a length of cable between any two taps. Each node is connected to the trunk cable with a tap.	R	Repeater	A two-port component that connects segments together and boosts the signal passing from one segment to the other.
B	Bridge	A device that provides a communication connection between networks.	TR	Terminating resistor	A 75 Ω resistor mounted in a BNC plug to absorb electrical energy of the signal at the end of the cable to prevent reflections. Each end of a segment must be terminated.
N	Node or Device	Any physical device connecting to the ControlNet cable system that requires a network address to function on the network.	T	Passive tap with drop cable	The connection between any device and the cable system. The length of the drop cable is 1 m (3.28 ft).

The illustrations throughout this section show how each of the components identified in the above table forms an efficient, deterministic, and repeatable communication network.





# ControlNet

# Cable Finder

Click on the cable cross section to view the product specification

ControlNet™ is an open network protocol which was originally supported by Controlnet International but was transferred to ODVA (Open DeviceNet Vendors Association Inc.) during 2008 who are responsible for all protocols within the Common Industrial Protocol family. Rockwell Automation - Allen-Bradley offer a wide variety of ControlNet™ products with built in connectivity.

ControlNet cable specification is an industrial RG6 but with a quad shield and is now available with Low Smoke Zero Halogen sheath and armoured version in SWA and GSWB.

- PVC or LSZH FireFighter Sheath as well as other special sheaths for food, chemical industries and low temperature environments.
- Dataguard Steel Wire Armoured for mechanical protection.
- Dataguard Galvanised Steel Wire Armoured for marine applications.

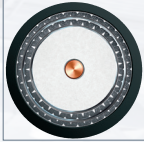
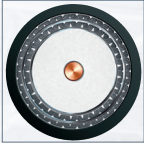
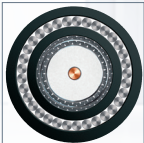




DeviceNet™ is a registered trademark of Open DeviceNet Vendor Association

[www.odva.org](http://www.odva.org)



## ControlNet

- 8-9  Quad Shield Cable PVC
- 10-11  Quad Shield Cable LSZH FireFighter®
- 12-13  Quad Shield Cable DataGuard® (SWA) PVC
- 14-15  Quad Shield Cable DataGuard® (SWA) LSZH FireFighter®
- 16-17  Quad Shield Cable DataGuard® (GSWB) LSZH FireFighter®
- 18  BNC DUAL/TRI/QUAD Compression Connector
- 18  F-Type DUAL/TRI/QUAD Compression Connector
- 19  LinearX 3 Compression Tool to suit BNC/F-Type Connectors



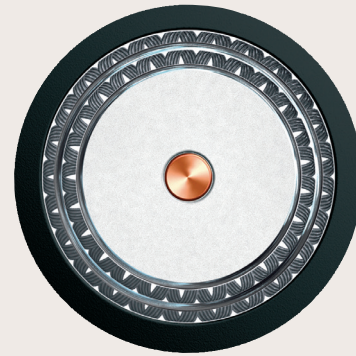


# ControlNet

## Quad Shield Cable PVC

### Cable Design

<b>Conductor</b>	Solid bare copper wire (18awg)	Ø 1,0 mm
<b>Dielectric</b>	Foam Polyethylene (PE)	Ø 4,60 mm
<b>Quad Shield</b>	1 - Aluminium/polyester/Aluminium tape	Ø 4,70 mm
	2 - Aluminium braid outer conductor 57% coverage	Ø 5,35 mm
	3 - Aluminium/polyester/Aluminium tape	Ø 5,45 mm
	4 - Aluminium braid outer conductor 40% coverage	Ø 6,10 mm
<b>Outer Jacket</b>	Polyvinylchloride (PVC), Black	Ø 7,60 ± 0,20 mm



### Electrical Data @ 20°C

Impedance	75 ± 3	Ohm
Capacitance	53	pF/m
Velocity ratio	84	%
Screening effectiveness	100-900 MHz	> 95 dB
Inner conductor resistance	22,5	Ohm/km
Outer conductor resistance	10,5	Ohm/km

### Specification

Part Number	Type
402186040	RG 6/U Type 18awg quad shield cable for ControlNet applications (PVC)

### Attenuation

Frequency (MHz)	dB/100m
50	4,4
230	9,6
470	13,9
860	19,5
1000	21,3
1350	25,0
1500	27,0
1750	29,1
2150	32,8
2400	35,2
3000	40,5

### Structural Return Loss

Frequency (MHz)	dB
30 - 470	> 33
470 - 860	> 31
860 - 2150	> 25
2150 - 3000	> 22

Also available with DataGuard® armoured protection :



DataGuard® SWA  
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# ControlNet

## Quad Shield Cable LSZH FireFighter®

### Cable Design

<b>Conductor</b>	Solid bare copper wire (18awg)	Ø 1,0 mm
<b>Dielectric</b>	Foam Polyethylene (PE)	Ø 4,60 mm
<b>Quad Shield</b>	1 - Aluminium/polyester/Aluminium tape	Ø 4,70 mm
	2 - Aluminium braid outer conductor 57% coverage	Ø 5,35 mm
	3 - Aluminium/polyester/Aluminium tape	Ø 5,45 mm
	4 - Aluminium braid outer conductor 40% coverage	Ø 6,10 mm
<b>Outer Jacket</b>	LSZH FireFighter®, Black	Ø 7,60 ± 0,20 mm

### Characteristics

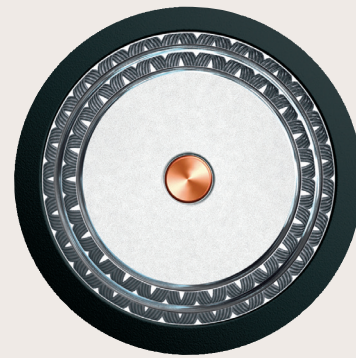
- Flame retardant acc. to IEC 60332-2-1,
- Halogen free acc. to IEC 60754,
- Smoke density acc. to IEC 61034,

### Electrical Data @ 20°C

Impedance	75 ± 3	Ohm
Capacitance	53	pF/m
Velocity ratio	84	%
Screening effectiveness	100-900 MHz	> 95 dB
Inner conductor resistance	22,5	Ohm/km
Outer conductor resistance	10,5	Ohm/km

### Specification

Part Number	Type
402186044	RG 6/U Type 18awg quad shield cable for ControlNet applications (LSZH FireFighter®)



### Attenuation

Frequency (MHz)	dB/100m
50	4,4
230	9,6
470	13,9
860	19,5
1000	21,3
1350	25,0
1500	27,0
1750	29,1
2150	32,8
2400	35,2
3000	40,5

### Structural Return Loss

Frequency (MHz)	dB
30 - 470	> 33
470 - 860	> 31
860 - 2150	> 25
2150 - 3000	> 22

Also available with DataGuard® armoured protection :



DataGuard® SWA  
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DataGuard® GSWB  
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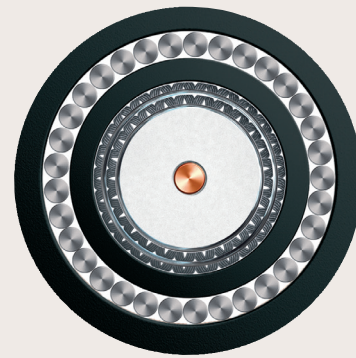


# ControlNet

## Quad Shield Cable DataGuard® (SWA) PVC

### Cable Design

<b>Conductor</b>	Solid bare copper wire (18awg)	Ø 1,0 mm
<b>Dielectric</b>	Foam Polyethylene (PE)	Ø 4,60 mm
<b>Quad Shield</b>	1 - Aluminium/polyester/Aluminium tape	Ø 4,70 mm
	2 - Aluminium braid outer conductor 57% coverage	Ø 5,35 mm
	3 - Aluminium/polyester/Aluminium tape	Ø 5,45 mm
	4 - Aluminium braid outer conductor 40% coverage	Ø 6,10 mm
<b>Inner Jacket</b>	Polyvinylchloride (PVC), Black	Ø 7,60 ± 0,20 mm
<b>Armour</b>	DataGuard® Steel Wire Armour (DSWA)	
<b>Outer Jacket</b>	Polyvinylchloride (PVC), Black	Ø 11,40 ± 0,40 mm



### Electrical Data @ 20°C

Impedance	75 ± 3	Ohm
Capacitance	53	pF/m
Velocity ratio	84	%
Screening effectiveness	100-900 MHz	> 95 dB
Inner conductor resistance	22,5	Ohm/km
Outer conductor resistance	10,5	Ohm/km

### Specification

Part Number	Type
11402186040	RG 6/U Type 18awg quad shield cable for ControlNet applications in harsh environments DataGuard® (SWA) (PVC)

### Attenuation

Frequency (MHz)	dB/100m
50	4,4
230	9,6
470	13,9
860	19,5
1000	21,3
1350	25,0
1500	27,0
1750	29,1
2150	32,8
2400	35,2
3000	40,5

### Structural Return Loss

Frequency (MHz)	dB
30 - 470	> 33
470 - 860	> 31
860 - 2150	> 25
2150 - 3000	> 22





# ControlNet

## Quad Shield Cable DataGuard® (SWA) LSZH FireFighter®

### Cable Design

<b>Conductor</b>	Solid bare copper wire (18awg)	Ø 1,0 mm
<b>Dielectric</b>	Foam Polyethylene (PE)	Ø 4,60 mm
<b>Quad Shield</b>	1 - Aluminium/polyester/Aluminium tape	Ø 4,70 mm
	2 - Aluminium braid outer conductor 57% coverage	Ø 5,35 mm
	3 - Aluminium/polyester/Aluminium tape	Ø 5,45 mm
	4 - Aluminium braid outer conductor 40% coverage	Ø 6,10 mm
<b>Inner Jacket</b>	LSZH FireFighter®, Black	Ø 7,60 ± 0,20 mm
<b>Armour</b>	DataGuard® Steel Wire Armour (DSWA)	
<b>Outer Jacket</b>	LSZH FireFighter®, Black	Ø 11,40 ± 0,40 mm

### Characteristics

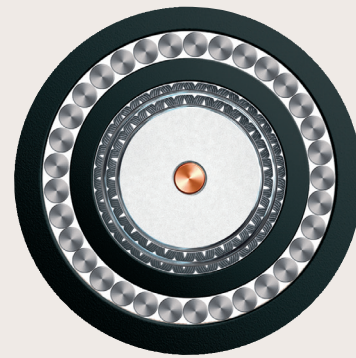
- Flame retardant acc. to IEC 60332-2-1, Halogen free acc. to IEC 60754,  
Smoke density acc. to IEC 61034,

### Electrical Data @ 20°C

Impedance	75 ± 3	Ohm
Capacitance	53	pF/m
Velocity ratio	84	%
Screening effectiveness	100-900 MHz	> 95 dB
Inner conductor resistance	22,5	Ohm/km
Outer conductor resistance	10,5	Ohm/km

### Specification

Part Number	Type
14402186044	RG 6/U Type 18awg quad shield cable for ControlNet applications in harsh environments DataGuard® (SWA) (LSZH FireFighter®)



### Attenuation

Frequency (MHz)	dB/100m
50	4,4
230	9,6
470	13,9
860	19,5
1000	21,3
1350	25,0
1500	27,0
1750	29,1
2150	32,8
2400	35,2
3000	40,5

### Structural Return Loss

Frequency (MHz)	dB
30 - 470	> 33
470 - 860	> 31
860 - 2150	> 25
2150 - 3000	> 22

Also available with DataGuard® armoured protection :



DataGuard® GSWB  
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# ControlNet

## Quad Shield Cable DataGuard® (GSWB) LSZH FireFighter®

### Cable Design

<b>Conductor</b>	Solid bare copper wire (18awg)	Ø 1,0 mm
<b>Dielectric</b>	Foam Polyethylene (PE)	Ø 4,60 mm
<b>Quad Shield</b>	1 - Aluminium/polyester/Aluminium tape	Ø 4,70 mm
	2 - Aluminium braid outer conductor 57% coverage	Ø 5,35 mm
	3 - Aluminium/polyester/Aluminium tape	Ø 5,45 mm
	4 - Aluminium braid outer conductor 40% coverage	Ø 6,10 mm
<b>Inner Jacket</b>	LSZH FireFighter®, Black	Ø 7,60 ± 0,20 mm
<b>Armour</b>	DataGuard® Galvanised Steel Wire Braid (GSWB)	
<b>Outer Jacket</b>	LSZH FireFighter®, Black	Ø 10,40 ± 0,40 mm

### Characteristics

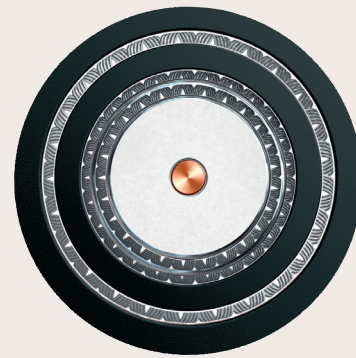
- Flame retardant acc. to IEC 60332-2-1, Halogen free acc. to IEC 60754,  
Smoke density acc. to IEC 61034,

### Electrical Data @ 20°C

Impedance	75 ± 3	Ohm
Capacitance	53	pF/m
Velocity ratio	84	%
Screening effectiveness	100-900 MHz	> 95 dB
Inner conductor resistance	22,5	Ohm/km
Outer conductor resistance	10,5	Ohm/km

### Specification

Part Number	Type
24402186044	RG 6/U Type 18awg quad shield cable for ControlNet applications in harsh environments DataGuard® (GSWB) (LSZH FireFighter®)



### Attenuation

Frequency (MHz)	dB/100m
50	4,4
230	9,6
470	13,9
860	19,5
1000	21,3
1350	25,0
1500	27,0
1750	29,1
2150	32,8
2400	35,2
3000	40,5

### Structural Return Loss

Frequency (MHz)	dB
30 - 470	> 33
470 - 860	> 31
860 - 2150	> 25
2150 - 3000	> 22

Also available with DataGuard® armoured protection :



DataGuard® SWA  
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# ControlNet

## 89-5048 RG6 BNC DUAL/TRI/QUAD Compression Connector

### Characteristics

- RG-6 Dual Shield BNC Connector (Jar of 35)
- Single piece design for easy installation
- Nickel plated brass construction
- Color coded by cable series for easy identification
- 3 GHz bandwidth, 75 ohms impedance
- Easily installs onto RG6 cable



LINEARX

## 92-659 RG6 F-Type DUAL/TRI/QUAD Compression Connector

### Characteristics

RG-6 Reg/Tri/Quad Compression F-Connector (Bulk of 1000)

- Approved for indoor/outdoor use
- All brass construction, nickel plated for superior corrosion resistance
- Plastic adapter sleeve and inner 'O' ring provide double protection for a watertight seal



LINEARX

## 33-632 LinearX 3 Compression Tool to suit BNC/F-Type Connectors

### LinearX3 F/BNC/RCA Compression Tool (Adjustable) with four RTQ™ WeatherProof™ F-Connectors

The LinearX3 adds an adjustability feature and is designed for F/BNC/RCA connectors. The post can be raised or lowered to accommodate different sizes and types of compression connectors. No separate or loose adapters are required for BNC or RCA connectors. This tool is for installers who work with multiple types of connectors looking for an economical all-in-one product as an alternative to traditional crimping tools. The LinearX3 is designed for installers of CCTV, Audio/Video, and CATV/SATV systems. It is compatible with all IDEAL F/BNC/RCA compression connectors for RG6/RG6 Quad/RG59.



LINEARX

### Characteristics

- Features
- Resources
- Compresses 21mm (industry standard) F compression connectors
- Durable and rugged zinc die-cast body with a protective powder coated paint finish
- Captive linear stroke for consistent compression results and easy operation
- Includes 4 RTQ™ RG6/6Quad WeatherProof™ F Compression Connectors







## FireFighter®

FireFighter cables are produced to exacting IEC standards for fire performance covering 60332-1 flame resistance for single cables and section 3 for bunched cables as well as low smoke generation (61034) and negligible halogen gas emission (60754-1). In addition to these, all FireFighter® cables are sheathed according to IEC60092-359 where applicable for electrical installation in ships as well as being 600 V rated for Tray Cable applications.

In order to meet demanding and diverse customer applications, FireFighter® performance materials are used in conjunction with other brands including DataGuard® (Armoured Cables), Armada® (MOG Cables), SureLAN® (Local area network cables), SureLIGHT® (Fibre Optic) and EventSeries® (Audio & Broadcast).

Whatever the application or installation, where public safety and reliability are concerned, FireFighter® Low smoke zero halogen properties have been proven to perform. It's not just LSZH sheath, It's a FireFighter® Cable.



## Quality Management

Belcom recognise the importance of quality control and constantly monitor our quality performance to ensure compliance with relevant standards whether they are self imposed, satutory or regulatory.

Our management system is approved by DNV to BS-EN-ISO 9001:2008 standard and is an imperative part of our organisation.

Environmental documentation is available at [www.belcom.co.uk/qa-environmental](http://www.belcom.co.uk/qa-environmental)







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