



Cable excellence engineered through quality

Foundation Fieldbus 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.

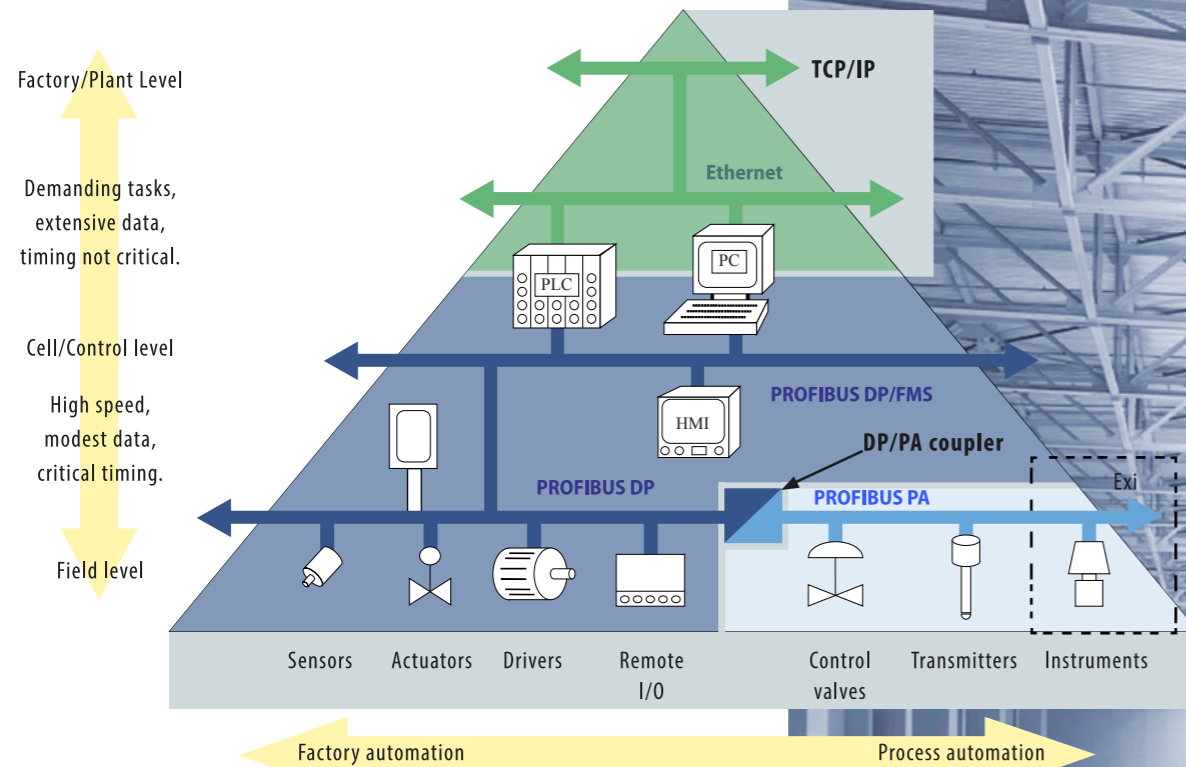
The first is stock, available cut to length and with a next day delivery across the UK or standard 2 day delivery to EIRE. The second is an unwavering commitment to providing the best quality Fieldbus cables available, this has been achieved by joining forces with Leoni special cables GmbH whose modern manufacturing plant in Northern Germany bristles with the latest in cable manufacturing technology. 'In process' continual testing cumulating in one of the best final test facilities we have seen, ensure strict adherence to performance standards critical to the performance of today's high speed data transfer requirements in the industrial network.

Many high tech intelligent process projects are functioning faultlessly over Leoni Fieldlink cables across the world, chemical, pharmaceutical, oil and gas, packaging, water treatment, food and beverage, automotive, you can name a process and there is already a strong presence or developing requirement for Fieldlink Fieldbus cables.

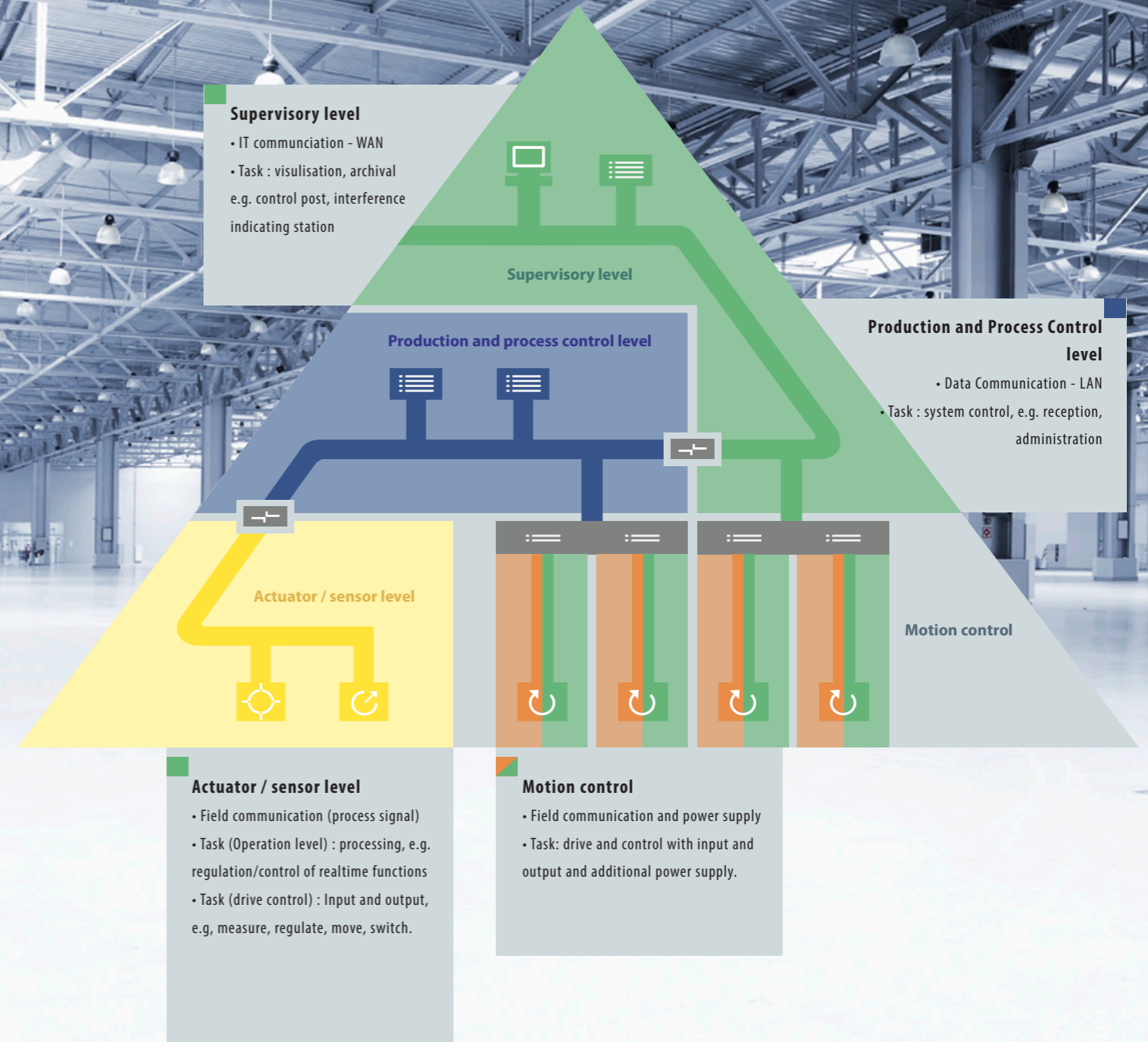
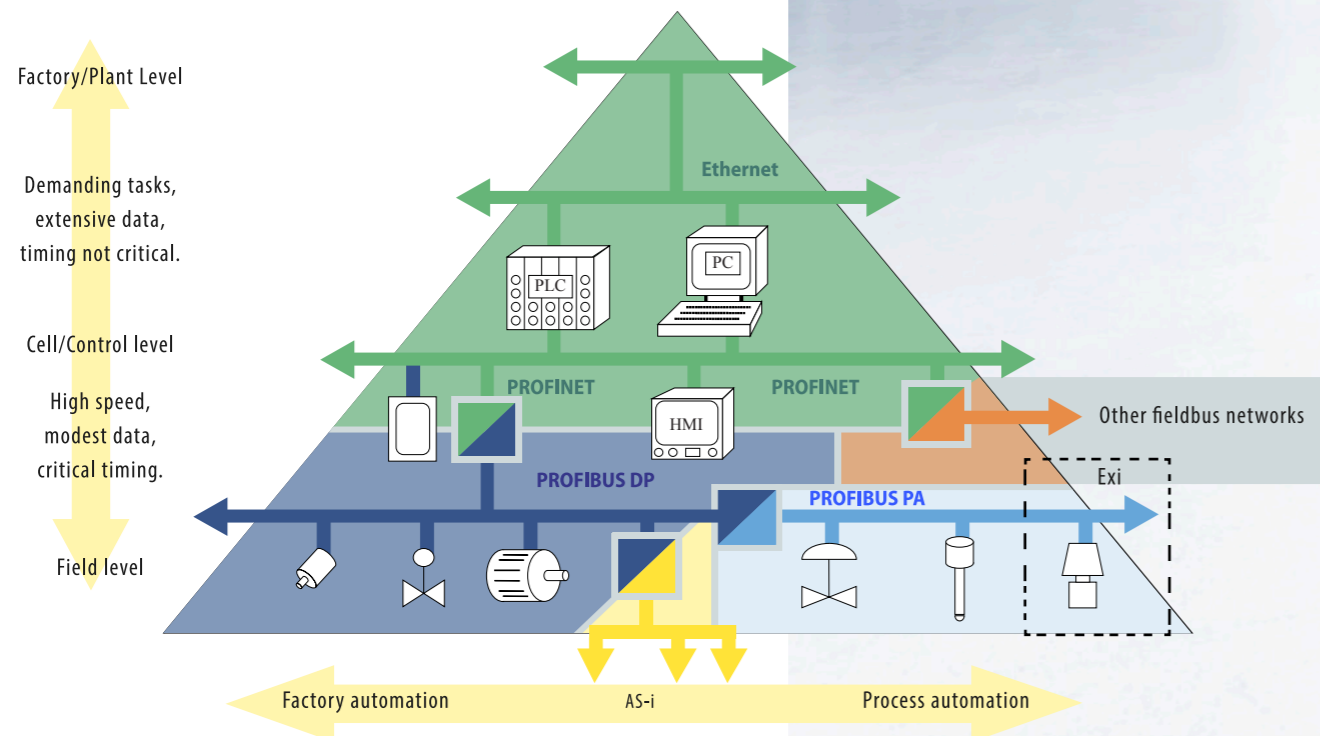
Cable is often an afterthought in the development of new technology process development, which often belies the time, research and testing that goes into producing specific cables for specific applications. With Belcom's range of Leoni Fieldlink cables you have the assurance and confidence that the best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



Fields of Application



The Control system hierarchy and use of PROFIBUS and Ethernet technology





Foundation Fieldbus

Cable Finder

Click on the cable cross section to view the product specification

Foundation Fieldbus was developed for the process automation industry and typically finds its place in the following industries; Chemical, Food & Beverage, Oil, Gas and Refining, Life Sciences, Pulp and Paper, Metals, Mining and Minerals.

The Foundation Fieldbus organisation operates an "open standard" philosophy and ensures all vendors products interoperate within Fieldbus Network. Based on IEC 61158-2 and complying with the international Society of Measurement and Controls (ISA) SP50 standard the Foundation Fieldbus Cable ensures fault free transmission of the fully digitalised serial two way communication system.

Belcom stock and cut to length Foundation Fieldbus Cables suitable for a range of environment conditions from tray cable indoor/outdoor (sunlight resistant) to armoured direct burial versions.

- Flame retardant
- Flexible installation
- Permanent installation
- Outdoor cable
- Silicon free
- Sunlight resistant
- Oil resistant
- Cold resistant
- RoHS compliant



Foundation Fieldbus Cables

8-9		ES Single Pair Type A IEC61158-2 LSZH FireFighter®	26-27		Eco Style Single Pair ISA/SP50 Type A LSZH FireFighter® DataGuard® (SWA)
10-11		Eco Style Single Pair ISA/SP50 Type A LSZH FireFighter®	28-29		Eco Style Single Pair ISA/SP50 Type A LSZH FireFighter® DataGuard® (GSWB)
12-13		Eco Style Single Pair Type A IEC61158-2 PVC	30-31		Eco Style Single Pair Type A IEC61158-2 PVC DataGuard® (SWA)
14-15		Single Pair 1,0mm² XLPE IEC61158-2 Type A	32-33		Single Pair 1,0mm² XLPE IEC61158-2 Type A DataGuard® (SWA)
16-17		Single Pair Type A for Long Distance Applications	34-35		Single Pair 1,0mm² XLPE IEC61158-2 Type A DataGuard® (GSWB)
18-19		For Flexible Installation Indoor or Outdoor	36-37		Single Pair Type A for Long Distance Applications LSZH FireFighter® DataGuard® (SWA)
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24-25		ES Single Pair Type A IEC61158-2 LSZH FireFighter® DataGuard® (GSWB)			



Foundation Fieldbus

FieldLink®

ES Single Pair Type A IEC61158-2 LSZH FireFighter®

Cable Design

Wire

Conductor	Stranded bare copper wire 7/0,40mm (18awg)	∅ 1,20 mm
Insulation	Foamed Polyethylene (PE) with skin	∅ 2,55 mm

Core

Pair	2 wires twisted to a pair (BU-OG)	
Tape	Plastic tape overlapped	
Easystrip Jacket	Soft Thermoplastic copolymer	∅ 5,50 mm
Screen	Alulaminare foil overlapped	
Braid	Tinned copper wire braid, 90% coverage	∅ 6,10 mm

Outer Jacket	Low Smoke Zero Halogen FireFighter®	∅ 8,0 ± 0,20 mm
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Characteristics

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

Specification

Part Number	Type
2401P1854	Orange Foundation Fieldbus ES, cable for permanent installation (easy to strip), 2x18AWG7, FireFighter®
2401P1854-02	Blue Foundation Fieldbus ES, cable for permanent installation in hazardous Ex-areas (easy to strip), 2x18AWG7, FireFighter®

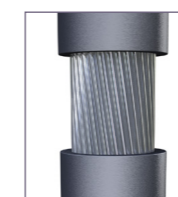
Electrical Data @ 20°C

Conductor resistance	≤	22	Ohm/km
Screen resistance	≤	9	Ohm/km
Insulation resistance	≥	10	MOhm*km
Capacitance (1 kHz)	≈	54	nF/km
Characteristic Impedance		31,25 kHz	100±20 Ohm
Attenuation		39 kHz	≤ 3 dB/100m
Capacitance unbalance e	≤	2	nF/km
Surface transfer impedance		20 MHz	≤ 5 mOhm/m
Rel. Velocity of Propagation	≈	72	%
Operating voltage (peak)	≤	100	V
UL rating		300	V
Test Voltage (wire/wire rms 50Hz 1min.)		1000	V
Test Voltage (wire/screen rms 50Hz 1min.)		800	V

Mechanical & Thermal Characteristics

Permissible Temperature range		-25 ~ +80	°C
Min. Bending radius allowed	repeated	10	x ∅
Min. Bending radius allowed	single	5	x ∅
Weight (approx.)		96	kg/km

Also available with DataGuard® armoured protection :



DataGuard® SWA
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DataGuard® GSWB
Page 24-25



Foundation Fieldbus

FieldLink®

Eco Style Single Pair ISA/SP50 Type A LSZH FireFighter®

Cable Design

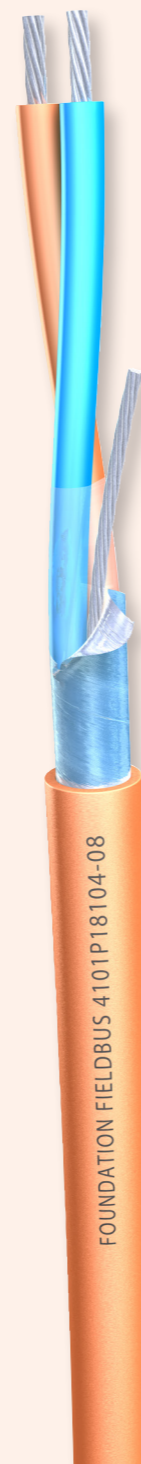
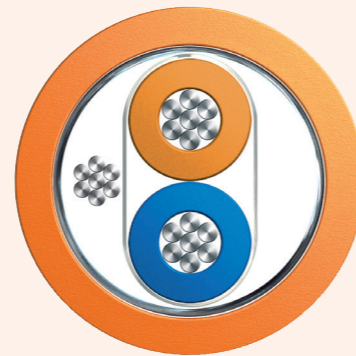
Wire

Conductor	Stranded tinned copper wire 7/0,40mm (18awg)	Ø 1,20 mm
Insulation	Polyethylene (PE)	Ø 2,55 mm

Core

Pair	2 wires twisted to a pair (BU-0G)
Tape	Polyester tape overlapped
Drain Wire	Stranded tinned copper wire 7/0,30mm
Screen	Aluminium/polyester tape overlapped, 100% coverage

Outer Jacket	LSZH FireFighter® Orange or Blue	Ø 6,70 ± 0,20 mm
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Characteristics

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



Specification

Part Number	Type
4101P18104-08	Orange Foundation Fieldbus cable Eco Style ISA/SP50 Type A LSZH FireFighter®, 2x18AWG7,
4101P18104-02	Blue Foundation Fieldbus cable Eco Style ISA/SP50 Type A for installation in hazardous Ex-areas LSZH FireFighter®, 2x18AWG7,

Electrical Data @ 20°C

Conductor resistance	nom.	19,33	Ohm/km
Screen resistance	nom.	37,60	Ohm/km
Capacitance (conductor/conductor)	nom.	79,2	pF/m
Capacitance (conductor/screen)	nom.	148,5	pF/m
Impedance	nom.	100	Ohm
Attenuation		0,50 MHz	2,1 dB/100m
Attenuation		1,00 MHz	3,2 dB/100m

Mechanical & Thermal Characteristics

Insulation Elongation	min.	300	%
Insulation Strength	min.	1000	N/cm ²
Outer Jacket Elongation	min.	300	%
Outer Jacket Strength	min.	650	N/cm ²

Also available with DataGuard® armoured protection :



DataGuard® SWA
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DataGuard® GSWB
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Foundation Fieldbus

FieldLink®

Eco Style Single Pair Type A IEC61158-2 PVC

Cable Design

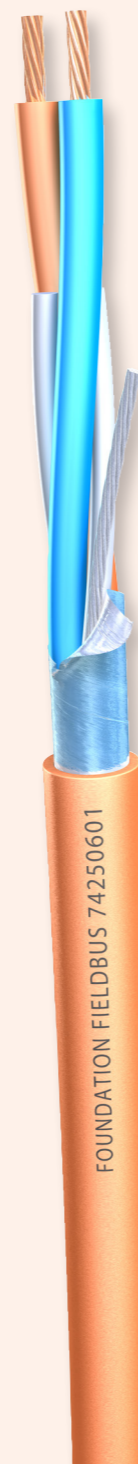
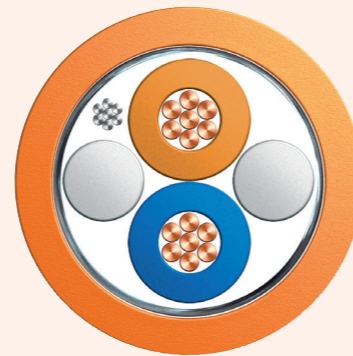
Wire

Conductor	Stranded bare copper wire 7/0,40mm (18awg)	Ø 1,20 mm
Insulation	Foamed Polyethylene (PE) with skin	Ø 2,55 mm

Core

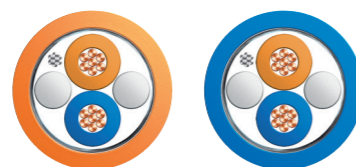
Pair	2 wires twisted to a pair (BU-0G) with fillers
Drain Wire	tinned copper wire
Screen	Aluminium/polyester tape overlapped, 100% coverage

Outer Jacket	Polyvinylchloride (PVC) Orange or Blue	Ø 0,00 ± 0,00 mm
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Characteristics

- Flame retardant acc. to IEC 60332-2-1, IEC 60332-3-24 (Cat. C)
- Oil resistance acc. to ICEA S-73-532
- Sunlight resistance acc. to UL 1581 section 1200



Specification

Part Number	Type
74250601	Orange Foundation Fieldbus cable Eco Style Type A IEC 61158-2 PVC, 2x18AWG7
74250601-02	Blue Foundation Fieldbus cable Eco Style Type A IEC 61158-2 for installation in hazardous Ex-areas, PVC, 2x18AWG7

Electrical Data @ 20°C

Conductor resistance (loop)	max.	43,6	Ohm/km
Screen resistance	nom.	30	Ohm/km
Mutual capacitance	nom.	60	nF/m
Inductance	nom.	0,7	mH/km
Capacitance unbalance to earth	max.	4	nF/m
Impedance at f = 31.25 kHz		100±20	Ohm
Attenuation at f = 39 kHz	max.	3,0	dB/km
Propagation delay change (f = 7.9 kHz - 39 kHz)	max.	1,7	µs/km
Test voltage Urms (core : core)		1500	V
Test voltage Urms (core : screen)		1500	V
Operating voltage		300	V

Mechanical & Thermal Characteristics

Temperature range	during operation	-30 ~ +70	°C
Temperature range	during installation	-5 ~ +50	°C
Min. Bending radius		7,5	x Ø
Weight (approx.)		85	kg/km

Also available with DataGuard® armoured protection :



DataGuard® SWA
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Foundation Fieldbus

FieldLink®

Single Pair 1,0mm² XLPE IEC61158-2 Type A

Cable Design

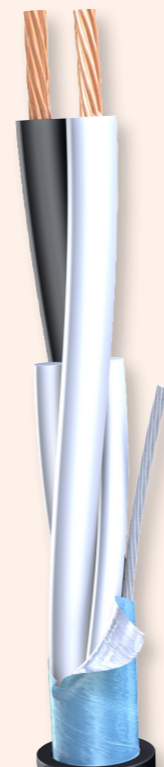
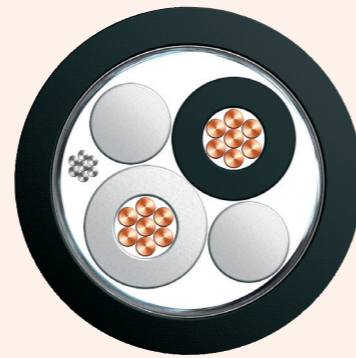
Wire

Conductor	Stranded bare copper wire 7/0,43mm	1,0mm ²
Insulation	Cross-Linked Polyethylene (XLPE)	Ø 2,90 mm

Core

Pair	2 wires twisted to a pair (BK-WH) with fillers
Tape	Overall Polyester tape wrapped
Drain Wire	tinned copper wire 7/0,30mm
Screen	Aluminium/polyester tape overlapped, 100% coverage

Outer Jacket	LSZH FireFighter® black, orange or blue	Ø 8,20 ± 0,10 mm
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Characteristics

- Flame propagation acc. to UL 13 vertical tray test - IEC 60332-3-22 (Cat. A)
- Low smoke characteristic acc. to IEC 61034 (L.T. >60 %)
- Amount of halogen acid acc. to IEC 60754-1
- Degree of acidity of gases acc. to IEC 60754-2
- Oxygen index of outer sheath acc. to ASTM D 2863 (min. 30%)
- Oil resistance acc. to ICEA S-73-532
- UV resistance acc. to UL 1581 article 1200

Specification

Part Number	Type
101P004FX	Black Foundation Fieldbus cable IEC 61158-2 Type A LSZH FireFighter®. 1x2x1,0m ²
101P004FX-02	Blue Foundation Fieldbus cable IEC 61158-2 Type A LSZH FireFighter®. 1x2x1,0m ²
101P004FX-08	Orange Foundation Fieldbus cable IEC 61158-2 Type A LSZH FireFighter®. 1x2x1,0m ²

Electrical Data @ 20°C

Conductor resistance (loop)	max.	37	Ohm/km
Screen resistance	nom.	30	Ohm/km
Mutual capacitance	nom.	60	nF/m
Inductance	nom.	0,7	mH/km
Capacitance unbalance to earth	max.	2	nF/km
Impedance at f = 31.25 kHz		100±20	Ohm
Attenuation at f = 39 kHz	max.	3,0	dB/km
Propagation delay change (f = 7.9 kHz - 39 kHz)	max.	1,7	µs/km
Test voltage Urms (core : core)		1500	V
Test voltage Urms (core : screen)		1500	V
Operating voltage	max.	300	V

Mechanical & Thermal Characteristics

Temperature range	during operation	-40 ~ +90	°C
Temperature range	during installation	-5 ~ +50	°C
Min. Bending radius		10	x Ø
Weight (approx.)		-	kg/km

Also available with DataGuard® armoured protection :



DataGuard® SWA
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DataGuard® GSWB
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Foundation Fieldbus

FieldLink®

Single Pair Type A for Long Distance Applications
LSZH FireFighter®

Cable Design

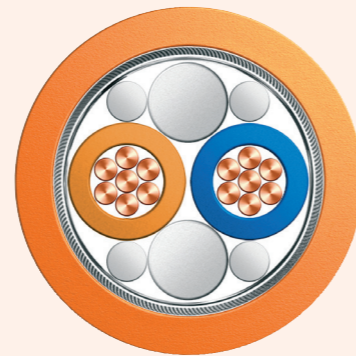
Wire

Conductor	Stranded bare copper wire (16/7awg)	Ø 1,60 mm
Insulation	Foamed Polyethylene (PE) with skin	Ø 2,70 mm

Core

Pair	2 wires twisted to a pair (BU-OG) with fillers	
Tape	Plastic tape overlapped	Ø 5,50 mm
Screen	Alulaminare foil overlapped	
Braid	Tinned copper wire braid, 90% coverage	Ø 6,10 mm

Outer Jacket	Low Smoke Zero Halogen FireFighter®	Ø 8,0 ± 0,20 mm
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Characteristics

- Flame retardant acc. to IEC 60332-3-24 (Cat.C)
- Halogen free acc. to IEC 60754-2,
- Smoke density acc. to IEC 61034,
- Sunlight resistant acc. to UL 1581 Sec. 1200

Specification

Part Number	Type
2401P1654	Foundation Fieldbus cable Type A for Long Distance Applications LSZH FireFighter®, 2x16AWG7

Electrical Data @ 20°C

Conductor resistance	≤	14	Ohm/km
Screen resistance	≤	8	Ohm/km
Insulation resistance	≥	200	MOhm*km
Capacitance (1 kHz)	≈	54	nF/km
Operating voltage (peak)	≤	100	V
Characteristic Impedance		31,25 kHz	100±20 Ohm
Attenuation		39 kHz	≤ 2 dB/km
Capacitance unbalance e	≤	2	nF/km
Surface transfer impedance		20 MHz	≤ 5 mOhm/m
Rel. Velocity of Propagation	≈	72	%
Test Voltage (wire/wire rms 50Hz 1min.)		1000	V
Test Voltage (wire/screen rms 50Hz 1min.)		800	V

Mechanical & Thermal Characteristics

Permissible Temperature range		-25 ~ +80	°C
Min. Bending radius allowed	repeated	10	x Ø
Min. Bending radius allowed	single	5	x Ø
Weight (approx.)		92	kg/km

Also available with DataGuard® armoured protection :



DataGuard® SWA
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Foundation Fieldbus

FieldLink®

For Flexible Installation Indoor or Outdoor

Cable Design

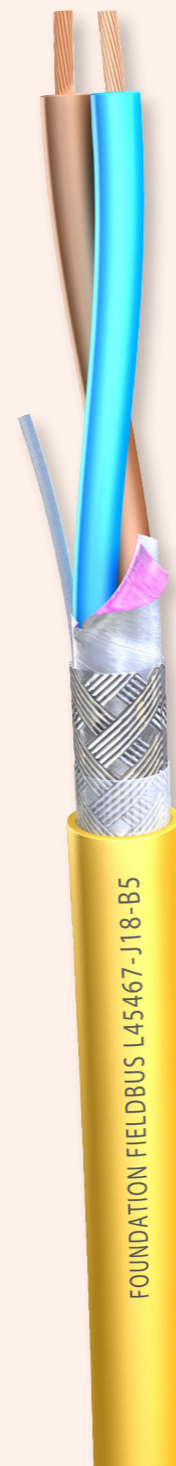
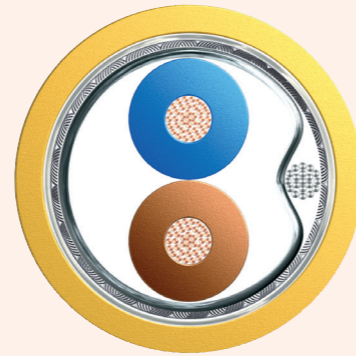
Wire

Conductor	Stranded bare copper wire (37/0,17mm)	Ø 1,15 mm
Insulation	Irradiated Polyethylene XLPE	Ø 2,85 mm

Core

Pair	2 wires twisted to a pair (BU-BN)
Screen	Alulaminare foil overlapped
Drain Wire	Stranded tinned copper 0,50mm ²
Braid	Tinned copper wire braid, 85% coverage
Tape	Plastic tape overlapped

Outer Jacket	Polyvinylchloride (PVC) Yellow	Ø 7,90 ± 0,30 mm
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Characteristics

- Flame retardant acc. to UL 1685 (CSA FT 4),
- Oil resistant acc. to UL 13 Sec. 40 (60 °C),
- Sunlight resistant acc. to UL 2556 Sec. 4.2.8.5,

Specification

Part Number	Type
L45467-J18-B5	FOUNDATION Fieldbus cable for flexible installation indoor or outdoor, 2x19AWG, UL listed: CMG and CL3

Electrical Data @ 20°C

Conductor resistance	≤	24	Ohm/km
Insulation resistance	≥	20	MOhm*km
Characteristic Impedance		31,25 kHz	100±20 Ohm
Capacitance (1 kHz) wire/wire	≈	65	nF/km
Capacitance (1 kHz) wire/screen	≈	125	nF/km
Inductance		31,25 kHz	0,75 µH/m
Capacitance unbalance to ground	≤	2	nF/km
Attenuation		39 kHz	≤ 3,4 dB/km
Propagation delay change 0,25*f to 1,25*f	≤	1,7	µs/km
Operating voltage (peak)	≤	300	V
Test Voltage (wire/wire/screen rms 50Hz 1min.)	=	1500	V

The electrical requirements similar to IEC 61158-2

Mechanical & Thermal Characteristics

Permissible Temperature range		-40 ~ +105	°C
Min. Bending radius allowed	repeated	10	x Ø
Min. Bending radius allowed	single	5	x Ø
Weight (approx.)		89	kg/km



Foundation Fieldbus

FieldLink®

Multi-Pair ICAT Type A IEC61158-2 LSZH FireFighter®

Cable Design

Wire

Conductor	Stranded tinned copper wire (18 AWG)	Ø 1,20 mm
Insulation	Insulation of Polypropylene (PP)	Ø 2,85 mm

Shielded Pair

Pair	2 wires twisted to a pair
Drain Wire	Stranded tinned copper drain wire (18awg)
Screen	Alulamine foil overlapped

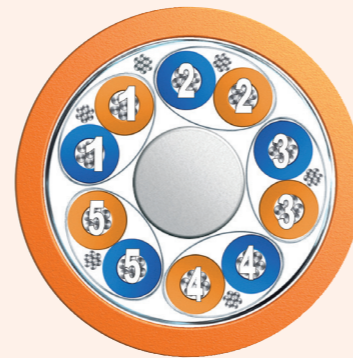
Core

Centre	# Shielded pairs OG/1-BU/1, OG/2-BU/2, OG/3-BU/3....
Tape	Each shielded pair with numbered tapes
Drain Wire	Stranded tinned copper drain wire (18awg)
Screen	Alulamine foil overlapped

Outer Jacket

Low Smoke Zero Halogen FireFighter®	Ø see table
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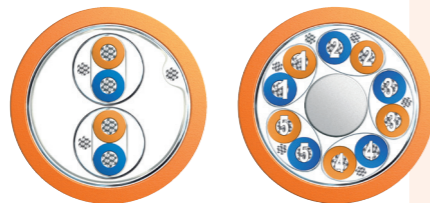
Colour Orange



FOUNDATION FIELDBUS 4602P1834

Characteristics

- Low Smoke, Fire retardant, Zero Halogen
- Corrosivity of fumes acc. to IEC 60754-2
- Smoke-density acc. to IEC 61034
- Oil resistant acc. to IEC60811-404 (4 hours @ 70°C)
- Sunlight resistant



Specification

Part Number	Type
4602P1834	Foundation Fieldbus 18awg ICAT Type A IEC61158-2 LSZH FireFighter®, 2x2x18/7AWG
4605P1834	Foundation Fieldbus 18awg ICAT Type A IEC61158-2 LSZH FireFighter®, 5x2x18/7AWG

Electrical Data @ 20°C

Conductor resistance	≤	22	Ohm/km
Insulation resistance	≥	5	GOhm*km
Operating voltage (peak)	≤	300	V
Attenuation (0.039 MHz)	nom.	3.4	dB/100m
Capacitance (1 kHz wire/wire)	nom.	65	nF/km
Capacitance (1 kHz wire/screen)	nom.	125	nF/km
Characteristic impedance at 31.25 kHz		100±20	Ohm
Test voltage (wire/wire rms 50Hz 1min)		1500	V
Test voltage (wire/screen rms 50Hz 1min)		1000	V

Mechanical & Thermal Characteristics

Permissible temperature range		-40 ~ +90	°C
Min. Bending radius allowed	repeated	10	x Ø
Min. Bending radius allowed	single	5	x Ø
Weight (approx.)	2 Pair	131	kg/km
Weight (approx.)	5 Pair	297	kg/km
Overall Diameter	2 Pair	9,8±0,4	mm
Overall Diameter	5 Pair	16,7±0,4	mm

Also available with DataGuard® armoured protection :



DataGuard® SWA
Page 38-39



DataGuard® GSWB
Page 40-41



Foundation Fieldbus

FieldLink®

ES Single Pair Type A IEC61158-2 LSZH FireFighter® DataGuard® (SWA)

Cable Design

Wire

Conductor	Stranded bare copper wire 7/0,40mm (18awg)	Ø 1,20 mm
Insulation	Foamed Polyethylene (PE) with skin	Ø 2,55 mm

Core

Pair	2 wires twisted to a pair (BU-OG)	
Tape	Plastic tape overlapped	
Easystrip Jacket	Soft Thermoplastic copolymer	Ø 5,50 mm
Screen	Alulminate foil overlapped	
Braid	Tinned copper wire braid, 90% coverage	Ø 6,10 mm

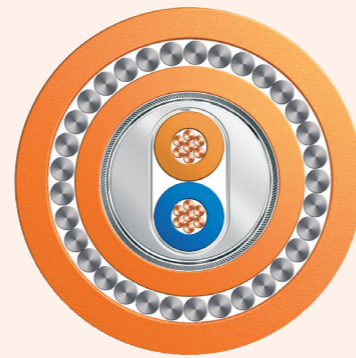
Inner Jacket	Low Smoke Zero Halogen FireFighter®	Ø 8,0 ± 0,20 mm
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Armour	DataGuard® Steel Wire Armour (DSWA)	
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Outer Jacket	Low Smoke Zero Halogen FireFighter®	Ø 12,80 ± 0,80 mm
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Characteristics

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



Electrical Data @ 20°C

Conductor resistance	≤	22	Ohm/km
Screen resistance	≤	9	Ohm/km
Insulation resistance	≥	10	MOhm*km
Capacitance (1 kHz)	≈	54	nF/km
Characteristic Impedance		31,25 kHz	100±20 Ohm
Attenuation		39 kHz	≤ 3 dB/100m
Capacitance unbalance e	≤	2	nF/km
Surface transfer impedance		20 MHz	≤ 5 mOhm/m
Rel. Velocity of Propagation	≈	72	%
Operating voltage (peak)	≤	100	V
UL rating		300	V
Test Voltage (wire/wire rms 50Hz 1min.)		1000	V
Test Voltage (wire/screen rms 50Hz 1min.)		800	V

Mechanical & Thermal Characteristics

Permissible Temperature range		-25 ~ +80	°C
Min. Bending radius allowed		10	x Ø (see Ø tolerance)
Weight (approx.)		-	kg/km

Also available with DataGuard® armoured protection :



DataGuard® GSWB
Page 24-25

Specification

Part Number	Type
142401P1854	Orange Foundation Fieldbus cable ES Type A IEC 61158-2 for Permanent Installation, DataGuard® (SWA) 2x18AWG7,
142401P1854-01	Black Foundation Fieldbus cable ES Type A IEC 61158-2 for Permanent Installation, DataGuard® (SWA) 2x18AWG7,
142401P1854-02	Blue Foundation Fieldbus cable ES Type A IEC 61158-2 for permanent installation in hazardous Ex-areas, DataGuard® (SWA) 2x18AWG7,



Foundation Fieldbus

FieldLink®

ES Single Pair Type A IEC61158-2 LSZH FireFighter® DataGuard® (GSWB)

Cable Design

Wire

Conductor	Stranded bare copper wire 7/0,40mm (18awg)	Ø 1,20 mm
Insulation	Foamed Polyethylene (PE) with skin	Ø 2,55 mm

Core

Pair	2 wires twisted to a pair (BU-OG)	
Tape	Plastic tape overlapped	
Easystrip Jacket	Soft Thermoplastic copolymer	Ø 5,50 mm
Screen	Alulamine foil overlapped	
Braid	Tinned copper wire braid, 90% coverage	Ø 6,10 mm

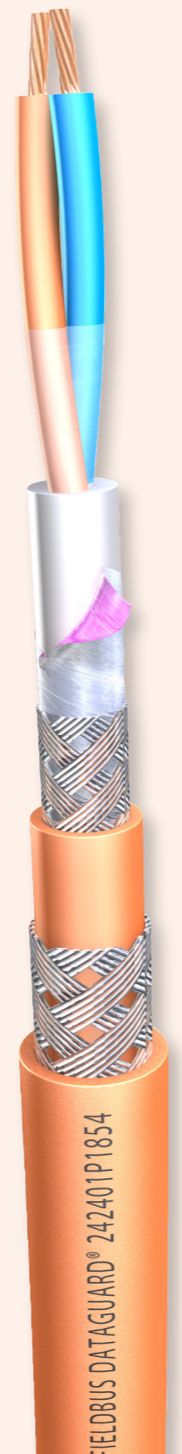
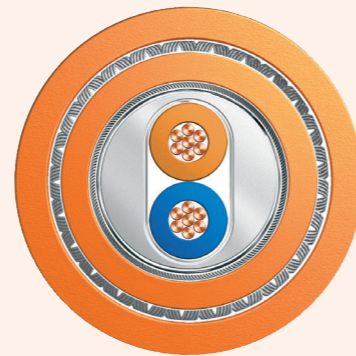
Inner Jacket	Low Smoke Zero Halogen FireFighter®	Ø 8,0 ± 0,20 mm
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Armour	DataGuard® Galvanised Steel Wire Braid (GSWB)	
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Outer Jacket	Low Smoke Zero Halogen FireFighter®	Ø 11,60 ± 0,80 mm
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Characteristics

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



Specification

Part Number	Type
242401P1854	Orange Foundation Fieldbus cable ES Type A IEC 61158-2 for Permanent Installation, DataGuard® (GSWB) 2x18AWG7,
242401P1854-01	Black Foundation Fieldbus cable ES Type A IEC 61158-2 for Permanent Installation, DataGuard® (GSWB) 2x18AWG7,
242401P1854-02	Blue Foundation Fieldbus cable ES Type A IEC 61158-2 for permanent installation in hazardous Ex-areas, DataGuard® (GSWB) 2x18AWG7,

Electrical Data @ 20°C

Conductor resistance	≤	22	Ohm/km
Screen resistance	≤	9	Ohm/km
Insulation resistance	≥	10	MOhm*km
Capacitance (1 kHz)	≈	54	nF/km
Characteristic Impedance		31,25 kHz	100±20 Ohm
Attenuation		39 kHz	≤ 3 dB/100m
Capacitance unbalance e	≤	2	nF/km
Surface transfer impedance		20 MHz	≤ 5 mOhm/m
Rel. Velocity of Propagation	≈	72	%
Operating voltage (peak)	≤	100	V
UL rating			300 V
Test Voltage (wire/wire rms 50Hz 1min.)			1000 V
Test Voltage (wire/screen rms 50Hz 1min.)			800 V

Mechanical & Thermal Characteristics

Permissible Temperature range		-25 ~ +80	°C
Min. Bending radius allowed		10	x Ø (see Ø tolerance)
Weight (approx.)		-	kg/km

Also available with DataGuard® armoured protection :



DataGuard® SWA
Page 22-23



Foundation Fieldbus

FieldLink®

Eco Style Single Pair ISA/SP50 Type A LSZH FireFighter® DataGuard® (SWA)

Cable Design

Wire

Conductor	Stranded tinned copper wire 7/0,40mm (18awg)	Ø 1,20 mm
Insulation	Polyethylene (PE)	Ø 2,55 mm

Core

Pair	2 wires twisted to a pair (BU-OG)
Tape	Polyester tape overlapped
Drain Wire	Stranded tinned copper wire 7/0,30mm
Screen	Aluminium/polyester tape overlapped, 100% coverage

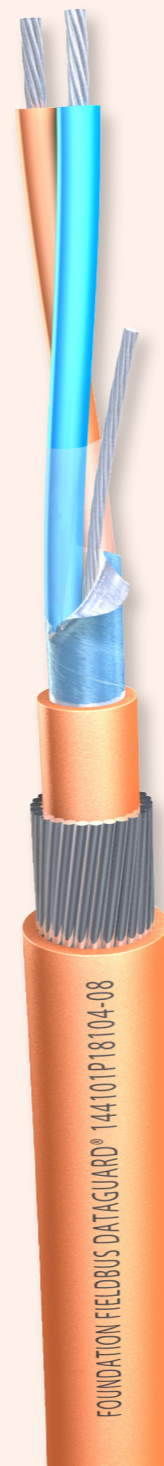
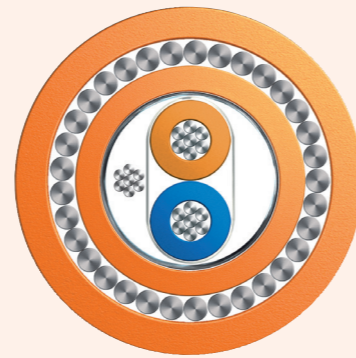
Inner Jacket LSZH FireFighter® Ø 6,70 ± 0,20 mm

Armour DataGuard® Steel Wire Armour (SWA)

Outer Jacket LSZH FireFighter® Black, Blue, Orange Ø 10,50 ± 0,40 mm

Characteristics

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



Specification

Part Number	Type
144101P18104-01	Black Foundation Fieldbus cable Eco Style ISA/SP50 Type A LSZH FireFighter®, 2x18AWG7, DataGuard® (SWA)
144101P18104-02	Blue Foundation Fieldbus cable Eco Style ISA/SP50 Type A for installation in hazardous Ex-areas, 2x18AWG7, DataGuard® (SWA)
144101P18104-08	Orange Foundation Fieldbus cable Eco Style ISA/SP50 Type A LSZH FireFighter®, 2x18AWG7, DataGuard® (SWA)

Electrical Data @ 20°C

Conductor resistance	nom.	19,33	Ohm/km
Screen resistance	nom.	37,60	Ohm/km
Capacitance (conductor/conductor)	nom.	79,2	pF/m
Capacitance (conductor/screen)	nom.	148,5	pF/m
Impedance	nom.	100	Ohm
Attenuation		0,50 MHz	2,1 dB/100m
Attenuation		1,00 MHz	3,2 dB/100m

Also available with DataGuard® armoured protection :



DataGuard® GSWB
Page 28-29



Foundation Fieldbus

FieldLink®

Eco Style Single Pair ISA/SP50 Type A LSZH FireFighter® DataGuard® (GSWB)

Cable Design

Wire

Conductor	Stranded tinned copper wire 7/0,40mm (18awg)	Ø 1,20 mm
Insulation	Polyethylene (PE)	Ø 2,55 mm

Core

Pair	2 wires twisted to a pair (BU-0G)
Tape	Polyester tape overlapped
Drain Wire	Stranded tinned copper wire 7/0,30mm
Screen	Aluminium/polyester tape overlapped, 100% coverage

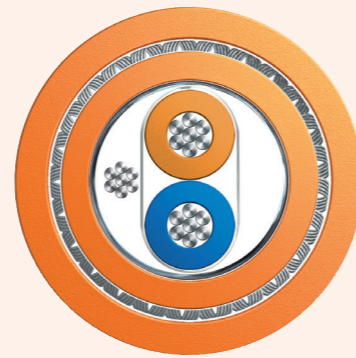
Inner Jacket LSZH FireFighter® Ø 6,70 ± 0,20 mm

Armour DataGuard® Galvanised Steel Wire Braid (GSWB)

Outer Jacket LSZH FireFighter® SHF-1 Black, Blue, Orange Ø 10,50 ± 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

Conductor resistance	nom.	19,33	Ohm/km
Screen resistance	nom.	37,60	Ohm/km
Capacitance (conductor/conductor)	nom.	79,2	pF/m
Capacitance (conductor/screen)	nom.	148,5	pF/m
Impedance	nom.	100	Ohm
Attenuation	0,50 MHz	2,1	dB/100m
Attenuation	1,00 MHz	3,2	dB/100m

Specification

Part Number	Type
244101P18104-01	Black Foundation Fieldbus cable Eco Style ISA/SP50 Type A LSZH FireFighter®, 2x18AWG7, DataGuard® (GSWB) SHF-1
244101P18104-02	Blue Foundation Fieldbus cable Eco Style ISA/SP50 Type A for installation in hazardous Ex-areas, 2x18AWG7, DataGuard® (GSWB)
244101P18104-08	Orange Foundation Fieldbus cable Eco Style ISA/SP50 Type A LSZH FireFighter®, 2x18AWG7, DataGuard® (GSWB) SHF-1

Also available with DataGuard® armoured protection :



DataGuard® SWA
Page 26-27



Foundation Fieldbus

FieldLink®

Eco Style Single Pair Type A IEC61158-2 PVC DataGuard® (SWA)

Cable Design

Wire

Conductor	Stranded bare copper wire 7/0,40mm (18awg)	Ø 1,20 mm
Insulation	Foamed Polyethylene (PE) with skin	Ø 2,55 mm

Core

Pair	2 wires twisted to a pair (BU-OG) with fillers
Drain Wire	tinned copper wire
Screen	Aluminium/polyester tape overlapped, 100% coverage

Inner Jacket	Polyvinylchloride (PVC)	Ø 0,00 ± 0,00 mm
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Armour	DataGuard® Galvanised Steel Wire Braid (GSWB)
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Outer Jacket	Polyvinylchloride (PVC) Black, Blue, Orange	Ø 11,80 ± 0,40 mm
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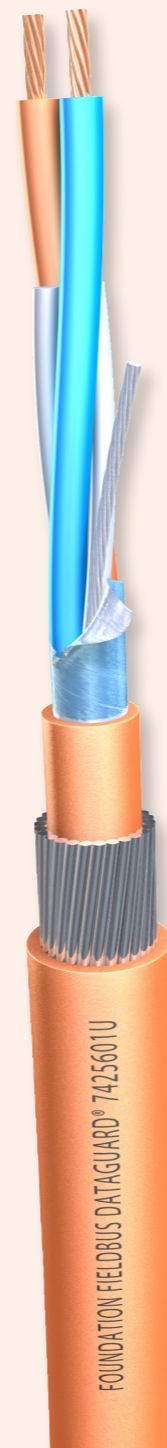
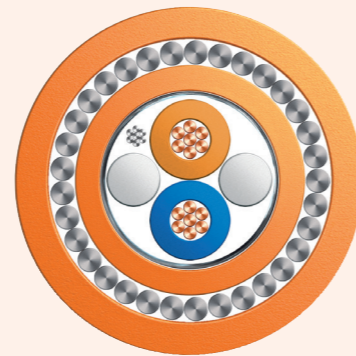
Characteristics

- Flame retardant acc. to IEC 60332-2-1, IEC 60332-3-24 (Cat. C)
- Oil resistance acc. to ICEA S-73-532
- Sunlight resistance acc. to UL 1581 section 1200



Specification

Part Number	Type
7425601U	Orange Foundation Fieldbus cable Eco Style ISA/SP50 Type A PVC ,2x18AWG7, DataGuard® (SWA)
7425601U-02	Blue Foundation Fieldbus cable Eco Style ISA/SP50 Type A for installation in hazardous Ex-areas, 2x18AWG7, DataGuard® (SWA)
7425601U-01	Black Foundation Fieldbus cable Eco Style ISA/SP50 Type A PVC ,2x18AWG7, DataGuard® (SWA)



Electrical Data @ 20°C

Conductor resistance (loop)	max.	43,6	Ohm/km
Screen resistance	nom.	30	Ohm/km
Mutual capacitance	nom.	60	nF/m
Inductance	nom.	0,7	mH/km
Capacitance unbalance to earth	max.	4	nF/m
Impedance at f = 31.25 kHz		100±20	Ohm
Attenuation at f = 39 kHz	max.	3,0	dB/km
Propagation delay change (f = 7.9 kHz - 39 kHz)	max.	1,7	µs/km
Test voltage Urms (core : core)		1500	V
Test voltage Urms (core : screen)		1500	V
Operating voltage		300	V

Mechanical & Thermal Characteristics

Temperature range	during operation	-30 ~ +70	°C
Temperature range	during installation	-5 ~ +50	°C
Min. Bending radius allowed		10	x Ø (see Ø tolerance)
Weight (approx.)		-	kg/km



Foundation Fieldbus

FieldLink®

Single Pair 1,0mm² XLPE IEC61158-2 Type A DataGuard® (SWA)

Cable Design

Wire

Conductor	Stranded bare copper wire 7/0,43mm	1,0mm ²
Insulation	Cross-Linked Polyethylene (XLPE)	Ø 2,90 mm

Core

Pair	2 wires twisted to a pair (BK-WH) with fillers
Tape	Overall Polyester tape wrapped
Drain Wire	tinned copper wire 7/0,30mm
Screen	Aluminium/polyester tape overlapped, 100% coverage

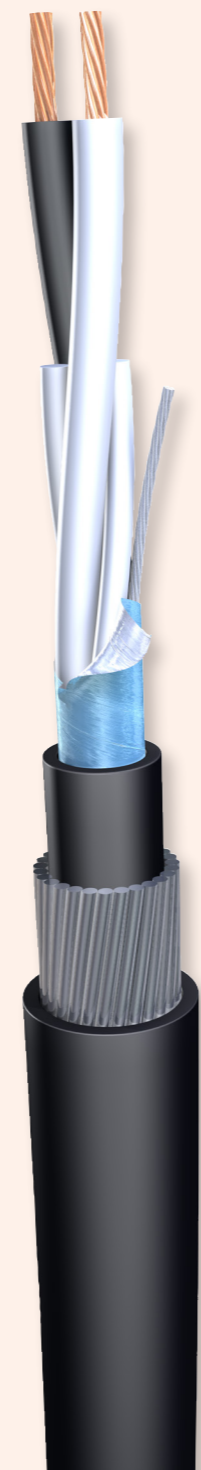
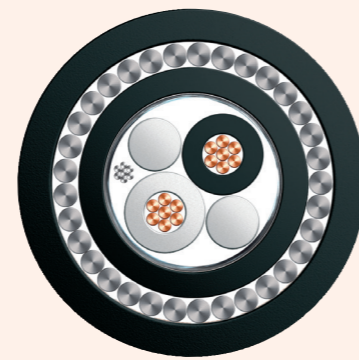
Inner Jacket	LSZH FireFighter®	Ø 8,20 ± 0,10 mm
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Armour	DataGuard® Steel Wire Armour (DSWA)
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Outer Jacket	LSZH FireFighter® black, orange or blue UV-Stable and colourfast	Ø 13,50 ± 0,50 mm
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Characteristics

- Flame propagation acc. to UL 13 vertical tray test - IEC 60332-3-22 (Cat. A)
- Low smoke characteristic acc. to IEC 61034 (L.T. >60 %)
- Amount of halogen acid acc. to IEC 60754-1
- Degree of acidity of gases acc. to IEC 60754-2
- Oxygen index of outer sheath acc. to ASTM D 2863 (min. 30%)
- Oil resistance acc. to ICEA S-73-532
- UV resistance acc. to UL 1581 at ticle 1200



Specification

Part Number	Type
101P144FX-01	Black Foundation Fieldbus cable IEC 61158-2 Type A LSZH FireFighter®, DataGuard® (SWA) 1x2x1,0m ²
101P144FX-02	Blue Foundation Fieldbus cable IEC 61158-2 Type A LSZH FireFighter®, DataGuard® (SWA) 1x2x1,0m ²
101P144FX-08	Orange Foundation Fieldbus cable IEC 61158-2 Type A LSZH FireFighter®, DataGuard® (SWA) 1x2x1,0m ²

Electrical Data @ 20°C

Conductor resistance (loop)	max.	37	Ohm/km
Screen resistance	nom.	30	Ohm/km
Mutual capacitance	nom.	60	nF/m
Inductance	nom.	0,7	mH/km
Capacitance unbalance to earth	max.	2	nF/km
Impedance at f = 31.25 kHz		100±20	Ohm
Attenuation at f = 39 kHz	max.	3,0	dB/km
Propagation delay change (f = 7.9 kHz - 39 kHz)	max.	1,7	µs/km
Test voltage Urms (core : core)		1500	V
Test voltage Urms (core : screen)		1500	V
Operating voltage	max.	300	V

Mechanical & Thermal Characteristics

Temperature range	during operation	-40 ~ +90	°C
Temperature range	during installation	-5 ~ +50	°C
Min. Bending radius		10	x Ø
Weight (approx.)		-	kg/km

Also available with DataGuard® armoured protection :



DataGuard® GSWB
Page 34-35



Foundation Fieldbus

FieldLink®

Single Pair 1,0mm² XLPE IEC61158-2 Type A DataGuard® (GSWB)

Cable Design

Wire

Conductor	Stranded bare copper wire 7/0,43mm	1,0mm ²
Insulation	Cross-Linked Polyethylene (XLPE)	Ø 2,90 mm

Core

Pair	2 wires twisted to a pair (BK-WH) with fillers
Tape	Overall Polyester tape wrapped
Drain Wire	tinned copper wire 7/0,30mm
Screen	Aluminium/polyester tape overlapped, 100% coverage

Inner Jacket	LSZH FireFighter®	Ø 8,20 ± 0,10 mm
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Armour	DataGuard® Galvanised Steel Wire Braid (GSWB)
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Outer Jacket	LSZH FireFighter® black, orange or blue UV-Stable and colourfast	Ø 12,30 ± 0,30 mm
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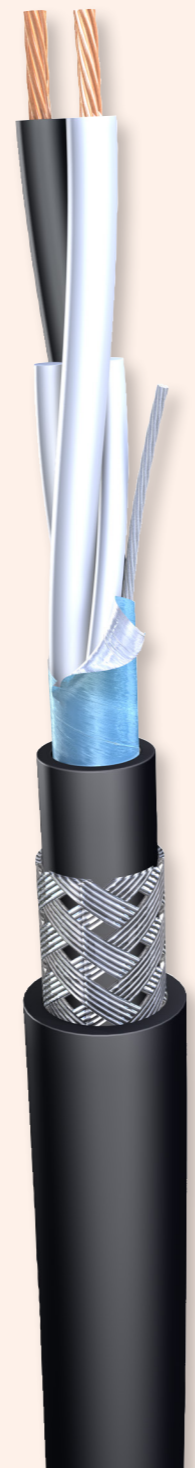
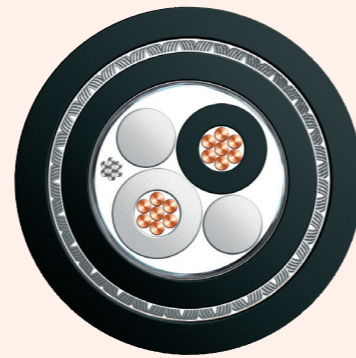
Characteristics

- Flame propagation acc. to UL 13 vertical tray test - IEC 60332-3-22 (Cat. A)
- Low smoke characteristic acc. to IEC 61034 (L.T. >60 %)
- Amount of halogen acid acc. to IEC 60754-1
- Degree of acidity of gases acc. to IEC 60754-2
- Oxygen index of outer sheath acc. to ASTM D 2863 (min. 30%)
- Oil resistance acc. to ICEA S-73-532
- UV resistance acc. to UL 1581 or ticle 1200



Specification

Part Number	Type
101P244FX-01	Black Foundation Fieldbus cable IEC 61158-2 Type A LSZH FireFighter®, DataGuard® (GSWB) 1x2x1,0m ²
101P244FX-02	Blue Foundation Fieldbus cable IEC 61158-2 Type A LSZH FireFighter®, DataGuard® (GSWB) 1x2x1,0m ²
101P244FX-08	Orange Foundation Fieldbus cable IEC 61158-2 Type A LSZH FireFighter®, DataGuard® (GSWB) 1x2x1,0m ²



Electrical Data @ 20°C

Conductor resistance (loop)	max.	37	Ohm/km
Screen resistance	nom.	30	Ohm/km
Mutual capacitance	nom.	60	nF/m
Inductance	nom.	0,7	mH/km
Capacitance unbalance to earth	max.	2	nF/km
Impedance at f = 31.25 kHz		100±20	Ohm
Attenuation at f = 39 kHz	max.	3,0	dB/km
Propagation delay change (f = 7.9 kHz - 39 kHz)	max.	1,7	µs/km
Test voltage Urms (core : core)		1500	V
Test voltage Urms (core : screen)		1500	V
Operating voltage	max.	300	V

Mechanical & Thermal Characteristics

Temperature range	during operation	-40 ~ +90	°C
Temperature range	during installation	-5 ~ +50	°C
Min. Bending radius		10	x Ø
Weight (approx.)		205	kg/km

Also available with DataGuard® armoured protection :



DataGuard® SWA
Page 32-33



Foundation Fieldbus

FieldLink®

Single Pair Type A for Long Distance Applications LSZH FireFighter® DataGuard® (SWA)

Cable Design

Wire

Conductor	Stranded bare copper wire (16/7awg)	Ø 1,60 mm
Insulation	Foamed Polyethylene (PE) with skin	Ø 2,70 mm

Core

Pair	2 wires twisted to a pair (BU-OG) with fillers	
Tape	Plastic tape overlapped	Ø 5,50 mm
Screen	Alulaminare foil overlapped	
Braid	Tinned copper wire braid, 90% coverage	Ø 6,10 mm

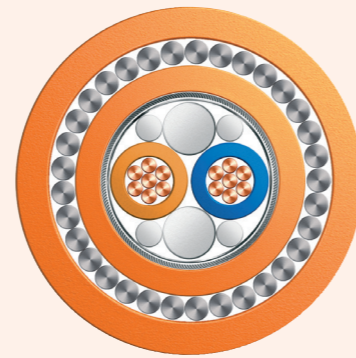
Inner Jacket	Low Smoke Zero Halogen FireFighter®	Ø 8,0 ± 0,20 mm
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Armour	DataGuard® Steel Wire Armour (DSWA)	
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Outer Jacket	Low Smoke Zero Halogen FireFighter®	Ø 12,80 ± 0,80 mm
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Characteristics

- Flame retardant acc. to IEC 60332-3-24 (Cat.C)
- Halogen free acc. to IEC 60754-2,
- Smoke density acc. to IEC 61034,
- Sunlight resistant acc. to UL 1581 Sec. 1200



Specification

Part Number	Type
142401P1654	Orange Foundation Fieldbus cable Type A for Long Distance Applications , 2x16AWG7, DataGuard® (SWA)
142401P1654-01	Black Foundation Fieldbus cable Type A for Long Distance Applications , 2x16AWG7, DataGuard® (SWA)
142401P1654-02	Blue Foundation Fieldbus cable Type A for Long Distance Applications in hazardous Ex-areas, 2x16AWG7, DataGuard® (SWA)

Electrical Data @ 20°C

Conductor resistance	≤	14	Ohm/km
Screen resistance	≤	8	Ohm/km
Insulation resistance	≥	200	MOhm*km
Capacitance (1 kHz)	≈	54	nF/km
Operating voltage (peak)	≤	100	V
Characteristic Impedance		31,25 kHz	100±20 Ohm
Attenuation		39 kHz	≤ 2 dB/km
Capacitance unbalance e	≤	2	nF/km
Surface transfer impedance		20 MHz	≤ 5 mOhm/m
Rel. Velocity of Propagation	≈	72	%
Test Voltage (wire/wire rms 50Hz 1min.)			1000 V
Test Voltage (wire/screen rms 50Hz 1min.)			800 V

Mechanical & Thermal Characteristics

Permissible Temperature range		-25 ~ +80	°C
Min. Bending radius allowed		10	x Ø (see Ø tolerance)
Weight (approx.)		-	kg/km



Foundation Fieldbus

FieldLink®

Multi-Pair ICAT Type A IEC61158-2 LSZH FireFighter® DataGuard® (SWA)

Cable Design

Wire

Conductor	Stranded tinned copper wire (18 AWG)	Ø 1,20 mm
Insulation	Insulation of Polypropylene (PP)	Ø 2,85 mm

Shielded Pair

Pair	2 wires twisted to a pair
Drain Wire	Stranded tinned copper drain wire (18awg)
Screen	Alulamine foil overlapped

Core

Centre	# Shielded pairs 0G/1-BU/1, 0G/2-BU/2, 0G/3-BU/3....
Tape	Each shielded pair with numbered tapes
Drain Wire	Stranded tinned copper drain wire (18awg)
Screen	Alulamine foil overlapped

Inner Jacket	Low Smoke Zero Halogen FireFighter®	Ø see table
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Armour	DataGuard®Steel Wire Armour (DSWA)
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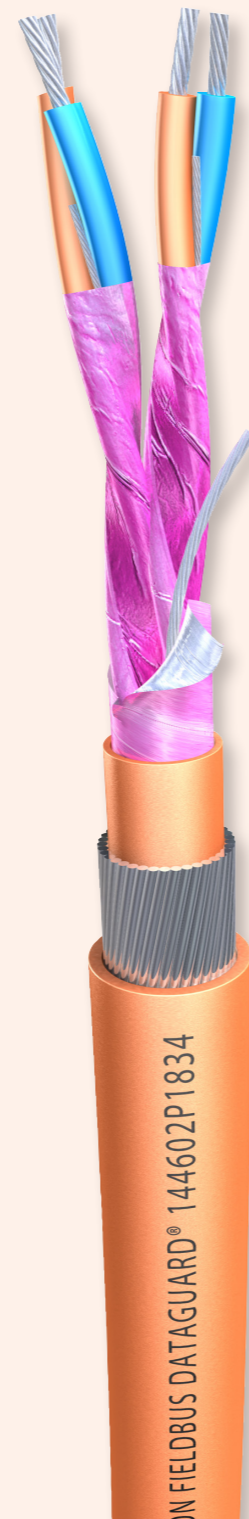
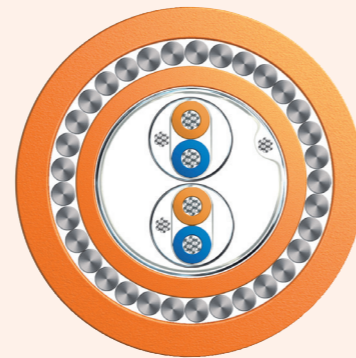
Outer Jacket	Low Smoke Zero Halogen FireFighter®	Ø see table
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Characteristics

- Low Smoke, Fire retardant, Zero Halogen
- Corrosivity of fumes acc. to IEC 60754-2
- Smoke-density acc. to IEC 61034
- Oil resistant acc. to IEC60811-404 (4 hours @ 70°C)
- Sunlight resistant

Specification

Part Number	Type
144602P1834	Foundation Fieldbus 18awg ICAT Type A IEC61158-2 LSZH FireFighter®, DataGuard® (SWA) 2x2x18/7AWG
144605P1834	Foundation Fieldbus 18awg ICAT Type A IEC61158-2 LSZH FireFighter®, DataGuard® (SWA) 5x2x18/7AWG



Electrical Data @ 20°C

Conductor resistance	≤	22	Ohm/km
Insulation resistance	≥	5	GOhm*km
Operating voltage (peak)	≤	300	V
Attenuation (0.039 MHz)	nom.	3.4	dB/100m
Capacitance (1 kHz wire/wire)	nom.	65	nF/km
Capacitance (1 kHz wire/screen)	nom.	125	nF/km
Characteristic impedance at 31.25 kHz		100±20	Ohm
Test voltage (wire/wire rms 50Hz 1min)		1500	V
Test voltage (wire/screen rms 50Hz 1min)		1000	V

Mechanical & Thermal Characteristics

Permissible temperature range		-40 ~ +90	°C
Min. Bending radius allowed		10	x Ø (see Ø tolerance)
Weight (approx.)	2 Pair	380	kg/km
Weight (approx.)	5 Pair	550	kg/km
Overall Diameter	2 Pair	-	mm
Overall Diameter	5 Pair	-	mm

Also available with DataGuard® armoured protection :



DataGuard® GSWB
Page 40-41



Foundation Fieldbus

FieldLink®

Multi-Pair ICAT Type A IEC61158-2 LSZH FireFighter® DataGuard® (GSWB)

Cable Design

Wire

Conductor	Stranded tinned copper wire (18 AWG)	Ø 1,20 mm
Insulation	Insulation of Polypropylene (PP)	Ø 2,85 mm

Shielded Pair

Pair	2 wires twisted to a pair
Drain Wire	Stranded tinned copper drain wire (18awg)
Screen	Alulamine foil overlapped

Core

Centre	# Shielded pairs 0G/1-BU/1, 0G/2-BU/2, 0G/3-BU/3....
Tape	Each shielded pair with numbered tapes
Drain Wire	Stranded tinned copper drain wire (18awg)
Screen	Alulamine foil overlapped

Inner Jacket

Low Smoke Zero Halogen FireFighter®	Ø see table
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Armour

DataGuard® Galvanised Steel Wire Braid (GSWB)

Outer Jacket

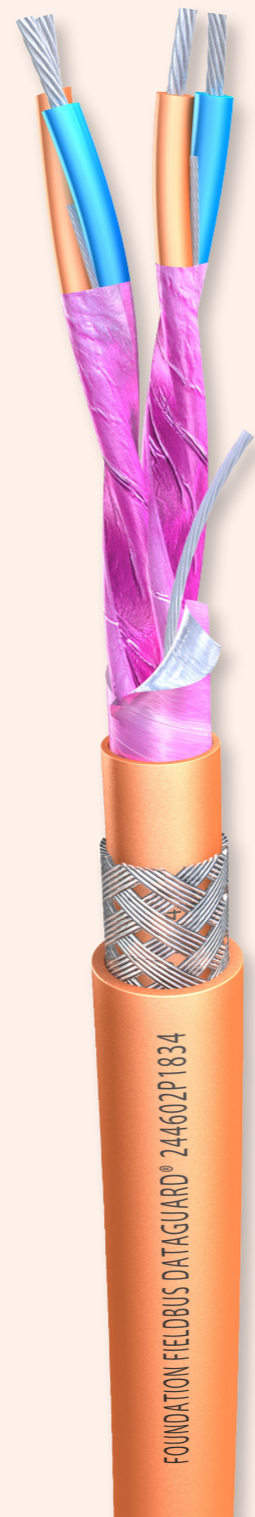
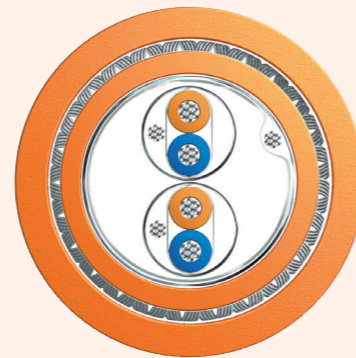
Low Smoke Zero Halogen FireFighter®	Ø see table
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Characteristics

- Low Smoke, Fire retardant, Zero Halogen
- Corrosivity of fumes acc. to IEC 60754-2
- Smoke-density acc. to IEC 61034
- Oil resistant acc. to IEC60811-404 (4 hours @ 70°C)
- Sunlight resistant

Specification

Part Number	Type
244602P1834	Foundation Fieldbus 18awg ICAT Type A IEC61158-2 LSZH FireFighter®, DataGuard® (GSWB) 2x2x18/7AWG
244605P1834	Foundation Fieldbus 18awg ICAT Type A IEC61158-2 LSZH FireFighter®, DataGuard® (GSWB) 5x2x18/7AWG



Electrical Data @ 20°C

Conductor resistance	≤	22	Ohm/km
Insulation resistance	≥	5	GOhm*km
Operating voltage (peak)	≤	300	V
Attenuation (0.039 MHz)	nom.	3.4	dB/100m
Capacitance (1 kHz wire/wire)	nom.	65	nF/km
Capacitance (1 kHz wire/screen)	nom.	125	nF/km
Characteristic impedance at 31.25 kHz		100±20	Ohm
Test voltage (wire/wire rms 50Hz 1min)		1500	V
Test voltage (wire/screen rms 50Hz 1min)		1000	V

Mechanical & Thermal Characteristics

Permissible temperature range		-40 ~ +90	°C
Min. Bending radius allowed		10	x Ø (see Ø tolerance)
Weight (approx.)	2 Pair	231	kg/km
Weight (approx.)	5 Pair	397	kg/km
Overall Diameter	2 Pair	-	mm
Overall Diameter	5 Pair	-	mm

Also available with DataGuard® armoured protection :



DataGuard® SWA
Page 38-39



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.

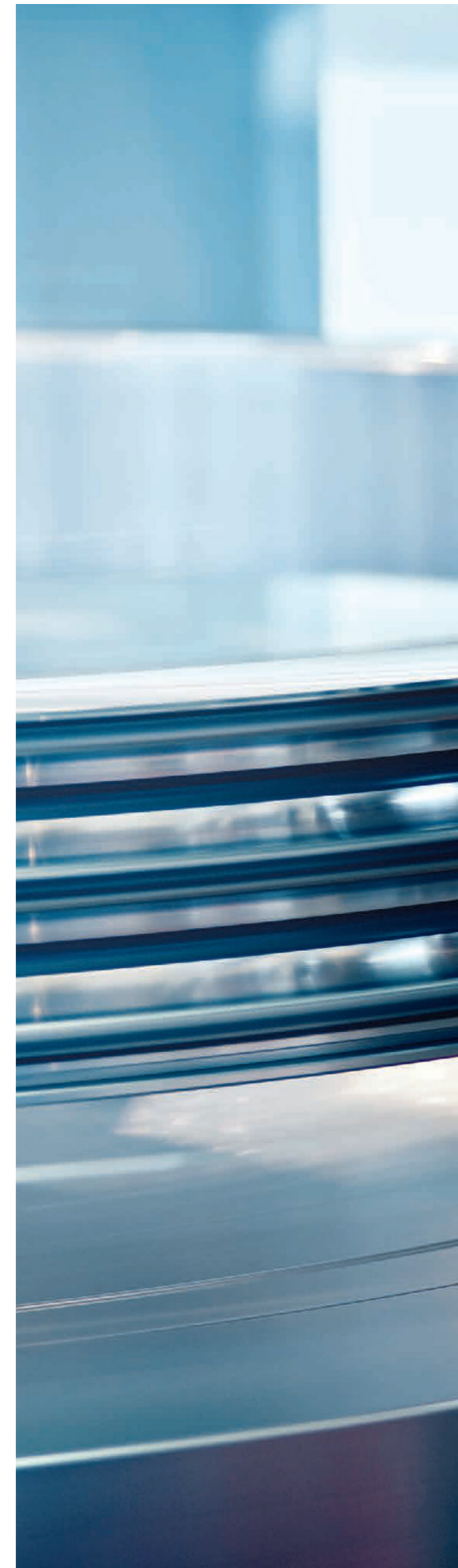
In order to meet demanding and diverse customer applications, FireFighter® performance materials are used in conjunction with other brands including DataGuard® (Armoured Cables), Armada® (MOG Cables), SureLAN® (Local area network cables), SureLIGHT® (Fibre Optic) and EventSeries® (Audio & Broadcast).

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.



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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





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