Multimedia Specials Training PPT

Understanding our products better, 2016

Multimedia Solutions, APAC

Prysmian Group

PRYSMIAN Draka

Cables Basics 123

For more information, pls email to mms.asia@prysmiangroup.com or visit www.DrakaUC.com

Produced by Ronald.wee@prysmiangroup.com

Cables Basics 123

Objectives

Understanding the common products available in our Multimedia Specials cables portfolio and its applications.

- **Business Overview**
- **Products Overview**
- **Industrial Communications Solutions**
- **Coaxial**
- **Building Management System**
- **Studio & Broadcast**

Business Overview – Telecom

Focus for the day

TELECOM BUSINESS

FIBRE

A wide range of **optical fibres** designed and made to cater to the broadest possible spectrum of customer applications, including single-mode, multimode and specialty fibres.

The Group also has at its disposal every currently available **technology** for the manufacture of optical fibre, allowing it to achieve optimal solutions for different applications.

Integrated Business
100% BU management

TELECOM SOLUTIONS

Solutions and connectivity products used for telecommunication networks.

Wide range of STANDARD **optical cables (from 1 to 1,700 fibres)** or designed for challenging environments. Passive **connectivity** solutions to ensure efficient management of optical fibre within networks. **Copper cables** for underground and overhead cabling solutions.

Intermediate Business
BU and Country jointly

MULTIMEDIA SOLUTIONS

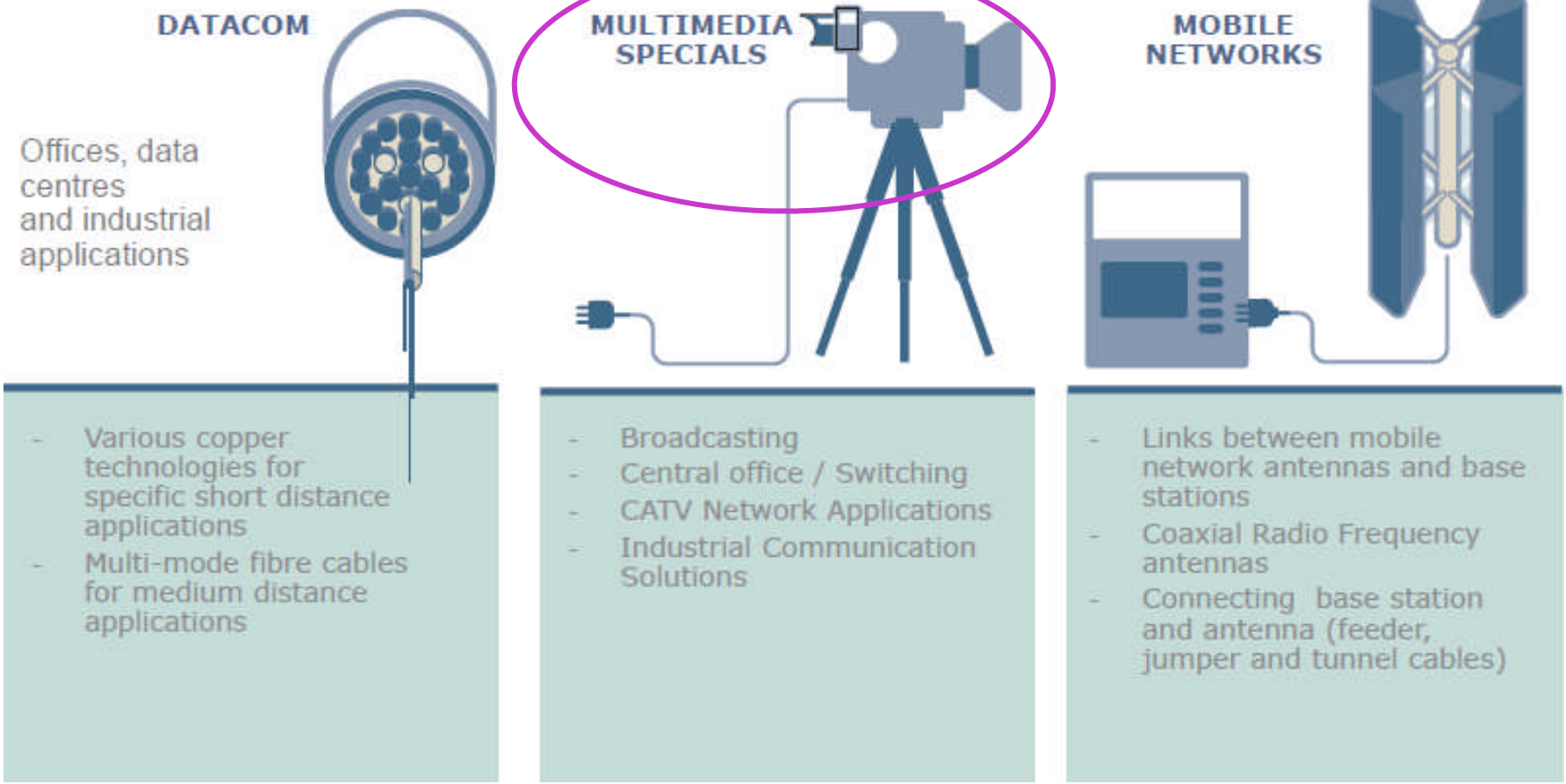
Cable solutions serving communication needs in **infrastructure, industry and transport**, for a diverse range of applications: cables for television and film studios, cables for rail networks, light-signalling cables and cables for track switching devices, as well as cables for mobile telecommunications antennae and for communication networks.

Integrated Business
100% BU management

Business Overview – Multimedia Solutions (MMS)

Generally defined as the data communication business providing cable solutions for all kind of communications needs in premises, enterprises, industry and transport infrastructures.

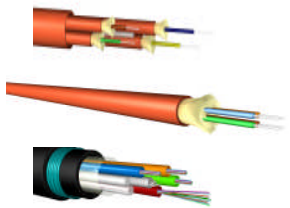
Focus for the day



High Value & Standard Products Segments

High Value Add Segment | Standard Segment

1.Fibre Data

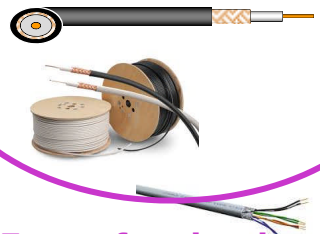


- Fibre optical data cables mainly utlizing multimodes fibres with focus on OM3/OM4/BB.
- Usually LSZH for indoor applications, compact high density design for minimal space usage
- SM & OM1 are considered standard

2.UC Connect

- Connectivity solutions for both copper and fibre to complete a structured cabling channel link
- Higher technology and premium designs are focus on Cat 6 & Cat 6a
- SM & Cat 5e connectivity are considered standard

3.MMSpecials



Focus for the day

- Premium range focus on ICS for SCADA & DCS. Ie Bus cables, PAGA, Industrial Ethernet
- Standard range focus on CCTV usages ie Coaxials, and BMS ie 2464 /485 modbus signals
- Added value for customization, ie SWB ./ SWA / LSZHFR

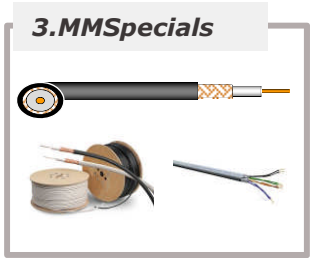
4.Copper Data

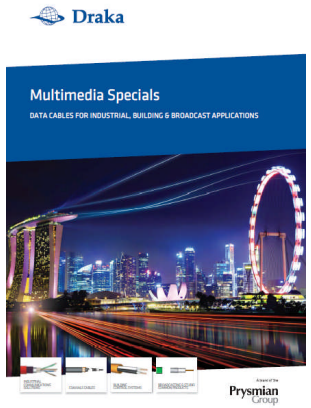
- Twisted pairs Category cables from 5e to 8 for data transmission in Ethernet.
- Cat 5e to Cat 6 is standard range
- Cat 6a and above is premium range with stronger focus on shielded cables.
- Can be value added with SWB.

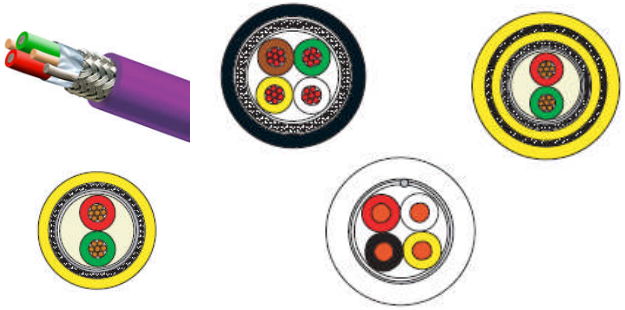
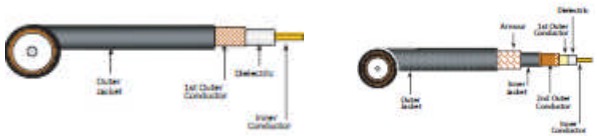
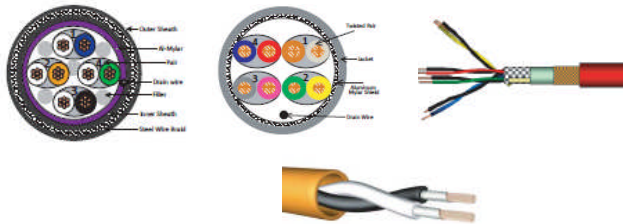
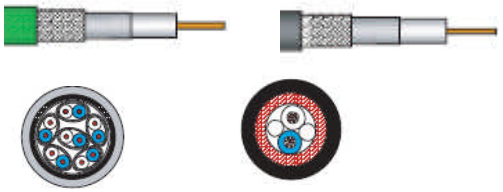
5.Mobile Network

- Coaxial Radio Frequency antennas for mobile networks
- Connectivity (feeder & jumper cables) between base station and antennas

Products Overview – MMS Specials





Overview	Product types
Bus Cables - Used for interconnecting sensors to monitoring peripherals ie computers. - Characteristics usually shielded, bare conductor, and have high capacitance tolerance. - For fast data rate transfer. - Profibus DP/PA, Fieldbus, Canbus etc..	
Coaxial - Used as transmission line for higher frequency signals, primarily in CATV and CCTV usages. - 75ohm primarily for Pictures, 50ohm for Data.	
Screened Data & PAGA - Control data cables used primarily for serial link networks, also mainly in building management for simple logic control ie Door access, car park sensors, HVAC sensors, lighting, intercom, Public Alarm & General Address.	
Studio & Broadcast - Studio cables used in media broadcast facilities. - Audio and multi pairs cables for connecting broadcasting equipment. - Microphone cables, audio cables, video links etc.	

Our main competitors for MMSpecials Products

BELDEN
SENDING ALL THE RIGHT SIGNALS

LEONI

LAPP KABEL

HELUKABEL®

Nexans

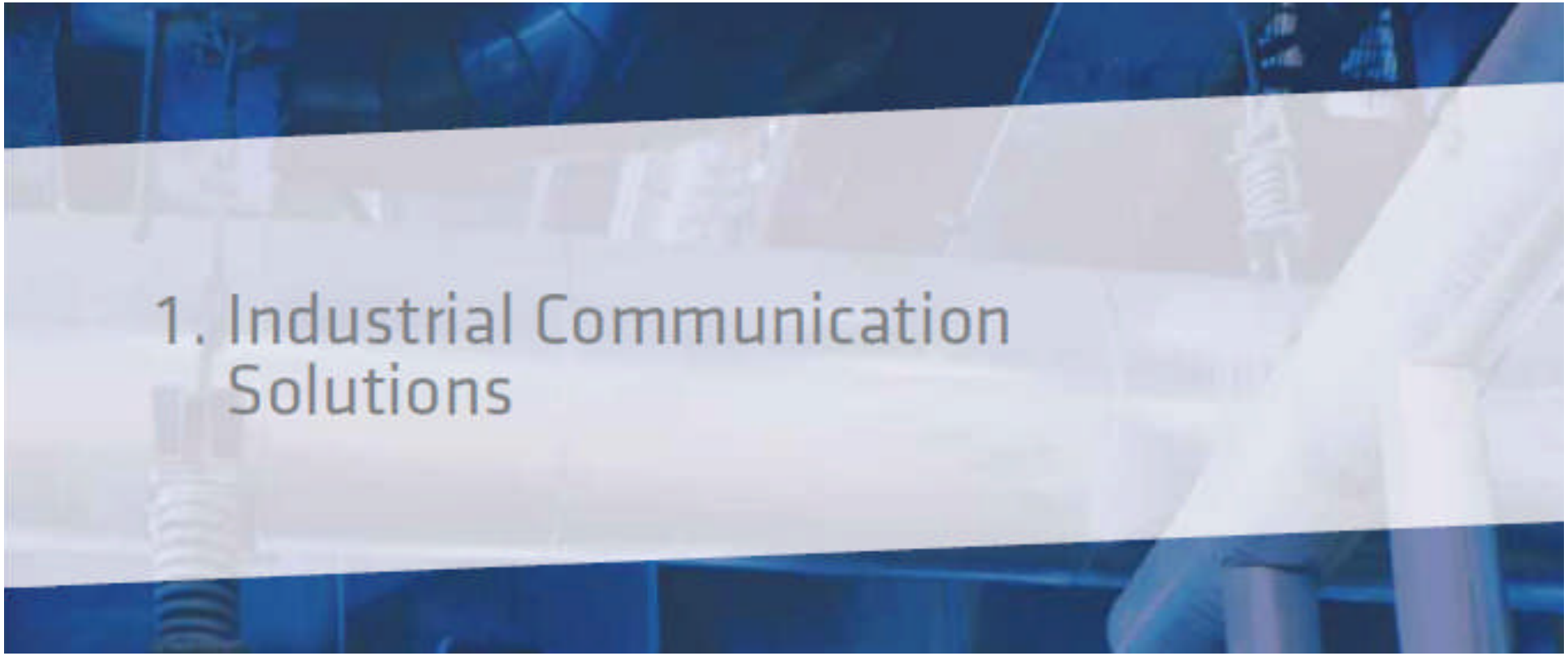
Products Training – ICS

***Analysis on FO and CU Cable Competencies**

**conducted based on internal understanding and base of products known*

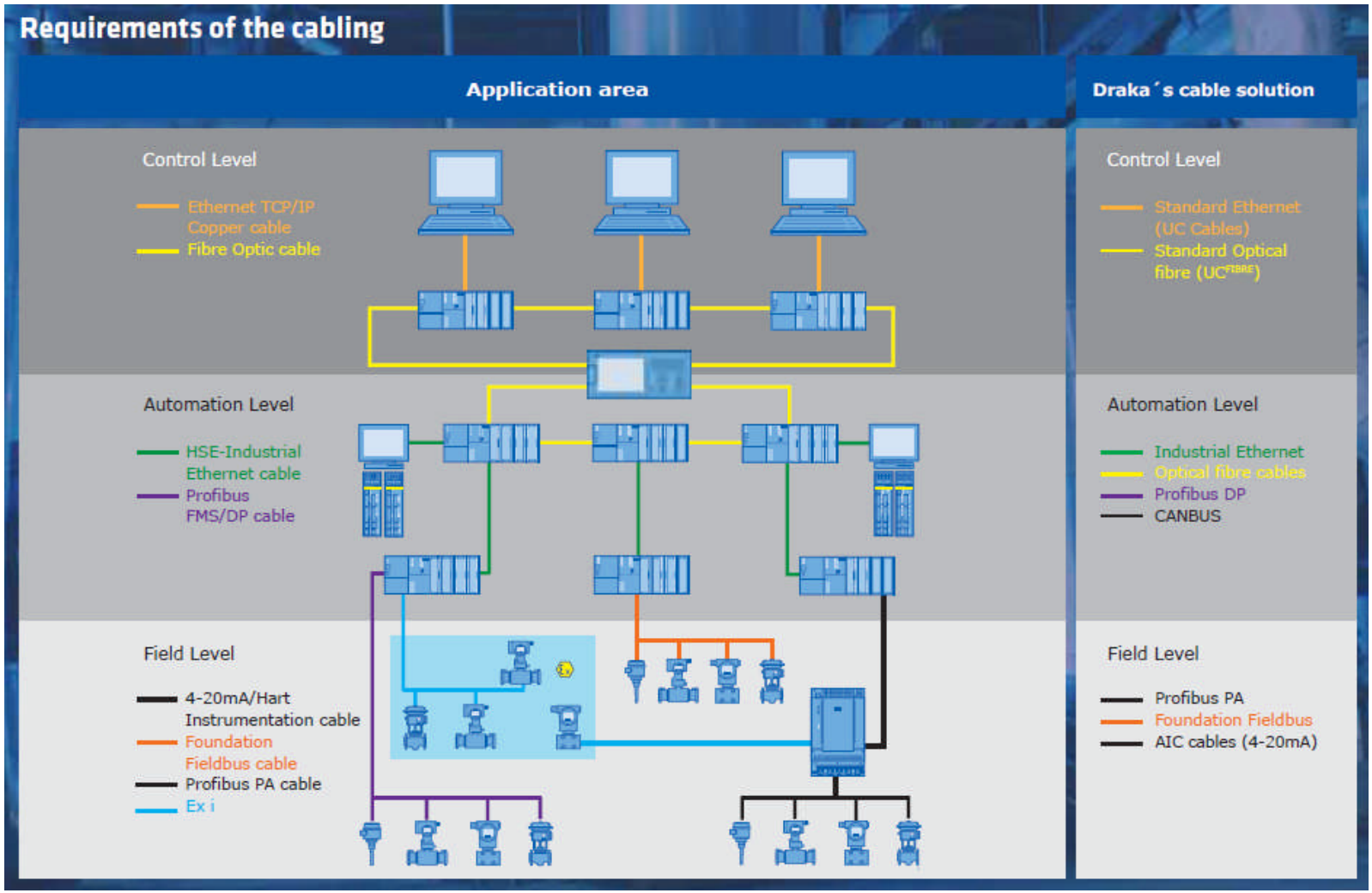
S/n	Brands	Origin	Structured Cabling		BMS Cabling	Studio & Broadcast	Mobile Networks
			FO Solutions	**Cu Solutions**			
1	Prysmian Group	Italy	Strong portfolio, up to OM4, highest technology available. Leading manufacturer and technology owner	Strong portfolio, up to Cat 8.2, highest technology available. Leading manufacturer and technology owner	Strong portfolio under Draka brand, capable of customization.	Strong portfolio under Draka brand	Strong portfolio under DRAKA brand
2	Commscope	USA	Strong portfolio, dependable of FO OEM manufacturers	Strong portfolio, up to Cat 7a, manufacturer.	None	Strong portfolio	Strong portfolio
3	Corning	USA	Strong portfolio, up to OM4, highest technology available. Leading manufacturer and technology owner	Not focused in Copper	None	None	None
4	Belden	USA	Basic portfolio, dependable of FO OEM manufacturers	Basic portfolio, dependable of CU OEM manufacturers	Strong portfolio	Strong portfolio	Strong portfolio
5	Tyco Electronics	USA	Basic portfolio, dependable of FO OEM manufacturers	Strong portfolio, depending on mix of OEM manufacturers and own production	None	None	None
6	Panduit	USA	Basic portfolio, dependable of FO OEM manufacturers	Strong portfolio, only on connectivity	None	None	None
7	Nexans	France	Basic portfolio, dependable of FO OEM manufacturers	Strong portfolio, up to Cat 7a, manufacturer.	Minimal	None	None
8	Datwhyler	Swiss	Basic portfolio, dependable of FO OEM manufacturers	Basic portfolio, dependable of CU OEM manufacturers	None	None	None
9	3M	USA	Basic portfolio, dependable of FO OEM manufacturers	Basic portfolio, dependable of CU OEM manufacturers	None	None	None
10	Siemons	USA	Basic portfolio, dependable of FO OEM manufacturers	Strong portfolio, up to Cat 7a, technology owner	None	None	None
11	R&M	Swiss	Basic portfolio, dependable of FO OEM manufacturers	Strong, only on connectivity	None	None	None
12	Lapp Kabel	Germany	Basic portfolio, dependable of FO OEM manufacturers	Basic portfolio, dependable of CU OEM manufacturers	Strong portfolio	None	None

Products Training – ICS

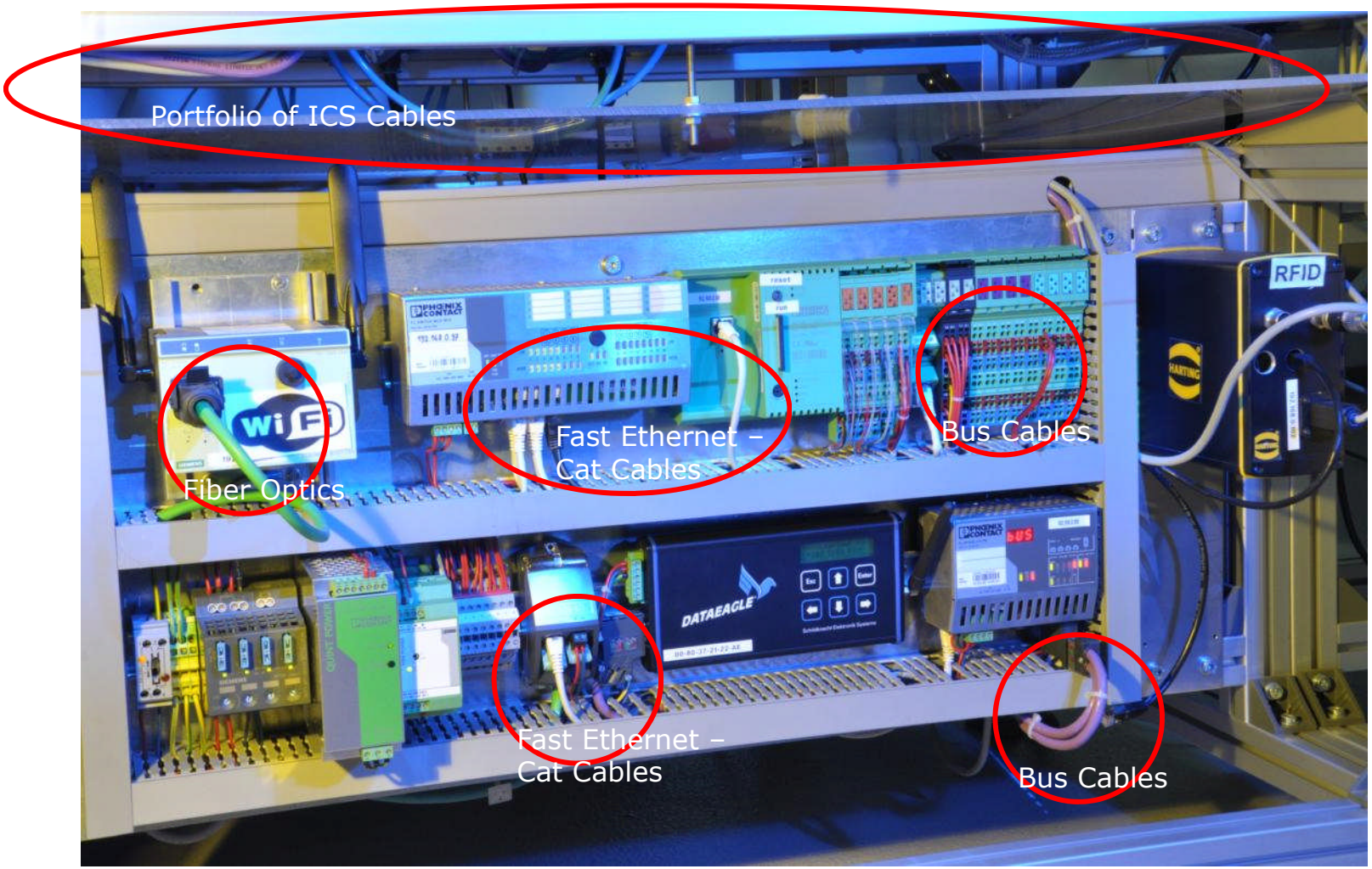


Products Training – ICS

As automation becomes more common in the industrial sector, more intelligent cablings are required to operate in higher bandwidth, higher velocity and reliable transmission, in a much robust environment.



Cablings used in Industrial Control System – Industry 4.0



What are Bus Cables?

Bus cables are typically low capacitance (fast reaction) cables carrying digital signal between sensors and display units, in a serial connection. These signals are transmitted at high transmission rate and data flow, especially more common for automation processes which require fast evaluation and reaction time.

There are many wide variety of Bus cables serving different protocols.

Interbus-S cables - remote bus cables
Interbus-S cables - installation remote bus cables
Interbus-Loop cables
CAN-Bus cables
DeviceNet cables
Profibus-DP cables
Profibus- PA cables
SafetyBUS cables
Hybrid field bus cables
USB 2.0 Cable

Industrial Ethernet Cables CAT 5
Special Industrial Ethernet Cables CAT 5
Gigabit Ethernet Cables CAT 6
Special Industrial Gigabit Ethernet Cables CAT 6
Industrial Gigabit Ethernet Cables CAT 6 & CAT 6A
Industrial Gigabit Ethernet Cables CAT 7A
Special Industrial Gigabit Ethernet Cables CAT 6A & CAT 7A

Applications of CAN-bus cables

Cables for a Controller Area Network have been standardized for different application fields. The largest spreading has got the high speed type acc. to ISO 11898-2. The bus is optimized for a band efficient digital information exchange on the controller level.

Li-2YC11Y 2 x 2 x 0.22 mm² FRNC

CanBus-Cable

Construction

Conductor	stranded bare copper wire, diameter 7 x 0.20 mm (cross section 0.22 mm²)	Ø 0.60 mm
Insulation	PE, Wall thickness 0.46 mm	Ø 1.75 ± 0.05 mm
Colour code	Pair 1: 1 x white, 1 x brown	
Core identification	Pair 2: 1 x yellow, 1 x green	
Cable lay up	4 cores twisted to a star quad	Ø 4.2 mm
Wrapping	1x PET-foil, overlapping	Ø 4.3 mm
Overall screen	Tinned copper braid Optical coverage ≥ 85%	Ø 5.0 mm
Foil	1x PET-foil under sheath	Ø 5.1 mm
Sheath	PUR Low Smoke Zero Halogen	Ø 6.9 ± 0.2 mm
Sheath colour	Black, RAL 9005	
Outer Diameter	Nom. 6.9 mm	
Weight	Nom. 70 kg/km	
Tensile force N	165	

Application

- The following CanBus cable is suitable for transmission of CanBus signals according **to DIN 19245 and EN 50170**
- The following CanBus cable is suitable for transmission of CanBus signals according **to ISO 11898-2**
- The cable is suited for fixed indoor and outdoor installation and under certain conditions also for mobile use.
- The cable is halogen free, flame retardant and oil resistant. The sheath material is tested in Hydraulic oil
- ARAL VITAM 32, Mobil DTE 13 M, Gear oil ARAL DEGOL BG Plus 320 and Tribol 1710/320.

EIB - BUS, PVC

EIB Bus cables
Symmetrical data cable for EIB – BUS Systems

Li-09YS(St)C11Y 2 x 0.35 mm² LSZH

CanBus-Cable

Applications of PROFIBUS cables

PROFIBUS systems are especially made for process automation (PA). PROFIBUS is standardized acc. to IEC 61158 that means best interoperability of components from different manufactures

PROFIBUS DP (Decentralized Peripherals) is used to operate sensors and actuators via a centralized controller in production (factory) automation applications. The many standard diagnostic options, in particular, are focused on here.

PROFIBUS PA (Process Automation) is used to monitor measuring equipment via a process control system in process automation applications. This variant is designed for use in explosion/hazardous areas (Ex-zone 0 and 1). The Physical Layer (i.e. the cable) conforms to IEC 61158-2, which allows power to be delivered over the bus to field instruments, while limiting current flows so that explosive conditions are not created, even if a malfunction occurs.

However, PA uses the same protocol as DP, and can be linked to a DP network using a coupler device. The much faster DP acts as a backbone network for transmitting process signals to the controller. This means that DP and PA can work tightly together, especially in hybrid applications where process and factory automation networks operate side by side.

Basic Constructions of Profibus cables

- Typically 1pr or 2pr max, stranded or solid bare copper.
- Profibus PA cables typically 18 AWG (1.2mm)
- Profibus DP cables typically 22 AWG (0.64mm)
- FOAM Injected PE as die-electric for higher Velocity of Propagation.
- Cables sheaths, armoring and Jacketing will depends on environmental conditions

Application
Installation cable :
- Halogen free and flame resistant
- Limited segment length (according to PROFIBUS-Net Manual)
- UV-resistant
- Silicon free
- Limited oil and grease resistance

Standards
- Customer specification
- EN 50170 part 8-2, cable type A, IEC 61158 and IEC 61784

PB PA FC 1x2xAWG16/7 LSHF-FR
PROFIBUS PA FC AWG16 FLEX LSHF-FR Cable, 100 Ohm

PB PA FC 1x2xAWG18/7 SWB PVC
PROFIBUS PA FC FLEX Steel Wire Braid Armoured PVC Cable, 100 Ohm

PB PA FC 1x2xAWG16/7 PVC
PROFIBUS PA FC AWG16 FLEX PVC Cable

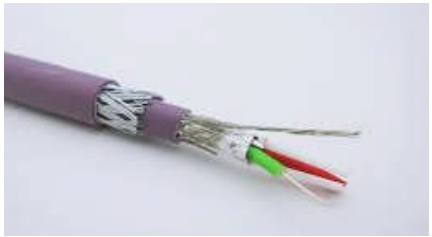
PB PA FC 1x2xAWG18/1 GST PVC
PROFIBUS PA FC Galvanized Steel Tape Armoured PVC Installation Cable, 100 Ohm

PB PA FC 1x2xAWG 18/19 PVC
PROFIBUS PA FC FLEX PVC Cable,100 Ohm

PB PA FC 1x2xAWG18/7 LSHF-FR
PROFIBUS PA FC FLEX LSHF-FR Cable, 100 Ohm

PB DP BASIC 1x2xAWG22/1 LSHF
PROFIBUS DP Basic LSZH Cable,150 Ohm

PB DP FC 1x2xAWG22/1 LSHF-FR
PROFIBUS FC LSHF-FR Cable, 150 Ohm



PB DP FC 1x2xAWG24/19 TRAILING PUR
PROFIBUS DP FC Trailing-Cable, 150 Ohm

PB DP FC 1x2xAWG24/19 PUR
PROFIBUS DP FC FLEX-PUR Cable, 150 Ohm

1.3 Profibus

PB DP BASIC 1x2xAWG22/1 LSHF

PROFIBUS DP Basic LSZH Cable,150 Ohm

Application

Installation cable :
- Halogen free and flame resistant
- Limited segment length (according to PROFIBUS-Net Manual)
- UV-resistant
- Silicon free
- Limited oil and grease resistance

Standards

- Customer specification
- EN 50170 part 8-2, cable type A, IEC 61158 and IEC 61784

Fire Rating

- IEC 60332-1, IEC 61034-2, IEC 60754-1/2

Construction

Conductor	Bare copper wire, Ø 0.64 mm, (cross-section 0.32 mm²)
Insulation	foam-skin-PE, Ø 2.5 mm
Stranding	two cores gn / rd to the pair and two fillers
Wrapping	PET-Foil, Ø 5.2 mm
Static screen	PET-Al-Foil longitudinally applied
Braid	tinned copper braid, coverage approx. 60%
Sheath	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, Ø 8.0 mm
Colour	violet RAL 4005
Outer Diameter	Nom. 8.0 mm
Weight	Nom. 71 kg/km
Tensile force N	100

Mechanical Properties

Bending radius	
single bending	≥ 60 mm
repeated bending	≥ 80 mm
Max. operating voltage	- 25°C to + 80°C
Relative velocity factor NVP	- 25°C to + 80°C
Impedance (at 10 MHz)	- 25°C to + 80°C

Electrical Properties at 20°C

Loop resistance	≤ 110 Ω/km
Screen resistance	≤ 9,5 Ω/km
Characteristic impedance (Nominal)	150 Ω
Mutual capacitance (at 1 kHz)	ca. 28.5 nF/km
Insulation resistance	≥ 5 GΩkm
Test Voltage (DC, 1 min) Core/Core and Core/Screen	1 kV
Operating voltage (RMS)	≤ 100 V

Application of Industrial ETHERNET cables

Industrial Ethernet is a quickly developing network technology. Ethernet with the worldwide accepted TCP/IP (Transmission Control Protocol/Internet Protocol) will be the future connection to the well established field bus or sensor / actuator level. Automation networks are incorporated into Ethernet known as SHARED Ethernet.

IE ToughCat 5e LSHF-FR
S/FTP Installation Cable 4x2xAWG24/7 for tougher environments

IE ToughCat 5e LSHF-FR MUD
S/FTP Installation Cable 4x2xAWG24/7 for tougher environments

IE ToughCat 7 LSHF-FR
S/FTP Installation Cable 4x2xAWG23/7 for tougher environments

IE ToughCat 7S* Armoured
S/FTP Installation Cable for tougher environments

IE SuperCat 7 HS23 Cat.7 LSHF
Water resistant S/FTP Installation Cable 4x2xAWG23/1 for Indoor/Outdoor use

IE UC900 SS23 Cat.7 PE
IE S/FTP cable 4x2xAWG23/1 with PE sheath

IE UC900 SS23 Cat.7 (L)H LSHF-FR
IE S/FTP cable 4x2xAWG23/1 with LSHF-FR moisture barrier sheath

IE ToughCat 7 LSHF-FR MUD
S/FTP Installation Cable 4x2xAWG23/7 for tougher environments

IE UC900 SS23 Cat.7 PUR
IE S/FTP cable 4x2xAWG23/1 with abrasion and oil resistant PUR sheath

IE UC900 SS27 Cat.7 PUR
IE S/FTP patch cable 4x2xAWG27/7 with abrasion and oil resistant PUR sheath

Application
- Generic Data transmission. This cable is a **Cat5e S/FTP** cable meant for use as installation/horizontal cable in tougher electrical and mechanical environment, including ships and offshore units.

Standards
- EN 50288-2-1
- Det Norske Veritas (DNV) specification No. 6-827.50-2 and Lloyd Register approval, system, 2002

Fire Rating
- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

Chemical Resistance
- Mineral oils IRM 902 (IEC60811-2-1) : 7 days/23°C, 4 hours/70°C
- Diesel - IRM 903 (IEC60811-2-1) : 7 days/23°C, 4 hours/70°C

Certification
- This cable is certified by: Det Norske Veritas (DNV) and Lloyd Register

Industrial Ethernet cables are with standard 5e/6/7 capabilities but reinforced with customized constructions to suit robust environment operating conditions.

IE ToughCat 7 LSHF-FR

S/FTP Installation Cable 4x2xAWG23/7 for tougher environments

Construction

Conductor	Stranded copper wire, cross section 0.27 mm² (AWG23/7)
Insulation	PE, Ø 1.6 mm
Twisting	2 cores to the pair
Cable lay up	4 pairs
Pair screen	Al-laminated plastic foil around each pair
Overall screen	Copper braid, tinned Ø 6.6 mm
Sheath	Oil resistant, Fire retardant and halogen free LSZH-FR (SHF1), diameter 8.1 mm
Colour	Grey RAL 7035
Outer Diameter	Nom. 8.1 mm
Weight	Nom. 75 kg/km
Tensile force N	100

Mechanical Properties

Bending radius	Without load	8 x D
	With load	4 x D
Temperature range	During operation	-40°C to + 85°C
	During installation	-15°C to + 50°C
Fire load	4 pair	670 MJ/ km
Maximum tensile load	During operation	No load
	During installation	100 N

Electrical Properties at 20°C

DC loop resistance	-	≤ 138 Ω/km
Resistance unbalance	-	≤ 2%
Insulation resistance	(500 V)	≥ 5000 MΩxkm
Capacitance	at 800 Hz	Nom. 43 nF/km
Capacitance unbalance	(pair to ground)	≤ 1500 pF/km
Mean Characteristic impedance	@ 100 MHz	100 ± 5 Ω
Nominal velocity of propagation	-	0.76c
Propagation delay	-	≤ 450 ns/100 m
Delay skew	-	≤ 15 ns/100 m
Transfer impedance	at 1 MHz	≤ 10 mΩ /m
	at 10 MHz	≤ 8 mΩ /m
	at 30 MHz	≤ 10 mΩ /m
Coupling attenuation	-	≥ 85 dB

Application

- Generic Data transmission. This cable is a **Cat7 S/FTP** cable meant for use as installation/horizontal cable in tougher electrical and mechanical environment, including ships and offshore units.

Standards

- EN 50173-1; EN 50288-4-1
- ISO/IEC 11801; IEC 61156-5
- Det Norske Veritas (DNV) specification No. 6-827.50-2

Fire Rating

- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

Chemical Resistance

- Mineral oils IRM 902 (IEC60811-2-1) : 7 days/23°C, 4 hours/ 70°C
- Diesel - IRM 903 (IEC60811-2-1) : 7 days/23°C, 4 hours/ 70°C

Certification

- This cable is certified by: Det Norske Veritas (DNV) and American Bureau of Shipping (ABS)

Products Training – ICS

We offer a complete portfolio for communication cables in industrial usage.

Knowing

1. No of pairs and conductor sizes

2. What kind of controlling protocols are used, ie CAN, Profibus, Devicenet, Ethernet

2. What capacitance and velocity of propagation% required from the cables

3. What kind of mechanical protection required

Determines the type of ICS cables to be used.

But most often, users already defined the type of ICS cables required. And we just need to asks the right questions.

Our range of Focus

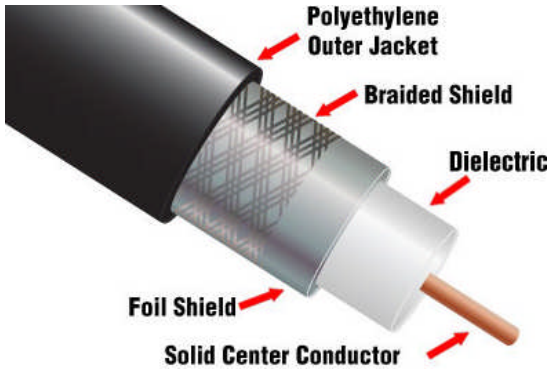
1. Canbus and Profibus all types (PA, DP, FC)
2. All kinds of mechanical constructions (SWB, PA, SWA, PE etc)
3. Profibus ie to Belden 3079a and 3079e series.

Usages of ICS cables

Products Training Agenda

What are Coaxial Cables?

Coaxial cable is used as a transmission line for radio or video frequency signals. Its applications include feed lines connecting transmitters and receivers with their antennas, computer network (Internet) connections, digital audio (S/PDIF), and distributing cable television signals. Typical property is highly resistance to noises.



It is also widely used as the copper cable transmission medium for CCTV network.

Cable Distance Limitations

Picture Quality	Maximum Cable Run feet (meters)		
	RG-59/U	RG-6/U	RG-11/U
Dim, faint picture Cable Amplification Required	Greater than 1100 (350)	Greater than 1500 (450)	Greater than 2400 (750)
Usable picture	1100 (350)	1500 (450)	2400 (750)
Clean picture	820 (250)	1000 (300)	1600 (500)
Best Picture	400 (120)	530 (160)	820 (250)

Understanding RG

Original applications and specifications driven by the US Government.

R - RADIO FREQUENCY
G - GOVERNMENT
8- Is the number assigned to the Government approval
/U - A universal specification

If the letters A, B, or C appear before the /, it means a specification modification or revision. For example - RG 8/U is superseded by RG 8A/U but both types are still being used.

Types not marked RG are primarily intended for use where the application is not met by some government type. There are many other types of cables designed for specific applications.

Most of the coaxial cables in the market are designed to the RG specifications, and conveniently known as RG, ie RG 8, RG 58, RG 59, RG 6, RG 11 …

Products Training – Coaxial

Main factors in a application that determines the coaxial cable to be used

1. ATTENUATION - It is commonly written and spoken of as dB/100 ft. at a specific frequency. An example is RG 59 /U which has a loss of ~ 7.6 dB/100 ft. at 440 MHz.

2. FREQUENCY - For example, the frequency of AC commonly used in the U.S. is 60 hertz and is usually shown as 60 Hz. Broadcast stations operate at frequencies of thousands of cycles per second and their frequencies are called kilohertz (kHz). High frequencies are in millions of cycles per second and are called megahertz (MHz). TV is broadcast in the MHz range.

3. IMPEDANCE - In the case of coaxial cables, impedance is expressed in terms of "ohms impedance". The coaxial cables generally fall into three main classes; 50 ohms, 75 ohms, and 95 ohms.

An example of each class is:

ie RG 8A/U, 213, 214, is 50 ohms impedance, mainly used for Data Transmission
RG 59, 6, 11A/U is 75 ohms impedance, mainly used for Video Transmission
RG 22B/U is 95 ohms impedance, mainly used for Twinaxial applications

Two main types of Coaxial Applications

CATV Coaxial cable typically has a copper-coated, solid steel center conductor and the shield is typically aluminum foil with a 40% using aluminum braid. It does not make good connections with BNC-style connectors, in particular, the twist-on style. The jacket of the cable is usually marked ”CATV”, indicating that this cable is designed for Community Antenna Television systems. CATV or MATV cable should never be used for CCTV systems.

CCTV Coaxial cable should have a good 95% coverage, braided-copper shield and a center conductor of 20 or 22 AWG (0.6~0.8mm) copper. Such cable is designed to transmit the complete video frequency range with minimum distortion or attenuation, The use of copper conductors is important in the frequency ranges used for baseband CCTV signals. Building codes usually restrict the open use of PVC cables in areas used as air returns. Cable used outdoors should be rated for exposure to ultraviolet (UV) light.

Products Training – Coaxial

S/n	P/N	Product Description	Level	Belden Equivalent
1	RG9174	RG59, CCS, 65% Aluminum Braid, PVC, 75 Ohm	Standard	9104 / 9110
2	RG9774	RG59, CCS, 65% Aluminum Braid, PVC CM, 75 Ohm	Standard	9104 / 9104N/ 9110
3	RG9274	RG59, CCS, 65% Aluminum Braid, LSZH, 75 Ohm	Standard	9104P higher but not ZH
4	RG5570	RG59, CCS, 60% Aluminum Braid, Aluminum Foil, 40% Aluminum Braid, PVC CMR, 75 Ohm	Standard	1186A
5	RG5270	RG59, CCS, 60% Aluminum Braid, Aluminum Foil, 40% Aluminum Braid, LSZH, 75 Ohm	Standard	No matching
6	RG6176	RG6, CCS. 60% Aluminum Braid, PVC, 75 Ohm	Standard	9116
7	RG6776	RG6, CCS. 60% Aluminum Braid, PVC CM, 75 Ohm	Standard	9116R
8	RG6276	RG6, CCS. 60% Aluminum Braid, LSZH, 75 Ohm	Standard	911SB
9	RG6174	RG6, CCS. 90% Aluminum Braid, PVC, 75 Ohm	Standard	1530
10	RG6774	RG6, CCS. 90% Aluminum Braid, PVC CM, 75 Ohm	Standard	1530
11	RG6274	RG6, CCS. 90% Aluminum Braid, LSZH, 75 Ohm	Standard	1530A higher but not ZH
12	RG6170	RG6, CCS, 60% Aluminum Braid, Aluminum Foil, 40% Aluminum Braid, PVC, 75 Ohm	Standard	1189A
13	RG6770	RG6, CCS, 60% Aluminum Braid, Aluminum Foil, 40% Aluminum Braid, PVC CM, 75 Ohm	Standard	1189A
14	RG6270	RG6, CCS, 60% Aluminum Braid, Aluminum Foil, 40% Aluminum Braid, LSZH, 75 Ohm	Standard	1189P but not ZH
15	RG6179	RG6, BC. 60% Tin Copper Braid, PVC, 75 Ohm	Standard	9248
16	RG6279	RG6, BC. 60% Tin Copper Braid, LSZH, 75 Ohm	Standard	89248 higher but not ZH
17	RG6576M	RG6 Drop, CCS. 60% Aluminum Braid, , PVC CMR, 75 Ohm	Standard	9117M / 9119M
18	RG6276M	RG6 Drop,CCS. 60% Aluminum Braid, , LSZH, 75 Ohm	Standard	No matching
19	RG6676M	RG6 Drop, CCS. 60% Aluminum Braid, , PE, 75 Ohm	Standard	No matching
20	RG1576	RG11, CCS, 60% Aluminum Braid, PVC CMR, 75 Ohm	Standard	Better than 1523A / 1523R
21	RG1276	RG11, CCS, 60% Aluminum Braid, LSZH, 75 Ohm	Standard	1523R
22	RG1676	RG11, CCS, 60% Aluminum Braid, PE, 75 Ohm	Standard	1525A
23	RG1576M	RG11, Drop, CCS, 60% Aluminum Braid, PVC CMR, 75 Ohm	Standard	1523AM
24	RG1276M	RG11, Drop, CCS, 60% Aluminum Braid, LSZH, 75 Ohm	Standard	No matching
25	RG1676M	RG11, Drop, CCS, 60% Aluminum Braid, PE, 75 Ohm	Standard	No matching

Products Training – Coaxial

S/n	P/N	Product Description	Level	Belden Equivalent
26	RG8156	RG58, Stranded TC, 95% Tin Copper Braid, PVC , 50 Ohm	**Premium**	8440 / 8259
27	RG8756	RG58, Stranded TC, 95% Tin Copper Braid, PVC CM , 50 Ohm	**Premium**	8440 / 8259
28	RG8256	RG58, Stranded TC, 95% Tin Copper Braid, LSZH , 50 Ohm	**Premium**	82240
29	RG9171	RG59, CCS, 95% Bare Copper Braid, PVC, 75 Ohm	**Premium**	8263
30	RG9771	RG59, CCS, 95% Bare Copper Braid, PVC CM, 75 Ohm	**Premium**	8263
31	RG9271	RG59, CCS, 95% Bare Copper Braid, LSZH, 75 Ohm	**Premium**	8241A
32	RG9171B	RG59, CCS, 95% Bare Copper Braid, PVC, SWB, 75 Ohm, Armoured	**Premium**	No matching
33	RG9271B	RG59, CCS, 95% Bare Copper Braid, LSZH, SWB, 75 Ohm, Armoured	**Premium**	No matching
34	RG517A	RG59, CCS, 95% Aluminum Braid, Aluminum Foil, 95% Aluminum Braid, PVC CMR, 75 Ohm	**Premium**	Better than 9167
35	RG527A	RG59, CCS, 95% Aluminum Braid, Aluminum Foil, 95% Aluminum Braid, LSZH, 75 Ohm	**Premium**	No matching
36	RG567A	RG59, CCS, 95% Aluminum Braid, Aluminum Foil, 95% Aluminum Braid, PE, 75 Ohm	**Premium**	No matching
37	RG6178	RG6, BC. 95% Tin Copper Braid, PVC, 75 Ohm	**Premium**	No matching
38	RG6778	RG6, BC. 95% Tin Copper Braid, PVC CM, 75 Ohm	**Premium**	No matching
39	RG6578	RG6, BC. 95% Tin Copper Braid, PVC CMR, 75 Ohm	**Premium**	1694A
40	RG6278	RG6, BC. 95% Tin Copper Braid, LSZH, 75 Ohm	**Premium**	1694SB
41	RG6478	RG6, BC. 95% Tin Copper Braid, LSFRZH, 75 Ohm	**Premium**	1695A higher but not ZH
42	RG6178B	RG6, BC. 95% Tin Copper Braid, PVC, SWB, 75 Ohm, Armoured	**Premium**	No matching
43	RG6278B	RG6, BC. 95% Tin Copper Braid, LSZH, SWB, 75 Ohm, Armoured	**Premium**	No matching
44	RG1171	RG11, BC. 95% Bare Copper Braid, PVC, 75 Ohm	**Premium**	9212
45	RG1771	RG11, BC. 95% Bare Copper Braid, PVC CM, 75 Ohm	**Premium**	9212
46	RG1271	RG11, BC. 95% Bare Copper Braid, LSZH, 75 Ohm	**Premium**	No matching
47	RG1171B	RG11, BC. 95% Bare Copper Braid, PVC, SWB, 75 Ohm, Armoured	**Premium**	No matching
48	RG1271B	RG11, BC. 95% Bare Copper Braid, LSZH, SWB, 75 Ohm, Armoured	**Premium**	No matching
49	RG1571	RG11, BC. APA, 95% Bare Copper Braid, PVC CMR, 75 Ohm	**Premium**	7731A
50	RG1271	RG11, BC. APA, 95% Bare Copper Braid, LSZH, 75 Ohm	**Premium**	7731A
51	RG1471	RG11, BC. APA, 95% Bare Copper Braid, LSFRZH, 75 Ohm	**Premium**	7732A

Knowing

1. What Impedance required
2. What Frequency required
3. What attenuation is allowable
4. What kind of braiding% and shielding material is required
5. What kind of sheath protection required?

Determines the type of RG cable to be used.

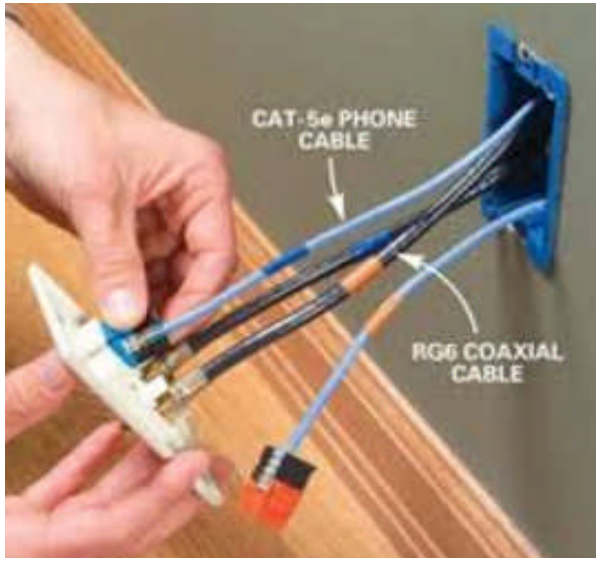
But most often, users already defined the type of RG required. And we just manufacture / supply <- Simple.

Our range of Focus

1. 50 & 75 Ohm applications
2. Premium range with higher % of braiding
3. Standard applications from daily inventories

Products Training – Coaxial

Usages of Coaxial Cables



Products Training – BMS

Products Training – BMS

A **building management system** (**BMS**) in principal is a computer-based control system installed in buildings that controls and monitors the building's mechanical and electrical equipment such as ventilation, lighting, power systems, fire systems, and security systems. Vendors are also producing BMSs that integrate using Internet protocols integrating into the structured cabling network which serve as the backbone network.

Characteristics

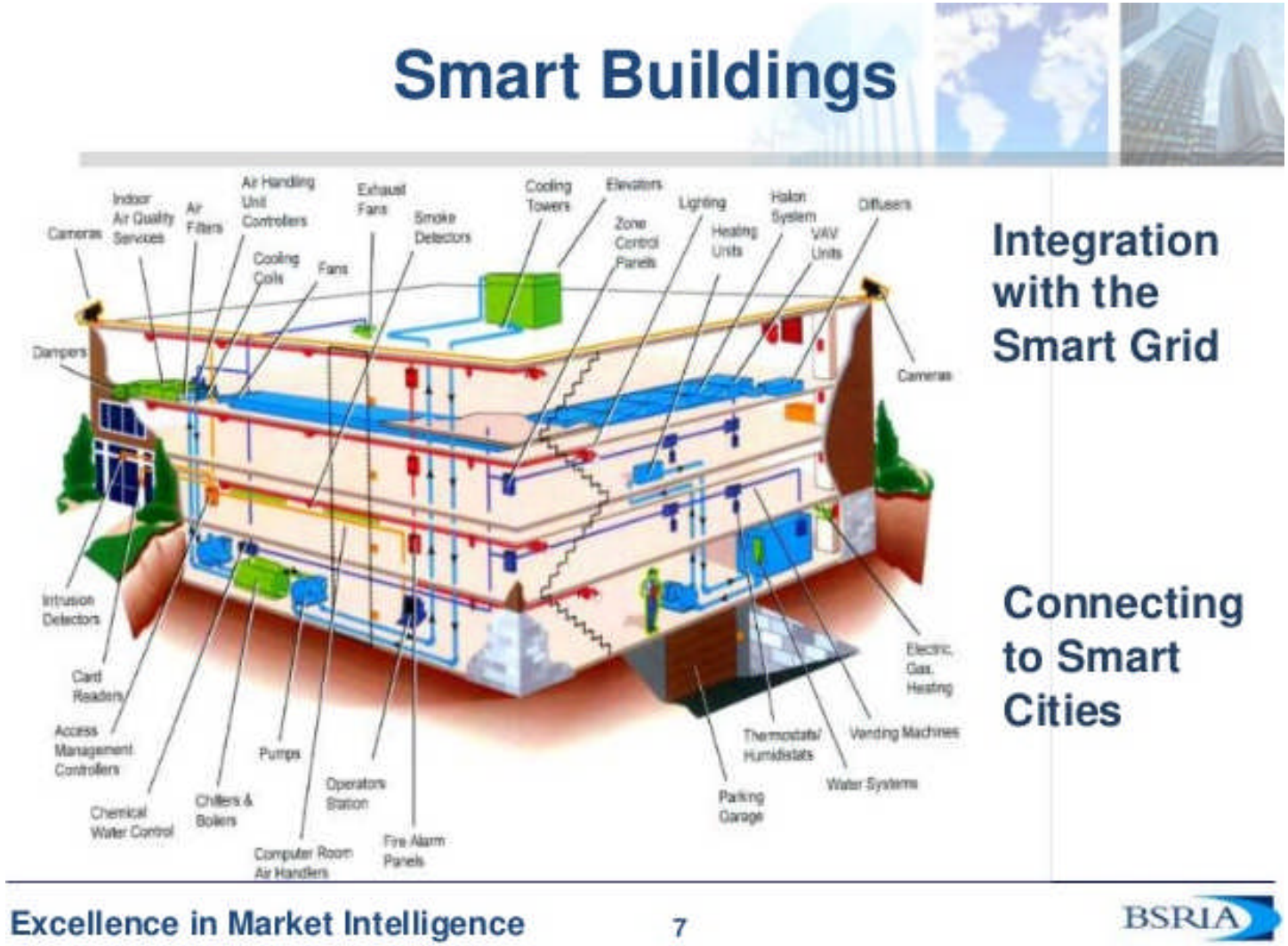
Building management systems are most commonly implemented in large projects with extensive mechanical, HVAC, electrical systems. Systems linked to a BMS typically represent 40% of a building's energy usage; if lighting is included, this number approaches to 70%.

Usages

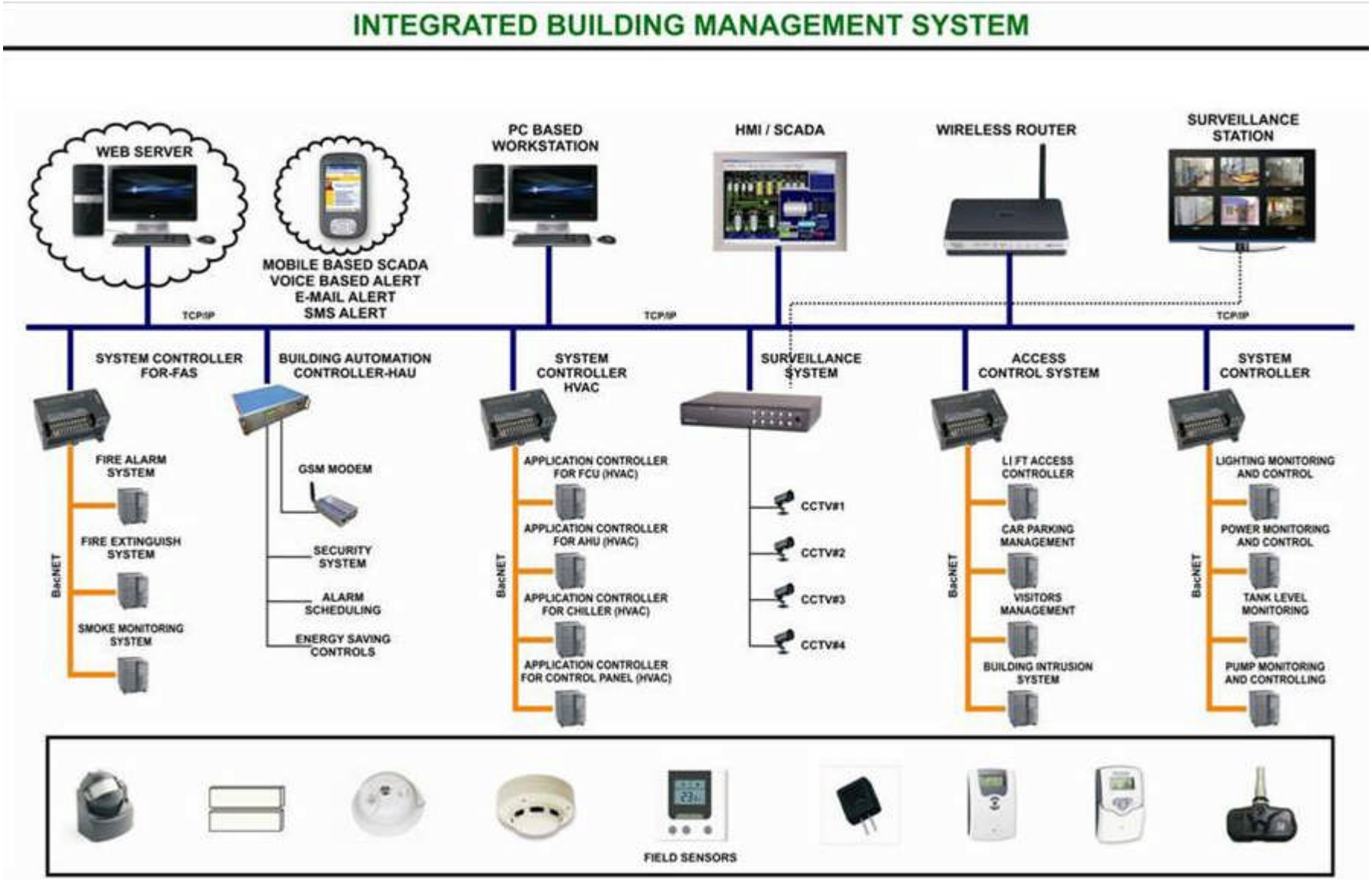
Illumination (lighting) control
Electric power control
Heating, ventilation and air-conditioning Security and observation
Access control
Fire alarm system
Lifts, elevators etc.
Plumbing
Closed-circuit television
Control Panel
PA system
Alarm Monitor
Security Automation
Other engineering systems

Products Training – BMS

Building management system (**BMS**) is playing an even bigger role than in the past, integrating more complex and faster transmission speeds networks.



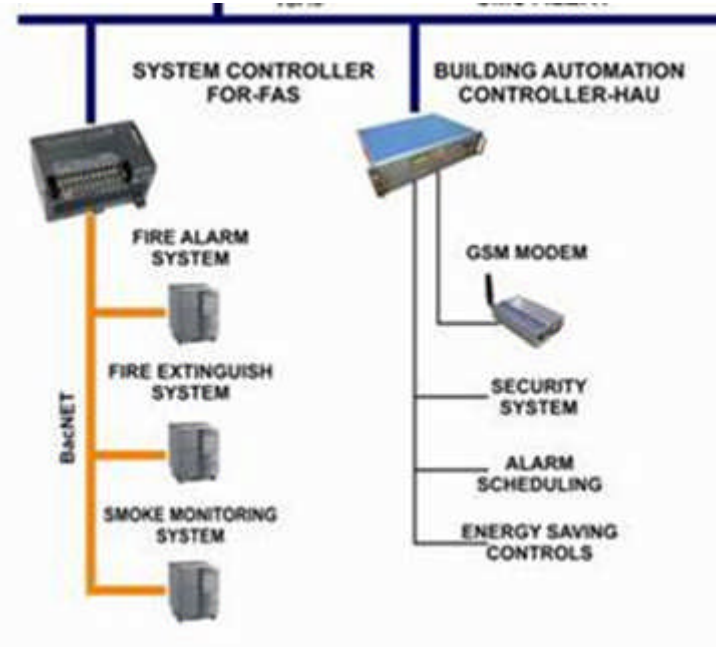
Products Training – BMS

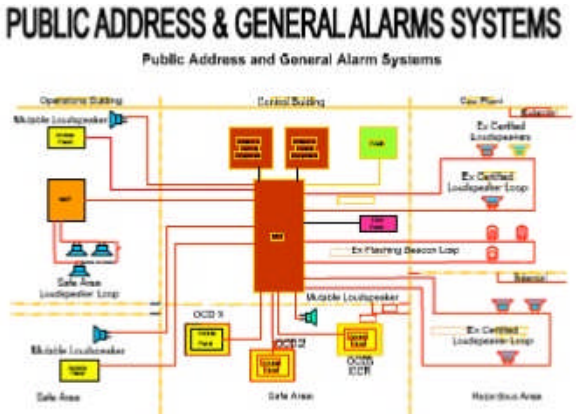


Source: IBM

Products Training – BMS

Fire Alarm & Security System – Utilizes serial interface modules





Typical cable constructions

- Twisted pairs or cores
- 1 or 2 pairs
- Unshielded or shielded
- 12~22 AWG non Fire Resistance
- 1.5mm2 ~ 4mm2 Fire Resistance
- Min PVC CMR

MAX-FOH™ Flexible PAGA & Control Cable

Public Address General Alarm, Data Control Cable, Fire Resistance

Fire Characteristics

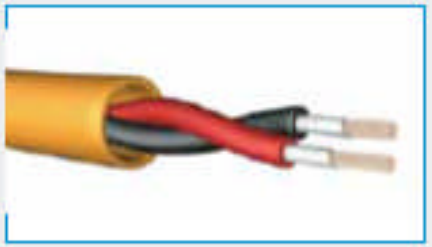
1.5mm² Core	Grade A Copper specially protected by fire barrier tape to ensure circuit integrity in fire situations.
Construction	Twisted pair for better signal transmission
Core Insulation	High temperature resistance PE
Outer Sheath	LSZH in accordance to IEC 60034, IEC 60754-1 & 2.

Main Characteristics

Nominal overall diameter	mm	8.0 (±0.5)
Nominal weight (completed cable)	Kg/km	66
Min bending radius	mm	60
Max pulling tension	kgf	21
Max conductor resistance @ 20°C	Ω/km	12.1
Min insulation resistance @ 20°C	MΩ/km	2000
Dielectric withstand test	kV/min	1/1

Technical Data

Size	-	2C x 1.5mm2
Specification reference	-	IEC 60332-1, IEC 60331, 55299 / BS 6387 CWZ
Conductor material	mm	Plain annealed copper wire to IEC
Max operating temperature	°C	90
No of Wire / Wire Diameter	mm	7 / 0.53
Conductor shape	-	Circular stranded
Insulation	-	Cross-linked PE, XLPE
Insulation thickness	mm	0.5
Core Colour	mm	Black & White OR Black & Red



Application

Most widely used fire resistance speaker & Audio/Motor control cables, which is highly flexible due to the unique tubing design. Draka MAX-FOH™ flexible speaker cables meets the stringent BS 6387 fire performance standards and can be used in all critical Public Address General Alarm Systems.

Fire Rating

Generally to: ISO/IEC 11801: 95, IEC 61156, EN 50173-95; EN 50288-1, BS 6387

Products Training – BMS

SACU Series, SECURITY ALARM (COMMS) Cable, Unshielded, PVC CMR, PE , LSZH

General		Material
Inner Conductor	:	Grade A Bare Copper, Stranded
Dielectric	:	PVC
Ripcord	:	Available
Jacket	:	PVC-CMR, PE or LSZH
Temp Rating	:	Up to 75°C
Core Color Code	:	1 - Black, 2 - Red, 3 - White, 4 - Green
Packing	:	500m/reel standard, 1km/drum optional
Standards	:	NEC Article Type FPLR, CL3R, CMR, comply to IEC 60332-1 LSZH - IEC 61034, IEC 60754-1 & 2, comply to IEC 60332-1
Applications	:	**Security, Intercom, Broadcast, Sound, Audio Systems**

FACS Series, FIRE ALARM Cable, Shielded, PVC CMR, PE , LSZH

General		Material
Inner Conductor	:	Grade A Bare Copper, Solid
Dielectric	:	PVC
Shielding:	:	100% Overall Aluminum Foil Screen
Jacket	:	PVC-CMR, PE or LSZH with Ripcord
Temp Rating	:	Up to 75°C
Core Color Code	:	1 - Black, 2 - Red, 3 - White, 4 - Green
Packing	:	500m/reel standard, 1km/drum optional
Standards	:	NEC Article Type FPLR, CL3R, CMR, comply to IEC 60332-1 LSZH - IEC 61034, IEC 60754-1 & 2, comply to IEC 60332-1
Applications	:	**Fire Alarm, Security, Intercom**

SACS Series, SECURITY ALARM (COMMS) Cable, Shielded, PVC CMR, PE , LSZH

General		Material
Inner Conductor	:	Grade A Bare Copper, Stranded
Dielectric	:	PVC
Shielding:	:	100% Overall Aluminum Foil Screen
Jacket	:	PVC-CMR, PE or LSZH with Ripcord
Temp Rating	:	Up to 75°C
Core Color Code	:	1 - Black, 2 - Red, 3 - White, 4 - Green
Packing	:	500m/reel standard, 1km/drum optional
Standards	:	NEC Article Type FPLR, CL3R, CMR, comply to IEC 60332-1 LSZH - IEC 61034, IEC 60754-1 & 2, comply to IEC 60332-1
Applications	:	**Security, Intercom, Broadcast, Sound, Audio Systems**

CE RoHS 2002/95/EC

FACU Series, FIRE ALARM Cable, Unshielded, PVC CMR, PE , LSZH

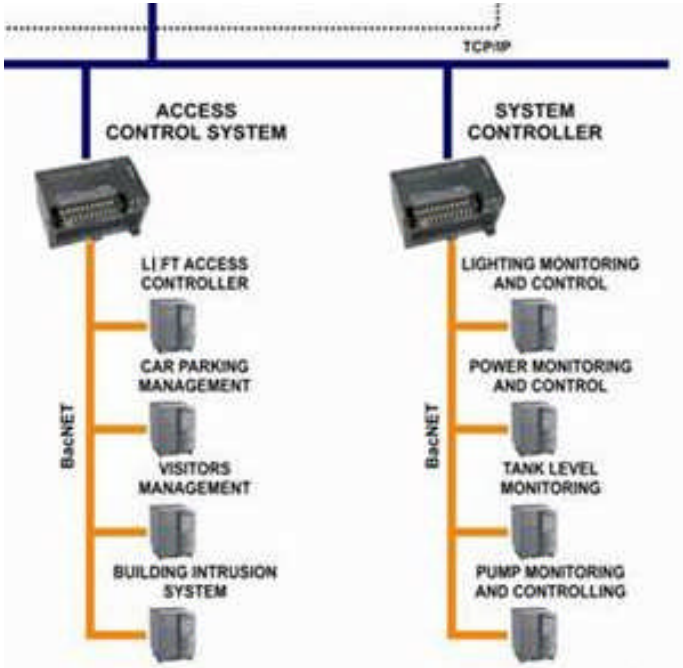
General		Material
Inner Conductor	:	Grade A Bare Copper, Solid
Dielectric	:	PVC
Ripcord	:	Available
Jacket	:	PVC-CMR, PE or LSZH
Temp Rating	:	Up to 75°C
Core Color Code	:	1 - Black, 2 - Red, 3 - White, 4 - Green
Packing	:	500m/reel standard, 1km/drum optional
Standards	:	NEC Article Type FPLR, CL3R, CMR, comply to IEC 60332-1 LSZH - IEC 61034, IEC 60754-1 & 2, comply to IEC 60332-1
Applications	:	**Fire Alarm, Security, Intercom**

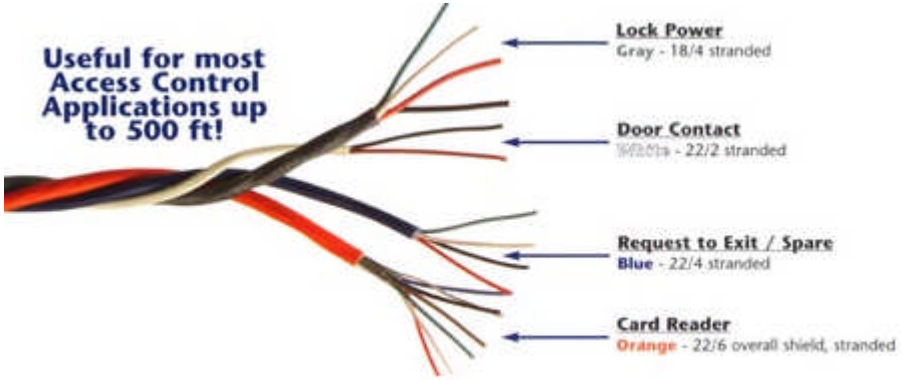
Products Training – BMS

DRAKA selections of Fire, Safety, Broadcast, Security & Alarm purposes cables.

Properties \ Type	Maxfoh™ PAGA Series	SACU Series	FACU Series
Applications	Critical systems ie Public Address General Alarm, Fire Safety System	Security, Communications, Public Address, Sound & Audio	Fire Alarm, Security and Intercom
Conductor	Stranded, Class 2 (Fixed Installations)	Stranded, Class 2 (Fixed Installations)	Solid bare conductor
Fire Resistance	Yes, BS 6387, IEC 60331	No	No
Flame Retardant	Yes , IEC 60332-3C	Yes, up to IEC 60332-3C except PE	Yes, up to IEC 60332-3C except PE
Outdoor usage	In conduit	Yes, PE	Yes, PE
Available Sheath Types	LSZH	PE, PVC-CMR, LSZH	PE, PVC-CMR, LSZH
Shielded	Yes, PAGAS series	Yes, SACS series	Yes, FACS series
Steel Wire Braid	Yes, PAGASB series	Yes, SACSB series	Yes, FACS series

Access Control & Monitoring System – Utilizes serial communications networks.






Readers and Controllers

Typical cable constructions
- Twisted pairs
- 1 or 2 pairs
- Overall, pairs shielding or both ISOS.
- 16~24 AWG


Biometric Time Attendance


Proximity Card

Products Training – BMS

BMS most commonly used type of communications network

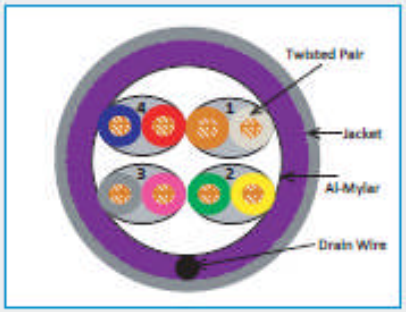
	Serial Link Communications Network		
Specifications	**RS-232**	**RS-422**	**RS-485**
Mode of Operation	Single-Ended	Differential	Differential
Total No. of Drivers and Receivers on one line	1 Driver / 1 Receiver	1 Driver / 10 Receiver	32 Driver (only 1 active at a time) / 32 Receiver
Maximum Cable Length	50 ft (15m)	4000 ft (1200m)	4000 ft (1200m)
Maximum Data Rate (at max cable length)	100 kbit/s	10 Mbit/s - 40ft 100kbit/s - 4000ft	10 Mbit/s - 40ft 100kbit/s - 4000ft
Typical Cable Type used	UL 2464	UL 2464	TIA (RS) 485, Cat 5e F/UTP, UL 2919 (for extended distance up to 1800m)
Max Operating Voltage Range	± 25 V	±15 V	±15 V

Products Training – BMS

3.2 Screened Control Cable

UL 2464 Overall Screen 16-24AWG PVC

Overall Screened Data Control Cable



Application

For installation requiring flexible connector cable to fulfill measuring, controls & command applications ie Computer Interconnection, Data Transmission, Control Circuits, Industrial Equipment Control, suitable for EIA RS-232 applications.

Optional

- LSZH

Technical Details

Conductor	Fully annealed stranded tinned copper per ASTM B-33
Operating Voltage	300V
Insulation	Premium grade SR-PVC
Overall diameter (mm)	0.51 - 1.29 nominal
Insulation Dia. (±0.08mm)	1.1
Twist(Direction)	S
Drain wire(Construction,mm)	7/0.254mm Stranded Tinned Copper
Assembly	Pairs + Drain wire
Al-Mylar Wrap(overlapping,%)	≥25%
Jacket	PVC
Insulation colour	White/Brown, Green/Yellow, Gray/Pink, Blue/Red
Rated Temperature	+80°C

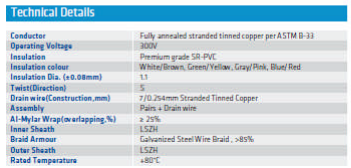
Cable Dimension

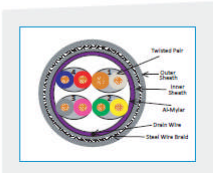
Conductor Size	DC Resistance @ 20°C (Ω/km)	No of Pairs	OD (mm) ± 5%
16 AWG	<= 14.50	1 Pair	6.50
	<= 14.50	2 Pairs	9.00
	<= 14.50	3 Pairs	9.60
	<= 87.0	4 Pairs	11.0
18 AWG	<= 23.60	1 Pair	5.60
	<= 23.60	2 Pairs	8.0
	<= 23.60	3 Pairs	8.2
	<= 23.60	4 Pairs	10.0
20 AWG	<= 36.0	1 Pair	5.00
	<= 36.0	2 Pairs	6.40
	<= 36.0	3 Pairs	7.70
	<= 36.0	4 Pairs	8.00
22 AWG	<= 56.0	1 Pair	4.60
	<= 56.0	2 Pairs	5.50
	<= 56.0	3 Pairs	6.40
	<= 56.0	4 Pairs	7.00
24 AWG	<= 86.60	1 Pair	4.00
	<= 86.60	2 Pairs	5.00
	<= 86.60	3 Pairs	5.80
	<= 86.60	4 Pairs	6.70

UL 2464 OVERALL SCREEN 16-24AWG SWB LSZH

3.2 Screened Control Cabl

Overall Screened Data Control Cable, Armoured





Most commonly used pair twisted overall screened cable due to wide applications of RS 232 & 422 BMS network in most buildings.

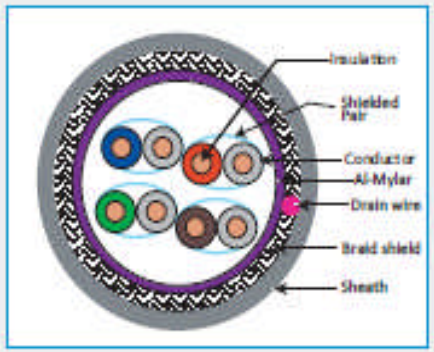
Provides adequate shielding, conductor flexibility for robust installations.

Higher grade PVC – SR is used as insulation.

3.2 Screened Data Control Cable

UL 2919 INDIV-PAIR SCREEN 18-24AWG LSZH

Individual Pair Screened Control Cable



Application

Multipairs individual shielded in sensitive EMI environment for general data control & BUS applications.

Can be used for Security & Control Application. Designed to pass UC 1666 burn test.

Optional:

- PVC / Steel Wire Braid
- High pair counts upon request.

Technical Details

Conductor	Stranded Tinned Copper , AWG 18, diameter 16 x 0.254 mm
Operating Voltage	300V
Insulation	HD-PE
Insulation colour	Pair 1: 1 x white, 1 x Blue Pair 2 : 1x white , 1 x orange Pair 3 : 1 x white , 1 x green Pair 4 : 1 x white , 1 x brown
1st screen	1x AL-Mylar Wrap, overlapping >= 25 %
Drain wire	7/0.254mm Stranded Tinned Copper
Coverage	Braid Shield coverage ≥ 85%
Sheath	LSZH
Sheath colour	Grey
Rated temperature	+80°C

Cable Dimension

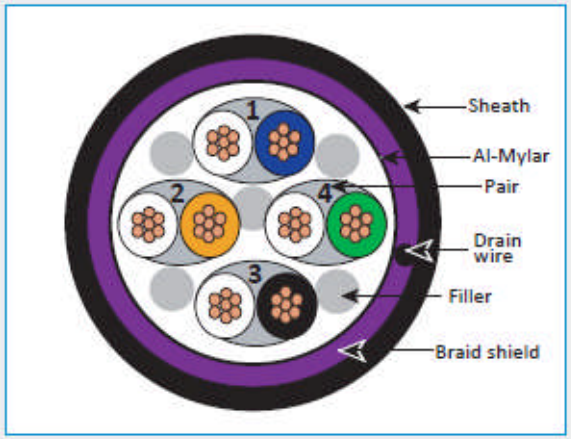
Conductor Size	Conductor Diameter (mm)	DC Resistance @ 20°C (Ω/km)	No. of Pairs	Insulation Diameter (MM)	Braid Shield %	OD (mm) ± 5%
18 AWG	1.17	<= 23.0	1 Pair	2.4 ± 0.2	16 / 11 / 0.12	7.5
		<= 23.0	2 Pairs		16 / 14 / 0.12	10.3
		<= 23.0	4 Pairs		16 / 17 / 0.12	12.8
20 AWG	0.94	<= 36.0	1 Pair	2.1 ± 0.2	16 / 10 / 0.12	7.0
		<= 36.0	2 Pairs		16 / 13 / 0.12	9.3
		<= 36.0	4 Pairs		16 / 15 / 0.12	11.5
22 AWG	0.76	<= 56.0	1 Pair	2.0 ± 0.2	16 / 09 / 0.12	6.5
		<= 56.0	2 Pairs		16 / 13 / 0.12	8.7
		<= 56.0	4 Pairs		16 / 15 / 0.12	11.0
24 AWG	0.61	<= 86.0	1 Pair	1.8 ± 0.2	16 / 08 / 0.12	5.9
		<= 86.0	2 Pairs		16 / 12 / 0.12	8.6
		<= 86.0	4 Pairs		16 / 14 / 0.12	9.9

High screening properties makes 2919 excellent choice to replace 2464 in high EMI environments.

3.1 EIA-485

EIA-485 22 & 24AWG LSZH

Serial Data Communication Cable



Application

For multidropped, medium-speed, serial data communication in electrically noisy industrial environments.
Application includes industrial networks using RS-485/RS-422 transcievers :
- RS-422 systems for Process Automation (chemicals, brewing, paper mills), factory automation (autos, metal fabrication), HVAC, security, motor control and motion control.

Construction

Conductor	Stranded Tinned Copper
Insulation	HD-PE
Colour	Pair 1: 1 x white, 1 x blue Pair 2: 1 x white, 1 x orange Pair 3: 1 x white, 1 x black Pair 4: 1 x green
1st screen	1 x AL-Mylar Wrap, overlapping >= 25 %
Drain wire	Stranded Tinned Copper
Braid Shield	Tinned copper
Braid Shield Coverage	≥85%
Sheath	LSZH
Sheath colour	Black

AWG / Pair	22 / 1P	22 / 2P	22 / 3P	22 / 4P	24 / 1P	24 / 2P	24 / 3P	24 / 4P
Conductor Ø mm	0.77				0.61			
Insulation Ø mm	1.8 ± 0.2				1.6 ± 0.08			
Drain wire Ø mm	7 *0.254				7 *0.254			
Braid shield	16*6* 0.12mm	16*10* 0.12mm	16*12* 0.12mm	16*12* 0.12mm	16*5* 0.12mm	16*11* 0.12mm	16*9* 0.12mm	16*11* 0.12mm
Sheath Ø mm	6.5	8.2	9.6	10	6.3	8.0	8.5	9.5

EIA-485 (formerly RS-485 or RS485) is an OSI model physical layer electrical specification of a two-wire, [1] half-duplex, multipoint serial connection. One polarity of voltage indicates a logic 1 level, the reverse polarity indicates a logic 0 level.

EIA-485 22&24 AWG SWB LSZH

3.1 EIA-485

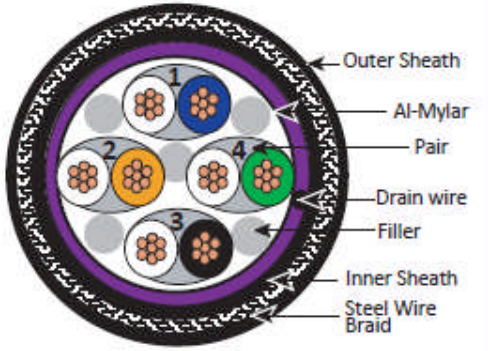
Serial Data Communication Cable, Armoured

Construction

Conductor	Stranded Tinned Copper
Insulation	HD-PE
Colour	Pair 1: 1 x white, 1 x blue Pair 2: 1 x white, 1 x orange Pair 3: 1 x white, 1 x black Pair 4: 1 x green
1st screen	1 x AL-Mylar Wrap, overlapping >= 25 %
Drain wire	Stranded Tinned Copper
Braid Shield	Tinned copper ; coverage ≥85%
Inner Sheath	LSZH
Braid Armour	Galvanized Steel Wire Braid ; >85%
Outer Sheath	LSZH

AWG / Pair	22 / 1P	22 / 2P	22 / 3P	22 / 4P	24 / 1P	24 / 2P	24 / 3P	24 / 4P
Conductor Ø mm	0.77				0.61			
Insulation Ø mm	1.8 ± 0.2				1.6 ± 0.08			
Drain wire Ø mm	7*0.254				7*0.254			
Braid shield	16*6* 0.12mm	16*10* 0.12mm	16*12* 0.12mm	16*12* 0.12mm	16*5* 0.12mm	16*11* 0.12mm	16*9* 0.12mm	16*11* 0.12mm
Inner Sheath Ø mm	6.5	8.2	9.6	10	6.3	8.0	8.5	9.5
Braid Armour Ø mm	7.4	9.4	11.1	11.8	7.5	9.6	10.2	11.3
Outer Sheath Ø mm	11.1	13.0	14.8	15.7	10.8	13.1	13.4	11.8

Most commonly used EIA 485 cable requiring armoring protection with LSZH / PE properties, for industrial usages, or outdoor.



Application

For multidropped, medium-speed, serial data communication in electrically noisy industrial environments.
Application includes industrial networks using RS-485/RS-422 transcievers:
- RS-422 systems for Process Automation (chemicals, brewing, paper mills), factory automation (autos, metal fabrication), HVAC, security, motor control and motion control.
- Suitable for outdoor installation due to steel wire braiding.

Products Training – BMS

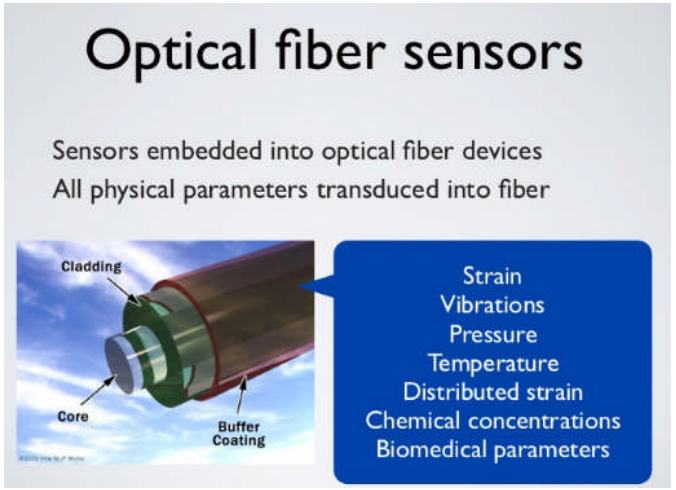
DRAKA selections of Serial Data, Modbus, cables range for access, monitoring and control purposes.

Properties	UL 2464 Cable	UL 2919 Cable	EIA 485 Cable
No of Pairs	1,2,4 pairs	1,2,4 pairs	1 & 2 pairs
Conductor sizes	16~24 awg	16~24 awg	22 & 24 awg
Pair Aluminum Foil Screened	No	Yes	No
Overall Aluminum Foil Screened	Yes	Yes	Yes
Tinned Copper Braid	No	No	Yes
Can be Steel wire braided	Yes	Yes	Yes
Can be Copper wire braided	Yes	Yes	Yes
Can be Steel wire armoured	No	No	Yes
Can be PE sheathed	Yes	Yes	Yes
EMI protection	Minimum	High	Medium

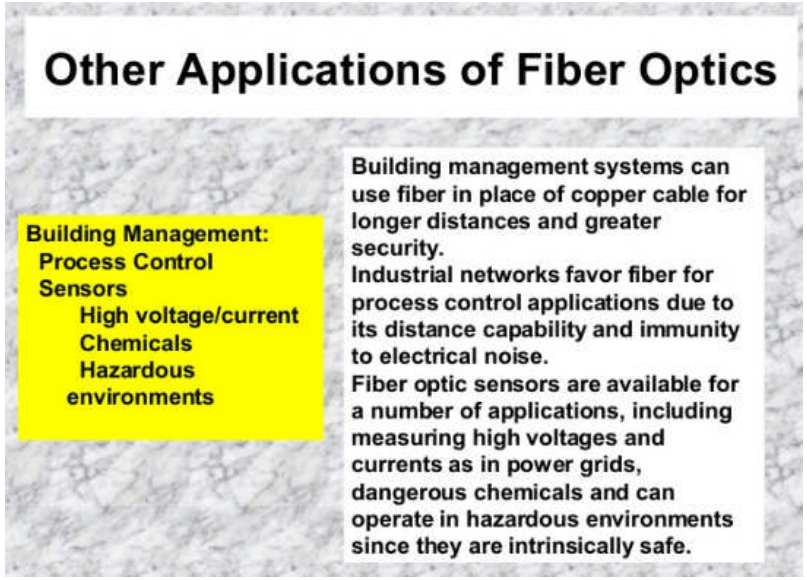
Products Training – BMS

Fiber Optics in Building Management Systems

Although still more pricey to implement fiber optical transmission into building management systems, but fibre optics are growing its presence in new BMS, controlling larger data flows, management more complex and critical safety /control / monitoring systems in larger building complexes, proving to be a better investments in such enlarged BMS scope and future proofing.



Applications for Fibre Optic Technology:
Vision and Control of Large Scale CCTV Systems
Computer/Telephone Switches
Types of Data Transmission RS232, RS485, RS422, 20Ma Loop, Audio
Large Scale Alarm Systems
Large Scale Access Control Systems
Higher Security protection
Fire Resistance
NO ONGOING RENTAL COSTS YOU OWN THE FIBRE

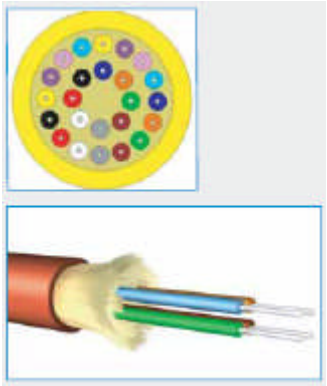


Products Training – BMS

Typical Fibre Optics cables used in BMS.

UC FIBRE™ MT SERIES

2-24 Cores, Indoor Tight Buffer Distribution Cable, LSZH

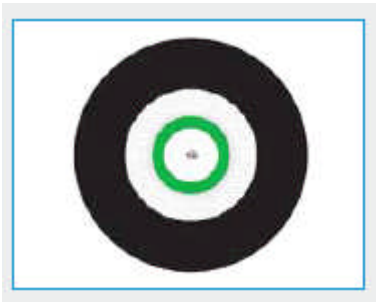


UC FIBRE™ MT SERIES

36,48,96 Cores, Indoor Tight Buffer Distribution Cable, LSZH

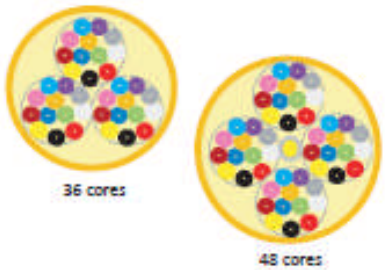
Firetuf™ OFC-UT-NM Fire Resistant Universal Central Tube Cable

Indoor/Outdoor non-metallic LSHF-FR sheathed optical cable with 2 – 24 fibers.
VDE: A/I-DQ(ZN)H



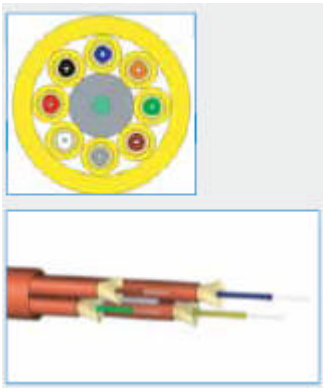
UC FIBRE™ MTC SERIES, 36 & 48 Cores, COMPACT Indoor

Tight Buffer Distribution Cable, LSZH

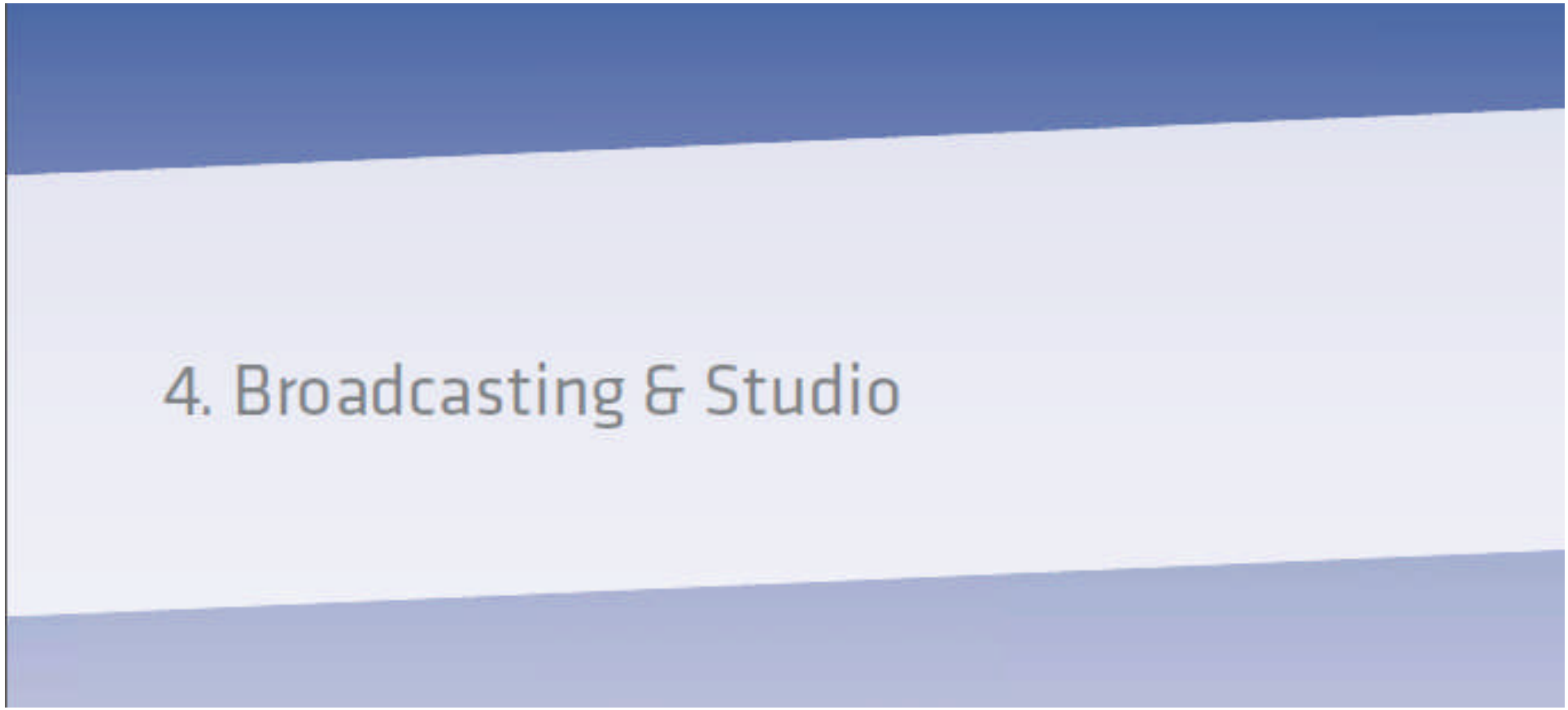


UC FIBRE™ MB SERIES

2-12 Core, Indoor, Breakout, Tight Buffer Distribution Cable, LSZH

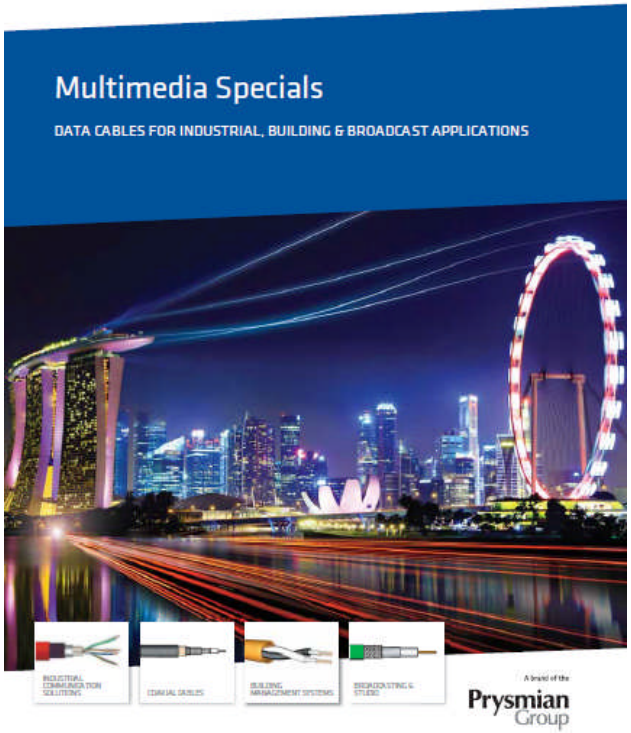


Products Training – B&S



Cables Basics 123 - End

For more information on our Multimedia Specials products, request for our MMSpecials catalogue (right) or visit our MMS dedicated website, www.DRAKAUC.com now.



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