# A-2Y(L)2YB2Y S(H45)

## **№** Applications

The cables are designed for transmission of low frequent signals up to 90 KHz through symmetric circuits in railway networks, and are suitable for laying directly into the ground or in ducts.

### Standards

- Dlk 1.013.109y
- Dlk 1.013.110y

#### **№** Construction

- Conductor: Solid annealed copper, 0.9 or 1.4 mm nominal diameter.
  - Insulation: Solid polyethylene.
- conductors are twisted together to form a quad.
- ► PE-copolymer Coated Aluminium Tape • Cabling Element: Four insulated ➤ One/Double Steel Tapes Stranding: Quads are helically stranded in concentric layers. Cables from 7 guads on, have two extra conductors of 0.5mm with perforated insulation (surveillance conductors).
  - · Core Wrapping: Plastic tape(s) with overlapping.
- Moisture Barrier: One laminated sheath made of aluminium tape (0.15mm) coated with PE-Copolymer on at least one side is applied with longitudinally overlap.
  - Inner Sheath: Low density polyethylene.
  - Electromagnetic Shield: One helically applied steel tape (0.2-0.3mm) or two helically applied steel tapes (0.1mm).
  - Outer Sheath: Low density polyethylene.

## **№** Type Codes

A-	outdoor cable	2Y	solid PE conductor insulation
(L)2Y	PE inner laminated sheath	В	steel tape armor
2Y	PE outer sheath	S	signal cable
LG	layer stranding	H(n)	operating capacity

## Ring marking of Quad

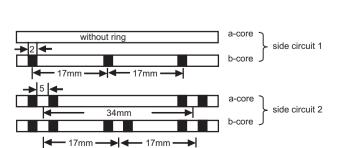
The single core is identified by black ring markings:

Side Circuit 1 a-wire without marking

> b-wire 1 mark distance 17mm

Side Circuit 2 a-wire 2 marks distance 34mm

> b-wire 2 marks distance 17mm





► Extra Perforated Insulated Conductor

► Inner PE Sheath

► Solid PE Insulation

➤ Solid Copper Conductor

Non Hygroscopic Tape



### ≥ Electrical Characteristics at 20°C

Minimum Insulation Resistance @500 V DC (1min)         MΩ.km         10000         100           Maximum Conductor Capacitance @800Hz         nF/km         45         45           Maximum Capacitance unbalance @800Hz         pF/km         45         45           K₁ (100% / 50% all values)         pF/km         650/150         650/150           K₂-1₂ neighboured quads         pF/km         500/150         500/150           K₃-1₂ over-neighboured quads         pF/km         150         15           ea₁/₂         pF/km         1300         130           Minimum Far-end Crosstalk Attenuation @90KHz         dB/km         58/62         33/4           Maximum Attenuation @90KHz         dB/km         3.3         2.6           Dielectric Strength, conductor to conductor (DC voltage 1min)         V         3535         353           Surveillance Conductors         Loop resistance, maximum         Ω/km         190         190           Insulation resistance         - dry cable core, minimum         MΩ.km         1000         100           - wet cable core, maximum         KΩ.km         30         30           Operating Voltage AC/DC         V         420/600         420/6           Test Voltage @50 Hz 1 min         V         2500	Nominal Conductor Diameter	mm	0.9	1.4
Maximum Conductor Capacitance @800Hz (AC)         nF/km         45         45           Maximum Capacitance unbalance @800Hz         pF/km         650/150         650/1           K₁ (100% / 50% all values)         pF/km         500/150         500/1           K₂12 neighboured quads         pF/km         500/150         500/1           K₂12 over-neighboured quads         pF/km         150         15           ea1/2         pF/km         1300         130           Minimum Far-end Crosstalk Attenuation @90KHz         dB/km         58/62         33/4           Maximum Attenuation @90KHz         dB/km         3.3         2.6           Maximum Attenuation @90KHz         dB/km         3.3         2.6           Surveillance Conductors         Dielectric Strength, conductor to conductor (DC voltage 1min)         V         3535         353           Surveillance Conductors         Dresistance, maximum         Ω/km         190         190           Insulation resistance         - dry cable core, minimum         MΩ.km         1000         100           - wet cable core, maximum         KΩ.km         30         30           Operating Voltage AC/DC         V         420/600         420/6           Test Voltage @50 Hz 1 min         V <sub>eff</sub> <	Maximum Conductor Resistance	Ω/km	56.6	23.4
Maximum Capacitance unbalance @800Hz       pF/km       650/150       650/150         K <sub>1</sub> (100% / 50% all values)       pF/km       500/150       500/150         K <sub>9-12</sub> neighboured quads       pF/km       500/150       500/150         K <sub>9-12</sub> over-neighboured quads       pF/km       150       15         ea <sub>1/2</sub> pF/km       1300       130         Minimum Far-end Crosstalk Attenuation @90KHz       dB/km       58/62       33/4         Maximum Attenuation @90KHz       dB/km       3.3       2.6         Maximum Attenuation @90KHz       dB/km       3.3       2.6         Dielectric Strength, conductor to conductor (DC voltage 1min)       V       3535       353         Surveillance Conductors       Dop resistance, maximum       Ω/km       190       19         Insulation resistance       - dry cable core, minimum       MΩ.km       1000       100         - wet cable core, maximum       KΩ.km       30       30         Operating Voltage AC/DC       V       420/600       420/6         Test Voltage @50 Hz 1 min       V <sub>eff</sub> 2500       250	Minimum Insulation Resistance @500 V DC (1min)	MΩ.km	10000	10000
K <sub>1</sub> (100% / 50% all values)   pF/km   650/150   650/7     K <sub>9-12</sub> neighboured quads   pF/km   500/150   500/7     K <sub>9-12</sub> over-neighboured quads   pF/km   150   150     ea <sub>1/2</sub>   pF/km   1300   130     Minimum Far-end Crosstalk Attenuation @90KHz   1300   130     Maximum Attenuation @90KHz   dB/km   58/62   33/4     Maximum Attenuation @90KHz   dB/km   3.3   2.6     Maximum Attenuation @90KHz   dB/km   190   190     Surveillance Conductors   20/km   190   190     Insulation resistance   - dry cable core, minimum   MΩ.km   1000   100     - wet cable core, maximum   KΩ.km   30   30     Operating Voltage AC/DC   V   420/600   420/6     Test Voltage @50 Hz 1 min   Core to Core   V <sub>eff</sub>   2500   250	Maximum Conductor Capacitance @800Hz (AC)	nF/km	45	45
Kg12 neighboured quads         pF/km         500/150         500/1           Kg12 over-neighboured quads         pF/km         150         15           ea <sub>1/2</sub> pF/km         1300         130           Minimum Far-end Crosstalk Attenuation @90KHz         dB/km         58/62         33/4           100% / 80% all values         dB/km         3.3         2.6           Maximum Attenuation @90KHz         dB/km         3.3         2.6           Dielectric Strength, conductor to conductor (DC voltage 1min)         V         3535         353           Surveillance Conductors         Loop resistance, maximum         Ω/km         190         19           Insulation resistance         - dry cable core, minimum         MΩ.km         1000         100           - wet cable core, maximum         KΩ.km         30         30           Operating Voltage AC/DC         V         420/600         420/60           Test Voltage @50 Hz 1 min         V <sub>eff</sub> 2500         250	Maximum Capacitance unbalance @800Hz			
Kg-12 over-neighboured quads   pF/km   150   150   150   eat_{1/2}   pF/km   1300	K₁ (100% / 50% all values)	pF/km	650/150	650/150
ea 1/12       pF/km       1300       1300         Minimum Far-end Crosstalk Attenuation @90KHz       480% all values       dB/km       58/62       33/4         Maximum Attenuation @90KHz       dB/km       3.3       2.6         Dielectric Strength, conductor to conductor (DC voltage 1min)       V       3535       353         Surveillance Conductors       20/km       190       190       190         Insulation resistance       40/km       1000       100 <td< td=""><td>K<sub>9-12</sub> neighboured quads</td><td>pF/km</td><td>500/150</td><td>500/150</td></td<>	K <sub>9-12</sub> neighboured quads	pF/km	500/150	500/150
Minimum Far-end Crosstalk Attenuation @90KHz       dB/km       58/62       33/4         Maximum Attenuation @90KHz       dB/km       3.3       2.6         Dielectric Strength, conductor to conductor (DC voltage 1min)       V       3535       353         Surveillance Conductors       Loop resistance, maximum       Ω/km       190       190         Insulation resistance       - dry cable core, minimum       MΩ.km       1000       100         - wet cable core, maximum       KΩ.km       30       30         Operating Voltage AC/DC       V       420/600       420/60         Test Voltage @50 Hz 1 min       Core to Core       V <sub>eff</sub> 2500       250	K <sub>9-12</sub> over-neighboured quads	pF/km	150	150
100% / 80% all values	ea <sub>1/2</sub>	pF/km	1300	1300
Maximum Attenuation @90KHz       dB/km       3.3       2.6         Dielectric Strength, conductor to conductor (DC voltage 1min)       V       3535       353         Surveillance Conductors	Minimum Far-end Crosstalk Attenuation @90KHz			
Dielectric Strength, conductor to conductor (DC voltage 1min)         V         3535         353           Surveillance Conductors         Dielectric Strength, conductor (DC voltage 1min)         V         3535         353           Loop resistance, maximum         Ω/km         190         19           Insulation resistance         HO.km         1000         100           - wet cable core, minimum         KΩ.km         30         30           - wet cable core, maximum         KΩ.km         30         30           Operating Voltage AC/DC         V         420/600         420/6           Test Voltage @50 Hz 1 min         Veff         2500         250	100% / 80% all values	dB/km	58/62	33/45
Surveillance Conductors         Ω/km         190         19           Loop resistance, maximum         Ω/km         190         19           Insulation resistance         - dry cable core, minimum         MΩ.km         1000         100           - wet cable core, maximum         KΩ.km         30         30           Operating Voltage AC/DC         V         420/600         420/6           Test Voltage @50 Hz 1 min         Veff         2500         250	Maximum Attenuation @90KHz	dB/km	3.3	2.6
Loop resistance, maximum         Ω/km         190         190           Insulation resistance         -	Dielectric Strength, conductor to conductor (DC voltage 1min)	V	3535	3535
Insulation resistance	Surveillance Conductors			
- dry cable core, minimum       MΩ.km       1000       1000         - wet cable core, maximum       KΩ.km       30       30         Operating Voltage AC/DC       V       420/600       420/600         Test Voltage @50 Hz 1 min       Veff       2500       250	Loop resistance, maximum	Ω/km	190	190
- wet cable core, maximum       KΩ.km       30       30         Operating Voltage AC/DC       V       420/600       420/60         Test Voltage @50 Hz 1 min       Veff       2500       250	Insulation resistance			
Operating Voltage AC/DC         V         420/600         420/6           Test Voltage @50 Hz 1 min         Veff         2500         250	- dry cable core, minimum	MΩ.km	1000	1000
Test Voltage @50 Hz 1 min         V <sub>eff</sub> 2500         250	- wet cable core, maximum	KΩ.km	30	30
Core to Core V <sub>eff</sub> 2500 250	Operating Voltage AC/DC	V	420/600	420/600
en	Test Voltage @50 Hz 1 min			
Core to Screen V <sub>eff</sub> 2500 250	Core to Core	$V_{ m eff}$	2500	2500
	Core to Screen	$V_{\rm eff}$	2500	2500

## ■ Mechanical and Thermal Properties

- Minimum Bending Radius: 10×OD
- Temperature Range: -40°C to +60°C (during operation); -10°C +60°C (during installation)

# Dimensions and Weight

Cable Code	Number of Quads	Nominal Sheath Thickness mm		Nominal Overall Diameter	Nominal Weight kg/km					
		Inner	Outer	mm						
0.9mm Conductor, 1.8mm Insulated Wire										
RS109y-2Y(L)2YB2Y-1Q0.9-S(H45)	1	1.3	1.2	12.0	170					
RS109y-2Y(L)2YB2Y-3Q0.9-S(H45)	3	1.3	1.2	17.0	310					
RS109y-2Y(L)2YB2Y-5Q0.9-S(H45)	5	1.3	1.2	19.0	410					
RS109y-2Y(L)2YB2Y-7Q0.9-S(H45)	7	1.3	1.2	21.0	500					
RS109y-2Y(L)2YB2Y-10Q0.9-S(H45)	10	1.3	1.2	24.0	640					
RS109y-2Y(L)2YB2Y-14Q0.9-S(H45)	14	1.3	1.2	27.0	800					
1.4mm Conductor, 2.8mm Insulated Wire										
RS109y-2Y(L)2YB2Y-1Q1.4-S(H45)	1	1.3	1.2	14.0	240					
RS109y-2Y(L)2YB2Y-3Q1.4-S(H45)	3	1.3	1.2	21.0	490					
RS109y-2Y(L)2YB2Y-5Q1.4-S(H45)	5	1.3	1.2	24.0	710					
RS109y-2Y(L)2YB2Y-7Q1.4-S(H45)	7	1.3	1.2	26.0	880					
RS109y-2Y(L)2YB2Y-10Q1.4-S(H45)	10	1.3	1.2	33.0	1190					
RS109y-2Y(L)2YB2Y-14Q1.4-S(H45)	14	1.3	1.2	36.5	1550					













er Resistant Rated Voltage

d Voltage Laid In Ducts

Zero Halogen IEC 60754-1/NF C20-454 EN 50267-2-1