

# KNX Cable

## 2 Pair versus Quad



The 2 pair (2x2x0.8) is laid up as a quad, (4 cores twisted together). KNX certified cable follows the “Certified Scheme of Products” initiated by KNX to ensure product suitability, you can also see in the extract from the consultants guide \*produced by KNX that this quad/pair terminology continues here. It is confusing as the Consultants guide clearly describes the specification as 2pr but the important part is the detailed in the construction where it highlights the laying up as “cores twisted to a quad”.

Before any cable can achieve certification the product must comply with the Certified Scheme of Products as well as providing very detailed test results. Belcom Cables KNX products have always been KNX recognised but certification was achieved in 2014. Confirmation of our KNX certification #330/11612/14 is also available on the KNX international website.

The history of the cable is derived from a German telephone cable (JYSTY) which formed the framework of the design, this is also referred to a 2 pair (2x2x0.8) quad laid up as a 4 core cable/starquad. The design has been modified for KNX with specific dimensions, materials, colour and increased voltage tests.

General requirements for KNX call for the use of two of the conductors, the red and black, the other two conductors are effectively spare or can be used for auxiliary power for devices. For this very reason we have introduced a single pair version over the last few years which has also been certified by KNX.

\*KNX Association 2009 – v2.7 page 11 of 23 (complete document available on request)

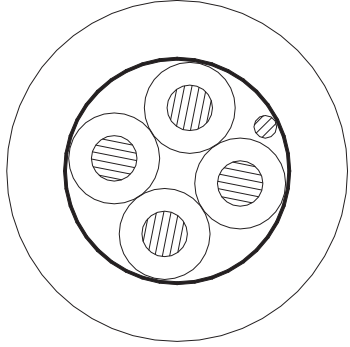
See Consultants Guide on page 2

Consultants Guide		KNX		
<b>Standard KNX Bus Cable Specification (2pr cable shown)</b>				
<ul style="list-style-type: none"> <li>Conductor: plain annealed copper, circular solid, 0.8 mm</li> <li>Insulation: zero halogen polymer</li> <li>Colour code: red, white, black, yellow</li> </ul>				
<ul style="list-style-type: none"> <li>Further Construction:               <ul style="list-style-type: none"> <li>Twisting: Cores twisted to quad</li> <li>Screen: ALU / PETP-tape over twisted copper drain wire</li> <li>Outer sheath: zero halogen, flame retardancy polymer, green (RAL 6031)</li> </ul> </li> <li>Cable marking:               <ul style="list-style-type: none"> <li>Printing: EB-Baukabelanlagenfabrik and Manufacturer's id thereof</li> </ul> </li> </ul>				
<b>Technical Data</b>				
<ul style="list-style-type: none"> <li>Flame retardancy: EC 60332-1</li> <li>Amount of halogen gas acid: EC 60754-1</li> <li>Change of weight of gases: EC 60754-2</li> <li>Min. bending radius: 8 x Cable (Installation) 4 x Cable (Operation)</li> </ul>	<ul style="list-style-type: none"> <li>Temperature range:               <ul style="list-style-type: none"> <li>+5 °C up to +50 °C (Installation)</li> <li>-30 °C up to +70 °C (Operation)</li> </ul> </li> </ul>			
<b>Geometrical Data</b>				
size	Conductor size (nom.)	Overall Ø (approx.)	Weight (approx.) kg/100m	Capacitance value (approx.) pF/m
2 x 2 x 0.8 mm	1 / 0.8	5.9	50	0.44
<b>Electrical Data at 20 °C</b>				
Conductor size	Character	Unit	Values	
Conductor resistance	max.	Ω / km	38.6	
Insulation resistance	min.	MΩ . km	5000	
Max. capacitance	nom.	pF / m	65	
Characteristic impedance at 0.1 / 1 / 5 cable 200 kHz	nom.	Ω	110 / 85 / 75	
Attenuation at 0.1 / 1 / 5 / 100 kHz	nom.	dB / 100 m	— / 0.66 / 1.16	
1 / 50 / 20 / 51.25 / 62.5 / 100 kHz	nom.	dB / 100 m	4.1 / 10.5 / 11.5 / 12.8 / 13.7 / 20.5	
Crosstalk attenuation at		nominal	dB	range
1 / 50 / 100 kHz		dB / 100 m	90 / 80 / 78	dB / 100 m
1 / 50 / 20 / 51.25 / 62.5 / 100 kHz		dB / 100 m	79.9 / 80.9 / 82.0 / 84	dB / 100 m
Test voltage (Core / Core)	U <sub>1</sub>	V	800	
(Core + Screen / Water)	U <sub>2</sub>	V	4000	
Max operating voltage	U <sub>0</sub>	V	350	
Operating voltage	U <sub>0</sub> / U <sub>1</sub>	V	350 / 350	



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Standard KNX Bus Cable Specification (2pr cable shown)					
<ul style="list-style-type: none"> <li>Cores  <b>Conductor</b> ..... plain annealed copper, circular solid, 0.8 mm  <b>Insulation</b> ..... zero halogen polymer  <b>Colour code</b> ..... red, white, black, yellow</li> <li>Further Construction  <b>Laying up</b> ..... Cores twisted to quad  <b>Screen</b> ..... ALU / PETP-tape over tinned copper drain wire  <b>Outer sheath</b> ..... zero halogen, flame retardancy polymer, green (RAL 6018)</li> <li>Cable marking  <b>Printing</b> ..... EIB-Buskabelhalogenfrei and <i>Manufacturer's id thread</i></li> </ul>					
Technical Data					
<ul style="list-style-type: none"> <li>Flame retardancy: IEC 60332-1</li> <li>Amount of halogen gas acid: IEC 60754-1</li> <li>Degree of acidity of gases: IEC 60754-2</li> <li>Min. Bending radius: <b>8 x Cable-Ø (Installation) 4 x Cable-Ø (Operation)</b></li> </ul>			<ul style="list-style-type: none"> <li>Temperature range:                      +5 °C up to +50 °C  <i>(Installation)</i>                      -30 °C up to +70 °C  <i>(Operation)</i></li> </ul>		
Geometrical Data					
Size	Conductor size (nom.) n/mm	Overall-Ø (approx.) mm	Weight (approx.) kg/km	Calorific value (approx.) MJ/m	
2 x 2 x 0.8 mm	1 / 0.8	5.9	50	0.64	
Electrical Data at 20 °C					
	Character	Unit	Values		
Conductor size			0.8 mm		
Conductor resistance	<b>max.</b>	Ω / km	36.6		
Insulation resistance	<b>min.</b>	MΩ x km	5000		
Mutal capacitance	<b>nom.</b>	pF / m	65		
<b>Characteristic impedance at</b> 0.1 / 1 / 5 upto 100 MHz	<b>nom.</b>	Ω	110 / 85 / 75		
Attenuation at 0.1 / 10 / 100 kHz	<b>nom.</b>	dB / 100 m	— / 0.46 / 1.16		
1 / 16 / 20 / 31.25 / 62.5 / 100 MHz	<b>nom.</b>	dB / 100 m	4.1 / 10.5 / 11.3 / 12.8 / 17 / 20.3		
Crosstalk attenuation at			<b>nominal</b>	<b>min. request at EIB</b>	
1 / 10 / 100 kHz		dB / 100 m	90 / 80 / 78	80 / 70 / 60	
1 / 16 / 20 / 31.25 / 62.5 / 100 MHz		dB / 100 m	73/61/60/54/52/48	nicht definiert	
<b>Test voltage</b> (Core / Core)	$U_{rms}$	V	800		
(Core + Screen / Water)	$U_{rms}$	V	4000		
Max. operating voltage	$U_{SS}$	V	350		
Operating voltage	$U_0 / U$	V	250 / 250		