2-WISE

The 2-WISE Concept allows interconnection of intrinsically safe apparatus and associated apparatus not specially assessed for such a combination. For the acceptance of the interconnection of the different intrinsically safe circuits of these apparatus, the comparison of the voltage U_i (V_{max}) with U_O (V_{OC}), the current I_i (I_{max}) with I_O (I_{OC}), and the power P_i (P_{max}) with P_O (P_{max}) of the interconnected circuits must demonstrate that U_i (V_{max}), I_i (I_{max}) and P_i (P_{max}) are equal to or greater than U_O (V_{OC}), I_O (I_{SC}) and P_O (P_{max}) of the connected circuits. In addition, the maximum internal capacitance (C_i) and maximum internal inductance (L_i) of each apparatus (other than those from auxiliary devices) connected to a 2-WISE system must not exceed 5 nF and 10 µH respectively.

In a powered 2-WISE system only 2 ports (power source and power load) are allowed to be connected at the opposite ends of a cable, with a maximum of two auxiliary devices connected in between. The power source port supplies DC power to the system, and the power load port consumes DC power from the system. Auxiliary device ports may also consume DC power from the system.

The voltage U_O (V_{OC}) of a power source port must be in the range of 14 V to 17,5 V. Any other device connected to the cable shall be passive, meaning that it is not allowed to provide energy to the system, with the exception of a leakage current of 1 mA for a power load port and a leakage current of 50 µA for each auxiliary device port. The intrinsically safe circuit of a 2-WISE port shall be galvanically isolated from non-intrinsically safe circuits.

The parameters of cable used to interconnect 2-WISE ports must be as follows:

cable resistance R_C:	15...150 Ohm/km
cable inductance L_C:	0,4...1 mH/km
cable capacitance C_C:	45...200 nF/km

$C_C = C_C$ line/line + 0.5 C_C line/screen, if both lines are floating, or

$C_C = C_C$ line/line + C_C line/screen, if the screen is connected to one line

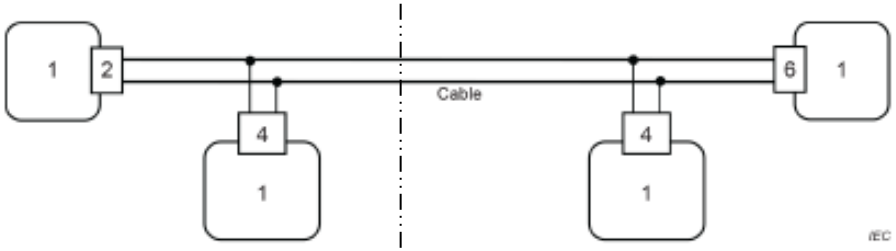
Length of cable (not including cable stubs):	≤ 200 m
Length of cable stubs:	≤ 1 m

If the above rules are respected, the inductance and the capacitance of the cable will not impair the intrinsic safety of the installation.

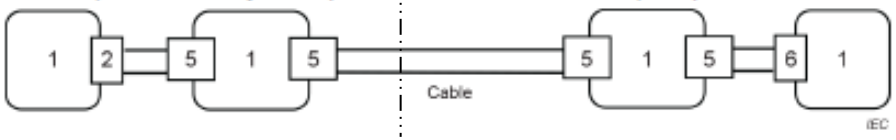
Non-hazardous classified area or Hazardous Locations

Non-hazardous classified area or Hazardous Locations

1 2-WISE device
2 2-WISE power source port
4 2-WISE auxiliary device port
5 2-WISE auxiliary device port that is physically split into two terminations, but electrically connected through and therefore counted as one 2-WISE auxiliary port per 2-WISE device.
6 2-WISE power load port



a) 2-WISE auxiliary device ports connected with short wires (stubs) to the cable



b) 2-WISE auxiliary device ports connected via a series connection in the cable

Approved 2-WISE device (1) with intrinsically safe 2-WISE power source port (2)	
Uo (V_{OC}) = 14,0 … 17,5 V	**Ci ≤ 5 nF**
Io (I_{SC}) ≤ 380 mA	**Li ≤ 10 µH**
Po (P_{max}) ≤ 5,32 W	

Approved 2-WISE device (1) with intrinsically safe 2-WISE auxiliary device port (4 or 5)	
Ui (V_{max}) = 17,5 V	**Ci ≤ 5 nF**
Ii (I_{max}) = 380 mA	**Li ≤ 200 nH**
Pi (P_{max}) = 5,32 W	
Leakage current:	**≤ 50 µA**

Approved 2-WISE device (1) with intrinsically safe 2-WISE power load port (6)	
Ui (V_{max}) = 17,5 V	**Ci ≤ 5 nF**
Ii (I_{max}) = 380 mA	**Li ≤ 10 µH**
Pi (P_{max}) = 5,32 W	
Leakage current:	**≤ 1 mA**

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Installation Drawing – Device End Users

Intrinsically safe Ethernet

2-WISE – System Concept

	designed		
	approved		
	cert. approved		
	seen		

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