



# 10 Mb/s Single Twisted Pair Ethernet Intrinsically Safe Applications

Jens Gottron, Siemens

Markus Wucher, Endress+Hauser

Steffen Graber, Pepperl+Fuchs

# Intrinsically Safe Applications

**The following text is proposed to replace the text on page 175 of informative Annex 146A:**

The principle of intrinsic safety is based on the limitation of voltage, current, power, capacity, and inductivity of electrical circuits. Within hazardous locations a circuit following the limits of the intrinsic safety standards will not be able to ignite gas or dust atmospheres in case of a short circuit or any other kind of failure.

Defining the limits of intrinsic safety is not the intention of this communication standard. Nevertheless the chosen 10BASE-T1L specification eases the realization of intrinsically safe systems.

In addition, the realization of the PHY IC has a strong impact on the possible intrinsic safety concepts, while using external and discrete components for intrinsic safety related aspects simplifies the certification process. A PHY IC with the following options would be beneficial:

- |   |   |
|---|---|
| External termination resistors:                 | These can be used to limit the energy and the current to or from the intrinsically safe link segment. |
| Providing separate high impedance receive pins: | External resistors for current and energy limitation can also be added to the receive path.           |

Figure 146A–1 and Figure 146A–2 show in principle two possible implementations on how to feed power onto an intrinsically safe link segment. The circuits should only be seen as examples. It is in the responsibility of the hardware designer to fulfill all relevant standards (especially IEC 60079-0 and 60079-11, but also others), when implementing devices for the use within intrinsically safe applications.

**Thank You**