

# IamaPLC Communication: PowerLink

PowerLink, originally developed by the Austrian specialist Bernecke&Rainer (B&R), is advanced by leading automation companies under the management of the **EPSG** - the *Ethernet PowerLink Standardization Group*. It is one of relevant standards in Europe for the use of Ethernet in the automation industry.



Through its past history Powerlink is very common. More than 100,000 nodes have worked without interference in series machines and plants for several years worldwide. Ethernet PowerLink, is a communication profile for extension of the IEEE 802.3 (**Fast Ethernet**) for automation. The EPSG standard is already brought in the IEC and accepted to the standardization.

## Powerlink Development Goals

- **Fast Ethernet** according IEEE802.3u 100BASE-TX as a transmission medium
- Use of standard network-hubs and standard cables
- deterministic transmitting of cyclical data with a minimal cycle time of 200  $\mu$ s
- Jitter smaller than 1  $\mu$ s
- Transmitting of deterministic and time uncritical data
- Use of standard IP protocols (TCP, UDP, HTTP)

## Powerlink Mode of Operation

In PowerLink all data transmissions are checked by a manager «Managing Node» MN to avoid frame collisions in the Ethernet network.

The network devices, «Controlled Node» CN, only send when they are asked for it by the manager. An PowerLink cycle is divided into two time domains. A «Start of Cyclic» (SoC) frame, sent by the manager as a broadcast message to all controllers, starts the strictly deterministic «Cycle period». In this cycle an isochronous data interchange is carried out. The Managing-Node sends one «Poll Request» in the Unicast mode sequentially to every Node.

## OpenSAFETY

Today, machines, plants and safety systems are stuck in a rigid scheme made up of hardware-based safety functions. The consequences of this are cost-intensive cabling and limited diagnostic options. The solution is the integration of safety relevant application data into the standard serial control protocol. OpenSAFETY allows both publish/subscriber and client/server communication. Safety relevant data is transmitted via an embedded data frame inside of standard communication messages. Measures to avoid any undetected failures due to systematic or stochastic errors are an integral part of a functional safety protocol. OpenSAFETY is in conformance with IEC 61508. The protocol fulfills the requirements of SIL 3. Error detection techniques have no impact on existing transport layers.

## Sources

Wikipedia ([here](#))  
[Introduction to POWERLINK](#)

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