Digitalization concepts for the process industry

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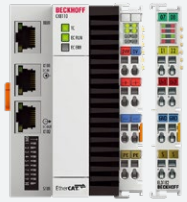
	Ethernet Advanced Physical Layer (APL)	NAMUR Open Architecture (NOA)	Module Type Package (MTP)
Definition	Ethernet-APL is a communication technology that enables fast and continuous data transmission in process plants. Power and data are transmitted over the same pair of wires (Single Pair Ethernet).	The NAMUR Open Architecture is a concept that is used to collect previously unused data from field devices in process plants via an additional channel without changing the existing automation structure.	The Module Type Package is a manufacturer-independent standard for describing process modules that enables modularity of the system structure.
Technical properties	▪ explosion protection according to IEC specification 60079-47 (2-WISE) ▪ communication in accordance with IEEE 802.3 Ethernet standard 10BASE-T1L ▪ data transfer rate up to 10 MBit/s ▪ cable lengths up to 1 km and flexible topologies ▪ applicable for various communication protocols	▪ provision of data in accordance with the standardized information model (PA-DIM) ▪ end-to-end data acquisition via secure second channel ▪ no changes to the core process control ▪ can be expanded with additional field devices for system monitoring	▪ standardization of all information required to integrate process modules into the orchestration layer (POL) in a manufacturer-independent manner ▪ automatic generation of cross-module visualization system in the POL with a uniform look and feel
Benefits of the technology	▪ seamless communication of all field device data ▪ fast transport of large data quantities ▪ additional data for system monitoring and diagnosis ▪ access to web servers and certificates	▪ monitoring and optimization of systems and processes – increase in efficiency and output – reduction in personnel resources and costs ▪ predictive maintenance for field devices	▪ time-to-market reduced due to minimized engineering ▪ time-to-repair reduced due to uniform module interfaces ▪ flexibility for changing requirements and small batch sizes ▪ decoupling of the command and control system
Beckhoff solutions			
Products	ELX6233 EtherCAT Terminal: ▪ direct connection of two APL-capable field devices up to zone 0/20 ▪ 24 mm wide terminal housing 	NOA edge device: ▪ Embedded PC ▪ I/O modules for communication with field devices ▪ TwinCAT software project 	TwinCAT MTP: ▪ Engineering (TE8400): Dedicated project type in TwinCAT for module definition ▪ Runtime (TF8400): PLC library with pre-implemented MTP function blocks
Benefits	▪ combination of different signals in one terminal segment ▪ simple integration into existing systems due to its compact design ▪ increased IT security through independent ports	▪ automatic identification of the connected field devices enables plug-and-play functionality ▪ scalable implementation ▪ compact form factor, design allows retrofitting in existing systems	▪ automatic PLC code generation ▪ automatic generation of the local human-machine interface ▪ integrated P&ID editor ▪ MTP export possible even before programming
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