






Course description

Industrial Communication with PROFINET

	Difficulty	Intermediate
	Learning time	6,5 h
	Additionally recommended learning media	Basics of PROFINET Communication (Evaluation)
	Course type	eLab
	Theme category	IIoT and Industry 4.0

After completing the training, the learners know the advantages of standardized communication. They can classify the associated opportunities and their significance for communication between machines and industrial plants. They can map data exchange between the various devices with the help of protocols such as MQTT. This means that they are familiar with the various data types in vertical and horizontal communication. In addition, they are able to network various software and hardware components.

No.	Task	Method	Competency level	Content	Competencies	Learning time	HW/ SW dependent
Learning unit 1: Basics of Industrial Communication with PROFINET							
1	From PROFIBUS to PROFINET	Technical exploration	Understand	<ul style="list-style-type: none"> ▪ Network standard Ethernet ▪ Fieldbus standard ▪ PROFINET ▪ PROFBUS ▪ Data transmission ▪ Field level ▪ Control level ▪ Control level ▪ Planning level 	<ul style="list-style-type: none"> ▪ Know the main differences between the system architecture of PROFIBUS and PROFINET. ▪ Know the advantages and disadvantages of PROFINET and PROFIBUS. ▪ Can grasp the interrelationships of digital networking in the I4.0 environment. ▪ Know the basics of data transmission. ▪ Know the different communication standards and their levels (field level control level management level planning level). 	30 min	No
2	PROFINET basics	Technical analysis	Understand	<ul style="list-style-type: none"> ▪ Advantages ▪ Areas of application ▪ OPC UA ▪ PROFINET ▪ TSN ▪ Protocols ▪ Topology ▪ EMC 	<ul style="list-style-type: none"> ▪ Know the advantages of PROFINET (openness flexibility efficiency performance) ▪ Know the communication architecture of PROFINET. ▪ Know the application areas of PROFINET (manufacturing industry/ process industry/ product development). ▪ Know the main differences between OPC UA, PROFINET and TSN. ▪ Can associate the different types of protocols. ▪ Know the different topologies (ring, line, tree/star). ▪ Know the challenges of EMC. 	30 min	No

No.	Task	Method	Competency level	Content	Competencies	Learning time	HW/ SW dependent
Learning unit 2: PROFINET in Production							
3	Set up network	Guidance text supported Method	Apply	<ul style="list-style-type: none"> ▪ Manufacturer neutrality ▪ PROFINET ▪ Commissioning ▪ TIA Portal ▪ Communication standards ▪ EMC ▪ Device types 	<ul style="list-style-type: none"> ▪ Can configure and commission a network with PROFINET. ▪ Know the advantage of PROFINET regarding the use of different components / manufacturers. ▪ Can perform parameterization (address assignment/name assignment). ▪ Know the different device types of PROFINET devices. 	120 min.	Yes
4	Maintenance	Case study	Knowledge	<ul style="list-style-type: none"> ▪ Smart Maintenance ▪ Conformity ▪ Acceptance protocol PNO ▪ Device types ▪ IP-based protocols 	<ul style="list-style-type: none"> ▪ Can integrate IP-based protocols. ▪ Know the acceptance protocol according to PNO. ▪ Know the different classes of conformity. ▪ Can assign different applications to conformance classes. ▪ Know the different device types of PROFINET devices. 	90 min.	Yes
5	Customize network	Case study	Rate	<ul style="list-style-type: none"> ▪ IWLAN (Industrial WLAN) ▪ Device Replacement ▪ Flexibly expandable ▪ Unmanged/ Manged Switch ▪ Risks 	<ul style="list-style-type: none"> ▪ Can expand an existing network or exchange components. ▪ Know the framework conditions for PROFINET devices. ▪ Know the terminology/difference unmanged vs. manged switch. ▪ Can identify failures and derive actions. 	90 min.	Yes

No.	Task	Method	Competency level	Content	Competencies	Learning time	HW/ SW dependent
6	Troubleshooting	Technical exploration	Rate	<ul style="list-style-type: none"> ▪ Energy efficiency ▪ Diagnosis ▪ Remonte Access ▪ Troubleshooting ▪ Network monitoring ▪ Tools 	<ul style="list-style-type: none"> ▪ Can perform systematic troubleshooting. ▪ Can perform network monitoring. ▪ Can derive energy efficiency measures. ▪ Can perform troubleshooting via (mobile) devices. ▪ Know different tools for diagnosis. 	60 min.	Yes
7	Risks	Case study	Knowledge	<ul style="list-style-type: none"> ▪ Data exchange ▪ Deterministic data exchange IRT ▪ Risks ▪ Profisafe ▪ System/media redundancy 	<ul style="list-style-type: none"> ▪ Know the terms bus parameters and network load and can classify them. ▪ Know the various risks associated with critical use cases. ▪ Can name measure to increase reliability. 	30 min	No