

Content of Training

Target Group

Persons from the departments planning, commissioning, maintenance and service

Content

General principles of CANBUS protocol (layers 1 and 2)

- **Principles of High-frequency Data Communication**
 - Physical transmission principle, logical telegram structure
 - EMC / shield current issues, symmetrical data transfer of differential voltage signals
 - Signal form – quality feature of data transfer
- **Physical Data Transfer CAN (ISO/OSI layer 1)**
 - Signal voltages dominant/recessive
 - Bit times
 - Bus access via bitwise arbitration (CSMA/CA)
- **Logical Data Transfer CAN (ISO/OSI layer 2a)**
 - Telegram structure
 - NRZ bit coding
 - Bit stuffing
- **CANopen (ISO/OSI layer 2b and higher)**
 - Producer/Consumer communication method
 - CiA installation guideline for CAN networks
 - CANopen telegram structure
- **DeviceNet (ISO/OSI layer 2b and higher)**
 - Producer/Consumer communication method
 - ODVA installation guideline for DeviceNet networks
 - DeviceNet telegram structure
 - CIP common industrial protocol of DeviceNet

Metrological quality determination / Troubleshooting

- **Determining the Physical Signal-to-interference Ratio**
 - Quality characteristics of physical data communication
 - How well is the network actually?
 - Acceptance and test criteria
- **Procedure for Commissioning/Service – Maintenance – Repair**
 - Tools / measuring and test equipment for problem analysis and fault location
 - Explanation of physical and logical measuring principle of measuring devices
- **Practical Application**

- **Workshop using Machinery/System or Indu-Sol's Sample Set-up**
- **Determining the Communication Parameters**
- **Metrological Quality Determination**
 - Handling and using measuring and test tools
 - Calibrating the communication quality
 - Evaluating and analyzing measured data
- **The Real Problem – Sporadic Failures - „It works...It doesn't work“**
 - Problem analysis, fault analysis/troubleshooting
 - Measures and recommendations
 - Evaluation and analysis of measuring results
 - Drafting the measuring and test record

Prerequisites

The training is structured so that all participants can be made acquainted with the subject of CAN/CANopen/DeviceNet/SafetyBus p in a straightforward manner. Basic knowledge of industrial automation is recommended.

General Remarks

Your training participation is confirmed by an Indu-Sol certificate.