Industry 4.0 Solutions:
MEP®DataRecorder
for the machine data collection

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Our solutions

Hardware
MEP®SmartDevice

+

Individual Software

MEP® Manager → Secure Remote Service

MEP® DataRecorder → Machine Data Collecting

For a secure monitoring and remote service of plants and machines

Remote Service for extruders

coperion
confidence through partnership

Issue presented: need to set up a global secure remote service

Solution: global secure service net

Results: Ca. 800 plant can now be monitored globally in a secure net. Cost saving through reduced travel times and expenses and quality improvement. Platform solution for Coperion service, clients and suppliers.

Machine data collecting for cement factories

KHD | HUMBOLDT WEDAG

Issue presented: need of global monitoring of cement factories

Solutions: plant visualisation with service data

Results: collection of data from different sensors taken forward to quality assurance. Protection against manipulation, saving of travel time and expenses. Time saving in service through reports.

MEP_HPD-01-042020

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MEP®*SmartDevice*

Machine data monitoring

Data collecting and data transfer as a flexible embedded system for machines, plants and technical systems is now made possible thanks to the products of the MEP® series. They allow the preventive maintenance and, in the event of malfunction, a simple and fast problem-solving remote access via secure internet connection.

Employment of MEP®SmartDevice:

- Set up of a cost efficient global service net
- Recording of valuable machine data

Central component of a remote service structure:

VPN Router, Data Recorder

- Date acquisition from PLCs, sensors and other devices
- Allocation of timestamps for every measured value
- Free eligible circular buffer
- Diverse interfaces
- Transfer of data to the central system

Functioning:

The MEP®SmartDevices are embedded industrial PC composed of add-on modules which are extensible to other different interfaces. Furthermore, the actual connection RS232 can also be reset to a RS422 or RS485.

On request we can deliver the IPC with your brand on it!

Type:	**MEP® *SmartDevice***
Voltage supply:	12V – 24V DC
Processor:	ARM-Cortex A9 Quadcore 4x 1 Ghz
Graphic:	onboard
Main memory	2 GB DDR3 onboard
Mass storage:	1 GB NAND Flash onboard 1GB – 128GB Industrial Grad microSD(HC)
Case (BxLxH in mm):	60x95x110
Connections:	LAN: 2x USB: 2x HDMI: 1x CAN: 1x GPI/O: 3x (24V) µSD: 1x RS232: 1x
Cabling:	2 PIN Terminal-Block for voltage storage/supply
Switch:	On / Off
Taste:	Reset Dial (int. LED)
Assembly:	35mm DIN rail
Temperature range:	0 °C – 70 °C
Operating system:	LINUX (Kernel 3.19.5)
Status LED:	Power Dial / Connect eMMC
Certification mask:	CE
Beeper:	onboard

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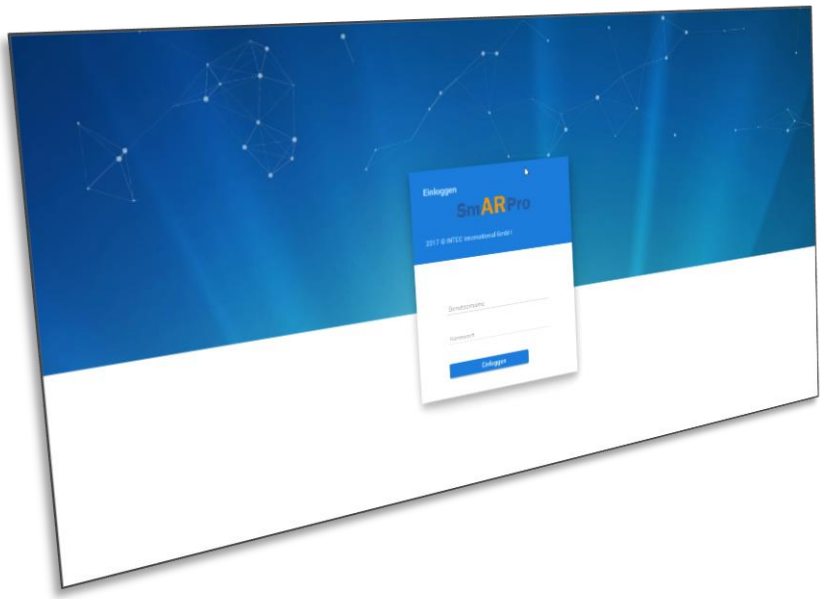

MEP®*DataRecorder*

Availability of machine data

Communication between production machines and the IT platform made possible thanks to MEP®DataRecorder software. This consists of three main modules: one for the description of the data sources, one for the pre-processing of the data and the last one for the transfer of the data to the designed destinations. For the protection from unauthorised accesses an additional module is provided with an authorization concept for security.

Communication to the sources:

- Different interfaces and protocols
- Determining the data block, the variables and their length, read cycle and format on the relative source (ex.: S7) via web-based Wizard
- Determining the used access protocols, such as OPC-UA, OPC-DA, Modbus, Canbus, or proprietary protocols and telegrams

Pre-processing with the calculator:

- Allocation of timestamps for the creation of a comparability
- Calculation of average/main values, etc. for saving of data traffic

It is important to set targets:

- The destinations can be chosen and selected on the interface
- So the databases with the data ready to be measured can be sent to the central servers or to the cloud
- It is also possible to send them via web services directly to the apps

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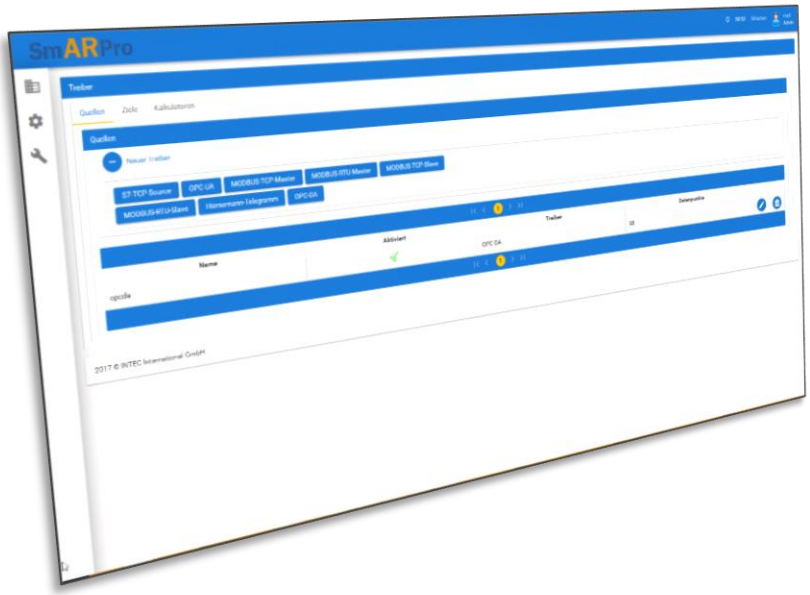

Data collecting and machine connection

The data collection occurs mostly through proprietary interfaces. Therefore the MEP®DataRecorder is a standardised modular state-of-the-art system. Intuitive programmable interfaces are also available, which are used to collect data from a large number of different control technologies that are standardly installed in machines today. The transmission of data to the IT platform occurs in RDF-triple format and with MEP®DataRecorder design.

The software of MEP®DataRecorder

The communication to the sources, such as PLC, can occur through different interfaces of the MEP®SmartDevice. Through a web based wizard the data block, the variables and their length, read-cycle and format can be determined on the respective sources, for example PLC S7. On the wizard it is also possible to determine the access protocols used to read the data, such as OPC-UA or OPC-DA. After the data have been read, they are provided with a time-stamp and afterwards can be pre-processed with the calculation-module. Here it is possible to evaluate the average value as well as any value of interest and then, through the transmission module, to send the data to the defined destinations. These can be database on central or decentralised serves, in the cloud, or IT applications in the IT platform.
The data can be sent directly to the database or, through other services such as Web-services, to applications.

Data collection and monitoring flexible for the future

MEP®DataRecorder offers a solution based on established standards but is also flexible for other future and different employments.

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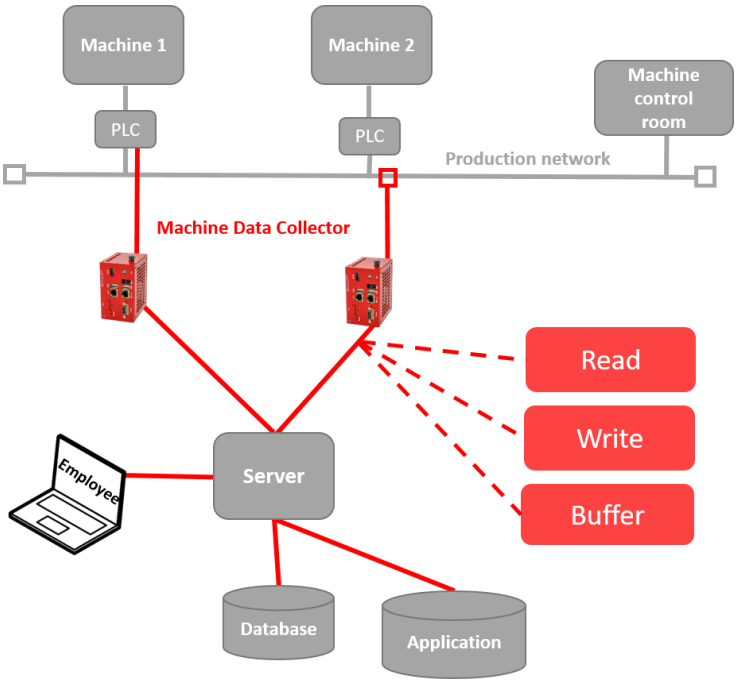

The combination of hardware and software

The MEP®SmartDevice in connection to the MEP®DataRecorder

Given the heterogeneous variety of machines in the existing production plants, MEP®SmartDevices are very useful to build a technical connection to the single machines and consequently realize a standard collection and processing of the production data.
The MEP®SmartDevices are embedded industrial PC composed of add-on modules which are extensible to other different interfaces. Furthermore, the actual connection RS232 can also be reset to a RS422 or RS485. From the software as well as from the hardware side MEP®SmartDevices can create an interface for the communication to the single machines and to the IT platform, to transmit business data and workflows or tasks for the machines.
The software is suitable for pc, laptops, tablets and mobile phones. The basis is HTML5.

Positioning of the MEP®SmartDevice:

- Connected to the bus system of the machine
- Radio and cable connection to the platform
- Reception of sensor data through connected I/O-Device
- Gateway-Function
- Standard interface based on web technologies

The buffer for data security

In case the communication between the IT platform and the MEP®SmartDevice is interrupted, the data continue to be read from the sources and they are temporarily saved in the MEP®SmartDevice until the connection is restored.

The time for the temporary saving of data depends on the quantity of data and also on the storage medium. On the MEP®SmartDevice it is possible to connect MicroSD as well as hard disk through a USB.

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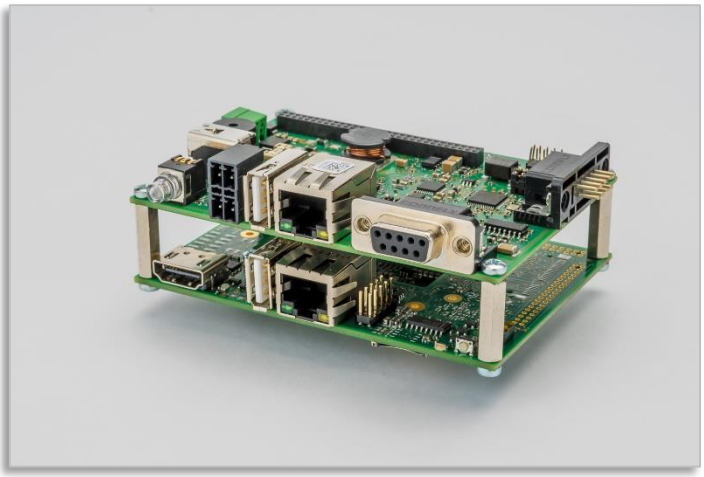

MEP®SmartDevice – The integration

The interface between machine network and company network

The MEP®SmartDevice is installed in the switch cabinet or in the plant. It is usually connected to the machine network through the LAN interfaces. The sensors can be connected through the RS232 interfaces or the digital I/O. the connection to the destinations, such as the IT platform, occurs through the remote port RJ45.
Thanks to its functionalities as a gateway the device is also able to interact with the interface between the company netork and the plants network. Account must be also taken of the security clearances and requirements of the company to ensure a secure network.

The integration in the switch cabinet:

With regard to the PLC, the preprocessing aspect of the MEP®SmartDevice must already be taken into account during programming. It is also decisive to define a fixed data-block structure as well as an appropriate processing of time-critical data.

Since the MEP®SmartDevice only disposes of read authorization on PLC due to security reasons, operator notifications or corresponding additional hardware parts must be planned in the event of an operator action based on the data obtained.

An upper limit also represents the data throughput of the selected interface. If necessary, appropriate abstraction levels for larger data volumes must be used here, or a reduction of the time triggers for more statistical variables may be appropriate.

A small hardware with great performance:

The basis for the MEP®SmartDevice is a powerful processor ARM9 with 4 cores, which are clocked at 1GHz, to ensure fast reading of the data.

One of the strengths of the MEP®SmartDevice is that it can take on the task of an edge gateway in the context of Industry 4.0 due to the high performance and communication speed.

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