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Energy optimization? Energy Manager EM400 SDK- A Platform for Customized Applications



NEW!

Hardware EM400 SDK with TQ-Software platform



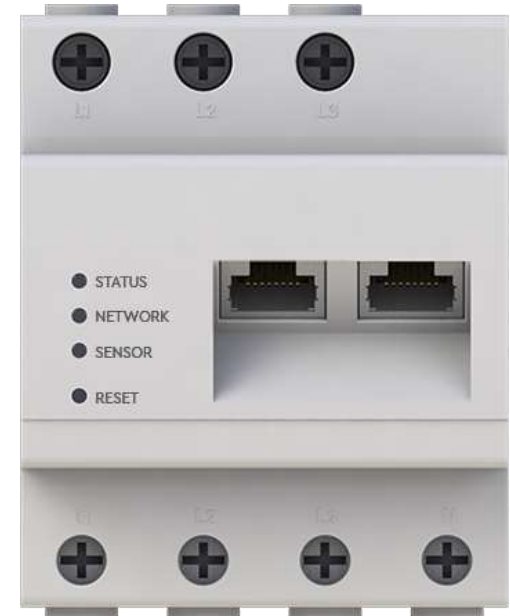
EM400 SDK - Patented Smart Meter with Integrated Controller Functionality

Application

- Energy management
- In residential and commercial sectors

Core features

- 3-phase direct measuring up to 63 A
- European patent EP 2 741 054 B1
- Measure active/reactive/apparant power, current, voltage and power factor in each phase
- Combinable with TQ-measurement technology for decentralized recording of up to 96 circuit breakers (page 7)
- CE-marking
- Manufacture quality based on IPC class 3



EM400 SDK - Patented Smart Meter with Integrated Controller Functionality

Interfaces

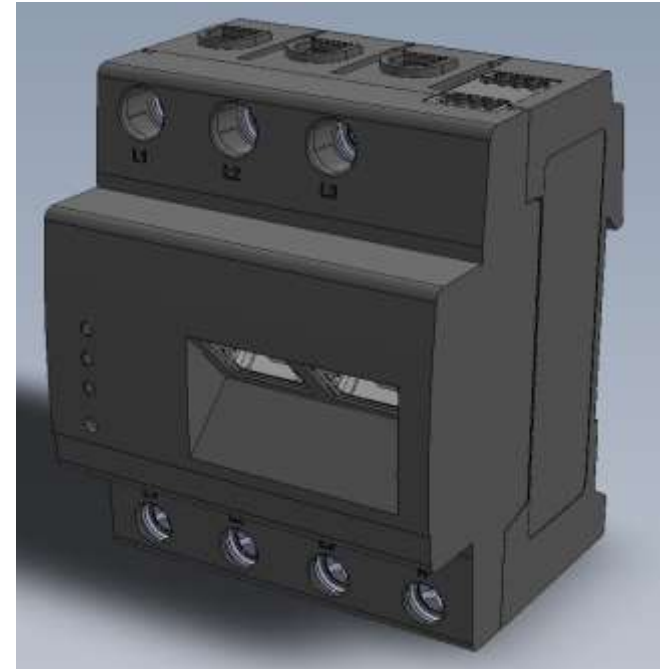
- 2 LAN (10/100 Mbit, optional Modbus TCP)
- 2 RS485 (up to 115200 baud, sensor connection, optional Modbus RTU)

Processor

- ARM9 with 450 MHz

Memory

- RAM DDR2 256 MB
- Flash eMMC 8 GB



[Grafik Platzhalter]



EM400 SDK - Patented Smart Meter with Integrated Controller Functionality

Measuring accuracy

- Accuracy class according to IEC 61557-12 to the related measured values:
 - voltage/current: $\pm 0,5 \%$
 - active/reactive/apparent power: $\pm 1,0 \%$
 - power factor: $\pm 1,0 \%$

Ambient temperature during operation

- $-25^{\circ} \text{C} \dots +45^{\circ} \text{C}$

Case width

- 4 horizontal pitch

Grid frequency/voltage

Use in low voltage grid with 110/230 V and 50/60 Hz

Measuring interval

- 200 ms

Installation

- On DIN rail in the sub-distribution behind the electricity of the utility companies

EM400 SDK – Combinable Measurement Technology

TQ-sensor technology over RS485

- Use for the detailed recording of consumption

Core features

- Current measuring bis 63 A
- Accuracy better +/- 1 % of measured value
- Ambient temperature during operation -25° C ... +55° C





The New TQ-Software platform on EM400 SDK



EM400 SDK – a TQ-Software Platform

The hardware EM400 SDK is equipped with a new operating system – a more reliable and performant base for customized application development.

Basic features

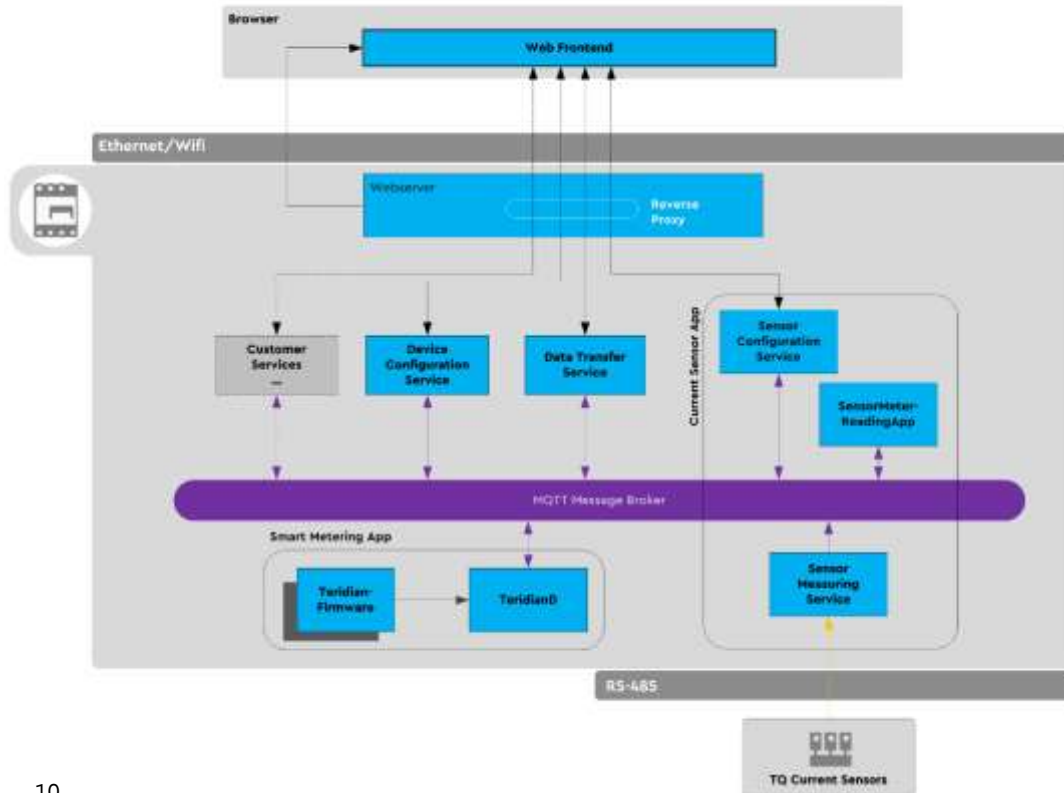
- YOCTO: with Linux-Kernel
- Support TQ measuring chip (Teridian)
- Support TQ sensor technology over RS485
- Web-GUI for the configuration with demonstrator for data visualization

Optional on request:

- EEBus Stack
- Modbus-TCP/RTU



EM400 SDK – a TQ-Software Platform





EM400 SDK – a TQ-Software Platform

What makes TQ-software platform outstanding?

Modular Platform

- The software architecture enables adding modulars with customized functional elements

Update concept

- Der Updateprozess ist sicher und zuverlässig konzipiert durch getrennte Bereiche für Daten / Apps / Config über das „Overlay Filesystem“

Device configuration

- Simple configurations can be made by the „Device Config“ via the provided Web-GUI (alternatively via SSH or similar)

Internal data transport layer

- MQTT – open message log M2M



In Detail: What makes your development based on SDK400 so simple?

1. MQTT – Open and standardized data exchange between the individual devices

- Third-party components and other function modules can be easily integrated
- Integration via MQTT Broker (all messages in the system can be „subscribed“)

2. Protobuf – Standardized data format

- Easy to implement for common languages (C, C++, Golang, JavaScript, ...)
- „Stable“ documentation of the data format on the basis of prot-files



In Detail: What makes your development based on SDK400 so simple?

3. Changeover to asynchronous communication

- No „polling“ necessary
- Timing is determined by the sources and is flexibly customizable

4. Connectivity

- Fast integration of cloud services or external servers
- Modbus TCP can be replaced by MQTT

5. Why YOCTO as development tool?

- Integration of different development environments
 - npm (package manager for Node.js)
 - Golang
- Build of a project-specific Linux distribution under one's control



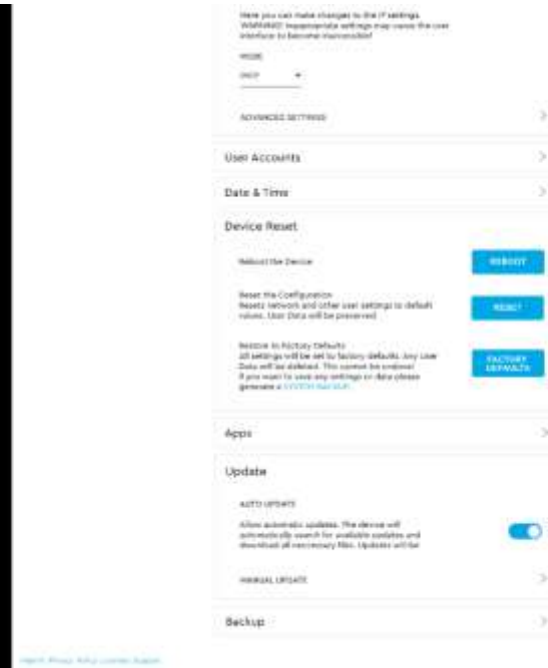
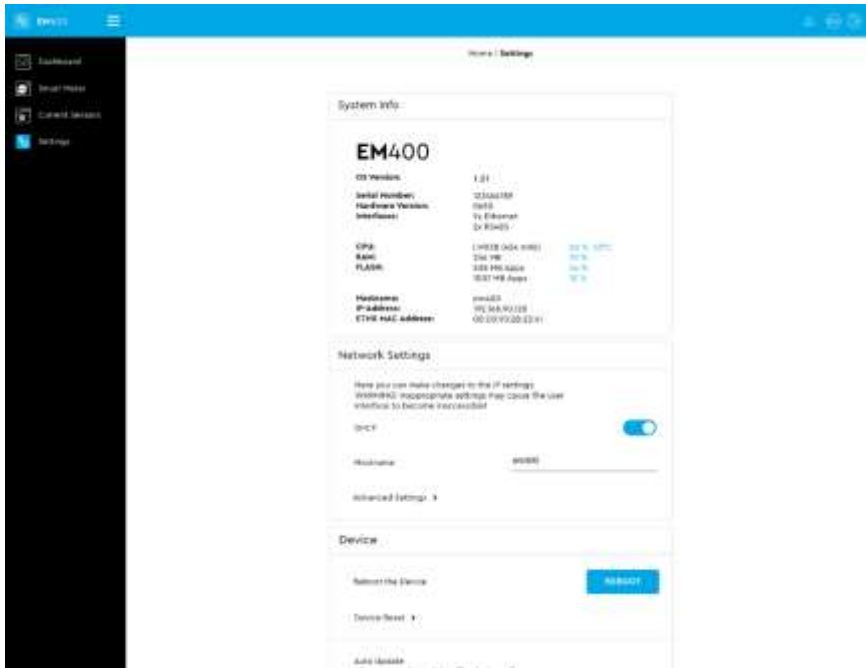
In Detail: What makes your development based on SDK400 so simple?

6. Modern framework for the GUI

- Compatible in resolution and format to all mobile devices
 - Bootstrap (css/javascript-Framework for styling) and vue.js (module View-components/HTML-module)
- Linked to a central data model management → easy to maintain
- Framework vue.js: more simple, smaller and more easy-to-use than comparable frameworks



EM400 SDK – the TQ-Software Platform. Device Configuration through the Web-GUI





EM400 SDK – the TQ-Software Platform. Device Configuration through the Web-GUI



Configuration TQ-Sensors

Sensor Settings

	Label	Phase	Power Factor	Direction
TS Sensor Serial No: 10.00.4C.87BF.4C	Sensor1	L1	Auto	Consumption
TS Sensor Serial No: 10.00.4C.87BF.3C	LongSensorLine	L1	Auto	Consumption
TS Sensor Serial No: 10.00.4C.87BF.EE	Sensor2	L1	Auto	Consumption
TS Sensor Serial No: 10.00.4C.87BF.10	Sensor3	L1	Auto	Consumption
TS Sensor Serial No: 10.00.4C.87BF.0A	Sensor4	L1	Auto	Consumption
TS Sensor Serial No: 10.00.4C.87BF.00	Sensor5	L1	Auto	Consumption
TS Sensor Serial No: 10.00.4C.87BF.42	Sensor6	L1	Auto	Consumption
TS Sensor Serial No: 10.00.4C.87BF.3E	Sensor7	L1	Auto	Consumption
	Sensor8	L1	Auto	Consumption
	Sensor9	L1	Auto	Consumption
	Sensor10	L1	Auto	Consumption
	Sensor11	L1	Auto	Consumption

Device

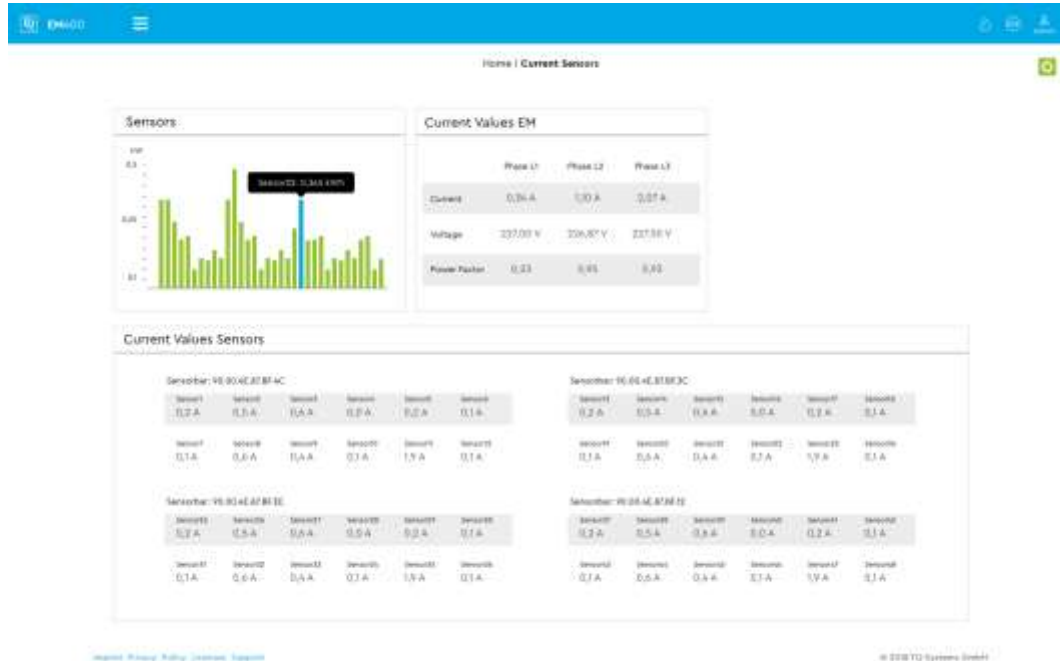
Find Current Sensors via a bus scan. Known Sensors

SCAN

- The TQ sensors which supported by a driver in the EM400 SDK can be configured in the Web GUI for power consumption and generation.



EM400 SDK – the TQ-Software platform. GUI – Demonstrator for Data Visualization

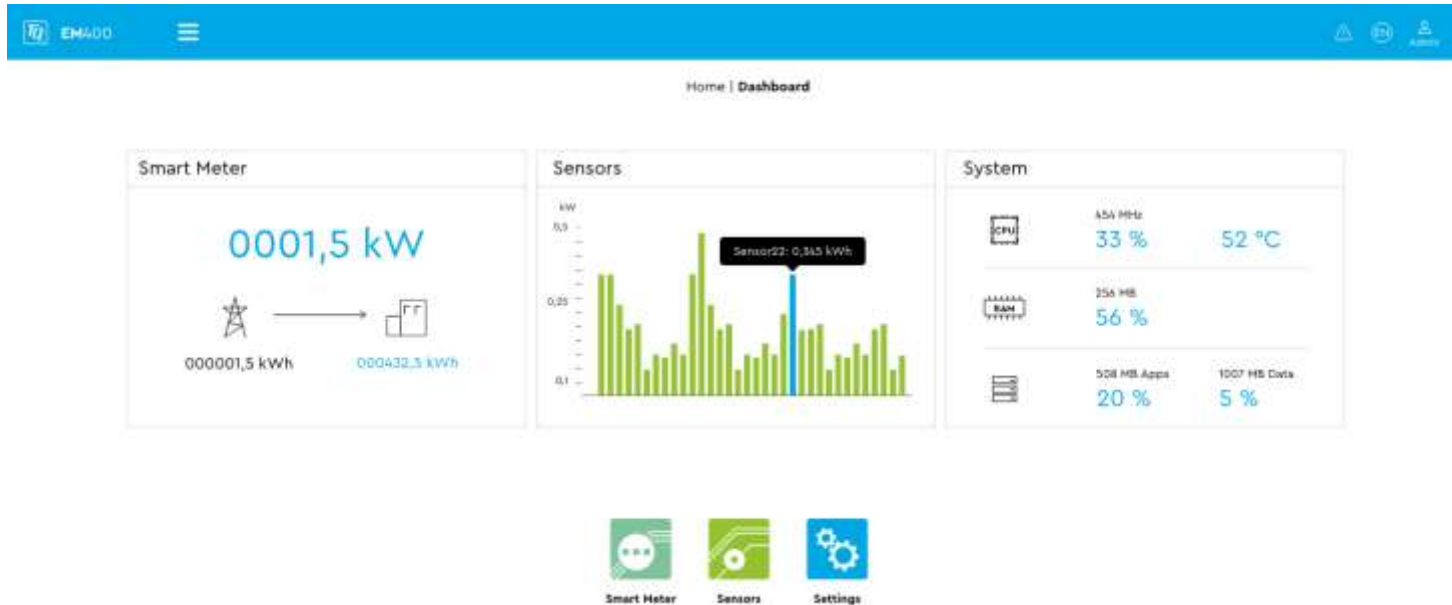


Beispielhafte Visualisierung Visualization

- In the web GUI exemplary the measured raw data (RAW) are visualized.



EM400 SDK – the TQ-Software platform. GUI – Demonstrator for Data Visualization





EM400 SDK – 6 Reasons to be successful!

1. You save time and money on hardware development and reduce the risk to 0
2. CE mark on a certificate of conformity
3. You start your software development immediately and we support your requirements
4. You get into the market rapidly and are present – typically you save 24 months of development time
5. Your product carries your label and nameplate ... you differentiate yourself from the competition and use your existing distribution channels
6. You are quickly on the market of „100 million“ Smart Energy Flow applications in Europe



You are already excited? What's next?



Your Energy Optimization Product Based on TQ EM400 SDK

Next steps

1. You are clear about your application and the available quantities
2. We agree to an NDA with you
3. You get access to the sources (GIT-Server)
4. You order the required number of SDK devices and have an introductory talk with TQ developers
5. Now you can start in your application

Good luck!



Ansprechpartner

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