Interoperable, flexible, sustainable
CONEXA Smart Meter Gateway
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Advantages at a glance

**Easy to install**
Easy installation with plug-in connectors according to the specifications of the FNN, as well as optimisation of the devices for quick installation due to well positioned LEDs for function display and chamfered housing to ease the mounting of the FAKRA antenna.

**Sustainable interoperability**
Our CONEXA 3.0 Smart Meter Gateway supports the OMS 4.0 and TR/FNN standards for modern measuring systems (meters). In the field of administration IT, we have worked with key enterprises on the market for several years.

**Maximum data security**
Maximum data security thanks to cryptographic encryption methods according to specifications of the Protection Profile (PP for Smart Meter Gateways) of the German Federal Office for Information Security (BSI).

**Maximum investment protection**
Maximum investment protection thanks to remote updates and customisation of the software in terms of the security and functionality of devices.

**One for all: Multi-client capability**
Minimum investment costs, even for large home or office complexes through multi-client capability. The various measuring systems for electricity, gas, water and heat are also supported.

**Sustainable interoperability**
This may sound like a purely technical hurdle, but for municipal utilities and energy suppliers it also represents a profound cultural shift as well. The issue is not just finding a way to replace analogue measuring devices with a digital infrastructure. Rather, in order to ensure competitiveness over the long term, it also involves figuring out how to develop new, sustainable business models and attractive products and services for your customers on the basis of this intelligent infrastructure. Because one thing is for certain: if your only revenue stream is from supplying electricity, survival in the future is far from guaranteed!

Rolling out makes sense. But how?
How should you approach the rollout of intelligent measuring systems in practice? What really matters when building a digital infrastructure? What components can I use to implement the infrastructure reliably and profitably? And what opportunities does the digital infrastructure afford on the way to new sources of revenue and business models?

Solutions for tomorrow.
Theben is here to help you complete the rollout not just in an intelligent way, but also to ensure success. Right from the start, we have relied on standardised protocols, processes and interoperable device technology. As a result, we are today able to offer an interoperable Smart Meter Gateway in the form of the CONEXA 3.0, which does considerably more than just meeting the statutory requirements of BSI, TR and FNN specifications. CONEXA is not just compatible with numerous gateway administrators; the gateway is also extremely open when it comes to meters. Moreover, the list of supported meters is growing constantly.

And for the day after tomorrow.
Nobody knows what the future holds in store. That’s why our gateway has been developed with a modular structure. Even today, a range of different modules can be fitted to the BSI-certified basic hardware, e.g. a HAN module for connecting to a local home grid. Another option is a KNX module for integration into the building system technology. Regardless of what the future brings, CONEXA can adapt to it accordingly.
Selection of our cooperation and system partners

All cooperation and system partners can be found on our website: www.smart-metering-theben.de/en
The smart way of communication
Interoperable, standardised, sustainable

Standards and norms constitute the basis for a successful and sustainable system landscape. Within DKE (standardisation body) and FNN working groups, standards have been developed over recent years for communication between the various market stakeholders and the corresponding system landscape.

These are the foundations of currently existing devices and the test landscape for the introduction and operation of intelligent measuring systems. Theben also supports this foundational work through active collaboration within the respective bodies. Meanwhile, on the basis of the standards developed, we are now offering the 3rd generation of Smart Meter Gateways. Our CONEXA 3.0 is fully standardised and interoperable with downstream systems. In our agile development process, we cooperate with leading suppliers of gateway administration systems. This creates a powerful and interoperable overall system which is ideal for the needs of the modern energy market both today and in the future.

The future advantage of standardisation
Standardisation enables various companies to contribute their individual strengths to the solution, and thus enhance the overall system. Defining and implementing market standards pays off in the long term. Not only the development speed increases, but also the number of available solutions.

Long-term device concepts
Theben customers expect that they don’t have to familiarise themselves with an entirely new product philosophy every year. And they expect an innovative, sophisticated and carefully developed device concept which is oriented to customers’ specific needs. This is what we stand for as a premium manufacturer.

You can find the current list of the supported GWA systems and modern measuring systems (meters) on our website:
www.smart-metering-theben.de/zaehlerliste
CONEXA 3.0 Smart Meter Gateway
Sustainable, interoperable, standardised

The most important performance characteristics

- Developed in accordance with the requirements of the BSI (German Federal Office for Information Security) (PP, TR-03109), PTB-A 50.8 and FNN specifications
- Can be updated for certified functions in grid and energy supply (depending on the ADMIN system)
- Suitable for connection to CLS (controllable local systems) components and Smart Grids
- Transfer from the meter to CONEXA via wM bus (OMS with AFL4.0, Mode 7) and serial (HDLC) via RS485
- Transfer of data to the administrator via XML (COSEM/https web services) standard via Ethernet, Powerline via Ethernet, mobile radio, GPRS and LTE
- Integrated standard interfaces for WAN, LMN, HAN and CLS
- Multi-client capability for apartment buildings
- Multi-disciplinary applications in terms of electricity, gas, water and heating

Technical data

| Operating voltage of defined operating range | 230 V AC, -10%, +10% |
| Operating voltage of extended operation | 230 V AC, -20%, +15% |
| Power supply | Plug-in terminal for mains cable |
| Frequency | 50 Hz |
| Type of installation | REG |
| Housing dimensions | Width 72 mm, height 90 mm, installation depth 74 mm (4 modules) |
| Power consumption | Approx. 3 W |
| Surge voltage fixed up to | 4 kV |
| Time basis | NTP time server (can be configured via VP 2) |
| Display | LED display |
| Housing and insulation material | High-temperature resistant, self-extinguishing thermoplastic |
| Protection rating | IP30 according to EN 60529 once integrated in the appropriate switch cabinet |
| Protection class | II subject to correct installation |
| Threshold for operation | -25 °C to +55 °C (temperature range class 3K6) |
| Threshold for storage and transport | -25 °C to +70 °C (temperature range class 3K8H) |
| LMN interface | Output voltage: 12 V Max. current load: 300 mA Cable: RS485 Plug: RJ-12 |
| WAN interface | RJ45 socket (Ethernet) |
| WAN-A interface | Antenna connection (mobile) |
WAN/Ethernet (DSL) via RJ45
Additional input: WAN-A for mobile radio GSM/GPRS
LMN RS485 via RJ12
Additional interface: LMN-A for wMBus (OMS with AFL4.0, Mode 7)
Power plug 230 V
Modularity
For tomorrow. And for the day after tomorrow

For the purposes of the Act on Digitisation of the Energy Transition, intelligent measuring systems are subject to very strict security regulations within communication with other market stakeholders and generally have a highly robust security infrastructure. This makes it all the more important to take into account the potential applications and usage scenarios of the future as much as possible when establishing an appropriate software architecture.

Our developers have delivered in this regard by providing the Smart Meter Gateway with a modular unit (CLS device). These solutions enable the inclusion of additional applications – such as the housing industry, e-mobility and building services technology – with efficiency and cost-effectiveness.

Today Theben is already working proactively in various research and innovation projects that conceptualise and develop the applications of the future.

FNN control box
The CONEXA 3.0 Smart Meter Gateway, combined with the CSX 324 control module, provides options for power reduction via the required functions from FNN specifications, e.g. in 4 stages (0%, 30%, 60%, 100%) according to Section 6 of the German Renewable Energy Sources Act (EEG), whereby (distribution) grid operator values are used.

Control module
The plug-in module features 2 switch outputs for controlling consumers and excels thanks to easy mounting and compact installation. Other functions include time control in the event of remote communication failure or possible remote updates. The module is implemented and the relays are controlled according to the FNN specifications for control boxes.

Building module
The plug-in module allows you to view the consumption by systems and devices in a transparent manner, among other features. Buildings can be used for consumption analysis, savings potential or for safety. Different systems can be controlled and commands can be forwarded to third-party systems.
**HAN module**

The HAN plug-in module provides connection to the local home grid and enables the display of information relating to consumption and billing by means of a display or a system. It forms the interface for the end user and service technician to directly check consumption and supply data on-site at the Smart Meter Gateway.

**E-mobility**

Our plug-in module is set to become a fixed element of the e-mobility infrastructure. In the future, every public or private charging station will have to be controlled and must be able to function in the interconnected overall system. Working with the automotive industry and authorities, we will develop sustainable concepts and solutions for future architectures.

**Building module**

The plug-in module allows you to view the consumption by systems and devices in a transparent manner, among other features. Building information can be used for consumption analysis, for identifying any savings potential or for safeguarding new investments. Different systems can be consolidated together and commands can be forwarded to second/third-party systems.

**FNN control box**

The CONEXA 3.0 Smart Meter Gateway, combined with the CSX 324 control module, provides options for power reduction via the required functions from TR 03109 and FNN specifications: e.g. in 4 stages (0%, 30%, 60%, 100%) according to Section 6 of the German Renewable Energy Sources Act (EEG) for power reduction by the (distribution) grid operator via the associated control points.

**Housing industry**

Our plug-in module enables the integration of devices such as heat meters and heat cost allocators into the secure communication infrastructure in accordance with the BSI’s Protection Profile for Smart Meter Gateways and the associated TR 03109. The measurement values can be forwarded to external market stakeholders (EMS) of the housing industry.

**E-mobility**

Our plug-in module is set to become a fixed element of the e-mobility infrastructure. In the future, every public or private charging station will have to be controlled and must be able to function in the interconnected overall system. Working with the automotive industry and authorities, we will develop sustainable concepts and solutions for future architectures.
Control boxes from Theben
EEG-compliant, bidirectional, secure

The CSX 324 and CSM 124 control boxes are used to control external consumers, such as heat pumps, night storage heaters, as well as generation plants, such as photovoltaic and CHP plants, and storage facilities in the field of electric mobility. The devices are the basis for secure and interoperable systems in today’s mains operation and for new business models in the area of future distribution grids.

CSX 324
Control box for CONEXA 3.0

In conjunction with the CONEXA 3.0 Smart Meter Gateway developed according to BSI, FNN and PTB-A 50.8 specifications, the CSX 324 control box is used for 4-stage power reduction in accordance with statutory requirements specified by the EEG. For example, for controlling inverters in photovoltaic power plants.
- Switch module for power reduction in e.g. 4 stages 0%, 30%, 60%, 100% in accordance with Section 6 of the EEG

EEG switching as per FNN

The existing network control technology shows a variety of different protocols, which have been used for controlling generation plants and large consumers, as well as energy storage systems. In order to enable the interoperability between the devices and the system, a uniform protocol (IEC 61850) has now been defined between network control technology and control unit.
CSM 124
Switch module for CONEXA 2.0 and 1.0

In connection with CONEXA 2.0 and 1.0, the CSM 124 switch module is used for 4-stage power reduction in accordance with the legal requirements defined by the EEG. For example, for controlling inverters in photovoltaic power plants.

- 4 floating outputs
- 4 relays 16 A
- Communication port to the Smart Meter Gateway
- Housing width: 4 modules
- For installation on a DIN-rail
The technical centre of the future
ENWG-compliant meter cabinets

Installation scenario 1
ENWG-compliant meter cabinet

The eHZ meter cabinet with pluggable measuring technology is the optimum centre for a modern and up-to-date system architecture. It is optimally suited for the installation of intelligent measuring systems (iMsys) and expansion units – e.g. the control box for lawful switching of EEG plants. Also for the integration of iMsys into the building system technology (KNX), the technical centre offers excellent and flexible opportunities for new construction and renovation.
Most likely, the installation of the 3 point version will be the most common installation scenario of iMsys in Germany. For this purpose, the basic meter as per FNN specifications is ideally suited.

With its DIN-rail, it offers flexible mounting options for the Smart Meter Gateway and further switch and control devices.

Installation scenario 2
3 point meter cabinet

Installation scenario 3
Mounting on bezel plate

The eHZ bezel plate offers flexible mounting options for the Smart Meter Gateway and further switch and control devices without additional space requirement inside the meter cabinet. The mounting plate is a good base for the use of modern measuring systems, or the system landscapes connected to them.
Since 1932, when we introduced the first tariff time switch, we have been supporting you in increasing energy efficiency. Today our solutions help you to manage your current and future challenges with even more success and to give your competitiveness a considerable boost of energy. For example, with the CONEXA 3.0 Smart Meter Gateway.

We have been committed to the field of smart metering since 2008 and, with CONEXA, we currently offer the first and only Smart Meter Gateway approved according to PTB-A 50.7. With over 20 years of experience in KNX building system technology, today we are one of the leading international providers of time, lighting and air-conditioning control solutions.
A 30-strong interdisciplinary team develops and distributes smart solutions for intelligent measuring systems on over 300 m² of state-of-the-art office architecture. The rooms were designed according to the security requirements derived from the EAL 4+ levels of the Common Criteria standard. The windows, doors and walls of the “Smart Energy” business unit and the production rooms are made from safety glass and special bricks which correspond to an increased resistance class according to EN 1627. They also withstand perpetrators who use axes, crowbars, hammer and chisel, or battery drills.

Access to the rooms is granted only to members of staff in the business unit by means of a corresponding chip with a PIN. All rooms and access points are monitored around the clock by security personnel, who can be on site in no time in the event of an emergency.

New, multi-purpose meters from different manufacturers are continuously tested for their compatibility with CONEXA 3.0 on an 8 metre long testing wall. The results are directly incorporated into the ongoing development of CONEXA and continuously increase the interoperability of our gateway.

**Tested quality and conformity**

The production rooms in Haigerloch – where the gateways are assembled, configured, personalised in advance, programmed with firmware and packaged – also meet the same security requirements. Before the gateways leave production, a 100% final check is carried out with meter simulation. Because the data collected by CONEXA is used for billing, the gateways are subjected to a conformity test according to module D of PTB-A 50.8. Last but not least, a seal of authenticity with a serial number is attached manually. This serial number is given to the customer for inspection in the electronic delivery note.
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