ZigBee Wireless Sensor Networks

Wireless Devices for Monitoring and Data Harvesting

Home & Building Automation
Automated Meter Reading
Energy Management
Renewable Monitoring
Environment Monitoring
4-noks designs and develops systems for monitoring, controlling and saving energy mainly using wireless technologies and ZigBee in particular. We provide customers with innovative eco-friendly solutions suitable for trading, housing and industrial application that lead to remarkable improvements in the field of energy efficiency and environmental monitoring. The main goal is to examine energy parameters in order to employ strategies to preserve the comfort and the safety of the environments for living and working, saving energy and, likewise, costs.

ZigBee Wireless Sensor Networks for Building and Commercial Applications

**BUILDING AND HOME AUTOMATION**

- Since energy-efficient control systems typically produce double-digit savings, the ability to go wireless for low installation costs is a powerful incentive. By installing a ZB-Connection network within a building any organization can reduce waste from building services such as lighting and heating. As ZB-Connection uses the Modbus Protocol it is simple and easy to integrate this to existing BMS/PLC/SCADA systems creating intelligent Wireless Energy Management Systems.

**AUTOMATED METER READING**

- Reading electricity, gas and water energy meters is a strategic activity within the management of multi-utilities. Performing these tasks manually can be un-productive since they require periodical reading. ZB-Connection products allows you to automate the reading process by collecting data from energy meters, circuits and appliances and sending automatically to a designated place for processing. Key benefits: easily identify waste and areas of poor performance; reduce operating costs and improve the bottom; improve productivity; readily comply with regulatory requirements.

**ENVIRONMENTAL MONITORING**

- Comfortable environmental conditions are of great importance in every building: ZB-Connection devices are designed to be positioned discreetly in offices, workplaces, warehouses, schools and other premises to fulfill a range of indoor/outdoor monitoring functions for parameters as temperature, humidity, light and CO₂. Applications include: recording environmental conditions to comply with Health and Safety regulations; refrigeration/freezer monitoring; validating heating, air-conditioning or climate control systems; calculating building temperature losses; monitoring CO₂ levels to ensure ventilation systems perform correctly.

**KEY FEATURES**

- ZigBee technology - a reliable wireless communication network
- IEEE 802.15.4 compliant ZigBeePro Stack EmberZNet5.1.2
- Wide range of sensors and actuators
- Quick and low-cost installation
- No ZigBee and RF skills required
- Easy integration with existing BMS/PLC/SCADA System
- Connect third party Modbus devices without wires
- Portable handheld diagnostic tool available
- Individual Circuit & Appliance Level Monitoring & Control
- Standard Home Automation and Modbus protocol interfaces into ZigBee network
- Customization of modules and sensors is available
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### ZC-BB-EM
- Data reading from 4-noks devices (max. 10) and Modbus RTU devices
- Data access through Web browser on PC or smart device
- Data storage at configurable intervals
- Data sending to remote points (Web portals, emails, FTP)
- Data validity control and report of alarms
- Remote updating with diagnostic system
- Integrated Wi-Fi, Modern GSM/GPRS (optional)
- Configuration and set up via Web Embedded
- System diagnostic (BlueBox and sensors)
- Fully customizable for OEM customers

### ZC-GB2-EM
- Integrated data logger with Gateway ZigBee and GSM/GPRS modem
- Browser based interface for configuration + set up (I.E., Firefox, Chrome)
- Big data logging capacity
- Communications for integration to BMS/PLC/SCADA systems
- Push or Pull data to any server/database - Full API provided
- Data access via Ethernet or Cellular
- Logged data sent via E-mail or FTP (CSV Format)
- System, sensor and communication diagnostics

### ZC-GW-xxx/ ZC-GW.485.D-EM
- Protocol converter from Modbus/RTU to ZigBee
- Standard Modbus interfaces (RS485, RS232, USB, Ethernet)
- Coordinator function for ZigBee network
- Local memory stores battery powered sensors data
- Transparent bridge towards other Modbus devices
- Din rail mounted version with RS485 interface (ZC-GW.D-EM)

### ZR-BR-485-EM/ ZB-BR-485.D-E
- Connecting third party Modbus devices to the ZigBee network
- Using Modbus/RTU protocol and RS485 interface
- Router function
- RF power 1mW
- External antenna
- Din rail mounted version (ZC-GW.D-EM)

### ZR-TIREL2-EM
- 2 relay outputs 250V/5A
- 2 digital inputs
- 1 NTC thermistor input (thermistor not included)
- Programmable thermostat function
- Router function
- 24 Vdc/Vac supply
- External antenna

### ZED-THL-M/ ZED-THI-M
- Temperature, humidity and light measurements for indoor/outdoor use (ZED-THL-M), temperature and humidity for indoor use (ZED-THI-M)
- Alarm thresholds
- Sampling and transmission rates are configurable
- Battery powered
- Long life battery
- Internal antenna

### ZED-TTR-HA/ Z-CTT-HA
- Full remotely configurable thermostat
- Heat/Cold/OFF operating mode
- Simple and intuitive touch user interface
- Heating/Cooling operating mode (remotely configurable)
- Weekly programming (remotely configurable)
- Relay output (ZED-TTR-HA), ZigBee radio remote actuator with relay (Z-CTT-HA)
- Battery powered

### ZED-TCM-M/ ZED-TCMR-M
- Full remotely configurable thermostat
- Wide 3 digit display
- 4 buttons
- Battery powered
- Internal antenna
- Bi-stable relay output to achieve low power consumption (ZED-TCMR-M)
**ZR-TID-EM / ZED-TID-M**  
ZigBee module with 2 NTC inputs and 2 digital inputs and router  
- Input for two NTC temperature sensors (not included)  
- Two digital inputs  
- Alarm thresholds  
- Sampling and transmission rates are configurable  
- 12-24 Vdc/Vac supply (ZR-TID-EM)  
- RF power amplifier: 10 mW (ZR-TID-EM)  
- Router function (ZR-TID-EM)  
- External antenna (ZR-TID-M)  
- Battery powered (ZR-TID-M)  
- Long life battery (ZR-TID-M)  
- Internal antenna (ZR-TID-M)  

**ZR-PLUG-xx-M**  
ZigBee electricity meter and remote control pass-through socket  
- Real time electricity active power measurement up to 2,5 kW  
- Electricity energy counter  
- Remote switch up to 2,5 kW  
- Stand-by killer  
- Override push-button  
- Pass-through socket for many countries available: Schuko, UK, French, Italian, US  
- Router function  

**ZR-HMETER,D-M - ZR-HMETER.W-M**  
ZigBee electricity meter and remote control unit  
- Real time electricity active power measurement up to 15 kW with external CT included  
- Electricity energy counter  
- Digital output to drive external high power relay  
- Stand-by killer  
- Override push-button  
- CT included with core split  
- Din rail mounted or wall mounted  
- Modbus profile on ZigBee platform  
- Router function  

**ZR-AIC-EM/ZR-AIV-EM**  
ZigBee module with 2 analogue inputs, 2 digital inputs and router  
- Two analogue inputs (0-20mA: ZR-AIC-EM, 0-10V: ZR-AIV-EM)  
- Two dry contacts digital inputs  
- Alarm thresholds  
- Sampling and transmission rates are configurable  
- 12-24 Vdc/Vac supply  
- RF power amplifier: 10 mW  
- Router function  
- External antenna  

**ZR-TIDCI-EM / ZED-TIDCI-M**  
ZigBee S0 pulse counter with router  
- 2 pulse counter inputs S0 compatible  
- 2 thermal resistor inputs (NTC resistors not included)  
- Sampling and transmission rates are configurable  
- 12-24Vdc/Vac supply (ZR-TIDCI-EM)  
- Router function (ZR-TIDCI-EM)  
- External antenna (ZR-TIDCI-EM)  
- RF power amplifier: 10 mW (ZR-TIDCI-M)  
- Battery powered (ZR-TIDCI-M)  
- Internal antenna (ZR-TIDCI-M)  

**ZR-SWITCH-M**  
ZigBee electricity meter and remote control wall mounted unit  
- Real time electricity active power measurement up to 2,5 kW  
- Electricity energy counter  
- Remote switch up to 2,5 kW  
- Stand-by killer  
- Override push-button  
- Modbus profile on ZigBee platform  
- Router function  

**ZED-3IAC-M**  
ZigBee module for alternate current measurements  
- 3 inputs 5A/380V compatible with most popular commercial current transformers (not included)  
- Simple and quick installation, without services breakdown  
- Alarm thresholds  
- Sampling and transmission rates are configurable  
- Battery powered  
- Internal antenna  

**ZED-3Px-EM**  
Three-phase energy meter with embedded ZigBee communication module  
- Measurement ranges:  
  - Current up to 200 A (100kW)  
  - Voltage from 90 to 500 Vac  
- Measurement of current, voltage, active energy, reactive energy, apparent energy, fi  
- Split core current transducers  
- Compact size for a plug and play installation  
- Router function  
- 1 or 2 three-phase lines monitoring or 6 single-phase
ZED-CO2-M
ZigBee sensor for carbon dioxide (CO₂)
- Measurement Dual Wavelength NDIR
- Autocalibration
- Long term stability and accuracy
- Internal antenna
- Slim size
- Router function
- Sampling and transmission rates are configurable
- Wall mounting

ZED-ICC-M
ZigBee hall effect sensor for direct current measurements
- Hall effect sensor for direct current measurements
- Range between 0 and 1000A
- Simple and quick installation, without services interruption
- Alarm thresholds
- Sampling and transmission rates are configurable
- Battery powered
- Internal antenna

ZR-TIDCI-OPTx-ZB-EM/ ZR-TIDCI-D-OPTx-EM
ZigBee optical interface for energy meter
- Led pulse counter of electricity and energy meter settable from 1 to 99 Wh/pulse
- It manages electricity and energy meter in Wh
- Digital input for remote alarms
- Compatible with energy meter (single phase/three phase)
- Universal optical interface for every kind of meter
- Supply 230 Vac (D version DIN rails)

ZR-BIDCI-PRO-ZB-EM/ ZR-BIDCI-GEN-ZB-M
Optical/electrical interface for bi-directional main meter
- Optical or electrical SO interface
- Monophase version: direction of the electricity energy thanks to the CT with core split
- PRO version interfaced to ES card or three-phase meter on BT with transducer and external CT
- Programming Wh/pulse
- Three time slots for energy bought and sold (with programmable meters)
- Universal optical interface for every kind of meter
- Supply 230 Vac

ZR-GW-BMx-M/ ZR-GW-BMx-EM/ ZR-GW-SMOD-EM
OEM Gateway: Modbus in ZigBee
- Protocol converter from Modbus/RTU to ZigBee
- Standard Modbus TTL interfaces (3.3 V)
- Coordinator function for ZigBee network
- Horizontal and vertical version (ZR-GW-BMx-xx)
- Local memory stores battery powered sensors data (up to 4 devices) (ZR-GW-BMx-xx)
- RF power 2mW (ZR-GW-BMx-xx)
- Antenna on-board, External antenna through IPEX connector (EM versions)
- Local memory stores battery powered sensors data (ZR-GW-SMOD-EM)
- Transparent bridge towards other Modbus device (ZR-GW-SMOD-EM)

ZED-REPL-EM/ ZR-REPL-E230M
ZigBee Repeater
- Repeating ZigBee messages between devices with poor link or out of coverage
- Router function function
- RF power 1mW (ZR-REPL-EM)
- RF power 10mW (ZR-REPL-E230M)
- External antenna
- 12-24 Vdc/Vac power supply (ZR-REPL-EM)
- 230 Vac power supply (ZR-REPL-E230M)

Z-HANDZER-M
Handy Net Analyzer
- Simple-to-use analyzer for 4-noks ZB-Connection networks
- Portable handheld tool
- Visualize RF strength of gateway and routers
- Find good position for ZigBee devices deployment
- Show all the ZigBee Pro networks in area
- Energy scan

ACCESSORIES
Antennas
- ANT-EXT002: Directional antenna for external use high panel, gain 2.4 GHz, 10 dBi, IP65 + 2 mt cable
- ANT-EXT007: Directional antenna for external use high panel, gain 2.4 GHz, 10 dBi, IP65 + 7 mt cable
- ANT-EXT003: Ominidirectional antenna 9 dBm, IP65 + 2 mt cable
- ANT-EXT004: Ominidirectional antenna 9 dBm, IP65 + 7 mt cable
- ANT-EXT005: Ominidirectional antenna 12 dBm, IP65 + 2 mt cable
- ANT-EXT006: Ominidirectional antenna 12 dBm, IP65 + 7 mt cable
- ANT-INT001: External omnidirectional antenna for internal use 7dBi with stand + cable, 1.5 mt with magnetic base
- ANT-RP-SMA-MF2: Cable for antenna RP-SMA M/F 2 mt
# TYPICAL APPLICATIONS

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- **Local Area Network (LAN)**
- **GSM/GPRS Network**

**Typical Applications**

- **Meters & Sensors**
- **ZB-Connection Products**
- **Wireless Sensor Network Data Access**
- **External Comms**
- **Integration & Analysis**

**Products**

- Electric: ZR-TIDCI-OPT, ZR-HMETER-3Px-EM
- Water: TIDCI
- Gas: ZR-PLUG-XX-M
- Renewable Energy: ZED-THL-M, ZED-CO2-M

**Networks**

- Local Area Network (LAN)
- GSM/GPRS Network

**Integration & Analysis**

- **Modbus**
- **Home Automation**
- **Kaleidos**

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