# Fidelix

M-Bus wireless

# FX-WMBUS-R4-M-LR-Ax-X
## Wireless M-BUS repeater
## (230 VAC, A1=IP40/A2=IP65)

> Mains powered with always-on function

> Support for AES128 encrypted Wireless M-Bus communication

> OMS 4 compatible

> Convert between different WMBUS modes

> Power supply cable entry from the back or the side

## Measure to manage

The mains powered FX-WMWUS-R4-M-LR-Ax-X is a wireless MBUS repeater mounted with AC/DC adapter in combined enclosure. The device is a plug-and-play and highly configurable repeater for extending the range between meters and a collector/gateway. The enclosure is chosen to make the repeater as discrete as possible.

Once a minute a packet is sent from the repeater and contains information about the repeater, such as number of routed packets and software version. The packet is also used for time synchronizing between repeaters in a multihop system. Furthermore, this packet can be used as an indication that the device is up and running.

The repeater do have industrial grade immune to electrical disturbances that could be generated by, for example, LED-lights in buildings.

## Technical features

| | |
|---|---|
| Temperature range: | -35..85°C |
| Dimensions: | 150 x 150 x 53 mm |
| Power supply: | 85-305 VAC |
| IP rating: | IP40 / IP65 |
| Max. number of connected sensors: | 932 |
| Communication: | OMS standard wireless M-Bus |
| | 0-30 min suppression timer |
| | Status Tx interval 60s |

## Firmware:

| | |
|---|---|
| INPUT MODE | T1/C1 (868 MHz) |
| OUTPUT MODE | C1- or T1 mode (configurable) |
| REPETITION | Twice – Once on each internal antenna |
| MAX SENSORS | 932 |
| MAX PACKET LENGTH | 255 bytes |
| FILTERING | 0-30 min suppression timer, RSSI, manufacturer, whitelisting |
| SECURITY | Supports routing of security profile A and B according to OMS 4 |
| STATUS TX INTERVAL | 60 seconds |
| DEFAULT FACTORY SETTINGS | Output T1, 2 min suppression timer, encrypting off |

## Radio:

| | |
|---|---|
| RECEIVER CLASS | 1,5 |
| RADIATED POWER | < 14 dBm |
| TRANSMISSION | Listen before talk, polite spectrum access |
| HARDWARE FILTER | Yes |

## Conformity:

| | |
|---|---|
| ENVIRONMENT | RoHS (2011/65/EU) / (EU) 2015/863 RADIO / EMC RED (2014/53/EU) |

## General information:

| | |
|---|---|
| TEMPERATURE RANGE | -35° to +85°C, rec. -30° to +50°C |
| IP RATING | A1=IP40 / A2=IP65 |
| POWER SUPPLY | 85-305 VAC |
| MATERIAL | UV-resistant PC/ABS |
| SIZE (W x L x D) | 150 x 150 x 53 mm |
| STANDARD | EN13757-3/4:2013 / OMS 4.0.2 |
| COLOR | RAL9003 (signal white) |
| FLAMMABILITY RATING | UL94 HB |

## Antenna:

The repeater use one external antenna and it suited when large antennas are desirable to cover large areas or long distances.

## Routing:

The advanced collision avoidance algorithm minimizes problems with collisions and data repetition. To ensure proper functionality, a randomised delay is used before repeating packets.

By default, our repeaters only retransmit packets coming directly from meters and not from other repeaters. However, the repeater comes with a transparent static routing algorithm which allow controlled static multihop between repeaters. By using multihop, up to three repeaters can be used to form an extended chain between meters and gateway.

The repeater supports both short and long transport header, as well as extended link layer 1-4. Furthermore, our repeaters can be configured to retransmit non-OMS wireless MBUS packets.

## Converter:

The repeater can be used to convert between different MBUS modes, for example, C-mode to S-mode.

## Features:

The repeater supports synchronisation via OMS time protocol. The configuration of the repeater can be protected via a 16- byte AES-key to avoid unauthorized changes of the configuration. It is always possible to read out data from the repeater even without the key.

It is possible to configure a repeater for untouched retransmissin, i.e., retransmits without chnaging anything in the package.

Repeaters are firmware upgradeable to ensure long-term reliability and to get newest features.

## Configuration:

All repeaters can be used right out of the box but they are also highly configurable. Configuration of repeaters is performed using Wireless M-BUS programming dongle FX-WMBUS-D1-TC and our Configurator tool. Using this program, it is possible to see the routing from repeaters and how good the repeaters communicate with the sensors.

A non-exhaustive list of parameters which can be changed on the repeaters:

• Number of minutes to be active / not active
• Specific time during the day to activate (e.g., at 12:30)
• Specific days to be active (e.g., Mondays and Wednesdays)
• Suppression timer (limit number of packets per sensor)
• Sensor filtering (e.g., manufacturer ID or whitelisting)
• Static routing between repeaters (multihop)
• Append RSSI value of received data

## Available different versions:

3 different versions of the Wireless M-BUS repeater are available either IP40 or IP65, each do have a unique hardware configuration. They are thus optimised for different situations and purposes:

| Product code | IP rating | Dual Internal Antenna | External SMA interface | Typical sensitivity mode S1 / TC | Optimised for |
|---|---|---|---|---|---|
| FX-WMBUS-R4-M-LR-A1 | IP40 | X | - | -111/-108 | Indoor multi-floor building with better range |
| FX-WMBUS-R4-M-LR-A2 | IP65 | X | - | -111/-108 | Outdoor multi-floor building with better range |
| FX-WMBUS-R4-M-LR-A1-X | IP40 | - | 1 TX/RX | -111/-108 | Indoor for longest range in one direction. |
| FX-WMBUS-R4-M-LR-A2-X | IP65 | - | 1TX + 1RX | -111/-108 | Outdoor for longest range in one direction |
| FX-WMBUS-RX4-M-LR-A1-X | IP40 | - | 1TX + 1RX | -113/-110 | Indoor maximum sensitivity - longest range in one direction. |
| FX-WMBUS-RX4-M-LR-A2-X | IP65 | - | 1TX + 1RX | -113/-110 | Ourtdoor maximum sensitivity - longest range in one direction. |