

## Installation and Operating Instructions

### Radio Module Wireless M-Bus for Water Meters “Modularis”

# FAW

## 1 Application and Function

The FAW is designed for the storage and radio transmission of the consumption rate of water meters with Modularis system.

## 2 Contents of the Package

- Radio module
- Fastening screw and adhesive seal
- Installation and Operating Instructions
- Mounting Manual
- Declaration of Conformity

## 3 General Information

- The technical regulations for electrical installations must be observed.
- This product fulfils the requirements of the European Council Directive on Electromagnetic Compatibility (EMC Directive) 2014/30/EU.
- The module left the factory in conformance with all applicable safety regulations. All maintenance and repair work is to be carried out only by qualified and authorized technical personnel.
- The instrument must be stored and transported at temperatures above-freezing.
- To clean the module (only if necessary) use a slightly moist cloth.
- To protect against damage and dirt the radio module should only be removed from the packaging directly before installation.
- All specifications and instructions listed on the data sheet and in the Application Notes must be adhered to. If this isn't done or if the mounting is shown to be faulty, any resulting expenses will be charged to the company responsible for the mounting.
- Further information can be obtained at [www.engelmann.de](http://www.engelmann.de).

## 4 Safety Information

- **Instruments with activated radio function are not allowed on air freight.**
- The radio module has a lithium-metal-battery. Do not open the batteries, do not bring the batteries into contact with water or expose them to temperatures above 80 °C. Do not charge them or short-circuit them.
- Instruments which have been replaced or exchanged must be disposed of according to relevant environmental regulations.

## 5 Mounting of the FAW

- Insert the radio module into the cleaned mounting slot of the water meter.
- Push the radio module as far as it will go.
- Fasten the screw hand-tight to the stop.
- Affix the adhesive seal over the mounting screw.

Also see „Montageanleitung\_mounting\_manual\_FAW\_xxxx-xx-xx\_de\_en“.

## 6 Start of Operation

Via the plug-on detection the radio module starts automatically the registration of water consumption and the radio transmission (exception: the „radio activation date“ in the radio settings was set on a later moment).

## 7 Technical Data

Temperature range medium	°C	0 – 105
Storage temperature / ambient temperature in the field	°C	1 – 55
Transport temperature min.	°C	-20 for seven days
Transport temperature max.	°C	70 for 24 hours
Protection class		IP68
Power supply		3 V lithium battery
Battery lifetime, estimated	years	12 + 1
Data storage		E <sup>2</sup> PROM; daily
Interfaces		infrared; wireless M-Bus EN 13757-4

## 8 Interfaces

### 8.1 Optical (infrared) interface

For communication with the optical interface an optocoupler and the “Device Monitor” software are necessary. The optocoupler and “Device Monitor” are available as accessory equipment.

**Baud rate: 2400 Bd.** The number of read-outs via the optical interface is limited to 128 times per day.

### 8.2 Radio interface wireless M-Bus

The radio interface is for the transmission of meter data (absolute values).

#### General information about the radio interface:

Installation of radio components between or behind heating pipes, or the presence of other bulky metallic obstacles directly over the housing must be avoided.

The transmission quality (range, telegram processing) of radio components can be negatively influenced by instruments or equipment with electromagnetic emissions, such as telephones (particularly LTE mobile radio standard), wi-fi routers, baby monitors, remote control units, electric motors, etc.

In addition, the construction of the building has a strong influence on the transmission range and coverage. Furthermore, when using installation boxes (substations) they must be equipped with non-metallic covers or doors.

**The factory-setting of the clock in the module is standard (winter) Central European Time (GMT +1). There is no automatic changeover to daylight savings (summer) time.**

**The radio function is deactivated upon delivery (factory-setting). See section “Activation of the radio interface”.**

#### 8.2.1 Technical data radio

Frequency	868 MHz
Transmission power	up to 13 dBm
Protocol	wireless M-Bus EN 13757-4
Selectable modes	S1 / T1 / C1
Telegrams	<ul style="list-style-type: none"><li>- short telegram in conformity to AMR (OMS-Spec_Vol2_Primary_v301 and _v402): serial number of FAW / water meter, total volume, information message, serial number of FAW</li><li>- long telegram for walk-by read-out: serial number of FAW / water meter, reading date volume, reading date, 15 monthly values, total volume, information message, serial number of FAW</li></ul>
Encryption	AES: Advanced Encryption Standard; key length: 128 bits

## 8.2.2 Radio configuration

Parameter	Possible settings	Factory setting (battery lifetime; estimated: 12 + 1 years)
Mode	S1 / T1 / C1; unidirectional	T1 (unidirectional)
Transmission period	00:00 – 24:00; any time period in the day	8:00 am – 6:00 pm
Transmission interval	120 seconds – 240 minutes	240 seconds
Weekdays	Monday – Sunday (any weekday)	Monday – Friday
Weeks in a month	1 – 4 (4: uninterrupted, incl. a possible 5 <sup>th</sup> week)	1 – 4 (4: uninterrupted)
Months	1 – 12	1 – 12
Radio activation date	01.01. – 31.12. (day. month)	not set
AES-128-encryption	<ul style="list-style-type: none"> <li>- not encrypted</li> <li>- encrypted according to MODE 5 or MODE 7: <ul style="list-style-type: none"> <li>- Master Key</li> <li>- key per instrument</li> </ul> </li> </ul>	Master Key
Type of telegram	<ul style="list-style-type: none"> <li>- short telegram in conformity to AMR (OMS-Spec_Vol2_Primary_v301 and _v402)</li> <li>- long telegram for walk-by read-out</li> </ul>	long telegram (walk-by)

## 8.2.3 Activation of the radio interface

The radio interface **leaves the factory deactivated**. It can be activated as follows:

- a) Via the plug-on detection the radio module starts automatically.
- b) The radio function can also be activated using the software “Device Monitor”. This software is available as accessory equipment.

The radio function can only be deactivated using the software “Device Monitor”.

After activation of the radio function or modification of the radio parameters the device remains in installation mode for 60 minutes.

If using the **compact mode**, after activation the device transmits during installation mode format telegrams and compact telegrams alternately.

During installation mode at least one FAW must be read out with the Engelmann “Read-out Software walk-by”. The format of the telegram will be stored locally in the PC in an .xml file.

After completion of the installation mode only compact telegrams will be transmitted.

## 9 Information Messages

The instrument recognizes eight message causes, which can also occur in combination with each other. The current status flag is output via the radio interface. The status flag can also be read out via the optical interface.

Information bit	Description	Hexadecimal display
1 at eighth place	Scanning coil fault	01
1 at seventh place	Reset	02
1 at sixth place	Check sum error	04
1 at fifth place	Removal detection	08
1 at fourth place	Magnetic manipulation	10
1 at third place	Leakage	20
1 at second place	Blocked water meter	40
1 at first place	Return flow volume too high	80

Only when the following messages appear the FAW must be exchanged and sent to the supplier for examination:

- scanning coil fault
- check sum error.

All other messages are only to inform the owner of the metering point.

### 9.1 Message description

Message	Effect	Possible cause
Scanning coil fault	Volume will no longer be measured.	FAW housing and scanning coil defective
Reset	The measurements since last storage of data in the E <sup>2</sup> PROM are lost (max. one day).	EMC; battery low
Check sum error	Volume will no longer be measured.	electronics defective
Removal detection	no influence on the calculation	module was removed
Magnetic manipulation	no influence on the calculation	detection of a strong magnetic field
Leakage	no influence on the calculation	alarm if within a period of 2 days there is no cycle of 20 min. without volume pulses
Blocked water meter	no influence on the calculation	alarm if within a period of 12 weeks no volume was detected
Return flow volume too high	No influence on the calculation; return flow volume will be subtracted furthermore.	alarm if at least 100 l were continuously detected flowing backwards

### 10 Manufacturer

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