

EDC – Electronic Data Capture Modul



Installation and operating manual

For non reactive, electronic pulse detection of all the ZENNER water meters whose registers are equipped with modulator disc

1. Description



AMR/AMI communication module for water meters

The EDC module (Electronic Data Capture) for non reactive electronic pulse detection of all ZENNER water meters whose registers are equipped with modulator disc is ideally suited for secure remote reading and integration of water meters in Smart- Metering AMR/AMI Systems.

Typical applications:

- Wireless remote readout of water meters with walk-by or drive-by system
- Wireless remote readout via LPWA-networks (LoRaWAN™, SIGFOX)
- Radio transmission of the readings to mobile or stationary receivers
- Remote reading of the meters via M-Bus systems
- Remote reading via GSM module
- Accurate dosing of fluids in the industrial and commercial segment
- Information of the flow volume and consumption e.g. by the means of a pulse counting module or measurement transducer

The EDC communication module ensures that in case of remote transmission of the readings, the current status always will be transmitted. There is no replica of the meter index due to pulse counting. The pulse detection of the register's modulator disc occurs electronically and without retroaction on the register. The electronics detects reverse pulses which will be computed internally, so that by means of the EDC module always the current status of the roller counter will be transmitted and read remotely.

The EDC-module is available in five different versions:

- RADIO: wireless M-Bus radio module according to OMS-Standard (868 MHz), EN 13757-4
- LPWAN-Radio module (LoRaWAN™, SIGFOX)
- M-Bus: wired M-Bus-module, EN 13757-3
- Pulse module: pulse module with forward and reverse detection
- M-Bus/Pulse combined M-Bus and pulse module

The EDC modules are each powered from a battery, which –depending of the version- has a lifetime of up to 15 years.

Scope of delivery

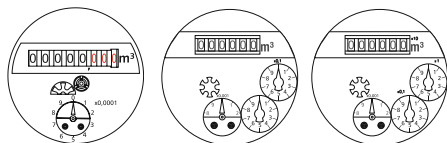
EDC communication module with installation notice, fixing screw (s), yellow adhesive securing mark (s) and water meter lid.

2. Technical data

Technical data	
Power supply	Long life battery up to 15 years (depending on the version)
Battery status monitoring	Yes
Operating temperature	-15 ... +55°C
Protection class	IP 68
Data logger:	
Annual due date values:	max. 16
Monthly values	18, plus 18 semi-monthly values
Daily values	96
Quarter hour values	96

3. Mounting respective retrofitting of the EDC module on a water meter

The ZENNER EDC modules have been developed for all ZENNER water meters whose registers are equipped with AMR/AMI modulator disc (Picture 1). Depending on the version, the registers are equipped with 6- or 8-digit roller counters.



Picture 1: ZENNER register with modulator disc

Depending on the register version (standard dry dial or copper-can) two different EDC casing types are available:



Picture 2: EDC with fixing clip/screw (EDC-C)



Picture 3: EDC with fixing screw (EDC-S) for meters with copper-can register (IP68)

3.1. Mounting (retrofitting) with fixing clip/screw (EDC-C)

Remove the metallic sticker from the bottom of the EDC module. Place the EDC on the previously cleaned register as shown on picture 4 and press it firmly. Make sure that the screw passage and the recess in the register cap fit correctly. Additionally, secure the EDC with the enclosed fixing screws. Then stick the two yellow adhesive security seal stickers over the screws. If necessary the water meter lid has to be changed against the supplied lid which is fitting with the EDC module.

3.2. Mounting with fixing screw (EDC-S)

Place the EDC on the previously cleaned register and fasten it with two fixing screws as shown in picture 5. Then stick the two yellow adhesive security seal stickers over the screws. If necessary the water meter lid has to be changed against the supplied lid which is fitting with the EDC module.



Picture 4: Mounting of the EDC-C.



Picture 5: Mounting of the EDC-S on the copper-can register (IP68)

4. Configuration

The local configuration is only required in case of retrofitting of the EDC module on a water meter. Otherwise the configuration has been made during manufacturing.

Setting parameters:

- Current status of the roller counter (register)
- The water meter number related to the EDC module
- Pulse value of the modulator disc
- Resetting of the status bits (tampering, error)
- Resetting of all logger values
(in case of replacement of the water meter and further use of the EDC module)
- Setting of the pulse length (ms)
- Setting of the output pulse value

Activation of the radio signal performs automatically, as soon as the function "pulse enabled" is activated and the EDC module scans 30 pulses from the register. The current status of the roller counter is programmable by means of the optical head using the front-mounted optical interface of the EDC module. A ZENNER PC-software is required for programming. The configuration is made by means of a ZENNER software, the universal interface MinoConnect and the specific ZENNER infrared optohead IrCombiHead.

5. Radio modules

The EDC wireless M-Bus radio modules are available in T-(standard), optionally in S- or C-mode. Various data telegrams are available. The modules operate unidirectional and usually send every 20 seconds. Special versions possible.

Data telegram contents (wM-Bus)

The EDC module can be delivered with various data telegrams:

Data protocols	Type A*	Type B*	Type C**
Current value	X	X	X
Current data	X	X	
Due date		X	X
Monthly value	X	X	X
Further 11 monthly values	X		
Status information 1	X	X	X
Status information 2	X	X	X

* Data telegram according OMS Spec., Transmission interval 20 sec.

** wM-Bus, manufacturer specific data telegram, Transmission interval 15 sec.

Technical specifications EDC-radio:

Transmission mode	wireless M-Bus unidirectional, T1 (standard), optionally S1, C
Encryption code	AES-128 nach OMS (device specific, optionally customer specific)
Telegram contents	rent value, due date, current month value, history of the monthly values, status information
Transmission interval	typically 20 s; other configurations possible
Transmission power	25 mW

Number of digit rollers	Pulse value
Counter with 8 digit with modulator disc	1 rotation = 1 litre
6-digit counter with modulator disc (DN50-DN125)	1 rotation = 10 litres
6-digit counter with modulator disc (DN150-DN200)	1 rotation = 100 litres

Pulse value of the modulator disc depending on the meter value

6. M-Bus module

The EDC-module as M-Bus module is used for integration of water meters in wired M-Bus networks. The EDC-M-Bus module which is mounted on the water meter enables the reading of the water meter via Bus.

Cable assignment (polarity protected):

Brown	M-Bus 1
White	M-Bus 2

General specifications EDC M-Bus:

Number of conductors	2
Cable length	1,5 m
Electromagn. compatibility	fulfils the European Directive 89/336 EWG

Cable assignment

Green	Output 1
Yellow	Output 2
Grey	Ground (GND)

General specifications EDC pulse

Number of conductors	3
Cable length	1,5 m
Output type N-channel	open-drain (equivalent to open-collector)
Max. output voltage	24 VDC
Max. output current	50 mA
Pulse length	≥ 50 ms
Output resistance (open)	110 Ω
Output capacitance (closed)	1 nF
Electromagn. Compatibility	fulfils the European Directive 89/336/EWG
Pulse value for all meters with modulator disc, excluding type WSD	DN15-40 1 L/Imp. DN50-125 10 L/Imp. DN150-200 100 L/Imp
Pulse value type WSD	DN 50-200 10 L/Imp.

7. Pulse modules

The pulse modules can be delivered in three different versions. Mode U will be delivered as a standard.

EDC-Pulse	Mode U:	Mode B1:	Mode B2:
Output 1:	balanced* pulses	Forward pulses	Forward and reverse pulses
Output 2:	Dismounting module alarm resp. cable break detection (normal state = closed)	Reverse pulses	Flow direction (open = forward)

Function of the pulse modules output according to ISO 22158

* Reverse pulses are reduced by the corresponding number of forward pulses

8. Combined M-Bus/Pulse module

The combined M-Bus and pulse module has been developed specifically to enable the simultaneous readout by two different users. In this case the pulse version will be delivered by standard as Mode U.

General specifications EDC M-Bus and pulse:	
Number of conductors	5
Cable length	1,5 m
Electromagn. Compatibility	fulfils the European Directive 89/336/EWG
Function Pulse output	Mode U balanced pulses

Important note

For EDC applications with simultaneous use of pulse output and M-Bus interface, only battery powered or galvanically isolated pulse modules can be connected to the pulse outputs. Otherwise, the EDC module may be damaged in the case of a potential difference between the connected devices.

9. AES-Key

The EDC-modules send their data contents only encrypted (AES-128, device-specific according to OMS, optionally customer-specific). To enable reception of the data contents and their further processing, the AES-Key has to be furnished to the respective recipients of the AES-Key. ZENNER provides the AES keys to the devices usually by means of electronic delivery or by customer-specific file.

10. Readout Data logger

The EDC modules have an internal memory (data logger). The readout of the data which are not already transmitted in the above data telegrams is carried out by means of the optical head and GMM software.

Data logger:	
Annual due date values:	max. 16
Monthly values	18, plus 18 semi-monthly values
Daily values	96
Quarter hour values	96

EDC Data logger

11. Smart Metering functions

Self-monitoring:

The module has an integrated battery status monitoring.

Tampering detection:

It will be detected as soon as the scanning coils of the EDC module are affected by a magnet. In the event memory date and time of the event will be memorized.

Dismounting of module and meter detection:

The detection is possible at all meters with grey register cap. A hall sensor detects here as soon as the EDC module was dismounted from the register. The event memory stores the date and time of the event.

Leakage detection:

If over a period of 24 h (96 quarter hour values) the flow value is never zero, than this indicates a leak. The EDC module sets corresponding bits.

If the flow rate remains zero during one quarter of an hour (before reaching 96 quarters of an hour with no flow) the algorithm restarts.

If 96 quarters of an hour were running with flow, leakage remains set until during 8 quarters of an hour in a row the flow remains zero.

The event memory stores the date and time of the event.

Meter Stop detection (blockade)

If no meter progress will be detected by the EDC module over a period of 4 weeks, meter stop (blockade) is detected. The blockade deemed to be revoked if a meter reading difference of > 10 liters occurs in a quarter of an hour.

Meter oversized detection

Meter is oversized when the flow rate never exceed $0,1 \cdot Q3$ (10% of Q3). This is averaged over a 15-minute period. It is counted how many times the flow rate of 10% of Q3 is not achieved. If the flow rate is not reached after 30 days "meter oversized" is detected.

If once a flow rate of > 10% from Q3, averaged, is reached by a quarter of an hour, the detection is permanently disabled and the status "meter oversized" deleted.

The event memory stores the date and time of the event.

Meter undersized detection

If the flow rate is continuously higher as Q3 (permanent flow) over a 6-hour period, this indicates an undersizing of the meter and the message "meter undersized" will be detected. This is averaged over a 15-minute period.

The event memory stores the date and time of the event.

Pipe burst detection

For EDC modules with M-Bus and Pulse: "Pipe burst" is detected when the flow rate has exceeded a given value (>30% of Q3) during a 30-minute period. This is averaged over a 15-minute period.

The event memory stores the date and time of the event.

Reverse water flow detection (wrong assembly)

If after reinstalling, the EDC module detects that the meter is running backwards each $\frac{1}{4}$ hour for 12 hours, reverse water flow is detected (wrong assembly). If the meter runs forward for 4 hours, the message shall be considered as finished.

Note:

The smart metering functions of the EDC retrofit modules are factory disabled. To use these functions, the respective settings have to be made in dependence of the permanent flow (Q3) via the optical interface of the EDC module. The programming of the smart metering function settings is made by using a ZENNER software, the universal interface MinoConnect and the ZENNER infrared optohead IrCombiHead.

12. Disposal

Attention: This device contains a non-removable and non-rechargeable lithium battery. Batteries contain substances, which could harm the environment and might endanger human health if not disposed of properly.

To reduce the disposal quantity so as unavoidable pollutants from electrical and electronic equipment in waste, old equipment should be reused prior or materials recycled or reused as another form.

This is only possible if old equipment, which contains batteries or other accessories are disposed. Therefore please contact the department of your local authority which is responsible for waste disposal. Alternatively a waste disposal via ZENNER is possible.

Your local or municipal authority or the local waste disposal company can give you information relating the collection points for your used equipments.

Attention:

Do not dispose of the devices with domestic waste.

In this way, you will help to protect natural resources and to promote the sustainable reuse of material resources.



For any question, please contact info@zenner.com

The most up-to-date information about this product and of our installation notice can be found at www.zenner.com

ZENNER International GmbH & Co. KG

Römerstadt 6

D-66121 Saarbrücken

Telephone +49 681 99 676-30

Telefax +49 681 99 676-3100

E-Mail info@zenner.com

Internet www.zenner.com