DIINNO Toolbox PC

User manual for the free Windows tool for electricity meters:
LMN, INFO, MSB, wM-Bus and LoRaWAN

Valid from version 0.17.11 · 11/2026

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Contents

1 Overview
2 Getting started
3 Connection and accessories
4 LMN interface
5 Test mode
6 INFO OKK
7 MSB interface
8 wM-Bus
9 LoRaWAN
10 Scanner
11 Setup, log and data
12 Troubleshooting

> **Safety and authorisation**
> On LMN and MSB the program sends real commands to real meters. Work only with the authorisation of the metering point operator (Messstellenbetreiber) and with the necessary qualification. Only qualified electricians may work on live installations. A key reset or a write access cannot be undone.

1 Overview

DIINNO Toolbox PC is the Windows version of the DIINNO Toolbox APP (Android), for the test bench and for use on site. It is free and needs neither an account nor an installation. The interface is available in German, English and Chinese.

Function	What it does
LMN interface	Find meters, pair with the SYM key, TLS, read TAF7 and TAF10, meter info, key reset
Test mode	Switch the meter's LEDs and test signals (no TLS, no pairing)
INFO OKK	Read the data stream of the optical INFO interface, decode the status word, record as CSV
MSB interface	RS232 or RS485: data reception, read and write single OBIS objects, group readout
wM-Bus	Receive radio telegrams on 868 MHz, decrypt with a key, one CSV file per meter
LoRaWAN	Listen to radio traffic (receive only, with a Dragino LA66 adapter)
Scanner	Check the content of Data Matrix and Code 128 meter codes from images

Differences from the Android app

- **Adapters:** USB serial adapters and optical heads from other vendors work too. The program only shows an orange hint and blocks nothing.
- **Scanner:** The program has no camera function on the PC. You open a photo or a screenshot instead.
- **Not included:** “Enter PIN” (needs the torch) and “NFC reader”. Please use the app for these.
- **Diagnosis:** If data arrives that cannot be decoded, the program names the likely cause (chapter 12).

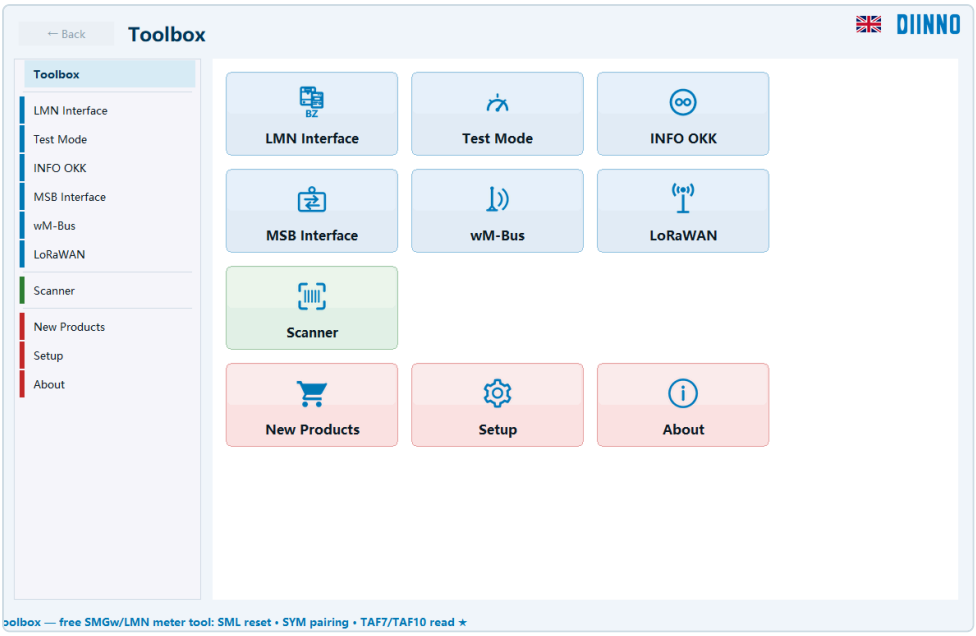


Fig. 1 · Home page

2 Getting started

Requirement: Windows 10 or 11 (64-bit). No administrator rights needed.

1. Download the ZIP file from the product page and **unzip it completely**.
2. Double-click the `.exe`. The first start takes a few seconds because the program unpacks itself.
3. Language and other options are under **Setup** (chapter 11).

> **Windows warning**
> As long as the program is not digitally signed, Windows SmartScreen shows “Windows protected your PC”. Click “More info”, then “Run anyway”. Verify the SHA-256 value first; it is on the product page and in `LIESMICH_README.txt`:
> `Get-FileHash .\DIINNO_Toolbox_PC_v0.17.11.zip -Algorithm SHA256`

New versions: At start the program checks for a new version and offers a link to the download page. It does not download anything itself. You can switch the check off under “Setup”.

3 Connection and accessories

Plug the adapter into a USB port and select the **port** (COM port) on the page you need. The COM number often changes after re-plugging; click “Refresh” then.

Page	Setting	Adapter	Connection at the meter
LMN, test mode	RS485, 921600 Bd, 8N1	DIINNO LMN-USB12V / LMN-USB RS485	RJ12 LMN or optical communication converter
INFO OKK	9600 Bd, 8N1, receive only	DIINNO INFO optical head or another optical head	Optical INFO interface, centred
MSB	9600 Bd, 8N1	DIINNO USB-RS232 or LMN-USB RS485, depending on the meter type	See below: RJ10 or terminals 27 / 28
wM-Bus	detected	DIINNO wM-Bus adapter, 868 MHz	Radio
LoRaWAN	EU868	Dragino LA66 with P2P firmware v1.2.4	Radio, receive only

MSB interface on Holley meters

The **fourth position of the type code** names the interface: **C = RS232**, **B = RS485**. Example: DDZ285-ZE**C**A has RS232, DDZ285-ZE**B**A has RS485.

Position 4	Connection	Pin-out
C = RS232	RJ10 socket	Pin 2 = TxD → adapter RxD · Pin 4 = GND → adapter GND · leave pins 1 and 3 open
B = RS485	Terminals 27 / 28	On the DDZ285-ZEBA: A → 28, B → 27. If nothing decodable arrives, swap A and B.

> **RS232 interface: use an RS232 adapter**
> An RS485 or TTL adapter on the RS232 socket delivers an inverted signal (chapter 12). We recommend a real RS232 adapter for this interface.

4 LMN interface

For base meters (Basiszähler) with an LMN interface. For pairing you need the meter's SYM key, which you receive from the meter vendor.

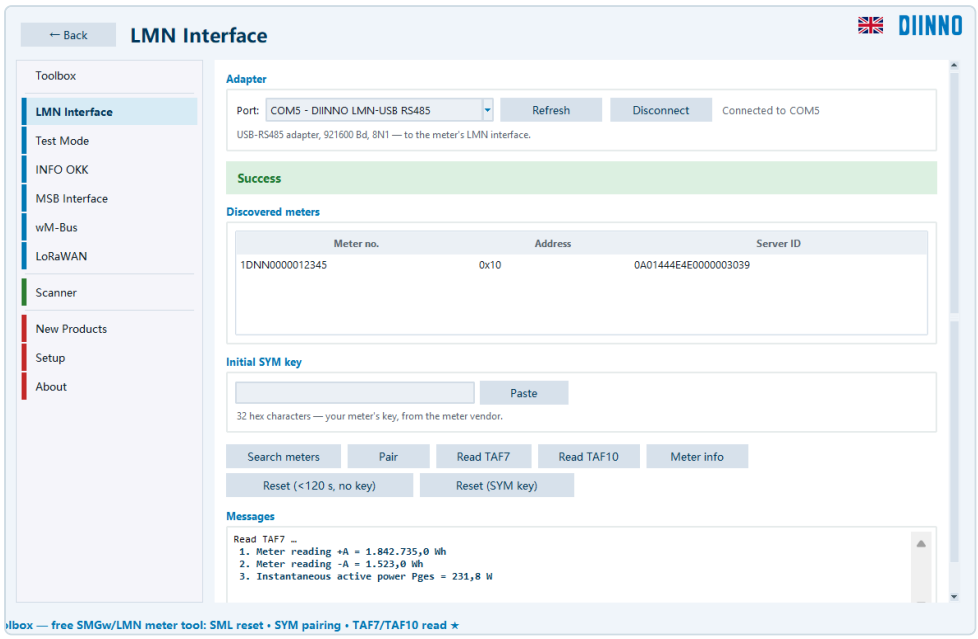


Fig. 2 · LMN interface with example data

1. **Connect:** select the port and click “Connect”.
2. **Search meters:** the meters found are listed with meter number, address and server ID. Select one.
3. **Key:** enter or paste 32 hex characters. If you have loaded a key file, the program fills in the matching key.
4. **Pair:** sets up SYM pairing and then TLS. The bar shows the result: green = success, red = error, blue = running.
5. **Read TAF7 / Read TAF10:** reads the registers over TLS. Without an open connection, it is set up automatically.

Key files: tables (`.xlsx` , `.csv` , `.txt` , `.enc`) can be loaded under “Setup”. The program only shows fingerprints, never the key, and writes no keys to the log.

The meter key stays unchanged: the PC version does not rotate the SYM key after pairing. The meter stays reachable with the key you paired with.

“not available” for single registers is not an error: the meter does not have this register, for example tariff registers on single-tariff meters.

Reset

Button	Effect and condition
Reset (<120 s, no key)	SML reset without a password. The meter accepts it only within 120 seconds after power-up.
Reset (SYM key)	Crypto reset with the initial key. Not every meter type supports it; the program then says that it depends on the type.

> **Before a reset**
> The key is reset to its initial value, and an existing pairing with a smart meter gateway becomes invalid. This cannot be undone. The program asks first and names the meter number.

Recommended order after power-up: power the meter up again → search meters → reset within 120 s → pair → read TAF7 / TAF10.

5 Test mode

Test mode implements the test function of the FNN specification for base meters: transmit LEDs on INFO and LMN, level detection, square-wave signals (4.8 kHz on INFO, 460.8 kHz on LMN) and the metrological LED. This lets you check meter and adapter without extra equipment. You only need “Search meters” and a selected meter on the LMN page, no pairing. “0. Exit test mode” ends the mode; the meter also ends it by itself, for example after a power interruption.

6 INFO OKK

Reads the data the meter sends every second over the optical INFO interface. The program sends nothing.

1. Place the optical head **centred** on the INFO window. Even a small sideways offset disturbs reception.
2. Select the port and click “Start receiving”. The telegram counter goes up.
3. Meter number, readings and status word are at the top, the raw data below.

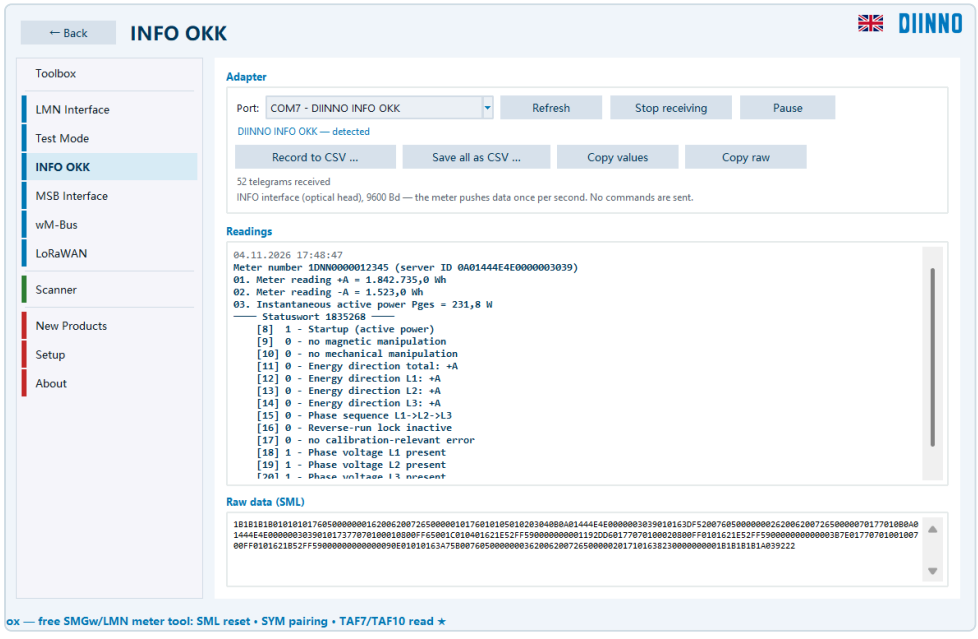


Fig. 3 · INFO OKK with example data

Button	Effect
Record to CSV …	Writes every telegram to a file at once. If reception is not running, it starts automatically.
Save all as CSV …	Saves all telegrams since reception last started.
Pause / Resume	Only freezes the display. Reception and recording continue.
Copy values / Copy raw	Copies the telegram shown to the clipboard.

Status word: bits 8 to 20 are decoded in plain text (start-up, manipulation, energy direction, voltage L1 to L3 etc.). If only the identification bits 0 to 7 are set, the program shows no bit-by-bit decoding, because the telegram says nothing about these bits.

7 MSB interface

The sealable, bidirectional data interface of the meter (9600 Bd, 8N1, SML). For the connection see chapter 3. You receive nothing here with the optical head.

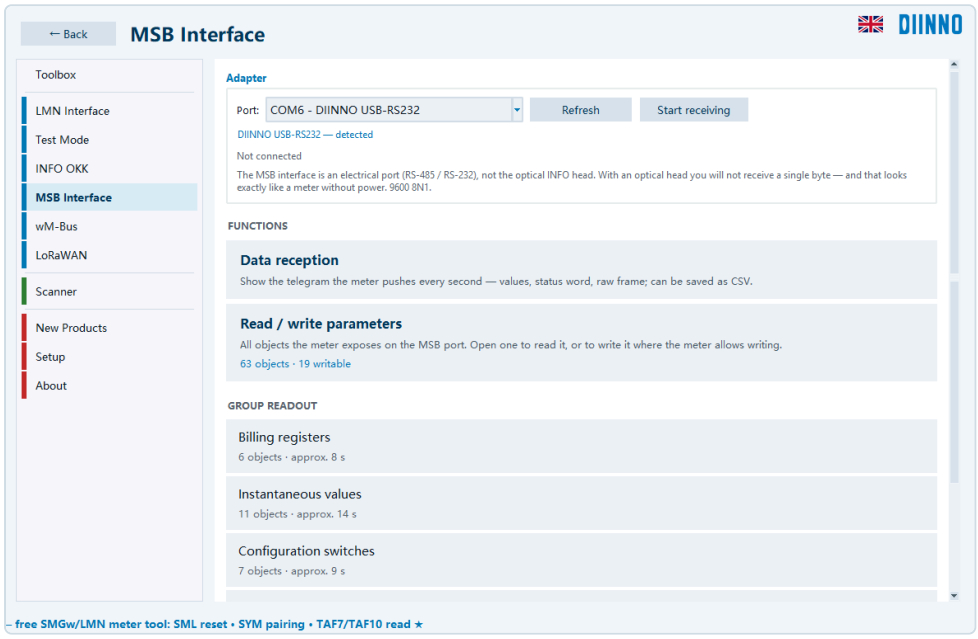


Fig. 4 · MSB interface: start page

- **Data reception** shows the telegram the meter sends every second, exactly like INFO OKK. Nothing is sent.
- **Read / write parameters** lists the objects the meter offers. Select an object and read it or, where allowed, write it.
- **Group readout** reads several objects in one pass, as a supplied or your own group. The result can be saved as CSV.

> **Writing**
> Write accesses cannot be undone and can affect billing. The program shows the meter number first and asks for confirmation. The write path has not yet been verified on a real meter; use it only after your own check on a test meter.

The program sends requests right after the meter's next telegram. Objects a meter does not have return an error message. That is a normal result.

8 wM-Bus

Receives radio telegrams on 868 MHz (wireless M-Bus). The program detects the adapter by itself and never writes to its flash memory; it sets the RF mode only temporarily.

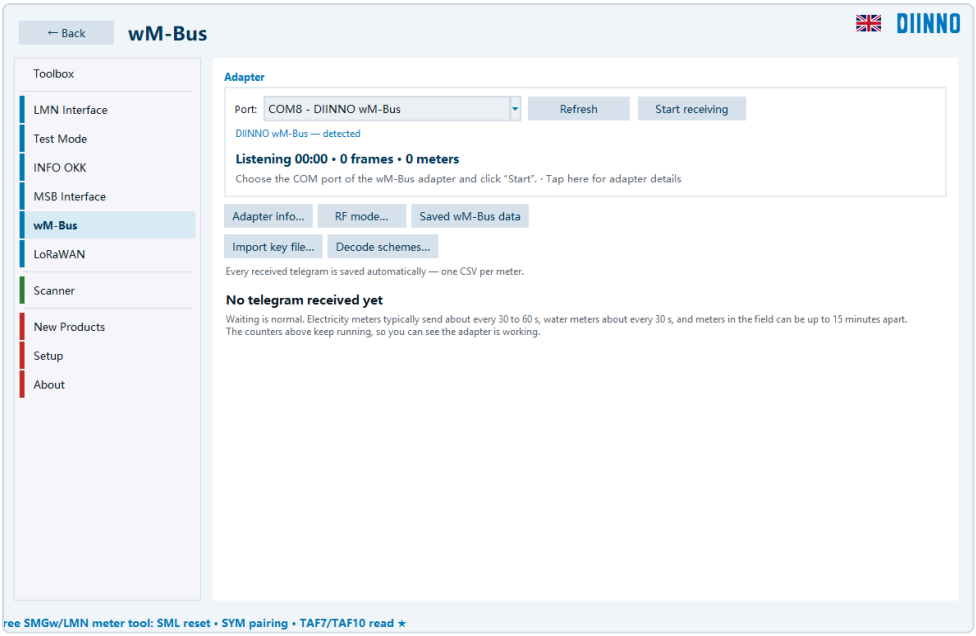


Fig. 5 · wM-Bus: no telegram received yet

1. Select the port and click “Start receiving”.
2. Wait: electricity meters usually send every 30 to 60 s, in the field up to 15 minutes can pass between telegrams. An empty list right after the start is normal.
3. Click a row for details. Red rows first ask for the key (32 hex characters). It is saved only if it really decrypts the telegram.

Every telegram is saved automatically, one CSV file per meter. “Saved wM-Bus data” shows the files and exports them as a ZIP.

9 LoRaWAN

Listens to LoRaWAN traffic nearby. The program does not transmit. You need a Dragino LA66 with P2P firmware v1.2.4; the program detects other firmware and reports it.

- Keep adapter and meter close together: same room, a few metres apart.
- “Scan channels automatically” switches every 20 s between the three EU868 join channels and SF12 / SF9 / SF7. Single telegrams can be lost. Switch the scan off to stay on one channel.
- A LoRaWAN meter sends every 15 minutes by default. Waiting is normal.

The exact format of received telegrams has not yet been confirmed over the air in all cases. Please leave the raw output on during tests and send it to us if anything looks wrong.

10 Scanner

“Scan Image” opens photos or screenshots (PNG, JPG, BMP …, several at once too). Every code in the image is checked: FNN Data Matrix and Code 128 meter number. The check covers code type and content, **not** print quality (that requires calibrated test equipment under ISO/IEC 15415 / 15416). Checked codes go into the batch and can be exported as CSV. The page also converts a meter number into the server ID.

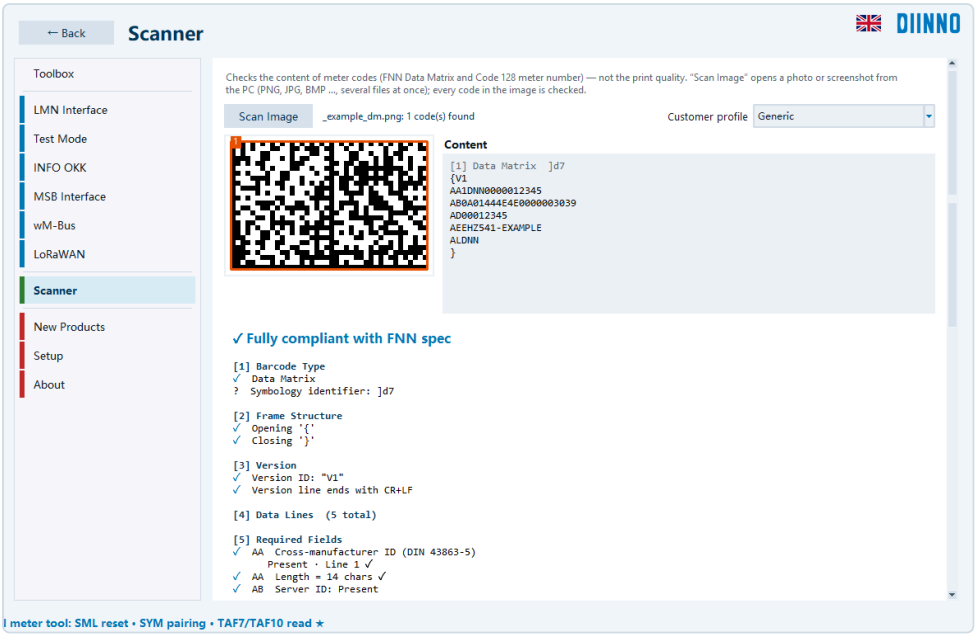


Fig. 6 · Scanner with an example code

11 Setup, log and data

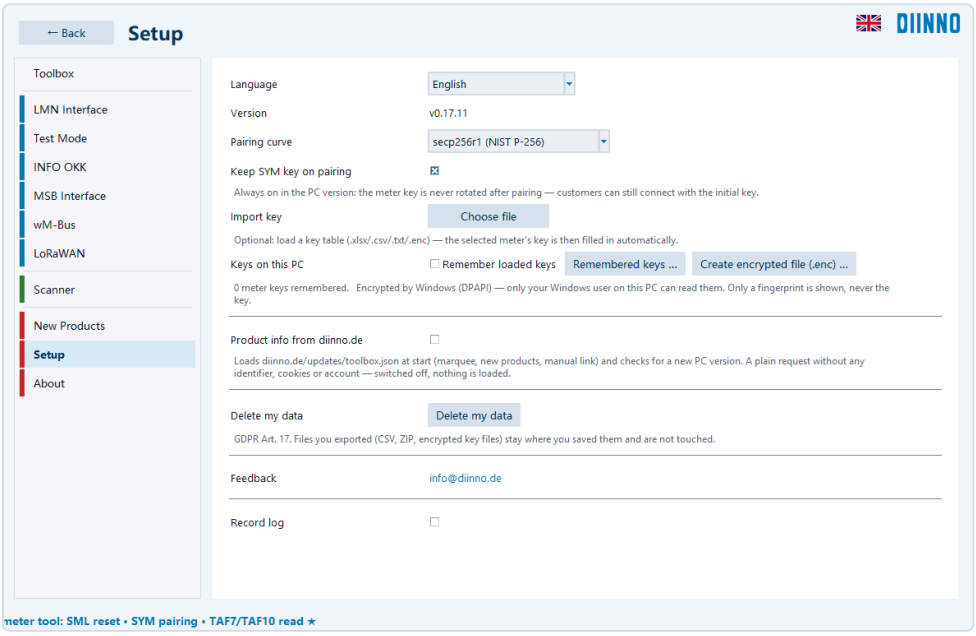


Fig. 7 · Setup

Setting	Meaning
Language	German, English, Chinese or system default
Pairing curve	Curve for pairing: secp256r1 or brainpoolP256r1
Import key	Loads a key table (`.xlsx` , `.csv` , `.txt` , `.enc`)
Remember loaded keys	Stores keys encrypted with Windows DPAPI. Only your Windows user on this PC can read them.
Product info from diinno.de	Loads the marquee, new products and the new-version notice at start. No identifier, no cookies. Switched off, nothing is loaded.
Delete my data	Deletes everything the program has stored on this PC. Exported files stay untouched.
Record log	Off by default. The files are in the `logs` folder next to the exe and stay local until you pass them on yourself. The log contains no keys, only fingerprints.

Privacy: no registration, no ads, no tracking. Your working data stays on your machine. The only network use is the optional fetch of product information; as with any internet request, our server sees your IP address. The full privacy notice and the terms of use are in the program under “About”.

12 Troubleshooting

What you see	Likely cause	What to do
“Signal inverted”, data starts with `72 72 72 72 7F 7F 7F 7F`	TxD and GND swapped, RS485 / TTL adapter on the RS232 socket, or A / B swapped	Holley RJ10: pin 2 = TxD, pin 4 = GND. On RS485 swap A / B. On RS232 use a real RS232 adapter.
INFO: “Data arrives … but no SML telegram” or **CRC error**	Optical head not centred	Move the head slowly until the telegrams count up. The meter must send SML at 9600 Bd.
INFO: “No data yet”	Nothing reaches the head, wrong COM port or meter without voltage	Check the COM port, place the head again, check the voltage. Some phone cameras show the infrared signal: it flashes about once a second.
MSB: not a single byte	Optical head instead of an electrical adapter, wrong socket or wrong terminals	Check chapter 3. It looks the same as a meter without voltage.
MSB: second index occasionally jumps by 2	No telegram lost: on the meters tested, the meter sends about every 1.05 to 1.07 s.	Nothing. Real losses are marked as CRC errors or missing from the count.
LMN: “Answer incomplete”	The telegram did not arrive completely	Read again. If it stays: switch the log on, repeat and send the log to info@diinno.de.
Orange hint “Not a DIINNO adapter”	Adapter from another vendor	Only a hint, the program works normally.

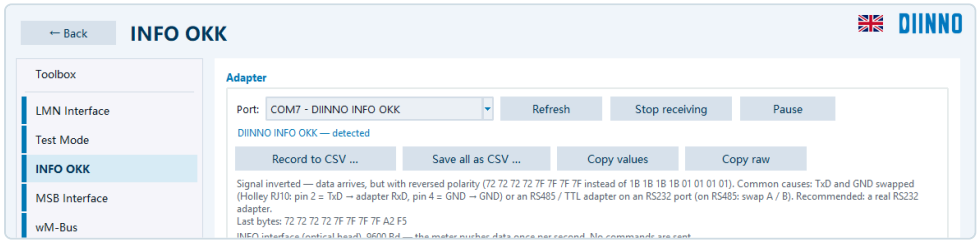


Fig. 8 · “Signal inverted” hint (example)

Support: please send **info@diinno.de** the program version (under “About”), the meter type, a screenshot and if possible the log. Do not send keys by e-mail.