

DIINNO

User Manual

DIINNO Toolbox App

Version **2.1.53** Edition **September 2026** Platform **Android**

Smart Metering. Precisely connected.

CONTENTS

1 Installation

2 Login & Privacy

3 Connection & Accessories

3.1 LMN cable connection · 3.2 IR reading head · 3.3 Which DIINNO adapter for which function

4 Functions

4.1 LMN Interface (5 keys) · 4.2 Test Mode · 4.3 INFO OKK · 4.4 MSB Interface · 4.5 wM-Bus · 4.6 LoRaWAN · 4.7 Input PIN · 4.8 Scanner · 4.9 NFC Reader

5 Setup

Language · Pairing curve · Keep SYM key · 5.1 Key vault · 5.2 Device keys · 5.3 Log

6 Products / New Release

About the screenshots

The app is available in English, German and Chinese. Screenshots marked **(DE)** show the German interface; layout and function are identical in English.

1. Installation

Install the app from the Google Play Store (or the APK). Before an update, always uninstall the older version first.



Download: Scan the QR code to download the DIINNO Toolbox app (APK) directly, or search for “DIINNO Toolbox” in the Google Play Store. The app is available for Android only and is free of charge.

2. Login & Privacy

On first start, read the privacy notice in full. Scroll to the end of the text — only then is the button enabled — and tap **“AGREE”**.

Privacy by design

All meter and key data stay exclusively on your device (stored encrypted). The app collects no personal data. An internet connection is used only for optional product/news notices (plain retrieval, without any device identifier).

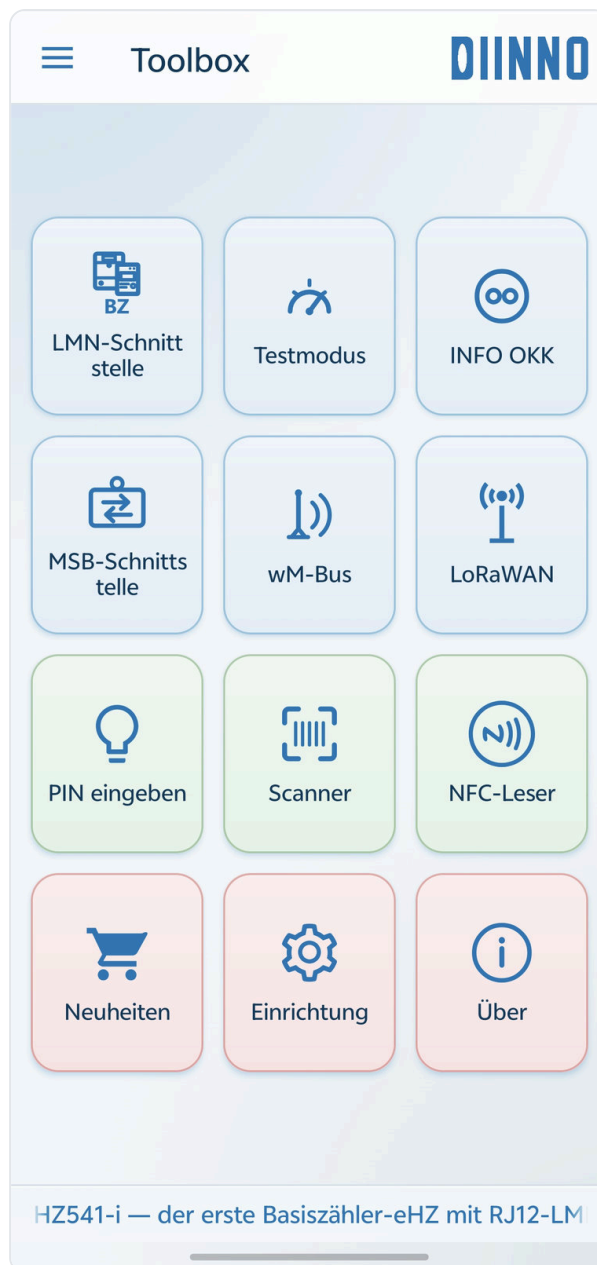


Fig. 1 · Start screen of the app (DE)

3. Connection & Accessories

Before use, the smartphone must be connected to the electricity meter. Both connection methods are suitable for **BZ-eHZ** and **BZ-3.HZ** meters (basic meters in eHZ and three-point mounting form).

3.1 LMN cable connection

- 1 Connect the meter to the LMN USB adapter via an LMN communication adapter or an RJ12 LMN bus cable.
- 2 Connect the LMN USB adapter to the smartphone via a USB Type-C converter.

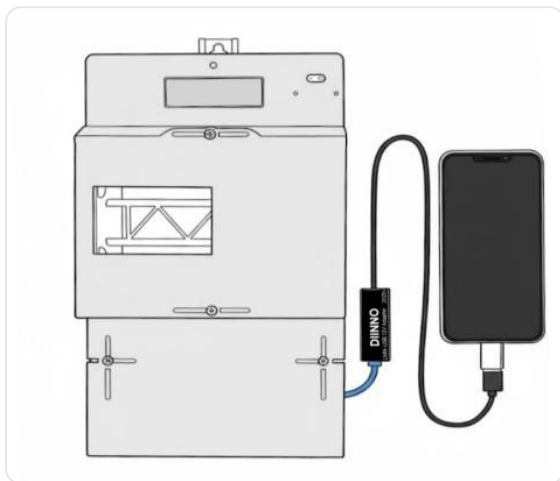
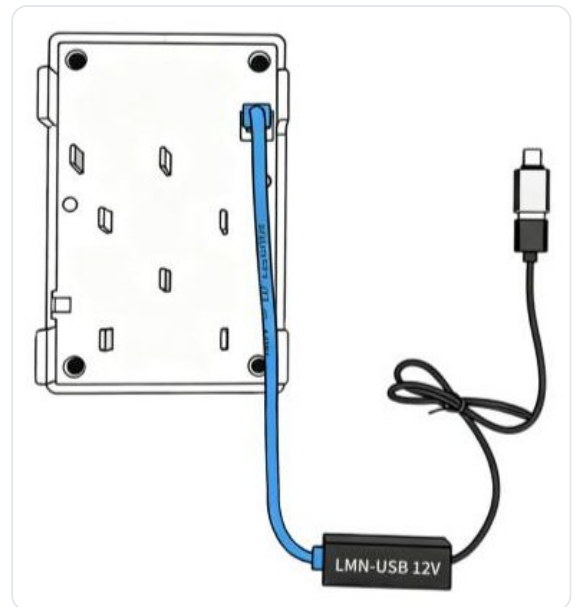
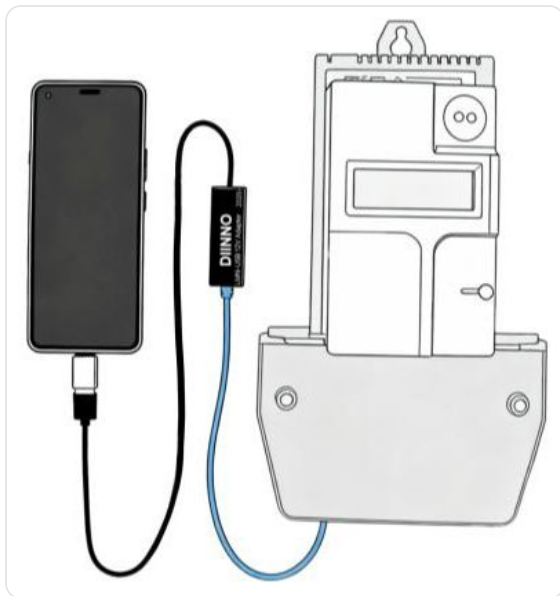


Fig. 2 · Meter connections

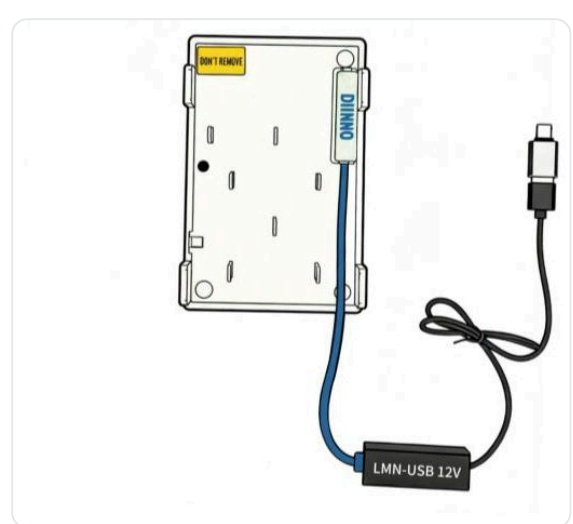


Fig. 3 · Adapter connections

3.2 IR reading head connection

- 1 Place the optical probe of the IR reading head flush on the meter's INFO port and fix it securely (magnet).
- 2 Connect the IR reading head to the smartphone via the USB Type-C converter.



Fig. 4 · IR reading head

3.3 Which DIINNO adapter for which function

Since app version 2.1.46 the app checks **which adapter is plugged in**. INFO OKK, the MSB interface and wM-Bus work **exclusively** with the matching DIINNO adapter. A generic USB-to-serial stick is rejected — the app then shows “No DIINNO adapter” or “Wrong adapter model” and names the expected type.

Function	Required adapter
LMN Interface · Test Mode	DIINNO LMN-USB RS485 (check currently suspended)
INFO OKK	DIINNO INFO optical head
MSB Interface	DIINNO LMN-USB RS485 or DIINNO USB-RS232
wM-Bus	DIINNO wM-Bus adapter

Why two adapters are allowed on the MSB port

In the field, both RS-485 and RS-232 wiring occur there. The INFO optical head is electrically **not** compatible with RS-485/232 — if it were allowed, “plugged into the wrong port” would look exactly like “meter without power”.

LMN Interface exempt

The LMN Interface (section 4.1) and Test Mode (section 4.2) currently do **not** check the adapter model — existing setups keep working unchanged.

4. Functions

4.1 LMN Interface

Meter selection. Make sure the meter and the smartphone are connected correctly (section 3.1). Open the app, tap “**LMN Interface**” and start the search. After a successful search, the meters found are listed with their **meter number** — tap the desired meter to open the console.

Unique meter list

Each meter appears exactly once (de-duplicated by meter number); actions always use the current device address.

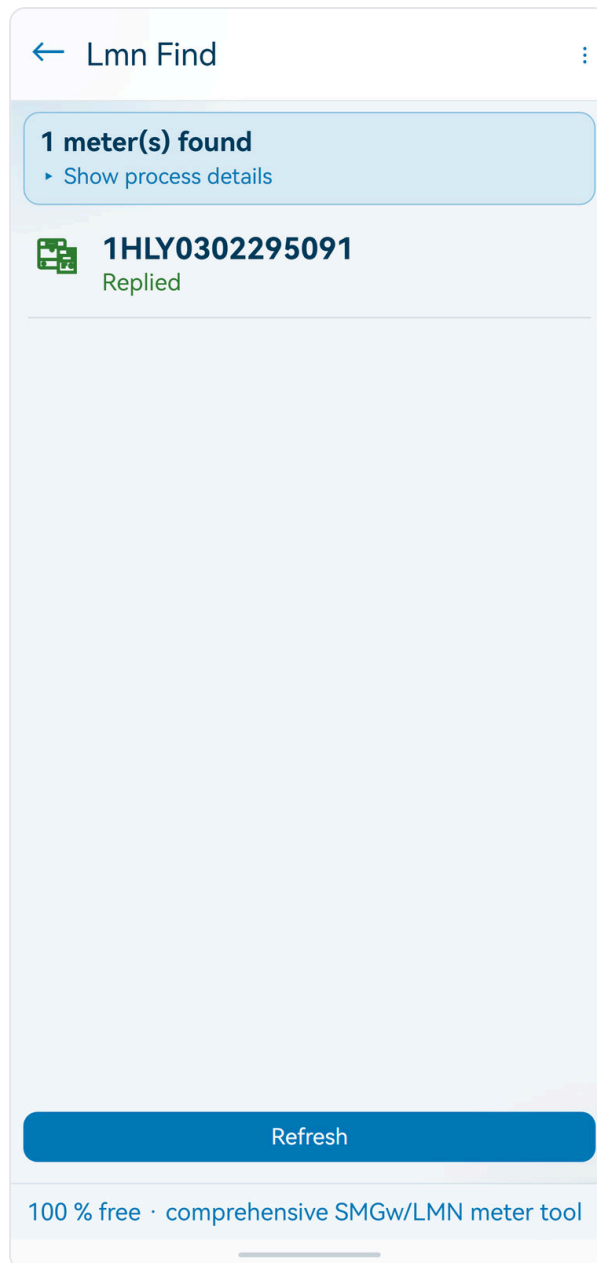


Fig. 5 · LMN search and meter selection

The LMN console offers five keys. Every action shows a **coloured result banner** — green = success, red = error, blue = running — directly above the log, so the result is visible at a glance.

✓ SML reset successful — meter key reset to the initial key

● Pairing in progress ... · SYM pairing type 3/5

! SYM reset failed — rejected by the meter (DM)

Key 1**Reset Key SML**

Password-less SML reset via SAP3.

Key 2**Reset Key SYM**

Crypto reset (type 6/7) with the initial key.

Key 3**Pairing**

SYM pairing + TLS setup; the connection is kept open.

Keys 4/5**TAF7 / TAF10**

Read the meter registers (via TLS).

Key entry & secret keys

Below the keys is the input field for the **SYM key**; to its right is a **“Paste”** button (key from the clipboard). Via the **menu at the top right** → **“Add secret key”** you can import an encrypted or plain-text key file; if the scanned meter is contained in it, its initial key is **filled in automatically** (see 5.1).

Key 1 • Reset Key SML

- 1 In the LMN console, tap **Crypto Reset (<120s)**.
- 2 Check the console window: the app sends an SML command. Success is confirmed with `8181C7C7FD00` (“OK”) and shown in the green banner. The current key is thereby reset to the initial key.

120-second window

The password-less SML reset is accepted only when the meter has just been powered up or restarted — within the first **120 seconds**. The meter’s reply is always authoritative.

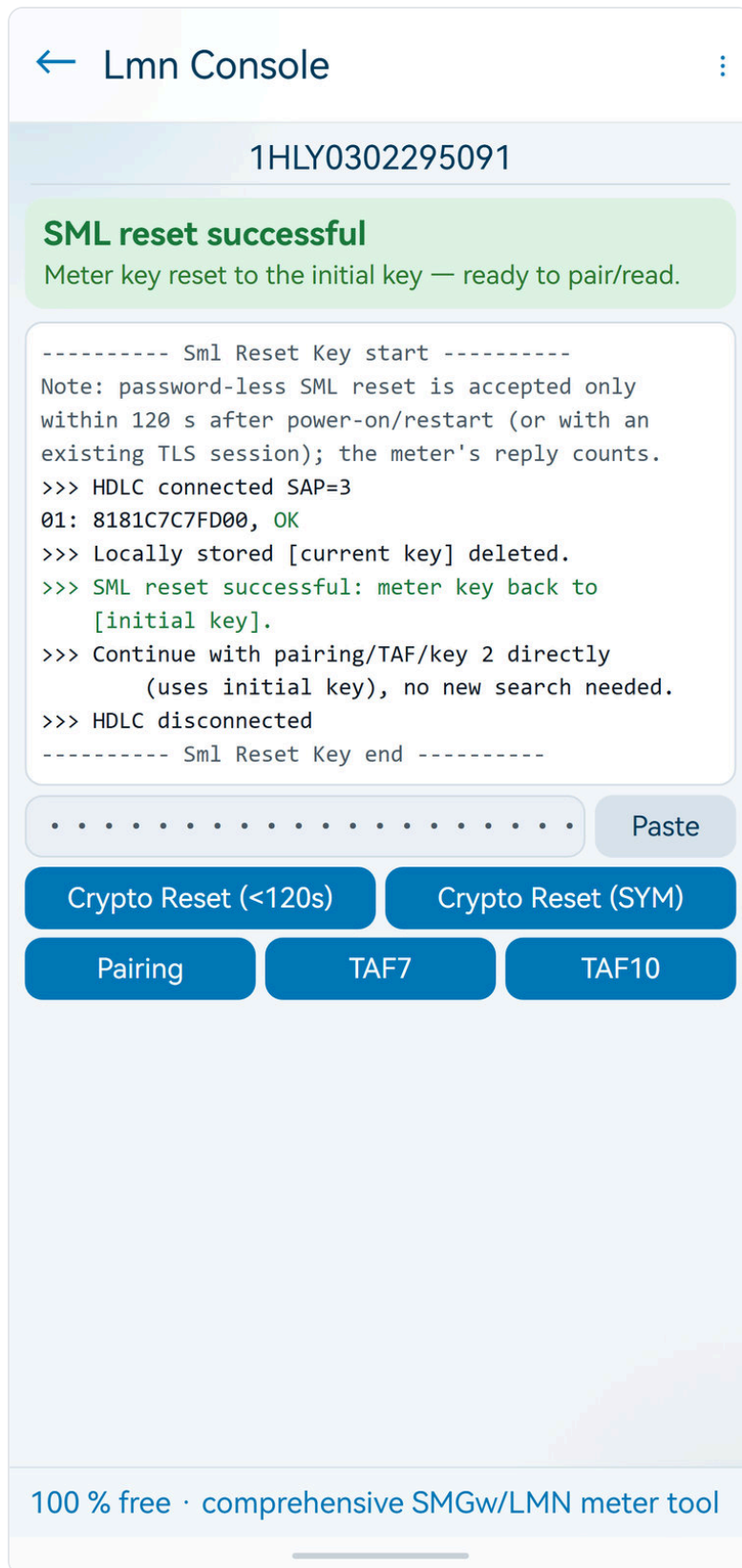


Fig. 6 · Reset Key SML

Key 2 • Reset Key SYM

- 1 Enter the symmetric initial key (32 hex characters) in the field “**Input init Sym Key 16 bytes**”.
- 2 Tap **Crypto Reset (SYM)**. The app performs the crypto reset (type 6/7) with the initial key.

- 3 Success (type 6 → 0x86 , type 7 → 0x87) is confirmed in the green banner.

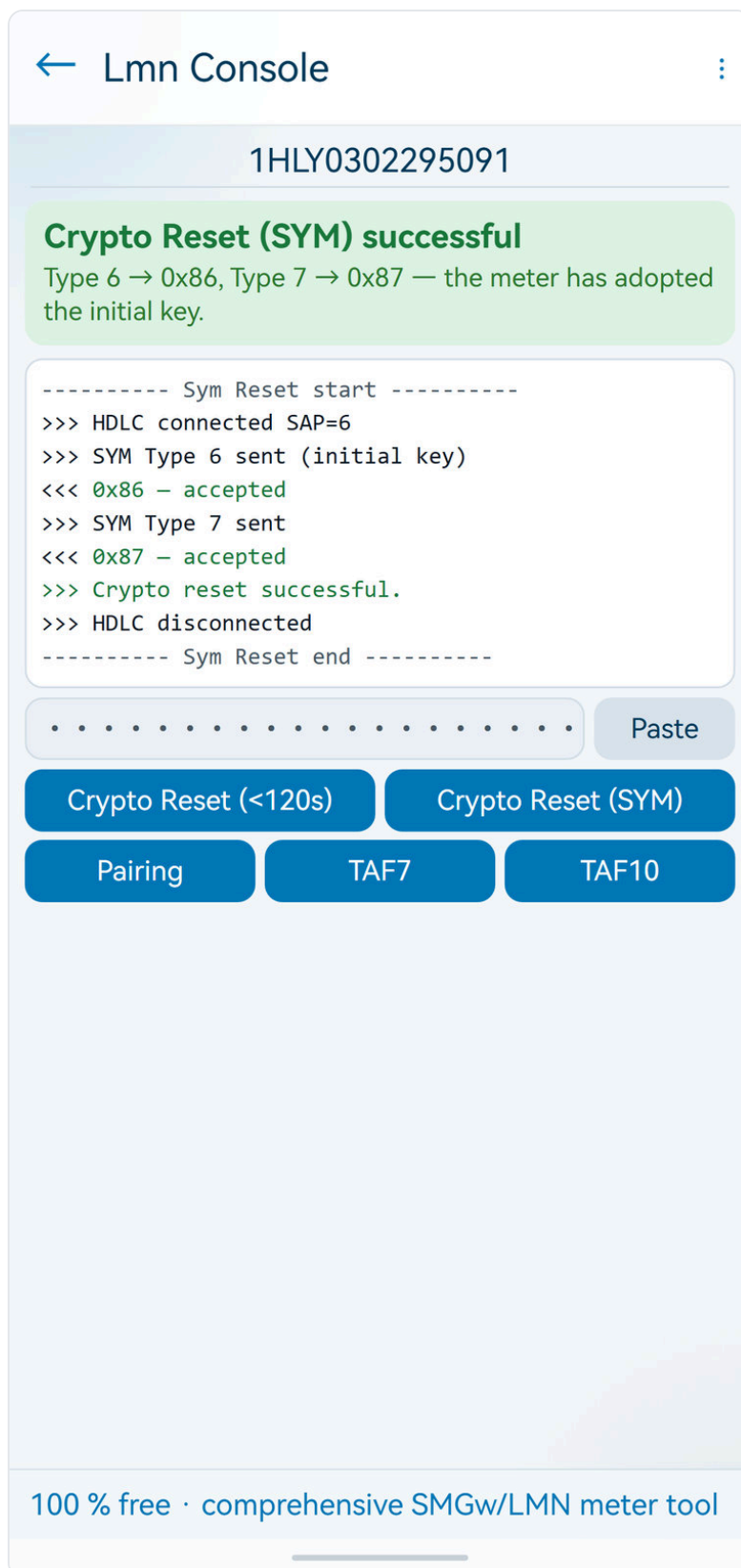


Fig. 7 · Reset Key SYM

Key 3 • Pairing

Establishes the secured connection in one go: connection (SNRM) → SYM pairing type 1–5 → TLS handshake. The banner shows the current step so that you can see the process is running. After success, the TLS connection is kept and you can read TAF7/TAF10 directly.

Meter key remains unchanged

Since v2.1.0 the meter's SYM key is **no longer rotated by default** after pairing (setting "Keep SYM key on pairing", see section 5). After the readout the meter therefore remains reachable with the key used for pairing — if you paired with the initial key, it stays valid. The console reports this in the log after pairing.

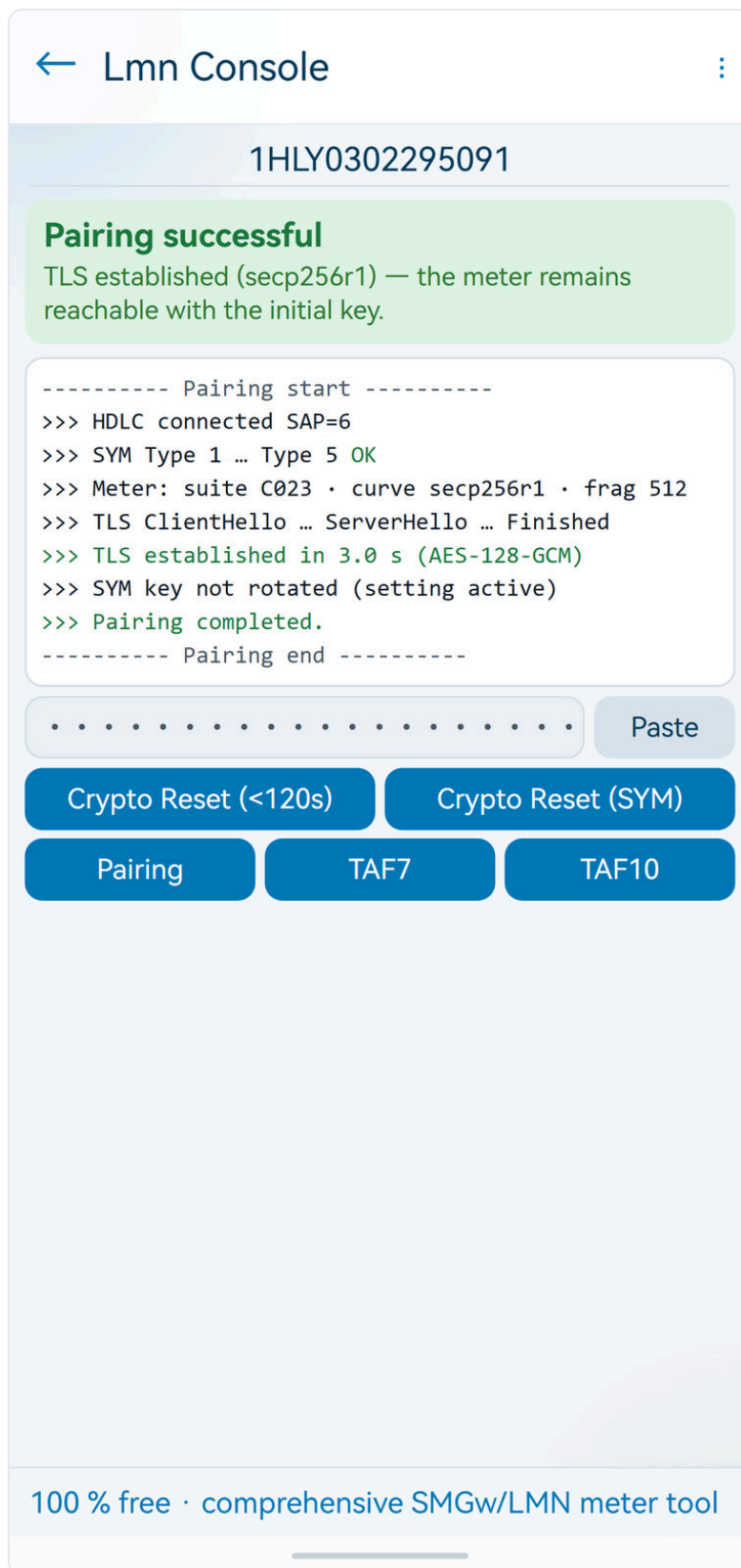


Fig. 8 · Successful pairing

Keys 4/5 · Read TAF7 / TAF10

Reads the meter registers over the secured TLS connection. If no connection is open, it is established automatically. The readings are presented as in the official test report — with the **register name**, the **converted value and unit** (with thousands separator) and a **status word evaluation**.

Register (excerpt)	Example
Meter reading +A / –A	0.0 Wh
Voltage L1/L2/L3	227.0 V
Current L1/L2/L3	0.3 A
Instantaneous active power P_{total} /L1–L3	0 W
Frequency	50.0 Hz
Status word	1048580 → evaluated bit by bit

Status word evaluation

The status word is shown bit by bit in plain language (bits 8–20), e.g. *Standstill, no manipulation, energy direction +A, phase voltage L3 present* — identical to the evaluation in the official test system.

Note on “order not executed”

Individual registers that the meter does not keep (e.g. tariff registers on single-tariff meters) are truthfully reported by the meter as “*order not executed*” — this is not an error of the app.

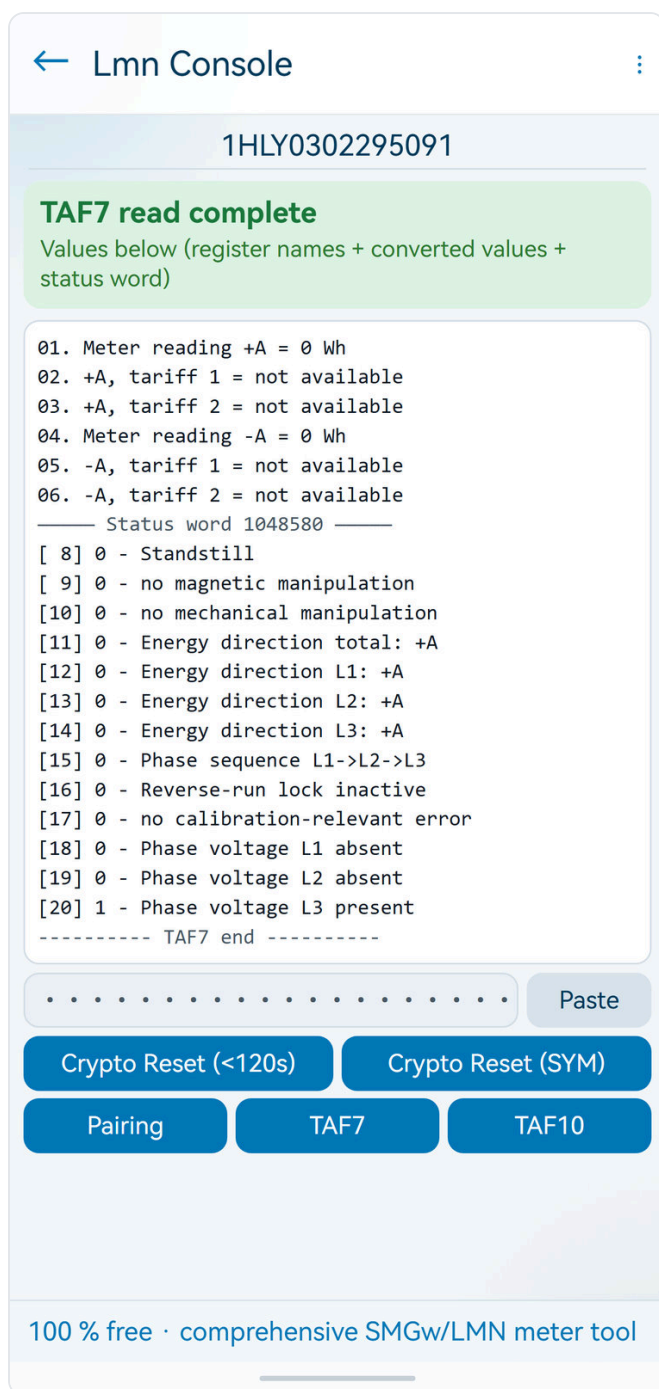


Fig. 9 · TAF7 readings

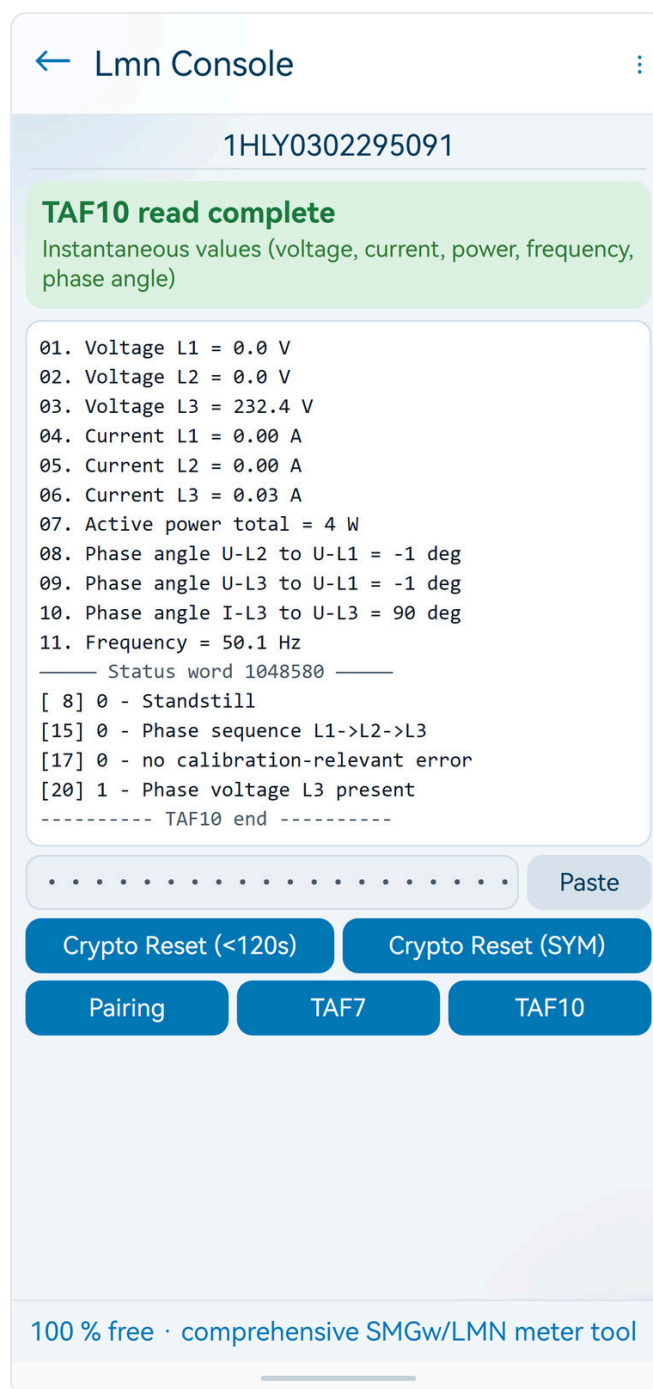


Fig. 10 · TAF10 readings

Recommended sequence (the golden sequence)

Meter de-energised → power up again → LMN search → within 120 s key 1 (SML reset) → key 3 (pairing) → keys 4/5 (readout). No new search is needed after the reset.

4.2 Test Mode

Test Mode implements the test mode newly introduced in the **FNN specification for basic meters (Lastenheft Basiszähler, version 1.5)**. It activates individual meter states and functions that are needed for a test in the field: continuous light of the transmit LED on the INFO

interface and on the rear (LMN) interface, level detection of the receiver (also for the flashlight function), output of a square-wave signal (4,800 Hz on the INFO interface, 460.8 kHz on the rear interface) and switching the metrological test LED on and off.

This allows meter and adapter to be checked quickly without additional equipment (signal/connection test) and faults to be narrowed down. The test mode can be used only outside the secured SMGW environment and ends automatically, e.g. after 24 h, on power interruption or when the SMGW environment is activated.

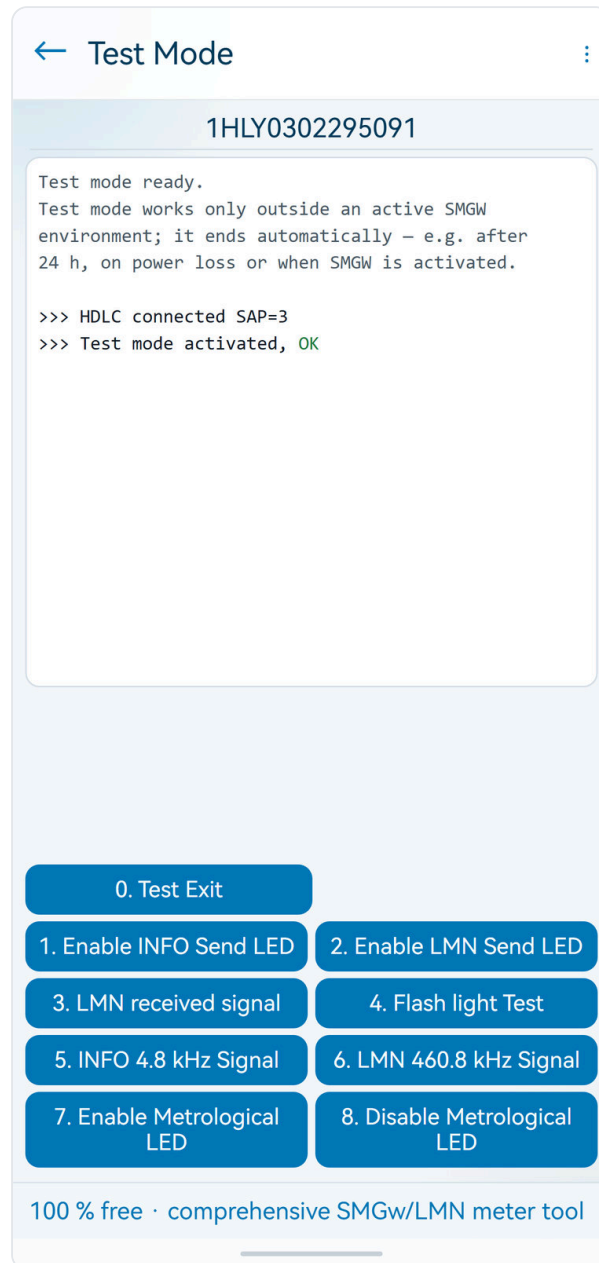


Fig. 11 · Test Mode

4.3 INFO OKK

Reads the **SML data stream sent every second** by the meter's optical INFO interface via the IR reading head (section 3.2). After opening, the app connects automatically and continuously shows the current data.

- 1 Place the IR reading head on the INFO port and connect it to the phone (section 3.2), then tap **"INFO OKK"** in the app.
- 2 The processed readings are shown **at the top** (main area), the raw data (SML telegram) **below**.
- 3 Use **"Pause / Resume"** to stop and continue reception; the **Copy** buttons let you take over the plain text and the raw data.

Presented like TAF10

The readings are shown with **register name, converted value + unit** (with thousands separator) and **status word evaluation** — analogous to the TAF readout. Firmware version and checksum are shown as readable **ASCII text**.

CSV recording

With **"Save CSV"** the data stream is continuously recorded as CSV (**"Stop"** ends the recording); **"Export"** hands the file over for sharing.

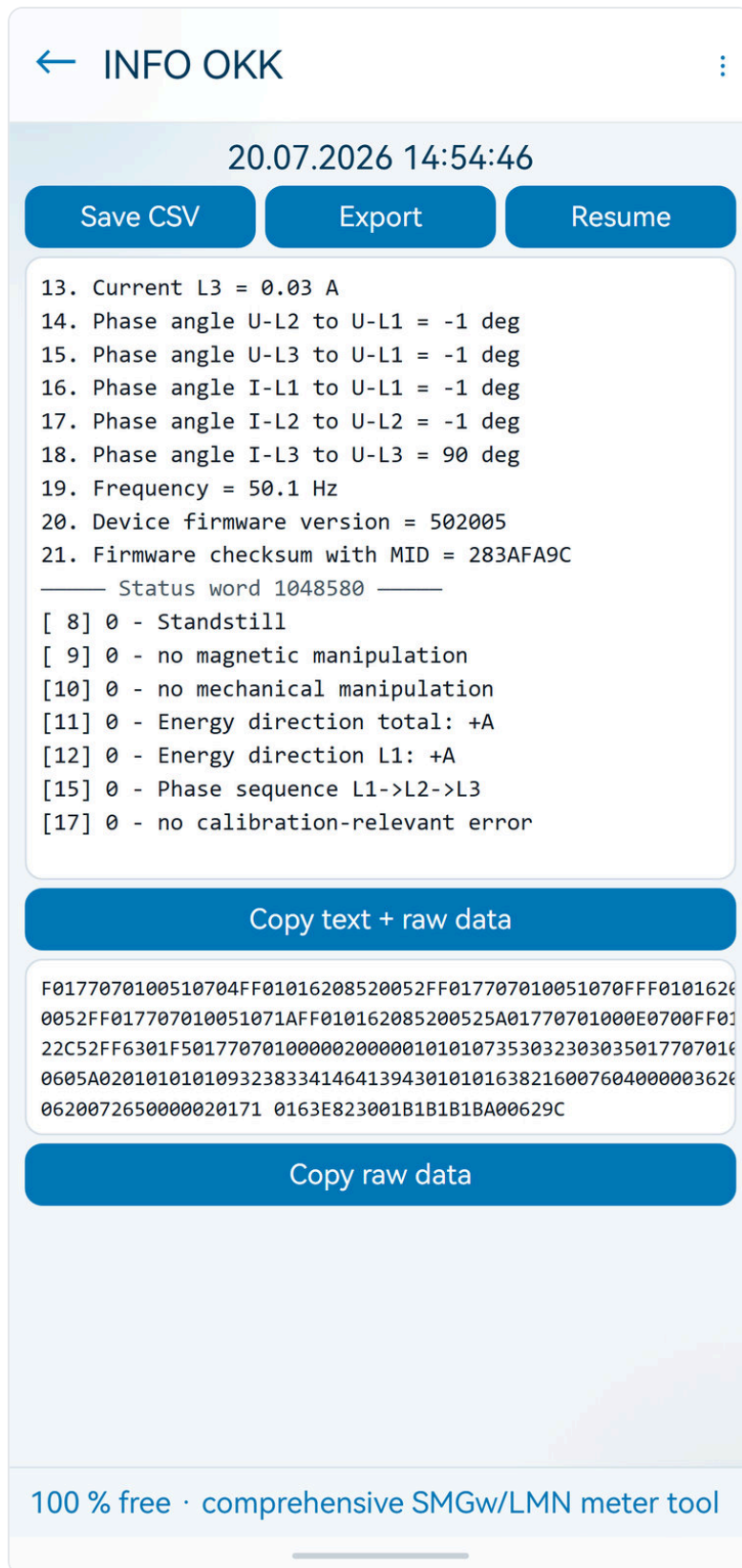


Fig. 12 · INFO OKK

4.4 MSB Interface

The MSB interface is the **sealable, bidirectional** data interface of the EDL meter (9600 8N1, SML). Unlike the INFO interface, it is not only listened to but actively **queried** and — as far as the meter permits — also **written**.

Adapter

DIINNO LMN-USB RS485 or DIINNO USB-RS232 (section 3.3). With the INFO optical head you will receive **not a single byte** on this port — the symptom looks the same as a meter without power.

The start page of the MSB interface offers three ways:

a

Data reception

Shows the cyclically sent telegrams every second, processed as in the test report.

Nothing is sent — suitable for pure listening.

b

Read / write parameters

List of all known OBIS objects with short code, name and writability. Tap an object to read it individually or — where permitted — write it.

c

Group readout

Several OBIS objects in one pass. Use the supplied groups as they are or create your own via "New group"; export or share the result as **CSV**.

Check before every write

The app shows the **meter number** beforehand. In the field with several meters, the wrong meter is the most expensive mistake.

Two OBIS worlds

The FNN specifications know two identifier systems — basic meter (01 00 ...) and EDL/eHZ (parameter tree 81 81 C7 8x xx FF). Where needed, the app automatically tries the other form, so the same list works on both meter families. If the meter reports "object not present", the app falls back — where available — to the cyclically sent value and marks it accordingly.



Fig. 13 · MSB Interface · start page, shown here without an adapter plugged in (DE)

4.5 wM-Bus

Reception of **radio meter telegrams on 868 MHz** (wireless M-Bus) — for water, heat and gas meters as well as radio-enabled electricity meters.

Adapter

DIINNO wM-Bus adapter (section 3.3). The app detects the variant itself and sets the transmission rate accordingly.

After starting, the app lists every meter received with meter number, manufacturer code and signal strength. The row colour shows the state at a glance — in addition, the state is always given as **text** in the row:

Colour	Meaning
Green	Key available, telegram decrypted
Red	Encrypted telegram, key missing
Yellow	Unencrypted telegram (plain text)

If a key is missing, tap the row and enter it; from the next telegram on, the values are shown. A key that has been used successfully is stored (section 5.2).

CSV recording

During reception the app writes **one CSV file per meter**. Via “Saved data (CSV)” you can view the recordings directly on the phone, share individual files or export everything as a ZIP.

Reception keeps running

Reception runs as a foreground service as long as the function is open — recognisable by the notification in the status bar.



Fig. 14 · wM-Bus · meter list (DE)

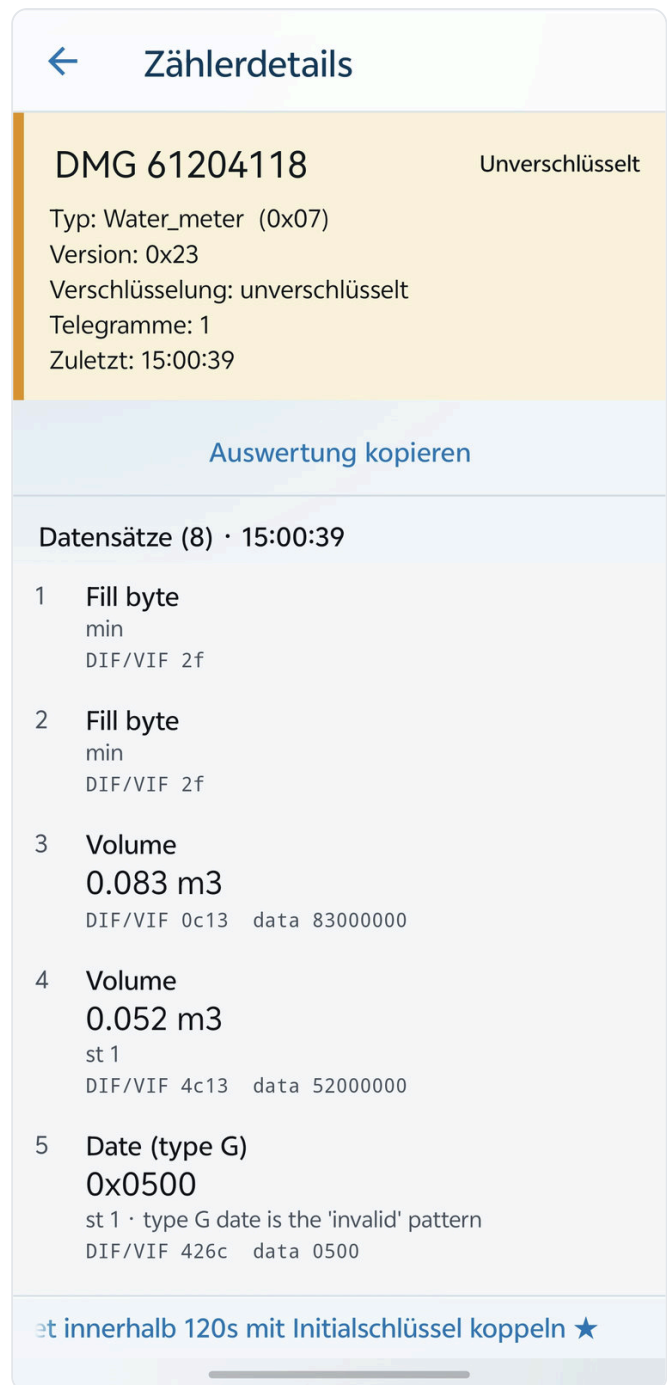


Fig. 15 · wM-Bus · meter details (DE)

4.6 LoRaWAN (under development)

The entry is already visible on the start screen, but the function is still **under development**. Tapping it shows a corresponding notice. We deliberately show the entry already now so that you can see the planned extension — **without** pretending it is already usable.

4.7 Input PIN

Transmits the **4-digit meter PIN as light pulses from the flashlight** (optically) to the meter in order to unlock protected displays.

- 1 Tap **"Input PIN"** and enter the four-digit PIN in the four fields.
- 2 Point the phone's **flashlight** directly at the meter's INFO port. (The lamp can also be switched manually via the lamp icon.)
- 3 Tap **"Start Input"**: the app first flashes an introductory sequence and then transmits each digit as the corresponding number of light pulses. A **progress bar** and the status lines show the current digit (e.g. 3/5).

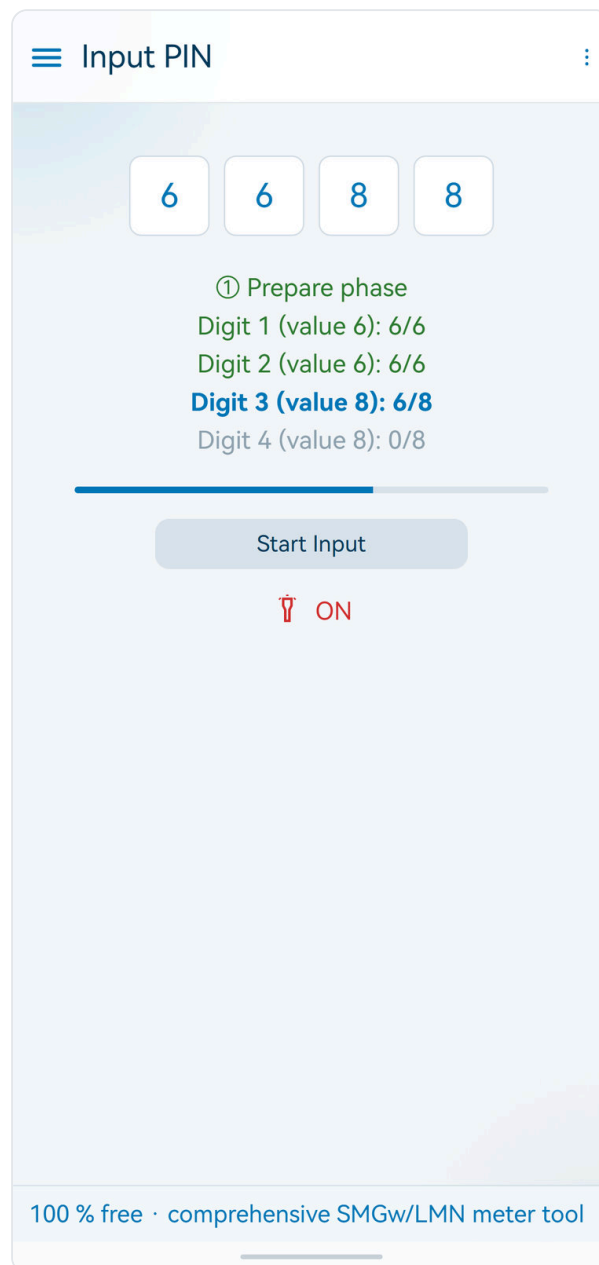


Fig. 16 · Input PIN

4.8 Scanner

Reads the meter's **Data Matrix / 2D barcode** and checks it against the **FNN rules** (FNN_TH 2D barcode). This function replaces the earlier NFC function.

- 1 Tap **"Scanner"** and choose **"Camera Scan"** — or **"Scan Image"** to read a barcode from an existing photo.
- 2 Capture the Data Matrix code on the meter.

The result is presented in several cards: **content** (with natural line breaks or with non-printable characters made visible), **FNN format check** and **meter number analysis** (meter number / server ID). Earlier scans are available via the **history**.

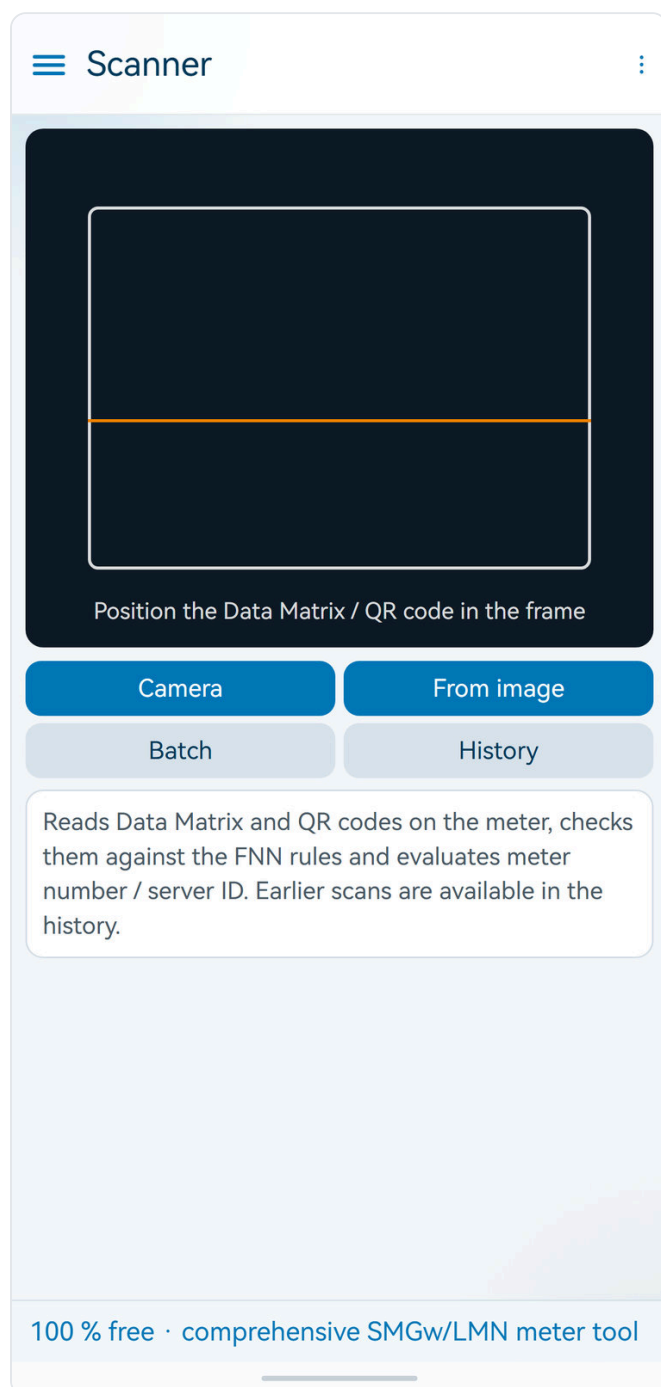


Fig. 17 · Scanner

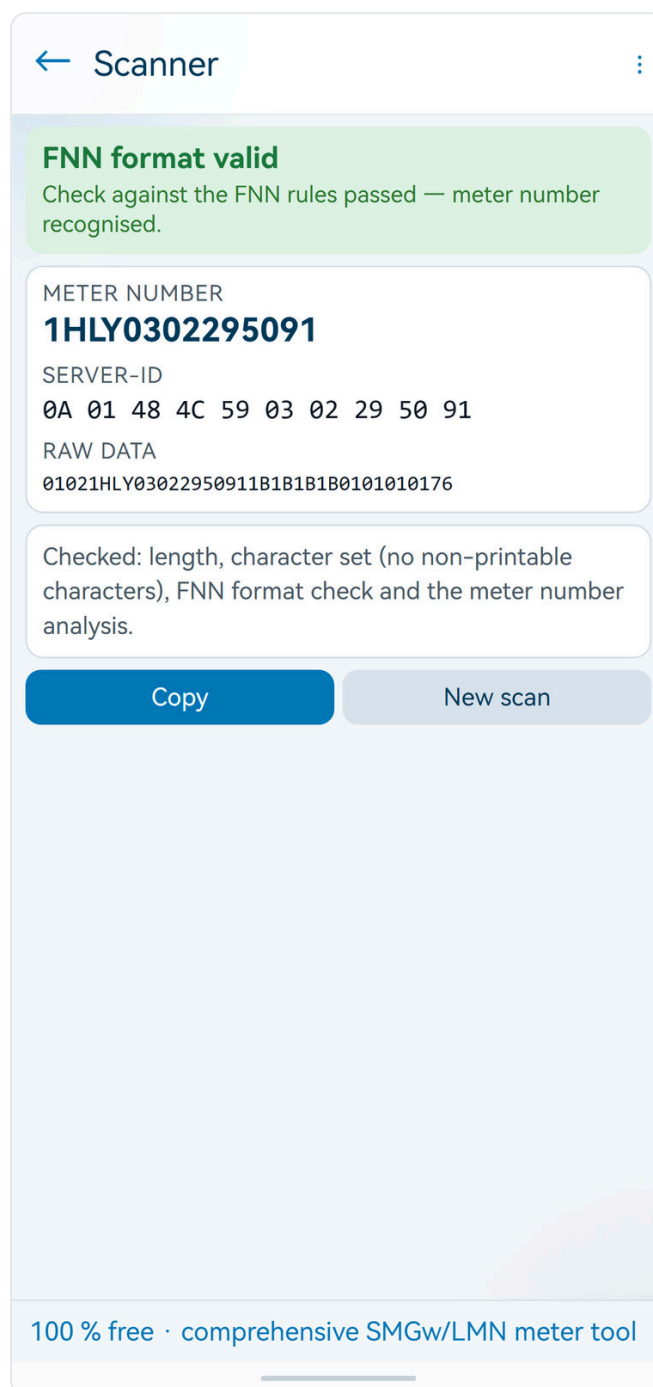


Fig. 18 · Scanner · FNN format check

4.9 NFC Reader

Some DIINNO meters have an **NFC interface**. Its content corresponds to that of the optical INFO interface — you read it directly with the smartphone by holding it against the meter. **No adapter, no cable.**

- 1 Tap “**NFC Reader**”.
- 2 Hold the **back** of the smartphone against the meter's NFC field.
- 3 The meter data appear processed; use “**Copy raw data**” or “**Copy everything**” to take them over.

Also for labels

Any other NFC tag (NDEF) is shown unchanged — with UID, technologies and records. Handy for checking labels and inventory tags.

Prerequisite

The smartphone needs NFC hardware, and NFC must be switched on in the system settings. If either is missing, the app says so.



Fig. 19 · NFC Reader (DE)

5. Setup

Reached via the **"Setup"** tile:

Setting	Function
Language	Deutsch · English · 中文 (per-app language, effective immediately).
Pairing curve	Choice of the EC curve for pairing/TLS: <code>secp256r1</code> (default), <code>brainpoolP256r1</code> (BSI), <code>secp384r1</code> , <code>brainpoolP384r1</code> , <code>brainpoolP512r1</code> . Certificates for all curves are included.
Keep SYM key on pairing (new)	Active by default. The meter key is no longer rotated after pairing — the meter remains reachable with the key used for pairing. If you paired with the initial key , the meter is still reachable with the initial key after the readout; a crypto reset before delivery is not needed. Switching it off restores the earlier behaviour (rotation after every pairing).
Encrypted SYM key → Generate...	Selects a plain-text key file (<code>xlsx</code> / <code>txt.csv</code> / <code>els</code> / <code>docx</code>), automatically extracts meter number + SYM key + public key and creates an encrypted <code>.enc</code> file from it (optionally with a password). Details in 5.1.
Import key	Import of an <code>.enc</code> or plain-text key file into the device vault — identical to “Add secret key” in the LMN console.
Device keys (new)	All meter keys used by the device in one place — LMN and wM-Bus. Only meter number and fingerprint are shown, never the key itself. Details in 5.2.
Log	Switch to record the communication (all functions, for fault analysis). When the switch is on, View • Export • Delete • More and “ Send by email to DIINNO ” appear. Export is possible after a security prompt (the log contains device and meter communication data and serves fault diagnosis only). Details in 5.3.
Privacy (GDPR)	At the very bottom of the page: “ Delete My Data ” (Art. 17) and “ Export My Data ” (Art. 20) — can be run locally at any time, without an internet connection. Deleting removes all stored keys, the device identifier and the log files; afterwards the app behaves like a fresh installation.
Feedback	Contact address info@diinno.de — for questions and error reports.
About DIINNO	Company and contact details, Privacy Notice , Service Agreement , Open Source Licenses , installed app version and the link to this user manual (section 6).



Fig. 20 · Setup (DE)

5.1 Encrypted key vault

So that SYM keys do **not** lie around **in plain text** on service devices, the app supports an encrypted key vault — **byte-compatible** with the DIINNO factory test system. Goal: a service technician can use **only the key of the meter currently scanned** and does not see the other keys.

1 • Generate (Setup)

“Encrypted SYM key → Generate...” → choose a plain-text key file. The app recognises the fields **by length/format** (independent of column order, tolerant of separators) and exports an encrypted `.enc` file (**AES-256-GCM + script**). Optionally, an **opening password** can be set.

2 • Add (Setup or LMN menu at the top right)

“Import key” or “Add secret key” → import an `.enc` or plain-text file. The keys are taken into a device-local vault; alternatively the key of the current meter can be entered manually.

3 • Automatic fill-in (pairing)

When the console of a meter contained in the vault is opened, its **initial key is entered automatically** into the input field. **Keys of other meters are never shown** (the vault is decrypted in memory only; only the meter currently scanned is displayed).

Security

On the storage medium the `.enc` file is **ciphertext** (not readable in an editor or by email). The full key is shown only in the app; logs and documents contain only the fingerprint (keyFp). The transparent mode (without password) offers **obfuscation protection**; for stronger protection, set a **password** when generating.

5.2 Device keys

While 5.1 describes the key file you **bring along**, the “**Device keys**” list collects the keys the device has learned itself during operation:

- 1 **LMN keys** are stored automatically after successful pairing.
- 2 **wM-Bus keys** are stored as soon as they have decrypted a telegram.

Fingerprint only, never the key

The list shows **exclusively meter number and key fingerprint** (e.g. `initial 3f9a... • current 7c21...`) — never the key itself. Mark entries you no longer need and delete them together.

Deletion is final

For LMN meters the initial key must be entered again before the next pairing; wM-Bus meters appear as encrypted again.

5.3 Log

For troubleshooting in the field, the app records the complete communication on request.

- 1 Switch on “**Record log**” — only then is anything written.
- 2 **Reproduce the fault once.**
- 3 “**Export**” — by default, **today's** log is output. Via “**More**” you choose another range (this session only · today · 3 days · everything kept); the estimated file size is shown for each range so that the email does not fail at the attachment limit.

- 4 **“Send by email to DIINNO”** — recipient, subject and attachment are pre-filled. Please add briefly: *what you did, what you expected, what happened.*

Retention

Logs stay on the device until you send or delete them. Older recordings are cleaned up automatically.

6. Products / New Release

The **“New Release”** tile presents the DIINNO accessories — including the basic meter eHZ (EHZ541-i), the LMN-USB-12V adapter, the optical communication converter and accessory cables. Swipe through the product cards; the cards lead to further information. Under **“About”** you will find company and contact details, the Privacy Notice, the Service Agreement and the Open Source Licenses.

User manual directly in the app

In the **“About”** section, the button **“Open the user manual (PDF)”** leads to exactly this document — it is hosted online, so you always open the current edition. An internet connection is required for this.

Free of charge

The DIINNO Toolbox app is completely free — no activation code and no account are required.



Neuheiten

DIINNO

NK-VDS



Konfektionierter Verdrahtungssatz zum Anschluss der Steuerbox (STB) an die Steuersignal-Klemmleiste (STK) nach BDEW. Flexible 6-adrige Steuerleitung $6 \times 0,75 \text{ mm}^2$, beidseitig mit Aderendhülsen, farb- und funktionsmarkiert.

Längen 100 / 150 / 200 cm (NK-VDS100 / NK-VDS150 / NK-VDS200). Im Lieferumfang: brauner Durchgangsbinderdraht (25 cm) inkl. Durchgangverbinder.



DIINNO Toolbox — kostenloses SMGw/LMN-Zähler

Fig. 21 · New Release (DE)



Fig. 22 · About DIINNO (DE)

DIINNO

DIINNO GMBH

Brunsbütteler Damm 93
13581 Berlin
Germany

CONTACT

Tel: +49 (0)30 2388 3766
info@diinno.de
www.diinno.de

ABOUT DIINNO

Smart metering — German engineering standards, compliant with BSI / MID / FNN.

Smart Metering. Precisely connected.