FAQs – DEHNrecord SD

A. General

1. What is DEHNrecord SD?

⇨ DEHNrecord SD is a multi-functional, high-quality measuring and analysis device based on edge computing for measuring
- power quality as per IEC 61000-4-30 class A / limit values as per EN 50160 and additional customised parameterisation,
- load profile and power measurement,
- power-frequency overvoltages as per EN 50550 and
- digital inputs and outputs.

⇨ An RJ45 Ethernet socket (10/100BASE-T as per IEEE802.3.i) is used as the communication interface. With the protocols Modbus TCP and MQTT 3.1 (Azure basis), communication can be performed to the Modbus master and to cloud systems respectively.

⇨ In order to reduce and efficiently organise the data volume, standardised mean values are communicated in a cloud system or via Modbus TCP, for example. If a limit value violation occurs, a high-resolution fault record of the event can be transmitted.

⇨ Independently of limit value violations, fast data transfer (3-second values) can be triggered through the Web or by pressing the appropriate pushbutton on the device.

2. Where are the measured values displayed?

⇨ The measured values can either be displayed via Modbus TCP in existing dashboards / software platforms or via the MQTT interface in a cloud system; e.g. from DEHN or other providers.

3. What does DEHNmonitor PQ contain?

⇨ DEHNmonitor PQ is the DEHN cloud solution for DEHNrecord SD. A display of the recorded measurement series and events.

⇨ Firmware updates can be downloaded via DEHNmonitor PQ for devices that are operated exclusively via Modbus TCP (offline devices).

⇨ When running DEHNrecord SD via the cloud (online mode), firmware updates can be installed automatically. (Configurable)

⇨ Furthermore, measurement site management, including configuration and parameterisation, can be performed through DEHNmonitor PQ. Configuration can be performed for every device individually and automatically on a pre-defined equipment group.

⇨ DEHNmonitor PQ is currently a beta version which can be used free of charge for an agreed period of time by accepting the terms and conditions.

4 How can a DEHNrecord SD be registered in the DEHNmonitor PQ?

⇨ In order to register a DEHNrecord SD in the DEHNmonitor PQ, a secret code must be specified. This is the four digits after the serial number stated on the respective device rating plate.

5. What models and accessories are there?

⇨ Model A – 230 V AC power supply, via measurement path L1.

⇨ Model B – external 24 V DC power supply.

⇨ Rogowski coils with a rated current of 1,000 A (cable lengths: 1,000 mm, 3,000 mm).

⇨ Split-core transformer with a rated current of 100 A (cable length: 1,000 mm).

⇨ Busbar, 3-pole (TN-C system) and 4-pole (TN-S and TT system).

⇨ Impulse current sensor*) (cable length: 3,000 mm).

⇨ Power supply unit for DIN rail mounting for DEHNrecord SD model with 24 V DC supply voltage.

6. With which lightning current and surge arresters can DEHNrecord SD be connected directly using busbars?

⇨ For the defined busbars, lightning current or surge arresters with a width of 3 standard DIN modules can be connected directly in the TN-C system and 4 standard DIN modules in the TN-S and TT system.

⇨ Products to be recommended are, for example, DEHNvap NG, DEHNshield, DEHNvap EMOB, DEHNguard ACI.

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*) Note: The function "lightning-induced impulse current measurement (8/20 μs and 10/350 μs)" does not currently form part of the functionality. Devices including the impulse current measurement function are expected to be available from Q4/2021.

B. Measurement functions

1. How is the power quality measured?

⇨ **This measurement is performed three-phase through a direct voltage tap either by means of wiring or using busbars directly on SPDs.** A connection to N/PEN is always mandatory.

⇨ The power quality measurement is performed to IEC 61000-4-30, class A.

⇨ The limit values are defined as per EN 50160.

⇨ In addition, individual limit values can be defined independently and parameterised.

2. What are the benefits offered by the option to parameterise additional individual PQ limit values?

⇨ It offers the option both of simultaneously taking into consideration user or location-specific concerns and monitoring them accordingly.
The limit values for event and violation detection and can be set/specified for this individually.
For example, to comply with a desired target corridor for certain voltage characteristics, or to act according to the specifications of the standard for an industrial environment (EN 61000-2-4).

3. How can the impulse current measurement*) be used and what benefits does it offer?

⇨ **An external sensor (optional) can be attached either to the PE/PEN conductor of the earthing busbar, to the PE/PEN conductor of SPDs or also to the insulated down conductors of external lightning protection systems. This allows the detection of impulse currents.**

⇨ Impulses of 1 kA to 100 kA (8/20 μs and 10/350 μs) are recorded.

⇨ As a result, transparency is achieved in relation to the quantity of discharge processes of SPDs, the impacts of atmospheric surges are reported or mains-induced voltage peaks are made visible. The findings can be thus be directly incorporated into the maintenance strategy, and potential faults can be isolated more quickly.

4. What is the purpose of measuring power-frequency surges?

⇨ If continuous overvoltages or neutral point shifts arise, the DEHNrecord SD. detects this and immediately reports an event to the control centre or gives a control impulse through the integrated digital outputs.

⇨ The limit values are defined based on EN 50550.

⇨ There is also the option of defining customised limit values. For example, undervoltage can be detected and reported.

5. How is the load profile and power measurement performed?

⇨ This can be performed either using defined split-core transformers with a current measurement range of up to 120 A, or Rogowski coils up to 2,000 A.

⇨ The measurement is performed with the correct polarity.

⇨ In the standard series device of DEHNrecord SD, the 5-minute mean values are currently transmitted.

6. Do the load profile and power measurement and impulse current measurement functions*) have to be used?

⇨ No, the DEHNrecord SD essentially represents a modular concept.

⇨ If individual measurement functions are not required, the functions can also be deactivated.

7. What function do the integrated IO interfaces offer?

⇨ The 3 digital inputs and 2 digital outputs can be freely programmed and logically linked. For example, control commands can be sent for **defined** PQ events or their status can be communicated through remote signalling contacts integrated in DEHNrecord SD.

8. Do I/Os need to be used?

⇨ No, these can be used optionally.

⇨ In addition, they can be safely deactivated so that no tampering is possible.

9. What is a measurement site operating concept, and what benefits does it offer?

⇨ Each DEHNrecord SD is assigned to a measurement site in the cloud. Any desired measurement sites can be generated, managed, assigned and shared by the user. This means:
  ▪ The data detected/determined by the device is not based on the serial no. of the device, but on the measurement site which allows trouble-free replacement of a device.
  ▪ Consequently, device-to-cloud synchronisation also works after connection interruptions.
  ▪ A large number of devices can thus be configured simultaneously.

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C. Installation

1. Where should I ideally install the device?

⇨ The ideal installation point for the DEHNrecord SD is near the transfer point to the utility (e.g. building connection) or the point of common coupling (PCC). The former is primarily for private and commercial customers; the latter for power supply companies.

⇨ The installation is generally always to be recommended as close to the feeding point of the electrical installation as possible; ideally directly at the place of installation of the lightning current and surge arresters.

2. How is installation performed?

⇨ **The DEHNrecord SD can be installed as a stand-alone device or, preferably, in connection with an SPD. Suitable busbars with a width of 3 standard DIN modules in the TN-C system or 4 standard DIN modules in the TNS and TT system are available for this purpose.**

3. What benefits are offered by a direct connection via a busbar on SPDs?

⇨ Quick and simple installation.

⇨ With the 230 V AC power supply model: Direct power supply without any wiring effort.

⇨ Direct voltage tap for three-phase measurement of the power quality.

⇨ Measurement at the perfect place of installation directly in the infeed.

⇨ No additional backup fuse necessary.

4. How is the DEHNrecord SD designed in terms of overvoltage category? Which measurement category does the DEHNrecord SD satisfy?

⇨ For the design of the power supply of the device with 230 V AC, the voltage measurement input L1 is simultaneously also the input of the power supply for the device.

⇨ Without additional protection measures, the DEHNrecord SD meets the requirements of measurement category 300 V CAT III. This applies both to voltage and current measurement inputs.

BUT:

⇨ If the DEHNrecord SD is combined with a lightning current or surge arrester, or installed within the effective range of one (e.g. DEHNvenCI, DEHNshield, DEHNvap, DEHNguard, etc.), then DEHNrecord SD meets the requirement according to measurement category 300 V CAT IV.

⇨ Our defined Rogowski coils for a measurement range up to 2,000 A meet the requirement of measurement category 600 V CAT IV.

⇨ Monitoring the function of the lightning current and surge arresters (SPDs) used is recommended. For example, the remote signalling contact of the SPD can be integrated and monitored using the I/Os of the DEHNrecord SD.

5. What needs to be observed in a TN-C system?

⇨ For the correct measurement, the N/PEN is required for reference potential. In this case, a link must be established from the N connection on the DEHNrecord SD to the PEN rail.

6. Is a backup fuse required?

⇨ In the case of a stand-alone installation, the cable branch must be fused according to the selected conductor cross-section of the supply line to the DEHNrecord SD.

⇨ The DEHNrecord SD itself does not need its own backup fuse.

⇨ **A backup fuse is chosen for an SPD in accordance with the data sheet of the SPD.**

⇨ When using SPDs with an integrated backup fuses (e.g. DEHNvenCI and DEHNguard ACI device families), no additional backup fuse is necessary.

7. Under which EMC conditions can the DEHNrecord SD be used?

⇨ The device has EMC immunity as per IEC 61000-6-5 for power stations and for switching stations, as well as according to IEC 62586-1 for the general EMC environment (G).

   · Interface type 3 (switchgear installation environment) for voltage, current and impulse current inputs[*]

   · Interface type 2 (power station environment) for external voltage and I/Os

8. What does the PQ measuring device definition PQI-A-FI1 mean?
PQI-A-FI1: PQI = Power Quality Instrument; A= measurement class A; F= fixed installation; I = indoors

⇨ PQ measuring method according to IEC 61000-4-30, class A

⇨ Permanently installed device for use indoors.

⇨ Ambient temperature range: −10 to +45°C (nominal),
 −25 to +55°C (limit).

⇨ Usage/set-up height up to 2,000 m above sea level.

⇨ Pollution degree 2 as per 61010.

⇨ EMC as per 61000-6-5.

⇨ IEC 62586-1 for general EMC environment (G).

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9. Which voltage category does DEHNrecord SD correspond to?

⇨ In a stand-alone installation outside the effective range of upstream DEHN lightning current and surge arresters, it satisfies overvoltage category III.

⇨ When connected to DEHN lightning current and surge arresters or when the DEHNrecord SD is installed in the effective range of DEHN lightning current and surge arresters, overvoltage category IV.

10. How does the AC power supply version of the DEHNrecord SD behave in the event of a power failure?

⇨ The DEHNrecord SD can bridge voltage interruptions of up to 5 seconds. In case of longer voltage interruptions, no measured values are recorded. As soon as the voltage supply is restored, an power interruption event is generated and reported as a limit value violation in the cloud or Modbus TCP.

11. How does the DEHNrecord SD behave, or what happens, in the event of temporary communication failures (e.g. in the event of unstable mobile network connections) i.e. power supply working but communication not?

⇨ Events and 10-min. heartbeats are buffered and then sent once the communication channel is re-established.

D. Configuration of DEHNrecord SD

1. How is configuration and parameterisation performed?

⇨ Configuration and parameterisation is possible via Web server, Modbus or cloud.

2. What can be configured?

⇨ Customised power quality limit values (via Modbus or cloud only).

⇨ Parameters for power-frequency overvoltages.

⇨ Current measuring coils.

⇨ I/O interfaces.

⇨ Geodata (latitude and longitude).

⇨ Impulse current parameters*).

⇨ LED function.

⇨ Logic links.

⇨ Network settings.

3. Do you have to be present on site for firmware updates?

⇨ No, not necessarily.

⇨ They are performed either manually as an offline update via the Web server (update file must be downloaded beforehand).

⇨ Or in fully automated fashion as an online update via the cloud.

4. Where do I get the latest firmware updates?

⇨ If the DEHNrecord SD communicates with the cloud (DEHNmonitor PQ), updates are automatically downloaded and installed. In the event of a new update status, you will automatically be notified accordingly via email.

⇨ The updates can be downloaded from the DEHNmonitor PQ and installed directly on the devices.

5. Despite being installed correctly, DEHNrecord SD is not visible in the DEHNmonitor PQ or in the network. What is the solution?

⇨ In "DEHNmonitor PQ", the device is only visible after it has been added to a measurement site manually by the user.

⇨ Following successful installation, pushbutton 2 on the DEHNrecord SD must be pressed once for approx. 1 second, so that the Web server is activated. After that it's visible in the network.

⇨ Follow the guidance in the installation instructions and user manual! (IP addresses, subnetwork screen, etc.)

E. Miscellaneous

1. Is there connectivity to the Cumulocity cloud platform?

⇨ This will be available as part of a firmware version from approx. Q3 2021.

2. Is there an IT security concept?

⇨ A state-of-the-art, future-proof IT security concept is always factored in so that no tampering is possible.

⇨ If you have any detailed questions, please refer to your DEHN contact person.

3. What features does DEHNrecord SD not currently have?

⇨ Adjustable current measurement value intervals. This will be added as part of a firmware update.

⇨ Calculation of PEN currents. This will be added as part of a firmware update.

⇨ It does not currently cover the standards for energy measuring devices, etc.

⇨ Cannot currently be used for other voltage ranges beyond 230/400 V and 50 Hz.

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