PD by Megger®

Power Diagnostix

GIS*monitor* Portable

Portable partial discharge monitor

LANGUAGE | EN

USER GUIDE

Power Diagnostix

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1 General

1.1 About this manual

This manual describes the hardware, software, and usage of the portable GIS*monitor* in its current version.

Software updates are available on Power Diagnostix's website (www.pdix.com). Access to the download area of this website is password protected and requires a valid software maintenance contract. Contact Power Diagnostix for details (support@pdix,com). Revisions of this manual and current brochures are also available for download (Adobes PDF format) on this website.

1.2 Instrument safety

Before using the GIS*monitor*, read the following safety information and this manual carefully. In particular, read and follow the information, which is marked with the words 'Warning' and 'Caution'. The word 'Warning' is reserved for conditions and actions that pose hazards to the user, while the word 'Caution' is reserved for conditions and actions that may damage the instrument, or its accessories, or that may lead to malfunction.

Always obey the safety rules given with the warnings on the unit and in this guide. Make sure to take care of the safety issues while performing field measurements. Never disregard safety considerations, even under the time constraints often found with on-line and off-line tests on site.

Warning

- Always ensure solid grounding of the instrument. Never operate the instrument without protective grounding.
- Use isolation techniques, such as isolation transformers or fibre optic isolation to avoid hazard and injury. With applications bearing a high risk of electrical shock or breakdown, use fibre optic isolation in general.
- Do not work alone.
- Do not allow the instrument to be used if it is damaged or its safety is impaired.
- Inspect the ground leads and signal cables for continuity.
- Select the proper coupling circuit and connection for your application.
- Do not use the instrument in an environment where there is risk of condensation or risk of explosion.

2 Hardware

2.1 Standard models

The GIS*monitor* unit comes in a portable, lightweight desktop enclosure of half (Figure 2.1) or $^{2}/_{3}$ 19 inch or a shock resistant and watertight Explorer case (Figure 2.2 and Figure 2.3) for outdoor use. All connectors necessary for measurement and remote control via a personal computer are accessible on the front or top side of the instrument.

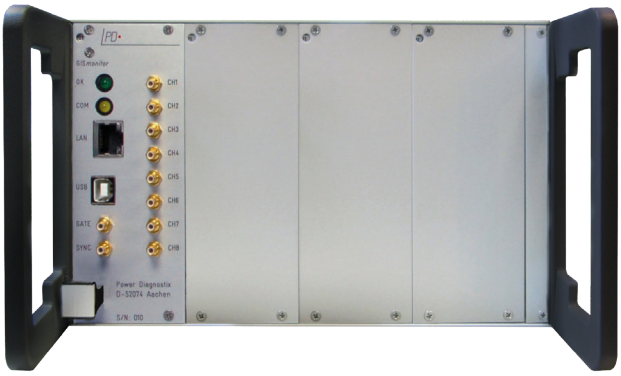


Figure 2.1: GISmonitor in a half 19-inch desktop enclosure

Figure 2.2: Eight-channel GISmonitor in an outdoor case

Figure 2.3: 40-channels GISmonitor in an outdoor case

2.2 Optional features

2.2.1 Monitoring server

Built-in monitoring web server providing an Ethernet gateway for platform-independent remote access to stored measurement data of a portable GIS*monitor* instrument.

2.2.2 Mobile communication interface MCI2

The mobile communication interface allows remote access to the GIS*monitor* Portable via UMTS. This option is available as additional module.

3 Installation

The GIS*monitor* Portable allows the partial discharge detection on external or embedded ultra-high frequency (UHF) sensors. With this application, the special UHF frequency converter unit FCU is closely connected to the sensor's output. At best, to avoid any unnecessary attenuation, this connection is made rather using an N-N adapter than a cable.

The input protection unit IPU2B protects the measurement system from high voltages generated by switching operations, transients, or overvoltage.

Figure 3.1: Input protection unit IPU2B; IP52 (left) and IP65 model (right)

The signal is then transformed by a frequency converter unit (FCU2) into a lower frequency range for easy submission over longer distances.

The transformed signal is transmitted by use of 50 Ohm coaxial cable (RG58 for indoor use, RG142 for outdoor use) and digitised by the GIS*monitor* Portable, which offers the acquisition of up to 40 sensors in parallel (depending on the instrument's model).

Figure 3.2: Frequency converter unit FCU2 (IP52 and IP65 model)

3.1 Connections

The connections to the GIS*monitor* Portable are made on the front or on the top panel of the instrument. The half 19-inch desktop model and the eight-channel Explorer version offer ten SMB or BNC connectors, one USB-B connector, and a LAN connector. If the GIS*monitor* is housed in an Explorer case, the mains supply and the wing nut screw for grounding are on the instrument's top side, whereas the desktop model offers these connectors on the rear panel.

The functions of the connectors are described in the following sections.

3.1.1 Desktop model and eight-channel Explorer version

CH1–CH8: These connectors take the PD signal coming from a frequency converter unit (FCU).

SYNC: The SYNC is used for external synchronisation to the frequency of the applied high voltage. This signal is usually derived from voltage transformers or different coupling units. This terminal can take voltages up to ca.100 V RMS or ca. 200 V_{peak}. If the SYNC is not connected, the GIS*monitor* must be set to "Internal Synchronisation" and will synchronise on the mains supply frequency (usually 50 or 60 Hz), then.

GATE: The GATE terminal can be used for noise rejection during measurements. For this, an additional FCU connects the unwanted noise signal with the GATE. To pick up these signals, a DA2 can be used as an antenna. The DA2 is equipped with a built-in FCU.

Mains supply: The mains power supply plug must be connected to a power outlet providing power in the voltage range 85 V AC up to 264 V AC, frequency 47 to 440 Hz. The on/off switch for the unit is located underneath the mains plug. A power supply fuse is located between the on/off switch and the mains power inlet.

GND: The wing nut of the GIS*monitor* must be connected to earth/ground.

USB: The USB port provides a USB connection to a personal computer for remote communications. A standard USB A-B cable is included in the delivery.

LAN: The LAN connector is a standard RJ45 connector for Ethernet and provides a connection to a personal computer for remote communications. The LAN module is pre-configured with an IP address and a port.

Figure 3.3: GISmonitor Portable installed on a GIS

3.1.2 Explorer version with up to 40 channels

CH1.1–CH5.8: These connectors take the PD signal coming from a frequency converter unit (FCU).

SYNC: The SYNC is used for external synchronisation to the frequency of the applied high voltage. This signal is usually derived from VTs or different coupling units. This terminal can take voltages up to ca.100 V RMS or ca. 200 V_{peak}. If the SYNC is not connected, the GIS*monitor* must be set to “Internal Synchronization” and will synchronise on the mains supply frequency (usually 50 or 60 Hz), then.

ANT1–ANT3: The ANT terminals can be used for noise suppression during measurements. A gating signal can be picked up using the disturbance antenna DA2 with a built-in frequency converter unit. Up to three gating signals can be connected at a time and are mixed to one disturbance signal.

GATE OUT: Output of the mixed disturbance signal (of ANT1–ANT3).

Mains supply: The mains power supply plug must be connected to a power outlet providing power in the voltage range 85 V AC up to 264 V AC, frequency 47 to 440 Hz. The on/off switch for the unit is located underneath the mains plug. A power supply fuse is located between the on/off switch and the mains power inlet.

GND: The wing nut of the GIS*monitor* must be connected to earth/ground.

USB: The USB port provides a USB connection to a personal computer for remote communications. A standard USB A-B cable is included in the delivery.

LAN: The LAN connector is a standard RJ45 connector for Ethernet and provides a connection to a personal computer for remote communications. The LAN module is pre-configured with an IP address and a port.

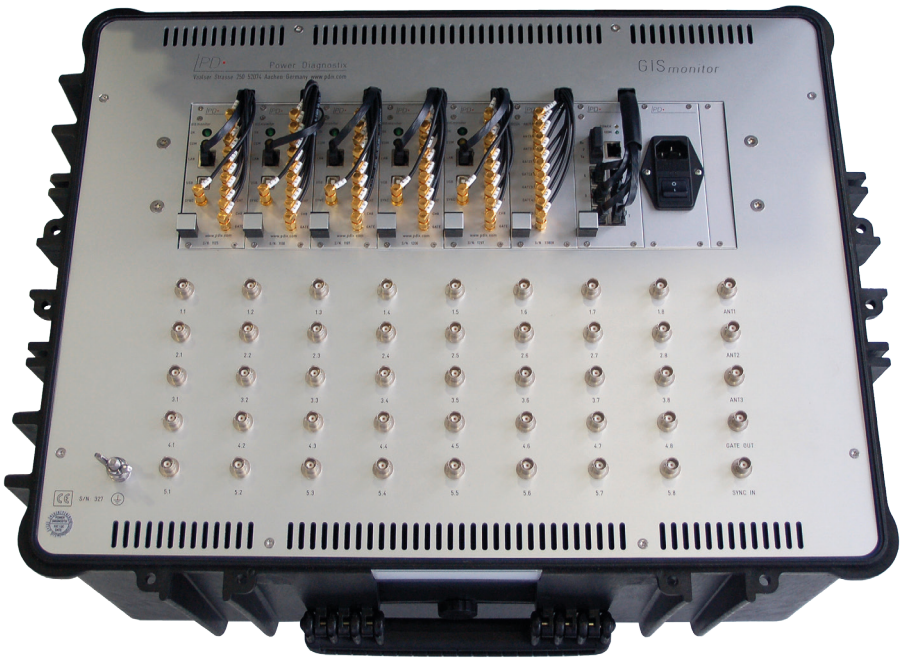


Figure 3.4: Panel of a 40-channel GISmonitor

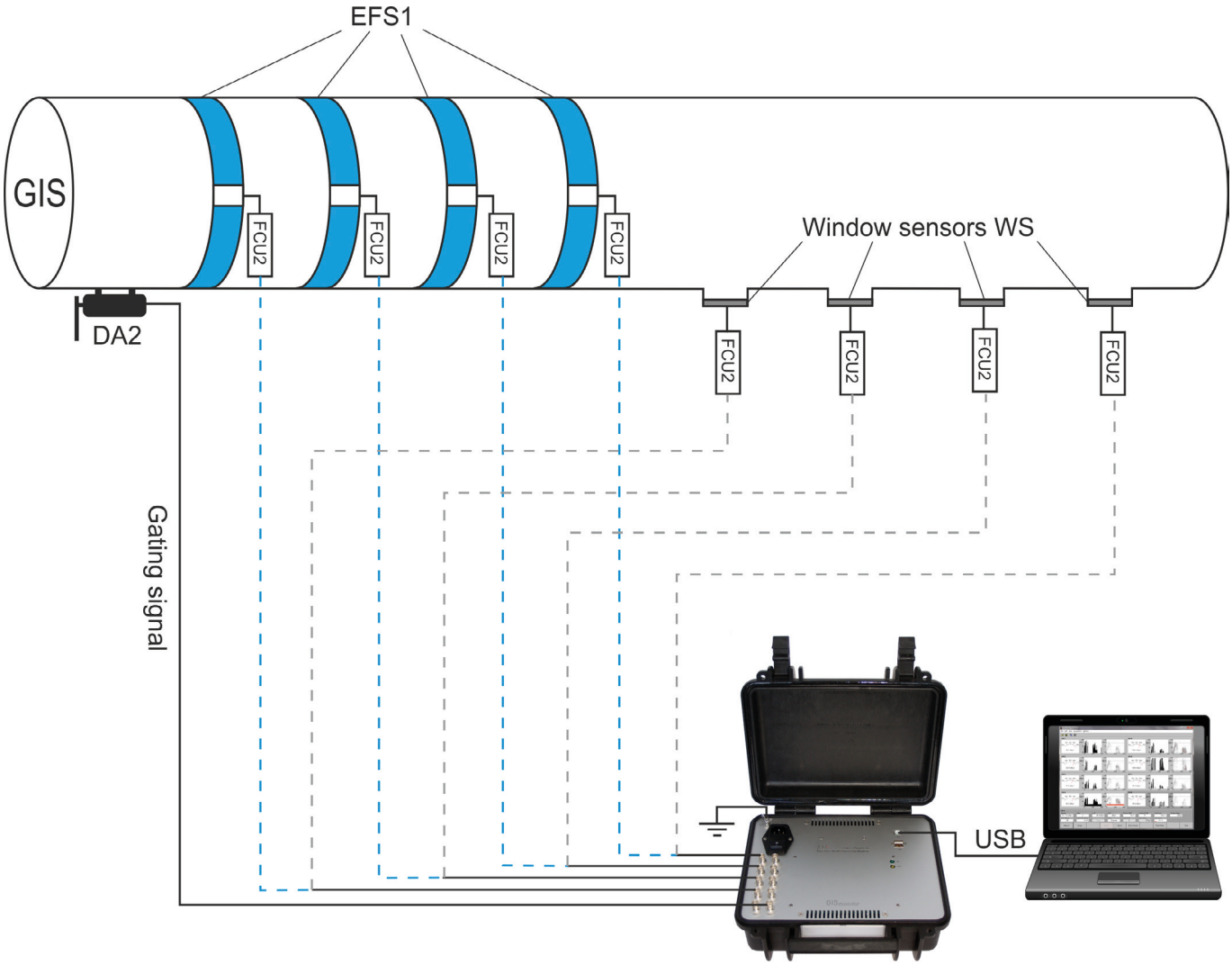


Figure 3.5: Example setup without external synchronisation

4 The GIS*monitor* Portable software

4.1 Introduction

The GIS*monitor* software visualises the current readings of the partial discharge sensors of a gas-insulated switchgear (GIS) and indicates PD events or system notifications. Each sensor is linked with a specific input channel of a GIS*monitor*.

4.2 Operation

The GIS*monitor* collects and stores the data of each connected sensor. This collected data is analysed by the GIS*monitor*Server software and presented to you in a variety of different visualisations in the GIS*monitor* viewer software. The software can operate in three modes. The default is the monitoring mode, in which trending data and system data are collected and stored in a database. Events will be created depending on pre-configured thresholds and several types of events are being logged. The manual mode is used for in-depth live visualisation and manual analysis of the current measurement data. Storing of the automated trending data and event creation is stopped as long as the manual mode is active. The maintenance mode stops the automated creation of events as well as the recording of measurement data during maintenance or rectification works.

4.2.1 Connecting to the instrument

The connection with the GIS*monitor* instrument can be made either by USB cable or by RJ45 cable (LAN). For the LAN connection, the user must set the IP address of the Ethernet port in the software (if the laptop was provided by Power Diagnostix, the port has already been set adequately).

To set up the IP address, take the following steps:

1. Right-click on the Windows start menu and select “Network Connections” from the context menu.
2. In the “Network Connections” window, locate the network adapter whose IP address you want to configure and right-click on it. Then select “Properties”.
3. Locate “Internet Protocol Version 4 (TCP/IPv4)”, right-click on it, and select “Properties”.
4. Select the option “Use the following IP address” and enter the following information:
   - IP Address: 192.168.20.99 (many others can be used but we strongly suggest to use this one.)
   - Subnet Mask: 255.255.255.0
   - Default Gateway: This can be left empty.

   Click “OK” to save the settings.
5. Now the PC should be able to connect to the instrument.

4.2.2 Starting the software

The GIS*monitor* Portable software can be started via the link on the desktop, the Windows Explorer, or the Windows Start/Programs menu. Subsequently, the main panel appears as shown in Figure 4.1.

Please note: You get the best possible view with a display zoom of 100 % at full HD.

4.2.3 Monitoring mode

In the upper left-hand corner is a context sensual quick settings toolbar. Settings that can be changed are the unit (dBµV or dBm) that the software will display and the displayed range of visualised measurement data.

4.2.3.1 Overview

The GIS*monitor* software starts in the “Overview” tab. The sensors are visualised by small coloured horizontal bars as shown in the figure below:

Figure 4.1: Overview schematic with all sensors being off-line

The sensor colours can be changed in the “Color Settings” menu under “Edit”. Default settings are green, yellow, and blue for appropriately working sensors of different phases. Black or grey sensors indicate false initiation or no connection to the related GIS*monitor*. In case the connection between the GIS*monitor* and a frequency converter unit (FCU) is lost, a flashing orange frame will appear around the associated bar. In case of a low-level PD warning, the sensors colour will turn to orange, in case of a high-level PD warning, it will turn to red.

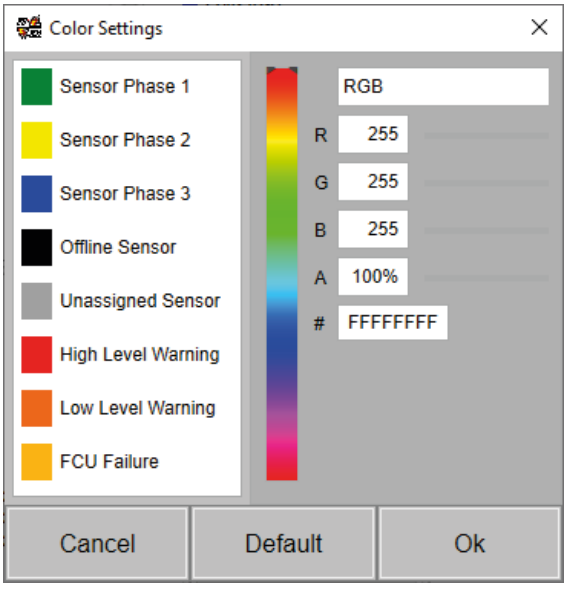


Figure 4.2: Colour settings

Double-clicking on a sensor displays a window showing the previous trending data and the current measurement values of this sensor.

On the upper left-hand side, the name of the sensor is displayed. The last average value and last pulse peak value of the sensor are shown as well as the configured event thresholds. On the upper right-hand side an accumulated pattern is displayed. The graph beneath shows the average and pulse peak trending values for the last six minutes. If “History” is selected in the “Show Trending” dropdown list, the data of the last month can be viewed. To get more detailed information about the sensor, the analysis panel can be opened by clicking the “Analysis” button. The analysis panel provides the complete trending data and allows the comparison between different sensors (see also section 4.2.5).

Press the “Print” button to either print the current panel or to save it as a file on the laptop.

Press the “Copy” button to copy the content of the window to the clipboard.

Pressing the “>>” button enlarges the window and displays a larger pattern.

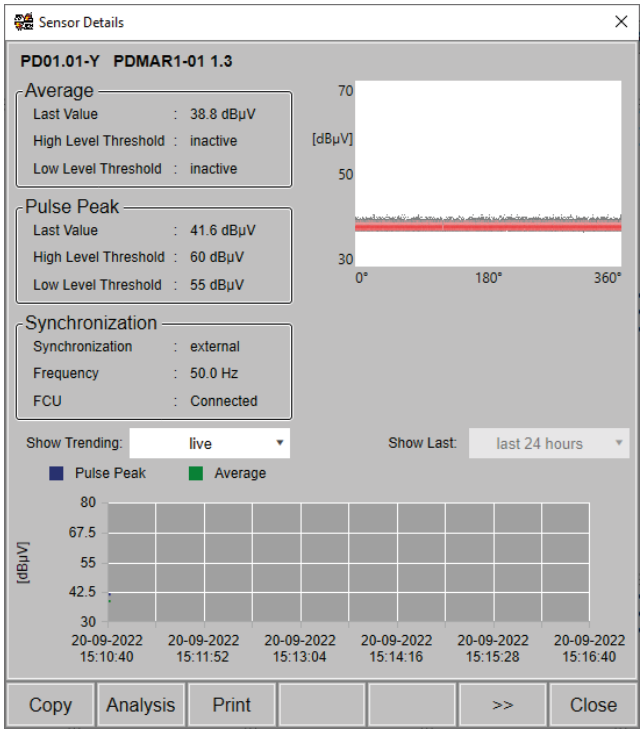


Figure 4.3: Sensor details

4.2.4 Live analysis

Up to 15 sensors can be selected in the overview tab and viewed simultaneously by clicking on the “Live Analysis” tab. The upper part of the panel shows a trending graph that depicts the average and pulse peak values of all selected sensors. In the lower part the patterns for the selected sensors are shown.

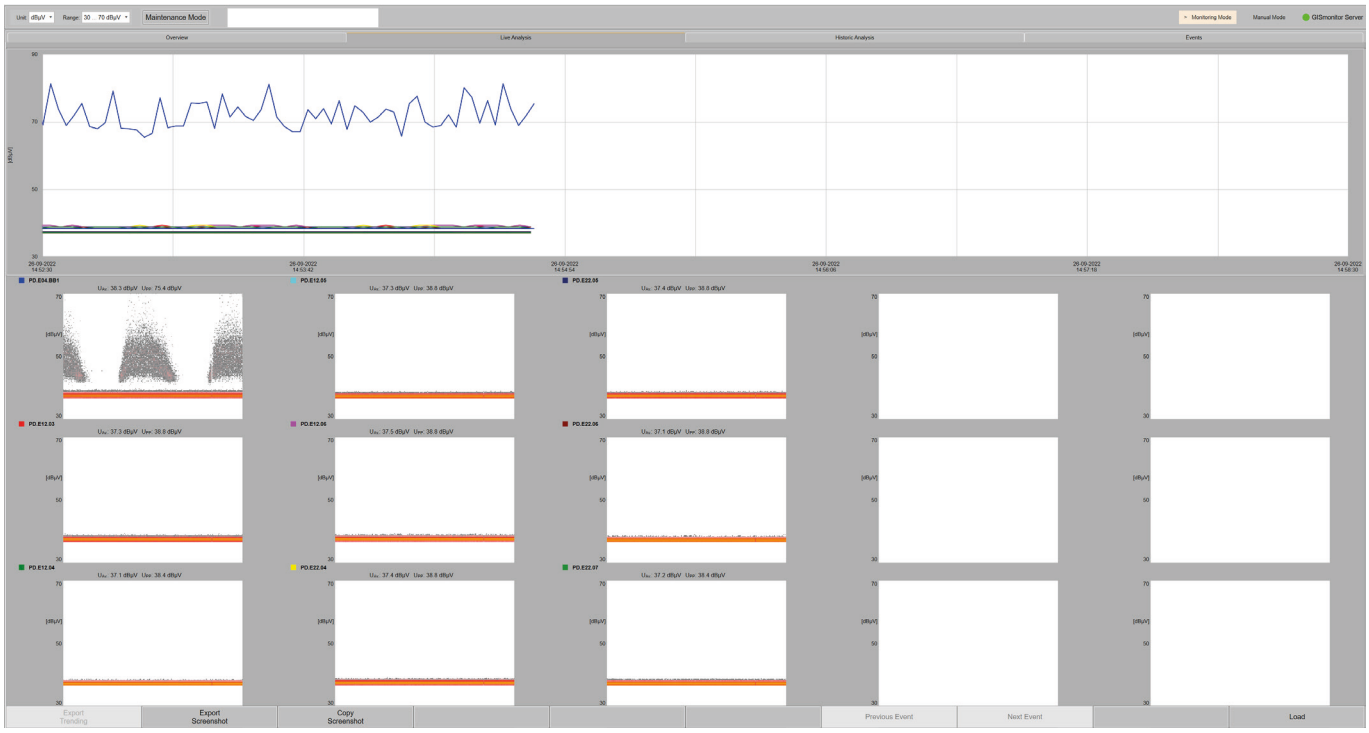


Figure 4.4: Panel for live analysis

4.2.5 Historic analysis

For a detailed analysis of the trending data, please select the “Historic Analysis” tab. Up to 15 sensors can be selected in the overview.

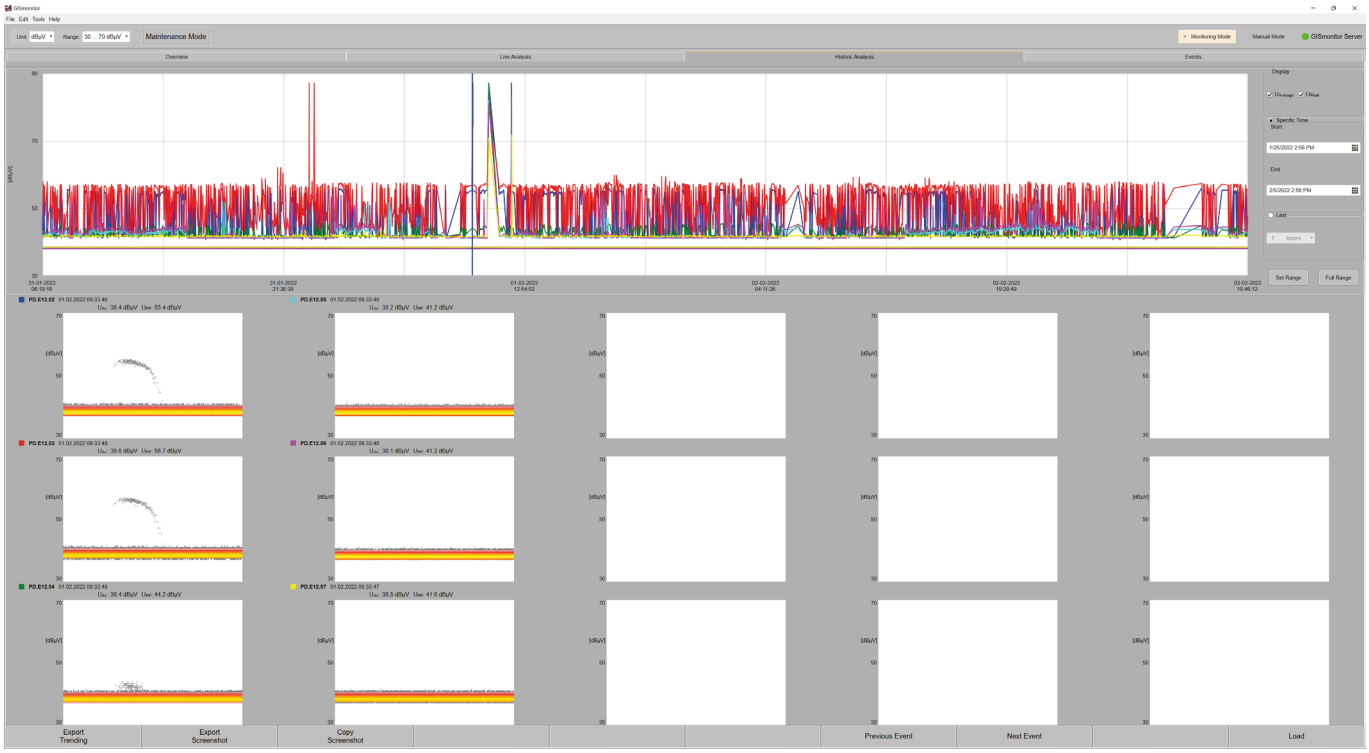


Figure 4.5: Panel for the historic analysis

The upper part of the panel shows the trending graphs for the average and pulse peak value, and the lower part shows the patterns of the selected sensors for the selected cursor position. Moving the cursor of the graphs will show the values at the new cursor position and will display the pattern next to this time.

Zooming and shifting of the graph in x-direction is done by selecting either the specific time or selecting the pre-defined interval and pressing the “Set Range” button. The “Full Range” button sets the zoom of the graph to a level, that the full range of the selected interval is shown.

By pressing the “Export Trending” button, the measurement data can be saved as an *.xlsx file.

The “Copy Screenshot” button will copy the content of the window to the clipboard. “Export Screenshot” will save the content of the window as a *.jpg file.

4.2.6 Alert and warning events list

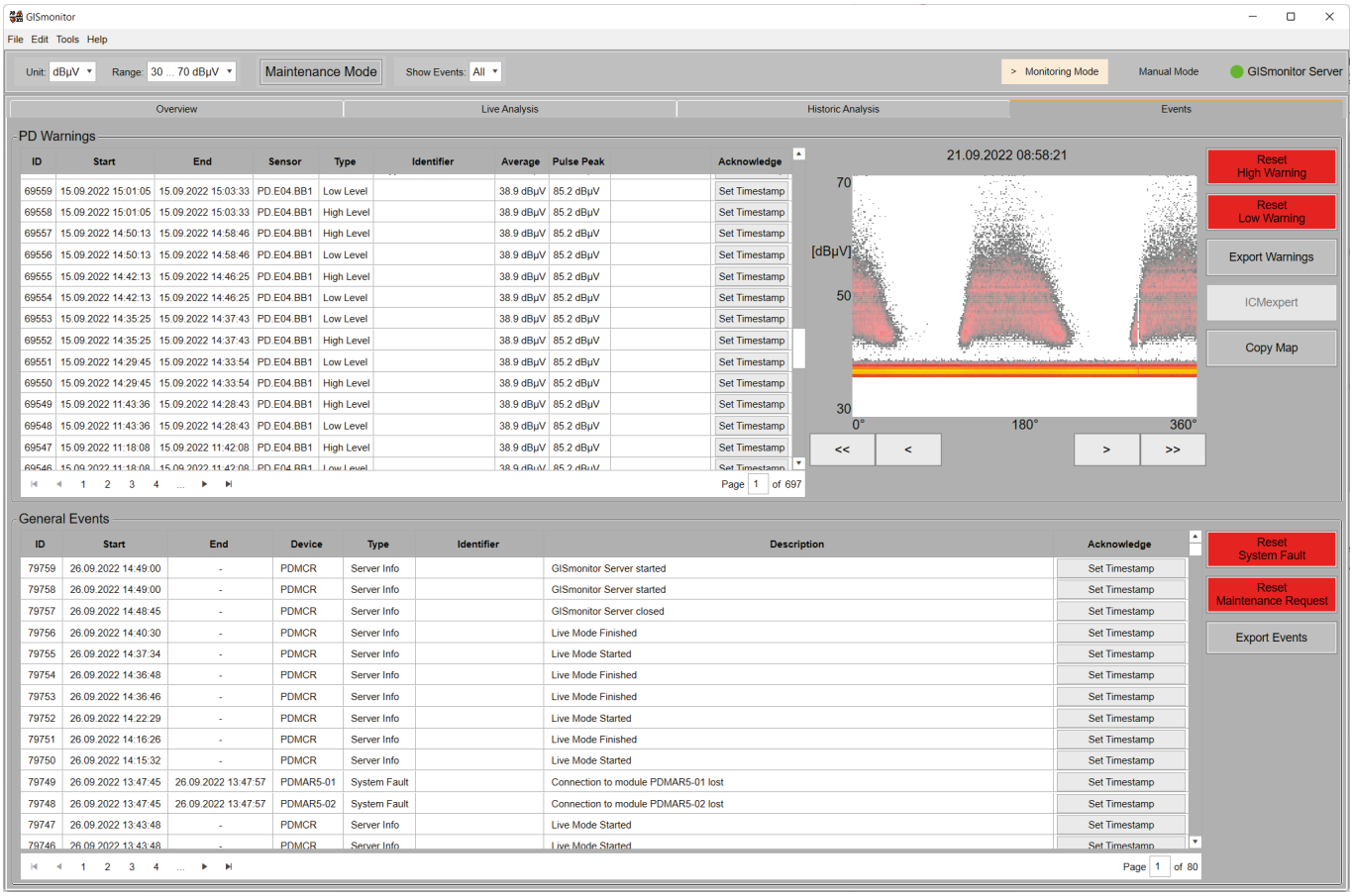


Figure 4.6: Events list

All alerts and warnings are stored and can be displayed in the events list, which can be accessed via the “Events” tab in the tab menu of the GIS*monitor* application. The “PD Warnings” list on the upper left-hand side displays the high-level and low-level warnings of all sensors. By clicking on a specific event, the corresponding coloured pattern is shown on the upper right-hand side. High-level and low-level warnings are triggered independently, relying on the respective alert threshold. Events are grouped and can contain several smaller events, depending on how long the threshold was surpassed. Each event of the group can be inspected separately by pressing the “<” or “>” button. Pressing the “<<” button will select the first event of the group, while pressing the “>>” button will select the last event. The “General Events” list at the bottom displays all maintenance and hardware events. Each event is tagged with a timestamp and provides information about the location, the type of error, and a short description. To acknowledge an event, you can click the “Set Timestamp” button, which will tag the event with date and time of acknowledgement.

Sensor high-level and low-level events as well as maintenance and hardware alerts can be reset by using the “Reset” buttons next to the respective list.

The event lists can be exported as .xlsx files by clicking the “Export Warnings” or “Export Events” button. The list shows the alarm and warning events sorted by the time they occurred.

4.2.7 Configuration of the monitor mode

Power Diagnostix provides the GIS*monitor* software completely set up and individually configured for your GIS*monitor* Portable, so, generally, there is no need to change the following options.

Please be aware that changing the set-up might corrupt the software functionality by worsen the detection and identification of partial discharges or preventing alarm and warning outputs.

Some changes will lead to a temporary disconnection between the laptop and the GIS*monitor* instrument. No data will be recorded during this timeframe.

4.2.7.1 General settings

The General Settings menu can be opened via “Edit” -> “General Settings”. The input field “Setup” allows the configuration of the settings regarding the presentation of PD patterns. For instance, the lower level of detection (LLD) can be set individually depending on the level of the background noise. The constant phase shift of the displayed patterns referring to the synchronisation voltage can be defined for each phase.

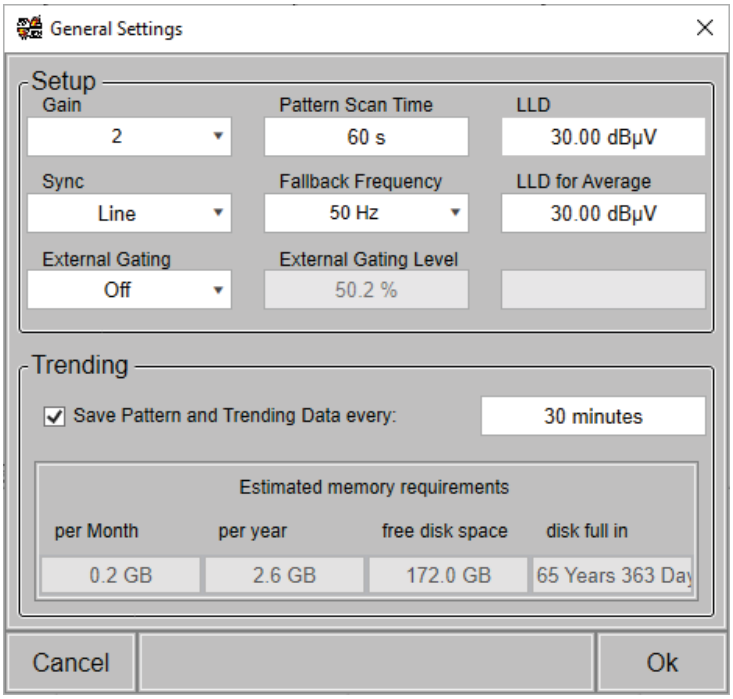


Figure 4.7: General settings window

In the centre of the dialogue box, the synchronisation and gating settings for the GIS*monitor* Portable can be adjusted. The synchronisation can be switched between line and external synchronisation to avoid long cables for synchronisation.

In case a disturbance antenna (DA2) is used, external gating can be enabled, and a threshold can be defined. This will provide suppression of noise created by cell phones, corona effects, and similar.

At the bottom of the dialogue box the settings for the trending data analysis can be adjusted. The acquisition interval of trending can be selected. Depending on the settings for saving trending data and patterns to the hard disk, the estimated memory requirements are calculated, and the time till depletion of disk space is given.

4.2.7.2 Device settings

The settings for the connection between the GIS*monitor* software, the GIS*monitor* instrument (or its plug-in boards), and the UHF sensors can be adjusted in the “Device Settings” dialogue box. This dialogue box is opened by selecting the “Edit” -> “Device Settings” menu item.

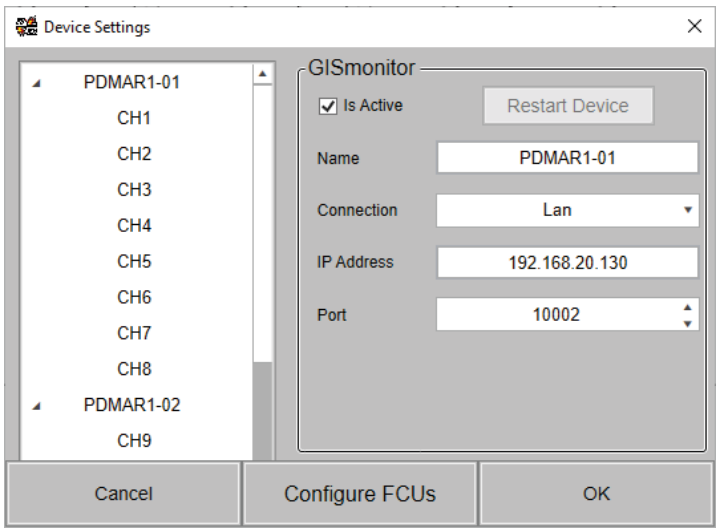


Figure 4.8: Device settings

General settings can be modified on the right-hand side. Enter the settings for the selected GIS*monitor* in the fields there. First a name of this GIS*monitor* can be assigned. Then the type of connection to this GIS*monitor* must be chosen, “USB” or “Lan”. The default setting is “Lan”, and the default port for the GIS*monitor* is 10002. The IP address must be selected according to the setting of the corresponding GIS*monitor*. The typical value for “IP Address” is 192.168.20.1xx (xx represent the last two digits of the serial number found on the instrument or the respective plug-in board). Newer revisions of the GIS*monitor* can be restarted with the software by clicking on the “Restart Device” button at the top of the settings, otherwise the button is disabled.

Click on the “Configure FCUs” button to set the type of the FCU which is connected to a particular sensor, e.g., FCU2 for UHF embedded sensors or FCU3 for high frequency current transformers (HFCTs).

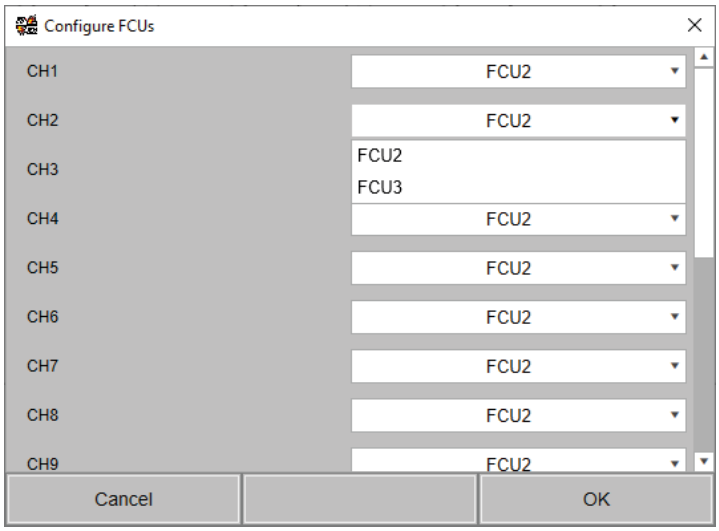


Figure 4.9: FCU configuration window

4.2.7.3 Alert settings

The alarm settings can be configured by selecting the “Edit” -> ”Alert Settings” menu item. The dialogue box that appears is shown in the figure below:

Figure 4.10: Alert settings

The average and pulse peak values that trigger a low-level or high-level alert can be set individually. By surpassing this level, the measurement data will be evaluated using the respective detection level. The minimal count rate defines the number of pulses above the required detection level in a specified acquisition time to trigger an alert/warning event.

These alert settings can be defined for up to 16 groups in which the sensors can be included. Click on “Add Group” to create a new group. Pressing “Remove Group” will delete the currently selected group.

Please note: Group 1 (default) can’t be deleted. To assign a sensor to another group, press the “Define Groups” button and then click on the sensor’s group entry to move the sensor to the desired group.

A recommended configuration will be set up by Power Diagnostix during commissioning.

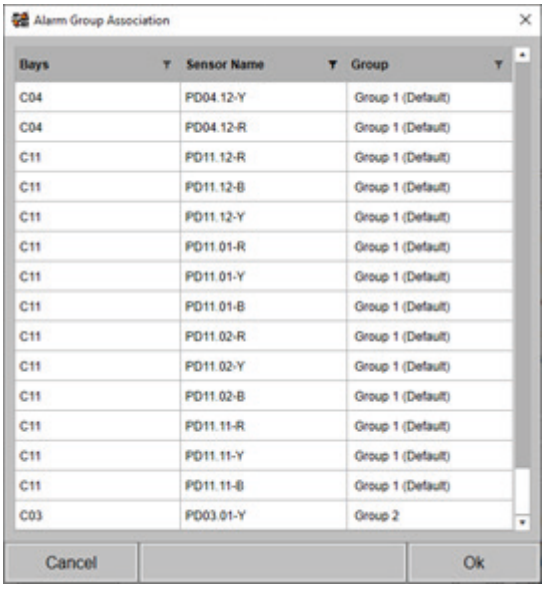


Figure 4.11: Alarm group association

4.2.7.4 Administrative settings

For maintenance purposes, such as installing the software or Windows updates, it may be necessary to re-start or close the GIS*monitor*Server software. This can only be done on the laptop by pressing the “Start” or “Stop GISmonitorServer” buttons. The manual shutdown of the GIS*monitor*Server will disable the watchdog, which restarts the software in case of a failure. It will automatically be enabled when the GIS*monitor*Server is started again, or the laptop gets restarted.

To ensure that only authorised people change the settings of the software, a password can be requested. To enable this option, press the “Enable Password” button. If you choose this option, you have to set an administrator password. This opens a dialogue box prompting for a password.

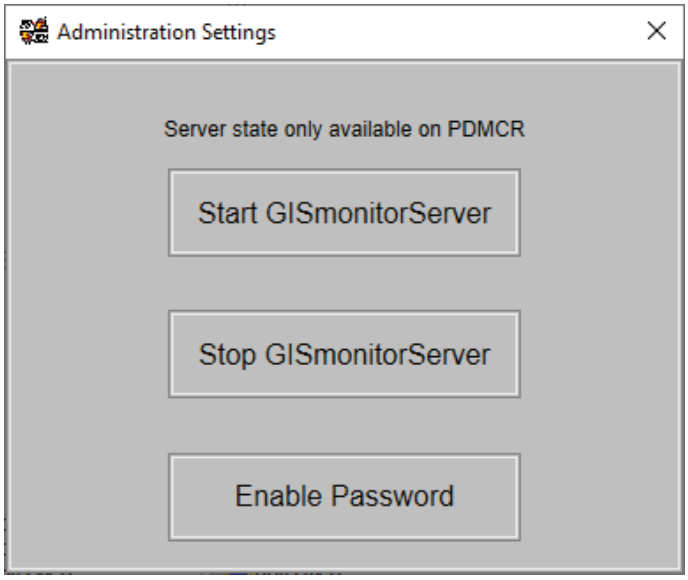


Figure 4.12: Administration settings

If a password is enabled, it can be disabled by pressing the “Disable Password” button and entering the current administrator password.

If an administrator password is enabled, changes of settings must be verified with this password. It is also required to enable or disable the maintenance mode.

4.2.7.5 Preferences

The GIS*monitor*Server settings can be modified in the preferences window. The GIS*monitor* software connects to the GIS*monitor*Server software running on the laptop and controls it. If the option for the built-in monitoring web server is included, the IP address will be 192.168.20.2, otherwise, the address 127.0.0.1 should be used.

The application settings can be modified to display the date or time format to the desired format.

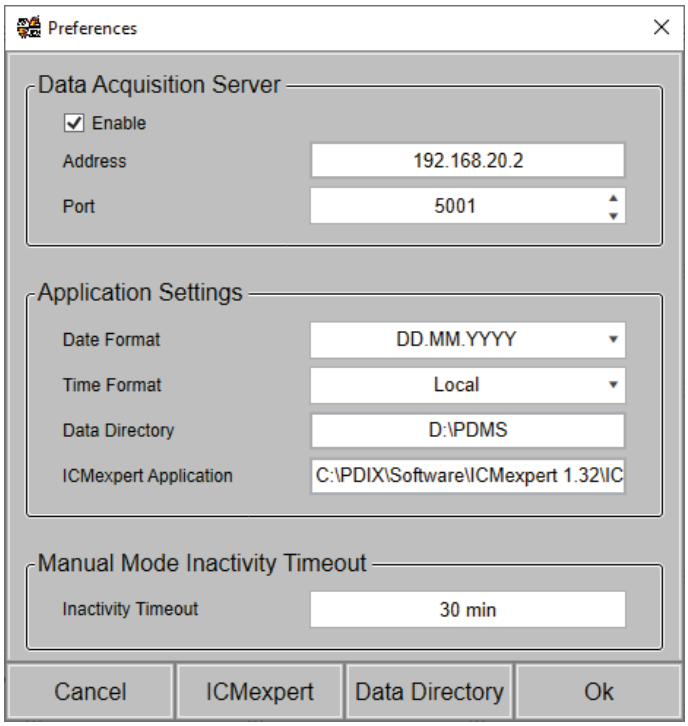


Figure 4.13: Preferences window

The GIS*monitor* software requires a data directory which will be used to save files for high voltage (HV) tests or the sensitivity check, as well as temporary files for use with the ICM*expert* software. The folder can be selected with the “Data Directory” button. If the ICM*expert* functionality should be used, the ICM*expert* application has to be installed on the computer, and the application has to be linked by selecting it with the “ICMexpert” button.

The GIS*monitor*Server usually monitors the GIS using the monitoring mode. If the manual mode is used, a timeout has to be defined, after which the GIS*monitor*Server automatically switches back to the monitoring mode. To do so, modify the inactivity timeout. If the manual mode is used for a HV test or sensitivity check, this timeout will be ignored. Please be aware that the use of the manual mode stops the continuous monitoring including the storing of data for the time that the manual mode is active.

4.2.8 Manual mode

For commissioning purposes, the GIS*monitor* software offers a special commissioning display, which shows relevant data in three different modes: A view for normal operation, a view for HV tests, and a view to perform the sensitivity verification. The manual mode can be started by pressing the “Manual Mode” indicator at the top of the window.

4.2.8.1 Sensor configuration

The “Configure Sensors” button in the toolbar of the application window in manual mode lets you change the displayed sensor names (default is CH1, CH2, etc.) for an easy identification of the different sensors. Additionally, the configuration window offers the possibility to change the phase shift for every sensor.

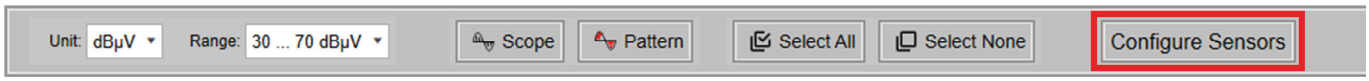


Figure 4.14: Toolbar of the application window in manual mode

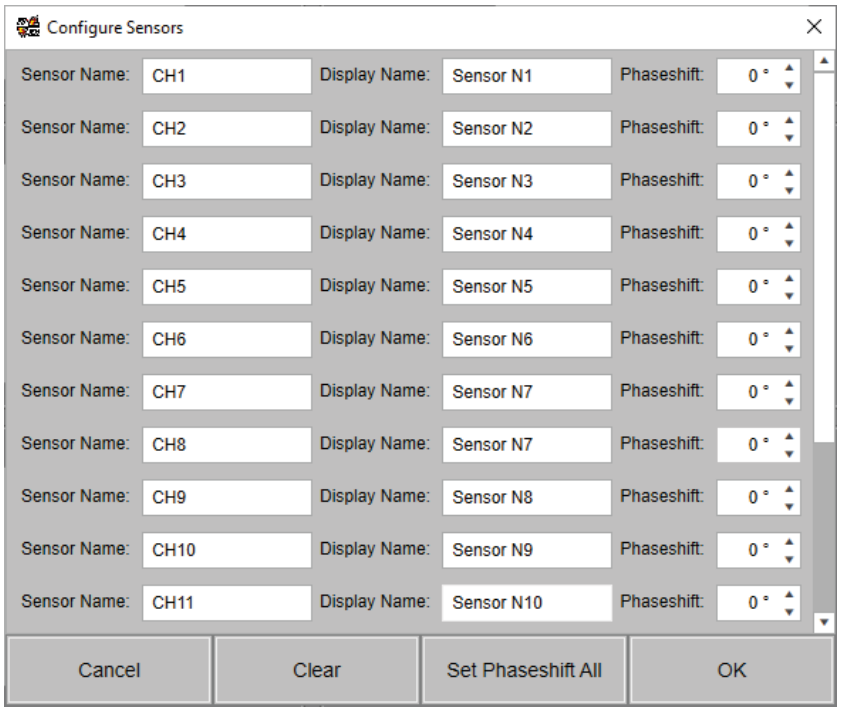


Figure 4.15: Window for sensor configuration

4.2.8.2 Measurement

By selecting the measurement tab, up to 24 sensors show the scope and pattern displays of partial discharge activities versus phase position as black and white or coloured patterns. Additionally, for every sensor, the recorded PD scope values of the last 50 periods can be shown as continuous 3D view or a larger phase-resolved partial discharge (PRPD) pattern by double clicking on a sensor.

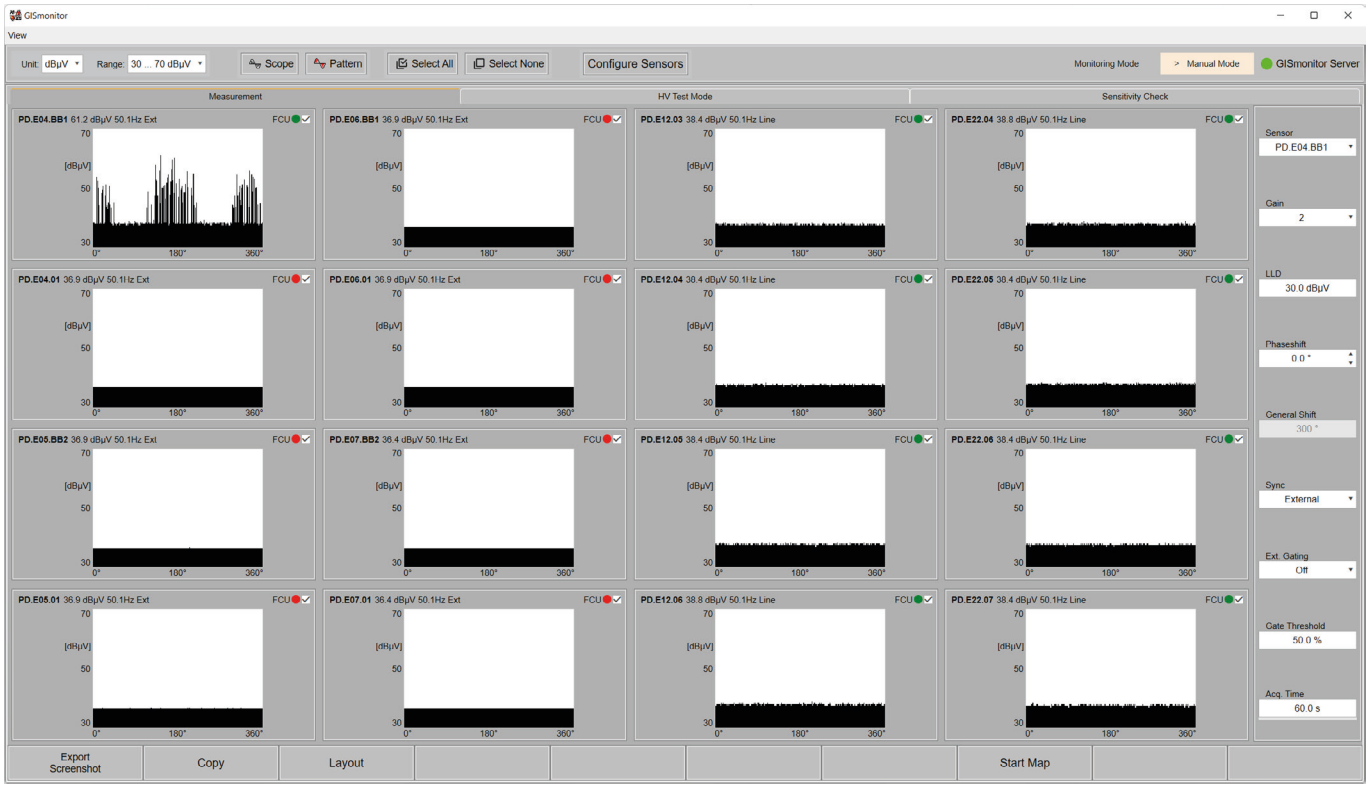


Figure 4.16: Measurement tab of the commissioning panel

The sensors, the data for which should be displayed in the commissioning panel, can be selected from the GIS*monitor* interface in the monitoring mode or by pressing the “Layout” button of the commissioning panel. Depending on the screen resolution, the settings of the currently selected sensor are shown beneath or next to the patterns.

The current view can be saved as PNG or BMP file to hard disk with the “Export Screenshot” button or can be copied to clipboard with the “Copy” button.

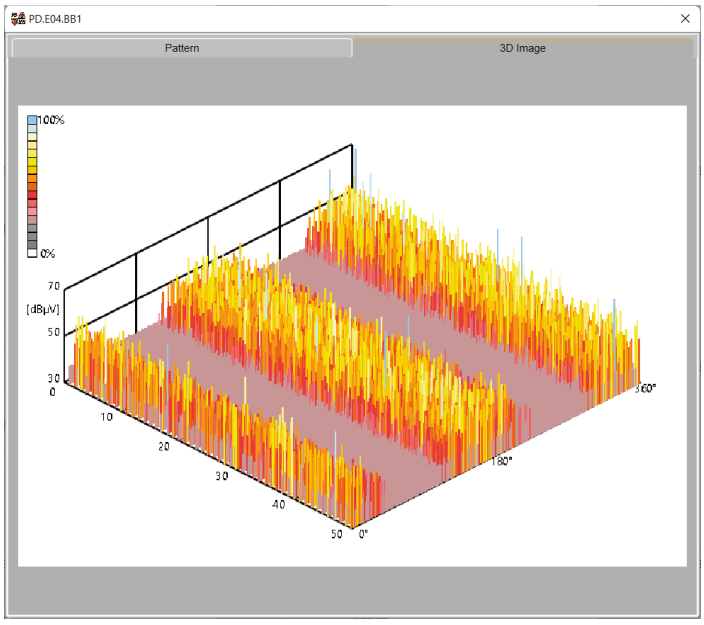


Figure 4.17: 3D view of sensor data

4.2.8.3 HV test

The HV test is performed on site before a GIS is finally energised. Different bays of the GIS are energised one after the other, and the UHF sensors located in these GIS sections are checked for PD signals originating from possible defects. This menu allows the operator to select the relevant sensors and record possible partial discharge signals as well as the profile of the applied voltage. This creates a playback that can serve as a fingerprint of the GIS and can be checked and viewed as many times as desired.

By selecting the “HV Test Mode” tab, a dedicated mode for HV testing purposes is opened. In the HV test mode, the synchronisation is enforced to “external”, and the phase shift of each sensor is set to 0 °. First the “Test Section” that is under testing has to be named. Afterwards, by pressing the “Start Recording” button, every scope image, every pattern image, and the measured voltage are stored for the duration of the recording.

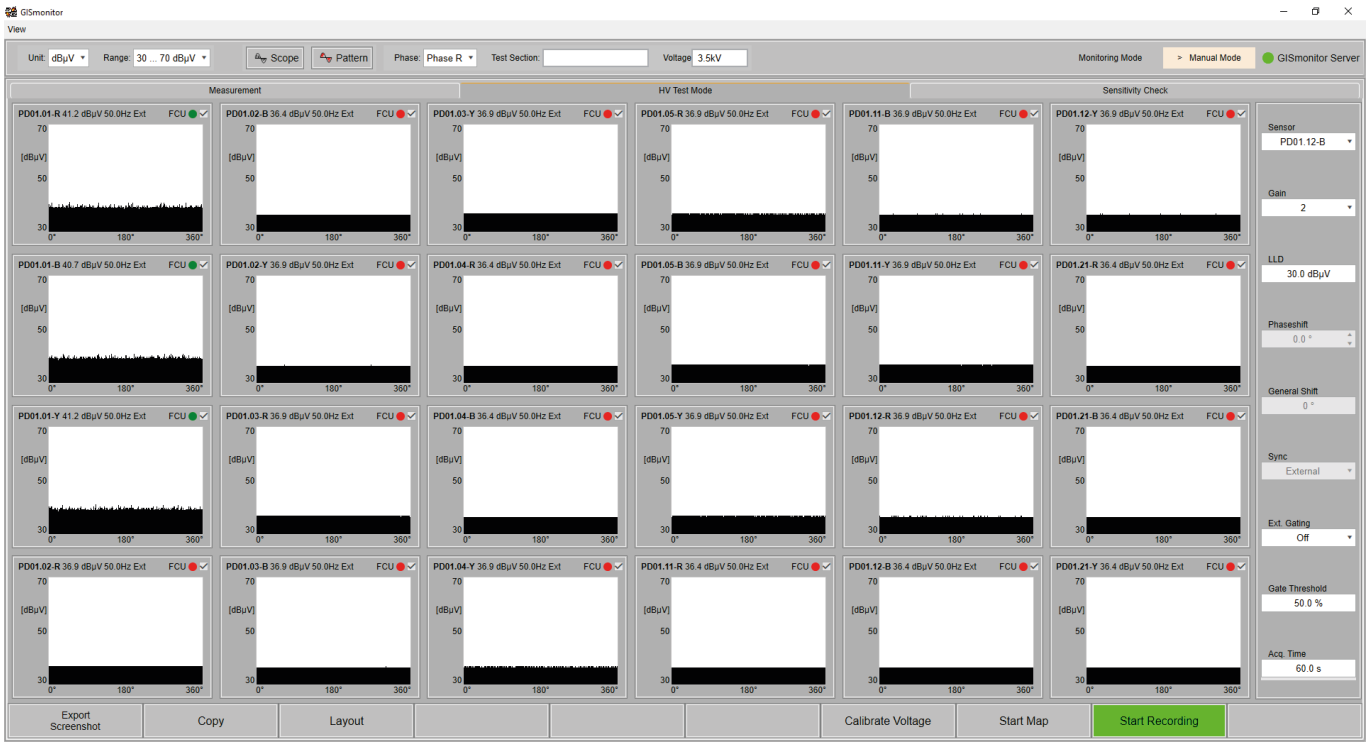


Figure 4.18: HV tests tab

After applying an external voltage, the measured voltage can be calibrated with the “Calibrate Voltage” button. A click on the “Stop Recording button finishes the HV test for the current section. Afterwards, all data is processed and saved in the data directory, which is specified in the preferences.

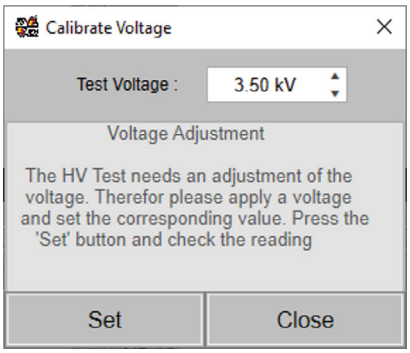


Figure 4.19: Voltage adjustment

To review a measurement, use the “View” -> “HV Replay” menu item. This replay view can load and display up to 24 hvt files. Depending on how many files are shown, the software displays either just the recorded images or the images and, next to them, a trending graph including pulse peak values and the recorded voltage. If only images are shown, the corresponding trending graphs can be displayed by clicking on the “Trend” button in the menu bar at the top of the panel. To display only the images again, press the “Image” button.

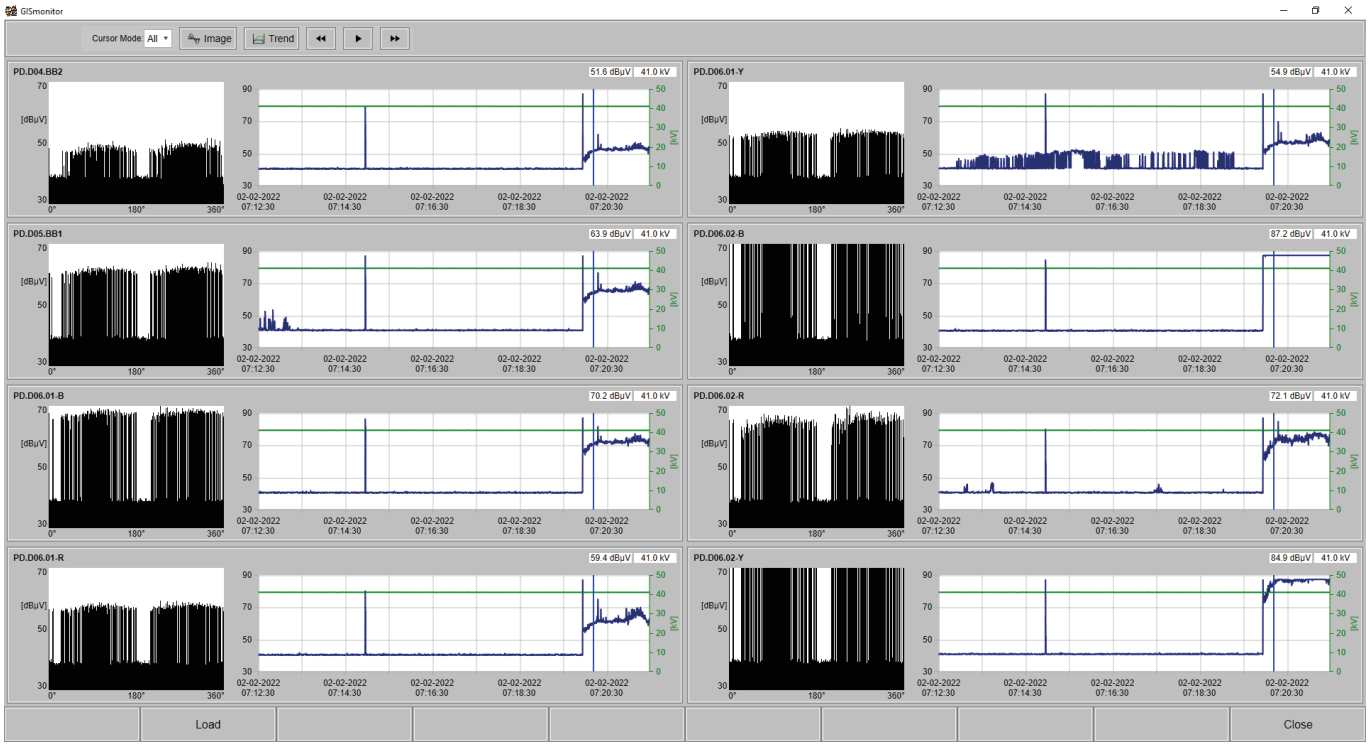


Figure 4.20: HV tests panel with trending graphs active

The recorded HV measurement can be replayed with the “Play” button. Additionally, the cursor in the trending graph can be moved to replay the measurement at a faster speed or to show specific sections of the measurement.

4.2.8.4 Sensitivity check

By selecting the “Sensitivity Check” tab, up to six sensors can be used to perform the sensitivity verification.

The sensitivity check menu/feature has been developed in order to ease the commissioning activities for the so called ‘sensitivity verification’ step. Before the HV test can be performed on site, it is necessary to perform the sensitivity verification in order to ensure that the UHF sensors are able to pick up a signal coming from a possible defect located inside the GIS enclosure. This is done by injecting with a calibrator into a sensor and reading the signal from the closest sensors. Since a GIS can have hundreds of sensors, the sensitivity check menu helps keeping track of every sensor that has been checked.

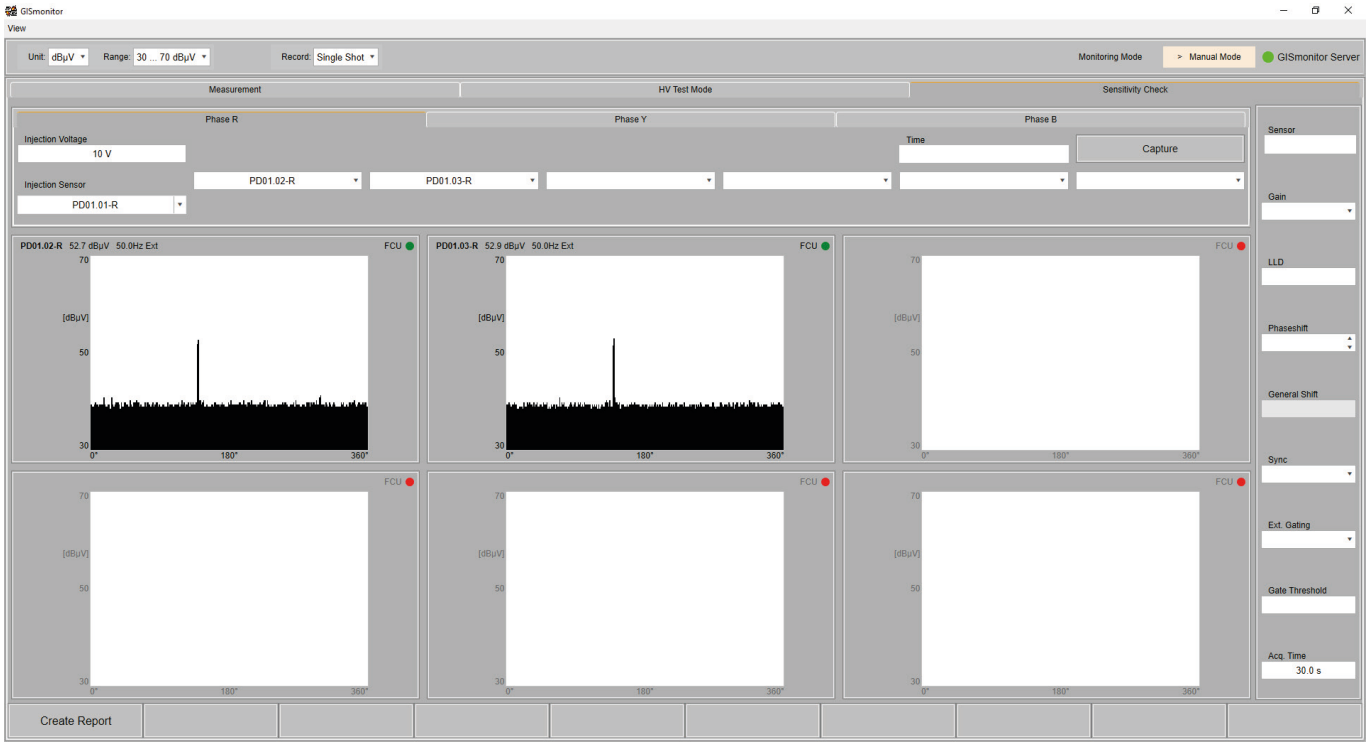


Figure 4.21: Panel for sensitivity checks with one tab for every phase

First a given injection sensor must be chosen from the “Injection Sensor” dropdown list, or the name of an injection sensor can be entered. The signal of the injected voltage should be visible at the nearest sensors to verify that a fault that occurs between these sensors can be detected. The value of “Injection Voltage” should be set to the voltage injected by the calibrator CAL2B.

The software takes a single shot measurement (scope image), a 3D series of 50 accumulated scope images, or a PRPD pattern (map), depending on the selection in the “Record” dropdown list of the toolbar.

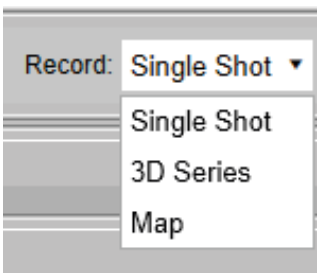


Figure 4.22: Record modes

By pressing the “Capture” button, the software will take the appropriate recording. After the measurement, a pop-up window will be shown, and the measurement can be stored in the data directory with the “Ok” button.

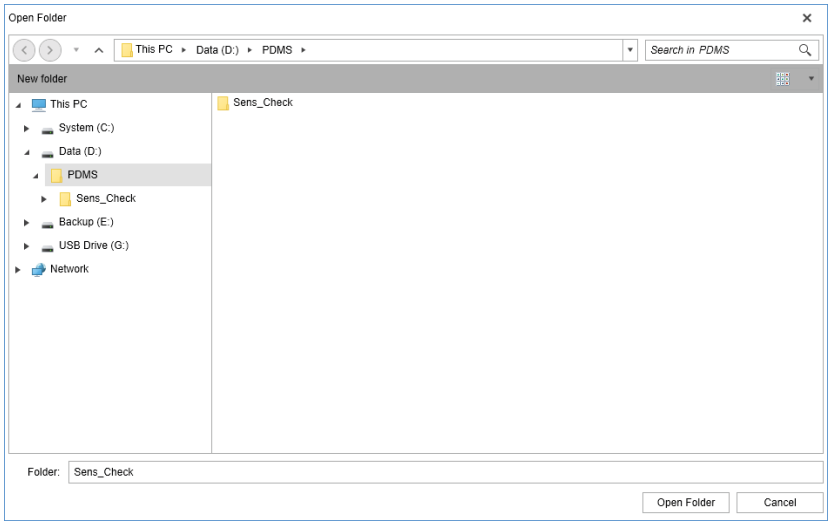


Figure 4.23: Saving sensitivity check data

The software offers the creation of an automated report for completed sensitivity checks. A click on the “Create Report” button of the “Sensitivity Check” tab brings up a report window for the choice of the data directory. Clicking the “Create Report” button of the report window will create a Word file and paste in all the measurement data including the scope images, 3D series images, and the PRPDs.

Figure 4.24: Window for creating a sensitivity check report

5 Miscellaneous

5.1 Maintenance

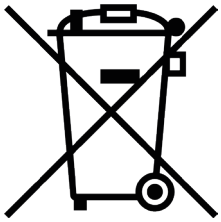
The GIS*monitor* Portable does not require any regular maintenance. Firmware or software updates can be requested from Power Diagnostix.

The following actions are recommended as software maintenance:

- Windows updates to prevent unwanted failures of the operating system
- Regularly updates of antivirus programs
- Updates of the GIS*monitor* Portable software if necessary

5.2 Product marks

This symbol indicates that the product should not be disposed of as normal household waste. As it is a B2B product, it may also not be disposed of at civic disposal centres. If you wish to dispose of this product, please do so properly by taking it to an organisation specialising in the disposal of old electrical equipment near you.



Any batteries installed must be disposed of separately from the unit.

As a responsible manufacturer, certified according to ISO 14001, Power Diagnostix offers to take back old instruments from its customers. Please contact Power Diagnostix at support@pdix.com to discuss the procedure for this.

5.3 Shipment instructions

In case a unit needs to be returned to the factory, make sure the acquisition unit is packed safely. As the units are relatively small, shipment by couriers, such as DHL, FedEx, or equivalent is the recommended mode of transportation. If possible, declare the instrument as ‘used instruments for evaluation’ at a relative low value. Consult Power Diagnostix for further details. Power Diagnostix may provide you with a temporary replacement unit in case of urgent needs.

5.4 Declaration of Conformity

The manufacturer
Power Diagnostix Instruments GmbH
Vaalser Strasse 250
52074 Aachen
Germany

CE

declares that the product

GIS*monitor* Portable

Portable partial discharge monitor

provided it is installed, maintained, and used for which it was made, in accordance with relevant installation standards and manufacturer's instruction, meets the requirements of the following directive(s):

Low Voltage Directive 2014/35/EU
EMC Directive 2004/108/EG
RoHS Directive 2011/65/EU

It complies with the following standards and/or normative documents:

EN 61010-1:2020
EN 61326-1:2013
EN IEC 63000:2018

Aachen, 10/04/2024
Dr. Mihai Huzmezan
(CEO, Power Diagnostix Instruments GmbH)

Remark: Since the measurement of partial discharge pulses is done in frequency bands partly occupied by radio transmission, and since test leads may act as antennas, disturbance free measurements may require well-shielded environments and/or additional filter techniques.

5.5 UK Declaration of Conformity

The manufacturer
Power Diagnostix Instruments GmbH
Vaalser Strasse 250
52074 Aachen
Germany

declares that the product

GIS*monitor* Portable

Portable partial discharge monitor

provided it is installed, maintained, and used for which it was made, in accordance with relevant installation standards and manufacturer's instruction, meets the requirements of the following Statutory Instruments:

SI 2016 no. 1101 The Electrical Equipment (Safety) Regulations 2016
SI 2016 no. 1091 The Electromagnetic Compatibility Regulations 2016
SI 2012 no. 3032 The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

It complies with the following standards and/or normative documents:

EN 61010-1:2020
EN 61326-1:2013
EN IEC 63000:2018

Aachen, 10/04/2024
Dr. Mihai Huzmezan
(CEO, Power Diagnostix Instruments GmbH)

Remark: Since the measurement of partial discharge pulses is done in frequency bands partly occupied by radio transmission, and since test leads may act as antennas, disturbance free measurements may require well-shielded environments and/or additional filter techniques.

6 Technical data

6.1 Acquisition unit

6.1.1 Half 19-inch desktop model for 8 or 16 channels

Mains supply:	100–240 V AC, 47–440 Hz (automatic)
Line fuse ⊟:	1.6 A time-lag
Power requirements:	Approx. 25 VA
Input impedance (PD):	50 Ohm//50 pF
Input sensitivity:	< 1 mV
Synchronisation:	VT input, 20–350 Hz
Interfaces:	USB, TCP/IP
Operation temperature:	10–40 °C (non-condensing)
Signal input:	8–16 SMB connectors (50 Ohm)
Gate input:	1–2 SMB connector (50 Ohm)
Sync input:	1–2 SMB connector, 100 V RMS into 10 MOhm//200 pF

6.1.2 $^2/_3$ 19-inch desktop model for 8, 16, or 32 channels

Mains supply:	90–240 V AC, 50–60 Hz (automatic)
Line fuse:	2 A time-lag
Power requirements:	Max. 70 W
Input impedance (PD):	50 Ohm//50 pF
Input sensitivity:	< 1 mV
Synchronisation:	VT input, 20–350 Hz
Interfaces:	USB, TCP/IP
Operation temperature:	10–40 °C (non-condensing)
Signal input:	8–32 SMB connectors (50 Ohm)
Gate input:	1–3 SMB connector (50 Ohm)
Sync input:	1–3 SMB connector, 100 V RMS into 10 MOhm//200 pF

6.1.3 Eight-channel Explorer model

Mains supply:	100–240 V AC, 47–440 Hz (automatic)
Line fuse:	1.6 A time-lag
Power requirements:	Approx. 25 VA
Input impedance (PD):	50 Ohm//50 pF

Input sensitivity:	< 1 mV
Synchronisation:	VT input, 20–350 Hz
Interfaces:	USB, TCP/IP
Operation temperature:	10–40 °C (non-condensing)
Signal input:	8 BNC connectors (50 Ohm)
Gate input:	1 BNC connector (50 Ohm)
Sync input:	1 BNC connector, 100 V RMS into 10 MOhm//200 pF

6.1.4 Explorer model for 16, 24, 32, and 40 channels

Mains supply:	85–264 V AC, 47–440 Hz (automatic)
Line fuse:	1.6 A time-lag 0.5 A time-lag
Power requirements:	Approx. 100 VA
Input impedance (PD):	50 Ohm//50 pF
Input sensitivity:	< 1 mV
Operation temperature:	0–40 °C (non-condensing)
Synchronisation:	VT input, 20–350 Hz
Interfaces:	USB, TCP/IP
Operation temperature:	10–40 °C (non-condensing)
Signal input:	16–40 BNC connectors (50 Ohm)
Gate input:	1–3 BNC connectors (50 Ohm)
Sync input:	1 BNC connector, 100 V RMS into 10 MOhm//200 pF

6.2 Housing

6.2.1 Desktop enclosure half 19-inch

Material:	Coated cast aluminium
Overall size:	236 x 132 x 296 mm^3 (W x H x D, excl. BNC connectors)
Weight:	Approx.4 kg (depending on the numbers of channels)

6.2.2 Desktop enclosure $^2/_3$ 19-inch

Material:	Coated cast aluminium
Overall size:	325 x 132 x 296 mm^3 (W x H x D, excl. BNC connectors)
Weight:	Approx.5,5 kg (depending on the numbers of channels)

6.2.3 Eight-channel outdoor case

Material:	Hardened polypropylene
Overall size:	305 x 144 x 270 mm^3 (W x H x D, closed) 305 x 360 x 270 mm3 (W x H x D, open)
Weight:	Approx. 3.2 kg

6.2.4 Outdoor case with up to 40 channels

Material:	Hardened polypropylene
Overall size:	670 x 510 x 372 mm^3 (W x H x D, closed)
Weight:	Approx. 23 kg (depending on the numbers of channels)

6.3 FCU2

Frequency range:	Typ. 100–1800 MHz	
Input impedance:	50 Ohm//50 pF	
Input sensitivity:	$<$200 μV at 500 MHz	(-61 dBm at 500 MHz)
Output signal:	2 MHz (approx., depends on input signal)	
Roll-off:	40 dB/dec	
Input connector:	N-Plug	
Output connector:	BNC plug TNC plug	(IP52 model) (IP65 model)
Operation temperature:	-10–60 °C	(non-condensing)
Overall size: (H x W x D)	26 x 26 x 87 mm^3 35 x 35 x 107 mm^3	(IP52 model) (IP65 model)
Weight:	Approx. 80 g Approx. 160 g	(IP52 model) (IP65 model)
Power requirements:	11–15 V DC, 0.31 W	
Enclosure:	IP52: aluminium; HF sealed IP65: aluminium; waterproof and HF sealed	

6.4 IPU2B

Transient over voltage protection

Input connector:	N-Plug
Output connector:	N-Jack (IP52 model) N-Plug (IP65 model)
Operation temperature:	-10–60 °C (non-condensing)
Overall size: (H x W x D)	26 x 26 x 64 mm^3 (IP52 model) 35 x 35 x 81 mm^3 (IP65 model)
Weight:	Approx. 80 g(IP52 model) Approx. 145 g (IP65 model)
Enclosure:	IP52: aluminium; HF sealed IP65: aluminium; waterproof and HF sealed

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Power Diagnostix

GIS*monitor* Portable

Portable partial discharge monitor

LANGUAGE | EN

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