MPD 600

High-end measurement and analysis system
for partial discharges

Partial discharge analysis

Partial discharges: weak points in insulation systems

Partial discharges, as defined by IEC 60270, are localized dielectric discharges in a partial area of an electrical insulation system under high electric field intensity. PD phenomena are in many cases the preliminary stage of a complete breakdown of the insulation. For this reason, for many years generators, transformers, switchgear and cable systems have been checked for partial discharge.

OMICRON's MPD 600 is a high-end measurement and analysis system for partial discharges. It corresponds to the relevant standards for electric PD measurements and also provides analysis techniques far beyond this.

Rising to the challenge: the OMICRON solution

The challenge when analyzing PD is to detect and evaluate discharges in the range of pico-coulombs (pC), while dealing with test voltages of up to several hundred kilovolts (kV).

These sensitive measurements are often complicated by severe external interference or noise from nearby equipment, caused by corona or other radio frequency (RF) sources.

The MPD 600 incorporates a range of leading-edge technologies which provide accurate, reliable and reproducible measurements – even under the most demanding circumstances.

The system

The MPD 600 system consists of a measurement unit, a USB controller and sophisticated analysis software. The modular plug-and-play system enables a number of state-of-the-art display and assessment features and achieves outstandingly high measurement accuracy.

Practical multi-channel operation

The system can be easily expanded to a virtually unlimited number of channels. This enables parallel and truly synchronous measurements. Fiber optic connections allow distances of up to 2 km / 1.2 miles between adjacent measuring devices.

Field-proven technology

Hundreds of units are operating worldwide in industrial and utility applications. MPD 600 reliability is being proven regularly by major cable, transformer and rotating machine manufactures in some of the world's largest PD measuring projects.

Your benefits

> IEC 60270-compliant PD measurement and automated reporting

> Synchronous multi-channel PD measuring and recording

> Excellent interference immunity for measurements under difficult conditions

> Safe operation through optical fiber isolation

> Fully digital data processing enables high measurement accuracy

Effective prevention of interferences

A main problem during PD measurements is interferences caused by adjacent electrical equipment. These can make measurement, analysis and localization of PD signals very difficult or even impossible. The elimination or at least reduction of such interferences is critical for successful PD analysis.

## Galvanic isolation through fiber optic cable

Fiber optic transmission of data between the individual measuring devices and the PC controller provides complete galvanic isolation. This minimizes ground loops, reduces interference coupling and achieves significantly higher system sensitivity through the improved signal-to-noise ratio.

Fiber optic connections have been proven reliable in industrial environments. Electrical or radio frequency connections (e.g. WLAN) are less reliable because of frequent disturbances from machines or electrical discharges (e.g. PD).

Fiber optic connections also may be very long, without degrading the instrument's performance.

Another convincing advantage of fiber optics compared to copper wires is the precise synchronicity of all connected units down to the range of nanoseconds. This simultaneous communication ensures a continuous, uninterrupted acquisition of time-critical PD events and the related test voltage, even under most demanding circumstances.

Conventional PD detection
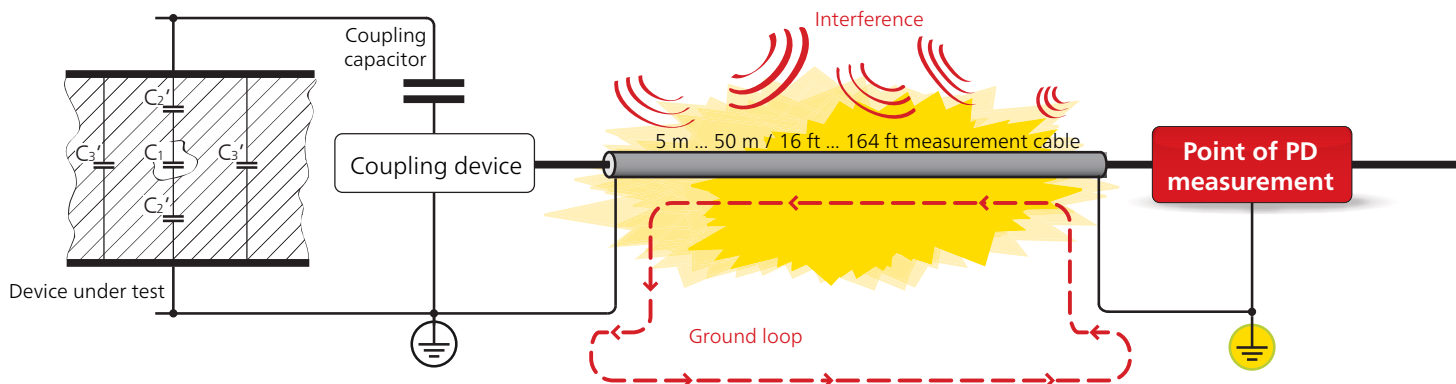
Innovative PD detection with the MPD 600
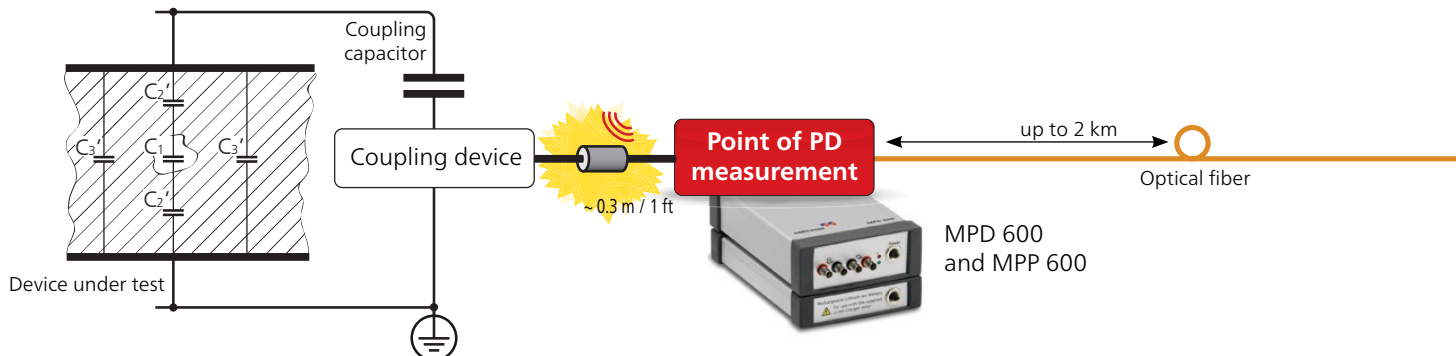
Advanced, fully digital filtering

From the first measuring point, MPD 600 uses a digital filter. Therefore no aging effects or drift over time and temperature occurs. This results in an exceptionally high degree of reproducibility to perform reliable, calibrated and traceable PD quality control.

Battery powered acquisition units

During battery operation, no noise from the mains power supply enters the measuring circuit. This way the measure-ment unit can also be operated at high-voltage potential. Due to the very low power consumption, an uninterrupted battery operation of more than 20 hours is ensured.

Measuring up to the UHF range

Interferences can often be avoided through changing the center frequency. A largely expanded measuring range up to the ultra-high frequencies (UHF) is realized with the optional UHF 620. This unconventional UHF measuring method can be used for commissioning tests as well as on-site and online diagnostics.

The combination of UHF 620 and MPD 600 results in a precise measurement system for different frequency bandwidths: Either narrow band, medium band or wideband measurements can be selected.

The UHF 620 is ideally suited for measurements of power transformers and gas insulated switchgear (GIS).

Different UHF sensors for conventional measurement systems, like spectrum analyzers, can be combined with the UHF accessories.
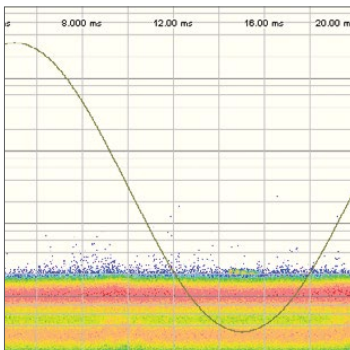
PD signals obscured in the noise band
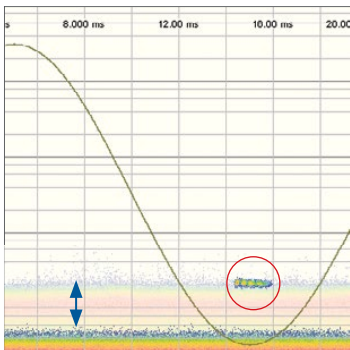
PD signal with reduced noise level

Tailored MPD software

Basic Mode – results by mouse click

In Basic Mode, most parameters and settings are automatically determined by the software, so the user can focus on performing the PD measurement.

> Highly responsive real-time display
>   (> 20 frames /sec)
> Configurable real-time oscilloscope view
>   for PD and V input
> Flexible PD event visualization, including the phase resolved histogram view, ellipse and real-time view
> Ellipse view for reproduction of a classical analog feel

Cable Mode – guided measurement

The Cable Mode is an intuitive, three-step interface for testing high-voltage cables. This module is used for quality assurance in the factory as well as fault localization on site.

The user is guided through the entire measurement. The detection of partial discharge faults in high-voltage cables, which is accurate to the meter, is thus particularly effective and precise.

Large scope view area

Independent of the connected units the large window displays:

> The progress of the test voltage
> The phase-resolved histogram in different presentations
> The 3PARD display
> The gating

Small scope view area

The small window can be configured to display different data depending on the setting:

> Frequency spectrum of the input signal at the PD input
> Threshold display with inception and extinction voltage
> Voltage and charge value trend curve in replay mode

Expert Mode – using all possibilities

The Expert Mode allows manual control over every aspect of PD detection and analysis, while providing access to advanced visualization options.

Possible displays in Expert Mode:

> 3PARD – 3-Phase Amplitude Relation Diagram
> 3FREQ – Synchronous multiband measurements
> Controlling of the advanced noise suppression by Dynamic Noise Gating
> Full oscilloscope style functionality for PD input signals
> Q(U) and H(Q) diagram

Apart from numerous detailed displays and manual settings, some functions characterize the Expert Mode particularly well:

> Hardware gating (with external gating unit)
> PD detection and analysis for DC applications
> Long-term aquistion of all relevant PD related trending purposes
> Statistical PD fault location
> Additional PD event evaluation in accordance to IEC 60270 (e.g. Q_{IEC} average)
> RIV measurements in µV
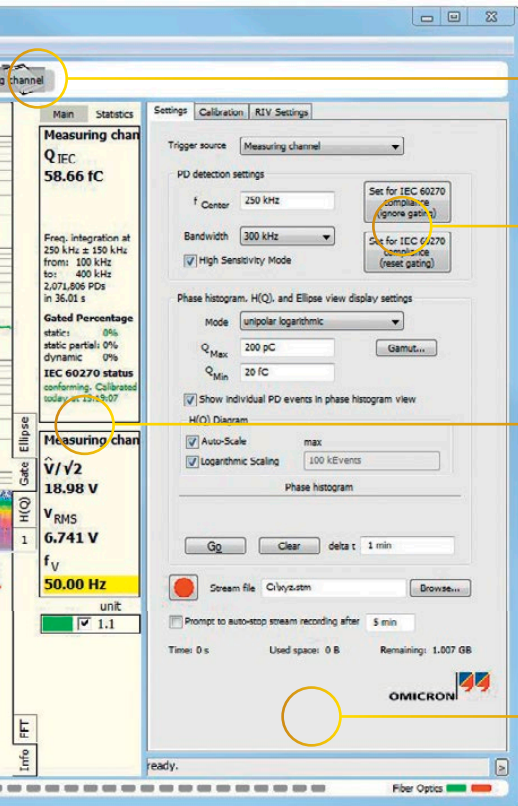
Acquisition unit selection

The upper display pane shows the connected acquisition units as well as their status

IEC button

Fast, automatic measuring according to IEC 60270, i.e., the center frequency and bandwidth are set automatically

Measured quantities display

The two windows for measured values and statistics show the current values for quantities conforming with IEC 60270 such as: PD charge, voltage or frequency

Settings area

Monitoring and control of the different software modes:

> Easy handling in Basic and Cable Mode
> Complete control in the Expert Mode

Active noise suppression

Some noise looks very similar to PD. With the increasing use of power electronic components, these pulses can be ever-present in industrial environments.

With freely-selectable filtering options, the MPD 600 can be flexibly adapted to challenging on-site conditions. This results in a maximal signal-to-noise ratio.

Manual Gating

An unlimited number of phase/amplitude gates allows to suppress signals with a certain amplitude and fixed phase position (e.g. converter pulses, drives, irrelevant PD). The gating areas are easy to define by marking them with the mouse.

Antenna Gating

To eliminate the effect of disturbances (e.g. corona) to the measurement results, an optional external MPD 600 can be used as unit gate (Antenna Gating).

Dynamic Noise Gating (DyNG)

Non-stationary pulses that are not fixed in phase ("moving" vs. phase) – e.g. interference from drives, motor-generator test sets and temporary interference – can be suppressed by the unique Dynamic Noise Gating. The amplitude-phase window follows the disturbance pulses regularly.

Advanced noise separation tools

PD events on one phase can be detected also on the other phases. Distinction between different PD sources and superimposed noise pulses is a challenge due to this coupling.

The MPD 600 provides powerful tools for separation of different sources of interference and easy visualization.
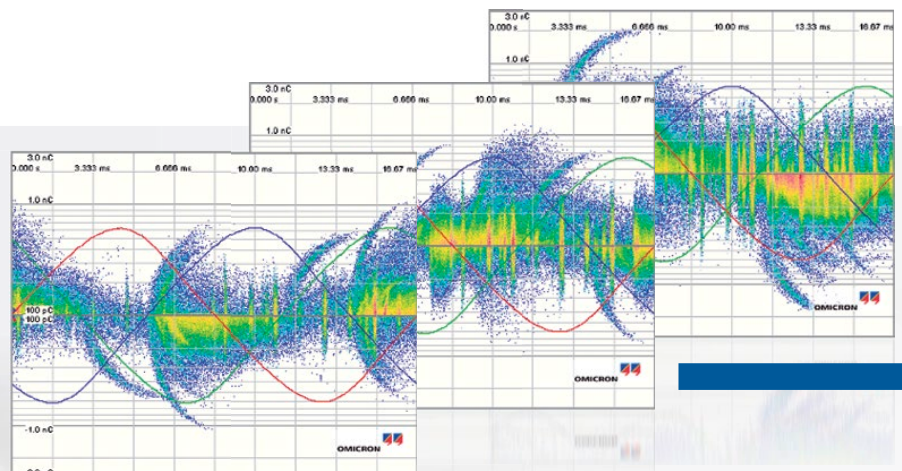
PD diagrams of three phases, partially superimposed or with interference signals

3-phase amplitude relation diagram (3PARD)

The 3PARD simplifies the differentiation of various PD sources and PD interferences. The three phases are measured synchronously and the results can be displayed combined in a single diagram, the 3PARD diagram.

This enables results to be easily compared and PD sources can be quickly selected in the star diagram. This can result in significant cost savings, for example when screening measures can be reduced.

Synchronous multi-frequency measurements (3FREQ)

The 3FREQ characterizes PD sources by their frequency signature. Even for a single phase, or a single PD decoupling position, pulse triples can be acquired by using three different PD filter settings.

The synchronous signal output from three filters with different center frequencies is visualized in a 3-Center Frequency Relation Diagram (3CFRD) for pulse waveform analysis.

Filtered interference signals

Broken down partial discharges
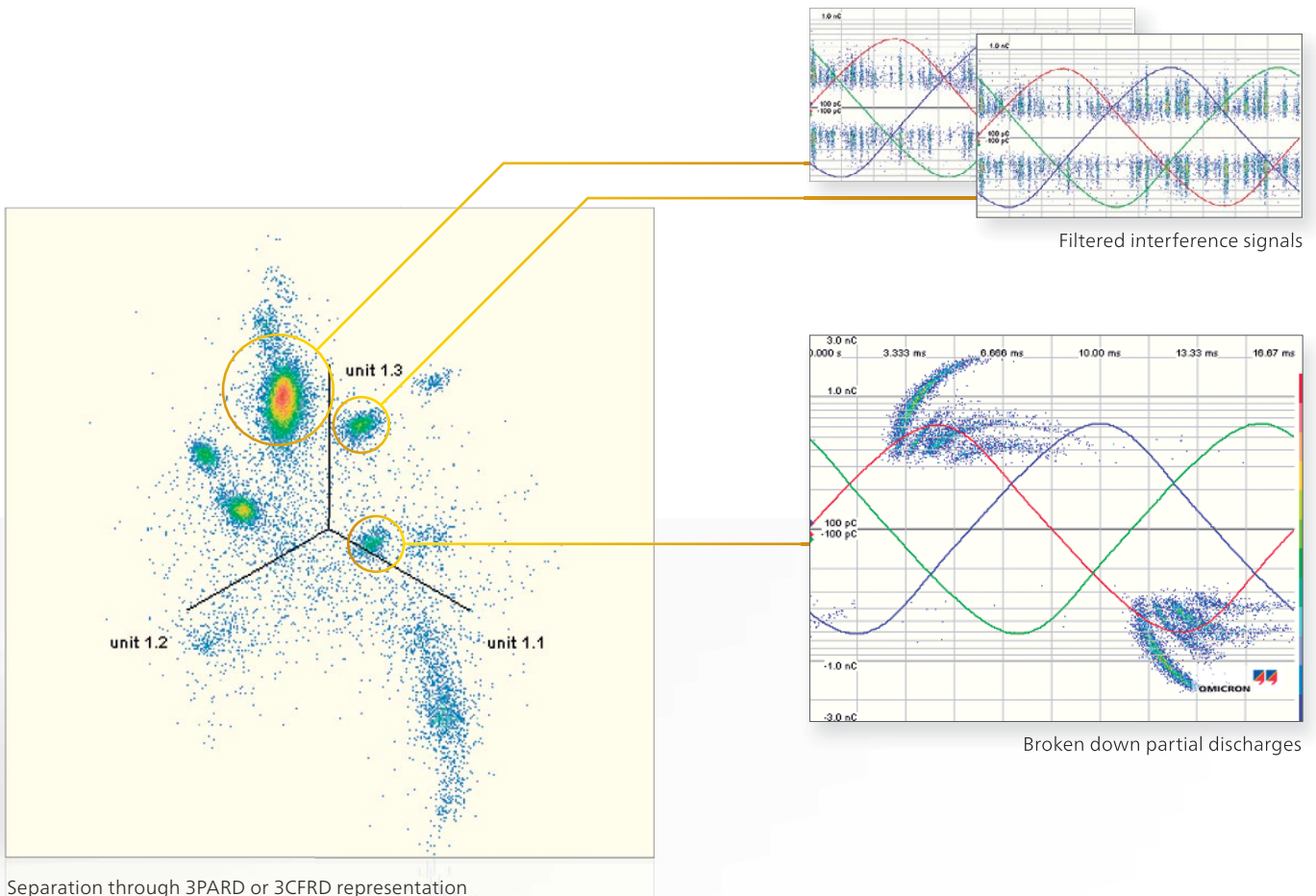
Separation through 3PARD or 3CFRD representation

Post processing of realtime data

In many cases there is insufficient time for further detailed analysis of the PD patterns or the changes which occurred during testing.

The MPD 600 can store PD events with very high sampling rate during testing. In addition, the test voltages and all other relevant system settings are stored.

This creates a growing database, which can be used as reference for the interpretation of future measurement results.

Numerous functions are integrated into the MPD 600 system for safe and easy handling of the measured data.

Replay function

By storing the measured data as unprocessed raw data, these can still be analyzed subsequently. The full set of analysis functions and the different tools like 3PARD or gating can be used for this – just as if the measurement was performed once again.

Streaming function

The recorded measured data, or so-called streams, can be cut individually, i.e. to focus on relevant PD events. As the playback speed can also be freely selected, some sections can be played back more slowly and thus be analyzed in greater detail.

Export function

Recordings can also be stored as video in .avi format. With the compressed file size, the videos are easier to handle, need less storage space and can be sent to experts as an email attachment. In addition, the videos can also be played back without the installed MPD software.

External application interface

A flexible application interface, based on Microsoft COM®, allows the complete transfer of all measured quantities and configuration settings to other programs like Microsoft Excel™ or MATLAB®. Application-specific software solutions can thus be realized without problems.

Integrated reporting

Clear reports can be created automatically in .xml format. A company logo can be easily integrated.

Furthermore, screenshots can be added to the report at any time at the touch of a button. The reports can also be stored as PDF file. This basic version for reporting is included in all software packages free of charge.

Individual protocol generator

The protocol generator integrated into Microsoft Excel™ supports significantly more functions. It controls the MPD 600 application and integrates all measurement functions into an individually adapted, ready-to-print protocol.

All measured values can be integrated as clear diagrams or tables in the report with just a few clicks. A screenshot of the PD pattern can be integrated at the touch of a button.

Applications and software packages

Multi-channel measurements of power transformers

The MPD 600 enables the user to quickly measure all of the relevant quantities for a reliable PD measurement of power transformers. No matter whether it affects a single or three-phase transformer.

Localizing PD failures accurate to a meter

Fault-finding in cables with the MPD 600 provides accuracy better than 0.2 % of the total cable length. PD faults can thus be localized with meter to centimeter precision. During commissioning, the MPD 600 can also be used for quality control of cable accessories, such as joints and terminations.

Reliable assessment of rotating machines

Rotating machines, industrial drives and railway transportation must be assessed offline or in operation. With the help of the MPD 600 and its unique functions, the difficulties of nearby interfering fields can be overcome much easier than other systems.

Precise assessment in factories and laboratories

In shielded laboratories, PD measurements on high-voltage components are carried out using coupling capacitors and measuring impedances. After calibration, the MPD shows the apparent charge according to IEC 60270. PD analysis is supported by graphical tools such as the PRPD pattern.

PD measurements on gas-insulated switchgear (GIS)

PD measurements within the ultra-high frequency range are very sensitive and have therefore been employed for PD detection in a long time. In new plants, UHF sensors are more and more integrated – alternatively, mobile and external sensors can be used. The combination of MPD 600 and OMICRON's UHF 620 allows fast and easy PD measuring up to the UHF range and provides different frequency bandwidths.

		Basic Package included	Cable Package VESM4102	Advanced Package VESM4101
Measurement and visualization	Multiple bandwidths with freely selectable measurement frequencies	■	■	■
	Recording and replaying stream files	■	■	■
	Software support for RIV measurements	■	■	■
	Oscilloscope and spectrum analyzer function	■	■	■
	Phase-resolved PD pattern (PRPD), ellipse visualizations and individual PD events	■	■	■
	3D histogram visualizations	■	■	■
	Voltage curve visualization	■	■	■
	Q(U) and H(Q) Diagram	–	–	■
	Trending	–	–	■
	DC measurements	–	–	■
	Additional statistic values in accordance with IEC 60270	–	–	■
Triggering	Light-sensitive sensor triggers the histogram	■	■	■
	Every MPD unit triggers itself	■	■	■
	Internal triggering if no artificial light source is available	■	■	■
Cable testing	Cable fault locating mode using TDR, statistical TDR and dual-end method	–	■	■
	Guided cable assessment user interface	–	■	–
Gating and noise suppression	Phase and phase-amplitude gating	■	■	■
	Unit gating (Antenna Gating)	■	■	■
	Dynamic Noise Gating (DyNG)	–	–	■
	3PARD multi-phase measurements	–	–	■
	Modul "3FREQ"[1] – VESM4104	–	□	□
	> 3FREQ multi-frequency measurements and 3CFRD visualization			
Generating reports and exporting data	Generating XML reports	■	■	■
	Exporting data into MATLAB® files	–	–	■
	Module "Report" – VESM4103	□	□	□
	> Automated, Microsoft Excel™-based report generation			
	> Automation via Microsoft COM® interface			
	> Providing voltage and PD values for external applications			

[1] Just available with "Advanced Package"   ■ included   □ optional   – not included

Measurement setup and ordering information

MPD packages — Order no.

Set with one channel — VE004110
1 × MPD 600 acquisition unit
1 × MCU 502 controller
1 × CPL 542 0.5 A impedance
1 × Fiber optical cable, 20 m / 66 ft
1 × MPP 600 power supply package
  + software package "Basic Package"

Set with three channels — VE004130
3 × MPD 600 acquisition unit
1 × MCU 502 controller
3 × CPL 542 0.5 A impedance
3 × Fiber optical cable, 20 m / 66 ft
3 × MPP 600 power supply package
  + software package "Basic Package"

Gating channel — VE004120
1 × MPD 600G
1 × Fiber optical cable, 20 m / 66 ft
1 × MPP 600 power supply package

Single-channel extention set — VE004111
1 × MPD 600 acquisition unit
1 × CPL 542 0.5 A impedance
1 × MPP 600 power supply package
1 × Fiber optical cable, 20 m / 66 ft

Software and setup components — Order no.

1 Software packages/modules

	Order no.
Package "Basic Package"	included
Package "Advanced Package"	VESM4101
Package "Cable Package"	VESM4102
Module "Report"	VESM4103
Module "3FREQ"[2]	VESM4104

2 Fiber optical bus controller

		Order no.
MCU 502:	Bus controller for MPD 600	VE004300
MCU 504:	Bus controller for MPD 600 and CAL 543	VE004301

3 Duplex fiber optical cables[1]

	Order no.
Duplex fiber optical cable, 3 m / 10 ft	VEHK4003
Duplex fiber optical cable, 5 m / 16 ft	VEHK4004
Duplex fiber optical cable, 20 m / 65 ft	VEHK4001
Duplex fiber optical cable, 50 m / 165 ft (on cable drum)	VEHK4002

4 Lithium ion battery

	Order no.
MPP 600 Power Pack Set (consisting of battery, fastener, and charger with power cord)	VEHZ4105
MPP 600 lithium ion battery	VEHZ4106

5 Protection cases

	Order no.
MPC 600 protection case	VEHP0041

6 Transport cases

	Order no.
MBT 560 for a complete MPD system	VEHP0040

[2] Just available with "Advanced Package"

MPD 600 system
Application and setup

PD Measurement   1 Software   2 MCU 502/504   3 Duplex fiber optical cable   MPD 600 and 4 MPP 600

Accessories

	Order no.
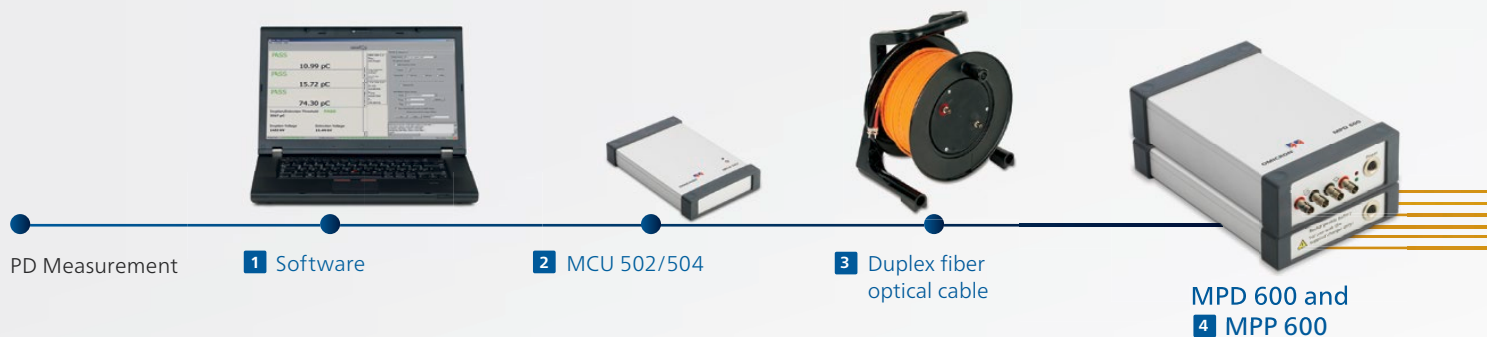
1 Charge calibrators/injectors

CAL 542:	Version A (0.1 pC … 10 pC)	VE004200
CAL 542:	Version B (1 pC … 100 pC)	VE004210
CAL 542:	Version C (10 pC … 1 000 pC)	VE004220
CAL 542:	Version D (0.1 nC … 10 nC)	VE004230
CAL 543:	Charge injector	VE004240
CAL 543R:	Remote control for CAL 543	VE004241

2 Measuring impedances

CPL 542:	0.5 A type	VEHZ4100
CPL 542:	2 A type	VEHZ4101
CPL 543:	5 A type	VEHZ4103

3 Coupling capacitors[3]

MCC 112:	12 kV, 1.1 nF	VEHZ4118
MCC 124:	24 kV, 1.1 nF	VEHZ4138
MCC 205:	50 kV, 1.0 nF (on mobile base)[4]	VEHZ4116
MCC 210:	100 kV, 1.0 nF (on mobile base)[4]	VEHZ4117

4 Bushing adapters[3] (incl. transport case)

Basic adapter:	G3/4" inside … 5/8"	VEHZ4121
F&G/HSP adapter:	M24 … G3/4"	VEHZ4122
HSP adapter:	M30x1.5 … G3/4"	VEHZ4123

	Order no.

5 High frequency current transformer

MCT 100	VEHZ4120

6 Bandwidth converter

UHF 620	VEHZ4137

7 Pulse generator

UPG 620	VE004242

8 UHF valve sensor

UVS 610 (incl. carry case)	VEHZ4131

9 UHF cable sensor

UCS1	VEHZ4144

10 Acoustic PD locator

PDL 650 (without sensors)		VEHZ4132
Kit of 4 x AES 075 sensors:	75 kHz	VEHZ4133
Kit of 4x DT15I sensors:	150 kHz	VEHZ4134

[3] Customized articles available on request
[4] Including CPL measuring impedance

Application areas
with accessories

- 1 CAL 542
- 1 CAL 543 — Calibration
- 3 MCC 112/124 / MCC 205/210 — Capacitive measurement
- 2 CPL 542/543
- 4 Bushing Adapter — Capacitive measurement
- 5 MCT 100 — Inductive measurement
- 6 UHF 620
- 7 UPG 620
- 8 UVS 610 — UHF measurement
- 9 UCS1 — UHF measurement
- 10 PDL 550/650 — Acoustic measurement
- MPD 600 — Multichannel measurement
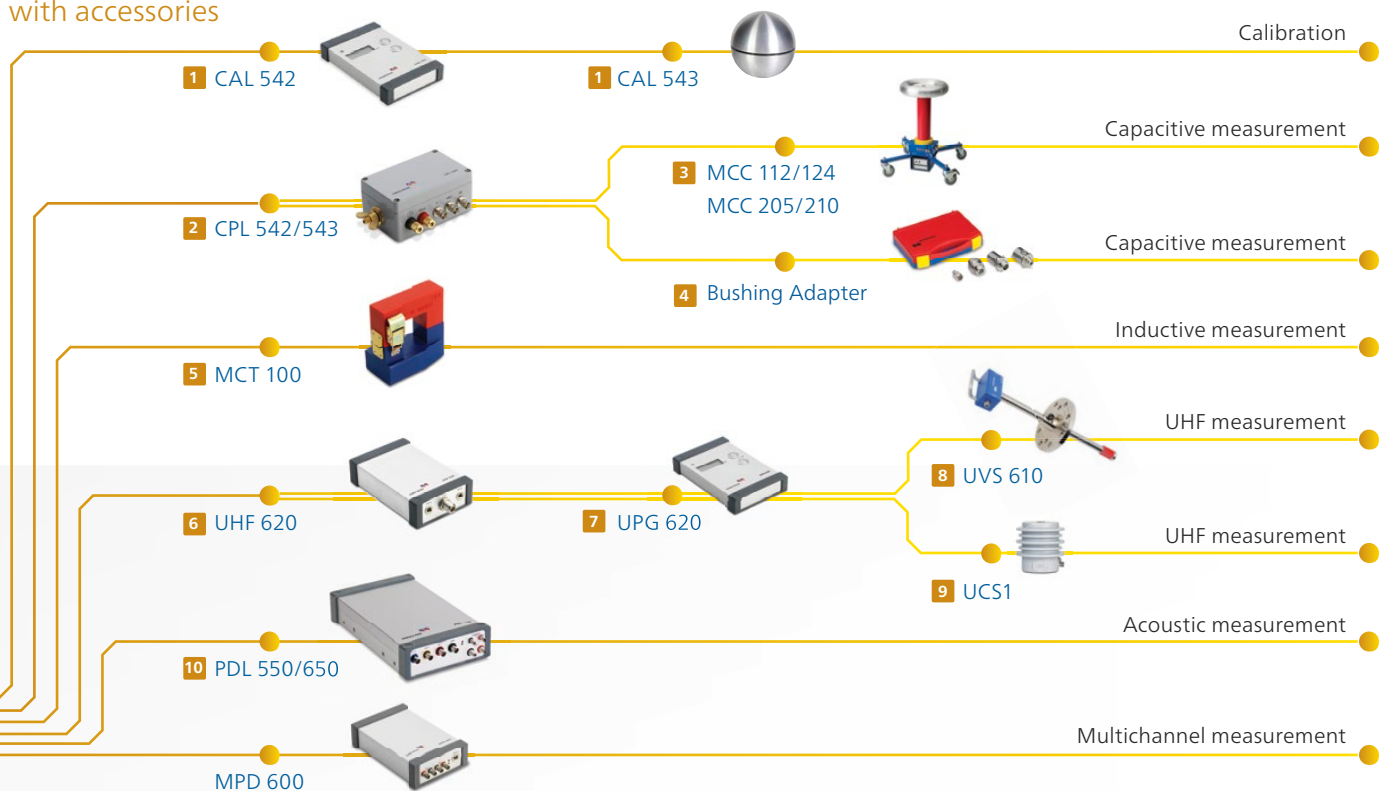
Further information about the accessories
can be found on our website www.omicron.at

Technical data

MPD 600

Input

Center frequency	0 Hz … 32 MHz
Frequency domain bandwidth	Standard: 9 kHz, 40 kHz, 100 kHz, 160 kHz, 300 kHz, 650 kHz, 1 MHz, 1.5 MHz With broadband filter: 9 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz
Time domain	100 ns … 8 µs
Input frequency range	V input: 0 Hz … 2.1 kHz PD input: 0 Hz … 20 MHz
Input impedance	V input: 1 MΩ (parallel 1 µF) PD input: 50 Ω
Input voltage	V input: 60 V rms (max.) PD input: 10 V rms (max.)
Dynamic range	V input: 102 dB PD input: 132 dB (overall), 70 dB (per input)

PC requirements

Min. hardware	Pentium 4® / Athlon 64® or better, 1 GB RAM, USB 2.0
Software	Windows 2000 Pro™, Windows XP™, Windows Vista™ or Windows 7™, Windows 8™

Exactitude

PD event time resolution	< 2 ns
System noise	< 0.015 pC
Spectrum analyzer noise	< -120 dB
Max. double pulse resolution	< 200 ns (time domain integration, superposition error < 1 %)
Measurement accuracy	Voltage: ± 0.05 % of calibrated V value Frequency: ± 1 ppm PD level: ± 2 % of calibrated PD value

Dimensions and ambient condition

Humidity	5 % … 100 %, non-condensing
Ambient temperature	Operation: 0 °C … 55 °C / 32 °F … 89 °F Storage: -10 °C … 70 °C / 14 °F … 158 °F
Power supply (MPP 600 package)	8 V DC … 12,3 V DC (external charger input range: 110 V … 240 V, 50 Hz … 60 Hz and battery pack)
Dimensions (W × H × D)	110 × 44 × 190 mm / 4.3 × 1.7 × 7.5 in
Weight	600 g / 1.3 lbs

1 CAL – Charge calibrator/injector

The CAL 542 charge calibrator is used to inject a
defined charge into and verify the measurement circuit.
The CAL 543 online charge injector remains permanently installed in
the test set-up and can inject pulses during the high-voltage test.

Technical Data	CAL 542	CAL 543
Pulse repetition frequency	300 Hz	1 200 Hz
Pulse rise time	< 4 ns	< 5 ns
Dimensions (W x H x D)	110 x 30 x 185 mm / 4.3 x 7.3 x 1.3 in	Ø 100 mm / Ø 3.9 in
Weight (incl.battery)	520 g / 1.2 lbs	400 g / 0.9 lbs
Output connector	1 × BNC (with BNC adapter, cables and connection clamps)	M8
Power supply	Lithium Battery 9 V, Lifetime > 10 years	Lithium battery, Lifetime > 10 years (with 12 h operation per day)

2 CPL – Measuring impedance

The CPL quadripoles are external measuring impedances
for partial discharge measurements. Both include
an integrated 90 V_{Peak} overvoltage protection device.

Technical Data	CPL 542	CPL 543
Max. currents	0.5 A or 2 A	5 A
Frequency range (PD output)	20 kHz ... 6 MHz	20 kHz ... 6 MHz
Low-arm capacitance	30 µF (for 0.5 A version) 120 µF (for 2 A version)	272 µF
Input connectors	2 × 4 mm terminals[5] 1 × GND	2 × 4 mm terminals[5] 1 × GND
Output connectors	2 × BNC (PD & V), 1 × BNC (TTL signal)	2 × BNC (PD & V)
Mechanical Data		
Dimensions (W x H x D)	150 × 60 × 100 mm / 5.9 × 2.4 × 4.0 in	150 × 60 × 100 mm / 5.9 × 2.4 × 4.0 in
Weight	700 g / 1.5 lbs	700 g / 1.5 lbs

[5] For connecting coupling capacitor

3 MCC – Coupling capacitor

The coupling capacitor connects the MPD 600 to the high-voltage test object. Different MCC coupling capacitors are available
for various voltage levels. The MCC 112 and MCC 124 are designed for direct connection to the MPD 600. The MCC 205 and
MCC 210 are designed with a built-in quadripole measuring impedance. Without the quadripole, they are available as MCC 205-L
and MCC 210-L.

Technical Data	MCC 112	MCC 124	MCC 205 / MCC 205-L	MCC 210 / MCC 210-L
U_{max} (rms /phase-to-ground)	12 kV	24 kV	50 kV	100 kV
$C_{Nominal}$ (± 10%)	1.1 nF	1.1 nF	1.0 nF	1.0 nF
Withstand Voltage (1 min)	28 kV	50 kV	95 kV	150 kV
Q_{PD}	< 2 pC @ 13.2kV	< 2 pC @ 26.4 kV	< 1 pC @ 50kV	< 1 pC @ 100 kV
Weight	4.5 kg / 9.9 lbs	6 kg / 13.2 lbs	7.6 kg / 16.8 lbs	10 kg / 22.1 lbs
Dimensions (W × H × D)	182 × 158 × 182 mm / 7.2 × 6.2 × 7.2 in	182 × 238 × 182 mm / 7.2 × 9.4 × 7.2 in	450 × 582 × 450 mm / 17.5 × 23 × 17.5 in	450 × 736 × 450 mm / 17.5 × 29 × 17.5 in
Scope of delivery	> Adapter (TNC to BNC) > BNC connection cable	> Adapter (TNC to BNC) > BNC connection cable	> Connection cable	> Connection cable

Technical data

4 Bushing adapters

A selection of combinable adapters for secure connections to bushings, delivered in a handy case.

Technical Data	Basic Adapter	M24-F&G	M30-HSP
Bushing manufacturer	Micafil / ABB	F&G, HSP	HSP (new types)
Measurement tap side (thread / connector)	G 3/4" inside female 4 mm / 0,2 in	M 24 inside male 4 mm / 0,2 in	M 30 x 1.5 female 4 mm / 0,2 in
Diagnosis system side	N-Type female (incl. BNC adapter)	Connects to basic adapter	Connects to basic adapter
Surge arrester	included	–	–

5 MCT 100 – High frequency CT

The MCT is a high-frequency current transformer (CT), which picks up partial discharge signals in moderate heights and at a safe distance from high-voltage.

Technical Data	
Frequency range	80 kHz ... 5 MHz
Inner hole dimensions	47 × 57 mm / 1.9 × 2.2 in
Outer dimensions	115 × 120 × 65 mm / 4.5 × 4.7 × 2.6 in
Ferrite core	Split
Connector	TNC (including BNC adapter)

6 UHF 620 – Bandwidth converter

The bandwidth converter extends the measuring frequency range up to the VHF/UHF range and makes the detection of partial discharge more sensitive. This is ideal e.g. for measuring power transformers and gas-insulated substations (GIS).

Technical Data

UHF input range fc	100 MHz ... 2 000 MHz (adjustable in 500 kHz steps)
Measuring bandwidth Δf	Narrowband: Up to 1.5 MHz Mediumband: At 70 MHz Broadband: At 1.9 GHz
Impedance UHF input	50 Ω (N-type input jack)
RF pre-amplifier	20 dB amplifier, switchable
Synchronization via UHF sensor	10 ... 100 Hz (test voltage frequency)

Mechanical data

Power supply	Via AUX-connector of MPD 600 and battery pack MPP 600
Weight	700 g / 1.5 lbs
Dimensions (W × H × D)	110 x 44 x 190 mm / 4.3 x 1.7 x 7.5 in
Operating temperature	0 °C ... 55 °C / 35 °F ... 130 °F
Relative humidity	5 ... 100 %, non-condensing

7 UPG 620 – Pulse generator

The UPG 620 generates very fast slope pulses and is mainly used to verify the measurement circuit in the UHF range.

Technical Data

Rise time	< 200 ps
Decay time	> 100 ns
Frequency repetition rate	100 Hz
Power supply	2 × 9 V lithium battery for > 120 h continuous operation
Weight	700 g / 1.5 lbs
Dimensions (W × H × D)	110 × 28 × 185 mm / 4.3 × 1.1 × 7.3. in
Operating temperature	0 °C ... 55 °C / 35 °F ... 130 °F

8 UVS 610 – UHF valve sensor

The UHF valve sensor allows partial discharge measurements in high-frequency ranges in power transformers with liquid insulation. It is inserted through the oil drain valve.

Technical Data

Usabel frequency range	150 MHz ... 1 GHz
Tightness	up to 5 bar pressure (-15 °C ... +120 °C / 5 °F ... 248 °F)
Insertion depth	55 mm ... 450 mm / 2.2 in ... 17.7 in
Weight	3.1 kg / 6.8 lbs
Dimensions (Ø x H)	200 × 610 mm / 7.9 × 24 in

9 UCS1 – UHF cable sensor

This sensor performs partial discharge measurements in UHF ranges in grounding systems of high-voltage cables and cable terminations.

Technical Data

|	
Frequency range	100 MHz ... 1000 MHz
Capacitance	2 nF
Insulation level	12 kV
AC withstand voltage	28 kV; 1 min
Operating temperature	-20 °C ... 85 °C / -4 °F ... 185 °F
Dimensions (Ø x H)	105 x 107 mm /4.1 x 4.1 in
Weight	1.2 kg / 2.6 lbs
Primary connections	Screw thread 2x M8x14
Connector	TNC

10 PDL 650 – Acoustic PD locator

The PDL 650 measures acoustic signals with multiple sensors spread over a power transformer. The software determines the failure location and shows its coordinates in a power transformer 3D model.

Technical Data

Measurement bandwidth	10 kHz ... 400 kHz
Amplification	0, 20, 36 dB
Sensors	Active, supplied via PDL 650
Battery life	> 4 h
Mains supply	110 V ... 240 V, 50 Hz ... 60 Hz

Mechanical data

Dimensions (W × H × D)	170 × 61 × 300 mm / 6.7 × 2.4 × 11.8 in
Weight	2.0 kg / 4.5 lbs
Ambient temperature	Operation: 0 °C ... 45 °C / 32 °F ... 113 °F Storage: -10 °C ... 70 °C / 14 °F ... 158 °F
Weight of complete system	< 20 kg / 45 lbs (including carry case, cables, etc.)
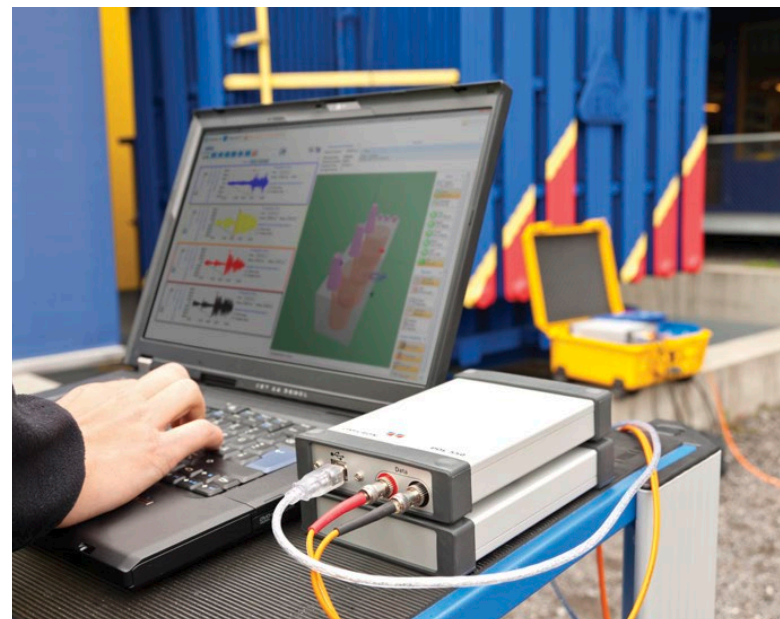
OMICRON is an international company serving the electrical power industry with innovative testing and diagnostic solutions. The application of OMICRON products allows users to assess the condition of the primary and secondary equipment on their systems with complete confidence. Services offered in the area of consulting, commissioning, testing, diagnosis and training make the product range complete.

Customers in more than 140 countries rely on the company's ability to supply leading-edge technology of excellent quality. Service centers on all continents provide a broad base of knowledge and extraordinary customer support. All of this together with our strong network of sales partners is what has made our company a market leader in the electrical power industry.

The following publications provide further information on the solutions described in this brochure:

MPD 500
Brochure

PDL 650
Brochure

For more information, additional literature, and detailed contact information of our worldwide offices please visit our website.