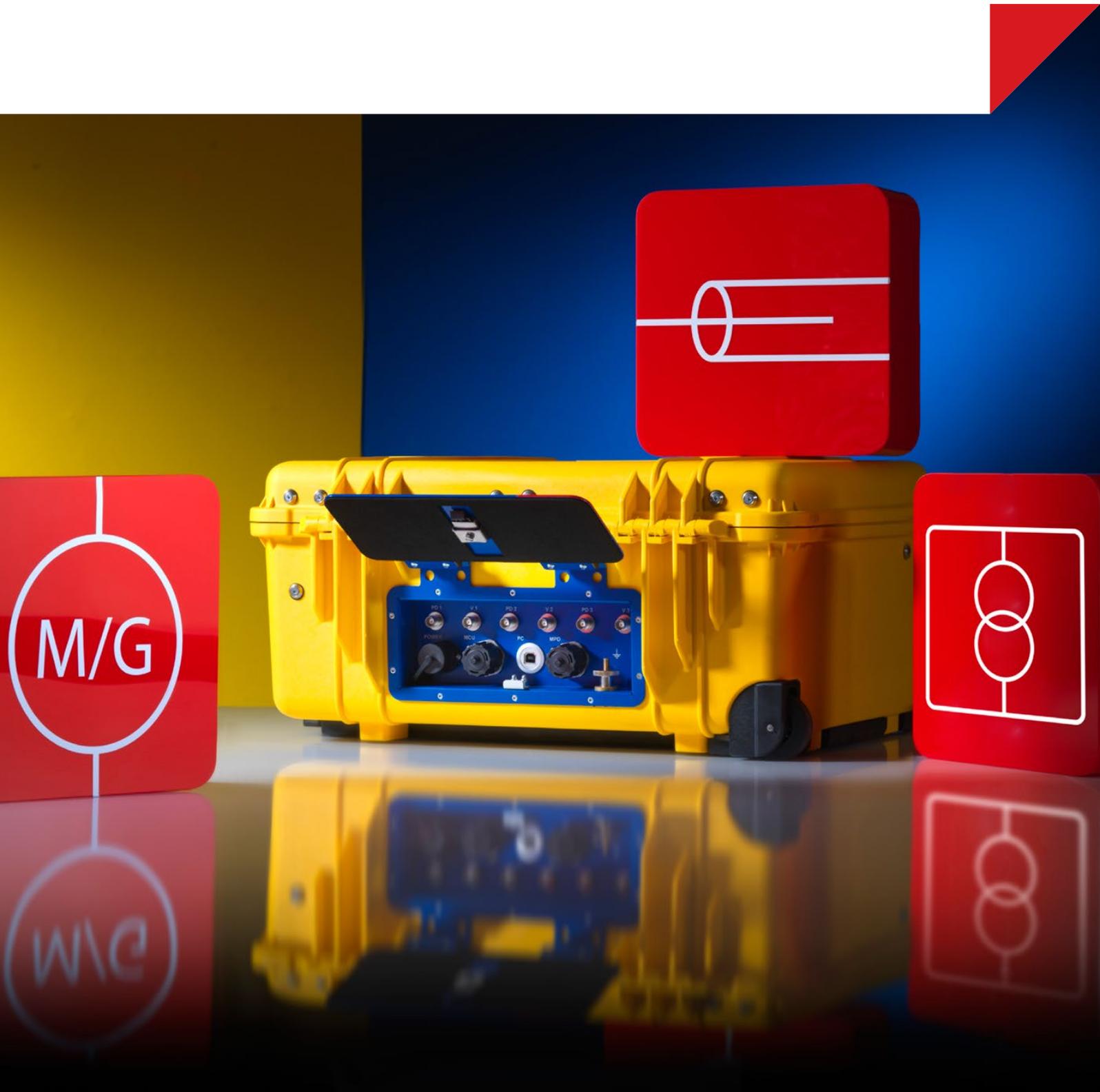


# OMS 605

Portable on-line partial discharge diagnosis and monitoring system for various electrical assets



# Periodic on-line assessments of insulation condition

## Early defect detection prevents failures

The insulation system of all medium-voltage (MV) and high-voltage (HV) assets is subjected to aging processes. These cause insulation defects over time, which can eventually lead to dielectric failure and costly outages.

To prevent this from happening, it is important to know the insulation condition of these assets over their entire service life.

## Insulation assessment based on partial discharge

Partial discharge (PD) is one of the most reliable indicators of insulation defects or degradation. That is why it is presently an important diagnostic parameter used in the factory acceptance testing, commissioning and in-service testing of a variety of MV and HV assets.

## Why on-line PD diagnosis and monitoring?

On-line PD diagnosis evaluates PD activity when the asset is in operation. It provides you with a snapshot of insulation status under normal load conditions.

On-line PD monitoring allows you to continuously observe changes in PD activity over a longer periods of time during asset operation.

The data gathered with on-line PD diagnosis and monitoring enables you to determine when your equipment is at risk of failure. This vital information helps you optimize your maintenance efforts, asset management and investment planning.



## Compact, portable design

The OMS 605 features a rugged portable case with an extendable handle and wheels. This makes it easy to transport to different locations.



## OMS 605 at a glance

Our OMS 605 is a portable, IEC 60270 compliant on-line PD diagnosis and monitoring system. It is designed for periodic inspections of electrical assets under load, including:

- > Motors and generators
- > HV cables and their accessories
- > MV and HV switchgears
- > Power transformers

### All-in-one solution

The OMS 605 includes the required hardware and software you need to perform periodic on-line PD testing and monitoring. It can be used with a variety of capacitive and inductive PD sensors for the entire frequency range relevant to PD signals, including the ultra high frequency range.

### Plug-and-play operation

The PD sensors can be permanently installed and connected via a 3- or 4-channel terminal box to the OMS 605. After the sensors have been installed with the terminal box, a user-friendly plug-and-play operation of the OMS 605 is then possible without having to shut down the asset.

### Synchronous, multi-channel data acquisition

The OMS 605 performs synchronous three-channel PD data acquisition. This enables complete data collection for more reliable evaluation of individual PD sources. A fourth channel is available for an additional PD sensor or noise gating hardware.

### Effective PD detection

The measurement challenges related to high noise levels are overcome by using various methods, such as:

- > Freely-adjustable digital filters to achieve the highest signal-to-noise ratio.
- > Synchronous multi-channel 3PARD (3-Phase Amplitude Relation Diagram) technique for reliable separation of actual PD from noise signals.
- > Synchronous multi-spectral 3CFRD (3-Center Frequency Relation Diagram) technique for signal separation in case of single-phase equipment testing.

The user can visualize the PD signals in PRPD (Phase-Resolved Partial Discharge) patterns.

### Software for PD data display and analysis

The OMS 605 software lets you define diagnostic measurements and monitoring sessions. You can also use it to view and record live PD data streams, as well as for detailed post-analysis.



## Your benefits

- > All-in-one solution for on-line PD diagnosis and monitoring
- > Easy to transport to different locations
- > Rugged design for reliable operation in industrial environments (IP65)
- > Advanced noise and PD source separation for reliable PD detection
- > Powerful software for PD data display and analysis

 [www.omicronenergy.com/oms605](http://www.omicronenergy.com/oms605)

# One portable solution for a variety of electrical assets

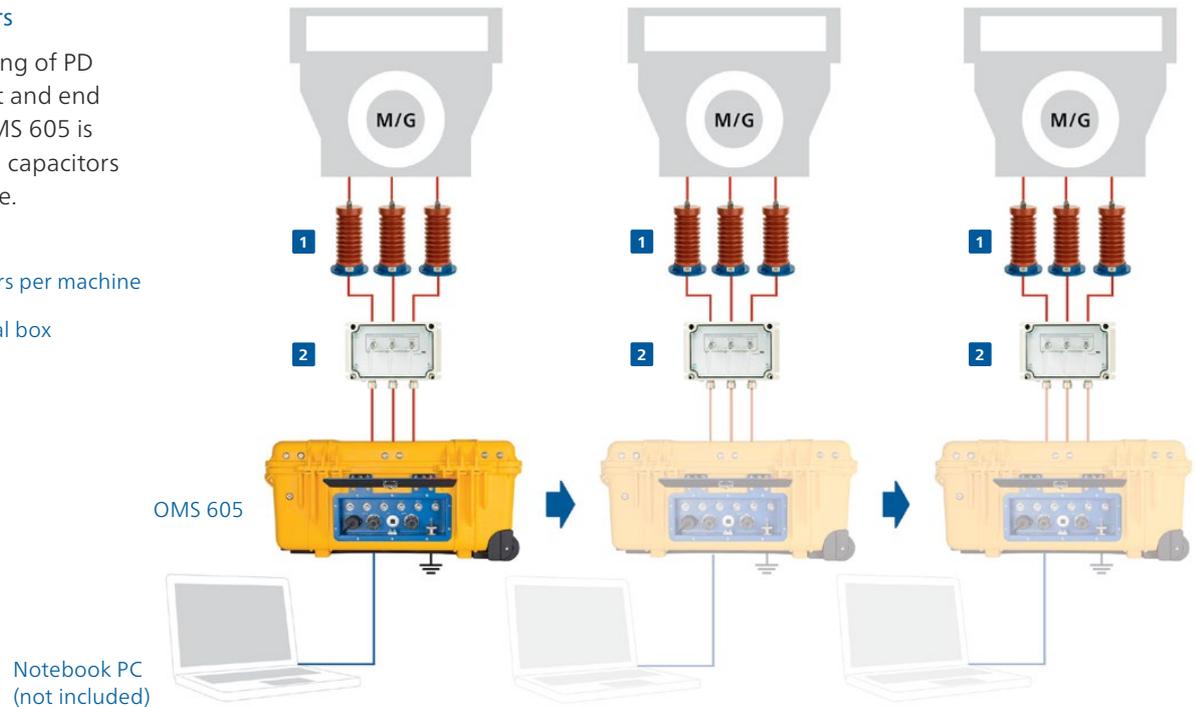
## Designed for easy and safe use across the electrical network

With the OMS 605, you can evaluate PD activity on a periodic basis in a variety of HV and MV assets. The same portable system can be used at different locations.

### Motors and generators

For complete monitoring of PD in stator windings (slot and end winding areas), the OMS 605 is connected to coupling capacitors installed on each phase.

- 1 3 x coupling capacitors per machine
- 2 (Optional) 1 x terminal box

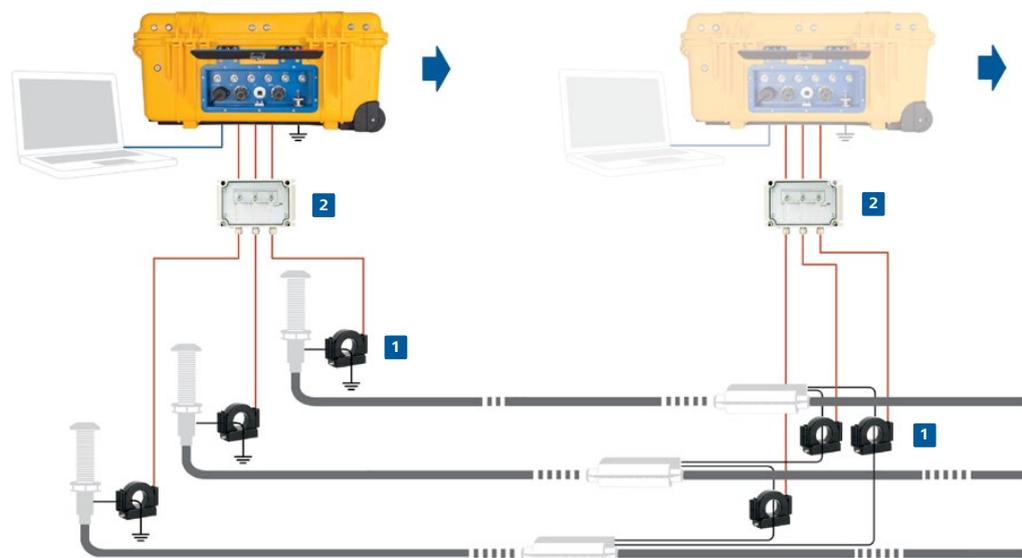


### HV cables and their accessories

The OMS 605 acquires the PD signals from a high-frequency current transformer (HFCT) installed on the grounding connection of each phase when the cable is in operation.

This enables you to detect PD activity in the cable and its adjacent accessories.

- 1 3 x HFCTs per cable accessory group
- 2 (Optional) 1 x terminal box



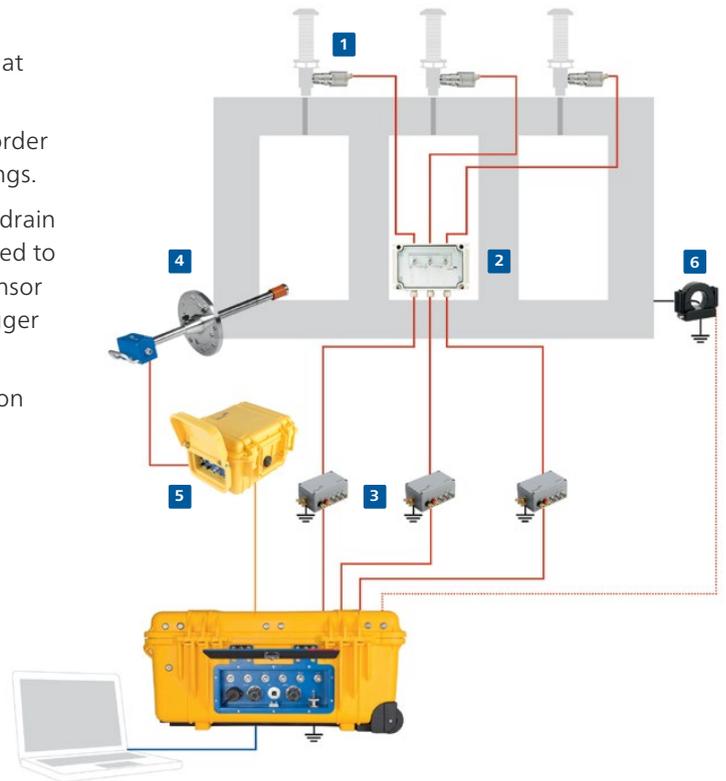
### Bushings and power transformers

The OMS 605 is connected to bushing taps via adapters that include several redundant levels of protection.

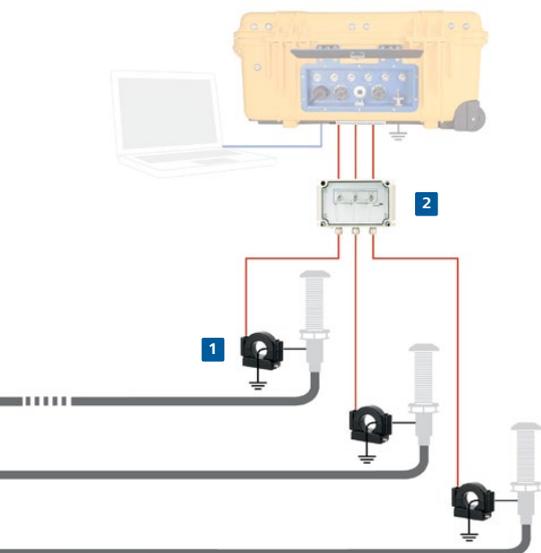
A measurement impedance is required for each phase in order to adapt the OMS 605 to the leakage current in the bushings.

To reduce the effects of external noise, like corona, a UHF drain valve sensor can also be simultaneously used. It is connected to the OMS 605 via our UHF extension kit. The drain valve sensor detects PD in the transformer tank and can be used to trigger the bushing measurements.

As an alternative, you can connect an HFCT for PD detection or gating.



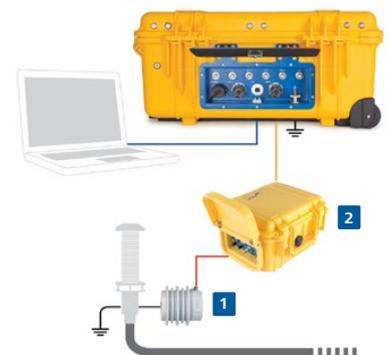
- 1 3 x bushing tap adapters per transformer
- 2 (Optional) 1 x terminal box
- 3 3 x CPL measuring impedances
- 4 (Optional) 1 x UHF drain valve sensor
- 5 (Optional) 1 x UHF extension kit
- 6 (Optional) 1 x HFCT



### HV cable terminations (UHF measurements)

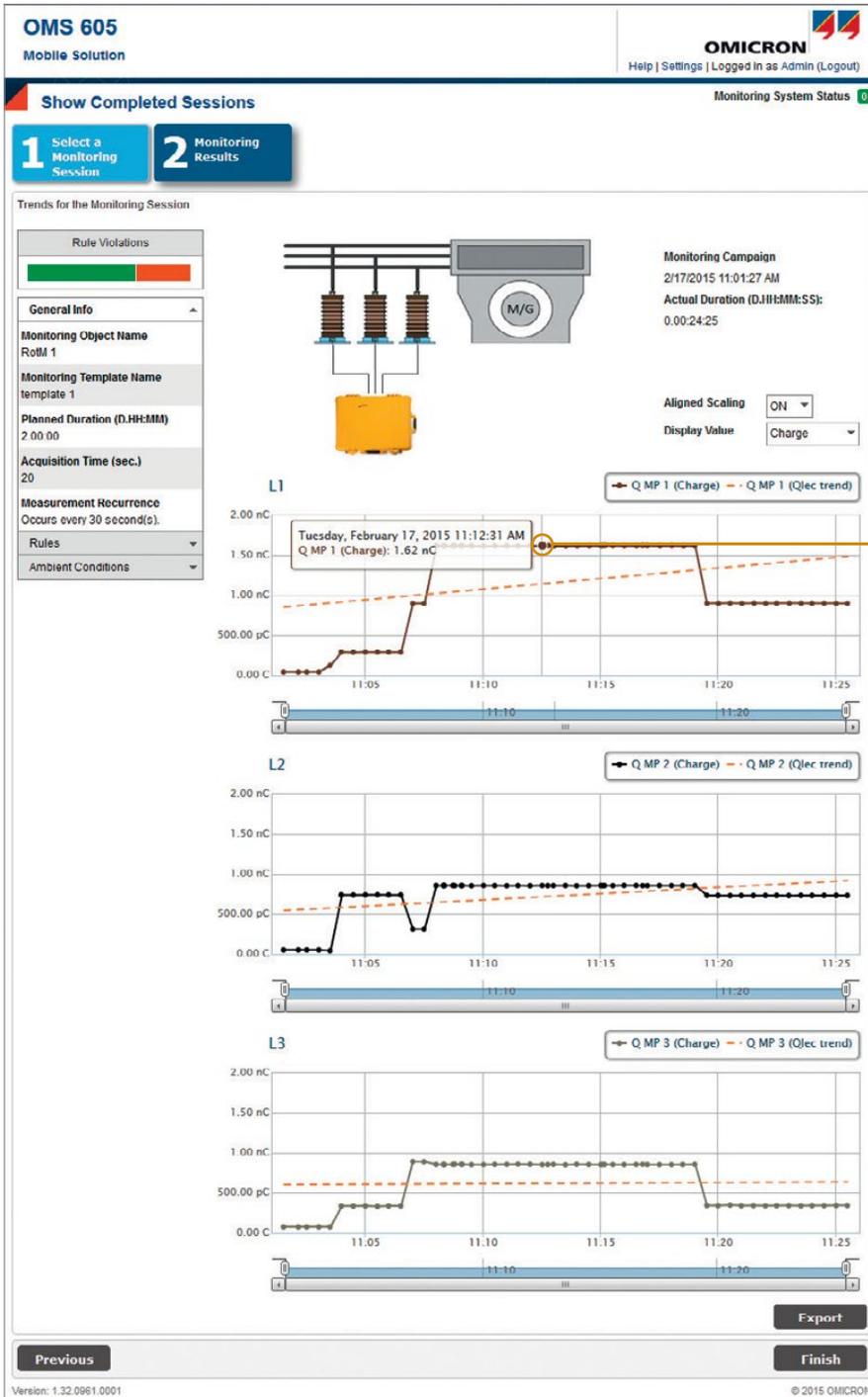
For more sensitive measurements on cable terminations, a UHF sensor can be alternatively installed on one or more phases. The sensors are connected via our UHF extension kit to the OMS 605.

- 1 1 x UHF sensor per cable termination
- 2 1 x UHF extension kit per cable termination

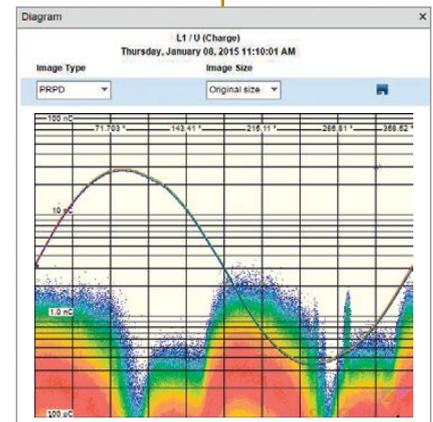


# Powerful PD data display and analysis software

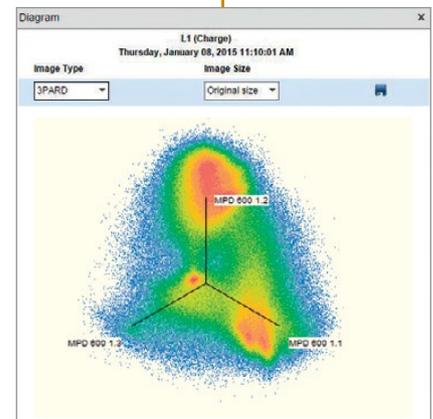
## View PD trend data from completed sessions



- > Warnings and alarms indicate threshold (rules) violations
- > View PD trend charts for each phase or channel
- > Scroll over data points to view date, time and PD value
- > Click on data points to display PRPD and 3PARD images and save them in BMP, PNG or JPG formats
- > Easily export trend data in CSV format for reporting
- > Record and download PD data streams for detailed post-analysis



PRPD



3PARD

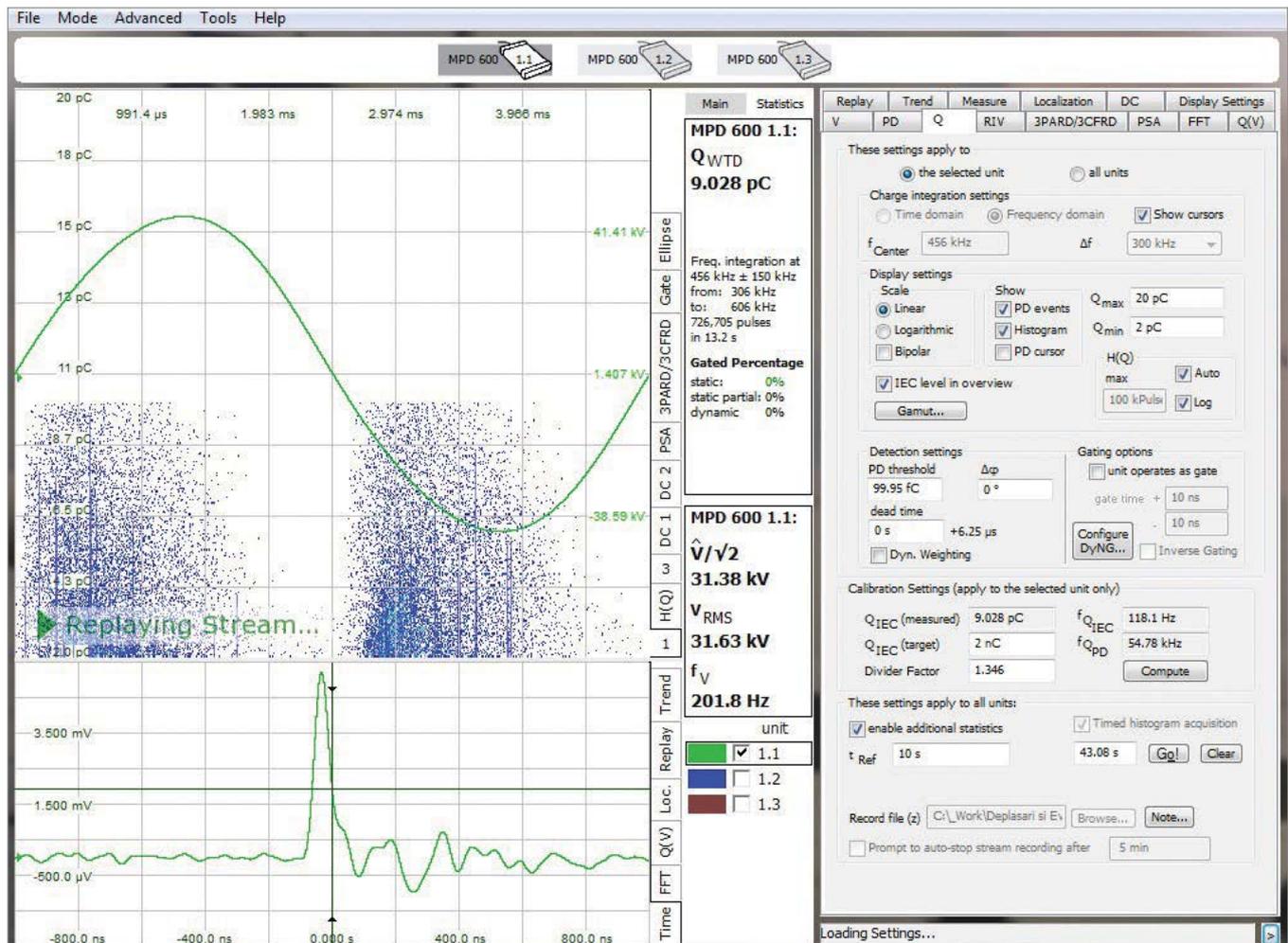
PD trend data for all three phases

## Expert PD analysis

Real-time diagnosis can be done using the expert PD analysis software included with the OMS 605 system.

This advanced software allows you to freely adjust the settings of the digital bandpass filter in order to achieve an optimal signal-to-noise ratio. The analysis of the signal in time and frequency domain is also possible.

The data can be exported for reporting in a variety of file formats, such as Excel and MATLAB.



Enables detailed post-analysis of recorded data streams

# OMS 605 system setup and ordering information

## OMS 605

Includes the system components listed below

Order no.

VEHZ4173

### Hardware

- 1 x Transportation suitcase
- 1 x 3-channel PD acquisition unit
- 1 x MCU 502 controller

### Software

- 1 x Expert PD analysis software
- 1 x Monitoring software

Notebook computer not provided.

### Cables and accessories

- 1 x USB cable (2 m / 6.56 ft)
- 1 x Duplex fiber optic cable (10 m / 32.81 ft)
- 1 x Grounding strap (4 m / 13.12 ft)
- 1 x Grounding clamp
- 6 x Signal cable (4 m / 13.12 ft)
- 1 x Power supply cord (2 m / 6.56 ft)

### Documentation

- 1 x OMS 605 user manual
- 1 x Software installation guide

## Optional accessories

Order no.

### Hardware

- CAL 542 calibrator
  - 1 pC ... 100 pC VE004210
  - 0.1 nC ... 10 nC VE004230
- UPG 620 pulse generator up to 60 V VE004242

### Software

- 3CFRD software module
- An alternative PD source separation technique when it is not possible to measure PD on all three phases. VESM4104

### Monitoring services

- Installation on request
- Commissioning on request
- Training on request
- Data evaluation assistance on request

## Application-specific accessories

Order no.

### 1 Measuring impedance<sup>1</sup>

- CPL 542: 0.5 A type VEHZ4100

### 2 Terminal box<sup>2</sup>

- 3-channel terminal box VEHZ4176
- 4-channel terminal box VEHZ4175

### 3 UHF extension kit

- Includes 1 x UHF 620, 1 x MPD 600, 1 x MPP battery and connection cables in a protected case. VEHZ4174

<sup>1</sup> For power transformers, a measurement impedance is required for each phase in order to adapt to the leakage current in the bushings.

<sup>2</sup> For use when PD sensors are permanently installed on various assets for plug-and-play on-line PD diagnosis and monitoring.



OMS 605

### Application-specific accessories

Order no.

#### 4 Coupling capacitors

MCC 117: 17.5 kV, 2.0 nF

VEHZ4157

MCC 124: 24 kV, 1.0 nF

VEHZ4158

MCC 117 permanent installation kit

Includes 3 x MCC 117, 1 x terminal box and 3 x tri-axial cables (5 m) with pre-installed connectors.

VEHZ4177

MCC 124 permanent installation kit

Includes 3 x MCC 124, 1 x terminal box and 3 x tri-axial cables (5 m) with pre-installed connectors.

VEHZ4178

### Application-specific accessories

Order no.

#### 5 Bushing tap adapters

A variety of adapters are available for connection to different types of taps on capacitive bushings.

on request

#### 6 UHF drain valve sensor

UVS 610: 150 MHz to 1 GHz

VEHZ4131

#### 7 High-frequency current transformers

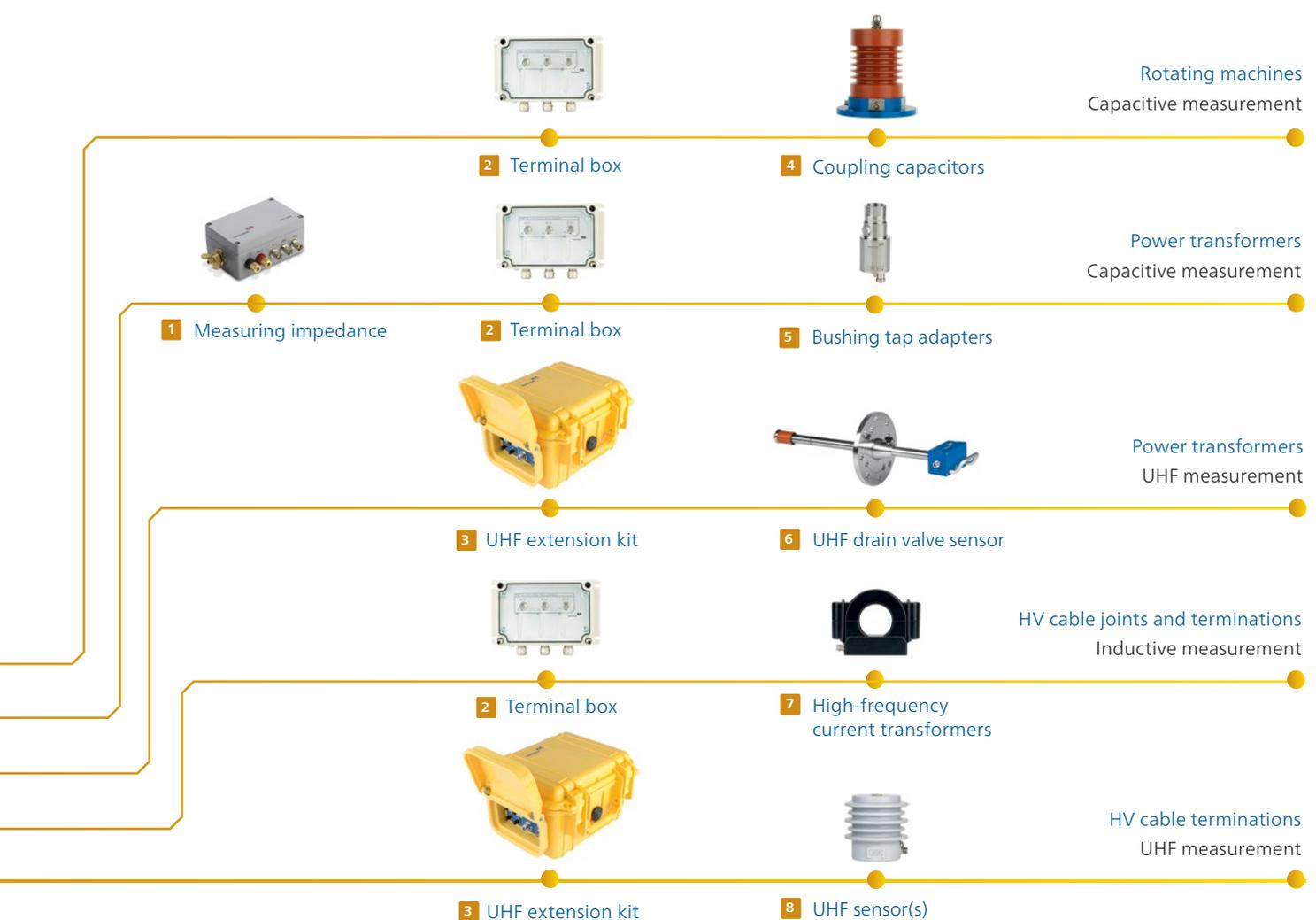
MCT 120: 100 kHz-25 MHz, split ferrite core

VEHZ4179

#### 8 UHF sensor for cable terminations

UCS1: 100 MHz to 1 GHz

VEHZ4144



# Technical specifications

## OMS 605

### Measurement data

Data Acquisition	3 channels (expandable with additional acquisition units)
Frequency range	0 ... 32 MHz
PD filter bandwidth	9 kHz; 30 kHz; 100 kHz; 160 kHz; 300 kHz; 650 kHz 1 MHz; 1.5 MHz; 3 MHz
PD event time resolution	< 2 ns
System noise	< 0.015 pC
Sampling rate	V input: 100 kS/s PD input: 64 MS/s
Input impedance	V input: 1 M $\Omega$ (in parallel with 1 $\mu$ F) PD input: 50 $\Omega$  V input: 102 dB / range PD input: 70 dB / range; total 132 dB
Power supply	110 ... 240 V AC / DC $\pm$ 10%

### Operating conditions

Operating temperature	-20 °C ... +55 °C -4 °F ... +131 °F
Storage temperature	-20 °C ... +60 °C -4 °F ... +140 °F
Humidity	5 % ... 85 % (non-condensing)
Protection class	IP65



### Mechanical data

Dimensions (W x D x H)	455 x 560 x 265 mm 18 x 22 x 10 in
Weight	16 kg / 35 lbs

### PC requirements

Processor	Intel Pentium 4 ( $\geq$ 2.5 GHz), Pentium M ( $\geq$ 1.5 GHz), Core or Core 2 processor, or AMD Athlon 64 or Turion 64 processor
Memory	1 GB RAM, USB 2.0 Hi-speed compatible
Operating system	Windows 7™, Windows 8™, Windows 8.1™, Windows 10™

## Application-specific accessories

### 1 CPL 542 measuring impedance



The CPL quadripoles are external measuring impedances for partial discharge measurements.

#### Technical Data

Max. currents	0.5 A
Frequency range (PD output)	20 kHz ... 5 MHz
Low-arm capacitance	30 $\mu$ F (for 0.5 A version)
Input connectors	2 x 4 mm terminal 1 x GND
Output connectors	2 x BNC (PD & V), 1 x BNC (TTL signal)

#### Mechanical Data

Dimensions (W x H x D)	150 x 60 x 100 mm / 5.9 x 2.4 x 4.0 in
Weight	700 g / 1.5 lb

### 2 Terminal box



Used for convenient connections of permanently-installed PD sensors to the OMS 605 without service interruption.

#### Technical Data

Protection class	IP 66 (EN 60529)
Input	3 or 4 channels equipped with 5m tri-axial cable and connectors TNC 50 $\Omega$ female connectors with short circuit dust cap
Output	3 or 4 channels Cable glands with outer shield connection Connection point for grounding

### 3 UHF extension kit



Connects one UHF sensor to the OMS 605 via a fiber optic cable (included). One UHF extension kit is required for each phase installed with a UHF sensor.

#### Technical Data

Protection class	IP66, IP67
Input	BNC 50 Ω female 2 x sockets for FO in with ST connectors
Output	2 x sockets for FO out with ST connectors
Data acquisition	1 channel
UHF input range	100 to 2,000 MHz (adjustable in 500 kHz steps)
PD filter bandwidth	9 kHz...600 kHz (narrow band) 70 MHz (wide band) 1.9 GHz (ultra wide band)
PD event time resolution	< 2 ns

### 4 MCC coupling capacitors



Different MCC coupling capacitors are available for various voltage levels.

#### Technical Data

	MCC 117 (Option C)	MCC 124 (Option C)
$U_m$ (phase-to-phase)	17.5 kV	24 kV
$C_{Nominal}$	2.0 nF (+/- 15%)	1.0 nF (+/-15%)
Withstand Voltage (1 min.)	38 kV	50kV
$Q_{PD}$	< 2 pC @ 20.7 kV	< 2 pC @ 27.6 kV

### 5 Bushing tap adapters



A variety of bushing tap adapters are available for PD measurements on various bushing types.

- > Robust, modular design
- > Built-in multiple redundant level of protection

Technical specifications available upon request. Contact OMICRON to select the right tap adapter for your application.

### 6 UVS 610 drain valve sensor



Allows PD measurements to be taken in liquid-insulated power transformers via the vent of an oil drain valve (DN50 or DN80).

#### Technical Data

Protection class	IP 66 / IP 67
Frequency range	150 MHz to 1000 MHz
Tightness	up to 5 bar pressure (at -15 °C to +120 °C / at 5 °F to 248 °F)
Insertion depth	55 mm to 450 mm / 2.2 inch to 17.7 inches

### 7 MCT 120 high-frequency CT



The MCT high-frequency current transformer (HFCT) picks up PD signals at a safe distance from high voltage. It is primarily intended for use on ground connections.

#### Technical Data

Frequency range (-6 dB)	80 kHz ... 40 MHz
Inner hole dimensions	53.5 mm / 2.11 inches
Ferrite core	Split
Connector	TNC (including BNC adapter)

### 8 UCS1 UHF sensor



The UCS1 sensor performs PD measurements in high-frequency UHF ranges on high-voltage cable terminations.

#### Technical Data

Frequency range	100 MHz to 1000 MHz
Insulation level	12 kV
Capacitance	2 nF (±10%)
Connections	Screw thread 2 x M8x14 Connector: TNC



## Project knowledge and expertise you can rely on

We support you with a variety of services to ensure your success, including:

- > System specific design consultancy
- > Installation and commissioning
- > Training and data evaluation assistance
- > Worldwide customer service and hotline

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 150 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.

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