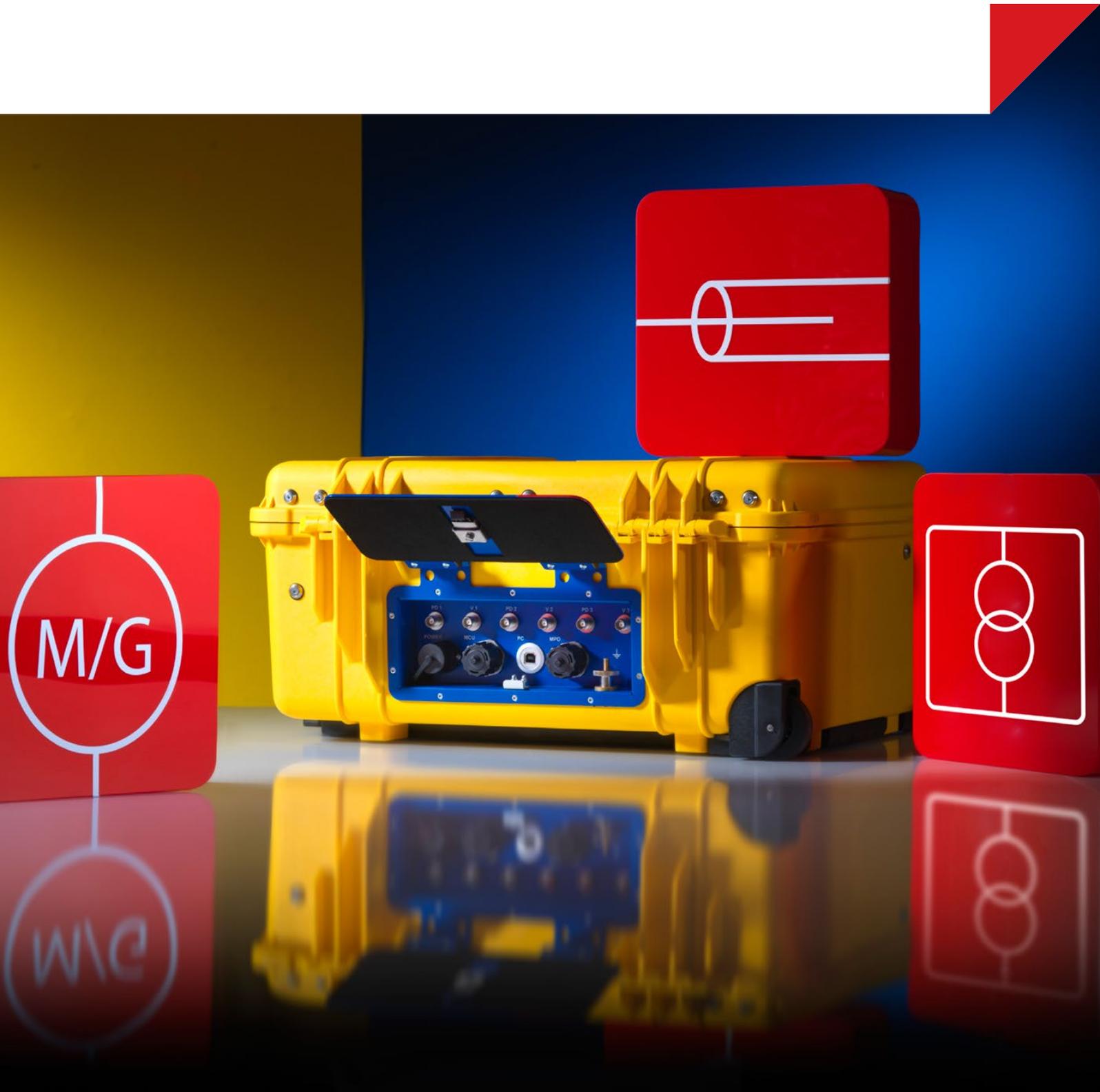


OMS 605

Portable partial discharge monitoring and diagnosis system for a variety of high-voltage assets



Periodic assessments of insulation condition

Early defect detection prevents failures

The insulation system of all high-voltage electrical equipment is subjected to aging processes. These cause insulation defects over time, which can eventually lead to dielectric failure and costly outages.

To prevent failure, it is important to know the insulation condition of electrical equipment over its entire service life.

Partial discharge is a reliable indicator

Partial discharge (PD) is one of the most reliable indicators of insulation degradation in your high-voltage assets. An increase in PD activity during operation reveals defects, which are affecting the integrity of the insulation.

Why online PD monitoring?

Compared to off-line diagnostic tests, on-line PD monitoring assesses insulation condition when the asset is in operation.

Condition-based trend data enables you to estimate insulation degradation rates. This is vital information to help you in optimizing asset management, maintenance efforts and investment planning.

Temporary vs. continuous PD monitoring

Temporary monitoring enables you to observe changes in PD activity over short periods of time. You can quickly assess the current insulation condition and identify which assets are most at risk of failure.

Those assets most at risk can then be monitored on a continuous basis with a permanent PD monitoring system.



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 monitoring locations.



OMS 605 at a glance

Our OMS 605 is a portable online PD monitoring and diagnosis system. It is designed for temporary inspections of high-voltage assets under load. It can be used for:

- > Motors and generators
- > High-voltage cable terminations and joints
- > MV and HV switchgears
- > Power transformers

All-in-one solution

The OMS 605 contains a data acquisition unit, a fiber optic data converter and essential cables for PD monitoring. The transportable case is also fitted for a notebook PC, which can be ordered separately. It is used for setting up monitoring sessions, PD analysis and viewing trend data using the system's monitoring and analysis software.

Quick and easy set-up

The OMS 605 can be used with a variety of PD sensors, including coupling capacitors, high-frequency current transformers, bushing tap adapters and UHF sensors.

These sensors can be permanently installed to avoid having to take frequently-monitored assets offline for set-up. All sensor connections can be made easily via a customized terminal box to the protected side panel of the OMS 605. A user-friendly plug-and-play operation is therefore possible at multiple monitoring locations.

Synchronous, multi-channel data acquisition

The OMS 605 has three channels for capturing PD activities on all three phases simultaneously. A fourth monitoring channel can be added for an additional sensor or auxiliary gating hardware.

Multi-channel PD data acquisition is performed synchronously. This enables complete data collection for more reliable evaluation of individual PD sources.

Effective PD detection

PD data is often challenging to interpret, because it is greatly influenced by external noise. The OMS 605 overcomes this by applying the unique 3PAR (3-Phase Amplitude Relation Diagram) separation technique. This filters out external noise and allows you to separate multiple PD sources for individual analysis.

Software for PD monitoring and analysis

The OMS 605 mobile monitoring software lets you define monitoring sessions and set warning and alarm thresholds. You can also use it to view and record live data streams. Collected PD data is shown in a trend chart for each phase.

The expert PD analysis software is used for more detailed evaluation of the recorded data streams.



Your benefits

- > Easy to transport for temporary monitoring at different locations
- > Rugged design for reliable operation in industrial environments (IP65)
- > Synchronous, multi-channel PD data acquisition for complete assessment
- > Advanced noise and source separation for reliable PD detection
- > Powerful software for PD monitoring, data display and analysis

 www.omicronenergy.com/oms605

One portable solution for all of your high-voltage assets

Designed for easy and safe use across the electrical network

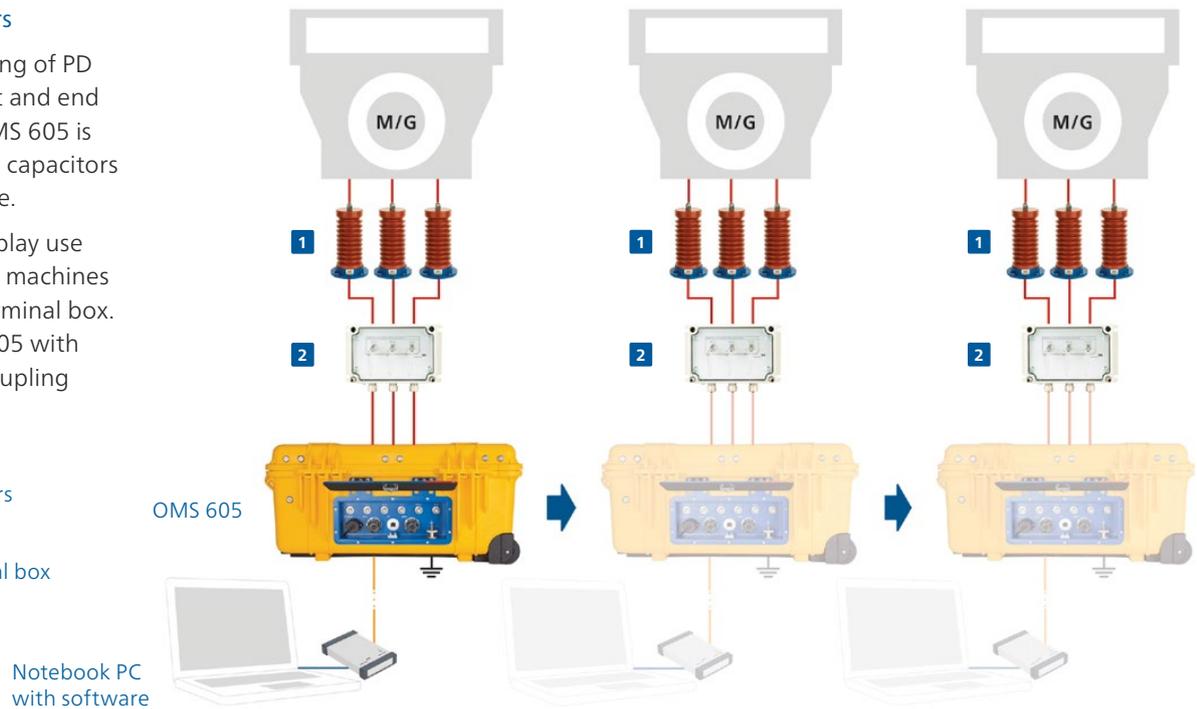
You can monitor and diagnose a variety of HV assets on a temporary basis with the OMS 605. The same portable system can be used for multiple monitoring locations. Its convenient plug-and-play operation and flexible software allow you to easily adapt the OMS 605 to the monitoring requirements of a particular asset.

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.

Convenient plug-and-play use with single or multiple machines is possible with our terminal box. It connects the OMS 605 with permanently-installed coupling capacitors.

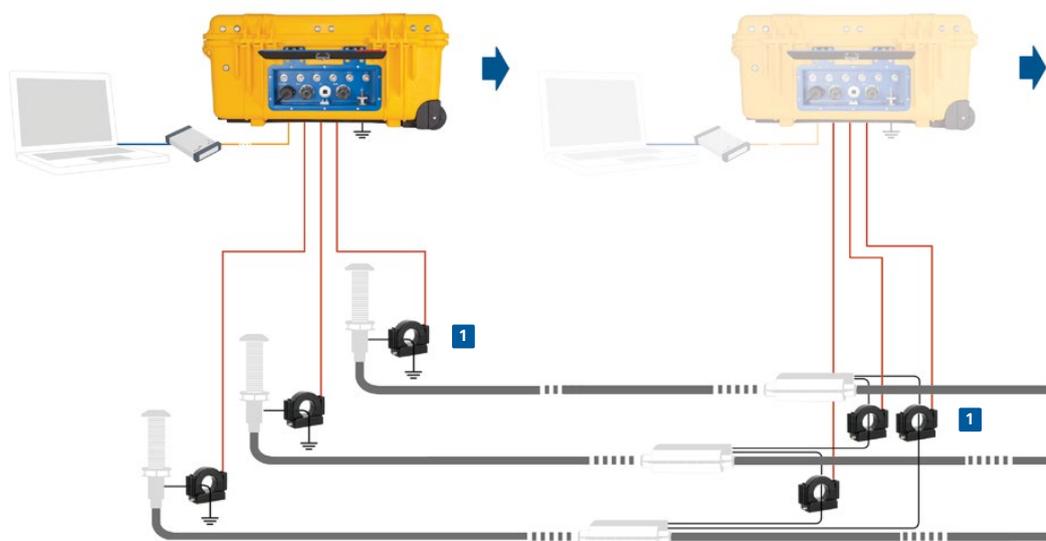
- 1 3 x coupling capacitors per machine
- 2 (Optional) 1 x terminal box



HV cable terminations and joints

The OMS 605 is connected to a high-frequency current transformer (HFCT) installed on each phase. This enables you to monitor PD for a complete group of cable terminations or joints.

- 1 3 x HFCTs per cable accessory group

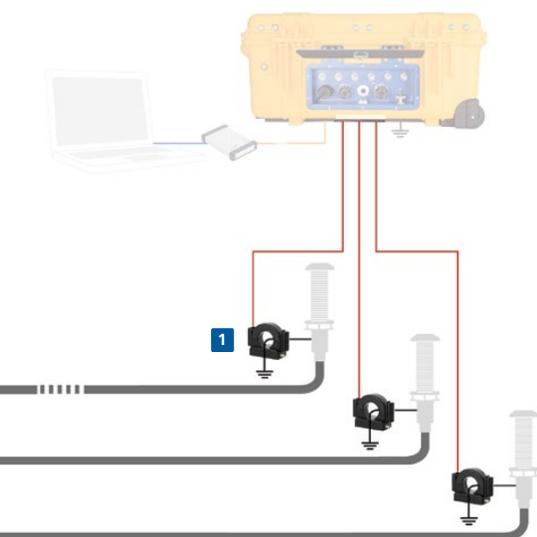
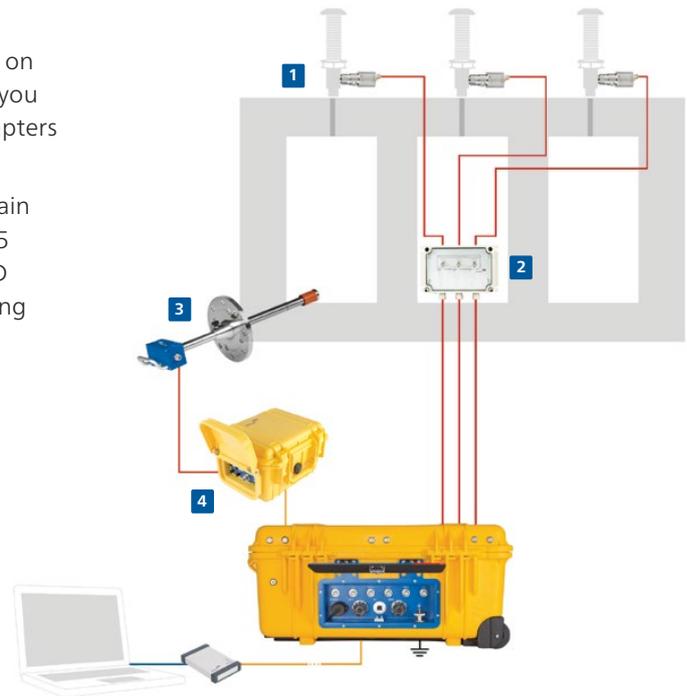


Bushings and power transformers

The OMS 605 is connected to bushing tap adapters installed on each bushing (phase). Our customized terminal box enables you to safely and easily connect the OMS 605 to the bushing adapters for each monitoring session.

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

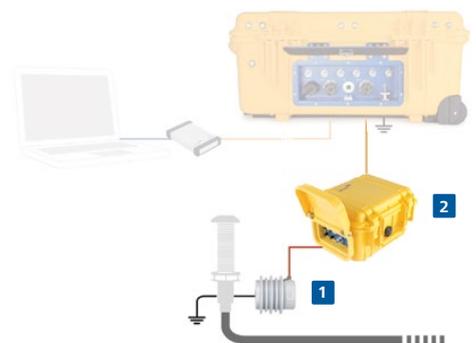
- 1** 3 x bushing tap adapters per transformer
- 2** (Optional) 1 x terminal box
- 3** (Optional) 1 x UHF drain valve sensor
- 4** (Optional) 1 x UHF extension kit



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 channel
- 2** 1 x UHF extension kit per channel

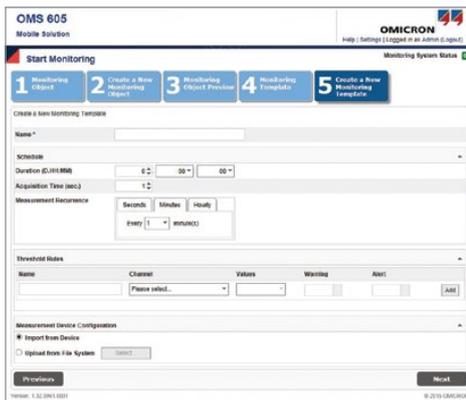


Powerful PD monitoring and analysis software

1 Set up and start a session

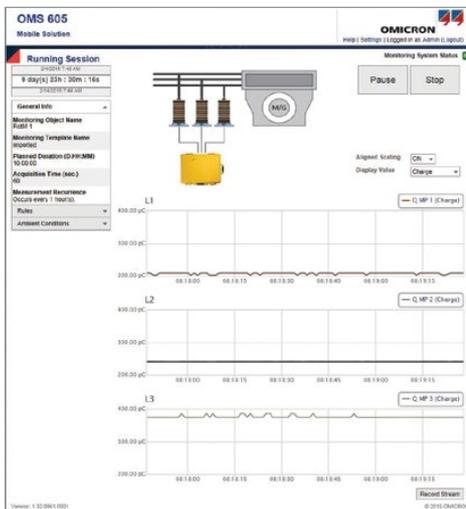
The OMS 605 mobile monitoring software lets you easily define monitoring sessions for each asset type, including duration and frequency. Monitoring configurations from previous sessions can be imported and reused for valid data comparisons.

Set up a monitoring session



- > Select an existing asset template or create a new one
- > Define monitoring duration and frequency
- > Set warning and alarm thresholds
- > Import settings from previous monitoring sessions or diagnostic tests

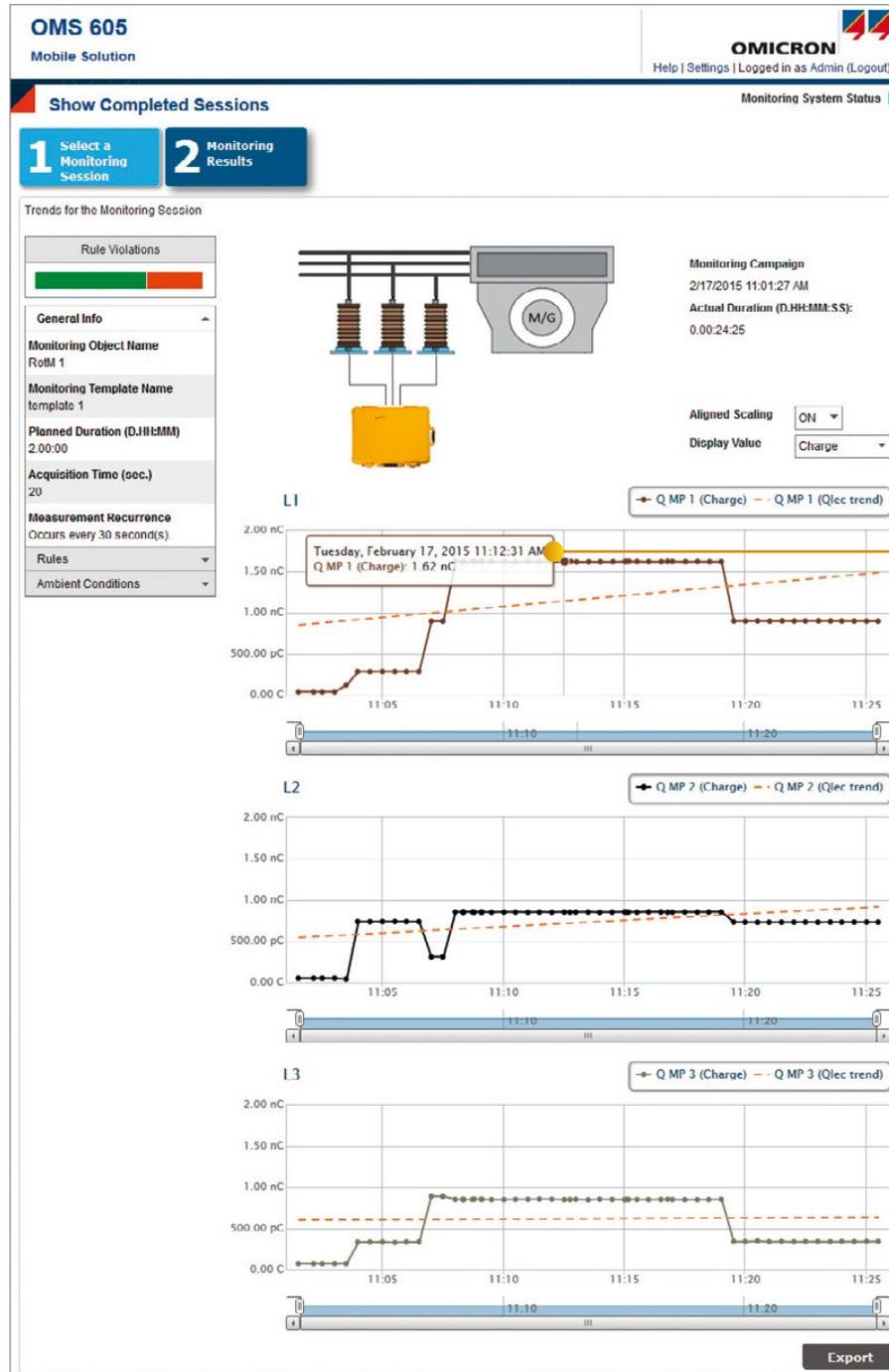
Start a monitoring session



- > View running monitoring session
- > Capture pre-analyzed PD trend data (see 2)
- > Record 30-second data streams to be analyzed using the expert PD software (see 3)

2 View PD trend data from completed sessions

PD trend data for all three phases



- > Warning / alarm indication when thresholds (rules) have been violated
- > See PD trend charts for each phase / channel
- > Scroll over data points in trend charts to view date, time and PD value
- > Click on data points to display PRPD and 3PARD images
- > Trend data can be easily exported in CSV format for reporting

3 Expert PD analysis

The OMS 605 monitoring software automatically displays the PD trend data for each phase when a monitoring session is completed.

You are also provided with PRPD (Phase-resolved PD) and 3PARAD (3-Phase Amplitude Relation Diagram) images. These show overlapping and separated PD activity for each data point in the trend charts.

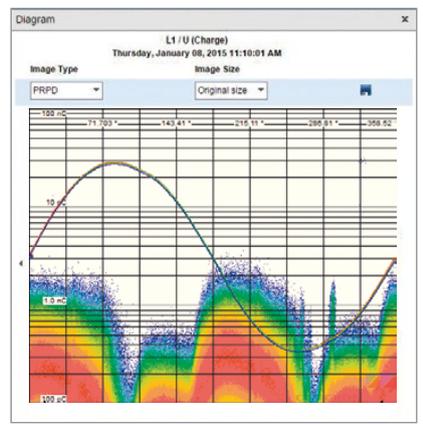
These images can be easily exported for reports in BMP, PNG and JPG formats.

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

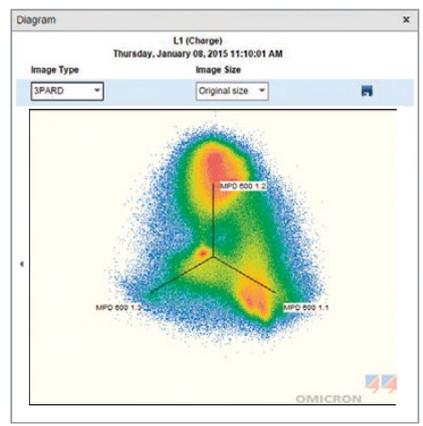
This advanced software allows the user to apply various filters to see more detail of the PD activity. The resulting information helps you to reliably assess insulation condition status.

The data can be exported for reporting in a variety of file formats (i.e. Excel, MATLAB).

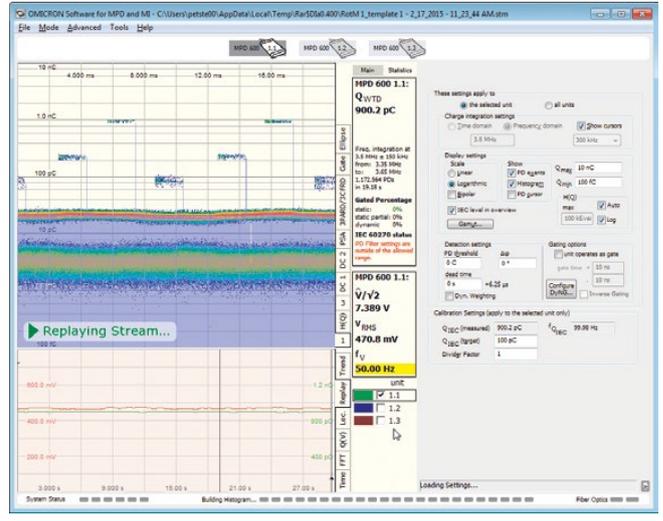
PRPD



3PARAD



Expert PD analysis software



Measuring setup and ordering information

OMS 605

Order no.

Includes the system components listed below

VMON0160

Hardware

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

Software

- 1 x Expert PD analysis software

(Notebook computer and OMS 605 mobile monitoring software not included. See under optional accessories.)

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

Optional accessories

Order no.

Hardware

- CAL 542 calibrator
 - 1 pC ... 100 pC
 - 0.1 nC ... 10 nC
- VMON0157
VMON0150

Software / Notebook computer

- OMS 605 mobile monitoring software
- VMON0020

3CFRD software module
on request

The 3-Center Frequency Relation Diagram (3CFRD) is an alternative PD source separation technique to the 3-Phase Amplitude Relation Diagram (3PAR). 3CFRD is used by the OMS 605 system when it is not possible to measure PD on all three phases.

- Notebook computer
- VMON0170

Monitoring services

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

OMS 605 system Components



PD monitoring and analysis

Notebook PC with monitoring and analysis software



OMS 605

Optional accessories

Order no.

1 Terminal box

Terminal box for rotating machines
Terminal box for power transformers

on request
on request

2 UHF extension kit

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

VMON0163

3 Coupling capacitors

MCC 112: 12 kV, 1.3 nF

VMON0141

MCC 117: 17 kV, 2.0 nF

VMON0161

MCC 124: 24 kV, 1.1 nF

VMON0140

Optional accessories

Order no.

4 Bushing tap adapters

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

on request

5 UHF drain valve sensor

UVS 610: 150 MHz to 1 GHz

VMON0187

6 High-frequency current transformers

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

VMON0154

7 UHF sensor for cable terminations

UCS1: 100 MHz to 1 GHz

VMON0162

Application areas with accessories

Rotating machines
Capacitive measurement

1 Terminal box (optional)

3 Coupling capacitors

Power transformers
Capacitive measurement

1 Terminal box (optional)

4 Bushing tap adapters

Power transformers
UHF measurement

2 UHF extension kit

5 UHF drain valve sensor

HV cable joints and terminations
Inductive measurement

6 High-frequency current transformers

HV cable terminations
UHF measurement

2 UHF extension kit

7 UHF sensor(s)

Technical specifications

OMS 605



Measurement data

Data Acquisition	3 channels (expandable to 4 channels with an additional acquisition unit)
Frequency range	0 ... 32 MHz
PD filter bandwidth	9 kHz; 30 kHz; 100 kHz; 300 kHz; 1 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 Ω (in parallel with 1 μ F) PD input: 50 Ω 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 (without notebook)

PC requirements

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



Monitoring project knowledge and expertise you can rely on

We support you in all stages of your monitoring project and provide you with a variety of services to ensure your success, including:

- > Project-specific monitoring system design
- > Installation, commissioning and calibration of the monitoring system
- > Monitoring system and data evaluation training
- > Data analysis and interpretation
- > Worldwide customer service & hotline

1 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	Prepared for connecting tri-axial sensor cables in various lengths TNC 50 Ω female connectors with short circuit dust cap
Output	1-, 3- or 4-channel Cable glands with outer shield connection Connection point for grounding

2 UHF extension kit



Connects one UHF sensor to the OMS 605 via 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 2x sockets for FO in with ST connectors
Output	2x sockets for FO out with ST connectors
Data acquisition	1 channel
Variable Centre Frequency	0 ... 32 MHz
UHF input range	100 to 2,000 MHz (adjustable in 500 kHz steps)
PD event time resolution	< 2 ns

3 MCC coupling capacitors



Different MCC coupling capacitors are available for various voltage levels.

Technical Data	MCC 112	MCC 117	MCC 124
U_{max}	12 kV	17 kV	24 kV
$C_{Nominal}$	1.3 nF (+/- 20%)	2.0 nF (+/- 20%)	1.1 nF (+/-20%)
Withstand Voltage (1 min.)	28 kV	38 kV	52 kV
Q_{PD}	< 2 pC @ 13.2kV	< 2.0 pC @ 20.6 kV	< 2 pC @ 26.4 kV

4 Bushing tap adapters



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

- > Robust, modular design
- > Built-in surge arrester for high-voltage protection

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

5 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 1 GHz
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

6 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	80 kHz ... 25 MHz
Inner hole dimensions	55 mm / 2.16 inches
Ferrite core	Split or one piece
Connector	TNC (including BNC adapter)

7 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 1 GHz
Transfer function (mean)	14 dB at 50 GHz
Pass band ripple	± 8 dB approx.
Capacitance	2 nF (±10%)
Connections	Screw thread 2 x M8x14 Outlet: TNC

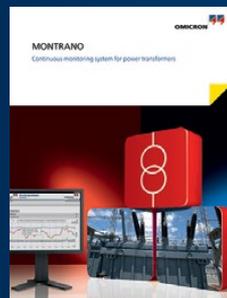
OMICRON is an international company serving the electrical power industry with innovative testing and diagnostic solutions. The application of OMICRON products allows users to assess the condition of the primary and secondary equipment on their systems with complete confidence. Services offered in the 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 information about additional monitoring solutions from OMICRON:



MONGEMO – Permanent on-line partial discharge monitoring system for power generators and electrical motors



MONTRANO – Continuous Monitoring System for Power Transformers



Continuous PD Monitoring System for High-Voltage Cable Systems

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