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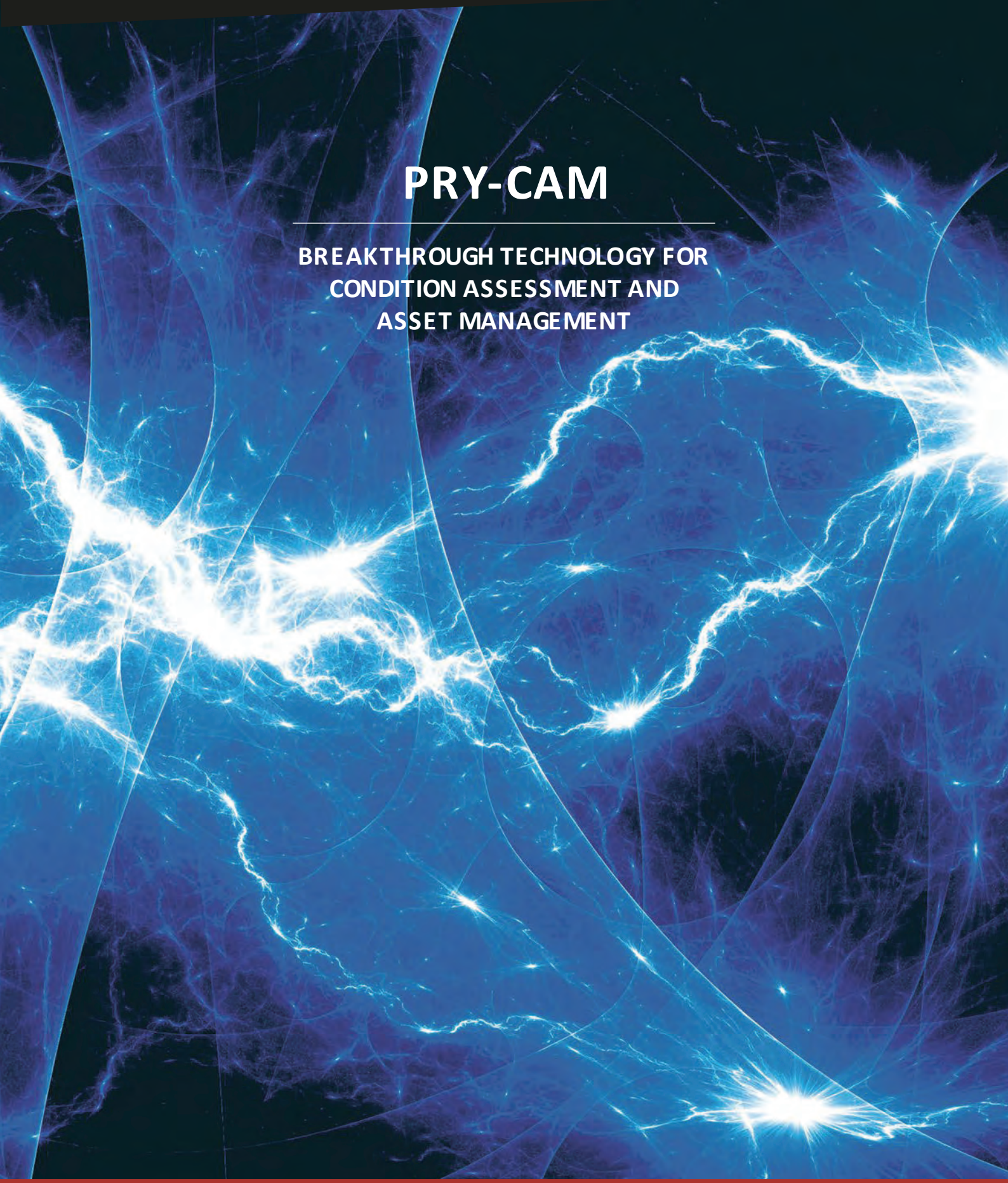
PRY-CAM | Prysmian Group

PRY-CAM

BREAKTHROUGH TECHNOLOGY FOR CONDITION ASSESSMENT AND ASSET MANAGEMENT



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WELCOME TO PRY-CAM

A REVOLUTION IN PARTIAL DISCHARGE MANAGEMENT

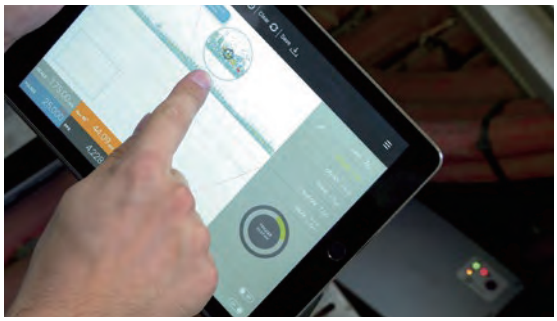
The worlds of partial discharge (PD) measurement, asset management and condition assessment of electrical assets are undergoing a revolution.

It's a revolution that can help us prevent failures and service interruptions.

A revolution that harnesses the extraordinary possibilities of the Internet of Things. Where PD measurement and condition assessment data can be collected and stored via the Cloud, to be accessed and shared remotely – across sites, cities, countries and continents.

Allowing effective maintenance strategies for electrical assets and learning for continuous improvement.

It's a revolution that puts cutting-edge technology into the hands of the right people, where it's most effective, in a way that's easier than ever before.



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LEADING THIS REVOLUTION IS PRY-CAM FROM PRYSMIAN ELECTRONICS

A fast, flexible, reliable game-changer. A portable instrument that performs online PD measurement without service interruption. All born of 140 years' expertise in designing and delivering world-leading cable technology.

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INTRODUCING PRYSMIAN ELECTRONICS

A CUTTING-EDGE COMPANY WITH PRYSMIAN GROUP'S DNA

Every day, our technologies help customers by increasing uptime and safety, enhancing asset longevity and significantly reducing maintenance costs and risks.

OUR CORE VALUES:

- Bring innovation to the Energy and Oil & Gas markets
- Create simple products for complex problems
- Revolutionise technologies for asset management

We're always developing new products and solutions for asset condition assessment and monitoring, driving widespread and lasting improvement in asset management strategy.

And thanks to our cable systems DNA – based on long-standing experience in insulation materials – we're developing the most powerful diagnostics tools. It's why we're a world leader.

We're solving problems today, and delivering learning for tomorrow.

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AN INNOVATIVE SOLUTION TO A REAL-WORLD CHALLENGE

Partial Discharge (PD) measurement is a crucial procedure for assessing the condition of electrical systems. In fact, it's one of the critical parameters evaluated during product manufacture, installation and normal operation. However PD testing was never widely used as a powerful online diagnostic tool due to several limitations of traditional PD technologies. In fact, these technologies for online condition assessment of MV and HV assets used to be complex, expensive, unscalable to the whole asset, and nearly impossible to integrate with all key asset parameters. In particular:

- traditional field-based technology for PD testing requires the electrical system to be switched off and connected to test equipment while diagnostics are conducted. This procedure leaves the system idle for several hours during each test. In addition, they are often too expensive and complex to be operated by a non-PD expert, and defect detection and localisation can't always be performed online.
- traditional handheld ultrasound or acoustical instruments aren't sensitive enough to detect and localise small but critical defects.

THE PRY-CAM ANSWER

PRY-CAM wireless technology allows PD testing to be performed at a distance, without the need for a direct connection to what is being tested. This means that measurements can be taken without having to switch the system off. And with a greater degree of safety for operators too.

Now, PRY-CAM's revolutionary technology allows online, accurate and reliable PD measurements, diagnosis and defect localisation.

It's faster, more accurate and **more effective than ever before.**

THE PRY-CAM FAMILY

The PRY-CAM family features not only PRY-CAM Portable but a range of cutting-edge products covering every aspect of condition assessment and asset monitoring.

Suitable for any electrical equipment from 3 kV to 600 kV.

USE ON HV AND MV EQUIPMENT

- CABLES
- SWITCHGEAR
- JOINTS
- TRANSFORMERS
- TERMINATIONS
- ELECTRICAL MACHINES

- TO DETECT
- TO PREVENT
- TO MONITOR
- TO LOCALISE

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PRY-CAM CLOUD

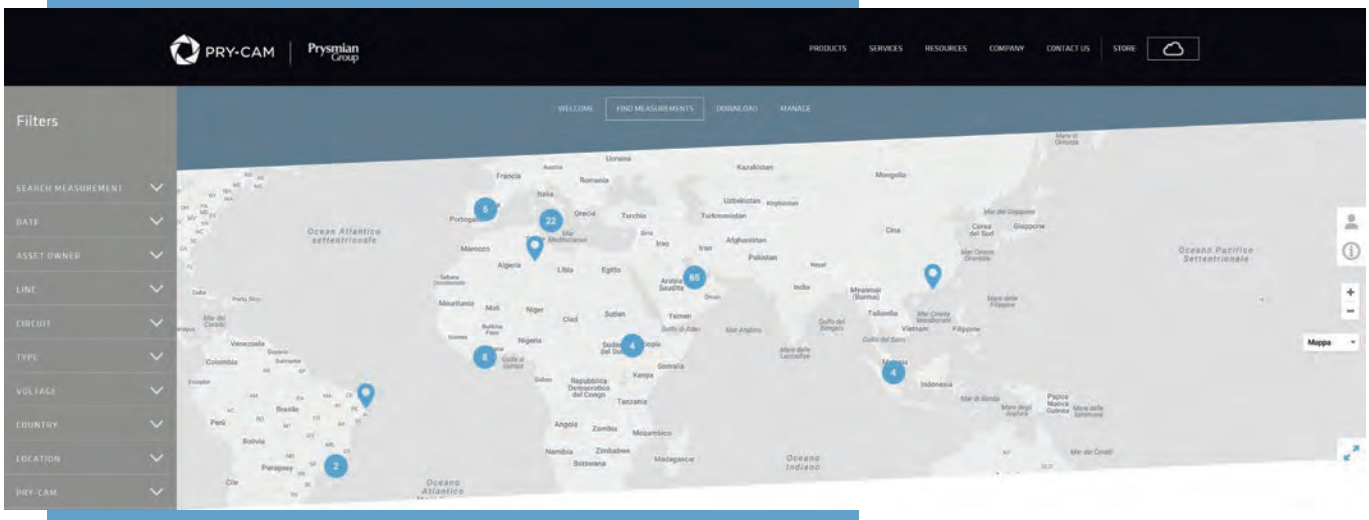
YOUR ASSETS UNDER CONTROL

HOW IT WORKS

PRY-CAM CLOUD is the ideal way to empower your business by effectively managing your data. Your measurements, collected by PRY-CAM devices, can be safely stored and protected on the PRY-CAM CLOUD, and used for advanced post processing and learning. So you can easily share measurements, test details and knowledge within your company.

You measure, you control, you learn.

Empower your business by managing, storing and sharing your data safely and effectively.



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KEY FEATURES

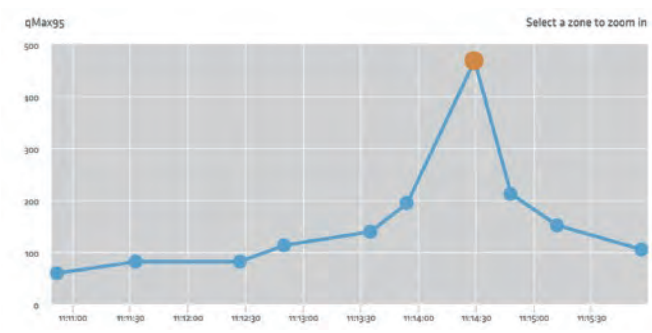
REMOTE MONITORING

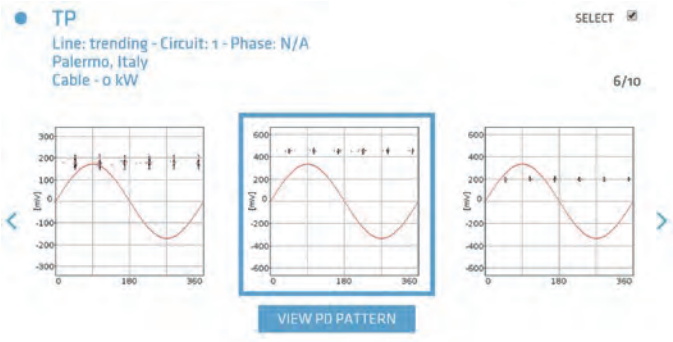
REMOTE CONTROL

REMOTE PROCESSING

DATA STORAGE AND PROTECTION

DATA ANALYSIS





PRY-CAM CLOUD optionally allows advanced processing based on the proprietary PRY-CAM BRAIN™ algorithm for automatic diagnosis of PD measurements. In addition, as an option, you can have virtual access to Prysmian PD Experts with remote diagnosis within 24 hours.

The analytics functions allows you to evaluate what impact the PRY-CAM technologies have on your electrical assets over time.

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PRY-CAM PORTABLE

PORTABLE, WIRELESS AND ONLINE PARTIAL DISCHARGE (PD) MEASUREMENT

HOW IT WORKS

PRY-CAM PORTABLE is an integrated portable instrument for the automatic acquisition, processing and classification of pulse signals generated by PD phenomena occurring in insulating materials of medium and high-voltage electrical systems and equipment, such as transformers, electrical machines, cables systems and switchgear.

PRY-CAM PORTABLE allows you to perform accurate diagnostic measurements and continuous monitoring, without the worry of service interruptions.

KEY FEATURES

- Portable
- Wireless technology
- Ultra-wide bandwidth differential field sensor with 0.5 pC sensitivity
- Accurate acquisition of PD and AC sync
- No galvanic connection for maximum safety

ACCURATE ACQUISITION SYSTEM

250 mega samples per second

100 MHz bandwidth

PATENTED WIRELESS SENSOR WITH TWO OUTPUTS

PD pattern with waveform and frequency spectrum of every PD pulse

AC synchronisation with supply voltage

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TECHNICAL SPECIFICATIONS

Sensor type
Electromagnetic, based on a patented Ultra Wide Band antenna, also providing AC synch signal

Bandwidth
100 MHz

PD sensitivity
Down to 1 pC

Synch frequency
From 10 Hz to 1 kHz

Sampling frequency
200 MS/s

Processing
Real-time filtering capabilities, ultra-precise time stamping (°10 ns)

Interfaces
Wireless 802.11 b/g (WiFi)

AC external synch
Wireless RF interface @ 868 MHz

Internal battery
Li-Po 7.4 V, 2200 mAh.
Autonomy approx. 6 hours

Working Temperature
From -25°C to 70°C

Weight
400g

Dimensions
160 mm x 120 mm x 130 mm (L x W x H)

Case
Rugged ABS plastic with IP67 protection rating

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ONE INSTRUMENT AND ONE APP. ALL YOUR NEEDS COVERED.

SEAMLESSLY MOVE BETWEEN BASIC, ADVANCED AND PREMIUM OPERATING MODES DEPENDING ON YOUR INFORMATION NEEDS AND PD EXPERTISE

3 OPERATING MODES. DISCOVER THE RIGHT ONE FOR YOU.

		RECOMMENDED FOR MV	RECOMMENDED FOR HV
BASIC Free use	Your PRY-CAM PORTABLE can be used as a reliable PD surveyor with traffic light and simplified PD pattern	✓	
ADVANCED Pay-per-use	Provides you with the PD pattern for simple diagnosis only	✓	✓
PREMIUM Pay-per-use	Provides you with the complete PD pattern, including waveforms and frequency spectrum, for any single PD pulse	✓	✓

You can temporarily upgrade from BASIC to ADVANCED or PREMIUM modes for more detailed diagnosis as and when you need it.

DATA MANAGEMENT

Every single PD measurement can be saved alongside other useful details, such as pictures, recorded messages, GPS coordinates, notes and tags.

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WHY PRY-CAM PORTABLE IS BETTER FOR YOUR BUSINESS

- 100% of critical defects detected on HV and MV
- Up to 80% of faults avoided
- 70% measurement time saved against traditional technologies
- Up to 5x higher sensitivity on small defects

APPLICATIONS

- Suitable for any electrical equipment from 3 kV to 600 kV
- Suitable for AC, DC and VLF
- Suitable for cable systems, transformers, switchgear and electrical machines

OPTIONAL EXTRAS

PRY-CAM BACKPACK KIT

Includes one backpack, one telescopic stick, one tripod, one strap and one car charger, giving you everything you need, even in the most diffi cult situations.

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PRY-CAM GRIDS

THE BEST CHOICE FOR PERMANENT MONITORING OF YOUR STRATEGIC ASSETS

HOW IT WORKS

PRY-CAM GRIDS is a high-performance acquisition system for automatic acquisition, processing and classification of PD signals and spot temperature.

It's designed specifically for remote monitoring of three-phase strategic assets and can be installed during normal operation.

KEY FEATURES

- No galvanic connection, allows installation during normal operation
- Suitable for PRY-CAM WINGS sensors for PD and local temperature
- PD pulses waveform and frequency spectrum acquired up to 50 MHz
- Advanced warning and alarms based on exclusive PRY-CAM BRAIN™ algorithm for automatic diagnosis
- Several data connectivity modes for remote communication and access
- Accurate PD pattern acquisition

WHY PRY-CAM GRIDS IS BETTER FOR YOUR BUSINESS

- Only 5 W of power consumption suitable for energy harvester, batteries, PV panels, micro wind turbines, etc.
- Warnings and alarms based on real risks, not on the misleading PD amplitude
- Reliable remote diagnosis

NUMBERS

- More than 150 permanent systems in operation around the world
- More than 200,000 PD measurements performed by permanent installations
- 100% of defects identified

ACCURATE
ACQUISITION SYSTEM

200 mega samples per second

50 MHz bandwidth

PATENTED PRY-CAM BRAIN™ ALGORITHM

For automatic diagnosis and advanced alarms

PD pattern, with waveform and frequency spectrum of every PD pulse

AC synchronisation with supply voltage

TECHNICAL SPECIFICATIONS

Input – PD & AC synch channels
3 x 100 Ohm diff., 1.5 Vpp (overvoltage protected) + 1 x 100 Ohm diff. (optional)

Processor
Based on ARM™ architecture

Sampling frequency
200 MS/s

Bandwidth
50 MHz

Processing
Real-time filtering, ultra-precise timestamp (5 ns)

Interfaces
Ethernet or wireless 802.11 b/g (via USB adapter)

Modem
GSM/UMTS modem (optional)

Local storage
Solid State Technology, up to 64 GB

Working modes
Stand alone or instrument or continuous monitoring

Power supply
110-230 V, 50-60 Hz AC / 12 V DC

Power consumption
< 5 W

Working temperature
From -50°C to 90°C

Weight
2.5 kg

Dimensions
250 x 210 x 100 mm (L x W x H)

Case
Aluminium with IP68 protection rating

Mounting
Flange/screw, orientation horizontal/vertical

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PRY-CAM WINGS SENSOR

THE BEST CHOICE FOR FIXED MEASUREMENT OF PARTIAL DISCHARGE AND LOCAL TEMPERATURE

HOW IT WORKS

PRY-CAM WINGS Sensor is a patented sensor for partial discharge (PD) and local temperature that can easily be fixed to any electrical components without service interruption.

KEY FEATURES

- Easy to fix on the cable close to test equipment
- No galvanic connection allows installation during normal operation
- Accurate PD acquisition with 50 MHz bandwidth
- Local temperature measurement at contact point
- Suitable for analogue and digital inputs

Patented sensors for PDs, local temperature at contact point and AC synchronization with supply voltage

WHY PRY-CAM WINGS IS BETTER FOR YOUR BUSINESS

- Installation without service interruption
- Active sensor for compensation of non-linearity
- 50 MHz bandwidth
- Suitable for remote monitoring of PD and temperature

NUMBERS

- More than 2,500 sensors installed worldwide

TECHNICAL SPECIFICATIONS

Sensor type
Electromagnetic active sensor also providing AC synch signal. Flat and flexible type

Sensor cable
10 m long ethernet 5E category cable, IP67

Connector
RJ45 connector with IP67 cap

Bandwidth
0.1-50 MHz (higher on request)

PD sensitivity
Down to 1 pC

Synch sensitivity
Down to about 150 VAC (at 10 cm)

Synch frequency
From 10 Hz to 1 kHz

Working temperature
From -50°C to 90°C

Weight
50 grams

Sensor dimensions
160 x 40 x 15 mm (L x W x H)

Case
Silicon rubber, IP67 protection

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PRY-CAM DLOG

EASILY MONITOR THE KEY PARAMETERS OF YOUR STRATEGIC ASSETS

HOW IT WORKS

PRY-CAM DLOG is a high-performance system for automatic acquisition and processing of key asset parameters, such as temperature, pressure, currents, voltage, flooding, intrusion, smoke, and much more.

It works with commercial sensors and can be installed during normal operation.

Up to 4 analogue or digital inputs

Up to 4 customised digital outputs

Internal processing and alarm generation

Customised sampling frequency from 1 second to 24 hours

KEY FEATURES

- No galvanic connection, allows installation during normal operation
- Suitable for analogue and digital inputs
- Advanced alarm functions
- Can be used in complex monitoring system or as a stand-alone unit accessible from remote
- Accessible from remote as a router
- Suitable for commercial sensors

WHY PRY-CAM DLOG IS BETTER FOR YOUR BUSINESS

- Installation without service interruption.
- Only 5 W of power consumption suitable for energy harvester, batteries, PV panels, micro wind turbines, etc.
- Continuous tracking of key parameters
- Advanced alarm functions

NUMBERS

- More than 40 permanent systems commissioned around the world 100% of critical conditions identified

TECHNICAL SPECIFICATIONS

Input channel number
Up to 4

Supported sensors
PT100 DIN IEC 751 (4 wires), Voltage, Current – other 4-20 mA sensors type on request

Temperature accuracy with PT100
0.1°C (limited by sensor)

Resolution
16 bit

Sampling frequency
1 second to 24 hours

Internal memory
4-16 GB (SSD)

Interface
USB 2.0 Host (multi-class support)

Network
Ethernet LAN: WiFi, GPRS/UMTS modem (external)

Working temperature
From -25°C to 50°C

Weight
300 grams

Dimensions
130 x 100 x 70 mm (L x W x H)

Case
Rugged aluminium

Power supply
12 V DC, 200 mA, 2.5 W

AC/DC power adapter
110-240 V AC, 50-60 Hz (optional)

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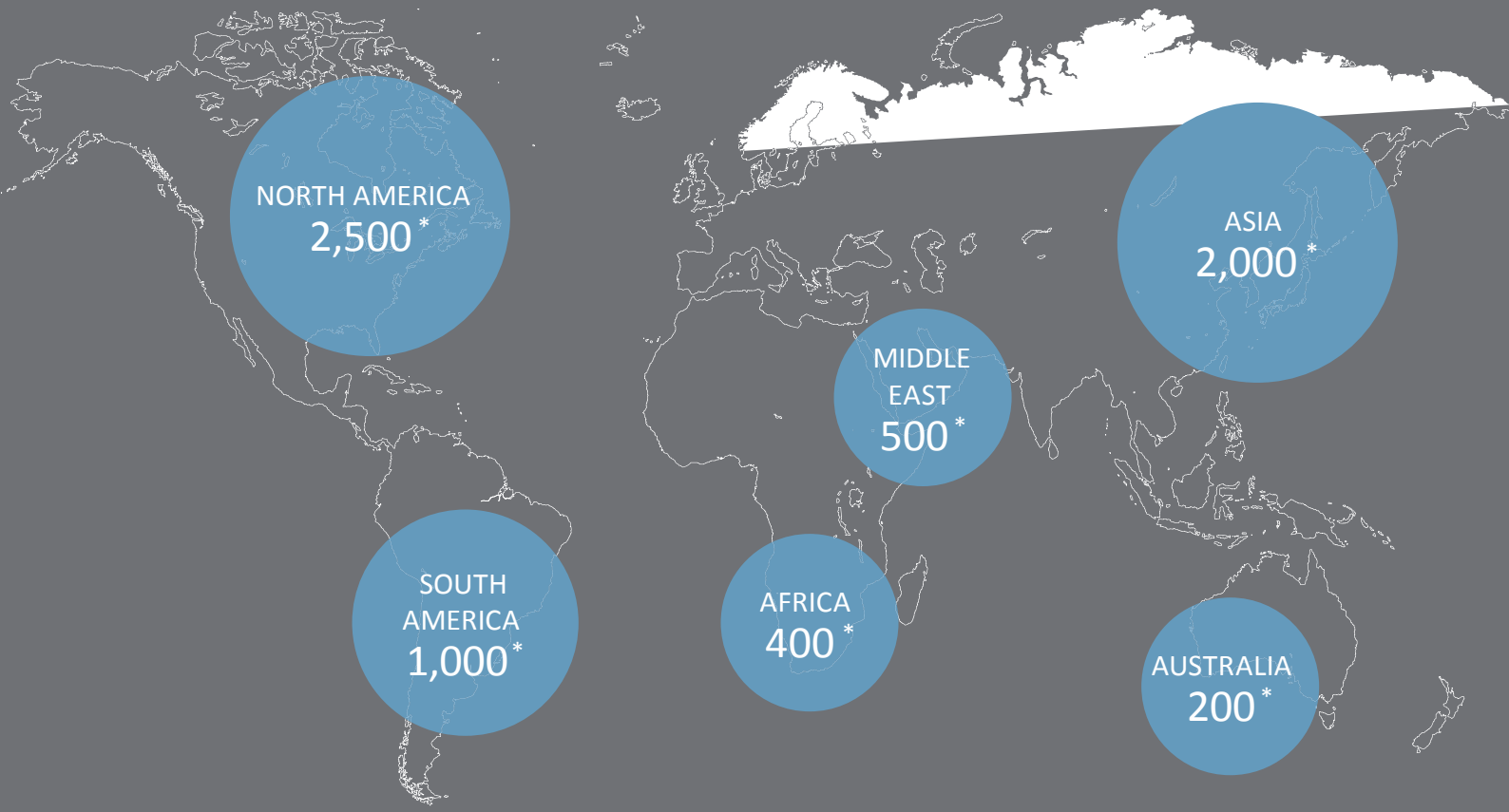
DIAGNOSTICS AND ASSET INTEGRITY SERVICES

Hundreds of failures have already been prevented by Prysmian PD experts using online condition assessment and defect localisation.

We believe that innovation and knowledge must be shared to achieve the highest level of asset management and condition assessment.
For this reason we can provide you with two types of PRY-CAM training, BASIC and ADVANCED .

For more information, please don't hesitate to contact a member of the team.

OUR WORLDWIDE FIGURES



Number of spot PD measurements	Number of recurring customers	Number of permanently monitored test points	PD diagnosis reliability rate
30,000+	40+	400+	100%

* Number of PD measurements performed.

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