HVPD

Products and Services

Complete High Voltage Network Monitoring

www.hvpd.co.uk

Who we are

Over 400 customers in 100 countries already trust our technology

THE QUEEN'S AWARDS
FOR ENTERPRISE:
INNOVATION
2014

THE QUEEN'S AWARDS
FOR ENTERPRISE:
INTERNATIONAL TRADE
2014

High Voltage Partial Discharge Ltd (HVPD) are experts in On-line Partial Discharge (OLPD) testing and monitoring.
Our technology is used in a number of industries for condition monitoring and to support Condition Based Maintenance (CBM) asset management schemes for medium, high and extra-high voltage (MV, HV, EHV) networks.
Our continued investment in research and development, supported with the UK government (DECC, TSB and RGF) have helped us to develop world-leading test and monitoring technology.
Our outstanding achievements were recognised by two Queen's Awards for Enterprise 2014, in the categories of Innovation and International Trade.
With offices and partners around the world we are focused on providing the highest quality service for our customers.

What is PD?

Partial Discharge (PD) is caused by defects and degradation of medium, high and extra-high voltage electrical insulation. PD activity will eventually lead to complete insulation failure which in turn can cause unplanned outages and downtime.
PD occurs due to many factors including poor installation, ageing, manufacturing defects, environmental impact and third-party damage.
If costly unplanned outages are to be avoided, it is vital to carry out regular OLPD testing as part of a Condition Based Maintenance regime.
This enables operators to monitor PD in order to evaluate insulation quality, to locate PD activity sites and to target repairs.

Contents

Industries

Oil & Gas

HVPD test and monitor assets for customers both onshore and offshore in upstream, midstream and downstream sectors.
We specialise in remote OLPD continuous monitoring of HV Ex/ATEX motors and in monitoring of complete HV networks, including power cables, switchgear, transformers and rotating machines.

Data Centres

The efficient performance of data centres relies on a dependable electrical power supply including HV substations, standby generators, and Uninterruptable Power Supply (UPS) systems.
We support our customers by testing and monitoring mission critical assets, and helping to prevent unplanned outages.

Renewables

With over 15 years of experience in offshore and onshore cable PD test services, we are committed to developing cost-beneficial solutions for our renewable energy customers.
Our services include commissioning and OLPD testing and monitoring of MV and HV cables, and Time Domain Reflectometry (TDR) testing to provide TDR signatures of cables to aid location of cable faults.

Power Generation

We supply condition-based assessment of MV and HV networks in the power generation industry with the main focus on OLPD monitoring of large generators, motors and transformers.

Transmission & Distribution
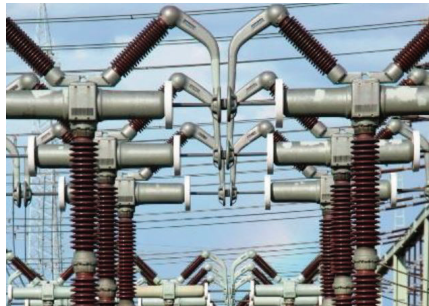
Our equipment is used to test and monitor all types of MV, HV and EHV plant including switchgear, power cables, transformers, CTs/VTs, and in both public utilities and private networks.
Our condition monitoring solutions have been developed in conjunction with a number of UK utilities.

Shipping

We provide non-invasive OLPD testing and monitoring on oil-drilling vessels, LNG vessels, FPSOs and cruise ships.
Our condition monitoring systems developed specifically for the shipping industry meet the requirements of smaller contained MV networks, helping to ensure reliability of the vessel's generators and drive/pump motors, cables, switchgear and transformers.

Applications

Complete Network Monitoring
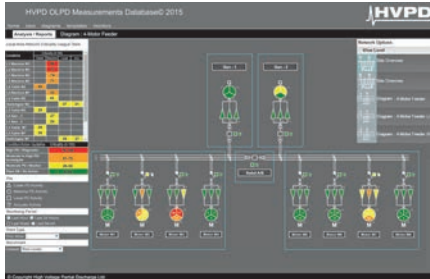
As innovators in the field of On-line Partial Discharge (OLPD), we are the only company in the world that applies remote OLPD monitoring to assess the condition of complete HV networks, including power cables, switchgear, transformers and rotating machines. Complete HV network OLPD monitoring coverage employs the real-time pooling of data from distributed monitoring nodes located across a facility into a central server running an OLPD monitoring database for the logging, display, benchmarking and trending of data. A graphical user interface (GUI) displays the 'condition criticality' (0–100%) of individual plant items on a 'mimic' of the HV network's single-line diagram (SLD).

Rotating Machines

OLPD testing is widely accepted in the oil and gas and power generation industries as the best way to assess the stator winding condition of motors and generators from 6.6 kV to 30 kV. Our unique, patent-pending, Queen's Awards for Enterprise winning technology is designed specifically for remote OLPD continuous monitoring of HV Ex/ATEX motors. This method is achieved by installing OLPD sensors and monitoring units at the network's central switchboard, without entering the hazardous zone.

Variable Speed Drive (VSD) Motors

Many large high voltage motors in the oil and gas industry are variable speed drive (VSD) operated. They require on-line condition monitoring (CM) technology in order to maintain availability of these critical machines. Our solution to making reliable OLPD stator winding insulation condition measurements on VSD motors enables us to differentiate between PD pulses and electromagnetic noise pulses.

Cables

PD can occur in any MV or HV cable operated at 3.3 kV or above. Our testing can locate potential failure sites to within 1% of a cable's overall length using the technique of On-line Cable Mapping.

Switchgear

Our OLPD test and monitoring technology can identify dangerous PD activity in AIS/GIS/SIS-type switchgear rated from 3.3 kV and above, and monitor any further insulation deterioration caused by such activity.
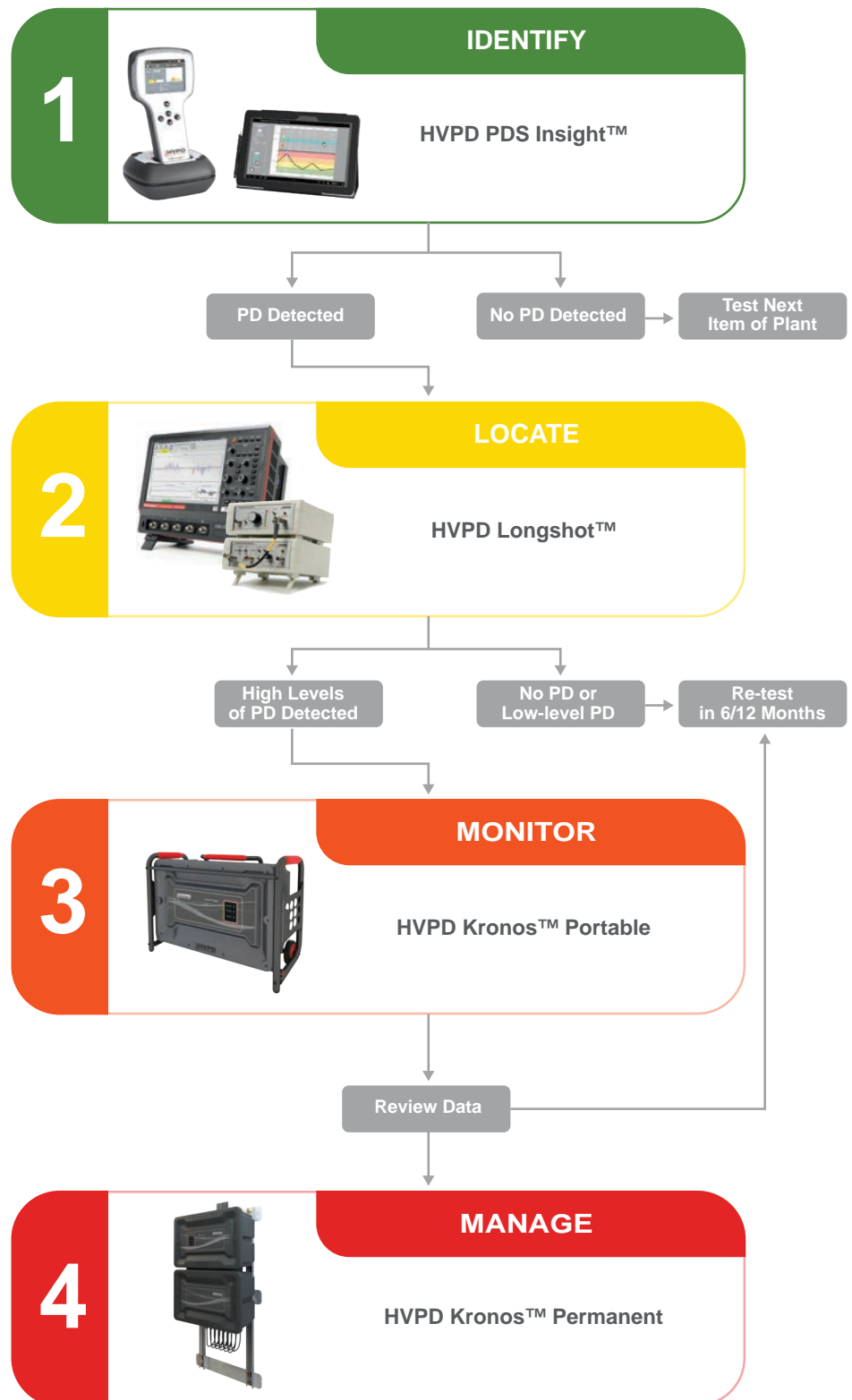
Transformers

OLPD screening can detect dangerous discharges that emanate from the main windings and bushings of in-service transformers rated at 3.3 kV and above, and from the transformer accessories.

4-Phase Asset Management

An integrated condition monitoring asset management solution

We work closely with our customers to provide **tailored and cost effective OLPD test and monitoring programmes** across complete MV and HV networks.

Our technology is used to support our clients with **condition-based, asset management decision-making**.

Our integrated, **4-phase condition-based asset management solution** combines a complete range of OLPD spot-test and monitoring technology. The solution provides the framework for a systematic and cost effective, condition-based asset management system which **identifies, locates, monitors** and **manages** OLPD activity within the customer's electrical network through four phases.

1 | **IDENTIFY**

HVPD PDS Insight™

PD Detected → No PD Detected → Test Next Item of Plant

2 | **LOCATE**

HVPD Longshot™

High Levels of PD Detected → No PD or Low-level PD → Re-test in 6/12 Months

3 | **MONITOR**

HVPD Kronos™ Portable

Review Data

4 | **MANAGE**

HVPD Kronos™ Permanent

PDS Insight™

NEW The world's first OLPD handheld test unit with an asset management app

The **PDS Insight™**, the world's first handheld On-line Partial Discharge (OLPD) test unit to be supplied with a dedicated asset management tablet application – the **OLPD Manager™** app.

This unique, world-leading handheld test unit combines HVPD's knowledge from over 20 years of OLPD test technology development with the flexibility and functionality of the Android™ operating system and a 10.1" Tablet.

The PDS Insight™ measures **PD Levels, PD Pulse Count** and **Cumulative PD Activity** across the 50/60 Hz power cycle to enable the severity of any PD activity to be assessed. By combining three types of PD sensor (TEV, HFCT and AA), the unit is suitable for the OLPD testing of most types of in-service MV cables and plant and OLPD surveying of outdoor HV switchyards. The handheld unit stores all measurement data on its internal memory that is then synchronised via Bluetooth® to the **OLPD Manager™** app. The unit and the app are available in several languages.

OLPD Manager™ app interface

The **OLPD Manager™** app is supplied on a 10.1" tablet PC for **analysis, benchmarking** and **trending.**

Store Test Results

The PDS Insight™ uses its in-built barcode scanner and the OLPD Manager™ app to link the assets under test to the sensor Point of Attachment (POA) labels.

Re-Visit and Re-Test

The OLPD Manager™ app records and stores substation details for the PDS Insight™ to guide the user through the repeat measurement trending.

View, Compare and Analyse

The OLPD Manager™ app creates a database of measurement results which you can use to view asset criticality, for benchmarking, to analyse OLPD activity trends over time and to generate automatic Excel® test reports.

HVPD Longshot™

The most versatile portable diagnostic unit in the market

Designed for diagnostic OLPD testing of medium and high voltage assets.
The **HVPD Longshot™** is designed to be used for both on-line (in-service) and off-line (factory/laboratory) testing.
The unit comes with pre-loaded **PDGold©** and **PDReader© v7** data analysis and reporting software.
Optional PDMap© expansion software, with the **Portable Transponder System,** enables On-line Cable Mapping (PD site location) on cables.

Available with a range of sensors and accessories for multiple applications, the unit can be used to test MV, HV and EHV, being the most versatile PD test unit presently in the market.
Synchronous and wideband (200 MHz) data acquisition accurately and rapidly measures PD magnitude and wave shapes.
This light and portable unit has a typical 'spot-test' time of five to ten minutes per plant item. Short-term OLPD monitoring of up to 48 hours is also possible.

Diagnostic OLPD Spot Testing

# Industry-leading data acquisition, automatic analysis and PD location

PDGold© and PDReader©

This dedicated software for the HVPD Longshot™ provides PD signal acquisition for on-site spot-testing and short term monitoring.
PD events are extracted from power cycles and classified by type for post-test analysis and report generation. PD levels are displayed in picocoulombs, millivolts and decibels, depending on the type of PD and PD sensor used, with the background noise being automatically removed.
Data preview and automatic report generation can be made either immediately on-site or off-site with any Windows®-based PC.

PDMap©

The optional expansion software for the HVPD Longshot™ provides PD site location on cables of up to 10 km.
Used with HVPD's Portable Transponder accessories at cable terminations, PD sites are accurately located along the length of power cables by measuring pulse travel times.
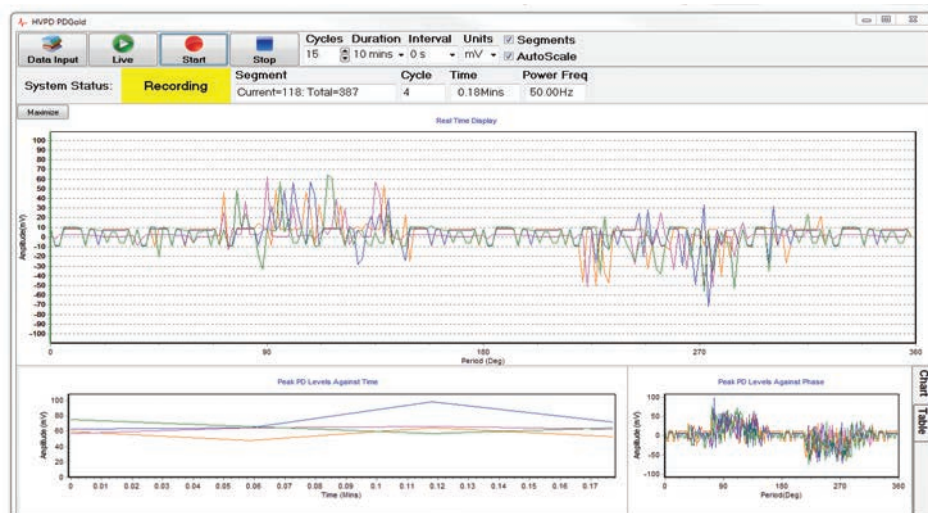
PDGold©
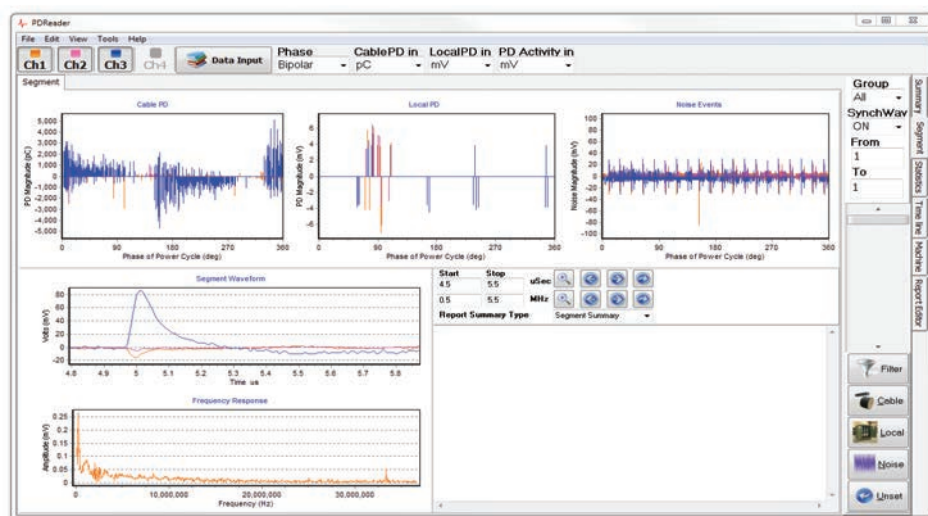
PDReader©

HVPD Kronos™ Portable Monitor

24-channel on-line monitor for temporary installation

A 24-channel portable on-line PD monitoring system. The HVPD Kronos™ Portable Monitor is designed to be moved around the network for short-term on-line PD monitoring sessions. The system trends PD activity over time and detects any load variances and intermittent PD activity. It can be used routinely or after a high PD level is detected with the PDS Insight™ or HVPD Longshot™ unit.

The HVPD Kronos™ Portable Monitor system is provided with a range of sensors and accessories according to the monitoring application.
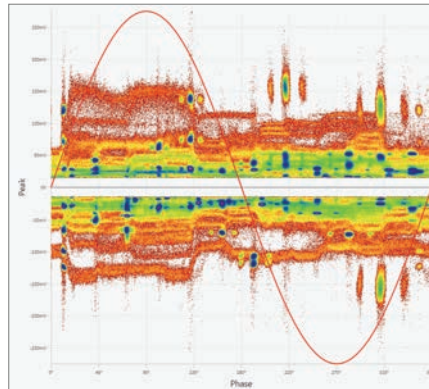
Noise reduction

**Noise Reduction Performed with the Kronos™ Software using Event Recogniser© Software Module.**

The HVPD Kronos™ software enables discrimination against electromagnetic noise and interference.

The below OLPD monitoring results show that only around 1 pulse in 1000 detected by the monitor is a partial discharge pulse, the remaining 999 being noise.


RAW Data

2,859,719 (100%) data points acquired over 36,073 power cycles.
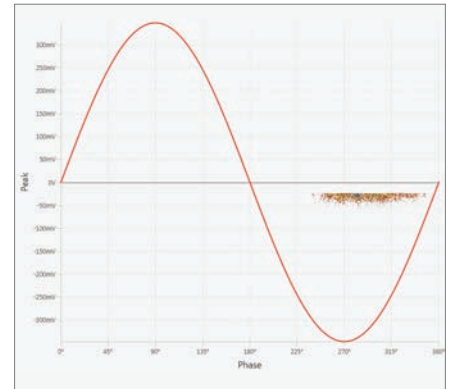
Clean PD Data

Data after noise rejection leaving 3,692 PD pulses (0.1%) correctly identified.

Portable network monitoring solution

The HVPD Kronos™ Portable Monitor can be moved around the network enabling fast deployment of the system whilst maintaining the full capacity of the continuous monitoring. It can be used for periodic monitoring of assets at-risk or to carry out short-term evaluations.
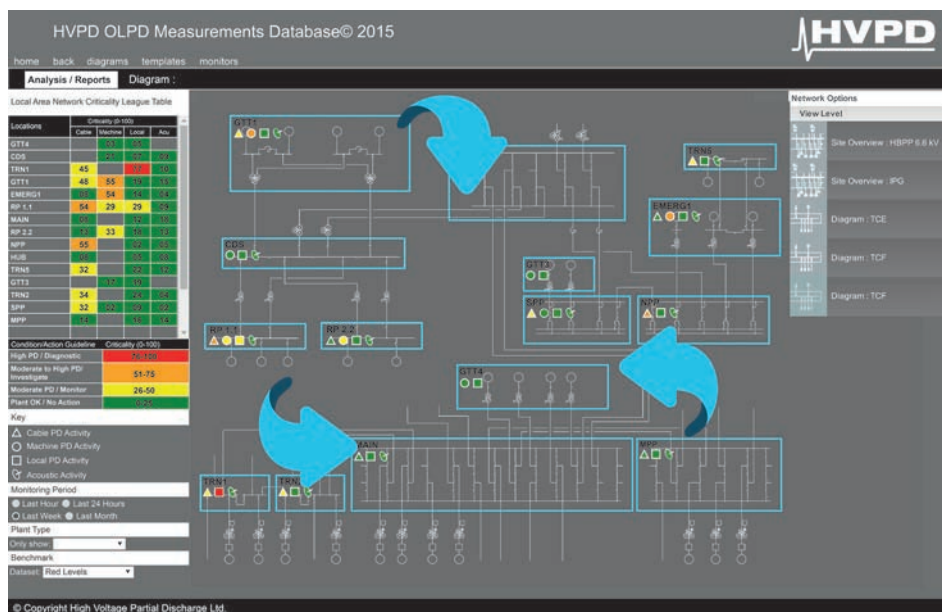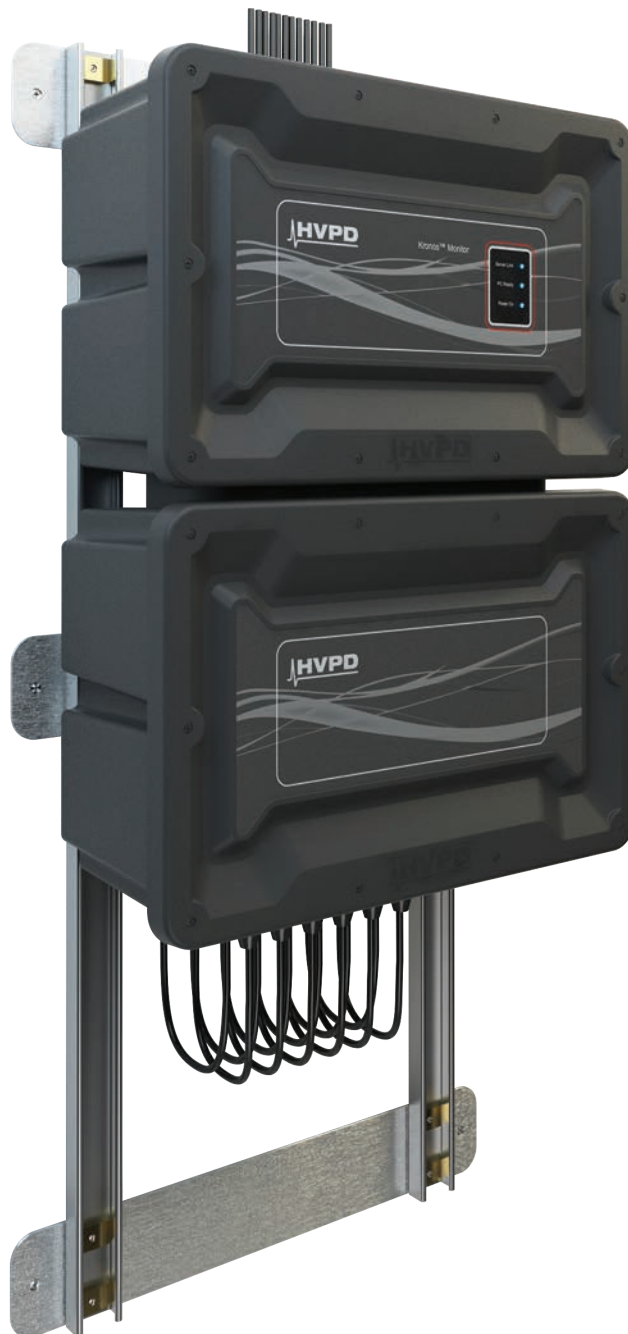

Portable network monitoring

HVPD Kronos™ Permanent Monitor

Continuous, synchronous, on-line partial discharge (OLPD) monitoring

The **HVPD Kronos™ Monitor** is an OLPD insulation condition monitoring (CM) system suitable for the long-term, continuous monitoring of complete HV networks of 3.3kV and above.
The 24-channel HVPD Kronos™ Monitor captures up to six (6) signal channels synchronously using its unique full cross point Smart Multiplexer and provides information to help network operators avoid unplanned outages.

All HVPD Kronos™ monitors distributed across the network communicate back to the central **Partial Discharge Monitoring Server (PDMS)** for coordination and organisation of data. The insulation condition data is then uploaded to the central **HVPD OLPD Measurements Database**© installed at the customer's control centre, for logging, benchmarking and trending. HVPD Kronos™ Monitor is expandable and can be installed both indoor and outdoor. We supply HVPD Kronos™ Monitors with a range of condition monitoring service contract options (p.17) and sensors (p.21-23).

Advanced diagnostic capabilities

The system can accurately identify insulation faults thanks to the advanced statistical waveshape analysis algorithms of the HVPD Kronos™ Monitor.

The data is analysed on a daily basis and at the end of the training period, the background noise level thresholds and software filter settings are adjusted. This approach helps to avoid 'false alarms' being accidentally triggered by noise spikes and HV network switching.

6 months of OLPD monitoring data showing a cable fault on an 11kV PILC cable

Permanent network monitoring solution

The HVPD Kronos™ Permanent Monitor provides 24/7, continuous, diagnostic insulation condition assessment of in-service HV plant, including cables, switchgear, rotating machines and transformers.

On-line Partial Discharge monitoring is regarded as the best early warning indicator of insulation degradation within in-service critical assets.

It measures the PD activity of in-service plant under both *normal* and *abnormal* operating conditions allowing operators and asset managers to identify time-varying and environmentally-driven PD activity in the HV network.

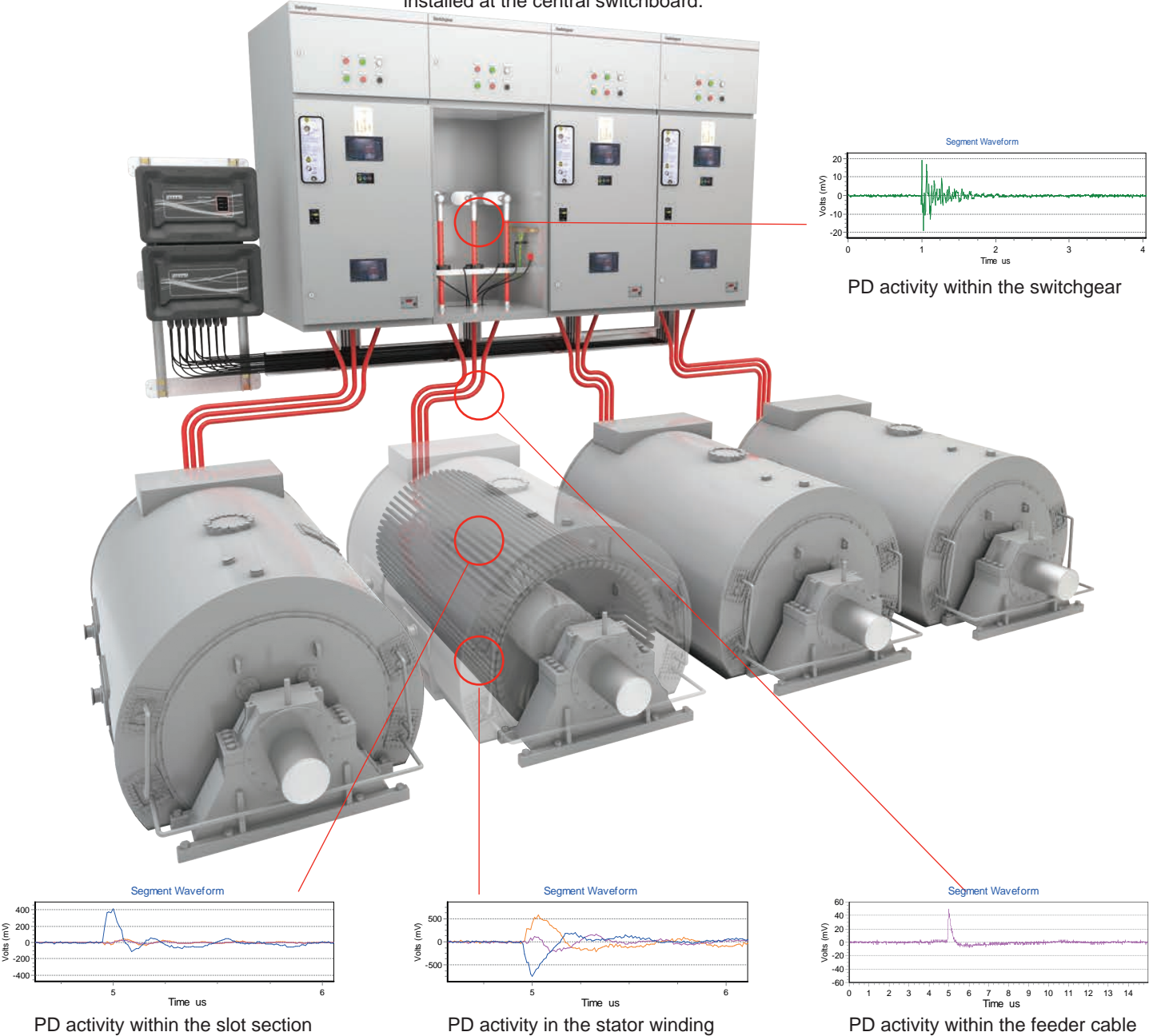**Permanent network monitoring**

Remote monitoring

Technology specifically for the oil and gas industry

Remote on-line PD monitoring of HV 'Ex/ATEX' motors

This unique, patent-pending technology has been designed specifically for the on-line PD monitoring of Ex/ATEX HV motors located in hazardous gas zones. Using HVPD's innovative technology, incorporating HVPD Kronos™ Monitors and advanced software algorithms, it is now possible to carry out remote OLPD monitoring of complete HV networks including switchgear, cable and the motor stator winding using OLPD sensors installed at the central switchboard.

Each 24-channel HVPD Kronos™ Monitor measures the PD signals from up to 4 HV motor feeders to provide an early warning of incipient insulation faults.

Data analysis is carried out by the unit's EventRecogniser©, knowledge-based software using PD pulse wave shape data analysis techniques to identify the sources of PD activity.

PD activity within the switchgear

PD activity within the slot section

PD activity in the stator winding

PD activity within the feeder cable

Complete HV Network Monitoring

The avoidance of one unplanned outage immediately pays back the cost of the system

The complete HV network monitoring technique employs the real-time pooling of data from multiple, distributed OLPD monitor nodes located at the HV switchboards across a facility, **monitoring complete circuits,** including the switchgear, cable and the remotely connected plant (motor, generator or transformer).

By providing an 'early warning' of 'incipient' insulation faults across a network, the HVPD Kronos™ system helps operators to plan and conduct **preventative maintenance** interventions for critical assets well **in advance of failure.**

The HVPD Kronos™ Monitors distributed across the network continuously transfer the insulation **condition data to the central HVPD OLPD Measurements Database©** for logging, benchmarking and trending to identify the worst-performing circuits.

Critical Condition Benchmarking© (CCB) System

Data from the entire network is complied into an 'OLPD League Table.' The example below shows a 33 kV network's 'Top 20' circuits, ranked by their 'OLPD criticality.' The colour-coded condition assessment is based on HVPD guideline PD levels.

Cost-Benefit Analysis

This solution allows operators / asset managers to avoid unplanned outages caused by insulation faults across their HV network (these having been reported to cost an average of $220,000 per hour* – this equates to $5,280,000 per day). Based on this analysis the initial capital cost of a complete network monitoring system is paid back through the avoidance of one unplanned outage on the network.

(*ABB Ltd - "Optimized cost of ownership (2012)")

Criticality number	Circuit	Comments	Peak Cable PD Level (pC)	Local PD Level (dB)	Cumulative Cable PD Level (nC/cycle)	OLPD Criticality (%)	Maintenance action
1	ABC to DEF1 C2	B Phase	25888	<10	247	97.4	Major concern, locate PD and then repair or replace
2	AKL to AZ A2	B/Y Phase	9729	<10	120	90.3	
3	BEE to DUTC2	B/Y Phase	3781	<10	12.3	78.7	
4	CBA to ABC C1	B/Y Phase	3245	<10	7.9	78.1	
5	ABS2 to AH A1	B/Y Phase	2920	<10	14.4	77.4	
6	NHD to QYD C2	R Phase	2849	<10	15.0	76.2	
7	MGA to AHS C2	B Phase	1733	<10	4.6	70.6	Some concern, repeat test and regular monitoring recommended
8	QAZ3 to POI B2	R/B Phase	1337	<10	6.4	65.5	
9	DDD to QYD C1	R Phase	887	<10	8.8	47.8	
10	HCC to CRK C1	Y/B Phase	759	<10	2.5	39.2	
11	AHS to SLD B2	Y/R Phase	705	<10	3.1	38.5	
12	STT to AQQ	Y Phase	238	<10	1.0	24.1	Re-test in 12 months
13	ALR to BNS B1	B Phase	184	<10	0.9	18.6	
14	UH7 to TYU	no PD detected	0	<10	0	0	
15	AL1G to PMD	no PD detected	0	<10	0	0	
16	ALG to KQO	no PD detected	0	<10	0	0	
17	GHI to DD2	no PD detected	0	<10	0	0	
18	JEB to CRK	no PD detected	0	<10	0	0	
19	QAZ2 to IJK A1	no PD detected	0	<10	0	0	
20	QAW to PLO A2	no PD detected	0	<10	0	0	

Example of an 'OLPD League Table' showing the 'Top 20' 33kV circuits

HVPD OLPD Measurements Database©

The database holds data from over twenty years of OLPD test experience

Comprehensive HV network On-line Partial Discharge (OLPD) condition monitoring (CM) coverage can be achieved by the pooling of the CM data from multiple distributed sensors and monitoring units across the facility into a central server storing the **HVPD OLPD Measurements Database©.**
This approach can be used for multiple sites or vessels when the operator wants to carry out condition benchmarking across all HV assets.
The central HVPD OLPD Measurements Database© holds data from all types of HV assets derived by HVPD from over twenty years of OLPD test experience and generates a simple 'OLPD Criticality' number for the asset, from 0–100%, through benchmarking and trending.

HVPD OLPD Measurements Database© uses superimposed colour-coded indicators integrated **into a mimic of the network's Single-Line Diagram (SLD).** The user interface provides a hierarchy of different schematic/geographical views on the interface to enable the user to look at all of the assets together (Level 1), at a particular site/vessel (Level 2) or to view detailed data on a channel-by-channel basis (Level 3).
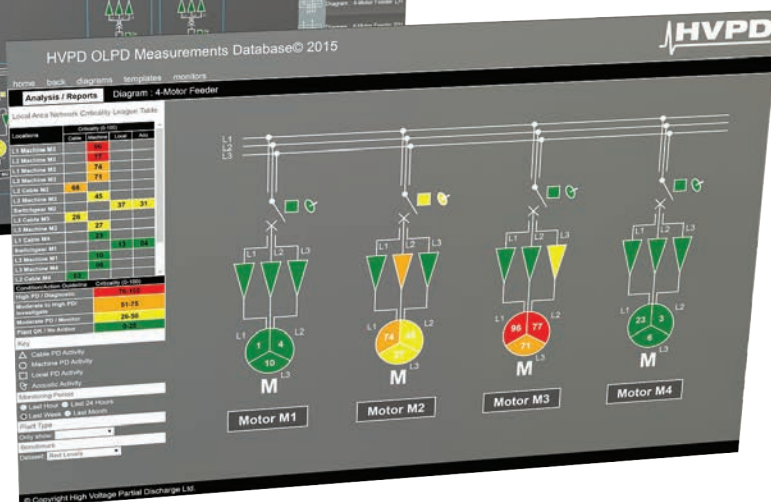
Level 1 - All Sites
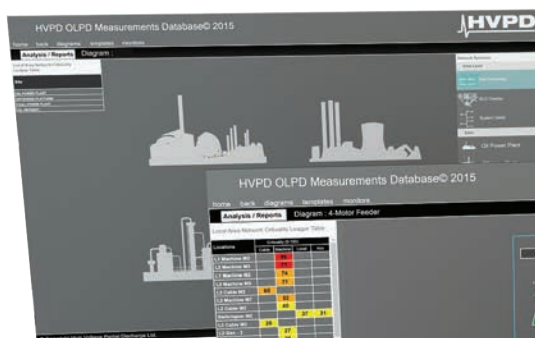
Level 2 - One Site
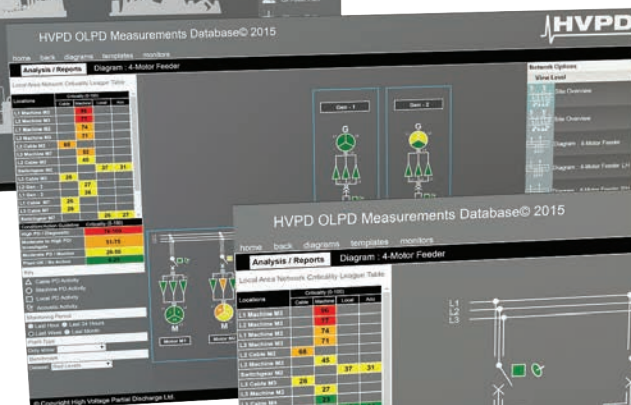
Level 3 - One Switchroom

HVPD OLPD Measurements Database© - A multi-level GUi

Condition Monitoring Service Contracts

Technical support, database and benchmarking

We pride ourselves on providing the highest levels of ongoing technical support through **Condition Monitoring Service Contracts.**
Uniquely in the market, HVPD provide a dedicated condition monitoring service in conjunction with HVPD Kronos™ monitoring technology and the **HVPD OLPD Measurements Database©** to provide continuous condition monitoring to support Condition-Based Maintenance (CBM).

The monitoring service approach avoids false alarms as any trends outside the norm are initially flagged and then investigated by our dedicated monitoring engineers.

Comparison and benchmarking of OLPD activity in the network across the assets to the HVPD OLPD Measurements Database© which holds data from all types of HV assets derived from over 20 years' experience

Database user interface with all condition data superimposed onto a bespoke single-line diagram (SLD) of the network

Periodic condition monitoring reports including updating of data to the latest HVPD OLPD Measurements Database©

Annual software upgrades, including updates in line with the HVPD OLPD Measurements Database©

Diagnostic recommendations and maintenance intervention advice

Technical support from HVPD engineers by phone or email on any identified incidents

Extended hardware warranty

Annual site visit to perform servicing of the monitor hardware and to perform fault location

On-line Partial Discharge (OLPD) Services

Expertise and support for total peace of mind

Our team of service engineers are certified with BOSIET, MIST, Working at Height and Rescue and site specific authorisation qualifications to achieve unrivalled safety performance and management of projects.

Engineering Site Surveys

We begin by carrying out a test survey and engineering evaluation of our client's MV/HV networks with asset management recommendations in the site survey report.

Diagnostic On-line Services

Live plant OLPD testing, diagnostics, and extended monitoring – without any costly interruption to service.

Motor Current Signature Analysis (MCSA)

We offer MCSA testing as a service to detect and assess mechanical issues within the machine rotor.

Continuous OLPD Monitoring

Our PD monitoring service allows a more in-depth OLPD assessment to be made. By continuously monitoring PD any variations over time can be identified, for example with loading or humidity. With the monitoring in place early warnings from developing faults can be detected.

Equipment Installation and Commissioning

Our installation and commissioning team installs temporary or permanent OLPD sensors and monitoring systems at the customer's facilities including hardware and software network infrastructure integration.

NEW Thermographic Surveys

On-line services now include thermographic surveys to identify thermal issues alongside partial discharge.

Off-line Partial Discharge Test Services

Insulation condition assessment of out-of-service plant and cables

We offer an extensive range of off-line diagnostic test services for insulation condition assessment of out-of-service MV and HV plant including:

Off-line Laboratory Testing

Our 100 kV HV test facility is equipped with electromagnetic shielding, providing high resolution (down to 1 pC), off-line PD test capability to IEC 60270 and other industry standards, along with Tan Delta (loss-angle) testing capability.

Mobile Diagnostic Off-line Cable Test Services

Using the HVPD Test Van we can deliver the most sophisticated diagnostic off-line test services across the UK including Very Low Frequency (VLF), Partial Discharge, Tan Delta, Time Domain Reflectometry (TDR) fingerprinting of cables, Insulation Resistance (IR) and Polarisation Index (PI).
In addition we can carry out 50/60 Hz Withstand and PD testing up to 50 kV and on-site PD commissioning tests (incl.24-hour soak tests).

Training Courses

Expand your understanding of partial discharge

Our On-line Partial Discharge (OLPD) courses are designed to provide delegates with both the theoretical and practical aspects of PD testing, including a comprehensive overview of PD screening, diagnostic and monitoring technologies, as well as practical PD testing in HVPD's 50 kV and 100 kV HV test laboratories. Available courses:

For further information and to book your place, visit www.hvpd.co.uk/training or contact us:

email: info@hvpd.co.uk
tel: +44 (0) 161 877 6142

Level I Introduction to Partial Discharge (PD) Testing	A one-day course designed for anyone new to PD.	Dates available on the website
Level II Intermediate Course on Plant Specific Testing	A one-day course on plant-specific PD testing and monitoring techniques with advanced diagnostic laboratory PD testing.	Dates available on the website
Level III HVPD-Accredited OLPD Test Engineer Course	A bespoke 5-day, OLPD Test Engineer course for HVPD Longshot™ users pursuing expert OLPD test skills and knowledge.	Date agreed with customer
HVPD-Accredited Installation Engineer Course	A bespoke 5-day training course for delegates wishing to become an HVPD Accredited Installation Engineer to carry out safe OLPD sensor installations.	Date agreed with customer
Bespoke seminars	We organise bespoke training and seminars at customer's facilities. Contact us for more information.	Date agreed with customer

Sensors Range

Temporary and permanent installation

HVPD's comprehensive range of sensors are available in both portable and permanent versions, and supplied with complete installation kits.

The use of permanent sensors helps reduce the time and cost of performing periodic OLPD diagnostic spot-testing as no outage is required after installation.

Recommended Sensors by Application:

Power Cables		HFCT SMART-TB3™
Switchgear (MV)	Air-Insulated	TEV HFCT AA
	Solid-Insulated	TEV HFCT
	Gas-Insulated	TEV HFCT
Rotating Machines	Cable-fed	HFCT SMART-TB3™
	Bus-fed	HVCC
	VSD Machines	HVCC HFCT SMART-TB3™
Transformers		TEV HFCT Bushing Tap

NEW SMART-TB3™ TriBand Sensor

The SMART-TB3™ is a world first, OLPD sensor for holistic plant condition monitoring. It utilises the detection capability of the HFCT sensor to detect high frequency PD and incorporates lower frequency bands for detection of power frequency (50/60 Hz), power quality, harmonics and current signature analysis.

TEV Transient Earth Voltage

The TEV sensor is a capacitive probe designed to detect local, high-frequency PD pulses in switchgear, cable sealing ends, machine cable boxes, transformers and other plant. We supply both indoor (left) and outdoor (right) versions of the TEV sensor for a portable or permanent installation.

AA Airborne Acoustic

The ultrasonic AA sensor detects airborne acoustic signals from PD into air, including corona and surface discharges in indoor air-insulated switchgear (AIS). It can be installed either inside or outside the switchgear panel, with a clear line-of-sight to the PD source.

Sensors Range

HFCT - High Frequency Current Transformer

	HFCT50	HFCT75	HFCT100	HFCT140	HFCT220
Internal Aperture	20 mm	40 x 25 mm	45 mm	94 mm	140 mm
External Aperture	50 x 64 mm	90 x 120 mm	110–150 mm	180 mm	237 mm
Installation Type	Permanent	Permanent	Portable & Permanent	Portable & Permanent	Portable & Permanent
High Current Version	○	○	●	●	●
Aluminium housing version for improved screening from RF noise	○	○	●	●	●
Outdoor Version	○	●	○	●	○
Ex/ATEX Certified Version	○	○	●	●	○

Permanent HFCT Installation kits

Permanent HFCT sensor kits are designed for sensor installation inside the cable boxes of the asset under test. Also available in Ex/ATEX versions.

A typical kit comprises:

- 3 HFCT sensors
- 3 silicone mounting collars
- Termination box
- RG223 coaxial cables
- Earth bonding cables
- TEV (optional)

Sensors Range

HVCC - High Voltage Coupling Capacitor (On-line)

	7 kV 1000 pF	15 kV 500 pF	16 kV 80 pF	30 kV 1000 pF
Dimensions (mm) W x D x H	134 x 81 x 68	186 x 135 x 197.7	186 x 135 x 197.7	230 x 150 x 230
Ex/ATEX Certified Version	○	●	●	○

Permanent HFCT Installation kits

Permanent HVCC sensor kits are designed for installation within the cable termination boxes of the rotating HV machines. Also available in Ex/ATEX versions.

The kit comprises:

- 3x HVCC sensors
- Termination box
- RG223 coaxial cables
- Earth bonding cables
- HVCC capacitor boots
- HVCC jumper cables

High Voltage Coupling Capacitor (Off-line)

	24 kV 1000 pF	36 kV 1000 pF	100 kV 100 pF
Dimensions (mm) W x D x H	250 x 290 x 430	250 x 290 x 430	250 x 300 x 750
Off-line PD testing up to:	24 kV	36 kV	100 kV

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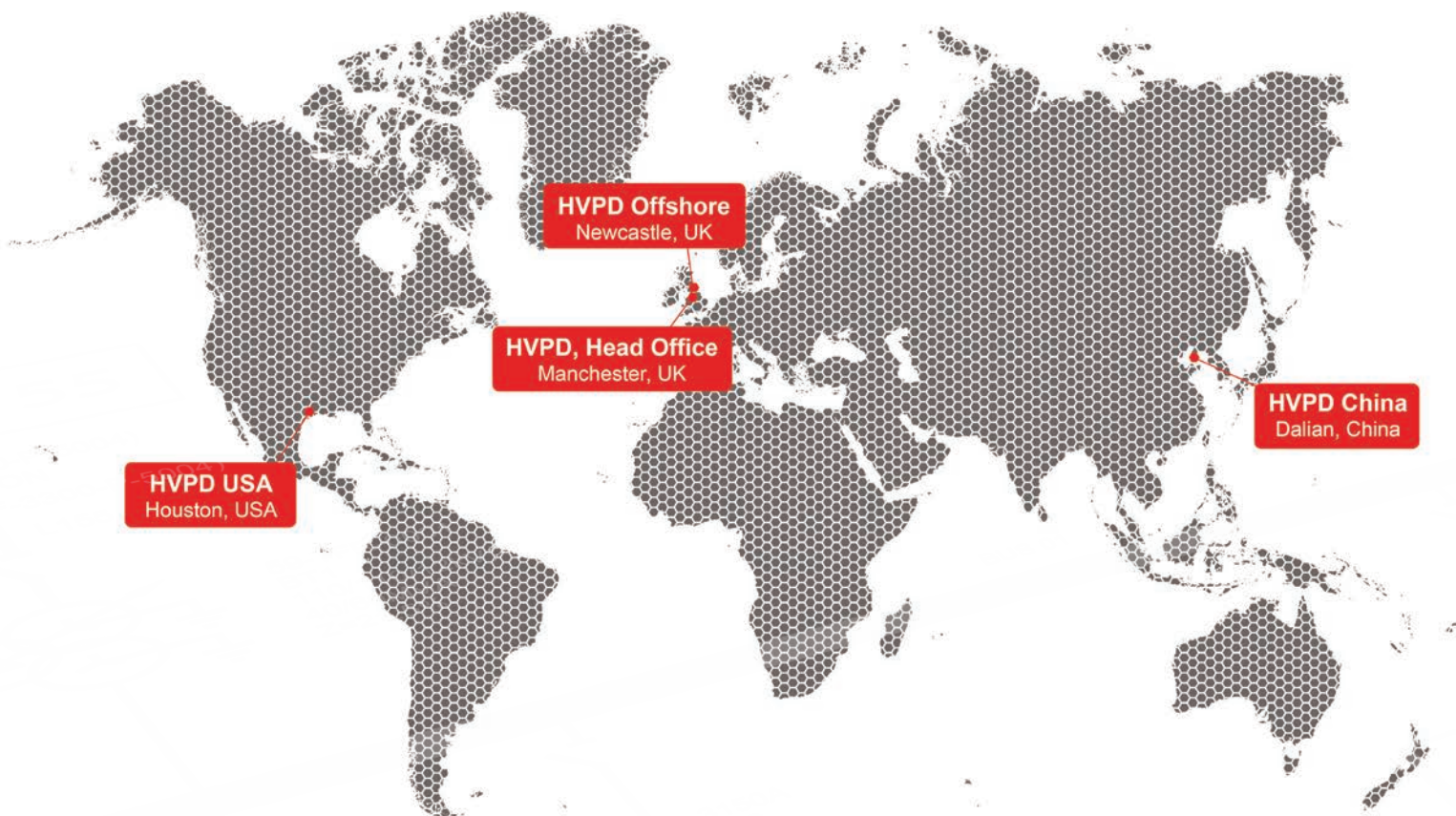Web: www. hvpd.co.uk/offshore

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