WINTECH 成浩科電股份有限公司

WinTech Partial Discharge Testing and Monitoring Systems

Predictive maintenance to eliminate power equipment failure risk.

WinTech Electric Co., Ltd
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About Us

Wintech Electric has been established in 2006, an affiliated company of Winsome Engineering Consultants. Winsome has considerable experiences over 15 years in engineering construction, such as Taiwan power company, nuclear power, airports, subway, railway, etc. Therefore, we are familiar with and passionately devoted to improving safety in engineering construction and power equipment maintenance.

Because knowing insulation deterioration resulting from partial discharge (PD) in power equipment often leads to failures of high-voltage equipment, WinTech gathered domestic and foreign experts, collaborated famous universities worldwide, and spend several years to develop a series of monitoring systems for detecting PD activities. **According to IEC 62478, an international standard for detecting PD, we develop our own techniques "multiple physical quantities" to distinguish PD phenomena. We produce high reliability sensors, and design software for identifying PD frequency and waveform.**

Maintaining power supply system stable and safe for customers is our prime concern. We are totally dedicated to providing power system with predictive maintenance-intelligence monitoring for 24 hours to eliminate the risk of equipment failure.

Classifications of PD Activities

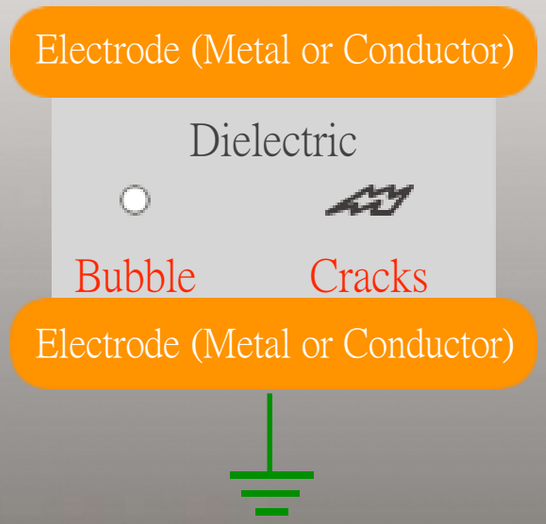
Definition: Partial discharges are electric discharges that occur inside the insulation material of high voltage equipment due to the presence of voids, impurities, or cracks resulting from failures on the manufacturing process, mechanical stress, or insulation ageing process. The PD, which only partially bridges the insulation between conductors, occurs repetitively in a small region, and thus is named partial discharge. Meanwhile, it produces sound, light, heat, electromagnetic signals, and chemical reactions.

Criterion: Under the IEC 60270[*] standards, choose the acceptable regulation, such as IEEE 400.3, IEEE C57-124 , etc., depending on types of HV equipment

[*] IEC 60270, High Voltage Test Techniques-Partial Discharge Measurements, 3rd Edition March2001.

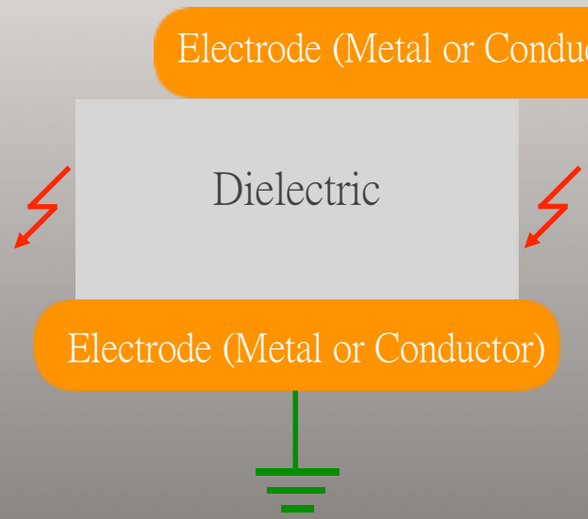
Internal Discharge

The discharge occurs from voids and impurities within the insulation material.



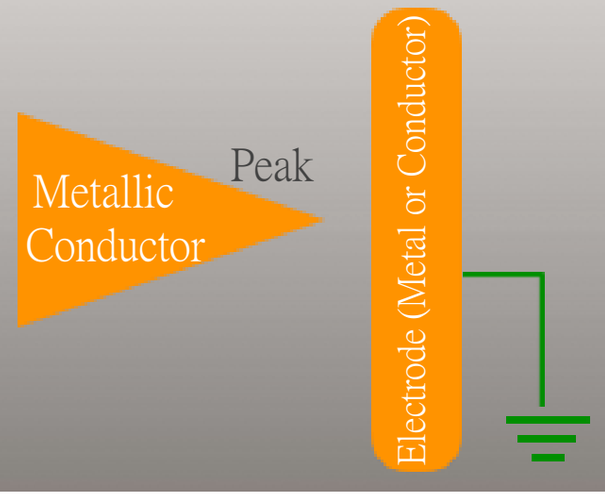
Surface Discharge

The discharge occurs in the surface of dielectric



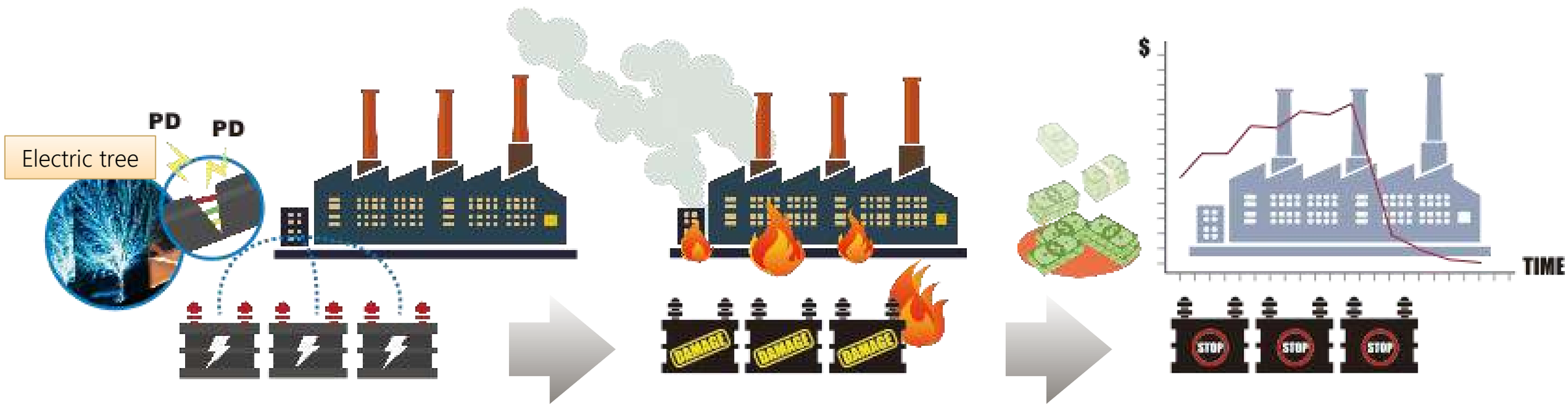
Corona Discharge

The discharge occurs in the peak due to the uneven spread of electric fields between conductors

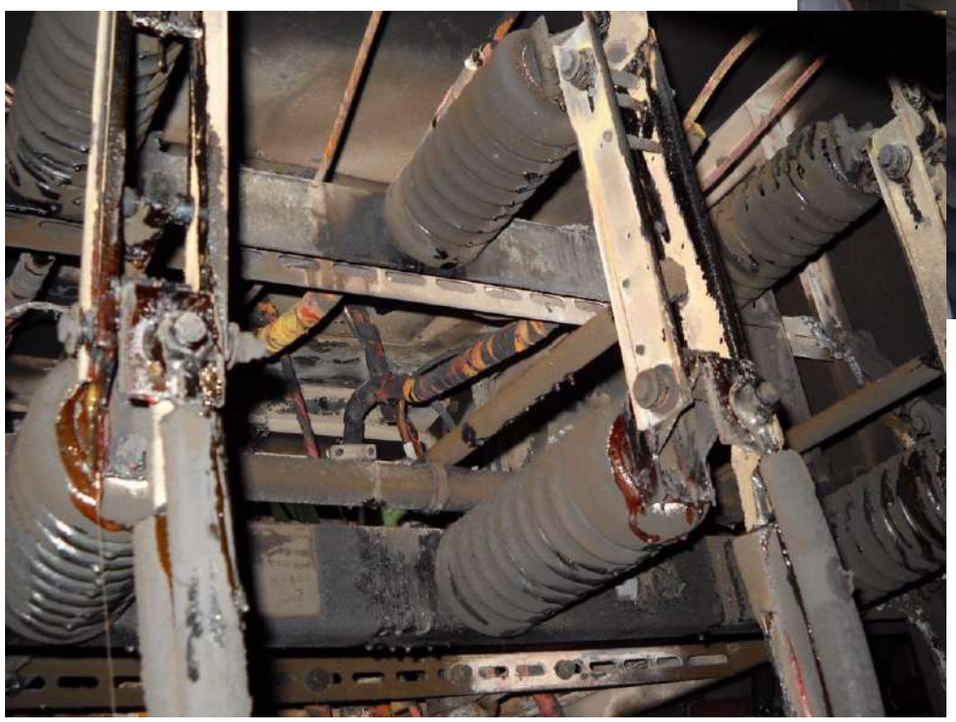


High Correlation Between PD Activities and Insulation Deterioration

- Internal discharge: The initial insulation aging still has the weak electrical signal, which can provide power without instant danger.
- Insulation deterioration: PD activities are irreversible and unpredictable. The ignorance of monitoring and observance of PD trend in the long term can cause the accidents resulting from insulation deterioration, and puncture.
- Electrical accidents: The economic loss can be up to millions or even several hundred million due to the power failure.



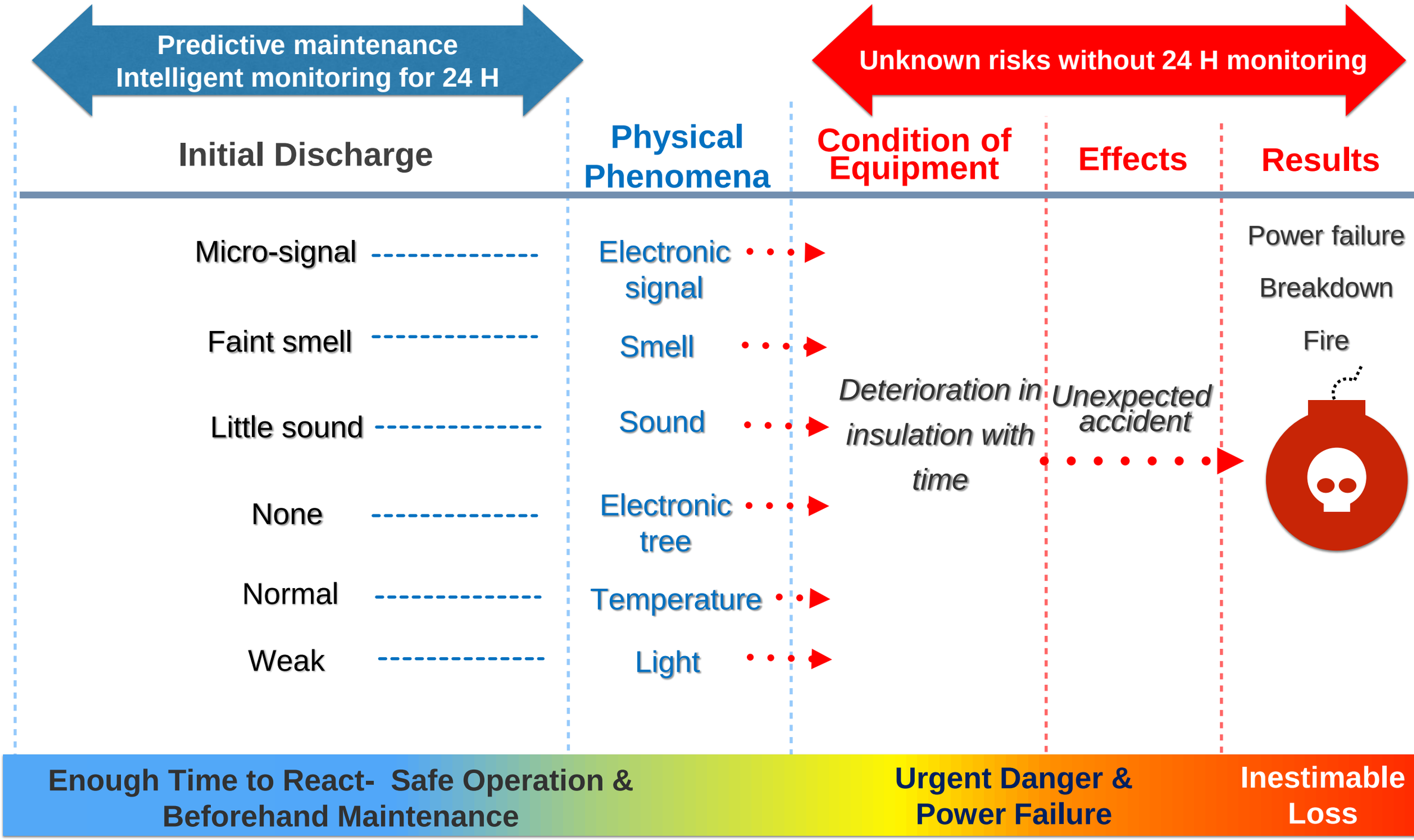
INESTIMABLE LOSSES AND DANGER DUE TO THE POWER FAILURE OF POWER EQUIPMENT...



PD Multiple Physical Quantities Schematic

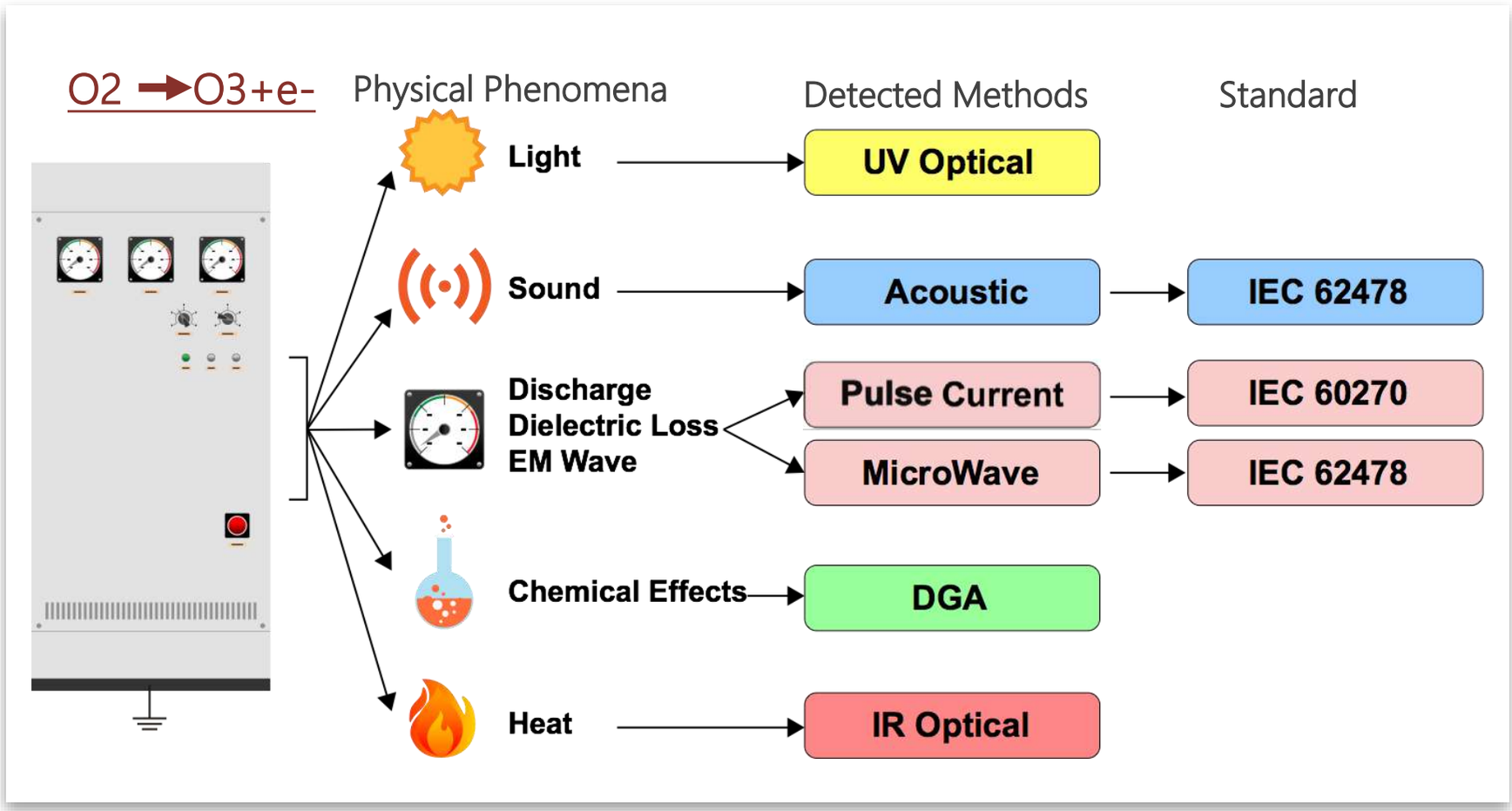
PREDICTIVE MAINTENANCE

-NO MORE FEAR, DANGER, AND COST WITH OUR PRODUCTS



WinTech "Predictive Intelligence" of Insulation System to Eliminate Power Failure Risk

- ***What is Partial Discharge?***
  - In electrical engineering, Partial Discharge is a local dielectric breakdown of a small portion of insulation system, where the electric field strength exceeds the breakdown point of the insulation material.
  - Protracted partial discharge can erode strength of insulation system and eventually lead to breakdown of insulation, causing equipment failures and affecting power quality.



Instruction of PD Monitoring and Testing Techniques

-Multiple Physical Quantities

- Leading PD detection techniques - We create accurate and reliable method for detecting PD activities.

(1) Sensors: Own-developed high bandwidth and high sensitivity sensors based on standard IEC 62478.

(2) Identification Software: We do cross-comparison by observed acoustic, pulse current and microwave signal to examine if PD occurs. Also, for raising the accuracy of identification about PD activities, besides the former physical quantities, we also utilize directivity to distinguish if it is corona discharge, surface discharge, internal discharge, or jamming.

(3) Signal Receiving: We replace partial discharge tester with own-developed LeCroy, a wide bandwidth (500MHz), and high gain(2.5GS/s) LeCroy, to perfectly show the PD waves and catch any complicated PD signals.

(4) Location of PD Sources:

A. Locate the PD sources by the signal from the process of changing AE sensor.

B. Estimate the PD location by the acoustic and electrical signals transmission speed from the time difference between AE sensor and HFCT sensor.

C. For the equipment without metallic screen,

such as power cable, cast-resin transformer, etc.,

we can locate the PD sources with UHF Antenna Array.

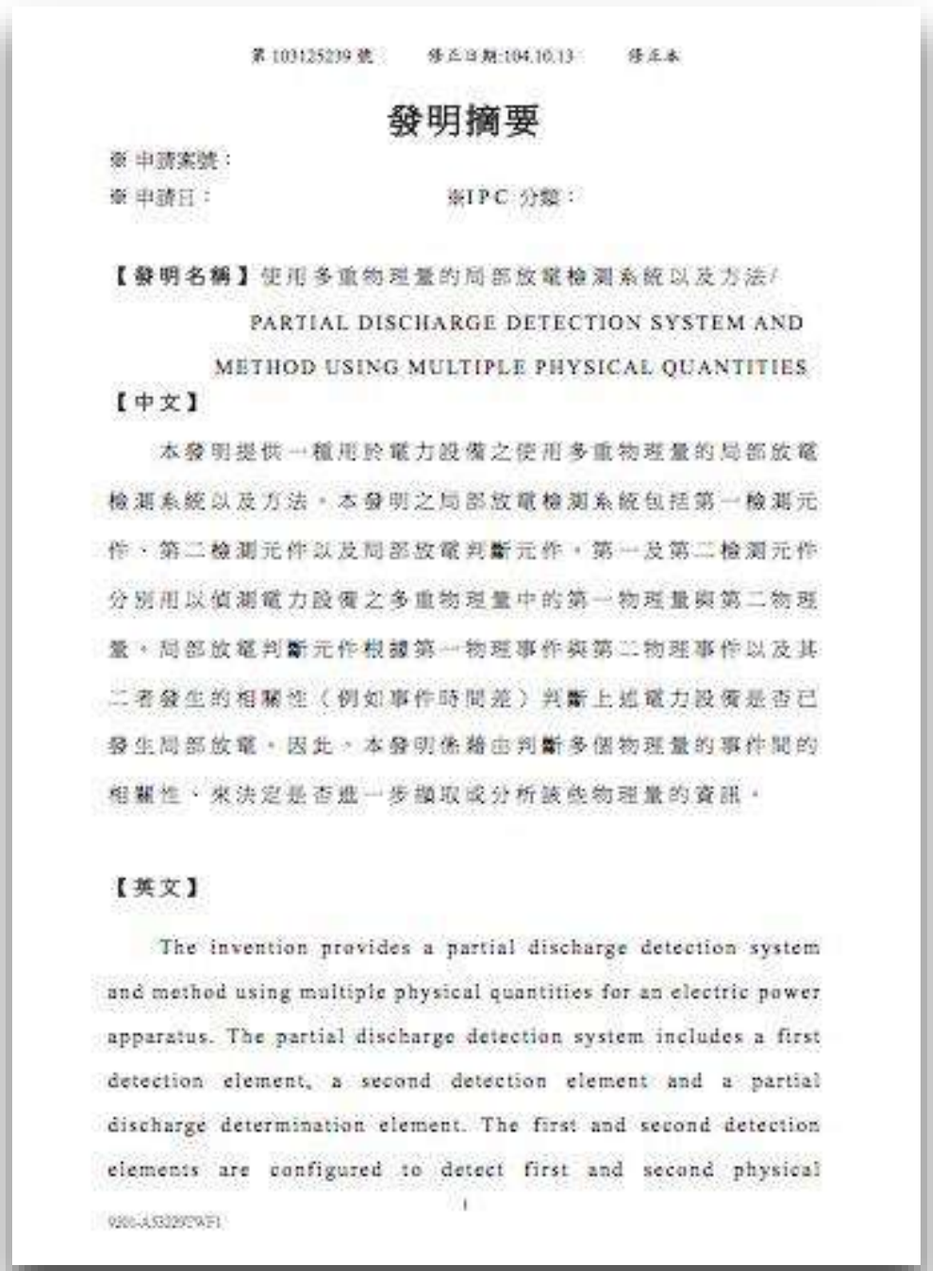
*IEC 62478

- ✓Measure electromagnetic wave (3MHz-3GHz) and acoustic waves (100Hz-250kHz)
- ✓Sensors: Acoustic, electromagnetic, and microwave sensors
- ✓On-line PD testing, mainly used in on-site testing
- ✓Advantage: No need to turn off power, easy testing process

Classifications of Two International Standards for PD Measurements

	IEC 60270	IEC 62478
Publication date	1968, and revised in 2000	2016
Standard	Measured in terms of “quantity”	Measured in terms of “quality”
Unit	pC	mV or dB
Calibration	Need	No need
Method	Off-line (turn off the power)	On-line (no need to turn off the power)
Sensor	Coupling capacitor	Acoustic, Pulse current, or Microwave sensor
Main use	Factory Testing; On-site test on a routine basis	24 hours remote monitoring
Feature	Test if PD activities is acceptable with complicated process	Observe the trend of PD activities with simple process

Invention Patents: Multiple Physical Quantities



第 103125239 號　　修正日期:104.10.13　　修正本

發明摘要

※ 申請案號：

※ 申請日：　　※IPC 分類：

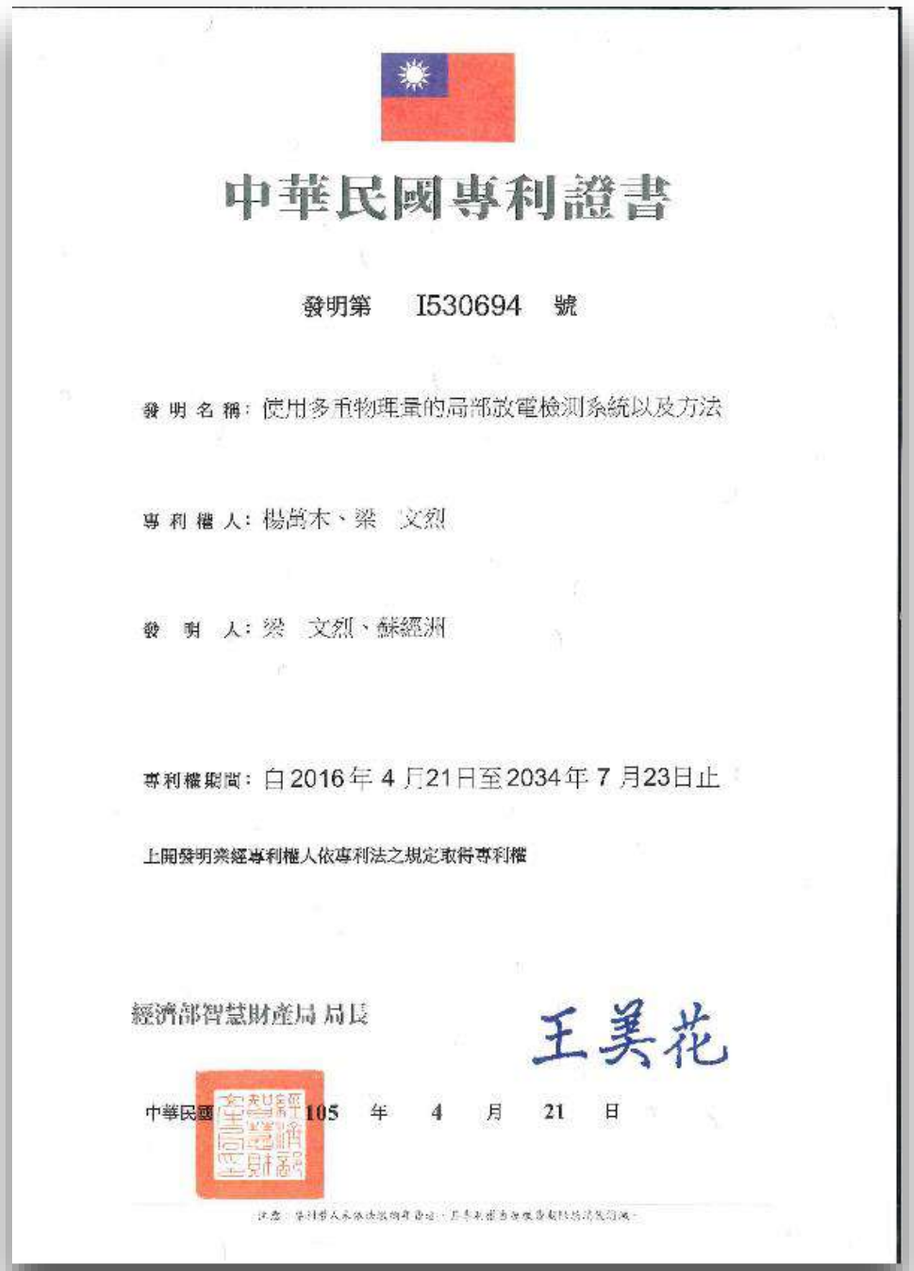
【發明名稱】使用多重物理量的局部放電檢測系統以及方法/
PARTIAL DISCHARGE DETECTION SYSTEM AND METHOD USING MULTIPLE PHYSICAL QUANTITIES

【中文】

本發明提供一種用於電力設備之使用多重物理量的局部放電檢測系統以及方法。本發明之局部放電檢測系統包括第一檢測元件、第二檢測元件以及局部放電判斷元件。第一及第二檢測元件分別用以偵測電力設備之多重物理量中的第一物理量與第二物理量。局部放電判斷元件根據第一物理事件與第二物理事件以及其二者發生的相關性（例如事件時間差）判斷上述電力設備是否已發生局部放電。因此，本發明係藉由判斷多個物理量的事件間的相關性，來決定是否進一步擷取或分析該些物理量的資訊。

【英文】

The invention provides a partial discharge detection system and method using multiple physical quantities for an electric power apparatus. The partial discharge detection system includes a first detection element, a second detection element and a partial discharge determination element. The first and second detection elements are configured to detect first and second physical



中華民國專利證書

發明第　I530694　號

發明名稱：使用多重物理量的局部放電檢測系統以及方法

專利權人：楊尚木、梁　文烈

發 明 人：梁　文烈、蘇經洲

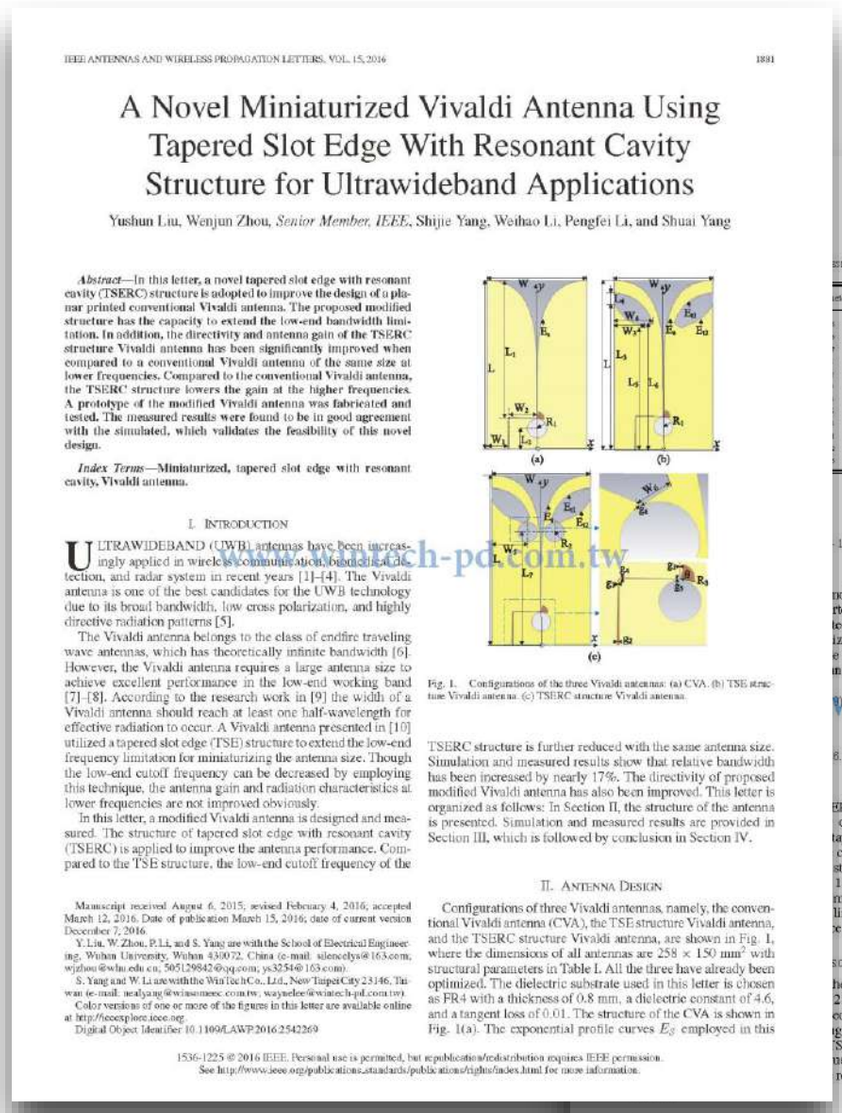
專利權期間：自2016年 4 月21日至2034年 7 月23日止

上開發明業經專利權人依專利法之規定取得專利權

經濟部智慧財產局 局長　王美花

中華民國 105 年 4 月 21 日

Patents and Publications on Multiple Physical Quantities



IEEE ANTENNAS AND WIRELESS PROPAGATION LETTERS, VOL. 15, 2016 1881

A Novel Miniaturized Vivaldi Antenna Using Tapered Slot Edge With Resonant Cavity Structure for Ultrawideband Applications

Yushun Liu, Wenjun Zhou, *Senior Member, IEEE*, Shijie Yang, Weihao Li, Pengfei Li, and Shuai Yang

Abstract—In this letter, a novel tapered slot edge with resonant cavity (TSERC) structure is adopted to improve the design of a planar printed conventional Vivaldi antenna. The proposed modified structure has the capacity to extend the low-end bandwidth limitation. In addition, the directivity and antenna gain of the TSERC structure Vivaldi antenna has been significantly improved when compared to a conventional Vivaldi antenna of the same size at lower frequencies. Compared to the conventional Vivaldi antenna, the TSERC structure lowers the gain at the higher frequencies. A prototype of the modified Vivaldi antenna was fabricated and tested. The measured results were found to be in good agreement with the simulated, which validates the feasibility of this novel design.

Index Terms—Miniaturized, tapered slot edge with resonant cavity, Vivaldi antenna.

I. Introduction

ULTRAWIDEBAND (UWB) antennas have been increasingly applied in wireless communication, biomedical detection, and radar system in recent years [1]–[4]. The Vivaldi antenna is one of the best candidates for the UWB technology due to its broad bandwidth, low cross polarization, and highly directive radiation patterns [5].

The Vivaldi antenna belongs to the class of endfire traveling wave antennas, which has theoretically infinite bandwidth [6]. However, the Vivaldi antenna requires a large antenna size to achieve excellent performance in the low-end working band [7]–[8]. According to the research work in [9] the width of a Vivaldi antenna should reach at least one half-wavelength for effective radiation to occur. A Vivaldi antenna presented in [10] utilized a tapered slot edge (TSE) structure to extend the low-end frequency limitation for miniaturizing the antenna size. Though the low-end cutoff frequency can be decreased by employing this technique, the antenna gain and radiation characteristics at lower frequencies are not improved obviously.

In this letter, a modified Vivaldi antenna is designed and measured. The structure of tapered slot edge with resonant cavity (TSERC) is applied to improve the antenna performance. Compared to the TSE structure, the low-end cutoff frequency of the TSERC structure is further reduced with the same antenna size. Simulation and measured results show that relative bandwidth has been increased by nearly 17%. The directivity of proposed modified Vivaldi antenna has also been improved. This letter is organized as follows: In Section II, the structure of the antenna is presented. Simulation and measured results are provided in Section III, which is followed by conclusion in Section IV.

Fig. 1. Configurations of the three Vivaldi antennas: (a) CVA, (b) TSE structure Vivaldi antenna, (c) TSERC structure Vivaldi antenna.

II. Antenna Design

Configurations of three Vivaldi antennas, namely, the conventional Vivaldi antenna (CVA), the TSE structure Vivaldi antenna, and the TSERC structure Vivaldi antenna, are shown in Fig. 1, where the dimensions of all antennas are 258×150 mm^2 with structural parameters in Table I. All the three have already been optimized. The dielectric substrate used in this letter is chosen as FR4 with a thickness of 0.8 mm, a dielectric constant of 4.6, and a tangent loss of 0.01. The structure of the CVA is shown in Fig. 1(a). The exponential profile curves E_S employed in this

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Color versions of one or more of the figures in this letter are available online at http://ieeexplore.ieee.org.

Digital Object Identifier 10.1109/LAWP.2016.2542269

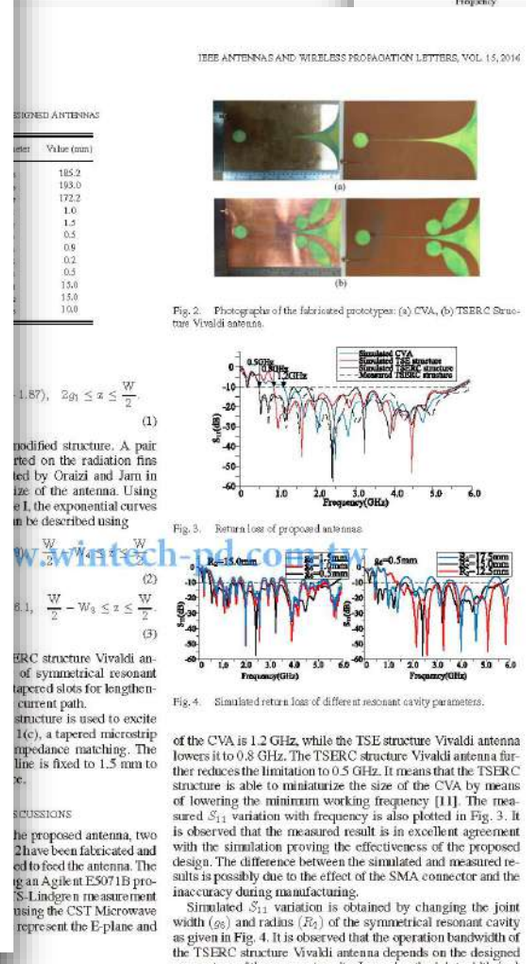

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Fig. 2. Photographs of the fabricated prototypes: (a) CVA, (b) TSERC Structure Vivaldi antenna.

Fig. 3. Return loss of proposed antennas.

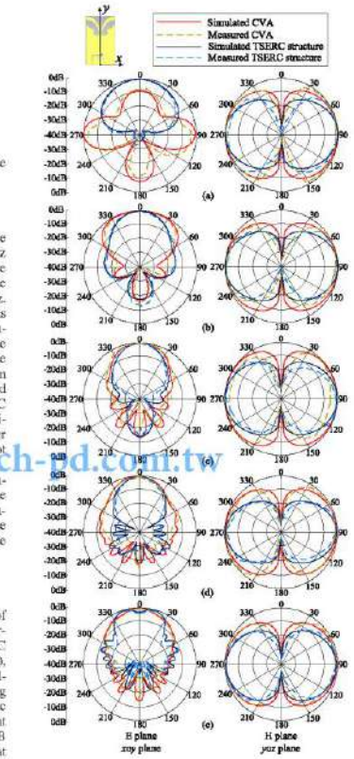
Fig. 4. Simulated return loss of different resonant cavity parameters.

of the CVA is 1.2 GHz, while the TSE structure Vivaldi antenna lowers it to 0.8 GHz. The TSERC structure Vivaldi antenna further reduces the limitation to 0.5 GHz. It means that the TSERC structure is able to miniaturize the size of the CVA by means of lowering the minimum working frequency [11]. The measured S_{11} variation with frequency is also plotted in Fig. 3. It is observed that the measured result is in excellent agreement with the simulation proving the effectiveness of the proposed design. The difference between the simulated and measured results is possibly due to the effect of the SMA connector and the inaccuracy during manufacturing.

Simulated S_{11} variation is obtained by changing the joint width (g_8) and radius (R_2) of the symmetrical resonant cavity as given in Fig. 4. It is observed that the operation bandwidth of the TSERC structure Vivaldi antenna depends on the designed parameters of the resonant cavity. Lowering the joint width (g_8) resulted in the reduction of low-end cutoff frequency. Meanwhile, the radius (R_2) of resonant cavity plays a vital role in return loss characteristic of the proposed antenna. In the proposed antenna, the joint width (g_8) and radius (R_2) of resonant

A. Return Loss

Fig. 3 illustrates the S_{11} variation of the CVA, the TSE structure Vivaldi antenna, and the TSERC structure Vivaldi antenna. As shown in the figure, the lower end $S_{11} \leq -10$ dB limitation

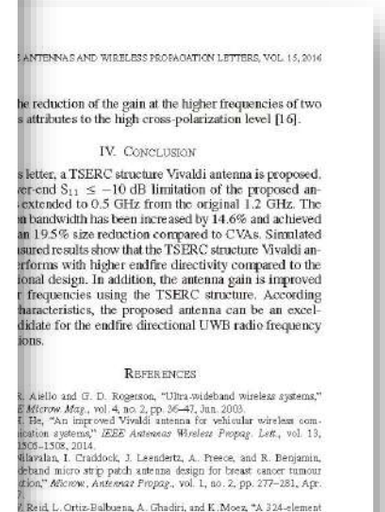


LIU *et al.*: NOVEL MINIATURIZED VIVALDI ANTENNA USING TSERC STRUCTURE FOR UWB APPLICATIONS 1883

Fig. 5. Simulated and measured radiation patterns of two printed Vivaldi antennas in E-plane (*xoy*) and H-plane (*yoz*) at (a) 0.5, (b) 1.5, (c) 2, (d) 3, and (e) 5 GHz.

D. Gains

According to the analysis of surface current distribution, the TSERC structure contributes to the radiation of electromagnetic wave at the lower frequencies. However, as shown in Fig. 6(c), part of the surface current along the radiating edges in region C, which can excite the higher-frequency electromagnetic wave, is coupled to the resonant cavity. This characteristic lowers



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[16] Y. W. Wang, G. M. Wang, and B. F. Zong, "Directivity improvement of Vivaldi antenna using double-slot structure," *IEEE Antennas Wireless Propag. Lett.*, vol. 12, pp. 1380–1383, 2013.

WinTech PD Products

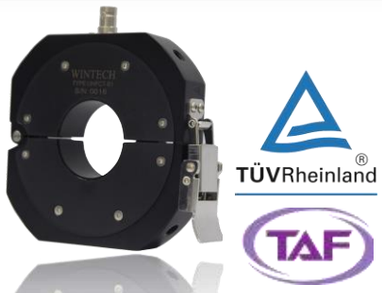
Summary of Products- Multiple Sensors with Various Frequencies

Signals of Partial Discharge

20kHz-250kHz 1kHz 10MHz 300MHz 500MHz 3GHz

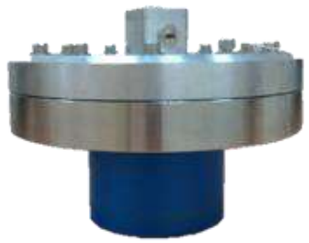
Ultrasonic wave (sound) Voltage/Current(Electromagnetic Field) Electromagnetic wave (Microwave)

Acoustic Emission (AE) Sensor

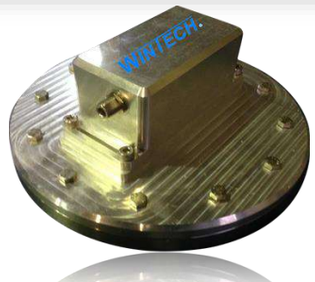


High Frequency Current Transformer (HFCT) Sensor

Transient Earth Voltage (TEV) Sensor



Active Ultra High Frequency (Submerged Type) Sensor



Active Ultra High Frequency (Embedded Type) Sensor

Active Ultra High Frequency (Bus-bar Type) Sensor

MADE IN TAIWAN

Flexible Magnetic Coupler (FMC) Sensor

Ultra High Frequency Current Transformer (UHFCT) Sensor

Active Ultra High Frequency (GIS Type) Sensor

Ultra High Frequency Antenna Array Locator

Superior Invention in Taiwan- UHF Antenna Array Locator

- Wintech attended 2017 Taipei International Invention Show and Technomart in Taipei World Trade Center Hall 1. Our product "UHF Antenna Array Locator" stood out among over 1300 candidates from Taiwan and other countries, and was ranked as second place in Platinum Prize (23 winners in Platinum Prize). Wintech's director Mr. Yang, Wan Mu personally received the trophy awarded by Intellectual Property Office of Economy Ministry.

- Wintech's "UHF Antenna Array Locator" is excellent at locating where partial discharge occurs in medium and high voltage equipment. It is a sensor with high directivity, high gain and high bandwidth. locating the flaws of insulation by electromagnetic signal of partial discharge in high-voltage equipment, especially in transformer station, Switchgear Transformer, Cast-Resin Transformer. It was published and recognized in a distinguished journal, IEEE.

WinTech PD Products

WinTech Power

Technical Specification			
Model	WP-1	Dimensions	H : 291.7 mm
Resolution	12 bits		W : 399.4 mm
Sampling	2.5 GS/s		D : 131.31 mm
Bandwidth	500 MHz	Power	90 – 264 VAC
Storage Capacity	12.5 Mpts/Ch		45 – 66 Hz
Channels	4 (Expandable with multiplexer)	Temperature	5℃ – 40℃
Screen Size	12.1"	Humidity	95 % RH
OS	Windows 7	Weight	5.9 ± 0.5kg

- WinTech PD Diagnostic System is used for partial discharge (PD) testing on medium voltage (MV) and high voltage (HV) equipment, such as power cables, various transformers, switchgear, etc.

- WinTech PD Diagnostic System is suitable for on-line monitoring and on-line testing. With our developed high quality sensors, the performance of PD diagnosis can further be enhanced.

WinTech PD Products

Wintech Power (Partial Discharge Diagnostic System)-Features

- **Wideband, High Sampling Rate, High Resolution:** Accurately Measure PD waveform.
- **Large Memory:** Full waveform record for data analysis and identification.
- **Simple User Interface:** Intuitive UI with real-time PRPD plot and data trend.
- **Signal Analysis Software:** Analyze data to achieve efficient diagnosis including PD identification, long-time trend chart, and report generation.
- **Remote Monitoring Software:** Off-site system control and setting with functions of offsite data backup and send alarm e-mail.
- **24 hours PD On-line Monitoring System**: Provide various detecting modes for customers' detecting requirements if needed.

WinTech PD Products

Wintech Power (Partial Discharge Diagnostic System)

PD Capture
Setting for system, including data record, trigger level, etc.

Core module

Alert email

AutoMail
For email setting, including alert, content, recipient

CxTraceLoad
Retrieve background value, record parameter, and original wave shape

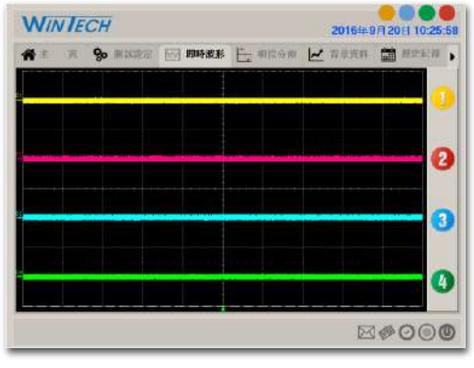
Data Retrieval

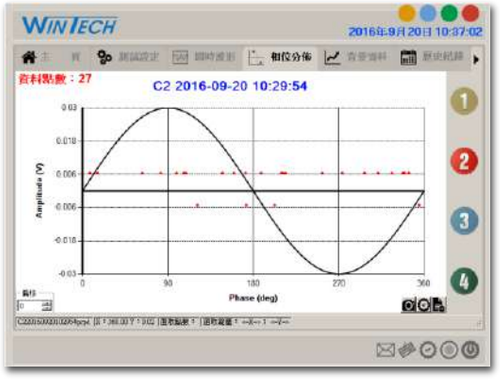
Remote control

Data upload

Data Upload
Upload data to assigned server

RDPC Line





WinTech PD Products

Partial Discharge Detector - SA

Technical Specification

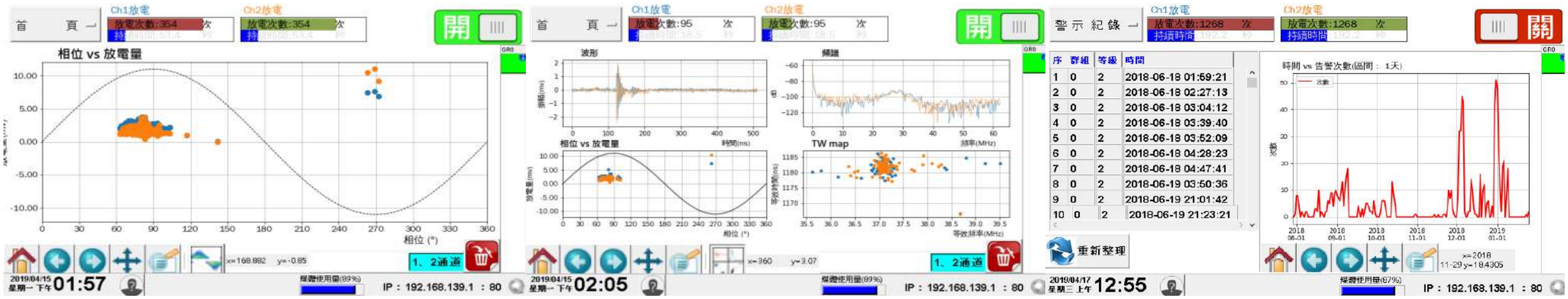
Model	PDD-SA
Channel	2 - 4 - 6
Bandwidth	1Mhz-80Mhz
Measured Range	1mV - 2V (50Ω)
Communication Port	Built-in RJ-45 & USB x 4
Power Supply	90 - 264 VAC / 45 HZ - 66 Hz
Dimensions	220mm x 170mm x 140 mm
Weight	< 2 kg
Functions	▶ 24 hours on-line monitoring ▶ 7" color touch screen ▶ Discharge level display (safety, warning, alarm) ▶ Alarm light, warning sound ▶ Waveform, FFT, TF map, PRPD, number of PD, Trent chart ▶ Off-site data backup, and alert email (with Internet)

- **Waveform, FFT, TF Map, volts,** PD phase (PRPD), number of PD, and PD trend Record display
- Suitable for various MV and HV power equipment detection
- 24 Hours on-line monitoring
- Economical and efficient
- 7" Color touch screen
- Alarm light, warning sound, and instant alert email or message delivery

WinTech PD Products

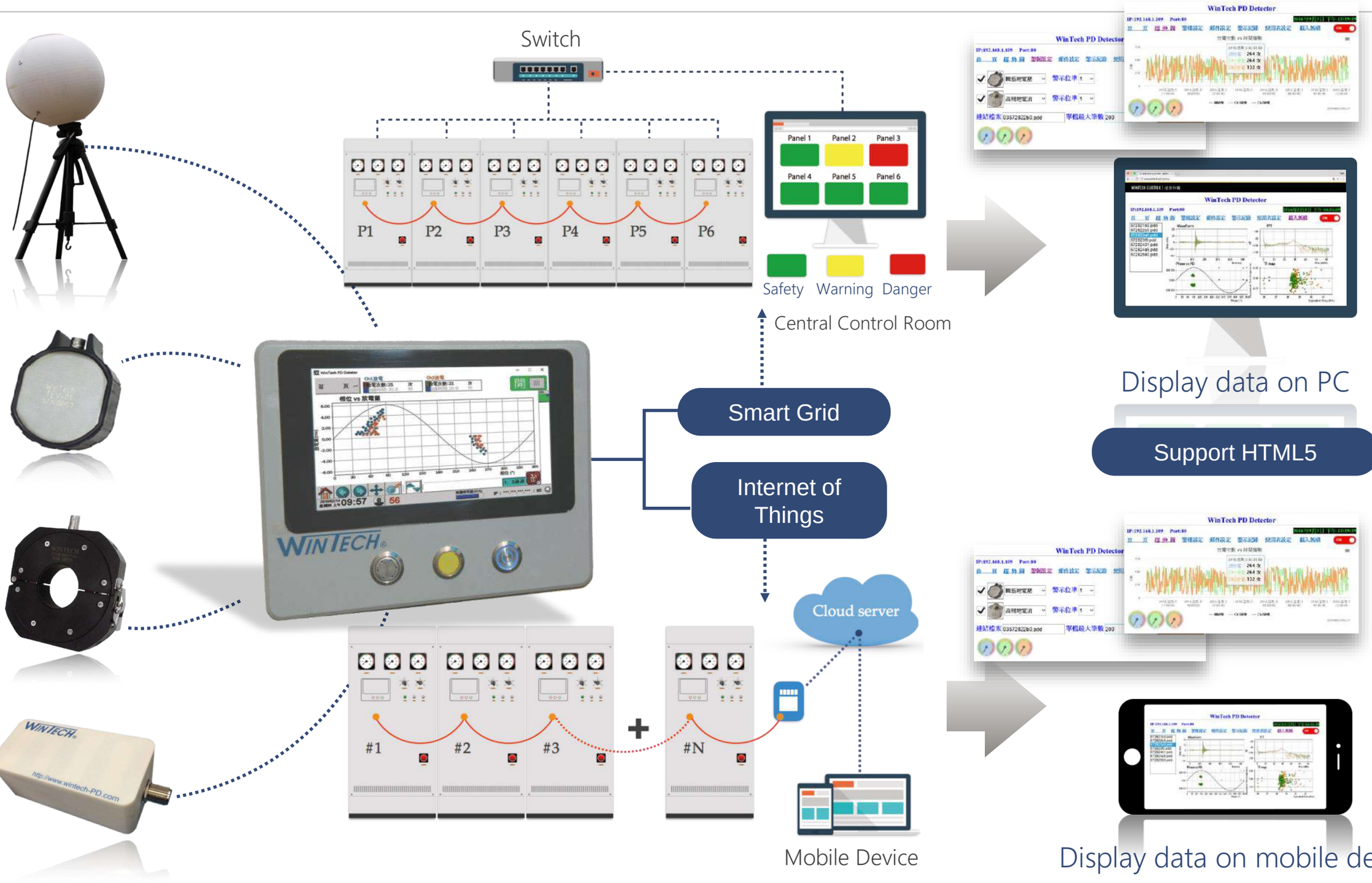
Partial Discharge Detector-Features

- Diagnose insulation deterioration of power equipment to avoid equipment broken and property lost, suitable for various transformers, switchgear, power cable, etc.
- Two signals comparison for PD identification: eliminate jamming from signal outside, and avoid false alarm.
- Phase Resolved Partial Discharge (PRPD) analysis corresponds with partial discharge occurrence frequency to identify the PD signal accurately.
- PD progress data record: create trend chart, predict insulated condition in advance.
- Automatically sends email alerts to administrators.
- PD Detector is the best instrument to detect early failure of power equipment.



WinTech PD Detector 24H Intelligent Remote Monitoring Systems

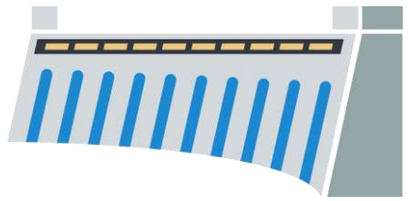
—Application of "Internet of Things" and "Smart Grids"



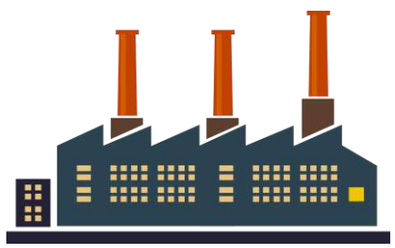
Applications and Objects

For medium and high voltage equipment running 24 hours a day, 365 days a year

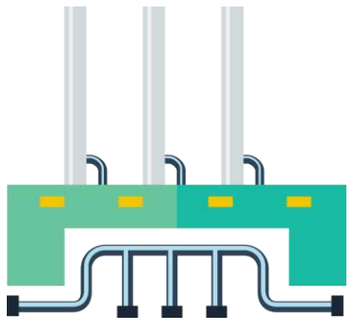
High-tech industry:
semiconductor, precision panel, biotechnology plants, substation, etc.



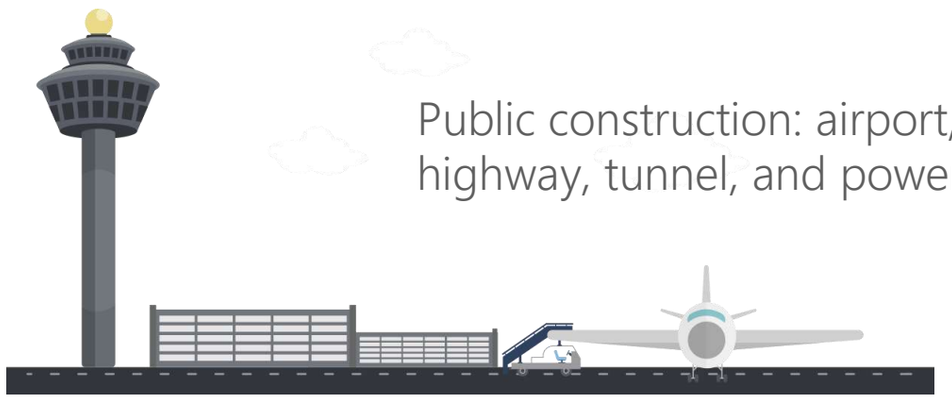
Power supply plants



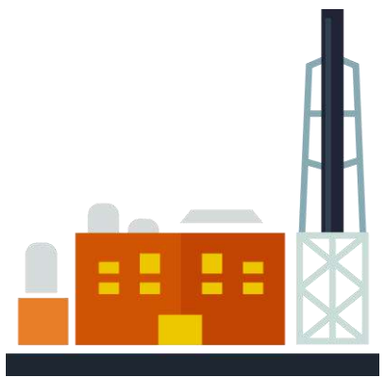
Traditional industry:
iron and steel industry



Sewage treatment plants



Public construction: airport, railway, subway, highway, tunnel, and power cable car

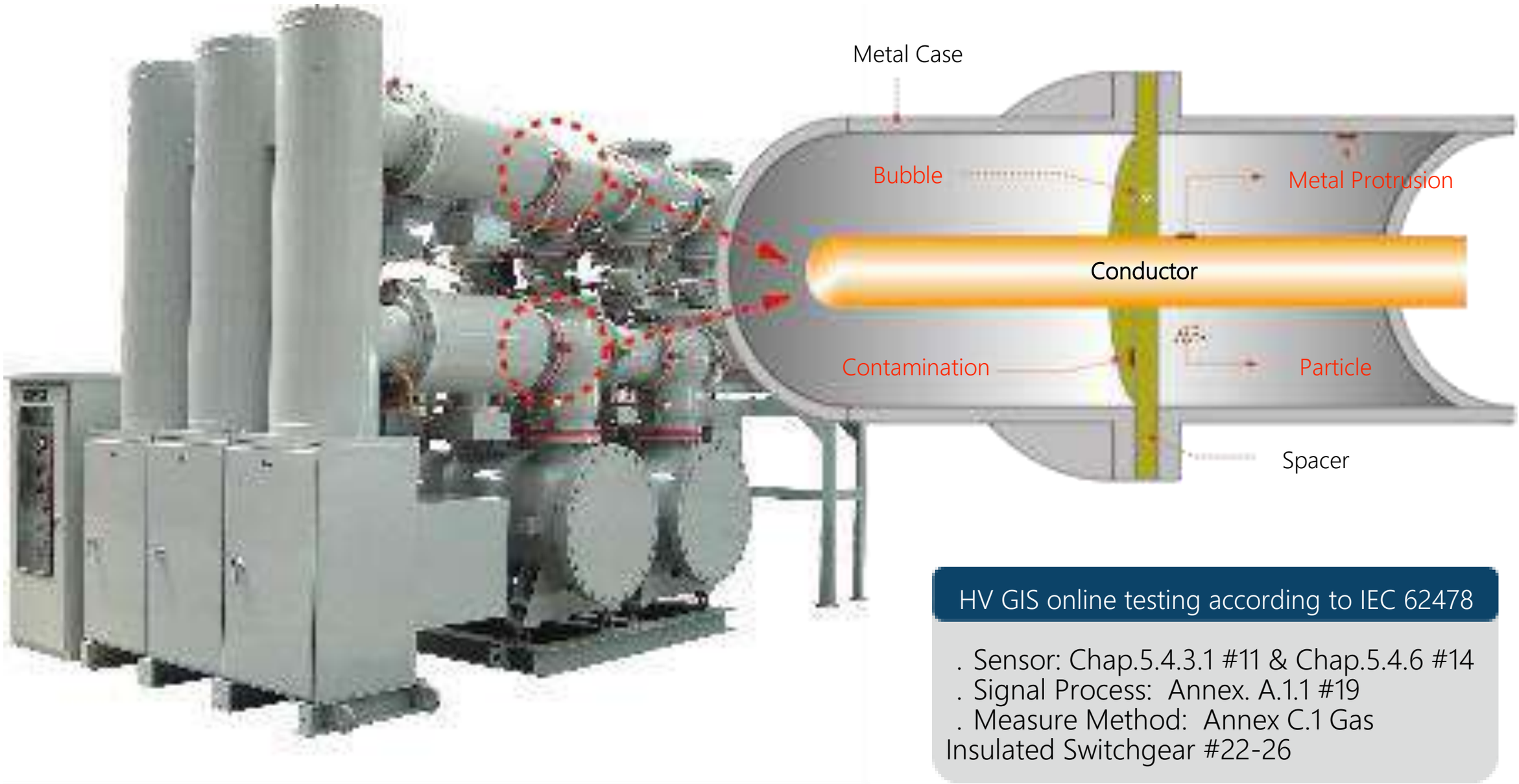


Refuse incineration plants

WinTech PD Application

Case 1 -PD Phenomenon in Gas Insulated Switchgear

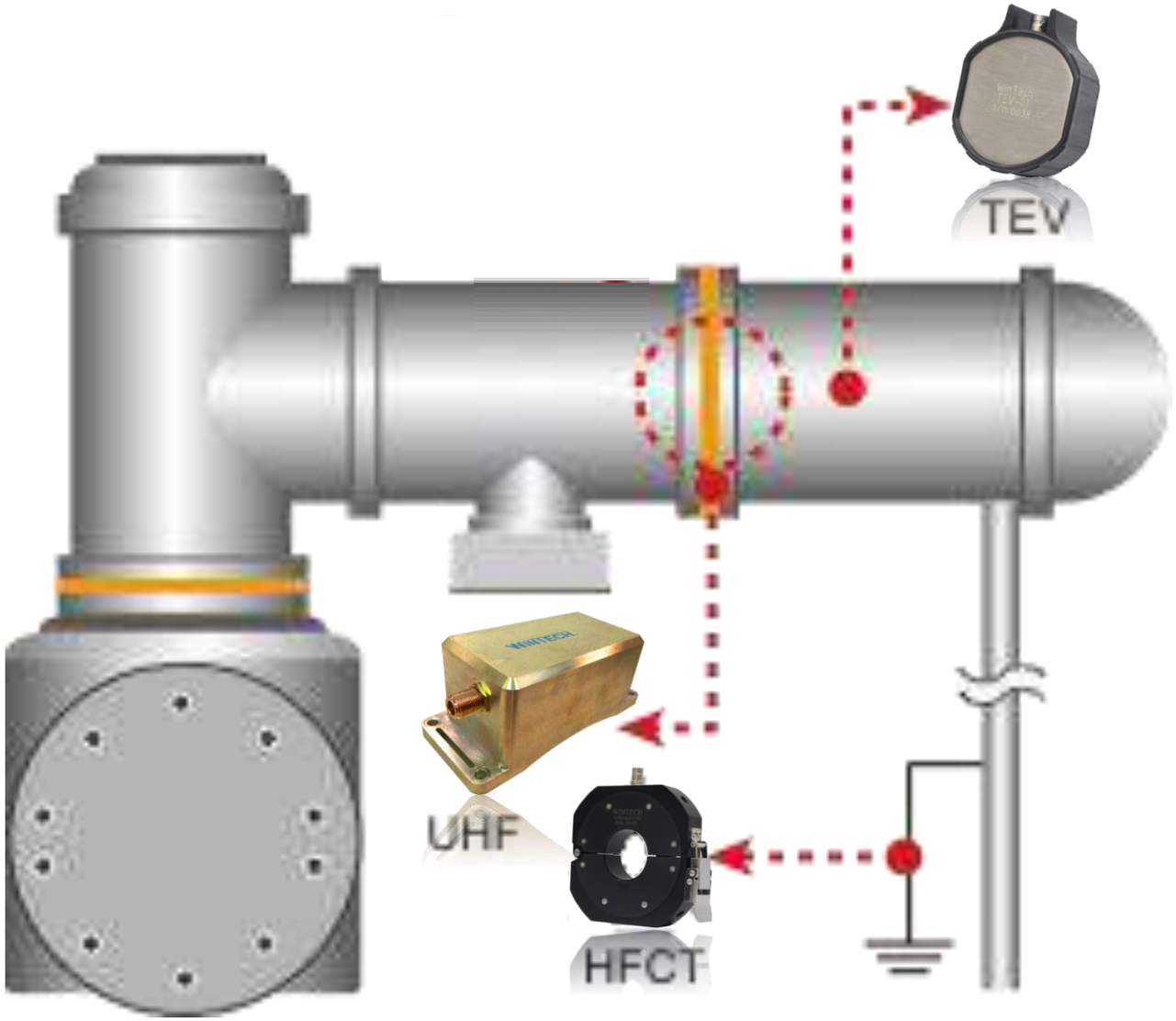
Cause: Metal particles and protrusion | Bubble and crack on spacer | Moisture in SF6



HV GIS online testing according to IEC 62478

. Sensor: Chap.5.4.3.1 #11 & Chap.5.4.6 #14
. Signal Process: Annex. A.1.1 #19
. Measure Method: Annex C.1 Gas Insulated Switchgear #22-26

Case 1 -Testing and Monitoring System Installation for Gas Insulated Switchgear



24 H Online Detecting

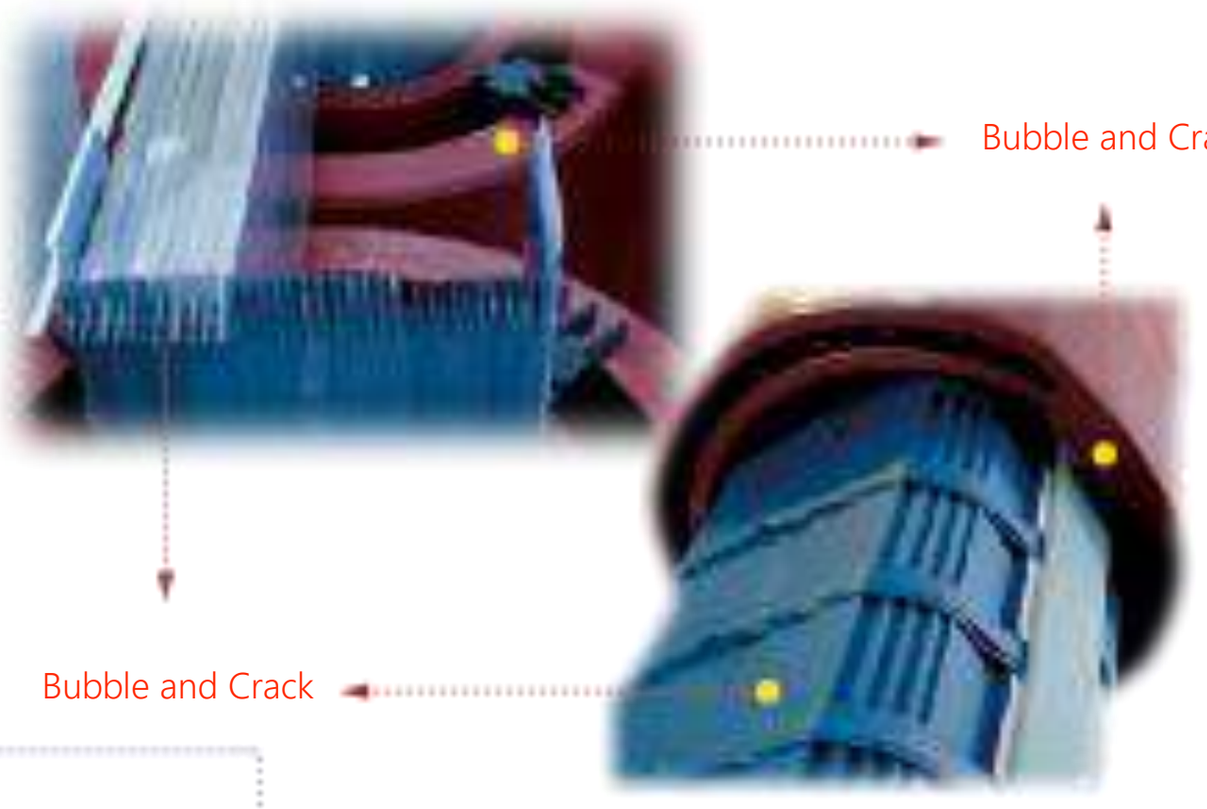
OR

24 H Online Detecting

WinTech PD Application

Case 2 - PD Phenomenon in Cast-Resin Transformer

Cause: Bubble and crack in resin | Metal protrusion



Bubble and Crack

Bubble and Crack

Bubble and crack in resin

HV TR online testing according to IEC 62478

. Sensor: Chap.5.4.3.1 #11 & Chap.5.4.6 #14
. Signal Process: Annex. A.1.1 #19
. Measure Method: Annex C.3 Transformer #28-29

Case 2 - Testing and Monitoring System Installation for Cast-Resin Transformer

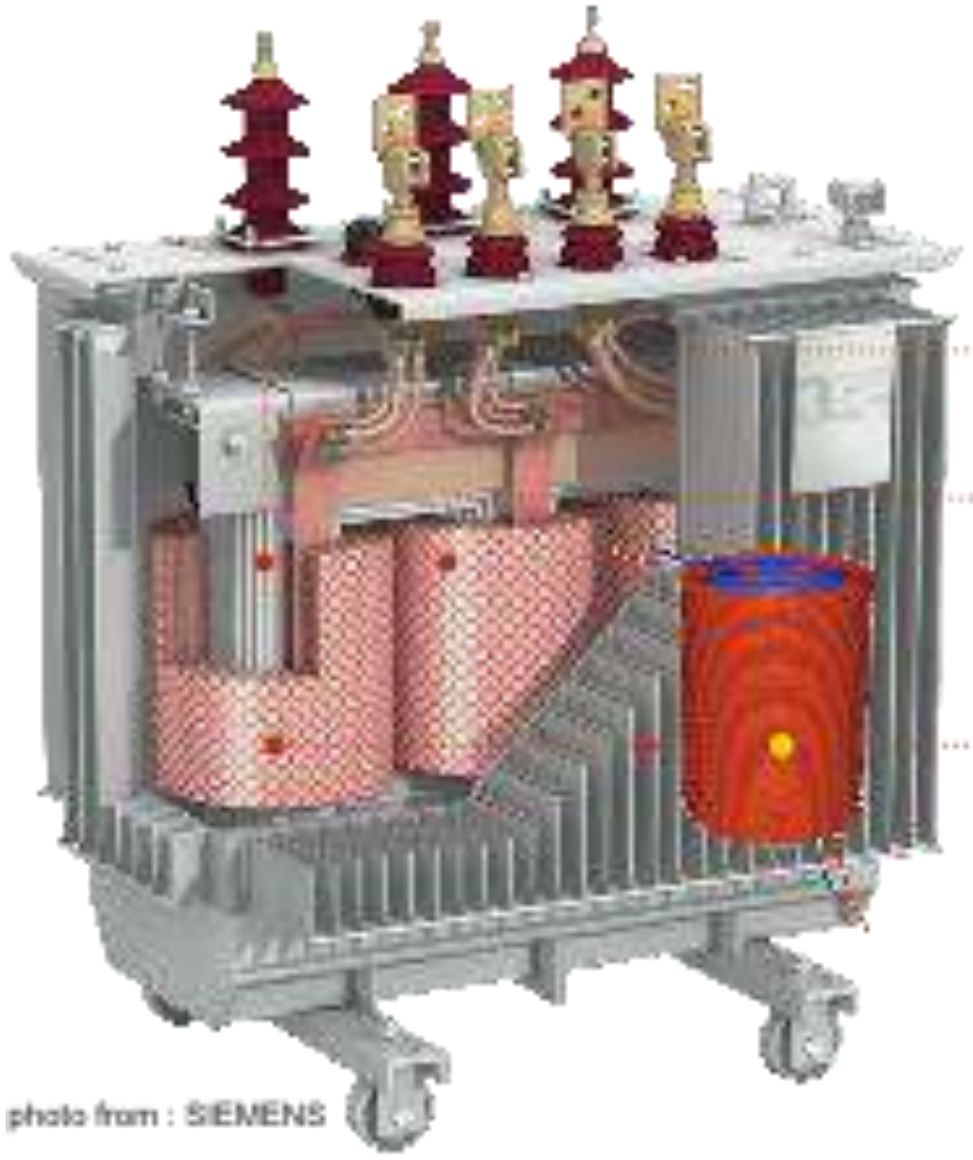
Online Testing
24 H Online Detecting

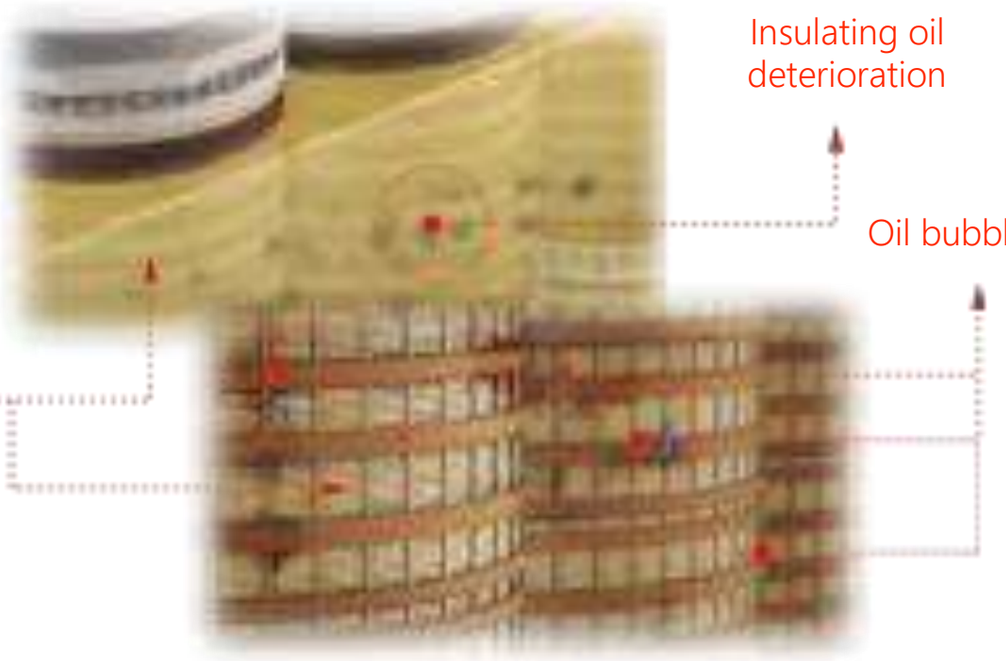
24 H Online Detecting

WinTech PD Application

Case 3 - PD Phenomenon in Oil Immersed Transformer

Cause: Insulating oil deterioration | Metal protrusion | Bubble in insulating oil and coil

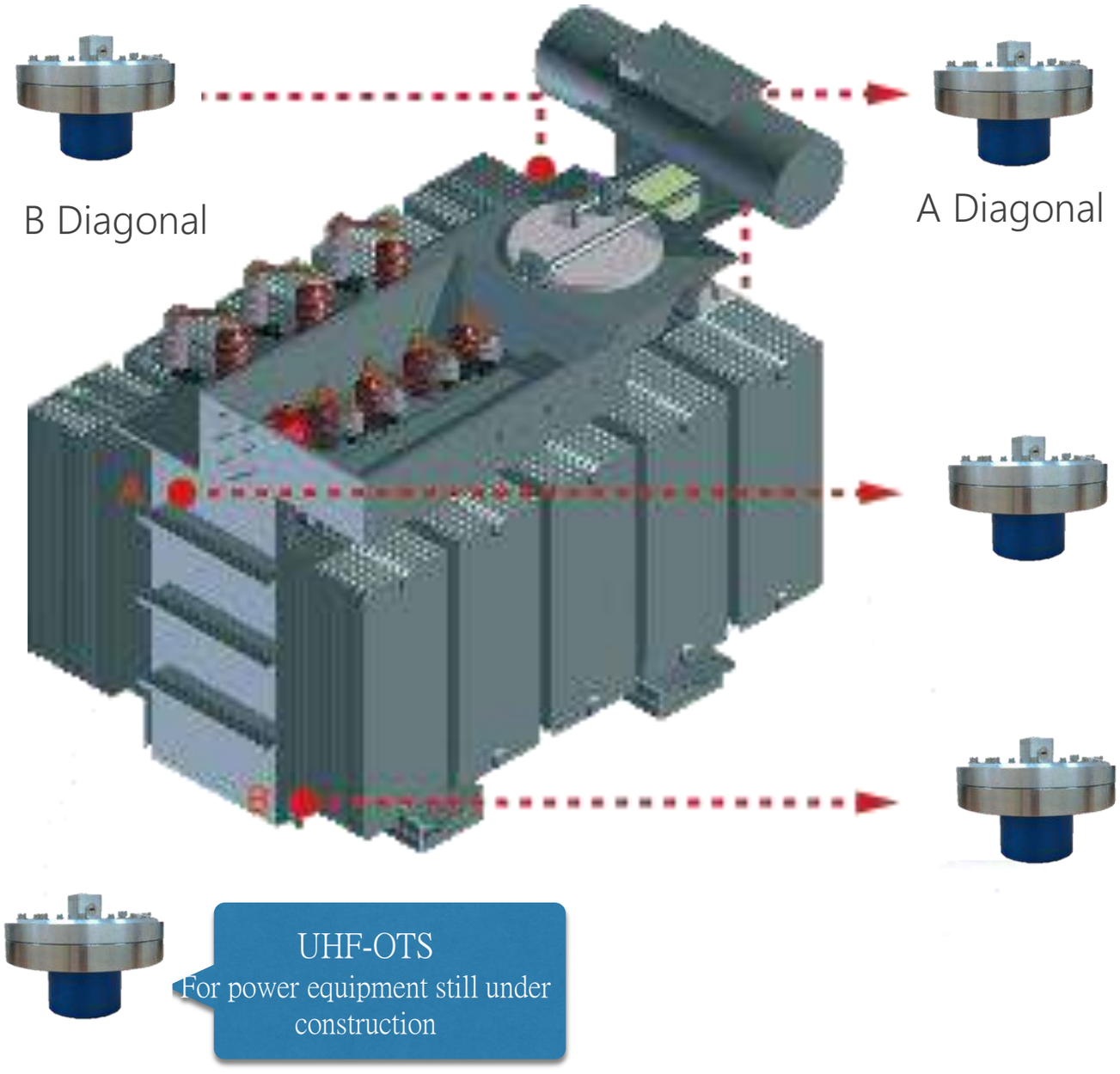




HV OIL TR online testing according to IEC 62478

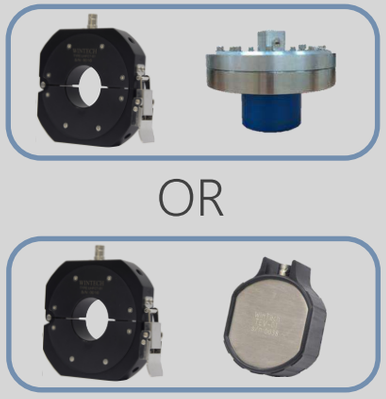
. Sensor: Chap.5.4.3.1 #11 & Chap.5.4.6 #14
. Signal Process: Annex. A.1.1 #19
. Measure Method: Annex C.3
Transformer #28-29

Case 3 - Testing and Monitoring System Installation for Oil Immersed Transformer



Online Testing
24 H Online Detecting

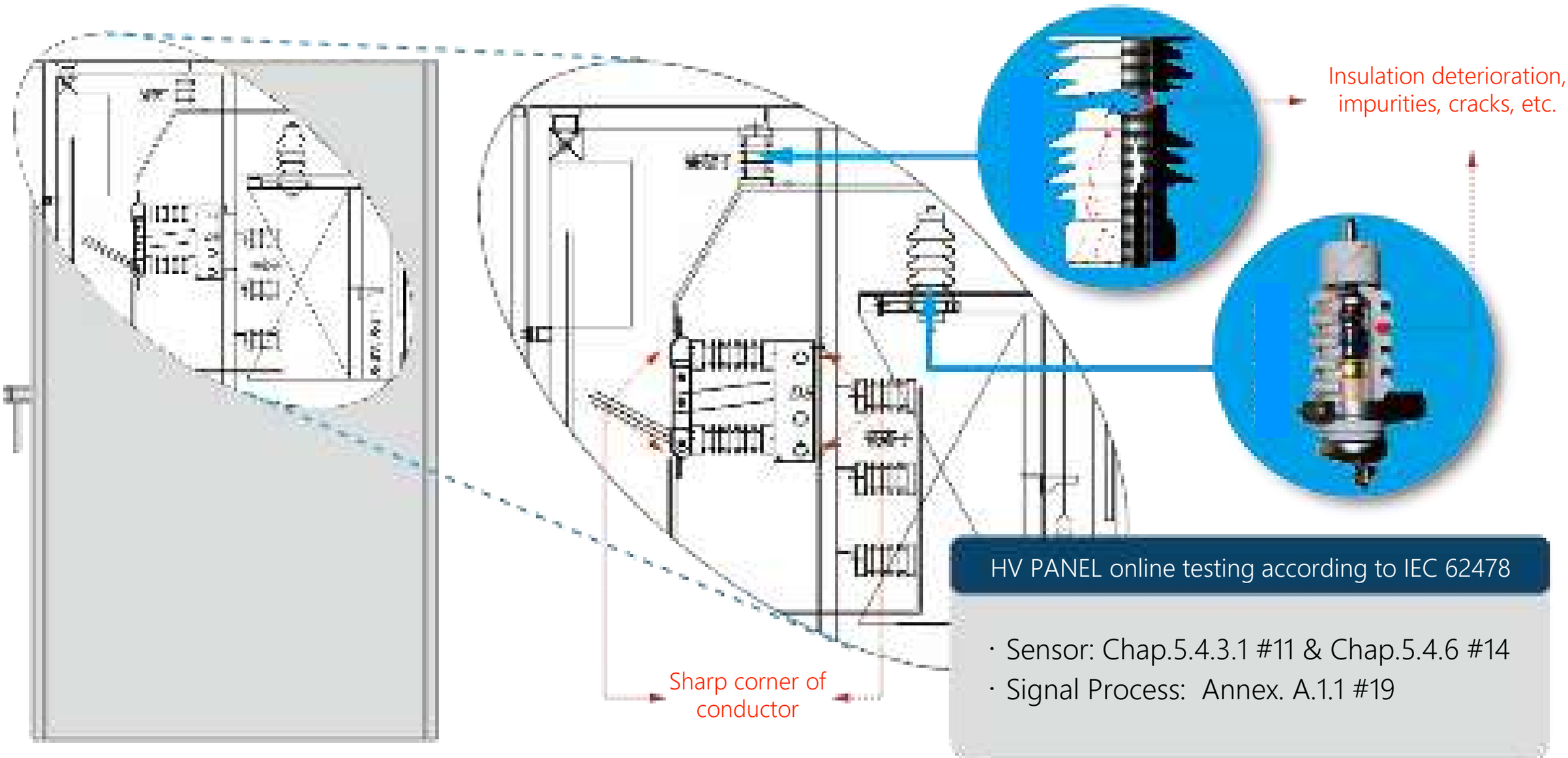
24 H Online Detecting



WinTech PD Application

Case 4 - PD Phenomenon in High-Voltage (HV) Switchgear

Cause: Insulation deterioration | Metal protrusion | Cracks | Poor connection

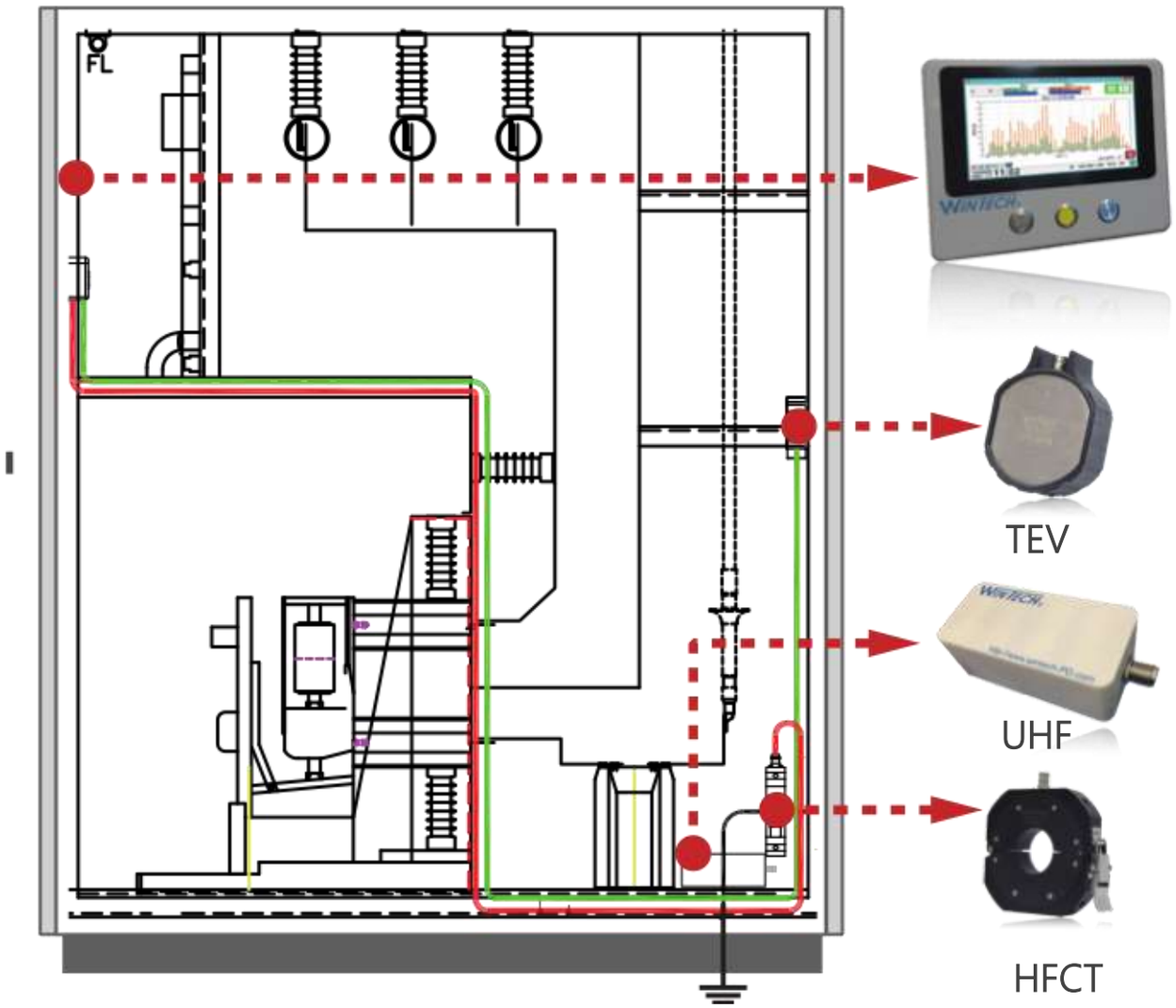


HV PANEL online testing according to IEC 62478

- Sensor: Chap.5.4.3.1 #11 & Chap.5.4.6 #14
- Signal Process: Annex. A.1.1 #19

WinTech PD Application

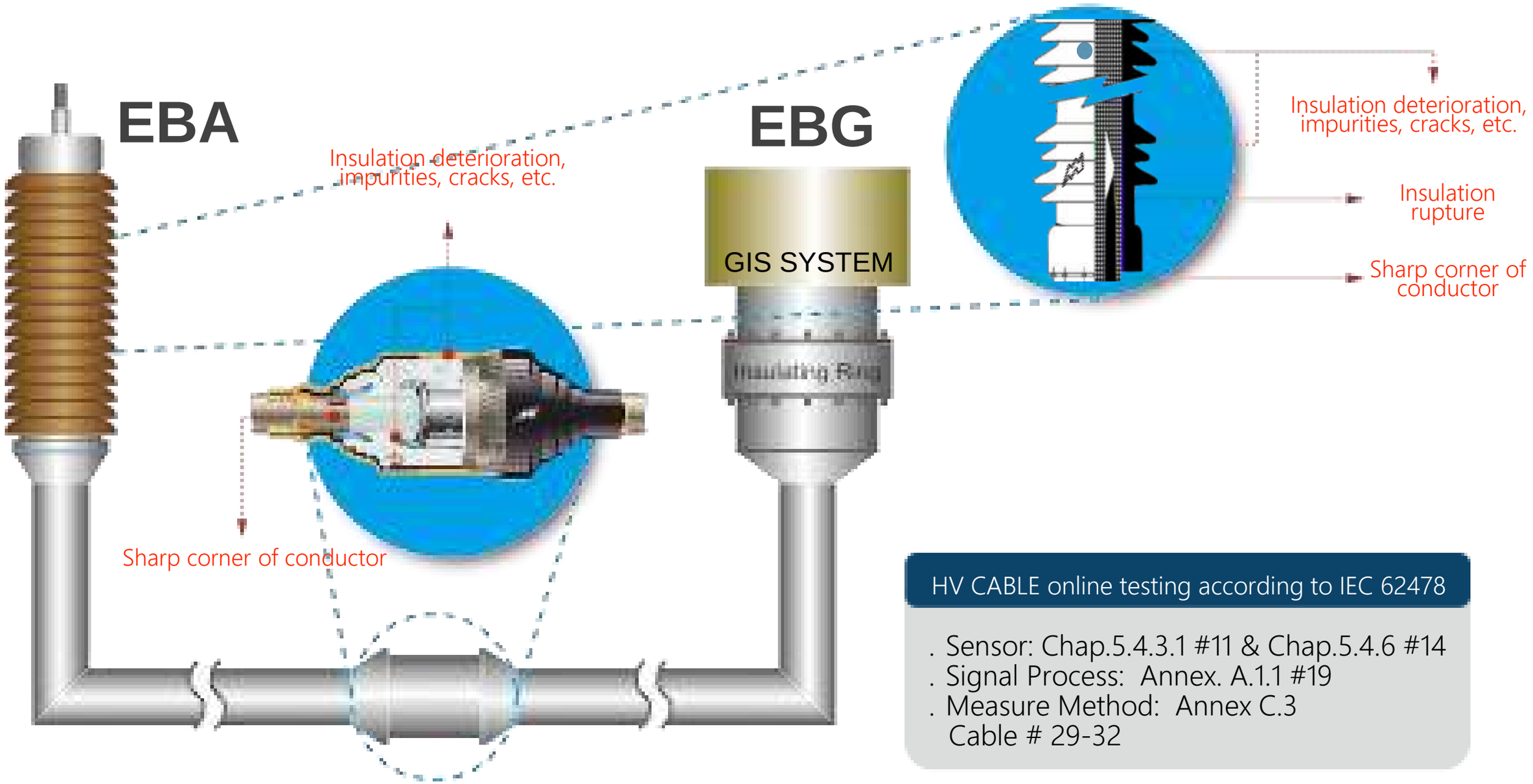
Case 4 - Testing and Monitoring System Installation for HV Switchgear



WinTech PD Application

Case 5 - PD Phenomenon in Power Cables

Cause: Crack | Metal protrusion | Steam | Poor installation

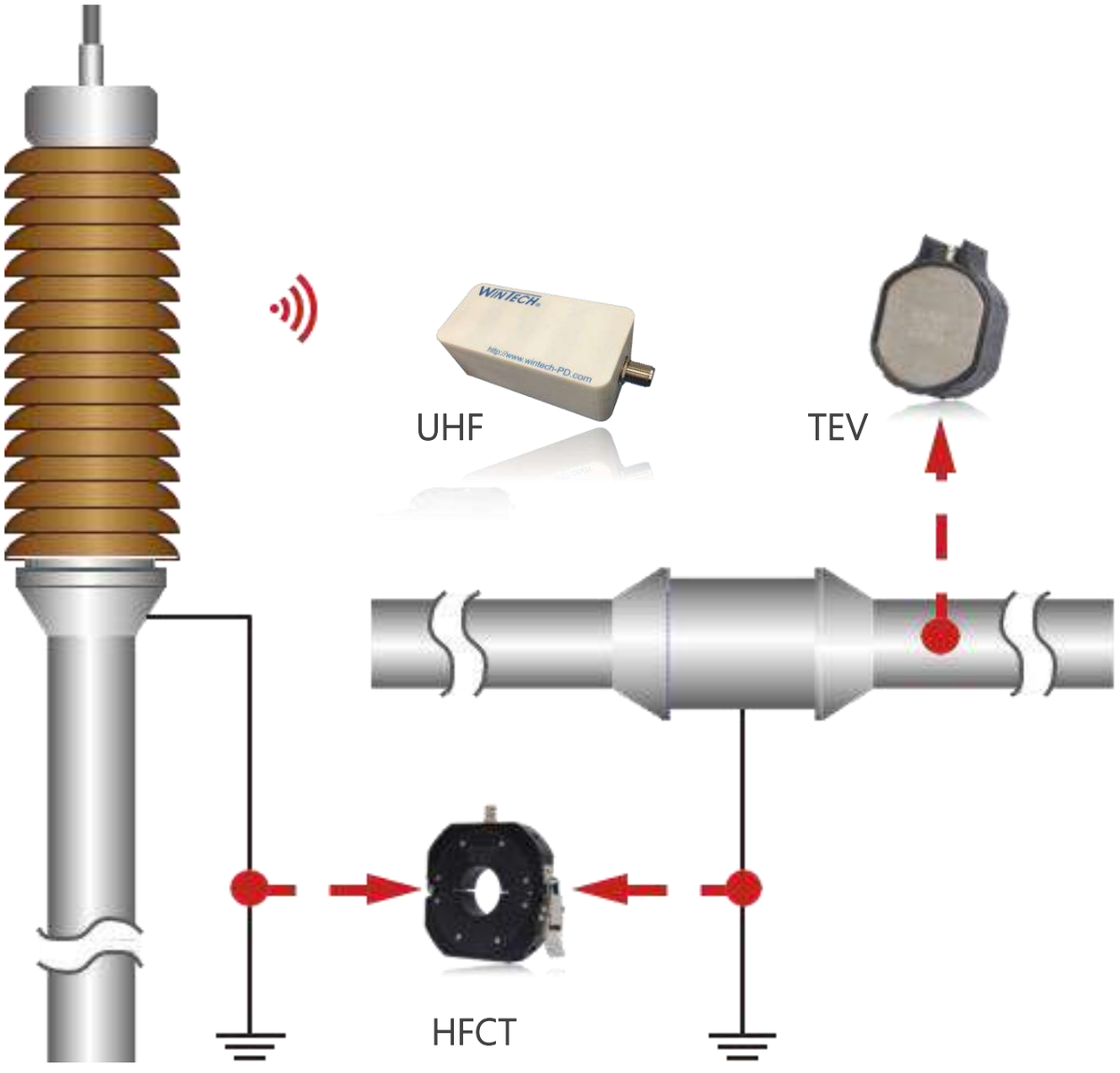


HV CABLE online testing according to IEC 62478

. Sensor: Chap.5.4.3.1 #11 & Chap.5.4.6 #14
. Signal Process: Annex. A.1.1 #19
. Measure Method: Annex C.3
Cable # 29-32

WinTech PD Application

Case 5 - Testing and Monitoring System Installation for Power Cables

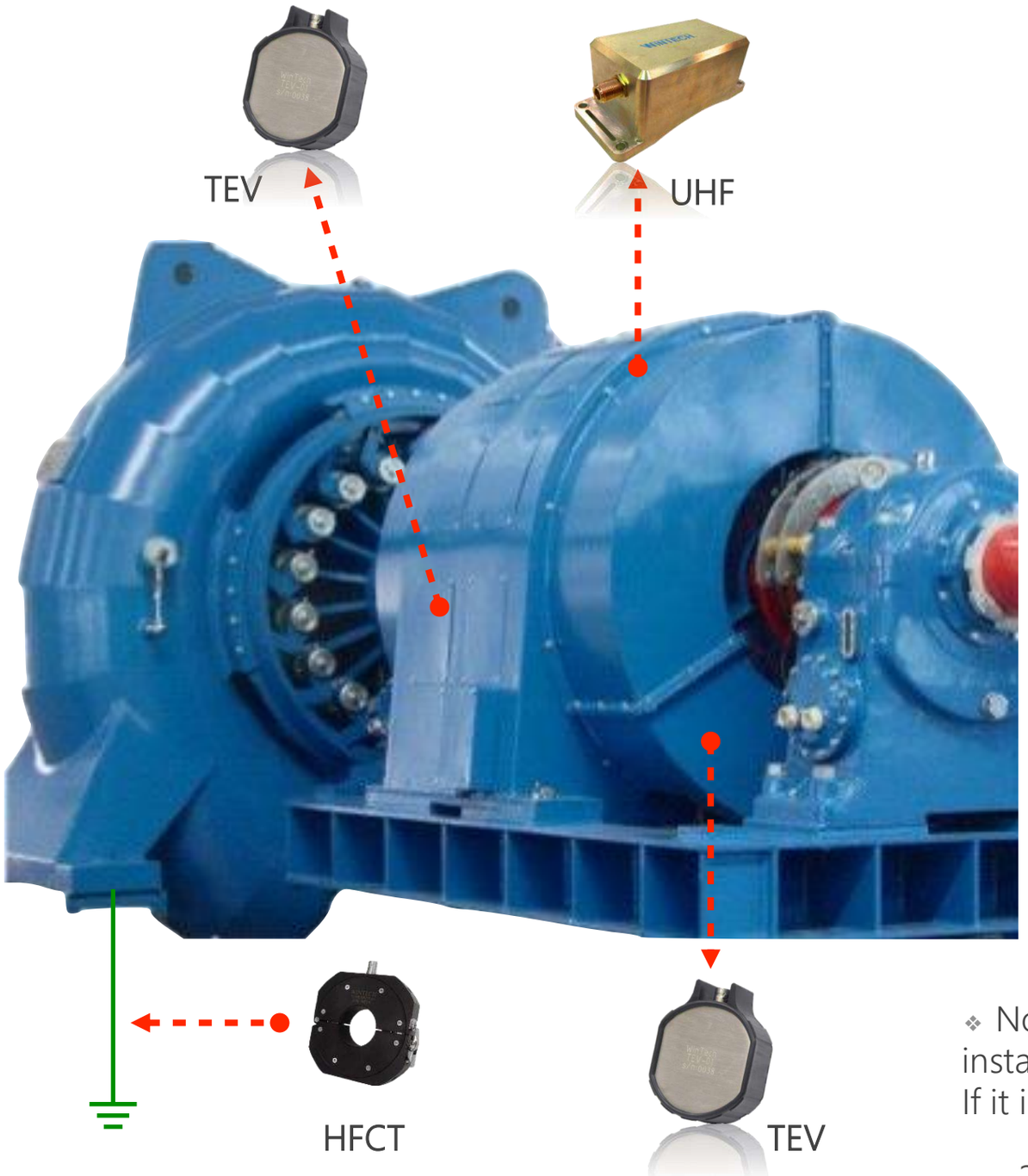


Online Testing
24 H Online Detecting

24H Online Detecting

WinTech PD Application

Case 6 - Testing and Monitoring System Installation for Rotating Machinery (Hydrogenerator)



❖ Note: If a power equipment is still under construction, UHF Sensor can be installed on it with/without drilling the hole of the equipment.
If it is an established equipment, TEV sensor can be installed on it directly.

24 hours PD Monitoring Project (1) in Magong Airport, Penghu

Application: Switchgear Transformer

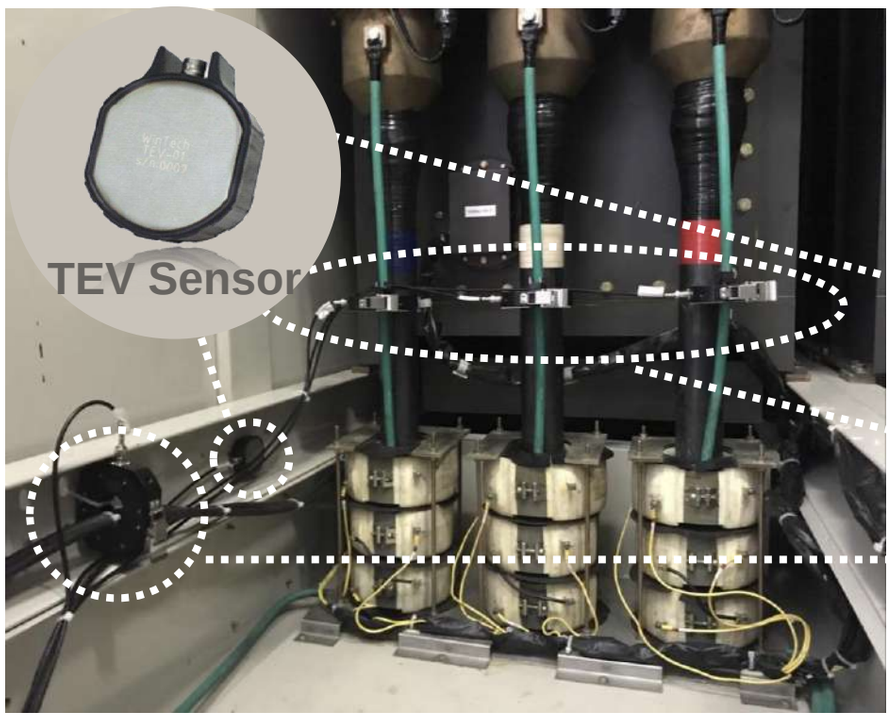
Wintech Detector 24 Hours On-line Monitoring

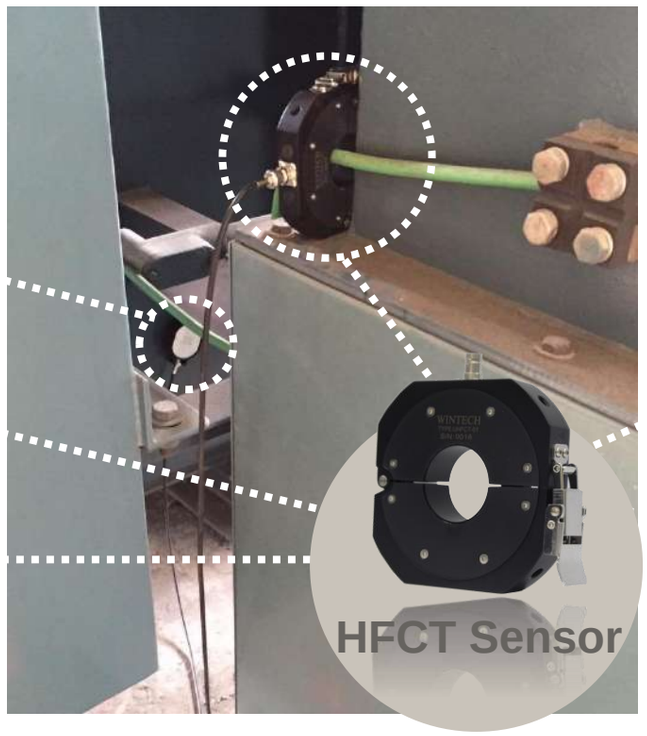
24 hours PD Monitoring Project (2) in UPCC (Logistics), Hualien
Application: Switchgear
Wintech Detector 24 Hours On-line Monitoring

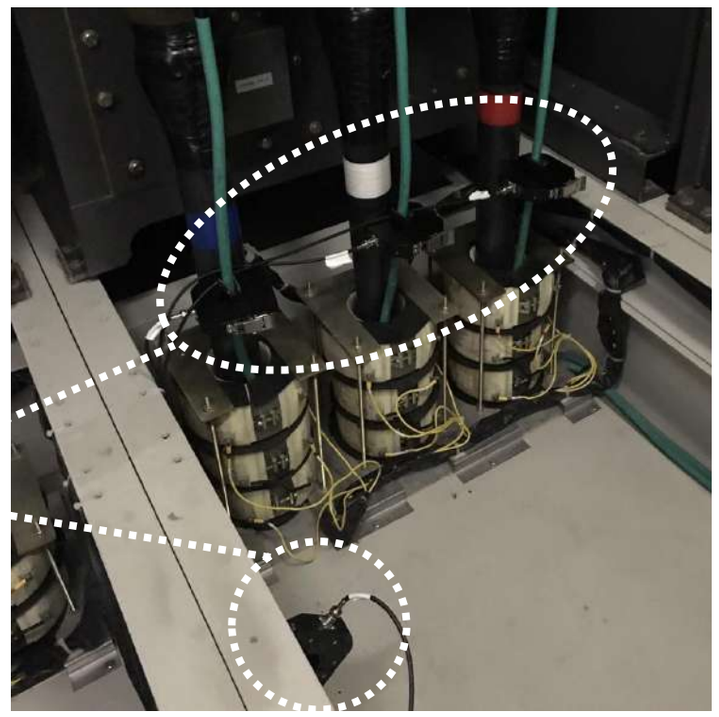
24 hours PD Monitoring Project (3) in Sewage Treatment Plant, Kaohsiung

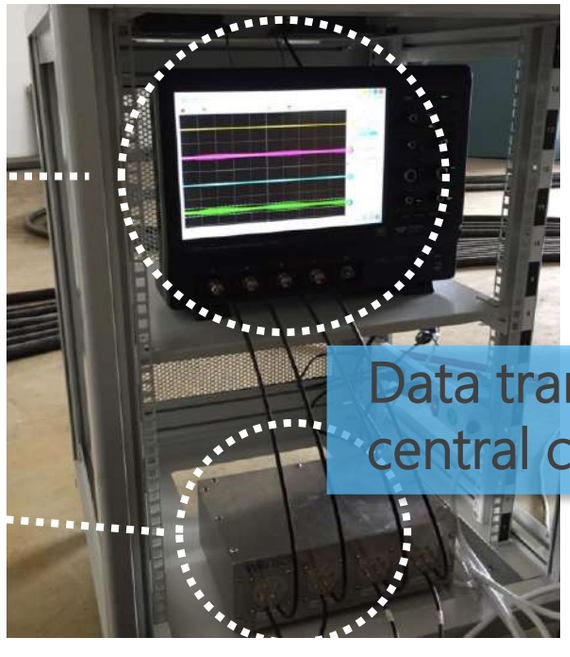
Application: 69kV Oil Immersed Transformer and Switchgear

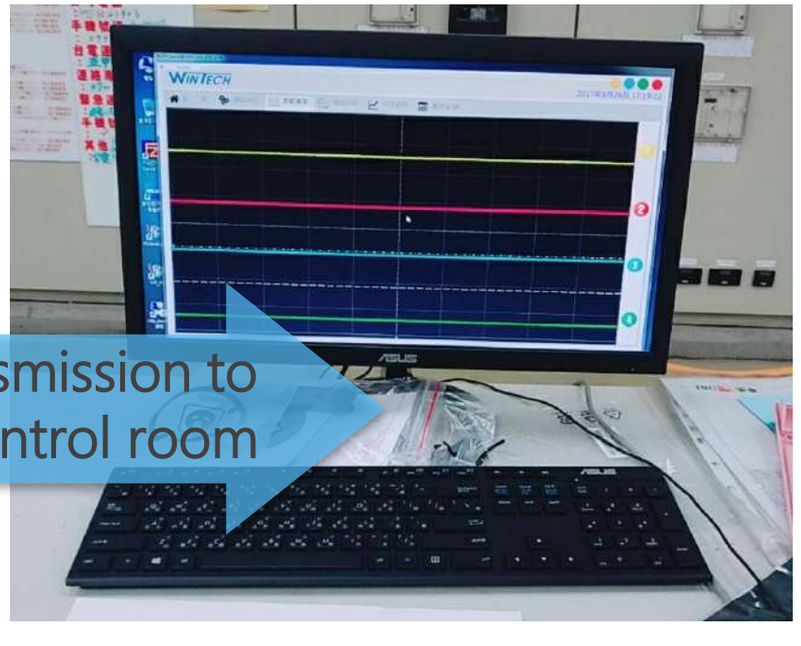
Wintech Power 24 Hours On-line Monitoring







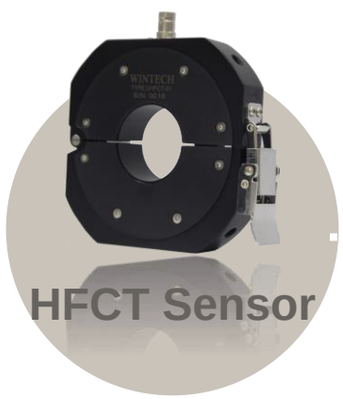




24 hours PD Monitoring Project (4) in NTU Hospital, Taipei

Application: 22.8kV VCB Switchgear

Wintech Detector 24 Hours On-line Monitoring



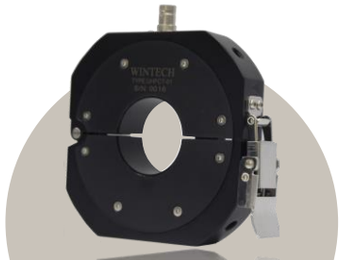
24 hours PD Monitoring Project (5) in Kang Chiao Intl School (Linkou)

Application: 22.8kV VCB Switchgear

Wintech Detector 24 hours On-line Monitoring

PD Detector x 7

UHF-BB Sensor x 7

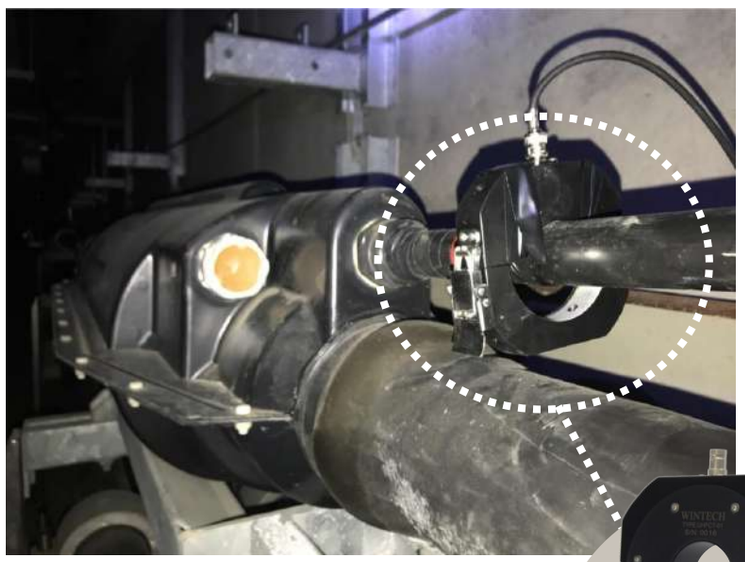


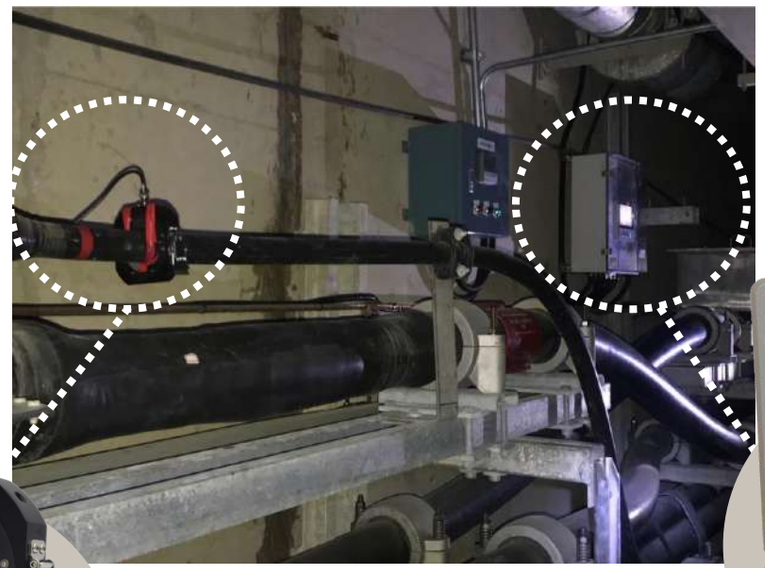
HFCT Sensor x 7

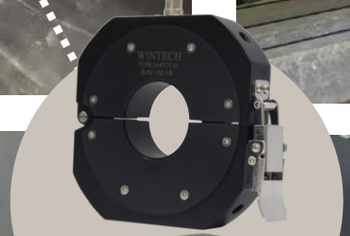
24 hours PD Monitoring Project (6) in Southern Taiwan Science Park (STSP), Tainan

Application: 345 kV Power Cable

Wintech Detector 24 hours On-line Monitoring

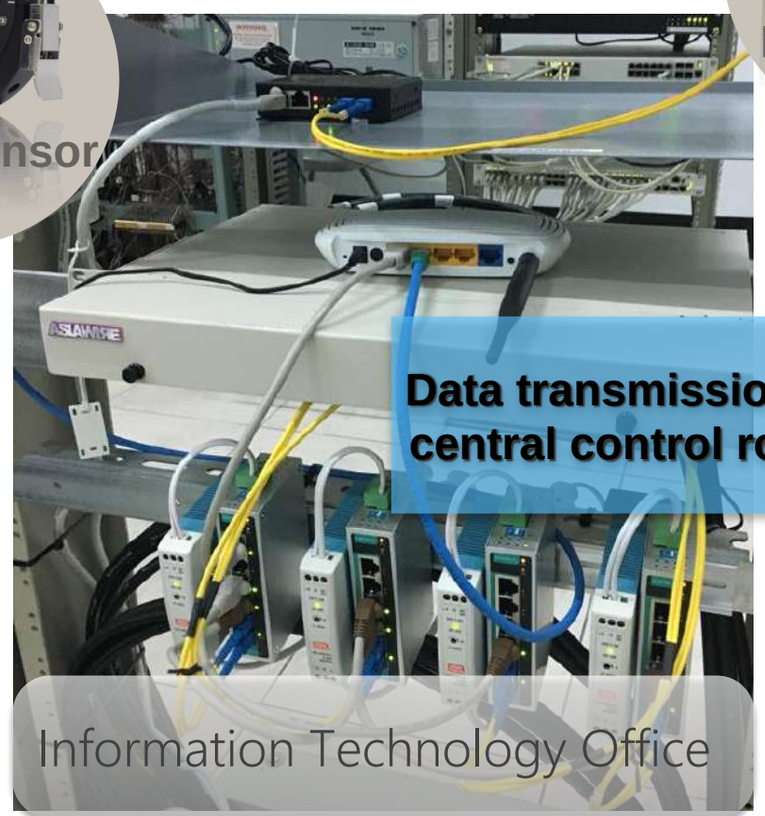






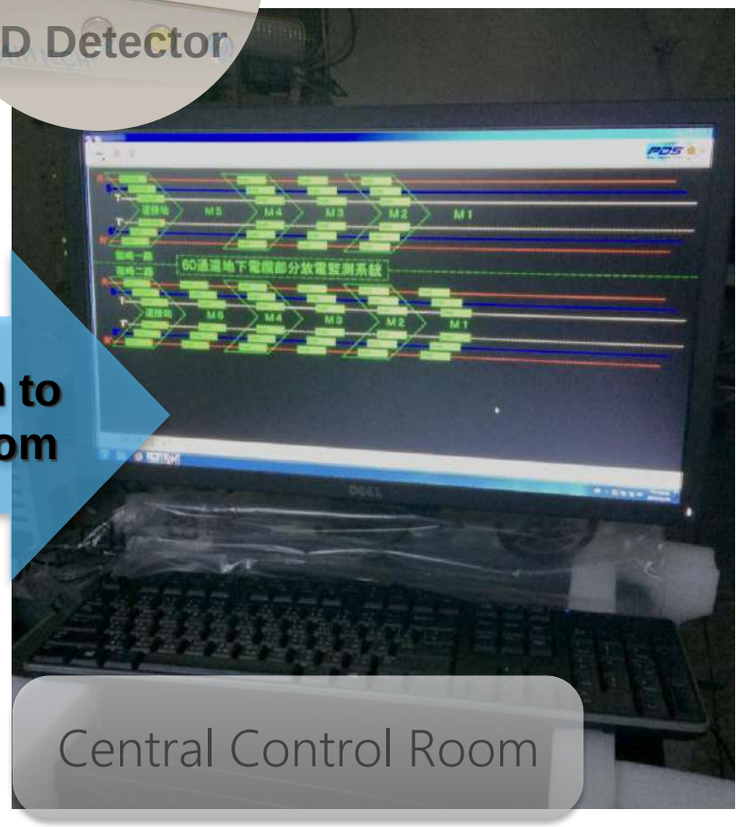
HFCT Sensor

PD Detector



Information Technology Office

Data transmission to central control room

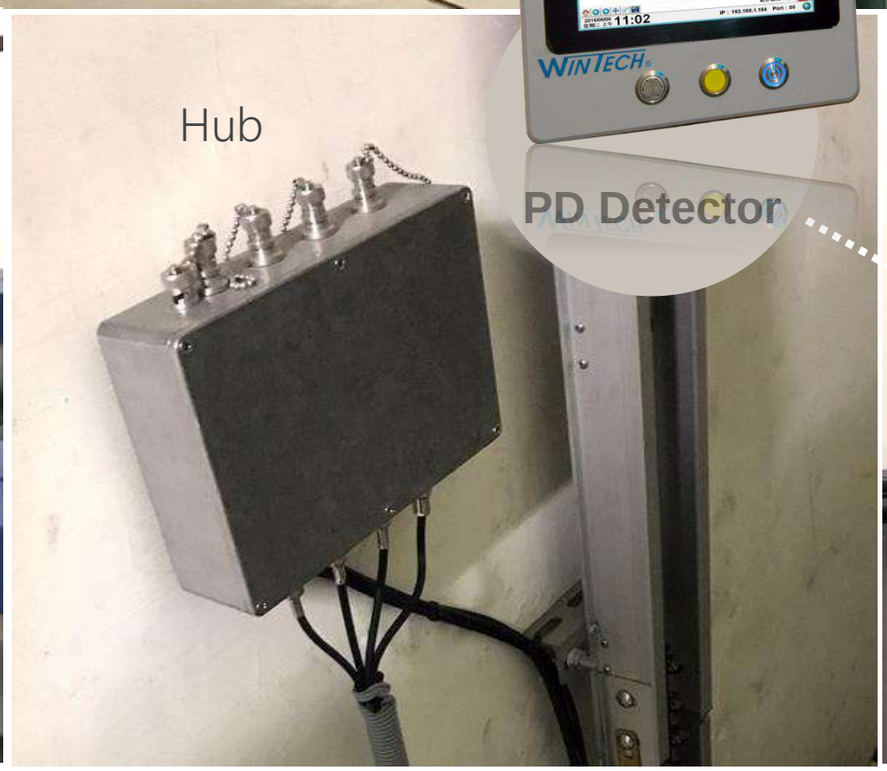


Central Control Room

24 hours PD Monitoring Project (7) in Kaohsiung Light Rail

Application: 22.8 kV Cast-Resin Transformer

Wintech Detector 24 hours On-line Monitoring



24 hours PD Monitoring Project (8) in Central Weather Bureau, Taipei

Application: 22.8 kV Cast-Resin Transformer
Wintech Detector 24 hours On-line Monitoring

24 hours PD Monitoring Project (9) in National Communication Commission, Taipei

Application: 22.8 kV Cast-Resin Transformer

Wintech Detector 24 hours On-line Monitoring

24 hours PD Monitoring Projects Lists

Object	Application
Magong Airport	24 hours on-line monitoring for 22.8kV switchgear
Taiwan Power Research Institute(Southern Taiwan Science Park)	24 hours on-line monitoring for 345kV (and above) power cable located in underground passage
NTU Hospital	24 hours on-line monitoring for 22.8kV switchgear
Kaohsiung Sewage treatment plant	24 hours on-line monitoring for 69kV oil immersed transformer & switchgear
UPCC (Logistics)	24 hours on-line monitoring for 22.8kV switchgear
Kang Chiao Intl school (Linkou)	24 hours on-line monitoring for 22.8kV HV substation
Kaohsiung Light Rail	24 hours on-line monitoring for 22.8kV cast-resin transformer
Central Weather Bureau	24 hours on-line monitoring for 11.4kV-22.8kV oil immersed transformer & 22.8 kV cast-resin transformer
National Communication Commission	24 hours on-line monitoring for 22.8kV cast-resin transformer
Tainan Water Resources Substation	24 hours on-line monitoring for 22.8kV VCB&GCV
Nan Ya Plastic Substation	24 hours on-line monitoring for 33.5KV&22.8KV VCB&GCV
The Third nuclear power plant	24 hours on-line monitoring for 13.8KV & 4.16KV NPBD
National Center for High-Performance Computing	24 hours on-line monitoring for 22.8kV cast-resin transformer
Hefei Changxin Wafer Factory (China)	24 hours on-line monitoring for 22.8kV cast-resin transformer & VCB
Hangzhou International Airport (China)	24 hours on-line monitoring for 220kV power cable located in underground passage
Pilot Project in TNB (Malaysia)	24 hours on-line monitoring for C-GIS

WinTech PD Products-Own Advantages

- ❖ Multiple physical quantities monitoring techniques (cross-comparison): WinTech develops various sensors to detect multiple physical quantities. Our advanced techniques are officially recognized and awarded by Ministry of Economic Affairs, R.O.C., in 2017 Taipei International Invention Show and Technomart.
- ❖ All PD products are "Own-developed (Made in Taiwan)": WinTech gathered domestic and foreign experts from domestic and foreign who have related experiences over 10 years, collaborated famous universities worldwide, and developed a series of precise sensors which are non-invasive for various electrical equipment individually.
- ❖ Built-in active PD signal receiver in UHF Sensor: increasing the accuracy for detection in the early period of deterioration.
- ❖ First patent possession and publication on "Antenna Array" in the world for locating the PD activities.
- ❖ WinTech detector and WinTech power are the highest level measurement systems developed by our team, including physical facilities and software, to detect PD activities with connecting to sensors.
- ❖ Human centered design, and multiple-language support.
- ❖ Sensors can be customized and mass production, frequency ranging from 20K-3000MHz.
- ❖ Acceptable by TCP/IP internet communication regulations, and realized by the concepts of "Internet of Things", and "Smart Grid".