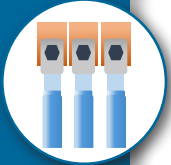
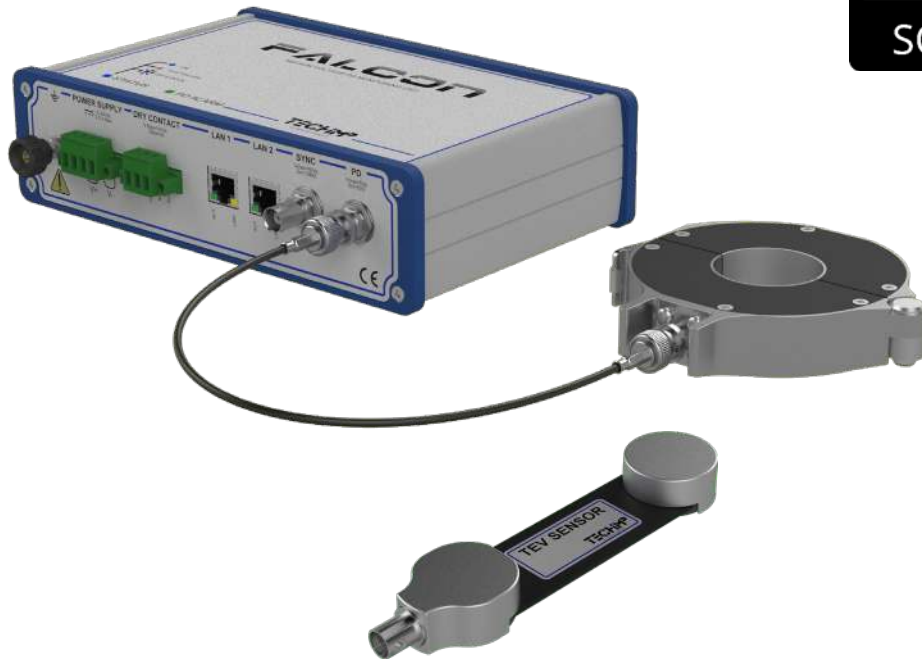


# FALCON

PLUG & PLAY Monitoring

TECHMP

Partial Discharge monitoring unit for medium voltage switchgears, cables, transformers and motors



- ✓ Partial discharge monitoring
- ✓ Easy to install: PLUG & PLAY
- ✓ Cost-effective solution
- ✓ Non-intrusive
- ✓ No need of specific skills
- ✓ Automatic clustering
- ✓ Automatic configuration
- ✓ Automatic Alarms



# FALCON

## PLUG & PLAY Monitoring

FALCON represents a cost-effective solution for the continuous monitoring of partial discharges in Medium Voltage assets such as, **MV Switchgears, MV Cables, MV Transformers and MV Motors.**

FALCON can identify the deterioration of insulation and the possible degradation of the health of the electrical system, before a failure.

The FALCON unit acquires and processes high frequency partial discharge signals, locally detected by the sensors to which it is connected, whether inductive (HFCT) or capacitive (TEV).

### EASY TO INSTALL

A FALCON KIT comes with a sensor, a synchronization kit and the web application.

FALCON is a plug & play device, that can be installed with only a few simple operations. It configures itself automatically and, once powered, it is immediately operational.

Another important advantage of FALCON is its capability to be easily integrated into an existing monitoring system. FALCON supports the IEC 61850 protocol.

The FALCON Unit is equipped with two magnets which allow the unit to be installed directly on the panel of the switchgear or with a DIN rail, for a different type of installation.

### SET UP

Below we have two examples of sensors installation. In the first case we have a 3-phase MT cable, the HFCT sensor can be positioned around the three screens or the common one.

A valid alternative is the TEV Antenna sensor, placed on the metallic enclosure of the panel by means of magnets.

Being a single-channel device, the main purpose of FALCON is to identify the existence of insulation defects. The exact localization of the defect requires further analysis.

### AUTOMATIC CONFIGURATION

The amplitude of the signals to be measured could be different at each acquisition.

FALCON is equipped with an automatic full scale and trigger level adjustment system, which always guarantees the best accuracy.



### MEASURE

Automatic detection of partial discharges through sensors located on the cable termination or switchgear enclosure



### STORAGE

Historical archive of measures up to two years



### ANALYSIS

Automatic recognition of critical issues as they evolve



### ALARMS

Maintenance activities only as necessary, and before a failure

### TWO EXAMPLES OF SENSOR INSTALLATION ON MEDIUM VOLTAGE SWITCHGEAR

HFCT Sensor



MV cable incoming into the switchgear (3-conductor cable)

MV cable terminations inside Switchgear connection compartment



TEV Antenna

placed on the metallic enclosure of the panel



## AUTOMATIC ALARMS

There are different ways to visualize incoming alarms:

- From a **LED** on the unit, that is green if FALCON doesn't detect any activity, and red if a harmful activity is detected
- From **DRY CONTACTS** that could be connected to any local SCADA System
- From FALCON's **WEB APPLICATION**, easily available through any web browser, laptop, or smartphone, that shows:
  - the state of the asset with traffic light logic
  - the list of alarms due to partial discharge activity
  - the list of system notifications (communication issues and malfunctions)
  - the display of trends and important statistical parameters (Qmax, repetition rate, alarms ...)
- From **IEC 61850** or **OPC UA**

Based on the defect evolution, the FALCON offers an algorithm able to determine if an asset has critical levels of PD. In case the identified PD represents a danger, FALCON sends an alarm to the operator to inform that a critical issue is found.

The alarms are given with 5 levels of severity:

**GOOD:** situation of stability.

**MODERATE:** birth of a phenomenon showing a very slow evolution. In this case it is advisable to schedule a further diagnostic intervention a few months later.

**SLIGHTLY DETERIORATED:** the phenomenon identified is growing.

**DETERIORATED:** it is advisable to schedule a further diagnostic intervention.

**CRITICAL:** the intervention must be scheduled as soon as possible.

All the information acquired is stored in FALCON memory and it is available via web application, PC, or smartphone.

When an evolving defect occurs, the web application immediately reports the condition of the asset and the criticality level of the defect. The interface is easy to read and doesn't require any specific skills. It is therefore not necessary to be a partial discharge expert to use the FALCON system.



MV CABLE with defect

## WEB APPLICATION

The WEB APPLICATION shows:

- Status of the monitoring system
- Alarm list relevant to partial discharge activity
- List of system notifications (communication issues and malfunctions)
- Visualization of trending of the most important statistical parameters (Qmax, Repetition rate, Alarms, ...)



WEB APPLICATION

## NETWORK INTEGRATION

The need to monitor many assets brings with it the need to manage a multitude of data. In the case of integrating the FALCON monitoring system with an existing infrastructure, the communication can take place via various protocols, such as IEC 61850, or the OPC UA, which allows the concentration of information from multiple units in one window.

If requested, ALTANOVA can provide TiSCADA software, which provides access to the information of each FALCON connected to the infrastructure that is being managed.



TECHNICAL SPECIFICATION		
Partial Discharge	PD channel quantity	1
	Bandwidth	16 kHz, 30 MHz
	Sampling frequency at full bandwidth	125 MS/s
	Resolution	12 bit
	Sensitivity	1,10000 mV <sub>peak</sub>
	Full Scale	5 V <sub>peak</sub>
	Input impedance	50 Ω
	Pre-trigger	0,100% @ 100 μs
	Connector type	BNC
Synchronization input	Channel quantity	1
	Frequency range	5-500Hz
	Input impedance	10 MΩ
	Sampling frequency at full bandwidth	1MS/s
	Resolution	12 bit
Communication system	Ethernet connector type	10/100/1000 Mb/s
		2 LAN ports
Communication protocol	OPCUA - IEC 62541	
	IEC 61850	
	Modbus	
	DNP3	
Power supply	12 / 24 V <sub>DC</sub> , 1A	
Working temperature	-20°C ÷ +55°C	

APPLIED STANDARD	
Standard	Description
93/68/EEC	CE Marking Directive
2014/30/EC	IEC 61326 (EMC) Electro Magnetic Compatibility
2014/35/EC	IEC 61010 (LVD) Low Voltage Directive
IEC 60068-2-6	Environmental testing - Test Fc: Vibration (sinusoidal)
IEC 60270 IEC 60034-27 IEEE 1434-2014	High-voltage test techniques - Partial discharge measurements Deviation: Magnitude of the apparent charge is measured in mV



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