

MV Network Management

Sentinel[®] - Fault detection and localization Solution and equipment for overhead lines and underground MV network



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Sentinel®

FAST SERVICE RECOVERY FURTHER TO AN INCIDENT ON THE MV NETWORK IS A KEY FACTOR IN THE QUALITY OF SUPPLY.

In order to achieve satisfactory standards, increasing the quickness and accuracy of defect localization forms one of the distribution network automation policy's objectives.

- The use of reliable and low-cost network faults detectors is one of the main means used in order to ensure the success of this policy.



ACCORDINGLY, THE **Sentinel®** RANGE ALLOWS LOCALIZING THE FAULT ARISEN ON THE MW NETWORK (OVERHEAD LINES OR UNDERGROUND), THAT THEY ARE SINGLE PHASE GROUNDING, MULTI-PHASE, TRANSIENT OR PERMANENT.

It allows identifying quickly the failing section of network, by supplying :

- **A blinking light for the permanent fault,**
- **A counting of all events (transient or permanent)**



Our offer includes fault detectors for overhead lines or underground networks, adapted to all the earthing mode of the MV neutral :

Sentinel®-A : detector by maximum current for the networks where the current of defect will always be over the value of capacitive current of the watched feeder.

- **Network with impedance earthing**
- **Network with directly earthing**

Sentinel®-D : directional detectors for the networks where the current of defect is potentially lower to capacitive current of the watched feeder.

- **Network with arc suppressing coil (Petersen coil)**



Functionning



Detection by maximum current

The fault is detected when it overtakes an adjustable threshold (residual current, phase current) during a fixed duration. The detector indicates that the fault is located downstream on the network.

Directional Detection

The detection is based on the analysis

of the transient residual current and tension during the appearance of fault single phase grounding.

The detector indicates in which geographical direction (downstream, upstream) the defect is located on the network.

A fault detector will flash if the capacitive current downstream to this detector is significant compared with the total capacitive current of the network.



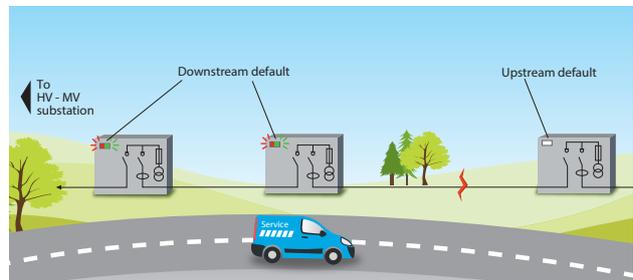
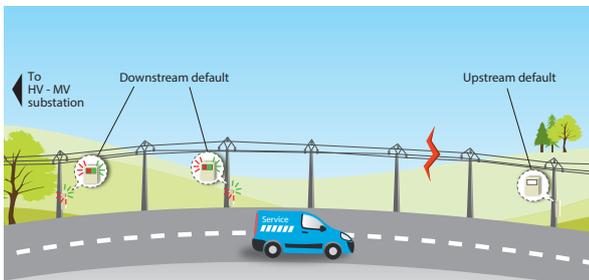
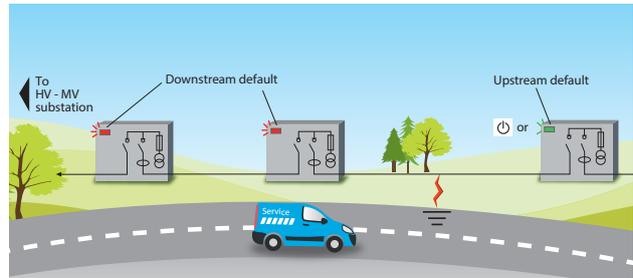
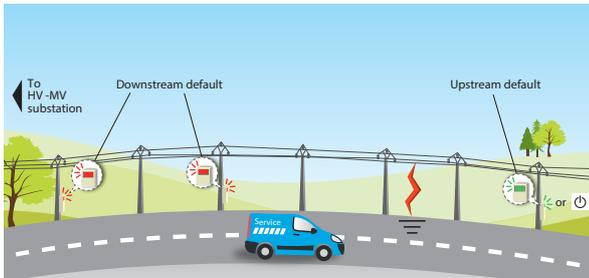
Sentinel® for overhead lines :

The detection is based on the analysis of the electric and electromagnetic fields.

For that purpose, the fault detector Sentinel® is constituted :

- Of an electric field sensor, supplying the information of the residual tension,
- Of a sensor of horizontal electromagnetic field for single-phase grounding,
- Of a sensor of vertical electromagnetic field for the multi-phase defects.

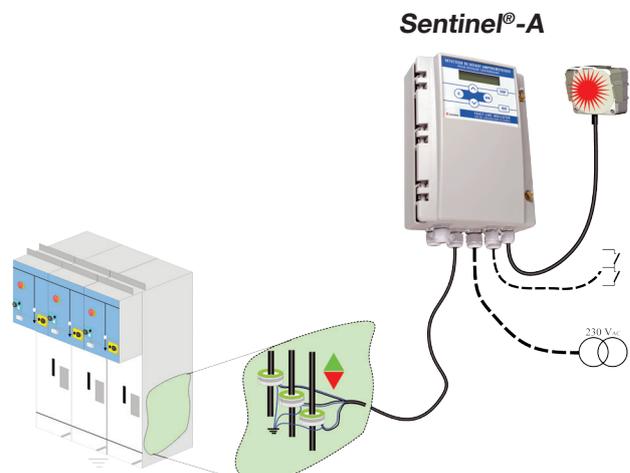
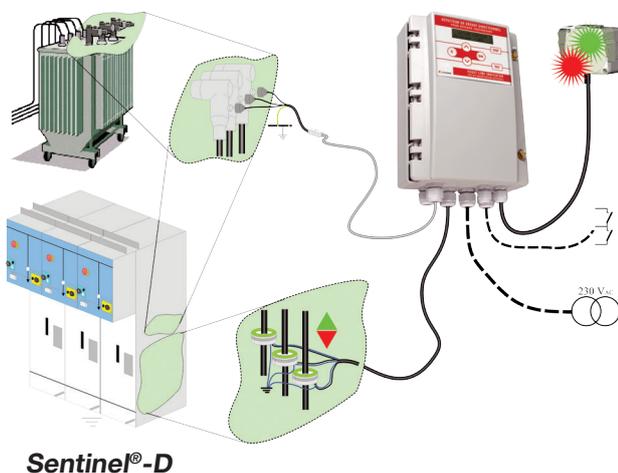
Flashing information



Installation



Sentinel® for overhead lines



Sentinel® for underground network



Main Characteristics

Sentinel®-D Directional fault detector

Sentinel®-A Maximum current fault detector



Type of network	MV (until 36 kV)			
	Underground	Overhead	Underground	Overhead
Earthing mode of the MT neutral	Network with Arc Suppressing Coil (Petersen oil)		Network with directly earthing Network with directly earthing	
Fault detection				
Single phase to earth	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Multi-phase	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Double-fault to earth	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Signalization	- LED indicator is located on remote wall mounted on the station - Auxiliary contacts	- Built-in LED Indicator - Auxiliary contacts	- LED indicator is located on remote wall mounted on the station - Auxiliary contacts	- Built-in LED Indicator - Auxiliary contacts
Measure sensors	- 3 opening current sensors - By capacitive voltage divider or voltage transformer	- Sensors of magnetic field included - Sensors of electrical field included	- 3 opening current sensors	- Sensors of magnetic field included - Sensors of electrical field included
Supply solutions	- 230 VAC saved by battery (10 years battery life with 250 hours of blinking indication) - 230 VAC saved by accumulator (life duration of over 15 years) - By lithium battery (10 years battery life with 250 hours of blinking indication)	- Solar panels energy saved by accumulator (life duration of over 15 years for panels, 5 years for sealed lead battery) - By lithium battery (10 years battery life with 500 hours of blinking indication) - By external 12 Vcc power supply	- 230 VAC saved by battery (10 years battery life with 250 hours of blinking indication) - 230 VAC saved by accumulator (life duration of over 15 years) - By lithium battery (10 years battery life with 500 hours of blinking indication)	- Solar panels energy saved by accumulator (life duration of over 15 years for panels, 5 years for sealed lead battery) - By lithium battery (10 years battery life with 250 hours of blinking indication) - By external 12 Vcc power supply
Norms / Specifications	ERDF - HN 45-S-51	ERDF - HN 45-S-52	ERDF - HN 45-S-50	
Electromagnetic compatibility :	IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, IEC 61000-4-12, IEC 61000-4-13, IEC 61000-4-16, IEC 61000-4-18, IEC 61000-6-5, IEC 61131-2			
Environmental :	IEC 61000-2-6, IEC 61000-2-11, IEC 61000-2-14, IEC 61000-2-30, IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-3			
Safety requirements :	IEC 60255-5			

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