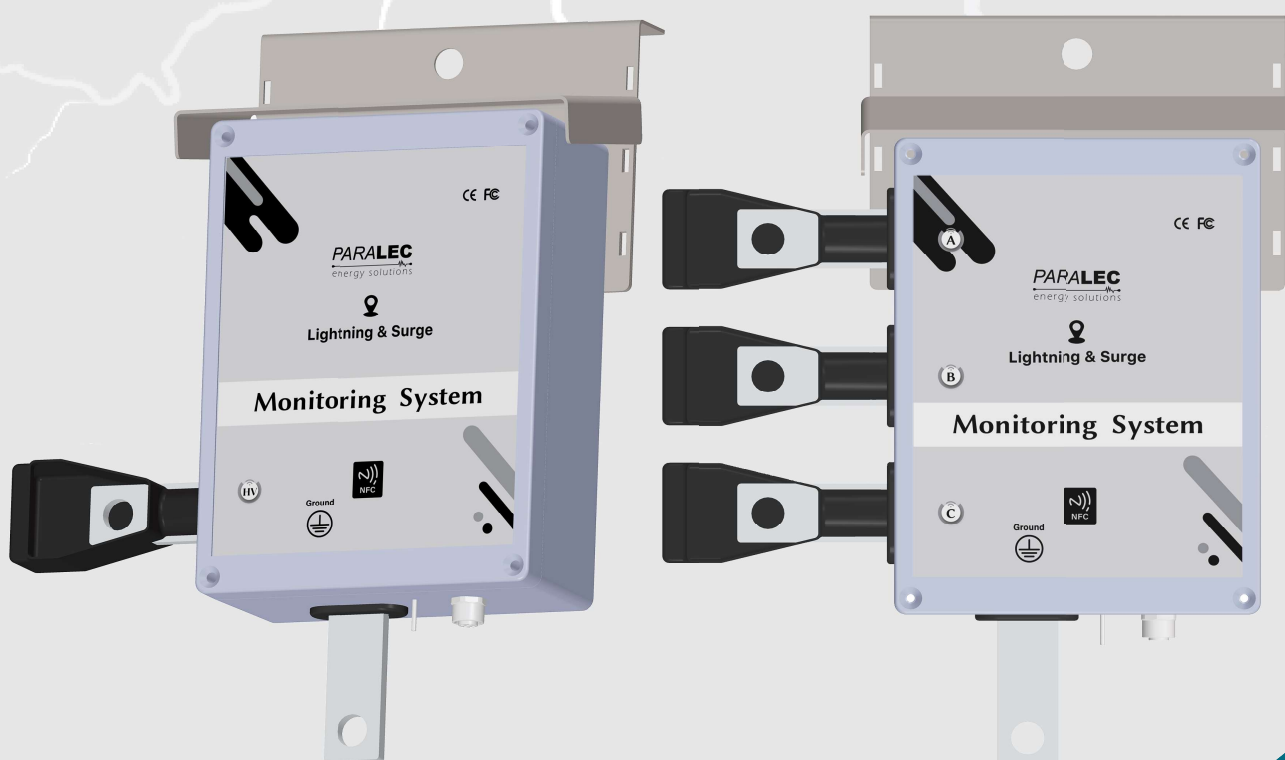


# Surge & Lightning Monitoring Device

For Metal Oxide Surge Arresters from 6 to 800 kV AC



## Monitoring of surge arrester, EGLA, MOA, MOR, SPD, TLA.

- LoRa and NFC wireless solution. Wired via RS485, Digital output.
- Solar supply & external supply versions.
- Unique condition monitoring : resistive leakage current & total discharged energy monitoring system, lightning, surge events and discharges records.
- Durable device: stainless steel, polycarbonate UV resistant, aluminum. Outdoor device : IP65.
- Up to 3 phases / surge arresters on the same device.
- Monitoring software
- GPS localisation and timestamp



## See lightning & surges, clearly

Streamer Electric has dedicated its research activities to lightning and surges qualification. This new range of products aims at helping our customer to understand the origin of surges, their parameters and impact on equipment.

It involves diagnostic of metal oxide based surge arresters (MOR, TLA, MOA) in service, record peak currents, historical data, number of events, cumulative charges discharged by equipment.

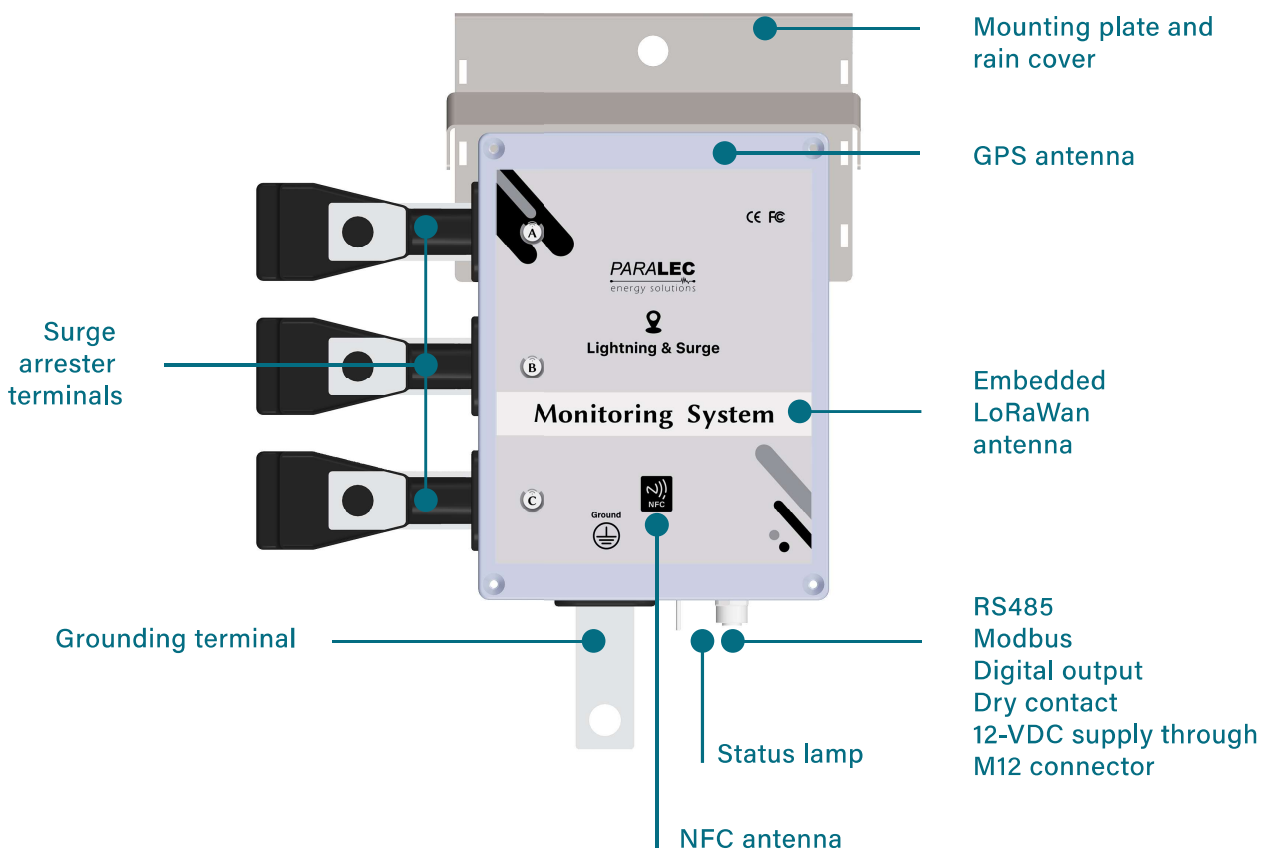
It allows ageing and problems qualification to reach higher accuracy in order to optimize reliability and expenditure.

With a communication range of 2.5km LoRaWan standards allows the user have a safe and remote connection.

SM Series Surge Monitoring can be installed easily on ground conductors.

Thanks to its IP65, housing, rugged materials and self power, the SM Series suitable for outdoors.

Power supply is ensured through supercap cell and solar panels. Optional DC power supply can also be arranged.



REFERENCE	SMC
<b>EARTHING CONNECTION</b>	
CONDUCTOR DIAMETER RANGE	5 to 25   35 to 300 mm <sup>2</sup>
INSTALLATION ON THE CONDUCTOR	Terminals, 13.5 mm hole in series
<b>SURGE EVENT COUNTER</b>	
MINIMUM DISCHARGE PEAK CURRENT DETECTED - 8/20 us waveform - IEC 62561-6	200 A*
MAXIMUM DISCHARGE PEAK CURRENT DETECTED - 10/350 us waveform - IEC 62561-6	100 kA
WAVEFORM REGISTRATION RESPONSE TIME	1.3 μs
MINIMUM TIME BETWEEN 2 STROKE FOR REGISTRATION, RESPONSE TIME	10 μs
LONG DURATION CURRENT WITHSTAND CAPABILITY	2500 A for 4 ms
HIGH CURRENT WITHSTAND CAPABILITY	100 kA
IMPULSE CURRENT PEAK MEASUREMENT	YES
IMPULSE DURATION	YES
IMPULSE POLARITY	YES
<b>MEASUREMENT</b>	
MINIMUM DISCHARGE PEAK CURRENT MEASURED - 8/20 us waveform - IEC 62561-6	200 A*
MAXIMUM DISCHARGE PEAK CURRENT MEASURED - 10/350 us waveform - IEC 62561-6	40 kA*
PEAK LIGHTNING CURRENT ACCURACY 8/20us	10%
FOLLOW CURRENT / GROUND FAULT RANGE	70 to 10 000 A*
FOLLOW CURRENT / GROUND FAULT (50/60Hz) ACCURACY	10%
TOTAL LEFT THROUGH I <sup>2</sup> t	YES
CHARGE RANGE	0 to 65C
<b>LEAKAGE MEASUREMENTS</b>	
TOTAL LEAKAGE CURRENT	50 μA to 50 mA
ACCURACY (at Tamb ≤ 40 °C)	± 10%
SURFACE POLLUTION & HUMIDITY INGRESS DETECTION (UNDER EVALUATION)	YES
THIRD HARMONIC LEAKAGE CURRENT	50 - 5000 μA
ACCURACY (at Tamb ≤ 40 °C)	± 15%
RESISTIVE LEAKAGE CURRENT	50 - 5000 μA
ACCURACY (at Tamb ≤ 40 °C)	± 15%

\*other ranges on request

## ENVIRONMENTAL CONSTRAINTS

TEMPERATURE - °C	Class C2: -40 to +70
PROTECTION CLASS	IP65, NEMA 4X
TEMPERATURE CHANGE RATE - °C/min	Class C2: 1,0
RELATIVE HUMIDITY - %	Class C2: 10 to 100
MAX ABSOLUTE HUMIDITY - g/m3	Class C2: 35
MAX ALTITUDE - m	2000
ATMOSPHERIC PRESSURE - kPa	70 to 106
STANDARDS/TEST	IEC 62561-6:2018
TYPE OF SURGE COUNTER as per IEC 62561-6	Type 1 and Type 2; outdoor

## RECORDS

NUMBER OF EVENTS	100 Events, with up to 300 components of 3 phases. Example see below
NUMBER OF LEAKAGES	300 components & waveforms for 3 phases
LOGS (WARNING,COMMUNICATION...)	400 records
1 <sup>st</sup> IMPULSE	100 μs at 1 MSPS   600 records for 3 phases
GPS	Time stamp and location
COUNTERS	I <sup>2</sup> t lightning, lightning charges (C) I <sup>2</sup> t power frequency currents,power frequency charges (C) I <sup>2</sup> t switching, switching charges (C) I <sup>2</sup> t total, total charges (C)
MAXIMUM	Max power frequency current Max switching Max lightning

## LIFE SPAN WARNING / ALARM

% OF LIFE REMAINING	%, ratio total I <sup>2</sup> t / maximum I <sup>2</sup> t
PROSPECTIVE END OF LIFE	Days
ALARM TRIGGER	Overcurrent 50/60Hz > 1 cycle 10 components registered < 10 days Maximum total I <sup>2</sup> t reached

## EVENT COMPONENTS RECORD EXAMPLE

### EVENT COMPONENTS RECORDS LEAKAGE

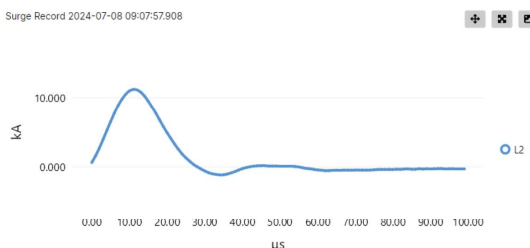
	Unit	Example of value
Date	Date	2021-05-06
Time	Time	14:30:05Z
Tot max mA	mA	0.5
Res max mA	mA	0.05
Cap max mA	mA	0.4
Temp °C	°C	37
I <sup>2</sup> t (A <sup>2</sup> s)	A <sup>2</sup> s	0.0002
Capacitance	pF	120
Tot min mA	mA	0.5
Res min mA	mA	0.05
Cap min mA	mA	0.4

### EVENT COMPONENTS RECORDS LIGHTNING

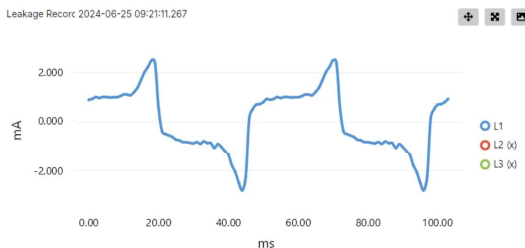
	Unit	Example of value
Date	Date	2021-05-06
Time	Time	14:30:05Z
Peak Current <sup>(1)</sup>	kA	-1
Changes Coulomb <sup>(1)</sup>	C	0.6
Duration <sup>(1)</sup>	μs	30
I <sup>2</sup> t (A <sup>2</sup> s) <sup>(1)</sup>	A <sup>2</sup> s	34

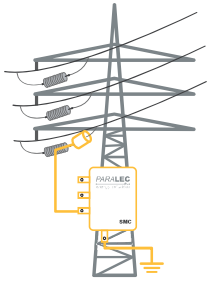
(1) available for 3 phases

Surge Record 2024-07-08 09:07:57,908

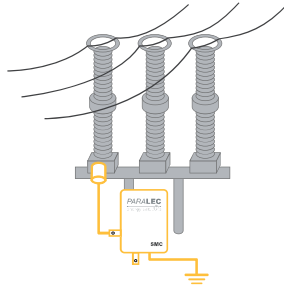


Leakage Record 2024-06-25 09:21:11,267

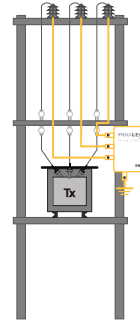




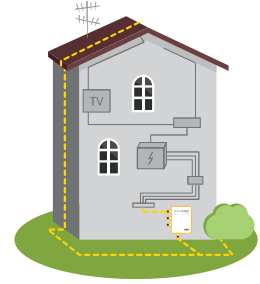
On overhead lines with TLA or ECLA



On substation MOA

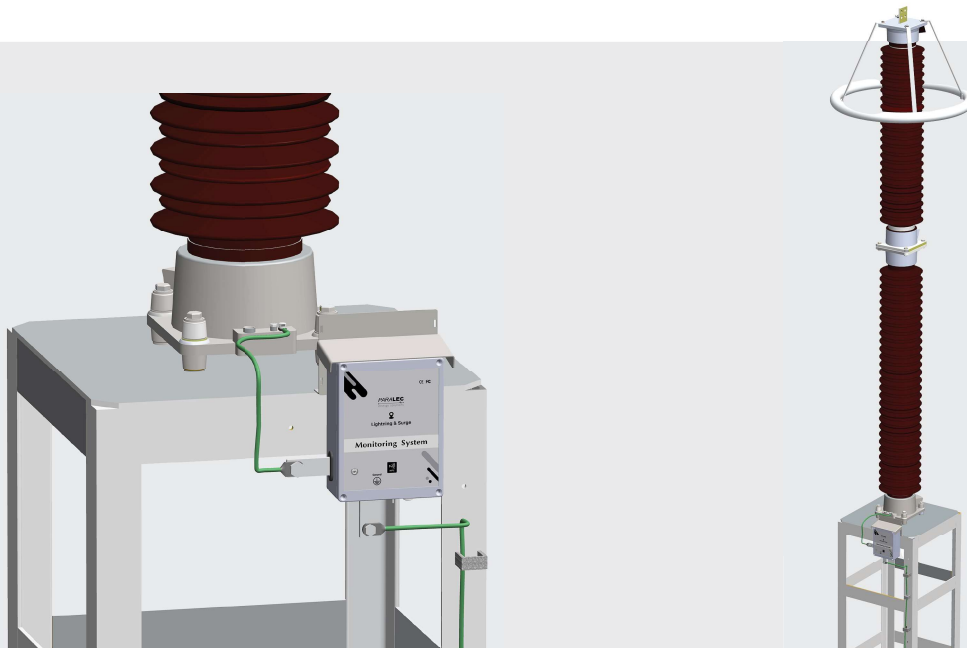


PMT MOA

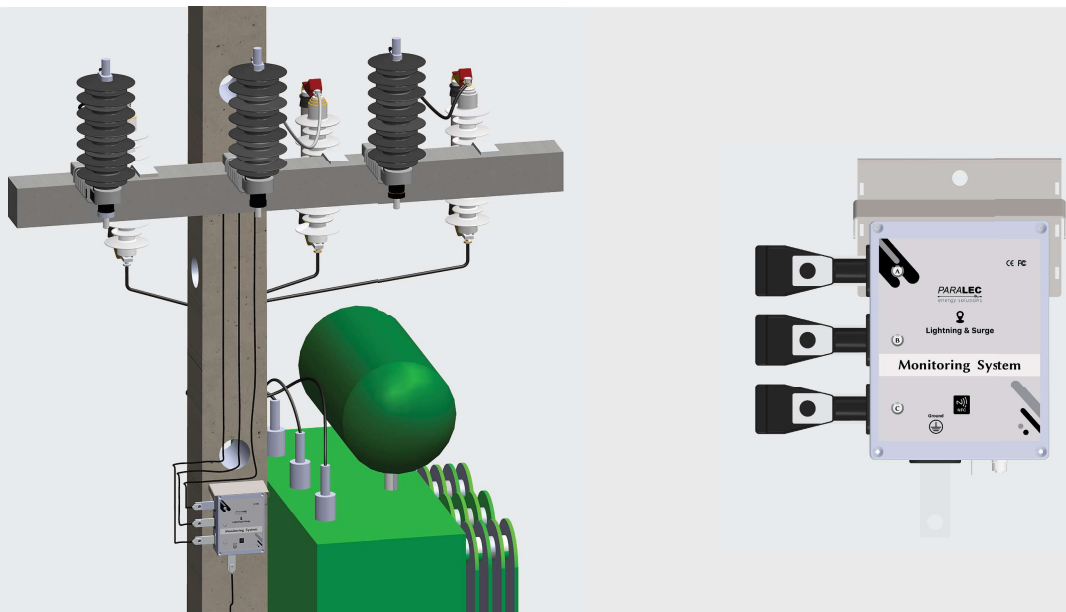


On building SPD

On MOA in Substation

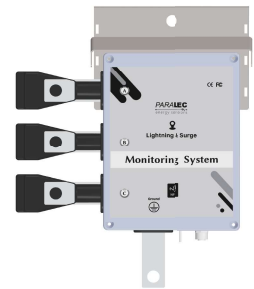
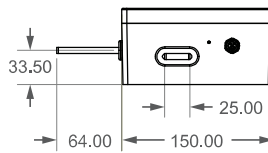
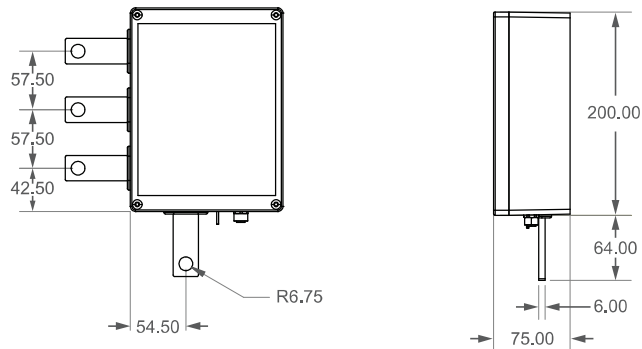
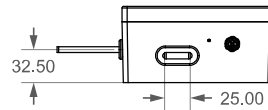
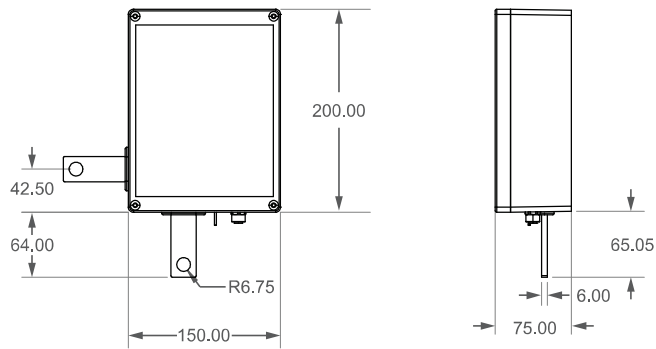


On MOA on PMT

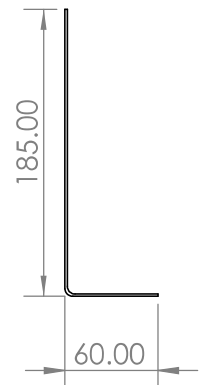
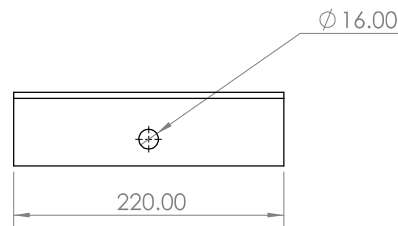
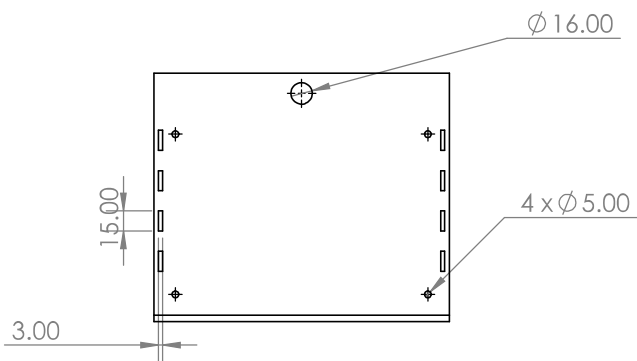


# DIMENSIONS

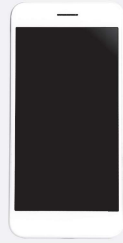
## SM



## Mounting plate (included)



## Short Range



**Wireless  
NFC**  
Contact



**Wired  
Modbus**

Modbus RTU via 2 wires,  
RS485 to master



**Wireless  
cellular(4/5G),  
Wi-Fi**

## Long Range



**Wireless  
LoRaWan**

Up to 3 km line of sight

**LoRaWAN®**  
Gateway



**SCADA / BMS**



**Concentrator**  
*Equipped with HMI, DataBase*

LAN or broadband  
cellular network (4/5G)  
IEC61850, DNP3, MODBUS, REST API



## Concentrator Lora Full I CL2H

*Equipped with HMI, DataBase*

LAN or broadband  
cellular network (4/5G)  
IEC61850, DNP3, MODBUS, REST API  
HMI touch panel 12"  
LoRA gateway  
Database Memory : 256Gb



## Concentrator Lora Light I CL2S

*Mini DataBase*

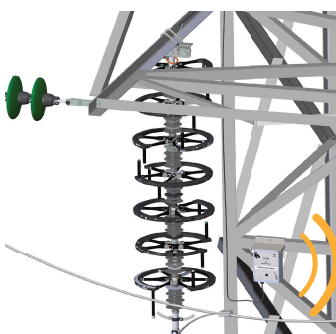
LAN or broadband  
cellular network (4/5G)  
IEC61850, DNP3, MODBUS, REST API  
LoRA gateway  
Database Memory : 64Gb

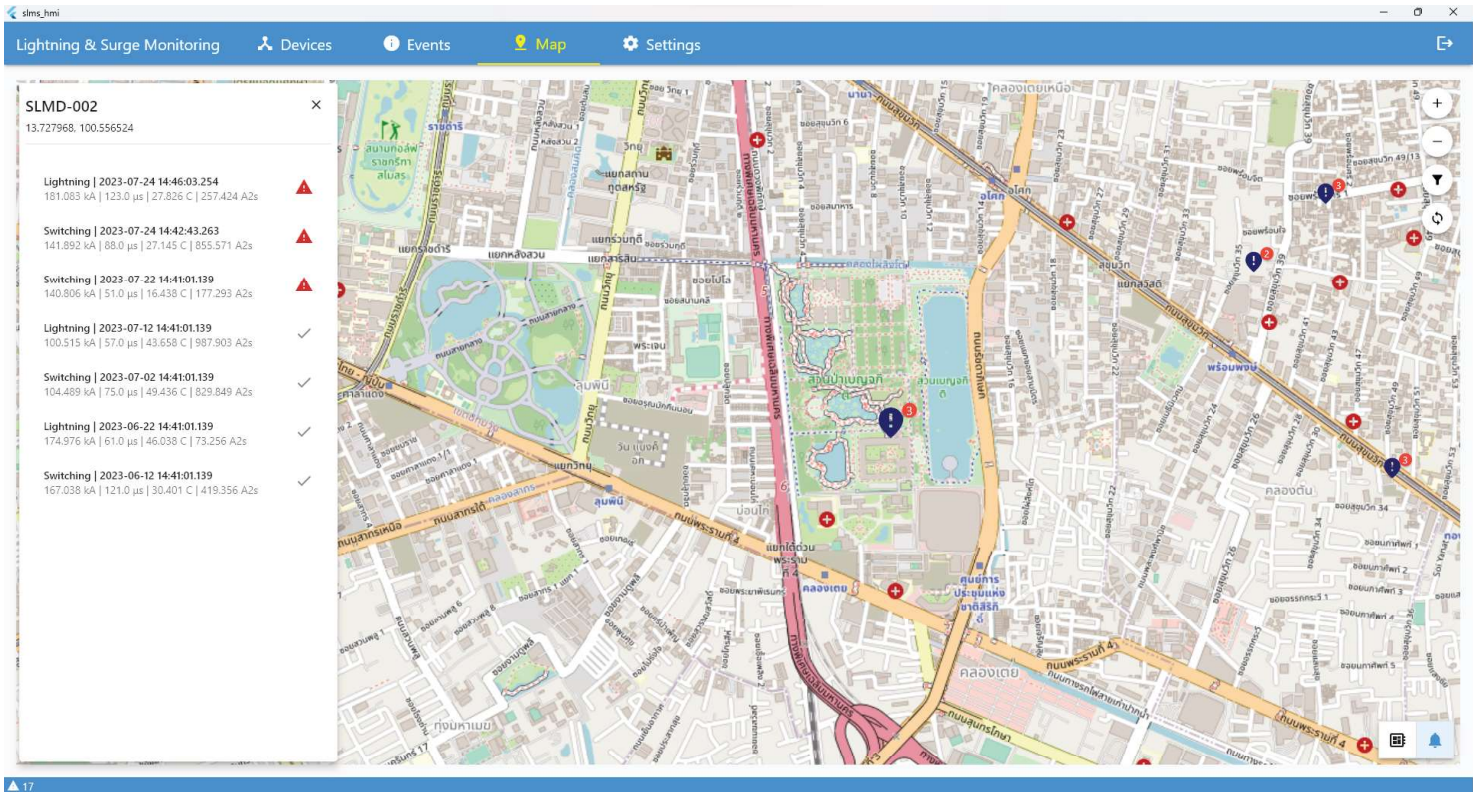
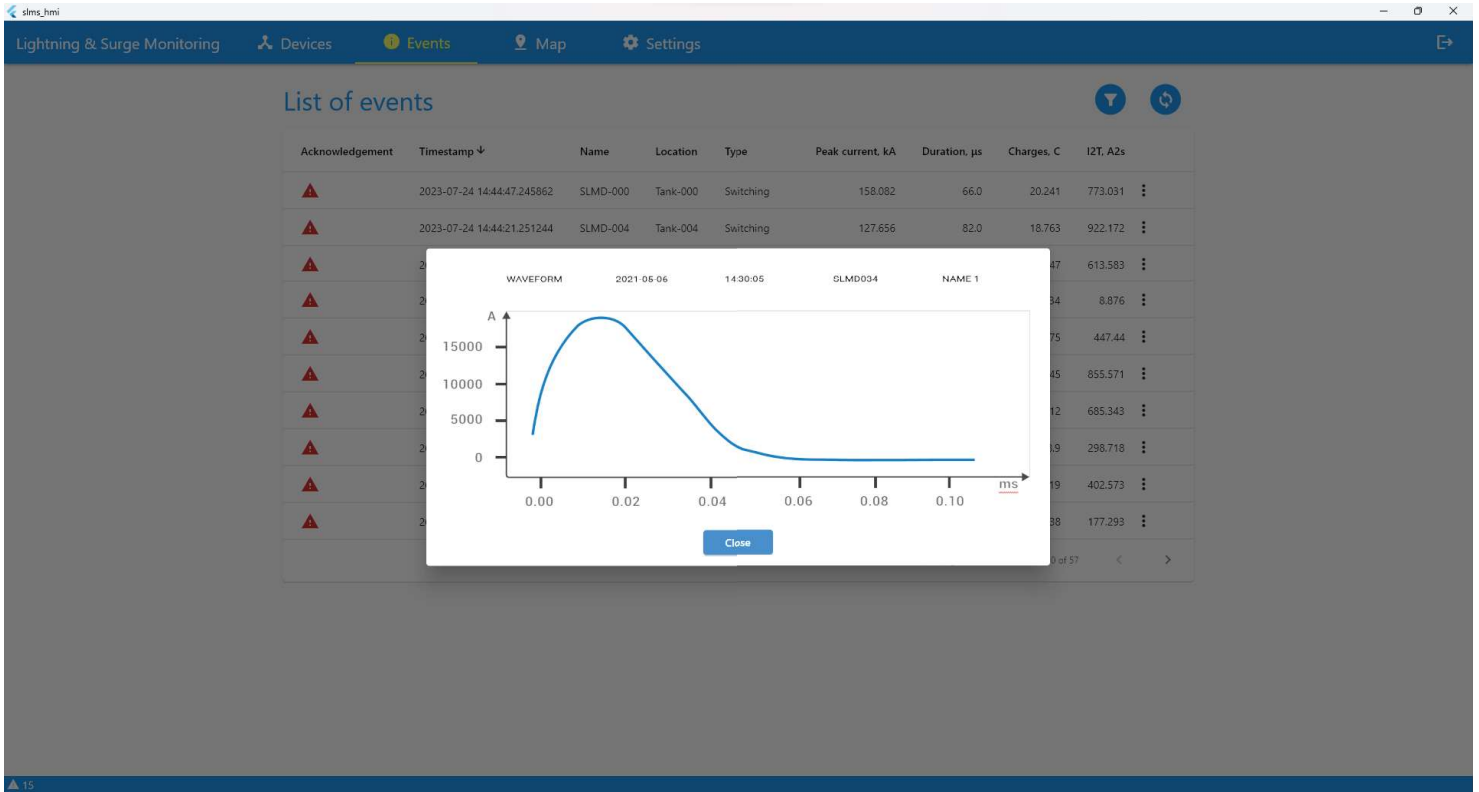


## Concentrator Wifi Light I CL2W

*Mini DataBase*

Data visualisation  
PostGRE Database  
Planar Antenna





← Device

**SMC SN650001-8960\*\*\* SLMD-002**

Counter I2t total

479.751

20% remaining

Max Resistive Leakage

456.449

+10% vs J-30  
+15% vs phase A, B  
20% of max

Max Leakage

900.315

20% remaining

Power Supply

OK

Last Communication

2 s

Number of Events

9

20% remaining

Max lightning

20kA, 30µs

Max Switching

1.2kA, 5ms

Leakage

List of events

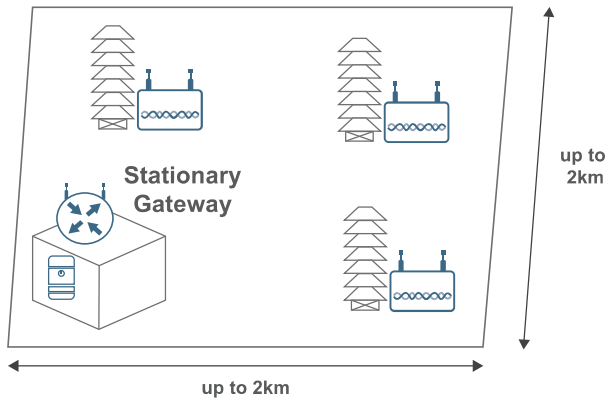
Acknowledgement	Timestamp ↓	Type	Peak current, kA	Duration, µs	Charges, C	I2T, A2s
⚠	2023-07-24 14:52:43.248366	Lightning	116.42	88.0	7.734	951.842
⚠	2023-07-24 14:49:23.249866	Switching	122.244	53.0	20.884	89.121
⚠	2023-07-24 14:46:03.254159	Lightning	181.083	123.0	27.826	257.424
⚠	2023-07-24 14:42:43.263834	Switching	141.892	88.0	27.145	855.571
⚠	2023-07-22 14:41:01.139850	Switching	140.806	51.0	16.438	177.293
✓	2023-07-12 14:41:01.139868	Lightning	100.515	57.0	43.658	987.903
✓	2023-07-02 14:41:01.139872	Switching	104.489	75.0	49.436	829.849
✓	2023-06-22 14:41:01.139879	Lightning	174.976	61.0	46.038	73.256
✓	2023-06-12 14:41:01.139883	Switching	167.038	121.0	30.401	419.356

Rows per page: 10 | 1-10 of 9

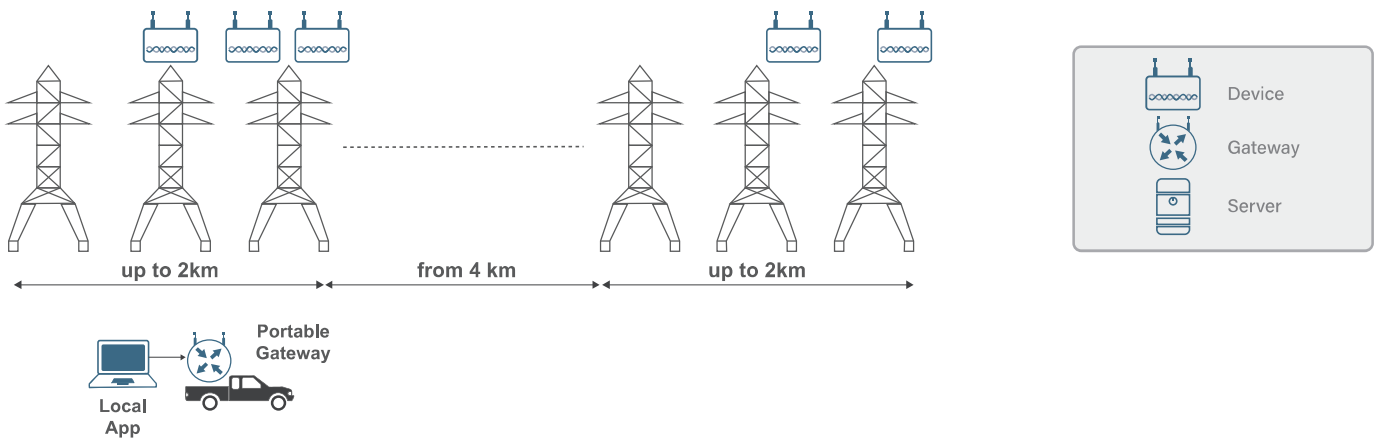
Counters

Counter I2t lightning: 100	Max Total Leakage: 100
Counter I2t switching: 100	Max Resistive Leakage: 100
Counter I2t 50Hz: 100	Max Capacity Leakage: 100
Counter I2t total: 100	Max Power Frequency Current: 100
	Max Lightning: 100
	Max Switching: 100

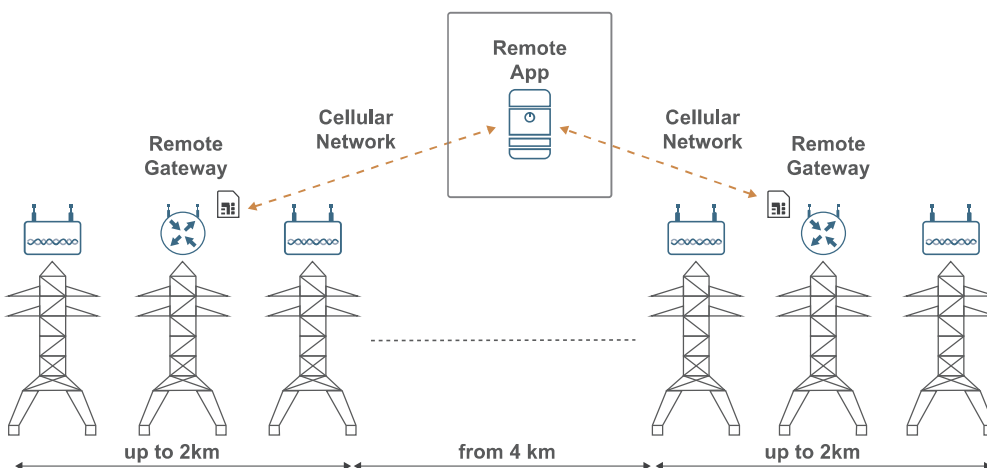
## Substation - LoRaWan local private network



## Transmission Line - LoRaWan temporary communication



## Transmission Line - LoRaWan private network

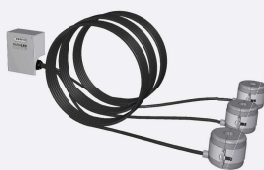


1,2,3	4	5	6	7	8	9	10
104	.....	.....	.....	.....	.....	1	1
SMC	Phases	Spare	Communication	Current range	LoRa frequency band	Brand	Version
4	1 phase 3 phase	5		8			
1				1	EU863-870		
2				2	US902-928		
6	RS485 LoRa Digital Output	7		3	CN470-510		
1		1	200A - 40kA	4	AU915-928		
2		2	100A - 20kA	5	AS920-923		
3		3	300A - 60kA	6	AS923-925		
		4	500A - 100kA	7	KR920-923		
		5	750A - 150kA	8	IN865-867		
	6	1000A - 200kA	9	None			

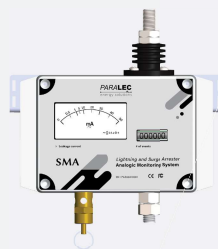
## Communication Devices

10742111	LORA gateway
10762111	Concentrator light LORA
10712121	Concentrator full LORA

### Also Available



**SC250**  
Surge Counter



**SMA**  
Surge Counter and  
leakage current



**SLC**  
Gapped arrester  
monitoring device

**STREAMER ELECTRIC AG, HQ**  
Technopark Graubünden,  
Bahnhofstrasse 11,  
7302 Landquart, Switzerland

+41 81 2500525  
office@streamer-electric.com  
www.streamer-electric.com

**STREAMER INDONESIA**  
Wilson Walton Building,  
Jl. Raya Tanjung Barat 155 Jagakarsa,  
Jakarta, Indonesia

+62 21 7884 0737  
office\_jkt@streamer-electric.com

**STREAMER CHINA**  
11th floor, Building A. Sanlitun SOHO,  
Workers Stadium North Road No.8 Yard.  
Chaoyang District, Beijing, China

+86 8565 1663  
office\_bjs@streamer-electric.com