

Surge & Lightning Monitoring Device

For Gapped Arresters from 6 to 800 kVAC



- **Monitoring of LLPD, EGLA, TLA, CLAH, lightning rods transmission lines, building**
- Wired or wireless communication : RS485 modbus, LoRA, Sigfox, NFC
- Outdoor device : IP65
- Solar supply & external supply versions
- Unique condition monitoring :
total discharged energy monitoring system , Lightning , surge events and discharges record, Lightning waveform
- Durable device:
stainless steel, polycarbonate UV resistant, aluminum.
- Up to 3 phases gapped arresters on the same device.
- Monitoring software
- GPS localisation and timestamp

A unique and innovative device to master surges activities

Paralec has dedicated its research activities to lightning and surges qualification and protection. 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 Gapped arresters (EGLA, CLAH, LLPD) in service, record peak currents, historical data, number of events, cumulative charges discharged by equipment.

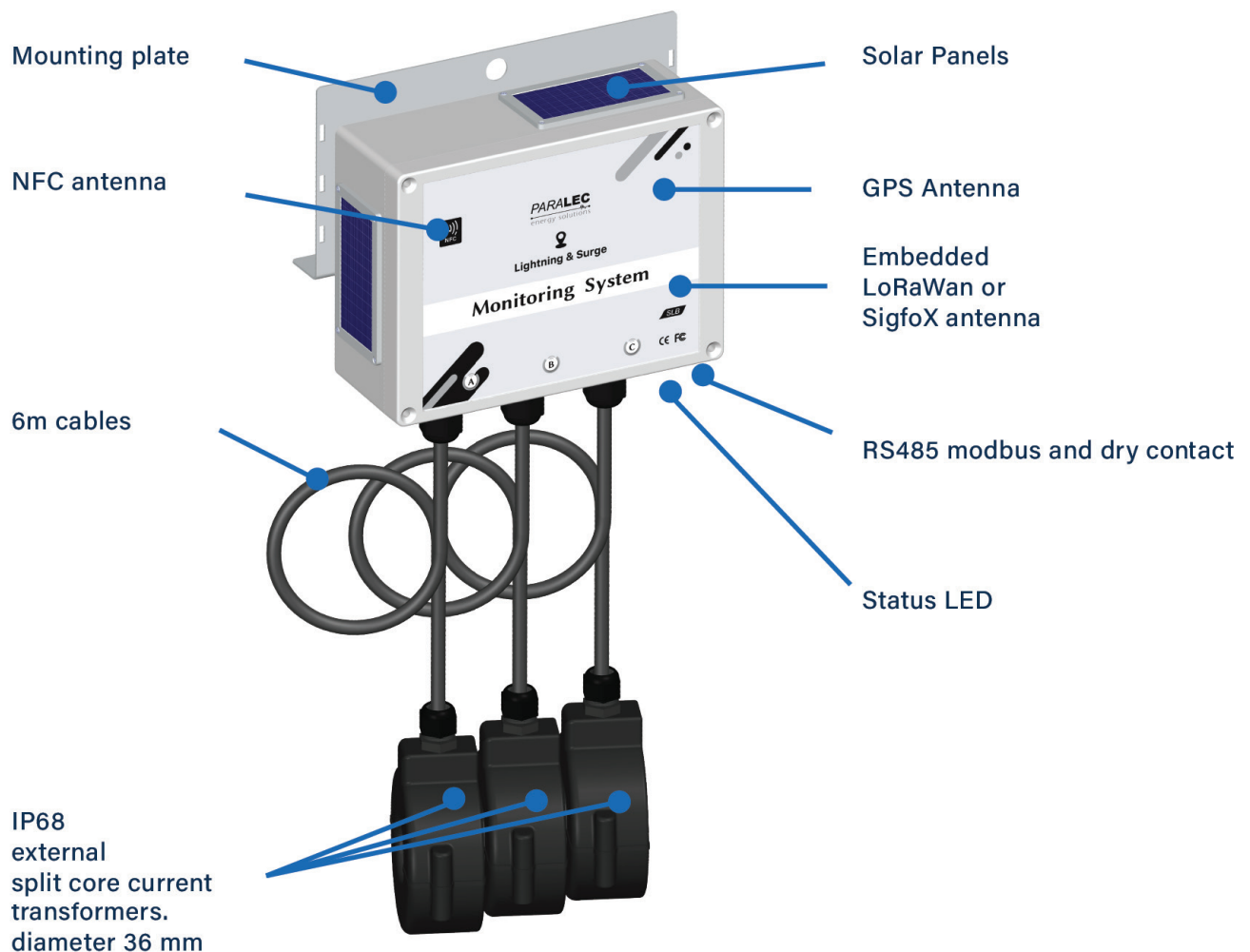
It allows ageing qualification to reach higher accuracy in order to optimize reliability and expenditure.

With a communication range of 5 km on Sigfox or LoRaWan standards allows the user have a safe and remote connection.

SL Surge Monitoring can be installed easily on ground conductors.

Thanks to its IP65, housing, rugged materials and self power, the SL serie is suitable for outdoor installation.

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



TECHNICAL CHARACTERISTICS



PARALEC
energy solutions

REFERENCE	SL
EARTHING CONNECTION | SLA / SLB / SLC	
CONDUCTOR DIAMETER RANGE	5 to 36 | 35 to 400 mm ²
INSTALLATION ON THE CONDUCTOR	Clamped on conductor
LIGHTNING EVENT COUNTER | SLA / SLB / SLC	
MINIMUM DISCHARGE PEAK CURRENT DETECTED - 8/20 μ s waveform - IEC 62561-6	200 A*
MAXIMUM DISCHARGE PEAK CURRENT DETECTED - 10/350 μ s waveform - IEC 62561-6	100 kA
MAXIMUM DISCHARGE PEAK CURRENT MEASURED - 10/350 μ s waveform - IEC 62561-6	40 kA*
RESPONSE TIME	1.3 μ s
MINIMUM TIME BETWEEN 2 STROKE FOR REGISTRATION, RESPONSE TIME	10 μ s
LONG DURATION CURRENT WITHSTAND CAPABILITY	2 500 A for 4 ms
HIGH CURRENT WITHSTAND CAPABILITY	100 kA
IMPULSE CURRENT PEAK MEASUREMENT	YES
MEASUREMENT | SLA / SLB / SLC	
MINIMUM DISCHARGE PEAK CURRENT MEASURED - 8/20 μ s waveform - IEC 62561-6	200 A*
MAXIMUM DISCHARGE PEAK CURRENT MEASURED - 10/350 μ s waveform - IEC 62561-6	40 kA*
FREQUENCY	50/60 Hz
FOLLOW CURRENT / GROUND FAULT RANGE	70 to 10 000 A*
TOTAL LET THROUGH I ² .t	YES
ENERGY REGISTRATION RANGE	0 to 4C
MEASUREMENT | SLB / SLC	
FOLLOW CURRENT / GROUND FAULT RANGE	70 to 10 000 A*
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/m ³	Class C2: 35
MAX ALTITUDE - m	2 000
ATMOSPHERIC PRESSURE - kPa	70 to 106
STANDARDS/TEST	IEC 62561-6
TYPE OF SURGE COUNTER as per IEC 62561-6	Type 1 and Type 2; outdoor

* other range on request

TECHNICAL CHARACTERISTICS



RECORDS I SLA / SLB / SLC

NUMBER OF EVENTS	100 Events. For each Events up to 4 components. See below example
TOTAL COUNTERS	Counter I ² t lightning Counter I ² t total Number of lightning events
MAX RECORDS	Max lightning
COMMUNICATION	Last 50 communications

RECORDS I SLA / SLC

NUMBER OF 1 st STROKE WAVEFORM	5 last waveforms for 100 μs at 1 MSPS
GPS	Time stamp and location

RECORD I SLB / SLC

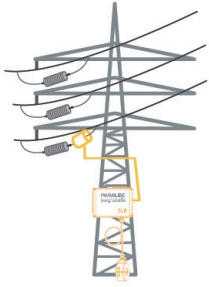
TOTAL COUNTERS	Counter I ² t switching Counter I ² t power frequency currents Counter I ² t total Counter I ² t switching events
MAX RECORDS	Max power frequency current Max switching
LIFE SPAN	End of life of protection device

RECORDS I SLC

LIFE SPAN	% of life remaining life
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EVENT COMPONENTS RECORD EXAMPLE

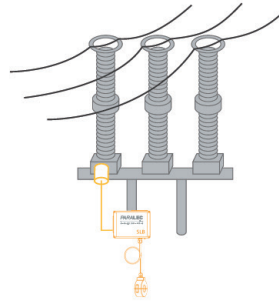
EVENT COMPONENTS RECORDS LIGHTNING	Unit	Example of Value
Date	Date	2021-05-06
Time	Time	14:30:05Z
Peak Current	kA	-1
Changes Coulomb	C	0.6
Duration	μs	30
I ² t(A2s)	A2s	34



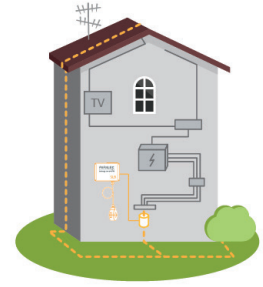
On overhead lines with
LLPD, TLA or EGLA



On buildings
ground lead

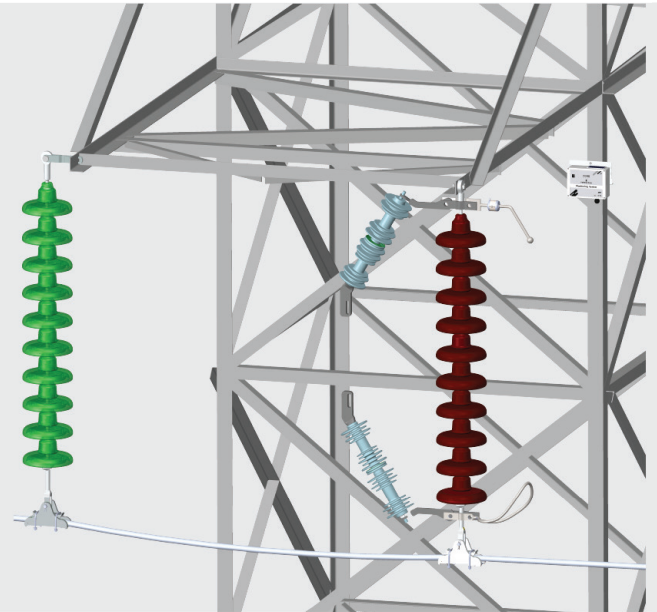
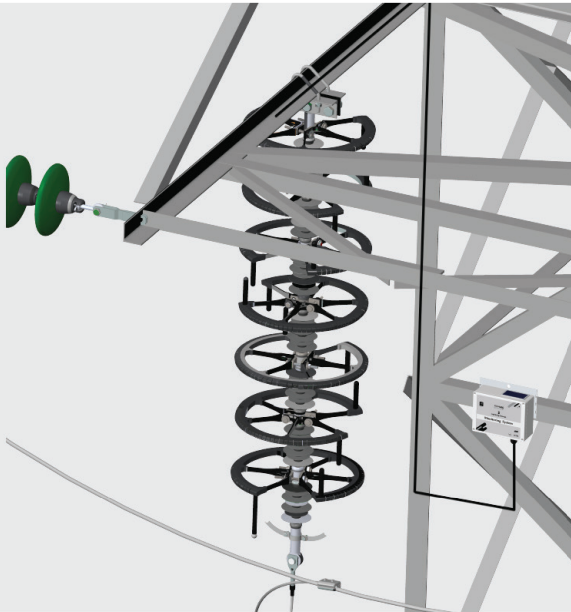


On substation MOA

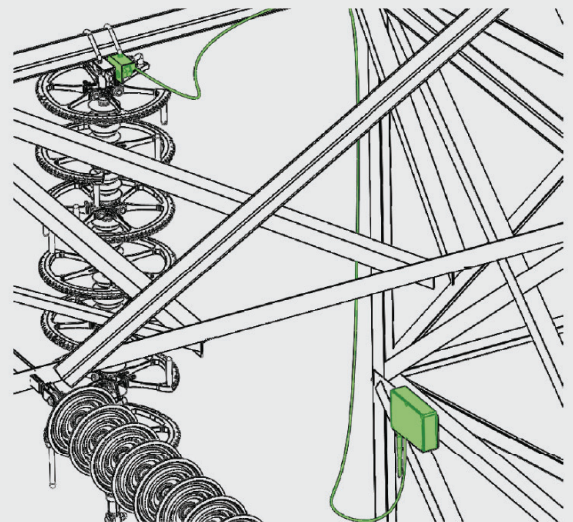
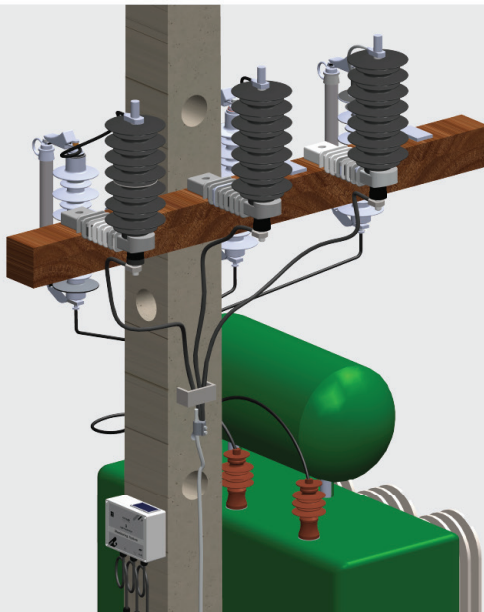


On building SPD

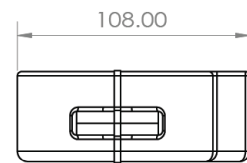
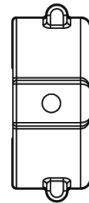
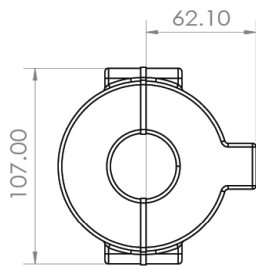
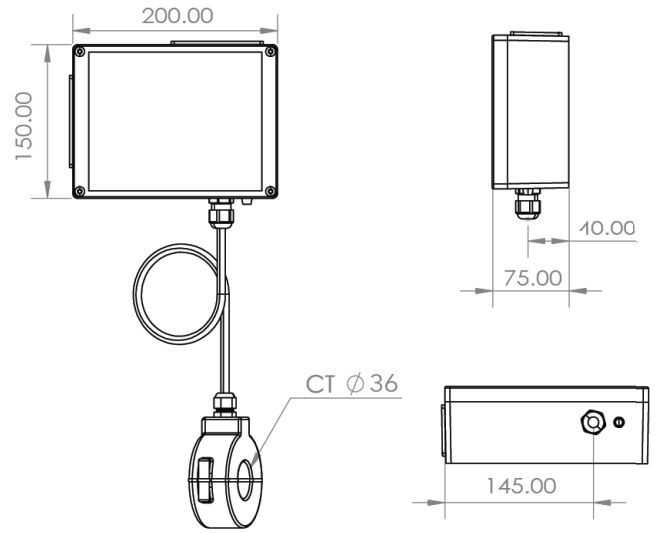
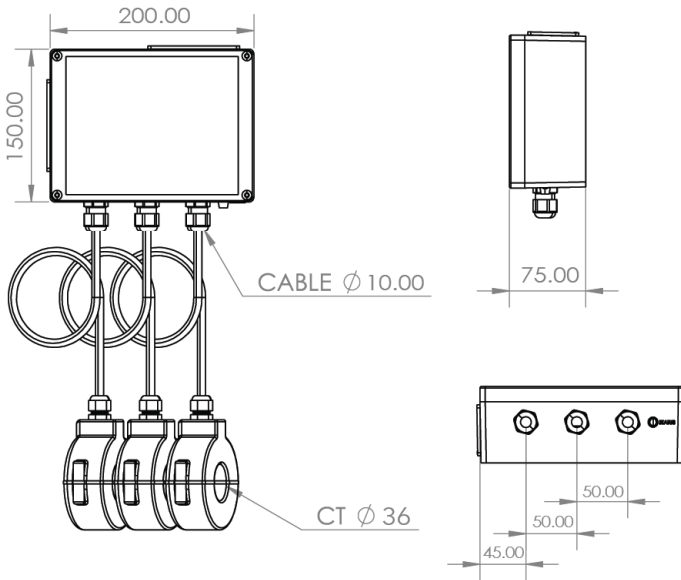
On EGLA or LLPD



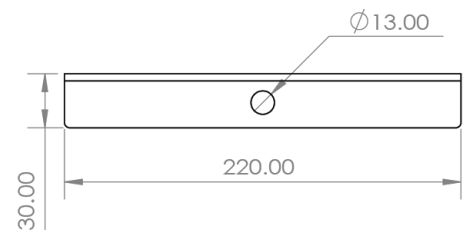
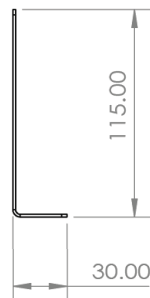
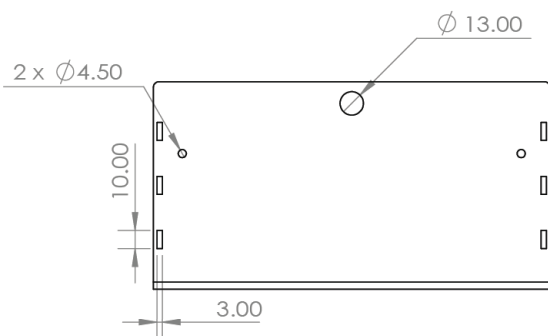
On MOA and PMT



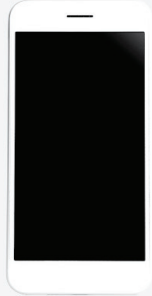
SL



Mounting plate (included)



Short Range



Wireless NFC Contact



Wireless Bluetooth
10 to 20 m



Wired Modbus

Modbus RTU via 2 wires, RS485 to master

Long Range



Wireless Sigfox

Wireless LoRaWan
Up to 5 km line of sight



LoRaWAN Gateway



Concentrator Equipped with HMI, DataBase

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



SCADA / BMS



Concentrator Full

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



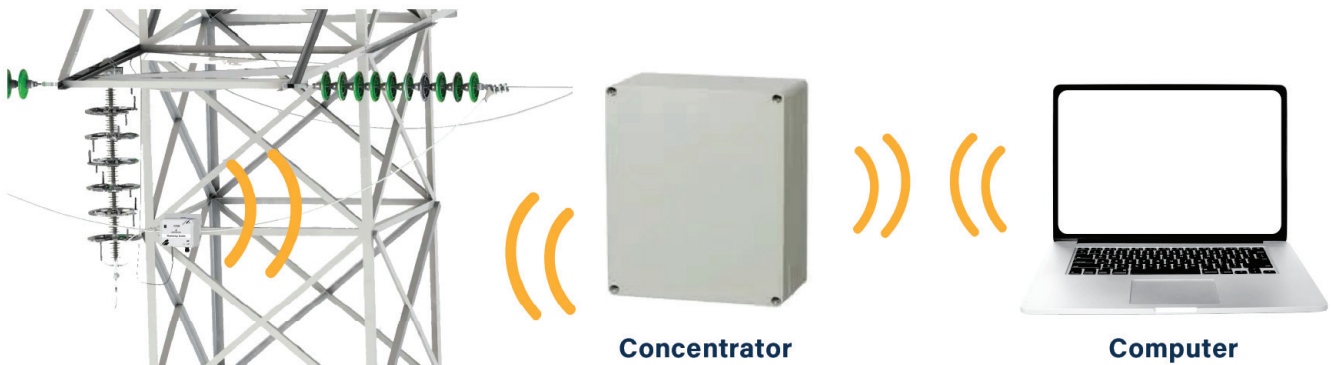
Concentrator Light

Mini DataBase

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



Bluetooth / LoraWan Converter



List of devices

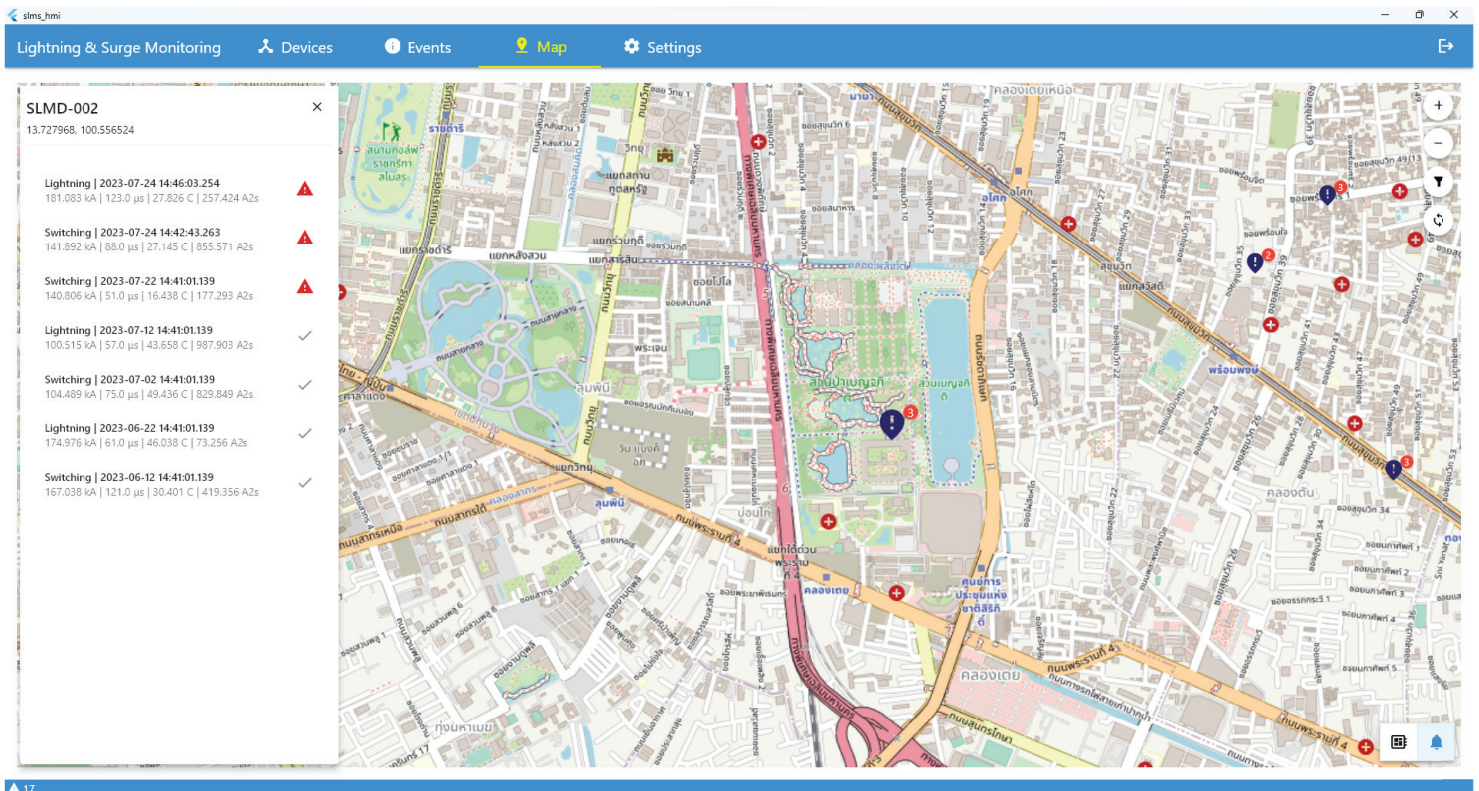
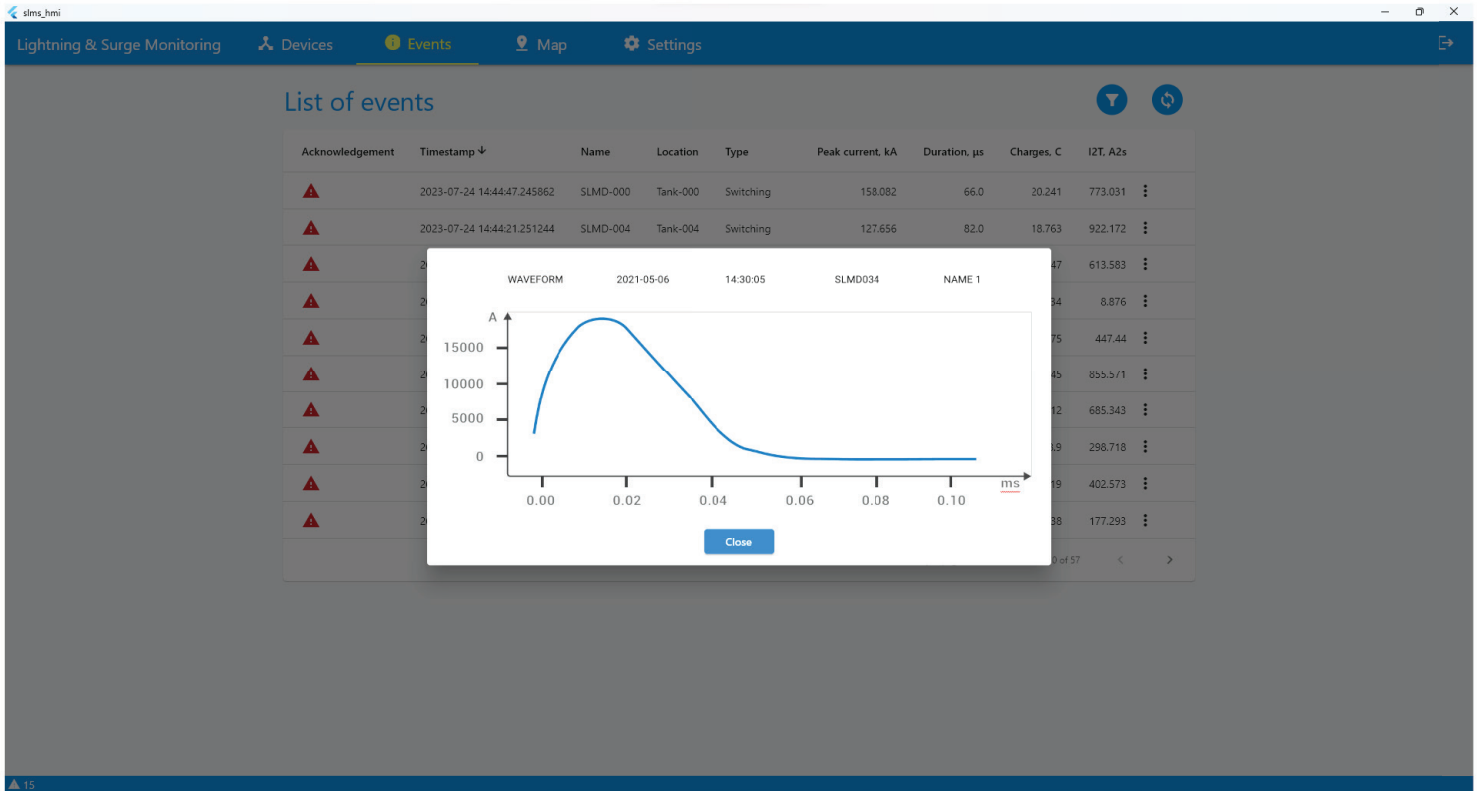
Serial	Name	Type	Protection	Location	Position	Phase	KV	Channel	Status
SN650001-4427*	SLMD-000	SMC	SA-000	Tank-000	Tower-000	C	110	COM10 | 1 | ...	1
SN650001-10a0*	SLMD-001	SMB	SA-001	Tank-001	Tower-001	A	35	COM11 | 2 | ...	0
SN650001-8960**	SLMD-002	SMC	SA-002	Tank-002	Tower-002	B	110	COM10 | 3 | ...	3
SN650001-256d*	SLMD-003	SMB	SA-003	Tank-003	Tower-003	C	35	COM11 | 4 | ...	1
SN650001-b169*	SLMD-004	SMC	SA-004	Tank-004	Tower-004	B	110	COM10 | 5 | ...	2
SN650001-63c5*	SLMD-005	SMB	SA-005	Tank-005	Tower-005	A	35	COM11 | 6 | ...	0
	SLMD-006	SMC	SA-006	Tank-006	Tower-006	C	110	Disabled	0
	SLMD-007	SMB	SA-007	Tank-007	Tower-007	A	35	Disabled	0
	SLMD-008	SMC	SA-008	Tank-008	Tower-008	B	110	Disabled	0
	SLMD-009	SMB	SA-009	Tank-009	Tower-009	C	35	Disabled	0

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List of events

Acknowledgement	Timestamp ↓	Name	Location	Type	Peak current, kA	Duration, μs	Charges, C	I2T, A2s
▲	2023-07-24 14:44:47.245862	SLMD-000	Tank-000	Switching	158.082	66.0	20.241	773.031
▲	2023-07-24 14:44:21.251244	SLMD-004	Tank-004	Switching	127.656	82.0	18.763	922.172
▲	2023-07-24 14:44:17.252680	SLMD-005	Tank-005	Switching	119.792	98.0	32.047	613.583
▲	2023-07-24 14:43:55.256857	SLMD-003	Tank-003	Lightning	139.982	110.0	7.634	8.876
▲	2023-07-24 14:42:49.262827	SLMD-001	Tank-001	Switching	114.348	50.0	35.975	447.44
▲	2023-07-24 14:42:43.263834	SLMD-002	Tank-002	Switching	141.892	88.0	27.145	855.571
▲	2023-07-24 14:41:27.257211	SLMD-000	Tank-000	Lightning	139.317	91.0	13.312	685.343
▲	2023-07-24 14:41:01.138973	SLMD-000	Tank-000	Switching	188.65	116.0	8.9	298.718
▲	2023-07-23 14:41:01.139848	SLMD-001	Tank-001	Switching	185.288	129.0	29.19	402.573
▲	2023-07-22 14:41:01.139850	SLMD-002	Tank-002	Switching	140.806	51.0	16.438	177.293

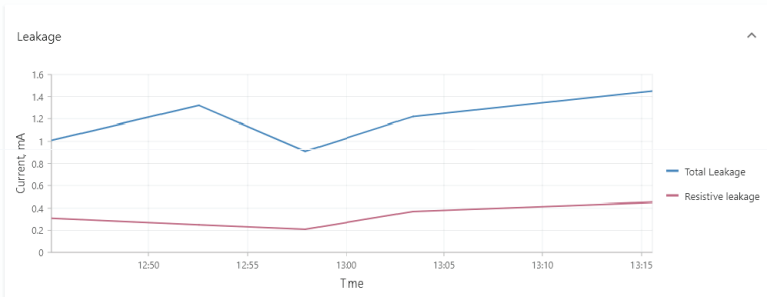
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SMC SN650001-8960*** SLMD-002

Counter I2t total 479.751 <small>20% remaining</small>	Max Resistive Leakage 456.449 <small>+ 10% vs J-30 + 15% vs phase A, B 20% of max</small>	Max Leakage 900.315 <small>20% remaining</small>	Power Supply OK	Last Communication 2 s
----------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------	----------------------------------	-----------------------------------------

Number of Events 9 <small>20% remaining</small>	Max lightning 20kA, 30µs	Max Switching 1.2kA, 5ms
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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 14:42:43.263034	Switching	141.892	80.0	27.145	055.571
⚠	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

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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

PRODUCT RANGE



PARALEC
energy solutions

1,2,3	4	5	6	7	8
113	.....	.....	.....	.....	.....
SLA	Phases	Power Supply	Communication	CT cable length	Current Range
1,2,3	4	5	6	7	8
105	.....	.....	.....	.....	.....
SLB	Phases	Power Supply	Communication	CT cable length	Current Range
1,2,3	4	5	6	7	8
106	.....	.....	.....	.....	.....
SLC	Phases	Power Supply	Communication	CT cable length	Current Range
4		5		8	
1	1 phase	1	12 VCD	1	200A - 40kA
2	3 phase	2	Solar Panel A	2	100A - 20kA
				3	300A - 60kA
6		7		4	500A - 100kA
1	RS485	1	3 meters	5	750A - 150kA
2	Modbus	2	6 meters	6	1000A - 200kA
3	LoRa	3	10 meters		
4	Sigfox				
	Digital Output				

Communication Devices

10752211	LORA / Bluetooth wireless converter
10742111	LORA gateway
10762111	Concentrator light
10712121	Concentrator full



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