



streamer[®]
keeping the light

Catalogue for Overhead Lines
Fault Indicators
Smart Solutions for Medium-Voltage Networks

2017



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Streamer International AG

Swiss company based in Chur, Switzerland

Innovation and Solution oriented

Streamer is a specialist for innovative solutions which improve the reliability of medium and high voltage electrical networks. Streamer invests more than 10% of its turnover every year in three different R&D centers:

- St. Petersburg, Russia - in cooperation with the State Polytechnical University of St. Petersburg;
- Moscow, Russia - for the development of electronic products;
- Chur, Switzerland - in cooperation with University of Applied Sciences Rapperswil

Product range

1. Lightning protection from 6 to 40 kV

A unique lightning protection solution for overhead line: Line Lightning Protection Devices (LLPDs) with EasyQuench (EQ) technology that has been invented and patented by Streamer. More than 1 million of LLPDs have been installed worldwide (Russia, China, Indonesia, Malaysia, Thailand, Brazil, UAE, Iran, Vietnam, Switzerland, Germany etc.).

2. Fault Passage Indicators (FPI)

A complete range of Fault Passage Indicators (FPI) for overhead lines and underground cables. Thanks to these products, our customers are able to reduce drastically the outage's time due to transient and permanent faults.

Streamer is the only manufacturer having a complete range with mobile devices, pole mounted or conductor mounted solution.

3. Transformer drying solution

TRANSEC is an online drying solution for oil insulated transformer of all sizes. It can be installed, operated and regenerated while the Transformer is running and operational. It pumps the transformer oil continuously through its cylinders and thereby extract the moisture smoothly from the paper.

Due to the robust design and it's operation principle, TRANSEC is the most cost-efficient drying solution for Transformer!

Tests

The certifications of our products are made in the best laboratories worldwide: CESI, CEPRI and STRI and meet the latest international standards (IEC, GOST).

- CESI (ITALY) - STRI (SWEDEN) - CEPRI (PRC)

Key points

- 20 years of experience.
- 1.2 Million lightning protection devices installed.
- Installation in more than 15 countries.
- Tested in CESI, EPRI, STRI, CEPRI.

Customers list

Groupe E (Switzerland)

SIG (Switzerland)

Romande Energie Holding SA (Switzerland)

BKW (Switzerland)

Repower (Switzerland)

LAPP Insulators (Germany)

Sicame Group (France)

China Southern Power Grid (China)

State Grid Corporation of China (China)

Electricity Generating Authority of Thailand (Thailand)

Tenaga Nasional Berhad (Malaysia)

Perusahaan Listrik Negara (Indonesia)

VietNam Electricity (Vietnam)

Dagupan Electric (Philippines)

Electronet (New Zealand)

Saudi Aramco (Saudi Arabia)

Federal Electricity & Water Authority (UAE)

Dubai Electricity & Water Authority (UAE)

Iran Power Generation and Transmission Company (Iran)

Botswana Power Corporation (Botswana)

Rio Grande Energia (Brazil)

CPFL Energia (Brazil)

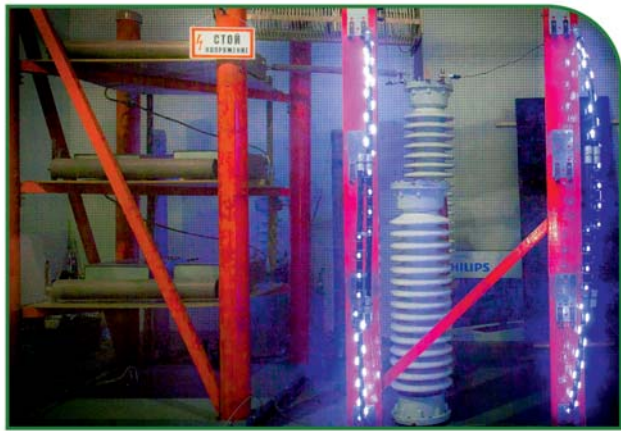
Celesc (Brazil)

AES Sul (Brazil)

PJSC ROSSETI (Russia)

LUKOIL (Russia)

GAZPROM (Russia)



Summary

Fault indicators* for overhead lines

from 6 kV to 110 kV

Portable, pole-mounted



Pole-mounted



Conductor-mounted



* **Fault Indicators - FI:** known as well as Fault Passage Indicators- FPI, Fault Circuit Indicators- FCI, Faulted Circuit Indicators- FCI.

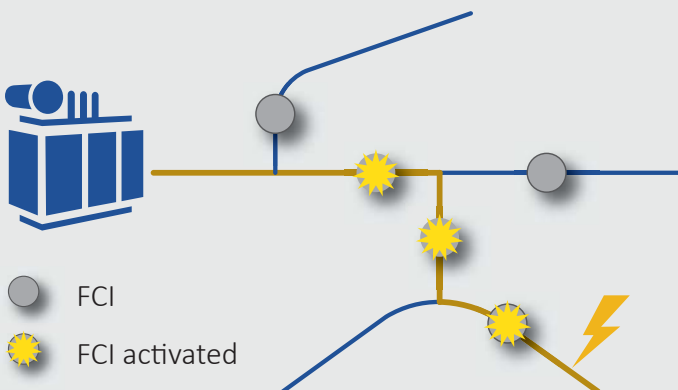
Fault Indication on Overhead Lines

Streamer's Fault Indicators for overhead lines are smart devices that are mounted directly on the line or on the pole to indicate the position of a fault which causes permanent or transient outages. The key advantage is, that the time of finding the source that caused an outage can be significantly reduced by placing the devices in strategic positions on the grid.

Streamer has a full range of conductor mounted and pole mounted devices which indicate the outage via red signs, bright LED flashes and SMS/GPRS. With our MK-range, Streamer has the first portable fault indicator on the market.

Working principle

1. The Fault Indicator is placed on strategic points of the line. This could be a branch on the grid.
2. When there is a fault on the line, a short circuit is measured along the fault path on the line.
3. Every indicator on that faulty path indicates the fault. By following the path, the fault can be easily found.
4. Using indicator with communication, the faulty section can already be determined as the device is sending the data via SMS/ GPRS. The Lineman can drive directly to the source of fault.



Pole Mounted Pathfinder



Portable MK



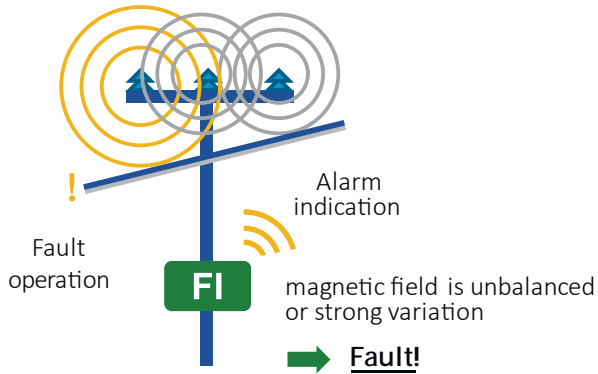
Conductor mounted Lodestar



Pole mounted range

Streamer's pole mounted range is the easiest and cheapest solution to equip the line with fault indicators.

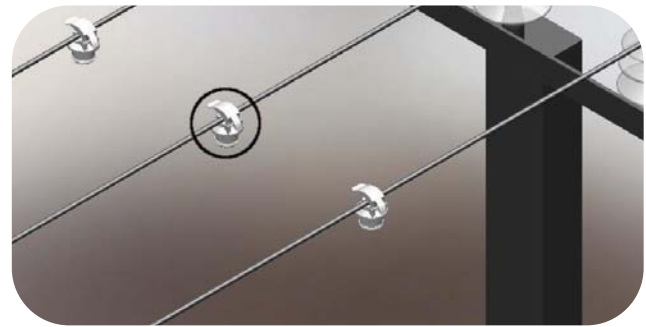
The devices measure the magnetic field of the three conductors. During a short circuit phase to phase or phase to ground, the magnetic field gets unbalanced, which is measured by the Fault Indicator.












Conductor mounted range

Streamer's conductor mounted range is the advanced option to collect fault data from the overhead line.

The devices are directly mounted on the conductor and measure the voltage and the current flowing through the line. During a short circuit: phase to phase or phase to ground, these values change rapidly, the fault Indicators can locate the direction of the fault as well as the faulty phase.



	MK8	MK10	P360 A	P360 A ROSCO	P360 AC GSM	P360 AC GPRS	Lodestar CL25	Lodestar CL2	Lodestar CL0.5
									
PORTABLE/ PERMANENT INSTALLED	portable	portable	permanent	permanent	permanent	permanent	permanent	permanent	permanent
POSITION OF INSTALLATION	pole – at eye level	pole – at eye level	pole – 3m below conductor	pole – 3m below conductor	pole – 3m below conductor	pole – 3m below conductor	conductor	conductor	conductor
OPERATING LINE VOLTAGE	6 kV - 66 kV	6 kV - 66 kV	6 kV - 66 kV	6 kV - 66 kV	6 kV - 66 kV	6 kV - 66 kV	6 kV - 66 kV	6 kV - 66 kV	6 kV - 66 kV
MIN FAULT CURRENT	14 A	14 A	12 A	12 A	12 A	12 A	25 A	2 A	0.5 A
FAULT INDICATION	red flag	red flag	LED	LED	LED	LED	LED	LED	LED
FAULT SENDING	—	SMS sending	—	output	SMS sending	data sending via GPRS	—	data sending via GPRS/ com module	data sending via GPRS/ com module
FAULT PHASE INDICATION	—	—	—	—	—	—	✓	✓	✓
FAULT DIRECTION INDICATION	—	—	—	—	—	—	—	—	✓
DIFFERENCE TRANSIENT/ PERMANENT FAULT	—	—	✓	✓	✓	✓	✓	✓	✓
CONNECT TO SCADA	—	—	—	✓	—	✓	—	optional	optional

Pole mounted, Portable Pathfinder MK Range

- From 6 kV to 66 kV
- Portable device
- Min. fault current 14 A
- Fault indication via red flag & SMS
- 1 product per pole
- Battery power for 6 years
- IP 67 weather resistant

Function

Streamer's Pathfinder MK are portable fault indicators. They are intended to be used by the line operation or maintenance team when a fault appears. The Pathfinder MK helps to locate the faults phase to phase or phase to ground on the line and therefore sensibly reduces the down-times.



Operation principle

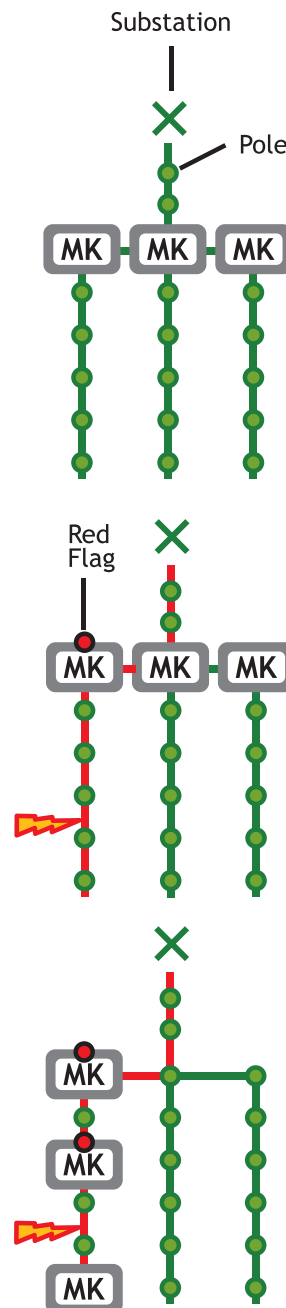
Streamer's Pathfinder MK Fault Indicators sense out of balance electro-magnetic fields in a single or 3-phase medium-voltage network. Sensing is triggered when it detects fault current, above the current/ time threshold curve, passing in the line conductors. Streamer's Pathfinder MK indicates the fault by showing a bright red mechanical flag and/or by sending the information by SMS.



MK8



MK10



1.

Place the Pathfinder MKs at the beginning of each section

2.

Close the main breaker and check the Pathfinder MKs to find the faulty section

3.

Move the Pathfinder MKs to the faulty section and repeat step 2 in order to isolate the fault accurately

Technical specifications

MODEL	PATHFINDER MK8	PATHFINDER MK10
APPLICATION	Portable	Portable
INSTALLATION	On pole (wooden, metal, concrete)	On pole (wooden, metal, concrete)
OPERATION VOLTAGE	<66	<66
CURRENT TRIPPING	High Sensitivity 14 A Low Sensitivity 72 A	High Sensitivity 14 A Low Sensitivity 72 A
RESPONSE TIME	min 20 ms	min 20 ms
INDICATION	Flag	Flag+COM
FAULT DETECTED	P-P P-G	Yes Yes
COMMUNICATION	No	GSM/GPRS
CONFIGURATION	Manual	Manual or COM
RESET	Manual	Manual or COM
TEST	Manual	Manual or COM
LIVE LINE INSTALLATION	Yes	Yes
BATTERY LIFE	6 years	5 years
TEMPERATURE	-20 °C to +70 °C	-20 °C to +70 °C
PROTECTION CLASS	IP67	IP67
OPTION	3 pcs carry-on case	3 pcs carry-on case, Software



Accessories

A case for up to 3 MK is available to store and move the sensitive devices securely.

How to order

- according to the needs of your network, choose a device with or without SMS communication
- If you use several products, choose a case to transport and protect

Reference

Fault indicator Mk8	FO.MK.MF30.00.WW
Carry-on case 3x Mk8	FO.MK.CAS3.08.WW
Fault indicator Mk10	FO.MK.MF3G.00.WW
Carry-on case 3x Mk10	FO.MK.CAS3.10.WW

Pole mounted, Permanent Pathfinder 360 Alpha Range

- From 6 kV to 66 kV
- Min. fault current 12 A
- Indication via LED, output, SMS, GPRS
- 1 product per pole, variable amount per line
- Battery power for 10 years
- IP67 weather resistant
- Testing via magnet

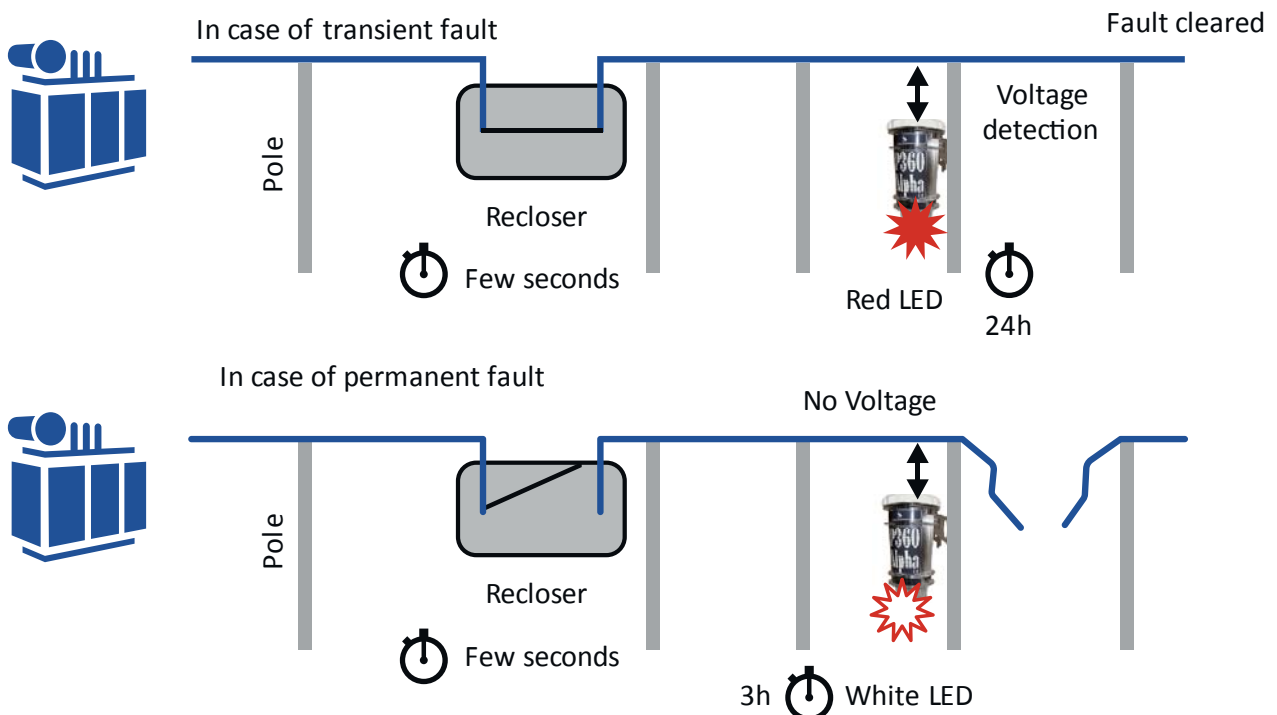


Function:

Streamer's Pathfinder 360 ALPHA (P360A) is pole mounted fault indicator. It is intended on the distribution lines up to 66 kV. The P360A helps to locate the faults phase to phase or phase to ground on the line with 2 very bright LEDs and therefore sensibly reduces the downtimes.

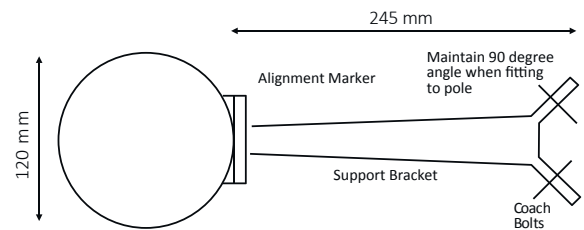
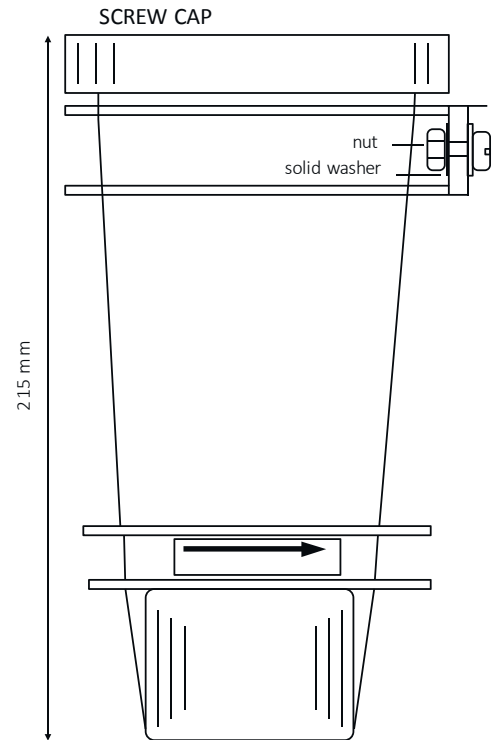
Operation principle:

Streamer's P360A Fault Indicators sense out of balance electromagnetic fields in a single or 3 phases high voltage network. Sensing is triggered when it detects fault current, above the current/time threshold curve, passing in the line conductors. Streamer's P360A will indicate the fault by lighting a bright LED and by sending the information by SMS/-data to a cell phone or directly to a server.



Technical characteristics

APPLICATION	Permanent	
INSTALLATION	On Pole (Wooden, Metal, Concrete)	
OPERATING VOLTAGE, KV	<66	
CURRENT TRIPPING, A	Min 12	
RESPONSE TIME, MS	Min 20	
INDICATION	2 very bright LEDs	
VISIBILITY	100 m daytime	
FAULT DETECTED	P-P P-G	✓ ✓
DIFFERENCE TRANSIENT/ PERMANENT FAULT		
RESET	After timer Manual via Magnet Return of Voltage	
TEST	With Magnet	
LIVE LINE INSTALLATION	✓	
BATTERY LIFE, YEARS	10	
TEMPERATURE, 0C	-50° to +80°	
PROTECTION CLASS	IP67	
EMI	BS EN 50081 -1 BS EN 50082 -2 IEC 801-2 -3 -4	



FI MODEL	INDICATION TYPE
P360A (D, S, or F & FD)	via LED
P360A COM GSM	via LED, SMS service
P360A COM GPRS	via LED, GPRS
P360A ROSCO	via LED, analog output



Integration

Pathfinder can be directly integrated in the existing SCADA System.
 Contact Streamer at office@streamer-electric.com

Standards

ELECTROMAGNETIC COMPATIBILITY

The PATHFINDER 360 ALPHA has been fully EMC tested to the following standards:

BS EN 50081-1: 1992 Generic emissions standard (Heavy industrial) – none detected

BS EN 50082-2: 1992 Generic immunity standard (Heavy industrial)

IEC 801-2: 1991 Electrostatic discharge

IEC 801-3: 1984 Radiated electromagnetic fields

IEC 801-4: 1988 Fast transient/Bursts

BS EN 60068: Environmental

IEC 60943: 1998 Temperature tests

BS EN 60068: Vibration endurance testing

BS EN 60068: Impact testing

Pathfinder casing chemical resistance

Impact testing – Airgun tests

Reference numbers

FAULT INDICATOR P360A	FO.P3.PL30.00.WW
FAULT INDICATOR P360A ROSCO	FO.P3.PL3T.00.WW
FAULT INDICATOR P360A COM GSM	FO.P3.PL3G.00.WW
FAULT INDICATOR P360A COM GPRS	FO.P3.PL3P.00.WW

How to order

- choose the right product according to your line data; you can mix Alpha with Alpha COM devices
- choose the type of communication, SMS or data
- choose the right mobile contract with your phone provider (sim-cards are not supplied by Streamer)

Fault Passage Indicator LODESTAR CL25

Fault Passage Indicator LODESTAR

- 6 kV to 110 kV line voltage
- Conductor mounted
- Sensitivity from 25A
- Bright LED
- Shows the faulty phase
- For outdoor use in tropical climate
- High strength plastic of UV stabilized and flame retarding type
- Metal parts such as spring and bar are made of stainless steel

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Key features

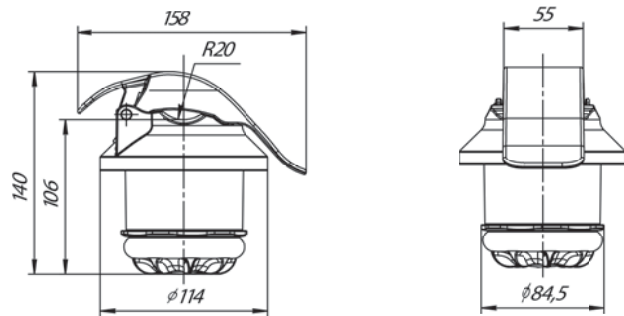
Lodestar CL25 Fault Indicator is an electronic device, which is intended for use in medium voltage overhead lines.

Lodestar CL25 senses current on the phase where it is installed. Indication is triggered when it detects a faulty current, above the current threshold, passing in the line conductors.

Lodestar is designed in such a way as not to react on inrush current. So-called inrush resistance is the parameter, which helps to restrain triggering due to transformer's magnetizing current or switching a load.

Lodestar CL25 is suitable for use on multiple lines supported by the same pole.

Lodestar CL25 is provided with a battery control. When the battery capacity is below 20% of nominal charge the yellow LED starts flashing for a period of 6 months.



Networks

- 6 to 110 kV
- Solidly grounded neutral
- 1 wire: Single Wire Earth Return
- 3 wires (3 phases)
- 4 wires: 3 phases + Ground wire
- Bare or covered conductor with external diameter 5-40 mm
- Steel, concrete or wooden poles
- Symmetric installation for P-P & P-G detection or asymmetric installation for P-P detection

Technical characteristics

MODEL		LODESTAR CL25
REFERENCE OVER ALL CONDUCTOR DIAMETER	7-28 mm (5-28 mm from mid-2017) 17-33 mm 24-40 mm	FO.LO.CL40.00.WW FO.LO.CL40.30.WW FO.LO.CL40.40.WW
INSTALLATION	clamp on conductor	
OPERATING VOLTAGE, KV	6-110	
FREQUENCY, HZ	45-65	
NOMINAL LOAD CURRENT, A	2-800	
MIN FAULT CURRENT SENSING, A	25	
ABSOLUTE CURRENT THRESHOLD	100 A, 250 A, 500 A, 1000 A	
AUTOMATIC THRESHOLD ADJUSTMENT (Y/N) (DIFFERENTIAL CURRENT THRESHOLD)	Y 50%, 100%, 200% 25 A, 100 A, 200 A, 500 A	
RESPONSE TIME/INRUSH RESISTANCE/DELAY	20 ms / 100 ms	
INDICATION	White LED flashing light	
FAULT DETECTED	Phase to Phase Phase to Ground	✓ ✓
FAULT PHASE INDICATION	✓	
FAULT DIRECTION INDICATION	no	
FAULT CURRENT WITHSTAND	25 kA / 500 ms	
COMMUNICATION	no	
SELECTABLE RESET TIME	6, 12, 24, 48 hours (DIP switches)	
RESET	Timer (automatic) Magnet (manual) Reenergized line (automatic)	
TEST	Magnet	
LIVE LINE INSTALLATION	✓	
TOTAL INDICATING TIME, HRS	> 1000	
BATTERY LIFE, YEARS AT 40°C	10	
BATTERY	Non-rechargeable Thionyl Chloride Lithium Battery	
FLASHING FREQUENCY DURING INDICATION	12 times/min	
PROTECTION CLASS	IP 66	
STANDARTS/TESTS	IEC 60068-2-9, IEC 61000-6-2 IEC 60068-2-30, IEC 60529 IEC 60068-2-14, IEC 60068-2-11 IEEE 495 (4.4.7, 4.4.8), IEC 60068-2-6 IEC 60068-2-29	
WEIGHT	0.4 kg	
SERVICE CONDITIONS		
AMBIENT TEMPERATURE, °C	-40 ° to +85°	
RELATIVE HUMIDITY	10-100%	
MAX ALTITUDE	3000 m	
WIND LOAD & PRESSURE	40 m/s (144 km/h) 200 kg/m ²	

LODESTAR CL2&CL0.5

Fault Passage Indicator

- 6 kV to 110 kV line voltage
- Conductor mounted
- High sensitivity – shows faults from 0.5 A
- Ultra bright LED
- Shows a faulty phase
- Shows a direction of faults
- Reporting by sending radio signals
- For outdoor use in tropical climate conditions
- High strength plastic of UV stabilized and flame retarding type

Function

Lodestar CL2 (and CL0.5) is an overhead line fault indicator conductor mounted helping the linemen to determine the origin of faults on the line. Powerful white and red LEDs allow them to locate faulty sections in bright daylight. Thanks to Remote control, users can access logs of events on the line, instant current values and settings of the device.



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Key features

Lodestar Fault Indicator senses current on the phase where it is installed. Indication is triggered when it detects a faulty current, above the current threshold, passing in the line conductors.

Lodestar is designed as not to react on inrush current. So-called inrush resistance is the parameter, which helps to restrain triggering due to transformer's magnetizing current or switching a load.

Lodestar is equipped with Radio Frequency (RF) channel and memory capabilities to allow connection to cloud monitoring and fault location system, as well directly to SCADA.

Installation

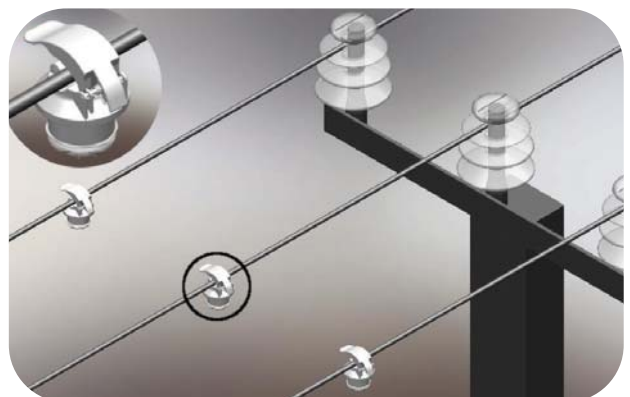
Lodestar is designed to be installed on bare or covered conductors up to 40 mm external diameters (equivalent to 240 mm² with insulation thickness of 7 mm).

One indicator per phase is required.

Lineman can use hotstick adapter to install FI on live line without switching off the line.

Networks

- 6 to 110 kV
- Insulated, compensated or effectively grounded neutral
- 3 wires (3 phases)
- 4 wires: 3 phases + ground wire
- Bare or covered conductor with external diameter of 5-40 mm
- Steel, concrete or wooden poles



Technical characteristics

MODEL		LODESTAR CL2	LODESTAR CL0.5
REFERENCE OVER ALL CONDUCTOR DIAMETER	7-28 mm (5-28 mm from mid-2017) 17-33 mm 24-40 mm	FO.LO.CL2R.00.WW FO.LO.CL2R.30.WW FO.LO.CL2R.40.WW	FO.LO.CL1R.00.WW FO.LO.CL1R.30.WW FO.LO.CL1R.40.WW
INSTALLATION		clamp on conductor	clamp on conductor
OPERATING VOLTAGE, KV		6-110	6-110
FREQUENCY, HZ		50	50
NOMINAL LOAD CURRENT, A		2-800	2-800
MIN FAULT CURRENT SENSING, A		2, but min 4% of I_{LOAD}	0.5
ABSOLUTE CURRENT THRESHOLD		20 A to 1000 A	20 A to 1000 A
AUTOMATIC THRESHOLD ADJUSTMENT (Y/N) (DIFFERENTIAL CURRENT THRESHOLD)		Y 20 A to 500 A	Y 20 A to 500 A
RESPONSE TIME/INRUSH RESISTANCE/DELAY		20 ms to 200 ms	20 ms to 200 ms
INDICATION		LED flashing light	LED flashing light
FAULT DETECTED	Phase to Phase Phase to Ground	✓ ✓	✓ ✓
FAULT PHASE INDICATION		✓	✓
FAULT DIRECTION INDICATION		no	✓
RESET		Handhold (manual) by magnet or Remote Control Timer, COM Reenergized line (automatic)	
PROGRAMMABLE RESET TIME		1h to 99h via RC	1h to 99h via RC
COMMUNICATION		COM module option	COM module option
CENTRAL FREQUENCY		433,92 MHz	433,92 MHz
BANDWITH		1,5 MHz	1,5 MHz
OUTPUT POWER		10 DBM (-20 DBM)	10 DBM (-20 DBM)
TEST		Handheld Magnet, Remote Control	
LIVE LINE INSTALLATION		✓	✓
FAULT CURRENT WITHSTAND		25 kA / 500 ms	25 kA / 500 ms
BATTERY LIFE, YEARS AT 40°C		7	7
BATTERY		Non-rechargeable Thionyl Chloride Lithium Battery	
TOTAL INDICATING TIME, HRS		> 1000	> 1000
FLASHING FREQUENCY DURING INDICATION		12 times/min	12 times/min
PROTECTION CLASS		IP 66	IP 66
STANDARTS/TESTS		IEC 60068-2-9, IEC 61000-6-2, IEC 60068-2-30, IEC 60529 IEC 60068-2-14, IEC 60068-2-11 IEEE 495 (4.4.7, 4.4.8), IEC 60068-2-6 IEC 60068-2-29	
WEIGHT	CL25 2016/2017	0.5 kg	0.5 kg

SERVICE CONDITIONS

AMBIENT TEMPERATURE, °C	-40 ° to +85°
RELATIVE HUMIDITY	10-100%
MAX ALTITUDE	3000 m
WIND LOAD & PRESSURE	40 m/s (144 km/h) 200 kg/m ²

Handheld Remote Control (RC)



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Lodestar comes with Radio Frequency (RF) and memory capabilities. Thanks to Remote control, linemen can access data, test & reset fault indicators, modify settings or even update software of fault indicators. Devices are accessible with Remote control within 50m, open air.

Instant line currents

Instant currents on each line (A, B & C) can be viewed thanks to the Remote control.

Data logs

Each fault is recorded into the data logger. Over 50 faults can be recorded. Information stored includes: phases, timestamp, currents values and others. Logs can be simply viewed on the remote control or downloaded.

Characteristics

Communication via	RF, 433,92 MHz
Communication distance	50 m
Battery	9 V

Settings

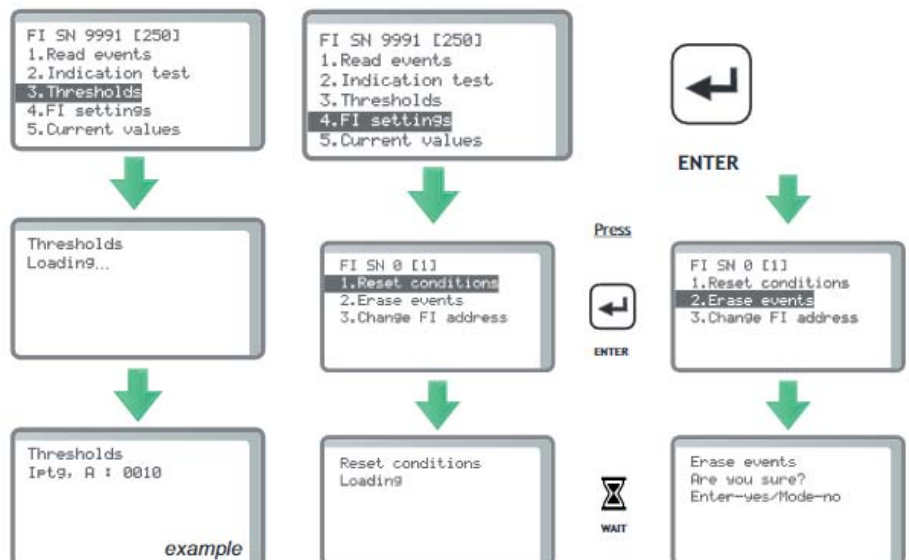
Settings of fault indicators can be modified with Remote control. Settings that can be modified are:

- minimum current sensing thresholds,
- delay timer,
- LEDs total flashing duration,
- automatic reset timers.

Testing

Indication indication that can be performed via Handheld Remote Control.

Is valid for CL2 and CL0.5 only



Relaybox

For CL2 & CL0.5

- Radio Frequency channel (RF) – 433,92 MHz
- Relay outputs
- IP67
- Health check

Function

Relaybox receives radio signals from Lodestar Fault Indicators installed upon phase conductors and provides its status to 6 output contacts.

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Relaybox

Characteristics

INSTALLATION	POLE, OPTIONAL WALL
COMMUNICATION	RADIO CHANNEL, RELAY OUTPUTS
FREQUENCY	433,92 MHz
DISTANCE	> 30 METERS
CONNECTION	INTERNAL TERMINALS OF SCREW TYPE
INDICATION	NO
CONFIGURATION	OPTIONAL REMOTE
INPUTS	12V DC, 10mA MAX, FI RESET, FI TEST
OUTPUTS	A, B, C, FI COM FAIL, FI LOW BATTERY, Relaybox POWER OK
CONTACT DATA	350V AC/500V DC/0.5A/max. 10W
SUPPLY	EXTERNAL (12V-24V DC, 100mA max)
MTBF	NO LESS THAN 60000 HOURS
MEMORY	50
STANDARDS/TESTS	ELECTROMAGNETIC COMPATIBILITY, IEC 61000-6-2
HOUSING	Polycarbonate - IP67
DIMENSION HEIGHT X WIDTH X DEPTH, MM	205 x 125 x 75
UV STABILIZED HOUSING	YES
WEIGHT, KG	0.65

SERVICE CONDITIONS

AMBIENT TEMPERATURE, °C	-40 to +70
RELATIVE HUMIDITY	10-100%
MAX ALTITUDE	3000 m
WIND LOAD & PRESSURE	40 m/s (144 km/h) 200 kg/m ²

Lightbox

For CL2 & CL0.5

- Radio Frequency channel (RF) – 433,92 MHz
- GPRS/3G
- 7 years of battery life expectance
- IP54
- Test via magnet
- Flag indication of fault passage
- Local (via Handheld Remote Control) and remote (via Monitoring software) configuration



Lightbox

Reporting:

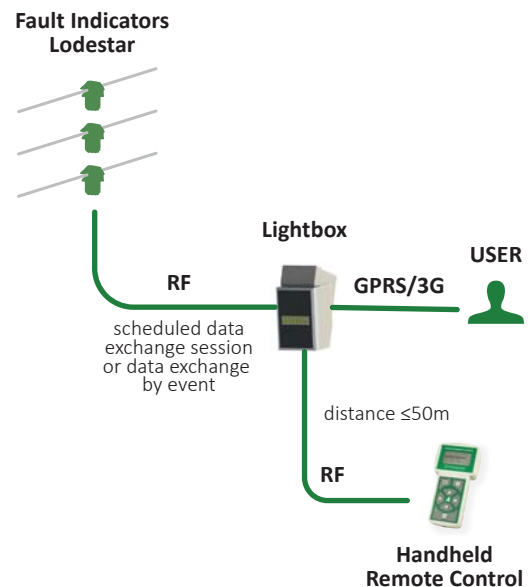
- Actual load current per phase
- Fault data:
 - permanent/transient fault current magnitude per phase and unbalanced current
 - timestamps
 - direction of fault location (upstream or downstream) – for CL0.5
- Cause of connection: health check, reboot, fault event etc.
- Battery status

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Function

Lightbox is a convenient data transmission device that receives radio signals and, by working as a GPRS/GSM modem, arranges connection between sets of fault circuit indicators and the user.

Lightbox is a pole mounted solution that intended to work together with Lodestar CL2 (or Lodestar CL0.5) fault passage indicators to provide nearly real-time information about fault events, fault locations and load data for overhead lines.

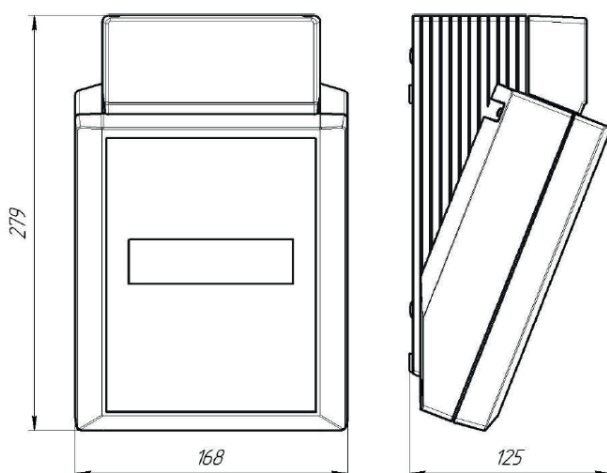


Characteristics

REFERENCE	FO.LO.COMB.00.WW
INSTALLATION	Pole mounted
INDICATION	Flag
SHORT DISTANCE COMMUNICATION (UP TO 50M)	RF
LONG DISTANCE COMMUNICATION	3G/GPRS
CONFIGURATION	Handheld Remote Control, cloud server (KOMORSAN)
TEST INDICATION	Handheld Remote Control, magnet
BATTERY LIFESPAN	7 years
PROTECTION CLASS	IP54
WEIGHT	1,74 KG
BATTERY	NON-RECHARGEABLE

SERVICE CONDITIONS

AMBIENT TEMPERATURE, °C	-40 to +70
RELATIVE HUMIDITY	10-100%
MAX ALTITUDE	3000 m
WIND LOAD & PRESSURE	40 m/s (144 km/h) 200 kg/m ²



Smartbox

For CL2 & CL0.5

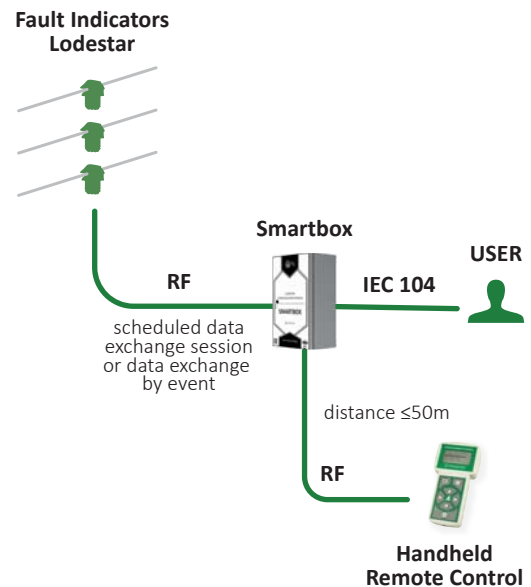
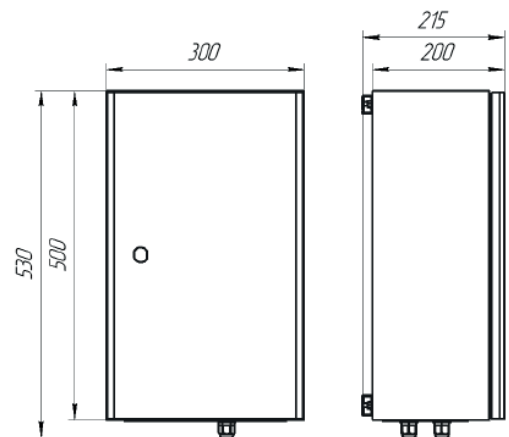
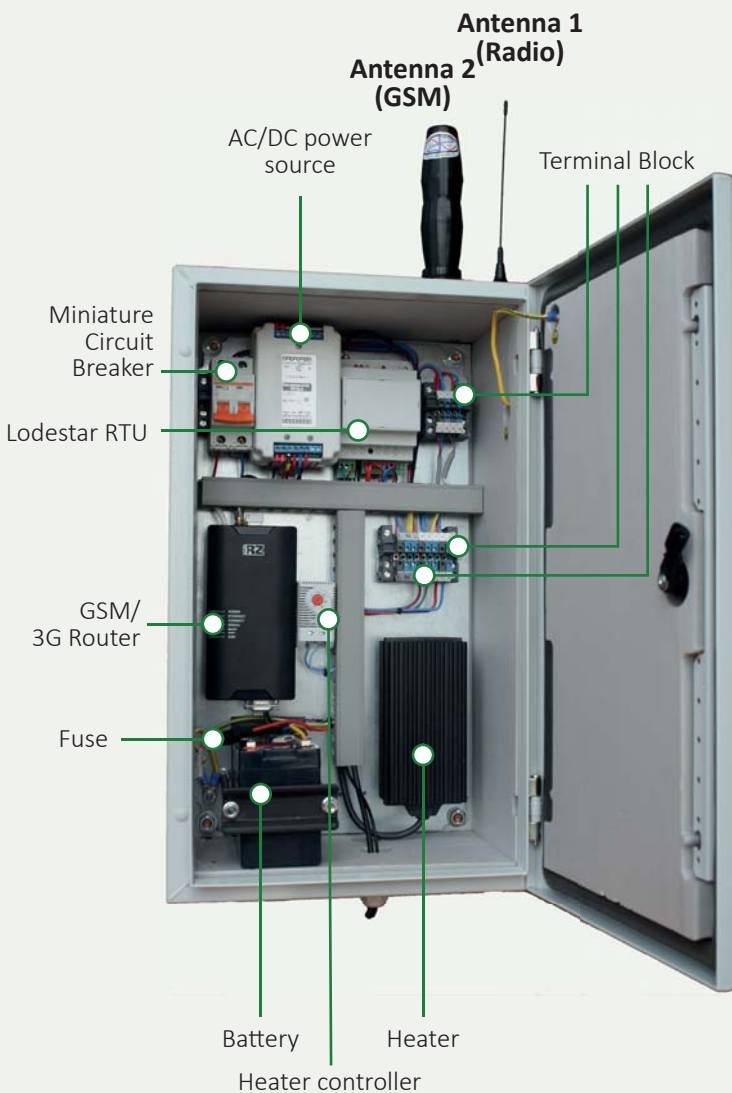
Smartbox

- Direct data exchange with SCADA by IEC 60870-5-104
- Radio Frequency channel (RF) – 433,92 MHz
- GPRS/3G/Ethernet
- External power supply
- IP65

Function

Smartbox is dedicated to provide data exchange between Lodestar FPIs and SCADA system avoiding intermediate elements.

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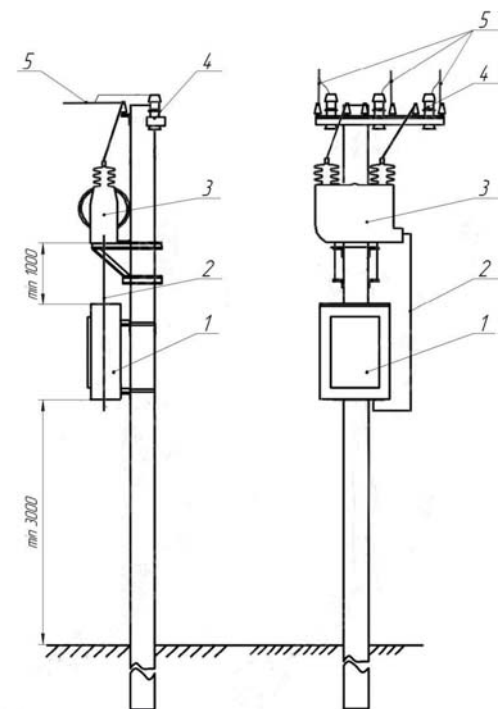
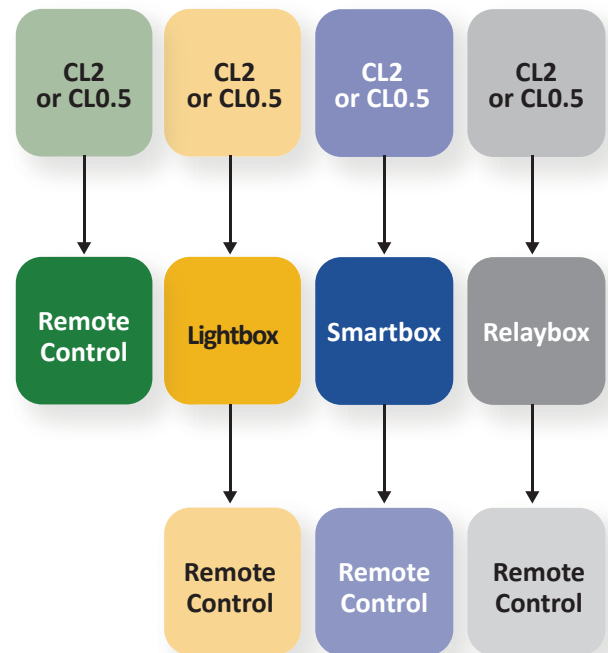
Characteristics

REFERENCE	Please contact us
TYPE OF LODESTAR TO BE PAIRED WITH SMARTBOX	CL2 or CL0.5
COMMUNICATION	RF, 433,92 MHz
BANDWIDTH	1.5 MHz
COMMUNICATION SMARTBOX TO SCADA	GSM/GPRS, IEC 60870-5-104
MEMORY, EVENT LIST	50 events
CONNECTION VIA ETHERNET PORT	possible
WIRED COMMUNICATION LINK THROUGH ETHERNET PORT	eq IEC 60870-5-104 over Ethernet or MODBUS
COM INTERVAL (SMARTBOX TO SCADA)	1 min
COM INTERVAL (SMARTBOX TO FPIS)	5 sec
CONFIGURATION THROUGH COMMUNICATION	YES
CLOCK: DATE & TIME	YES
SELF DIAGNOSTIC	YES
SELF RECOVERY	YES
MIN COMMUNICATION DISTANCE FPI & SMARTBOX	30 m
MIN COMMUNICATION DISTANCE SMARTBOX & RC	100 m
EXTERNAL SUPPLY OPTIONS (TO BE DEFINED BY CUSTOMER)	220V AC, 12-48V DC, solar panel
RECHARGABLE BATTERY	12V, 7Ah, backup for 10 h
FAULT REPORT VIA SMS	NO
ENCLOSURE	Metal
PROTECTION CLASS	IP 65
DIMENSIONS	500x300x200 mm
WEIGHT	14,4 kg

SERVICE CONDITIONS

AMBIENT TEMPERATURE, °C	-30 to +70
RELATIVE HUMIDITY	10-100%
MAX ALTITUDE	3000 m
WIND LOAD & PRESSURE	40 m/s -> 144 km/h 200 kg/m ²

Lodestar pairing options



1. Smartbox;
2. Power cable of PCV insulated conductor 2,5x3 with corrugation- not included in the package;
3. AUX transformer- not included in the package;
4. Excess-voltage suppressor;
5. Power transmission line;

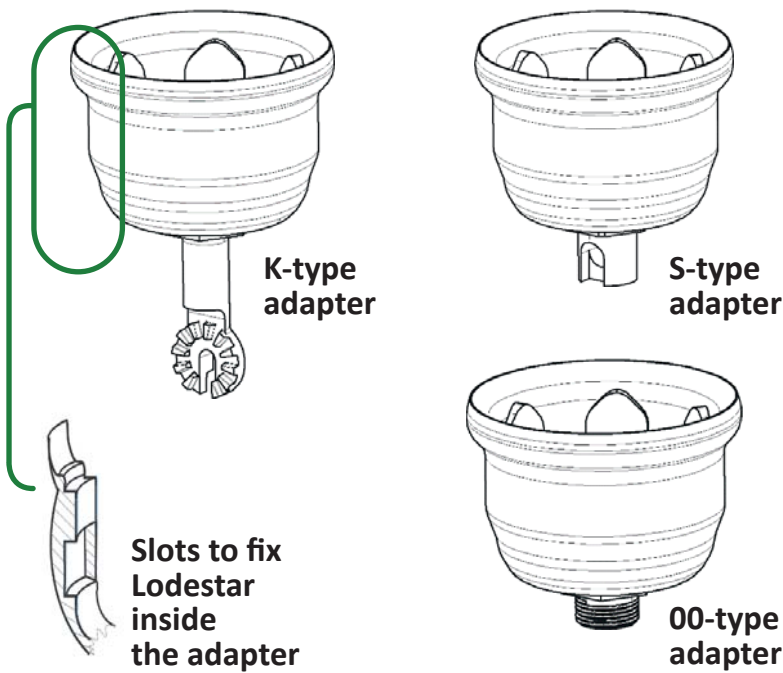
Hotstick adapter

for live-line installation

Linemen use hotsticks to carry out maintenance operations without energy supply interruption as well as to provide restoration of power of overhead networks **without having to climb poles**. These standard tools can be used easily for FPIs installation. Hotsticks may vary in junction and length, as overhead lines in different regions differ in design and dimensions.



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Installation

1st step:
put Lodestar inside



2nd step:
turn and fix



Selection guide

TYPE OF HOTSTICK ADAPTER	DESCRIPTION	REFERENCE
K-type adapter	Hotstick adapter universal	FO.LO.HSTI.OK.WW
00-type adapter	Hotstick adapter with threaded end	FO.LO.HSTI.00.WW
S-type adapter	Hotstick adapter for clamp-stick	FO.LO.HSTI.0S.WW

Monitoring Software

KOMORSAN

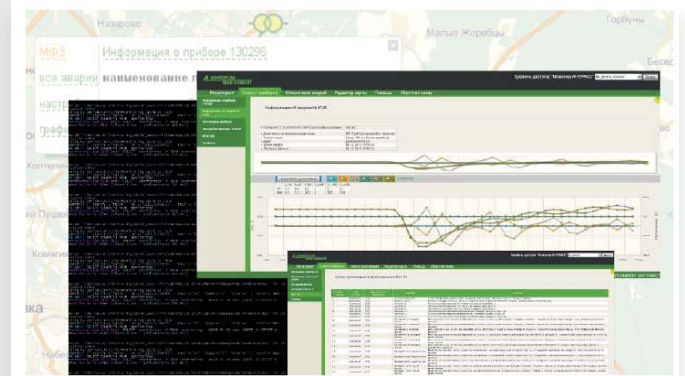
- Advanced data analysis functions
- Reporting to SCADA (optional)
- Cost saving: dynamic IP address
- Subscribe to receive SMS and e-mail alarm
- Platform independent solution: web-based
- Low cost for communication

Function

KOMORSAN software provides the platform for distribution network monitoring. Komorsan data acquisition and processing system is based on increasing number of small, low cost communicating Lodestar FCIs installed in every section of the network.

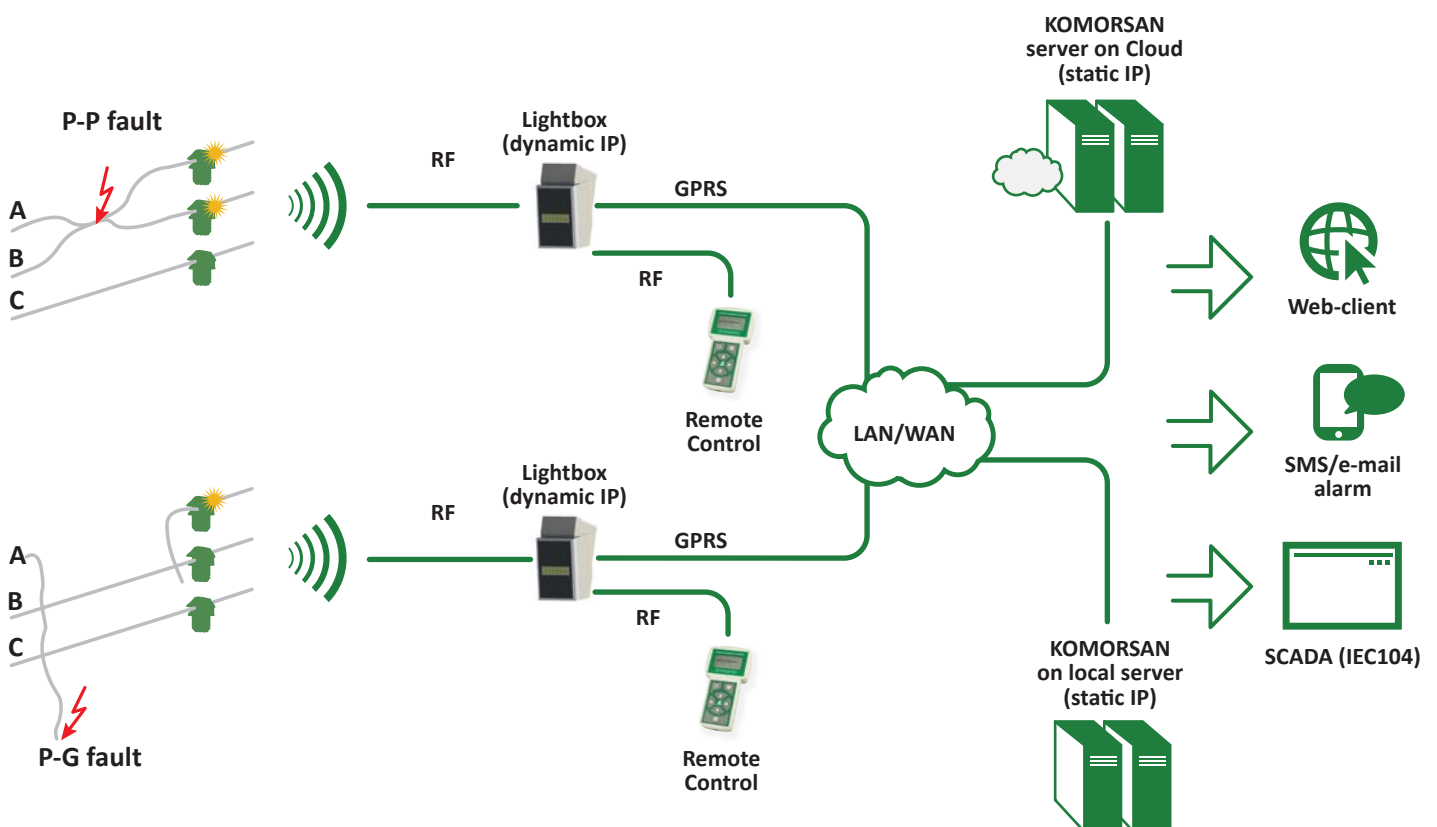
KOMORSAN allows the utility to control the status of installed Lodestar FCIs on map.

At the same time KOMORSAN provides the possibility of transferring data to SCADA via IEC 104 protocol.



Installing Lodestar FPIs paired with Lightbox means that control engineers get near real-time data of a network status as well as receive alarms about events with the section involved.

Designed by



System overview

Information about system status, operating current and voltage can be seen in web-clients. KOMORSAN is an intuitive and user-friendly tool. Data can always be accessed thanks to the web client displaying status and reports with graphs.

Map visualisation

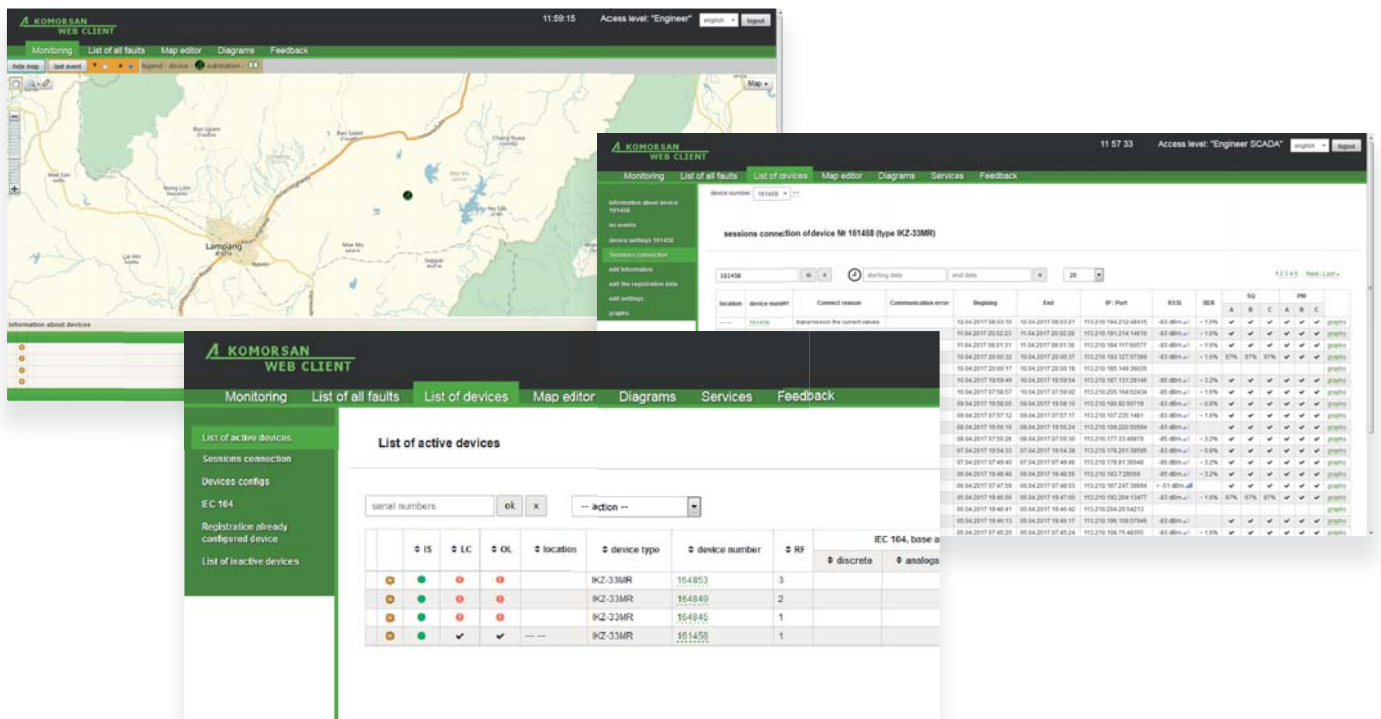
Installed devices can be saved with their current location. They will be shown on an online map to speed up the access by linemen. This tool also gives a realistic overview of the network. Status of the particular Lodestar on the map is available in just one click.

Unit control

Settings of the installed devices can be changed remotely. Each time when the device is connecting to the network (fault event or health check) the updated settings are transmitted. Information sent by the device is stored in KOMORSAN event list.

Fault message forwarding

During fault events, the system directly contacts the right addressee via SMS and sends details about the type of a fault and the devices triggered.



Selection guide

DATA TRANSMITTED TO	EXPENSES	FUNCTIONS	REFERENCE
KOMORSAN hosted on Cloud	License + monthly installment	FPIs settings adjustment Access to event list Displaying network on map	Please contact us
KOMORSAN hosted on local server	License + server cost	Advanced data analysis Subscribing to receive alarms Integration to SCADA (optional)	Please contact us

FAULT INDICATOR LODESTAR CL25 7-28MM (5-28 MM FROM MID 2017)	FO.LO.CL40.00.WW
FAULT INDICATOR LODESTAR CL25 17-33MM	FO.LO.CL40.30.WW
FAULT INDICATOR LODESTAR CL25 24-40MM	FO.LO.CL40.40.WW
FAULT INDICATOR LODESTAR CL2 7-28MM (5-28 MM FROM MID 2017)	FO.LO.CL2R.00.WW
FAULT INDICATOR LODESTAR CL2 17-33MM	FO.LO.CL2R.30.WW
FAULT INDICATOR LODESTAR CL2 24-40MM	FO.LO.CL2R.40.WW
FAULT INDICATOR LODESTAR CL2 7-28MM 110 KV (5-28 MM FROM MID 2017)	FO.LO.CL2R.0H.WW
FAULT INDICATOR LODESTAR CL2 17-33MM 110 KV	FO.LO.CL2R.3H.WW
FAULT INDICATOR LODESTAR CL2 24-40MM 110 KV	FO.LO.CL2R.4H.WW
FAULT INDICATOR LODESTAR CL0.5 7-28MM (5-28 MM FROM MID 2017)	FO.LO.CL1R.00.WW
FAULT INDICATOR LODESTAR CL0.5 17-33MM	FO.LO.CL1R.30.WW
FAULT INDICATOR LODESTAR CL0.5 24-40MM	FO.LO.CL1R.40.WW
HANDHELD REMOTE CONTROL FOR LODESTAR	FO.LO.REMO.00.WW
HOTSTICK ADAPTER UNIVERSAL (K-TYPE)	FO.LO.HSTI.0K.WW
HOTSTICK ADAPTER FOR CLAMP-STICK (S-TYPE)	FO.LO.HSTI.0S.WW
HOTSTICK ADAPTER WITH THREADED END (00-TYPE)	FO.LO.HSTI.00.WW
LIGHTBOX	FO.LO.COMB.00.WW
SMARTBOX	FO.5I.CM.AE.00.0W
RELAYBOX	FO.30.B0.00.60.0W

How to order:

- Choose the right FI-type for your network
- Choose a hot stick for live-line Installation
- Choose a Communication Box for external communication (CL 2 & CL 0.5)
- Choose a remote for individual setting and reading log-data (for CL 2 & CL 0.5)

Standards

ELECTROMAGNETIC COMPATIBILITY

IEC 61000-6-2 | ELECTRO MAGNETIC COMPATIBILITY
 IEEE/ANSI 495 (4.4.7 & 4.4.8) | SHORT CIRCUIT

ENVIRONMENTAL

IEC 60529 | IP66 PROTECTION LEVEL
 IEC 60068-2-30 | DAMP HEAT, CYCLIC
 IEC 60068-2-11 | SALT MIST
 IEC 60068-2-6 / IEC 60068-2-29 | SINUS WAVE VIBRATION & SHOCKS
 IEC 60068-2-14 | CHANGE OF TEMPERATURE
 IEC 60068-2-9 | SOLAR RADIATION TEST

