



Lime

Lime is the fastest arc flash protection device in the world, designed to protect your facilities and save people's lives. Usually, it's installed in LV compartment of indoor or outdoor MV switchgears, but also can be used in LV applications. Then, what you need to do is simply connect fiber-optic sensors to Lime and place them in switchgear compartments (cable, circuit breaker and busbar). To implement the protection of one 6-35 kV switchgear cell, it is necessary to install a LIME in it with three fiber-optic sensors, each of which is placed in an optically-isolated compartment.

Lime can be used in all energy segments, like power plants, distribution substations, oil and gas industry, heavy industry segments, metro or traction substations and all other energy segments.

Lime is easily integrated into any kind of protection systems and is designed to work together with any microprocessor relay protection IEDs available on the market, as well as with electromechanical relays.



Chief Technical Officer
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The fastest arc flash protection device in the world

We managed to create a product that is many times superior to competitors in technical point of view. The fastest arc flash protection device in the world is developed with love by best engineers in the industry. All technical characteristics are verified by third-parties independent laboratories.

At the same time, LIME is one of the few products in the electrical industry that has a unique lively design.



The familiar connection scheme is supplemented by the ability to make a reset key and an alarm on the cell door

Lime is the fastest arc flash protection device in the world that detects a short circuit with an open electric arc. The speed of Lime, taking into account the duration of the output relay operation is only **0.9 ms**. Lime is triggered before the appearance of a stable electric arc or in an extreme cases at the very initial moments of the appearance of the arc. This ensures protection of equipment from destruction, damage is practically eliminated. High speed lime reduces the risk of injury to operating and service staff.

The device warm-up time after power is on average 3 times faster than conventional arc protection solutions (36-40ms).

Lime stays in ON position for **3 seconds** even in case of power supply outage or disruptions. It does not require high quality of power supply, hence it can save project initial costs.

A dual and mutually independent internal self-diagnosis system continuously monitors correct operation of all the main components of the system (controller, memory, operating voltage level).

Additionally, LIME continuously monitor the integrity of all fiber optic paths and all three optical sensors.

Lime

Unique
Technology

Optoflex



Continuous integrity of
sensors
and fiber paths

Easy replacement
thanks to removable connector,
both on the device and sensor sides

Patented technology

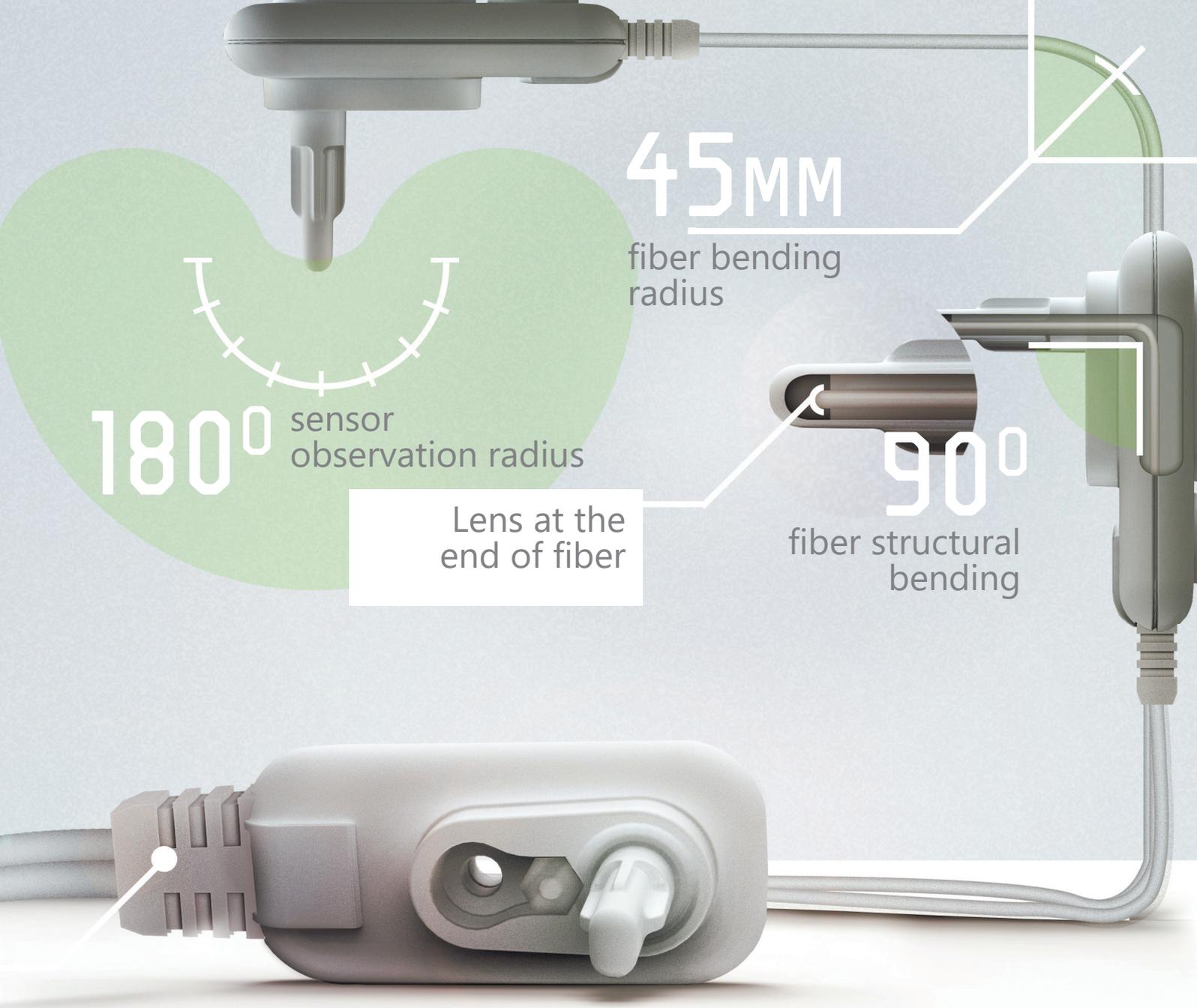
Optoflex technology was developed by our engineers. Thanks to this technology we have created a truly **unique sensor**. The tip of the fiber is manufactured on high-precision optical-mechanical equipment in a such way that the lens itself is not placed on the sensor housing, but on the optical fiber itself. The detection angle of the sensor exceeds 180°. A sensor is attached to the mounting surface at a right angle, which eliminates a break in the optical fiber.

All sensor components are not susceptible to electromagnetic interference.

Due to the integral design of the sensor, which does not have a removable lens, as the lens is inside the sensor, protection against dust is achieved.

The use of a duplex fiber optic path provides continuous diagnostics of each of the sensors.

The system continuously monitors the **integrity** of each fiber optic path. The staff will be immediately notified of any deviations in its work.



The sensor has a removable connector, thus it's easy to install. Plus, you can set set sensors first and only then put fiber optic paths. If necessary, you can entirely replace the optical fiber without touching sensors. The sensor can be mounted both from the inside of the switchgear compartment, and from the outside, due to the features of sensors' design.

180° observation angle

Provides full coverage of the monitoring zone in which the sensor is installed.

45mm bending radius

Specialized optical fiber eliminates the possibility of break.

90° design bending

There is no need to bend the fiber while attaching it to a surface.

Lime

Device Functions

	registration of an arc in a MV & LV switchgear compartments (busbars, circuit breaker, cable)
	dual interdependent internal self-diagnosis system
	continuous integrity monitoring of all optical channels and sensors
	generation of registration output signals, plus 50BF signal
	Recloser blocking signal generation when CB opening is a result of detecting an arc in cable compartment
	generation of light alarm signal on the door of the relay compartment, as well as its reset by an external control key
	protection against lighting and false activation
	maintaining performance in soot and dust environment
	control of the operational voltage level
	failure alarm in external circuits in case of power supply circuit disruptions, damage to fiber optic paths

On our web-site you can find albums of typical solutions and drawings with LIME integration to different types of IEDs:

- digital relay protection IEDs
- electromechanical protection relays.

Lime

Technical characteristics

Fiber optic sensors

The length of the fiber-optic cable (foc), m	up to 10
Trip threshold, mW/cm ² *	0.5
The lower limit of the passband of the optoelectronic path, at least	50 Hz
Operating temperature range, °C	-40 ... +55

* — corresponds to the operation of a 60W incandescent lamp located at a distance of 30 cm from the fiber-optic lens.

Performance and power outages

Lime response time from the moment the flash occurrence until the output relay trip comand, ms	0,9
Lime readiness time after power supply switches on, ms	40
Permissible duration of power interruption, s	3

Nominal power supply

Nominal voltage (DC), V	120-370 (40-190)*
Nominal voltage (AC), V	85-265 (35-135)*
Power consumption, W	4
Starting current when the device is switched on, A	1,5

Digital output characteristics

Total number of output relays	6
Number of output relays with NC	1
Number of output solid-state (optoelectronic) relays	5
Range of switched AC or DC voltage, V	5-264
Switched alternating current when closing and opening the circuit, A, not more than	8
Load current of optoelectronic relays, mA, no more than	120
DC voltage switched by optoelectronic relays, V, not more than	400
AC voltage switched by optoelectronic relays, V, not more than	280
Type of switched load	Active

* — MT.LIME.112 version is available for 110 V (AC/DC)

Digital input characteristics

Number of inputs	1
Rated voltage (AC/DC), V	220 (110)*
Activation voltage level (AC/DC), V	170/168 (88/79)*
Reset voltage AC or DC, V	154/132 (77/66)*
Signal duration sufficient for input activation, ms, no more than	7
Nominal amplitude of the current rejection pulse, mA	50 (25)*

The digital input is universal for connecting direct or alternating current

Operating conditions

Operating temperature range, °C	-40 ... +55
Humidity at +25°C	98%
Atmosphere pressure	550 ÷ 800 mmHg Art.
Installation height above sea level, m	2000
Insulation resistance at normal climatic conditions, not less	100 at 500
Insulation resistance at high humidity, megaohm	1
AC test voltage	2.5 kV; 50 Hz; 1 min
Test impulse voltage	5 kV; 1.2 / 50 µs; 5s

**Lime does not require
any additional adjustments on-site**

Tools

For self-assembly of fiber optic cables you will need:



1. Optical cable 1mm with an outer sheath 2.2mm, required length of duplex, m.



2. Connector with crimp ring — 2 pcs.



3. Connector with crimp ring, duplex — 1 pc.



4. Cutter for optical cable.



5. Stripping kit.



6. Polishing kit (table, paper, equipment).



7. Crimping tool.

We recommend you to order this kit of tools for convenient and professional every day work. To place an order, please contact our sales representative in your region or contact us via our web-site.