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**MARSENERGO**  
INSTRUMENTS FOR POWER INDUSTRY

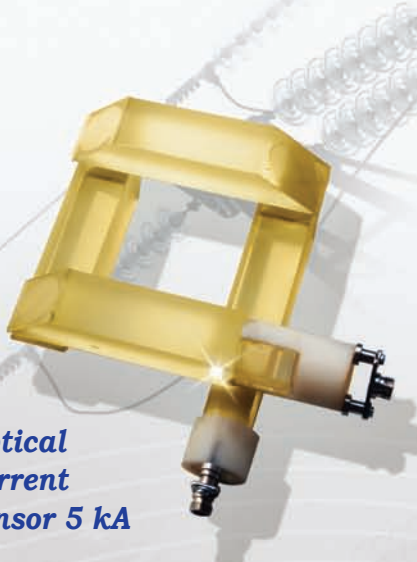


# Crystal future of power industry

## KRISMARS-CT

*Optical  
current  
transducer*

*Optical  
current  
sensor 5 kA*



## KRISMARS-VT

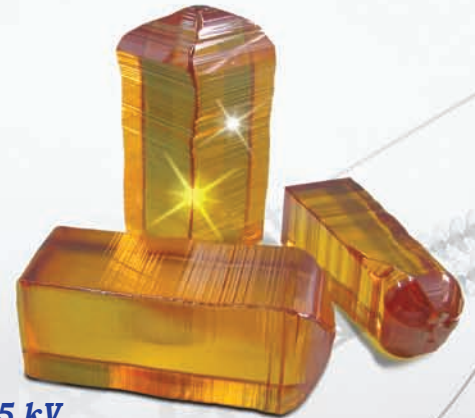
*Optical  
voltage  
transducer*

*Optical  
voltage  
sensors*

*110/3 kV*

*35 kV*

*35/3 kV*



*Optoelectronic units*

Project status: Research & Development; investment offer  
Result: testing and adjustment of prototype

# KRISMARS-CT

## Optical current transducer

### Purpose

- Designed to convert primary AC or pulse current into secondary current (analogue or digital signal) with the established scaling factor (current ratio).

### Field of application

- Automatic substation control and relay protection systems.

### Operating principle

- Magneto-optical (Faraday) effect.

### Features and benefits

- No magnetizing and magnetic saturation effects.

### Components

- Optical sensor of current;
- Optoelectronic unit (the desired current signal is taken from its output) + Merging Unit (for Digital Substation applications).

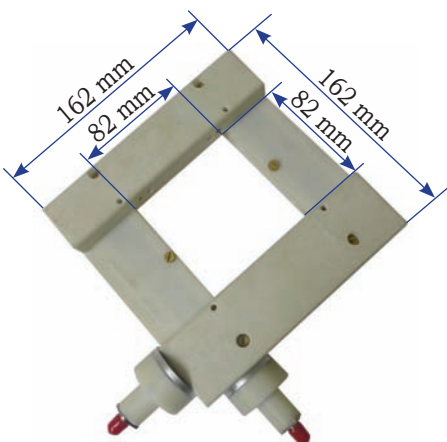
### Design for DSS applications

- IEC 61850-9-2LE compliand output.

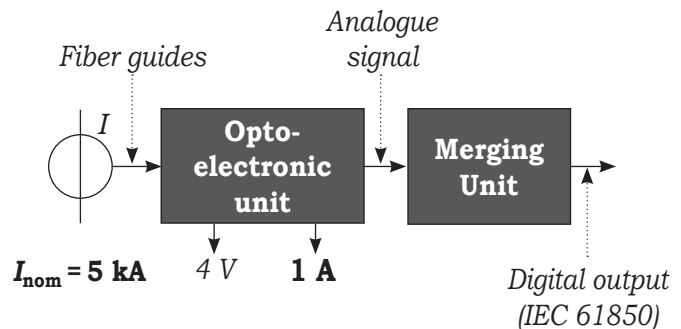
### Equipment for testing and calibration

- Test Sets produced by Mars-Energo.

### Overall dimensions of the optical sensor



### Block diagram



- The prototype is designed for current carrying lines of up to 80 mm
- The optical sensor is designed for mounting / dismantling from the line without brealing into current circuits.

### Basic specifications (to be provided)

Parameter	Value
Operating voltage range	0.4 ... 35 kV
Frequency range	10 ... 6000 Hz
Nominal primary current	100 ... 5000 A
Accuracy classes	0.2S; 0.5S
Thermal and electrodynamic withstand	100; 150 kA
Output signal:	
• Analogue	1 A; 4 V
• Digital	According to IEC 61850-9-2LE
Fiber guide length between the optical sensor and optoelectronic unit	up to 200 m
Dimensions and weight, no more than	
• Optical sensor	162 × 162 mm, 1 kg
• Optoelectronic unit	134 × 215 × 450 mm; 3 kg
Power supply (optoelectronic unit)	220 V; 50 Hz

# KRISMARS-VT

## Optical voltage transducer

### Purpose

- Designed to convert primary (high) AC or pulse voltage into secondary (low) voltage with the established scaling factor (voltage ratio).

### Field of application

- Automatic substation control and relay protection systems.

### Operating principle

- Electro-optical effect of electro-gyration.

### Features and benefits

- No piezoelectric effect;
- Phase-to-phase voltage can also be measured.

### Components

- Optical sensor of voltage;
- Optoelectronic unit (the desired voltage signal is taken from its output) + Merging Unit (for Digital Substation applications).

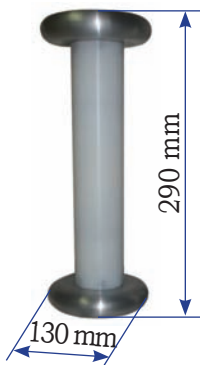
### Design for DSS applications

- IEC 61850-9-2LE compliant output.

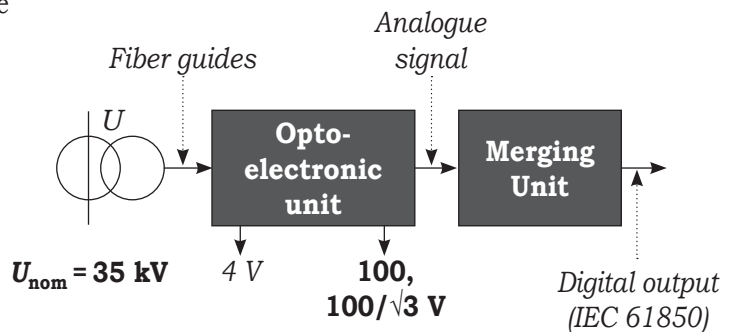
### Equipment for testing and calibration

- Test Sets produced by Mars-Energo.

### Overall dimensions of the optical sensor



### Block diagram



*Measured voltage is directly applied to the centrosymmetric crystal ends.*

### Basic specifications (to be provided)

Parameter	Value
Rated AC voltages	from 10, 20, 35 kV to 110 kV
Accuracy classes	0.2; 0.5S
Frequency range	10 ... 6000 Hz
Output signal: <ul style="list-style-type: none"> <li>• Analogue</li> <li>• Digital</li> </ul>	4; 100; 100√3 V according to IEC 61850-9-2LE
Fiber guide length between the optical sensor and opto-electronic unit	up to 200 m
Dimensions and weight, no more than <ul style="list-style-type: none"> <li>• Optical sensor</li> <li>• Optoelectronic unit</li> </ul>	130 × 290 mm, 5 kg 134 × 215 × 450 mm, 3 kg
Power supply (optoelectronic unit)	220 V, 50 Hz

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# Complex optical voltage / current transducer KRISMARS-CT/VT 6, 10, 15, 20, 35 kV; 5 kA

### Purpose

- Designed to convert primary (high) voltage and/or current signals into the secondary analogue signals or IEC 61850 digital signals with the established scaling factor.

### Components

- Optical sensor of current;
- Optical sensor of voltage;
- Optoelectronic unit (the desired current and voltage signals is taken from its output) + Merging Unit (for Digital Substation applications).

