



Sensors



VOLTAGE AND CURRENT SENSORS FOR
INTELLIGENT TRANSFORMER SUBSTATIONS

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ZELISKO



2

AT THE ZELISKO ENERGY DEPARTMENT CT AND VT ARE DEVELOPED, PRODUCED AND DISTRIBUTED, for indoor and outdoor application. The range of rated values is up to 52 kV and 50 kA. By taking over AEG Instrument Transformers in the year 2004, Zelisko is able to provide the former transformer product range of AEG.

To satisfy the customer's high requirements regarding quality, flexibility, lifetime and competitive price, the engineering and production methods are improved continuously. In particular, the APG casting process for epoxy resin in connection with computer-aided design gives our customers an essential competitive advantage on the market.

High reliability, which is indispensable for products in power T&D, is guaranteed by the implementation of the state-of-the-art technologies and the long-term experience of engineers in the Zelisko Energy department. For more than 60

years, the high quality of Zelisko instrument transformers is proven by error-free operation in substations under various climatic conditions all over the world.

Zelisko's sensors and instrument transformers are designed to be implemented in intelligent transformer substations in the medium voltage secondary distribution grid. Regarding the development, processing and production of sensors and instrument transformers, Zelisko accesses profound know-how, continuously grown over the years.

GENERAL INFORMATION ABOUT SENSOR TYPES. All current and voltage sensors are finished and routine tested according to IEC60044-7 and -8.

Due to the standardised output voltages calibration and adjustment in the power grid are not necessary anymore. The sensors are marked with a serial number and an inspection record is attached to each product. Furthermore, all the devices are maintenance-free and can be operated under extreme climatic indoor conditions, i.e. elevated temperature and humidity.

TABLE OF CONTENTS

| | |
|---|-----------|
| 1. Current and voltage sensors for medium voltage applications | 4 |
| 1.1 Background and field of application | 4 |
| 1.2 Customer's benefits | 5 |
| 1.3 Application and use | 6 |
| 1.4 Configuration options | 7 |
| 1.5 Function and error limits | 8 |
| 2. Product overview and configuration table | 10 |
| 2.1 Voltage sensors | 12 |
| 2.1.2 SMVS-UW1002-0, UW1002-1 & UW1002-2 | 12 |
| 2.1.2 SMVS-UW1002 | 12 |
| 2.1.3 SMVS-UW1013 | 14 |
| 2.2 Phase current sensors | 16 |
| 2.2.1 SMCS-JW1001 | 16 |
| 2.2.2 SMCS/T-JW1002 | 16 |
| 2.3 Sensor for earth fault detection | 18 |
| 2.3.1 GAE120/SENS-JW1003 | 18 |
| 2.4 Multifunction current sensor | 20 |
| 2.4.1. SMCS3-JW1004 | 20 |
| 2.5 Combined sensor | 22 |
| 2.5.1 SMKS-K1112 | 22 |
| 2.6 Grid intelligent monitor | 24 |
| 2.6.1 GIM | 24 |

1. CURRENT AND VOLTAGE SENSORS FOR MEDIUM VOLTAGE APPLICATIONS

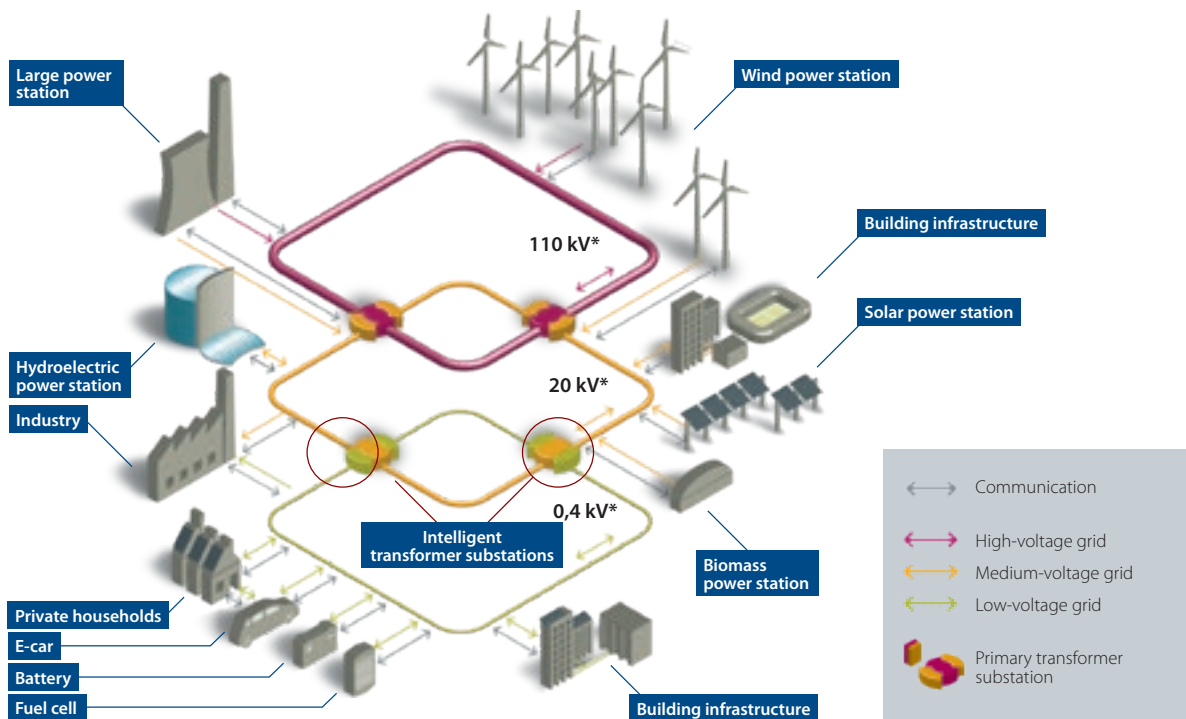
1.1 BACKGROUND AND FIELD OF APPLICATION

The increasing emergence of decentralized supply led to a destabilization of the network in the last years. Therefore the extension of a smart grid is necessary.

| Today | Future |
|---|---|
| Extension of renewable energy | Grid expansion |
| ▶ decentralized power generation systems | New energy storage systems |
| ▶ fluctuating availability | Intelligent transformer substations |
| ▶ feeding in LV- / MV- / HV-grid | ▶ remote signaling and control |
| Consequently: | ▶ integration in power system management |
| ▶ fluctuating energy flow | Intelligent power grid and active load management |
| ▶ variable cable load | Current- / voltage measurement on relevant points in MV-grid |
| ▶ increased short-circuit current | |
| ▶ difficult handling of power quality | |
| ▶ increased demand for balanced energy | |
| ▶ different network control/protection concept | |

4

ACTIVE DISTRIBUTION GRID WITH INTELLIGENT TRANSFORMER SUBSTATIONS



* The given voltage values are exemplary

1.2 CUSTOMER'S BENEFITS

Benefits by implementing Zelisko- I/U-sensors

High measurement accuracy
without on-site calibration

Good transfer behaviour
of current sensors for harmonics

simple installation of I/U-sensors
in original equipment

Simple retrofitting of old facilities
without major modifications of the local network substations

High reliability
even for application in harsh environmental conditions (temp./condensation/EMC)

Measuring signal
In accordance with international transformer standards / IEC standards

This enables

Monitoring of network conditions

- ▶ monitoring of power quality
- ▶ measurement / notification of operational characteristics
- ▶ improved power quality / power system stability

Exact short-circuit / earth fault detection and direction detection

- ▶ faster earth fault detection/elimination
- ▶ less downtime / increased availability
- ▶ automatic switchovers possible

Measuring signal for control tasks

- ▶ reactive current and harmonics compensation
- ▶ voltage regulation through inverters
- ▶ optimized control of transformer tap switch

Optimised management of decentralized power generation systems and of large consumer stations

Cost savings due to:

- ▶ low investment costs
- ▶ cost-effective retrofitting of old facilities
- ▶ no on-site calibration necessary
- ▶ reduced grid losses
- ▶ increased transmission power in MV grid
- ▶ delay/avoidance of grid expansion

1. Current and voltage sensors for medium voltage applications

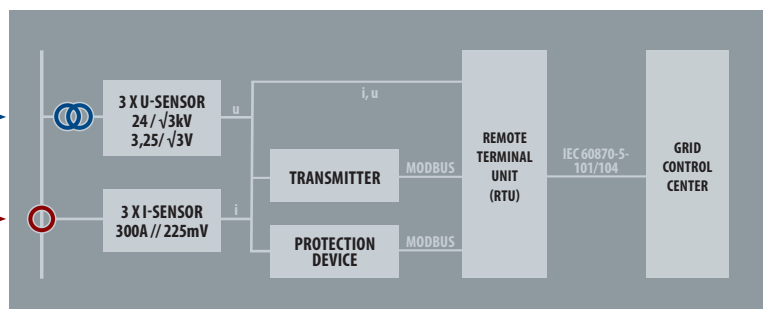
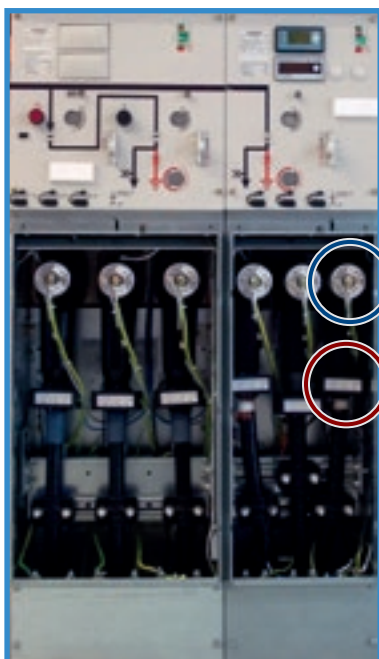
1.3 APPLICATION AND USE

The current and voltage sensors have been developed primarily for medium-voltage switchgear in local network substations in order to equip them with precision measurement technology.

The focus lies on network substations in urban, rural and industrial areas. The measuring sensors are implemented in order to measure, monitor and to detect short-circuits or earth faults and to determine their direction. The com-

pact sensors of Zelisko enable an easy and quick retrofit without major changes in the switch-gear and in the network infrastructure.

INTELLIGENT TRANSFORMER SUBSTATION
(Source: Siemens)









- Transmission of the instantaneous values of current and voltage transducers, protection devices or directly to analogue RTU inputs
- RTU communication to grid control center

CABLE COMPARTMENT OF MV SWITCHGEAR TYPE 8DJH SIEMENS

1.4 CONFIGURATION OPTIONS

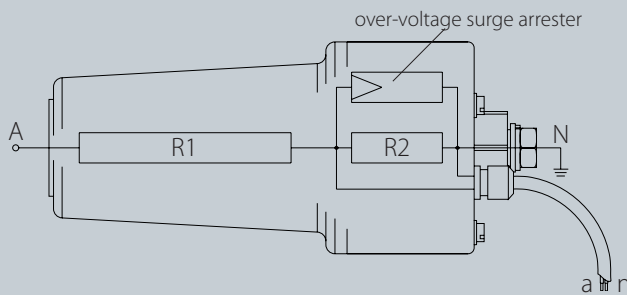
The equipment of the T-connectors with the sensors depends on the type of application, the size of the cable connection compartment in the switchgear and the local situation (i.e. original equipment or retrofit).

| Original equipment | Retrofit |
|---|--|
|  |  |
| 3 x SMCS-JW1001 (current sensor) | 3 x SMCS/T-JW1002 (current sensor) |
| 3 x SMVS-UW1001 (voltage sensor) | 3 x SMVS-UW1001 (voltage sensor) |
|  |  |
| 2 x SMCS-JW1001 (current sensor) | 2 x SMCS/T-JW1002 (current sensor) |
| 3 x SMVS-UW1001 (voltage sensor) | 3 x SMVS-UW1001 (voltage sensor) |
| 1 x GAE120/SENS (sensors for earth fault detection) | 1 x GAE120/SENS (sensors for earth fault detection) |
|  |  |
| 1 x SMCS3-JW1004 (multifunction current sensor) | 3 x SMCS/T-JW1002 (current sensor) |
| 3 x SMVS-UW1001 (voltage sensor) | 3 x SMVS-UW1001 (voltage sensor) |
| | 1 x GAE120/SENS (sensors for earth fault detection) |

1. Current and voltage sensors for medium voltage applications

1.5 FUNCTION AND ERROR LIMITS

VOLTAGE SENSOR

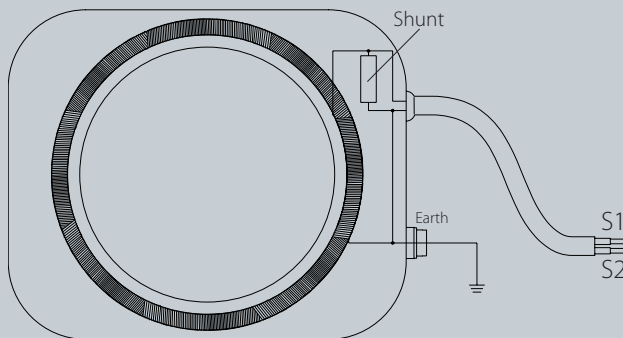


THE FUNCTION PRINCIPLE OF THE **VOLTAGE SENSOR** IS BASED ON A RESISTIVE DIVIDER.

It consists of two resistive elements, which divide the input signal in order to retrieve a normed output value.

The surge arrester provides protection of sequentially connected measuring devices.

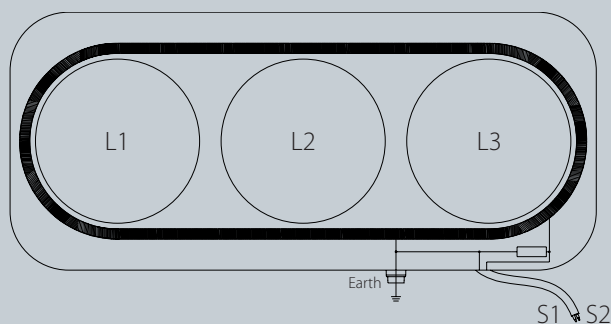
PHASE CURRENT SENSOR



THE **PHASE CURRENT SENSOR** IS BASED ON A LOW POWER INDUCTIVE CURRENT TRANSFORMER.

The current is converted into a proportional voltage by implementing a shunt resistor.

SENSORS FOR EARTH FAULT DETECTION



THE OPERATING PRINCIPLE OF THIS **SENSOR FOR EARTH FAULT DETECTION** IS BASED ON THE ZERO CURRENT TRANSFORMERS.

In case of earth fault, due to a displacement of the neutral point, an asymmetric current occurs in each phase. This current is converted into a defined ratio to the voltage output of the sensor.

Accuracy limits of voltage sensors for measurement purposes

| Class | | Voltage error (%) | Phase displacement (min) |
|----------------------------|-----|-------------------|--------------------------------|
| Accuracy class IEC 60044-7 | 0,5 | 0,5 | 20 |
| | 1 | 1 | 40 |
| | 3 | 3 | limit values are not specified |

Accuracy limits of voltage sensors for protection purposes

| Class | | Voltage error (%) | Phase displacement (min) |
|----------------------------|----|-------------------|--------------------------|
| Accuracy class IEC 60044-7 | 3P | 3 | 120 |
| | 6P | 6 | 240 |

Accuracy limits of phase current sensors for measurement purposes

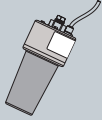
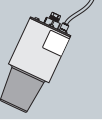
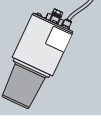
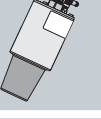

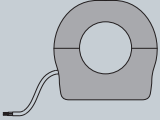
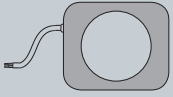
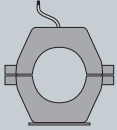

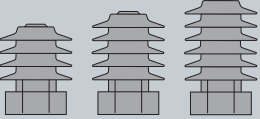
| Class | | Current error (%) | | | | | Phase displacement (min) | | | |
|----------------------------|-----|-------------------|--------------------|--------------------|---------------------|---------------------|--------------------------------|--------------------|---------------------|---------------------|
| | | 5% I _p | 20% I _p | 50% I _p | 100% I _p | 120% I _p | 5% I _p | 20% I _p | 100% I _p | 120% I _p |
| Accuracy class IEC 60044-8 | 0,5 | 1,5 | 0,75 | – | 0,5 | 0,5 | 90 | 45 | 30 | 30 |
| | 1 | 3 | 1,5 | – | 1 | 1 | 180 | 90 | 60 | 60 |
| | 3 | – | – | 3 | – | 3 | limit values are not specified | | | |

Accuracy limits of phase current sensors for protection purposes

| Class | | Current error (%) 100% I _p | Phase displacement (min) | Composite error at rated accuracy-limits |
|----------------------------|-----|--|--------------------------|--|
| Accuracy class IEC 60044-8 | 5P | 1 | 60 | 5 |
| | 10P | 3 | – | 10 |

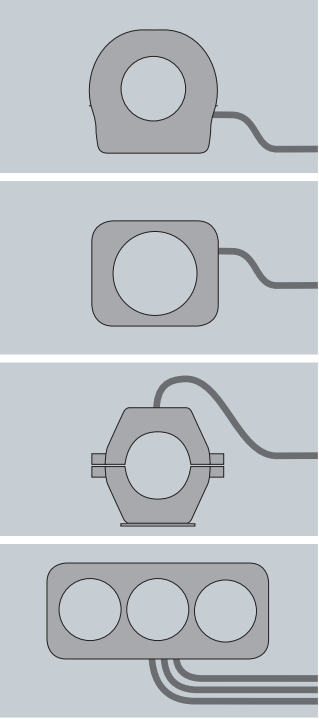
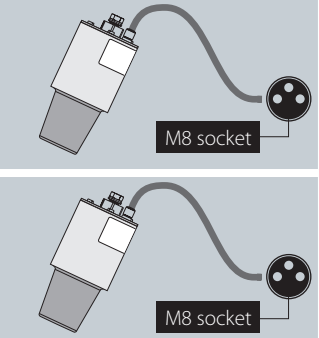
I_p = primary rated current

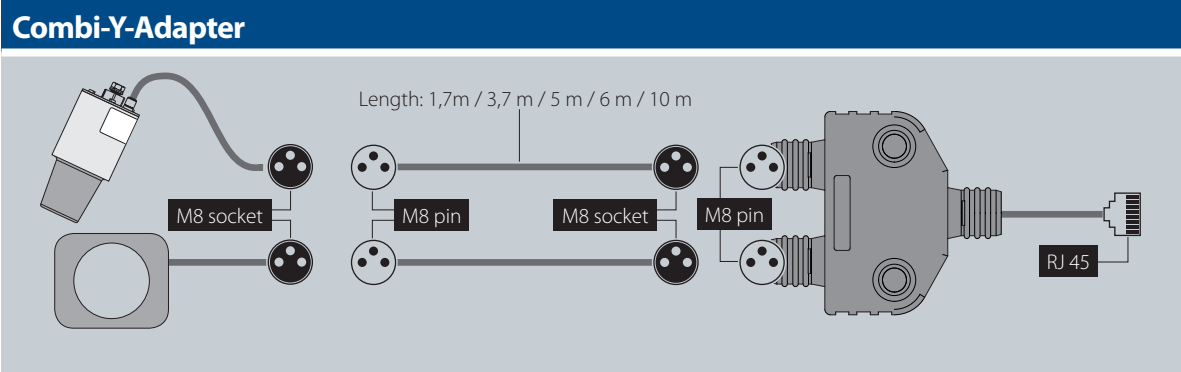
2. PRODUCT OVERVIEW

| Voltage Sensor | | | U (kV) | Application | Manufacturer | T-connector | Page |
|---|---|--|-------------------------------------|-------------------------|--|-------------|------|
| SMVS-UW1001  | Voltage sensor for symmetric plug | 12 / 28 / 75 24 / 50 / 125 36 / 70 / 170 | Original equipment / Retrofitting | Nexans - Euromold | 400TB/G / 440TB/G / K400TB/G / K440TB/G / 400PB-XSA / KAA4 | 12 | |
| | | | | Cellpack | CTS-S 630A | | |
| | | | | Suedkabel | MUT 33 / SEHDT 13 / SEHDT 13 / SEHDT 23 / SEHDT 33 / SEHDT 23 EHDT 33 / UT 33 | | |
| SMVS-UW1002-0  | Voltage sensor for asymmetric plug | 12 / 28 / 75 24 / 50 / 125 36 / 70 / 170 | Original equipment / Retrofitting | NKT | CB 12-630 / CC 12-630 / CB 24-630 / CC 24-630 / CB 36-630 / CC 36-630 | 12 | |
| | | | | TE connectivity-Raychem | RSTI 58xx / RSTI-CC 58xx | | |
| SMVS-UW1002-1  | Voltage sensor for asymmetric plug | 12 / 28 / 75 24 / 50 / 125 36 / 70 / 170 | Original equipment / Retrofitting | Nexans - Euromold | 430TB - 630A / M430TB - 630A / K430TB - 630A / 300PB - 630A / K300PB - 630A | 12 | |
| | | | | Suedkabel | SET 24 / SEHDT 23.1 / SAT 24 / SEHDK 23.1 / SAK 24 / MUT 23 / MUT 23.1 / AD 23.1 SP / SET 36 / SAT 36 / SEHDK 36 | | |
| SMVS-UW1002-2  | Voltage sensor for asymmetric plug | 12 / 28 / 75 24 / 50 / 125 | Original equipment / Retrofitting | Cellpack | CTS 630A / CTKS 630A | 12 | |
| SMVS-UW1013  | Air-insulated voltage sensor | 12 / 28 / 75 24 / 50 / 125 36 / 70 / 170 | Original equipment / Retrofitting | | | 14 | |
| Phase Current Sensor | | | U (kV) | Application | Inside diameter | | Page |
| SMCS/T-JW1002  | Separable phase current sensor (divisible ring cores) | 0,72 / 3 | Retrofitting / (Original equipment) | Ø 55 mm | | 16 | |
| SMCS-JW1001  | Not separable current sensor (closed ring cores) | 0,72 / 3 | Original equipment | Ø 82 mm | | 16 | |
| Sensor for Earth Fault Detection | | | U (kV) | Application | Inside diameter | | Page |
| GAE120/SENS-JW1003  | Separable sensor for earth fault detection (divisible ring cores) | 0,72 / 3 | Retrofitting / (Original equipment) | Ø 120 mm | | 18 | |
| Multifunction Current Sensor | | | U (kV) | Application | Inside diameter | | Page |
| SMCS3-JW1004  | Not separable sensor for earth fault detection (closed ring cores) with phase current sensors | 0,72 / 3 | Original equipment | 3 x Ø 84 mm | | 20 | |
| Combined Sensor | | | U (kV) | Application | Inside diameter | | Page |
| SMKS-K1112  | Combined outdoor sensor | 12 / 28 / 75 24 / 50 / 125 36 / 70 / 170 | Original equipment | | | 22 | |

* Alternatives on request

CONFIGURATION TABLE/CABLE CONNECTIONS

| Sensor | Cable | Connection | Length |
|---|--------------------|---------------------|-------------------------------|
| Current  | LiYCY-OB | open, 2-pin (pref.) | 1 – 20 m |
| | CAT5e | RJ 45 | |
| | 3/4 x LiYCY-OB | open, 2-pin (pref.) | |
| | 1 x CAT5e | RJ 45 | |
| Voltage  | M8 pin LiYCY-OB | open, 2-pin (pref.) | 1.7 m 3.7 m 6 m 10 m |
| | CAT5e M8 pin | RJ 45 | |



2. Products

2.1 VOLTAGE SENSORS

The voltage sensor is mounted on the cable outlet at the back of the T-connector. Therefore, the insulating plug is replaced by the voltage sensor. The accuracy of the sensor, i.e. the absolute value error and phase error, is constant over the lifetime and have not to be recalibrated or readjusted. The calibration to the desired nominal and secondary voltage is performed at Zelisko. Cable length in delivery condition may not be changed.

The voltage sensor is suitable for both, original equipment and retrofitting, without any reconstructions of network stations necessary.

2.1.1 SMVS-UW1001 (for symmetric plug)



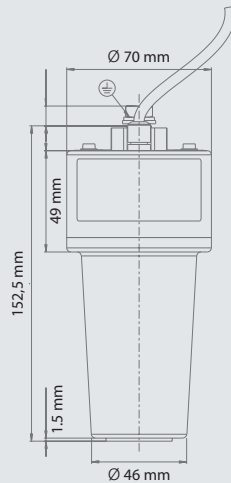
The cone of the voltage sensor is designed in accordance with EN50181, type C. Due to the standardized design it is possible to equip different T-connectors with this sensor.

2.1.2 SMVS-UW1002-0 (for asymmetric plug)

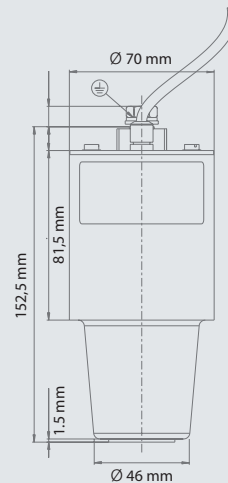
The voltage sensor with shortened cone fits to T-cable manufacturers according table page 13.



SMVS-UW1001



SMVS-UW1002-0



Datasheet

SMVS - UW1001, SMVS - UW1002-0, SMVS - UW1002-1 & SMVS - UW1002-2

| | |
|--|---|
| Insulation level | max. 36 / 70 / 170 kV |
| Rated frequency | 50 Hz / 60 Hz |
| Rated voltages | max. $30/\sqrt{3}$ kV |
| Voltage factor | $1,2 U_N$ and $1,9 U_N$ 8h |
| Accuracy class / Protection class | 0,5 / 1 / 3 // 3P / 6P |
| Rated secondary voltage | $3,25/\sqrt{3}$ V (or on request) |
| Standard | IEC 60044-7 |
| External conditions | Operation: -25°C to +55°C or -40°C to +40°C * Storage: -40°C to +80°C (or on request) |
| Rated burden | 200kΩ ±1% Genauigkeit, 350 pF ±10% * |
| Connection cable & interface | See configuration table page 11 |
| Overvoltage protection | Internal surge arrester |
| Cable connector type | UW1001: Nexans (K) 440TB / Cellpack: CTS-S / Südkabel SEHDT 13 & SEHDT23 * UW1002-0: Nkt CB-24, CC-24 / Raychem RSTI-58xx / RSTI-CC-58xx* UW1002-1: Südkabel SEHDT 36 / Nexans 430TB UW1002-2: Cellpack CTS 630A |

* Alternatives on request

2. Products

2.1 VOLTAGE SENSORS

2.1.3 SMVS-UW1013

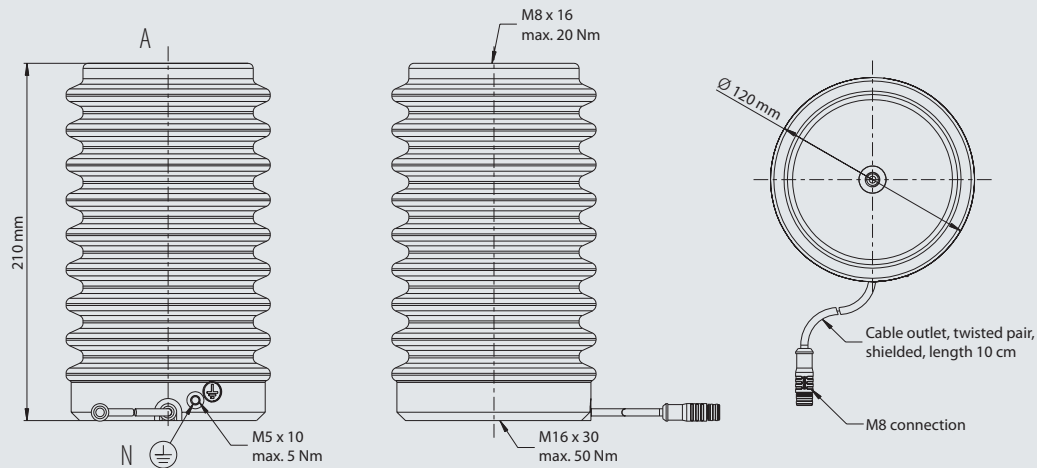
This air-insulated voltage sensor is suitable as original equipment and for retrofitting of air-insulated switchgears. The sensors don't have to be calibrated because the output signal (acc. to IEC60044-7) is guaranteed over the lifetime. Innovative design eliminates ambient influences from electrical and magnetical fields.

On the customer's request, this sensor can be used with supporting function (post insulator function). Technical details are provided in the specific data sheet on request.

The voltage sensors are originally equipped with shielded 2-pole connection cable with a M8-industrial socket. The connection to the electronic device will be realized with an additional extension cable with open ends or on customer request.



SMVS - UW1013



Datasheet SMVS - UW1013

| | |
|--|--|
| Insulation level | 12 / 28 / 75 24 / 50 / 125 36 / 70 / 170 |
| Rated frequency | 50 Hz / 60 Hz |
| Rated voltages | max. $30/\sqrt{3}$ kV |
| Voltage factor | 1,2 U_N and 1,9 U_N 8h |
| Accuracy class / Protection class | 0,5 / 1 / 3 // 3P / 6P |
| Rated secondary voltage | $3,25/\sqrt{3}$ |
| Standard | IEC 60044-7 |
| External conditions | Operation: -25°C to +55°C or -40°C to +40°C * Storage: -40°C to +80°C |
| Rated burden | 200kΩ ±1% Genauigkeit, 350 pF ±10% * |
| Connection cable & interface | See configuration table page 11 |
| Overvoltage protection | Internal surge arrester |
| Height | 12/28/75kV... 130mm 24/50/125kV... 210mm 36/70/170kV... 300mm |
| Max. bending strength | on request |

* Alternatives on request

2. Products

2.2 PHASE CURRENT SENSORS

The phase current sensors are available in different versions. The first version has a dividable ring core for retrofit purposes whereas the second one is available with closed ring cores for original equipment.

2.2.1 SMCS-JW1001 (closed core)



This type is designed for simple original equipment in switchgears. It is slide on the not mounted output T-connector in the substation. When the connector is screwed on the feed through, its sheathing expands. Thus, the sheathing presses against the inner surface of the current sensor and fixes it. Consequently, additional fixations of the sensor in the substation are not necessary.

Due to a stable production process, it is possible to provide sensors in a set of three with a standard deviation in absolute value and phase error of 0,05% and 0,05°, respectively. Consequently, a set of three sensors enables earth fault current detection in addition to the current measurement, without using earth fault detection transformers.

Due to their small size, up to three sensors can be mounted in a cable compartment with a width of 300mm and a phase distance of 95mm.

2.2.2 SMCS/T-JW1002 (split core)

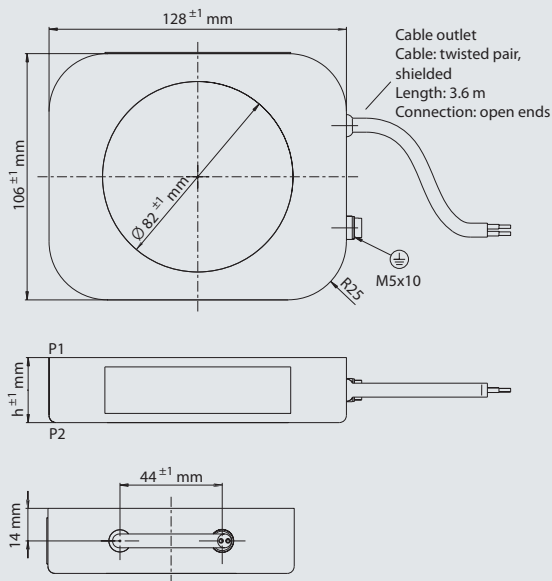


The retrofit application in existing installations is the primary field of application for this type. The click system enables a tool-free mounting of the sensor on site. Dismounting of the T-connector is not necessary, since the sensor is enclosing the cable.

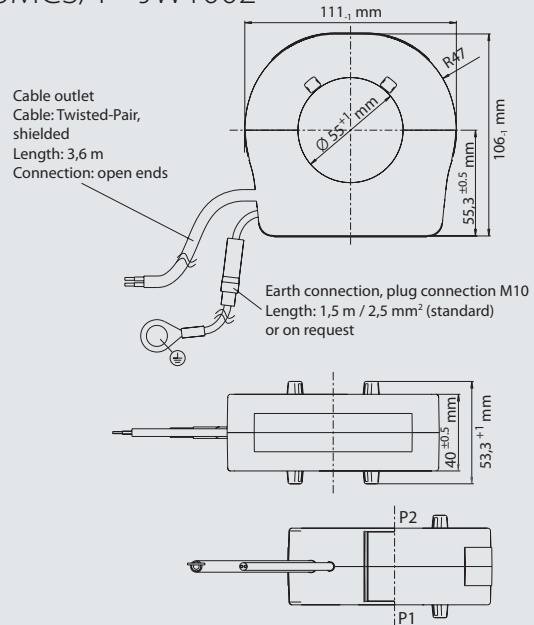
The sensor is delivered with two cable straps to fix it directly on the output cable. The cut surface of the iron core and a sophisticated spring system in the sensor housing ensure that the measurement precision of the sensor is guaranteed after assembly on the output cable.

The accuracy of this sensor, more precisely the absolute value error and the phase error is in class 1 according to IEC 60044-8.

SMCS-JW1001



SMCS/T - JW1002



Datasheet SMCS/T - JW1002 & SMCS - JW1001

| | | | | |
|---|---|-------------------|------------------|--|
| Insulation level | 0,72 / 3 kV | | | |
| Rated frequency | 50 Hz / 60 Hz | | | |
| Rated short time thermal current | 25 kA / 1 s | | | |
| Primary current | 300 A; Ext. 200% * | | | |
| Accuracy class | SMCS/T - JW1002 | 1 & 5P10 ... 5P20 | | |
| | | 3 & 5P10 ... 5P20 | | |
| | SMCS - JW1001 | 28 mm | 0,2 / 0,5 & 5P20 | |
| | | | 1 & 5P10 | |
| | | 50 mm | 3 & 5P10 | |
| | | | 0,2 / 0,5 & 5P20 | |
| | | 1 & 5P20 | | |
| | | 3 & 5P20 | | |
| Output signal | 225 mV according to IEC 60044-8 | | | |
| Standard | IEC 60044-8 | | | |
| External conditions | Operation: -25°C to +55°C or -40°C to +40°C, on request | | | |
| | Storage: -40°C to +80°C, on request | | | |
| Rated burden | ≥ 20 kΩ | | | |
| Connection cable & interface | See configuration table page 11 | | | |

* Alternatives on request

2. Products

2.3 SENSORS FOR EARTH FAULT DETECTION

2.3.1. GAE120/SENS-JW1003 (split core)

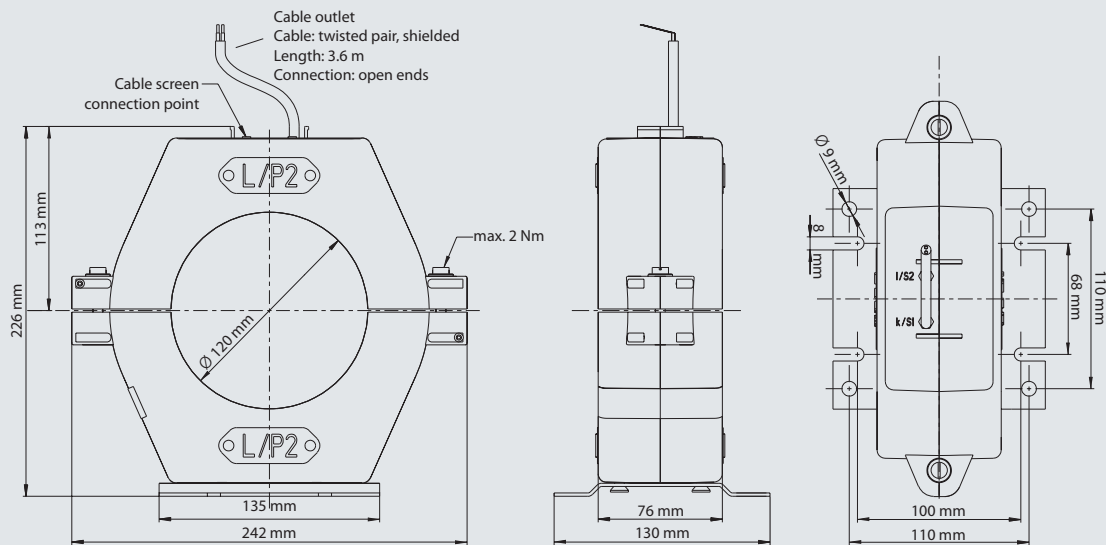
The sensor for earth fault detection of type GAE120/SENS is based on a market proven and established product. All output cables of the substation are conducted through this transformer.



In case of earth fault in a three-phase network, a current occurs due to the displacement of the neutral point. This current is implemented with a specific ratio in the output of the sensor. Therefore the system enables to detect fault and short-circuit currents.

In this sensor inductive transformer principles are combined with sophisticated sensor technology. The high finished cut surfaces of the iron core ensure a constant and high accuracy of the measurement after assembling.

GAE120/SENS - JW1003



Datasheet GAE120/SENS - JW1003

| | | |
|---|---|----------------------------------|
| Insulation level | 0,72 / 3 kV | |
| Rated frequency | 50 Hz / 60 Hz | |
| Rated short time thermal current | 25 kA / 3 s | |
| Ratio earth fault detection | 60 A // 225 mV * | |
| Accuracy class | Primary current: from 1 to 60 A | Phase displacement: ±120 minutes |
| | Class 1 according to IEC 60044-8 | |
| Output signal | 225 mV according to IEC 60044-8 | |
| Standard | IEC 60044-8 | |
| External conditions | Operation: -25°C to +55°C or -40°C to +40°C * | |
| | Storage: -40°C to +80°C * | |
| Rated burden | ≥ 20 kΩ | |
| Connection cable & interface | See configuration table page 11 | |

* Alternatives on request

2. Products

2.4 MULTIFUNCTIONAL CURRENT SENSORS (phase current- and earth fault detection)

2.4.1. SMCS3-JW1004 (closed core)

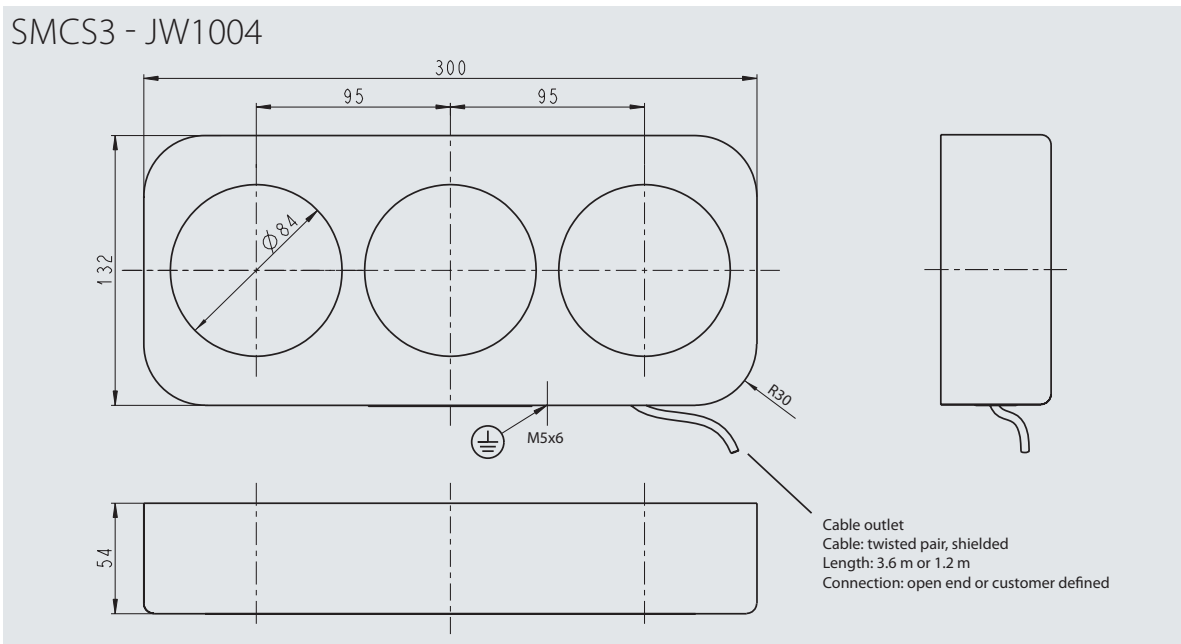
The current sensor in 3-phase design combines maximal flexibility with maximal functionality. It is possible to add the earth fault detection to the three single phase converter in the sensor.



In addition to the extended version, consisting in three current sensors and a sensor for the earth fault detection, different simpler layouts can be provided in accordance with customers' requirements. This sensor is designed for original equipment in switchgears.

An advantage of this system is a simple and easy assembling of a single sensor, which takes over the tasks of up to four different sensors.

The size of the device is always the same, regardless of the configuration chosen by the customer. Due to the closed design of the sensor core, significantly higher accuracies, than with cut iron cores, are achieved. The design of the sensor can be adapted to the customer's request regarding the distance between the poles and the external dimensions.



Datasheet SMCS3-JW1004

| | |
|---|--|
| Insulation level | 0,72 / 3 kV |
| Rated frequency | 50 Hz / 60 Hz |
| Rated short time thermal current | 25 kA / 1 s |
| Ratio phase current sensor | 300 A // 225 mV Ext. 200% * |
| Ratio earth fault detection | 60 A // 225 mV * |
| Accuracy class phase current | 0,5 & 5P10 |
| | 1 & 5P10 |
| | 3 & 5P10 |
| Accuracy class earth fault detection | Primary current: from 1 to 60 A Phase displacement: ± 120 minutes |
| | Class 1 according to IEC 60044-8 |
| Output signal at rated current | 225 mV according to IEC 60044-8 |
| Integrable sensor options | 3x phase |
| | 2x phase + 1 earth fault |
| | 3x phase + 1 earth fault |
| Standard | IEC 60044-8 |
| External conditions | Operation: -25°C to +55°C or -40°C to +40°C * |
| | Storage: -40°C to +80°C * |
| Rated burden | ≥ 20 k Ω |
| Connection cable & interface | See configuration table page 11 |
| Phase distance | 95 mm; other phase distances possible on request |

* Alternatives on request

2. Products

2.3 COMBINED SENSORS

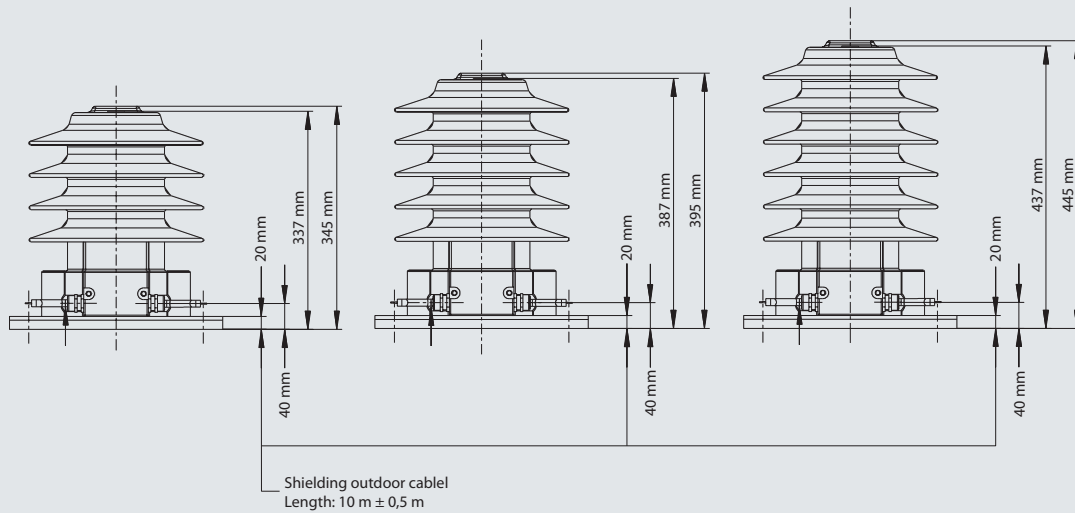
2.2.1 SMVS-K1114

This outdoor sensor combines functions of a voltage and a current sensor in one design. Due to the structural shape and use of cycloaliphatic epoxy resin, it is adapted for outdoor application. The combined sensor is available with an insulation level up to 36 kV.

By usage of proven Zelisko sensor-technology, specified accuracy class can be guaranteed for the complete lifetime without calibration on site.



SMCS-K1112



Datasheet SMVS - K1114

| | Voltage sensor | Current sensor |
|---|---|------------------------------|
| Insulation level | max. 36/70/170 kV | |
| Rated frequency | 50 Hz / 60 Hz | |
| Rated voltages / Rated current | max. 30/ $\sqrt{3}$ kV | 300 A * |
| Voltage factor / Ith | 1,2 U_N und 1,9 U_N 8h | 25 kA, 1 s |
| Accuracy class | 0,5 / 1 / 3 & 3P, 6P | 0,2 / 0,5 / 1 / 3 & P10, P20 |
| Secondary | 3,25 / $\sqrt{3}$ V * | 225 mV or 1 A |
| Standard | IEC 60044-7 | IEC 60044-8 |
| External conditions | Operation: -25°C to +55°C or -40°C to +40°C * | |
| | Storage: -40°C to +80°C | |
| Rated burden | 200 k Ω \pm 1%, 350 pF \pm 10% | \geq 20 k Ω |
| Connection cable & interface | 2 x 2 pin shielded or 1 x 4 pin shielded | |
| Overvoltage protection | Internal surge arrester | |
| Construction heights | 24/50/125kV... 398mm | |
| | 36/70/170kV... 448mm | |

* Alternatives on request

2. Products

2.6 GRID INTELLIGENT MONITOR

2.6.1 GIM (Digital short-circuit indicator with measuring function)

More transparency in the distribution system. The key to continuously improving power supply is essentially in-depth knowledge of the relevant conditions of the local power supply network. This is supported with smart devices which ensure unprecedented transparency.

Zelisko offers a complete portfolio for network monitoring, power quality recording, fault recording, phasor measurement and system software application for this requirement.

Zelisko GIM – the finger on the pulse of your distribution network

Zelisko GIM (Grid Intelligent Monitor) is a short-circuit and ground fault indicator with direction indication which uses

protection algorithms and Zelisko low-power sensor technology in accordance with IEC 60044. Additionally the integrated Modbus RTU Interface can provide up-to-date measured values for a precise evaluation of the distribution grid.

The GIM was specially designed for Zelisko current and voltage sensors and can be used without any additional calibration on site.



Benefits

| | |
|---|---|
| Usable in grounded, isolated and compensated networks | Facilitate minimum loss of network fees/end consumer fees |
| Integrated load flow direction indicator | Up-to-date measured values for operation management and planning support targeted use of investment resources in network planning and network expansion |
| Directional short-circuit and ground fault detection | Direct voltage measurement in the low-voltage network |
| Cost savings thanks to precise and fast fault localization | Direct connection of Zelisko low-power sensors with a high measuring quality and accuracy |
| Selective fault information with direction indication used as a basis for „self-healing“ applications | Flexible ground current measurement down to 0.4 A |
| Service restoration times in the range of minutes or seconds (depending on the primary equipment) | Self-testing function of communication connection |

Zelisko GIM is the first short-circuit indicator which uses sensors in line with the IEC 60044-7 /-8 standard. This enables high-precision measurements without calibration and adjustment to the primary variables.

Device characteristics

| | |
|---|---|
| Communication: | Auxiliary voltage: |
| Interface RS485 incl. Modbus RTU communication for all data and remote configuration | AC 230 V |
| Signalization: | DC 24 - 110 V |
| Display for visualization of current measured values or fault information in the distribution network, 4 function keys | Battery with service life > 15 years |
| 3 LEDs to signal the operating mode | Inputs: |
| 2 binary outputs | 3 inputs for alternating voltage, settable for either $100V/\sqrt{3}$ or Zelisko voltage sensors (e.g. UW 1002) (in accordance with IEC 60044-7) |
| Measured variables: | 3 inputs for Zelisko current low-power sensors e.g. JW 1002 (as per IEC 60044-8). The nominal primary current can be configured from 50 A to 1000 A in Zelisko GIM. Optional configuration of current input L2 for sensitive ground fault detection with Zelisko current sensor GAE 120/Sens-JW 1003 (as per IEC 60044-8). The nominal primary current can be configured in Zelisko GIM |
| RMS measured values | Alternatively: Inputs for conventional transducers |
| Phase voltages and currents, ground current, power system frequency and $\cos \varphi$ phase angle, active power, reactive power and apparent power | 1 A / 5 A via adapter |
| Energy meters | 1 binary input |
| Minimum and maximum values for all phase currents from 15 minutes to one year as a slave pointer function | Housing: |
| Time synchronization: | Polycarbonate, for panel flush mounting |
| Time synchronization via Modbus RTU | Dimensions: 96 x 48 x 109.5 mm (W / H / D) |
| Temperature range: | Protection class: Front IP40, rear IP20 |
| From -40 °C to +70 °C | |

Notes



Notes

A series of 25 horizontal dotted lines for taking notes.

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