NON-CONVENTIONAL VOLTAGE AND CURRENT TRANSFORMERS (NCVT & NCCT)



1969
ZAJEČAR
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INTRODUCTION

GENERAL INFORMATION

The development of microprocessor technology has led to a modification of the requirements for instrument transformers used for measurement and protection because of self-powered and microprocessor-based relays. Modern secondary equipment does not require the high-power outputs of the instrument transformers, which was necessary with electromechanical relays.

For this reason, FMT has developed a series of low-power sensors, a range of voltage and current transformers which are compatible with modern microprocessor-controlled relays and other secondary equipment with high input impedance.

FMT Low-Power Sensors fit into existing, as well as future switchgear designs and they meet the requirements of standards IEC61869-10 and IEC61869-11.

The output signal of the FMT **Voltage Sensor** is expressed in volts rather than in conventional hundreds of volts; the output of the FMT **Current Sensor** is expressed in millivolts rather than in conventional amperes. The low-power sensors have a very good linearity and an extended measuring range. Both current and voltage sensors produce a small voltage signal at the output (in the order of mV, up to a few V). This provides increased safety for the field service staff as well as durability and reliability of the connected equipment, while reducing the risk of damages caused by human error.

VOLTAGE AND CURRENT SENSORS

The latest and highly focused products are non-conventional current and voltage transformers (NCCT & NCVT) also known as sensors, for secondary energy distribution. These products are type and routinely tested according to the IEC61869-11 standard for voltage transformers and IEC61869-10 for current transformers.

PRODUCT ADVANTAGES

General

- Passive technology, with no active components inside and no need for a power supply
- Accuracy classes for all sensors are tailored to customer needs/applications
- High temperature range
- Cost effective
- Reduced size and weight

Current sensor

- Compact in size
- Divisible form suitable for retrofitting
- Easy installation, mounting without screws
- Customized earthing connection system

Voltage senzor

- These sensors can be used with a wide range of T-connectors from different manufacturers
- The sensor is reduced in size, so it is the same length as a standard blind fitting
- The sensor's reduced size allows for maximum installation possibilities.
- Robust design, hexagon nut is made of solid aluminum
- Sensor can withstand torque of up to 50Nm during installation
- Compatible with T-connectors manufactured in accordance with IEC50181 standard, Type C connectors

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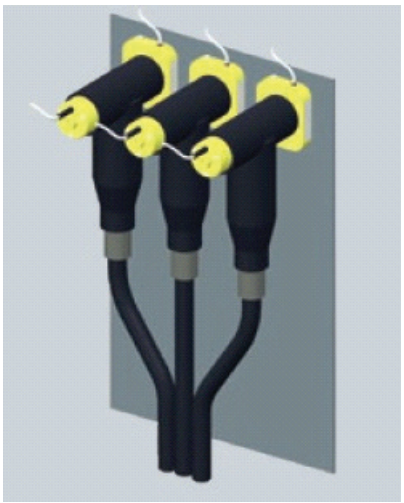
INSTALLATION

Current and voltage sensors will be mounted inside the cable compartment of a ring main unit. You will find T-connectors in this compartment (see below).

There is no need to calibrate the sensor on-site because they are factory-calibrated to output a signal in accordance with the IEC standard.







For the initial installation of new ring main units, the current sensor is mounted over the bushing-type insulator. This solution is more cost-effective and allows for higher accuracy classes.



For retrofit installations, another type of current sensor is used. This sensor is divisible and could be easily mounted on the cable which connects the ring main units together.

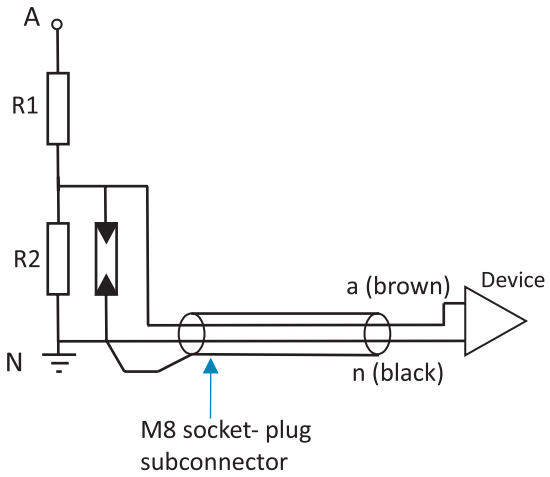
The voltage sensor is designed for both initial and retrofit installation. To equip a cable with this sensor, it is only necessary to remove the blind epoxy resin plug from the cable and screw the sensor into place.

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VOLTAGE SENSORS

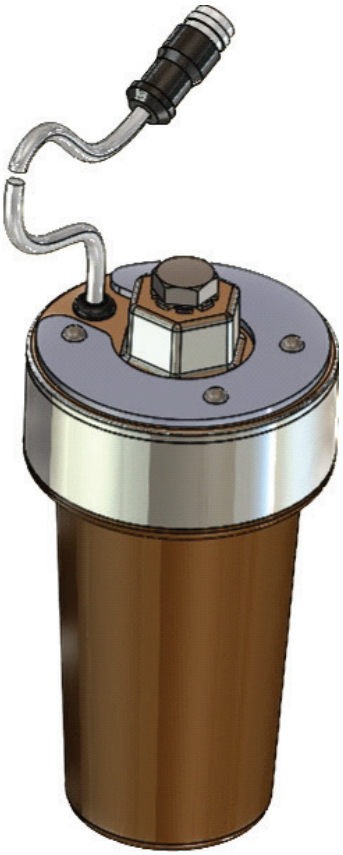
The voltage sensor's operation is based on the principle of an ohmic divider, which is factory-calibrated to a guaranteed accuracy class. It is only necessary to know the ohmic resistance of the measuring device's input impedance, because the sensor is insensitive to changes in capacitance.
They are designed for protection in medium-voltage networks and for measuring system in accordance with IEC61869-11 standard. For voltage levels between 1kV and 24kV, there are resistors embedded into a casted resin.
All voltage sensors are type tested and routine tested in accordance with IEC61869-11 standard.

Operating principle



NSCxx-xx

12-24 kV voltage sensor for type C cone according to EN50181 and EN50180 standards

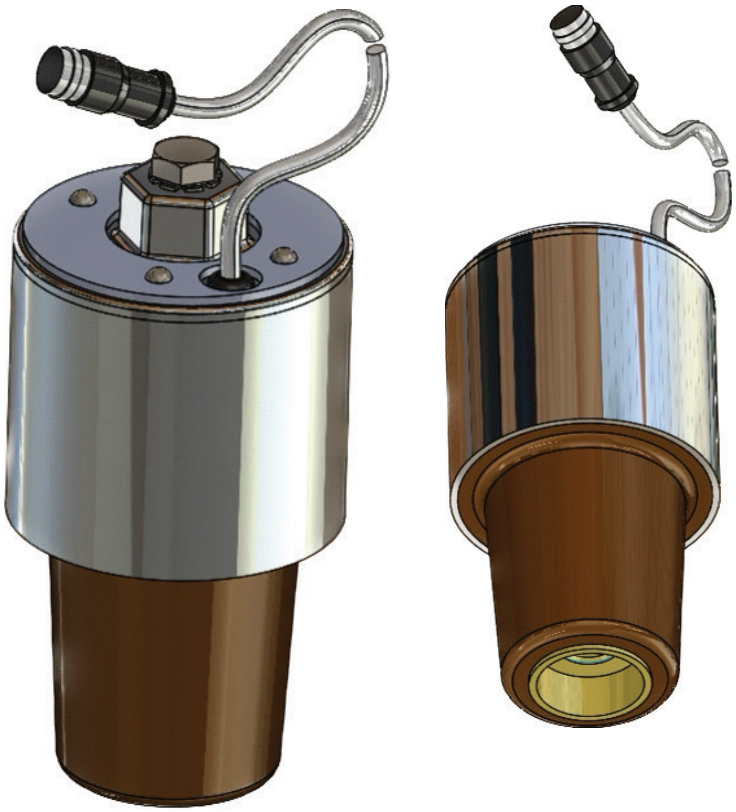




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NSKxx-xx

12-24 kV voltage sensor for asymmetric T-connectors



Data sheet

NSCxx-xx//NSKxx-xx	
Isolation level	max. 24 / 50 / 125kV
Nominal voltage	max. 24/√3 kV
Nominal frequency	50Hz
Secondary output	3,25/√3 V or customer defined
Overvoltage factor	1,9 Un for 8h
Accuracy classes	0,2 / 0,5 / 1 / 3 &3P / 6P
Standard	IEC 61869-11
Input impedances of measurement devices	200kΩ [1]; Capacitance max. 5nF
Connection	2 pole, open wires inclusive screen, cable length in 2m, 10m and 20m [2]
Temperature range	Operating and storage: -40 to +80°C
T-Connector for NSCxx-xx	*Planned: Südkabel, Nexans, Prysmian, 3M*
T-Connector for NSKxx-xx	*Planned: Südkabel, Nexans, nkt, Raychem, Cellpack, 3M* [3]

[1] Accuracy of input impedance of measurement device influences the accuracy of the entire measurement system
Rule of thumb: +/-1% means an additional error of 0.1% in the amplitude

[2] Cable length could be cut by the customer, if it is necessary

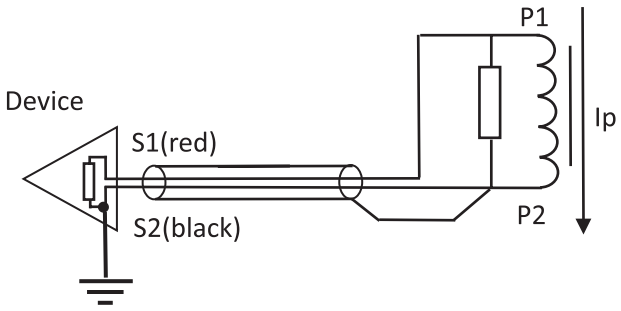
[3] A multicompatible sensor for the short cone is used

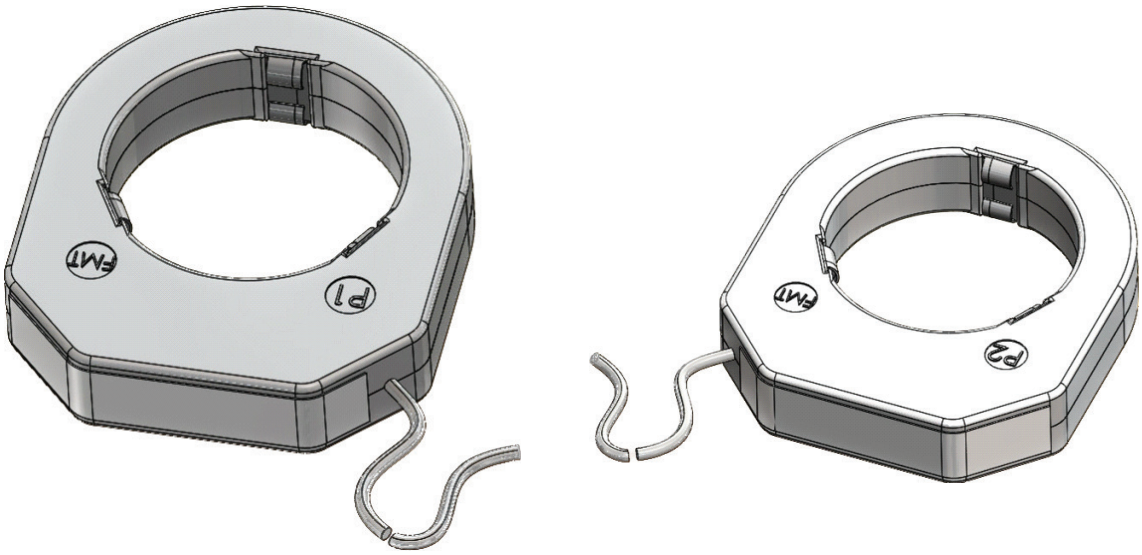
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CURRENT SENSORS

Current Sensors are passive devices. Their operation is based on the principle of a ring or split core transformer with an integrated precision shunt, designed for medium-voltage protection and measuring systems in accordance with IEC61869-10 standard. Current sensors provide a voltage output proportional to the primary current.
All current sensors are type tested and routine tested in accordance with IEC61869-10 standard.

Operation principle

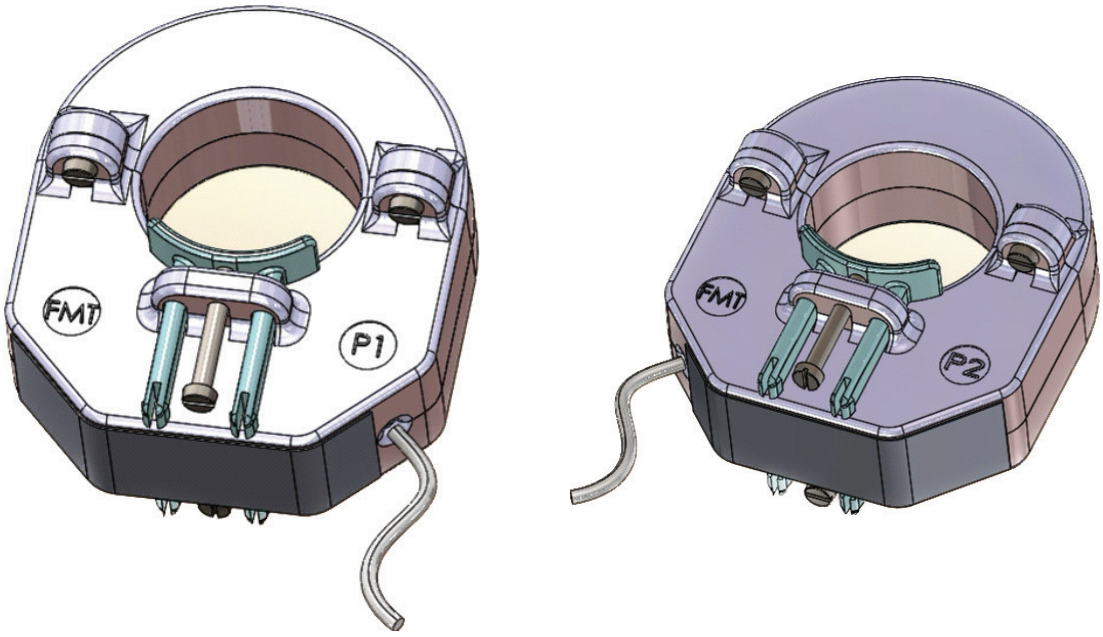




SSOxxx-xx

The non-divisible current sensor SSOxxx-xx is mounted over the bushing-type isolator of the T-connector.

The internal holders are flexible to accommodate any external diameter of the T-connector.



SSDxxx-xx

The divisible current sensor SSOxxx-xx is mounted around the cable.

The flexible clamps system allows for easy and reliable installation on any cable with a diameter of up to 55mm.

Data sheet

SSOxxx-xx// SSDxxx-xx	
Isolation level	0,72 / 3kV / -
Nominal primary current	40-1000A; Extension 200%; or customer defined
Secondary output	225mV acc. IEC; or customer defined
Nominal frequency	50Hz
Thermic short current	25kA 3s
Accuracy classes SSOxxx-xx	0,2S / 0,2 / 0,5S / 0,5 / 1 / 3 &max. 5P20
Accuracy classes SSDxxx-xx	0,5S / 0,5 / 1 / 3 &max. 5P20
Standard	IEC60044-8 / IEC61869-11 (future)
Input impedances of measurement devices	20kΩ[1]; capacitance not relevant
Connection	2pole, open wires inclusive screen
Temperature range	Operating and storage: -40 to +80°C

[1] The input impedance of the measurement device influences the accuracy of the entire system. The higher the impedance - the better. With 20kΩ an additional error of 0.02% in amplitude error will be generated.

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