

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







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INTRODUCTION

GENERAL INFORMATION

By growing microprocessor technology, the modern switchgear technology has modified the requirements for instrument transformers used for measurement and protection because of self-powered and microprocessor-based relays. The modern secondary equipment does not need the high-power output of the instrument transformers as this was necessary for electromechanical relays. For this reason, FMT developed the low power sensors series, a range of voltage and current transformers which are compatible with the modern microprocessor-controlled relays and other secondary equipment with high input impedance.

FMT Low Power Sensors fit into existing as well as future designs of switchgear and fulfill the requirements of standards IEC61869-10 and IEC61869-11. The output signal for the FMT Voltage Sensor is volts rather than conventional hundreds of volts; the output of the FMT Current Sensor is millivolts rather than conventional amperes. Low power sensors have a very good linearity and an extended measuring range. Both, current and voltage sensors provide a low voltage signal output (mV to some Volts). Thereby the safety for the connected equipment and for the field service staff increases and the risk of damages caused by human errors is reduced.

VOLTAGE AND CURRENT SENSORS

Newest and highly focused products are non-conventional current and voltage transformers (NCCT & NCVT) also known as sensors, for the secondary energy distribution. Those products are type and routine tested according IEC61869-11 for voltage transformers and IEC61869-10 for current transformers.

PRODUCT ADVANTAGES

General:

- Passive technology, no active parts are inside or a power supply is needed
- Accuracy classes for all sensor designed for customer needs/application
- High temperature range
- Cost effective
- Reduced size and weight

Voltage sensor:

- Sensor could be used on a big range of different T-connectors of different manufacturers
- Short-form factor, Sensor is as long as a standard blind plug
- Short-form factor, Sensor is shortened to the limit to enable maximum installation possibilities
- Robust design, hexagon nut is made of solid aluminium
- Sensor can resist torque up to 50Nm used during installation
- Compatible to T-connectors acc. IEC50181, Type C connectors

Current sensor:

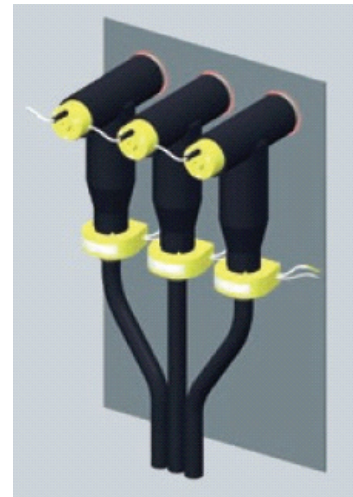
- Small form factor
- Split-able form factor for Retrofit installations
- Easy installation, fixation without screws
- Adaptive connection system for earth connection

INSTALLATION

Current and voltage sensors will be mounted inside the cable compartment of a ring main unit. In this housing, you can find the T-connectors (see below).



For first installation of new ring main units the current sensor is mounted over the bushing of the line. This solution is more cost effective and higher accuracy classes are possible.



For Retrofit installations, another 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 first 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 in.

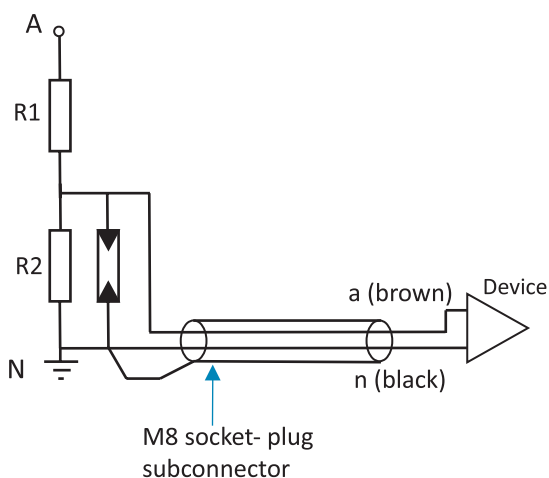
It is not necessary to make an adjustment of the sensors in the field, due to all sensors are factory calibrable delivering a signal according to the IEC standard.



VOLTAGE SENSORS

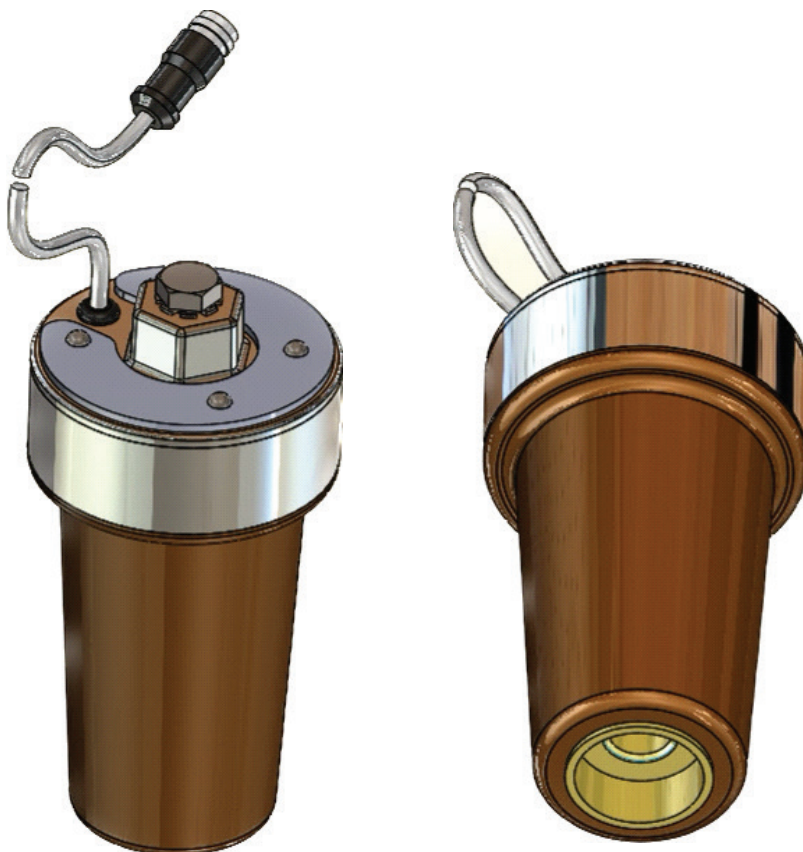
The voltage sensor base on the principle of a ohmic divider, which is adjusted in the factory to the guaranteed accuracy level. It is only necessary to know the ohmic part of the input impedance of the measurement device, due to the sensor is insensitive against changes in the capacitance. They are designed for medium voltage protection and measuring system in accordance with IEC61869-11. For voltage levels between 1kV and 24kV the resistors are embedded into a casted resin. All voltage sensors are tested according IEC61869-11, type tested and routine tested.

Function principle



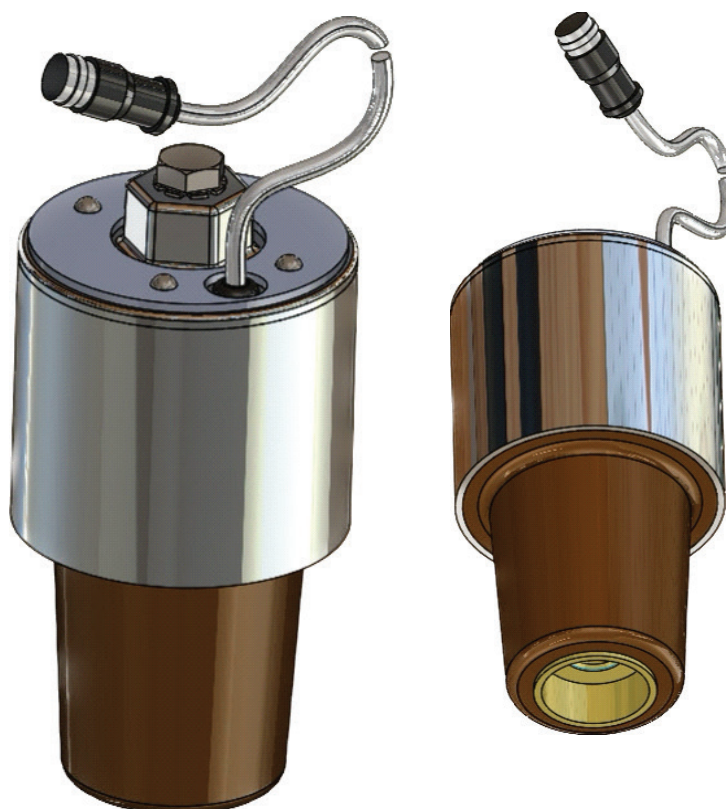
NSC-xx-xx

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



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/ $\sqrt{3}$ kV
Nominal frequency	50Hz
Secondary output	3,25/ $\sqrt{3}$ 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	200k Ω 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 whole 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

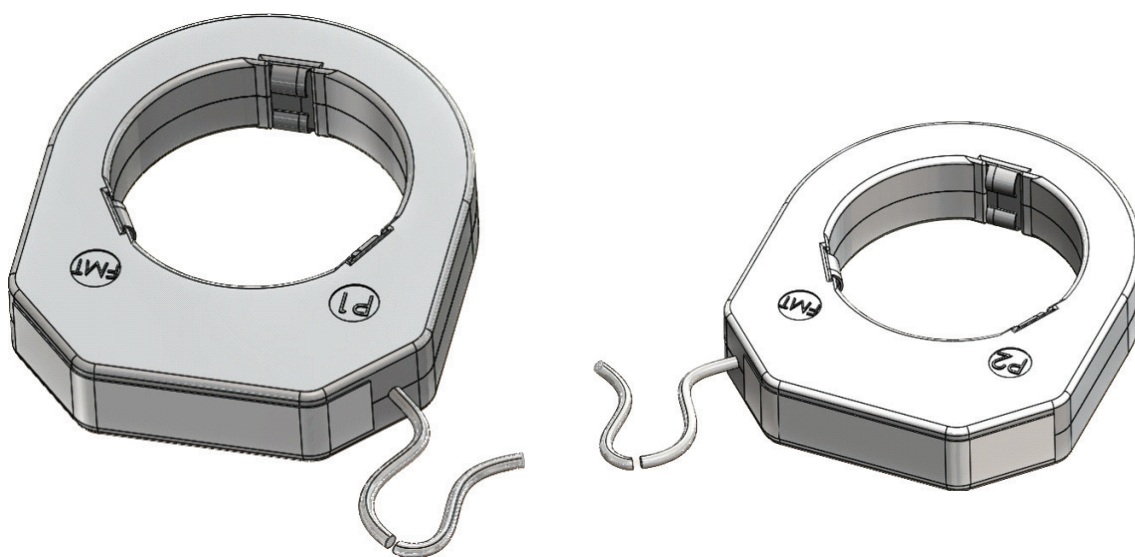
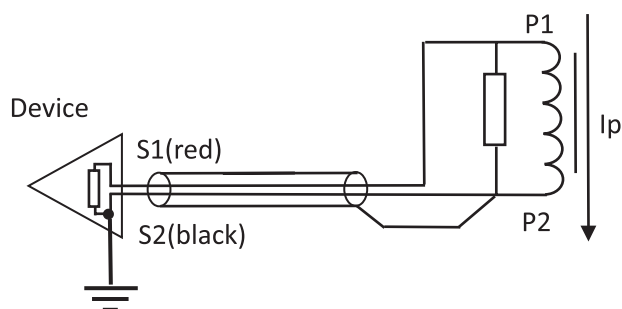
³ A multicompatible sensor for the short cone is used



CURRENT SENSORS

Phase Current Sensors are passive devices, based on 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. The current sensors provides a voltage output proportional to the primary current. All current sensors are tested according IEC61869-10, type tested and routine tested.

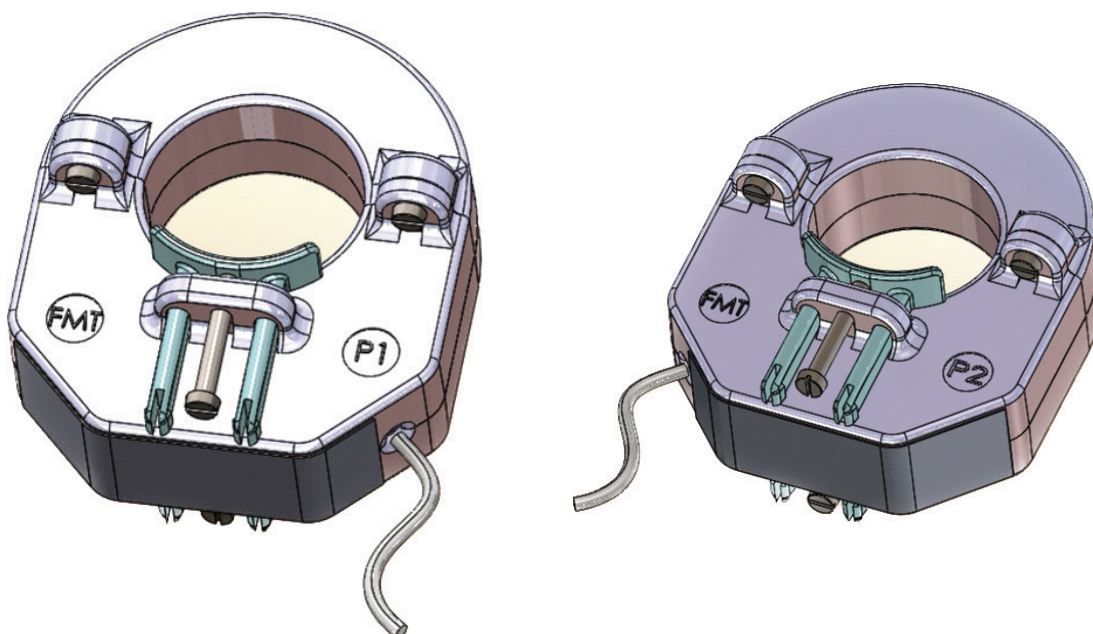
Function principle



SSOxxx-xx

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

Holders on inner diameter are exchangeable to fit on any T-connector outer diameter



SSDxxx-xx

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

The flexible clamps system allows an easy and reliable installation on any cable up to 55mm diameter

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 whole system. The higher the impedance the better it is. With 20kOhm an additional error of 0.02% in amplitude error will be generated.

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