
GWP
greenwood power
LEADING INNOVATOR FOR NON-CONVENTIONAL TRANSFORMERS
2024

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COMPANY PROFILE

GWP

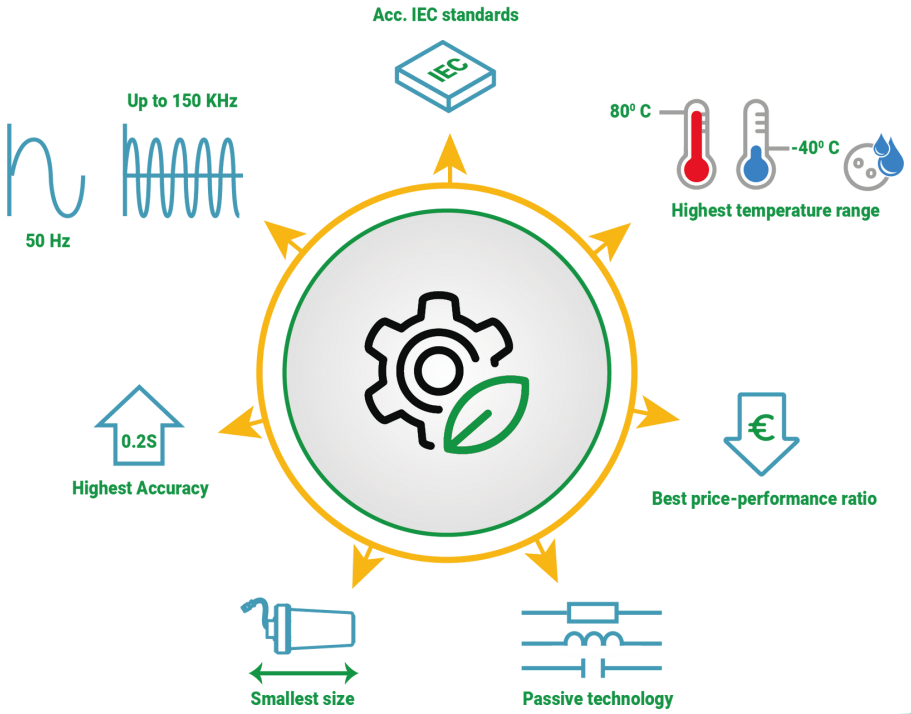
The leading innovator for non-conventional transformers

Your innovative partner for every design of non-conventional instrument transformers at low and medium voltage level.

Our products promote the progression into a smart grid with superior resilience, outstanding sustainability and excellent safety.

We stand for:

- absolute customer specialization and tailored customer solutions
- high quality products
- best price-performance ratio on the market
- short decision-making processes and extremely fast implementation
- unique expertise



VOLTAGE SENSORS

Cone type sensors for T-connectors in gas-insulated, medium voltage switchgears according to IEC 61869-1, -11

VxxxC-xx

Voltage sensor with type C cone, acc. EN 50181

VxxxK-xx

Voltage sensor with shortened cone

VxxxB-xx

Voltage sensor for Nexans T-connector 480TB/G

VxxxAE-xx

Voltage sensor with IEEE-386 Size 11 cone

VxxxJC-xx

Voltage sensor for Cellpack CTS-S 630 Type C cone

VxxxJK-xx

Voltage sensor for Cellpack CTS 630 short cone

VxxxAQ-xx

Voltage sensor for installation inside elbow connector

DESCRIPTION

Features

- Passive technology – no active parts are inside, and no power supply is needed
- Short-form factor - Sensor is as long as a standard blind plug
- Robust design - Hexagon nut is made of solid aluminum
- Sensor can resist torque up to 50Nm used during installation
- Compatible with many different T-connectors
- High temperature range
- Available as ECO-variant: Initial accuracy class 1, utilizing correction factors accuracy class improvement possible

PRODUCT DESCRIPTION

The voltage sensors are commonly used in T-connectors of different manufacturers. The T- connectors are usually closed with a blindplug, however this could be removed, and the sensor could be installed into its place. The sensor is then connected with the common earth and with the secondary connection cable to an intelligent electronic device (IED).

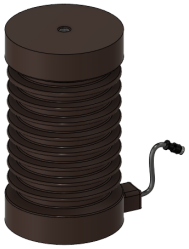
TECHNICAL DATA

	VxxxC-xx VxxxJC-xx	VxxxK-xx VxxxJK-xx	VxxxB-xx	VxxxAE-xx	VxxxAQ-xx
Isolation level	max. 36/70/170kV	max. 24/50/125kV		max. 15/25/28kV	
Nominal voltage	max. 30kV/√3*	max. 20kV/√3*		max. 25kV/√3*	
Secondary output	3.25V/√3*				
Accuracy classes	0.2/0.5/1/3 & 3P/6P				
Burden	≥100kΩ-10MΩ, < 500pF*				
Primary connection	Type C-cone acc. EN50181	Short Cone**	Nexans 480TB/G	IEEE-386 Size 11cone	Elbow connector
	Cellpack CTS-S 630 Type C-cone	Cellpack CTS -24			
Secondary connection	open ends (interconnection)*				
Length	124 - 168 mm 124 mm	136 mm 125.5 mm	118mm	120mm	163mm

*or customer defined
** designed T-connectors for Südkabel, NKT, Tyco, 3M

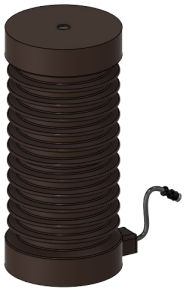
VOLTAGE SENSORS

Support insulator sensors for installation in air insulated switchgears according to IEC 61869-1, -11



V120L-xx

Support voltage sensor



V240L-xx

Support voltage sensor

V360L-xx

Support voltage sensor

DESCRIPTION

Features

- Bending strength on request
- Passive technology – no active parts are inside, and no power supply is needed
- Easy installation due to a single screw point on the bottom side
- High temperature range
- Available as ECO-variant: Initial accuracy class 1, utilizing correction factors accuracy class improvement possible

PRODUCT DESCRIPTION

The voltage sensors of Type VxxxL-xx are used in indoor air insulated switchgears. The sensor is connected to the common earth by the installation point of the product and with the secondary connection cable connected to an IED. The sensor can resist horizontal forces and therefore could be used as support insulator sensor for bus bars.

TECHNICAL DATA

	V120L-xx	V240L-xx	V360L-xx
Isolation level	12/28/95kV	24/50/125kV	36/70/170kV
Nominal voltage	max. 10kV	max. 20kV	max. 30kV
Secondary output	3.25V/√3*		
Accuracy classes	0.2/0.5/1/3 & 3P/6P		
Burden	≥100kΩ-10MΩ, < 500pF*		
Primary connection	busbar M10x20mm*		
Secondary connection	open ends *		
Height	130mm	210mm	300mm

*or customer defined

CURRENT SENSORS

Current sensors for retrofit or first installation applications in medium voltage switchgears according to IEC 61869-1, -10

ExxxR-xx

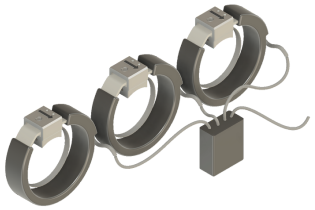
Current sensor for installation on bushings

ExxxE-xx

Residual current sensor for retrofit installation in split-core-design with correction factors

ExxxT-xx

Current sensor for retrofit installation in split-core-design



ExxxE-9L

Residual current sensor for retrofit installation in split-core-design

ExxxTx-xx

Waterproof current sensor for retrofit installation in split-core-design

DESCRIPTION

Features

- Passive technology – no active parts are inside, and no power supply is needed
- Splitable form factor for retrofit installations
- Easy installation on bushings and cables
- Correction factors for amplitude and phase inaccuracy improve the sensor class
- Available as ECO-variant: Initial accuracy class 1, utilizing correction factors accuracy class improvement possible
- IP68 protection if needed

PRODUCT DESCRIPTION

These sensors are dedicated to installation on the cables of a GIS or AIS in the primary or secondary energy distribution or around the bushing of a GIS. The design can be realized wirth a splitable core, making it easy to put the sensor on an existing cable. Due to cost effective construction, the sensor has a very high cost-benefit ratio.

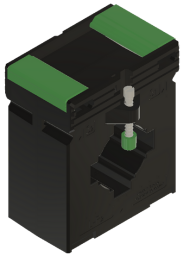
TECHNICAL DATA

	ExxxR-xx	ExxxT-xx	ExxxTx-xx	ExxxE-xx	ExxxE-9L
Isolation level	0.72/3/-kV				
Nominal voltage	300A Ext. 200%			60A *	
Secondary output	225mV$_{AC}$ *				
Accuracy classes	0.2S/0.2/0.5S/0.5/1/3	0.5S/0.5/1/3		3	1/3
Over current factor	max. P10	max. P20		max. P50	
Burden	≥10kΩ-10MΩ, <1nF				
Primary connection	on bushing	on cables			
Secondary connection	clamps, RJ45, open ends *				
Inner diameter	83mm	65mm			160mm

*or customer defined

CURRENT SENSORS

Sensors for low voltage applications according to IEC 61869-1, -10



LxxxR-xx

Low voltage current sensor in different sizes

LxxxT-xx

Highly-flexible low voltage current sensor for retrofit installation on low voltage wires

DESCRIPTION

Features

- Passive technology – no active parts are inside, and no power supply is needed
- Standard housings, commonly used in low voltage applications are used
- Easy installation as retrofit solution
- High temperature range
- Wide range behaviour is feasible
- Available as ECO-variant: Initial accuracy class 1, utilizing correction factors accuracy class improvement possible

PRODUCT DESCRIPTION

The LxxxR-series is developed specially for low voltage applications. The design is ideal for installation since the housing has an extra small design for easy implementation in switchgears or in common housings of CT's.

The LxxxT-xx current sensor has a split-core design, yet has a robust and cost efficient shape. With the same flexibility as a Rogowski coil and accuracy of a CT it includes all advantages of conventional products.

TECHNICAL DATA

	LxxxR-xx	LxxxT-xx
Isolation level	0.72/3/-kV	
Primary current	40-1600A	100-1000A
Secondary output	225mV*	
Accuracy classes	0.2/0.5S/0.5/1/3	0.5/1/3
Over current factor	max. P10	
Burden	≥10kΩ, <1nF	
Primary connection	busbar	on cables
Secondary connection	screw terminals	open ends*
Inner diameter	150-510mm	400mm

*or customer defined

OUTDOOR APPLICATIONS

Voltage-, current - and combined sensors for applications on overhead lines, either hanging or mounted on a rail.

VxxxFE-xx

Voltage sensor rail mount
up to 36kV

VxxxFD-xx

Voltage sensor hanging
up to 36kV

ExxxFG-xx

Current sensor rail mount
up to 36kV

ExxxFF-xx

Current sensor hanging
up to 36kV

PxxxFC-xx

Combined voltage and
current sensor rail mount
up to 36kV

PxxxFB-xx

Combined voltage and
current sensor hanging
up to 36kV

DESCRIPTION

PRODUCT ADVANTAGES

- Modular system for best price performance ratio
- Long lifetime, outdoor epoxy resin
- All products available as hanging or standing version
- Highest stability against harsh environmental conditions due to passive components

PRODUCT DESCRIPTION

All outdoorsensors are built in a modular system, which allows to offer different kind of installations like hanging or standing on a rail. In addition, the systems could be easily extended to voltages up to 36kV.
Either pure current-, voltagesensors or combined sensors could be supplied. The sensors are made of cycloaliphatic epoxy resin, which is well known and proven in outdoor applications.

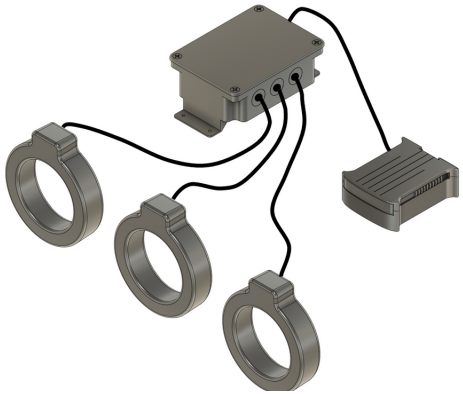
TECHNICAL DATA

	V240FE-xx V240FD-xx	E240FG-xx E240FF-xx	P240FC-xx P240FB-xx	V360FE-xx V360FD-xx	E360FG-xx E360FF-xx	P360FC-xx P360FB-xx
Isolation level	24/50/125kV			max. 36/70/170kV		
Nominal voltage&currents	max. 20kV/√3*	300A*	max. 20kV & 300A*	max. 36kV*	300A*	max. 36kV & 300A*
Secondary output	3.25/√3*	225mV*	3.25/√3 & 225mV*	3.25/√3*	225mV*	3.25/√3 & 225mV*
Accuracy	CS: 0.2S/0.2/0.5S/0.5/1/3 & 5P10/5P20			VS: 0.2/0.5/1/3 & 3P/6P		
Burden	CS: >10kΩ			VS:≥100kΩ-10MΩ, < 500pF*		
Primary connection	hanging or standing, directly connected to the overhead line					
Secondary connection	open ends*					

*or customer defined

SYSTEM APPLICATIONS

Combined outdoor sensor for load break switches



CxxxF-xx

Active, combined voltage and current sensor in a two-box system

DESCRIPTION

PRODUCT ADVANTAGES

- Combined voltage and current measurement on load break switches - up to 6x voltage and 3x current measurement
- Self-calibrating capacitive divider for voltage measurement
- Complete galvanic seperation between LBS and product
- Active temperature compensation over operating range
- According to IEC 61869-6
- 2 box system for easy and convenient installation

PRODUCT DESCRIPTION

The combined active sensor system can measure 6x voltage and 3x current without an electrical connection to the primary conductor. The system is applied on the In- and outputs of a load break switch or sectionalizer. The sensors are splash water protected and modular. A temperature compensation system keeps the accuracy over a big temperature range of -20°C up to 70°C.

TECHNICAL DATA

Isolation level	max. 36/70/170kV
Nominal voltage & currents	voltage: 30kV/√3* current: 300A* Ext. 200%
Merging box output	voltage: 3.25V/√3* current: 225mV*
Accuracy	voltage: ± 3% current: 0.5, max. 5P10
Burden	voltage: ≥10MΩ, <75pF current: ≥10kΩ
Installation	outdoor
Secondary connection	open ends*
Power supply	± $24V_{DC}$

*or customer defined

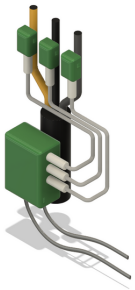
SPECIAL APPLICATIONS

Primary capacitance for Power Line Carrier applications

A240F-16K

Coupling capacitance with 10nF

Combined temperature measurement system for switchgears in primary and secondary energy distribution



TSS-1

Temperature monitoring system via Modbus

DESCRIPTION

Features A240F-16K

- 24/50/125kV coupling capacitance for PLC
- Light weight form factor
- 10nF capacitance inside to enable communication through networks
- Passive technology - No active parts, no humidity drift, no additional power supply is needed
- Ultra-stable capacitance due to the usage of ceramic dielectrics
- Outdoor sensor that can restist all weather conditions, e.g. on poles
- Hybrid material prevents humidity drift over the lifetime
- Small form factor due to an intelligent arrangement of high voltage components inside.

Features TSS-1

- Up to 6 Temperature sensors can be connected, including a temperature and a humidity sensor in the base station
- Modular bus system, base stations could be connected in a line via modbus/power supply with only 1 plug
- Satellites are powered via base station either with wired copper connections for low voltage application or with power over fiber connections in medium voltage switchgears
- Communication via modbus-RTU between basestation and modbus-master
- Configurable through modbus or via mobile app

TECHNICAL DATA

	A240F-16K
Isolation level	max. 24/50/125kV
Maximum system voltage	24kV
Nominal coupling capacity	max. 15nF*
Accuracy	± 15% capacity value*
Application	PLC
Installation	outdoor
Secondary connection	open ends*

*or customer defined

	TSS-1
Isolation level	0.72/3/-kV
Temperature sensors	7 (6 satellites + 1 base station)
Humidity sensors	1
Accuracy	± 1°C// ±1%rel
Satellite connections- LV	shielded cable
Satallite connections- AIS	connection cable
Basestation connection	Modbus-RTU

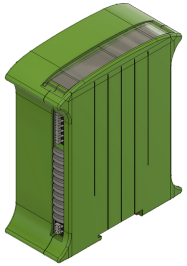
SPECIAL APPLICATIONS

Current sensor on a chip

SoC-C01

AMR-based current sensor on a chip

Amplifier



HxxxAC-xx

Phase voltage sensor amplifier

DESCRIPTION

Features SoC.C01

- AMR-based technology for easy PCB integration with one SoC per phase for ideal operation
- Primary current passes through the SoC and is able to transmit DC signals up to 2MHz with high accuracy
- With the embedment in a smal plastic housing and casting with epoxy resin maximum environmental protection is maintained
- A separate power supply is required

Features Amplifier

- Separate application for voltage and current sensors via two different designs:
  e.g. VS: 3.25V → 100V*
- Perfect extension of voltage or current sensors signals for easy transformation of secondary outputs to any standard measuring device
- Active temperature and input compensation of the amplifier allows a linearity of + 0.3 % of the amplitude and +1° of the phase
- Individual adaptation to the customer's application with the setting of the input/output ratio during the production process

TECHNICAL DATA

	SoC-C01
Nominal primary current	up to 50A
Isolation level	0.72/3/-kV
Power supply	± 15V_{DC}
Power consumption	~ 10mA
Amplitude accuracy	± 0.5% AC,DC
Phase accuracy	± 0.5° AC
Frequency	DC up to 2MHz
Operating temperature	-40°C to +85°C

*or customer defined

	HxxxAC-xx
Isolation level	0.72/3/-kV
Accuracy	± 0.3% to primary voltage, ± 1°
Power supply	± 24V_{DC}
Input power	22-26 V_{DC}, 0.25A
Operating temperature	-40°C - +80°C
Frequency	50Hz or 60 Hz
VAPF primary voltage	3.25V/√3
VAPF secondary voltage	100$V_{AC, eff}$*

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