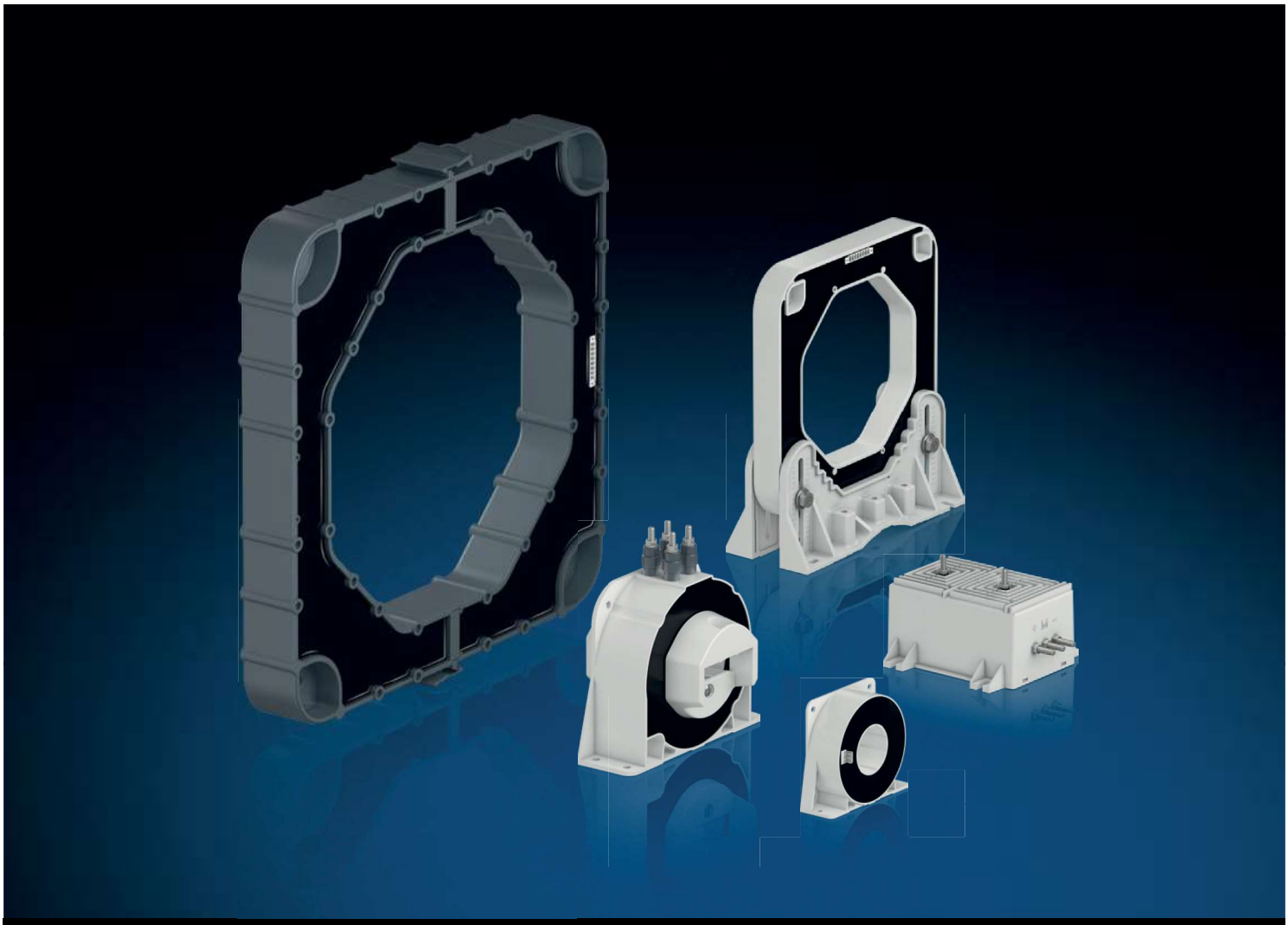
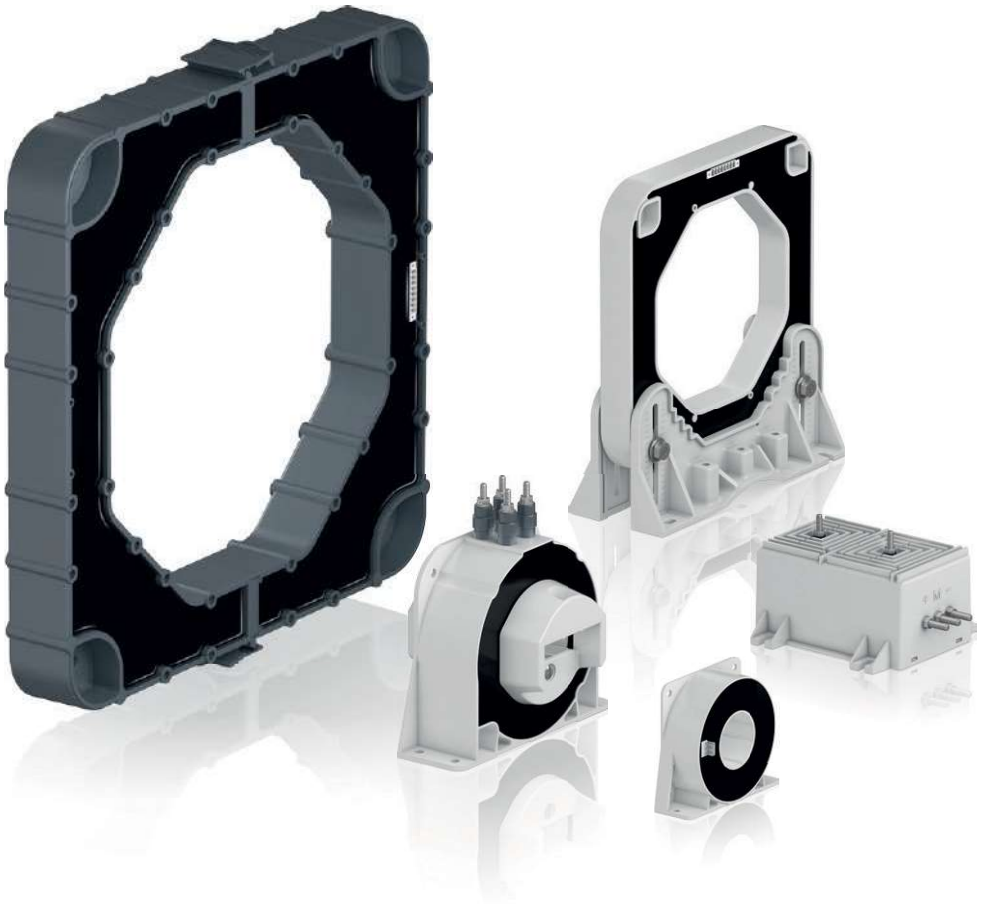


Catalog

Current sensors, voltage sensors and voltage detectors

PETERCEM



Current sensors, voltage sensors and voltage detectors

1

Current and voltage measurement expertise from PETERCEM

Competence that you can rely on

Profit from our global network and 40 years of experience in current and voltage measurements. As an expert in electrical engineering, we offer sensors that can handle rough applications like rail, mining, offshore windmills, compact drive solutions and many more.

Speed up your projects

Don't spend your time searching for another partner, select current and voltage sensors to measure DC, AC and pulsating current.

Add other low voltage products to your order and get all the components you need from PETERCEM.

Reliable in extreme conditions

Years of product development and improvements allow us to offer you a product operating from -40 °C up to +85 °C.

Thanks to their specific designs, which prevents electric and magnetic perturbations, our sensors can be implemented into compact systems or next to high current or voltage bus bars.

Continuous operation

For precise energy metering PETERCEM sensors guarantee very low accuracy error under 0.5% over frequencies up to 100 kHz. Allowing your installation to run in a reliable and efficient way.

Get high dynamic performances with representative outputs correctly followed up to 100 A/µs and 50 V/µs.

Sensor panorama

Measure DC, AC or pulsating currents and voltages with a galvanic insulation

1

Current measurement - Hall effect technology

Closed loop

MP25 

EL100 

CS300 

ES 

5 A

2 000 A

Voltage measurement

Full electronic technology

VS50 

VS4200 

50 V

4 200 V

Railway applications

Full electronic technology

Dedicated products meeting main railway standards.
Current measurement from 100 A to 40 000 A.
Voltage measurement from 50 V to 4 200 V.

IRIS Certification

CS2000 

VS4200 

VD1500 

Open loop

HBO

100 A — 1 000 A

Full electronic

NCS125

NCS305

4 000 A — 40 000 A

Voltage detection

Full electronic technology

Maintenance personnel warning from dangerous voltages.
Very good visibility thanks to red colored LEDs.
Complies with main railway standards.

VD1500

VD3000

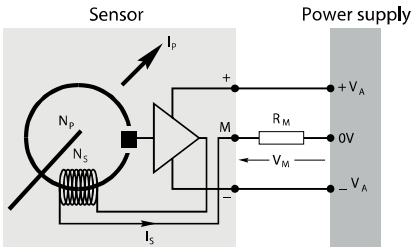
25 V — 3 600 V

1. Closed loop Hall effect technology

1

Principle

PETERCEM current sensors based on closed loop Hall effect technology are electronic transformers.
They allow for the measurement of direct, alternating and impulse currents, with galvanic insulation between the primary and secondary circuits.
The primary current I_P flowing across the sensor creates a primary magnetic flux.
The magnetic circuit channels this magnetic flux. The Hall probe placed in the air gap of the magnetic circuit provides a voltage proportional to this flux.
The electronic circuit amplifies this voltage and converts it into a secondary current I_S. This secondary current multiplied by the number of turns Ns of secondary winding cancels out the primary magnetic flux that created it (contra reaction). The formula $N_P \times I_P = N_S \times I_S$ is true at any time. The current sensor measures instantaneous values.



The secondary output current I_S is therefore exactly proportional to the primary current at any moment. It is an exact replica of the primary current multiplied by the number of turns N_P/N_S. This secondary current I_S can be passed through a measuring resistance R_M. The measuring voltage V_M at the terminals of this measuring resistance R_M is therefore also exactly proportional to the primary current I_P.

Advantages

The main advantages of this closed loop Hall effect technology are as follows:
–– Galvanic insulation between theprimary and secondary circuits
–– Measurement of all waveforms is possible: direct current, alternating current, impulse, etc.
–– High accuracy over a large frequency
range (from direct to more than 100 kHz)
–– High dynamic performance
–– High overload capacities
–– High reliability.

Applications

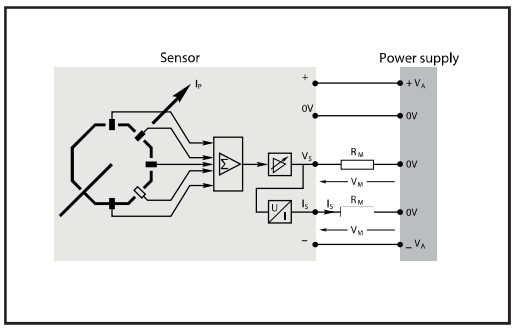
Industry
Variable speed drives, Uninterruptible Power Suppliers (UPS), active harmonic filters, battery chargers, wind generators, robotics, conveyers, lifts, cranes, solar inverter, elevator, etc.

Railway
Main converters, auxiliary converters (lighting, air conditioning), battery chargers, choppers, substations, mining, etc.

2. Electronic technology

Principle

PETERCEM current sensors are based on entirely electronic technology. In contrast to closed or open loop Hall effect technology, no magnetic circuit is used in the sensor.
They allow for the measurement of direct, alternating and impulse currents with galvanic insulation between the primary and secondary circuits.
The primary current I_P flowing across the sensor creates a primary magnetic flux. The different Hall probes included in the sensor measure this magnetic flux. The electronic circuit conditions and treats these signals (summation and amplification) to provide two output currents I_{S1} and I_{S2} and/or two output voltages V_{S1} and V_{S2}. All the outputs are exactly proportional to the measured primary current.
The current sensor measures instantaneous values.



Advantages

The main advantages of this electronic technology are as follows:
–– Galvanic insulation between the primary and secondary circuits
–– Measurement of all waveforms is possible: direct current, alternating current, impulse, etc.
–– Choice of output type (current or voltage, IPN or IPMAX)
–– Very large current measuring range (up to 40 kA) without overheating the sensor
–– High dynamic performance
–– Low power consumption
–– Reduced weight and volume
–– Simplified mechanical fixing

Applications

Industry
Electrolysis, rectifiers, welding, etc.

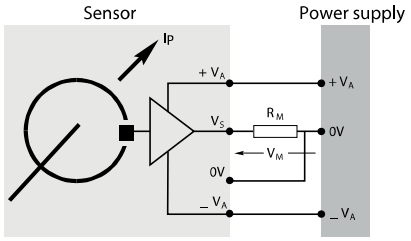
Railway
Substations in continuous voltage.

3. Open loop
Hall effect technology

1

Principle

PETERCEM current sensors based on open loop Hall effect technology are also electronic transformers. They allow for the measurement of direct, alternating and impulse currents, with galvanic insulation between the primary and secondary circuits.
The primary current I_P flowing across the sensor creates a primary magnetic flux.
The magnetic circuit channels this magnetic flux. The Hall probe placed in the air gap of the magnetic circuit provides a voltage V_H proportional to this flux, which is itself proportional to the current I_P to be measured.
The electronic circuit amplifies this Hall voltage (V_H) allowing it to be directly exploited by the operator as a secondary output voltage V_S.
The current sensor measures instantaneous values.



The secondary output voltage V_S is therefore directly proportional to the primary current. It is an exact replica of the primary current, generally with a value of 4 V for a nominal current IPN.

Advantages

The main advantages of this open loop Hall effect technology are as follows:
–– Galvanic insulation between the primary and secondary circuits.
–– Measurement of all waveforms is possible: direct current, alternating current, impulse, etc.
–– Good accuracy over a medium frequency range (from direct to several tens of kHz).
–– High reliability.
–– Low power consumption.
–– Reduced weight and volume.
–– Excellent Performance/Cost ratio.

Applications

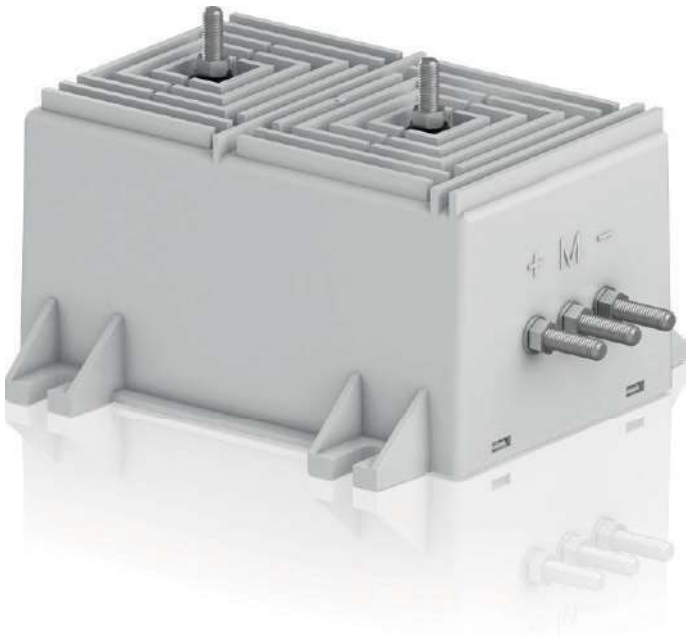
Industry

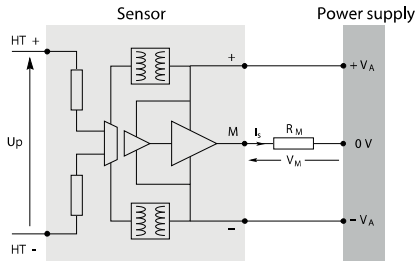
Variable speed drives, backups ("UPS"),
active harmonic filters, battery chargers,
conveyers, lifts, cranes, solar inverter, etc.

1. Electronic technology

Principle

PETERCEM voltage sensors based on electronic technology only use electronic components. In contrast to closed or open loop Hall effect technology, no magnetic circuits or Hall effect probes are used in the sensor.
This allows for the measurement of direct or alternating voltages with electrical insulation between the primary and secondary circuits.
The primary voltage to be measured is applied directly to the sensor terminals: HT+ (positive high voltage) and HT– (negative high voltage or earth). This voltage is passed through an insulating amplifier and is then converted to a secondary output current IS. This secondary current Is is electrically insulated from the primary voltage to which it is exactly proportional.
The voltage sensor measures instantaneous values.





In the same way as for current sensors, this secondary current I_s can be then passed through a measuring resistance R_m. The measuring voltage V_m at the terminals of this measuring resistance R_m is therefore also exactly proportional to the primary voltage U_p. The electrical supply to the sensor is also insulated from the primary voltage.

Advantages

The main advantages of this fully electronic technology are as follows:
–– Electrical insulation between the primary and secondary circuits.
–– Measurement of all waveforms is possible: direct voltage, alternating voltage, impulse, etc.
–– Excellent immunity to electromagnetic fields.
–– Excellent accuracy.
–– High dynamic performance.
–– Excellent reliability.

Applications

Railway
Main converters, auxiliary converters (lighting, air conditioning), battery chargers,
choppers, substations, mining, etc.

2. Closed loop Hall effect technology

1

Principle

PETERCEM voltage sensors based on closed loop Hall effect technology are also electronic transformers. They allow for the measurement of direct, alternating and impulse voltages with galvanic insulation between the primary and secondary circuits.

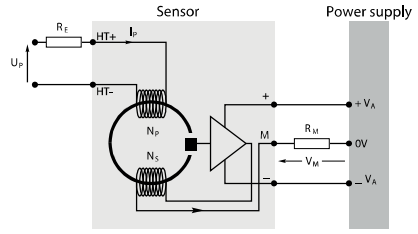
The primary voltage U_P to be measured is applied directly to the sensor terminals: HT+ (positive high voltage) and HT– (negative high voltage). An input resistance R_E must necessarily be placed in series with the resistance R_P of the primary winding to limit the current I_P and therefore the heat dissipated from the sensor. This resistance R_E may be either integrated during the manufacturing of the product (calibrated sensor) or added externally by the user to determine the voltage rating (not calibrated sensor).

The primary current I_P flowing across the primary winding via this resistance R_E generates a primary magnetic flux. The magnetic circuit channels this magnetic flux. The Hall probe placed in the air gap of the magnetic circuit provides a voltage V_H proportional to this flux.

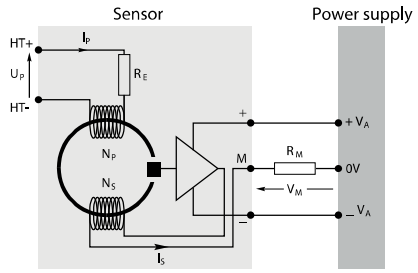
The electronic circuit amplifies this voltage and converts it into a secondary current I_S. This secondary current multiplied by the number of turns N_S of secondary winding cancels out the primary magnetic flux that created it (contra reaction). The formula $N_P \times I_P = N_S \times I_S$ is true at any time.

The voltage sensor measures instantaneous values.

The secondary output current I_S is therefore exactly proportional to the primary voltage at any moment. It is an exact replica of the primary voltage. This secondary current I_S is passed through a measuring resistance R_M. The measuring voltage V_M at the terminals of this measuring resistance R_M is therefore also exactly proportional to the primary voltage U_P .



Principle diagram of a not calibrated EM010 sensor



Principle diagram of a calibrated EM010 sensor

Advantages

The main advantages of this closed loop Hall effect technology are as follows:

–– Galvanic insulation between the primary and secondary circuits.

–– Measurement of all waveforms is possible: direct voltage, alternating voltage, impulse, etc.

–– High accuracy.

Applications

Railway

Main converters, auxiliary converters (lighting, air conditioning), battery chargers,
choppers, substations, mining, etc.

1. Electronic technology

Principle

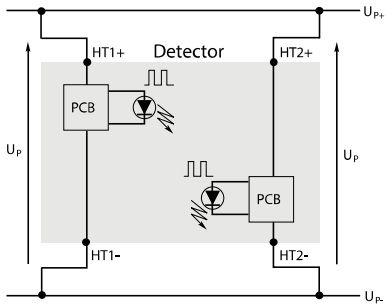
PETERCEM voltage detector is based on entirely electronic technology. It allows the detectionof the presence of direct voltages. For safety reasons this main function is duplicated within the detector to increase the product lifetime.

The voltage detector converts the primary voltage UP applied to its terminals to visual information for the user. This function permits the user to carry out maintenance operations with the assurance that dangerous voltage is not present.

The primary voltage U_p to be measured is applied directly to the detector terminals: HT1+ and HT2+ (positive high voltage) and HT1– and HT2- (negative high voltage or 0 V electric). The electronic circuit (PCB) converts the primary voltage U_p to an electrical signal supplied to a light emitting diode (LED).

The information is supplied to the user visually through two flashing LEDs.

The detector does not need an external power supply in order to work.



The voltage detector indicates the presence of a voltage higher than a limit (maximum 50 V in compliance with standards) by the illumination of a LED. Inversely, the LED is extinguished when the voltage is below this limit.

Advantages

The main advantages of this electronic technology are as follows:

–– Detection of direct voltages.
–– Very good visual indication.
–– High overload capacities.
–– Excellent reliability (functional redundancy in a single product).
–– Excellent immunity to magnetic fields.
–– Compact product.

Applications

Railway

Main converters, auxiliary converters (lighting, air conditioning), electronic power devices integrating capacitors banks, battery chargers, choppers, substations, etc.