janitza Current Transformers Instruction Manual

Janitza®

Current Transformers
Instruction Manual

Current transformers
Installation manual
www.janitza.de
Examples current transformers

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Current Transformers

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GENERAL

Disclaimer
Compliance with the usage information for the devices is a prerequisite for safe operation and attaining the stated performance characteristics and product features.
Janitza electronics GmbH assumes no liability for bodily injury, material damage or financial losses which result from disregard of the usage information.
Ensure that the usage information for the products is legible and accessible.
Copyright notice

Subject to technical alterations.
First make sure you have read and understood the usage information accompanying the product. Keep the usage information associated with the product available for the entire service life and pass it on to any possible subsequent users. Find out about device revisions and the associated modifications of the usage information associated with your product at www.janitza.de.
Disposal
Before sending defective devices, modules or components back to the manufacturer for testing:

- Contact the manufacturer's Support department.
- Send devices, modules or components complete with all accessories.
- When doing so, please bear the terms for transportation in mind.

INFORMATION

Please return defective or damaged devices to Janitza electronics GmbH in accordance with the shipping instructions for air or road freight (complete with accessories).

Do not attempt to open or repair the device (the component) on your own because otherwise all warranty claims become invalid!
For the **Disposal** of the device please observe national regulations! Dispose of individual parts, as applicable, depending on their composition and existing country-specific regulations, e.g. as

- Electronic waste,
- Batteries and rechargeable batteries.
- Plastics.
- Metals.

Engage a certified disposal company to handle scrapping as needed
Incoming goods inspection
The prerequisites for trouble-free and safe operation of the devices and their components include proper transport, storage, setup and assembly, as well as proper operation and maintenance. Exercise due caution when unpacking and packing the device, do not use force and only use suitable tools. Check:

- Visually inspect the devices and components for flawless mechanical condition.
- Check the scope of delivery for completeness before you begin installing your devices and components.

If it must be assumed that safe operation is no longer possible, immediately put the device with components out of service and secure against unintentional startup.
It can be assumed that safe operation is no longer possible, for example, if the device with components:

- Has visible damage,
- No longer functions despite an intact power supply.
- Was subjected to extended periods of unfavorable conditions (e.g. storage outside of the permissible climate thresholds without adjustment to the room climate, condensation, etc.) or transport stress (e.g. falling from an elevated position, even without visible external damage, etc.).

SAFETY

Be certain to read and understand the documents associated with this device and its components before using it. The following safety information provides an overview of safety measures required for the operation of the device and its components. Please observe the safety information and warning notices to ensure your personal safety and avoid material damage. Special operating conditions can require additional measures! Please also observe the special safety information that is listed in the respective documents on the devices and their components. Documentation associated with the product can be found on our website at **www.janitza.de** >Support>Downloads.
Electrically qualified personnel
To avoid bodily injury and material damage, only electrically qualified personnel are permitted to work on the devices and their components, assemblies, systems and current circuits who have knowledge of:

- the national and international accident prevention regulations,
- Safety technology standards.
- Installation, commissioning, operation, disconnection, grounding and marking of electrical equipment.
- the requirements concerning personal protective equipment.

Electrically qualified persons within the scope of the technical safety information of all documents associated with the device and its components are persons who can furnish proof of qualification as an electrically skilled person.
Intended use

The devices and their components are:

- Intended for installation in switchboard cabinets and small distribution boards.
- not intended for installation in vehicles! Use of the devices and their components in non-stationary equipment constitutes an exceptional environmental condition and is only permissible by special agreement.
- not intended for installation in environments with harmful oils, acids, alkalis, gases, vapors, dusts, radiation, etc.

Safe and trouble-free operation of the devices and their components presupposes proper transport, proper storage, set-up and assembly as well as operation and maintenance in addition to compliance with the safety information and warning notices. Further safety information can be found on our website at **www.janitza.de>Support>Downloads.**

Safety information

The installation manual does not represent a compete set of all safety measures required for the operation of the device. Special operating conditions can require additional measures. The installation manual contains information which must be observed to ensure your personal safety and avoid material damage.

Symbols used on the device:

	The additional symbol on the device itself indicates an electrical danger that can result in serious inj uries or death.
	This general warning symbol draws attention to a possible risk of injury. Be certain to observe all of the information listed under this symbol in order to avoid possible injury or even death.

Safety information in the installation manual is marked by a warning triangle and, in dependence on the degree of hazard, is displayed as follows:

 **DANGER** Warns of an imminent danger which, if not avoided, results in serious or fatal injury.

 **WARNING** Warns of a potentially hazardous situation which, if not avoided, could result in serious injury or death.

 **CAUTION** Warns of an immediately hazardous situation which, if not avoided, can result in minor or moderate injury.

ATTENTION Warns of an immediately hazardous situation which, if not avoided, can result in material or environmental damage.

 **INFORMATION** Indicates procedures in which there is no hazard of personal injury or material damage.

Safety measures

When operating electric devices, it is unavoidable for certain parts of these devices to conduct hazardous voltage. Consequently, severe bodily injury or material damage can occur if they are not handled properly:

- Hazardous voltages can be present in all circuitry parts that are connected to the power supply.
- Do not operate equipment with current transformer circuits when open.
- Do not exceed the limit values specified on the rating plate! This must also be observed during testing and commissioning!
- Observe the safety and warning notices in the usage information associated with the device and its components!

WARNING

Hazard due to disregard of warning and safety notices! Disregard of the warnings and safety information on the device itself and in the usage information for the device and its components can lead to injuries or even death! Observe the safety and warning notices on the device itself and in the usage information associated with the devices and their components.

WARNING

Risk of injury due to electrical voltage!

Severe bodily injury or death can result! Therefore please abide by the following:

- Switch off your installation before commencing work! Secure it against being switched on! Check to be sure it is de-energized! Ground and short circuit! Cover or block off adjacent live parts!
- During operation and troubleshooting (especially for DIN rail devices), check your system for dangerous voltages and switch these off if necessary!
- Wear protective clothing and protective equipment in accordance with applicable guidelines when working on electrical systems!
- Before making connections to the device/the component, ground the device by means of the ground wire connection, if present.
- Do not touching bare or stripped leads that are energized! Equip stranded conductors with wire ferrules!
- Hazardous voltages can be present in all circuitry parts that are connected to the power supply.
- Protect your wiring, cables and devices with a suitable line circuit breaker/fuse (for dimensioning, see the documentation for the device)!
- Never switch off, remove or tamper with safety devices!
- There can still be hazardous voltages present in the device or in the component even after it has been disconnected from the supply voltage (capacitor storage).
- Do not operate equipment with current transformer circuits when open.
- Only connect screw terminals with the same number of poles and design!
- Do not exceed the limit values specified in the user manual and on the rating plate; this must also be observed during testing and commissioning.
- Take note of the safety and warning notices in the documents that belong to the device!

Safety information for handling current transformers

The field of transformer technology groups the totality of all devices that perform the function of a current, voltage or measuring transformer together as sensors.

In the usage information for our devices, modules and components, the terms current transformer, voltage transformer or transformer all refer to sensors.

A further distinction is made by using the terms current transformer (abbr. CT) and LP current transformer (abbr. LP-CT, low-power current transformer): The term “current transformer” is used for special transformers for the primary-proportional conversion of currents of large magnitudes to directly measurable, smaller current values. In contrast, the term “LP current transformer” is used for special transformers for the primary-proportional conversion of currents of large magnitudes to directly measurable voltage values (low power).

Current transformers and LP current transformers provide safe galvanic isolation between the primary circuit and the measurement circuit due to their design and their physical operating principle. For Janitza measurement devices, modules and components, use only “transformers for measuring purposes” which are suitable for the energy monitoring of your system! Observe the corresponding warning notices.

This manual only describes the handling of current transformers for the primary-proportional conversion of currents of large magnitudes to directly measurable, smaller current values.

WARNING Risk of injury due to large currents and high electrical voltage on the current transformers! Current transformers operated while open on the secondary side (high voltage peaks pose a hazard when

touched) can result in severe bodily injury or death.

- Avoid operating the current transformers while open; short circuit the unloaded transformers!
- Before interrupting the current supply, short circuit the secondary connections of the current transformers. Switch any test switches that automatically short circuit the secondary lines of the current transformers to the “Test” status (Check the test switch/short circuiting connection beforehand)!
- Only use current transformers with basic insulation to IEC 61010-1:2010!
- Caution, even current transformers rated as safe for open operation can pose a hazard when touched during operation while open!
- Make sure that screw terminals for the current transformer connection on the device are adequately tightened!
- Comply with the information and provisions in the documentation of your current transformers!

CAUTION Risk of injury or damage to the meter due to high measurement currents at the connections of the current transformers! High measurement currents can cause temperatures of up to 80 °C (176 °F) on the connections of the current transformers

- Use wiring that is designed for an operating temperature of at least 80 °C (176 °F)!
- The current transformers can be hot even after the power supply has been switched off. Allow the connections of the current transformers and the connecting wires to cool down before touching them!

BRIEF DESCRIPTION

A current transformer is a device for measuring purposes used to generate a current that is reduced within the measuring range as proportionally as possible so it can be used with current measurement devices, energy meters or universal measurement devices. Transformers of this type protect themselves and the connected measurement devices in the event of overcurrent by going into saturation.
The transformers are available in two designs: ·

- Feedthrough current transformers (plug-in current transformers)
- Split-core transformers (separable or folding-type transformers)

Principle of operation

- A proportional conversion of currents of large magnitude to directly measurable, smaller values takes place, i.e. a primary measured variable is adapted to suit the nominal input values of connected measurement devices.
- A current transformer puts out a secondary current of milliamperes up to a few amperes (usually 1 A or 5 A) as an output signal.
- Due to the principle of the current transformer, there is a safe galvanic isolation between the primary circuit and the measurement circuit.
- Additional protection of the secondary circuit against excessive currents is ensured due to the physically induced saturation phenomenon of the core material.

Ratio

- The ratio of the primary rated current to the secondary rated current is given by the transformer factor. The totalizer reading of the transformer meter multiplied by the transformer factor gives the actual amount of energy that has flowed.
- Common types are: x/5 A transformers, x/1 A transformers

Measuring accuracy
Current transformers are divided into classes according to their accuracy. The accuracy classes of current transformers are related to the measured value.

INFORMATION Further information can be found on our website in the download area at **www.janitza.de.**

Example: Feedthrough current transformer

Example: Split-core current transformer

MOUNTING & INSTALLATION

WARNING

Risk of injury due to high currents and high electrical voltages! Severe bodily injury or death can result from:

- Touching bare or stripped leads that are energized.
- Device inputs that pose a hazard when touched. Therefore, please note for your system:
- Disconnect the supply of power before starting work!
- Secure it against being switched on!
- Check to be sure it is de-energized!
- Ground and short circuit! Use the ground connection points with the ground symbol for grounding!
- Cover or block off adjacent live parts!

WARNING

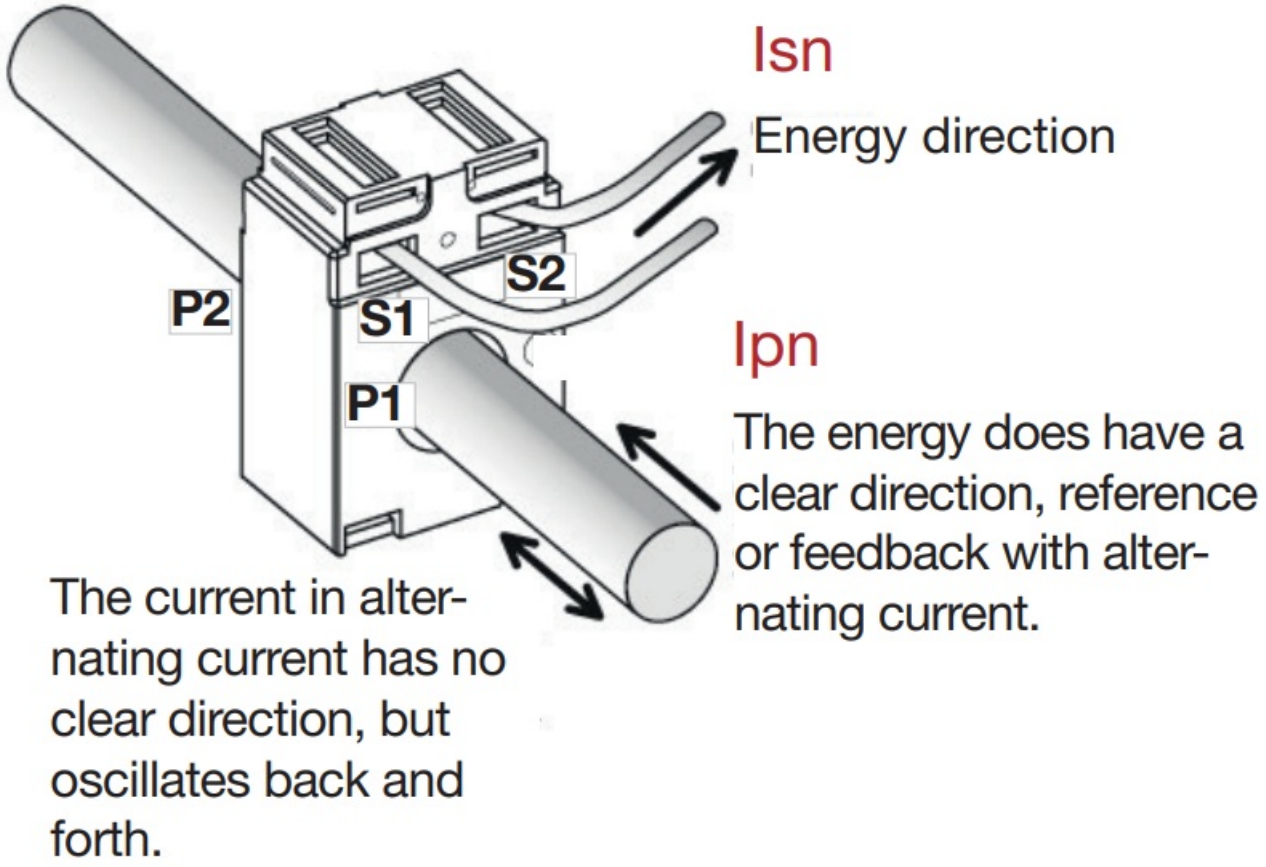
For mounting and installation, also observe the ,,Safety measures” on pages 4 and 5!
Ensure there is a safe working environment during assembly, maintenance and installation work.
5. Disconnect the power supply of the primary conductor and secure it against unintentional reconnection.
6. Guide the primary conductor through the current transformer in such a way that ensures the direction of the energy flow is from P1 to P2.
7. Fasten the current transformer with appropriate fastening material either directly to the primary conductor or to a mounting plate or DIN mounting rail (for an example, see page 9).
8. Connect the secondary side S1 and S2 of the current transformer to the measurement device according to the installation manual of the measurement device. (When connecting the meter later on, short-circuit the secondary side to prevent the current transformer from operating with an open circuit on the secondary side.)
9. If the current transformer has a grounding point, ground the secondary side of the current transformer.
10. When configuring the measurement device, enter the transformer ratio of the current transformer that is used.

ATTENTION

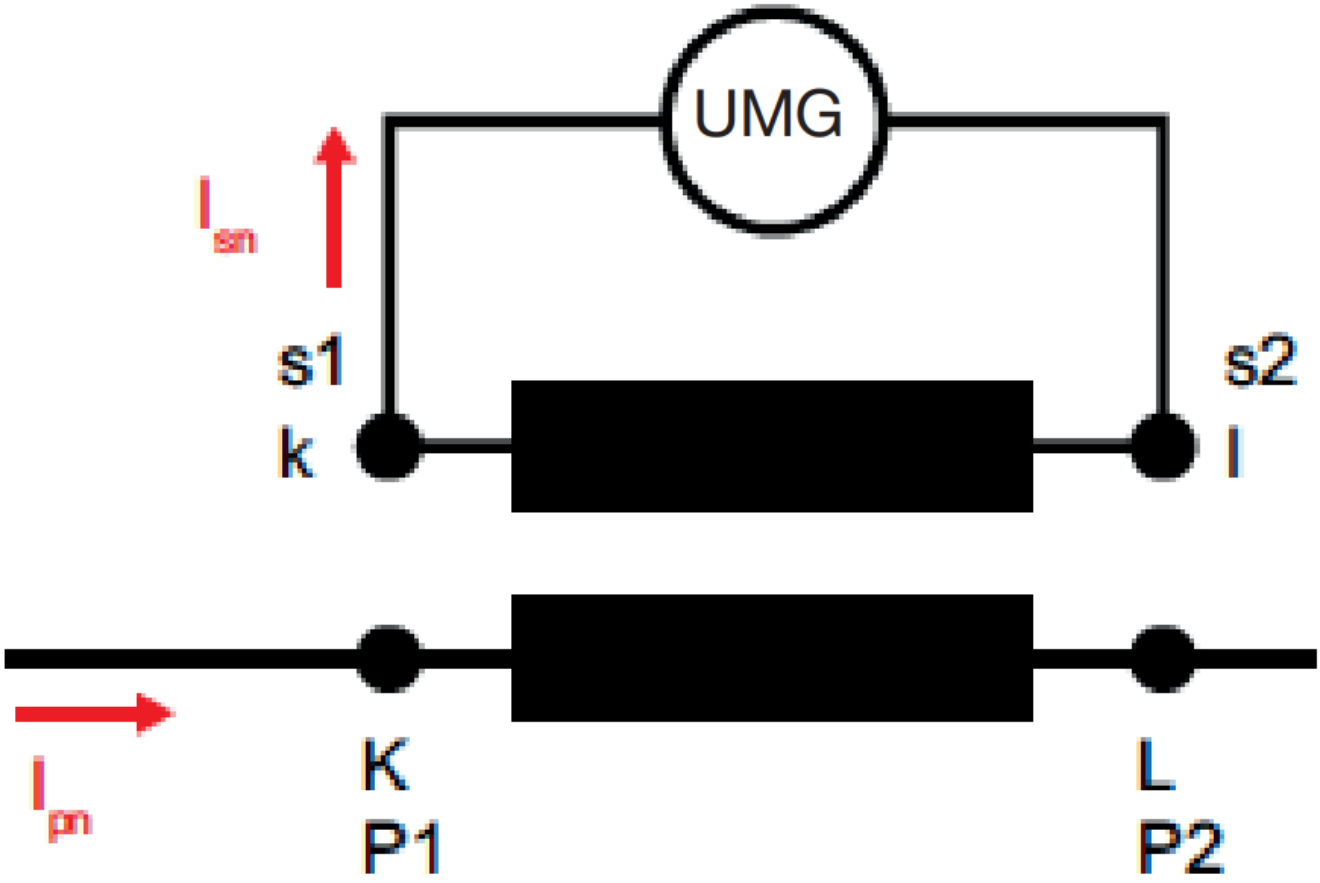
Material damage due to disregard of the installation instructions! Disregard of the installation instructions can damage or destroy your device. · Provide adequate air circulation in your installation environment and cooling, as needed, when the ambient temperatures are high.

Installation direction

The connections of the primary winding are marked with P1 (K) and P2 (L) and the connections of the secondary winding are marked with S1 (k) and S2 (l).



Energy flow direction



Temporary disconnection of a current transformer

WARNING

Risk of injury due to high voltages when the current transformer is operated with an open circuit on the secondary side.

The current transformer secondary wires must always be connected to a low impedance load such as an ammeter.

If no such load is available during maintenance work, short-circuit the secondary wires of the current transformer!

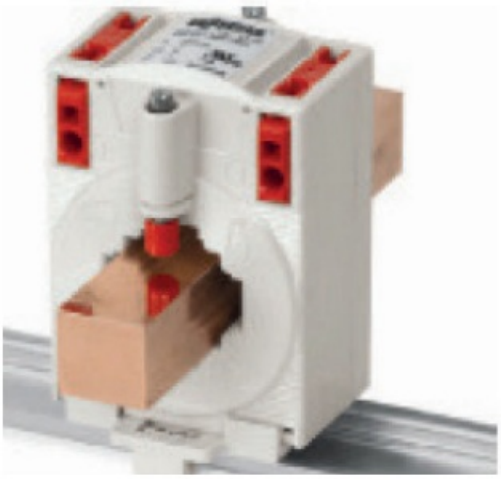
EXAMPLES

The mounting / installation depends on the respective design of the transformer. Some mounting examples for transformers are shown below.

Feedthrough current transformer

Example of DIN rail mounting with snap-on fastening

Example for mounting with a copper bar / round conductor

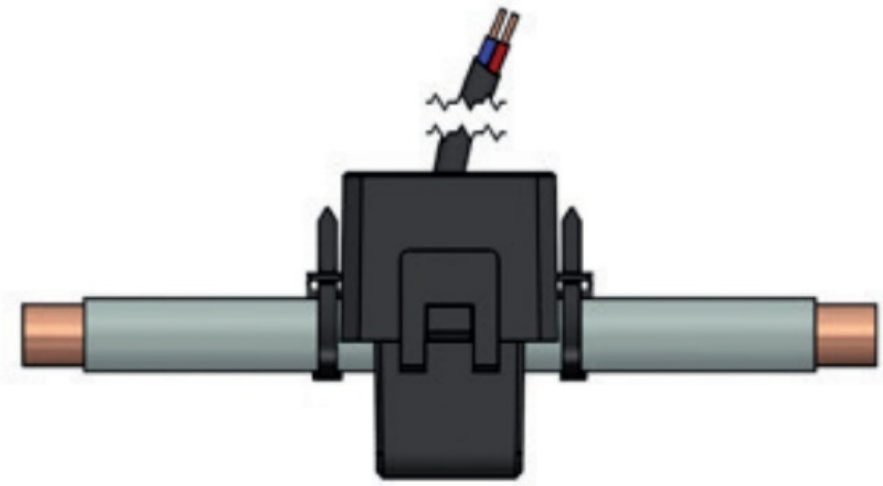


Example of mounting on a mounting plate

Split-core current transformer

The current transformer secondary circuit must not be opened under any circumstances when the current transformer is closed and current is flowing in the primary circuit. High voltages can arise on the wires of the secondary circuit if it is open.

Example: Fastening the primary conductor with cable ties



ATTENTION
In the case of current transformers where the metallic transformer core is openly accessible:

- Do not touch the contact surfaces of the transformer core with your hand as they may be damaged by the acid mantle of the skin.
- Make sure that no dust is deposited on the contact surfaces.

DISMOUNTING

Prepare the dismounting of the transformer in accordance with the following warning:

⚠ **WARNING** Risk of injury due to high currents and high electrical voltages! Severe bodily injury or death can result from:

- Touching bare or stripped leads that are energized.
- Device inputs that pose a hazard when touched. Therefore, please note for your system:
- Disconnect the supply of power before starting work!
- Secure it against being switched on!
- Check to be sure it is de-energized!
- Ground and short circuit! Use the ground connection points with the ground symbol for grounding!
- Cover or block off adjacent live parts!

Perform the following steps to dismount the transformer:

1. Loosen the mounting fastenings of the transformer as needed.
2. – for split-core current transformers:
   Open the transformer and remove the pri mary conductor from the transformer.
   – For feedthrough current transformers: Disconnect the primary conductor at a suit able location and pull it through the trans former.
3. Disconnect the test leads from the transformer to the measurement device.
4. Remove the transformer and test leads from the system.

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Documents / Resources

	janitza Current Transformers [pdf] Instruction Manual Current Transformers, Current, Transformers

References

- Janitza electronics
- Janitza – Spezialist für Energiemanagement, Universalmessgeräte & digitale Einbaumessgeräte