Non-Intrusive Current Sensing

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The clamp-on current sensors from CTS Corporation offer precise and easily installable AC and DC measurement in the low-to-mid current range. The contactless clamp-on design of these magnetic field concentrators enables seamless integration into existing system architectures, making them ideal for preventive maintenance of complex industrial and transportation machinery.

In today's electrified society, most of us would think nothing of walking through sliding train doors on our daily commute, climbing escalators at the station platform or riding the lift to the top floor of our office building. We have grown so accustomed to these instances of everyday engineering that we fail to notice the countless electronic systems at work behind the scenes. Until they stop functioning, that is. Then our reliance on these otherwise inconspicuous technologies becomes very apparent. And the need for a fix becomes imminent.

Ensuring the continued operation of technologies powering everyday infrastructure begins with proper system monitoring. Timely diagnosis of an imminent malfunction can save time, resources and depending on the application, lives. Yet, as modern technology grows ever more complex, monitoring devices are often required to be implemented at the system level in the early stages of development, placing an increased burden of costs on system designers and manufacturers.

Alternatively, the devices must offer a means of easy, effortless and cost-effective implementation into existing systems. Which is exactly what the CTS clamp-on current sensor does.



CTS-CS-CXX-04 Magnetic Field Concentrator



CTS-CS-CAX Current Sensor Module



3

Application Note

Accurate and Easy to Implement: Clamp-On Current Sensors

The clamp-on current sensor from CTS Corporation is an off-the-shelf current sensing solution, intended for AC and DC measurement in the low-to-mid current range.

The clamp-on design, to which the current sensor owes its name, allows for easy integration into existing system structures. No need for cutting cables or interrupting circuits when retrofitting your application; simply place clamp-on current sensor around the conducting element as shown in the illustrations on the right.

Paired with a planar magnetic field sensor, the magnetic field concentrator will create an open loop system that utilizes the Hall-effect to enable contactless, non-intrusive current measurements up to ± 200 A.

The clamp-on current sensor can be acquired through CTS' global network of distributors. It is available as a complete sensing module (series CTS-CS-CAX), paired with an integrated Melexis IMC-Hall® planar sensor and mounted on a PCB that features a snap-fit mechanism for easy installation.

If you wish to use the clamp-on design in combination with a sensor of your own choice, the magnetic field concentrator is available as a standalone option as well (series CTS-CS-CXX).





CTS-CS-CAX Current Sensor Module (incl. Melexis IMC-Hall® Planar Sensor)				
Image	Parameter	Unit	Value	
	Current Range	A	<u>+</u> 200	
	Sensor Output Accuracy	%	± 1	
	Operating Temperature	°C	10-85	
	AC Frequency Range	kHz	< 30	

CTS-CS-CXX Magnetic Field Concentrators				
Image	Parameter	Unit	Value	
	Current Range	А	<u>+</u> 200	
	Sensor Output Accuracy	%	± 1	
	Operating Temperature	°C	10-120	
	AC Frequency Range	kHz	< 30	
	Concentrator Diameter	mm	4, 10	

Ideal Applications: Preventive Maintenance

The clamp-on current sensor excels as a flexible means of preventive maintenance for electric systems of moderate current range applications. Thanks to the non-intrusive, contactless design, it can easily be retrofitted into existing installations with no built-in monitoring. If not outright impossible, the implementation of current measurement devices at the system level for such applications would likely require a complete design overhaul, resulting in considerable downtime and increased costs. The clamp-on current sensor completely circumvents this issue. Once enclosed around a conductor cable, the clamp-on current sensor will measure the flow of current in the system at high accuracies. Should changes in the flow occur, the sensor will immediately detect them, warning of potential and imminent malfunctioning.





Train Doors

The opening and closing of sliding train and platform screen doors are either completely automated or controlled manually by the train operator. Regardless of operating method, the clamp-on current sensor is an excellent fit for this application, as not all trains have built-in means of system monitoring, and maintenance downtime will have a big impact on everyday commuters. Implementing the clamp-on current sensor can be done effortlessly, after which it will provide a dependable diagnostic signal to either the control system or the operator, allowing for timely maintenance scheduling, rather than impromptu ones during the height of rush hour.

Lift and Elevator Inverters

Lifts, elevators and escalators often employ inverters (also known as *drives*) to control voltage and frequency of their AC motors. Capable of controlling and adjusting the movement of the application with great precision, inverters help to prolong the mechanical lifespan, reduce noise and vibrations and improve the overall user experience. The clamp-on current sensor grants a reliable and cost-effective method of measuring current flow in the inverter unit, ensuring smooth operation and reliable monitoring. The quick, seamless installation will also spare building residents or busy commuters from having to use the stairs for an extended period of time.





Ideal Applications: Preventive Maintenance

Solar Panels and Photovoltaics

In 2023, solar energy accounted for approximately 5.5% of global electricity generation with projections pointing to a further increase in the years to come. As the world's reliance on renewable energy continues to grow, ensuring smooth operation of solar panels and photovoltaics becomes ever more important. The clamp-on current sensor can easily be integrated in existing solar installations to monitor the performance of for instance the inverters that transform the direct current generated by the solar cells into alternating current, before it is immediately used or distributed throughout the power grid.



About CTS Corporation

CTS is a leading designer and manufacturer of products that Sense, Connect, and Move. We manufacture sensors, actuators, and electronic components in North America, Europe and Asia, and provide solutions to OEMs in the aerospace & defense, medical, industrial, communications, information technology and transportation industries.

Off-the-shelf solutions from CTS combine the impeccable product quality of a well-established and renowned western electronics manufacturer with highly competitive price points and short lead times. The clamp-on current sensor is a ready-made, plug-and-play solution with the flexibility of implementation to fit a broad spectrum of applications across various industries and markets. Quote requests can be made through the CTS website, and the clamp-on current sensor will soon be available for direct purchase via CTS' global network of product distributors.

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