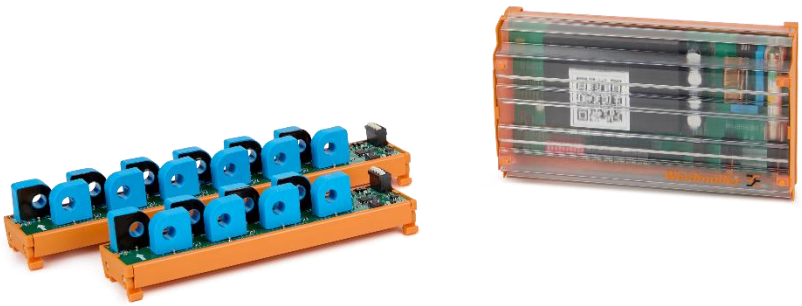
Operating photovoltaic systems efficiently in the long term

Detmold, March 2022. A prerequisite for the development and construction of today's photovoltaic systems is to operate them efficiently - economically and without downtime. To achieve this, it makes sense to constantly monitor the electrical parameters of the PV strings when operating the systems. Only in this way can owners and operators maintain the performance and yield of their systems in the long term. The new "PV String Monitoring System" from Weidmüller offers a compact and powerful solution that can monitor up to 32 strings.

Photovoltaic systems are exposed to constant environmental conditions that have a direct impact on all components installed in the system and thus on the system yield. The solar modules play a key role in this. Therefore, the use of string monitoring makes sense in order to detect possible defects in the power generation operation at an early stage. String monitoring not only enables the detection of faults in the DC Combiner boxes (for example, blown fuses), but also power deviations in the module strings. This early detection allows faults in the PV system to be localised and rectified before power losses occur.

Weidmüller's new PV String Monitoring System was developed to monitor the current and voltage of the individual strings as well as to determine the current Surge Protective Devices and switch status in the generator junction box. Thanks to its modular design, the system can monitor up to 32 strings simultaneously and measure 25 to 50 A per string. The system is integrated directly into the DC Combiner boxes of PV power plants with central inverters. These combiner boxes are characterised by their compact design - DC/DC converters and communication hardware are already integrated. In addition, system operators benefit from the fact that the combiner boxes can withstand extreme climatic conditions over a long period of time, making them ideal for use on photovoltaic systems.

There are two variants for data transmission: The system can transmit data either via RS-485 cable or wirelessly (with LoRA-WAN protocol) to the SCADA system. For wireless transmission, a LoRa RF module is simply plugged onto the master module, which functions as a plug-and-play solution. Reliable data transmission is thus ensured at all times, so that the monitoring system can quickly detect possible defects and minimise performance losses without oversizing the dimensions of the PV power plant to compensate them.



Caption: The new and modular Weidmüller PV String Monitoring System
Photo: Weidmüller

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