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Rugged Voltage Transducers Deliver Precision For DC Power Distribution

Filling a long standing need for precise voltage measurements in power distribution systems, the DC10 Voltage Sensor from Tualatin Valley Labs (TVL) is designed specifically for 100 Vdc and below. With 4.5 kV of isolation, the DC10 is ideal for dc lighting systems as well as motor control and monitoring. The DC10 is the newest addition to TVL's dc family of voltage transducers, which includes products with up to 1000-Vdc measurement capability.

According to Pat Adamosky, president of Tualatin Valley Labs, this voltage transducer family was originally developed to meet the needs of ultility-scale (5 MW to 100 MW) solar power installations (Fig.1.) "Until recently, these installations used systems that ran at 600 Vdc to power the inverters. But due to the price of copper and increased efficiency demands, these systems started moving to 1000 Vdc as a standard," says Adamosky.

This created an opportunity for TVL because, as Adamosky explains, "there appeared to be no voltage transducers available that met the voltage and environmental requirements for this application. These installations are normally in remote locations and typically require operating temperature ranges of at least -30°C to +70°C."

As a result, a number of system contractors asked Adamosky to provide a voltage transducer (VT) that would meet temperature and other requirements as part of the remote monitoring system for their sites. "In utility-scale solar installations, the VT is used at the sub-combiner level to monitor groups of solar panel strings. Typically, a 5-MW site will have around 100 sub-combiners," says Adamosky.

Among the design criteria for the solar power application was a requirement to meet UL1741, the standard for solar installations. "This presented some difficulty as UL had yet to release the standard requirements for 1000 Vdc," says Adamosky. "I had a rough idea of what the isolation requirements might be, and to be on the safe side, ended up using 4.5 kV, almost double of what the estimate was. There are not a lot of parts available that can meet this isolation and still provide the range, accuracy and environmental specs the customers required. The design turned out to be quite a challenge for such a simple product."

TVL began shipping VTs for the solar market in September. Since that time, the company has received inquires about VTs for dc motor control applications such as those found in petroleum drilling, and dc power networks for buildings and data centers.

For these types of applications, TVL's family of VTs has three distinct advantages, according to Adamosky:

1. Wide voltage range up to 1000 Vdc
2. Rugged (-30°C to +70°C) environmental specifications
3. Compliance with UL508 requirements for test equipment

"I don't believe that there are any VTs on the market that meet all these requirements, especially at the price of $159.00 List," says Adamosky.

Returning to the subject of the DC10, Adamosky notes that this lower voltage (100 V) model was developed as a result of requests from residential solar installers for a transducer that would work well with 24-Vdc and 48-Vdc battery-backup systems. Specifically, the DC10 targets large ranches (livestock watering and irrigation) and vacation cabins.

The DC10 is designed to convert a dc voltage input to either a 4-mA to 20-mA or a 0 to 5-Vdc output that is proportional to the input. The transducer includes safety ratings for both UL and CSA. DIN configuration and standard 24-Vdc power allow quick and easy installation (Fig 2.) For more information, see www.voltage-transducer.com.

Fig. 1. Tualatin Valley Labs' DC1 voltage transducer was developed to meet the needs of ultility-scale (5 MW to 100 MW) solar power installations, which require rugged, precise 1000-V rated transducers to monitor groups of solar panel strings.

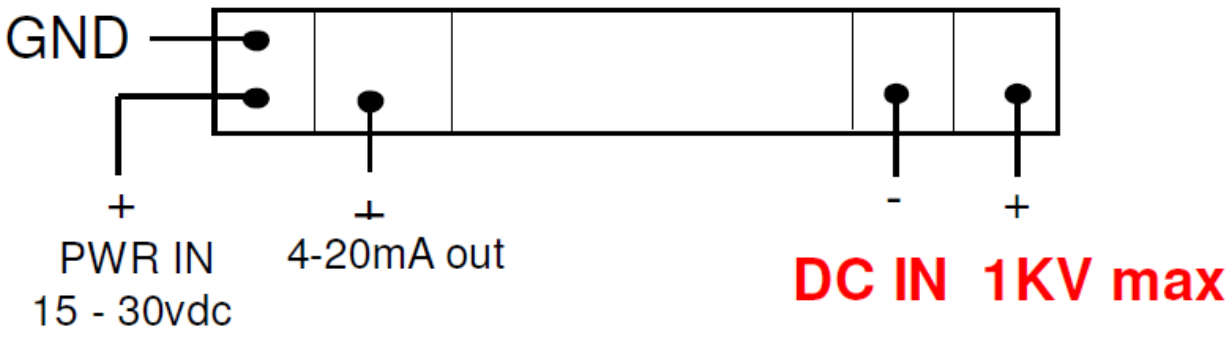

Fig. 2. Taking power from a 24-V supply, the DC1 is designed to convert a dc voltage input to either a 4-mA to 20-mA or a 0 to 5-Vdc output that is proportional to the input.