

## Why Voltage Inspections of High Voltage Photovoltaic Power Generation Facilities Need CAT III Measuring Instruments

The voltage in photovoltaic (PV) power generation systems is increasing to enhance efficiency and lower operating costs. Voltage measurement is important for ensuring that PV power generation facilities are operational and in excellent condition. For measuring higher voltages safely, it is important to use instruments with the right measurement category (CAT). This article describes why CAT III 2000 V measurement category instruments are suitable for high-voltage power generation systems.

### Target

Photovoltaic (PV) power generation systems above 1000 V

### Question

How is it possible to safely measure 1300 V of PV power generation facilities with CAT III 1000 V measuring instruments?

### Answer

Such measurement is possible by using the DC High Voltage Probe P2000.



DT4261



CAT IV 600 V  
CAT III 1000 V



CAT IV 1000 V  
CAT III 2000 V



P2000

### Details

#### Features of DC High Voltage Probe P2000

##### 1. The input voltage to the measuring instrument is reduced to 1/10.

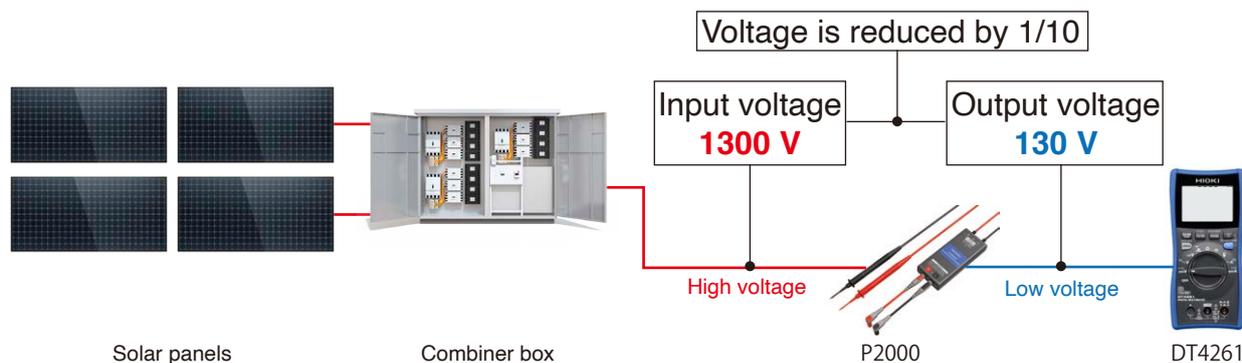
Since the output of P2000 is 130 V when measuring 1300 V, voltage measurement is possible with a CAT III 1000 V measuring instrument. To exaggerate, it is also possible to perform measurement even with a “no measurement category” 200 V instrument.

##### 2. P2000 protects the connected measuring instrument from getting damaged.

It is possible to use instruments of “no measurement category” regarding measurement categories for photovoltaic installations if they are not grid-connected. And it is also encouraged to use instruments of “at least CAT III” if they are grid-connected.

Surge voltages (impulse voltages) occur in many conditions when measuring solar panels, even when the panels are not connected to the grid. For example, when breaker switches are turned on and off, or while making cable connections when voltage is present.

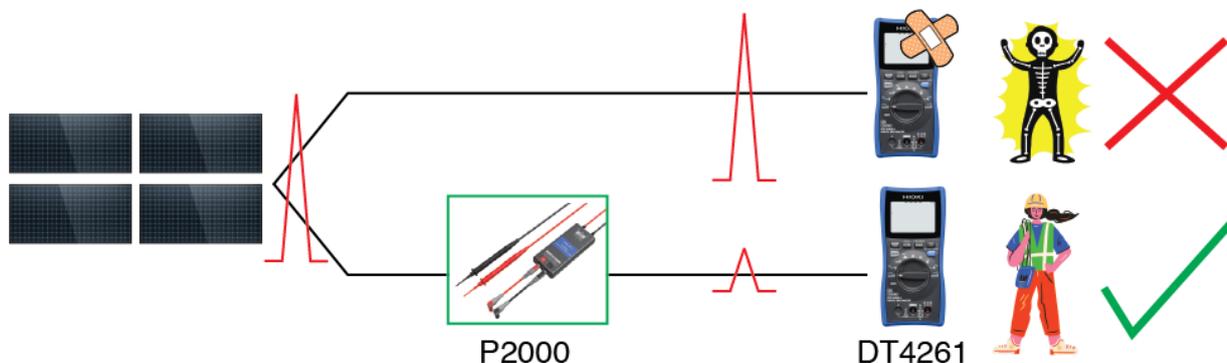
Generally, the measuring instrument is equipped with a protection circuit against surge voltage. However, if repeated surge voltages are input into the instrument, it could cause damage to the protective circuit. This could lead to damaging the instrument itself.



# Application Note

## When using P2000 for the measurement

P2000 reduces the surge voltage applied to the instrument. As a result, surge voltage is less likely to cause harm to the measuring instrument, which can avoid damage to the instrument. Furthermore, measuring voltage this way is safer.



## Conclusion

Field measuring instruments such as digital multimeters and clamp meters are often used by holding them directly in the hand. For safer high-voltage measurements, we recommend using the P2000. Measuring instruments equipped with "DC HIGH V PROBE" mode, such as the DT4261, are designed to be connected to the P2000. The high affinity between the two enables accurate measurement with minimal measurement error. With the conversion function equipped in this mode, the P2000 output value, which is 1/10 of the actual value, is calculated and converted to the actual value on the instrument.

Furthermore, the P2000 prevents damage to the instrument's protective circuit as the surge voltage that goes through it is sufficiently small. So, when you are looking for a hand-held instrument, please consider one equipped with "DC HIGH V PROBE" mode.



DC HIGH V PROBE



DC HIGH V PROBE

## Models with DC HIGH V PROBE mode

Digital Multimeter	DT4261
AC/DC Clamp Meter	CM4371-50
AC/DC Clamp Meter	CM4373-50
AC/DC Clamp Meter	CM4375-50