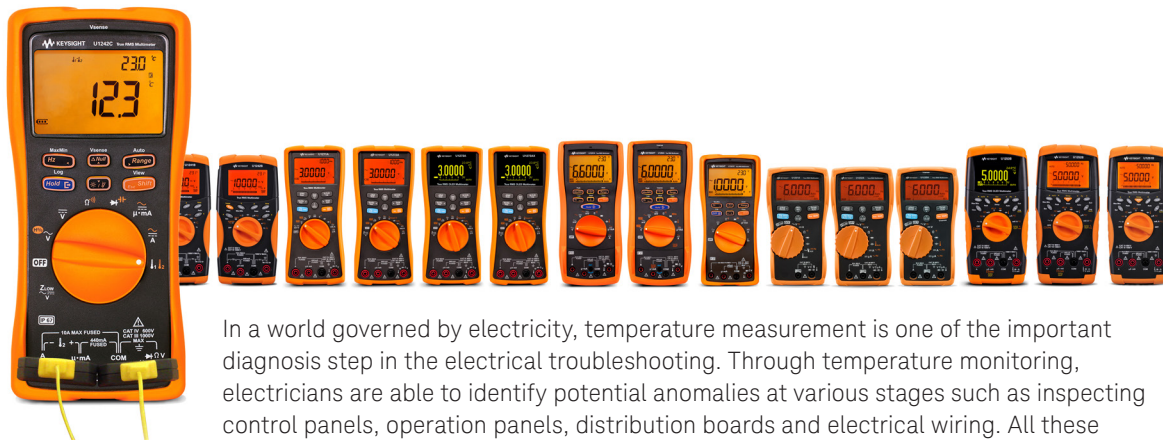# Keysight Technologies
Monitoring the Control Panel Temperature

Capture the temperature easily with Keysight's handheld digital multimeters during troubleshooting

Solution Brochure

In a world governed by electricity, temperature measurement is one of the important diagnosis step in the electrical troubleshooting. Through temperature monitoring, electricians are able to identify potential anomalies at various stages such as inspecting control panels, operation panels, distribution boards and electrical wiring. All these tasks are to be carried out safely with proper tools. Handheld digital multimeters are the common tools used by the electricians in their daily troubleshooting tasks. Therefore, handheld digital multimeters that have temperature measurement capability are essential for electricians to perform the temperature measurement when needed at the site.

KEYSIGHT
TECHNOLOGIES

Unlocking Measurement Insights

Measuring and monitoring temperature of control panels using handheld digital multimeters

A typical control panel comprises of the inverter, servo drive amplifier, PLC controller, relay and display unit. These components are housed in enclosures for electrical safety and to prevent electromagnetic interference. When the electrical components are energized, heat is generated within the enclosure. Excessive increase in temperature may lead to component degradation and a drop in output current. To mitigate this, the control panel usually comes with pre-installed fans or air-conditioning. There are times when the thermal solution employed on the control panel fails and causes the entire system to overheat. When abnormal temperature is detected, it is crucial for electricians to be able to monitor and accurately measure the temperature inside the control panel.

Temperature monitoring inside the control panel is normally carried out using a handheld multimeter with a thermocouple cable attached as shown in Figure 1.
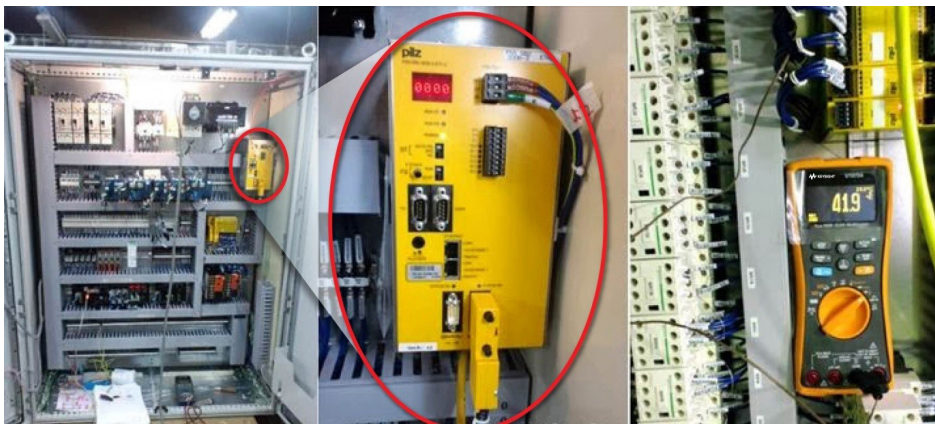

Figure 1. Testing the temperature of a control panel component using a Keysight handheld digital multimeter and a thermocouple cable

U1242C with dual and differential temperature measurements

To expedite the troubleshooting process, sometimes the electrician will compare the temperature of the suspected abnormal device with the adjacent device. The electrician will either need 2 handheld multimeters to run the test or measure one point after another. Keysight U1242C handheld multimeter with dual temperature input terminal will be the suitable solution for this situation. With the dual temperature inputs, Keysight U1242C handheld multimeter can measure two temperature points simultaneously, and display the temperature reading of each terminal points and their differential value, all with a press of toggling button.

In order to measure the inside temperature of the control panel, the control panel needs to be operating with the enclosure door closed. However, when the enclosure door is closed, the thermocouple cable will not be able to pass through the enclosure to capture the measurement. Hence, monitoring the temperature of the control panel with the enclosure door open may not reflect the actual scenario. Furthermore, there are cases in which equipment such as an assembly machine can only be operated with the system door closed for safety reasons.

Keysight Remote Link Solution

Keysight U1117A IR-to-*Bluetooth*® Adapter

To get temperature readings that reflect the real situation inside the panel, the handheld digital multimeter and the thermocouple cable are left inside the control panel with the door closed. In order to view the temperature reading from outside the control panel, Keysight offers the Remote Link solution for its U1200 series handheld digital multimeters. This allows for wireless remote monitoring by pairing the Keysight U1117A IR-to-*Bluetooth* Adapter with a Keysight handheld digital multimeter. The handheld digital multimeter transmits the temperature readings wirelessly to a PC or a mobile device, such as a mobile phone or tablet, for real-time monitoring and analyses.

Keysight U1115A Remote Logging Display

When a PC or a mobile device is not available, a good alternative is to use the dedicated Keysight U1115A Remote Logging Display with the U1117A *Bluetooth* adapter. With the U1115A Remote Logging Display, readings from four handheld digital multimeters can be viewed at a distance. The Remote Link solution also enhances the safety level for working in dangerous environments, such as measuring at places surround by live electrical systems. With Keysight Remote Link solution, electricians will be able to test and monitor the components from a safe distance.

Keysight Handheld Meter Logger Software

Usually, only one handheld digital multimeter can be connected to a PC but Keysight Remote Link Solution allows up to 10 handheld digital multimeters to be used in the Keysight Handheld Meter Logger Software. This is useful in many ways especially for electricians specializing in the human machine interface (HMI) field that deals with touch panels and control switch lamps. They will be able to monitor and record multiple multimeter readings such as the temperature, output voltage and current simultaneously.

Figure 2. Ten U1200 series handheld multimeters connect to Keysight Handheld Meter Logger Software

Keysight Mobile Meter and Keysight Mobile Logger apps

Using the free downloadable Keysight Mobile Meter and Keysight Mobile Logger apps electricians can easily monitor and record the multimeter readings on their mobile devices. The Keysight Remote Link Solution also enables up to three multimeter measurements on a mobile device, saving the electricians' time from having to test each point individually.

With support for Android and IOS platforms, the tools allow for greater flexibility, mobility and can be used in a variety of mobile devices such as tablets and phones.
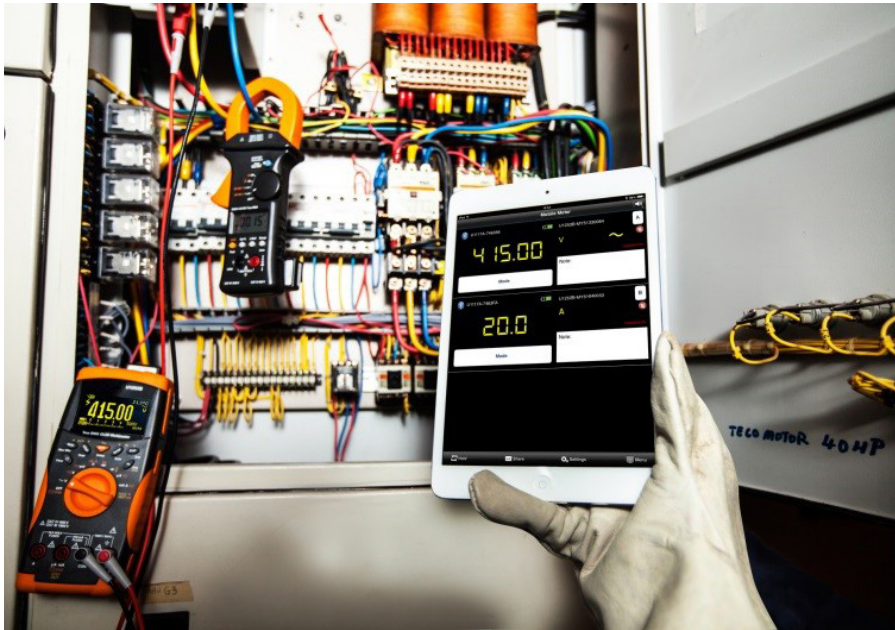

Figure 3 Monitoring handheld multimeter and clamp meter readings remotely via iOS/Android based smart devices

Summary

Temperature monitoring helps electricians to detect potential failures in the system. Handheld multimeters such as U1200 series handheld multimeters with temperature measurement function will be useful test tool for them in performing the troubleshooting. The U1242C handheld meters even offers dual temperature measurement function to capture the temperature reading from two separate devices simultaneously, and allow you to detect the temperature delta with the differential temperature function.

Coupled with the Remote Link Solution, the U1200 series handheld multimeters provide a powerful measurement solution for the electrical troubleshooting at confined environment where it is hard to access. With the wireless connection capability, electricians can now read the multimeter values with a device from a distance up to 100 meters away in various working environments, from dangerous situations or in confined spaces.
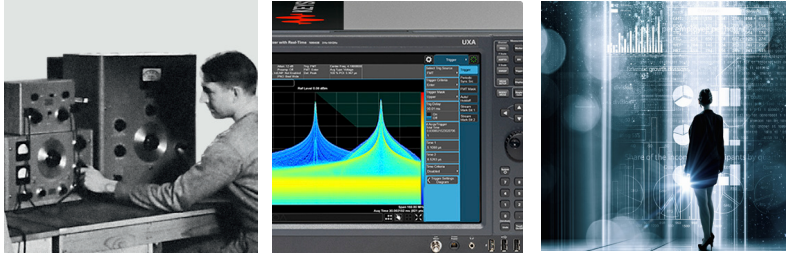

Figure 4 Keysight
Remote Link solution

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