

Agilent 34405A DMM

Maximizing DMM Throughput: Reading Rate versus Configuration and Settling Time

Product Note

Introduction

The Agilent 34405A 5.5-digit digital multimeter is a member of Agilent's digital multimeter (DMM) family, and it expands Agilent's offerings in electronics measurement tools.

The Agilent 34405A 5.5-digit DMM, gives you the capability to make fast, accurate measurements at an affordable price. This product note explains the Agilent 34405A's reading rate and throughput to help you better understand the 34405A and thus enable you to work more efficiently.



Figure 1. The 34405A DMM

Measurement speed is important in many test environments, especially on the production line. So the instrument's reading rate is an important factor when you select a DMM as it directly affects the throughput. However, users often pay more attention to the reading rate than the configuration time and settling time. Faster reading rate might lead to faster testing time but if the measurement is not accurate, it becomes meaningless. The fact is, configuration time and settling time are as important as the reading rate when it comes to making fast, accurate measurement on the production line. Configuration time is the time when the DMM's settings have been changed by users while settling time is the total time required to amplify signals to achieve the DMM's accuracy.



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In the DMM measurement cycle which is shown in Figure 2, the DMM will first perform hardware and software configuration (point A to point B). A settling time is needed for the signal to achieve DMM accuracy (point B to point C). Then, the DMM starts to register the first reading (at point C) and continue to make multiple readings until point D.

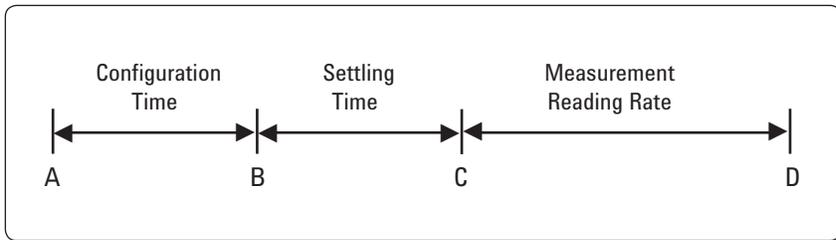


Figure 2. The 34405A DMM measurement cycle

When you press a button (function) on the front panel or uses an SCPI command through the USB connectivity (at point A), the 34405A DMM does all the configuration (from point A to B), and will automatically add in the settling time (point B to C). The 34405A DMM will then perform measurement at point C and finish the measurement at point D.

The configuration time, settling time, and measurement reading rate is crucial in order to improve the DMMs speed. In Table 1, Test 1 shows the importance of the configuration time, and Test 2 shows the use of the measurement reading rate.

Table 1. Tests on the 34405A DMM

Scenario	
Test 1	Test 2
The DMM is used to take single measurement for different type of signals: AC voltage, AC current, DC Voltage, DC voltage, and Resistance. The DMM needs to change to other functions after every single measurement reading.	The DMM is used to measure multiple measurements (DC voltage) in a short time period for many device under tests (DUTs).

In Test 1 scenario, the configuration time and settling time play important roles than the measurement reading rate. In Test 2, the DMM only needs one configuration time and settling time for the first DUT. For the following DUTs, repeated measurements are carried out for the same function. Test 2 involves multiple measurement readings in a short period of time, so the configuration time and settling time are not critical for Test 2.

Related Agilent Literature

Please refer to the application note below for further information.

Publication title	Pub number
Understanding the Agilent 34405A DMM Operation	5989-9171EN



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