Development of a Measuring Instrument that Seamlessly Realizes Quality Management

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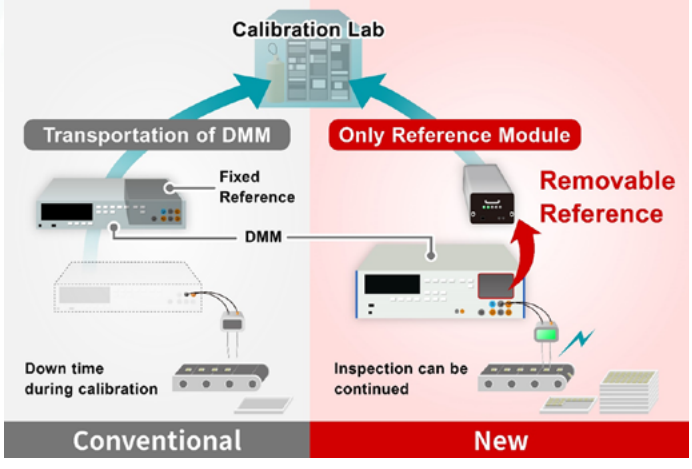
To obtain reliable measurement results, traceable “reference standards” and the “calibration” of measuring instruments based on them are essential. However, while frequent calibration improves reliability, it also presents a dilemma by increasing operational costs and the risk of degradation. To address this issue, NMIJ, in collaboration with a domestic measuring instrument manufacturer, has developed a new type of digital multimeter—the Removable-Reference Digital Multimeter (RR-DMM)—which features a detachable reference source that was previously fixed. This solution achieves both high measurement accuracy and reduced operational cost. In this system, a temperature stabilized Zener diode reference voltage source module can be removed from the DMM main unit for calibration while still powered. Once calibration is completed, the module can simply be reinserted into the main unit, eliminating the need to transport the DMM itself. Even when the reference module is removed, the DMM remains operational, allowing continuous operation 365 days a year with zero downtime.

Reference:
M. Maruyama, et al., *Conference on Precision Electromagnetic Measurements (CPEM)*, 2024
https://doi.org/10.1109/CPEM61406.2024.10646039



Photographs and concept of the developed RR-DMM