



Significance and Expectations of Measurement

A handwritten signature in black ink that reads "Y. Kaneko".

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As its corporate philosophy, Yokogawa Group defines its goal as “to contribute to society through broad-ranging activities in the areas of measurement, control, and information” and is working hard every day toward this.

Yokogawa Electric Corporation was established by Dr. Tamisuke Yokogawa in 1915 to manufacture electric meters for the first time in Japan. The measurement business is the original business of the company. Since its establishment, Yokogawa has been growing by providing products that satisfy the needs of the respective times throughout its history.

I have been consistently involved in the measurement business since I joined the company in 1982. In this paper, first of all, I would like to discuss why we need to measure various things. After the age of self-sufficiency, people started to exchange goods and found it necessary to quantitatively express the value of things in order to conduct fair business. For example, a wooden measuring box called a *masu* was used to measure the volume of rice in Japan. In other words, measurement is a means to quantify things by referring to a standard. I emphasize here again that measurement is crucial for a fair commercial transaction.

Measurement has another aspect: the ability to quantitatively express certain physical values of things secures their quality, performance, and function. The horsepower and torque of automobiles are examples. In my younger days, horsepower was the top priority in car performance. Most people believed that the more horsepower a car had, the better it was. In recent years, however, good fuel consumption is prioritized in the backdrop of an eco-oriented society. Anyway, the physical value of something can be an indicator to assess the quality and performance of it. To ensure such quality, the measured value must be reliable. It is not sufficient

for a measuring instrument to precisely measure only on given days. It must not be susceptible to the environment (temperature and humidity, etc.) and must obtain the same value over intervals of time. Put another way, the quality of measuring instruments is also crucial. The spirit of “Quality first” was also integral during Yokogawa’s foundation.

As significant aspects of measurement, these two factors have not lost their importance at all. Meanwhile, expectations for measurement are changing and new expectations are emerging over time. One is a request to secure the interconnectivity among devices while supporting open architecture. In recent years, few systems come with a single vendor as many systems consist of devices from multiple vendors. Take cell phones as an example. You can talk with anyone using a cell phone even if both parties use different brands of phone. You can also connect your TV with video recorders from other manufacturers to record and watch programs. This compatibility has been achieved through the use of standardized interfaces among devices.

In measurement, interconnectivity must be ensured in both hardware and software. As for device interfaces, electric quantities (voltage, current, etc.) and their dynamic responses (timing, etc.) must conform to a standard. Software-related compatibility such as that in protocol analysis is also required because the meaning of signals depends on the sequence of signal changes over time in specific electric quantities. To satisfy these requirements, Yokogawa is offering measuring instruments that can analyze signals on a controller area network (CAN) bus and a local interconnect network (LIN) bus that are used in automobiles. These requirements are, in a wider sense, a request for quality assurance.

Another new requirement is to verify conformance to regulations. As globalization progresses in recent years, each country is strengthening various regulations, mainly regarding imports. A typical example is the CE marking in Europe. European countries use this mark to enable people to use things safely and reliably, and especially in recent years they are strengthening regulations related to the environment. Thus, manufacturers need to verify whether their products conform to the regulations in target areas, and measuring instruments are required to have functions for confirming that conformity. Yokogawa provides power measuring instruments and software that verify the conformity to the latest regulations regarding standby power consumption in Europe. As in the examples mentioned above, simple measurement of electrical quantities is not sufficient. Measuring methods must be changed in accordance with the power consumption of devices, and measurement must be carried out in consideration

of optimal conditions. Therefore, measuring instruments are often provided with dedicated control software. These requirements meet the need for measurement for fair commercial transactions and only products that conform to the regulations can be sold. Of course, quality assurance is required, too.

As I mentioned above, the significance of measurement – the purpose of which is to ensure fair commercial transactions and quality – never changes over time.

Meanwhile, the requirements for measurement are expected to change in line with changes in the social system and needs of the times. We will stick to the quality first approach and contribute to society by quickly respond to its changing requirements for measurement.