

# Paris Session 2022



## Effort for automatic acquisition of open/close time of circuit breaker

Study Committee A3  
PS 3/ Q16

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Group Discussion Meeting

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# Question and our contribution

## *Question PS3 Q16*

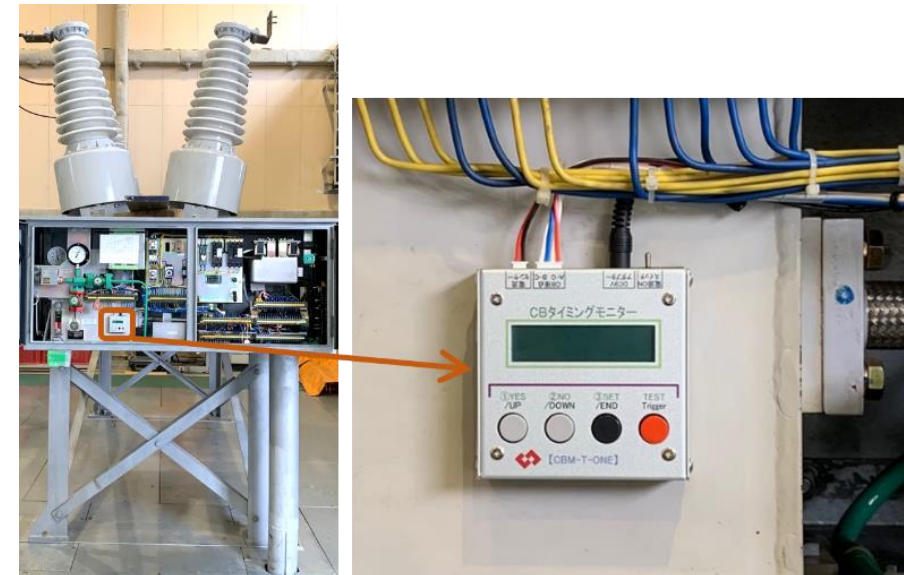
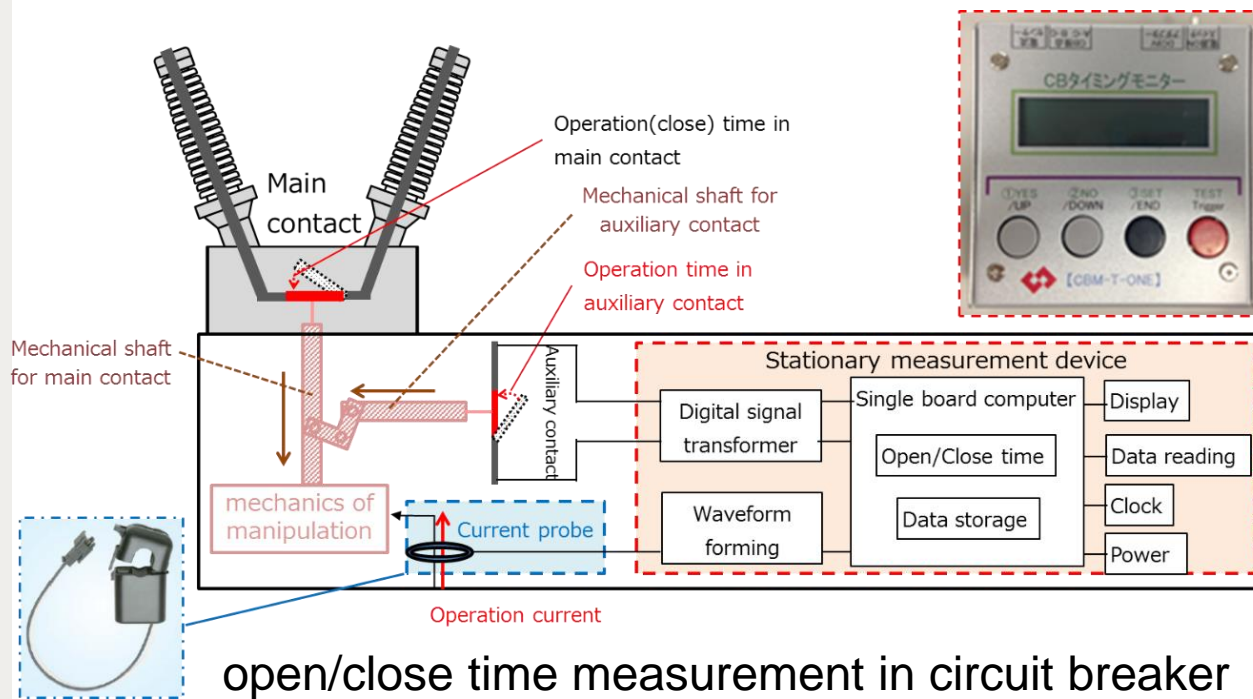
- A general question to utilities: Which is the expected maintenance interval extension by applying condition-based approach in comparison to a time-based one?

## *Answer*

- We present an example of on-site omitting the measurement of open/close operation time, which was conventionally carried out every six years.
- The approach is evaluation of circuit breaker main contact open/close operation time by correlation with the operation time of auxiliary contacts and automatic acquisition by remote transmission using wireless LAN.

# Methodology of primary evaluation of open/close time

- The operation time of the main contact is correlated directly to the auxiliary contacts via a shaft driven by the main contact mechanical shaft.
- The stationary measuring device consists of an electronic circuit that is permanently installed inside the circuit breaker mechanism enclosure and has a wireless data transmission function.

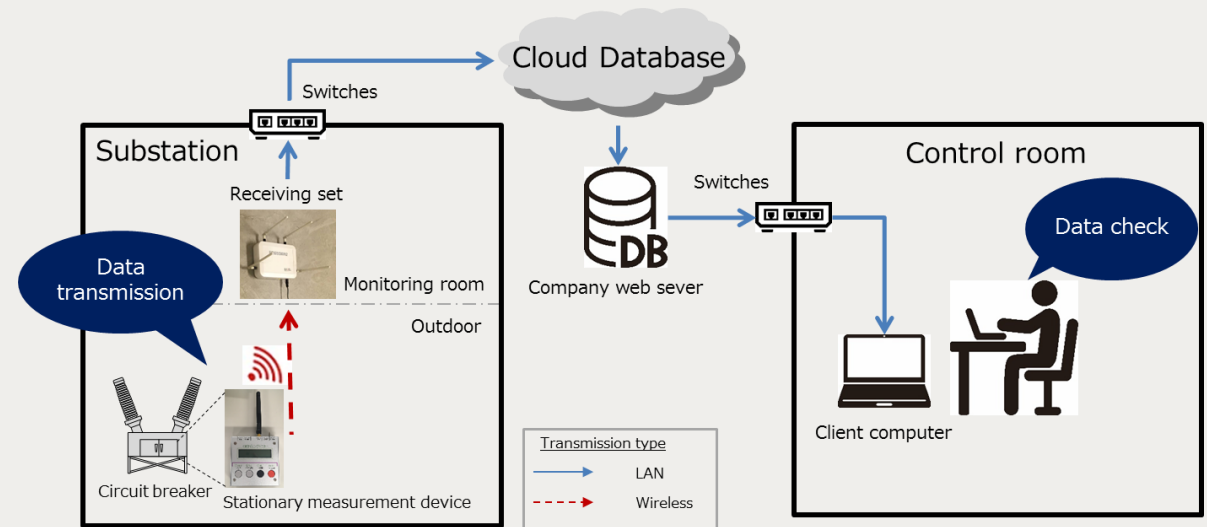


Installation of the measurement device

## Effect of the application of the stationary measurement device

- It is possible to carry out the inspection remotely with the application of the stationary measurement device, and to reduce the number of personnel required for on-site maintenance.
- It is no longer necessary to dispatch personnel due to the introduction of the stationary measurement device. Now the open/close time may be obtained when the circuit breaker is de-energized at the night or on holidays because of system restrictions.
- Timing data may also be obtained in parallel with routine switching operations.

➤ The application of the stationary measuring device has increased the work efficiency of circuit breaker inspection by **more than 70%**, which is a significant improvement.



Acquisition and data transmission of open/close time

## Conclusion

- A wireless communication function was added to the stationary CB timing monitor to transmit measurement data to the maintenance base, further improving efficiency and saving labor in the measurement of open/close operation time (performed every six years).
- The verification of wireless data transmission in outdoor substations has been completed, and field application is being promoted by installing repeaters according to the distance between the measuring equipment and the receiver.
- In future work, the communication method between floors in indoor and underground substations where measurement devices are installed in different levels will continue to be studied.

Thank you for you kindness.