

CIRCUIT BREAKER TESTING AT THE GENERAL ELECTRIC TECHNICAL INSTITUTE, KASSEL



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Rainer Lübeck,
Senior Master Trainer, General Electric

Rainer Lübeck has acquired a wealth of knowledge during his 46-year career with AEG, Alstom, Areva and General Electric (GE). He now imparts this knowledge to his customers as the Senior Master Trainer at the GE Technical Institute in Kassel. Andreas Nanning, the Product Manager for the CIBANO 500 circuit breaker test system, asked him about the institute.

Rainer, what exactly is a GE Technical Institute?

Rainer Lübeck: The GE Technical Institutes offer training courses in over 200 different subjects. Customers are trained on real devices and can try out what they have learned on new or former products that GE has acquired, for example, from AEG or Sprecher & Schuh. There are Technical Institutes at 21 factory premises across five continents. For the medium- and high-voltage sectors, we have institutes in Germany, France, Switzerland, Russia, the UAE, India, Turkey and Chile.

What's special about the program offered at the Lilienthalstraße 150 site in Kassel?

The Kassel training center is located on the site of the former Fieseler-Storch factory, which built STOL

aircraft during the war. AEG moved into the building after the war, and it's where GE now produces instrument transformers, compact switching devices and circuit breakers for voltages between 36 kV and 170 kV. It's also home to the service department, and where GE has been holding training courses for its customers for about eight years. After they've been trained, customers are able to install and commission the switching devices themselves. The training team here in Kassel has access to outdoor power circuit breakers in the 36 kV to 420 kV range and a HYPACT 145 kV compact switching device, plus two 123 kV to 170 kV GIS, all of which are fully operational.

What kind of training does GE Kassel offer for circuit breakers?

We have packages such as "Installation and Commissioning" or "Operation and Maintenance". The first day of the "Installation and Commissioning" course deals with the theoretical aspects. We explain how the breaker operates, what happens during arc quenching, how the switching unit is powered, etc. On the second day we delve into the practical side of things. The participants have to construct a switching device and piece together

all the components. They install the breaker and then fill it with SF₆ gas. They take measurements during commissioning and perform a function test on the finished device. Learning-by-doing in other words.

What motivated you back then to purchase the CIBANO 500?

At the time I naturally had devices from other manufacturers as well. However, the OMICRON device stood out as it's so user-friendly. All you needed to do was connect it to the switching device, turn it on, press Start, measure, and there's your result. Our customers were also impressed by how easy it is to get a result. It's otherwise all a bit of a hassle, as configurations first have to be produced and test programs written, and that's before you even get around to taking a measurement. That's too much trouble for our customers. They don't want to have to attend a two- or three-day training course just to find out how the device works. What they want is to connect the device, press a button and see the results.

There's a lot to be said for the integrated power supply as well, as it provides power continuously whenever it's needed, not only during the measurements. This is ▶



a great help when commissioning, as the device can be used as a power pack. Voltage stability is very good and remains stable even at currents of over 20 A, which is fantastic.

The CIBANO is also extremely compatible, we can even use it to carry out a full set of measurements for our 1,200 kV GL 319. We have all the measurement results in an instant, whether it's the motion sequence, the individual switching contacts, the auxiliary switches or all the operating mechanisms. The breaker has two operating mechanisms and four interrupters per phase, in other words, six operating mechanisms and twelve interrupters. With one measurement we get a result for all three phases.

What measurements do you recommend carrying out during the commissioning tests?

It's possible to create a type of fingerprint during commissioning. The dynamic contact resistance and the minimum excitation voltage for the coils is measured. During any later

maintenance work, the engineer can use the fingerprint to see what the breaker looked like when it was new. The measurement is taken again and we can then see whether anything has changed. In the case of the dynamic contact resistance, we can get a good look at the condition of the arc contacts and we're also able to determine their length. Likewise, the minimum excitation voltage: For example, the breaker has an operating voltage of 110 V and tripped during commissioning at 55 V. Now imagine if I'm doing some maintenance and repeat the measurement. It's now tripping at 85 V! This indicates that the operating mechanism may be a bit sluggish. I can then troubleshoot and fix the fault. This is really useful for customers who do their own maintenance.

How do you see the situation with motion sensors? Are more of them on the way?

The flexible arm provided with the motion sensors makes them kind of adaptable. They can be fitted to the HYpact, or to the old pneumatic break-

ers. When new products are launched, then special adapters will obviously be needed. There's a range of requirements dictating where transducers can be attached, especially in the case of GIS installations, where the bays are very close together. However, that's just how it is and it can't be changed.

We'll soon be seeing a new gas in GE products. Are you already offering training courses for it?

We've been running a number of pilot projects for years where customers have also inquired about training. Handling the new gas is a bit different from the SF₆ gas, particularly when it comes to filling. Different temperatures and pressures have to be used so the gases mix. We use special devices for gas handling and we'll be running courses on them in the Technical Institute. ■

For more information and videos about movement measurements please scan the QR code.

