

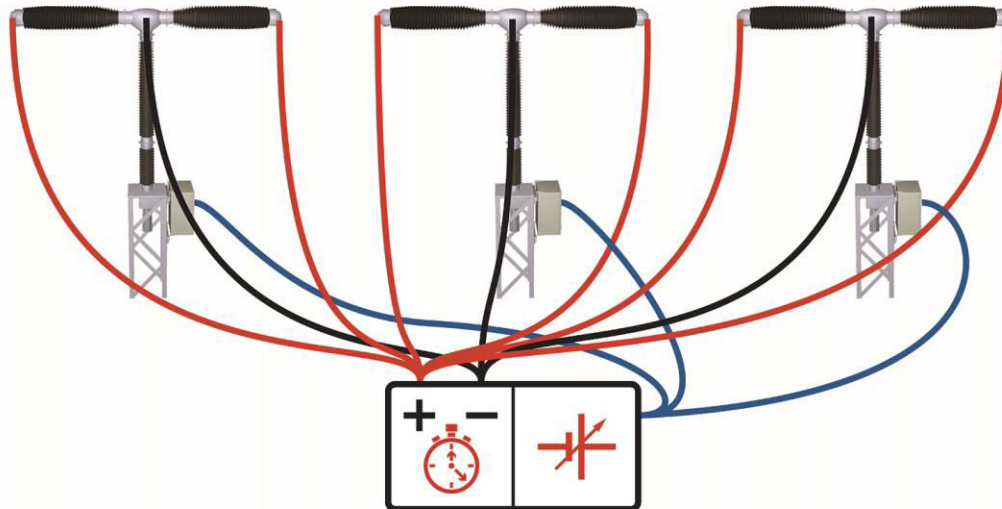
Testing Of Circuit Breaker

Contd...

3a. Timing Test

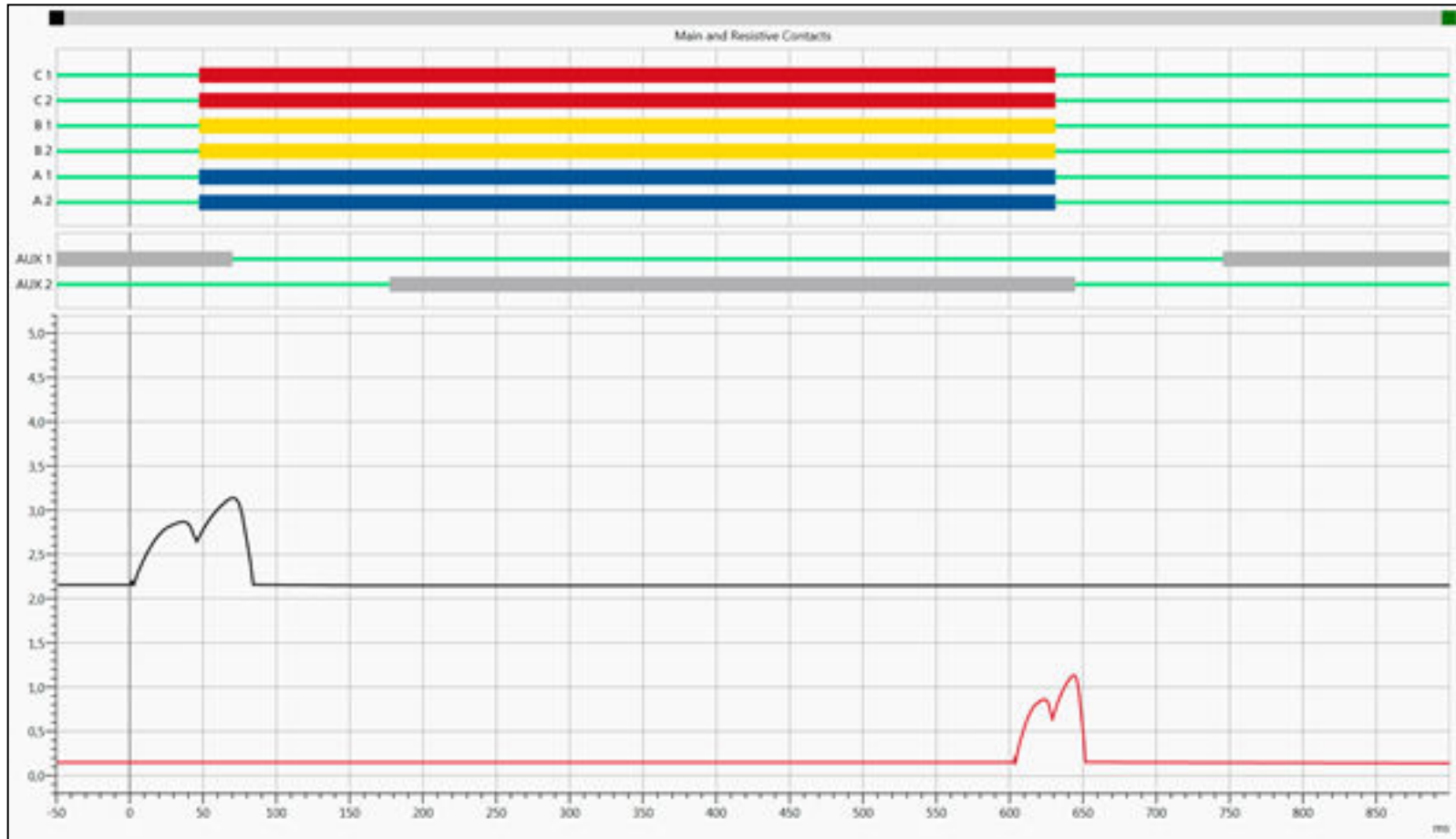
- > **Connect to all main contacts**
- > **Connect to trip & close coil**
- > **Voltage supply required**

Conventional Setup



Time-consuming and error-prone

3a. Timing Test - Measured Values



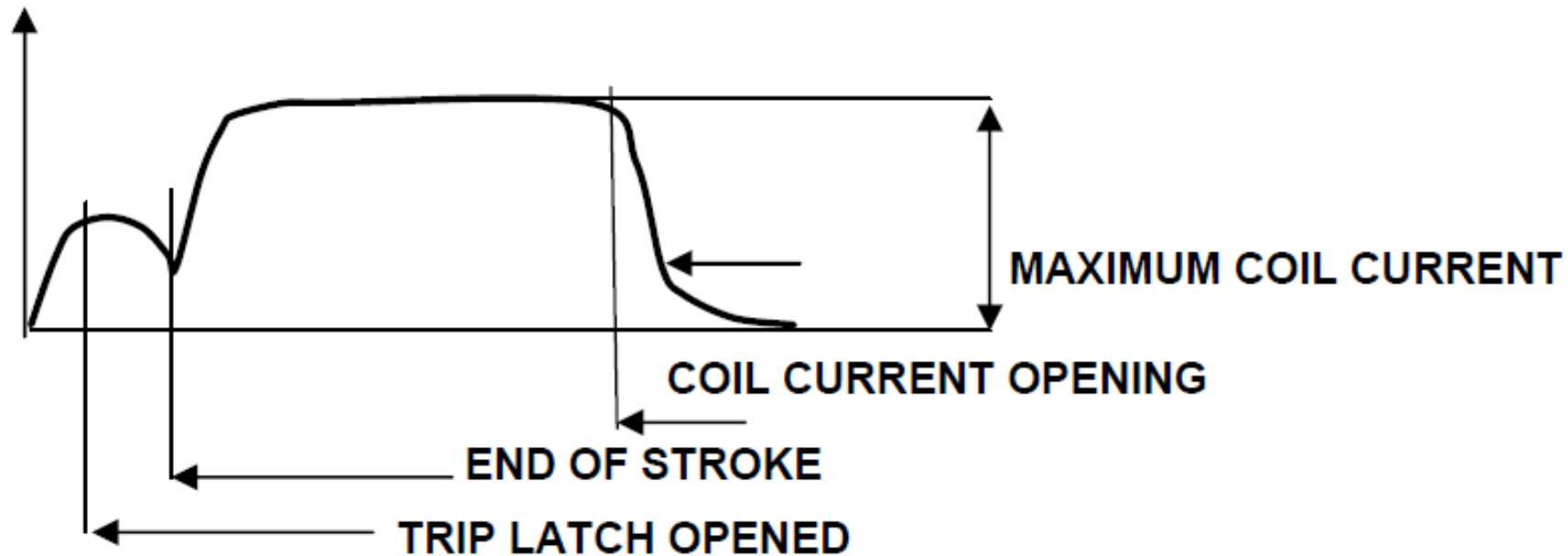
Open Time, Close Time, Contact Spread, Phase Spread, Trip-Free Time, Reclose Time

3b. Timing undervoltage condition

- > **Coils are normally driven by station battery**
- > **What happens if battery condition is not the best**
- > **Perform a test with reduced supply voltage (e.g. 80 %)**
- > **Check times for under voltage**
 - > **does it work anyhow**
 - > **are there any delays compared to nominal voltage?**
- > **Measure the overall times and compare to manufacturer values**

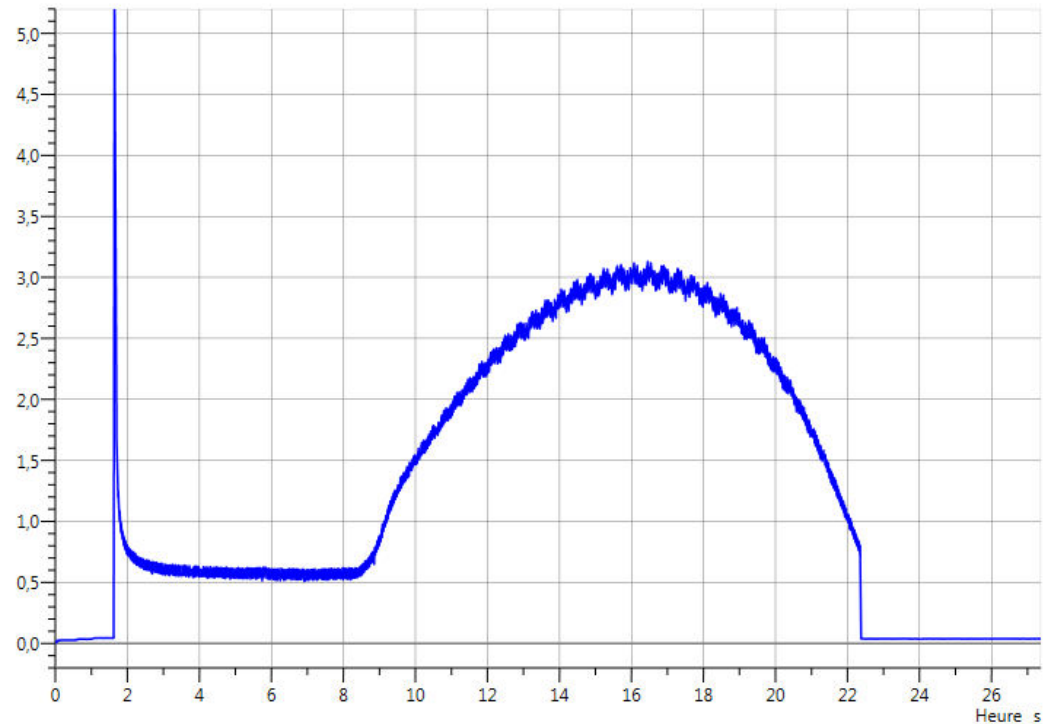
3c. Coil Current

- > Important tool in circuit breaker analysis
- > Detect potential problems in actuating coils
- > Reveal information on power supply
- > Comparison is best method of analysis

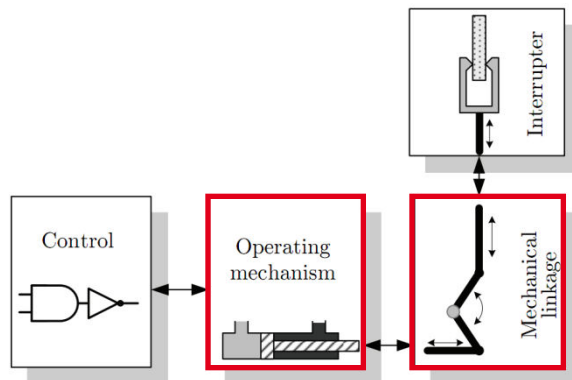
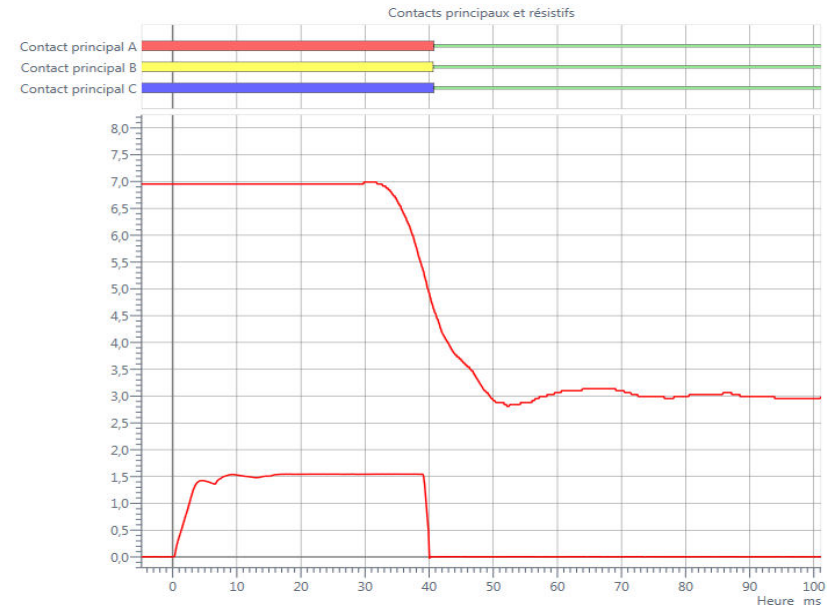
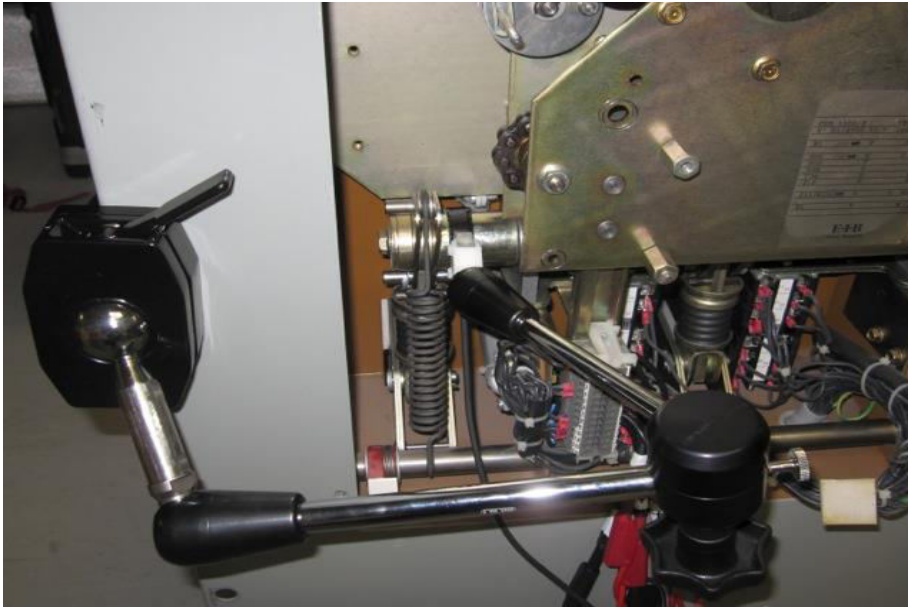


4. Motor Current

- > **Connect source to charging motor or use current clamp**
- > **Check charging times and charging currents**
- > **Compare with previous measurements**



5. Contact Travel



Functional Breaker Model

5. Contact Travel - Travel Measurement to find out:

- > **Mechanical defects of the cinematic chain**
- > **Overall mechanical performance**
- > **Slow operation due to jammed mechanism**
- > **Deterioration of mechanical damping**

- > **Contact wear**
- > **Arcing contact length (in combination with DRM)**