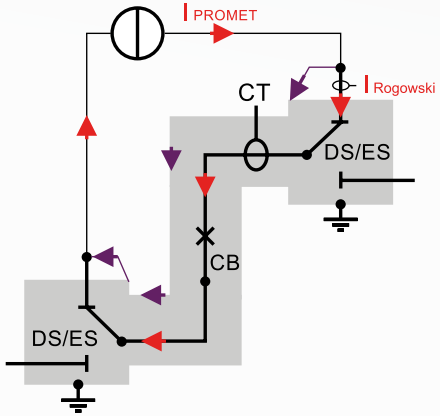
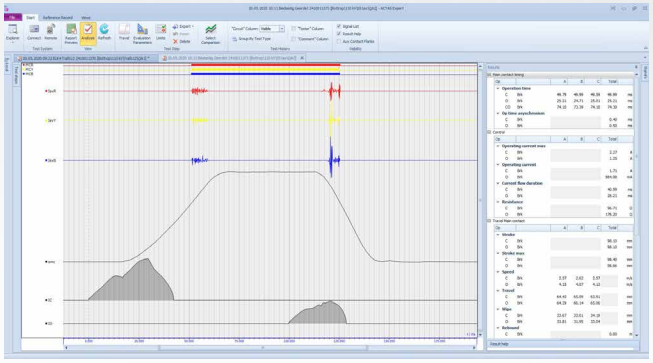
KoCoS uses the "GIS Timing" method to measure correct switching times. For this measuring method, the GIS must have at least one insulated ground lead to the outside. Again, PROMET resistance meters are used which generate current outputs of up to 600 A depending on the version. The resistance measuring devices are controlled by ACTAS. The resistance measuring devices are only used as current sources and not as actual measuring instruments.

Circuit diagram GIS



In order to obtain measured values, in addition to the resistance meters and ACTAS, current sensors specifically developed for KoCoS are used. They are flexible rogowski coils which can be attached to the insulated ground. The current curves measured during the switching operation on the insulated ground can be used to determine the switching times for opening and closing during the various switching sequences of the circuit breaker.

This "GIS Timing" method has a great safety advantage and still offers the possibility of evaluating the GIS systems by means of measurement results and correspondingly recorded measurement signals.



Components for GIS testing

- ACTAS P360 device with cable set
- 1* PROMET R600/R300
  or 3* PROMET L100
  or 3* PROMET SE
- 3* Rogowski coils

KoCoS Messtechnik AG
Südring 42
34497 Korbach, Germany
Tel. +49 5631 9596-40
info@kocos.com
www.kocos.com

KoCoS A FRIEND OF ENERGY

[ENG]

GIS TESTING WITH ACTAS

GIS Testing

with ACTAS and PROMET

GIS Timing – The all in one solution for testing grounded GIS systems

- Current impulse measurement via Rogowski coils
- Easy connection of the Rogowski coils to the insulated earth
- Except Rogowski coils, no further equipment required than for the standard test with AIS
- Very fast configuration for the timing test
- Automatic timing calculation
- High safety due to circuit breaker earthed on both sides

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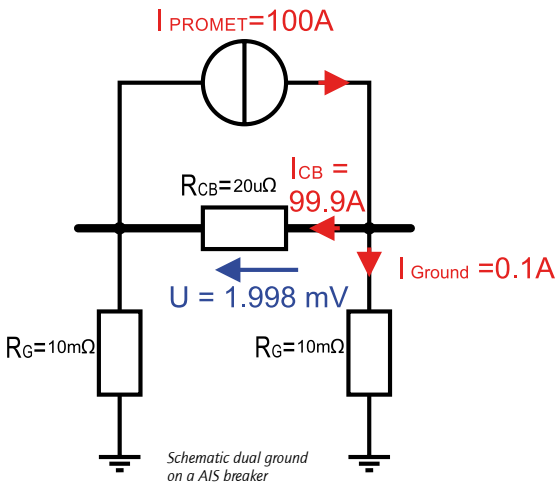
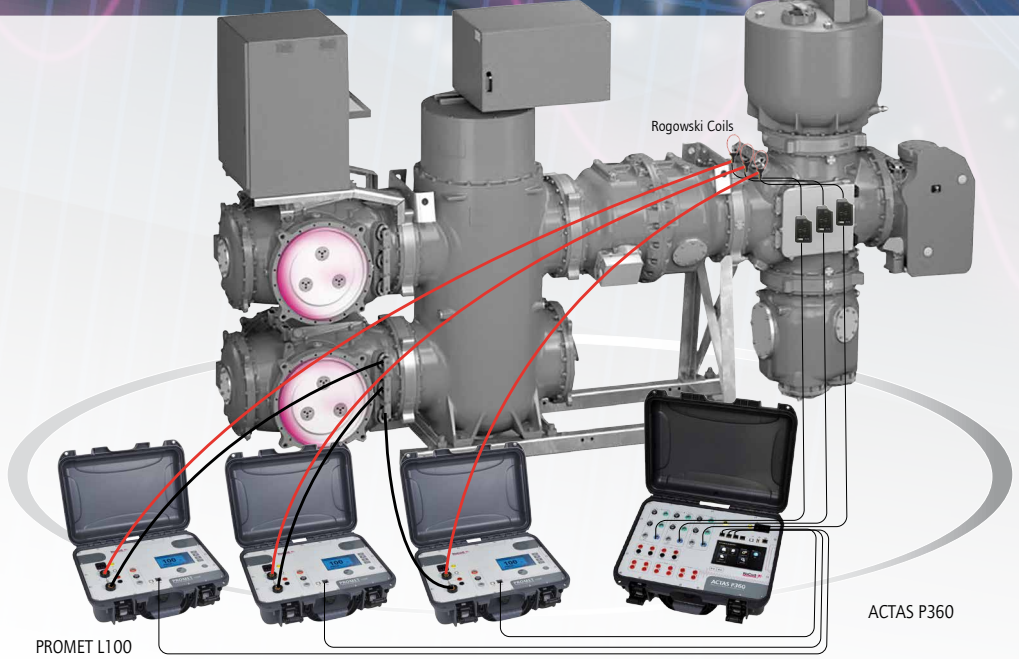
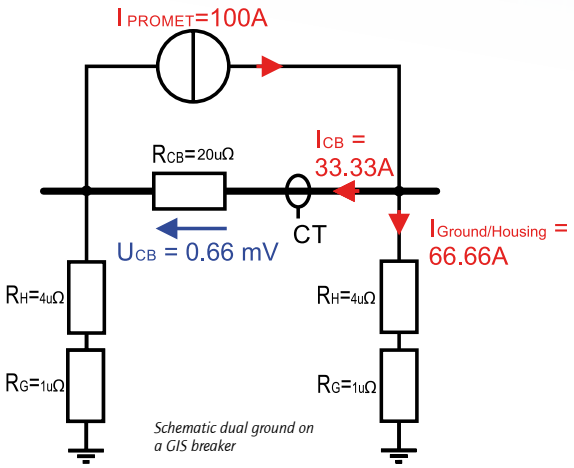
Timing measurements of AIS and GIS switchgears, what are the differences?

GIS high-voltage switchgears are located at many nodes in our voltage network, such as three-phase or single-phase encapsulated switchgear panels. High-voltage switchgears consist of several components and can be designed differently depending on the required function. They contain components such as current transformers, disconnectors, ground switches, circuit breakers, etc. Compared to air insulated switchgear (AIS), they offer a number of advantages, including smaller space requirement, higher personnel safety, a longer service life, and higher reliability. Disadvantages compared to AIS are evident in terms of maintenance, as individual components are very difficult to access. Measurements, such as those of circuit-breaker operating times and resistance of the circuit-breaker interrupter units, are rather difficult to carry out, since the basic requirement is, that in high-voltage installations all the parts being worked on must be grounded.



Schematic dual ground on a AIS breaker





Schematic dual ground on a GIS breaker

In outdoor switchgear systems (AIS), measurement with ground on both sides is generally not a major problem, simply because the typical ground resistance is much higher than the main contact resistance. KoCoS uses „Dynamic Timing“ to combine the ACTAS switchgear test system with PROMET resistance meters.

The standards DIN VDE0105-100 and EN50110-1 clearly state that a GIS system must be measured with ground on both sides. The problem, which is particularly relevant for GIS, is the very low ground resistance resulting from the encapsulation of the entire switchgear in a metal housing. Often, the ground and case resistance may be lower than the main contact resistance. This makes it difficult to carry out a condition assessment of the switchgear using standard measuring equipment.

For testing GIS systems grounded on both sides, the Dynamic Timing method cannot be used in the same manner as used with AIS testing grounded on both sides. It is not possible to measure the correct switching time of the circuit breaker integrated in the GIS.
The components installed in GIS like current transformers, cause measurement delays. Depending on the switching sequence, the result will contain correspondingly faster switching times when tripping or slower switching times when closing.