

Subject:

Reference current transducer (CT) for a high-voltage test laboratory

The main challenge:

Senseleq is in development with a customer on a reference CT for a high-voltage test laboratory. The CT is required to measure from 1 A up to 80 kA with an accuracy better than existing technologies.



Proposed solution:

Together with the customer, Senseleq has defined the following specifications that must be fulfilled by one CT.

- A reference CT in the short-circuit test lab to check accuracy of other measurements.
- Existing set-up includes shunts, Rogowski, and inductive CTs TPX and TPY. Zero flux technology is requested and expected to be more accurate than existing set-up.
- 1% transient error is the maximum acceptable.
- No real continuous DC. During short-circuit DC-offset is experienced which damps in millisecond range (max 1 second).
- High accuracy at nominal 1 kA. No continuous load.
- Ideal measurement: 150 kA (i.e. 218 kA instantaneous peak value – including the DC offset + peak value calculation). DC content damps based on the time constant. 218 kA divided by $\sqrt{2} = 150$ kA.
- Output peak can be 10 V, 100 V or 600 V.
- Accuracy should be 0.5% or better.
- Size is not the limiting factor, however the ability to move the unit on a simple four-wheel set-up was preferred.
- 80kA/3s is the maximum short-circuit level. If the CT is able to withstand the same, it simplifies the test set-up. But the measurement period is less than 0.5 second. The system should not be damaged after 1 second.
- Switching on a DC offset is allowed:
 $I_{dyn} = 2.7 \times 80 \text{ kA} = 218 \text{ kA}$.