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ANALYSIS OF EXTERNAL INSULATION OF OPTIC- FIBER 35 KV CURRENT TRANSFORMER

Current transformers (CT) are designed for reducing alternating current to controlled level in proportion to the corresponding original values. They provide galvanic isolation of measuring devices, counters, relays, etc. from the high-voltage (HV) circuit. Principle of their operation is based on the electromagnetic induction law.

Digital (microprocessor) systems of relay protection, automation, automatic control, measurement and dispatching systems are modern trends in the world power industry, along with the existing traditional systems of relay protection, emergency control, measurement and metering at power plants and substations. And this situation leads to an increase in the load on CT and, as a result, to a deterioration in the accuracy class of CT.

Grechukhin V.N.[1] analyzed the economic conditions for the functioning of power energy enterprises and energy systems in his work “Electronic current and voltage transformers”. According to this work, it is necessary to increase the accuracy of electricity monitoring signals. Digital metering systems can achieve it, but, the insufficient accuracy class of conventional CTs is a barrier on this path.

World leading companies’ designers strive to develop CTs of a higher accuracy class (better than accuracy class 0,2S and 0,2) with greater load capacity. Satisfying these requirements will inevitably lead either to an increase in weight and size indicators (larger amount of electro-technical steel, copper and other high-cost materials), which is undesirable under the conditions of current economy situation. The identified problems have led to more intensive use of insulation, and according to international normative documents, this question remains open and relevant.

On the modern stage of the HV technology development conventional transformers have reached the limit of their capabilities and can hardly meet new requirements and tendencies, such as digitalization, safeness, and compactness.

Search for an alternative technical solution measuring current and voltage of high voltage electric power plants started a long time ago both in our country and abroad.

These researches have become more relevant considering the intensive process of introducing microprocessors into control systems, measurement, relay protection, emergency control at substations.

Optic-Fiber Current Transformer (OFCT) is next generation transformers. In our country many transformers are approaching deadline of service life. Implementation of the modern technologies makes senseless a replacement of the old current transformers (CT) for the similar new ones, as they can be hardly matched with digital communication methods.

Aim of the work: Analysis of materials and shapes used in external insulation design, in terms of optimal protection of optical sensors from natural phenomena and breakdowns

Conclusion: The external insulation of OFCT 35kV is researched for 3 contamination types of insulation. The further research intention is to develop more economically effective optic current sensor. It is obvious, that the development of digital current transformers and their use together with microprocessor-based measurement devices at substations with the prospect of a transition to a "digital" substation, where all information flows are circulated and processed in digital form is a promising area of research.

REFERENCES

1. Гречухин В.Н. Электронные трансформаторы тока и напряжения. Состояние, перспективы развития и внедрения на ОРУ 110–750 КВ станций и подстанций энергосистем [Текст] / В.Н. Гречухин // Вестник Ивановского государственного энергетического университета - 2006. - №4. - С. 1– 9.