

Power distribution facilities are the end-point of the power distribution system which supplies electric power not only to factories, offices, apartment buildings, and other housing, but also public facilities such as traffic signals, street lights, etc. And, an enormous number of the facilities are used. Although equipment failures such as power outages due to insulation breakdown in power distribution facilities or in power cable terminals have a large public effect, no technology for diagnosing the condition of insulation breakdown had been established under the conditions that wire is live and equipment is operating.

JFE Advantec, the partial discharge detecting

technique by using of AE was commercialized in 2005 as AE Insulation Deterioration System “AE-210” as a dedicated system for diagnosis of power distribution facilities.

JFE Advantec and the Tokyo Electric Power (TEPCO) received the 50th Shibusawa Award of the Japan Electric Association for this activity. This report introduces the outline and features of AE-210, which is actively used to promote preventive maintenance of power distribution facilities using the AE method.

In general terms, AE means the phenomenon in which the strain energy accumulated in material is discharged as an elastic wave when material is deformed or a crack occurs. The technique of detecting this wave by an AE sensor and performing nondestructive evaluation is called the AE method. It is known that AE is also generated when partial discharge occurs. Therefore, this

tery alone, and can be used without an external power supply for one full day (approximately 8 hours) when the default and spare batteries are used.

(3) Improved Sensor Workability

Easy attachment of the sensor is important when wearing high voltage insulating gloves and measuring AE in constricted spaces. Therefore, the dimensions and shape were designed based on opinions regarding measurement workability in the field, an integrated sensor unit with the AE sensor and the preamplifier was fabricated.

3.2 Improvement in On-site Diagnosis

The correlation between the partial discharge quantity and AE amplitude had been investigated in partial discharge tests^{1,2)} previously. In case of on-site diagnosis, not visual analysis of the wavelength but judgment by a quantitative index is important.

As shown in **Fig.**

cialized by integrating measurement and analysis tech

- degradation diagnosis technique." Proc. 13th Annual Conf. of Power & Energy Society. IEE of Japan, vol. B, 2002. p. 224–225. (Japanese).
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 - 3) Kusaka, Norihiro; Oda, Masahiro. "Diagnosis techniques of electric power distribution installations by means of acoustic emission." Proc. of 20th Annual Conf. of Power & Energy Society. IEE of Japan, 2009, p. 41-17–41-18. (Japanese).

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