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EQUIPMENT FOR HIGH VOLTAGE CAPACITOR TYPE BUSHINGS MONITORING, type DPD 06

GENERAL

DPD 06 is an intelligent on-line diagnosis system for monitoring continuously the bushings.

With its computing and analyzing system, **DPD 06** detects the deterioration of the capacitor-type insulation and releases alarm signals, which can be locally or remotely taken over.

The permanent monitoring of the technical condition of the insulation is very important, since the statistics show that 30% of the transformers faults are due to the bushings; over 80% of the faults can be prevented by monitoring, this fact being essential because 52% of the failures are followed by violent fire and explosions.



DPD 06 has the following features

- **Continuous assessment** It performs a continuous monitoring of the dielectric losses for the bushings, providing an assessment of the insulation system.
- **Identification of the bushings having problems** Finding out the bushing with abnormal behaviour, it provides the information needed to plan the appropriate corrective actions.
- **Alarm messages** In case of insulation condition damage, two alarm levels will warn and provide information required to plan the corrective action for the bushing subjected to deterioration.

DESCRIPTION

DPD 06 is a cost-effective solution to continuously evaluate the condition of bushings while in service.

The equipment takes over the electrical signals from the bushing taps and corresponding voltage transformers, calculating the dielectric losses by using a dedicated algorithm.

The condition of the bushing is evaluated by displaying $\tan\delta$ [%].

The monitoring can be performed for each bushing individually or for all the bushings of a transformer.

The tap adapters especially designed for the particular bushing are mounted to the tap, allowing DPD 06 to measure the leakage current. The analysis system establishes a benchmark value of $\tan\delta$, comparing it to the value of $\tan\delta$ measured by the bushing manufacturer.

Subsequent measurements are compared to the benchmark value and the values of $\tan\delta$ are monitored in time.

When a change of the value of $\tan\delta$ occurs, the system identifies the change trend of the bushing with problems, by comparison with the other bushings (from the set of three bushings under the same potential), and offer warnings by the LED – ON and NC – NO contacts.

Bushing tap adapters

Tap adapters are specific to bushing type, voltage class and manufacturer.

ICMET Craiova has developed a number of adapters for the most commonly used bushings, and the particular types can be ordered at request.

Protection for bushing taps

Most bushings are designed with the tap grounded while in service.

The grounding of the tap is usually achieved through the tap cap. At DPD 06 installation, the tap cap is replaced with the bushing adapter and the potential of the tap is maintained to a value lower $10 V_{ef}$, by means of the tap adapter.

The tap adapters are designed to prevent a voltage from developing on the tap, even when the sensor is disconnected from the equipment.

The tap protection consists of:

- Two redundant voltage limiters (at a voltage lower than $10 V_{ef}$) under normal operating conditions;
- Surge suppression circuit which includes surge arresters with variable resistance.

Equipment software allows:

- ◆ dielectric loss calculation for each monitored bushing
- ◆ displaying of $\tan\delta$ for each bushing
- ◆ displaying of leakage current and bushing self capacity
- ◆ analogue inputs calibration
- ◆ setting of alarm thresholds
- ◆ simulation of equipment and alarm operation
- ◆ self-testing
- ◆ displaying of measured parameters / alarm threshold setting, respectively
- ◆ data recording in RAM nonvolatile memory
- ◆ connecting to PC, for data downloading and set parameters (filtering coefficient, alarms, archiving time etc) visualisation

TECHNICAL CHARACTERISTICS

● Supply:	220 V +10 %,-15 %, 50 Hz
● Number of monitored bushings	6 (3)
● $\tan \delta$ measuring range	0....10 [%]
● Measuring uncertainty	± 10%
● Alarm level	adjustable, within the measuring range
● Protection degree	IP 30

OVERALL DIMENSIONS:

Central unit:	283 x 180 x 110 mm
Electric switch base unit UAA:	740 x 560 x 560 mm

CLIMATE CONDITIONS:

● Operating temperature:	0 ⁰ C to 50 ⁰ C
● Storing temperature:	-40 ⁰ C to 80 ⁰ C
● Environment without corroding gases and vapors	
● Relative humidity of air	80 % at 20 ⁰ C
● Maximum altitude:	1000 m
● Lack of direct solar radiations	
● Atmosphere aggressiveness degree:	normal according to STAS 7222-90