IDR-10

Partial discharge Monitoring relay

Monitors and assesses Insulation Condition On-line in high-voltage switchgears, Generators, Motors and Cables

Intelligent diagnostic device «IDR-10» (Insulation Diagnostics Relay) is universal instrument for insulation condition diagnostics and equipment protection in industrial three phase power systems.

«IDR-10» relay can be applied to:

- Stator winding insulation of high-voltage turbo and hydro generators and motors.
- Switchgear sections with voltage rated from 6 to 36 kV.
- Power cables, at 6 kV and above.

Assessment of high voltage insulation condition is made by partial discharges measurements and analysis. This On-line diagnostics method is universal and very sensitive method that can be applied to almost any HV apparatus with rated voltage above 3 kV. It allows detecting insulation problems on early stages of insulation deterioration. The method is also helpful for assessing the quality of maintenance and repair.

Achievements of modern electronics and gained over the years experience allowed «DIMRUS» to compact the knowledge and technology into a small, inexpensive, but still very powerful device. It has most of the features of its more expensive predecessors and unbeatable price making **IDR-10** most attractive monitor on the market of high voltage insulation diagnostics.

IDR-10 acquires and processes PD pulses originated in insulation of monitored equipment, calculates Partial Discharge Power taking into account measured pulse magnitudes, repetition rates and high voltage in the system. Partial Discharge Power is proportional to the power dissipated in partial discharge and damaging HV insulation. Programmable threshold allows Alarm relay to operate and warn about worsening of the insulation condition, saving equipment before immanent critical failure.

IDR-10 relay is network enabled by built-in RS485 interface, allowing integrating relay(s) into a plant automated control system. USB interface allows for local communication with a PC with help of "Insulation Health Monitor" software. The software allows for more sophisticated data analysis – "PD Expert", recognizing specific patterns of partial discharges, providing additional valuable information for maintenance and repair. This software is shipped with every monitor. Optionally, **IDR-10** monitor can come with that expertise embedded into monitor's firmware. Software or/and firmware compares the detected "PD patterns" to "patterns' library" and makes intelligent conclusion on type and severity of the defect(s) in insulation. Along with PD power, the rate of upward trend of PD power is used as diagnostic parameter allowing warning about fast development of even low PD activity. With the sensors coupled to HV buses, the relay also functions as HV indicator, indicating presence of high voltage on all three phases by three designated LEDs on front panel.

Switchgear application

IDR-10 utilizes PD sensors designed as support insulators, but constituting a capacitive voltage divider. Such supports-dividers are used for indication of presence of high voltage in switchgears and commonly installed in every section of contemporary switchgear line-ups. Existing sensors can be used or supports-dividers can be easily installed replacing bus supporting insulators. The sensors function as support insulators, have the same size and shape and manufactured by the same manufacturer as simple supporting insulators. Three types of the sensors are designed to cover all HV operating ranges up to 36 kV.

The relay is installed on front panels of the gear replacing HV indicators. Three LED indicators show presence of high voltage on the buses within the nominal operating range. Partial Discharge Power data are displayed on digital display and by LED indicators. If a measurement comes up with PD power exceeding preinstalled alarm threshold, LED will lit up and alarm relay will operate output dry contacts.

Since **IDR-10** is inexpensive, it can be installed in every section of switchgear line and provide excellent localization of PD activity, allowing isolating and eliminating the problem before it comes to a critical failure.

Generators and motors applications

Same PD sensors as for switchgear application can be used in PD measurements on rotating machines. Sensors are installed in the stator leads termination box. Different Bus Couplers or High Frequency Current Transformers (HFCT) on feeders' shield grounds can be used for Partial Discharge monitoring with **IDR-10** relay.

Cables insulation monitoring with IDR-10 relay

For that purpose the same bus supports - capacitive dividers connected to the bus or cable terminations can be used as primary sensors. High Frequency Current Transformers on cable shields grounds can be used too. Utilizing those sensors eliminate necessity of connecting to HV circuits. Depending on feeder design, **IDR-10** can monitor insulation condition using HFCTs on three three-phase cables or on one feeder with three separate phase cables.

IDR-10 is a versatile intelligent monitoring relay and can be used for multiple applications including, but not limited discussed above applications.

Specifications of relay «IDR-10»

№	Parameter	
1	Number of input PD channels	3
2	Frequency range for PD measurements (MHz)	0.5-20
3	Capacitance of the capacitive dividers (pF)	20,15 and 10
4	Rated Voltage of the capacitive dividers (kV)	6-10, 24 and 36
5	Computer interfaces	USB, RS485
6	Display	6 LEDs and Digital display
7	Software	IHM and PD Expert
8	Dimensions (mm)	144*144*50
9	Operating temperature range (^{0}C)	-40 - + 50