

IDD[®]



IDD[®] INTELLIGENT DIAGNOSTIC DEVICE FOR BUSHINGS & CTs

Introduction

The *IDD, Intelligent Diagnostic Device for Bushings and CTs*, is a revolutionary online diagnostic package that continuously monitors bushings and CTs. The *IDD*, with its field-proven embedded expert system, will detect abnormalities in the insulation system and, when appropriate, will issue alerts. The *IDD* will display alerts locally and remotely. There are hundreds of installations around the world relying on this expert system to identify impending problems. Most importantly, the *IDD* keeps asset managers up to date on the condition of their bushings, providing them lead time to determine the appropriate corrective action.

Features

- **Continuous Assessment** – the *IDD* performs an analysis on the bushing leakage current, providing assessment of the insulation system.
- **Identifies Problem Bushing** – knowing the bushing which is manifesting abnormalities provides the information needed to plan the appropriate corrective actions.
- **Diagnoses Severity of Problem** – after detecting a problem, the expert system calculates the absolute and rate of change of power/dissipation factor and capacitance of the suspect bushing, providing diagnostic information to determine the severity of the problem.
- **Eliminates False Alerts** – advance signal processing and field-proven algorithms eliminate the effect of noise and other environmental conditions that could lead to incorrect diagnosis of the bushing status and inappropriate corrective actions.
- **Remote Alert Notification** – industry-standard DNP 3.0 SCADA protocol and supervisory I/O interface enables the operator to monitor the *IDD* remotely.
- **Detailed Alert Messages** – an alert will indicate the problem and criticality, providing valuable information to schedule corrective action.

Description

The *IDD, Intelligent Diagnostic Device for Bushings and CTs*, is a cost-effective solution to continually evaluate the condition of bushings and CTs while in service. The conditions of the bushings and CTs are evaluated by monitoring the leakage currents measured at each tap. The analysis requires monitoring all bushings or CTs in a three-phase set. One *IDD* can monitor up to four sets of bushings (2 sets of CTs) associated with the same apparatus.

Tap adapters specifically designed for the particular bushing/CT are mounted to the tap, allowing the *IDD* to measure the leakage current.

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Bushing and CT Analysis

Bushings and CTs are evaluated by measuring the individual leakage current, one from each phase of a three-phase system. With one of the bushings as reference, the three phasor values of the rap currents are extracted. A process of superposition is then applied to quantify a change in an individual tap with respect to the other two bushings. This information is then applied to three trending periods to establish the normalized capacitance and power factor of the individual bushing/CT. This is then used by the analysis to assess the condition of the three bushings. Once a change that warrants attention is detected, the expert system will identify the specific bushing or CT that is experiencing the problem and suggest appropriate action.

Bushing and CT Tap Adapters

Tap adapters are specific to manufacturer, type, and voltage class. Doble has developed a number of adapters for the most commonly used bushing and CT types. If a particular adapter is not currently available, Doble will develop an adapter to meet a specific need.



Protection for Bushing and CT Taps

Most bushings and CTs are designed with the tap grounded while in service. The grounding of the tap is usually achieved through the tap cap. On an **IDD** installation, the tap cap is replaced with an **IDD** bushing adapter, and the grounding of the tap is maintained through the **IDD**.

There are features designed into the **IDD** tap adapters to prevent a voltage from developing on the tap should the sensor become disconnected from the **IDD**. The tap protection consists of:

- Two redundant voltage limiters (13V peak maximum), under normal operating conditions.
- Surge suppression circuit, which includes surge arrestors and a 1500 Vac spark gap.

Installation

The installation is very straightforward:

1. Mount the tap adapter to the bushing or CT tap.
2. Connect 20 AWG shield wire between the tap adapters and **IDD**.
3. Connect **IDD** to substation power source (AC/DC).
4. Connect PC to **IDD** and configure the **IDD**.
5. The **IDD** is now fully operational.

Continuous Diagnostics

The **IDD** is designed to operate reliably under extreme weather conditions and electrical interference. The self-diagnostic continuously tracks the condition of the unit and issues an alert if an abnormality is detected

Technical Specifications

IDD Electrical Inputs:

Input Measuring Range Accuracy	0 - 100mA +/- 1% of reading
Resolution	12 bit
Sampling rate	5kHz
Isolation between phases	2500V RMS, for one minute

Power Supply: 90 - 264 VAC, 47 - 63 Hz or 100 - 280 Vdc

Environment:

Designed to meet :

Surge withstand ANSI/IEEE C37.90.1-1989 (R1994)

ESD: EN 61000-4-2

Ambient Operating Temp

-40° to 65° C

Storage Temp

-40° to 85° C

Humidity

5% to 95% non-condensing

Physical dimensions:

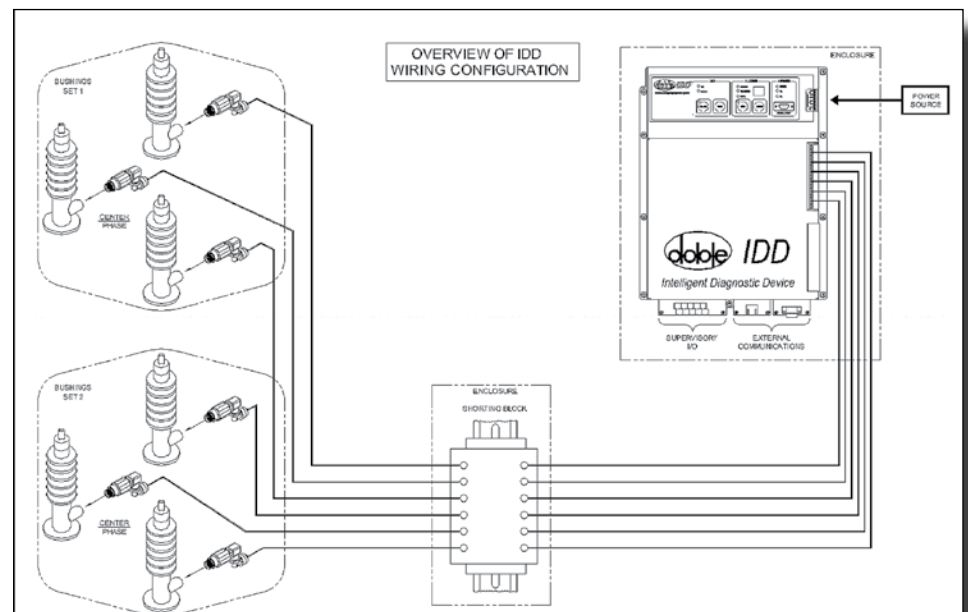
17.25 in. H x 15.25 in. W x 3 in. D (438.2mm H x 387.4mm W x 76.2mm D) for control-cabinet mounting

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Doble is certified ISO 9001:2000

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