

# IDD<sup>®</sup>



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The **IDD for Moisture** provides a true assessment of the moisture concentration in both transformer oil and paper

## IDD<sup>®</sup> INTELLIGENT DIAGNOSTIC DEVICE FOR ON-LINE MOISTURE IN OIL ANALYSIS

### Introduction

Assessing the moisture content in insulation is a key factor to ensure the reliability and longevity of a transformer. The moisture content in oil is continuously changing, and could have adverse effects mostly on quality. The majority of the moisture resides in the paper. It is essential to know the amount of moisture in the solid insulation to determine the short and long term health of the transformer. The **IDD for Moisture** reliably evaluates the moisture concentration in both the oil and paper.

### Why Monitor Moisture?

Moisture affects the dielectric breakdown strength of solid and liquid insulation, affects the rate the cellulose insulation ages, and the propensity for bubble evolution during overloads. Ambient temperature, loading, aging, leaks and other factors cause the level of moisture to change continuously. The need for continuous monitoring and diagnostics increases as the transformer temperature cycles. This is especially true for transformers that are overloaded or peak loaded.

### IDD for Moisture Features

- **Continuous Assessment** – the **IDD for Moisture** takes moisture and temperature measurements, calculating water concentration, interpreting the data, and sending notifications of impending problems.
- **Diagnoses Severity of Problems** – the “*Doble Expert System*” calculates the dielectric breakdown strength of the insulating fluid. A series of alerts are issued, starting with early warnings to identify impending serious problems.
- **Assesses the Moisture Content of the Entire Insulation System**- in addition to measuring the moisture in oil, **IDD for Moisture** estimates the water content of the paper. As a result, changes can be tracked to detect a situation where water vapor bubbles could form during overloads.
- **Detailed Alert Messages**- when there is a problem, alert messages warn of serious decreases of dielectric strength, the percentage decreased in dielectric strength of the insulating fluid, the moisture content and temperature, and recommended corrective action.
- **Stable Calibration**- the stability of the **DOMINO<sup>®</sup>** sensor and self-diagnostics of the **IDD for Moisture** ensure accurate and reliable system diagnostics.
- **Immune to Interference**- the performance of **DOMINO** and **IDD for Moisture** are not affected by electrostatic and electromagnetic interference as experienced in normal substation operations.



The **IDD for Moisture** allows users to combine the measuring capability of an on-line Moisture in Oil sensor with a comprehensive diagnostic system. The resulting diagnostic system provides early detection of problems and information for determining when maintenance is truly required.

One **IDD** can support multiple applications of analysis. A single **IDD** can be used to analyze data on Bushings, DGA, and Moisture.



## IDD On-line Moisture Diagnostics

Doble's Moisture in Oil sensor, **DOMINO**, measures the relative saturation and temperature of the insulating fluid and calculates the moisture concentration in parts per million.

The **DOMINO's** stainless steel probe is placed directly into the insulating fluid through an access point on the transformer wall, typically a sampling or drain valve. Every 60 minutes, the **IDD for Moisture** polls the **DOMINO** for data.

With the information from **DOMINO**, the **IDD for Moisture** establishes if the transformer is close to a state of equilibrium. The **IDD for Moisture** estimates the moisture concentration in paper and the average moisture concentration over time. The **IDD for Moisture** also tracks the dielectric breakdown strength and stores this hourly recording for 30 days. The daily averages are stored for 300 days. Alerts are issued when the estimated loss of dielectric breakdown is excessive due to a significant amount of moisture.

The **IDD for Moisture** combines the monitoring capability of the Doble Moisture in Oil sensor (**DOMINO**) measuring the moisture in the insulating fluid, with the data processing capability of the **IDD** to calculate the water content in the transformer. This provides a diagnostic package that will accurately assess if your transformer needs maintenance or is at risk due to excessive moisture.

## IDD for Moisture Technical Specifications

<b>Power Supply:</b>	90 - 264 volts, 47 - 63 Hz or 100 - 280 Vdc
<b>Environment:</b>	
<b>Surge withstand</b>	ANSI/IEEE C37.90.1-1989 (R1994)
<b>ESD:</b>	EN 61000-4-2
<b>Ambient Operating Temp</b>	-40° to 50° C
<b>Shortage Temp</b>	-40° to 85° C
<b>Humidity</b>	5% to 95% non-condensing

## DOMINO® Technical Specifications

### Relative Saturation/PPM:

<b>Measuring range of relative saturation</b>	0 - 100%
<b>Accuracy, (including nonlinearity and repeatability)</b>	±1% RS (0 - 90%) ±2% RS (90 - 100%)

**Concentration, calculated (parts per million):** ppm (mg/Kg)

**Sensor:** thin film polymer sensor

### Temperature:

<b>Measuring Range</b>	-40 to +180° C
<b>Typical Accuracy at +20 °C (+68 °F)</b>	±0.1° C
<b>Typical Temperature Coefficient</b>	0.005° C/°C
<b>Temperature Sensor</b>	Pt 100 RTD 1/3

### Pressure:

<b>Range</b>	
<b>DOMINO® Probe</b>	0 to 2 MPa (0 to 20 bar, 0 to 290 psi)

### Analog Outputs:

<b>Analog Outputs (2)</b>	
<b>Selectable</b>	Scalable within 0 to 20 mA, or 0 to 10 V

### DOMINO with a Display:

<b>Display</b>	2 x 16 character alphanumeric high-contrast, wide view angle LCD
<b>LCD Operating Temperature Range</b>	0° to +50° C
<b>LCD Readability</b>	-20° to +50° C
<b>LCD Survivability</b>	-40° to +50° C

Refer to **DOMINO** technical data sheet for additional information.

### Physical dimensions:

<b>17.25 inches H x 15.25 inches W x 3 inches D</b>
<b>CM 43.8 x 38.7 x 7.6 (cm) for control cabinet mounting</b>

*Specifications are subject to change.*

