

DOBLE ON-LINE MONITORING

# doblePRIME IDD

Bushing Monitor

## FOR ON-LINE MONITORING OF BUSHINGS AND CURRENT TRANSFORMERS

The unparalleled doblePRIME IDD Bushing Monitor detects deterioration in bushings, finding abnormalities in the insulation and issuing actionable alerts. Over almost 20 years of successful monitoring Doble has identified two distinct failure modes—rapid onset and graceful decay—and have cases of averting bushing failures in both modes. The doblePRIME IDD Bushing Monitor provides leakage current, phase and harmonic analyses for up to 12 bushings, measuring parameters for each bushing individually and together. This intelligent device also uses an embedded expert System to provide you with notifications and alarms based on comparisons between off-line and calculated on-line data. Designed to fit your monitoring program, the doblePRIME IDD Bushing Monitor can operate as a standalone device or as part of a doblePRIME Condition Monitoring Platform.

### FEATURES

- Capture bushing current waveforms in real time
- Calculates values for power factor and capacitance for each bushing
- Records data at user specified intervals, or ad hoc to reflect likely failure modes and industry experience
- Displays alerts locally and remotely; alerts at three levels for all measured or derived data
- Intelligent Expert System learns what is normal for your bushings
- Built in Alert State Machine analyzes data trends and variations to identify bushing deterioration
- Available in three versions: 12 current, 6 current, or 6 current and 3 voltage reference with one reference per phase
- Optional armored cables & junction boxes for optimal performance in harsh environments
- Provides a sum current value for each bushing set



*Above shows 7 days of individual leakage current rms values recorded at 15 minute intervals for a set of 3 bushings. doblePRIME IDD stores over 2 years of data. Individual phase angles, power factor and capacitance values are also available.*

### BENEFITS

- Save costly equipment by quickly reacting to rapid deterioration warnings
- Identify problem bushings and diagnose the severity of the situation
- Plan for bushing replacements in a proactive, risk management approach
- Monitor up to 12 bushings, either individually or in sets of three
- View data, alerts and analyses though local or remote connection via cell phone, tablet or laptop, within your organization's security/cyber policy
- Use as a standalone product, networked to existing SCADA system, or as part of a doblePRIME Condition Monitoring Platform
- Records both raw waveforms and derived values to allow for deep analysis
- Alerts based on latest analysis techniques—and built on Doble's decades of experience in the field

## doblePRIME IDD TECHNICAL SPECIFICATIONS

### DATA ACQUISITION

|                           |                                                                                        |
|---------------------------|----------------------------------------------------------------------------------------|
| Inputs                    | 6 channel options (models DPID 101 and DPID 102)<br>12 channel option (model DPID 100) |
| Connector                 | Screw terminal                                                                         |
| Measurement method        | Leakage current raw waveform and relative phase                                        |
| Tap Current Range         | 1 - 200 mA                                                                             |
| Bushings Monitored        | Up to 4 sets of 3 bushings                                                             |
| Bushing-Bushing Isolation | >2500 V                                                                                |
| Bushing-Host Isolation    | >2500 V                                                                                |
| Magnitude Accuracy        | ± 1% of reading                                                                        |
| Phase Accuracy            | 0.01 Degrees                                                                           |
| Resolution                | 0.1% of input signal peak                                                              |
| Voltage reference         | 3x instrument transformer input (model 101 only)                                       |
| Core CPU                  | ARM Cortex 180MHz                                                                      |
| Memory                    | 32MB RAM, 16MB flash                                                                   |

### PRIME GATEWAY

#### CPU, MEMORY AND BUSES

|          |                     |
|----------|---------------------|
| Host CPU | ARMv8 1.2GHz        |
| Memory   | 1 GB RAM, 4GB Flash |

#### STORAGE

32GB for application and data storage

#### PERIPHERALS

USB 2.0  
2x Isolated RS485 (Modbus, DNP3)  
10/100 BaseT Ethernet (DNP3, Modbus, HTTP)  
GPS 1PPS time sync (Fibre/IRIG)  
Alert LED (Status, Info, Warning, Action)  
Status Relay, 240VAC 5A (Status, Info, Warning, Action)

### ENVIRONMENTAL

|                                                                             |                      |
|-----------------------------------------------------------------------------|----------------------|
| Humidity                                                                    | 0-95% non-condensing |
| Operating temperature                                                       | -20°C to +50°C       |
| Storage temperature                                                         | -20°C to +70°C       |
| Available Doble enclosure includes climate control to extend range to -40°C |                      |

### MECHANICAL DATA

|              |                    |
|--------------|--------------------|
| Height       | 200mm / 7.9 in     |
| Width        | 330mm / 13.0 in    |
| Depth        | 82mm / 3.2 in      |
| Weight       | 2kg / 4.4 lbs      |
| Construction | Anodized aluminium |

### POWER SUPPLY

|                 |               |
|-----------------|---------------|
| External supply | 24 V DC @ 1 A |
|-----------------|---------------|

An optional power adapter can be supplied to suit global mains voltage

### Detect Slow or Rapid Failures

Bushings can fail slowly, giving you time to plan for replacement; they can also fail rapidly, leaving little time to act. Doble Engineering has documented cases of bushing saves where detection of bushing deterioration allowed for appropriate intervention and the resulting 'save' of transformers. With intelligent monitoring from Doble Engineering Company, you can proactively manage risks associated with either failure mode and act on intervention plans in a timely manner.

### Safety Starting at Installation

The doblePRIME IDD uses multiple redundant safety systems & ground paths, including transorbs & sparkgaps, to ensure anytransients are safely conducted to ground. The safety systems have been tested under overvoltage impulse to demonstrate functionality. During an installation, the bushing cap is replaced with the IDD bushing adapter, ensuring grounding is maintained in service. For harsh environments, armored cables are available, meeting full military specification protection. For high criticality applications, and for those in areas with significant switching transients, protection remote from the bushing is available.

### Cybersecurity

The doblePRIME IDD works completely within your organization's cyber security, not requiring access to the cloud for data storage or analysis.

### Scalability

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