

## IDAX 322 Insulation diagnostic analyzer



- **State-of-the-art high voltage Dielectric Frequency Response (DFR) instrument tailored for field testing of power transformers, bushings and many other test objects.**
- **Instrument and accessories designed for the most demanding field conditions**
- **2 kV<sub>peak</sub> and 50 mA capacity – ideal for low capacitance objects such as bushings and instrument transformers**
- **Best hardware and specifications for most accurate results**
- **Dual ammeters for two simultaneous measurements**
- **Easy to use software with assessment guidance by standards and 25+ years of field experience with DFR technology**

### DESCRIPTION

IDAX 322 is a high voltage insulation diagnostic instrument based on DFR (Dielectric Frequency Response), also known as FDS (Frequency Domain Spectroscopy). DFR is a measurement technique in which capacitance and losses (dissipation factor/tan delta or power factor) is measured over multiple frequencies to assess insulation condition in test objects such as power transformers, bushings and instrument transformers. DFR technology is an established test procedure in laboratories that in an innovative effort by Megger has been adapted for field use in the IDAX range of instruments.

In these types of test objects, issues are most often not visible at conditions at which it is easy to perform diagnostic tests (typically at ambient temperature and line frequency) but rather develop at higher temperatures or closer to the operational limits of the objects. The basis for DFR measurements, the tan delta or power factor value, is primarily a function of insulation system geometry, aging byproducts, moisture, possible liquid insulation conductivity, frequency, and temperature. Using knowledge of this relationship, assessment can be made in the frequency domain rather than in the much more difficult to handle temperature domain.

In the calculations ITC (Individual Temperature Correction), another important Megger innovation is used to translate test data from the test object temperature to the reference temperatures. In the latest release, the IDAX SW incorporates a new ITC corrected frequency sweep specifically designed for assessment of instrument transformers and bushings. IDAX is exceedingly easy to use with an automated test flow and presentation of results in an easy to understand “traffic light” manner. The IDAX DFR method is now part of international guides and standards e.g. Cigre TB 254, Cigre TB 414, Cigre TB 445, Cigre TB 775, IEEE C57.152-2013, IEEE C57.161-2018

### APPLICATIONS

IDAX provides an accurate and reliable condition assessment of insulation in bushings, current transformers, power transformers and generators. The IDAX system maximizes the outcome of maintenance activities allowing for load and service life optimization.

#### Bushings and current transformers

Ingress of moisture is a normal part of bushing and current transformer life cycle that can have catastrophic consequences; bushing malfunction is the cause of 17% of all transformer failures and up to 70-80% of all transformer fires. A failing bushing is also very likely to explode which can damage the entire substation. Normal testing at line frequency is not enough as it can give false OK results, only through DFR the true status of the bushing can be assessed. Beside assessment of high moisture levels, DFR has also proven to be successful in detecting traces of partial discharges in HV and EHV bushings.

IDAX 322 is specifically designed for the requirements of bushing testing; Voltage up to 2 kV gives excellent signal-to-noise-ratio and measurement up to 1 kHz enables diagnosis of low capacitance objects. A special single material version of ITC is used to bring test results to a reference temperature regardless of test object temperature. IDAX has support for RBP, OIP, RIP and RIS bushings as well as liquid impregnated instrument transformers and user defined materials.

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### Power transformers

Moisture that accumulates in the insulating system of a power transformer affects several properties:

- Limits the loading capability as higher humidity brings the transformer closer to bubble inception
- Lowers the dielectric strength of the oil which has direct effect on the insulation properties
- Ages the cellulose insulation with less mechanical strength as a consequence.

DFR by IDAX is the only reliable method to determine the humidity in power transformers without decommissioning or disassembly.

Normal, single frequency tan delta / power factor tests can due to temperature effects give false results and oil analysis is unreliable as moisture mainly resides in the solid insulation. In the power transformer application IDAX uses a unique 2 material model and for accurate calculation of humidity, oil conductivity and delta / power factor. By advanced curve fitting to a reference material model, it is possible to calculate moisture content mainly in solid insulation, the oil's conductivity at 25°C reference temperature and tan delta / power factor at 20°C reference temperature.

### SPECIFICATIONS IDAX 322

#### Environmental

**Application field** The instrument is intended for use in medium and high-voltage substations and industrial environments.

#### Ambient temperature

Operating -20 °C to +55 °C (-4 °F to +131 °F)  
Storage -40 °C to +70 °C (-40 °F to +158 °F)

#### Humidity

< 95%RH, non-condensing

#### CE-marking

**LVD** 2014/35/EC

**EMC** 2014/30/EC

**RoHS** 2011/65/EC

#### General

**Mains voltage** 100 – 240V ±10%, 50/60 Hz

Power consumption 180 VA (max)

#### Dimensions

420 x 480 x 210 mm (16.5" x 18.9" x 8.3")

#### Weight

IDAX 322 unit 13 kg (28 lbs)

Lead backpack 10 kg (22 lbs)

#### Measurement section

**Inputs** Red, blue, ground

**Capacitance range** 10 pF – 100 µF

**Accuracy** 0.5% + 1 pF

**Tan delta range** 0 – 100 (with retained accuracy of capacitance; otherwise higher)

**Power factor range** 0 – 1 (with retained accuracy of capacitance; otherwise higher)

#### Accuracy at 2kV<sub>peak</sub><sup>1)</sup>

>100 pF 0.5% of reading + 0.01% absolute

>30 pF 0.5% of reading + 0.02% absolute

>10 pF 0.5% of reading + 0.03% absolute

<sup>1)</sup> At 22 °C ±10 °C

**Max AC interference** 10 mA, 1:10 SNR

**Max DC interference** 20 µA

#### Test modes<sup>2)</sup>

UST-R  
UST-B  
UST-RB  
GST-GND  
GSTg-R  
GSTg-B  
GSTg-RB  
UST-R & UST-B  
UST-R & GSTg-RB  
UST-B & GSTg-RB  
UST-RB & GSTg-RB

<sup>2)</sup> IDAX322 can measure multiple test modes in an automatic sequence as well as two test modes simultaneously.

#### Calibration

**Field calibration** Possible with IDAX Calibration Box CAL300 (AG-90010)

#### Time domain current measurement (PDC)

**Range** ±50 mA

**Resolution** 0.1 pA

**Accuracy** 0.5% ±1 pA

**Input resistance** ≤10 kΩ

#### (DC mode)

#### Generator outputs

**Voltage/current ranges, 10 V** 0 – 10 V<sub>peak</sub>  
0 – 50 mA<sub>peak</sub>

**Voltage/current ranges, 2kV** 0 – 2 kV<sub>peak</sub>  
0 – 50 mA<sub>peak</sub>

**Frequency range** 10 V<sub>peak</sub> – DC – 10kHz  
2 kV<sub>peak</sub> – DC – 1kHz

## IDAX 322 Insulation diagnostic analyzer

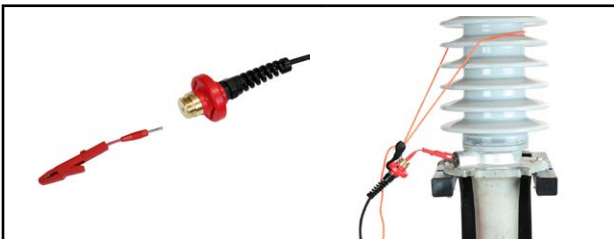
### PC requirements for IDAX software

<b>Operating system</b>	Windows XP / 7 / 8 / 10
<b>Memory</b>	512 Mb RAM
<b>Interface</b>	USB 2.0 and Ethernet

### INCLUDED ACCESSORIES



Generator cable, black 18 m (60 ft)	GC-30350
Measure red lead, 21 m (70 ft)	25572H-1
Measure blue lead, 21 m (70 ft)	25572H-2



Measure leads red / blue come complete with universal clamp, mini clamp and a bungee cord



Fixed interlock	AF-90010
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Test lead soft backpack	GD-30225
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### OPTIONAL ACCESSORIES



Indicator box (Safety beacon)

#### Accessory kit, AG-90100

##### Bushing tap adapters

4 mm female/male jack connector 4 mm female/female joiner	
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"J" probe adapter	
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ABB bushing adapter	
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1" thread adapter 0.75" thread adapter	
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Hot collar/guard ring straps, three of different length	
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Temperature and humidity meter	
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Non-insulated shorting leads: 3 m (10ft) 1 pc 6 m (20ft) 1 pc	
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## ORDERING INFORMATION

Item	Cat. No.
<b>IDAX 322</b>	AG-29090

### Included accessories

USB cable, A & B type, 2 m (5 ft)	GA-30030
Earth/ground cable, 6 mm <sup>2</sup> , 5 m (15 ft)	GC-30060
Generator cable, 18 m (60 ft)	GC-30350
Measure red lead, 21 m (70 ft)	25572H-1
Measure blue lead, 21 m (70 ft)	25572H-2
Fixed interlock	AF-90010
Test lead soft backpack	GD-30225
USB memory stick, 16 GB	GC-30334
Windows software, IDAX 5.1	AG-8100X
User's manual IDAX 322	ZP-AG03E
Mains cable	

### Optional accessories

Indicator box (Safety beacon)	AJ-90030
IDAX calibration box CAL 300	AG-90010
IDAX demo box IDB 300	AG-90020
Accessory kit	AG-90100

#### Bushing tap adapters:

- 4 mm female/male jack connector
- 4 mm female/female joiner
- "J" probe adapter
- ABB bushing adapter
- 1" thread adapter
- 0.75" thread adapter

Hot collar/guard ring straps, three of different lengths

Temperature and humidity meter

Non-insulated shorting leads:

- 3 m (10ft) 1 pc
- 6 m (20ft) 1 pc

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