

ADMIE TECHNICAL DESCRIPTION

TRANSFORMER DIAGNOSTIC SYSTEM

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TRANSFORMER DIAGNOSTIC SYSTEM

1. General Description

The Independent Power Transmission Operator (IPTO or ADMIE) is interested on the purchase of a portable multipurpose power transformer diagnostic system.

This document describes the minimum requirements that the device should meet, as well as some required features. The probes/devices must be supplied as complete items, with all of the parts (e.g. batteries, cables, probes) required for their immediate operation. Full, illustrated operation manuals must accompany all of the supplied equipment. All device(s) described in this document must be usable with 230 V / 50 Hz AC input voltage.

A calibration certificate must accompany the device. The bidder must ensure that maintenance and repair parts for every supplied item will be available for at least five (5) years after the delivery date of the equipment. Finally, the device must be covered by warranty for at least two years after its delivery date.

The device must bear CE conformity with reference to the related EU directives.

2. Specifications

The device must be capable of determining the winding resistance, dynamic resistance, capacitance, and power factor / dissipation factor of high voltage transformers. It must be completely autonomous, with an integrated computer, and user interface. The high voltage generator required for tan delta measurements can be supplied as an add-on module or accessory, it must however be officially endorsed and / or manufactured by the manufacturer of the transformer diagnostic device.

The device should be at least capable of measuring a transformer's:

- Winding resistance
- Demagnetization
- Excitation current
- Leakage resistance
- Capacitance
- Power factor / dissipation factor
- Short circuit impedance
- Tap Changer characteristics (Continuity, dynamic resistance, dynamic current, dynamic voltage, and motor current)

The following table designates the minimum guaranteed required operational parameters and precision:

OUTPUT VOLTAGE RANGE	At least up to 12 kV (50 Hz)
VOLTAGE MEASURING ACCURACY	At least $\pm 1\%$
3-PHASE OUTPUT CURRENT	At least 20 A
CAPACITANCE MEASURING RANGE	At least 0 to 1 μF (with integrated reference capacitor)
CAPACITANCE MEASURING ACCURACY	At least $\pm 0.5\% + 1 \text{ pF @ } 50 \text{ Hz}$
INDUCTANCE MEASURING RANGE	At least 20 H to 5 MH
INDUCTANCE MEASURING ACCURACY	At least $\pm 1\% + 1 \text{ mH @ } 50 \text{ Hz}$
DISSIPATION FACTOR MEASURING RANGE	0 to 100% with at least 0.01% maximum resolution
DISSIPATION FACTOR MEASURING ACCURACY	At least $\pm 1\%$ (guaranteed)
OPERATIONAL TEMPERATURE RANGE WITHOUT DERATING	At least $25^\circ\text{C} \pm 2^\circ\text{C}$
OPERATIONAL RELATIVE HUMIDITY RANGE	10% to 80% or better

The device will be used exclusively in substations and locations with strong electrical fields; therefore, noise suppression/immunity features are required. The device should be immune to induced noise up to at least 5 mA into any test lead.

The device must fully comply with the following standards:

- Safety : IEC/EN 61010-1 (2001)
- EMC : EN 61326-1 (2013)

The device must be lightweight and easily portable for transportation and use by a single individual, allowing for effortless on-site measurements. The total weight of the device must not exceed 30 kg (not including cables and/or other accessories). The input voltage will be 230 VAC / 50 Hz. The following cables must be included:

- 2 m input power cable
- 5 m grounding cable
- 15 m high voltage test cables (shielded)

The use of extensions to reach the abovementioned lengths is acceptable.

For safety purposes, the device must have a monitored ground connection. The generation of high voltage must cease immediately if the ground connection is disconnected. A visual warning (signal lamp) must also be present.

A three-phase switchbox appropriate for power transformers, including all of the necessary cables, must also be included in the offer.

The device must have a built-in data logger with data evaluation capabilities. It feature a USB port for the connection to a personal computer (PC) or for the transfer of the data to a USB stick. These cables must be included in the offer. Appropriate software for the transfer and management of data to the PC must be supplied and, if applicable, its license must not expire indefinitely. The software must be compatible with Microsoft Windows 7 and Microsoft Windows 10 operating systems.

3. Packing

The main device must be delivered in a hard case that will provide adequate transportation protection. The case must feature heavy-duty wheels. If the case does not have wheels, the provision of a heavy-duty transportation trolley is acceptable but must be included in the offer. A printed manual or basic instructions summary must be included in the case, stored inside a waterproof protective bag or sheath. Any accessories accompanying the device, such as (but not limited to) an external high voltage generator and the three-phase power transformer switchbox, these must also be supplied in their own heavy-duty hard cases.

4. Training

The bidder is required to undertake a training programme on the operation of the instrument. The training programme and any seminars will take place at the premises of the company (Agias Annis 70, Aegaleo, Athens, Greece).

5. Appendix A

All candidates are required to fill the following form and attach it alongside with their detailed offer:

- 1 Device manufacturer
- 2 Device model / part number
- 3 Voltage Measuring Accuracy
- 4 Capacitance Measuring Range
- 5 Capacitance Measuring Accuracy
- 6 Inductance Measuring Range
- 7 Inductance Measuring Accuracy
- 8 Power Factor And Dissipation
Factor Measuring Range
- 9 Power Factor And Dissipation
Factor Measuring Accuracy
- 10 Operational Temperature Range
Without Derating
- 11 Operational Relative Humidity
Range
- 12 Reference Capacitor
- 13 Length of HV Cables
- 14 Length of Grounding Cable



INDEPENDENT POWER TRANSMISSION OPERATOR SA (ADMIE)
TRANSMISSION SYSTEM MAINTENANCE DEPARTMENT

15 Weight

16 Warranty Period