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Data Sheet 5.85-11/1

Automatic Transformer Observation Device (ATOS)

Application

The Automatic Transformer Observation Device (ATOS) is designed to automatically measure both winding resistance and transformation ratio of power transformers with high accuracy.

Description

The device consists of a winding resistance meter, a turns ratio meter and multiplexers.

The winding resistance meter is capable to deliver direct current for fast core magnetization. It is designed for highly accurate measurements of very low resistances. Measurements can be made with a selectable current level. The winding resistance meter is suitable for inductive loads and includes safety functions for de-energizing the transformer core to protect user, test object and measuring equipment.

The turns ratio meter allows to measure voltage ratio, turns ratio and phase displacement of a complete three-phase test object. The device is able to execute a full three-phase test sequence and an automatic phase vector detection. But also single-phase operation is possible. The ratio meter measurements are controlled by a processor. A tap changer can be controlled by the device by means of an appropriate interface.

Measurement results of the winding resistance meter and the turns ratio meter are available on both screen and interface port. All measured data can be stored or printed.

Advantages

Multiplexers allow automatically controlled interconnection of power and measurement circuits. They are designed to reduce cabling time and are meant to be used with winding resistance and turns ratio meters. The multiplexer configuration can be controlled by the touch panel of the winding resistance meter.

The handling of the ATOS is user-friendly: once the test object is connected to the device most measurements can be executed by just one simple interaction with the measuring equipment.

Type designation

The type designation depends on the design types and the main parameters as follows:
ATOS-a (a = maximum of absolute DC current of the winding resistance meter)

Example: ATOS-50 means a device capable to deliver up to 50A DC for resistance measurements.

Table 1: Technical Data

Technical Data	unit	Type ATOS-100	Type ATOS-50
System components			
Winding resistance meter		WR100-12 R	WR50-12 R
Turns ratio meter		TR Mark III R	TR Mark III R
Multiplexer A		MUX R	MUX R
Multiplexer B		MUX R	MUX R
Safety Unit		ISU R	ISU R
Output Winding Resistance Meter			
Voltage	V	0 to 50	0 to 50
Test Current	A	0.025 to 100A	0.025 to 50A
Performance Winding Resistance Meter			
Measurement Range	Ω	0 to 100k	0 to 100k
Accuracy	% Rdg.	$\pm 0.1 \pm 5 \cdot 10^{-8} \Omega$ (@100A test current)	$\pm 0.1 \pm 5 \cdot 10^{-8} \Omega$ (@50A test current)
Resolution	digits	5	5
Output Ratio Meter / Phase Angle			
Voltage	V	1 to 100 (automatic test voltage range)	1 to 100 (automatic test voltage range)
Test Current	A	0 to 1A	0 to 1A
Performance Ratio Meter			
Measurement Range	Ratio	0.8 to 16000	0.8 to 16000
Accuracy	% Rdg.	$\pm 0.3 \pm 1 \text{ LSD}$ (@10V/100V, ratio <2000)	$\pm 0.3 \pm 1 \text{ LSD}$ (@10V/100V, ratio <2000)
Resolution	digits	5	5
Performance Phase Angle			
Measurement Range	deg(°)	-90 to +90	-90 to +90
Accuracy	deg(°)	$\pm 0.6 \pm 1 \text{ LSD}$ (@10V, ratio <2000)	$\pm 0.6 \pm 1 \text{ LSD}$ (@10V, ratio <2000)
Resolution	deg(°)	0.01	0.01
Features			
Intended Use		Laboratory	Laboratory
Charges inductive loads		Yes	Yes
Protection circuitry		Yes	Yes
Discharge indicator		Yes	Yes
Emergency STOP button		Yes	Yes
DC current adjustable		Yes	Yes
Temperature channels		3	3
Display		Color LCD, Touch screen	Color LCD, Touch screen
Memory		>10000 results	>10000 results
Interface		RS232, USB	RS232, USB
Tap Changer Interface		Yes	Yes
Automatic phase vector detection		Yes	Yes

Technical Data	unit	Type ATOS-100	Type ATOS-50
Normal operating conditions			
Rated power supply voltage	V(AC)	100 to 240 (2phase + neutral)	100 to 240
Power supply frequency	Hz	50 to 60	50 to 60
Maximum required input power	kW	3.5	2
Environmental conditions			
Temperature	°C	0 to 40	0 to 40
Humidity	%r.H.	10 to 90, non condensing	10 to 90, non condensing
Altitude	m	<2000	<2000
Ingress protection		IP20	IP20
Accessories			
Control enclosure		1	1
Interconnection cable set		1	1
Current and potential test lead set			
Length	m	10	10
Wire cross section	mm ²	16/6	16/6
Number of channels		4	4
Power cord		1	1
Optional Accessories			
Resistance Meter Extension cable set			
Length	m	15	15
Wire cross section	mm ²	16/6	16/6
Number of channels		2	2
Temperature Probe		See ¹⁾	See ¹⁾
Software			
Heat Run Test		See ²⁾	See ²⁾

¹⁾ To be used for temperature correction and heat run test.

²⁾ Performs a timer controlled measurement during the cooling curve of a transformer after the transformer has been heated.