WA 2293

Automatic Transformer Winding Analyser

Datasheet



HAEFELY

Current and voltage – our passion

Designed by Tettex

General Description

The 2293 is an automatic winding analyser, optimized for three phase power and distribution transformer measurements.

It uniquely combines winding resistance measurement, turns ratio, dynamic resistance measurement, core demagnetization, transformer type detection, magnetic balance, short circuit impedance and heat run test (temperature rise and cooling curve) in the fastest single instrument solution on the market.

A simple “one-time-connection” system drastically reduces measuring time: once connected all tests can be performed in a row without any reconnection.

The built-in simultaneous winding magnetization method guarantees fast and reliable resistance measurements. Stable measurements are reached even on large power transformers with delta windings on the low voltage side. A progressive method for measuring transformer turns ratio guarantees results closer to the nominal ratio even in large power transformers with tertiary windings.

Dynamic resistance measurement on tap changer perform an efficient and reliable check of the transformer tap changer.

The demagnetization function eliminates the magnetic remanence, which can cause faulty measurements, high inrush currents and incorrect operation of protective relays.

Short circuit impedance test at reduced current helps locating mechanical damages. In addition, the magnetic balance test can detect faults in the transformer magnetic core.

Personnel safety is guaranteed by an emergency button as well as a state-of-the-art active discharge circuit and a “caution” indicator that continues to operate even without line power. An optional interlock connector can be ordered.

Features	Advantages
▪ Transformer winding resistance, turns ratio, dynamic resistance on tap changer, type detection, arbitrary phase ratio measurement, demagnetization, short circuit impedance, magnetic balance and heat run test (heat rise and cooling curve).	☑ Multipurpose winding analyzer – all in one solution
▪ Simple “one-time-connection” system.	☑ Once connected can perform all tests in all phases on both windings*.
▪ Unique simultaneous winding magnetization method for winding resistance measurements.	☑ More compact and lightweight solution in comparison to traditional equipment with up to 100 A test current.
▪ Touch screen interface with full graphical test visualization.	☑ Easy operation
▪ Dynamic resistance for tap changer diagnosis ▪ Tap changer control signal (controller – option)	☑ Fully automated tap changer test
▪ Advanced procedure for turns ratio and phase displacement measurement	☑ Measurement also on non-regular phase displacements (arbitrary phase shifted transformers).
▪ Demagnetisation function	☑ Transformer is returned to a demagnetized status after measurement.
▪ Automatic magnetic balance test	☑ Magnetic core fault detection.
▪ Short circuit impedance at reduced current	☑ Mechanical damages detection.

* Except short circuit impedance

Applications

The 2293 is a valuable tool for factory test, acceptance test and regular maintenance on:

- Power and distribution transformers
- All type of HV windings

Scope of Supply

- 2293 measuring device
- Eight measuring cables 10m each equipped with kelvin probes
- Cable bag
- Test certificate
- Operating manual

Technical Data

Resistance Measurement			
Max. meas. current DC	32 A (user selectable)		
Max. charging voltage DC	100 V		
Range	0.1 µΩ … 300 kΩ		
Resistance range	0.1 µΩ ... 300 µΩ	300.1 µΩ … 30 kΩ	30.01 kΩ … 300 kΩ
Accuracy [1]	0.1% ± 0.5 µΩ	0.1 %	1 %

Ratio measurement				
Max. Supply Current ACΩ	1 A_{peak} / 700 mA_{RMS}			
Max. Meas. Voltage AC	95 V_{peak} / 67 V_{RMS}			
Range	1.0 … 100'000			
Ratio range	1.0 … 100	100 … 2'000	2'000 … 20'000	20'000 … 100'000
Accuracy [1]	0.05 %	0.1 %	1 %	5 %
Phase (Ratio meas.)	1.0 … 500		500 … 10'000	
Typical accuracy [2]	±0.25°		±1.00°	
Phase (Clock number detection)	1.0 … 500			
Phase Accuracy [2]	±0.05°			

Temperature	
Type sensor type	PT 100 Class A
Temperature sensor range	-50 …. +200 °C
Accuracy	± 0.15° ± 0.2% t
Measuring device range	-50 …. +200 °C
Accuracy	± 0.25°C

Environmental Mechanical and Power Supply	
Operating temperature	-10 °C … +45 °C
Storage temperature	-20 °C … +70 °C
Humidity	5 ... 95% r.h., non-condensing
Vibration	MIL-STD-810G Table 514.6C-II. Category Common carrier
Dimensions (W x D x H)	521 x 425 x 216 mm (20.5 x 16.7 x 8.5 in)
Weight	17.9 kg (39.5 lb)
Power supply specification	90 … 264 V_{AC}, 50/60 Hz, maximum power 1000 W
General	8 measuring channels, 6 built-in temperature channels, 7" graphical touch screen interface, tap changer control signal, built-in printer, USB and LAN connections for data exchange

[1] at temperature 0 … +50°C at highest available current [2] at 0 … +50°C at highest available voltage [3] Unit only without measuring cables

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Current and voltage – our passion

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