

Winding Ohmmeter RMO20TW

- Test currents 5 mA - 20 A DC
- On-load tap changer dynamic resistance measurement
- Two resistance measurement channels
- Automatic discharge circuit
- Lightweight – only 7,5 kg
- Detailed analysis of test results using DV-Win software



Description

The Winding Ohmmeter RMO20TW is designed for the resistance measurement of inductive test objects and for on-load tap changer verification. The RMO20TW generates a true DC ripple-free current. The injection of current and discharge of energy from the inductance are both automatically regulated.

The RMO20TW injects a current at the voltage level as high as 60 V. This ensures the duration of test is as short as possible, and that the desired test current is reached faster. The two independent channels enable testing of two windings in series – primary and secondary. There is enough memory within the RMO20TW instrument to store 500 measurements. All measurements are time- and date-stamped.

The instrument is equipped with a thermal and overcurrent protection. The RMO20TW has a very high ability to cancel electrostatic and electromagnetic interferences that exist in HV electric fields. It is achieved by proprietary filtration solution applied to the instruments hardware and software design.

Automatic discharging circuit (independent of power supply) safely discharges the energy stored in the transformer windings at the end of the test in very short time. An audible and visible indication of the discharging state is provided. An automatic connections check is performed at the beginning of each test, and the instrument warns the user if an open connection is detected.

On-Load Tap Changer Verification

The RMO20TW can be used to measure the winding resistance of individual taps on a power transformer's tap changer without discharging between the tests.

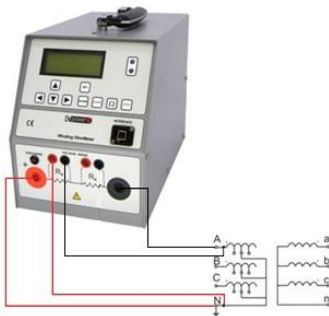
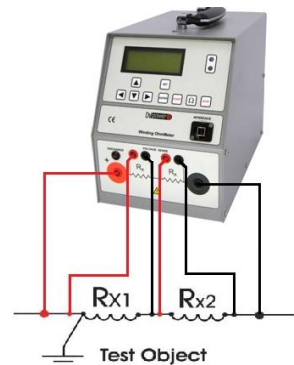
The unit also checks whether the on-load tap changer (OLTC) performs switching without an interruption. The moment a tap position is changed from one tap to another, the device detects a sudden, very short drop of the test current. These drops called "Ripple" should be consistent, where any drop out-of-line should be investigated. Defective "make before break" tap changer performance results in a 100% Ripple value, which is easy to observe. This is an indication of an interruption during the change, in which case the transition time also increases. This type of defect is one of the most troublesome ones. Other tap changer malfunctions detected analyzing measurements of Ripple, Transition time, and visualizing DRM graphs, can be observed too.

DV-Win Software

The DV-Win software enables control and observation of the test process, as well as saving and analyzing the results on a PC. It provides a test report, arranged in a selectable form as an Excel spreadsheet, PDF, Word, or ASCII format. The software provides an OLTC (tap changer) condition assessment through analysis of the graphs representing dynamic resistance values during the tap changer transitions. Additionally, the DV-Win measures and calculates OLTC transition time, the ripple and the resistance for each tap changing operation. The standard interface is USB. RS232 is optional.

Connecting the RMO20TW to a Test Object

The RMO20TW has two separate resistance measurement channels, which enable simultaneous measurement of the primary and secondary winding on the same phase. This significantly speeds up the measurement and reduces the total transformer testing time. The two resistances are connected in series using the provided current connection cables. The current and sense cables are connected as shown in the figure to the right. At the start of the test a cable continuity check is performed. In case of disconnection, an alarm is activated, and the error message is shown on the display.



The winding resistance of individual taps of a power transformer's tap changer can be measured by using the Tap Changer (TapC) mode of the RMO20TW. There is no need to charge and discharge the transformer between tap position changes. The inputs of the instrument are protected during the switching process in order to avoid damage to the instrument in case of a faulty tap changer. Only the first channel (CH 1) is active during the TapC mode measurement.

Accessories

Included

- DV-Win PC software
- Mains power cable
- Ground (PE) cable
- USB cable

Recommended

- Current cables 2 x 10 m 2,5 mm² and Sense cables 2 x 10 m with TTA clamps
- Current connection cable 1 x 5 m 6 mm² with TTA clamps
- Sense cables 2 x 10 m with TTA clamps
- Cable bag
- Device bag

Optional

- Built-in thermal printer 80 mm
- Test shunt 150 A / 150 mV
- Current cables 2 x 10 m 2,5 mm² with TTA clamps
- Sense cables 2 x 2 x 10 m with TTA clamps
- Cable plastic case
- Transport case



Current cables with TTA clamps



Voltage sense cables with TTA clamps



Current connection cable



Test shunt



Cable plastic case



Transport case



Cable bag and device bag

**The above cables are also available in several lengths. Please contact DV Power for more information.*

Technical Data

Static Resistance Measurement

- Test currents: 5 mA – 20 A DC
- Output voltage: up to 60 V DC
- Measurement range: 0,1 $\mu\Omega$ - 2 k Ω
- Typical accuracy: \pm (0,1 % rdg + 0,1 % F.S.)

Data Storage

- 500 internal memory positions

Warranty

- Three years

Printer (optional)

- Thermal printer
- Graphic and numeric printout
- Paper width 80 mm

Mains Power Supply

- Connection according to IEC/EN60320-1; UL498, CSA 22.2
- Mains supply: 90 V - 264 V AC
- Frequency: 50/60 Hz
- Mains supply voltage fluctuations up to \pm 10 % of the nominal voltage
- Input power: 1500 VA
- Fuse 15 A / 250 V, type F, not user replaceable

Environmental conditions

- Operating temperature: -10 $^{\circ}\text{C}$ - + 55 $^{\circ}\text{C}$ / 14 F - +131 F
- Storage & transportation: -40 $^{\circ}\text{C}$ - + 70 $^{\circ}\text{C}$ / -40 F - +158 F
- Humidity 5 % - 95 % relative humidity, non condensing

Resolution

- 0,1 $\mu\Omega$ – 999,9 $\mu\Omega$: 0,1 $\mu\Omega$
- 1000 m Ω – 9,999 m Ω : 1 $\mu\Omega$
- 10,00 m Ω – 99,99 m Ω : 10 $\mu\Omega$
- 100,0 m Ω – 999,9 m Ω : 0,1 m Ω
- 1,000 Ω – 99,99 Ω : 10 m Ω
- 100,0 Ω – 999,9 Ω : 0,1 Ω
- 1000 Ω – 2 k Ω : 1 Ω

OLTC Dynamic Resistance Measurement

- Sampling rate: 4 ms
- Automatic open circuit detection and warning
- Transition current ripple measurement
- Transition time measurement using DV-Win software
- Timing measurement of different transition changes using DV-Win graph analysis tools

Computer Interface

- USB
- Optional: RS232

Dimensions and Weight

- Dimensions: 198 mm x 255 mm x 380 mm
7,8 in x 10 in x 15 in
- Weight: 7,5 kg / 16,5 lbs

Applicable Standards

- Installation/overvoltage: category II
- Pollution: degree 2
- Safety: LVD 2006/95/EC (CE Conform)
EN 61010-1
- EMC: Directive 2004/108/EC (CE Conform)
Standard EN 61326-1:2006
- CAN/CSA-C22.2 No. 61010-1, 2nd edition, including Amendment 1

All specifications herein are valid at ambient temperature of + 25 $^{\circ}\text{C}$ and recommended accessories. Specifications are subject to change without notice.