



Tap Changer Analyzer & Winding Ohmmeter RMO40TC

- Lightweight – 13 kg
- Test current 5 mA – 60 A DC
- Measuring range 0,1 $\mu\Omega$ - 2 k Ω
- Two voltage sense channels
- Extremely quick measurement
- Automatic discharge circuit
- Built-in Tap Changer Control Unit



High DC current tap changer analyzer & resistance meter for transformers

Description

The Tap Changer Analyzer & Winding Ohmmeter RMO60TC is designed for resistance measurement of inductive test objects. RMO60TC generates true DC ripple free current. Both injection of current and discharge of energy from the inductance are automatically regulated.

RMO60TC injects current with a voltage as high as 60 V. This ensures that the duration of test is as short as possible, and that the desired test current is reached faster. Two independent channels enable testing of two series windings, or primary and secondary windings. There is enough memory within RMO60TC instrument to store 500 measurements. All measurements are time and date stamped.

The set is equipped with thermal and overcurrent protection. The RMO60TC has very high ability to cancel electrostatic and electromagnetic interference in HV electric fields. It is achieved by very efficient filtration. The filtration is made utilizing proprietary hardware and software.

On Load Tap Changers

The RMO60TC can be used to measure winding resistance of individual taps of a power transformer's tap changer. It can also check whether the on-load tap changer (OLTC) switches 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 current. A properly working tap changer differs from a malfunctioning one. This is obvious from an interruption during the change, by the magnitude of the current ripple and also by the transition time. Malfunctioning behavior of Tap Changer will result in much higher current ripple value and by changed transition time than a properly functioning Tap Changer. The Tap Changer Control Unit allows the operator to control the Tap Changer operation box from the RMO60TC position.

DV-Win

Using DV-Win software, tests could be performed from a PC, and results can be obtained directly at a PC. The DV-Win software allows results to be arranged in an Excel spreadsheet, which can be shown later as a diagram and printed for a report, or ASCII format. This software can control the RMO-T instrument, allowing a condition assessment of OLTC (tap changer) analyzing the graph which represents dynamic resistance during the tap change. The DV-Win measures OLTC transition time. Using DV-Win and RMO60TC it is possible to perform heat run test on distribution and power transformers.

Typical application

Typical application of RMO60TC is measuring the resistance of:

- ✓ Power transformers
- ✓ On-Load Tap Changers
- ✓ Generators and electrical motors
- ✓ High-current busbar joints
- ✓ Cable splices

Accessories

Included

- ✓ DV-Win PC software
- ✓ Built-in Tap Changer Control Unit
- ✓ Tap Changer Control cable set 5m
- ✓ Mains power cable
- ✓ Ground (PE) cable

Recommended

- ✓ Current cables 2 x 10 m 10 mm² with clamps
- ✓ Current connection cable 1 x 5 m 10 mm² with clamps
- ✓ Sense cables 2 x 2 x 10 m 2,5 mm²
- ✓ Cable bag

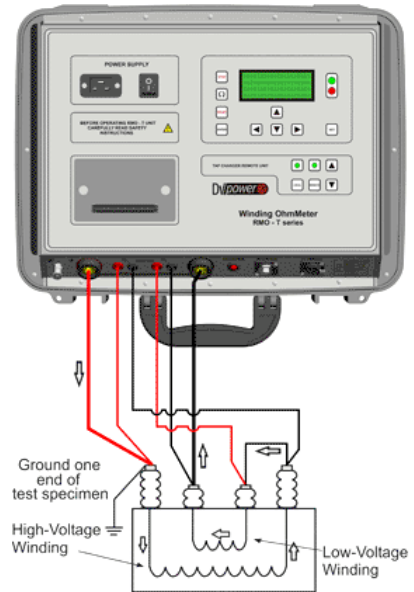
Optional

- ✓ Built-in thermal printer
- ✓ Test shunt 150 A / 150 mV
- ✓ Current cables 2 x 15 m 10 mm² with clamps
- ✓ Sense cables 2 x 2 x 15 m 2,5 mm² with clamps
- ✓ Cable plastic case

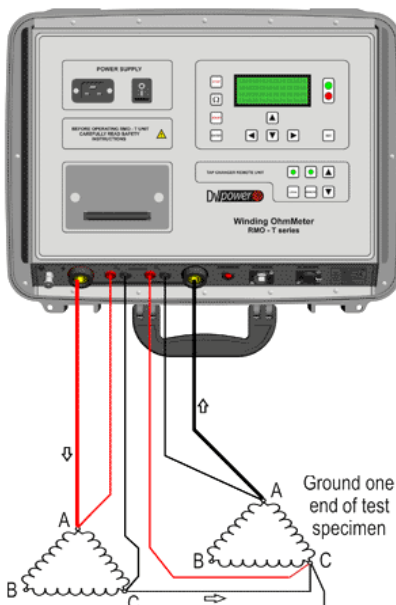
<p>RMO60TC</p>	<p>Shunt</p>	<p>Cable bag</p>
<p>Current cables with battery clamps</p>	<p>Voltage sense cables with alligator clamps</p>	<p>Current connection cable</p>

Connecting a Test Object to RMO60TC

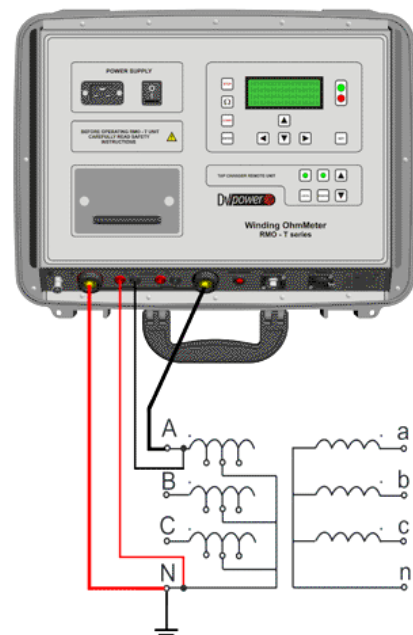
The RMO60TC should be turned off, connection between RMO60TC and the test object is such that the measuring cables from the "Voltage Sense" sockets are attached as close as possible to the measured resistance, while they are connected between the current feeding cables. That way, resistance of cables and clamps is almost completely excluded from the resistance measured. The figure to the right shows simultaneous testing of both windings (high and low) on a single-phase transformer. In such a way, it is possible to speed up the measurement when two channels are used to test both windings of the transformer.



Testing of a Delta-delta winding resistance is usually a very time consuming procedure. The two windings represent two closed loop inductors. When energy is brought into the inductors, this energy (in the form of D.C. current) continually circulates within each winding. To test this configuration quickly, both high and low sides should be connected in series with the current source of a Transformer Ohmmeter. By having these two windings in opposing polarity, the internal circulating currents settle very quickly to obtain a balance, and discharge with the same speed. Even if only one side of the transformer needs to be tested, connecting both high and low windings in series will speed up the test considerably.



Using RMO60TC's Tap Changer menu, the power transformer winding resistance of individual tap positions can be measured. Also, you can check whether the on-load tap changer switches without an interruption. The RMO60TC current output injects a constant current into a power transformer. This current and voltage value is measured, and the winding resistance is calculated.



Technical data

1 – Mains Power Supply

- Voltage	110 – 230 V AC
- Frequency	50 – 60 Hz
- Input power	2250 VA
- Fuse	15 A / 250 V, type F

2 – Output data

- Test current	5 mA DC – 60 A DC
- Measuring range / Resolution	
0,1 $\mu\Omega$ - 999,9 $\mu\Omega$	0,1 $\mu\Omega$
1,000 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 - 2000 Ω	1 Ω
- Typical accuracy	\pm (0,2 % rdg + 0,2 % FS)

3 – Environmental conditions

- Indoor use
- Altitude below 2000 m
- Temperature -10 °C - +55 °C / 14 °F - +131 °F
- Maximum relative humidity 95 % for temperatures up to 31 °C, decreasing linearly to 40 % relative humidity at 55 °C
- Mains supply voltage fluctuations up to \pm 10 % of the nominal voltage
- Installation/overvoltage category II
- Pollution degree 2

4 – Dimensions and Weight

- Dimensions	502 mm x 190 mm x 395 mm 19,75 in x 7,48 in x 15,53 in (W x H x D)
- Weight	13 kg / 28,6 lb

5 – Warranty

three years

6 – Safety Standards

- European standards	EN 61010-1 LVD 2006/95/EC
- International standards	IEC 61010-1 UL 61010-1 CAN/CSA-C22.2 No. 61010-1, 2nd edition, including Amendment 1

7 – Electromagnetic Compatibility (EMC)

- CE conformity	EMC directive 2004/108/EC
- Emission	EN 61326-1
- Interference Immunity	EN 61326-1

*All specifications herein are valid at ambient temperature of + 25 °C and standard accessories.

*Specifications are subject to change without notice.