

# MTO3XX Series

## Automated Six-Winding Transformer Ohmmeter



MTO330 (PowerDB Onboard)



MTO300 (use with external PC with PowerDB)

- One-time connection principle results in a 4x faster setup time eliminating over 70% of safety risk\*
- Automated eight-terminal/six-winding measurement capability
- Interchangeable lead set with the Megger 3-phase series of TTRs
- Simultaneous winding magnetization for fast and accurate dc winding resistance measurements of high inductive loads
- Built-in auto-demagnetization
- On-load tap changer operation testing

### DESCRIPTION

The MTO3XX series delivers full eight-terminal/six-winding resistance measurement capability. It is designed to save time by testing all six windings without having to disconnect and reconnect leads. Also, the simultaneous winding magnetization (SWM) method gives fast and reliable measurements even on large transformers with delta configuration on the low voltage side. Additionally, the MTO3XX series leads are interchangeable with the Megger TTR300 series of three-phase turns ratio instruments which eliminates additional connecting time for turns ratio measurements.

The MTO3XX series consists of two models:

- The base model, MTO300, is designed to be remote controlled via PowerDB software on an external PC or a Megger transformer test product with on-board computer.
- The MTO330 offers the same functionality as the MTO300. However, it is equipped with an onboard computer featuring full QWERTY keyboard and navigational pushbuttons as displayed on an 8.4 inch full-color VGA transfective screen viewable in bright sunlight.

### Modular Testing

The MTO3XX series is the latest addition to Megger's extensive line of products with a common digital platform, allowing users the ability to link with other compatible Megger transformer test instruments.

- The MTO300 can be controlled by an external PC or other Megger products with on-board computer such as the DELTA3000, DELTA4310, TTR330, and FRAX150.
- MTO330 has an internal computer and can be used to control other Megger products such as the TTR300, TTR310, FRAX99, FRAX101, DELTA2000, DELTA4110, and MLR10.

### APPLICATIONS

MTO3XX Transformer Ohmmeters are used to:

- Verify factory test readings.
- Help locate the presence of defects in transformers such as increased contact resistance in terminal connections and tap-changers.
- Check the operation of on-load tap changers.

\* Historically, a common accident when working in a substation happens while the technician is going up and down a ladder. The design of the MTO3xx series of products allows testing of all six windings, on a 3-phase transformer, with one lead set connection. Traditional "one-at-a-time" six-winding testing required 7 to 8 separate trips up/down the ladder as compared to only one trip to connect and one trip to disconnect with the MTO3xx series.

**FEATURES AND BENEFITS**

- Faster testing with one-time connection principle, measures all phases and windings without disconnecting or reconnecting leads.
- “One clamp per designated bushing” concept significantly reduces chance of operator error in making lead set connections.
- Automated eight-terminal/six-winding measurement capability saves time and eliminates the need for external jumper cables.
- Interchangeable lead set with the Megger TTR300 series of 3-phase turns ratio instruments saves time and money.
- DC test current up to 10 A.
- Built-in discharge circuit safely discharges the specimen when test is completed, if lead accidentally disconnects, or if power is lost.
- Built-in demagnetization circuitry allows the operator to de-magnetize the transformer core upon completion of resistance testing, or as a stand-alone feature before SFRA testing or when the transformer is put back in service.
- Custom PowerDB form for production heat-run (interval) testing.
- PowerDB software allows for data analysis and trending while in the field without the use of an external computer.
- The user can easily recall transformer set ups from a custom-settings menu with PowerDB.
- PC interface via USB for remote control operation and downloading of test results for ease of use.
- MTO330 is equipped with onboard 8.4 inch, full-color VGA transfective screen viewable in bright sunlight and built-in capability for storing and downloading test results.

**Easy, Automatic Testing of All Six Windings**

Once connected, the MTO3XX performs resistance measurements on all windings without any reconnection. The test procedure is simple and efficient. One end of the measurement cable set is connected to each bushing/terminal of the transformer using the special Kelvin clamp. The other end of the cable is connected to the MTO3XX. The instrument will automatically measure selected resistances of both HV and LV windings. The test sequence can be selected as 6-winding with simultaneous winding magnetization, 3-winding measurement of HV and LV separately, or single-winding test.

**PowerDB™ ONBOARD Software (Model MTO330 only)**

The “PowerDB ONBOARD” logo means PowerDB software is running on a computer embedded within the MTO330. This software provides the MTO330 with a common “user interface” to minimize operator training and provides a seamless interface to the full PowerDB (PC version) application.

Easy-to-read on-screen test forms provide the user interface for instrument set-up and test operation. Results are displayed against pass/fail nameplate limits and can be stored (either internally or to a USB storage device) in an open XML data format.

The ONBOARD software also maintains a historical data file so that, while in the field, current and past results can be analyzed, compared, and displayed in trend charts without the need of an external computer. An 8.5” x 11” or A4 test form can also be printed in the field via an optional USB printer, and without the use of an external computer.

**Two Instruments, One Set of Leads**



*The diagram shows the MTO3xx series and TTR300 series easily and conveniently using the same set of test leads. For example, the user can leave the leads connected to the transformer and use the same lead set to run turns-ratio testing with the Megger TTR3xx series, eliminating several up-and-down-the-ladder trips.*

**SPECIFICATIONS**

**Input Power**

120/240 V, 50/60 Hz, 720 VA

**Output**

**User Selectable Current Ranges:**

- up to 10 mA
- up to 100 mA
- up to 1 A
- up to 10 A

**Open Circuit Test Voltage:** up to 40 V dc

**Measurement Voltage:** up to 20 V dc

**Max Power:** 200 VA continuous

**Resistance Measurement/Display**

**Resistance ranges:**

- 1  $\mu\Omega$  to 2  $\Omega$  @ 10 A
- 10  $\mu\Omega$  to 20  $\Omega$  @ 1 A
- 100  $\mu\Omega$  to 200  $\Omega$  @ 100 mA
- 1 m $\Omega$  to 2000  $\Omega$  @ 10 mA

**Accuracy:**  $\pm 0.25\%$  reading,  $\pm 0.25\%$  full scale (when current has stabilized)

**Resolution:** Up to 4 digits

**Printer Interface**

**MTO300:** Via external PC

**MTO330:** USB

**Computer Interface**

**MTO300:** Ethernet

**MTO330:** Ethernet for remote control; USB flash drive for storage and transfer of test results

**User Interface**

**MTO300:** PowerDB on external PC

**MTO330:** PowerDB on internal computer with 8.4 inch, full-color VGA, test forms on-screen view, full QWERTY keypad and navigational pushbuttons

**Internal Data Storage**

**MTO330:** 10,000 data points

**Environmental**

**Operating:** 14° F to 122° F (-10° C to 50° C)

**Storage:** 5° F to 158° F (-15° C to +70° C)

**Relative Humidity:** 0-90% non-condensing

**Dimensions**

8.5 H x 21.5 W x 13 D in (216 H x 546 W x 330 D mm)

**Weight**

Instrument only, not including leads

**MTO300:** 29 lbs (13.1 kg)

**MTO330:** 33 lbs (14.9 kg)

**Case**

Ruggedized plastic case with removable lid and carrying strap

**Communication/Control Software**

**MTO300:** PowerDB Basic (PowerDB Pro, optional)

**MTO330:** PowerDB ONBOARD

**Safety/EMC/Vibration**

Meets the requirements of IEC-1010-1, CE and ASTM D999.75

**ORDERING INFORMATION**

Item (Qty)	Cat. No.	Item (Qty)	Cat. No.
Transformer Ohmmeter 120/240 V, 50/60 Hz input	MTO300	<b>Optional Accessories</b>	
Transformer Ohmmeter, with onboard computer, 120/240 V, 50/60 Hz input	MTO330	USB portable thermal printer (120 V)	36493-1
<b>Included Accessories</b>		USB portable thermal printer (230 V)	36494-1-KIT
AC power cord (IEC60320-C13 to US Standard)	17032	Foam lined transit case	37009
AC power cord (IEC60320-C13 to Schuko CEE 7/7)	17032-13	PowerDB Pro software 1st machine license, soft key	DB1001
CAT5e patch cable	36798	PowerDB Pro software 1st machine license, USB dongle	DB1001S
Instruction manual	ATVMMT0300	Remote hand switch	30915-220
USB to ethernet adapter for use with MTO300 only	90001-541	Universal lead sets, compatible with Megger TTR300 Series products (up to 10 A DC max)	
PowerDB Lite		3-phase shielded test lead set, X and H windings	
		60 ft (18 m)	36486-5
		30 ft (9 m)	36486-6
		33 ft (10 m) extension	36486-9
		Ground lead, 15 ft (4.5 m)	4702-7
		Canvas carrying bag	30915-211

**ISO STATEMENT**

Registered to ISO 9001:2000 Cert. no. 10006.01

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