

## MTOU3

### Switched Three-phase transformer winding ohmmeter

技术咨询和询价：010-68940148

**Megger**<sup>®</sup>



#### Three-phase switched source and measurement for:

- **Winding resistance**  
Up to 10 A,  $\pm 0.2\%$  accuracy
- **Adaptive demagnetization**
- **Unique transformer vector validation**
- **Accuracy guaranteed from  $-20\text{ }^{\circ}\text{C}$  to  $50\text{ }^{\circ}\text{C}$**
- **Save time and protect operators with efficient one-time lead connection for all tests**

#### MTOU3 DESCRIPTION

Power through transformer winding resistance tests with the new MTOU3, the switched three-phase transformer winding ohmmeter. Perform vector confirmation, winding resistance, and demagnetization tests with the same one-time lead connection. Guided by color-coded leads and extendable clamps with on-screen vectors that match the transformer nameplate, the easy to follow setup ensures the right result the first time - just click start! Auto vector confirmation before every test ensures that the proper transformer vector is selected.

#### MTOU3 STANDARD FEATURES

- Microsoft Excel export
- PowerDB import and export
- 10.1 in Hi-bright touch screen
- Find vector, polarity recognition and validation
- Winding resistance, up to 10 A DC,  $\pm 0.2\%$  resistance accuracy
- Independent dual winding magnetization
- Adaptive demagnetisation
- OLTC make before break continuity testing
- OLTC control with breaker protection
- One-touch OLTC
- Built in retractable handle and wheels
- Emergency stop

- Key lock
- Safety interlock

#### MTOU3 ADDITIONAL FEATURES

- Dynamic resistance measurements\*
- Winding resistance dry out\*
- Winding resistance heat run\*
- USB printer
- Safety beacon
- OLTC motor current monitor\*
- OLTC vibration monitor\*
- External temperature probe\*

## MTOU3

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### DETAILED DESCRIPTION

The MTOU3 is designed to test all power and distribution transformers, and potential transformers. With minimal input from the user, the MTOU3 delivers the DC voltage and current to obtain fast, accurate results.

A single ladder climb and one-time lead connection reduces time spent on top of transformers. Once connected to the transformer, a key lock, safety interlock, and an emergency stop ensure testing starts and stops safely.

#### Confirm vector / polarity recognition

A first for winding ohmmeters, confirm vector provides confidence in transformer results by performing vector group discovery and validation before every test. The operator is required to validate the intended winding to be measured and failure to do so could have catastrophic consequences when system voltage energises the transformer.

#### Winding resistance

Efficiently test winding resistance with switched three-phase dual winding DC output of the MTOU3. 50 VDC open circuit voltage quickly saturates the transformer core as independent current sources for H and X channels deliver stable and accurate measurements for each winding under test. No lead changes are required to switch from phase to phase - select auto save and the MTOU3 does all the work. If one phase is out of limits, the user interface simplifies investigation by highlighting the problem phase and guiding the user through the results validation process.

#### Automatic adaptive demagnetization

Adaptive demagnetization removes remanence (magnetization) that remains after winding resistance tests are complete. The MTOU3 avoids costly nuisance trips of protection equipment with automatic demagnetization performed after each winding resistance test.

#### OLTC make before break continuity

When performing winding resistance tests across multiple OLTC taps, make before break testing automatically verifies continuity of the tap changer connections. This first level diagnostic mode is useful in determining when dynamic resistance measurements are appropriate for further investigation.

#### One-touch OLTC

Save time testing with One-touch OLTC. Connect to the transformer OLTC with the included cables and run through an entire OLTC with one click, providing maximum test efficiency.

### PROBLEMS TYPICALLY FOUND WITH THE MTOU3

- Loose connections
- Tap changer contact problems

### SOFTWARE, SAVING, AND PRINTING RESULTS

Minimise training time with the intuitive 10.1 in user interface of the MTOU3. Large, self-explanatory buttons guide operation, while on-screen vectors provide reassurance that the transformer nameplate matches the test setup. When exported, results are grouped by file name, producing an XLSX/PDF report that is easy to read, email, or import into PowerDB. When needed, the optional USB printer can print results on demand.

When you connect the MTOU3 to your PC, not only can you control the device, but a USB drive will appear. The user manual, data sheet, and MTOU3 PC application installer can be found on this drive so you always have the necessary documentation and applications on hand.

#### PowerDB control\*

If you're looking to step up your reporting, use PowerDB to configure and execute your tests. With PowerDB you can produce consistent test reports from all of your Megger instruments.

#### Custom application control

With custom app control, any program can control the MTOU3 through the API. Great for organisations looking to push their test program to the limit! Non-disclosure agreement required for access to the API.

#### Dynamic resistance measurements (DRM)\*

Dynamic resistance measurements are an advanced diagnostic test for on-load tap changers. Pinpoint issues in on-load tap changers with individual resistor values and vibration and motor current profiles.

#### Heat run – internal temperature\*

Winding resistance cool down is an advanced diagnostic tool to determine the maximum temperature of a winding immediately after removal from full power.

#### Dry out – internal temperature\*

A transformer may need to go through a dry out process before going into service. This dry out process requires the internal temperature to remain steady for a set amount of time. Provide a reference temperature and resistance, and the MTOU3 will report the temperature of the winding.

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#### UNIVERSAL LEAD SET

The three-phase universal lead set simplifies connecting to any transformer. The durable kelvin clamps extend up to 7.6 cm (3 in) for connecting to any bushing size. Lead spans range from 5 m (15 ft) to 30 m (100 ft), ensuring secure connection and test capabilities for all transformer shapes and sizes. Connecting all leads in one ladder climb greatly reduces the risk of fall injuries and test time. Existing customers are able to use legacy lead sets with the MTOU3. See the tables to the right for details.

#### COLOR CODED LEADS FOR QUICK SETUP AND VERIFICATION

Jackets      Connectors      Clamps



16 A H leads - MTOU3 BASIC



16 A X leads - MTOU3 BASIC

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## SPECIFICATIONS - Valid from -20 ° to +50 °C

### Input power

100-240 V AC, 47-63 Hz, 1200 W±10 %  
Mains supply voltage fluctuations overvoltage category II

### Output power

Voltage: 3-phase switched, 1-50 V  
Frequency: DC, 80 Hz  
Current: 0.1 mA – 1 A at 50 V  
Current: 0.1 mA – 10 A at 24 V

### Regulatory

Safety IEC 61010-1:2010 + AMD1:2016  
EMI/EMC IEC 61326-1:2012  
RoHS2 EN50581  
Vibe/Shock MIL-STD-810G  
Ingress protection IP67 (in transit case)

### Transformer testing standards

IEEE C57.152-2013  
IEC 60076-1:2011  
AS/NZS 6076 1:2014  
CIGRE 445 2 011  
GOST 3484.1-88

### Dimensions

55.8 x 28.7 x 19 cm  
22 x 11.3 x 7.5 in

### Weight

17 kg 38 lbs

### Case

Rugged case with built in wheels and handle  
Backpack lead bag for leads and accessories

### Internal/external data storage

Up to 10 000 sets of three-phase results internal storage  
Transferable via USB 2.0 drive

### Communication/control software

USB interface for PC control with custom GUI

### Touch screen

25.6 cm 10.1 in  
1024 x 600 resolution  
1000 NITS

### Printer (optional)

51 mm (2 in) thermal printer  
Prints all measurement data displayed on GUI

### Environmental

Operating -20 ° to 50 °C (-4 ° to 122 °F)  
Storage -30 ° to 70 °C (-22 ° to 158 °F)  
Relative humidity 0-90 %, non-condensing  
Indoor and outdoor use in dry locations  
Elevation 2000 m MAX  
Pollution degree 2

## WR

### Resistance measurement methods

1-phase wye, delta, zigzag  
Dual winding excitation

### DC open circuit

**voltage** Up to 50 V

### DC measurement

**voltage** Up to 50 V

### Resistance accuracy

1.0 µΩ to 30 kΩ  
±0.2 % reading, ± 1µΩ  
30+ kΩ  
±0.5 % reading

### Resistance resolution

5 digits

### DC voltage accuracy

Typical: ±0.05 % reading, ±0.1 mV  
Guaranteed: ±0.5 % reading, ±0.1 mV

### DC current accuracy

Typical: ±0.05 % reading, ±0.1 mA  
Guaranteed: ±0.5 % reading, ±0.1 mA

Specified accuracy for external verification only and does not impact DC tests accuracy (Winding resistance).

## Current and resistance ranges

Typical with 9 m (30 ft) leads

Current	Min Ω	Max Ω
10 A	1.0 µΩ	1.0 Ω
8 A	1.0 Ω	2.0 Ω
1 A	2.0 Ω	20 Ω
100 mA	1.0 Ω	100 kΩ

### Dynamic resistance measurement method\*

Dynamic voltage  
Dynamic current  
Dynamic resistance

### Dynamic Resistance Speed\*

Speed 20 kHz

### Motor current measurement (optional)

9 V battery power

Measuring range: 3.0 A/30 A  
Frequency range: DC to 60 Hz  
Resolution: ± 50 mA / ± 100 mA  
Accuracy: ±1 % reading

### Temperature probe measurement (optional)

Range: -20 °C to + 110 °C  
Accuracy: ±1 % reading, ± 1.0 °C

## MTOU3

### Switched Three-phase transformer winding ohmmeter

#### ORDERING INFORMATION

Item (Qty)	Cat. No.
Three-phase transformer winding analyser	MTOU3 BASIC

##### Included Accessories

AC Power Cords (US, EU, UK)	1014-927
USB 2.0 Cable	CA-USB
OLTC Tap Changer Cable	1011-622
Cable Bag – Backpack	2012-180
Ground Lead 4.5 m (15 ft)	4702-7
USB Drive	90012-878

##### Accessories required for operation

###### Choose one lead kit

###### MTOU3 BASIC Lead kits

**16 Amp H leads with red jacket and red, yellow, blue, and white clamps (4 total)**

**16 Amp X leads with black jacket and red, yellow, blue, and white clamps (4 total)**

5 m (15 ft) H and X leads	2008-15KIT2
9 m (30 ft) H and X leads	2008-30KIT2
18 m (60 ft) H and X leads	2008-60KIT2
30 m (100 ft) H and 18 m (60 ft) X leads	2008-100KIT2

##### Optional lead accessories

###### MTOU3-BASIC 16 A H and 16 A X lead extensions

9 m (30 ft) H and X extensions	2008-30XKIT2
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Item (Qty) for price list	Cat. No.
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##### Optional hardware accessories

Calibration Certification	MTOU3-CAL-CERT
Safety Beacon – 18 m (60 ft)	1004-639
Transit case (for instrument)	1014-928
USB Printer	90029-573
USB Printer Paper (x48 rolls)	90029-573-P
OLTC tap changer cable adapters	1011-622-A
Motor current monitor*	1014-929
Vibration monitor*	1014-930
Temperature probe kit*	1014-931
TOS1 calibration standard	TOS1

##### Optional software accessories

PowerDB control	SW-POWERDB
Custom application control	SW-CUSTOMAPP
Dynamic resistance measurements*	SW-DRM
Transformer dry out measurements*	SW-DRYOUT
Transformer heat run measurements*	SW-HEATRUN

\*Coming 2025!