TAU3
Three-phase transformer winding analyser

- **Three-phase switched source and measurement for:**
  - **Turns ratio**
    - Up to 62.5 V, ± 0.10 % accuracy
  - **Winding resistance**
    - Up to 10 A, ± 0.2 % accuracy
  - **Adaptive demagnetization**
  - **Unique transformer vector validation**
- **Accuracy guaranteed from -20 °C to 50 °C**
- **Save time and protect operators with efficient one-time lead connection for all tests**

DESCRIPTION

Power through transformer electromechanical tests with the new TAU3, the three-phase transformer winding analyser. Perform polarity validation, turns ratio, 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!

Combined AC and DC output offers numerous benefits for today's demanding schedules:

- No lead changes = faster, safer with more time for testing
- Auto vector confirmation before every test, including winding resistance, ensures that the proper transformer vector is selected

STANDARD FEATURES

- **Microsoft Excel export**
- **PowerDB import and export**
- **10.1 in Hi-bright touch screen**
- **Find vector, polarity recognition and validation**
- **TTR, Up to 62.5 V AC, ±0.10% accuracy**
- **Excitation current**
- **Winding resistance, up to 10 A DC, ± 0.2 % resistance accuracy**
- **Independent dual winding magnetization**
- **Adaptive demagnetisation**
- **Magnetic balance**
- **OLTC make before break continuity testing**
- **OLTC control with breaker protection**
- **One-touch OLTC for AC and DC tests**
- **Built in retractable handle and wheels**
- **Emergency stop**
- **Key lock**
- **Safety interlock**

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***

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PROBLEMS TYPICALLY FOUND WITH THE TAU3

- Loose connections
- Turn-to-turn shorts
- Broken strands
- Winding deformation
- Tap changer contact problems
- Core problems

The TAU3 has been designed with a diagnostic mode, where the operator can focus on problem phases and unique tests for pinpointing and confirming where issues exist in the asset.

DETAILED DESCRIPTION

The TAU3 is designed to test all power, instrument (CTs and PT/VTs), and distribution transformers. With minimal input from the user, the TAU3 uses patent pending step up excitation to deliver the required AC/DC voltage and current to obtain 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.

Shock-mounted electronics are housed in a compact, wheeled, and water tight case that's up to 50 % lighter/smaller than other multifunction electromechanical test solutions.

Find vector / polarity recognition

Find vector provides confidence in transformer results by performing vector group discovery and validation before every test. Windings such as zigzag, can be mistakenly seen as a delta, so the operator is required to validate the intended winding to be measured. Failure to do so could have catastrophic consequences when system voltage energises the transformer.

TTR - Turns ratio testing

When the TAU3 detects an issue with a phase, a diagnostic mode allows pinpointing of issues where traditional ratio instruments fail to operate/test.

Excitation current

Included with turns ratio testing, the excitation current test is extremely useful in locating problems such as defects in magnetic core balance, magnetic core structure, shifting of windings, failures in the turn-to-turn insulation, or problems in tap changers.

Phase angle deviation

Phase angle deviation (not to be confused with phase shift) is the phase relationship between in-phase vectors of the high side versus the low side windings. Phase deviation denotes the quality of the core and the winding, and when functioning properly should exhibit very low values (< 0.1 °). Shorted or partial shorted turns and/or a deteriorated or damaged core can cause significant changes in the phase deviation values.

Magnetic balance

Magnetic balance assess the health of the windings, core assembly condition, and flux distribution within the transformer. This test, performed safely and efficiently by the TAU3, is a measure of how well balanced (electrically) the transformer is versus nameplate specifications.

Winding resistance

Efficiently test winding resistance with three-phase dual winding DC output of the TAU3. 100 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 TAU3 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 TAU3 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. One-touch OLTC is available for both AC and DC, providing maximum test efficiency.

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SOFTWARE, SAVING, AND PRINTING RESULTS

Minimise training time with the intuitive 10.1 in user interface of the TAU3. 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 TAU3 to your PC, not only can you control the device, but a USB drive will appear. The user manual, data sheet, and TAU3 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 TAU3 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)*

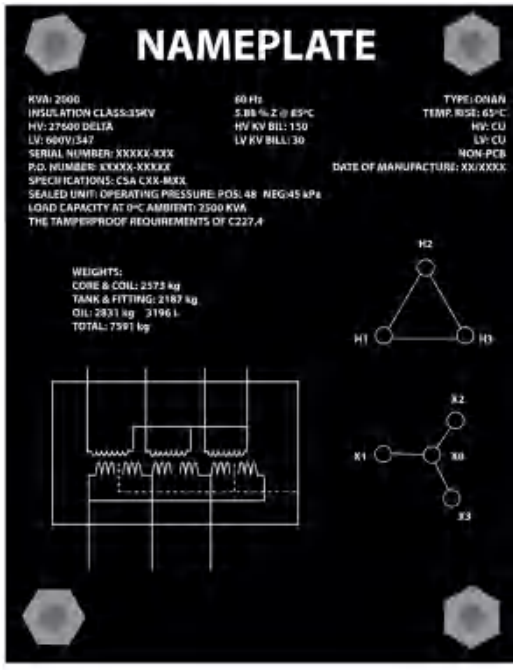
Dynamic resistance measurements are an advanced diagnostic test for on-load tap changers. Pinpoint issues in on-load tap changers with individual resistor values and vibration and motor current profiles.

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 TAU3 will report the temperature of the winding.



Compare nameplate vector to images on screen

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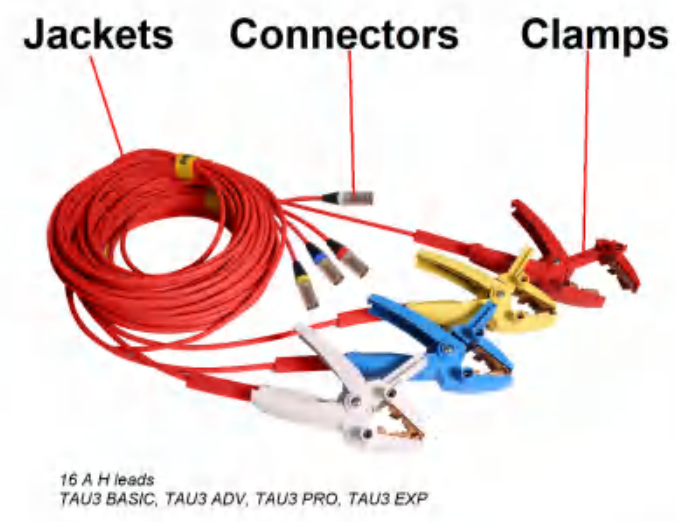
UNIVERSAL LEAD SET

The three-phase universal lead set simplifies connecting to any transformer. The durable kelvin clamps extend up to 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 TAU3. See the tables to the right for details.

The kelvin clamps also accept safety banana plugs, simplifying connection to a CT terminal block. Clearly displayed electrical shock and potential markings on the clamp inform operators how to connect safely and securely.

H leads PNs that can be used with any TAU3 model	X lead PNs that can be used with TAU3-BASIC and TAU3-ADV
2008-001-XXX 2008-002-XXX 2008-003-XXX 2008-004-XXX	2008-005-XXX 2008-006-XXX 2008-007-XXX 2008-008-XXX

XXX denotes length



16 A H leads
TAU3 BASIC, TAU3 ADV, TAU3 PRO, TAU3 EXP

32 A X leads
TAU3 PRO, TAU3 EXP

16 A X leads
TAU3 BASIC, TAU3 ADV

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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, 1-48 V
Frequency:	DC, 80 Hz
Current:	0.1 mA – 1 A at 48 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 15 kg 33 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 (optional)

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

TTR

Turns ratio measurement methods

1-phase step up

1-phase step down

Turns ratio range and accuracy

Step down excitation

25-48 V

±0.10 % 0.8 – 1000

±0.20 % 1001 – 2000

±0.60 % 2001 – 15000

±1 % 15001 – 50000

1-24 V

±0.10 % 0.8 – 1000

±0.20 % 1001 – 2000

±0.60 % 2001 – 15000

Excitation current resolution

Resolution 0.1 mA, 0.1 mA – 100 mA
1.0 mA, 101 mA – 3.5 A

Excitation current accuracy ±1% Reading, ±0.1 mA

Frequency accuracy ±1% Reading, ±0.1 Hz

Phase range Range 0 – 360 °

Phase accuracy ±0.05 °

Max voltage output 45 V AC peak

Voltage accuracy Typical ±0.1 % reading, ±0.1 mV
Guaranteed ±0.5 % reading

Specified accuracy for external verification only and does not impact AC tests accuracy (TTR, Magnetic Balance, SCI, FRSL, or Losses)

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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 ±0.2 % reading, ±1 µΩ

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

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ORDERING INFORMATION

Item (Qty)	Cat. No.
Three-phase transformer winding analyser	TAU3BASIC
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	
TAU3 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	
TAU3-BASIC 16 A H and 16 A X lead extensions	
9 m (30 ft) H and X extensions	2008-30XKIT2

Item (Qty) for price list	Cat. No.
Optional hardware accessories	
Calibration Certification	TAU3-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
1:1 Test Jig	2005-249
OLTC tap changer cable adapters	1011-622-A
Motor current monitor*	1014-929
Vibration monitor*	1014-930
Temperature probe kit*	1014-931
TRS1+ calibration standard	TRS1PLUS
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!

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