TTR 2795
TTR 2796

TRANSFORMER TURNS RATIO MEASUREMENT

Leaflet



HAEFELY

Current and voltage – our passion

Designed by Tettex INSTRUMENTS



FULLY AUTOMATED THREE PHASE TRANSFORMER TURNS RATIO METER

Haefely TTR 2795 & TTR 2796 measure transformer turns ratio with the greatest accuracy across the widest ranges of ratios in the industry.

Measuring turns or voltage ratio can help in detecting faulty transformer windings and defective tap changer positions. The excitation current and phase angle between the primary and secondary windings also provides additional information regarding the winding condition.

The Haefely TTR's are supplied with application software that guides the user through the measurements and generating test reports quickly and easily. The accuracy, easy to use and additional features makes these TTR's ideal for acceptance testing and on-site maintenance testing according to IEEE, IEC, and ANSI standards.

	TTR 2795	TTR 2796
Transformers < 150 MVA	●	○
Transformers > 150 MVA	○	●

● Recomended
○ Posible

FEATURES	ADVANTAGES
• Highest measurement accuracy in the market of up to 0.03 %	✔ Perfect tool for preventive maintenance measurement
• Fully automated measurement of turns ratio, voltage ratio, phase displacement and excitation current	✔ Reliable and fast measurement
• Automatic winding connection identification AWCI (patented) and automatic vector group detection	✔ Quick and easy operation
• Safety connection control proofs test setup before applying test voltage	✔ Avoids harm to personnel,damage to test equipment and instruments
• Built-in printer	✔ Quick test report generation and prevention of data loss
• Rotary-push-button for easy access to the menu structure	✔ User-friendly and self-explanatory interface
• Large graphic display	✔ Data visible at a glance and displays tap changer results in a clear graphic diagram
• Remote control software included	✔ Easy operation, gathering and analyzing data on laptop/ PC
• Lightweight, compact and rugged. Closed case is IP65 waterproof, open case is splash proof	✔ Use in harsh environments

APPLICATIONS

Factory routine test, acceptance test and regular maintenance on:

Power transformers

Distribution transformers

Instrument transformers

THE EXPERT'S CHOICE

Since 1902 Haefely's accuracy, reliability and expertise have made us the preferred choice for factory testing, as well as preventive maintenance on site of electrical apparatus.



EASY TO USE

The measurements procedure is automated, just select the basic transformer configuration (single phase , delta, star ...) and the auto-detection will find the transformer phase shift and will do the turns ratio measurement in seconds.

The rotary switch allows test configuration in just a few clicks, the function soft keys together with the display shows the operator the right options at each screen.

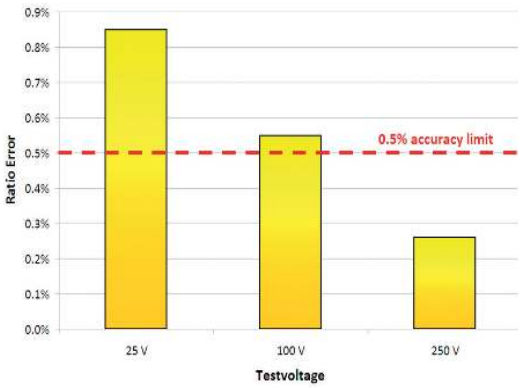
The included windows based software allows remote control and measurement from a windows based computer, test reports can be then quickly prepared.

INCREASED TEST VOLTAGE UP TO 250V

Working closely together with major transformer manufacturers has revealed that an increased test voltage gives better results when measuring turns and voltage ratio of large power transformers. Comparison measurements on a 350MVA transformer with tertiary winding show significantly improved accuracy with higher test voltage.

The TTR2796 with 250V measuring voltage reduced measured error on these large power transformers , which is sometimes critical to keep results within specified in the IEC 60076-1 and IEEE C57.12.00-2006-1.





REMOTE SOFTWARE

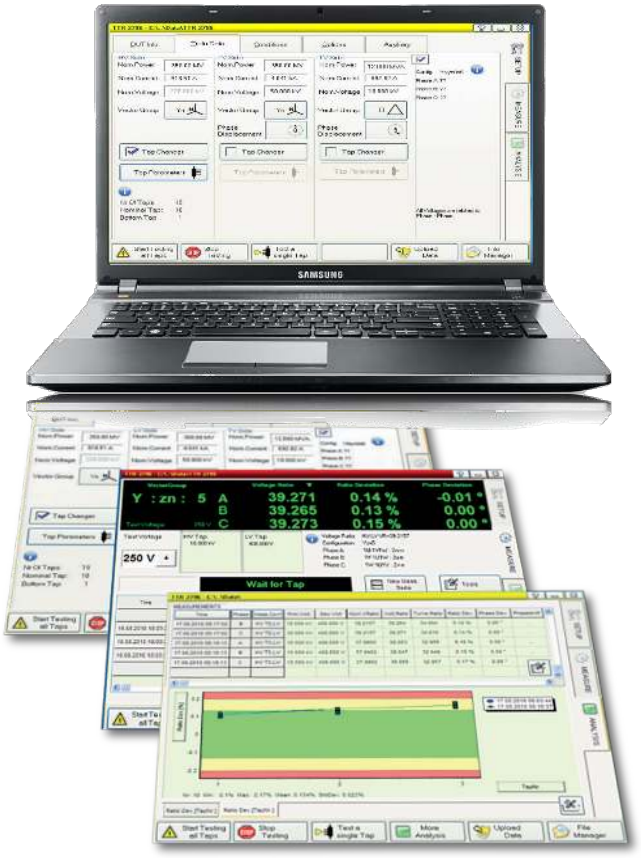
The included TTR APSW software offers remote set-up and control of the TTR 2795 or TTR 2796 from a computer through a USB connection. Additionally advanced analysis is available trough customized graphs, trending and report generation capabilities. Data can be analyzed in real time or stored and recalled for analysis.

The comprehensive user interface guides the operator through the setup steps by entering nameplate info, transformer vector group, environmental conditions and user comments.

Setting parameters of multi-tapped transformers is greatly simplified by an intuitive setup wizard that enables the user to easily program the taps for primary, secondary or tertiary windings.

Measurements are performed via the MEASURE window. Values of the actual measurement are shown in the top while the history of all measurements taken is recorded in the bottom of the screen. Automated or manual test of taps are controlled and performed by the software.

The software offers additional tools for in depth analysis of the measured transformer data. Flexible graphs allow quick comparison of several measurement series from live or pre-captured data. Additional limit lines show a colourful graphical interpretation of preset margins.



REPORTING

Immediate reports can be printed using the device Printer in the front panel. Full reports are automatically generated in XML-, HTML- and CSV- format using the remote software (included).

While the XML- and HTML-files can be opened in a web browser e.g. Ms. Edge , printed or copied into a Microsoft Word document, the CSV-file can be directly opened in Microsoft EXCEL where customer specific data processing and calculations are possible.

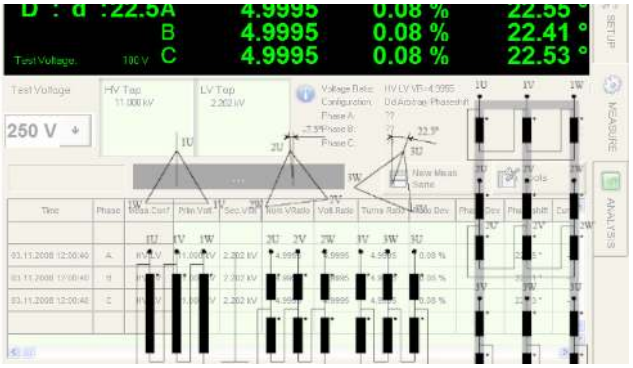


ARBITRARY PHASE SHIFTS

Arbitrary phase shifts or those that do not follow the 30° phase steps between the primary and secondary winding are common in special transformers like phase-shifting, rectifier / furnace and traction transformers.

The Figure above shows the schematic of a three- phase transformer with an irregular vector group of Dd11.75 (-7.5°) and Dd0.75 (22.5°).

With the optional Arbitrary Phase-Shift (APS) feature, the TTR 2796 can measure turns and voltage ratio, phase displacement and excitation current of these special-type transformers. The TTR 2796 achieves this using the regular single phase supply without additional hardware making it a more versatile and compact solution.





TTR 279X BASIC SPECIFICATIONS

	TTR 2795	TTR 2796
Excitation Voltage	1 V, 10 V, 40V and 100 V	2.5 V, 25 V, 100 V and 250 V
Accuracy	0.03 %	0.03 %
Ratio range	0.8 ... 20'000	0.8 ... 50'000

[1][2] Complete technical specifications in the TTR 2795 & TTR 2796 Datasheets available at www.haefely.com

STANDARD PACKAGE

Measuring bridge		
	Measuring Bridge	TTR 2795
	Measuring Bridge	TTR 2796
Including		
	Cable bag with • 3 phase spider cables, 5m length • 4 HV large red clamps • 4 LV large Black clamps • 10 small red clamps	
	Remote control/ data storage/ report genertion software	
	Remote/ data transfer cable (USB to RS232)	
	Calibration certificate and Operating Manual.	
	3 phase extension cables , 10 m (TTR 2796 only)	







Ext. Cables only TTR 2796

OIPTIONS AND ACCESORIES

TTR 2795 & TTR 2796			
	External Tap Test Start Switch 2796TAP is used for convenient remote tap changer testing.		279x/TAP
	Warranty Extensions to 2 or 3 years		TTR 2795/WE2 TTR 2796/WE 3
TTR 2796			
	The Arbitrary Phase-Shift (APS) feature allows the TTR 2796 measure turns and voltage ratio, phase displacement and excitation current of special-type transformers with arbitrary phase shifts. The software runs on an external computer (not included) connected through USB.		279x/APS
TTR 2795			
	10m, 3-phase extension cables, 2 units for HV and LV winding		279x/10
	Verification box to check 2795 functionality Selectable ratios: 1, 10, 100, 1000		279x/V

ADDED SERVICES



- Pre & After Sales Support
- Application Support
- Commissioning
- Calibration (accredited & factory)
- Training and Seminars



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HAEFELY
Current and voltage – our passion

H HIGH VOLTAGE
I INSTRUMENT
E EMC

precision. swiss made.