



TMS 580

Transformer Loss Measuring System

Datasheet



HAEFELY

Current and voltage – our passion

Sold & Serviced in USA by:



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General Description

The measurement of the losses in power transformers is an indispensable quality-verification process. The TMS 580 system has been specially developed for highly accurate measurements of power losses in transformers.

The TMS 580 system combines well-established and reliable hardware with up-to-date and powerful software.

Loss measurements

The total losses of a transformer are the sum of the no-load and load losses. In general the actual loss figure has to be guaranteed by the manufacturer and is verified for the customer during the acceptance test. The appropriate standard is IEC 60076-8 clause 10

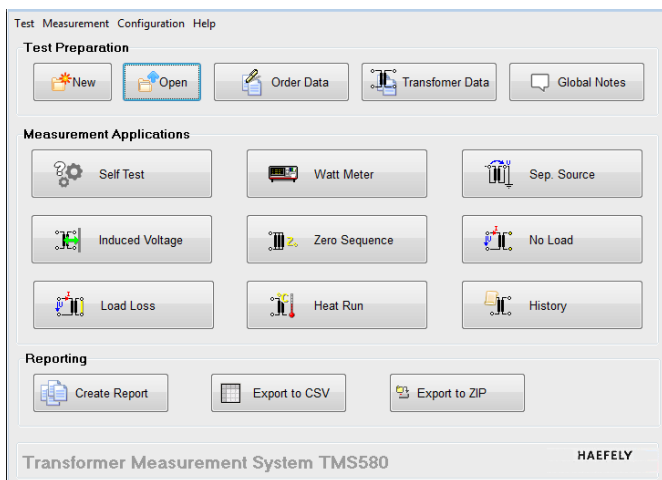
“Guide to the measurement of losses in power transformers”.

Measurement Accuracy

The power factor ($\cos \phi$) of large transformers is small. Even minute phase angle errors of the instrument transformers can lead to substantial power measurement errors. The instrument transformers of the TMS 580 are specially designed to ensure very small phase angle errors thus making additional error correction redundant.

The maximum power measurement error is a function of the power factor.

To allow the current and voltage distortion to be properly measured the TMS 580 instrument accurately responds to the power frequency harmonic encountered.



TMS 580 operation software is a result of our close collaboration with transformer test systems users worldwide. It has evolved and improved over the years with continuous interaction with multitudes of users throughout the transformer world.

Software is Fast, Safe and has excellent visualization by means of Graphs, Popup windows and colored symbols

TMS 580 measurement window shows all the data at one time. Color coded display makes it easy to have an overview of the system status and note system ranging.

History function takes care of the storage of measured data. Individual measurements can be marked for reporting.

The screenshot shows the main measurement data window of the Transformer Measurement System TMS580. It displays a table of electrical parameters for three phases (A, B, C) and their totals. The parameters are color-coded: red for voltage (U), green for current (I), and blue for power (P, S, λ, f). The table is organized into three sections: A-N, B-N, C-N; A-B, B-C, C-A; and A, B, C. The 'Total' column provides the sum of the three phases for each parameter.

| | A-N | B-N | C-N | Total |
|-----------|-------------|-------------|-------------|-------------|
| U rms | 4.664 kV | 4.501 kV | 4.693 kV | 4.620 kV |
| U rm | 4.512 kV | 4.411 kV | 4.539 kV | 4.487 kV |
| U peak/√2 | 4.646 kV | 4.693 kV | 4.531 kV | 4.623 kV |
| U thd | 0.03% | 0.03% | 0.03% | 0.00% |
| | A-B | B-C | C-A | Total |
| U rms | 8.122 kV | 7.751 kV | 8.287 kV | 8.053 kV |
| U rm | 8.300 kV | 7.802 kV | 7.573 kV | 7.892 kV |
| | A | B | C | Total |
| I rms | 68.903 A | 71.283 A | 66.768 A | 68.985 A |
| S | 321.365 kVA | 320.877 kVA | 313.358 kVA | 955.600 kVA |
| P | 305.609 kW | 304.346 kW | 296.921 kW | 906.876 kW |
| λ | 0.951 ind | 0.948 ind | 0.948 ind | 0.949 ind |
| f | 50.03 Hz | | | |

Technical Data

| Model | Range | Accuracy* |
|-----------------|---|-----------|
| TMS 580-100-... | 100 V, 200 V, 500 V | 0.12 % |
| | 1 kV, 2 kV, 5 kV, 10 kV, 20 kV, 50 kV, 100 kV | 0.10 % |
| 2000A | 1 A, 2 A, | 0.15 % |
| | 5 A, 10 A, 20 A, 50 A, 100 A, 200 A, 500 A, 1000 A, 2000 A | 0.11 % |
| 4000A | 2 A, 4 A, 10 A, 20 A, 40 A, 100 A, 200 A, 400 A, 1000 A, 2000 A, 4000 A | 0.11% |
| TMS 580-200-... | 100 V, 200 V, 500 V | 0.12 % |
| | 1 kV, 2 kV, 5 kV, 10 kV, 20 kV, 50 kV, 100 kV, 200 kV | 0.10 % |
| 4000A | 2 A, 4 A, 10 A, 20 A, 40 A, 100 A, 200 A, 400 A, 1000 A, 2000 A, 4000 A | 0.11% |

* at 40-110% range utilization, includes uncertainty of calibration, @ 50/60Hz

| Power Factor | Range | Accuracy* |
|-----------------------|----------------------------------|-----------|
| cos φ = 1.000 | ≥ 1 kV, < 20 A | 0.20 % |
| | ≥ 1 kV, ≥ 20 A | 0.17 % |
| cos φ = 0.100 | ≥ 1 kV, < 20 A | 0.25 % |
| | ≥ 1 kV, ≥ 20 A | 0.19 % |
| cos φ = 0.050 | ≥ 1 kV, < 20 A | 0.35 % |
| | ≥ 1 kV, ≥ 20 A | 0.26 % |
| cos φ = 0.020 | ≥ 1 kV, < 20 A / 40A** | 0.70 % |
| cos φ = 0.010 | ≥ 1 kV, ≥ 20 A / 40A** | 1.05 % |
| cos φ = 0.008 | ≥ 1 kV, ≥ 20 A / 40A** | 1.25 % |

* includes uncertainty of calibration /

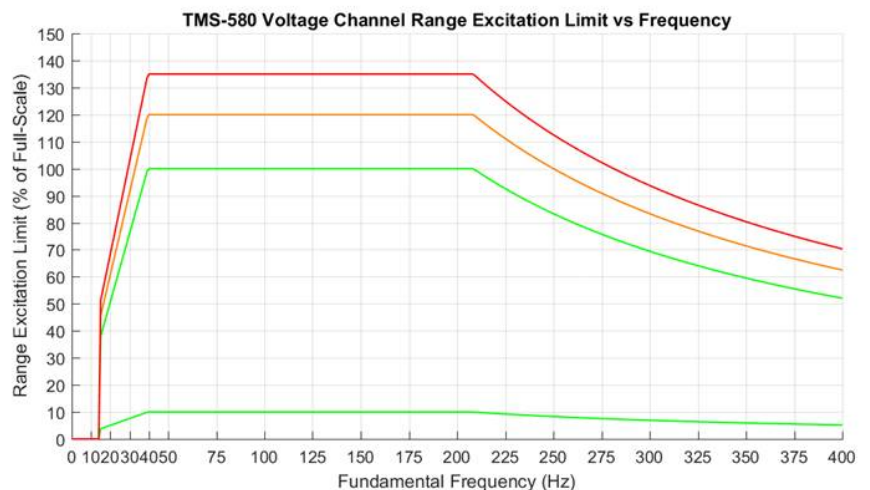
** for 4000A System, @ 50/60Hz

Voltage Frequency Range

The system can be used in the area depicted.
Amplitude accuracy is typically better than 0.2% for 15 to 400Hz,

Calibration is done at 50/60Hz

- Red: Range at max utilization
- Orange: Range at useful utilization
- Green band: Optimal utilization



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Current and voltage – our passion



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