



# TLMS Series

TRANSFORMER LOSS MEASURING SYSTEM



- ✓ No-load Loss & Current Measurement
- ✓ Load Loss & Impedance Voltage Measurement
- ✓ Loss Measuring in Temperature Rising Test
- ✓ Induce Voltage Measurement
- ✓ Zero Sequence Impedance Measurement



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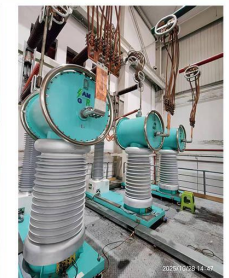
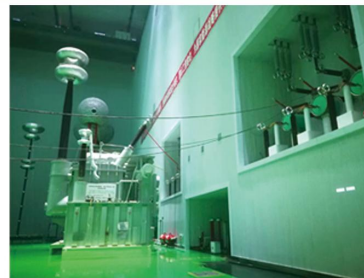
## Brief

Transformer Loss Measuring System plays an important role in the quality inspection of the transformer. The transformer loss can be no-load loss and load loss. Because of the improvement of processing and the new material application, the no-load loss is much lower than before, so is the power factor of load loss. Therefore, the requirement for the measuring range and accuracy in transformer loss measuring system is increasing higher and higher.

TLMS System have the high accuracy in the big range of 10V~220kV, 0.5A~6000A. Its error is no more than 1.15% with the power factor of less than 0.008, which does completely match the requirement for the transformer loss measurement at present. The measurement tap is changing at its secondary side and the software can adjust the measurement range in automatic way. Such method makes the test much simple and more efficient since the engineer need not to change the tap in the primary side for each test section.

TLMS System will use the power analyzer of YOKOGAWA WT5000, which are the most popular ones in the market with good reputation. The customer can choose any of them to work with our system. TLMS System has its own software which combines many functions and advantages from other international transformer loss measuring systems. Moreover, some special functions are developed such as test data uploading to grid company base, real-time waveform display and analysis.

TLMS System features high quality, compared with other transformer measuring system. Its automatic switch can avoid the mis-operation by the engineer. Its good insulation structure improves the system in EMC, EMI and EMP, which protect the system and test object from the damage by the self-discharge and transmit over-voltage.

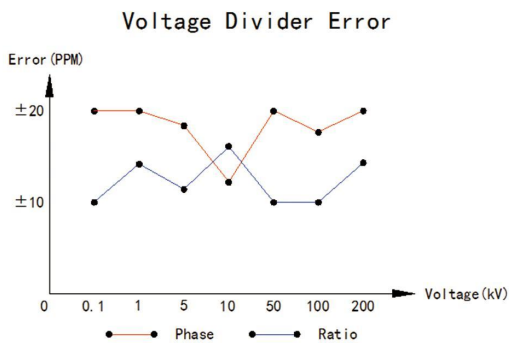


## Advantage

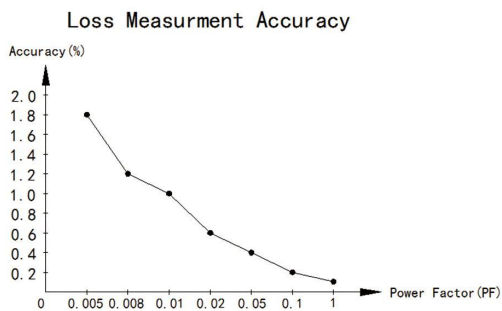
- ✓ High accuracy, with low power factor ( $\pm 1.15\%$  when power factor is 0.008);
- ✓ Wide measurement range 10V~220kV, 0.5A~6000A, 40Hz~200Hz;
- ✓ Manual/automatic shifting current & voltage taps;
- ✓ All the ratios can be shifted at load condition;
- ✓ High accuracy at full measurement range of voltage and current taps;
- ✓ SF6 gas insulated CT & Voltage divider in one;
- ✓ Low partial discharge;
- ✓ Calibration port is reserved for calibration;
- ✓ Combined advantages and functions from the international transformer loss measuring system
- ✓ Good durability with insulation protection to 20kV level;

# System Measurement

**Voltage measurement:** Three sets of shielded HV standard electronic voltage dividers are used to measure voltage. The divider consists of one HV SF6 gas-insulated standard capacitor and one electronic LV arm. Its output is directly connected to the power analyzer with accuracy of less than 0.06%.

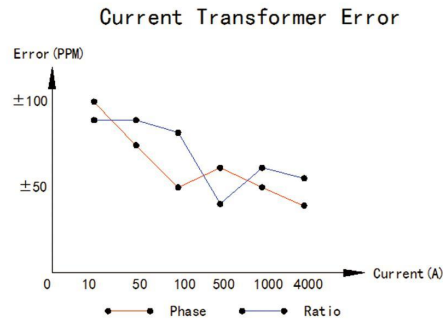


**Loss measurement:** The voltage and current from three sets of HV electronic voltage dividers and current transformers will be delivered to the power analyzer of YOKOGAWA WT5000. All the data will be processed by the analyzer including voltage, current, loss, frequency, power factor, harmonic, and waveform. The loss measurement accuracy will be different with the power factor value. The accuracy will be less than 1.15% at very lower power factor of 0.008.



TLMS Transformer Loss Measuring System will provide one set of the calibration certificate by the CNAS qualified third party lab to ensure its accuracy.

**Current measurement:** Three sets of multi-tap HV current transformer(CT) is used to measure the current. The current transformer is designed in serial structure. Each set has two independent CTs. One is for small ratio and the other is for the big ratio. The accuracy will be ensured in the full range with value <0.06%.



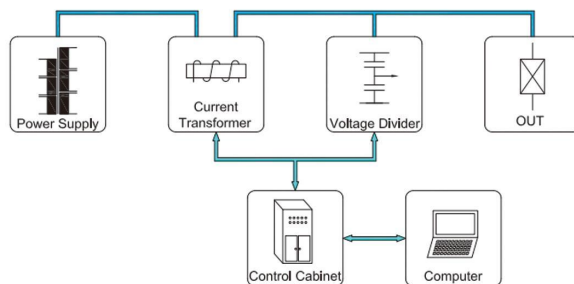
TLMS System has developed its own software based on the JAVA platform and windows system. The software is integrating various functions which is popular in other international loss measuring system. Moreover, some special functions are developed or improved such as data uploading to grid's database, and waveform real-time display.

TLMS software is able to measure and analyze different data including voltage/current, no-load loss, load loss, power factor, frequency, temperature rising curve, zero sequence impedance, voltage/current waveform, harmonic wave (max 50th)

TLMS software can select the proper measuring range in automatic way, which is based on the sampling signals. In manual mode, the software will activate the warning once over current or over voltage happens. If the over load is more than 150%, the system will automatically select the proper measuring range to continue the test. Its test report will be generated in the format of XML/CSV.

TLMS-201803				
3 Phase	Phase A-B	Phase B-C	Phase C-A	Mean
Voltage(RMS)	± 0.000mV	± 0.000mV	± 0.000mV	± 0.000mV
Voltage(Mean)	± 0.000mV	± 0.000mV	± 0.000mV	± 0.000mV
Frequency	0.000Hz	0.000Hz	0.000Hz	0.000Hz
Phase A		Phase B		Phase C
Phase A		Phase B		Phase C
Voltage(RMS)	± 0.000mV	± 0.000mV	± 0.000mV	± 0.000mV
Voltage(Mean)	± 0.000mV	± 0.000mV	± 0.000mV	± 0.000mV
Current(RMS)	0.000mA	0.000mA	0.000mA	0.000mA
Phase A		Phase B		Phase C
Real Power	0.000mW	0.000mW	0.000mW	0.000mW
Idle Power	0.000mW	0.000mW	0.000mW	0.000mW
App Power	0.000mW	0.000mW	0.000mW	0.000mW
Power factor	□	□	□	□
Voltage tap	connection fail	connection fail	connection fail	
Current tap	connection fail	connection fail	connection fail	

## Block Diagram



## Specification

### Measurement Range:

Model	Voltage	Current	Accuracy*
TLMS3000-50/1000	0.01kV-50kV (L-N)	0.5-1000A	0.0006
TLMS3000-100/2000	0.01kV-100kV (L-N)	0.5-2000A	0.0006
TLMS3000-150/4000	0.01kV-150kV (L-N)	0.5-4000A	0.0006
TLMS3000-200/6000	0.01kV-200kV (L-N)	1A-6000A	0.0006

\* Continuous running @5%~120% of current range incl uncertainty in calibration

### Power Measurement:

Power Factor	Range	Accuracy
$\cos\Phi = 1.000$	$\geq 0.1kV / \geq 1 A$	0.0006
$\cos\Phi = 0.100$	$\geq 0.1kV / \geq 1 A$	0.0016
$\cos\Phi = 0.050$	$\geq 0.1kV / \geq 1 A$	0.0023
$\cos\Phi = 0.020$	$\geq 0.1kV / \geq 1 A$	0.0065
$\cos\Phi = 0.010$	$\geq 0.1kV / \geq 1 A$	0.01
$\cos\Phi = 0.008$	$\geq 0.1kV / \geq 1 A$	0.0115

### Safety Clearance:

Model	Clearance to wall	Phase to Phase
TLMS3000-50/1000	>0.4m	>0.6m
TLMS3000-100/2000	>0.8m	>1m
TLMS3000-150/4000	>1m	>1.5m
TLMS3000-200/6000	>1.5m	>2m

### Power Source:

Voltage	110-240V
Frequency	50 Hz / 60 Hz
Power	600 VA (desk), 500 VA (cabinet)

MORE INFORMATION:  
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