

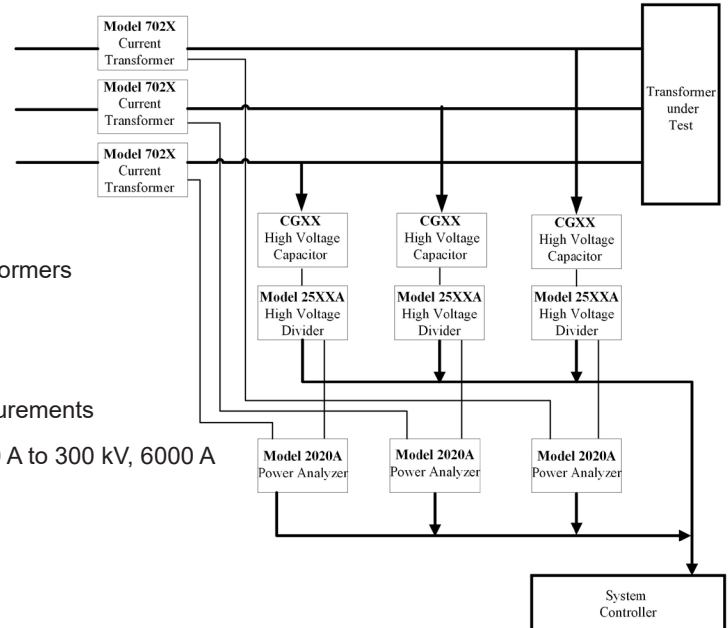


## ACCULOSS® TLMS SERIES

### “WITH NEW AND IMPROVED POWER ANALYZER”

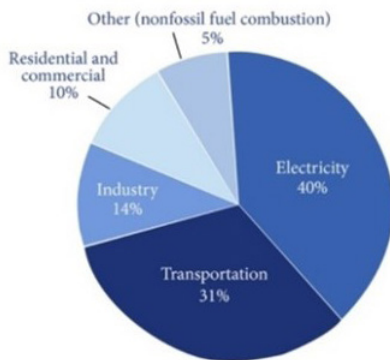
The AccuLoss® Transformer Loss Measurement System is an effective tool for transformer manufacturers around the world.

- ▶ Loss Measurements
- ▶ High Accuracy
  - Voltage 0.05 %, Current 0.005 %
  - Power ≤ 0.61 % at PF=0.01
- ▶ Helps Manufacturers Design More Energy Efficient Transformers
- ▶ Positive Impact on the Environment
  - Result = Reduced Emissions
- ▶ Power Analyzer Based With Fast Reliable Accurate Measurements
- ▶ Wide Range of Applications with Systems from 1 kV, 1000 A to 300 kV, 6000 A
- ▶ Horizontal & Vertical Bushings
- ▶ Standard and Premium Versions



As the need to reduce CO<sub>2</sub> emissions in the electricity sector grows, accurate measurement of losses in power transformers and reactors has become increasingly important. The AccuLoss® Transformer Loss Measurement System provides a comprehensive solution that includes low-voltage, low-current (control), and high-voltage high-current components. The low-voltage section consists of three Voltage Dividers (Model 25XXXA), three Power Analyzers (Model 2020A), and a System Controller (with AccuLoss® SW). The high-voltage section includes three reference High Voltage Current Transformers (Model 70XX), and three compressed-gas-dielectric High Voltage Capacitors (Model CGXX). Inquire about available options for SF6-free systems if you're interested.

The 2020A series of Power Analyzers, based on simultaneous sampling technology, has upgraded the AccuLoss® Transformer Loss Measurement System with new features, improved accuracy, and reliability. The simultaneous sampling technology is a key factor that allows us to achieve better accuracy at low Power Factors and when combined with the small phase errors of the high voltage capacitive divider and two-stage compensated current transformer creates a significant advantage in the measurement of losses over the full range of power factors. It is crucial to accurately measure losses to comply with standards like IEC/TS 60076 and the Ecodesign Directive.



Main CO<sub>2</sub> emissions contributors

Data Subject to Change – 2023-07-04

The electric power system is a significant contributor to CO<sub>2</sub> emissions, and transformers play a part in this. As the demand for electric power increases, more transformers will be needed, resulting in even higher emissions. However, there is an opportunity for significant CO<sub>2</sub> reduction if low-loss transformers are utilized. As Transformer technology is unlikely to change significantly, it emphasizes the importance of accurate industrial loss measurement systems, like the AccuLoss® Transformer Loss Measurement System, to measure losses in Reactors and Transformers. This ensures that new transformers are designed and manufactured with low losses, achieving potential energy savings, and reducing CO<sub>2</sub> emissions. The industry must adopt these technologies to minimize the environmental impact of the electric power system.



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The AccuLoss® Loss Measurement System offers two types of bushings: horizontal and vertical. Horizontal bushings are suitable for systems with voltages up to 100 kV Line-to-Neutral (173 kV Line-to-Line) and Currents up to 4000 A. These bushings can be directly installed in the busbar structure which saves space on the test floor. Models available for horizontal bushings include the AccuLoss® 1058-H-S, AccuLoss® 2100-H-S, and AccuLoss® 4058-H-S. Bushing mounts are available for the 7020H two-stage-current transformers. Vertical bushings are designed for systems with up to 300 kV Line-to-Neutral and Currents up to 6000 A and are typically mounted on the mezzanine or test floor. The vertical bushings models include AccuLoss® 2100-V-S, AccuLoss® 4100-V-S, and AccuLoss® 4200-V-S up to 4000 A. For higher currents, the AccuLoss® 4100-V-P and AccuLoss® 4200-V-P have 50 % over range to 6000 A. Systems can come in two versions ending with an S or P. S is for the Standard version (10 % over-range on the current), and P is for Premium (50 % over-range on the current).





For higher voltages, the AccuLoss® 2300-V-S and 4300-V-S are available for 300 kV line-to-neutral systems up to 4000 A only.

The system model number can be chosen independently using the formula:

$$\text{ACCULOSS } \underset{\substack{\uparrow \\ \text{kA}}}{\text{X}} \underset{\substack{\uparrow \\ \text{kV}}}{\text{XXX}} \text{ -H/V, - S/P}$$

Where X - is the Current (kA), XXX - is the Voltage L-to-N (kV), -H is for Horizontal and -V is for Vertical, S is for Standard, or P is for Premium. E.g., AccuLoss® 4100-V-P.

Models	TLMS Horizontal	TLMS Vertical
		
Voltage (L-N) (L-L)	≤ 100 kV ≤ 173 kV	≤ 100 kV, 200 kV, 300 kV ≤ 173 kV, 346 kV, 519 kV
Current	≤ 1000 A, 2000 A, 4000 A	≤ 2000 A, 4000 A, 6000 A
Frequency	from 40 to 400 Hz	from 40 to 400 Hz
Accuracy	Measuring accuracies are better than any system available on the market today with voltage and current measurements < 0.05 % and 0.005 % respectively.	
Capabilities	<ul style="list-style-type: none"> <li>• Performance of Load and No-Load Loss Measurements</li> <li>• Heat Run Test</li> <li>• Induced Voltage Test</li> <li>• Zero Sequence Impedance Measurements</li> <li>• “Operator Friendly” software includes voltage and current waveform analysis, manual and fully automatic time-saving range selection, over-voltage, and over current protection.</li> <li>• Output Data: Supplied in an ASCII file for easy import into Excel spreadsheets.</li> <li>• Electromagnetic Compatibility: All components comply with the requirements of IEC Recommendations. In addition, the foot space for the electronics is housed in one shielded enclosure.</li> </ul>	



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The AccuLoss® System is designed to test small, medium, and large power transformers, motors, and turbines up to 400 Hz and is ideal for R & D facilities. The AccuLoss® System also calibrates single and 3-phase reactors at power factors down to 0.001 and lower.

Power Factor	Range	Accuracy (2σ)
cos φ = 1.000	≥ 100 V ≥ 1 A	0.05 %
cos φ = 0.100	≥ 100 V ≥ 1 A	0.07 %
cos φ = 0.050	≥ 100 V ≥ 1 A	0.12 %
cos φ = 0.020	≥ 100 V ≥ 1 A	0.27 %
cos φ = 0.010	≥ 100 V ≥ 1 A	0.54 %
cos φ = 0.005	≥ 100 V ≥ 1 A	1.08 %

Accuracy specifications are calculated for an ambient temperature of 25 °C, ± 10 °C, and are of full scale. If the ambient temperature is less than or greater than 10 °C, contact Measurements International for an updated accuracy specification.

### Ordering Information:

Depending on the operating conditions required, the low-voltage part of the Model AccuLoss® System can be designed as follows for both Horizontal and Vertical systems:

AccuLoss® Rack on wheels for test room with built in controller (Height 1520 mm)	AccuLoss® Bench Top setup on wheels for test room with built in controller	AccuLoss® Portable enclosures on wheels for test floor with built in controller	Optional CT Stand (for TLMS-H)
			

### Options:

Spare components such as the 2500A, the 2020A, and the PC controller are available. 17025 Calibration on all the components is also available on these Models including on-site calibrations. An optional CT stand, shown above, is also available for horizontal bushing. All CTs are protected from power outages.

Model 7020H CAL - 17025 (ISO/IEC 17025 Accredited Certificate of Calibration)

Model 25XXA CAL - 17025 (ISO/IEC 17025 Accredited Certificate of Calibration)

Model 2020A CAL - 17025 (ISO/IEC 17025 Accredited Certificate of Calibration)

*On-site System Calibration by previous appointment*



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### Specifications:

HV Bushing Style	Horizontal		Vertical	
Models	1058-H	2100-H	2100-V	4200-V
<b>Voltage</b>				
Applied Voltage Line to Neutral	100 V to 58 kV	100 V to 100 kV	100 V to 100 kV	200 V to 200 kV
Accuracy	≤ 0.05 % of full scale			
Ranges	1,2,5,10, 20, 50, 100			
<b>Current</b>				
Applied Current	1 A to 2000 A (S) (P)		1 A to 2000 A (S) (P)	1 A to 4000 A (S) (P)
Input Current Ratio	1000:1		2000:1	2000:1
Accuracy	≤ 0.005 % of full scale			
Ranges, A (Blue - Premium)	10 20 40 100 200 400 1000 1500	10 20 40 100 200 400 1000 2000 3000	10 20 40 100 200 400 1000 2000 3000	10 20 40 100 200 400 1000 2000 4000 6000
Note: All CT's are protected against power outages.				
<b>Power</b>				
Power Factor	1, 0.1, 0.05, 0.02, 0.01, 0.005			
Accuracy	≤ 0.05 % to ≤ 1.21 %			
<b>Safety Clearances</b>				
To Adjacent Walls	1 metre		2 metres	
Between Phase	1 metre		2 metres	
<b>Power Supply</b>				
Voltage	100, 120, 220, 240 V ± 10 %			
Frequency	50/60 Hz			
Power	1200 VA			
<b>Environmental Conditions</b>				
Operating Temperature	Control Cabinet: 15 °C to 30 °C, Bushings and Capacitors: -10 °C to 40 °C			
Storage Temperature	- 20 °C to 50 °C			
Relative Humidity	30 % to 90 % (non condensing)			

Ask about different Currents & Voltages.

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