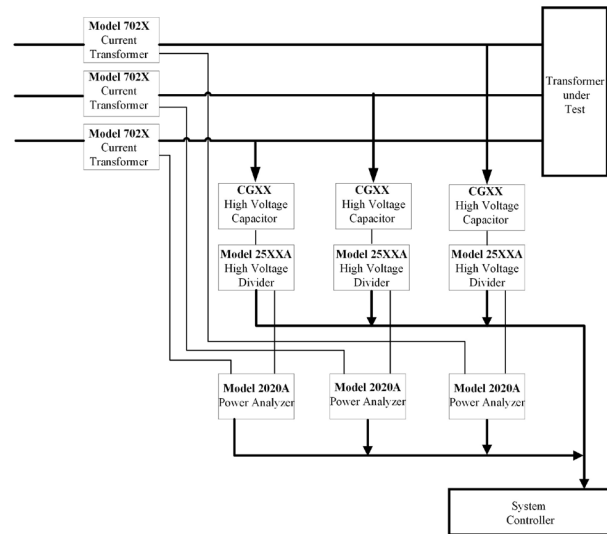




ACCULOSS® TLMS SERIES OF TRANSFORMER LOSS MEASUREMENT SYSTEM

“WITH NEW AND IMPROVED POWER ANALYZER”

- ▶ Loss Measurements
- ▶ Highest Accuracy Available
- ▶ Positive Impact on the Environment
- ▶ Power Analyzer Based
- ▶ Fast Reliable Accurate Measurements
- ▶ Overall Accuracy < 50 ppm
- ▶ Systems to 300 kV, 6000 A
- ▶ Horizontal & Vertical Bushings
- ▶ Small Footprint

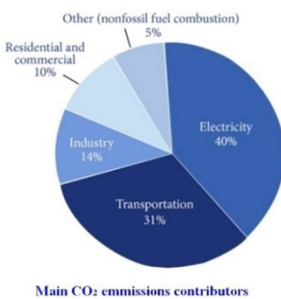


TLMS System includes both the low voltage (control) and high voltage transducers.

The three Voltage Dividers (Model 25XXX), three Power Analyzers (Model 2020A) and System Controller (with AccuLoss®SW) are included in the low voltage part. The three reference High Voltage Current Transformers (Model 70XX) and three compressed-gas-dielectric High Voltage Capacitors (Model CGXX) are included in the high voltage section.

The advanced AccuLoss® Transformer Loss Measurement System (TLMS) with the improved features of the 2020A series of Power Analyzers leads to even more accurate and reliable measurements. The ability to verify the functionality and accuracy of the voltage channel during operation without shutting down the system or adding extra equipment is a significant advantage and can help ensure that the system is functioning properly. Overall, this is a promising development that could help improve the efficiency and effectiveness of transformer manufacturing.

Accurate measurement of losses is important to ensure compliance with applicable standards and directives, such as IEC/TS 60076-19 and the Ecodesign Directive.



It is clear that the electric power system is a significant contributor to CO₂ emissions, and transformers play a role in this. As the demand for electric power continues to grow, the need for new transformers will increase, which will further increase emissions. However, there is potential for significant reduction in CO₂ emissions if low loss transformers are used. This highlights the importance of accurate industrial loss measurement systems such as the AccuLoss® TLMS and RLMS types to ensure that new transformers are designed and manufactured with low losses. By doing so, the potential for reducing CO₂ emissions by 2045 and energy savings can be achieved. It is important for the industry to adopt these technologies to reduce the environmental impact of the electric power system.

Carbon Footprint of Transformer and the Potential for Reduction of CO₂ Emissions 2019 IEEE 4th International Conference on Technology, Informatics, Management, Engineering & Environment (TIME-E).



ACCULOSS® TLMS SERIES

There are two types of bushings available for the AccuLoss® TLMS system:

Horizontal Bushings for systems below 100 kV Line-to-Neutral (173 kV Line-to-Line) and Currents to 6000 A. Horizontal bushings have the advantage that they can be directly installed in the busbar structure saving space on the test floor. Bushing mounts are available.

Models TLMS Horizontal: 1058-H, 2058-H, 2100-H, 4058-H, 6058-H



Vertical Bushings for systems for voltages up to 300 kV Line-to-Neutral and Currents to 6000A for mounting on the mezzanine or test floor.

Models TLMS Vertical: 2100-V, 4100-V, 6100-V, 2200-V, 4200-V, 6200-V, 4300-V.

The customer can choose the system model independently using the formula:

$$\text{TLMS } \underset{\substack{\uparrow \\ \text{kA}}}{\text{X}} \underset{\substack{\uparrow \\ \text{kV}}}{\text{XXX}} \text{ -H/ -V}$$

Where X - number is the Current (kA), XXX - is the Voltage L-to-N (kV),
-H is for horizontal and V is for -Vertical.

Models	TLMS Horizontal	TLMS Vertical
		
Voltage (Line-to-Neutral)	≤ 100 kV	≤ 100 kV, 200 kV, 300 kV
Voltage (Line-to-Line)	≤ 173 kV	≤ 173 kV, 345 kV, 519 kV
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 < 0.02 %.	
Capabilities	<ul style="list-style-type: none"> • Performance of Load and No-Load Loss Measurements • Heat Run Test • Induced Voltage Test • Zero Sequence Impedance Measurements • "Operator Friendly" software includes voltage and current waveform analysis, manual and fully automatic time-saving range selection, over voltage and over current protection. • Output Data: Supplied in an ASCII file for easy import into Excel spreadsheets. • 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. 	




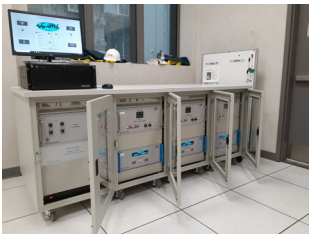


ACCULOSS® TLMS SERIES

The TLMS System can be used for testing small, medium and large power transformers as well as motors and turbines up to 400 Hz and is ideal for R & D facilities. The AccuLoss® TLMS system can also be used to measure losses in single and three-phase reactors (See Reactor Loss Measurement datasheet).

Power Factor	V & I Range		Accuracy (2σ)	
cos φ = 1.000	≤ 100 V. < 1 A	≥ 100 V. ≥ 1 A	0, 05 %	0, 05 %
cos φ = 0.100	≤ 100 V. < 1 A	≥ 100 V. ≥ 1 A	0.15 %	0.08 %
cos φ = 0.050	≤ 100 V. < 1 A	≥ 100 V. ≥ 1 A	0.2 %	0.13 %
cos φ = 0.020		≥ 100 V. ≥ 1 A	0.35 %	
cos φ = 0.010		≥ 100 V. ≥ 1 A	0.7 %	

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:

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

Options:

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



ACCULOSS® TLMS SERIES

Specifications: Rev 1

HV Bushing Style	Horizontal				
Models	1058-H	2058-H	2100-H	4058-H	6058-H
Voltage					
Applied Voltage Line to Neutral	100 V to 58 kV		100 V to 100 kV	100 V to 58 kV	
Accuracy	0,05 %				
Ranges, kV	1,2,5,10, 20, 50, 100				
Current					
Applied Current	1 A to 2000 A		1 A to 2000 A	1 A to 4000 A	
Input Current Ratio	1000:1		2000:1	2000:1	2000:1
Accuracy	0, 05 %				
Ranges, A	(0, 5 to 5) 10 20 40 100 200 400 1000	(0, 5 to 5) 10 20 40 100 200 400 1000 2000	(1 to 10) 20 40 100 200 400 1000 2000	(1 to 10) 20 40 100 200 400 1000 2000 4000	(1 to 10) 20 40 100 200 400 1000 2000 6000
Safety Clearances					
To Adjacent Walls	1 meter	1 meter	1 meter	1 meter	1 meter
Between Phase	1 meter	1 meter	1 meter	1 meter	1 meter

Corporate Headquarters
Measurements International
 PO Box 2359, 118 Commerce Drive
 Prescott, Ontario, Canada K0E 1T0
 Phone: 613-925-5934
 Fax: 613-925-1195
 Email: sales@mintl.com
 Toll Free: 1-800-324-4988





ACCULOSS® TLMS SERIES

Specifications: Rev 1

HV Bushing Style	Vertical				
Models	2100-V	4100-V	2200-V	4200-V	4300-V
Voltage					
Applied Voltage Line to Neutral	100 V to 100 kV		200 V to 200 kV		300 V to 300 kV
Accuracy	0, 05 %				
Ranges, kV	1,2,5,10, 20, 50, 100	1,2, 5, 10, 20, 50, 100	2, 4, 10, 20, 40, 100, 200	2, 4, 10, 20, 40, 100, 200	3, 15, 30, 60, 150, 300
Current					
Applied Current	1 A to 2000 A	1 A to 4000 A	1 A to 2000 A	1 A to 4000 A	
Input Current Ratio	2000:1	2000:1	2000:1	2000:1	2000:1
Accuracy	0, 05 %				
Ranges, A	(1 to 10) 20 40 100 200 400 1000 2000	(1 to 10) 20 40 100 200 400 1000 2000 4000	(1 to 10) 20 40 100 200 400 1000 2000	(1 to 10) 20 40 100 200 400 1000 2000 4000	(1 to 10) 20 40 100 200 400 1000 2000 4000
Safety Clearances					
To Adjacent Walls	1 meter	1 meter	2 meters	2 meters	3 meters
Between Phase	1 meter	1 meter	2 meters	2 meters	3 meters
Power Supply					
Voltage	100, 120, 220, 240 ± 10%				
Frequency	50/60 Hz				
Power	1200 VA				
Environmental Conditions					
Operating Temperature	Control Cabinet: 15° to 30°C, Bushing and Capacitors -10° to 40°C				
Storage Temperature	-20 to 50°C				
Relative Humidity	30 to 90 % (non condensing)				
Statement of Standard Deviation	2 Sigma				

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