

CT Analyzer

What's New in Version 5.00

Compared to Version 4.52



What's New in the CTA Hardware?

- > Updated front plate
- > Optional multi-functional transport case and trolley/backpack

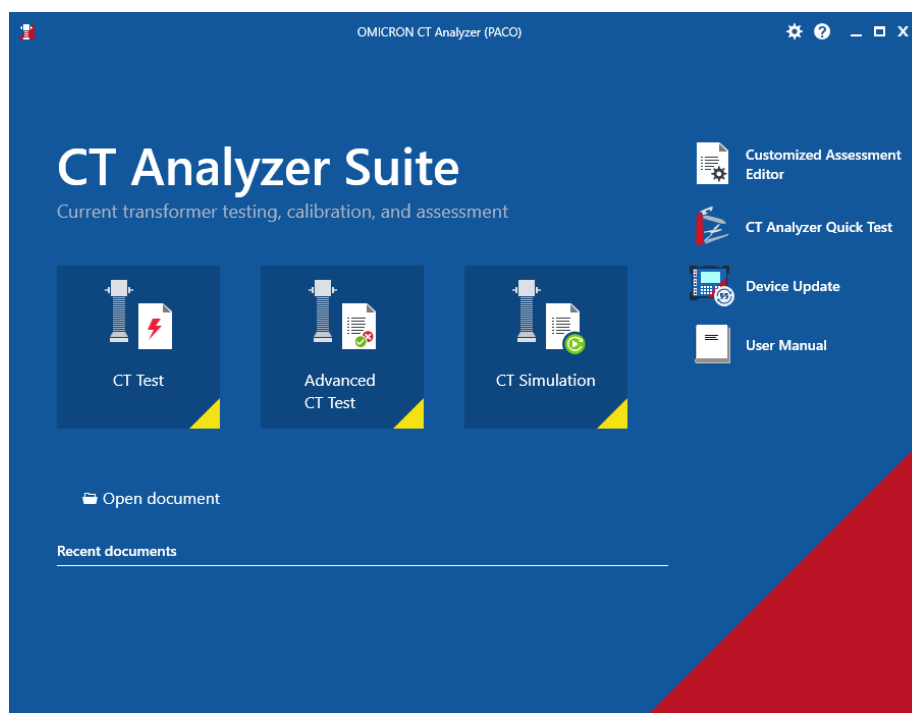
What's New in the CTA Software Version 5.00?

The new 5.00 version of the CT Analyzer software offers new features and further improvements including:

- New PC Software **CT Analyzer Suite**
- New **CT Test** functionality
- Customized CT class assessment
- Accuracy improvements for low kneepoint CTs down to 0.1 V
- Protection CT testing up to 40 kV kneepoint
- Consideration of connection impedance in test procedure
- Adaptions in assessment of CT overcurrent performance

1 New PC Software CT Analyzer Suite

A new dedicated PC software named CT Analyzer Suite for Microsoft computers is now available for CT Analyzer (for system requirements, please see CT Analyzer user manual).



This software allows users to do test preparation, execution and result assessment. It also provides a customized assessment editor and allows to export test reports to the known formats. All known CT Analyzer features are now accessible via CT Analyzer Suite.

2 New CT Test Functionality

The CT Analyzer test infrastructure has been expanded. CT Analyzer now offers different tests with a different degree of extent. The *Advanced CT Test* is available next to the *CT Test*. Whereas the *Advanced CT Test* offers well-known test features based on the selected license (Standard, Advanced) including an assessment, the *CT Test* offers limited extent with a clear focus on basic CT tests useful for integrity check or commissioning for example.



The new *CT Test* allows to perform basic CT tests such as ratio and phase measurement, composite error measurements, polarity check, excitation and kneepoint test and winding resistance measurement.

With only limited mandatory asset information, the *CT Test* will provide the most common and important CT performance parameters for single as well as for multi-tap CTs.

General			
Company:	<input type="text"/>	Manufacturer:	<input type="text"/>
Country:	<input type="text"/>	Type:	<input type="text"/>
Station:	<input type="text"/>	Serial number:	<input type="text"/>
Feeder:	<input type="text"/>	Comment:	<input type="text"/>
Phase:	<input type="text"/>		
▶ Show more			
Test configuration			
Measurement temperature:	<input type="text" value="25 °C"/>	Reference temperature:	<input type="text" value="75 °C"/>
Temperature unit:	<input type="text" value="Celsius"/>		
Asset			
Ipn:	<input type="text" value="500 A"/>	Isn:	<input type="text" value="5 A"/>
Standard:	<input type="text" value="IEC 60044-1"/>	Application:	<input type="text" value="Metering"/>
Frequency:	<input type="text" value="50 Hz"/>	Class:	<input type="text" value="3"/>
Multi-tap details			
Multi Ratio CT:	<input type="checkbox"/>	Use CT SB2:	<input type="checkbox"/>

The *CT Test* does not support any automated class assessment. The results can be stored and exported to XML or Excel reports.

The CT Analyzer Standard and Advanced packages contain both the *CT Test* and *Advanced CT Test* whereas the CT Analyzer Basic Package only contains the *CT Test*.

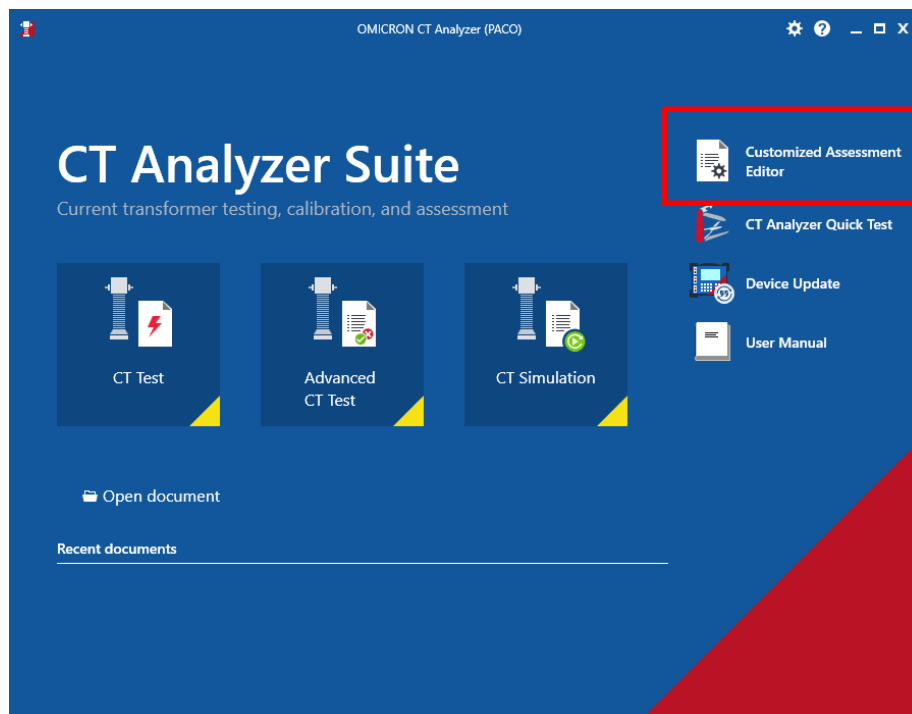
3 Customized CT Class Assessment

The new customized assessment feature as part of the Advanced package allows users to customize their result assessment upon individual requirements. Per default, CT Analyzer assesses the test results based on the selected international standard (IEC or IEEE) for the dedicated test object and its application (protection or metering). The new platform allows users to extend the assessment rule set or to develop an assessment rule set based on the requirements of any national or corporate standard. Any modified or newly created standard (assessment rule set) can be named, stored and integrated into CT Analyzer test configuration.

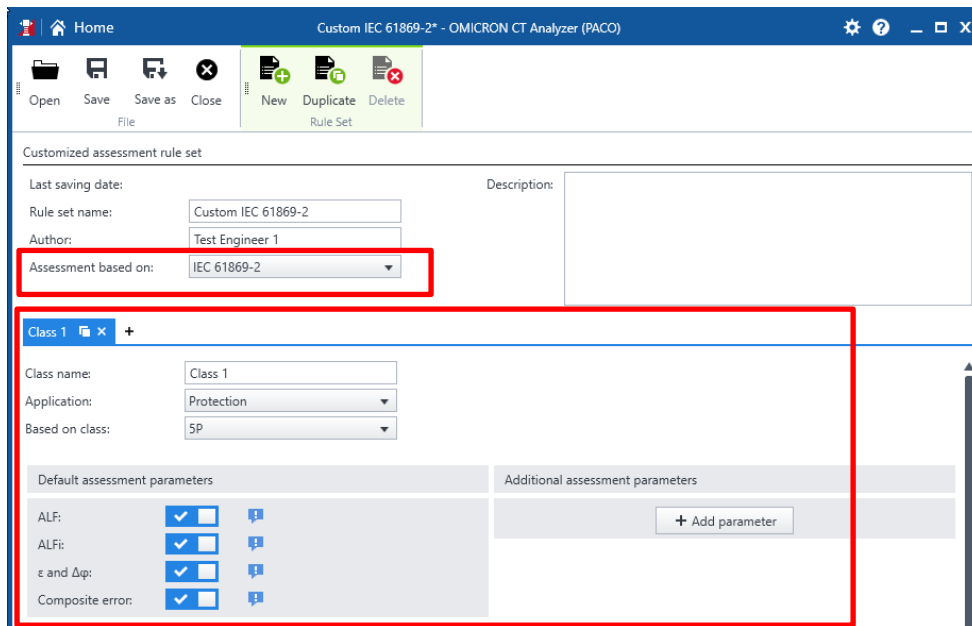
As an example, the Canadian Standard as a combination of IEC and IEEE requirements or any other national standard can be configured in the customized assessment editor and saved for further use.

The Customized Class Assessment can only be configured in the CT Analyzer Suite and not on the CT Analyzer itself. Once configured and saved, the new or extended class can be used with the PC software and standalone on the CT Analyzer itself using the built-in display.

The Customized Assessment Editor can be found in the upper right corner on the CT Analyzer Suite Homescreen.

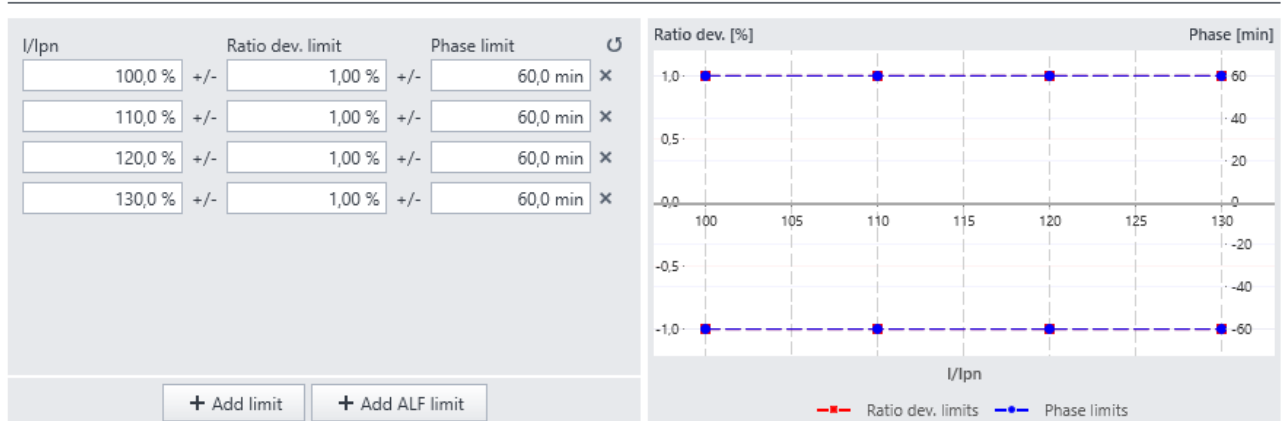


After selecting a reference standard for the class limits and excitation characteristics (for IEEE only), different new classes can be customized and assessment rule sets can be defined. In this regard, additional assessment parameters can be added or default parameters removed.



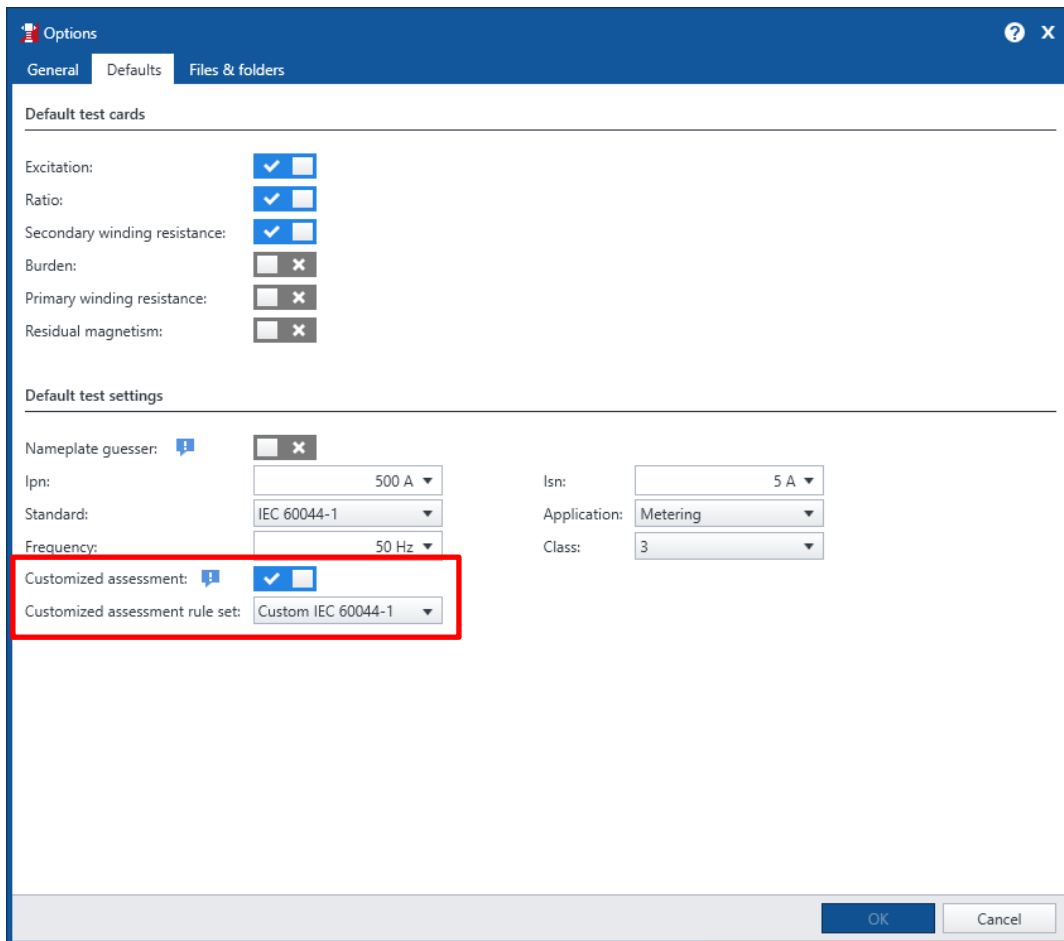
Limits of ratio error and phase displacement can be configured, added or removed for rated currents or overcurrent conditions (FS for metering, ALF / V_b for protection).

Definition of ratio error (ϵ) and phase displacement ($\Delta\phi$) limits

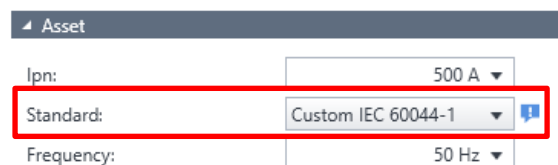


The customized assessment rule set can finally be saved and stored.

To make use of the new rule set (new custom class), enter the settings in the Advanced CT Test mode. The Custom Assessment button must be activated and the saved standard has to be selected.



Once this has been done, the new customized rule set will automatically appear in the list of selectable standards in the test configuration. The rule set can be easily checked by clicking on the blue information button.



4 Accuracy Improvements for Low Kneepoint CTs down to 0.1 V

The new CT Analyzer Toolset 5.00 allows to test CT excitation curves with low kneepoints down to 100mV. Testing of the excitation curve of low kneepoint CTs is difficult because of its low voltage and current readings. Especially in noisy environments, it is difficult to measure small currents in μA range and voltages in mV range. The new CT Analyzer toolset applies sophisticated filter and noise suppression algorithms to accurately measure currents and voltages in μA resp. mV range making it possible to accurately test low kneepoint CTs independent on the application.

5 Protection CT Testing up to 40 kV Kneepoint

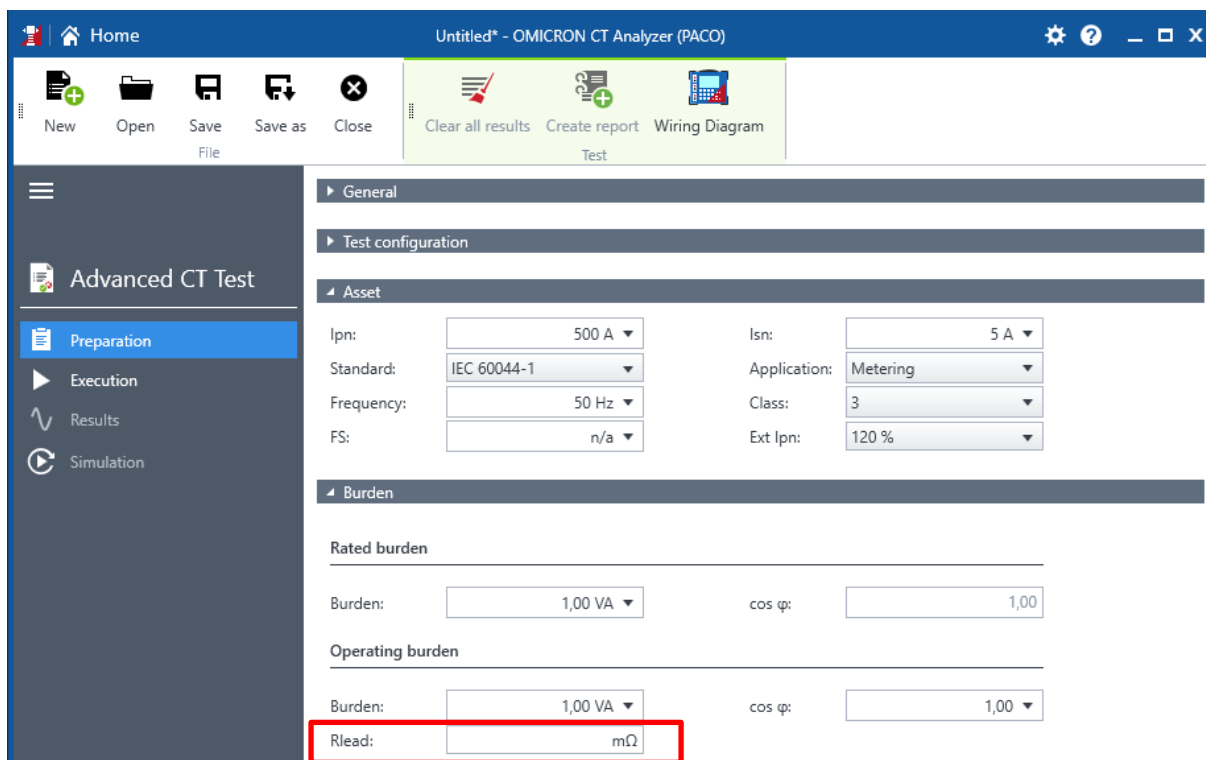
Using the model-based testing approach, CT Analyzer Toolset 5.00 now guarantees to test CT excitation curves with kneepoints up to 40kV. CT Analyzer applies a voltage signal to the secondary terminals of the CT with a low frequency. The applied test signal with reduced frequency allows to saturate CT cores with comparably low magnitude of the applied voltage. Thus, test voltages of maximum 120 V can be used to saturate CT cores with kneepoints up to 40kV.

6 Consideration of Connection Impedance in Test Procedure

The connection impedance on the secondary side of current transformers plays a significant role for CT performance, especially when protection or metering devices with low input impedance and thus low burden are connected. In this case, the impedance of the connections and cable may have an influence on the accuracy and/or overcurrent performance.

The following use case can now be considered with the CT Analyzer Toolset 5.00:

The CT secondary terminal is not directly accessible on-site. The secondary winding of the CT can only be accessed via a connected cable with a significant resistance (R_{lead}) during the test. The CT Analyzer Toolset 5.00 allows to enter the resistance of the connected cable and to determine the performance resp. accuracy on both ends, directly at the secondary terminal and behind the cable in the control cabinet.



The screenshot shows the software interface for the OMICRON CT Analyzer (PACO). The window title is "Untitled* - OMICRON CT Analyzer (PACO)". The interface includes a menu bar with options like New, Open, Save, Save as, Close, Clear all results, Create report, and Wiring Diagram. A sidebar on the left shows navigation options: Preparation, Execution, Results, and Simulation. The main area displays configuration parameters for an "Asset" and "Burden".

Asset	
Ipn:	500 A
Standard:	IEC 60044-1
Frequency:	50 Hz
FS:	n/a
Isn:	5 A
Application:	Metering
Class:	3
Ext Ipn:	120 %

Burden	
Rated burden	
Burden:	1,00 VA
cos φ:	1,00
Operating burden	
Burden:	1,00 VA
cos φ:	1,00
Rlead:	mΩ

7 Adaptions in Assessment of Overcurrent Performance

The overcurrent performance of CTs is different for metering and protection CTs. Whereas metering CTs need to saturate “early” to protect the connected equipment, protection CTs need to saturate “late” to accurately measure high fault currents as well. In IEC, FS for metering and ALF for protection CTs are defined for this purpose.

The CT Analyzer Toolset 5.00 tests the overcurrent performance in two different ways using the indirect testing method. Even if CT Analyzer can calculate ALF and FS as obtained by a direct test as well, only the results obtained by the indirect method are used for assessment from Toolset 5.00 onwards.

Example for ALF on a 5P20 protection CT:

First, CT Analyzer characterizes the CT and determines the overcurrent to nominal current ratio, where the composite error is exactly 5 % at rated burden as well as operating burden. This numeric value is considered as the measured ALF. If this value is larger than the rated ALF of the CT, the assessment is ok. Otherwise, it is not ok.

Second, CT Analyzer tests the composite error at 20 (ALF) times rated current. If the composite error is smaller than 5 %, the assessment is ok. Otherwise, it is not ok.

Example for FS on a 0.2 FS5 metering CT:

First, CT Analyzer characterizes the CT and determines the overcurrent to nominal current ratio, where the composite error is exactly 10 % at rated burden and operating burden. This numeric value is considered as the measured FS. If this value is smaller than the rated FS, the assessment is ok. Otherwise, it is not ok.

Second, CT Analyzer tests the composite error at 5 (FS) times rated current. If the composite error is smaller than 10 %, the assessment is ok. Otherwise, it is not ok.

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Subject to change without notice.