

INSTRUCTION BOOKLET

Transformer Wizard –

Advanced Setting Tool

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| | |
|----------|------------|
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| Date | 20.1. 2015 |
| Changes | N/A |

Read these instructions carefully and inspect the equipment to become familiar with it before trying to install, operate, service or maintain it.

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. Local safety regulations should be followed. No responsibility is assumed by Arcteq for any consequences arising out of the use of this material.

Transformer Wizard software and related material should be used for educational purposes only. All settings calculated and materials provided by this software shall be verified and checked prior to applying in real conditions.

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We reserve right to changes without further notice.

1 OVERVIEW

1.1 INTRODUCTION

Transformer Wizard is an integrated tool inside AQtivate configuration and setting tool. The Wizard can be used to generate settings to Arcteq transformer protection relays. Transformer related information among with other settings like CT specification and wiring is used as a base to build suitable setting parameters to the relay.

The main benefits of the Transformer Wizard are:

- Easy to install and use (integrated in AQtivate)
- Built in user manual
- Writing differential and REF settings to relay is easy
- Direct feedback from the installation

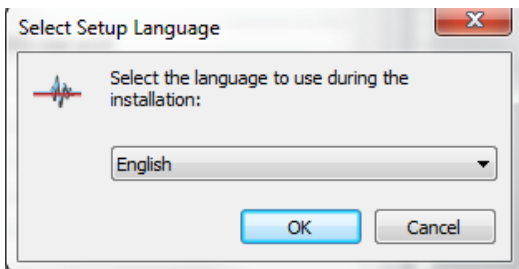
2 GETTING STARTED

To communicate with the device and to download/upload configurations free Ethernet port in the PC is needed and standard RJ-45 cable. Make sure that your firewall program allows AQtivate to connect and freely use Ethernet ports of the PC.

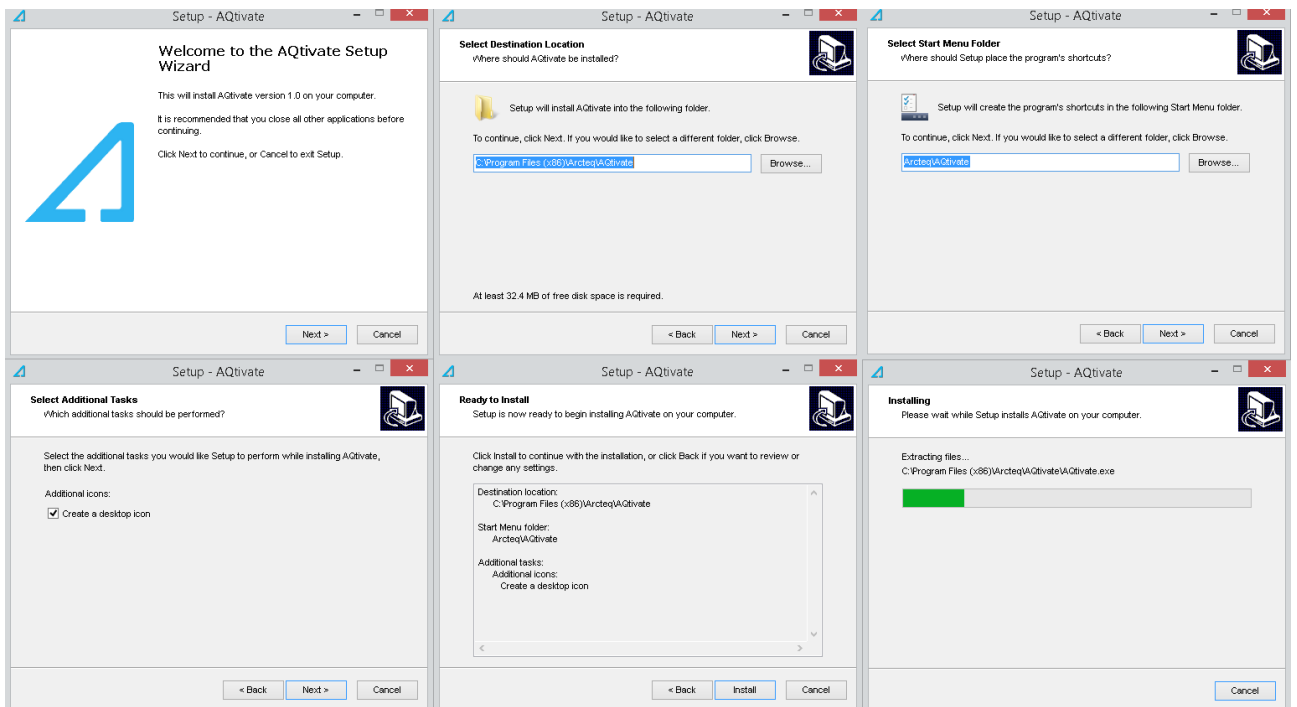
2.1 INSTALLING AQTIVATE SOFTWARE

First launch the “AQtivate offline Installer”. Administrator rights required.

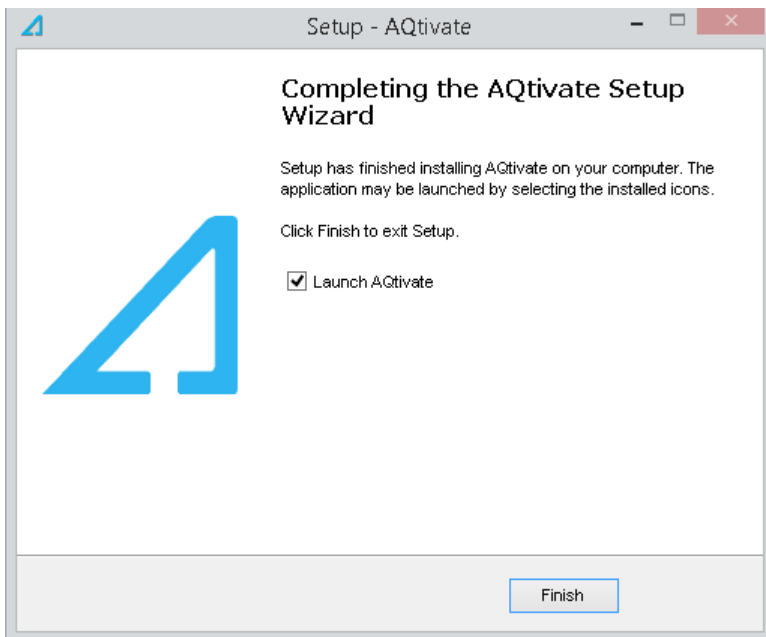
Choose your language:



Follow step by step (wizard) instructions for installing the software.



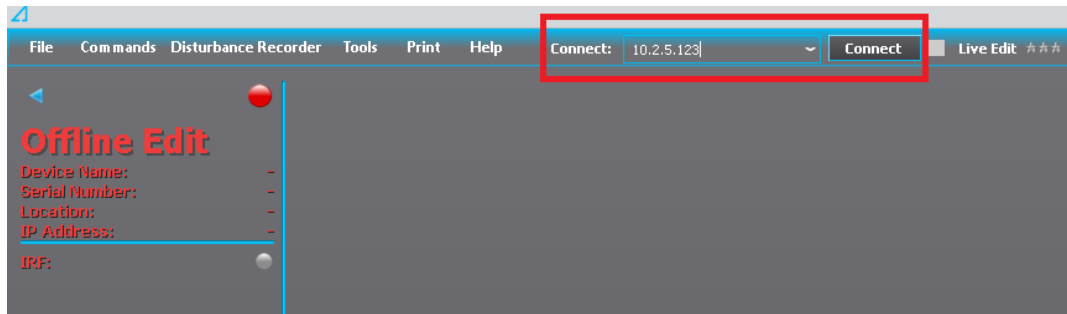
When program is successfully installed the following screen will appear:



Note that your firewall software may detect AQtivate and you need to select option “allow connection” or manually set AQtivate to list of allowed programs.

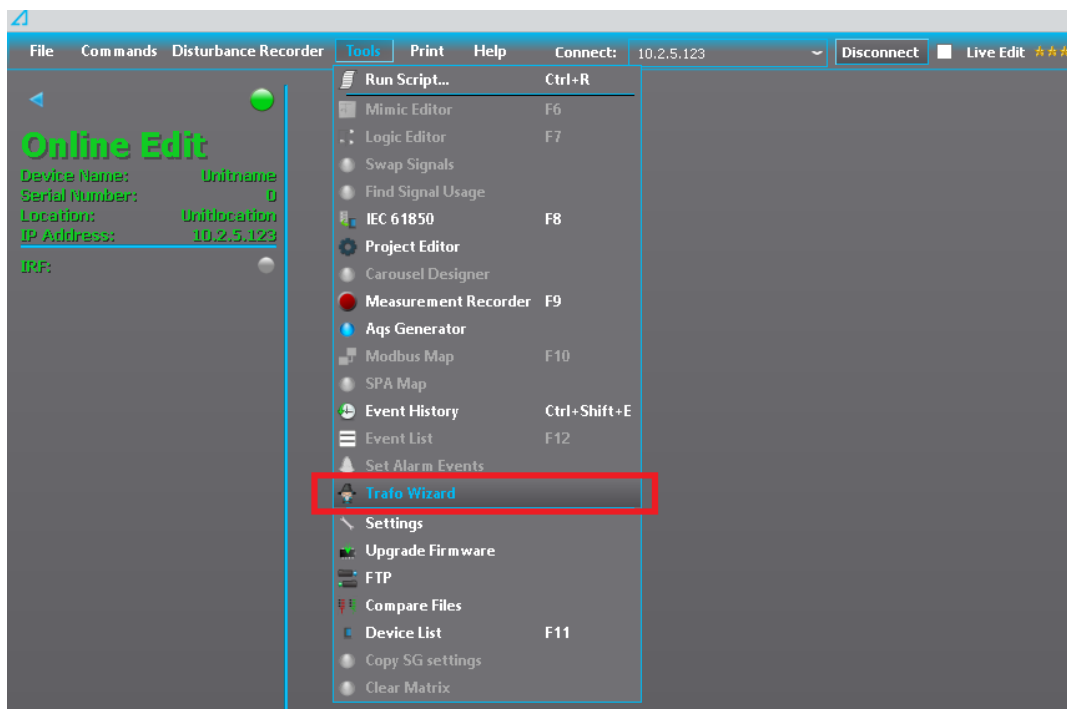
3 CONNECTING TO DEVICE

Establish connection between AQtivate and relay by typing the IP address to Connect – field and clicking “Connect”. Notice that transformer wizard can be used offline as well. Any project can be stored and re-opened at any time. To write settings to the relay the connection has to be established.

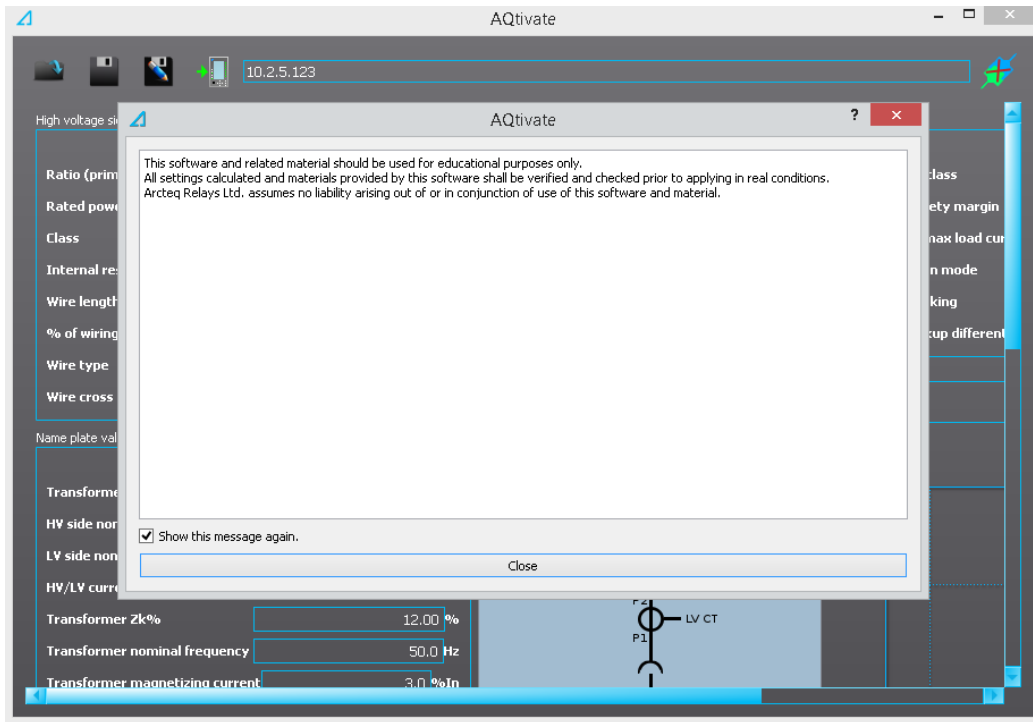


3.1 TRAF0 WIZARD

To open Transformer Wizard go to Tools and choose “Trafo Wizard” from the list.

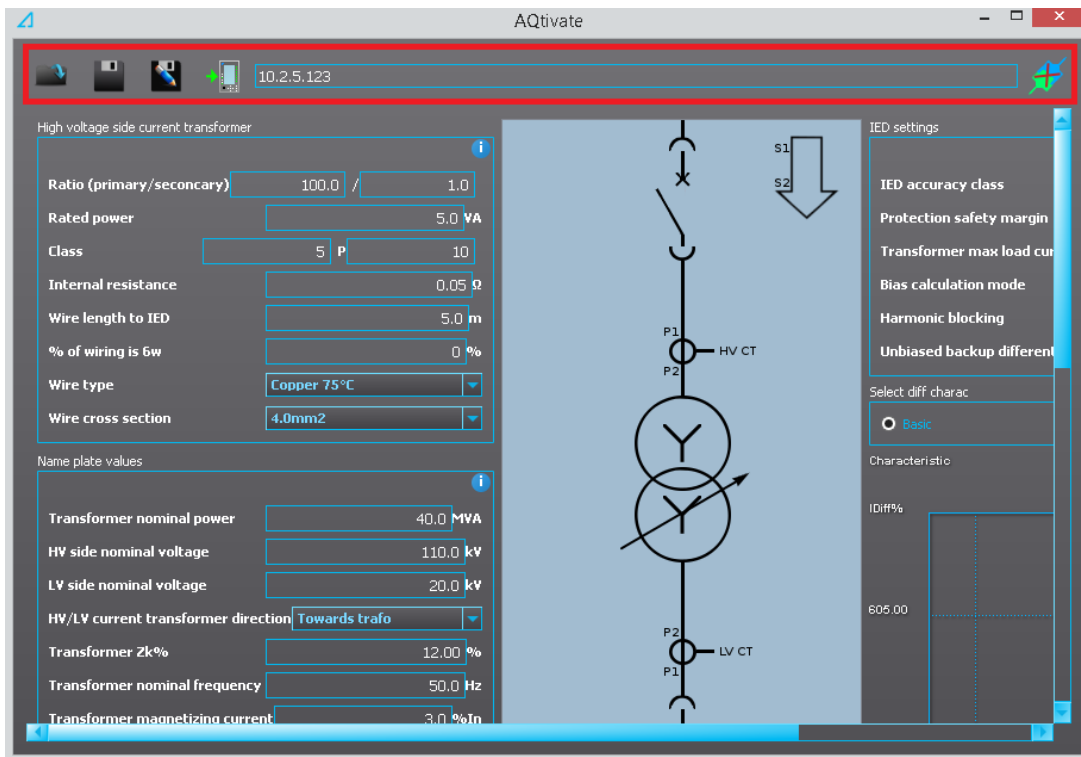







Bypass the notification screen by clicking “Close”.



3.2 BUTTONS

Transformer wizard default view includes several push buttons which are explained below.



| | | |
|---|---------------------------|---|
|  | Open | Open existing wizard file (*.aqwz). |
|  | Save | Save made changes. |
|  | Save as.. | Save setting wizard file (*.aqwz) to the desired location with chosen name. |
|  | Write values to the relay | Write the calculated values of the wizard to connected relay. |
|  | Connect | Connect or disconnect to a relay. |

3.3 SAVE WIZARD FILE

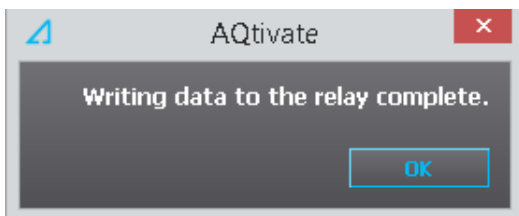
To save a wizard file, press either the *Save as..* or *Save* -button. Format of wizard file is *.aqwz. Wizard file includes all essential settings related to differential protection, including phase CT, neutral CT, connection direction, transformer and characteristic settings. Transformer back-up protection has to be set separately. Also breaker connections and I/O connections (matrix) has to be set manually by using AQtivate 200.

3.4 OPEN WIZARD FILE

To open an existing project, press the *Open Project*-button. Choose *.aqwz file and click “Open”. AQtivate –and wizard files are fully separate and has to be stored and opened separately.

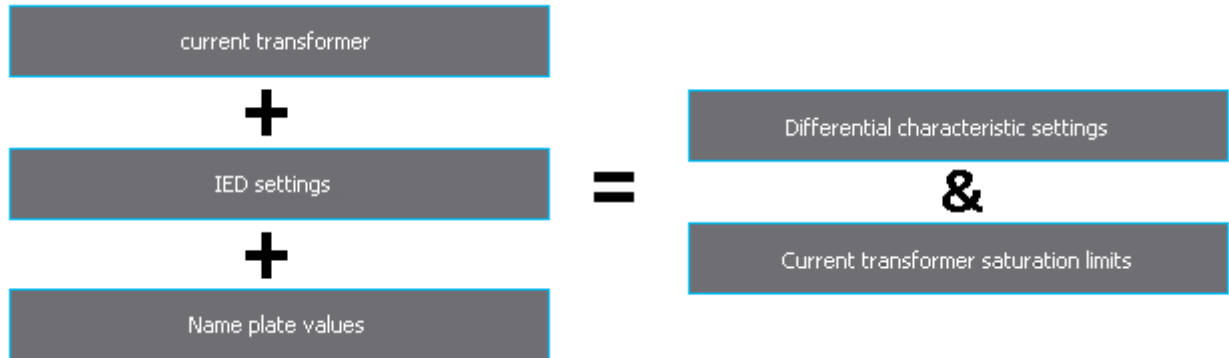
3.5 WRITING WIZARD-FILE SETTINGS TO A DEVICE

To write an .aqwz-file to a relay, click *Write values to the relay* –button. Notice that connection to the relay has to be established. When finished *Write data to the relay complete* –information screen appears. Click *OK* to proceed.



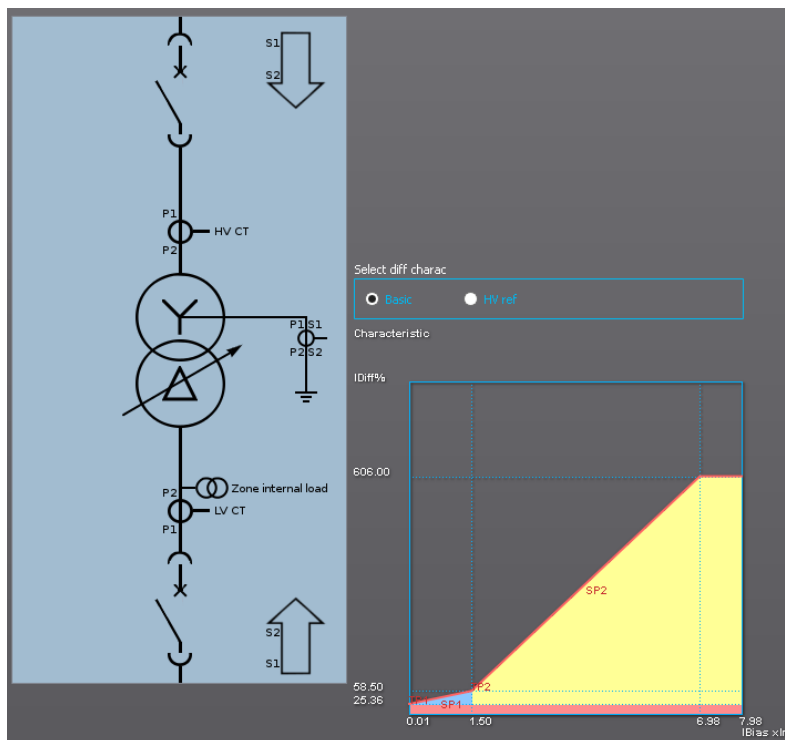
4 ABOUT TRANSFORMER WIZARD

Basically transformer wizard calculates certain output result based on given input values. When combining together transformer name plate values, current transformer information and certain relay settings parameters the output gives calculated differential characteristic settings and current transformer saturation limits.



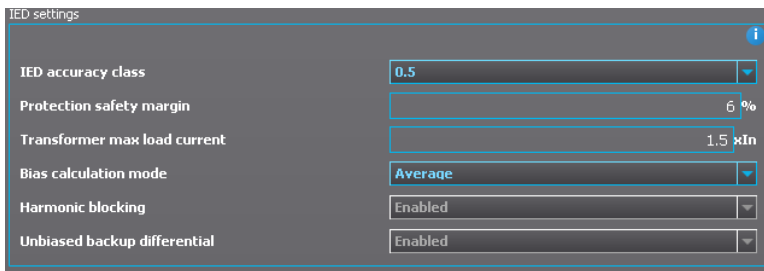
4.1 SCHEMATICS AND OTHER VISUALIZATION

The wizard has separate schematic view which follows the application settings. An idea of the schematic is to make it easier to comprehend the full picture of the protection. Also differential characteristic curve is visualized. It is possible to toggle between the basic differential characteristic and when used the REF1 and REF 2 characteristics.



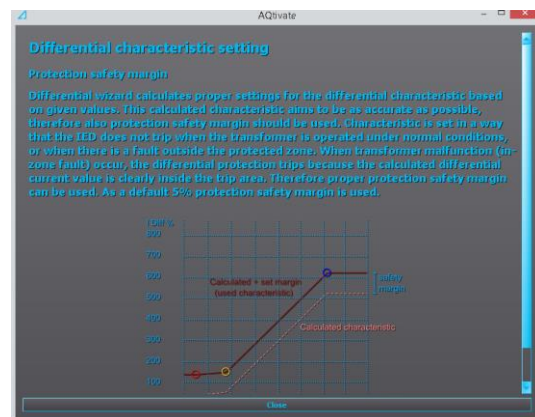
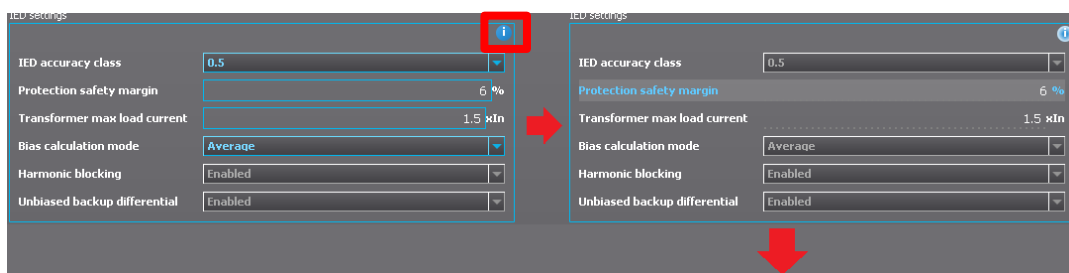
4.2 CHANGING SETTING PARAMETERS

All white and blue parameters can be changed. In case the parameter has grey background it cannot be changed. This kind of value is fixed and it is visible only for informative purpose. To change parameter value go on top of the box and click mouse left to open drop down box (blue values) or just type in new value and click enter (white values).



4.3 MANUAL / INFO VIEW

Each visible parameter has detailed description available. This function is called internal manual. To activate the info –view; go on top of blue/white info –picture located at the upper right corner of each setting section and click mouse left. While in information mode, go on top of any parameter and click mouse left to see the available information. In information view it is not possible to change setting parameters. To get back to the regular setting view, click the info –picture again.



5 CALCULATED VALUES

Transformer wizard calculates characteristic settings to the relays differential protection, but also some informative data as well. CTs nominal currents are calculated as primary and secondary values. Same applies to 3 –and 1 phase short circuit currents, but also values as per unit are calculated. Also CT saturation limits are presented.

5.1 CHARACTERISTIC VALUES

| | | | |
|---------------------------|--------------------|--------------------|--------|
| Turnpoint 1: Bias x In... | 0.01 / I diff %... | 25.36 / Slope1%... | 22.24 |
| Turnpoint2: Bias x In... | 1.50 / I diff %... | 58.50 / Slope2%... | 100.00 |
| Idi> Pickup: Bias x In... | 6.98 | Id> %... | 606.00 |

The full scale of differential characteristic values is presented among with the characteristic curve.

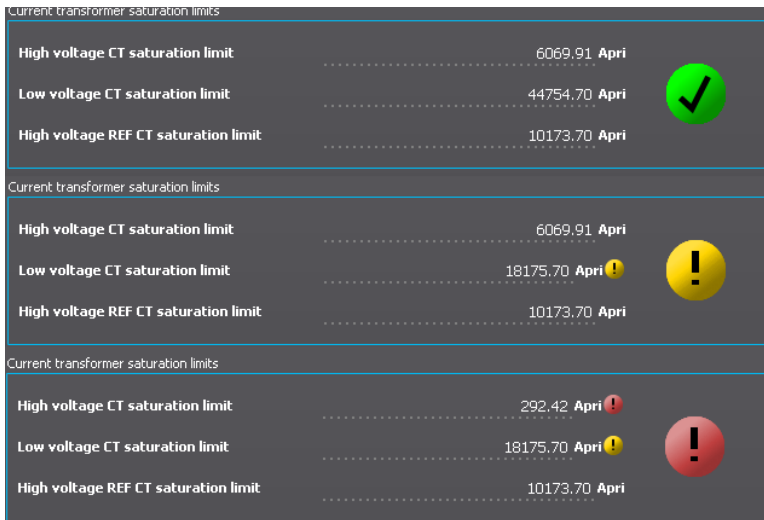
5.2 CT VALUES

| | | |
|-----------------------------------|-------------|------------|
| HV side nominal current | 306.2 Apri | 1.53 Asec |
| HV side maximum 3ph fault current | 2449.4 Apri | 12.25 Asec |
| HV side maximum 1ph fault current | 2701.8 Apri | 27.02 Asec |
| | | 27.02 xIn |




| | | |
|-----------------------------------|--------------|-----------|
| LV side nominal current | 1837.0 Apri | 4.59 Asec |
| LV side maximum 3ph fault current | 14696.2 Apri | 1.47 Asec |
| | | 8.00 xIn |

Calculated CT values include the following; Nominal currents as primary and secondary amperes. The maximum three phase short circuit current as primary and secondary amperes and per unit values (xIn). In star connected (Y) transformers also the one phase short circuit current as primary, secondary and per unit amperes is presented.

5.3 CT SATURATION LIMITS



The magnitude that the current transformers are able to reproduce is calculated based on given CT technical values. Also the wiring between the CT secondary and the relay plays a high role. Basically the CT functionality is categorized in to three levels;

| | |
|---|---|
|  | Sufficient. |
|  | CT may saturate and operation time might get delayed in big faults. |
|  | Unreliable. |

Wizard gives more information related to CT operation in all three conditions and also possible ways to solve the problematic situation.

6 REFERENCE INFORMATION

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