

CL-PRO FILER

THE SOLUTION FOR
COMMUTATOR AND
SLIP RING PROFILES

USER MANUAL



and its smart device, **DiaMeter**,

FOR MEASURING DIAMETERS
OF COMMUTATORS,
SLIP RING ASSEMBLIES,
ROLLING STOCK WHEELS...



merseN

CL-Profiler Operating Instructions

Safety Instructions

This device is safe and complies with the current regulations. If however it is used for purposes other than those intended, or operated by unskilled personnel, risk of serious / life threatening injury may occur!

Below instructions must be strictly followed:

1. Read enclosed documentation before using the device for the first time. All safety regulations included in the manual must be complied with.
2. Specially trained personnel only may operate this device. The customer must ensure that unauthorised personnel do not approach the machine on which the device is being used.
3. This device may only be used for the intended purposes.
4. The customer is not allowed to make any modification on the device unless prior written approval given by Mersen France Amiens.
5. The device must not be used in case of deterioration or in case of lack of maintenance.
6. Mersen France Amiens may not be held responsible for any damage and/or injury if the customer does not fully comply with these safety instructions.

CL-Profiler operating instructions

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I. Introduction

CL-Profiler is an instrument that must be used in combination with a PC, laptop or mini-PC. The instrument records the movements of a probe as function of time.

CL-Profiler is usable for different profile applications but is specially developed for profiling commutators and slip ring assemblies.

II. Computer installation

1) Computer requirements

- Computer with Windows 2000, XP, VISTA or Windows 7.
- Minimum 100MB free disk space.
- Minimum 512MB RAM memory.
- One or two free USB ports. We strongly recommend not using a USB hub, since it will decrease the sensor performance (add noise).

2) Software installation

Connect the probe to the USB port AFTER installing the software!

Run the setup file which is provided on the CD or was downloaded from www.cl-profiler.com (see Downloads in the web site main menu). Once the installation is complete, the computer must be restarted.

The device is ready to be used.

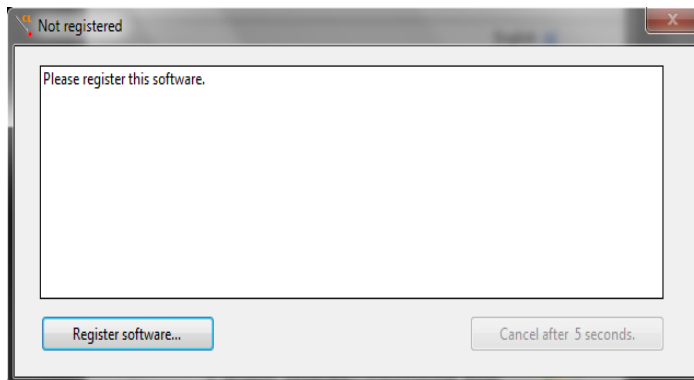
For users with administrator limitations:

- Connect the USB plug of the probe to the computer for activating the USB driver.
- Let Windows search for a driver.
- CL-Profiler is now ready to be used.
- The file "CL-Profiler" on C drive should not be limited.

III. Registration

To start the CL- Profiler software, click on the Windows start menu, go to “Programs” and select “CL- Profiler”. You can also use a shortcut on the desktop.

If the software is unregistered a pop-up will appear for registration:

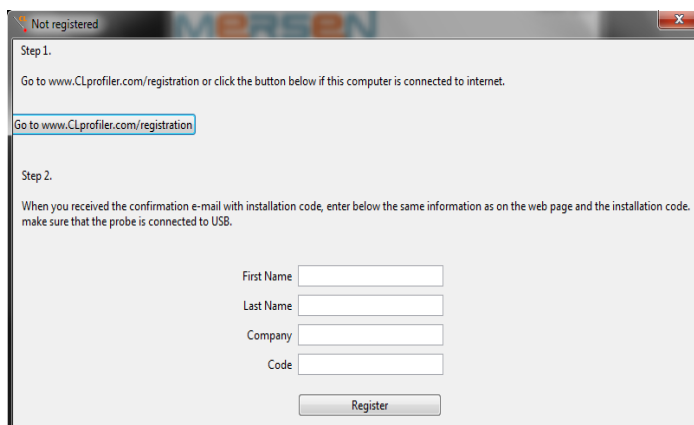


For registration, access to the Internet is required to obtain an installation code. This can be done on any computer. If you are unable to register at this time, you can click the “Cancel after xx sec” button. The tab will change to “Register later”.

To obtain an installation code, click the “Register software” button and go to: <http://www.cl-profiler.com/registration.aspx>

Enter all the information elements requested on the web page. The registration site will send the installation code to your e-mail address.

Once you’ve received the installation code by e-mail, click the “Register software...” button, the window underneath will appear:



Enter here your personal information (exactly the same as on the web page), and make sure the CL- Profiler is connected to the computer. When all fields are complete, click “Register”.

Note: the registration is based on your personal information and the CL-Profiler serial number. When connecting a different CL-Profiler, registration must be done again.

IV. Software use

To start the CL-Profiler software, click on the Windows start menu, go to “Programs” and select “CL- Profiler”. If installed, you can also use the shortcut on the desktop.

The main screen looks as follows:



1) Language selection

Select your language via the drop-down list located above Settings. If your language is not listed, contact Mersen France Amiens to check if it can be made available.

2) Settings

Click “Settings” to open the menu.

a - General

Set your preferences.

Click the “BACK” button to leave Settings.

Click “Show registration” to check on whose name the software is registered to.

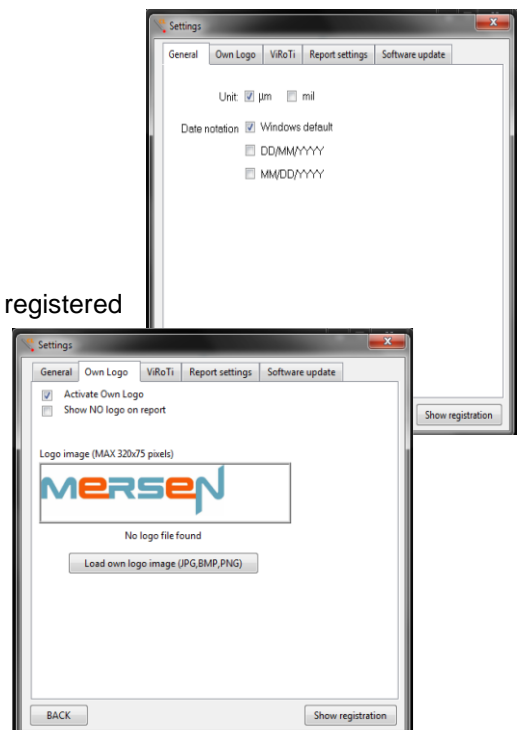
b - Own logo

Click the tab: “Activate Own Logo”.

Here you have the possibility to personalize the software with your own logo. This logo appears on the main menu and the reports.

Check the box “Activate Own Logo”.

Load your own logo by clicking “Load own logo image (jpeg, bmp, png)”.



Make sure the logo image does not exceed following measurements: 320 x 75 pixels.

If no logo is required on the report, check the box “Show NO logo on report”.

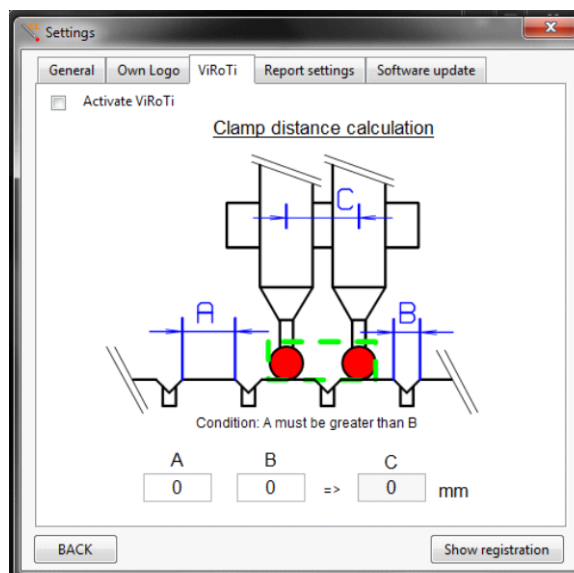
c - ViRoTi

ViRoTi stands for **V**irtual **R**oller **T**ip and is used to profile grooved slip rings and commutators.

(Please check Chapter 7 on page 12 for more information).

To use the ViRoTi tool, click "Activate ViRoTi".

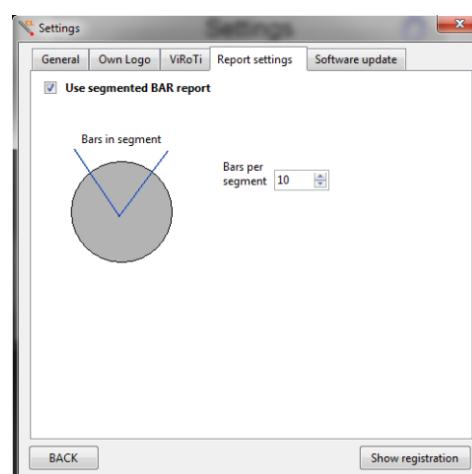
In field A (bar without chamfer) & B (groove width including chamfer) fill in the distances to let the software calculate the necessary distance for your clamp (C).



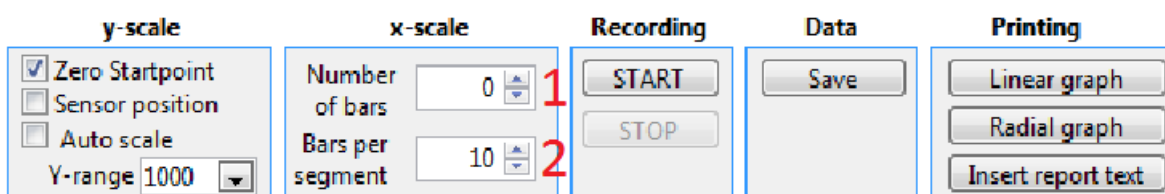
d - Report settings

In this window the amount of bars in a segment can be specified in which the biggest peak to peak occurs.

Check the box "Use segmented BAR report", use the arrow keys to specify how big the segment has to be in the drop-down menu, or just simply by entering a value into the box.

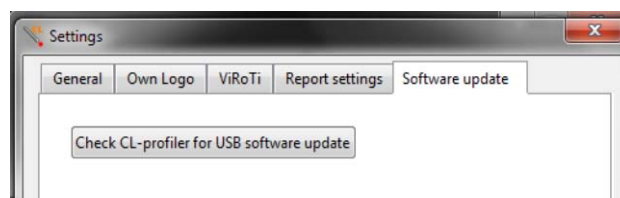


In the bar to bar window the bars per segment (2) will show up. Remember that this box will only show up if you click the box "Use segmented BAR report" in the Report settings.



e - Software update

To update the software of your probe(s), click "Check CL-Profiler for USB software update". If necessary the probe will automatically update.

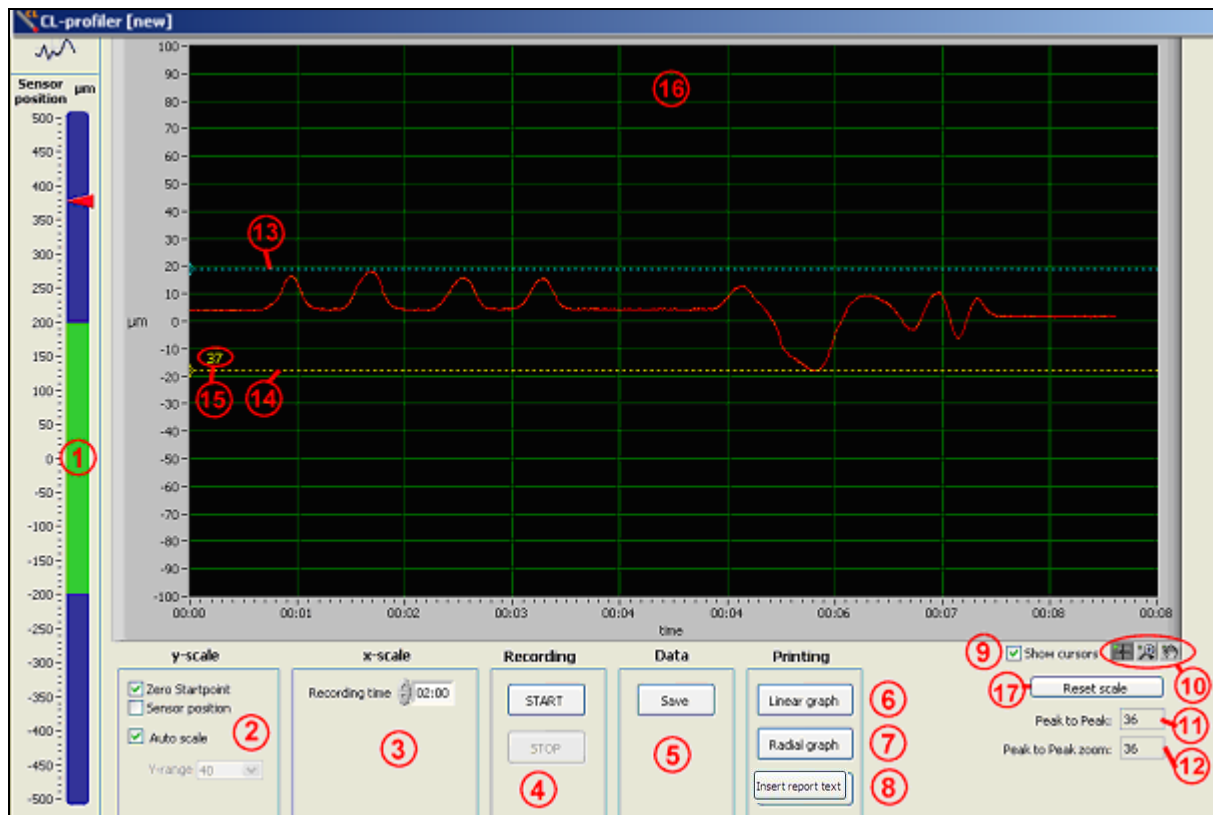


ATTENTION: do not disconnect the probe during updating. This could cause irreversible damage to the software.

At the bottom of the settings window there is a "Show registration" button. Click this button to show the registration information of the probe.

3) Linear measurement

Click "Linear measurement" to open the linear measurement screen:



a - Slider

On the left side, the slider (1) indicates the current location of the sensor, in the centre or at the end of the range. The scale will become narrower when the middle point (zero) is approached. It is better to move the sensor close to the zero point where it has lower noise.

b - Y-scale

There are several settings for setting the Y-scale (2). Select "Zero Startpoint" or "Sensor position" (is absolute value). "Zero Startpoint" will use the start point as zero value when recording starts. When recording stops, the y-scale will be adjusted so that the zero point is centred between maximum and minimum. Auto scale will make the scale of the graph (16) fit to the running measurement. If auto scale is disabled, one can select the range of the Y-scale by means of the menu "Y-range".

c - Recording

The recording time (3) determines how long the signal will be recorded. A running measurement can always be interrupted with the "STOP" button (4).

To start or stop recording, click the "START" or "STOP" button (4). When recording is busy, a red blinking indicator is shown on the bottom right hand side of the screen.

d - Save data

When a measurement is finished, it can be saved with the “Save” button” (5). A new window will pop-up which allows you to enter some additional information about the measurement (machine name...). Also note that the scale information element is saved together with the data. If one zooms into a part of the graph (see picture in paragraph f below), that scale position is also saved.

e - Printing

For the linear measurement there are two reports available, the “Linear graph” (6) and the “Radial graph” (7). These reports can be printed or saved as jpeg files so that they can be included in your own reports. Make sure a printer is installed before attempting to print.

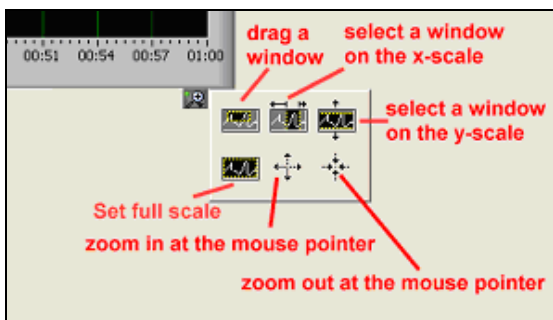
Measurements can also be transferred to a different computer with a USB stick.

Before printing it is possible to add additional information that belongs to this measurement by clicking “Insert report text” (8). This is the same text as in the pop-up window when saving the data.

f - Graph

The graph (16) shows the current measurement. It is possible to zoom in on a part of the graph. It allows for example to take only that piece of the X-scale that contains useful data. For example, if two rotations of a device under test are recorded, you can zoom into a part so that you get the data of only 1 rotation. When printing, only the part in which you were interested will be printed.

The ZOOM tools are located above (10). Click on the magnifying glass to see new options appear:



Click button (17) “Reset scale” to reset the scale as it was before modification.

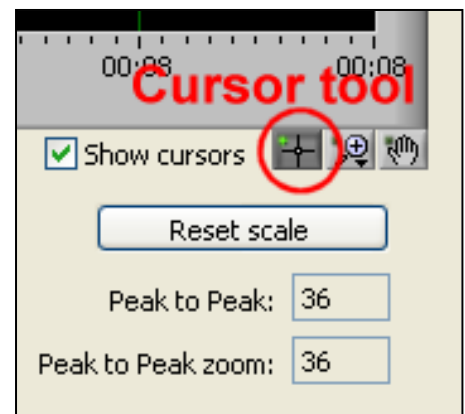
The peak to peak indicator (11) shows the difference between maximum and minimum of the whole curve. The “peak to peak zoom” indicator (12) shows the difference between maximum and minimum of the zoomed area (as in the example).

g - Cursors

When activating the selection “Show cursors” (9), two cursor lines will show on the screen: a blue (13) and a yellow (14) horizontal line. They are useful for determining the difference between 2 points. The number (15) at the yellow cursor shows the difference.

To move the cursor lines, first select the cursor tool in the zoom palette, then move the mouse over the blue or yellow cursor and click on to grab. Drag it up or down.

The cursors will also be shown on the reports.

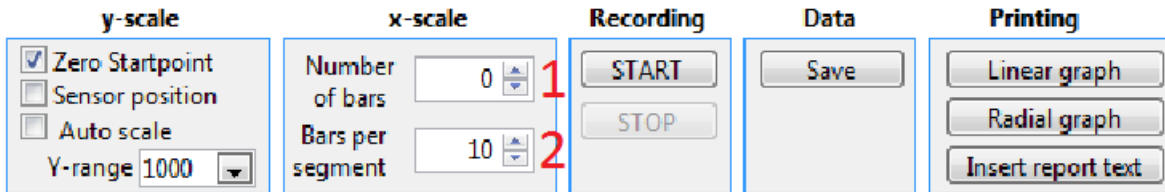


4) Bar to bar measurement

On the main screen click button (3). A new window will show, looking very similar to the previous paragraph.

“3) Linear measurement”.

The difference is explained below:

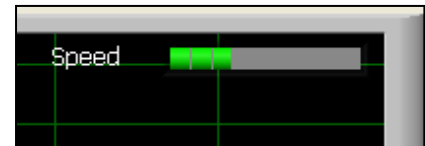


(1) Instead of recording time there are settings for “number of bars”.

(2) This box shows up if you check the box “Use segmented BAR report” in the settings, report settings menu. The highest peak to peak per segment will be displayed. The bars per segment can also be changed.

While recording, the software tries to detect the bars by the peaks that appear when the sensor jumps down between two successive bars. It is important that the rotor speed is not too high to be able to measure these peaks and bar values correctly. Limit the rotation speed to a maximum of 30 bars per second. An indicator on top of the graph will show the speed. It is green when the speed is OK, orange when it gets high and red when it is too high. If the speed is too high, it will be impossible to save the data because the result is not reliable.

During recording, the graph shows the real time sensor value, which also includes the peaks between the bars.



Once recording is finished, the software will try to find the bars and show one value for each bar. The curve is then converted from a flowing line to a step-wise presentation, where each step represents a bar.

In the bar to bar measurement there are also 2 reports available, the Linear and Radial report. The bars can be represented in a circular plot (radial) or in linear fashion.

5) Open saved measurement files

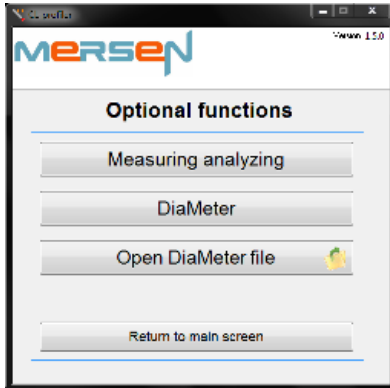
On the main screen, click “Open measurement file” to open data that was previously saved.

When the data is shown, it is represented in the graph exactly as it was when it was saved. The whole graph is included in the data, also if one zoomed in, into a smaller part of the graph when it was saved.

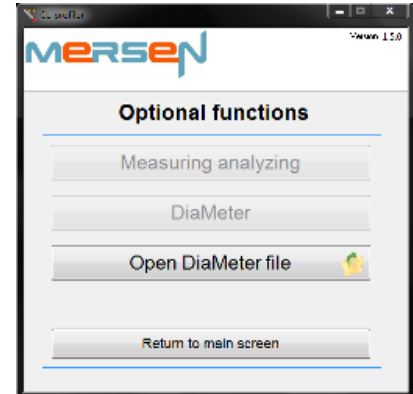
The tools and reports are the same as in previous paragraphs.

6) Optional functions

Here you can select additional software. You will need to receive a registration key to obtain access to the extra software.



If the registration key is not entered, the optional functions will be greyed out.

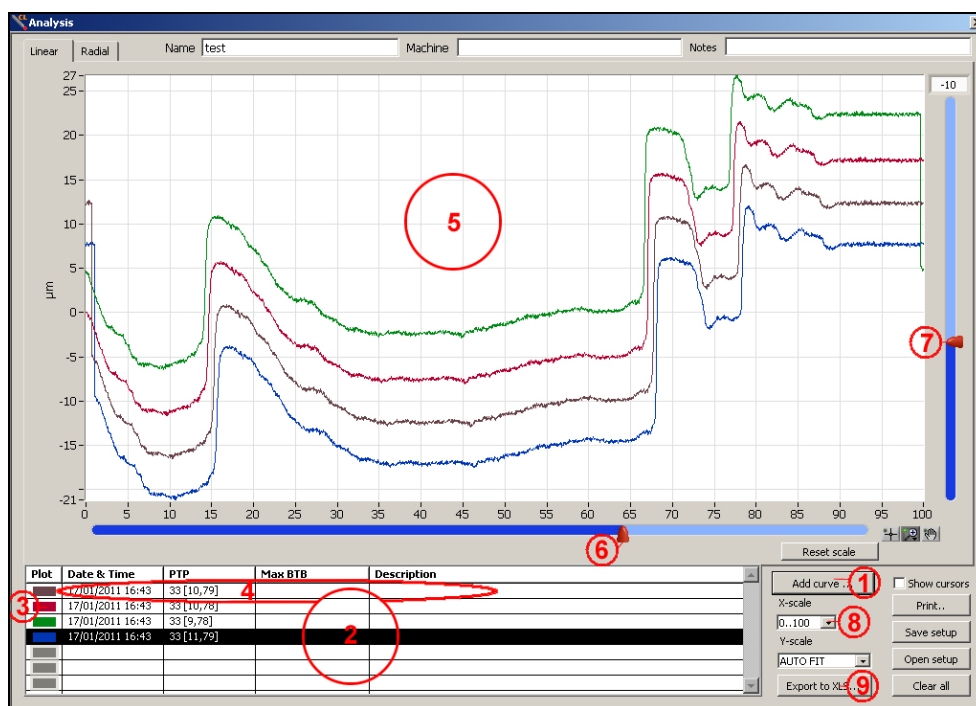
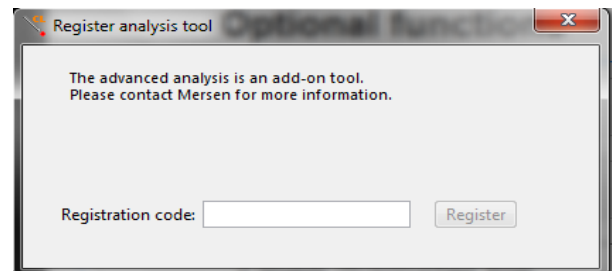


7) Measuring Analysing

This software contains extra add-on functions for analyzing and comparing recorded curves.

a - Registration

Click "Optional functions" in the main screen. The first button is the additional analysis software. Fill in your analysis registration code and click "Register" to access the additional software.



b - Add Curves

Click 'Add curve' (1) to add new curves. They will appear in the small window on the left (2).

You have the possibility to add up to a maximum of 10 curves.

You can change the color of your curve [click (3)] and change the description or remove the curve by double clicking the curve's information zone (4).

c - Curve's position

You can change the curve's position in window (5) by selecting the specific curve in window (2) [click to select], and then adjust the sliders (6) and (7). This way we can for example compare a previous measurement with a more recent one at the same starting point.

d - X-Scale

The X-scale (8) can be adjusted to view in percentage, bars, length and degrees.

e - Export to Excel

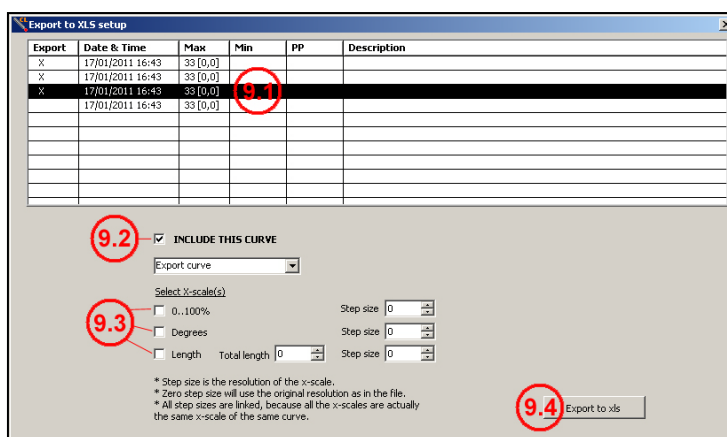
Another additional feature in the 'measuring analyzing' function is exporting your measurements to an Excel-file. This can be obtained by clicking the "Export to xls" button (9).

An "Export to xls setup" window pops up, in which you can select the curves you would like to export to Excel.

Select a curve (9.1) and check the "Include this Curve" box (9.2) to export the relevant curve.

"Select X-scale" (9.3), gives you the option to export your curve(s) in percent and/or degrees and/or length.

Once exported to xls (9.4), you can create an automatic Excel format to calculate the different measurements in your curve(s). In this way you can systematically judge your curve(s) state.

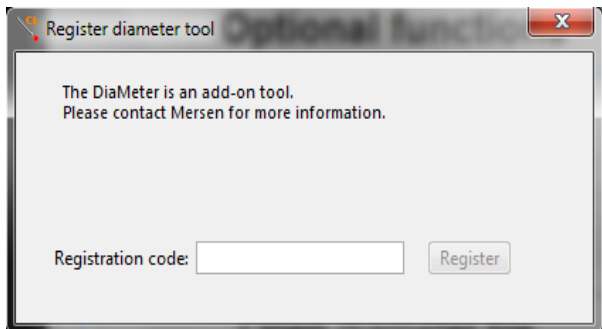


f - Other buttons

The remaining buttons have similar function as explained in chapter (IV)

8) DiaMeter

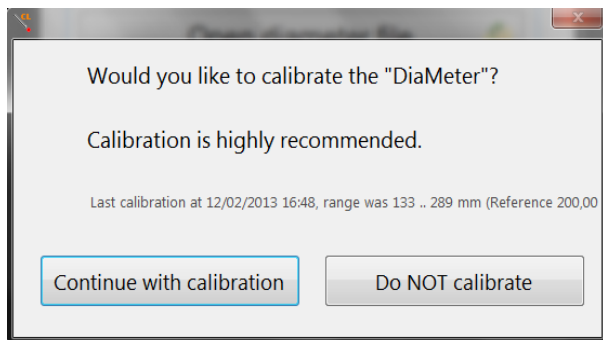
a - Registration



Click "Optional functions" in the main screen. The second button is the DiaMeter software. Open it and fill in your obtained registration code.

Fill in your DiaMeter registration code and click "Register" to access the additional software.

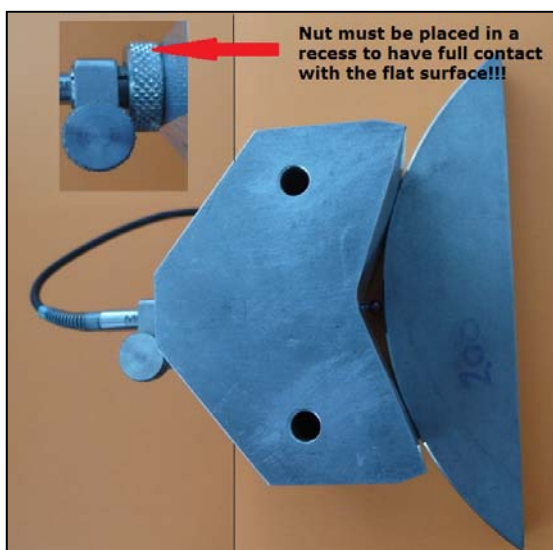
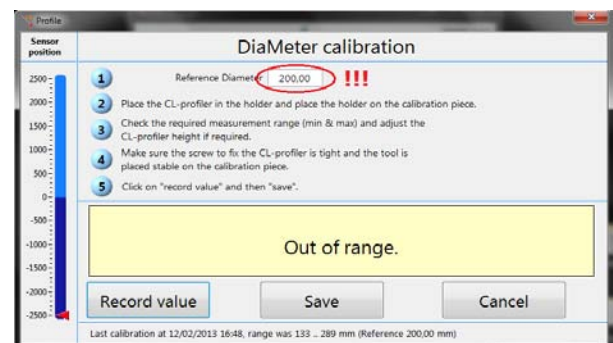
b - Calibration



You will be prompted with a question to calibrate the DiaMeter probe. Calibration is not always necessary, but to achieve the best results it is recommended to calibrate the probe every time before use. Click "Continue with calibration" to start the calibration process.

Next screen will show in order to start calibration.

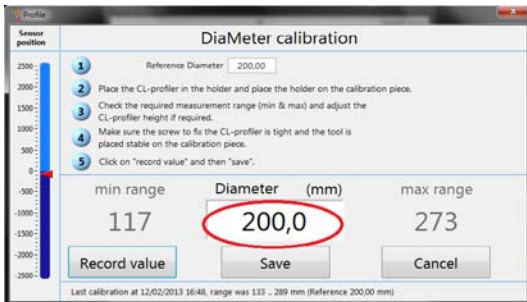
Insert the measurement of the calibre in the above red-circled box. To obtain the best accuracy it is possible to create your own calibre.



Put calibre and DiaMeter on a flat surface like in the picture on the left.

Mind the round nut on top of the DiaMeter. It is slightly bigger, and therefore should be placed in a recess to have good contact with the flat surface of the DiaMeter.

Click "Record value", and the diameter of the calibre will appear in the middle box as in the example below.



Click “Save” to continue, and the saved settings will be applied.

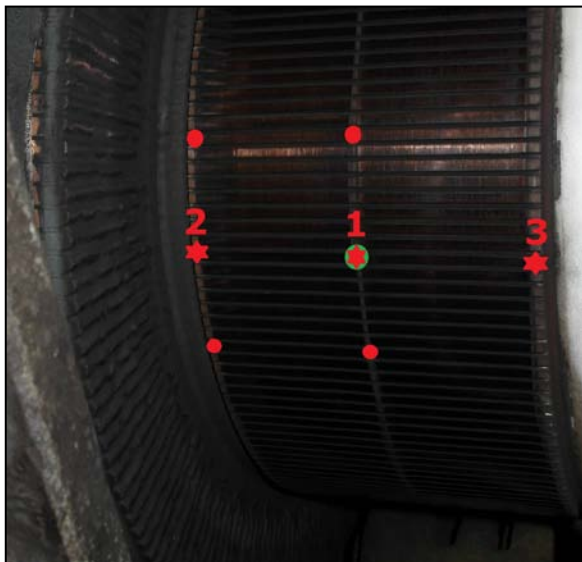
If you do not want to calibrate, click “Do NOT calibrate” and confirm your choice in the next window. (Not recommended.)

It is possible to create your own calibre with a diameter closer to the diameter to be measured. This can provide more accuracy.

c - Measuring the diameter

To measure the commutator, the DiaMeter needs to be placed on an unworn structure. The red circles show the 4 outer corners of the DiaMeter. The red stars show the positions of the probe in numbered order of preference.

Possibilities of placing the DiaMeter on the commutator:



Possibility 1:

This is the preferred position. There is a clear view on the ruby tip.

The middle ring (1, red star) is used to measure with the probe, and ring (2) is used to support the DiaMeter.

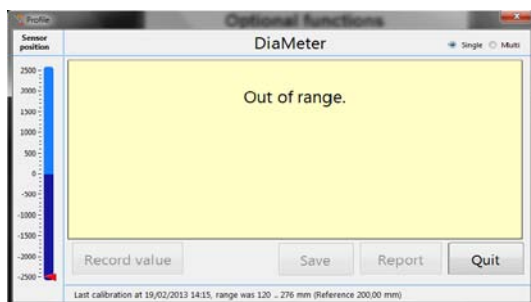
Possibility 2:

Probe towards vanes: here is less visibility on the ruby tip. If you do not see the ruby tip touching the bar, look at the measurement displayed in the diameter field. The measurement will drop drastically when the probe is in a mica groove.

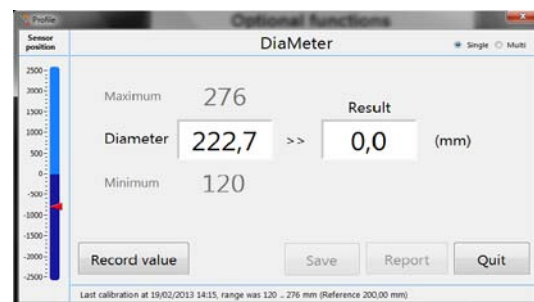
Possibility 3:

On the bearing side: this is the last option. Sometimes there are small burrs from flashovers (Traction motors!).

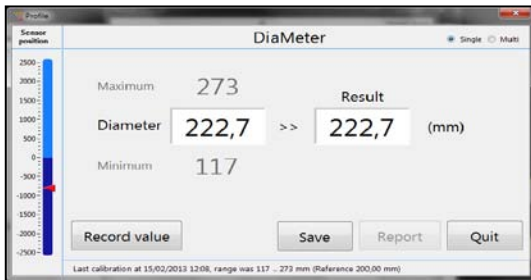
Never measure the diameter in a worn brush track!



No reading



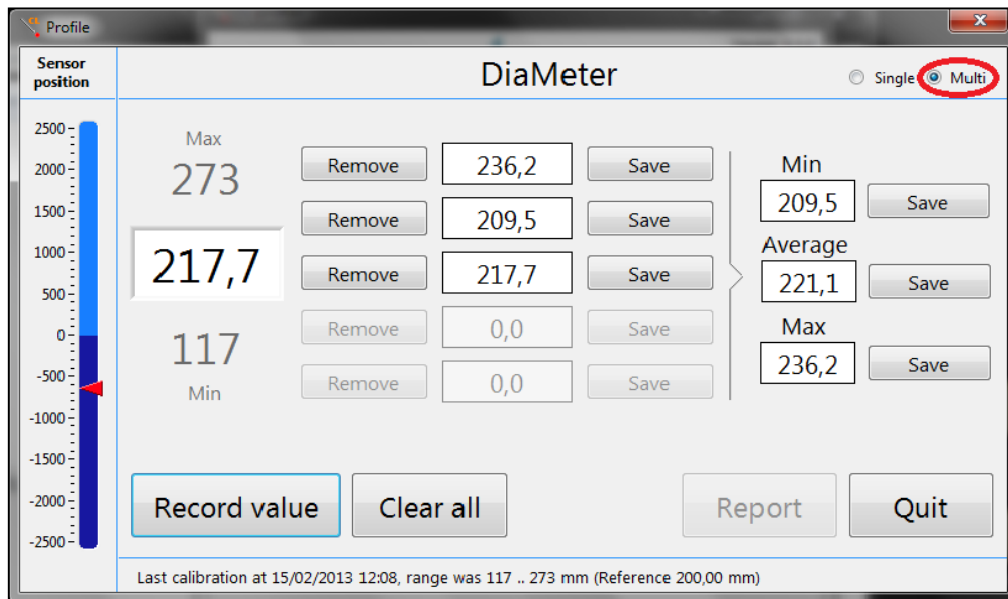
Measuring diameter



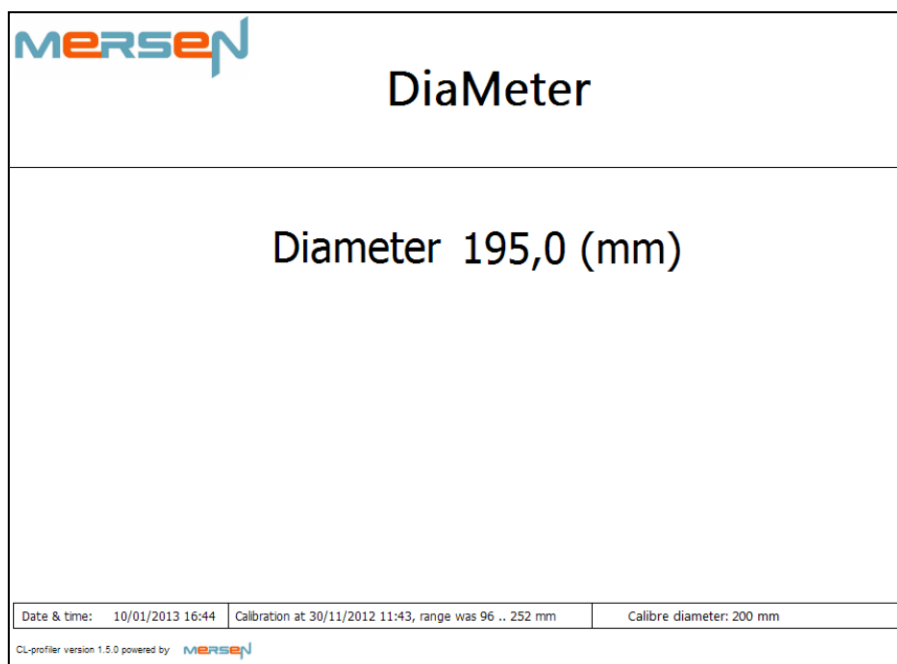
When the readings stabilize, click “Record value” to freeze.

Click “Save” to store the readings at a specific location on your device.

By selecting “Multi”, it is possible to create multiple recordings with averages, each recording can be saved accordingly.



After measuring, a report can be made by pressing the “Report” button.



9) ViRoTi Tool

ViRoTi stands for **Virtual Roller Tip** and is used to profile grooved slip rings and grooved commutators.

To use this tool you need:

- 2 free USB ports on your computer
- 2 CL-Profiler probes or one CL-Profiler and one ViRoTi probe

This function only works if the “A” measurement is wider than the “B” groove width, including the chamfers.

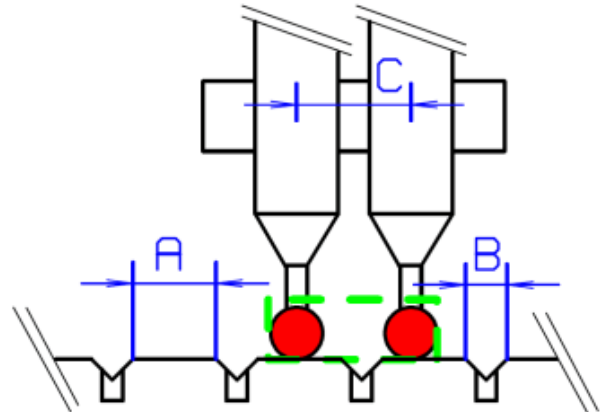
Note: Before using this tool you need to update the probe software. See chapter: (IV, 2) d - [CL-Profiler software update, a – How to use](#)

Place the probes radial or your commutator or slip ring, with a “C” axial distance.

To start profiling: both probes must be located on a flat surface of the slip ring or commutator, and not in a groove.

The “C” distance depends on the width between the bar without chamfer (A) and the chamfer groove (B). The “C” probe distance can be calculated using the ViRoTi calculator in the “Settings menu”.

See chapter (IV, 2) c – [ViRoTi Measurement](#)



Connect only the registered probe on your PC and start the CL-Profiler software.

Activate the ViRoTi tool by checking the “Activate ViRoTi” box in the “Settings menu”. A ViRoTi activation option will be added in your measurement window. When activating the ViRoTi tool in your measurement window, the software will ask you to connect the second probe on your PC.

After connecting the second probe on your PC you will see two needles (red and green) in your measurement window.

You can adjust the radial position of each probe separately, but it is not necessary that both probes are exactly identical. You can simply activate "zero start point" before starting profiling. The software will then place both probes on the same level independently of the physical position of the ruby tip positions.

Please note: for wide grooves or/and mica slots you use the 8 mm ruby tips on both probes.

V. Maintenance

Make sure the cable to the sensor and USB port is not damaged. Clean the sensor when necessary.

It is recommended that the probe is calibrated every two years.

VI. Warranty

The warranty covers construction and material faults of the CL-Profiler equipment.

The warranty period is valid for 1 year after invoicing.

Damage due to incorrect or inexpert handling is excluded from the warranty.

The CL-Profiler probe must be placed as radial as possible, especially if you profile the bars on commutators.

Angled probe position will cause damage.

To eliminate probe damage the ruby tip diameter must be:

- For mica slots: approximately 4 times larger than the full width of the mica slot including the chamfers.
- For spiral grooves: approximately 3 times larger than the full width of the groove including the chamfers.

VII. Technical data

- Interface: USB
- Dimensions: 8 mm diameter
- Weight: 0.1 kg
- Max operating temperature: 40°C
- Max storage temperature: 50°C
- Measurement range: +/- 2,5 mm
- Max variation speed to be measured: 120/40Hz
- Sample rate: 250 Hz
- Typical noise level: 0.5 µm
- Repetitive accuracy: +/- 0.25 µm
- Relative accuracy: +/- 1 µm
- Absolute accuracy at 20°C: +/- 2 µm

Contacts

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