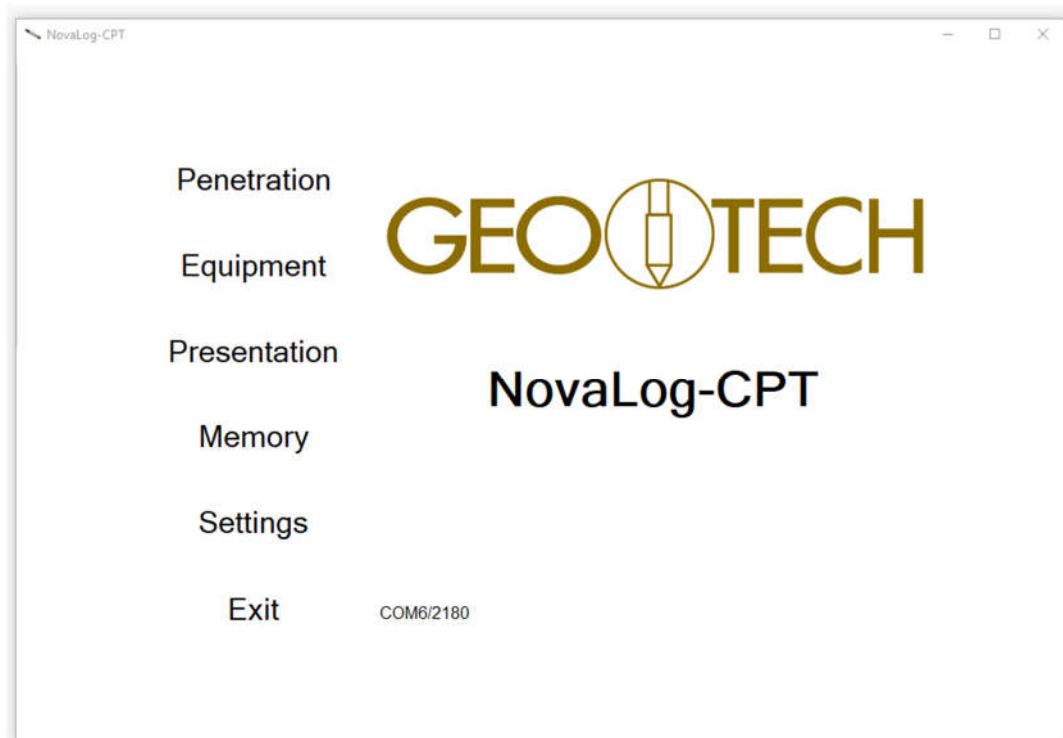




USERS MANUAL

CPT GEOTECH NOVA Logging software NovaLog-CPT



Ingenjörfirman Geotech AB
Datavägen 53
SE-436 32 ASKIM (Göteborg)
Sweden
Ph: +46 - 31 28 99 20
Fax: +46 -31 68 16 39

E-mail: info@geotech.se
www.geotech.eu

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DOCUMENT HISTORY

Date	Comment	Sign
2018-03-26	First version for review.	mcn
2019-09-09	Improved software functionality	mcn
2020-05-26	New pictures. Editorial changes.	mcn
2020-12-07	New pictures. Improves software functionality. New text chapters 1 and 2.	mcn

1 General Information

1.1 Foreword

This manual contains important information for the proper use and safe operation of the equipment

Read the manual carefully before you start operating the system. Also read the maintenance instructions before performing any maintenance work. The warranty from Ingenjörfirman Geotech AB is valid only if the instructions in this manual are followed.

Always keep the manual by the equipment and replace it immediately if it should become wholly or partially unusable. A new copy can always be ordered from Ingenjörfirman Geotech AB.

1.1.1 Content

The information in this publication is on the basis of information that was available at the time that the publication was written.

The information can change at any time. Ingenjörfirman Geotech AB reserves the right to change or update the content of the manual without prior notice.

1.2 Safety

The user must be alert to potential hazards. The user should also have the necessary training, skills and tools to perform these functions properly.

1.3 Intellectual property rights and terms of use

The NovaLog-CPT software, including all rights, is the property of Ingenjörfirman Geotech AB.

Unauthorised copying is prohibited.

Right to use the software for commercial purposes can only be licensed to named customer by owner of all rights, Ingenjörfirman Geotech AB. The right to use license (RTU) will give the customer permission to simultaneously use the software on one computer. The RTU must be recorded with an order number at Ingenjörfirman Geotech AB and confirmed by a paid invoice to be valid.

The software may be used for a limited time to demonstrate or validate functionality without a valid RTU. The software shall be uninstalled and removed after the test/validation period.

2 Product Information

2.1 General Description

GEOTECH NOVA is a modularly designed product family for geotechnical field investigations. The NovaLog-CPT software supports user-friendly, robust and accurate CPT, CPTU and Electric Conductivity CPT soil investigations. The software supports full-flow testing together with special hardware. The optional Seismic CPT (SCPT) will require an additional software for the measurement of shear wave velocity. A different software is required for Field Vane testing

The CPTU probes are designed for use on land as well as off shore, and give accurate measurements of cone resistance (q_c), sleeve friction (f_s), pore pressure (u) and inclination. Options for sintered pore pressure filters in u_1 and u_2 positions as well as slot filters are available.

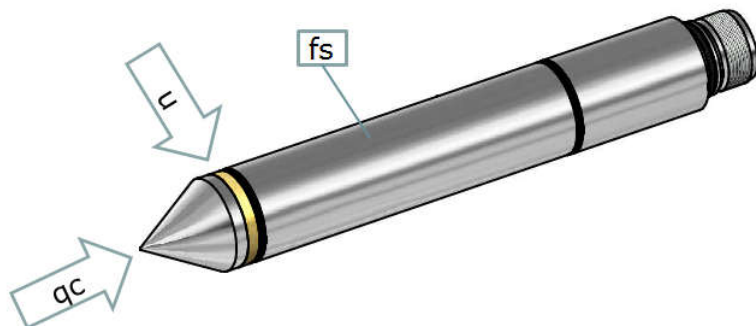


Fig. 1 – The probes are designed for use on land as well as off shore, and give accurate measurements of cone resistance (q_c), sleeve friction (f_s) and pore pressure (u) (figure shows pore pressure filter in standard position “ u_2 ”). In addition there is a built-in inclinometer and optional temperature sensor.

The equipment is available with wireless or cable-based communication from the probe to the surface equipment, facilitating full data transfer and near real-time presentation on the operator's screen. The equipment is also available with optional back-up memory with user-friendly data synchronisation.

The Geotech NovaLog-CPT software is to be installed on your computer and used for logging standard CPTU data from the CPT GEOTECH NOVA probe as well as optional sensors, e.g. for temperature, electric conductivity and total pushing force. Please note that separate (additional) software is required for Seismic CPT (SCPT).

2.2 Intended use

The system is designed for geotechnical site investigation, and may only be used for this purpose. All other use is prohibited.

2.3 System components overview

Item No.	Item	Illustration	Description
		Items comprising the right to use NovaLog-CPT	
200127	NovaLog-CPT		CPTU logging software. Right to use on one computer, licensed to named customer by owner of all rights, Ingenjörfirman Geotech AB. Logging computer not included. <i>Medium for delivery may change without prior notice.</i>
200197	Interface box with Geotech NovaLog-CPT software		Interface for data collection and connection to logging computer. Basic functionality. CPTU logging software included. Right to use on one computer, licensed to named customer by owner of all rights, Ingenjörfirman Geotech AB. “Stand alone” configuration. Approx. 1.2 kg.
200125	Interface box with Geotech NovaLog-CPT software and full-flow functionality.		Interface for data collection and connection to logging computer. Basic functionality and full flow functionality. CPTU logging software included. Right to use on one computer, licensed to named customer by owner of all rights, Ingenjörfirman Geotech AB. “Stand alone” configuration with additional “full-flow” functionality. Approx. 1.2 kg.

Item No.	Item	Illustration	Description
		COMPATIBLE EQUIPMENT (a few examples)	
		in the hole equipment:	
See separate list	CPTu Probe NOVA		Electronic probe for testing soil properties according to the CPT and CPTU methods. Measures soil data while being pushed through the ground, e.g. point resistance (q_c), sleeve friction (f_s) and pore water pressure (u). Diameter 36 mm. Approx. 1.3 kg. 15 cm² equipment available on request.
12451	Sound transmitter NOVA		Combined data transmitter and battery compartment to be connected to "Probe NOVA". Data is being transmitted as sound signal through the rod. Diameter 36 mm. Conical standard CPT thread (36 STD). Approx. 2.4 kg. 15 cm² equipment available on request.
12452	Sound transmitter NOVA 7/8 NOTE: SWEDEN ONLY		Combined data transmitter and battery compartment to be connected to "probe NOVA". Data is being transmitted as sound signal through the rod. Diameter 36 mm. Thread 7/8" for use with 32 mm rod. Approx. 2.4 kg.
10646	Adapter, cable CPT - NOVA		Cable adapter to be connected to "probe NOVA". Power supply and data transmission through the cable. Diameter 36 mm. Conical standard thread. Approx. 1 kg. 15 cm² equipment available on request.
19689	Electric conductivity sensor NOVA		Add-on sensor to the CPTu probe NOVA for measurement of electric conductivity / resistivity. Probe with 10 pole contact is required.

Item No.	Item	Illustration	Description
		NOVA surface equipment	
10661	Memory read out unit NOVA		Connect the Memory read out unit to the "probe NOVA" (use magnet for removing protection plug) and to the USB connection of your computer. Used for synchronising clocks and uploading data.
31719	Interface CPT, Total Force		Interface for data collection and connection to logging computer. "Stand alone" configuration with standard functionality and support for total force logging. Ask for separate document for description of Total Force stand-alone hardware. Approx. 1.2 kg.
10666	Interface drill rig		Interface for data collection, normally pre-mounted on Geotech multi-functional rigs. Interface for data collection and connection to logging computer. Standard functionality, including total force logging. Approx. 1.2 kg.
			<i>Please refer to separate documents for more information on hardware.</i>

The GEOTECH NOVA product family is being continuously developed and improved. We therefore reserve the right to changes of the information above.

3 Operation

Instructions below apply for full system with depth encoder and interface in real-time operation.

3.1 Preparation

Make sure to do all software installations “as Administrator”. Install the software on your computer (MS Windows 7 with .NET Framework 4.5 or later). Install driver.

Connect the interface and turn it on. Start up the program.

Preparations and initial setup can preferably be made at the office prior to going to the test site.

3.2 Main screen



You can see the NovaLog-CPT software version in the upper left corner.

Properties for connected interface when starting up the software are shown in the lower part of the screen. In example above:

- COM port number 6.
- Interface serial number 2178.
- Interface software version M232.

Choose function from the menu to the left.

3.3 Equipment

Select "Equipment" from the main menu.

The screenshot shows the 'Equipment' window with a back button (<) in the top left. The window is divided into three sections: 'Probe' (with a probe icon), 'Drilling Rig' (with a rig icon), and 'Conductivity Adapter' (with an adapter icon). Each section contains 'New' and 'Edit' buttons, followed by a dropdown menu.

Click "<" to return to "Equipment" window

3.3.1 Probe

Select "New" under the "Probe" headline in the "Equipment" window for registering properties of a new probe or select "Edit" to view or change properties of an existing probe. Refer to the specific Calibration Certificate for your probe.

The screenshot shows the 'Probe' configuration window. It includes a back button (<) and several sections:

- Serial Number:** A text input field, a 'Read' button, and a 'Calibration Date' dropdown set to '2020-08-25'.
- Range:** A section with three input fields for 'Point Resistance [MPa]', 'Local Friction [MPa]', and 'Pore Pressure [MPa]', all set to '0,0'.
- Scaling:** A section with three input fields for 'Point Resistance', 'Local Friction', and 'Pore Pressure', all set to '0'.
- Geometric:** A section with four input fields: 'Tip Area [cm²]' (10,00), 'Sleeve Area [cm²]' (150,00), 'Area Factor A' (0,000), and 'Area Factor B' (0,000).
- Other controls:** 'Save', 'Synchronize', 'Zero History', 'Dual Certificate' (toggle), 'Memory Probe' (toggle), 'Length' (input), 'Tilt Sensor' (1,00), and 'Temperature' (1,00).
- Delete:** A button at the bottom left.

If you are using a probe with memory function: Select "Memory Probe". Connect the probe to the logging computer via the "memory read out unit", item No. 10661 (19647 for EC probe). Click "Read".

If you are using a probe with two valid calibration certificates: Select "Dual Certificates".

Enter probe data from valid calibration certificate(s). Click "Save".

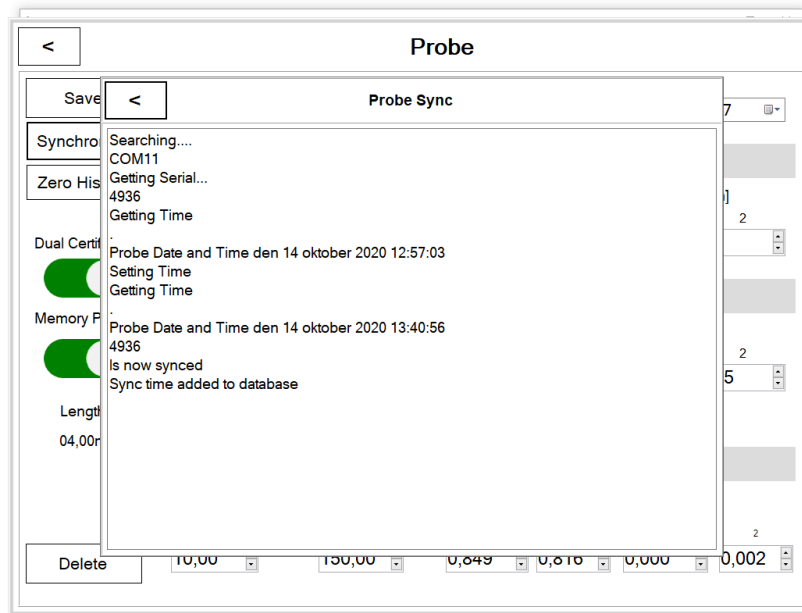
Example: Registering a new probe equipped with memory. Note that the internal clock of a Memory Probe must be synchronized with your logging computer at least once every week.

Example: Editing a memory probe with dual certificates. This is applicable for Q_c range 25 MPa probes with additional "Swedish class 0" calibration optimised for Q_c less than 8 MPa.

Click "<" to return to "Equipment" window

3.3.2 Synchronize

If you are using a probe with memory function, open the “Probe/Edit” window, click “Synchronise” to synchronise the probe clock with the clock of the logging computer. Note that the internal clock of a Memory Probe must be synchronized with your logging computer at least once every week.



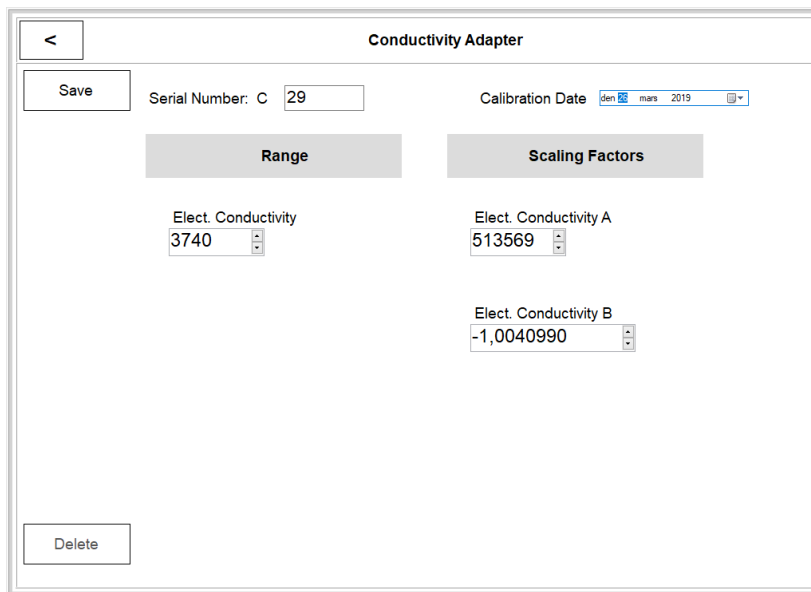
3.3.3 Zero history

In the “Probe/Edit” window, select “Zero History” to view results from previous “zero readings”.

Click “<” to return to “Probe/Edit” window

3.3.4 Conductivity Adapter

Select “New” in the “Conductivity Adapter” box in the “Equipment” window for registering properties of a new adapter or select “Edit” to view or change properties of an existing electric conductivity adapter.



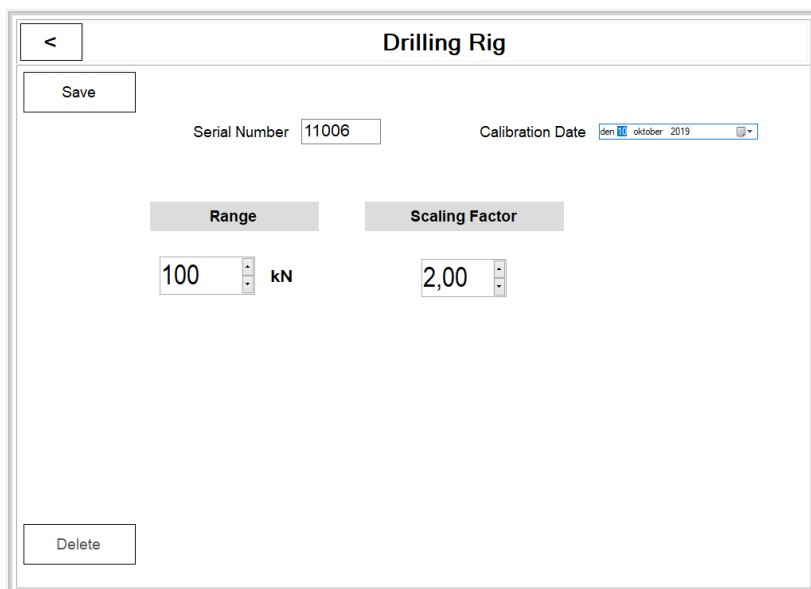
The screenshot shows the "Conductivity Adapter" window. At the top left is a back button "<". Below it is a "Save" button. To the right of "Save" are two input fields: "Serial Number: C" with the value "29" and "Calibration Date" with a date picker set to "den 26 mars 2019". Below these are two main sections: "Range" and "Scaling Factors". Under "Range", there is a label "Elect. Conductivity" and a value field "3740". Under "Scaling Factors", there are two labels: "Elect. Conductivity A" with value "513569" and "Elect. Conductivity B" with value "-1,0040990". At the bottom left is a "Delete" button.

Enter serial number and data from valid calibration certificate. Click "Save". Click "<" to return to "Equipment" window.

3.3.5 Drilling rig

This function is only applicable for site investigation rigs equipped with Geotech data collection system and "total force" sensor.

Select "New" in the "Drilling Rig" box in the "Equipment" window for registering properties of a new rig (or separate total force sensor) or select "Edit" to change properties of existing equipment.

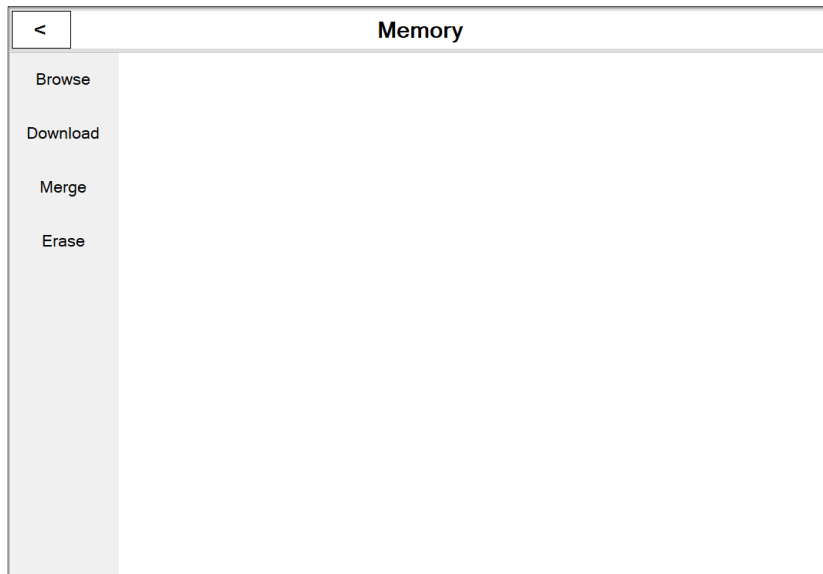


The screenshot shows the "Drilling Rig" window. At the top left is a back button "<". Below it is a "Save" button. To the right of "Save" are two input fields: "Serial Number" with the value "11006" and "Calibration Date" with a date picker set to "den 10 oktober 2019". Below these are two main sections: "Range" and "Scaling Factor". Under "Range", there is a label "100" followed by "kN". Under "Scaling Factor", there is a value field "2,00". At the bottom left is a "Delete" button.

Enter serial number and data from valid calibration certificate. Click "Save". Click "<" to return to "Equipment" window.

3.4 Memory

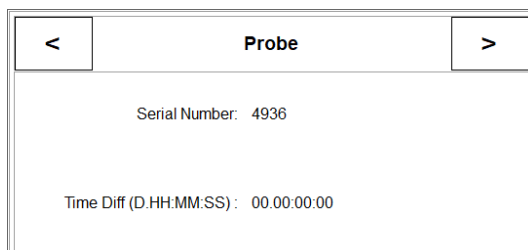
Connect the probe via the “Memory read out unit NOVA 10661” (19647 for EC probe). Select “Memory” from the main menu.



Click “<” to return to main window or select function.

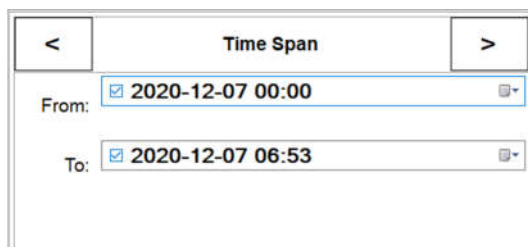
3.4.1 Download

Select “Download” from the memory menu to download stored logging data from the probe to the logging computer. Connect the



The connected probe will automatically be detected. “Time Diff” indicates difference between probe and logging computer before download/synchronisation.

Click “<” to return to “Memory” window or click “>” to continue.

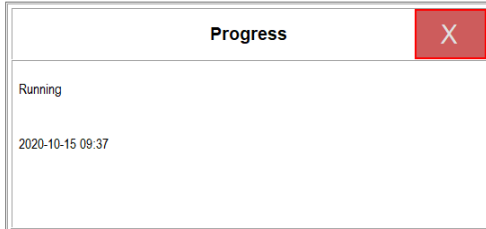


Select date and time for beginning and end of data to download. Note that boxes must be ticked to activate the filter. Download of full memory data might increase “Merge” processing time with several minutes.

Click “<” to abort and return to “Memory” window.

Click “>” to start downloading.

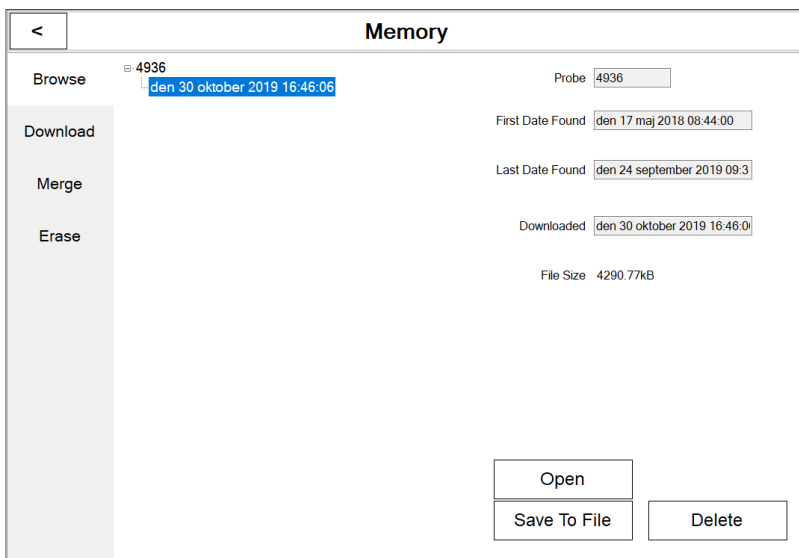
Memory data download may take a while.



Click “X” to abort and return to “Memory” window or wait until download is ready. The “Progress” window will be automatically closed when download is ready.

3.4.2 Browse

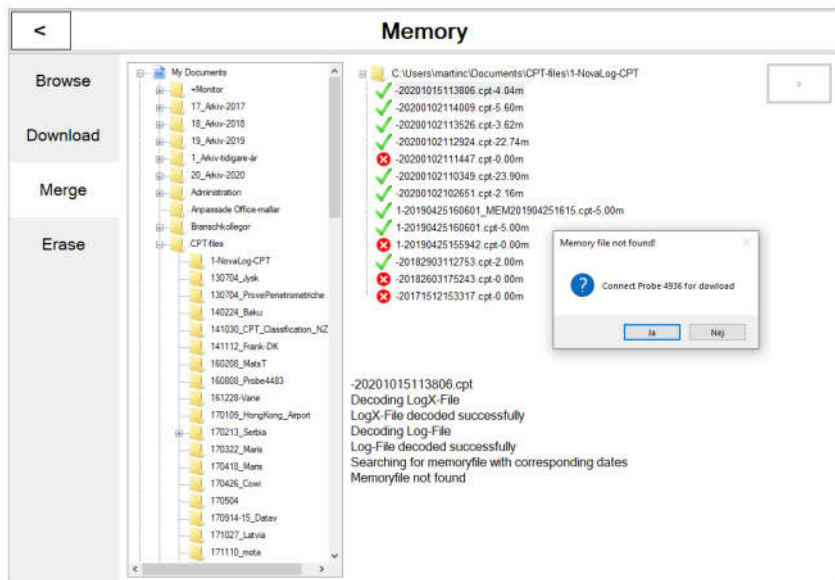
Select “Browse” from the memory menu to manage files. Here you can open/delete/save memory-files. Click “+” to expand files connected to your probe.



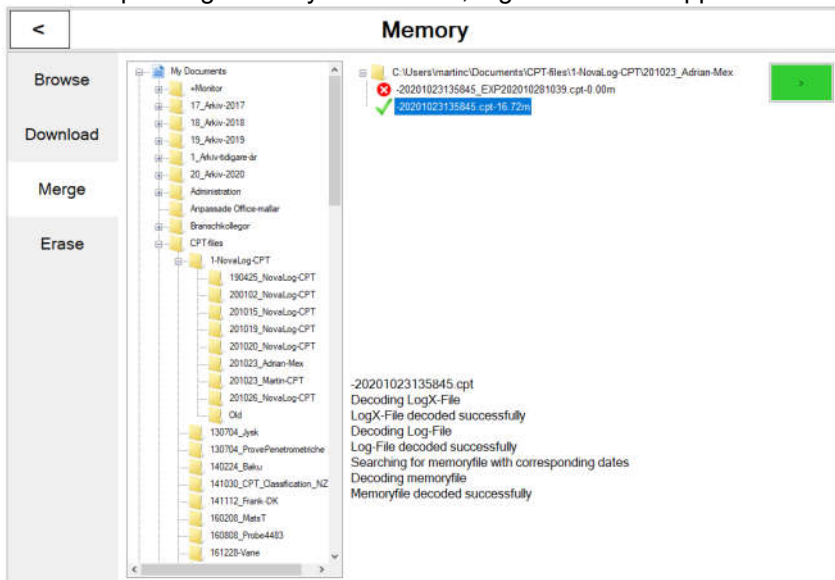
3.4.3 Merge

This function is used for merging a .cpt file in the computer containing time-stamped depth information with corresponding probe data from the probe memory. Select “Merge” from the “Memory” window. Select .cpt file to merge. The program will now search for a corresponding memory file in your computer.

If no such file is found, you will be asked to connect the probe. Confirm and you will automatically be directed to the “Download” function.



If a corresponding memory file is found, a green box will appear.



Click > to continue. Note that download of full memory data might increase “Merge” processing time with several minutes.



Click “Zoom Test” to show the relevant time window. Mark a square in the diagram to zoom in further.

Use the time offset boxes to manually adjust for a possible time difference between real-time data (Log) and data from the probe memory (Memory).



3.4.4 Erase

Select “Erase” from the “Memory” window to clear the memory of the connected probe. Click “<” to return. Click “Start erase”. Memory content will be permanently deleted.

<
Memory erase

Serial Number: 4936

Start erase

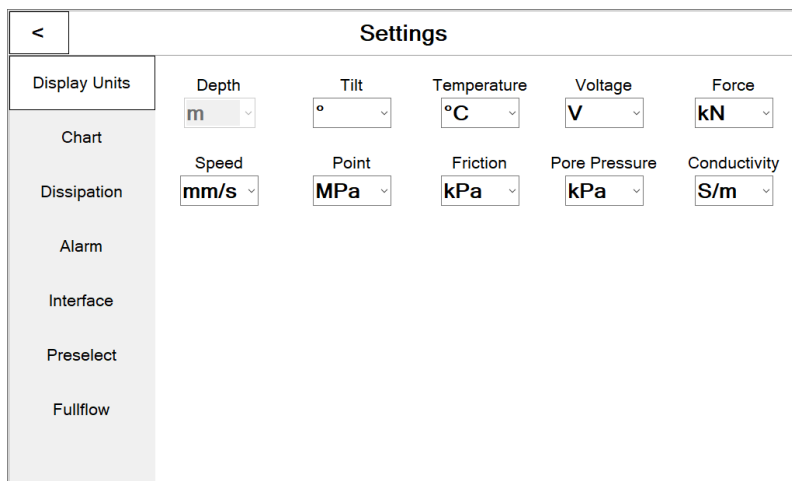
-

3.5 Settings

Select function or click “<” to return to main window.

3.5.1 Display units

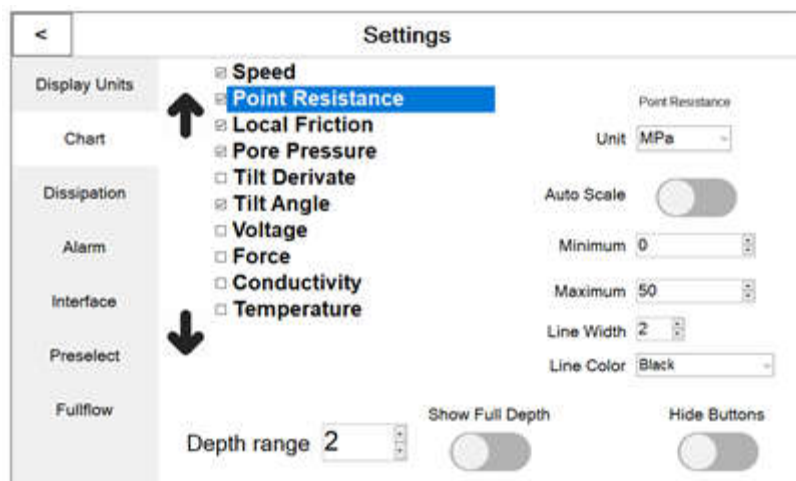
Select “Display Units” to set units for tables and boxes (not charts/diagrams).



The screenshot shows the 'Settings' window with a left sidebar containing menu items: Display Units, Chart, Dissipation, Alarm, Interface, Preselect, and Fullflow. The 'Display Units' menu item is selected. The main area displays various parameters with their corresponding units in dropdown menus: Depth (m), Tilt (°), Temperature (°C), Voltage (V), Force (kN), Speed (mm/s), Point (MPa), Friction (kPa), Pore Pressure (kPa), and Conductivity (S/m).

3.5.2 Chart

Select “Chart” to customise real-time graphs:



The screenshot shows the 'Settings' window with the 'Chart' menu item selected. The main area displays a list of parameters with checkboxes to select them for real-time graphs: Speed, Point Resistance, Local Friction, Pore Pressure, Tilt Derivate, Tilt Angle, Voltage, Force, Conductivity, and Temperature. To the right of the list, there are settings for 'Point Resistance' (Unit: MPa), 'Auto Scale' (toggle), 'Minimum' (0), 'Maximum' (50), 'Line Width' (2), and 'Line Color' (Black). At the bottom, there are settings for 'Depth range' (2), 'Show Full Depth' (toggle), and 'Hide Buttons' (toggle).

Tick boxes to select parameters to be shown as real-time graphs. Charts for parameters that are not available will not be shown even if selected.

Click on text to mark and use arrows to move parameters up/down (left/right in the graph). Select parameter and decide how it will be displayed as graph.

Depth range (common for all graphs): Select how many meters to be shown in real-time graph or select “Show full depth”.

Select “Hide buttons” to hide menu when pushing the probe (pushing speed > 0).

3.5.3 Dissipation

Select “Dissipation” to customise real-time graph for the dissipation chart.

Settings	
Display Units	Unit MPa
Chart	Auto Scale ☐
Dissipation	Minimum 0
Alarm	Maximum 2
Interface	Line Width 2
Preselect	Line Color Blue
Fullflow	Time Range (s) 500

3.5.4 Alarm

Select “Alarm” for setting alarm thresholds for change in pushing direction, point resistance and total force:

Settings	
Display Units	Alarm Interval [mm] 20
Chart	Tilt Derivate ☒
Dissipation	Sensitivity [mm] 50
Alarm	Limit [°/m] 30
Interface	Point Resistance ☒ 100,0 %
Preselect	Force ☐ 100,0 %
Fullflow	

The tilt derivate function will give you a warning for changes in pushing direction that might endanger the equipment. Lower numbers will increase sensitivity.

“Force” requires the presence of a separate total force sensor. Never activate “Force” alarm when only using the CPT probe.

Units for point resistance and total force are set as [MPa] / [kN] or percent of range for the equipment.

3.5.5 Interface

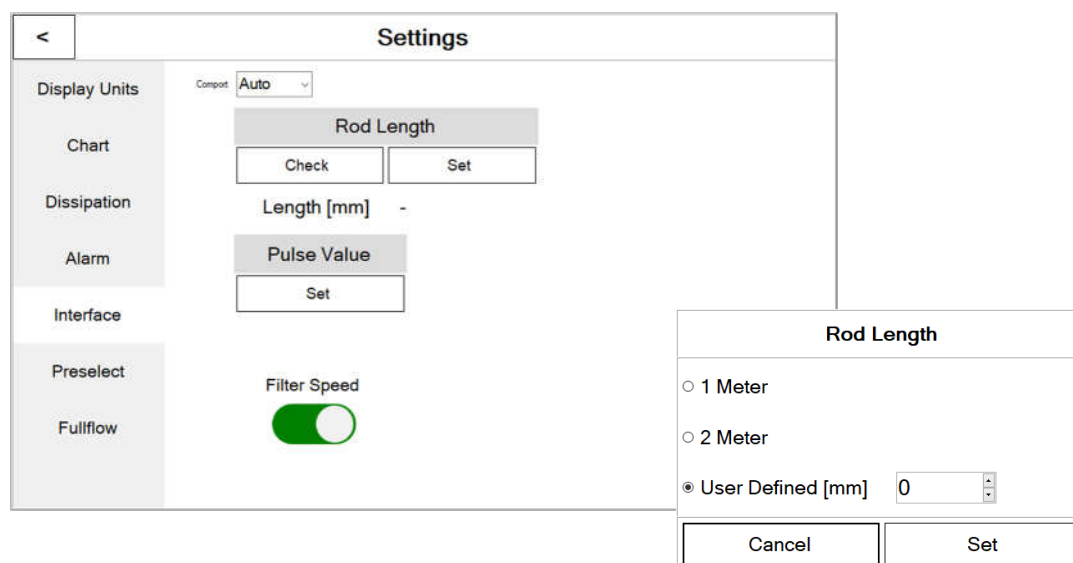
Select “Interface” for setting interface properties.

You may select logging computer com port (automatic detection is default).

Pre-processing of depth information is done inside the interface. Rod length setting is important when running the equipment in “top-pushing mode”. Click “Check” to read rod length from the interface. Click “Set” to change rod length. Enter new rod length and click “Set”.

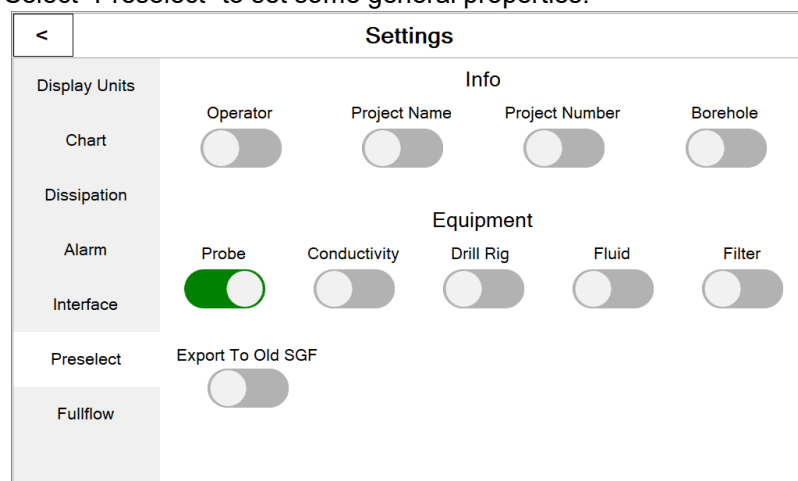
The software supports depth encoders with different numbers of pulses per meter. Ask us for the pulse value setting for your equipment.

Select “Filter Speed” to smoothen a too vivid real-time speed graph. This function could facilitate the pushing speed adjustment of your rig.



3.5.6 Preselect

Select “Preselect” to set some general properties.



Select information fields to be hidden or shown.

“Export to old SGF”: export data on previous Swedish standard.

3.5.7 Fullflow

Full-flow testing is normally performed to establish the sensitivity of soft sediments, using a probe with T-bar or ball-shaped tip. Data are recorded when pulling as well as pushing the probe. Select “Fullflow” to set properties for real-time graph during full-flow testing. Test results are delivered based on normal CPT probe properties.

Note that full-flow enabled interface and additional “right to use license” are required for full-flow testing.

<

Settings

Display Units

Unit

MPa

Chart

Auto Scale

Dissipation

Minimum

0

Alarm

Maximum

0

Interface

Line Width

2

Preselect

Line Color

Black

Fullflow

3.6 Penetration

Select “Penetration” from the main menu.

3.6.1 Preparing for a test

<
Info
>

Geographical

Surveying Position

X-Coordinate

Y-Coordinate

Z-Coordinate

Surveying Length

Right

Left

Height

General

Operator

Project Name

Project Number

Borehole

Casing Dimension

Offshore ☐ Yes ☒ No

Predrilling [m]

COM6-2178-M232

Continue Aborted Test

Here you may enter test information. It is possible to continue an aborted test. Select “Continue aborted test” and select file. Click “<” to return or click “>” to continue.

<
Equipment
>

Probe

Calibrated den 30 oktober 2019

Synchronized den 30 oktober 2019

Filter Position ☐ U1 ☒ U2

Filter Fluid

Filter Type

Certificate ☒ 1 ☐ 2

Drilling Rig

Calibrated den 10 oktober 2019

Range 100

Scaling Factor 2,00

Use Force ☐

	Range	Scaling Factor	Conductivity
Point Resistance	25	3335	Calibrated -
Local Friction	0,5	3762	Range -
Pore Pressure	2	3500	Scaling Factor A -
			Scaling Factor B -

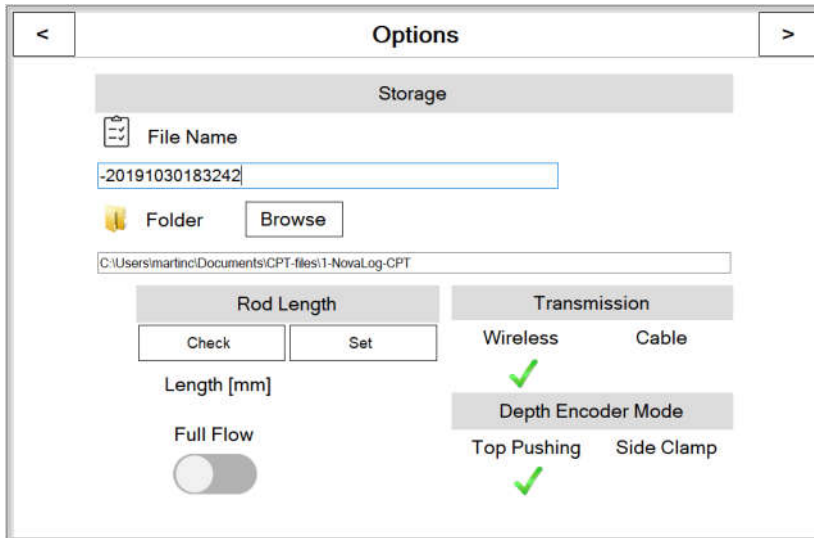
Select equipment. Red text indicates that clock synchronization of a memory probe is too old. You need to synchronize in order to continue. “Use Force” should only be activated if a separate total force sensor is present.

If your probe is equipped with memory, you may connect the probe to the logging computer via the “Memory read out unit NOVA 10661” (19647 for EC probe) to synchronize the probe clock with the logging computer clock. Click “Sync”.

Enter equipment details.

Click “<” to return to the “Info” menu or click “>” to continue.

3.6.2 Options



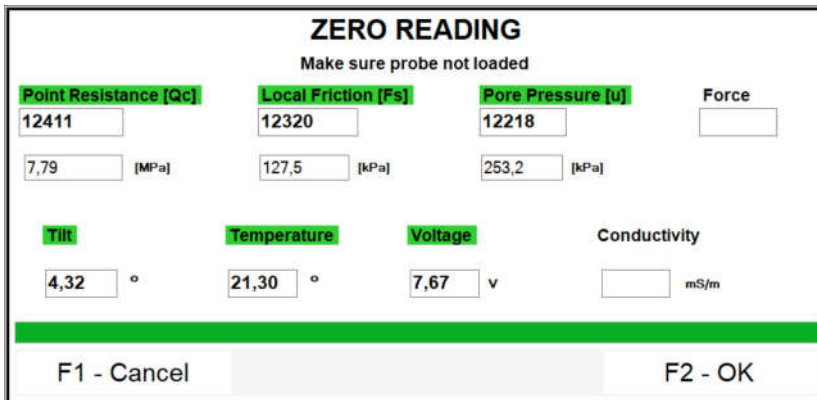
Enter options for the test.

Information about the length of rod segments is stored in the interface. Click “Check” to upload rod length from the interface. Click “Set” to change rod length.

Click “<” to return or click “>” to continue.

Refer to Appendix 1 for information on full-flow testing. Note that full-flow enabled interface is required for full-flow testing.

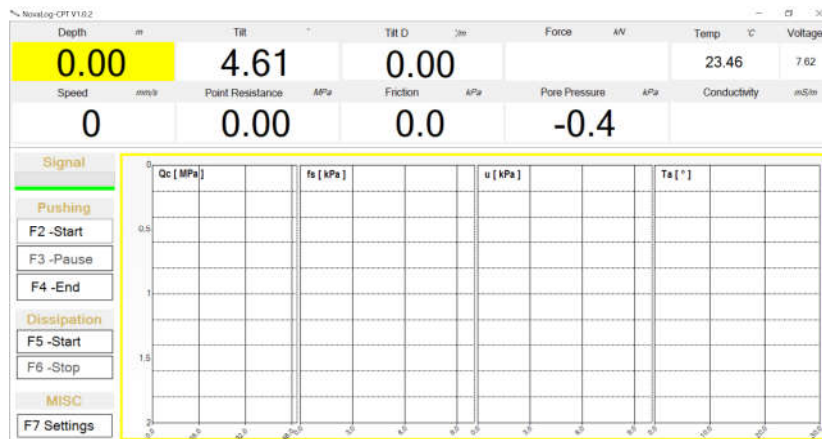
3.6.3 Zero reading before test



Acoustic system: Prepare the probe and connect it to the acoustic transmitter equipped with fresh batteries. Hold the transmitter against the receiver microphone without touching tip or friction sleeve. Click OK when numbers are stable.

Cable system: Prepare the probe and connect it to the interface via the cable adapter and cable. Hold it without touching tip or friction sleeve. Click OK when numbers are stable.

3.6.4 Performing a test

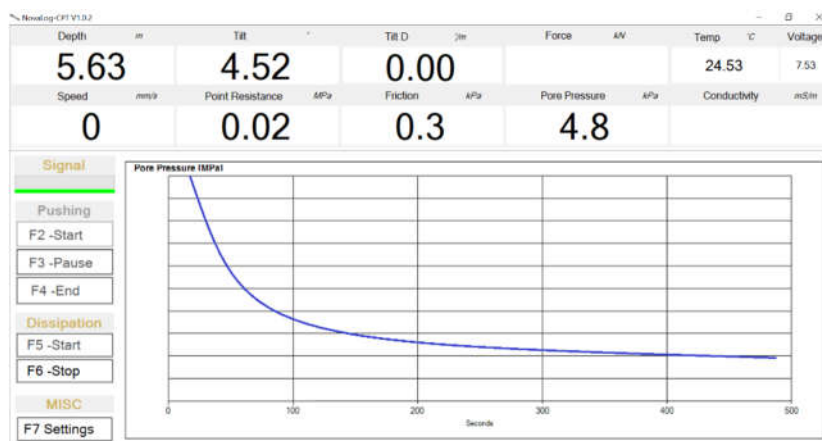


Put the probe in start position. Click “Start” and start the test.

To customise the diagram, select “Settings” and “Chart”.
Return to the penetration window by pressing “<”.



3.6.5 Dissipation test



Stop pushing at the desired level. Under the Dissipation headline immediately click “Start”. Wait until dissipation test is ready. Click “Stop”. Under the Pushing headline click “Start” and continue the CPT test.

3.6.6 End of test

Click “Pause” and pull up the probe. Click “End” and select “Stop” code.

Abort Test?

Stop Code

- 90 - The test ended without any stop in the ground
- 91 - Could not penetrate the soil any further
- 92 - Stop against a stone or a stone block
- 93 - Stop against a stone or a stone block or rock
- 94 - Stop against probably the rock
- 95 - Aborted
- 96 - Predetermined Depth
- 97 - Maximum Capacity
- 98 - Maximum Tilt
- 99 - Damaged Equipment

ZERO READING

	Point Resistance [Qc]	Local Friction [Fs]	Pore Pressure [u]	Force
1	-0,006 [MPa]	0,2 [kPa]	-0,2 [kPa]	[kN]
2	[MPa]	[kPa]	[kPa]	

F1 - Cancel F2 - OK

Acoustic system: Hold the transmitter against the receiver microphone without touching tip or friction sleeve. Click OK when numbers are stable.

Cable system: Hold the probe without touching tip or friction sleeve. Click OK when numbers are stable.

ZERO READING

	Point Resistance [Qc]	Pore Pressure [u]	Force
1	-0,006 [MPa]	-0,4 [kPa]	[kN]
2	[MPa]	[kPa]	

F1 - Cancel F2 - OK

Values shown are “delta” values that indicate the difference from zero values before test.

Unscrew the tip and make a second zero reading.

ZERO READING

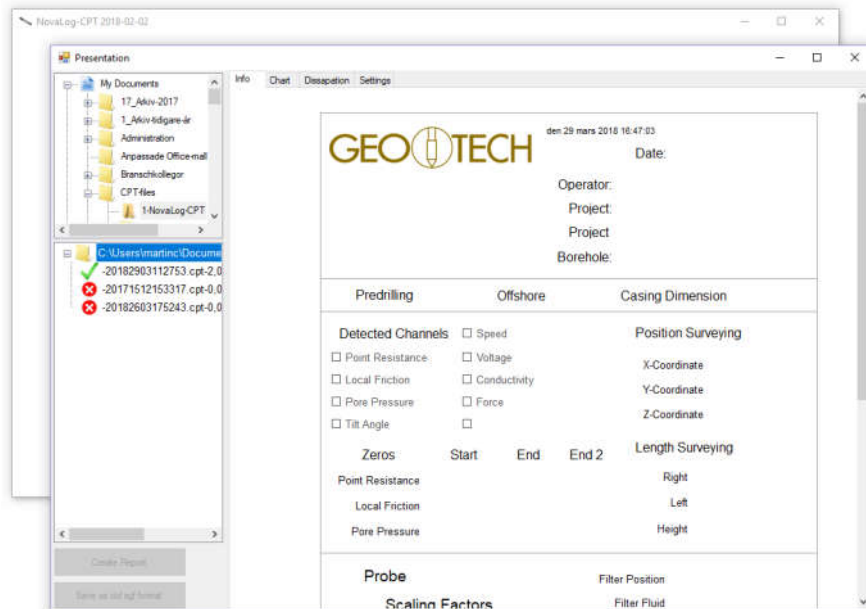
	Point Resistance [Qc]	Local Friction [Fs]	Pore Pressure [u]	Force
1	-0,006 [MPa]	0,2 [kPa]	-0,4 [kPa]	[kN]
2	-0,008 [MPa]	0,2 [kPa]	-0,5 [kPa]	

F1 - Cancel
F2 - OK

Click OK when numbers are stable. Values shown are “delta” values that indicate the difference from zero reading before test.

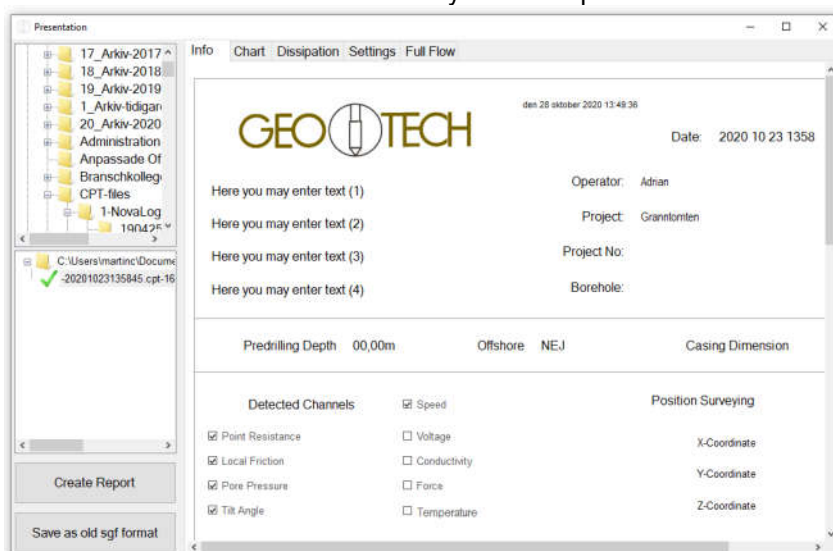
3.7 Presentation

Select Presentation from the main menu and select file:



3.7.1 Info

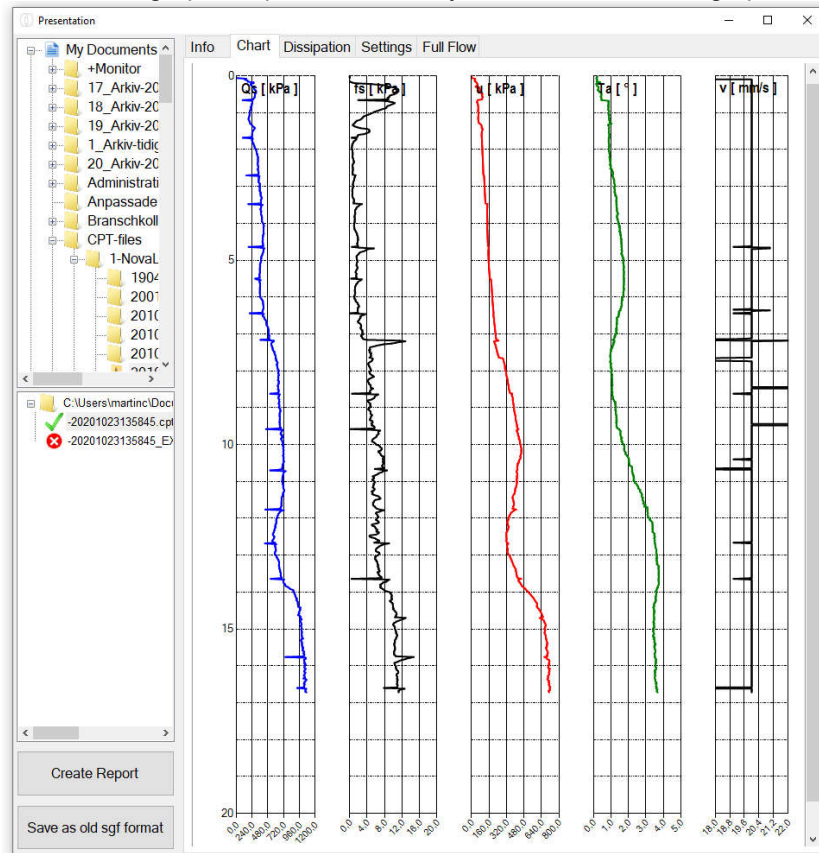
Preview information to be included in your test report.



Logotype and custom text in the left column may be changed under the “Settings” tab. Other texts come from the test file.

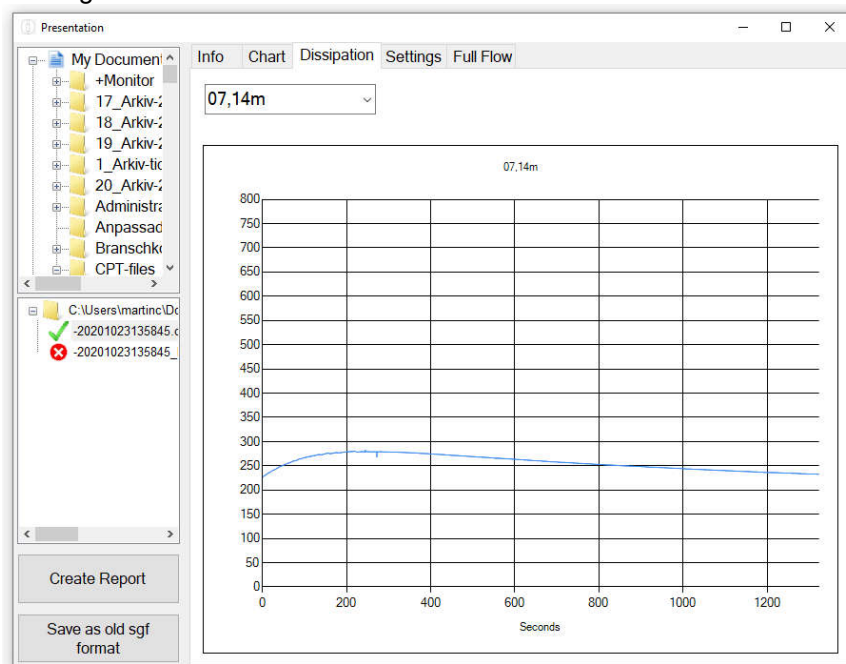
3.7.2 Chart

Preview the graphical presentation of your CPTU test. Change parameter under tab “Settings”.



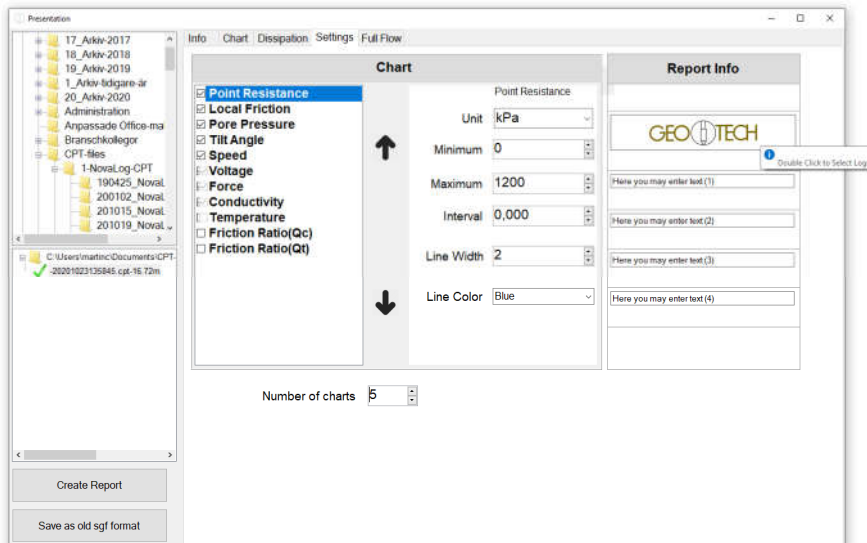
3.7.3 Dissipation

Select depth and preview graphical presentations of your dissipation test. Change parameter under tab “Settings”.



3.7.4 Settings

Here you can set properties for your CPTU test graphs. Select number of charts. Tick box to include parameter. Mark blue to edit settings.



Report Info:

Double-click to change logotype. You may enter optional texts to be shown on your report.

3.7.5 Fullflow

Chart: Preview the graphical presentation of your full-flow test.

Data: Preview and export full-flow test data.

Refer to appendix for more details.

3.7.6 Create report

Click "Create report" to preview your report. Tools for printing and saving on pdf format will be visible.

3.7.7 Save as old SGF format

Click "Save as old SGF format" to save a copy on the same format as CPT-LOG 5.22.

3.8 Exit

Click "Exit" to close the program.

4 Files

A complete CPTU test will generate a number of data files. Some of them are mainly for internal use of the system and will not be described here. In addition it is possible to manually export data on other formats. We welcome descriptions and suggestions for other formats.

Basic CPT-file (.cpt)

This file type is generated during a normal CPTu test. The format is based on Swedish Geotechnical Society Report 3:2012. Data is stored for every 20 mm pushing depth. Please refer to Appendix 1 for more information. The suggested file name is based on text entered in the “bore hole” box and time stamp at start of the test. The suggested file name of a merged file in addition has text “MEM” followed by time for merge. Files exported on other formats will have “EXP” followed of time forexport in their suggested file names.

Dissipation file (.dpt)

This file type is generated during dissipation test. The format is based on Swedish Geotechnical Society Report 3:2012. In addition to measurements at “Start” and “Stop”, data is stored with time stamp at change of pore pressure. Please refer to Appendix 1 for more information. The suggested file name is based on text entered in the “bore hole” box and time stamp at start of the test. The suggested file name of a merged file in addition has text “MEM” followed by time for merge. Files exported on other formats will have “EXP” followed of time forexport in their suggested file names.

FFL file (.ffl)

This file type is generated during “full flow” test with a T-bar or Ball-type probe. The format is based on Swedish Geotechnical Society Report 3:2012. In addition to measurements at “Start” and “Stop”, data is stored with time stamp at change of depth. The suggested file name is based on text entered in the “bore hole” box and time stamp at start of the test. The suggested file name of a merged file in addition has text “MEM” followed by time for merge.

Log file (.log)

Raw data from the interface with time stamps. Only for internal use of the software.

LOGX file (.logx)

Used for restoring aborted tests etcetera. Only for internal use of the software.

5 Installation and support

5.1 Installation

Normally the system is delivered without logging computer. A standard Windows computer is to be sourced locally by the customer.

Unzip the installation folder (if applicable) and run “setup.msi”. Ignore all warnings and click “yes”, “continue” or “finish” to questions from the Setup Wizard.

5.2 Contact information

For support and repair please contact:

Ingenjörfirman Geotech AB
Datavägen 53
SE- 436 32 Askim
SWEDEN

info@geotech.se
+46 31 289920

For customs reasons, please declare **serial number** of probes etcetera when sending equipment for service.

5.3 Trouble Shooting

The trouble shooting table below is not complete, nor subject to any quality assurance, and thus published as indication only. Please feel free to revert with additional questions and suggestions.

Indication Only: Please feel free to revert with additional questions and suggestions.		
Issue:	Finding possible causes:	Actions:

Notes

[illegible]

Appendix 1: Data format

A complete CPTU test will generate a number of data files. Some of them are mainly for internal use of the system and will not be described here. In addition it is possible to manually export data on other formats. We welcome descriptions and suggestions for other formats.

Basic CPT file

This format is based on Swedish Geotechnical Society Report 3:2012.

Main Block:

Code	Explanation	Comments
Dform	Data format standard (r3:2012)	Text
KP	Name and location for the project	Text
HJ	Work or project number	Text
HM	Method (107A=CPTU)	Text
KD	Date and time	yyyy mm dd hhmm
Person	Responsible drilling manager or measurement manager	Text
HK	Investigation point	Text
InMatn	Measuring-in occurs in other order	JA=yes, NEJ= no
HX, HY, HZ	Positioning measuring-in x, y, z	
HH, HV, HL	Length measurement	
H2OJobb	Job on pontoon	JA=yes, NEJ= no
HO	Pre-drilling depth	[m]
FoderDim	Casing dimensions, external/internal diameter	[mm]
FoderDj	Length, casing pipe	[m]
Rigg	Rig or total force transducer identity	
HN	Serial number of probe	

Method Block:

Code	Explanation
IG	Use class
FiPos	Filter location ($2=u_2$)
HI	Start time
AN	Home depth, probing
FiTyp	Filter type
FiLiq	Fluid in filter
IE	Tip area factor
IF	Friction area factor
MC	Cross section area [cm ²]
MD	Friction sleeve area [cm ²]
KQ	Calibration factor, tip
KF	Calibration factor, friction
KU	Calibration factor, pore water pressure
KT	Calibration factor, inclinometer
KO	Calibration factor, temperature

Data Block:

Code	Explanation	Unit
NA	Zero value before test, tip pressure	MPa
NB	Zero value before test, friction	kPa
NC	Zero value before test, Pore pressure	kPa
NA2	Zero value after test, tip pressure	MPa Δ
NB2	Zero value after test, Friction	kPa Δ
NC2	Zero value after test, Pore pressure	kPa Δ
NA3	Other zero value after test, tip pressure	MPa Δ
NB3	Other zero value after test, Friction	kPa Δ
NC3	Other zero value after test, Pore pressure	kPa Δ

D	Depth	m
QC	Tip pressure uncorrected	MPa
U	Pore pressure	kPa
FS	Local friction, uncorrected	kPa
TA	Inclination, absolute	degrees
B	Feed rate	mm/s
A	Feeding force	kN
M	Conductivity	S/m
O	Temperature	°C
BattVolt	Battery voltage	Volt
DatumTid	Date and time	yyyymmddhhmmss[ms][ms][ms]

Flags

F=11	Tilt derivative alarm
F=12	Point resistance alarm
F=13	Depth unchanged for 5 seconds
F=14	Transmission lost
F=16	Dissipation start

Stop codes

90	Interrupted without stop
91	Cannot drive further
92	Stop against stone or block
93	Stop against stone, block or rock
94	Stop against presumed rock
95	n/a
96	Predetermined depth
97	Max. capacity
98	Max. inclination
99	Equipment damaged

File example

```
$
Dform=r3:2012,KP=Granntomten,HJ=,HM=107A,KD=2020 10 23
1358,Person=Adrian,HK=,InMatn=,HX=,HY=,HZ=,HV=,HH=,HL=,H20jobb=NEJ,HO=0,
FoderDim=,HN=4936
£
IG=
,FiPos=2,FiLiq=,FiTyp=,IE=0.849,IF=0,MC=10,MD=150,KQ=3335,KF=3762,KU=3500,KT=
0.92,KO=1
#
D=0.000,QC=-
0.001,FS=0.00,U=0.17,TA=72.29,B=0,DatumTid=20201023140141114,NA=2.6803,NB=126
.8,NC=230.1,F=13
D=0.020,QC=-0.001,FS=0.00,U=0.17,TA=72.29,B=10,DatumTid=20201023140141114
D=0.040,QC=-0.001,FS=0.00,U=0.17,TA=72.29,B=15,DatumTid=20201023140141114
D=0.060,QC=-0.001,FS=0.00,U=0.17,TA=72.29,B=14,DatumTid=20201023140141114
D=0.080,QC=0.150,FS=-0.05,U=33.85,TA=0.97,B=0,DatumTid=20201023140414191,F=13
D=0.100,QC=0.129,FS=-0.05,U=33.40,TA=0.48,B=20,DatumTid=20201023140415357
D=0.120,QC=0.156,FS=-0.06,U=32.33,TA=0.17,B=20,DatumTid=20201023140416137
D=0.140,QC=0.177,FS=-0.05,U=28.52,TA=0.21,B=20,DatumTid=20201023140417305
D=0.160,QC=0.175,FS=0.15,U=38.95,TA=0.18,B=20,DatumTid=20201023140418088
D=0.180,QC=0.261,FS=0.47,U=43.85,TA=0.40,B=20,DatumTid=20201023140419254
```

Dissipation file

This format is based on Swedish Geotechnical Society Report 3:2012E.

Refer to definitions for the “Basic CPT file” above with the following exception:

HM Method (35=dissipation test)

Log file

For internal use only.

Memory file

For internal use only.

FFL file

Full flow data.

LOGX file

Used for restoring aborted tests etcetera. Only for internal use of the software.

File name format: xxxx.logx

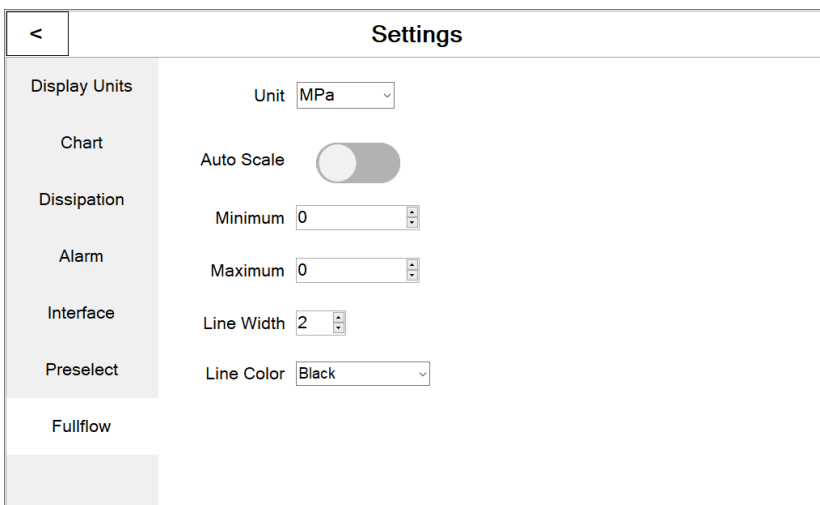
Appendix 2: Full-flow testing

Full-flow testing is normally performed to establish the sensitivity of soft sediments, using a probe with T-bar or ball-shaped tip. Data are recorded when pulling as well as pushing the probe. Select “Fullflow” to set properties for real-time graph during full-flow testing.

Note that full-flow enabled interface and additional “right to use license” are required for full-flow testing. The full-flow functionality is only available with wireless probes.

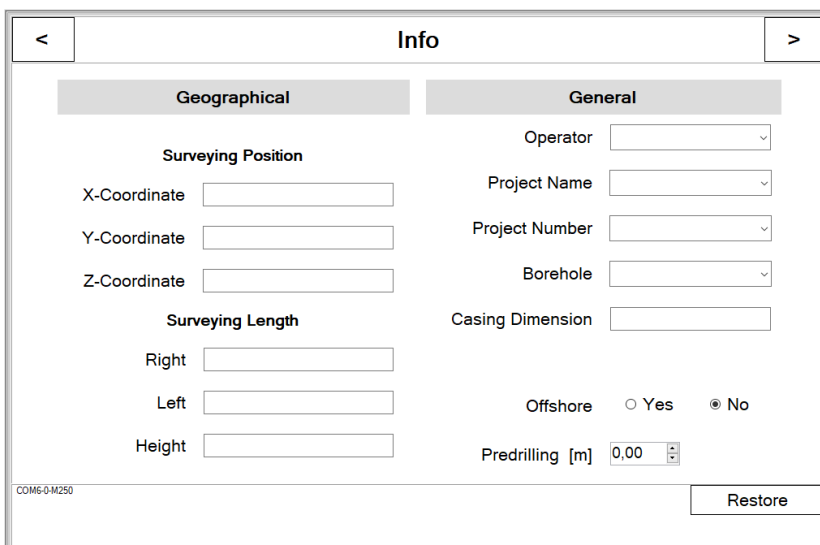
Data from your calibration certificate, including the geometry of the original standard probe must be entered before start of penetration.

Settings



From the main menu, select “Settings” and “Fullflow”. Here you can set properties for the graphical real-time presentation of your full-flow test.

Penetration



Enter test information. Click “<” to return or click “>” to continue.

<

Equipment

>

Probe

4936

▼

Sync

Drilling Rig

11006

▼

Calibrated

den 30 oktober 2019

Calibrated

den 10 oktober 2019

Synchronized

den 30 oktober 2019

Range

100

Filter Position

☐ U1
 ☒ U2

Scaling Factor

2,00

Filter Fluid

▼

Use Force

☐

Filter Type

▼

Certificate

☒ 1
 ☐ 2

Range

3335

Scaling Factor

▼

Conductivity

▼

Calibrated

-

Range

-

Point Resistance

25

Local Friction

0,5

Pore Pressure

2

Scaling Factor A

-

Scaling Factor B

-

Select equipment and click ">" to continue.

<

Options

>

Storage

File Name

-20201207082914

Folder

Browse

C:\Users\fredricn\Desktop\solve

Rod Length

Check

Set

Length [mm]

-

Full Flow

☒

Tip Area [cm²]

100,00

Transmission

Wireless

Cable

Depth Encoder Mode

Top Pushing

Side Clamp

Select "Full Flow".

Choose cross-section area of your ball or T-bar. Note that data from your calibration certificate, including the geometry of the original standard probe must be entered before start of penetration.

Click ">" to continue.

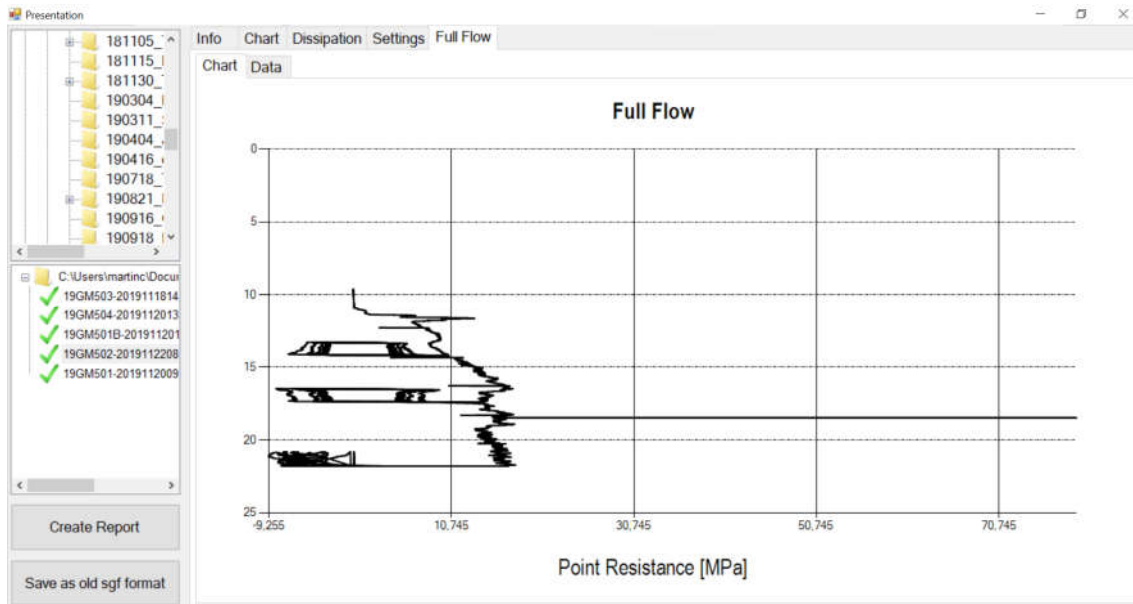
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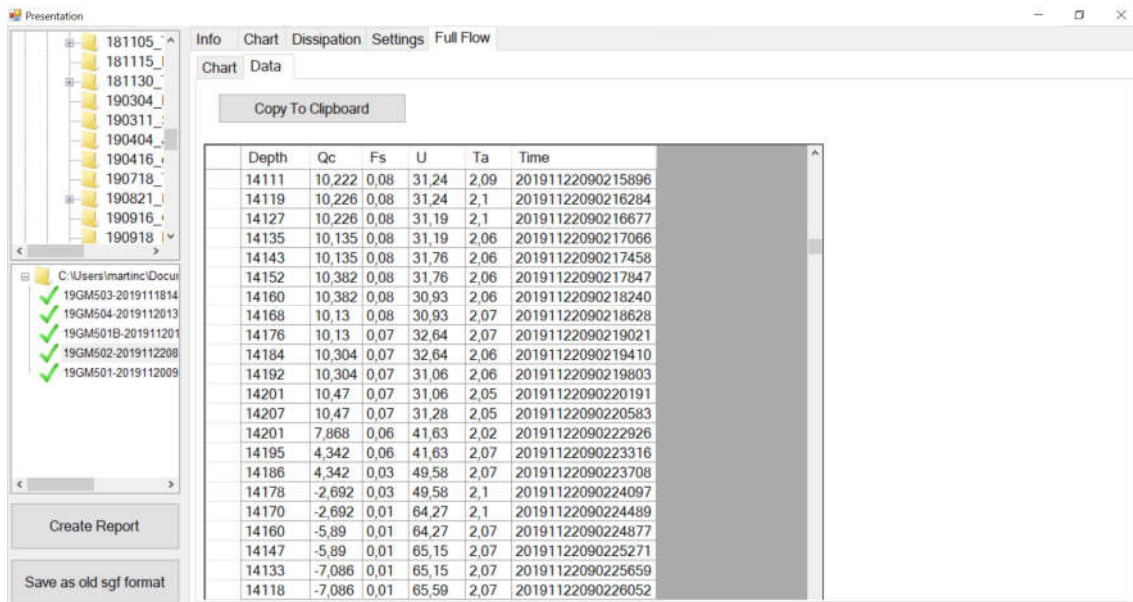
Presentation

Select Presentation from the main menu and select file. Select Full Flow.

Select "Chart" for pre-view of the full-flow graph:

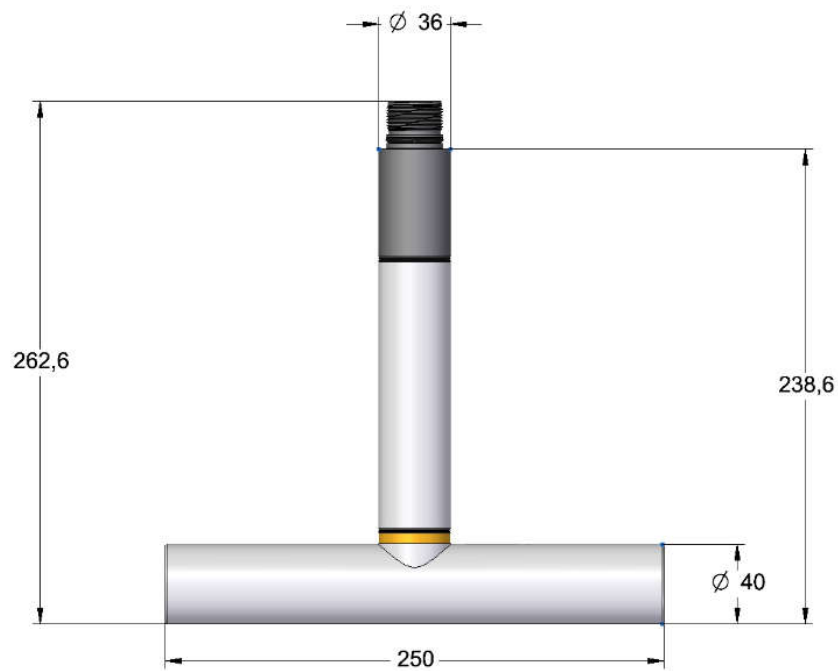


Select "Data" for pre-view of full-flow test results:



Depth	Qc	Fs	U	Ta	Time
14111	10,222	0,08	31,24	2,09	20191122090215896
14119	10,226	0,08	31,24	2,1	20191122090216284
14127	10,226	0,08	31,19	2,1	20191122090216677
14135	10,135	0,08	31,19	2,06	20191122090217066
14143	10,135	0,08	31,76	2,06	20191122090217458
14152	10,382	0,08	31,76	2,06	20191122090217847
14160	10,382	0,08	30,93	2,06	20191122090218240
14168	10,13	0,08	30,93	2,07	20191122090218628
14176	10,13	0,07	32,64	2,07	20191122090219021
14184	10,304	0,07	32,64	2,06	20191122090219410
14192	10,304	0,07	31,06	2,06	20191122090219803
14201	10,47	0,07	31,06	2,05	20191122090220191
14207	10,47	0,07	31,28	2,05	20191122090220583
14201	7,868	0,06	41,63	2,02	20191122090222926
14195	4,342	0,06	41,63	2,07	20191122090223316
14186	4,342	0,03	49,58	2,07	20191122090223708
14178	-2,692	0,03	49,58	2,1	20191122090224097
14170	-2,692	0,01	64,27	2,1	20191122090224489
14160	-5,89	0,01	64,27	2,07	20191122090224877
14147	-5,89	0,01	65,15	2,07	20191122090225271
14133	-7,086	0,01	65,15	2,07	20191122090225659
14118	-7,086	0,01	65,59	2,07	20191122090226052

Click "Copy To Clipboard" and paste in Excel for further processing. Note that data are based on the geometry of a normal CPTU probe and has to be post-processed with actual dimensions of the full-flow probe.



Dimensions of a "T-bar" full-flow probe (example).



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Datavägen 53 • 436 32 Askim • SWEDEN
Phone +4631289920 • Fax +4631681639
www.geotech.eu • info@geotech.se