DECADE Elite driver

for OpenLab CDS

User Manual

176.0102, Edition 9, 2021

Contents

In this guide

This installation guide is designed to help users install the new RC.NET-based driver for the Antec Scientific driver for the DECADE Elite for use with Agilent OpenLab CDS 2.x software.

For further information regarding the DECADE Elite, please refer to the User's Guide that was originally shipped with the unit or download the User's Guide using the following link:

https://antecscientific.com

Terms and Abbreviations

Terms and Abbreviations used in this document

Term	Description
ECD	Electrochemical Detection
RC.NET	An instrument driver framework developed by Agilent based on Microsoft's .NET platform
CDS	Chromatography Data System

1. Introduction

This user guide covers the installation and operation of the DECADE Elite control driver for OpenLab CDS. The driver is developed by Antec Scientific and supplied to Agilent Technologies for distribution with OpenLab CDS.

Version history

Date	version	OpenLab CDS	OS	description
6/6/2019	1.2.0	2.3 and 2.4	Win 10 Pro	Initial release
7/7/2020	1.3.1	2.4 and 2.5	Win 10 Pro	Update
20/7/2021	1.3.2	2.5 and 2.6	Win 10 Pro	Update
4/25/2024	**1.3.5**.24116	2.5 – 2.8	Win 10 and 11 Pro	Update

Software platform prerequisites
OpenLab CDS 2.3 or higher

Supported instruments
DECADE Elite/Lite with FW 1.09 (or higher)

Supported OS
Windows 10 Professional 64/32 bits, language English only, regional settings: US English.
Windows 11 Professional 64 bits, language English only, regional settings: US English.

Driver licensing
176.0100 DECADE Elite license for OpenLab CDS

2. Installation

The DECADE Elite device driver for OpenLab can be downloaded from the internet site
https://antecscientific.com/driver-for-OpenLab. The credentials to login to this web page will be
supplied with the license code.

1. Log on to the PC with a local Administrator account and privileges.
2. Close OpenLab CDS if running.
3. De-install previous versions of the driver before attempting an installation.
4. Unzip the downloaded file and start the executable
   DecadeEliteRCNetInstallerOpenLabCDS_x_x_x_x.msi.
5. Follow the installation instructions on the PC screen.
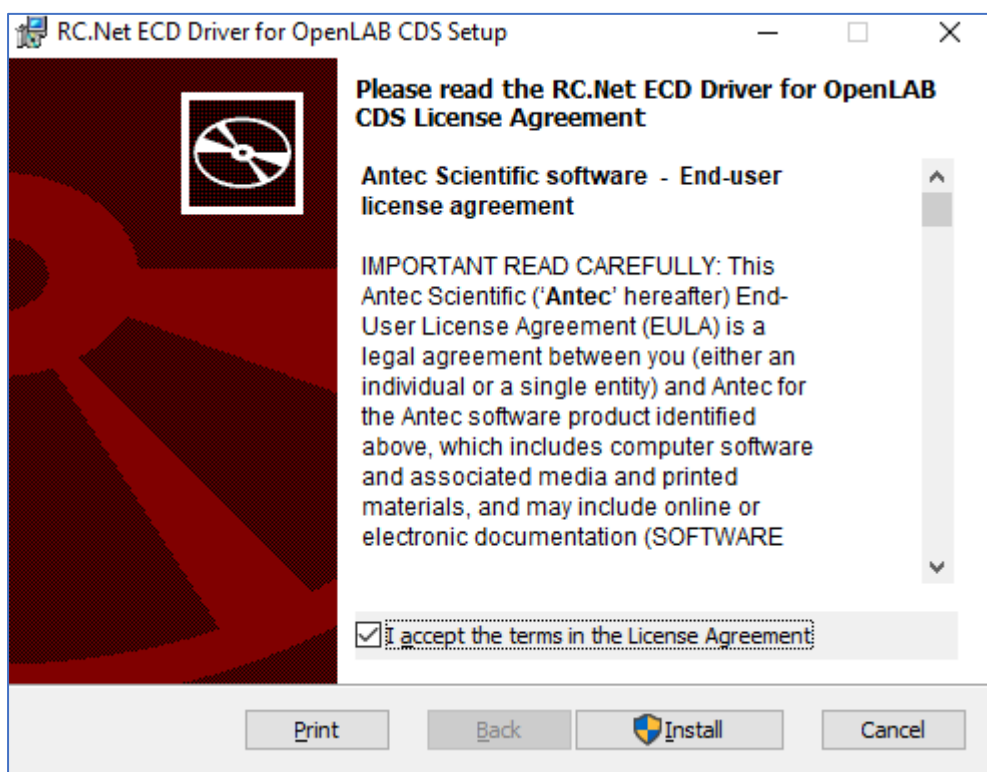
Verify the driver installation
To verify the driver installation was successful, run the Software Verification Tool to obtain a report.

1 Go to Start > All Programs > Agilent Technologies > Software Verification Tool.
2 Check for a PASS in the report, and ensure that the DECADE Elite driver entry is present.

Connect the ECD to the PC
Follow the instructions from the ECD user manual to connect the instrument to the PC. The device
can be connected through LAN and USB.

ECD device driver

The ECD device driver has three sections: **Configuration, Method** and **Status.** The ECD configuration is accessed from the CDS Control Panel, the Method and Status menu is accessible after 'Launch' of an instrument with the ECD.

Configuration: parameters are the connection port, serial numbers, valve present, CRC checksum, and units. These are parameters that are not likely to change much between methods.

Method: parameters are all operational settings such as measurement mode, range, potential and so on. These parameters are usually different for each new method.

Status: reflects the relevant device parameters actual status.

3. Configuration

To create a new instrument, go to the OpenLab CDS Control Panel, Create an instrument, and add/configure the devices. If needed, first create a Project.

1. If a project is not available, start with first create a project folder by selecting "projects" in the left bottom of the navigation pane. Then click create button in the top Management pane, and add a new project. Click "instruments" in the left bottom of the navigation pane and continue creating the new Instrument.
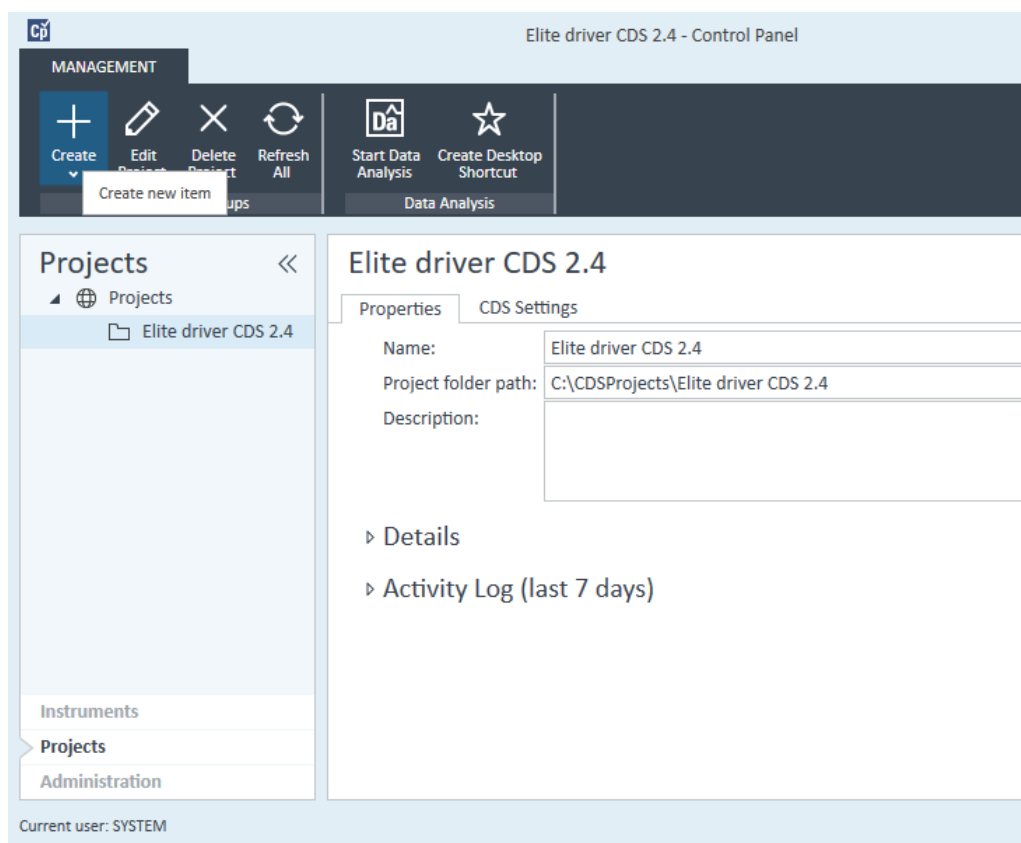
2. Create an instrument by right clicking on the instrument symbol, or click the + Create button. Note that at the left bottom, the "Instruments" is selected.
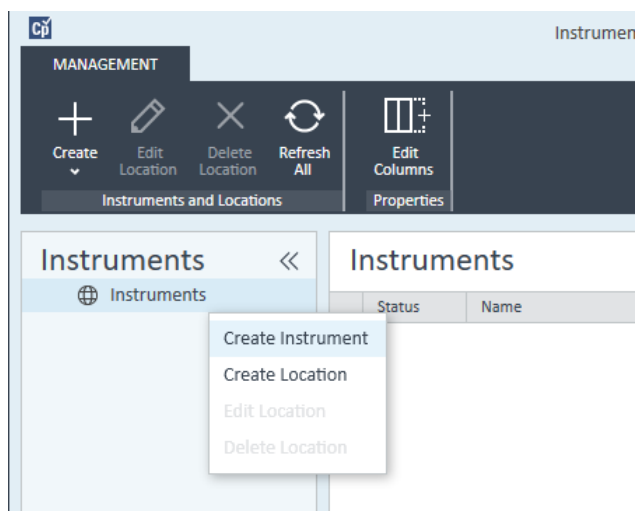
3. Fill in the relevant details for this new instrument and link to your project folder. Here is the location where all data and methods are stored.

4. Save the new instrument, select it in the left navigation pane, and click "Configure Instrument" in the top management pane.
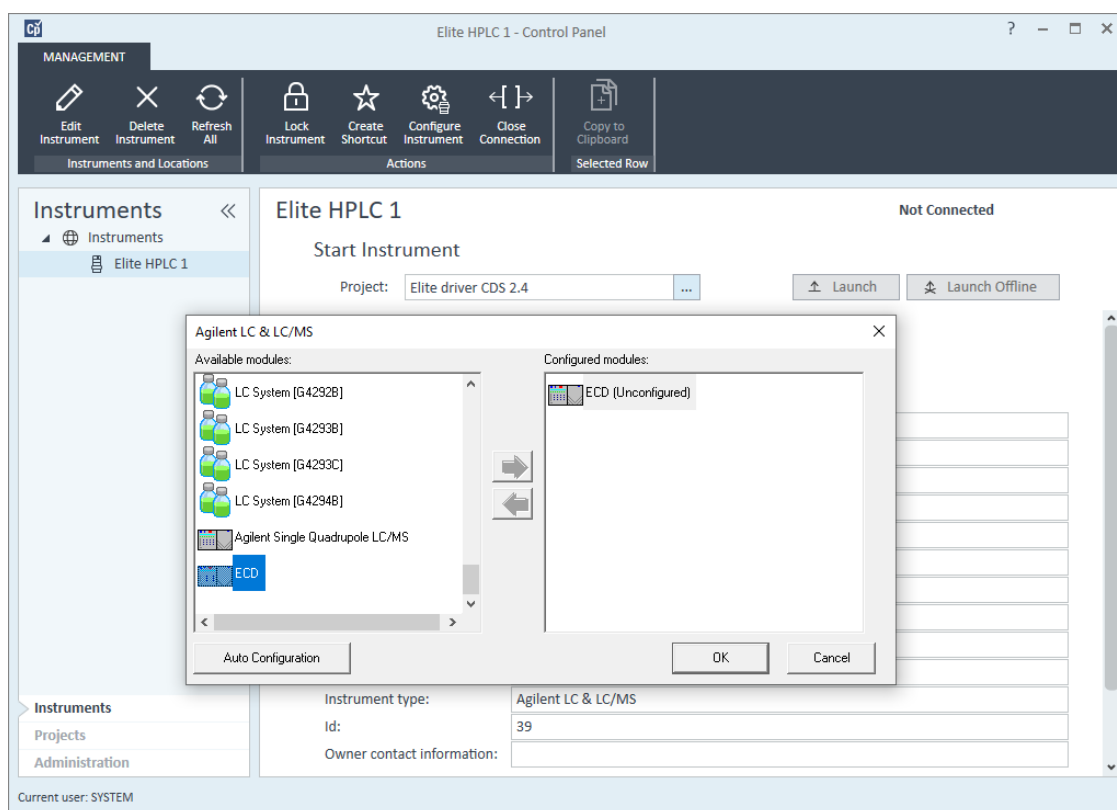
5. Select the ECD in the Available Modules list and click the right arrow button to add the module to the configured devices list. Repeat this for all devices that are part of the configuration. It is not possible to add more than 1 ECD.

6. In some cases the order of adding modules appears important. This has to do with loading and locking of certain software modules. For example, when an UIB is used **first add the ECD** then the UIB.

7. Double-Click on the ECD module symbol and configure the device settings. More details on the configuration is in the next paragraph.
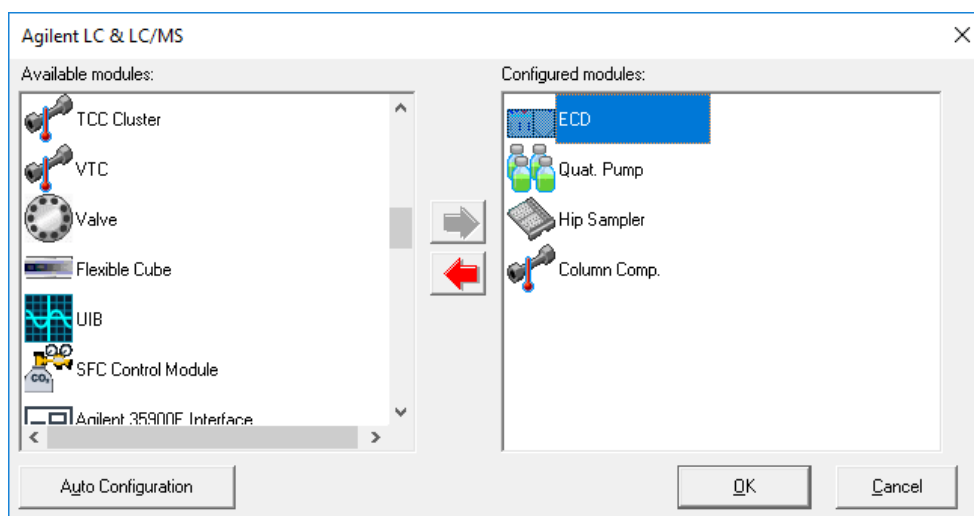
4. Configuration parameters

When a module is added to the configuration, it needs to be configured before it can be saved. Double click on the module to enter the configuration menu. The configuration menu has 3 sections:

- Communication : port or IP settings
- Device : device name, type and serial numbers
- Options : for output display, checksum check, and units

Communication

The ECD device communicates with a PC using USB or LAN. Switch on and connect the device to the PC, select the connection that is used, and set the port or IP address. For details see ECD device user manual (chapter "Installation").

USB: in case the device is connected via USB select the correct PC virtual serial port that is used. The device must be on and connected to the PC with the USB cable. The pull down menu shows the available COM ports. The virtual COM port of the device is usually visible in the list as soon as the device is on and connected. If not visible, a restart of the PC is required.

TCP/IP: in case the device is connected via LAN enter the IP address of the device, or select the device from the 'find device' window. Default IP address is 192.168.5.1. LAN adapter of the PC must be in the same IP range (i.e. 192.168.5.10). For direct connection a special cross-over UTP cable is needed, for connection via a switch a regular network cable.

Find device: Click button to find devices on the network. First 10 characters is the MAC address, followed by the IP address. Only devices connected to the same LAN network with the same IP range are found.

IP Port : port number for LAN communication, is normally set to 10001.

Device

This section is mostly information fields for serial number and other device information. The number of active cells can be set here in case of dual cell control. This would only make sense in case a dual cell device will be used with a single cell only for longer time. The 'valve connected' shows if an external valve is connected to the ECD device using the valve control cable at the rear panel.

Name: is device name, displayed in method.

Instrument type : ECD type.

Number of cells : select the number of cells (in case 'supported' cells > 1).

Firmware version : firmware revision number

Detector SN : serial number ECD device

Control SN : serial number ECD control board

Sensor(s) SN : serial number ECD sensor board

Valve connected : checked when external valve is connected to ECD device

Options

Certain options can be set with the configuration. **Display of the output** status only makes sense in case the output cable is used connected to the rear panel of the ECD. It can be used to control external devices The data **checksum** is an additional data verification for data acquisition. It calculates and adds the 32bit checksum over each data transmission, which is verified by the receiving software and accepted only when the checksum is identical. otherwise the data is re-queried. For normal use this option is not really needed, as data transmission is already extremely safe by the nature of the data protocol. The **IC (cell current) units** are for visualization only, the data in the graph is scaled with the selected units. The data stored is unchanged.

Display outputs: display or hide the ECD output status in the method window

CRC-32 check: use a 32 bits checksum check for data acquisition transmissions

IC Units: display units in graph, for display only. Does not effect the stored, actual data or cell current units.

5. Method

The Method menu in the CDS is accessible after 'Launch' of the instrument with the ECD. It contains the sections:

Cells with the cell specific parameters:

Cell selection : selected cell to which the displayed parameters refer to. Is always 1 for a single cell configuration.

The 3 tabulated sections:

- **Main**: ECD parameters related to device status

- **Output**: ECD output parameters related to data acquisition

- **Time Table**: parameters that change during analysis time
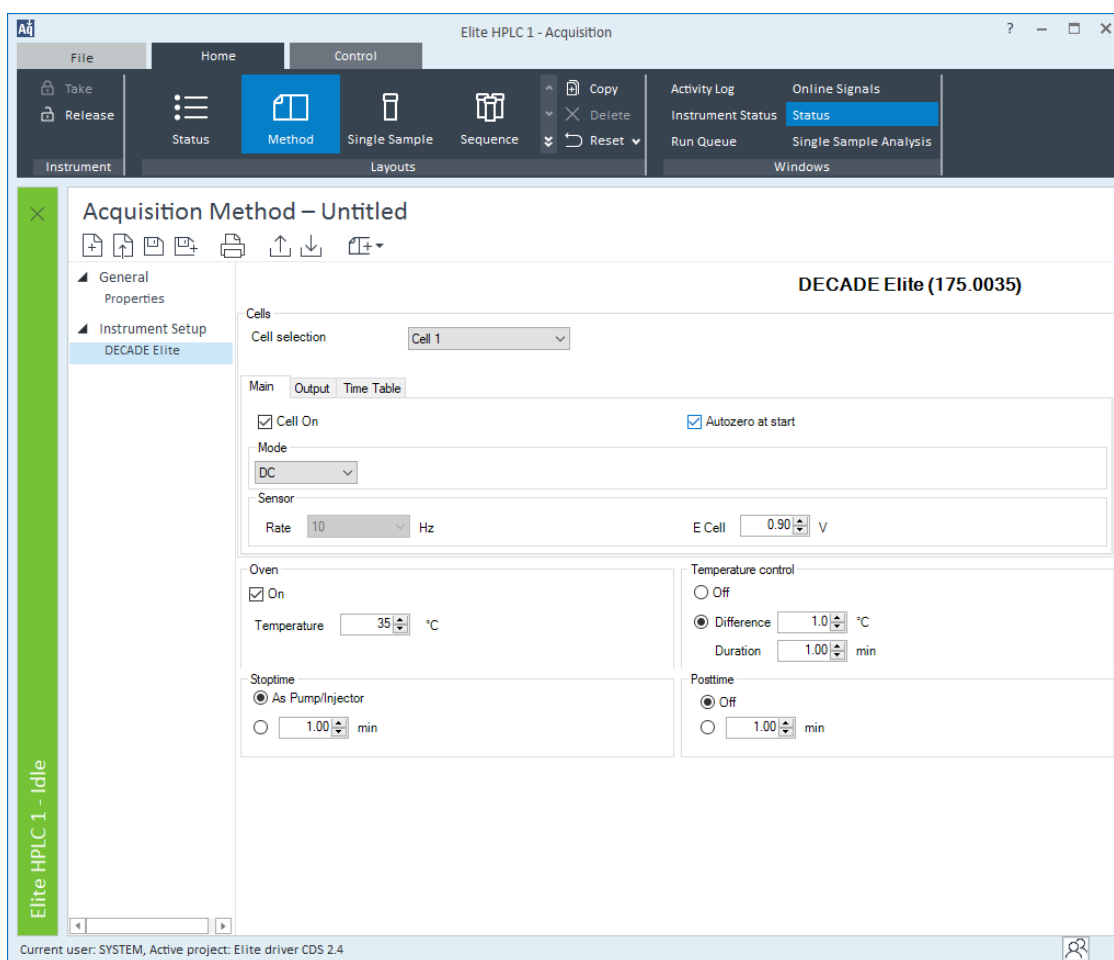
Global device parameters

The global device parameters are not cell or mode specific, they apply to the device and are not automatically changed when changing a cell or mode.

Oven: set the temperature of the ECD cell compartment. This parameter is independent from selected cell (so called global parameter).

Temperature control: defines the parameters for ECD device "ready" status, when the oven is stabilizing. When selected, the ECD device will be ready when within the **temperature difference** window for a **minimum duration**. The temperature difference window should be chosen with care. A window of ≥ 1.0 °C is advisable, a smaller T window may lead to unacceptable long waiting time when starting a run.

Stoptime: analysis time for data acquisition, is usually linked to the pump or injector time.

Posttime: duration before system is 'ready' after finishing the analysis. Is sometimes used to create a delay between runs in a sequence.

Note 1: a temperature difference window of ≥ 1.0 °C is advisable to avoid unacceptable long waiting time.

Note 2: when working with an HPLC system incl. HPLC and Autosampler, the stop time should be set to "As Pump/Injector".

Main

Cell on: switches on or off the flow cell. When unchecked (off), the ECD is 'not ready' for analysis.

Autozero at start: check option to apply an automatic autozero after start of run, but prior to the start of acquisition. The autozero is executed during the autosampler sample processing time.

Mode: set the ECD detection mode to

- **DC**: constant potential measurement
- **Pulse**: measurement with multiple potential steps
- **Pulse Type 2**: measurement mode applies interpolated potential coordinates

Each mode has different 'Sensor' parameters.

DC

DC is a measurement mode with constant potential applied.

Rate: data acquisition rate in data points per second. Parameter is dependent on the filter setting, except when filter is set to 'raw'. In that case the data rate is selectable between 1 and 100 Hz.

E Cell : working potential for the ECD cell.

Pulse

Pulse is a measurement mode with multiple potential steps applied.

Autozero at start: check option to apply an automatic autozero after start of run, but prior to the start of acquisition. The autozero is executed during the autosampler sample processing time.

Rate: data acquisition rate in points per second, equal to 1 / [total pulse duration]. In Pulse mode the filter setting has no effect on the rate.

E1 - E5: potential steps of the working electrode.

t1 - t5: duration of each potential step.

ts: duration of sampling time at the end of the first potential step.

Pulse type 2

Pulse (type 2) is a measurement mode which applies a potential coordinates table. The applied potential fluently interpolates between coordinates.

Autozero at start: check option to apply an automatic autozero after start of run, but prior to the start of acquisition. The autozero is executed during the autosampler sample processing time.

Rate: data acquisition rate in points per second, equal to 1 / [total duration]. In Pulse type 2 mode the filter setting has no effect on the rate.

t and E: enter the potential coordinates in ms and mV. Minimum step is 10 (ms or mV). Always start with t = 0 [ms]. Each time can only occur once. Maximum table length is 30 rows.

Data: begin and end of interval of data sampling. Always include one 'Begin' followed by one 'End' at a later time.

Copy to clipboard/Paste from clipboard : the coordinates table can be copied from/to via right mouse click.

Graph: next to the table a graph shows the wave form. In red the sampling interval is shown.
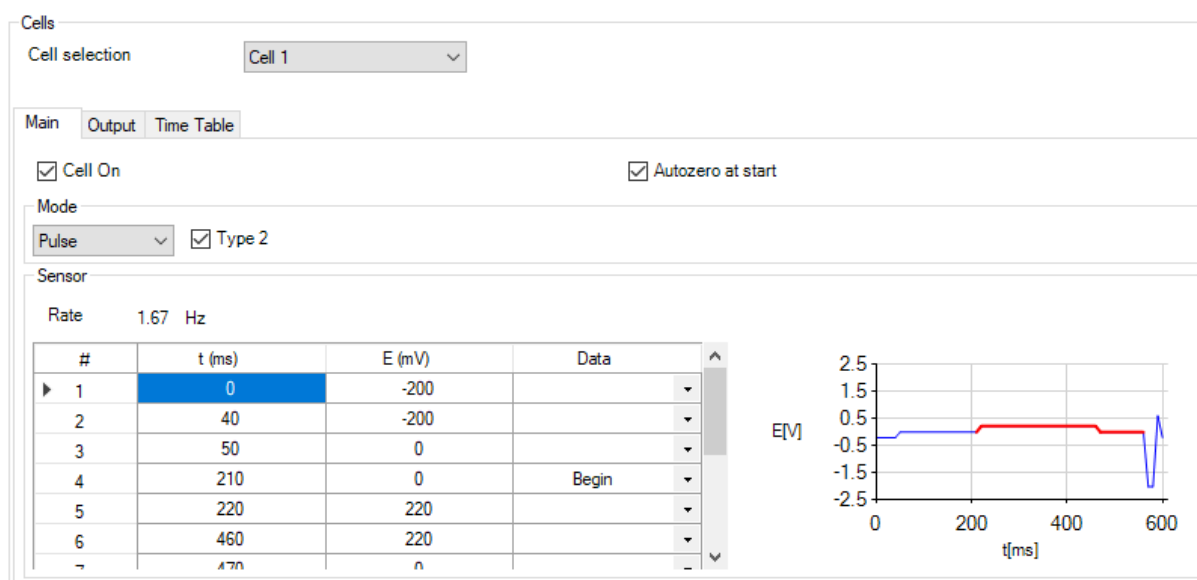
Output

Compensation On: enable or undo autozero compensation

Range: sensitivity setting of the measurement. Typically, the range is set to a value of 3 to 10 times the expected highest peak of relevance. This is particularly relevant for high sensitivity measurements. Range of 5 nA and below is for high sensitivity and small signals (available in DC mode only). Range of 10 nA and higher is for large peaks and high background signal.

Offset: applies an offset level to the measurement signal. For example, a full scale range setting of 20 nA and an offset of -10% sets the baseline after autozero to -2 nA instead of the usual 0 nA. Offset does <u>not</u> affect the uncompensated current, only the data for data acquisition.

Filter: applies an advanced digital filter to the acquisition data. The smaller the value, the stronger the filter setting. Only in DC mode, the filter also affects the data rate.

Polarity : reverses the data polarity, peaks that are negative become positive peaks (and visa versa). Polarity does <u>not</u> affect the uncompensated current, only the data for data acquisition.

Time Table

Programmable parameters in the Time Table are: range, filter, offset, Ecell (DC only), autozero, and the TTL outputs 1 - 4, and the relays 1 and 2. The TTL outputs and relay require the IO cable connections for proper function. To be effective in the next analysis the TTL and relay must be set back to default after being activated.

Time Table : holds the programmable parameters that are executed during run time of the analysis.

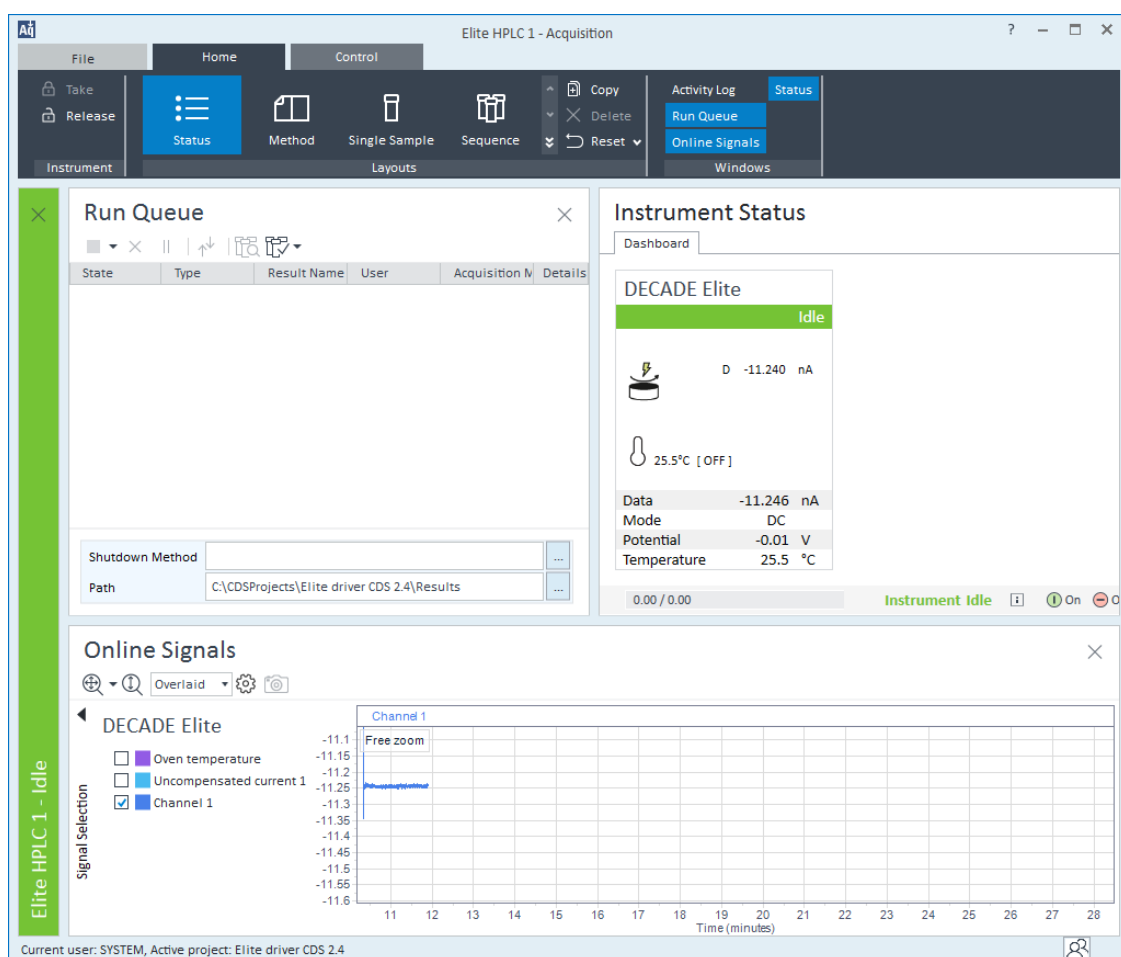**Add**: adds a new line to the time table.

Remove: removes the selected line from the time table.

**Clear All**: resets to an empty time table.

6. Status

Status menu in the CDS is accessible after 'Launch' of the instrument with the ECD. It reflects the relevant device parameters actual status.

- Uncompensated current
- Temperature
- Status parameters

Status Parameters and uncompensated current

Uncompensated current: upper part of the status window shows the real current value (I-cell) which is not affected by autozero, offset or polarity setting. The current value is preceded by D, P, or I for DC mode, Pulse mode or Pulse type 2 mode.
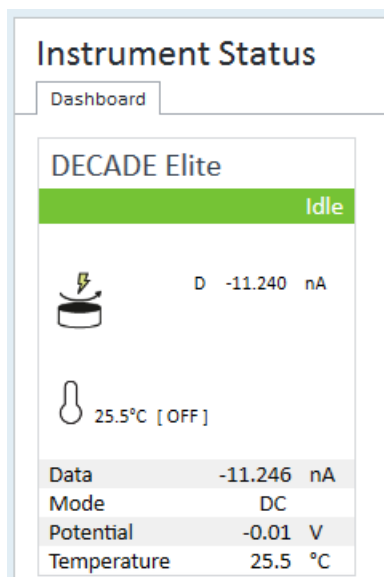
For example:

The cell is on in DC mode and the uncompensated current is -11.240 nA is shown as:

D -11.240 nA

Pictogram status:

cell is on (at least one of the cells is on in case of dual cell configuration).

cell(s) are all off.

Temperature

Temperature: real and [set] temperature. When stabilizing and 'temperature control' is set, the pictogram shows the stabilization status (left picture).

For example:

The is ECD heater is on and set to 30 °C. The actual temperature is stable at 30.2 °C.

         30.2°C [30°C]

Pictogram status:

         temperature is on and stable.

         temperature is off.

         temperature is stabilizing.

Status parameters

Clicking the expand box in the top right corner of the status window shows a few more status parameters.

Data: processed data for acquisition (incl zero compensation, offset, polarity)

Mode: measurement mode

Potential : measurement potential (DC), or the first potential in the sampling interval (Pulse).

Temperature: the [set] and actual temperature

Outputs: displays a binary status string, from left to right Aux 1, 2, relays 1, 2, Aux 3, 4. A few examples:
00 00 00 01   aux 1 activated
00 00 10 10   aux 2, relays 2 activated
00 01 00 00   aux 3 activated

Valve: displays the status (load or inject) of the external valve if present.

7. Miscellaneous

Method compatibility

Only methods with identical configuration (same device type Elite/Lite, and same number of cells) are inter-exchangeable. Methods created on different configurations may lead to unexpected results, the advice is to create a new method.

Online help

To access Online Help, press the F1 key while the user interface is open within the Agilent OpenLab CDS.

Driver Update

A driver update is provided as a full version and will not update your existing driver installation. The previous version must be completely removed from the computer before the new version can be installed. To update the drivers, please use the supplied instruction. It is highly recommended to create new instruments if the drivers have been updated.

Uninstall the driver

The DECADE Elite driver can be uninstalled from Microsoft control panel. You must be logged in with local administrator rights.

1   Open Microsoft Control Panel, and go to Programs and Features.
2   Select the DECADE Elite driver from the list.
3   Select Uninstall and follow the wizard instructions.

Trouble shooting

In case the instrument cannot be configured or opened online, verify the following:

1   Double-check the communication settings as documented in this guide.
2   Double-check that all components are connected and turned on.
3   Check that the driver is correctly installed and reports the correct version.
4   Check the system configuration in terms of the maximum number of instruments allowed.
5   Run the Software Verification Tool.
6   Ensure that the firmware revision is correct for the specified instrument.

Known issues

The following issues are known and work arounds are advised.

	Description	Workaround
1	Methods created in an older driver version result in an incorrect data result. Plotting of the data in Online Signals is fine but after processing the data and opening in Data Acquisition, the time axis is incorrect.	Do not use methods of an older driver version to be 100% sure. Depending on the adjustments in the driver update, the old method might work correctly but this should be checked by the user.
2	Switching between Single Cell Configuration (SCC) and Dual Cell Configuration (DCC) cannot be done using a method created on a different cell setup. Symptoms are comparable with the effects of bug 1.	Do not use SCC methods on a DCC setup or the other way around. To be sure the 2nd cell is not turned on in SCC mode when switched from DCC mode, reboot the ECD.
3	In the configuration window, it is not possible to add the ECD to the configuration while the UIB is in it. Adding the ECD when the UIB is not added works fine.	The easiest way to setup the configuration is to add the ECD first and later add the UIB.
4.	PC with insufficient resources may lead to data time out and stalling of a sequence.	See PC requirements for minimum requirements.
5.	When the a temperature difference window of < 1.0 °C is set a time-out may occur.	A temperature difference window of ≥ 1.0 °C is advisable to avoid unacceptable long waiting time.

Support

Contact support@antecscientific.com for support on this device driver.