

Using ISET in Empower Environment

Technical Note

Technical Guide for the configuration and use of the Agilent Intelligent System Emulation Technology (ISET) G2197AA with Waters Empower

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Introduction

Intelligent System Emulation Technology (ISET) is a propriety technology offered by Agilent Technologies that allows users to run methods developed on different Agilent, Waters or Shimadzu systems with a simple mouse click while maintaining similar Retention Times and resolution without modifying the system or method. Please contact your local sales representative for more information or visit www.agilent.com to learn more about ISET (Product Number G2197AA).

Waters Corporation's adoption of the Agilent Instrument Control Framework (ICF) for their Empower Data System is called *Waters ICF Support*. The *Waters ICF Support* is part of the Waters Instrument Control Package (ICS).

This guide describes how to configure ISET in a Waters Empower environment.

Table 1 Supported and unsupported configurations using ISET in Empower

Waters ICF support Version	Agilent ICF Agilent LC Driver	ISET support for Empower 3	ISET support for Empower 2
ICF Support v3.1 P/N 667005859	A.02.05 A.02.18	ISET 1 ISET 2 ISET 3 ISET 4	Not supported
ICF Support v3.0 With ICF A.02.05 Update P/N 667005815	A.02.05 A.02.18	ISET 1 ISET 2 ISET 3 ISET 4	Not supported
Waters ICF Support v3.0 P/N 667005585	A.02.04 A.02.14	ISET 1 ISET 2 ISET 3 ISET 4	Not supported
Waters ICF Support v 2.2 With ICF A.02.04 Update P/N667005678	A.02.04 A.02.14		ISET 1 ISET 2 ISET 3 ISET 4
Waters ICF Support v2.2 P/N 667005450	A.02.03 DU2 ² A.02.13		ISET 1 ISET 2 ISET 3 ISET 4
Waters ICF Support v2.1 HF1 ¹ P/N 667005397	A.02.03 DU1 ² HF2 ¹ A.02.11 SP1 ³		ISET 1 ISET 2 ISET 3 ISET 4
Waters ICF Support v2.1 HF1 ¹ with #667004877 ICF A.01.05 Update	A.01.05 A.02.06 SP1 ³		ISET 1 ISET 2
Waters ICF Support v2.1 HF1 ¹ P/N 667004899	A.01.04 A.02.04 SP1 ³		ISET 1
Waters ICF Support v1.0	A.01.02 A.02.01		Not supported

¹Hotfix ²Driver Update ³Service Pack

Prerequisites/Compatibility Information

For general software requirements such as operating systems, refer to the Waters Empower documentation.

The requirements for ISET are outlined in the ISET manual
https://www.agilent.com/cs/library/usermanuals/public/ISET4_USR.pdf
G7120-90310.

NOTE

ISET is not available in a dual needle set up of the 1260 and 1290 Multisampler (G7167A/B). Single needle setup is required.

The list of modules, which can be emulated by ISET (Agilent), is provided in the ISET manual along with their minimum firmware revision.

ISET Trial

A 700-hour demonstration/trial version of ISET is available with the following pumps:

- Agilent 1290 Infinity II Flexible Pump (G7104A firmware B.06.56 and later)
- Agilent 1260 Infinity II Flexible Pump (G7104C firmware B.07.20 and later)
- Agilent 1290 Infinity Quaternary Pump (G4204A firmware B.06.56 and later)
- Agilent 1290 Infinity II High Speed Pump (G7120A firmware B.06.42 and later)
- Agilent 1290 Infinity Binary Pump (G4220A firmware B.06.42 and later)
- Agilent 1290 Infinity Binary Pump VL (G4220B firmware B.06.42 and later)

A pictogram in the LC status dashboard indicates whether the demonstration or trial version is active.

	Pictograms of ISET versions	
	Demonstration/trial	Registered
Active		
Inactive		

Figure 1 Pictograms of ISET versions

End of Trial Period Requires Reconfiguration in Empower

The trial period begins with the first initiation of the pump. Unless the trial version is upgraded to a registered version, the ISET function will be deactivated when the trial period has lapsed.

NOTE

Methods generated during the trial period might require a manual resolution, if ISET was enabled in the method. For details see, "[Method Migration - Methods Generated During the ISET Trial Period](#)" on page 12.

Using ISET in the Agilent LC Instrument

Installation

Instrument Set Up

- 1 Close the Empower CDS.
- 2 Switch off the Agilent LC system or at least the Agilent pump. Plug the ISET dongle into the USB port on the back of the pump (please verify if your pump supports ISET).
- 3 Power on the pump.
- 4 Wait until the USB dongle stops blinking.
- 5 Switch off the pump and remove the dongle or leave the USB dongle inserted.
- 6 Switch on the pump to finalize the activation procedure.

(Details on the activation process are outlined in the ISET manual
https://www.agilent.com/cs/library/usermanuals/public/ISET4_USR.pdf)

- 7 Switch on all modules in the Agilent LC instrument system.

HINT

Details on the activation process are outlined in the ISET manual
https://www.agilent.com/cs/library/usermanuals/public/ISET4_USR.pdf

Ensure that all Agilent LC modules in the system meet or exceed the minimum firmware requirements specified by the 3rd-party CDS software vendor and Agilent's firmware set/firmware interoperability requirements. Agilent recommends using the latest available firmware set.

<https://www.agilent.com/en-us/firmwareDownload?whid=69761>

PreConfiguration of ISET in Empower

When using the PreConfiguration Tool, follow the instructions in the Empower ICF support release notes. The following procedure describes the set up using ICF Support v2.2, which works the same as ICF Support v3.0.

For information on the PreConfiguration Tool, refer to the related documents on the Waters Empower support page:

- *ICF Support Version Release Note*
- *TECN134936402. Using the Agilent PreConfiguration Utility with Agilent Instrument Control Framework (ICF) Support Version 2.2*

To enable ISET perform the following steps:

Software required ICF Support v2.2 or higher

- 1 Once ISET was activated, the driver detects ISET automatically and the **ISET installed** check box is pre-selected automatically.
- 2 In the Empower Configuration Manager, select **Tools > Agilent PreConfiguration**.

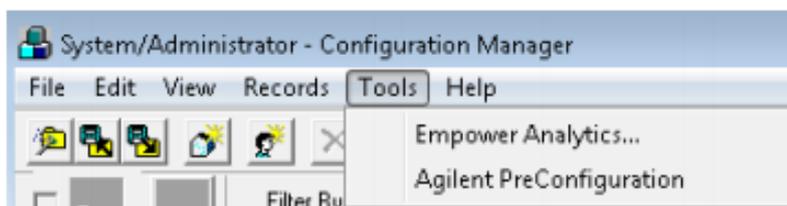


Figure 2 Configuration Manager

- 3 In the **Configuration Directory** screen, enter the IP address or host name of the LAC/E box that your instrument is connected to and click **Connect**.

NOTE

Do not enter the IP address of the instrument here. The IP address of the LAC/E box is required.

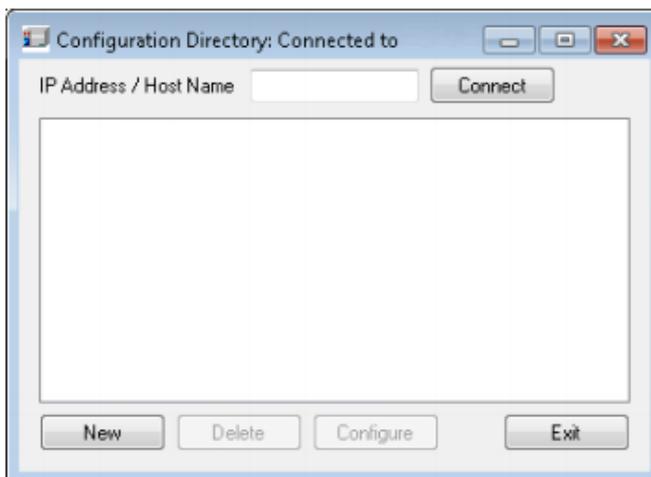


Figure 3 IP address to connect

- 4 Once connected to the IP address, click **New** to open the PreConfiguration Utility.
- 5 In the **Configuration Editor** select the node corresponding to your instrument type.
- 6 Click **Auto Configure**.

PreConfiguration of ISET in Empower

- 7 Enter the IP address of the instrument and click **OK**. The instrument is detected, and the LC modules are shown on the right side of the configuration window.

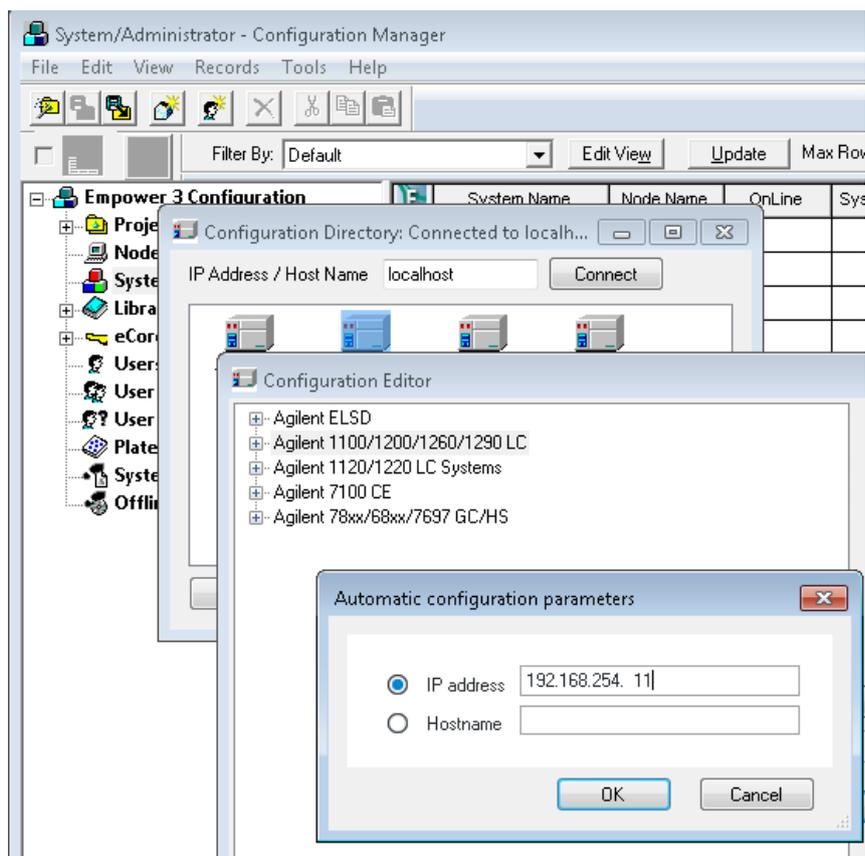


Figure 4 Configuration of the LC with ISET

NOTE

The default IP address is 192.168.254.11. Please refer to the Agilent User Manual of the module with the LAN connection, if an IP address change is required. The detector is the preferred access point for control via LAN due to the high data rates generated.

- 8 To verify the proper pump configuration, double-click the pump or select the pump and click **Configure**.

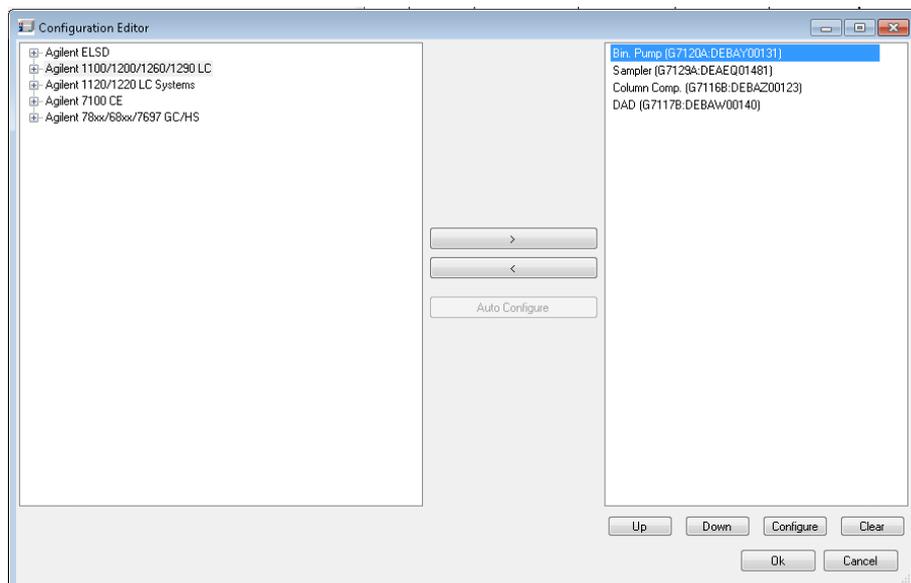


Figure 5 Configuration Editor

The pump configuration window opens.

PreConfiguration of ISET in Empower

- 9 Verify that the **ISET installed** check box is selected. ISET is detected automatically. If the check box is not selected, ISET has not been activated.

As the configuration is directly read out of the instrument, the pump configuration window indicates the current ISET configuration status.

- a If **ISET installed** is selected, ISET demo mode is active or ISET is available via a dongle. This does not mean that ISET is used in a method, it only indicates that ISET is available and can be used in a method.
- b If **ISET installed** is not selected, ISET is not detected and therefore not present.

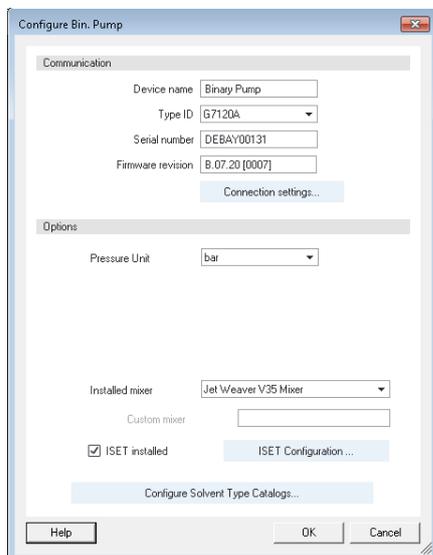


Figure 6 Configure ISET in the pump

- 10 Click **ISET Configuration...** and verify the sampler configuration.
- 11 Leave the PreConfiguration Utility by closing all screens using **OK**.

Configuration of LC with ISET in Empower

Refer to the Waters Empower documentation for installation and configuration of the LC/CE system in Empower.

- 1 Open the **Waters DHCP Server Configuration** window by entering the following command in the windows command line:

C:\Empower\Instruments\Waters DHCP Server Configuration.exe

Or

In the Empower Configuration Manager window, select **Node** in the tree on the left side, then right-click the node you want to add the instrument to and select **Properties**. Select the **Configure DHCP** tab and click **Configure DHCP**.

- 2 Add the **IP Address** and **MAC Address** manually for the LC instrument.
- 3 Select **Instrument Type AgilentLC** and click **OK** to leave the screen.

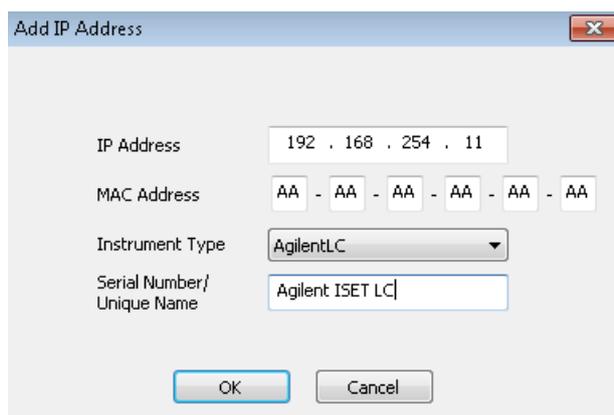


Figure 7 Entering communication details for the instrument

- 4 Access the **Nodes Properties** in the Empower Configuration Manager and verify that the Instrument is shown as **OK**.
- 5 Generate a new chromatographic system with the newly configured instrument using **File > New > Chromatographic System**. Follow the instructions on the screen.

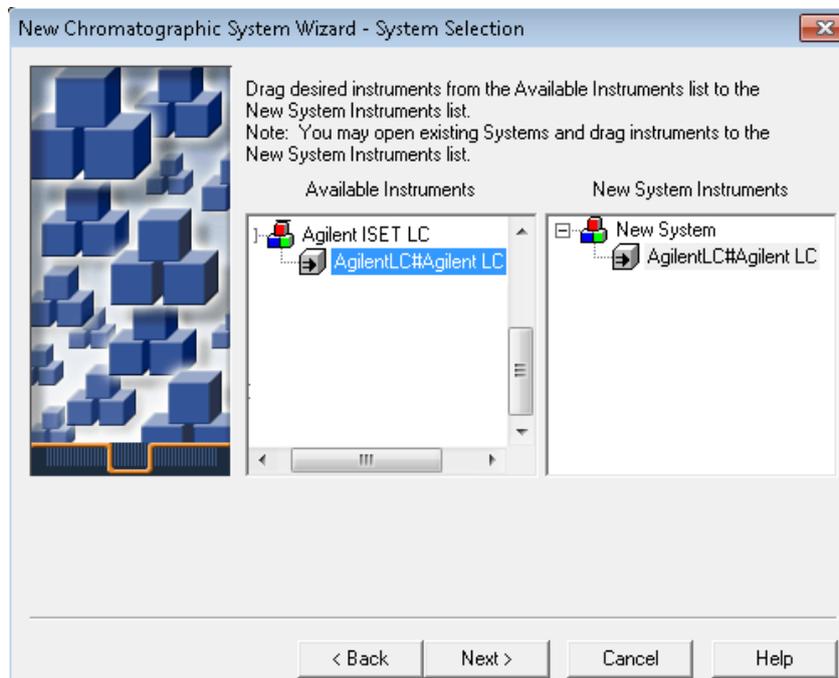


Figure 8 Generating a new chromatographic system

Using ISET in Empower

- 1 Start Empower and open the **Run Samples** screen.

The LC Status window automatically displays all available online modules. The pump user interface now includes the ISET pictogram. If the pictogram is displayed in grey, it is present, but not active.

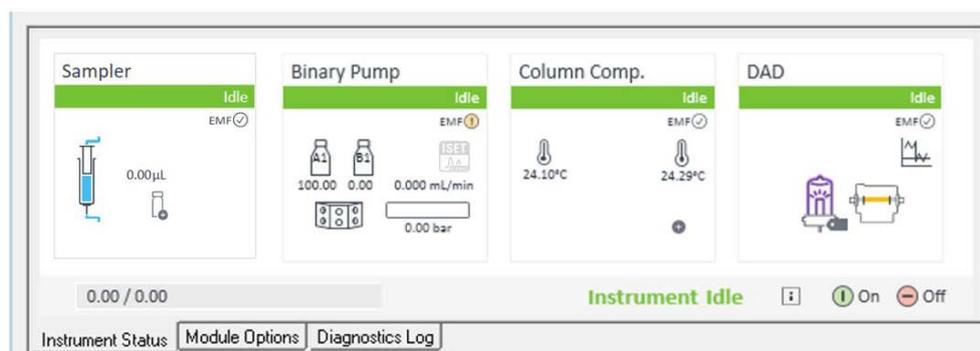


Figure 9 ISET in LC Status Dashboard in Empower - inactive

- 2 When loading the instrument method, the system asks you to update the given method configuration with the new instrument configuration. Click **OK**.

The method dialog opens.

- **Instrument Configuration** tab: View of the LC system configuration.

All settings in this dialog are already defined by the PreConfiguration Tool. Changes in this section of the method are *not* applied to the system. Any changes such as modifying the IP address need to be handled in the PreConfiguration Tool on the LAC/E box controlling the instrument in question.
 - **Instrument Method** tab: The instrument method tab provides access to all method parameters of the LC system.
- 3 Select the pump tab to enter the ISET method parameters. For details on the parameters, refer to the online help and the ISET user manual.
 - a Locate the ISET method section and select the **Enable ISET** check box.
 - b Select the appropriate ISET version. It is recommended to use the newest ISET version.
 - c Choose the manufacturer of the system you want to emulate.
 - d Select the emulated pump and sampler. The ISET solvent model is not required for common solvents like water, MeOH and ACN.
 - e If you use non-standard configurations of the original system or different capillaries, **Enable manual fine tuning** might be required to manually adjust ISET settings. Details are outlined in the ISET user manual.

Using ISET in Empower

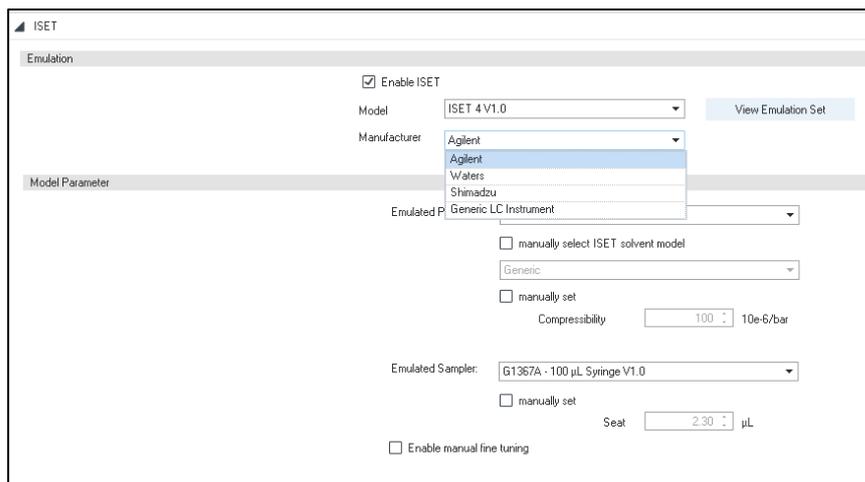


Figure 10 Setting up ISET in the acquisition method

- 4 Save the method and close the method screen.

The ISET pictogram in the LC status dashboard interface for the pump now indicates that ISET is enabled (the ISET pictogram changed from grey to black) and your method is set up and ready for the first injection.

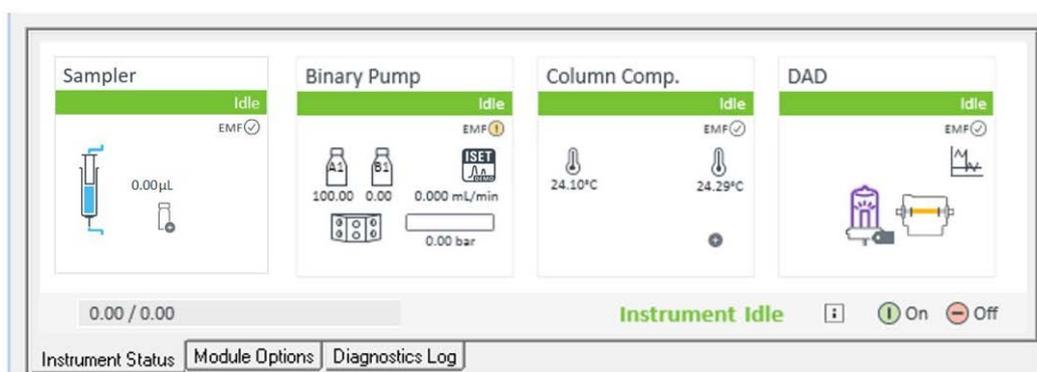


Figure 11 ISET pictogram in pump status tile of the LC Status dashboard - active

Method Migration - Methods Generated During the ISET Trial Period

Each method is created based on a dedicated LC instrument configuration. If methods are loaded onto an online system with a different configuration, they need to align their method parameters to the given configuration. This is called *Method Resolution*:

There are various kinds of method resolution:

- *Automatically resolvable*: for example, the method was generated using a configuration with a quaternary pump, now the configuration is a binary pump. Channels A/B are resolved, channels C/D are dropped. The automatic resolution is documented in the Audit trail.
 - *Manual resolution necessary*: for example, the method was generated using a configuration with a sample cooler where the sample cooler temperature is controlled via the method. Now, the configuration is changed to a sampler without a cooler.
 - This configuration change needs to be manually adjusted by a new auto-configuration.
 - The user will see a manual method resolution. The temperature parameters for the sampler will vanish from the method after acknowledgment of the method resolution. All steps are documented in the Audit trail.
 - *No resolution*: no resolution possible. A new method must be generated.
- 1 In the method screen, go to the tab ISET and check whether the parameter **enable ISET** is selected. As the parameter enable ISET is a method parameter, this parameter is present only if
 - the ISET trial version is active
 - ISET is installed and active via a dongle.
 - 2 In the LC status dashboard, review the pump status tile
 - If ISET is available, but not enabled, the ISET pictogram in LC status dashboard is grey (see Figure 9 on page 10)
 - If ISET is available and enabled, the ISET pictogram in the LC status dashboard is black (see Figure 11 on page 11)
 - If the ISET pictogram is missing on the pump status tile, the ISET functionality is not available anymore.

If either the dongle is de-installed/deactivated or the 700-hour-ISET trial version expires, the method parameter **enable ISET** along with the ISET pictogram in the pump tile vanishes (after a reboot of the pump). This is a method change due to a configuration change. Each method created with a previous configuration requires manual method resolution to adjust to the new configuration.

Any method generated during the 700h trial version includes a method setting called **enable ISET**. As it is a method parameter, it will be shown whether it is selected or not (ISET pictogram black or grey). With the end of the 700h trial period, the configuration is changed, as ISET is removed from the LC instrument. The ISET pictogram as well as this method parameter are removed. A method resolution is required.

As soon as the 700h trial period elapses and the pump is turned off and back on, the configuration change happens. The pump goes offline, reinitializes and comes back without ISET present in its configuration.

Using ISET in Empower

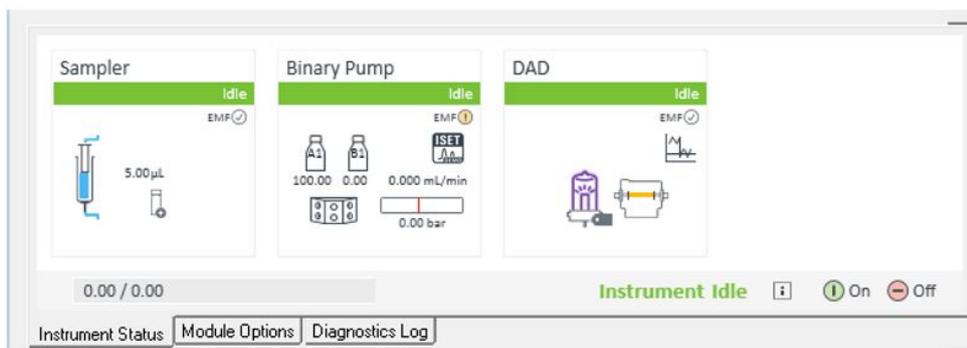


Figure 12 LC status dashboard before the power cycle of the pump

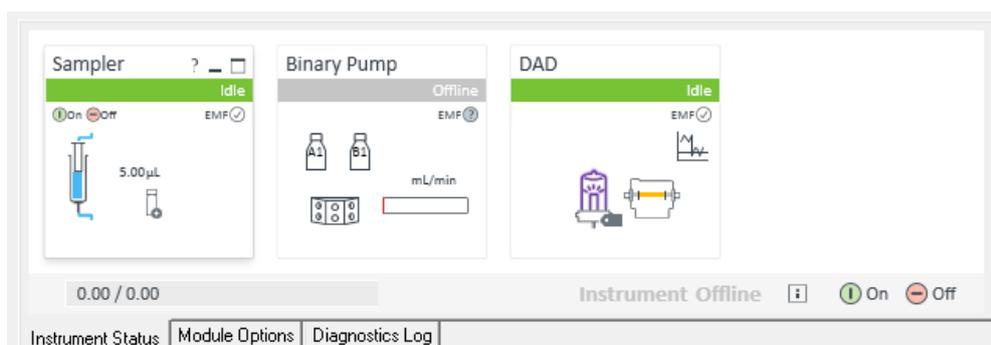


Figure 13 LC status dashboard after the power cycle of the pump

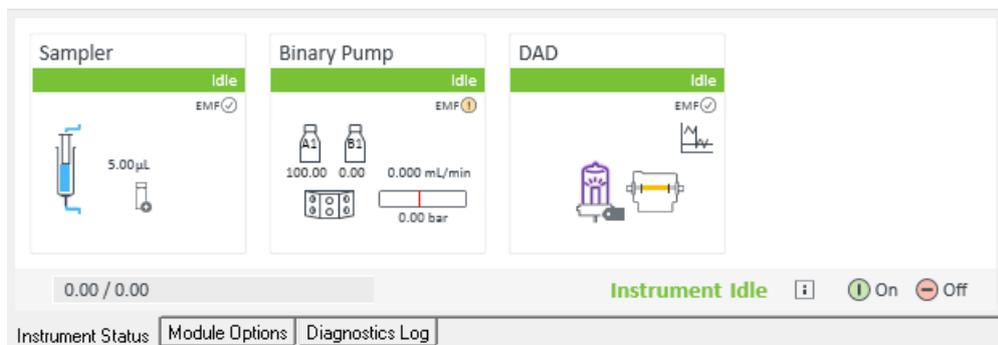


Figure 14 LC status dashboard after the power cycle of the pump

```
9/3/2018 2:38:32 PM: Fatal: G7120A:DEBAY00131 - Configuration changed.  
9/3/2018 2:40:26 PM: Information: G7120A:DEBAY00131 - Get System Ready triggered  
9/3/2018 2:40:26 PM: Information: G7120A:DEBAY00131 - Pump initializing  
9/3/2018 2:40:39 PM: Information: G7120A:DEBAY00131 - Pump on
```

Figure 15 Information provided in the Diagnostic Log of the LC Status Dashboard

After the restart of the pump the LC Dashboard is green and ready. Note that the Diagnostic log as well the Empower Message Center indicate a configuration change.

Using ISET in Empower

- Perform a new configuration after the reboot of the LAC/E to ensure a correct configuration.

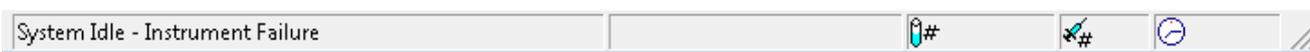


Figure 16 Empower Status Information bar

Error	Instrument	9/3/2018 2:38:33 PM CEST	ISET_vialsampler	System/Administrator	LC\Caffeine Test Data	G7120A:DEBAY0031 - Configuration changed.
Error	Instrument	9/3/2018 2:42:36 PM CEST	ISET_vialsampler	System/Administrator	LC\Caffeine Test Data	Agilent.LC#ISET Setup Failed
Error	Instrument	9/3/2018 2:42:36 PM CEST	ISET_vialsampler	System/Administrator	LC\Caffeine Test Data	Instrument Failure

Figure 17 Information provided in the Empower Message Center

86	Error	Instrument	9/3/2018 3:17:30 PM CEST	ISET_vialsampler	System/Administrator	LC\Caffeine Test Data	Agilent.LC#ISET Setup Failed
87	Error	Instrument	9/3/2018 3:17:30 PM CEST	ISET_vialsampler	System/Administrator	LC\Caffeine Test Data	Instrument Failure
88	Error	Instrument	9/3/2018 3:17:30 PM CEST	ISET_vialsampler	System/Administrator	LC\Caffeine Test Data	InstrumentAgilent.LC#ISET: Manual resolution is required, as Method is inconsistent with the current hardware configurations

Figure 18 Information provided in the Empower Message Center

After the successful reconfiguration of the system, now without ISET, method resolution is called, opening a method generated on the system while ISET was activated.

NOTE

Each method generated during the 700h trial period requires method resolution. The Empower and instrument logbook (Diagnostic logbook) inform about the configuration change. Without manual method resolution, the methods cannot be executed. If an unresolved method is called in an unattended sequence, the sequence will stop.

NOTE

Until the method is correctly resolved, the system will respond with an instrument failure.

- In order to resolve the method, click **Yes** in the method resolution window and the ISET parameter section will disappear from the method screen.

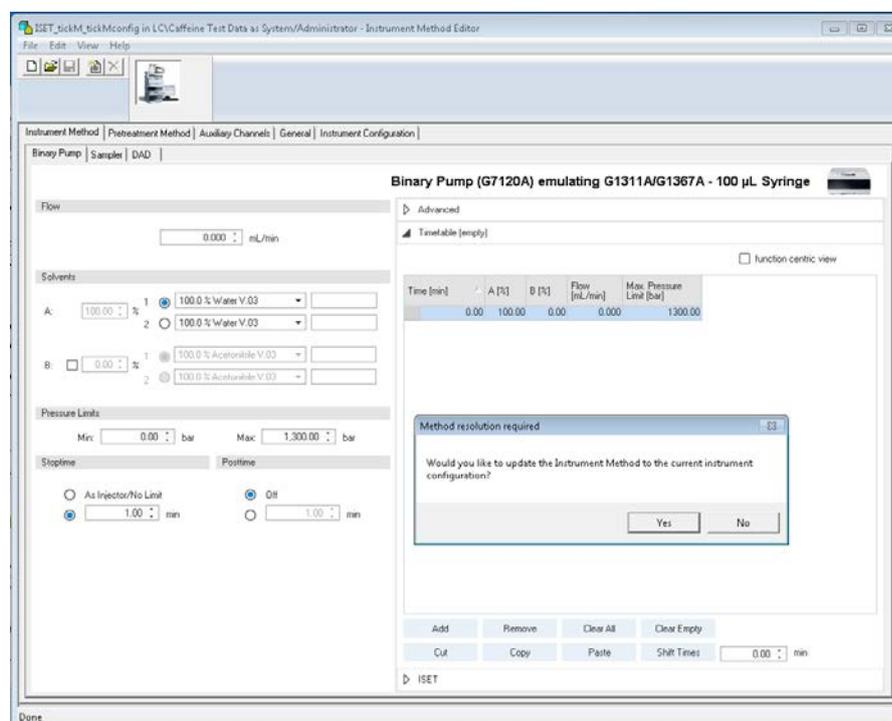


Figure 19 The method's ISET parameter calls the method resolution

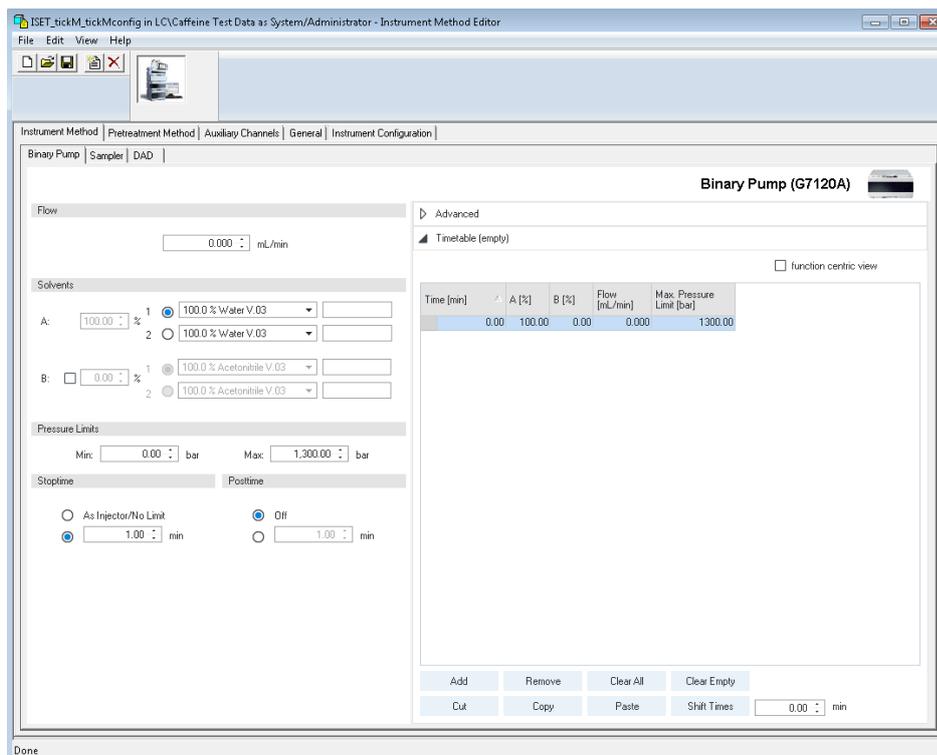


Figure 20 Method after performed method resolution

Empower Systems without PreConfiguration Tool

Perform the following steps, as loading the method will trigger a method resolution:

- 1 Reboot the pump and wait for the re-initialization (ISET pictogram gone).
- 2 Close Empower and reboot the LA/CE.
- 3 To run a method generated during the trial time on the updated system, perform the method resolution and save the method.

NOTE

If step 2 is not performed, the system continues to provide instrument failures. Unless a reboot is performed, it is not possible to proceed with methods written during the 700h trial period.

Empower Systems with PreConfiguration Tool

- 1 Perform the following steps, as loading the method will trigger a method resolution:
- 2 Reboot the pump and wait for the re-initialization (ISET pictogram gone).
- 3 Close Empower and reboot the LA/CE.
- 4 Open the PreConfiguration Tool and perform a new auto-configuration.
- 5 To run a method generated during the trial time on the updated system, perform the method resolution and save the method.

NOTE

If step 2 and 3 are not performed, the system continues to provide instrument failures. Unless a new auto-configuration is performed in the PreConfiguration Tool, it is not possible to proceed with methods written during the 700h trial period.

References

Agilent InfinityLab LC With ISET User manual:

https://www.agilent.com/cs/library/usermanuals/public/ISET4_USR.pdf

Agilent InfinityLab LC with ISET User manual

[https://www.agilent.com/cs/library/usermanuals/public/ISET4_USR.pdf\(G7120-90310\)](https://www.agilent.com/cs/library/usermanuals/public/ISET4_USR.pdf(G7120-90310))

Application Notes / Information on ISET available on www.agilent.com

<https://www.agilent.com/en/applicationfinder/applicationfinder>

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REVISION 2



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