

Using the Fraction Collector in Empower 3 Environment

Technical Note

Technical Guide for the configuration and use of the Agilent Fraction Collectors with Waters Empower

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Introduction

When using an Agilent LC without an automated sampler, a manual injector is required to perform a run, e.g. G1328C Agilent 1260 Infinity II Manual Injector.

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

This guide describes how to configure Agilent Fraction Collectors in a Waters Empower environment.

Table 1 Supported and unsupported configurations

Waters Instrument Control Packages	Agilent ICF Agilent LC Driver	Fraction Collection support in Waters Empower 3
ICF Support v3.2 With ICF 2.6 Update 2 # 667006157	A.02.06 U2 A.02.19 SR2	supported
ICF Support v3.2 #667006057	A.02.05 A.02.18	supported
ICF Support v3.1 #667005859	A.02.05 A.02.18	
ICF Support v3.0 With ICF A.02.5 Update #667005815	A.02.05 A.02.18	
ICF Support v3.0 #667005586	A.02.04 A.02.14	
ICF Support v2.2 With ICF A.02.04 Update #667005584	A.02.04 A.02.14	Supported
ICF Support v2.2 #667005449	A.02.03 DU2 A.02.13	
ICF Support v2.1 HF1 #667005397	A.02.03 DU1 HF2 A.02.11 SP1 HF2	
ICF support v3.0	A.02.04 A.02.14	
ICF Support v2.1 HF1 #667004920	A.01.05 SP1	
ICF Support v2.1 HF1 #667004900	A.01.04	Not supported
and any lower integration	and any lower integration	

Table 2 Supported Agilent Fraction Collectors

Product No.	Module Name	Min. FW
G1364A	1100 Automatic Fraction Collector	A.06.53
G1364B	1260 Infinity Preparative-scale Fraction Collector	A.06.53
G1364C	1260 Infinity Analytical-scale Fraction Collector	A.06.53
G1364D	1260 Infinity Micro-scale Fraction Collector	A.06.53
G5664A	1260 Infinity Bio-inert Fraction Collector	A.06.53

Adding the Fraction Collector to the Agilent LC Instrument System

NOTE

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

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

Adding the Fraction Collector to the Agilent LC Instrument System

First prepare the instrument set up:

- 1 Close the Empower CDS.
- 2 Switch off the Agilent LC Tower and add the Agilent Fraction Collector to the LC System.
- 3 Connect the power plug and use the CAN cable to connect the fraction collector module with one module of the existing Agilent LC system. If additional information is required, please consult the user manual of the fraction collector in question.
- 4 Switch on all modules in the Agilent LC instrument system.
- 5 Put the required vial tray, wellplate tray, or tube tray in the Fraction Collector.
- 6 If wellplates are in use: Place all required wellplates in the Fraction Collector.
- 7 Close the Fraction Collector door.

Configuration of the Fraction Collector

Configure Fraction Collector in Empower

The configuration of the Fraction Collector in Empower requires the **PreConfiguration Utility**.

Agilent provides the **PreConfiguration Utility** as part of the ICF installation, starting with ICF A.02.01, available in Empower since ICF Support v 2.1 HF1 / ICF A.02.03 DU1 HF2.

The **PreConfiguration Utility** can be found at one of two locations:

- ICF Support v 2.1 HF1: Using Empower installation on the LAC/E box (see "Using Empower Installation on the LAC/E box" on page 3).
- ICF Support v 2.2 and higher: Via the Empower Configuration Manager (recommended for Client/Server configuration) (see "Via the Empower Configuration Manager" on page 4).

Using Empower Installation on the LAC/E box

- 1 Navigate to <drive letter>:\Empower\Instruments\AgilentLC and double-click the PreConfiguration Utility.

 Agilent.InstrumentControl.InstrumentPreConfigurator.exe

Figure 1 PreConfiguration Utility

Configuration of the Fraction Collector

Via the Empower Configuration Manager

Software required: ICF Support v2.2 or higher (See "Known Issues and Limitations" on page 16)

- 1 In the Empower **Configuration Manager**, select **Tools > Agilent PreConfiguration**.

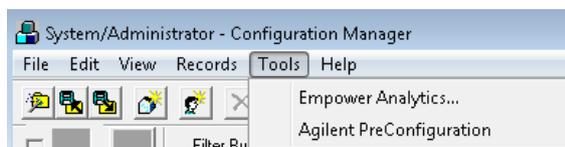


Figure 2 Configuration Manager

- 2 Enter the IP address or host name of the LAC/E box that your instrument is connected to into the pop-up screen **Configuration Directory** and click **Connect**.

NOTE

Do not enter the IP address of the instrument here.

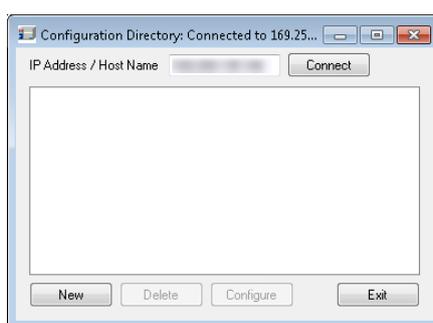


Figure 3 IP address to connect

- 3 Once the IP address is connected, click **New** to open the **PreConfiguration Utility**.

Regardless of which PreConfiguration Utility was chosen, continue the configuration using the following steps when **InstrumentConfigurations** opens:

- 1 Configure the Agilent system using **AutoConfigure**. All online LC modules (connected via CAN cables) are automatically detected and added into the right-hand window.

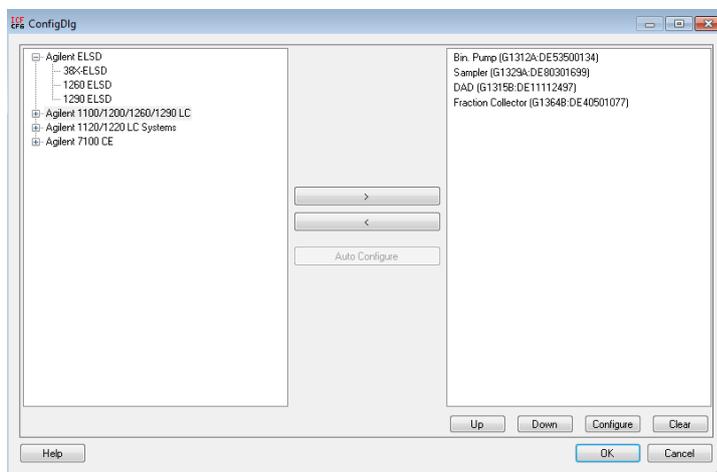


Figure 4 Fraction Collector configuration set up

Configuration of the Fraction Collector

- 2 Double-click on the Fraction Collector in the left side of the window or select it and click **Configure** at the bottom of the screen.

The Fraction Collector configuration window opens.

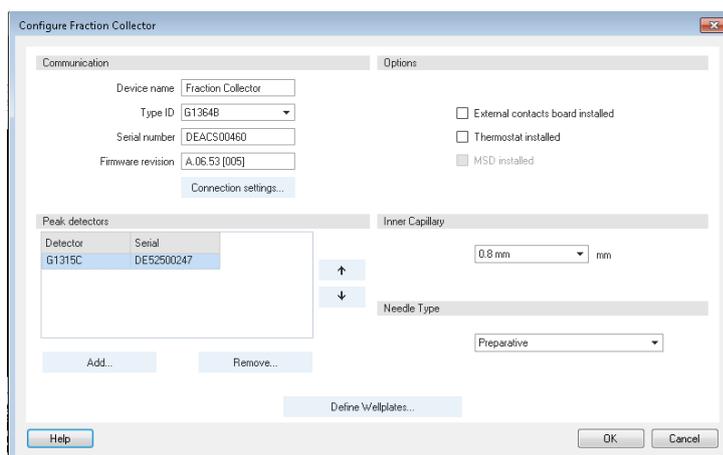


Figure 5 Configuration Screen of the Fraction Collector

- 3 In the **Configure Fraction Collector** dialog, the following set points/information can be defined:

Communication: This information is automatically determined when first connecting with the module.

Peak Detector: Present detectors in this screen can be used as peak triggers for the Fraction Collector. They are detected during auto-configuration. Up to 4 peak detectors are supported.

- a Define the required peak detector.
- b If you have several peak detectors, specify the order by using the up and down arrows.

Options: Additional options for the Fraction Collector can be selected. Additional options are graphically indicated in the LC status window (e.g. **Thermostat installed**, **External contact board installed**) and enable additional method settings for these options.

NOTE

In Empower environment mass-based fraction collection is not supported. Regardless, the option becomes available as soon as a G1390A Universal Interface Box (UIB) is connected.

Inner Capillary: Specify the inner capillary to be used. The value needs to be set according to the capillary in use. This parameter is not detected automatically.

Needle Type: Depending on the physically built-in needle, the needle type must be set manually. This parameter is not detected automatically.

Define Wellplates...: This dialog offers various predefined wellplates currently available, as well as the possibility to add customized plates. You cannot assign which plates will be used for a run in this dialog. This can only be done in the LC Status Dashboard.

NOTE

The wellplates used for the Fraction Collector need to be set here and in **Empower > Configuration Manager > Plate Types**. Ensure that the sample to be used is defined in both dialogs.

Note that wellplate changes can be triggered by a user changing the tray or a plate configuration on purpose, but a change is also triggered by the system when

- a tray is not in the fraction collector during startup of the software
- the fraction collector door is open while software starts up
- a tray is changed during the runtime of the fraction collector – a change on the fly is not possible.

Run Sample – Use the Fraction Collector in Empower

NOTE

Before starting **Run Sample** in Empower ensure that

- a tray is present in the fraction collector. In case of a wellplate tray, the plates are already placed on the tray.
- the fraction collector door is closed.

Start Empower **Run Sample** screen. The LC Status window automatically displays all available online modules. The Fraction Collector shows the identified tray (vial tray, tube tray or wellplate tray).

Figure 6 exemplarily shows a recognized tray example of a new instrument with a 4 plate wellplate tray.

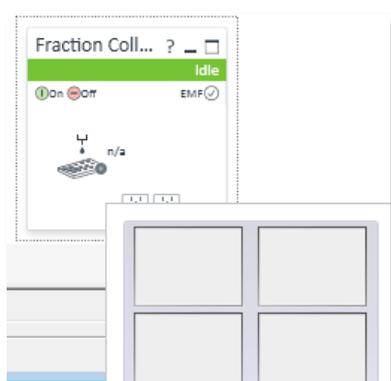


Figure 6 New instrument with a 4 plate wellplate tray

NOTE

After this first instrument start up not all configuration items are defined. For example, you need to define the wellplates you want to use or add the tube volume and height information if you want to use a tube tray.

If the instrument was never used with this tray before, the tray is recognized, and the last known plates are used. You need to assign the correct plates currently present in the next step.

If the instrument was already used before, the last known plate configuration for this tray used by this instrument appears.

If the user requires a different plate type and changes them in the tray, a new assignment is required. Figure 7 shows a recognized tray example of an instrument with a 2 plate/10 vial tray, which was previously used on this instrument with those assigned plates.

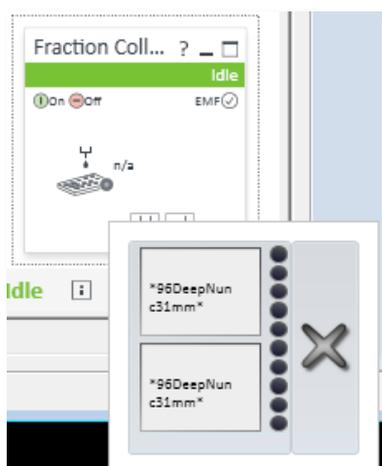


Figure 7 Instrument with previously assigned plates

Assign Wellplates or Tube Information

There are two ways to assign these additional configurations

- via **Module Option** (recommended) OR
- via right-clicking on the Fraction Collector tile

NOTE

Agilent strongly recommends using the Module options to change the configuration settings.

The Fraction Collector offers additional configuration parameters, e.g. the fraction order.

- 1 To define these parameters via the **Module Options**, select the corresponding tab below the LC Status Dashboard.

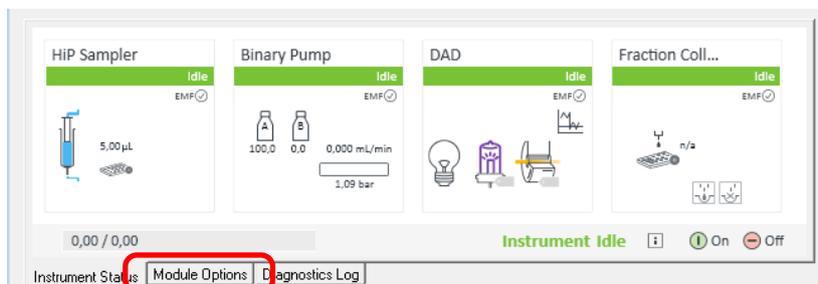


Figure 8 Agilent LC Instrument Status Window

- 2 Click **Module Options**.



Figure 9 Module options button

- 3 Define the parameters in the **Soft Configuration**.

Tray A/B/C – the tray is automatically recognized during the software startup. If the tray is *not* recognized, verify that there is no hardware related issue.

- The tag is not written correctly (try another tray)
- A defect antenna (try the same tray in another fraction collector)

Plate Type (not accessible when using tube trays)

The LC driver offers these plate types, for example 384 Agilent.

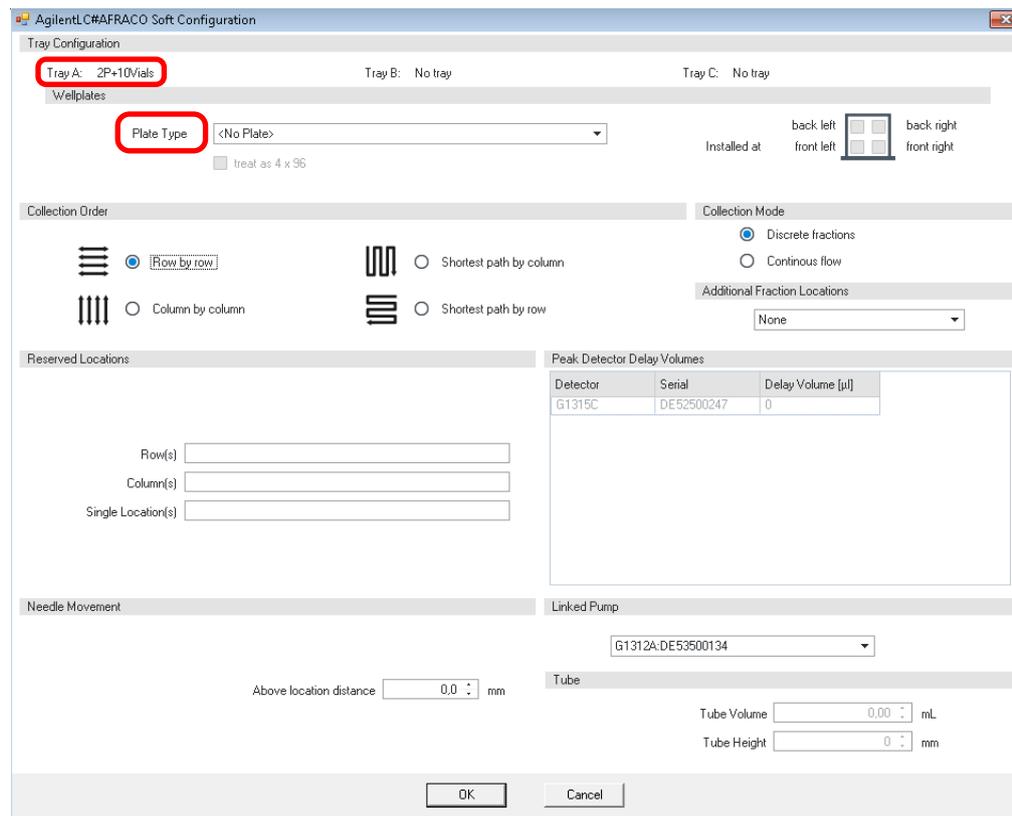


Figure 10 Fraction Collector Options Wellplate and Vial Tray

Collection order

Offers the possibility to define the collection order strategy, for example **Row by row**. Detailed information is provided in the online help. Press **F1** while in the Soft Configuration window.

Collection mode

Offers the definition how the collection takes place

- **Discrete fractions:** The diverter valve switches to waste before moving on.
- **Continuous flow:** The flow continues while moving to the next position.

Detailed information is provided in the online help. Press **F1** while in the Soft Configuration window.

Additional Fraction Locations (Not supported in Empower environment)

Offers additional fraction collection locations like 10 vials or funnel bars. This option is not supported in Empower Environment.

Reserved Location

Allows to specify locations that will not be used for fraction collection. Detailed information is provided in the online help. Press **F1** while in the Soft Configuration window.

Peak Detector Delay Volume

Use Lab Advisor for the delay volume calibration. The delay volume is written to the Fraction Collector module and read out by the Driver. It is also possible to manually enter the delay volume.

Needle Movement

Allows to specify how the need moved into/above the fraction collection. Detailed information is provided in the online help, Press **F1** while in the Soft Configuration window.

Linked Pump

If required, this parameter needs to be set manually. This function should be used, as the delay volume calibration will enable this volume to be calculated based on new flow rates set on the pump.

Tube (parameter only active if a tube tray is recognized)

These parameters are required when using tubes and are automatically filled by the system for Agilent consumables.

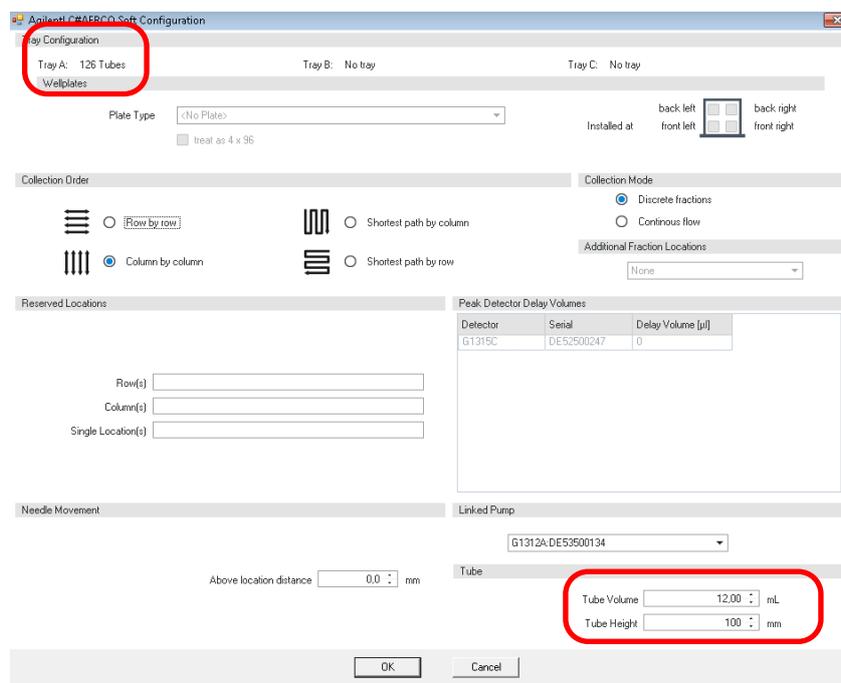


Figure 11 Fraction Collector Options Tube tray

NOTE

Important: Any change in this dialog requires a reboot and a new auto-configuration using the **PreConfiguration Utility**.

Additional Fraction Collector Configuration via Fraction Tile

- 1 Right-click on the Fraction Collector Tile. Select **Assign Wellplates...**

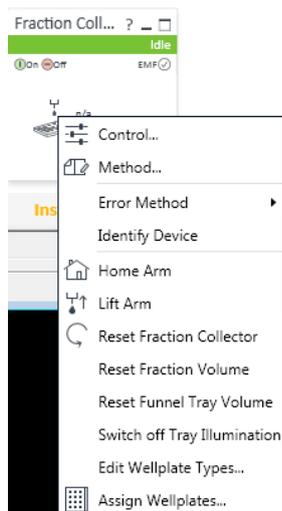


Figure 12 Assigning wellplates via the LC status window

- 2 In the **Tray and Plate Configuration** dialog, select the plate type you want to use.



Figure 13 Plate Type selection

NOTE

Important: Any change in this dialog requires a reboot and a new auto-configuration using the **PreConfiguration Utility**.

The Fraction Collector method

- 1 If the currently loaded configuration is not in synch with the loaded **Instrument Method**, the system requests the user to update the given method configuration with the new instrument configuration. Click **OK** and the system opens the method dialog.
- 2 Set the parameters:

Instrument Configuration tab: In the **Instrument Configuration** tab, the LC system configuration is available. Changes in this section of the method are not applied to the system. All settings in this dialog, as well as any changes such as modifying the needle type must be set in the PreConfiguration tool.

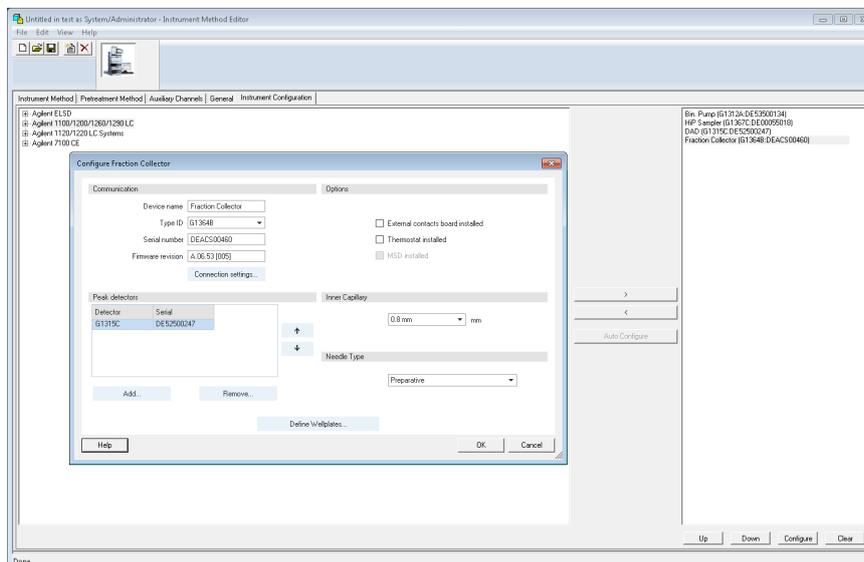


Figure 14 Fraction Collector Configuration Screen in instrument method

General Tab: Select the **Start at Location** check box and provide the fraction start location.

NOTE

The syntax of the fraction start location is important. Only correct locations parameters enable a start of the run/sequence. Ensure to follow the schema, for example: P1-A-1.

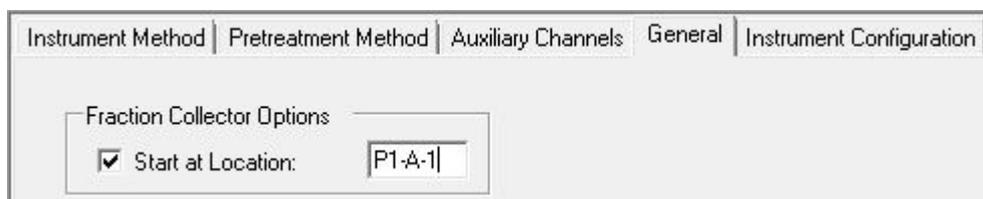


Figure 15 Fraction Collector Options

Instrument Method tab: The instrument method tab provides access to all method parameters of the LC system, one tab per module. Select the **Fraction Collector** tab to enter the method parameters.

Run Sample – Use the Fraction Collector in Empower

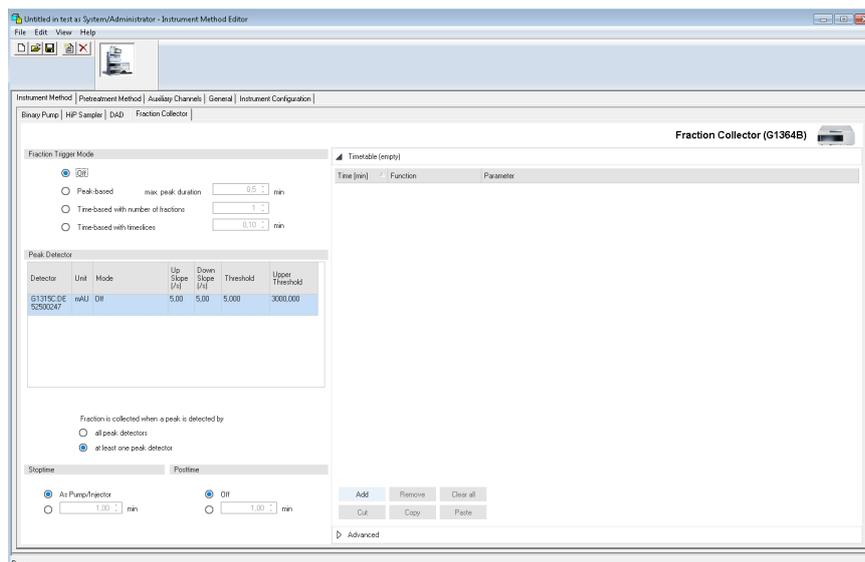


Figure 16 Fraction Collector Method Screen

Left Hand side:

- **Fraction Trigger Mode:**
 - Off** (no fraction triggering)
 - Peak-based** (at least one peak detector must be set)
 - Time-based with number of fractions** (ensure to enter a stop time)
 - Time-based with time slices**

Mass-Based fraction collection requires the option **MSD installed** to be enabled. When using an UIB to connect to an MS, this setting is available. Keep in mind that the combination of Fraction Collection and MSD is not supported.

NOTE

For the delay volume calibration use Lab Advisor. The delay volume is written to the Fraction collector module and read out by the Driver. Also, it is possible to manually enter the delay volume.

- **Peak Detector parameters**

The detector being used to trigger the Fraction Collector is listed along with peak detector parameters for slopes and threshold.

Right Hand Side:

- **Timetable**
- **Advanced** set points
 - Rinse Fraction Collector Needle (Default: no selection)
 - Auxiliary – Max. fill volume per location (Default: as configured)

Changing Trays and Plates using the Fraction Collector

Changing a tray and changing plates in the Fraction Collector is a change of the configuration.

The instrument and software need to adjust the parameters accordingly. Examples are the number of locations, the tube height/volume, the position numbering. These changes have to be written to the instrument and read out by the software as the system needs to be synchronized. In Third Party environment, this synchronization requires a restart of the instrument control PC or, if PreConfiguration is used, a new auto-configuration.

A configuration change is triggered

- if no tray is present in the fraction collector during software start-up.
- if the fraction collector door is open during software startup.
- if the tray is exchanged during run time.
- if the assigned wellplate is changed.

Example:

How to change from a 2 plate/10 vial tray to a wellplate tray with 4x 384 wellplates:

- 1 The current set up shows the 2 plate/10 vial tray. Changing to the 4x 384 wellplates requires a tray change.

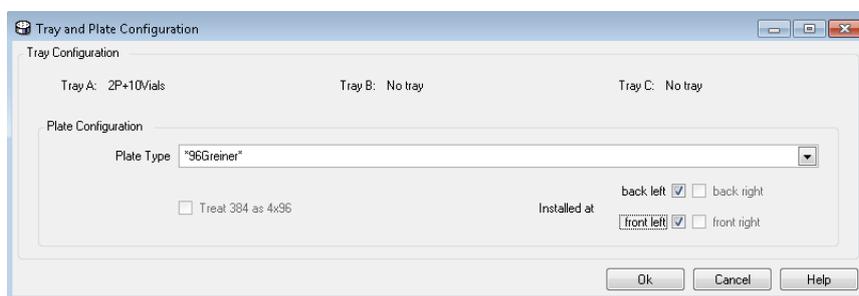


Figure 17 Tray and Plate Configuration dialog

- 2 Exchange the tray in the fraction collector. Place the 384 wellplates on the tray.
- 3 Close the fraction collector door and wait until the system finishes the arm movement.

The LC Status dashboard of the fraction collector still shows the 2 plates/10 vial tray, the sequence locations offer less location, etc. as the new configuration is not synchronized between instrument and software.

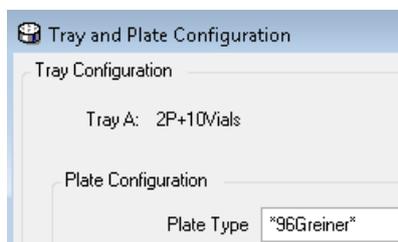


Figure 18 Tray Configuration

- 4 Close **Run Samples** and open the Empower **Configuration Manager**.
- 5 Reboot the LAC/E.
- 6 Start the **PreConfiguration Utility**.
- 7 Delete the existing instrument and perform a new auto-configuration.
- 8 Close the **PreConfiguration Utility**.

Run Sample – Use the Fraction Collector in Empower

- 9 Start **Run Samples**. The LC Dashboard Fraction collector tile shows the updated tray information. The last assigned plates are displayed in the graphical interface:
- If this tray has not been on this system before, the plates' locations are empty.
 - If this tray was previously used with 4x 384 plates, the plates are already correctly assigned as the instrument stored this information.
 - If the tray was used with another plate, that plate assignment will appear in the graphical interface.

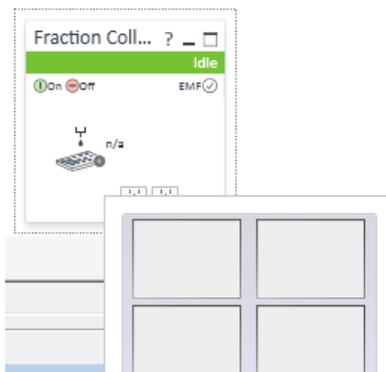


Figure 19 New wellplate tray recognized

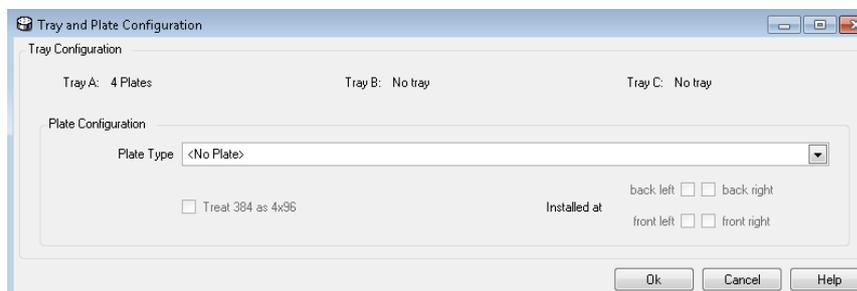


Figure 20 Tray after change recognized, no plates defined after recognition

Run Sample – Use the Fraction Collector in Empower

- Assign the plate type either via the Module options or the LC Status Dashboard Fraction Collector tile. To do the latter, right-click and select **Assign wellplates > Assign plates to the tray**. Changing the plate here, the tile will briefly go to status yellow as it writes the new configuration to the instrument.

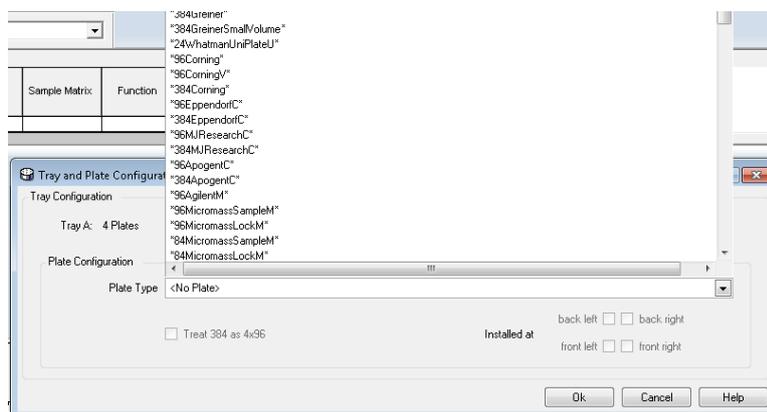


Figure 21 Plate Configuration

- Close the CDS and reboot the LAC/E.
- Perform a new auto-configuration using the PreConfiguration Utility.
- Restart the run samples.

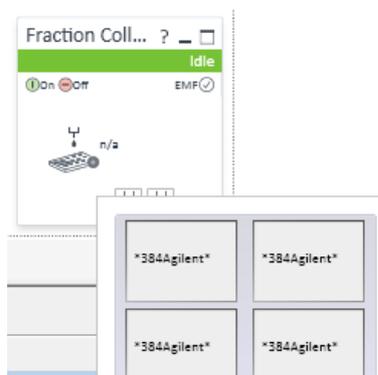


Figure 22 Wellplate tray

Known Issues and Limitations

Following functions /features are not supported in Empower Environment:

- **MS installed**
- **Additional Fraction Locations**
- The 10 vial position on a **10 vial position on a 2Plate/10 vial tray** is not supported

Appendix

Waters TechNotes

Additional information on the PreConfiguration Utility is provided on the Waters Support Webpage:

<http://www.waters.com/waters/support.htm?lid=134936402&cid=511442&type=TECN>

Document reference: TECN134936402

Title: Using the Agilent PreConfiguration Utility with Agilent ICF Support Version 2.2