Agilent InfinityLab LC Series Multicolumn Thermostats and Column Usage in Empower

Technical Note

Technical Guide for the configuration and usage of columns with the Agilent 1260 Infinity II Multicolumn Thermostat (G7116A) and Agilent 1290 Infinity II Multicolumn Thermostat (G7116B) within Waters Empower environment.

Introduction

The Agilent InfinityLab LC Series Multicolumn Thermostats (G7116A/B MCT) provide precise temperature control over a broad temperature range and optional use of column switching valves. The chromatographic columns in the compartments can be equipped with column identification tags, which help you check your column use by logging various column properties and usage parameters. Two types of information are stored: static fields featuring physical characteristics such as column length and particle size; and dynamic fields, which include details such as number of injections and the maximum temperature used.

This information could be used later in Data Analysis and may be required on reports in regulated environments.

Depending on the lab requirements, column configuration can be static or require column changes by the user.

Waters Corporation´s adoption of the Agilent Instrument Control Framework (ICF) for their Empower Data System is called *Agilent ICF Support Layer* (ICF SL).

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

Table 1 Supported Column Compartments

Waters ICF support Version	Column Compartments
Starting with Waters ICF Support v2.2.1 P/N 667005678 Updated with ICF A.02.04 and LC Driver A.02.14	G7116A 1260 Infinity II Multicolumn Thermostat G7116B 1290 Infinity II Multicolumn Thermostat G1316C 1200 Series Thermostatted Column Compartment
Below Waters ICF Support v2.2.1	G1316C 1200 Series Thermostatted Column Compartment

NOTE

Ensure that all Agilent LC modules in the LC system meet or exceed the minimum firmware requirements specified by the third-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

Offered valve heads

Agilent offers various valve heads for the Column Compartments, please contact your Agilent representative for specific needs or have a look at the Agilent Webpage InfinityLab Quick Change Valves Ordering Details | Agilent.

Prerequisites/Compatibility Information

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

Requirements for the Column Compartment modules and for valve heads are outlined in the Agilent User Manuals:

- Agilent InfinityLab LC Series Multicolumn Thermostats User Manual

The following material is available on www.agilent.com.

- HPLC Column Compartments | Agilent
- HPLC Column Scouting Valve, InfinityLab Quick Change Valves | Agilent

Overview of possible Quick Change Valves

- InfinityLab Quick Change Valves Ordering Details | Agilent

Adding a Column Compartment to the Agilent LC Instrument System

First prepare the instrument set up:

1. Switch off the Agilent LC stack and add the Agilent Column Compartment to the LC System.
2. Connect the power plug and use the CAN cable to connect the Column Compartment module with one module of the existing Agilent LC system. If additional information is required, consult the User Manual of the respective Column Compartment.
3. Place the columns into the compartment and connect them with the required valve ports using installation instructions provided with the valve (see "Prerequisites/Compatibility Information" on page 3).
4. Install the column ID tags if present.
5. Switch on all modules in the Agilent LC instrument.

Summary of Column Assignment Configuration Steps

The next chapters describe the steps to set up the initial column assignment as well as necessary steps when altering the column assignment. Alterations include adding, changing, or deleting a column.

This is the summary list of steps to be taken to ensure the correct display and use of the columns. The detailed steps are outlined in:

- Initial Configuration of the Column Compartment on page 6,
- Initial Column Configuration in Run Samples on page 8, or
- Add, Change, or Delete Columns After the Initial Configuration on page 11

Initial setup

NOTE Due to a technical limitation in ICF SL (see "Known Limitations" on page 17), this step procedure is required to correctly assign columns using Empower/ICF SL.

NOTE During initial configuration, do not perform the plumbing configuration in the **PreConfiguration Utility**.

1. Start Empower **Run Samples** and perform **Column Assignment** via the Column Compartment status dashboard.
2. Close Empower.
3. Open the Empower **Configuration Manager**.
4. Perform **Auto Configuration** via the **PreConfiguration Utility**.
5. Generate your methods for this setup.
6. As soon as the Column Assignment is altered, perform the following additional actions. For details see "Add, Change, or Delete Columns After the Initial Configuration" on page 11.

Add, change, and delete columns – with changing plumbing and color code

1. In the Column Compartment status dashboard, use the **Column Assignment** to set up a new column.
2. Close Empower.
3. Open the Empower **Configuration Manager** and perform **Auto Configuration** via the **PreConfiguration Utility**.
4. Generate new methods with the new **Column Assignment**. It is not possible to update the column of a method generated with a different plumbing or color code assignment.

Add, exchange, change, and delete columns – without changing plumbing and color code

Adding, exchanging, changing, or deleting a column without a change in plumbing and color code does not require a new configuration.

1. Open the **Column Assignment** via the Column Compartment tile.
2. Perform the required change.
3. Click **Refresh Table** in the table dialog box to see the updated column information.

Initial Configuration of the Column Compartment

Configure Column Compartment in Empower

The configuration of the Column Compartment 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.

You can open the **PreConfiguration Utility** as follows:

- Using the Empower installation on the LAC/E box
- Using the desktop shortcut to the **PreConfiguration Utility**
- Using the Empower Configuration Manager (recommended for client/server configuration)

Using the Empower Configuration Manager

Software required: ICF Support v2.2

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

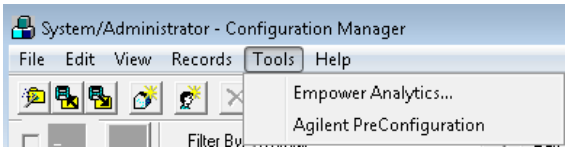

Figure 1 Configuration Manager

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. The IP address/host name of the LAC/E box is required.

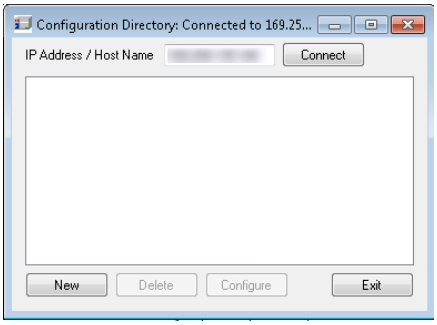

Figure 2 IP address to connect

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

Regardless of which **PreConfiguration Utility** was chosen, continue the configuration as follows.

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

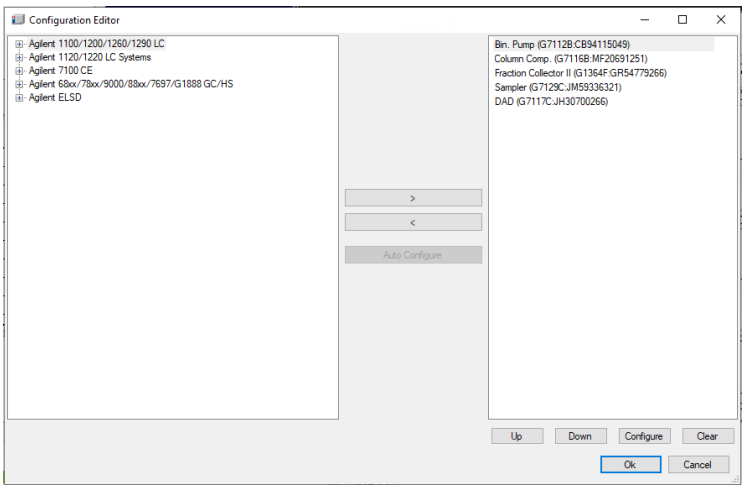

Figure 3 Column Compartment configuration setup

NOTE

Do not open the configuration screen of the Column Compartment. Configurations added here are not applied to the system.

If you changed the plumbing and column assignment in the LC Status Dashboard of the Column Compartment tile, repeat the **Auto Configuration**.

Initial column configuration in Run Samples

NOTE

Before starting **Run Samples** in Empower, ensure that the columns are present in the Column Compartment. If you want to use column tags, ensure they are present.

1 Start Empower **Run Samples** screen. The LC Status window automatically displays all available online modules.

Figure 4 exemplarily shows the Column Compartment Status Dashboard with no assigned columns.

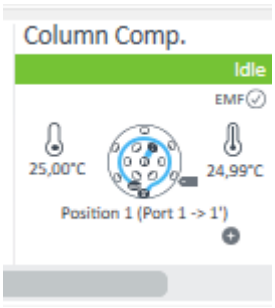

Figure 4 LC Dashboard Column Compartment Tile without column assignment

2 Right-click into the Column Compartment tile and select **Column Assignment**.

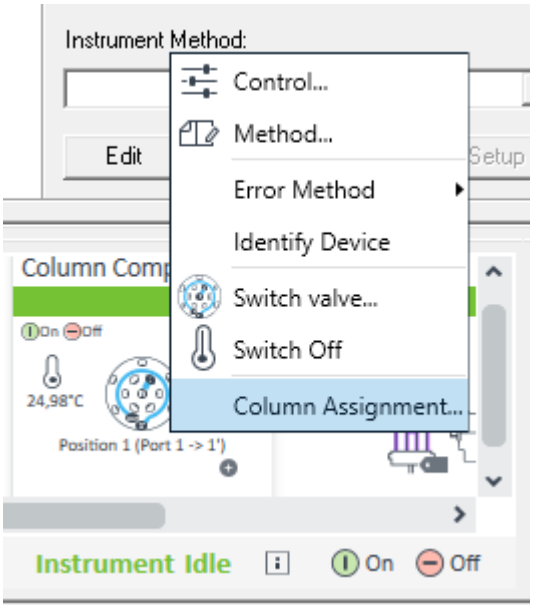

Figure 5 Column Compartment context menu

The system reads back the current column information present on the LC instrument.

For columns with column tag, the parameters on the tag are reported.

For columns without column tag, the parameters manually entered by the user are reported. They are written into the firmware of the module. Hence, for newly set up systems, there will be no column information.

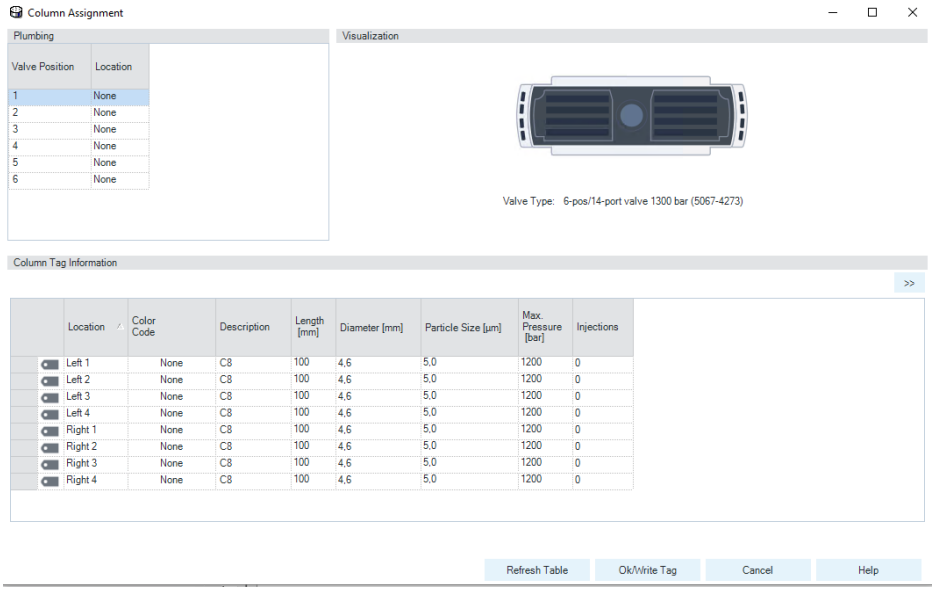

Figure 6 Default **Column Assignment** window with no columns in the compartment

3 Perform **Column Assignment** for each of the columns in the compartment with the following steps:

a Define the **Plumbing** for the column matching the physical set up in the compartment.

b Define the **Column Tag Information**. For details, see the Online help or chapter *Using Column ID Tags* in the Agilent InfinityLab LC Series Multicolumn Thermostats User Manual.

For columns with prelabeled ID tag column details are already present.

For columns with empty column ID tags, the information must be provided and written on the tag. As soon as the tag holds information, it is automatically presented here.

For column without column ID tag the information needs to be entered manually.

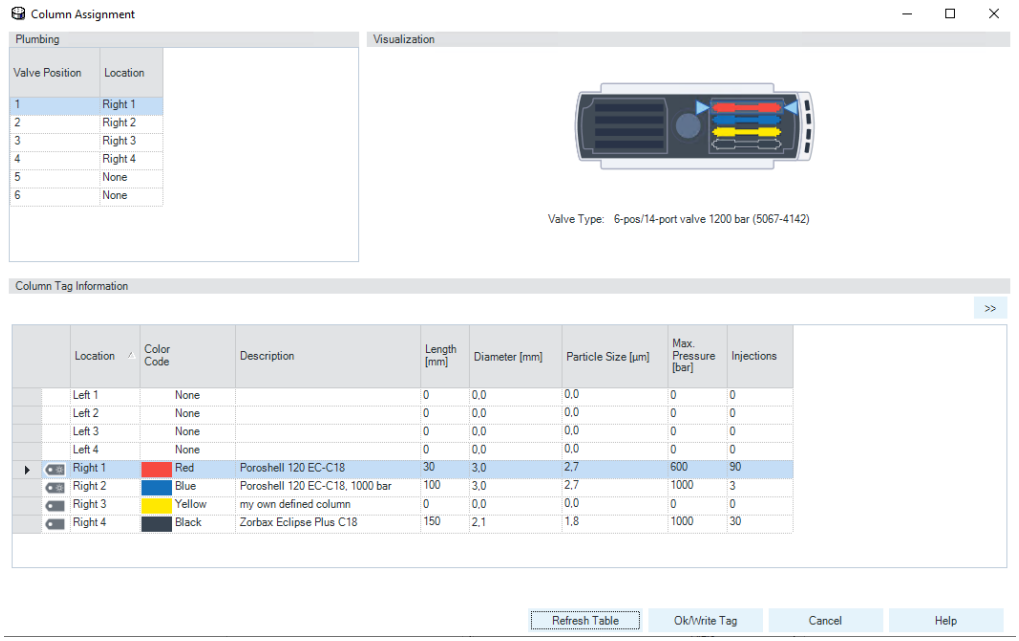

Figure 7 **Column Assignment** in LC Dashboard

NOTE

Any change of the **Plumbing** requires a reboot and a new **Auto Configuration** using the **PreConfiguration Utility**.

Thus, close **Run Samples**, switch off the instrument and perform a new **Auto Configuration**.

NOTE

Changes of the following **Column Tag Information** require a reboot and a new **Auto Configuration** using the PreConfiguration **Utility**:

- Location
- Color Code

Ensure that the Plumbing part of the Column Compartment configuration screen in the **PreConfiguration Utility** is in synch with the Plumbing part of the Column Assignment window on the Column Compartment tile of the LC status dashboard.

NOTE

Once the **Column Assignment** is performed, the plumbing is written back to the instrument and changes the configuration**.** *Changes of the plumbing enforce a new Auto Configuration via the* **PreConfiguration Utility**.

The column tag information is written to the tag only and does not enforce a configuration change (except changing location and color code).

To finalize the column configuration and assignment, perform an **Auto Configuration** via the **PreConfiguration Utility** (see Using the Empower Configuration Manager on page 6).

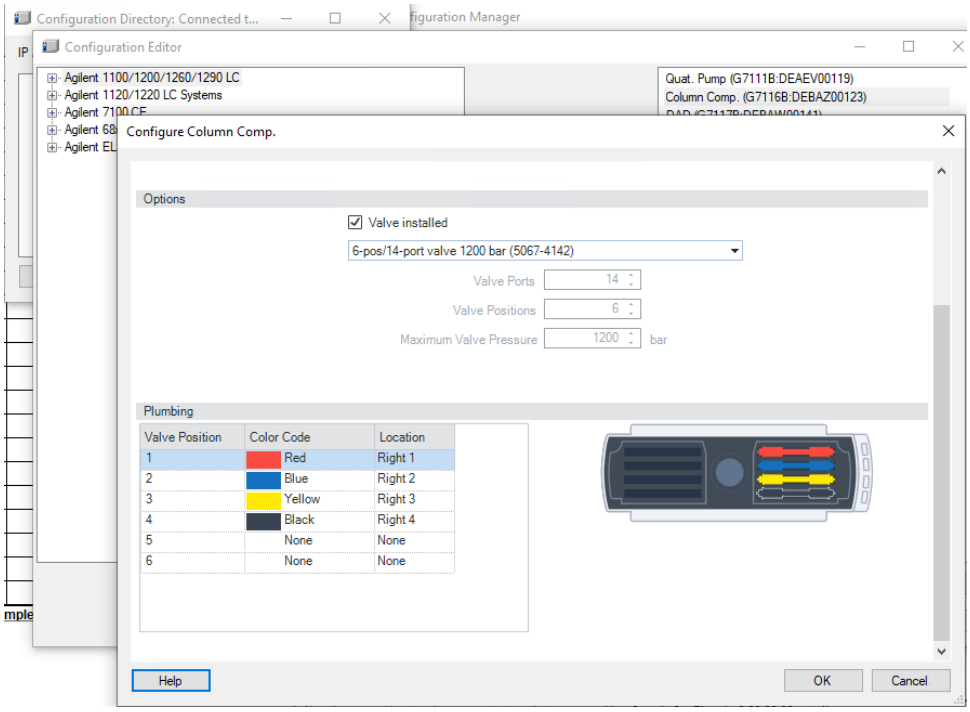

Figure 8 Synchronization with the LC Status Dashboard

4 Restart **Run Samples**.

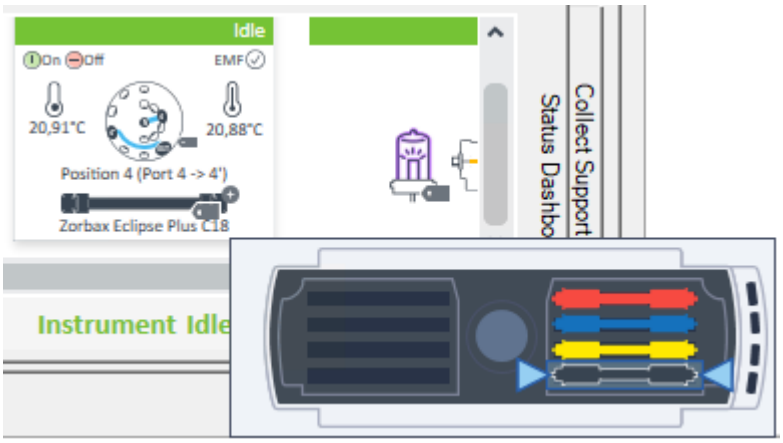

Figure 9 LC Status Dashboard

Add, Change, or Delete Columns After the Initial Configuration

Depending on the focus of the laboratory (e.g. QA or R&D), you need to change columns with different frequency. Changing columns and their information may impact the configuration.

- With column ID tag, columns are identified automatically.
- Without column tag, the user must manually add all column parameters.

NOTE

Adding, changing, exchanging, or deleting a column *with a change in plumbing/color code,* requires a new configuration.

Thus, close **Run Samples**, switch off the instrument and perform a new **Auto Configuration**.

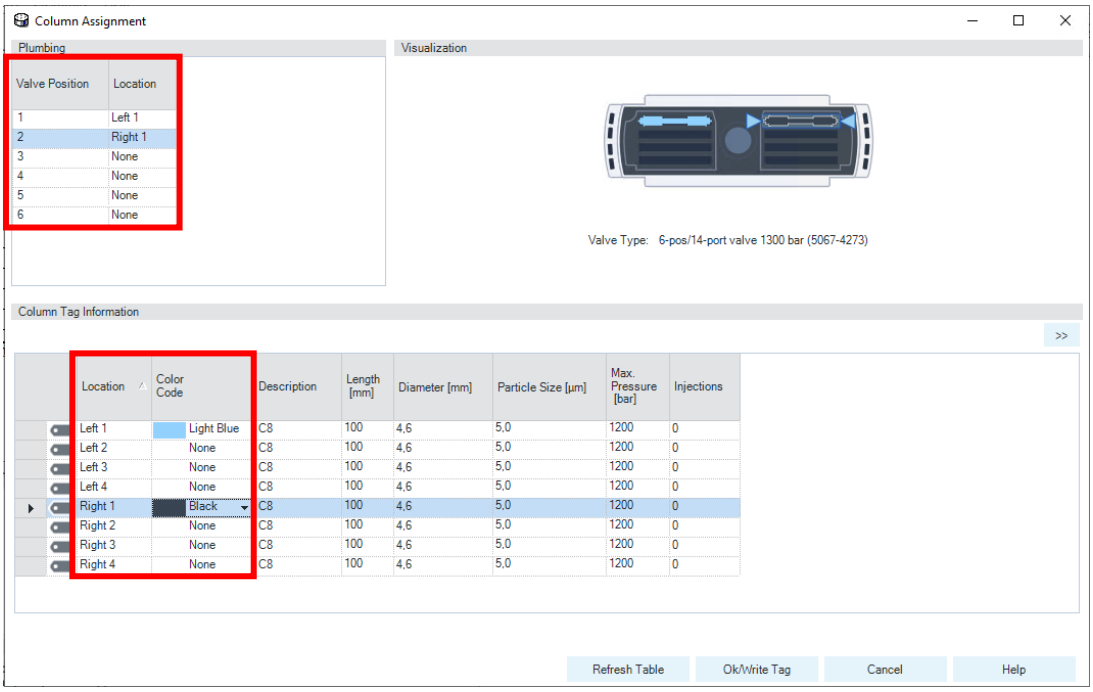

Figure 10 Parameters in the **Column Assignment** window

Changing the settings shown in Figure 10 impacts the configurational setup and requires a new **Auto Configuration** via the **PreConfiguration Utility** (see "Using the Empower Configuration Manager" page 6).

NOTE

Adding, changing, exchanging, or deleting a column *without a change in plumbing/color code* does not require a new configuration. To see the updated column information, click **Refresh Table** in the **Column Assignment**.

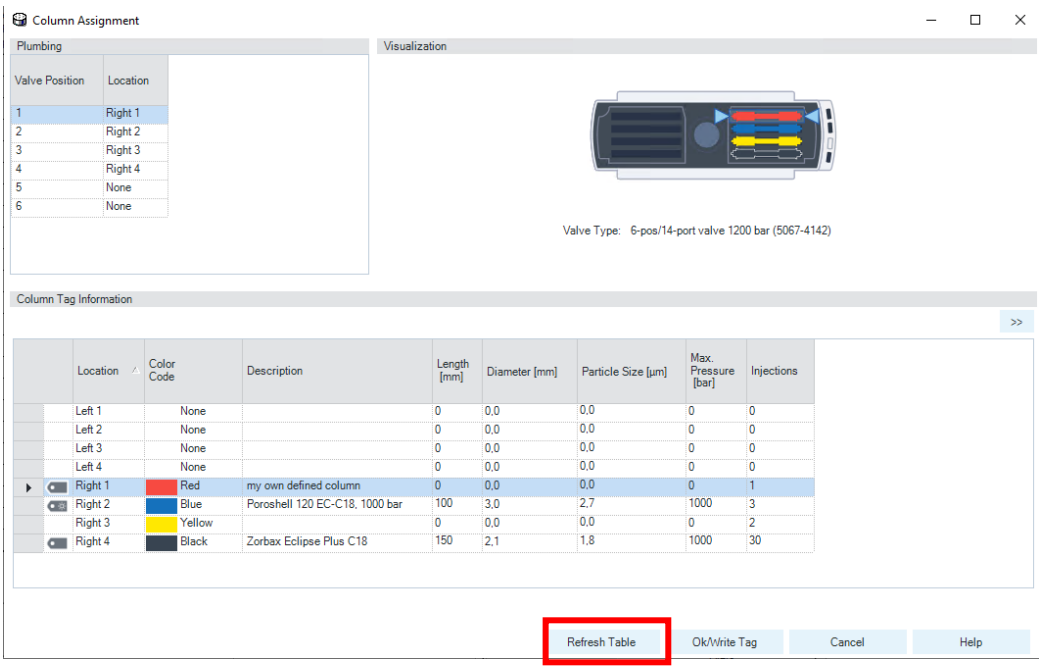

Figure 11 Refresh Table button in the **Column Assignment** window

The **Column Assignment** provides column details which are supposed to be visible in the method screen. In non-Agilent data systems like Empower, the full information can be provided only to the LC Dashboard method, but not in the Acquisition Method (Empower Instrument method). For details, see "Comparison LC Dashboard Method and Empower Instrument Method" on page 13.

Comparison LC Dashboard Method and Empower Instrument Method

In non-Agilent data systems like Empower, the acquisition method cannot actively call the status information on the column configuration. Therefore, the column description remains empty, even if the columns appear in the **Column Assignment** dialog box.

Hence, in the method screens *ensure to focus on the valve switching position,* as the column tag information (column description and position) does not show up in the Empower **Instrument Method**. Clicking the refresh button will not update the column information to the system. To continue, click somewhere else in the method screen.

LC Dashboard Method

To access the LC Dashboard Method, right-click the Column Compartment tile. In the method screen, full details of the configured column are present, see Figure 12 A. By clicking the refresh button, the **Column Assignment** table is read out directly.

Empower Instrument Method

In the Empower **Instrument Method** (acquisition method) the color coding and position are present, see Figure 12 B. By clicking the refresh button, the column information cannot be read out. The system stalls and you need to close the method.

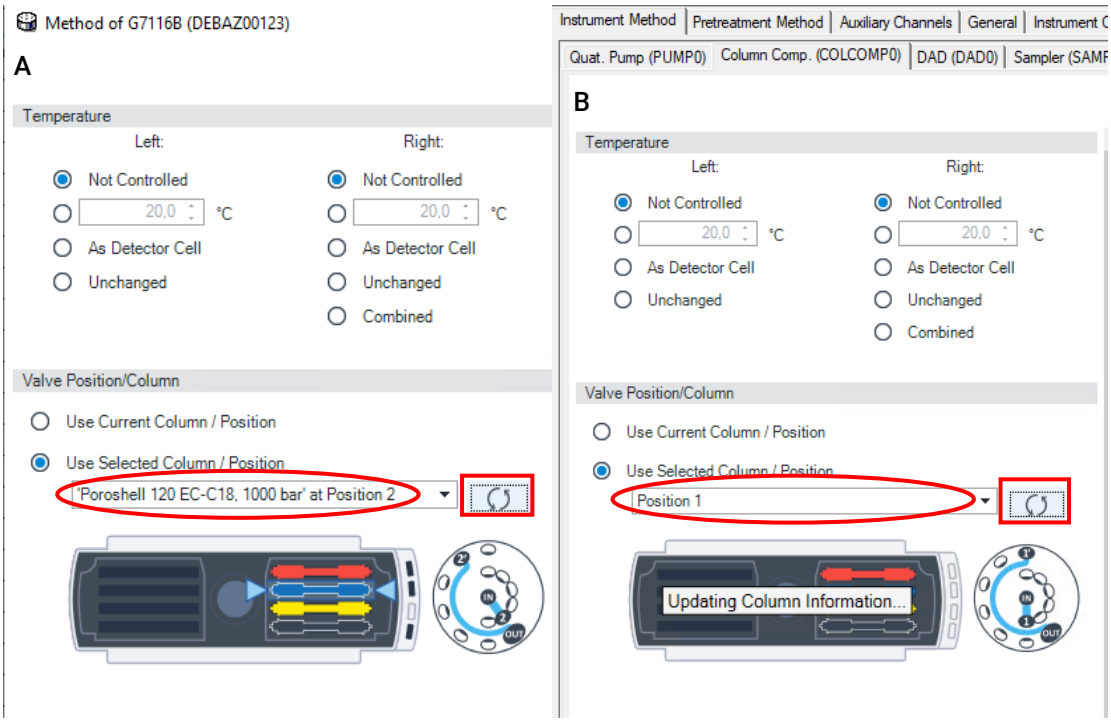

Figure 12 Comparison of status information in the **LC Dashboard Method (A)** and **Empower Instrument Method (B)**

Using the Method Parameter Enforce Column for Run

The Column Compartment offers the method parameter **Enforce column for run**. This restricts the execution of the method to a specific column type, identified by its product number.

Comparison LC Dashboard Method and Empower Instrument Method

LC Dashboard Method

Right-click the LC Dashboard Column Compartment tile to access the Instrument Method.

As the LC dashboard receives the status information directly from the instrument, the column description and product number are visible.

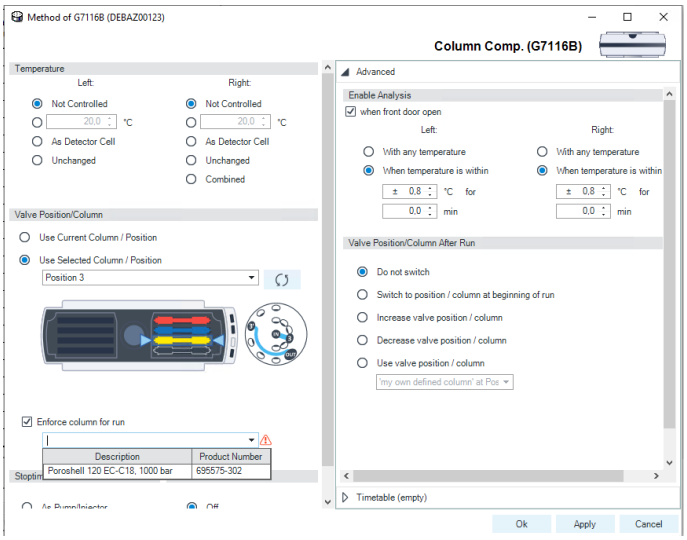

Figure 13 LC Dashboard Instrument Method

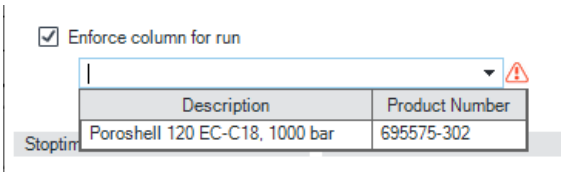

Figure 14 Enforce column for run parameter

Empower Instrument Method

The Acquisition Method cannot actively receive the status information on the column configuration. Therefore, the column description remains empty, even if the columns appear in the column assignment dialog box.

To use the feature, type the column description manually in the **Enforce column for run** field and ensure that the column is present in the **Column Assignment** screen. The text in this field and the product number of the column must be identical.

Details are provided in the Online help on that screen. The Online help can be accessed using the **F1** key while the user interface is open.

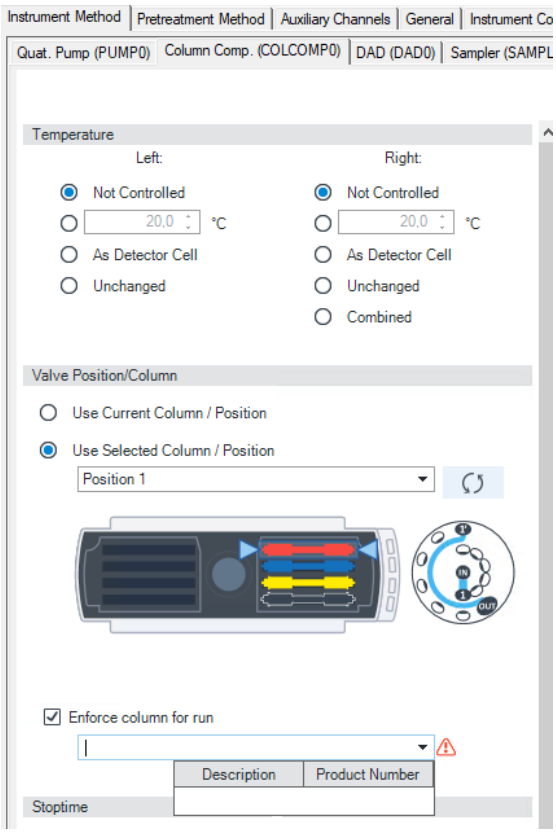

Figure 15 Empower **Instrument Method**

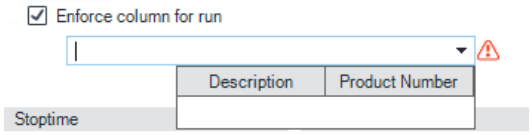

Figure 16 Enforce column for run parameter

Column Information in Empower

Setting up the sample set, the Empower **Identification** screen allows you to select a column by name or by column serial number.

The columns defined in the Agilent LC Driver via **Column Assignment** *do not appear* for selection in these screens. The column information can only be entered manually into this field for identification.

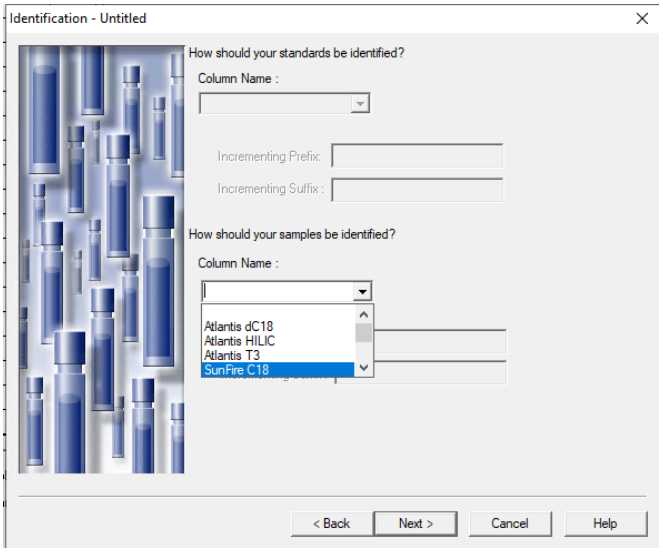

Figure 17 Empower screen for column identification – **Column Name**

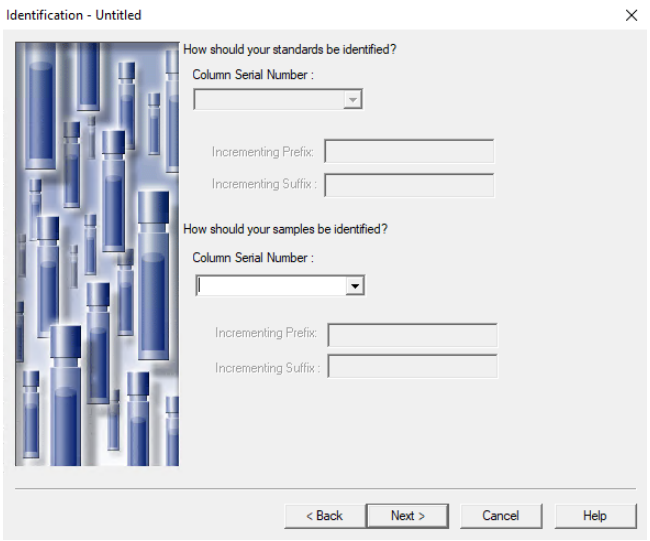

Figure 18 Empower screen for column identification – **Column Serial Number**

Via the **Report publisher** the column name and serial number can be added to the reporting template.

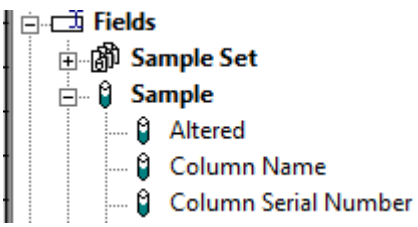

Figure 19 Selection of column identification in Empower **Report publisher**

Known Limitations

Waters

Due to a technical limitation in Agilent ICF SL, the system requires a new Auto Configuration to apply the configuration changes (see Figure 10 on page 11) when performing a change of **Location** or **Color Code** in the **Column Assignment** screen of the LC Status Dashboard.

The system does not provide the information of a configuration change, nor does the instrument go offline to enforce the new **Auto Configuration** (see "Add, Change, or Delete Columns After the Initial Configuration" on page 11). Notification about a misconfiguration is missing. A new **Auto Configuration** is required.

Agilent

The following limitation is present, using the method parameter **Enforce column for run**

Enforce column for run in MCT method requires 14 characters or less.

- *SSB Problem Description*: Using the **Enforce column for run** on the MCT method screen while using more than 14 characters for the product number causes a method download failed error. G7116A/B and the valve-thermostat clusters (VTC) are affected.
- *Fix Note*: The issue is fixed with Agilent LC Driver 3.5.
- *Temporary Fix*: Use 14 characters of less for the product number field.

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