

FMS HISTORIC DRIVER NEW FOR FMS 5.2.0 SETUP AND CONFIGURATION

TECHNICAL BULLETIN TCC-121

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Contents

Intent.....	1
Overview.....	1
Setup and Configuration	2
Helpful Hints and Known Issues	6
Helpful Hints.....	6
Sample Point Failure States.....	6
Counts Per Cubic Meter Calculations.....	6
Buffer Download and Main Database Spooling.....	6
Best Practice(s).....	7
Known Issue(s).....	7
Revision History.....	8

Intent

The purpose of this document is to detail the setup and use of the new FMS Historic driver introduced in FMS 5.2.0.

Overview

The counts per cubic meter *data type* on a TSI particle counter's driver in FMS is a real-time rolling counts per cubic meter calculation (c/m^3). This means the driver is only capable of calculating c/m^3 in real-time, any non-real-time data will not be calculated. Prior to FMS 5.2.0 this is fine, but with the introduction of buffer download, any buffered data that is downloaded from the instrument will not have c/m^3 calculated. Thus the Historic driver is introduced in FMS 5.2.0 to enable buffered data to be presented as c/m^3 .



The new Historic driver calculates the c/m^3 of air based off of another (associated) sample point's database table. This new driver will be able to calculate c/m^3 of air in real time as well as non-real-time information. Because the Historic driver does the calculations based on the associated sample point's database table, the Historic driver will **not be able to perform calculations if there is not a valid main database connection**. If there is a main database connection error, once FMS re-establishes connection to the main database and the spooled information is inserted into the database, the Historic driver will check and attempt to make calculations based on the information that was back-inserted into the database.

Setup and Configuration

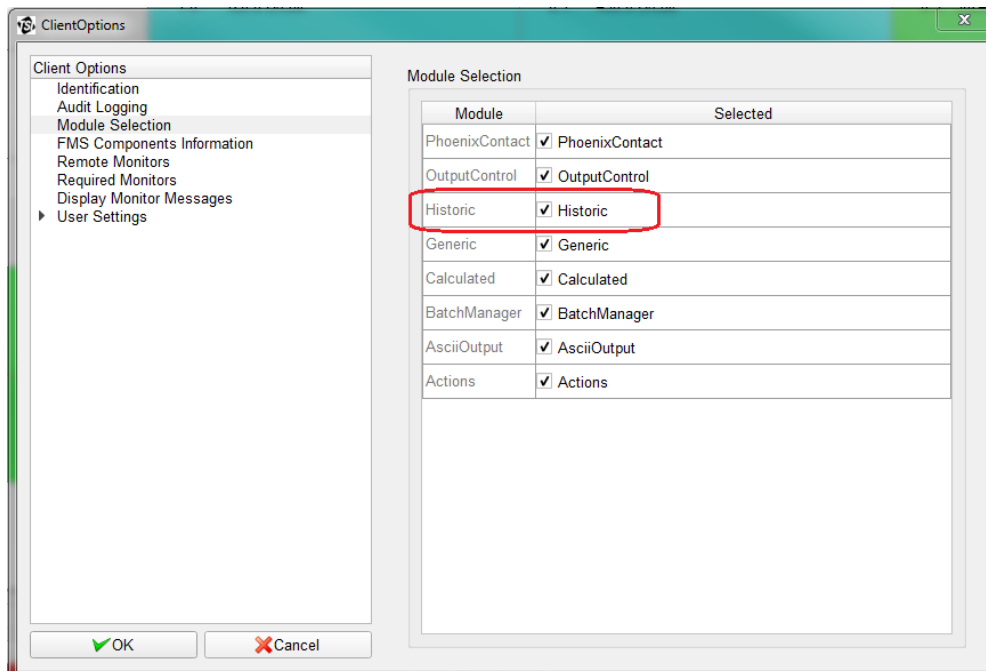
Setup and configuration is the same for both Pharmaceutical and Semiconductor (Standard) mode.

Note: The Historic Unit and Historic Sample Point has a one-to-one relationship, meaning each Historic Sample Point should have its own unique Historic Unit. In other words, no two Historic Sample Points should be using the same Historic Unit.

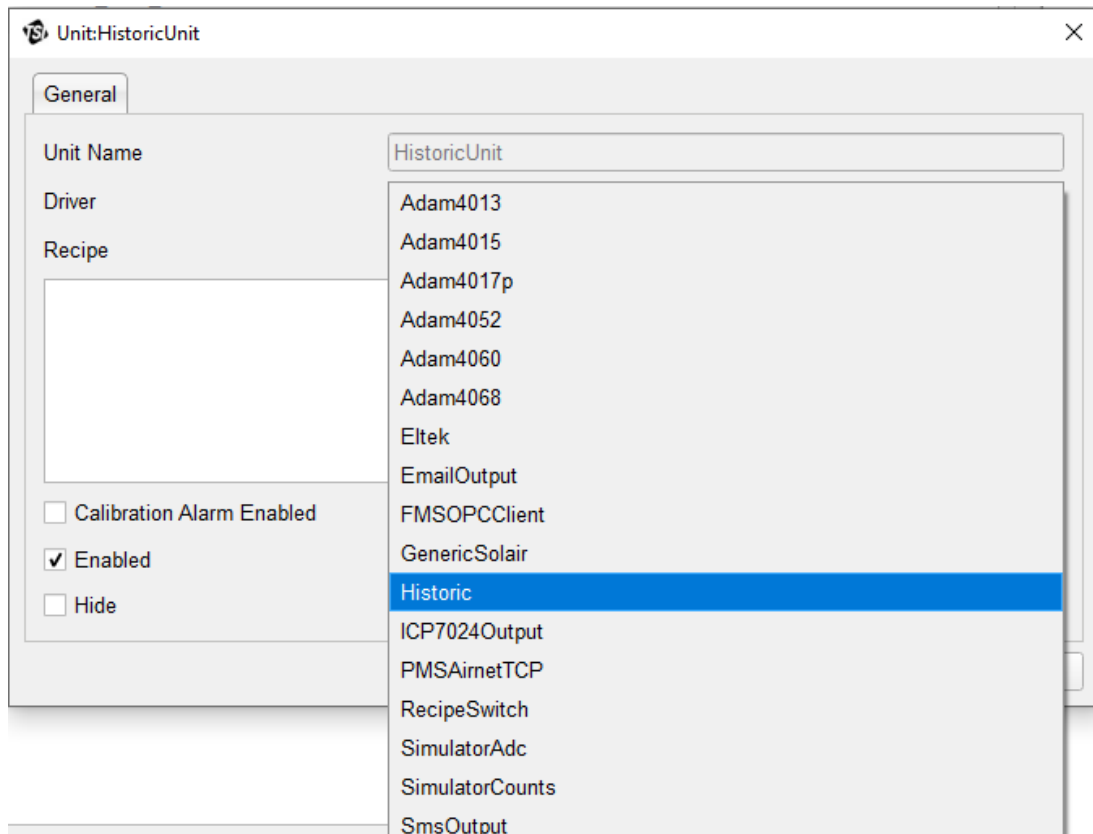
Note: Before you create and configure a Historic Sample Point, ensure you already have the Associated Sample Point created and configured.

- **Associated Sample Point:** This is the sample point that the Historic driver will base its counts per cubic meter calculations on.
- **c/m^3 :** Counts per cubic meter. This is **not** normalized counts per cubic meter.
- **c/ft^3 :** Counts per cubic foot.

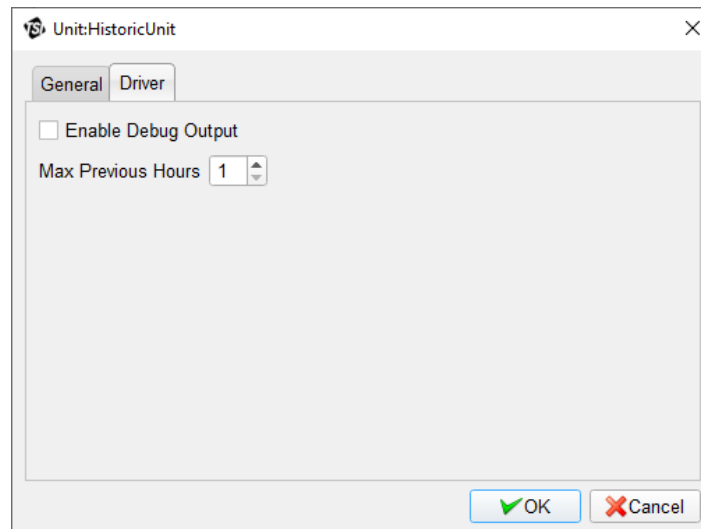
By default, the Historic driver module is enabled. If the Historic driver is not selectable in the driver drop-down menu of a Unit configuration, make sure the Historic module is checked under **Client Options** → **Module Selection**.



- Start by creating a new Historic Unit and select **Historic** from the Driver drop-down list.



- Select the **OK** button to close the dialog.
- Re-open the Unit properties window and navigate to the Driver tab.
- The configurable options in the Driver tab are:
 - Enable or disable debug output statements related to the Historic driver. In general, during normal operations, it is recommended to leave this unchecked for performance reasons. Debug output statements can be seen with a debug program such as DebugView.
 - Max Previous Hours: After recovering from a communication error an historic sample point can miss data, the historic driver will then search in the past for these missing data. This search is selectable with a maximum limit of 24 hours.



- Next, create a new Historic Sample Point and select the Historic Unit in the Unit drop-down list created in the first steps. Before you close the Sample Point window, navigate to the Driver tab.
- Here you will be able to point the Historic Sample Point to the Associated Sample Point, configure the Historic Sample Time and Hold Time, as well as configure a Custom Flow Rate if desired. Custom Flow Rates will be described in detail later.

Important: Upon initial configuration of the Historic Sample Point, when first navigating to the Driver tab, if the correct Associated Sample Point is currently listed, select a different Sample Point in the drop-down list and then select the correct Associated Sample Point. This will refresh the tags list to get the proper tags for the Historic Sample Point.

Important: Ensure the Sample Time and Hold Time match those of the Associated Sample Point.

The screenshot shows a software window titled "Sample Point: newtest" with a "Driver" tab selected. The configuration fields are as follows:

- Associated Sample Point: nonzero3 (dropdown menu)
- Associated Data Type: RawCounts (text field)
- Sample Time (s): 60 (text field)
- Hold Time (s): 0 (text field)
- Flow Rate: CFM (selected radio button), LPM (unselected radio button)
- Flow Rate value: 1.000 (spinner box)
- Custom Flow Rate: (checkbox)

Buttons for "OK" and "Cancel" are located at the bottom right of the window.

- The Associated Sample Point list contains all other Sample Points except for other Historic Sample Points, Manifold Sample Points, and Cubic Meter Sample Points.
- The Associated Sample Point list is 1 to 1, meaning no two Historic Sample Points can point to the same Associated Sample Point. Once a Historic Sample Point has an Associated Sample Point, the Associated Sample Point will not appear on any other available Historic Sample Point's Associated Sample Point list.

- The Flow Rate field will attempt to automatically detect and populate the Associated Sample Point's flow rate. If for some reason the Flow Rate does not match or the Historic driver does not detect the Associated Sample Point's Flow Rate, the "**Custom Flow Rate**" check box can be checked. A custom flow rate corresponding to the particle counter used can then be manually entered.

Sample Point: History_lowCFM

General SPC Recipe Alarms Driver

Associated Sample Point: simADC01

Associated Data Type: Ramp

Sample Time (s): 60

Hold Time (s): 0

Flow Rate CFM LPM 0.100

Custom Flow Rate

Warning! Could not detect the sample point's flow rate. Please manually enter flow rate.

OK Cancel

Helpful Hints and Known Issues

Helpful Hints

Sample Point Failure States

1. The Historic Sample Point will enter a failure state in the following scenarios:
 - a. The Associated Sample Point does not insert a new value into the database within 15% of the Historic Sample Point's sample time + hold time.
 - b. The main database is spooling.

Note: No failure will occur if the main database is running and the mirror database is down. This is because the Historic driver only bases its calculations on the main database. The Historic driver will continue to calculate if only the mirror database is spooling and the main database is fine.
 - c. The Associated Sample Point is in a failure state.

Counts Per Cubic Meter Calculations

1. The cubic meter calculation will not calculate if any two consecutive entries fall outside 15% of the sample time + hold time.
 - a. This scenario could occur if the Associated Sample Point is restarted so that the ending value of the sample cycle changes. For example, the Associated Sample Point's ending values are 10:11:34, 10:12:34, 10:13:35, 10:14:34, etc. Then the Associated Sample Point restarts so that the new ending values are 10:15:56, 10:16:56, etc. The Historic Sample Point will detect this time error and not perform any cubic meter calculations that span a time period in which both 10:14:34 and 10:15:56 are needed.
 - b. Historic c/m³ does not calculate if communication is lost to the Associated Sample Point, or in the case of main database spooling.
2. Because the Historic calculations are based off of the Associated Sample Point's posted values in the database SQL table, the Historic driver's precision will increase with the higher decimal place precision of the Associated Sample Point. A Sample Point's decimal place precision can be configured on the Sample Point's configuration window. This scenario only applies if the Sample Period's volume is not 1 ft³. For example, a 1.0 CFM instrument with a 60-second Sample Period's volume is 1 ft³. A 0.1 CFM instrument with a 60-second Sample Period's volume is 0.1 ft³, and thus its Sample Period value will be scaled by a factor of 10 in FMS.

Note: To reiterate, the above scenario does not apply if the Associated Sample Point is raw counts or if the Associated Sample Point has a 1.0 CFM flow rate.
3. The Historic driver attempts to calculate c/m³ for all values when the values are posted to the database. This means if a value is posted to the database and the Historic driver is not able to calculate c/m³ based on this value, the Historic driver will still attempt to calculate c/m³ for the next posted value and so on.

Buffer Download and Main Database Spooling

1. If Buffer Download occurs while the main database is down, the Buffered Data will be logged in the main database's spool within FMS, just like a regular sample cycle. When FMS reestablishes a valid connection to the main database the spooled information, including Buffer Download, will be written to the database. Once the spooled information is written to the database, the Historic driver will then be able to perform c/m³ calculations on the spooled data.

2. On large amounts of Buffer Downloaded data or spooled data, it may take a few minutes for the Historic driver to perform its calculations once the Buffer Download or spool is finished inserting to the database. The Historic driver is usually capable of performing all calculations within a few minutes, however if reporting is required after large amounts of Buffer Downloaded data or spooled data, we recommend waiting 10 minutes after Buffer Download or spool written to the database is **done**. This is to ensure all non-real-time values have been posted to the database and the Historic driver has a chance to perform c/m³ calculations on these values.
3. The Historic driver's non-real-time values function the same way as Buffer Download for alarming and warning, triggered digital outputs, and acknowledgements. Please see the Buffer Download technical note for more detail.

Best Practice(s)

In general, it is best practices whenever an Associated Sample Point is deleted to perform one or more of the following: delete the Historic Sample Point, disable the Historic Sample Point, disable the Historic Unit, or delete the Historic Unit.

Known Issue(s)

If for any reason the Monitor crashes or restarts during the Historic counts per cubic meter calculation, the Historic driver will not be able to recover any calculations done prior to the Monitor crashing that did not finish calculating the counts per cubic meter value.

Revision History

Revision	Released	Description
A	29 July 2015	Initial Release
B	16 October 2015	
C	14 July 2021	Adapted for SU134: <ul style="list-style-type: none">• Historic Driver Max Previous Hours search.

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