Calculation guide

Table-43 historical averaging

thermo scientific

Contents

Revision History

Revision	Date
01	05-19-2023

Section 1: Introduction

Table-43 in AutoCONFIG is a function that is used for single point historical archiving of any process variables and inputs. This function is available as a default calculation in all models of Thermo Fisher Scientific AutoSERIES which include AutoXP, AutoPILOT PRO, AutoEXEC, and AutoFLEX. In all of these models, Table-43 can be used for event-based logging or monitoring of variables. Because the AutoXP SMV is not set up to perform any flow calculations, this table is limited to storage of the historical data for the process variables being measured. The number of default entries may vary by the flow computer model selected in the configuration. However, user can add additional entries as needed, limited by memory available. The two types of default historical averaging entries are History Avg and Tank Avg.

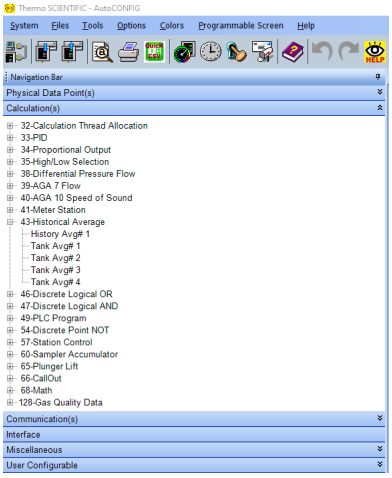


Figure 1. Table-43

Following is a list of some common applications of Table-43 usage.

a. Archive analog inputs such as pressures (i.e., tubing, casing)

b. Event-based logging

c. Measure the state of a valve

d. Historical archiving of Inputs and Outputs that may or may not be associated with a flow calculation

e. Tank level/gauging archiving

Each entry within Table-43 has three tabs for user configuration and data monitoring. The parameters and variables within these tables are defined below.

Section 2: Tabs and Field Definitions

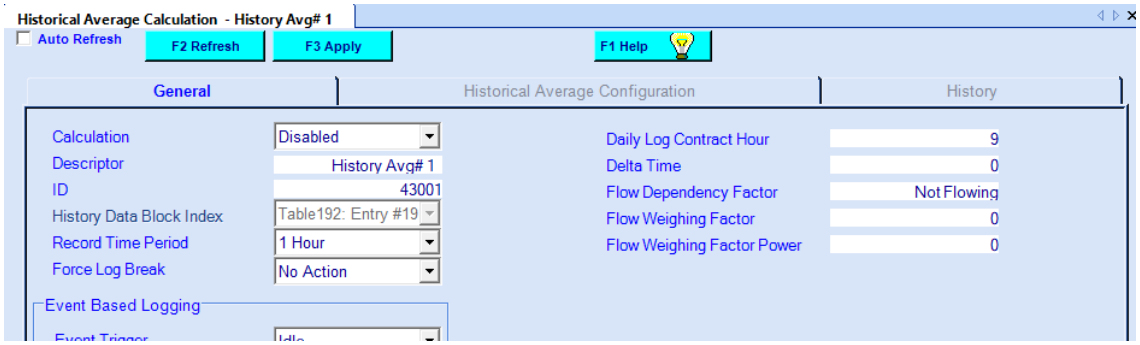


Figure 2 . Table-43 Showing Three Tabs

General Tab: This tab is used for enabling and disabling of the entry and quick configuration. Following are the fields in this Tab.

Calculation: This field allows for the user to enable or disable the calculation. The field needs to be set to Enabled for the calculation to work. Please double check this field if the calculation is not working to ensure the calculation is Enabled. It is recommended that the calculation be enabled after all the parameters and associated history log have been configured.

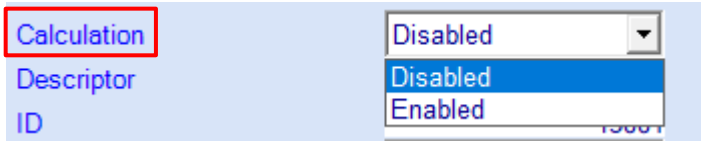


Figure 3. Calculation Field

Descriptor: This is a user configurable field. User should enter a text string that identifies the device or function associated with the calculation. This is a user configurable field with a default value of History Avg# 1 or Tank Avg# 1, with the numerical value representing the sequential entry number for the entry type. This alpha-numeric field is limited to 16 characters.

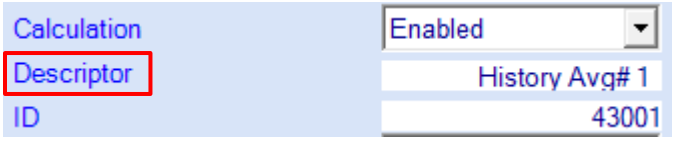


Figure 4. Descriptor Field

ID: The historical average calculation table ID. This is a user configurable field with the default value that begins with 43, for example 43001 for the first entry. User can only enter numerical values in this field.

Figure 5. ID Field

History Data Block Index: This field displays which historical data allocation log (Table #192) the data will be logged in at the end of each period. This field is assigned automatically by AutoCONFIG and is not user configurable.

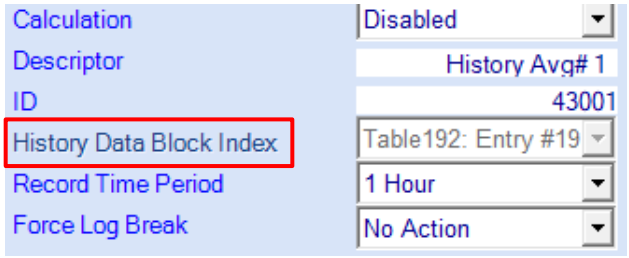


Figure 6. History Data Block Index

Record Time Period: This field allows the user to select the frequency the data should be averaged and logged. Selection options are available from 1 second up to 12 hours with the default value of 1 Hour. This value applies to all calculation points set up in the entry.

Figure 7. Record Time Period

Force Log Break: You can use this field to manually end the current log period and begin a new one; this is done by selecting “triggered” from drop down and clicking on Apply. The default value for this field is ‘No Action.’ The log break operation can also be performed by connecting the field to a Discrete point. This discrete point can be a physical discrete input or any internal database discrete point. This point can also be controlled via PLC logic to generate log breaks as needed.

Figure 8. Force Log Break

Daily Log Contract Hour: This field represents the hour of the day that the daily log ends, and a new daily log begins. The default contract hour is set at 9. The contract hour is user configurable and can be matched with a calculation contract hour or it can be different for the Historical Average entries.

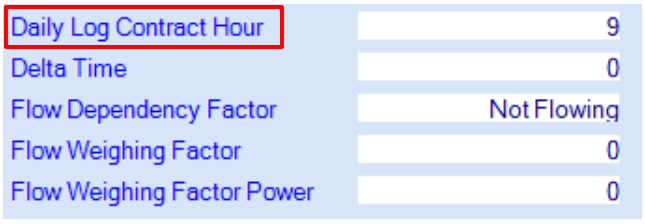


Figure 9. Daily Log Contract Hour

Delta Time: This field reflects the time that has elapsed since the last time the averaging module ran. This value will typically be one second when the calculation is running. It is a system calculated value.

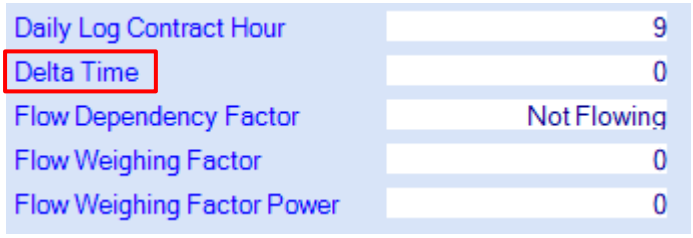


Figure 10. Delta Time

Flow Dependency Factor: A discrete point such as Flow Status in Table-38 is linked to this field to indicate whether the associated meter run is flowing. This field is not connected to any discrete point in a default configuration and will indicate “Not Flowing.” This flow status connection will enable the history log to perform records based on Flow-Dep Avg./Acc/ Technique selected in Figure 20. Daily Log Contract Hour.

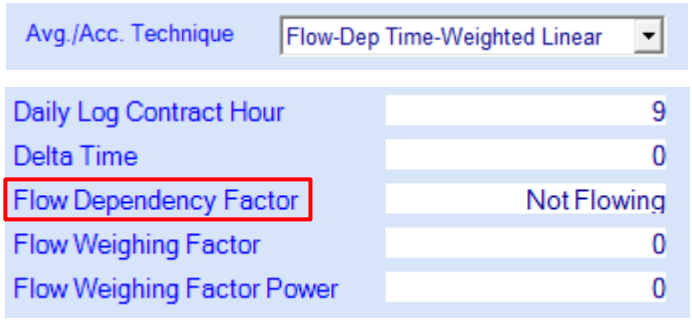


Figure 11. Flow Dependency Factor

Flow Weighting Factor: It is a floating-point value that is used for the calculation of flow weighted averages. This field is set to 0 if no Flow Weighted Average is used in the history log, however if flow weighted averaging is required it should be connected to the instantaneous flow value from the meter run.

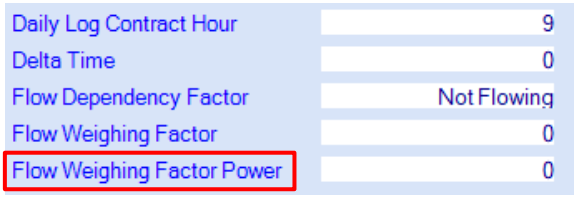


Figure 12. Flow Weighting Factor

Flow Weighting Factor Power: Floating point value that holds the lowest order power with which the primary input variable appears in the flow or volume measurement equation. For example, with differential meters the value should be set to 0.5 (Square Root). This is normally set to 0 if Formulaic Weighted Averaging is not used, however if Formulaic Weighted Averaging is used then it should be set to the correct power value.

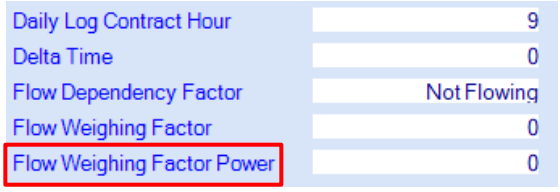


Figure 13. Flow Weighting Factor Power

Event Based Logging: The historical average function has the ability to provide event-based logging. In this mode, the function will continuously log records until and after an event trigger occurs. The count of records logged after the event trigger is guided by the Post Event Records count specified by the user. The event-based logging provides user with a number of records before and after an event. Event Based Logging needs to be reset once an event occurs. User can reset the function by selecting Reset/Idle option from the drop down in the Event Capture field and clicking F3/Apply button at the top of the screen.

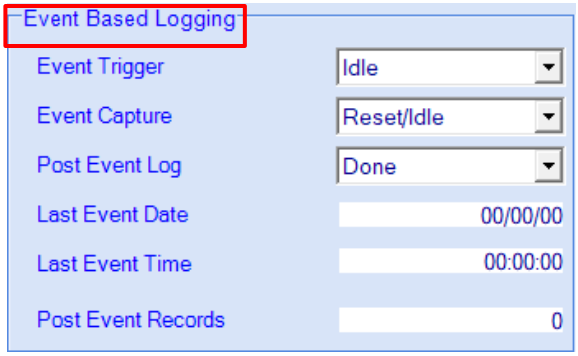


Figure 14. Event Based Logging

Event Trigger: It is a state of event-based logging. For event-based logging to work, user must link this field with a discrete point such as Callout Status, Flow Status, and PLC Output. The default value for this field is Idle which changes to Triggered only when an event is triggered by a connected discrete point.

Event Capture: This field tells the user whether the application is in an idle mode, or an event has occurred. The default value for this field is Reset/Idle. The value changes to Event Occurred once an event is triggered. As noted earlier, the Event Based Logging needs to be reset after every event to prepare for next event cycle. User can reset the function by changing the value of the Event Capture field to Reset/Idle and clicking on the Apply button at the top of the window.

Post Event Log: This field indicates whether it is in collecting phase of the post event records or if the collection is done. To get a full understanding of the event, user should wait for the full record collection at which point this field will change to 'Done.' Post event count stops at the record numbers specified under 'Post Event Records.'

Last Event Date/Time: These fields display the last date and time a trigger occurred. These are system generated values and cannot be modified by the user.

Post Event Records: This is a user configurable field with a default value of zero. User can enter an integer value in this field equivalent to how many records they would like for the RTU to keep after the event is triggered. For example, if 10 is entered in this field, the meter will log 10 records post event and stop logging anymore records.

Historical Average Configuration: This tab allows the user to configure the averaging parameters and view instantaneous results. Each available field in this tab is described below.

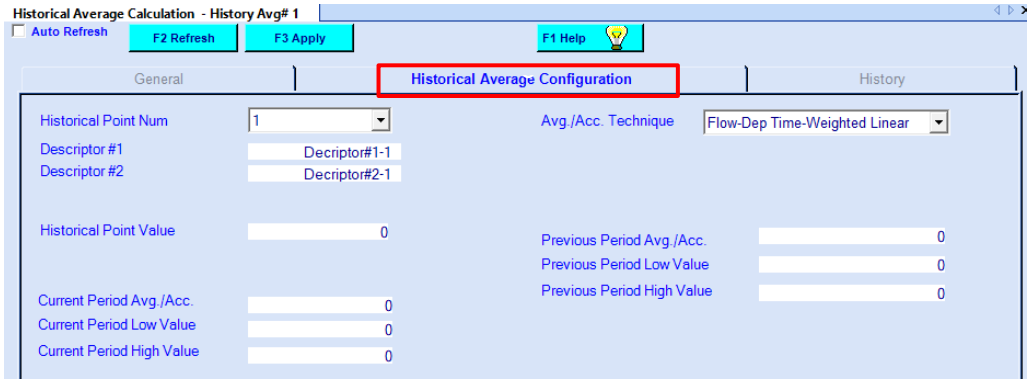


Figure 15. Historical Average Configuration Tab

Historical Point Num: In each Table-43 entry, user can have up to 40 points for historical average calculation. In this field, user can select which point to configure. The default selection for this field is 1.

Figure 16. Historical Point Number Selection

Descriptor#1: User can enter the description for the Historical Point Number selected in the previous field. The default description in this field is 'Descriptor#1-1' where the second number represents the point selected. For example, if a 5th point is selected in the Historical Point Num field, the default value in Descriptor#1 will be 'Descriptor#1-5'.

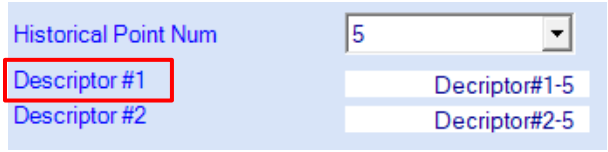


Figure 17. Descriptor#1

Descriptor#2: This is an additional field to enter the point description. This field follows the same format as Descriptor#1.

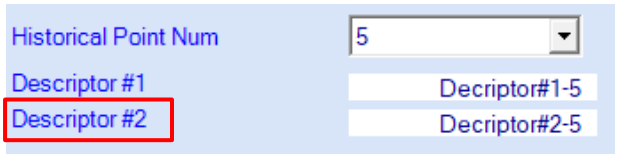
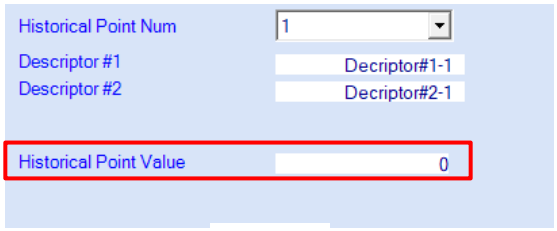


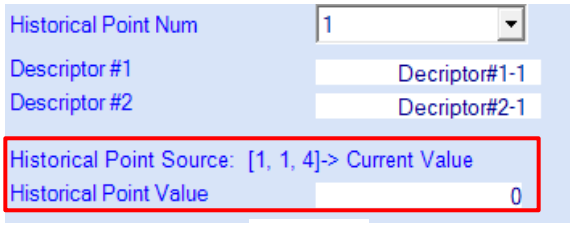
Figure 18. Descriptor#2

Note: For example, if Historical Point Num 1 represents Flow Rate, Descriptor#1 will be used to enter the description that helps user recognize the point as Flow Rate, and the Descriptor#2 is used to enter the associated measurement units such as Mcf/Hr.

Historical Point Value: This is the field where user needs to link the physical point that needs historical average record. The data in Table-43 will be based on this variable. The point source will be displayed above this field once the connection is established. Following picture shows the field before and after a data point is connected.



Before



After

Figure 19. Historical Point Value

Avg./Acc.Technique: In this field, user can select the historical averaging technique. This selection is made based on customer application. Options available include Flow-Dependent Time-Weighted Linear Average, Flow-Dependent Time-Weight Formulaic Average, Flow-Weighted Linear Average, Flow-Weighted Formulaic Average, Time-Weighted Linear Average, Linear Average, Accumulation (accumulator input), Accumulation (hourly rate input), Accumulator (daily rate input), and Snapshot. The default value for this field is Flow-Dependent Time-Weighted Linear. User can choose to use different technique for different historical point number.

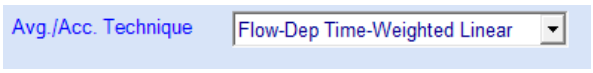


Figure 20. Daily Log Contract Hour

Following are the system generated instantaneous readings that are not user configured.

Current Period Avg./Acc.: The average or accumulation for the current period.

Current Period Low Value: The low value for the current period.

Current Period High Value: The high value for the current period.

Previous Period Avg./Acc.: The average or accumulation for the previous period.

Previous Period Low Value: The low value for the previous period.

Previous Period High Value: The high value for the previous period.

Note: the period is determined by the Record Time Period selection under the General tab.

History: This tab is where user can retrieve the averaged data and generate reports as needed.

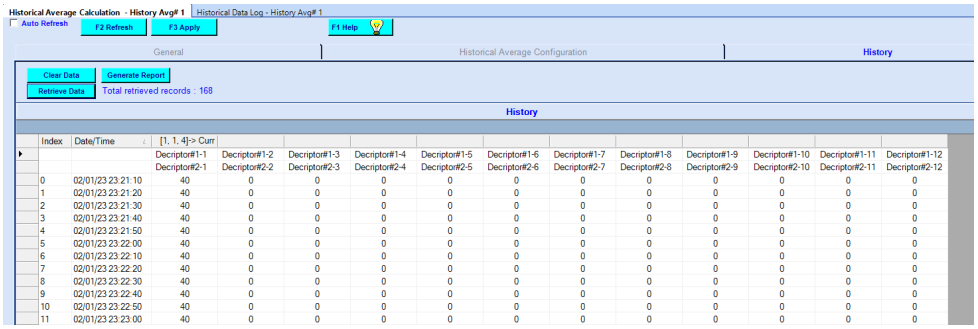


Figure 21. History Tab

Follow the steps below to generate a report:

a. Click the **Retrieve Data** button to display the historical data. This action only displays the data on the History tab. Go to next step to generate a report file.

b. Click **Generate Report** button. This function saves the data on the PC as a '. hst' file so that the user can view/export or print it on a later date.

The AutoCONFIG by default only records data for the first 12 points in each Historical Average Entry. The number of records per point defaults at 168. If the user has more than 12 points being used in an entry for historical averaging record, and desires to increase or decrease the record count per point, then the History Log will need to be modified as desired under Table-192. The associated Table-192 entry is labeled as History Avg#1 as shown in the following figure.

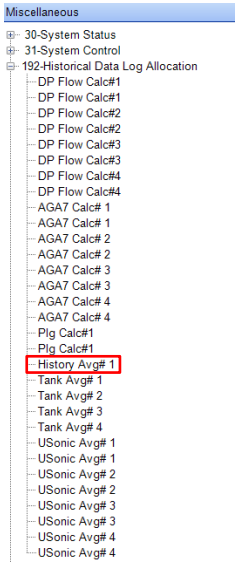


Figure 22. Miscellaneous Navigation Bar

Follow the steps below to make modifications in the History log. **Please note that any modification to a History Log needs to be performed in an offline mode and applies to all entries and points under Table-43.**

a. Open the History Avg#1 Entry under Table-192. The window looks as shown below.

Figure 23. History Data Log

Note: Pay attention to the on-screen instructions for proper history log configuration.

b. Change the Items Per Record count to a desired value.

c. Change the Number of Records to a desired value.

d. Click F3 on your keyboard or F3Apply button on AutoCONFIG to implement the changes.

e. Upload the modified configuration from the offline mode.

f. Download the modified configuration to the live meter.

Section 3: Example 1- Simple Averaging

This example explains the steps in setting up Tabl-43 to log external process variables for archiving, trending, monitoring, or troubleshooting. The example uses Oil Pressure and Oil Temperature as variables for compressor monitoring application.

Section 3.1: Key Parameters

1. Compressor Monitoring (Generic Archiving)
    a. Oil Pressure (Analog input 1)
    b. Oil Temperature (Analog input 2)
2. Table-43 configuration parameters
    a. Record Time Period: 10sec
    b. Avg./Acc. Technique: Snapshot
    c. Table-192, Entry
        i. History Avg# 1
            1. Items per Record: 2

Note: This example configuration is set-up in an offline mode. While all the steps of this procedure can also be completed in a live unit, all set-up and modifications of historical data log parameters in Table-192 must be made in an offline mode.

Detailed procedure

1. Expand Calculation(s) navigation bar.

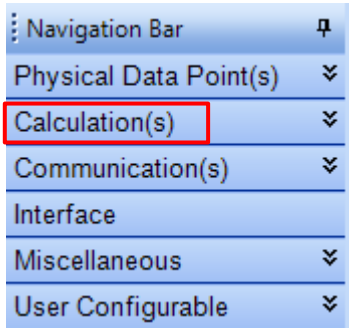


Figure 24. Calculation(s)

2. Open Table 43-Historical Average (Referred to as Table-43).

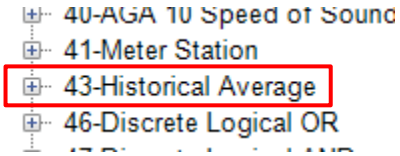


Figure 25. Table 43

3. Select Historical Avg# 1 (Referred to as Table-43, Entry-1).

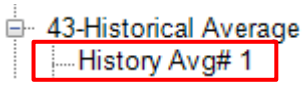


Figure 26. Historical Average Entry

4. Go to General tab.

Figure 27. General tab

5. Change the record time period to 10 seconds from the drop down.

Figure 28. Record Time Period

Note: The rest of the parameters in this tab are not applicable to this example.

6. Click 'F3 Apply' at the top of the screen to save the change.

Figure 29. F3 Apply

7. Go to Historical Average Configuration tab.

Figure 30. Historical Average Configuration

8. Select Historical Point Num 1, which is the default selection. User needs to change it only if the selection in this field is at a different point.

Figure 31. Selecting Historical Point Num

9. Enter the point description in Descriptor #1 and Descriptor #2 field. For this example, Descriptor #1 is Oil Pressure and Descriptor #2 is Psi.

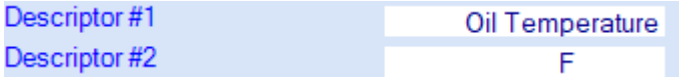


Figure 32. Entering the point description

10. Open Table 1-Floating Point Value.

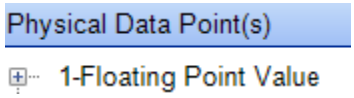


Figure 33. Table 1-Floating Point Value

11. Open Tbl 1 Itm 1, Oil Pressure.

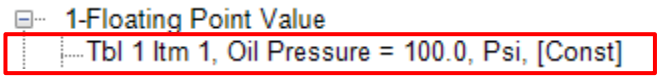


Figure 34. Tbl 1 Itm 1, Oil Pressure

12. Right click top of the 'Current Value' and select 'Copy Point'.

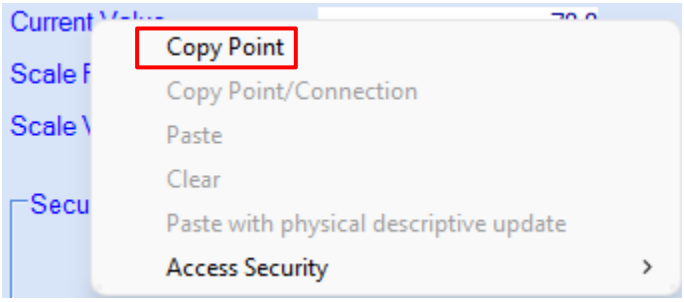


Figure 35. Selecting Copy Point

13. Go to Table-43, Entry-1.

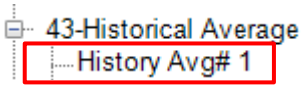


Figure 36. Table-43, Entry-1

14. Go to Historical Average Configuration tab and right click over the Historical Point Value field and select 'Paste'.

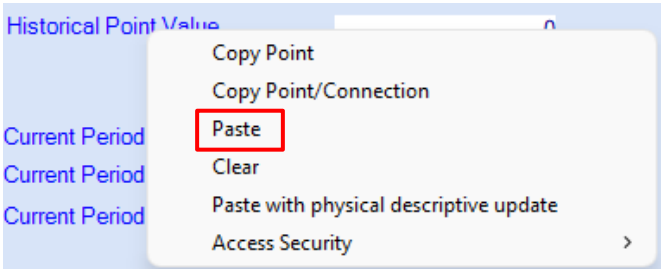


Figure 37. Selecting Paste

15. In the same tab, select the Avg./Acc. Technique to 'Snapshot' from the dropdown.

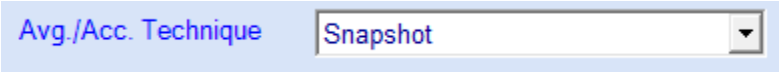


Figure 38. Snapshot

16. Click ‘F3 Apply’ button at the top of the screen.

Figure 39. F3 Apply

17. Change the Historical Point Num value to 2 from the dropdown.

Figure 40. Historical Point Num

18. Enter the point description in Descriptor #1 and Descriptor #2 field. For this example, Descriptor #1 is Oil Temperature and Descriptor #2 is F (Fahrenheit).

Figure 41. Entering Point Description

19. Go to Table 1-Floating Point Value.

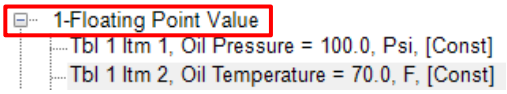


Figure 42. Table 1-Floating Point Value

20. Open Tbl 1 Itm 2, Oil Temperature.

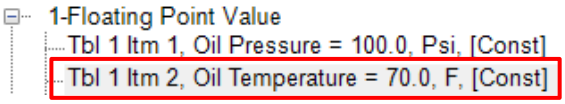


Figure 43. Tbl 1 Itm 2, Oil Temperature

21. Right click top of the ‘Current Value’ and select ‘Copy Point’.

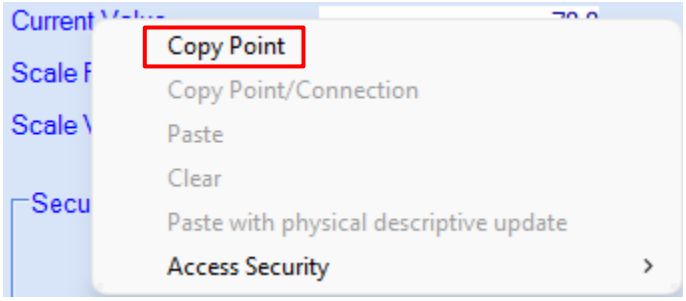


Figure 44. Selecting Copy Point

22. Go to Table-43, Entry-1.

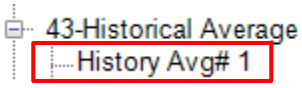


Figure 45. Table-43, Entry-1

23. Go to Historical Average Configuration tab and right click over the Historical Point Value field and select ‘Paste’.

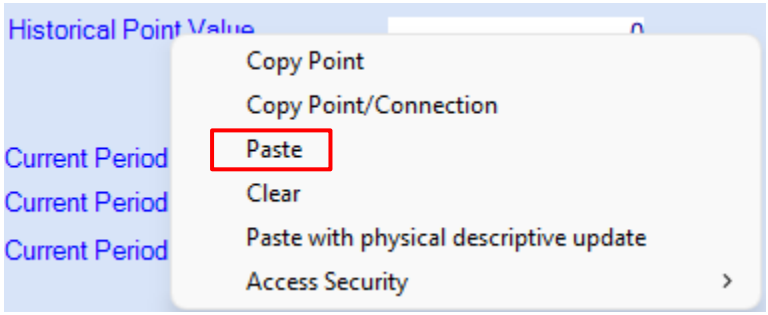


Figure 46. Selecting Paste

24. In the same tab, select the Avg./Acc. Technique to ‘Snapshot’ from the dropdown.

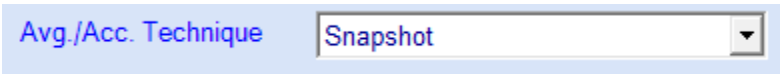


Figure 47. Snapshot

25. Click ‘F3 Apply’ button at the top of the screen.

Figure 48. F3 Apply

26. Expand the Miscellaneous navigation bar.

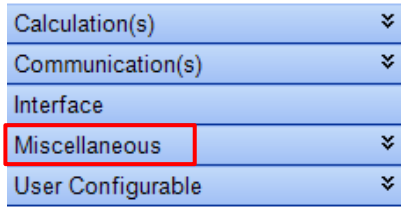


Figure 49. Miscellaneous

27. Expand Table 192-Historical Data Log Allocation.

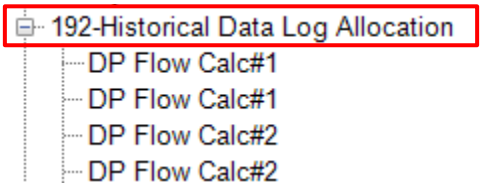


Figure 50. Table 192-Historical Data Log Allocation

28. Double click History Avg# 1.

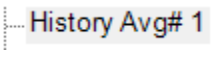


Figure 51. History Avg# 1

29. Change the Items Per Record to 2.

Figure 52. Items Per Record

30. Click ‘F3 Apply’ button at the top of the screen.

Figure 53. F3 Apply

31. When ready, download the configuration modified in the offline mode to the RTU by connecting with the RTU and using ‘Download Configuration To RTU’ option in Files menu.

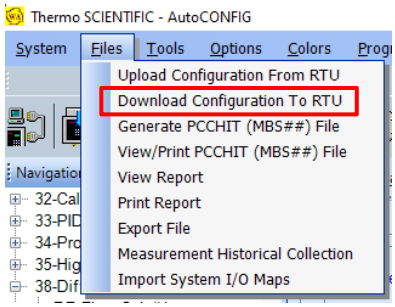


Figure 54. Download Configuration To RTU

32. Go to General tab in Table-43, Entry-1 and enable the calculation.

Figure 55. Enabling Calculation

Note: It is recommended for a calculation to be enabled after the configuration is downloaded to an RTU. If the configuration is modified in a live meter, a calculation should be enabled after all other parameters are configured.

Section 4: Example 2- Event Based Historical Archiving

This example explains the steps in setting up Tabl-43 to log selected process variables based on event occurrence. The example uses Flow Status for a Differential Pressure calculation as a variable that triggers the event for well-head monitoring application. We will be taking snapshot data of tubing and casing pressure to illustrate the Event Based Historical Archiving.

Section 4.1: Well-head monitoring (Snapshot Archiving)

Key Parameters

1. Tubing Pressure (Analog Point 1)
2. Casing Pressure (Analog Point 2)
3. Table-43 key configuration parameters
    a. Record Time Period: 10 sec

Note: For event-based logging, it is ideal for the record time period to be set up for shorter time increments.

    b. Event Trigger
    c. Post Event Records: 5
    d. Avg./Acc. Technique in 'Historical Average Configuration' Tab: Snapshot.
4. Table 54-Discrete Point NOT configuration
    a. Source point
    b. Destination point

Note: Table 54 is utilized to set up this example to invert the variable being used as trigger for the application. If a Discrete Input in Table 16 is being utilized as trigger, the discrete point can be inverted within Table 16 entry.

5. Table-192 configuration
    i. History Avg# 1
        1. Items per Record: 2

Note: For the purpose of this example, it is assumed that a flow run in Table-38 is pre-configured.

Note: This example configuration is set-up in an offline mode. While all the other steps of this procedure can also be completed in a live unit, all set-up, and modifications of historical data log parameters in Table-192 must be made in an offline mode.

Detailed Procedure

1. Expand Calculation(s) navigation bar.

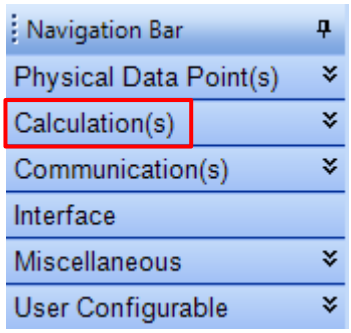


Figure 56. Calculation(s)

2. Open Table 43-Historical Average (Referred to as Table-43).

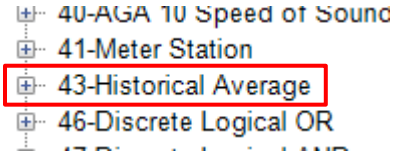


Figure 57. Table 43-Historical Average

3. Select Historical Avg# 1 (Referred to as Table-43, Entry-1).

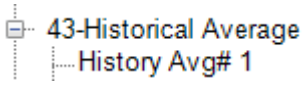


Figure 58. Historical Avg# 1

4. Go to General tab.

Figure 59. General Tab

5. Change the record time period to 10 seconds from the drop down. Click ‘F3 Apply’.

Figure 60. Changing the Record Time Period

6. Go to Table 38-Differential Pressure Flow.

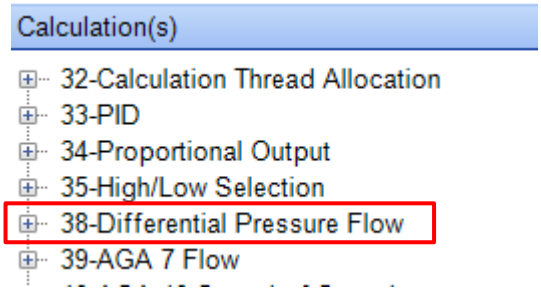


Figure 61. Table 38-Differential Pressure Flow

7. Open first entry, DP Flow Calc#1. Instantaneous tab for the first DP calculation will open on the right window.

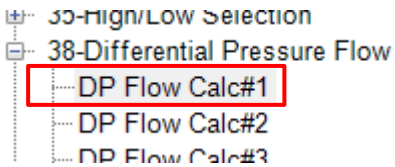


Figure 62. DP Flow Calc#1

8. Right click the 'Flow Status' field and select Copy Point.

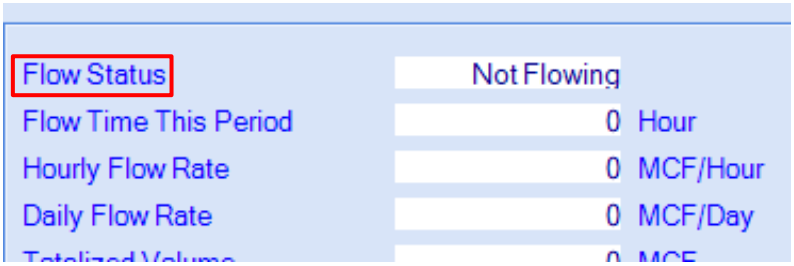


Figure 63. Flow Status

9. Go to Table 54-Discrete Point NOT and open the first entry, DP Not# 1.

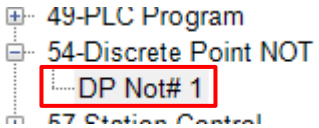


Figure 64. DP Not# 1

10. Right click top of the Source #1 and select Paste.

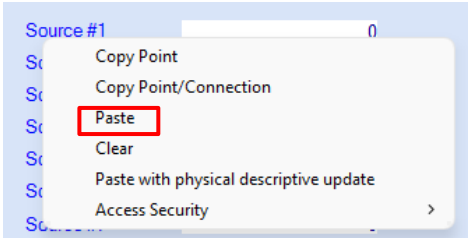


Figure 65. Selecting Paste

11. Enable the Table 54 Calculation using the drop-down option and selecting 'Enabled.' The default status of this calculation is 'Disabled'.

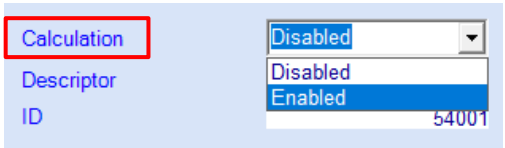


Figure 66. Table 54 Calculation

12. On the same page, right click top of the Destination #1 field, and select Copy Point.

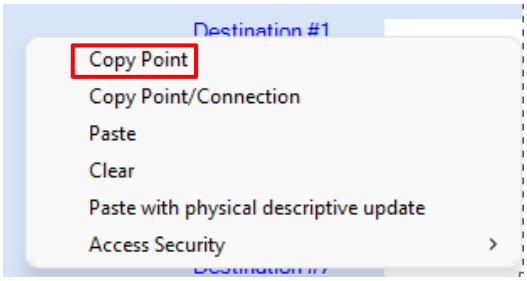


Figure 67. Selecting Copy Point

13. Go to History Avg# 1 entry in Table 43-Historical Average.

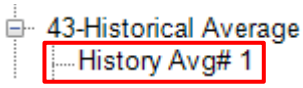


Figure 68. History Avg# 1

14. Open the General tab.

Figure 69. General Tab

15. Right click the Event Trigger field and select Paste. The field should now be connected to the Flow Status field from the Table 38.

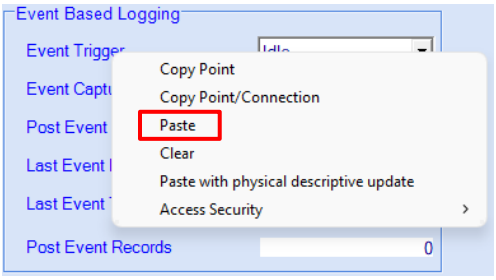


Figure 70. Connecting to the Flow Status

16. Enter '5' in the Post Event Records field.

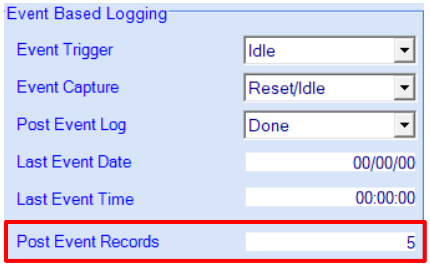


Figure 71. Post Event Records

17. Go to Historical Average Configuration tab.

Figure 72. Historical Average Configuration

18. Select Historical Point Num 1, which is the default selection. User needs to change it only if the selection in this field is at a different point.

Figure 73. Historical Point Num

19. Enter the point description in Descriptor #1 and Descriptor #2 field. For this example, Descriptor #1 is Tubing Pressure and Descriptor #2 is Psi.

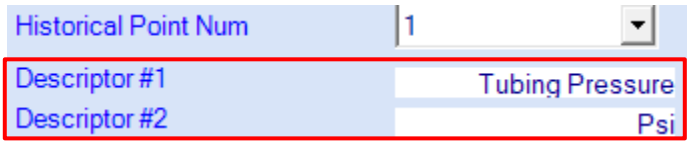


Figure 74. Point Descriptors

20. Open Table 16-Physical Analog Input.

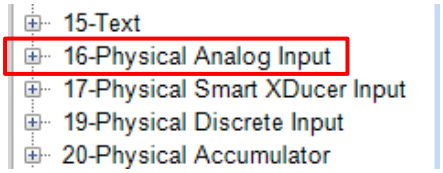


Figure 75. Table 16-Physical Analog Input

21. Open the Tubing Pressure Entry. In this example Tubing Pressure comes in to the first Analog Input Entry and is labeled Tubing Pressure, Pt 16-1 [….].

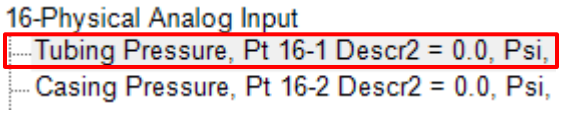


Figure 76. Tubing Pressure

22. Right click top of the 'Current Value' and select 'Copy Point'.

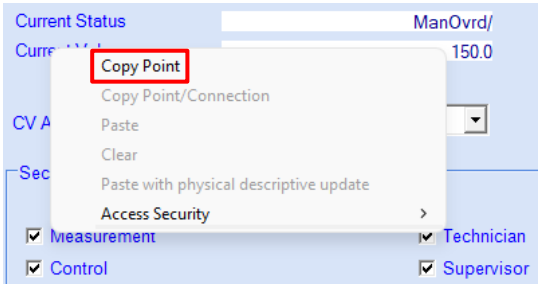


Figure 77. Selecting Copy Point

23. Go to Table-43, Entry-1.

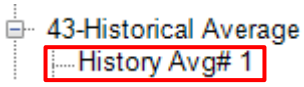


Figure 78. Table-43, Entry-1

24. Go to Historical Average Configuration tab and right click over the Historical Point Value field and select ‘Paste’.

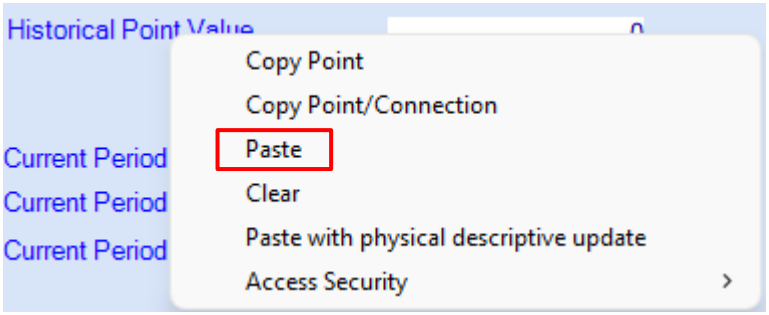


Figure 79. Historical Point Value Field

25. In the same tab, select the Avg./Acc. Technique to ‘Snapshot’ from the dropdown.

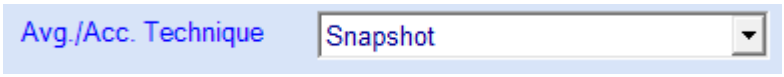


Figure 80. Snapshot

26. Click ‘F3 Apply’ button at the top of the screen.

Figure 81. F3 Apply

27. Change the Historical Point Num value to 2 from the dropdown.

Figure 82. Historical Point Num

28. Enter the point description in Descriptor #1 and Descriptor #2 field. For this example, Descriptor #1 is Casing Pressure and Descriptor #2 is Psi.

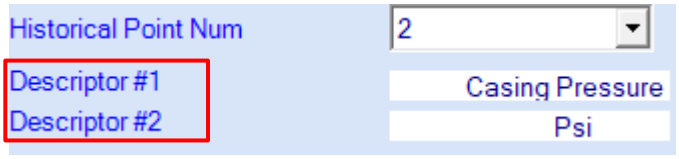


Figure 83. Entering Point Description

29. Go to Table 16-Physical Analog Input.

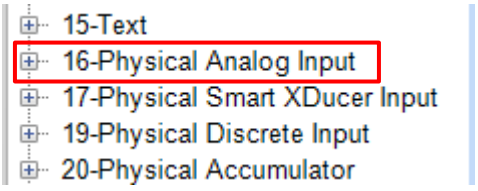


Figure 84. Table 16-Physical Analog Input

30. Open Second Entry, labeled Casing Pressure, Pt 16-2 [….].

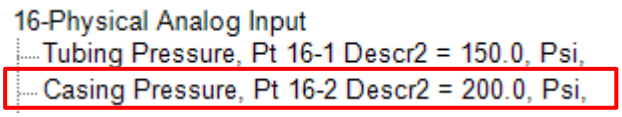


Figure 85. Casing Pressure, Pt 16-2 [….]

31. Right click top of the ‘Current Value’ and select ‘Copy Point’.

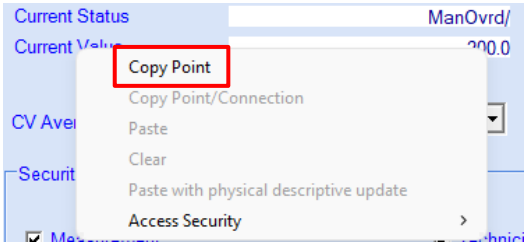


Figure 86. Copy Point

32. Go to Table-43, Entry-1.

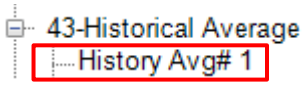


Figure 87. Table-43

33. Go to Historical Average Configuration tab, ensure Historical Point Num value is 2, right click over the Historical Point Value field, and select ‘Paste’.

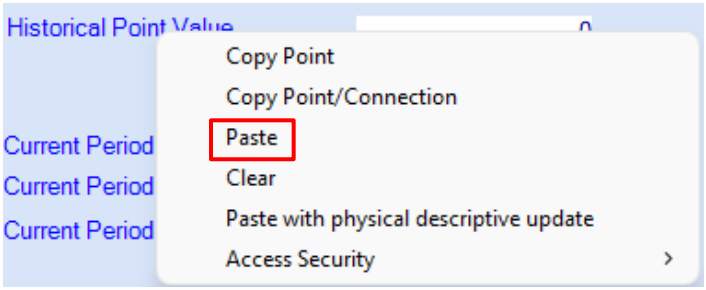


Figure 88. Historical Average Configuration

34. In the same tab, select the Avg./Acc. Technique to ‘Snapshot’ from the dropdown.

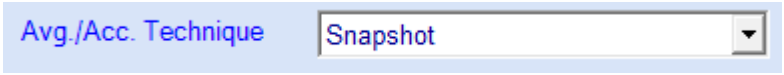


Figure 89. Snapshot’

35. Click ‘F3 Apply’ button at the top of the screen.

Figure 90. F3 Apply

36. Expand the Miscellaneous navigation bar.

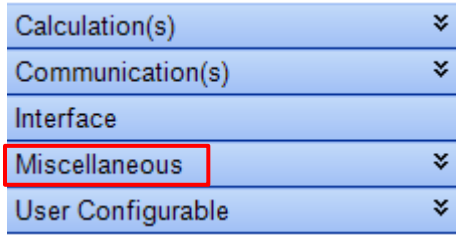


Figure 91. Miscellaneous

37. Expand Table 192-Historical Data Log Allocation.

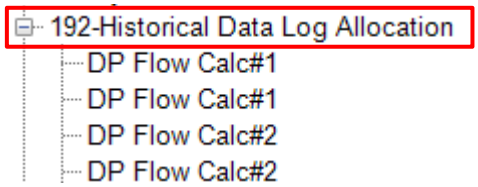


Figure 92. 192-Historical Data Log Allocation

38. Double click History Avg# 1.

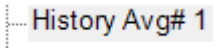


Figure 93. History Avg#1

39. Change the Items Per Record to 2.

Figure 94. Items Per Record

40. Click 'F3 Apply' button at the top of the screen.

Figure 95. F3 Apply

41. When ready, download the configuration modified in the offline mode to the RTU by using 'Download Configuration To RTU' option in Files menu.

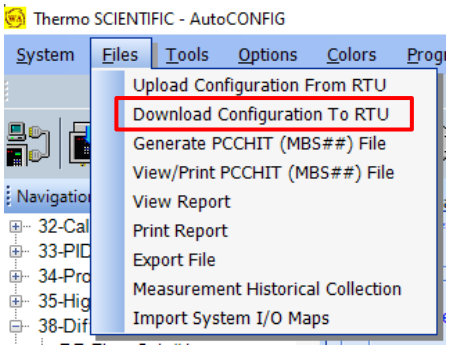


Figure 96. Download Configuration To RTU

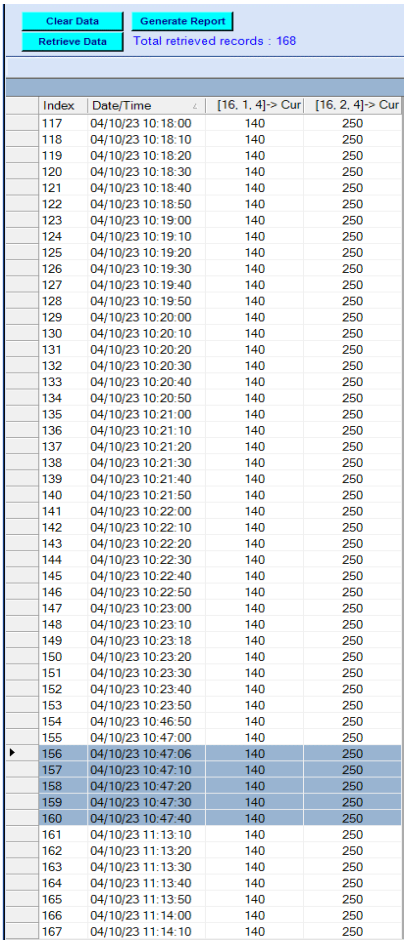
42. Go to General tab in Table-43, Entry-1 and enable the calculation.

Figure 97. General Tab in Table-4

Note: It is recommended for a calculation to be enabled after the configuration is downloaded to an RTU. If the configuration is modified in a live meter, a calculation should be enabled after all other parameters are configured.

Section 5: Appendix I - History Log

The history log in Figure 1. Table-43 shows the data for the Event Based Log in Example 2. The data is logged every 10 seconds which is the configured ‘Record Time Period’ for the calculation. However, when the event occurs, the data log stops after 5 records which is the ‘Post Event Records’ count configured in the example. The record on row 156 in Figure 1. Table-43 is the first record after the event is triggered. The software logs the first record at the exact moment the trigger occurs, but the subsequent readings follow the specified time interval under ‘Record Time Period’. As shown in the figure (Row 161 onward), the system starts to log the data again once the ‘Event Capture’ field is manually reset to Reset/Idle state.



Index	Date/Time	[16, 1, 4]-> Cur	[16, 2, 4]-> Cur
117	04/10/23 10:18:00	140	250
118	04/10/23 10:18:10	140	250
119	04/10/23 10:18:20	140	250
120	04/10/23 10:18:30	140	250
121	04/10/23 10:18:40	140	250
122	04/10/23 10:18:50	140	250
123	04/10/23 10:19:00	140	250
124	04/10/23 10:19:10	140	250
125	04/10/23 10:19:20	140	250
126	04/10/23 10:19:30	140	250
127	04/10/23 10:19:40	140	250
128	04/10/23 10:19:50	140	250
129	04/10/23 10:20:00	140	250
130	04/10/23 10:20:10	140	250
131	04/10/23 10:20:20	140	250
132	04/10/23 10:20:30	140	250
133	04/10/23 10:20:40	140	250
134	04/10/23 10:20:50	140	250
135	04/10/23 10:21:00	140	250
136	04/10/23 10:21:10	140	250
137	04/10/23 10:21:20	140	250
138	04/10/23 10:21:30	140	250
139	04/10/23 10:21:40	140	250
140	04/10/23 10:21:50	140	250
141	04/10/23 10:22:00	140	250
142	04/10/23 10:22:10	140	250
143	04/10/23 10:22:20	140	250
144	04/10/23 10:22:30	140	250
145	04/10/23 10:22:40	140	250
146	04/10/23 10:22:50	140	250
147	04/10/23 10:23:00	140	250
148	04/10/23 10:23:10	140	250
149	04/10/23 10:23:18	140	250
150	04/10/23 10:23:20	140	250
151	04/10/23 10:23:30	140	250
152	04/10/23 10:23:40	140	250
153	04/10/23 10:23:50	140	250
154	04/10/23 10:46:50	140	250
155	04/10/23 10:47:00	140	250
156	04/10/23 10:47:06	140	250
157	04/10/23 10:47:10	140	250
158	04/10/23 10:47:20	140	250
159	04/10/23 10:47:30	140	250
160	04/10/23 10:47:40	140	250
161	04/10/23 11:13:10	140	250
162	04/10/23 11:13:20	140	250
163	04/10/23 11:13:30	140	250
164	04/10/23 11:13:40	140	250
165	04/10/23 11:13:50	140	250
166	04/10/23 11:14:00	140	250
167	04/10/23 11:14:10	140	250

Figure 98. History Log

USA
27 Forge Parkway
Franklin, MA 02038
Phone: 800-437-7979 • Toll free: (866) 282-0430
orders.process.us@thermofisher.com

Learn more at **thermofisher.com/autoflex**