

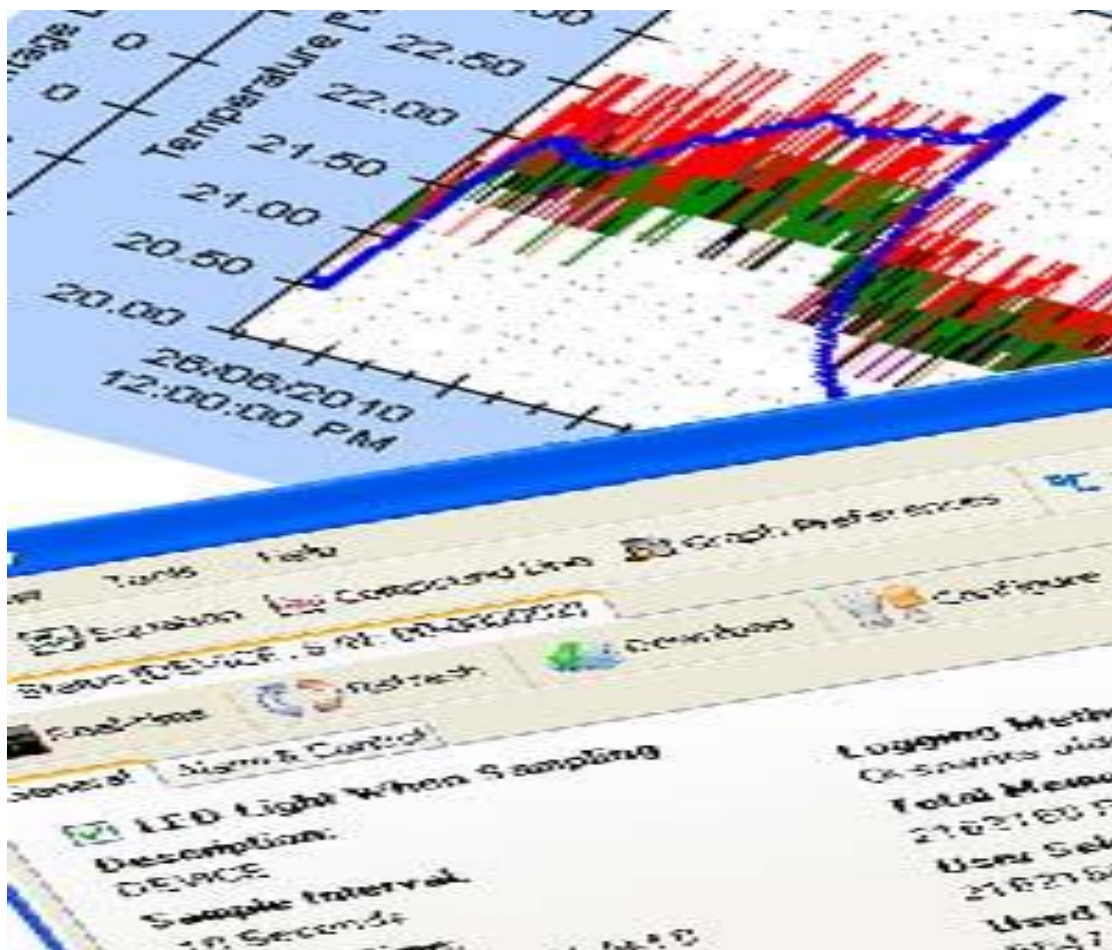


404 – 1688 152nd Street  
Surrey, BC  
Canada, V4A 4N2  
Phone: 604.424.9092

Toll Free: 1.877.352.9158  
Fax: 778.807.5098  
Email: [info@microedgeinstruments.com](mailto:info@microedgeinstruments.com)  
Web: [www.microedgeinstruments.com](http://www.microedgeinstruments.com)

# SiteView

*Site-Log Data Logger Software*



## User's Manual

Microedge Instruments Inc.  
404 – 1688 152nd Street  
Surrey, BC  
Canada, V4A 4N2  
Toll Free: 1.877.352.9158  
[www.microedgeinstruments.com](http://www.microedgeinstruments.com)

## **ABOUT THIS MANUAL**

This manual contains operational information for SiteView software.

Copyright © 2020, Microedge Instruments Inc.

### **Limits of Liability and Disclaimer of Warranty:**

---

The manual contained in this document is furnished for informational use only and is subject to change without notice.

Microedge Instruments Inc. shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

### **Copyright and Trademarks**

---

This manual contains proprietary information which is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced, or translated to another language without prior written consent of Microedge Instruments Inc.

Microedge Instruments Inc., Site-Log, SiteView are the trademarks of Microedge Instruments Inc.

All other trademarks and registered trademarks are the property of their respective owners.

### **End User License Agreement**

---

End User License Agreement is available for download on our website.

PLEASE DOWNLOAD AND READ THE SOFTWARE LICENSE AGREEMENT CAREFULLY BEFORE DOWNLOADING OR USING THE SOFTWARE.

#### **Microedge Instruments Inc.**

404 – 1688 152nd Street

Surrey, BC

Canada, V4A 4N2

Toll Free: 1.877.352.9158

Web-Site: [www.microedgeinstruments.com](http://www.microedgeinstruments.com)

Email: [info@microedgeinstruments.com](mailto:info@microedgeinstruments.com)

Revision 3.3 For SiteView 4.3, May, 2020

# Table of Contents

<b>ABOUT THIS MANUAL.....</b>	<b>1</b>
LIMITS OF LIABILITY AND DISCLAIMER OF WARRANTY: .....	1
COPYRIGHT AND TRADEMARKS .....	1
END USER LICENSE AGREEMENT.....	1
FEATURES .....	6
SYSTEM REQUIREMENTS .....	6
<b>CHAPTER 1 - INSTALL SITEVIEW .....</b>	<b>7</b>
INSTALL SITEVIEW .....	7
CONNECT DATA LOGGER.....	11
ACTIVATE SITEVIEW .....	15
<b>CHAPTER 2 – PROTECT YOUR LOGGER .....</b>	<b>17</b>
TYPES OF USER ACCOUNT AND PRIVILEGE .....	17
CREATE ACCOUNTS .....	17
<b>CHAPTER 3 - COMMUNICATE WITH LOGGER.....</b>	<b>21</b>
USB PORT CONNECTION .....	21
<i>Start Communication</i> .....	21
USB DEVICE SERVER CONNECTION .....	22
<i>Communicate With Site USB Device Server or PRECISE-LOG Logger:</i> .....	23
<i>Start Communication</i> .....	24
<i>Adjust Ethernet Settings</i> .....	27
SERIAL PORT CONNECTION.....	27
<i>Start Communication</i> .....	27
<b>CHAPTER 4 - VIEW STATUS OF LOGGER.....</b>	<b>29</b>
WHAT IS THE STATUS OF LOGGER .....	29
GENERAL STATUS .....	30
ALARM AND EXCITATION STATUS .....	30
KNOW IF LOGGER OPERATE PROPERLY? .....	31
<b>CHAPTER 5 - DOWNLOAD LOGGER DATA .....</b>	<b>32</b>
CHOOSE FILENAME AND TIME SPAN .....	32
<b>CHAPTER 6 - CONFIGURE LOGGER.....</b>	<b>34</b>
CLOCK OF DATA LOGGER .....	35
DECIDE WHEN TO START AND WHEN TO STOP LOGGING .....	35
DECIDE HOW OFTEN THE LOGGER SAMPLES SOURCES.....	36
DECIDE WHICH CHANNELS TO LOG ON .....	36
DECIDE HOW TO CONVERT TO PHYSICAL MEASUREMENT .....	37
<i>Role of Equation</i> .....	37
<i>Decide What Equation to Use</i> .....	37
MANAGE ALARM AND EXCITATION CONTROL.....	37
<i>Configure Channel Alarms</i> .....	37

<i>Decide what to do when in Alarm State</i> .....	38
<i>Configure Excitation Control</i> .....	38
QUICK WAY TO CALIBRATE LOGGER .....	39
<i>Understand Cali. Low &amp; Cali. High</i> .....	39
<i>Calibrate Channel</i> .....	40
SAVE SETTINGS AND START NEW SESSION .....	40
<b>CHAPTER 7 - REAL-TIME CHART VIEWING/RECORDING .....</b>	<b>41</b>
DISPLAY REAL-TIME DIALOG .....	41
SAVE REAL-TIME DATA .....	42
CHANGE VIEWS PROPERTIES .....	42
<b>CHAPTER 8 - CALIBRATE LOGGER .....</b>	<b>44</b>
<i>On-Line Calibrate</i> .....	44
<i>Off-Line Calibrate</i> .....	49
<b>CHAPTER 9 - WORK WITH EQUATIONS .....</b>	<b>51</b>
WHAT IS EQUATION .....	51
BUILT-IN EQUATIONS .....	51
<i>Equations for Temperature Channels</i> .....	51
<i>Equations for Relative Humidity Channel</i> .....	52
<i>Equations for Voltage Channels</i> .....	52
<i>Equations for Current Channels</i> .....	52
<i>Equations for Pulse/State/Event Channels</i> .....	52
TEMPERATURE EQUATION FOR THERMISTOR .....	52
CUSTOM EQUATION .....	54
CREATE EQUATION .....	55
IMPORT/EXPORT EQUATIONS .....	57
APPLY EQUATION TO LOGGER .....	60
CREATE CUSTOM-LINE EQUATION .....	60
ADD CUSTOM-LINE EQUATION TO PLOT.....	61
CALL/INVOKE OTHER CUSTOM EQUATIONS .....	62
<b>CHAPTER 10 - WORK WITH UNITS .....</b>	<b>64</b>
WHAT IS UNIT.....	64
OPEN UNIT CATEGORY DIALOG.....	65
CREATE UNIT.....	66
IMPORT/EXPORT UNITS.....	67
USE UNIT .....	70
<i>Apply Unit Category in Equation</i> .....	70
<i>Change Unit</i> .....	70
<i>Change Unit in Plot</i> .....	71
<b>CHAPTER 11 - WORK WITH SETTINGS &amp; PREFERENCES .....</b>	<b>72</b>
GRAPH PREFERENCES .....	72
SAVING SITEVIEW FILE (SVF).....	73
SVF FILENAME STRUCTURE .....	73

LOOK AND FEEL (SKIN) .....	74
REAL-TIME SETTINGS .....	74
<b>CHAPTER 12 - WORK WITH SCHEDULE DOWNLOAD.....</b>	<b>75</b>
ADD SCHEDULE DOWNLOAD .....	75
MANAGE SCHEDULE DOWNLOAD .....	78
<b>CHAPTER 13 – UPGRADE SITEVIEW AND FIRMARE .....</b>	<b>80</b>
UPGRADE SITEVIEW .....	80
UPGRADE FIRMWARE.....	80
<b>CHAPTER 14 - WORK WITH PLOT .....</b>	<b>82</b>
BASIC VIEWS .....	83
<i>Plot View</i> .....	83
<i>Tabular View</i> .....	84
<i>Statistics</i> .....	84
ADD MORE SITEVIEW FILES .....	85
EXPORT.....	85
<i>Save As Image File</i> .....	85
<i>Save as CSV File</i> .....	86
<i>Save as CSV File</i> .....	86
CHANGE LOOK AND FEEL .....	86
<i>Change Graph Pane Settings:</i> .....	86
<i>Save as CSV File</i> .....	86
EDIT THE GRAPH.....	86
<i>Add Annotation:</i> .....	87
<i>Add Comment:</i> .....	87
<i>Change Title:</i> .....	87
<i>Change Legend:</i> .....	87
PRINT PLOT.....	88
CHANGE PLOT SETTINGS .....	88
<i>Change Axis Settings</i> .....	88
<i>Change Line/Curve Settings</i> .....	88
ZOOM PLOT.....	89
<i>Zoom-In</i> .....	89
<i>Zoom Previous/Unzoom All</i> .....	91
<i>Zoom First</i> .....	91
<i>Zoom Next</i> .....	91
<i>Zoom Last</i> .....	92
<i>Navigate / Time-Zoom</i> .....	92
ADD CUSTOM LINES .....	92
OTHER FEATURES OF PLOT .....	93
<i>Apply Changes to Graph</i> .....	93
<i>Save Changes to SVF File</i> .....	93
<i>Copy Graph to Clipboard</i> .....	94
<i>Show Value</i> .....	94
<i>View Mouse-Point Values</i> .....	94

<i>Fast Draw Mode</i> .....	94
<b>CHAPTER 15 - EQUATION REFERENCES</b> .....	<b>96</b>
C# LANGUAGE SOURCE CODE REFERENCES .....	96
<i>Basic data types</i> .....	96
<i>Basic Operators</i> .....	96
<i>Basic Math Methods</i> .....	100
ACCESSIBLE OBJECTS .....	101
EQUATION EXAMPLES .....	102
<i>Dew Point Temperature</i> .....	102
<i>Carbon Dioxide Transmitter (0 – 5000 PPM)</i> .....	102
<i>External Thermistor</i> .....	103
<i>Previous Hour Average</i> .....	103

Congratulations on using SiteView - the complete software package working closely with Site-Log and VersaLog series data loggers for device configuration, data downloading, plotting and analyzing.

## **Features**

---

- ❑ Supports Serial Port, USB, Ethernet and Modem connections for easy local and remote access of data loggers.
- ❑ Allows downloading multiple data loggers simultaneously.
- ❑ Provides powerful custom equation functionality solving scientific and laboratory algorithm difficulties.
- ❑ Displays both tabular data and plot view. Zooming function provides detailed view of specific data section.
- ❑ Annotation/Comment highlights the important data points and sections.
- ❑ Custom channel and custom line allow adding more channels to the logger and plot lines to the plot view.
- ❑ Allows real-time chart and list views of the data logger, replacing paper chart recorder.
- ❑ Receives alarm notifications from data logger and takes actions like sending email, playing music etc.
- ❑ Access remote data loggers via LAN/Internet as if they were connected directly to the local computer.
- ❑ User Account Control to protect data loggers and important settings.

## **System Requirements**

---

Computer:

CPU: 1.0 GHZ or above  
Memory: 256M or above  
Port: 1 USB port or 1 COM port  
Hard Drive: 1GB or above

Operating System:

Window XP with SP2 or later, Windows Vista, Windows 7, 8, 10

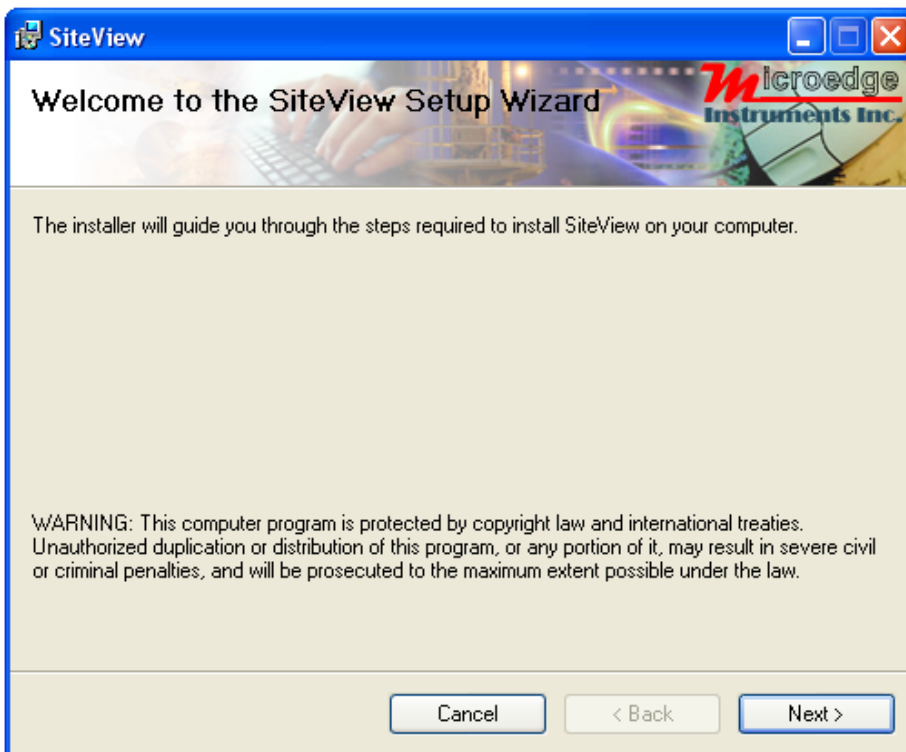
# CHAPTER 1 - INSTALL SITEVIEW

**NOTE:** Before the installation, please make sure the product key is available.

## Install SiteView

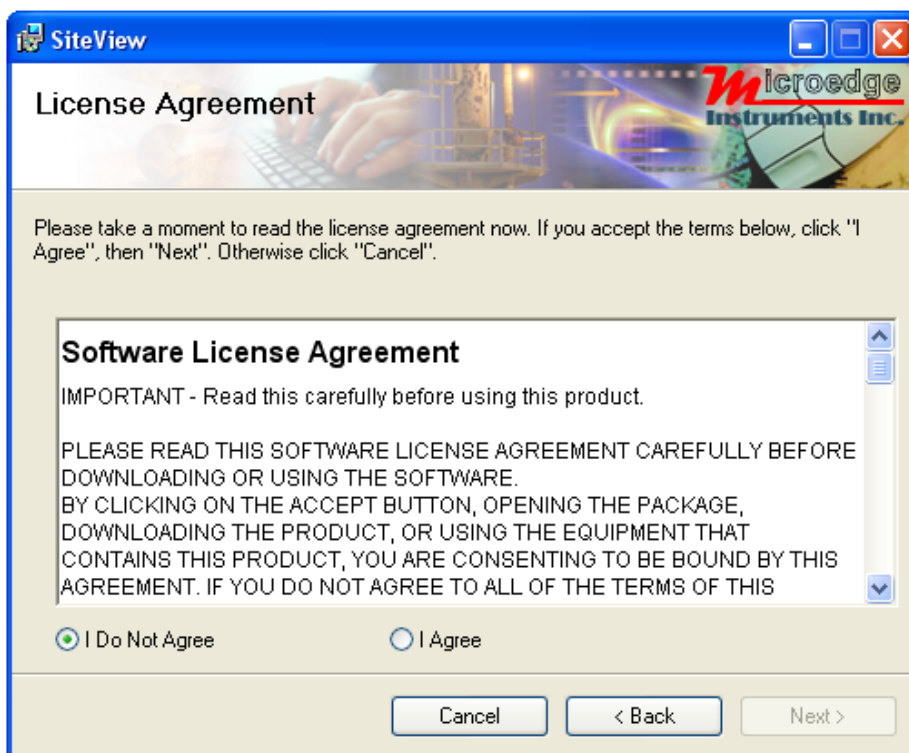
1. Install SiteView and Data Logger USB Driver

Insert the included CD to the CD Drive. The installation should start to run automatically. Follow the on-screen instructions to complete the installation.

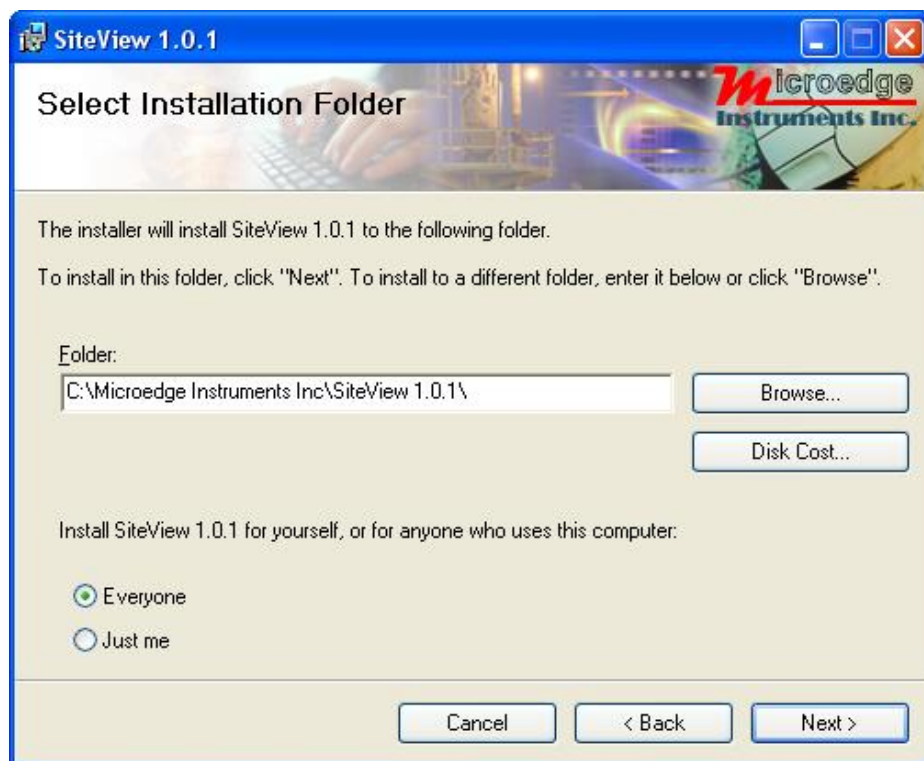


Click "Next >" button to proceed to the next page.



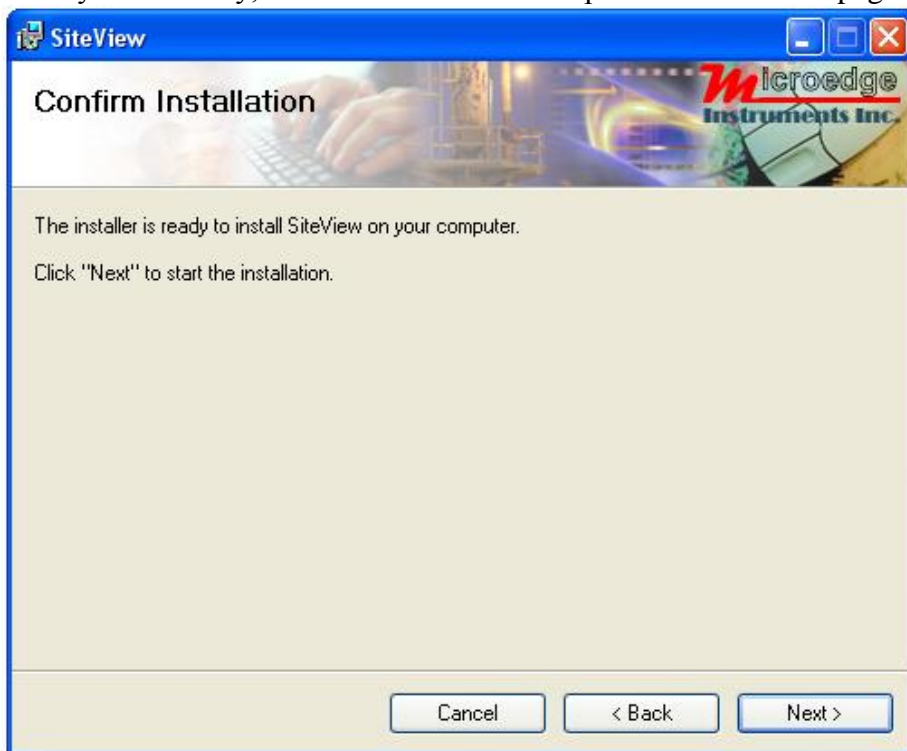


Please read the License Agreement carefully. If you accept the terms click “I Agree”, then click “Next >” button. Otherwise click “Cancel” to cancel the installation.

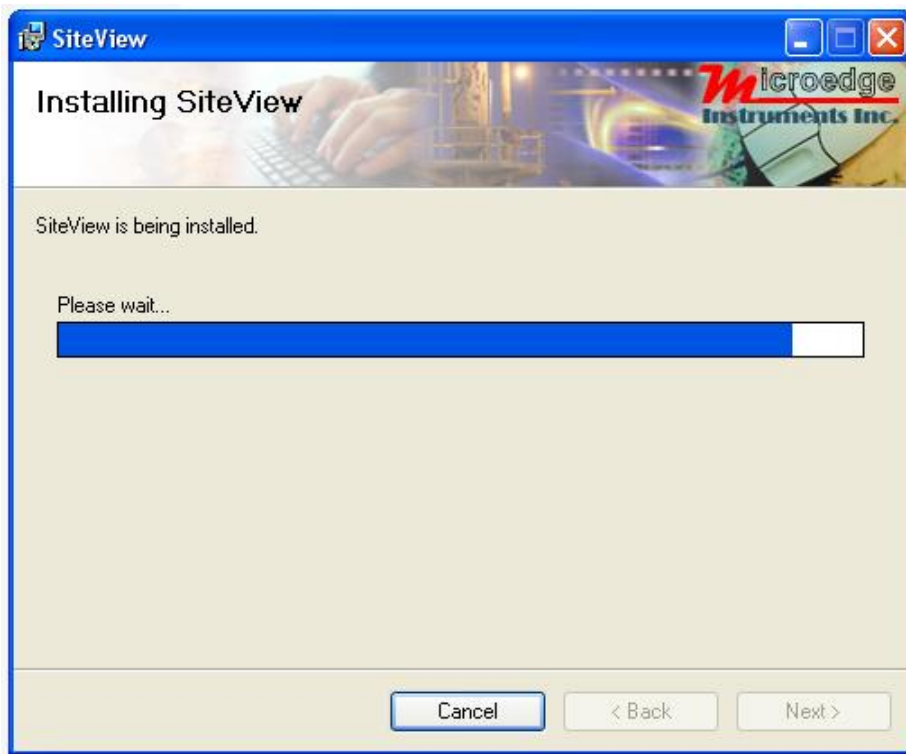


In this dialog select a destination folder where SiteView will be installed. We recommend you keep the default folder.

Once you are ready, click “Next >” button to proceed to the next page.

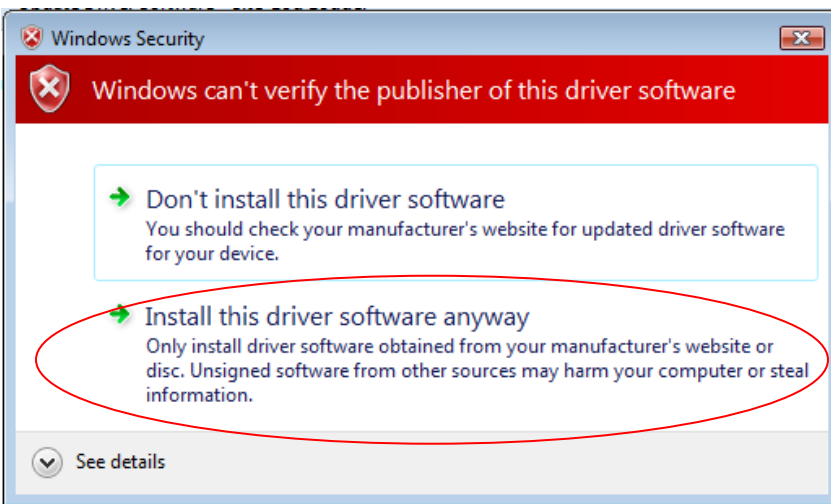


This confirmation page gives you the chance to modify previously selected options. Click “Next >” button to start the installation.

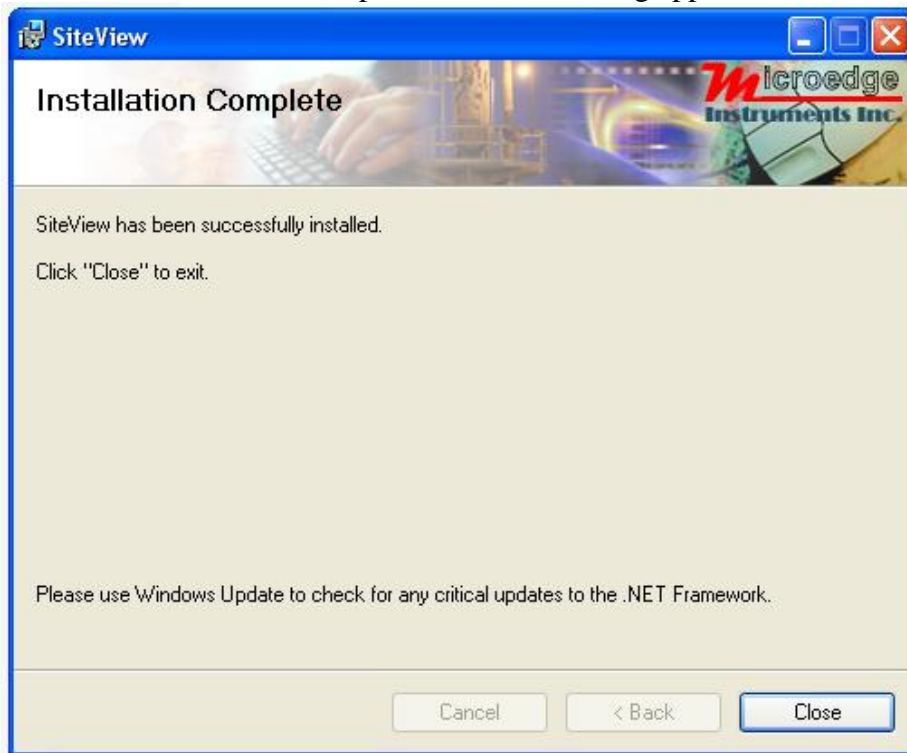


As SiteView is being installed the above dialog shows the installation progress by percentage.

Depending on the operating system, you may see the dialog similar to the one below displayed. Please select “Continue Anyway” or “Install this driver software anyway” to allow the software and the driver to be installed.



Once the installation is complete, the below dialog appears:



Click "Close" button to finish the installation and close the dialog.

## **Connect Data Logger**

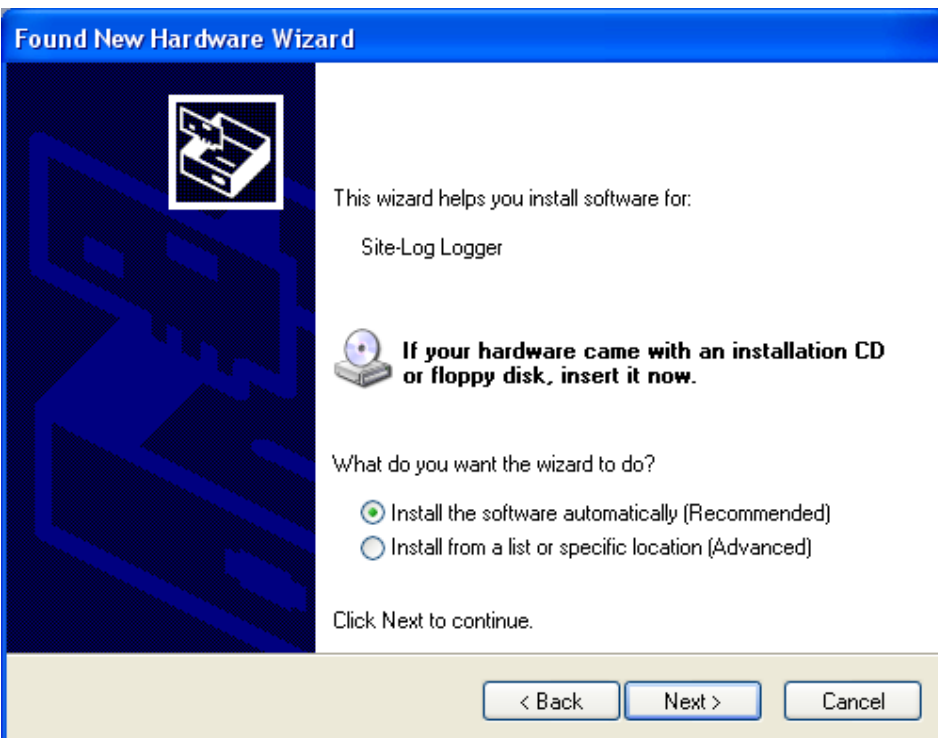
---

Connect the logger to the computer's USB port. Windows Vista and Windows 7, 8, 10 will automatically recognize the data logger.

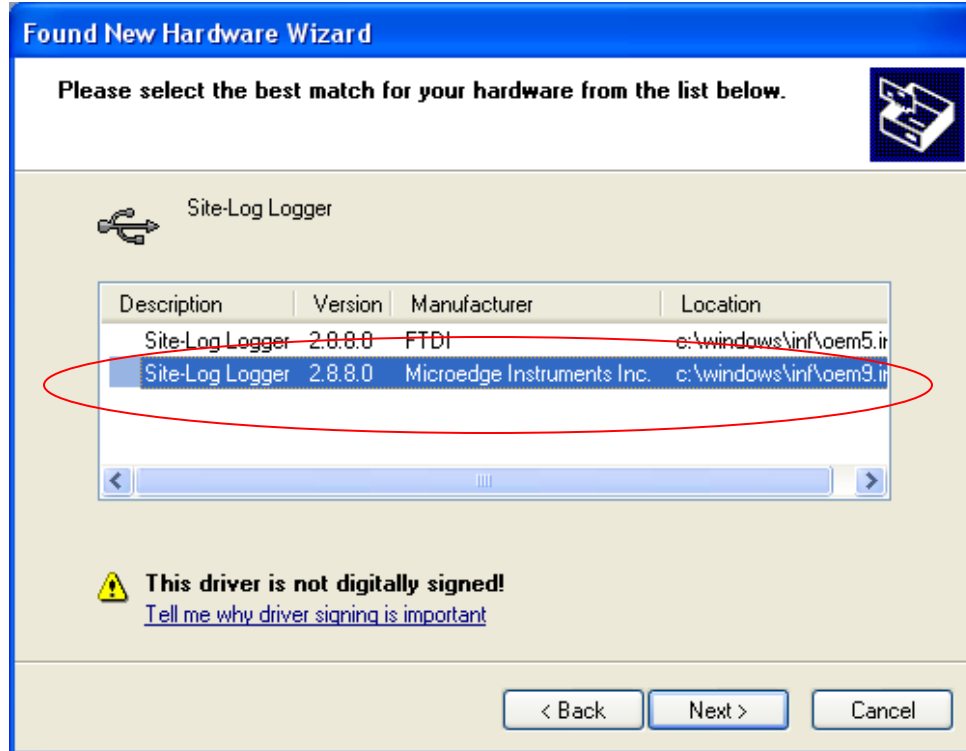
For Windows XP user, the following dialog window will appear:



Select "No, not this time" from options available and then Click "Next >" to proceed with the installation.



Select "Install the software automatically (Recommended)" as shown in the above figure and then click "Next >".

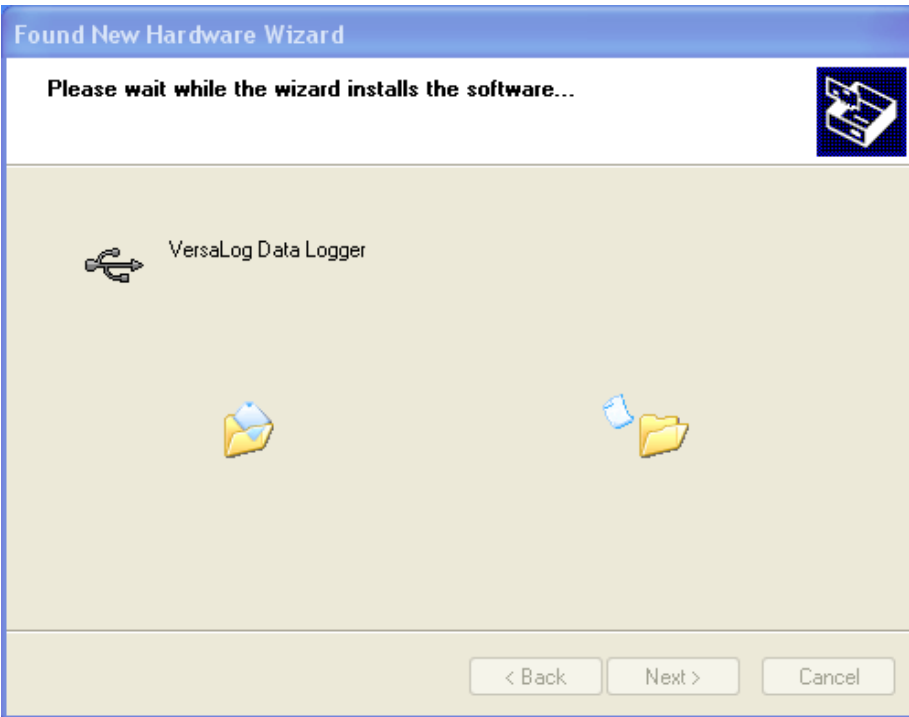


Select the item with Manufacturer of Microedge Instruments Inc and click "Next>" to proceed.

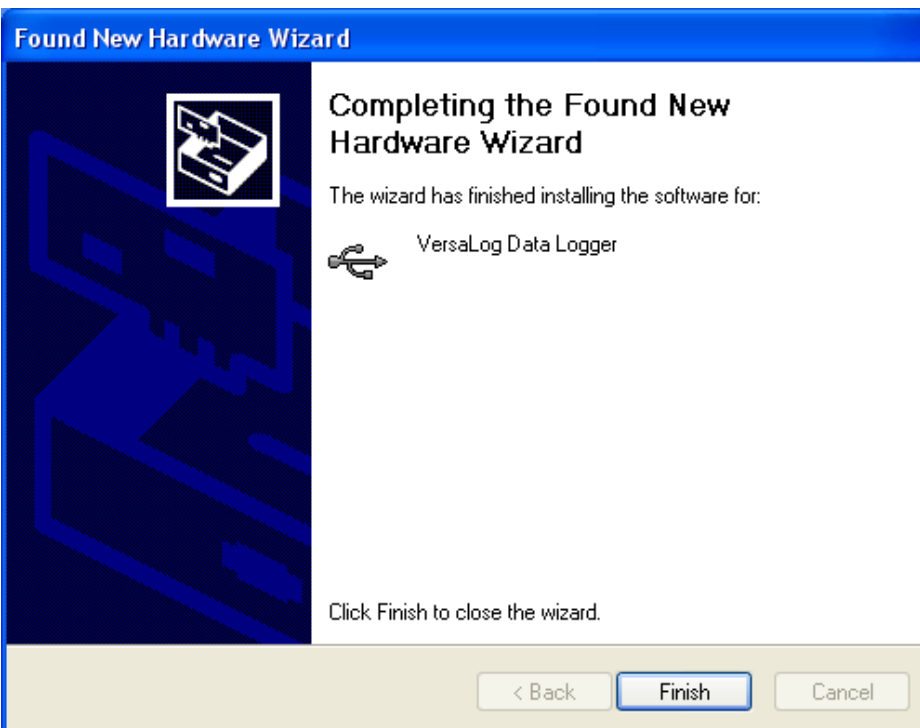
In the following message dialog, click "Continue Anyway" to continue with the installation:



The screen below will be displayed as Windows copies required driver files:



Windows should then display a message indicating the installation was successful:



## Activate SiteView

---

After the installation SiteView needs to be activated by the Product Key you obtained when you bought SiteView.

If the above installation of SiteView was successful, SiteView can be launched by either one of the following:

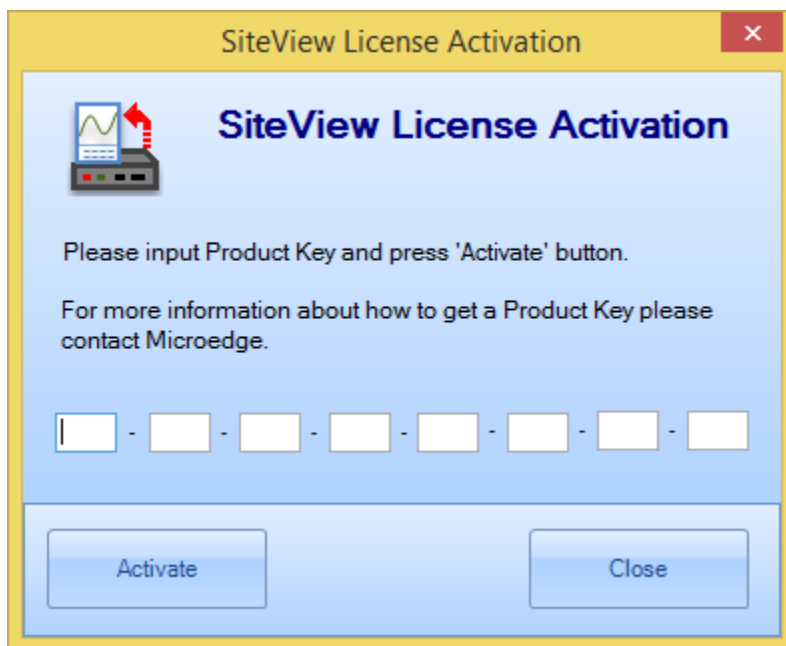
**Double click on SiteView icon on the desktop:**



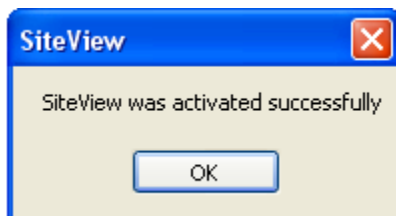
Or:

**Using Windows Start Menu, select Start : All Programs: Microedge Instruments Inc.: SiteView.**

Double click **SiteView** icon on the desktop, the following dialog appears:



Enter the Product Key, then click **Activate** button. If the Product Key is accepted the following confirmation dialog will appear:





Click **OK** button to finish the activation. From now you can start using SiteView.

## CHAPTER 2 – PROTECT YOUR LOGGER

When SiteView is first installed there are no user account and password protections. We strongly recommend you to create user accounts as early as possible in order to protect your logger and system.

### Types of User Account and Privilege

---

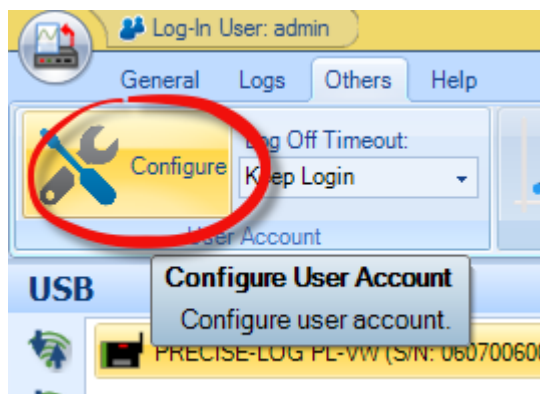
- |                       |   |
|-----------------------|---|
| <b>Administrator:</b> | Change all fields of the system and configure data logger. Add, modify and delete other users. You can only have one Administrator account in the system. |
| <b>Master:</b>        | Has the same privilege as Administrator except Master can not create, modify and delete other users.  |
| <b>Standard User:</b> | Can view logger status, download data and view plots. Some system settings are not allowed to view. Can not change most of settings.                      |

### Create Accounts

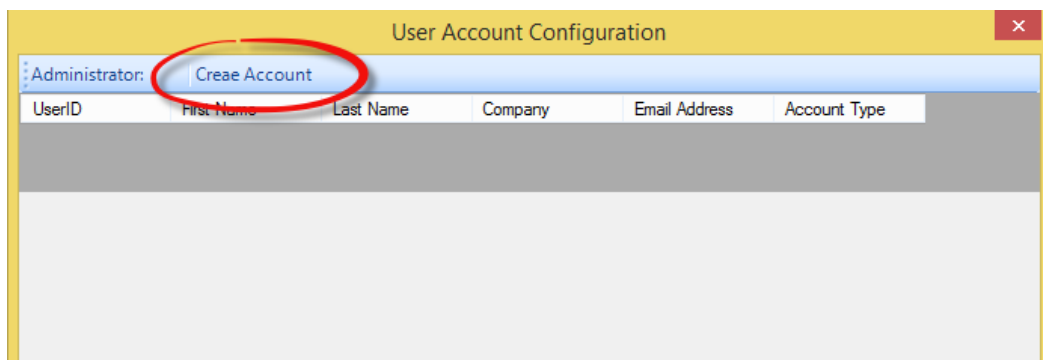
---

To enable User Account and create one or more users with SiteView system:

1. Navigate to Others tab and click 'Configure' button under User Account:

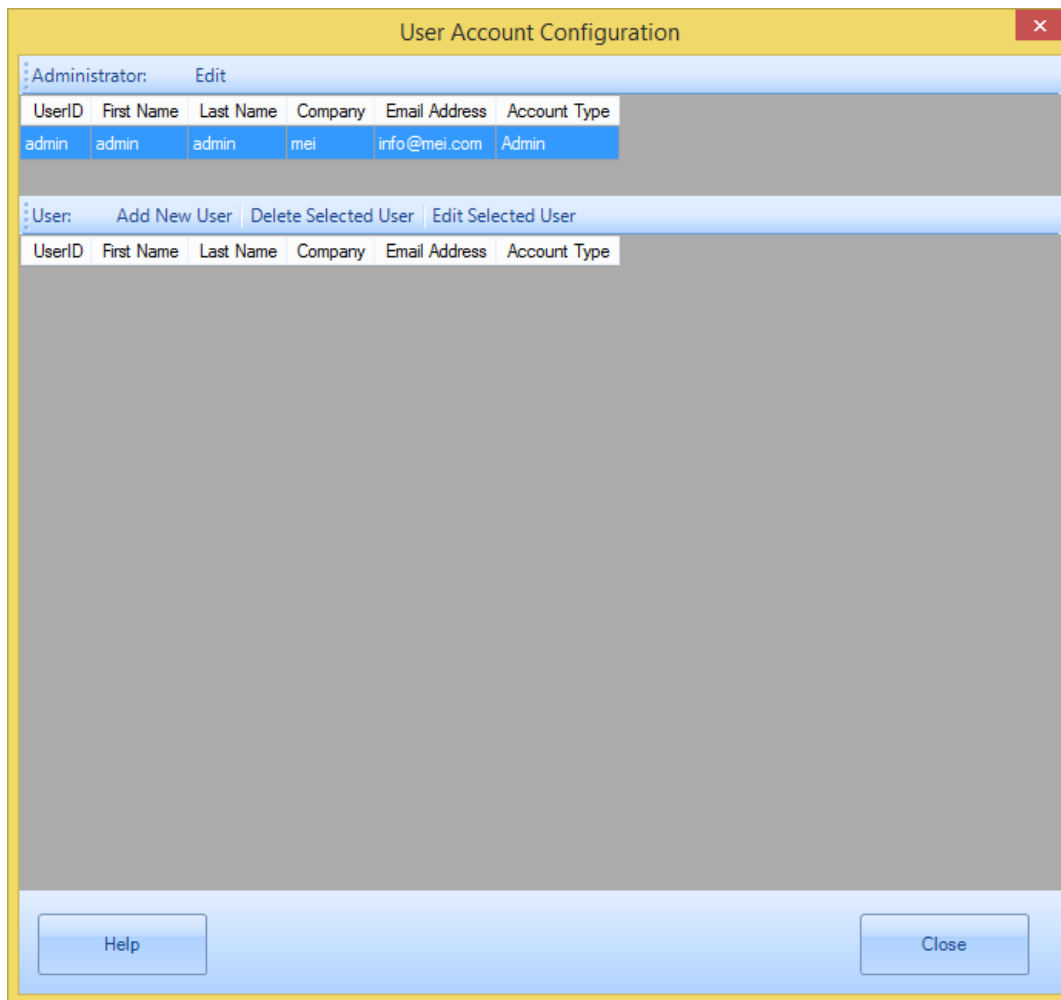


2. Click "Create Account" button to create an Administrator account:



3. Fill out the registration dialog and click "OK" button. Make note of your user ID, password and put them in a safe place.

4. You may create other user accounts by clicking "Add New User" button after you have created the administrator account.

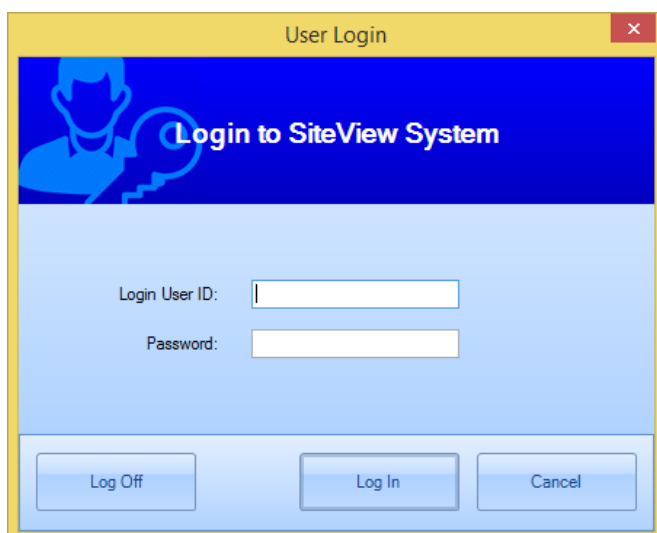


The 'User Account Configuration' dialog box features a yellow title bar with a close button. It contains two sections: 'Administrator' and 'User'. The 'Administrator' section has an 'Edit' button and a table with one row of user data. The 'User' section has buttons for 'Add New User', 'Delete Selected User', and 'Edit Selected User', followed by an empty table. At the bottom are 'Help' and 'Close' buttons.

UserID	First Name	Last Name	Company	Email Address	Account Type
admin	admin	admin	mei	Info@mei.com	Admin

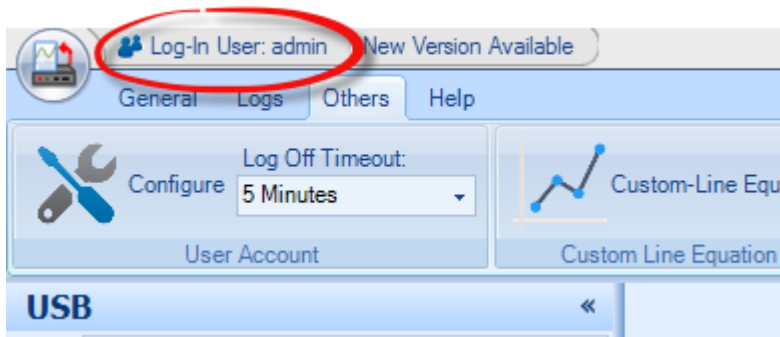
UserID	First Name	Last Name	Company	Email Address	Account Type
--------	------------	-----------	---------	---------------	--------------

Once you have created users, on the next start of SiteView you are prompted with User Login dialog. Only valid users can log in to the system and start using SiteView:



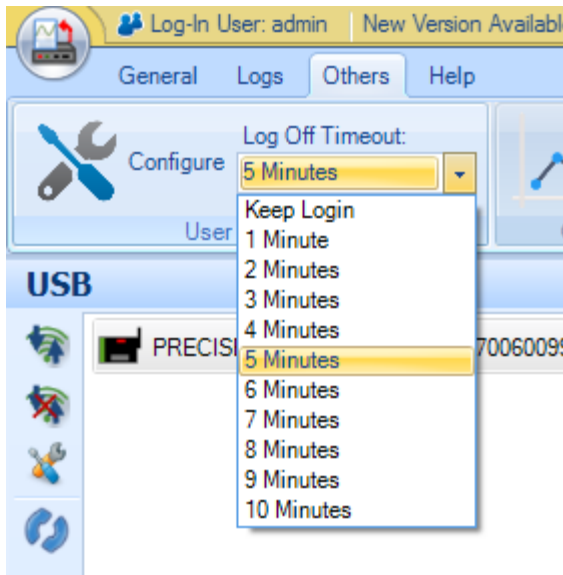
The 'User Login' dialog box has a yellow title bar with a close button. It features a blue header with a user icon and the text 'Login to SiteView System'. Below the header are input fields for 'Login User ID' and 'Password'. At the bottom are 'Log Off', 'Log In', and 'Cancel' buttons.

You can also display the above dialog to log off the system if you want to prevent other people from using SiteView. To display the above dialog within SiteView, click Log in/off button:



Then click "Log Off" button on the above User Login dialog.

The system will automatically log off if you have not interact with the system for a period of time that you can set from here:



Change "Log Off Timeout" to a value suits your need.

## CHAPTER 3 - COMMUNICATE WITH LOGGER

All Site-Log series data loggers come with an USB and an AUX ports. The USB port is for connecting directly to the computer. The AUX port is for connecting to a serial communication device like a Modem or a Serial Device Server when the logger needs to be accessed remotely.

---

**NOTE:** Please make sure SiteView and USB driver are installed correctly. Refer to [Chapter 2C:\Dev\microedge\Product Manual\Product Manual 2014-06\SiteView manual\Install SiteView.htm](#) for details on the installation.

---

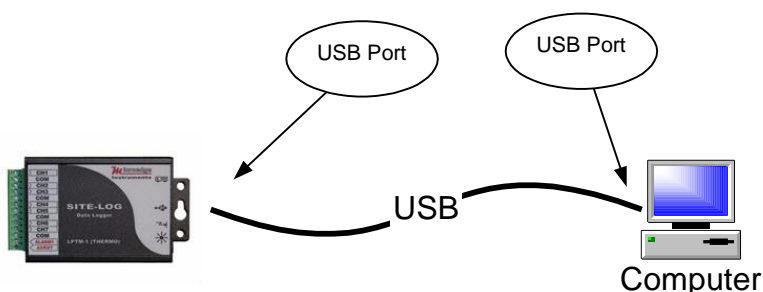
### USB Port Connection

---

#### Start Communication

To communicate with the logger via USB port:

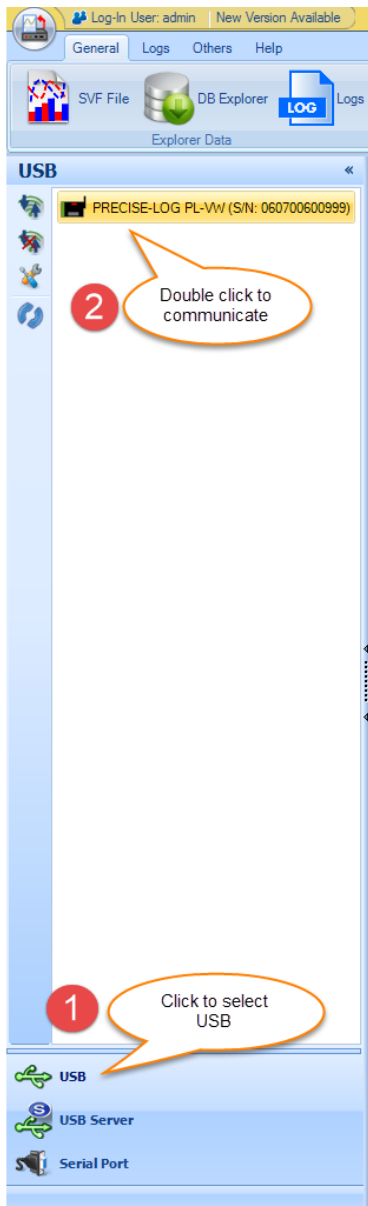
1. Connect accompanied USB cable from the logger to a computer's USB port.



2. Launch SiteView application by double clicking on SiteView icon on the desktop:



SiteView application starts running and the logger icon is showing in the USB tab page of the communication panel:

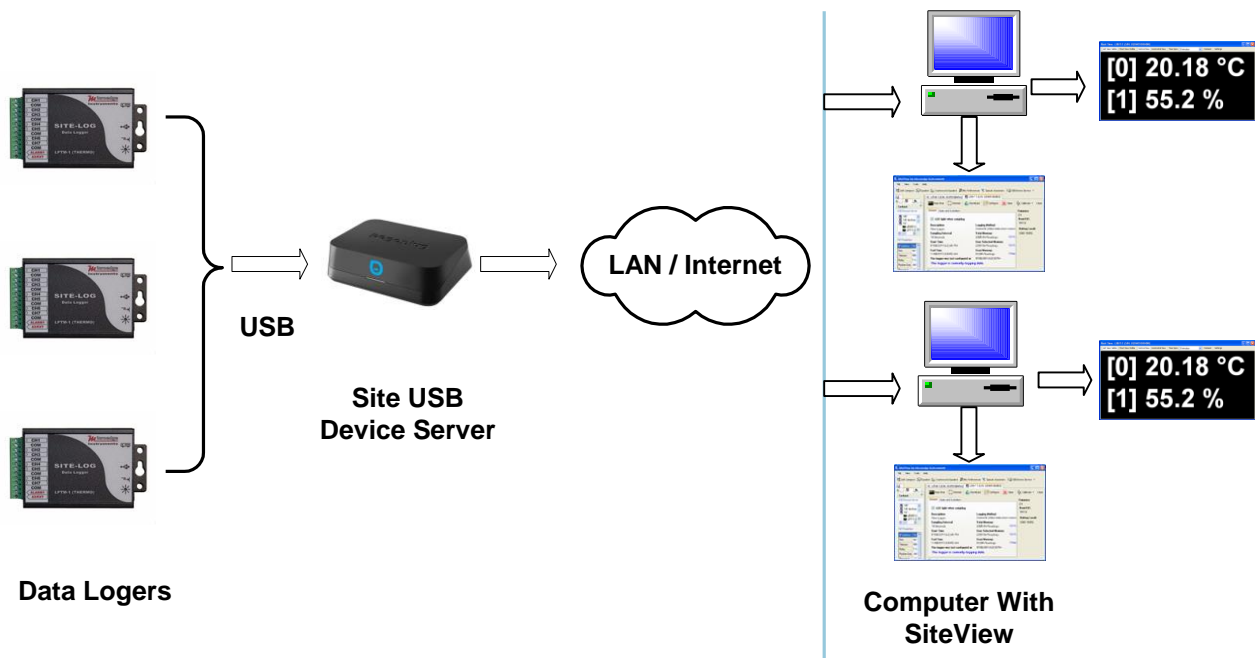


3. Double click the logger icon. If the communication is successful the logger's status page will appear.

## USB Device Server Connection

---

USB Device Server Connection is for the communications with data logger via USB Device Server over LAN/Internet . A USB Device Server can be a Site USB Device Server hardware or PRECISE-LOG WIFI-enabled data loggers.



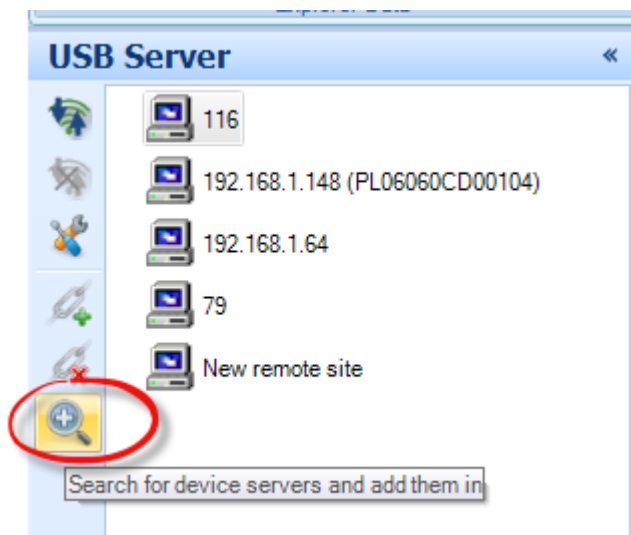
USB Device Server Connection with Site USB Device Server

## Communicate With Site USB Device Server or PRECISE-LOG Logger:

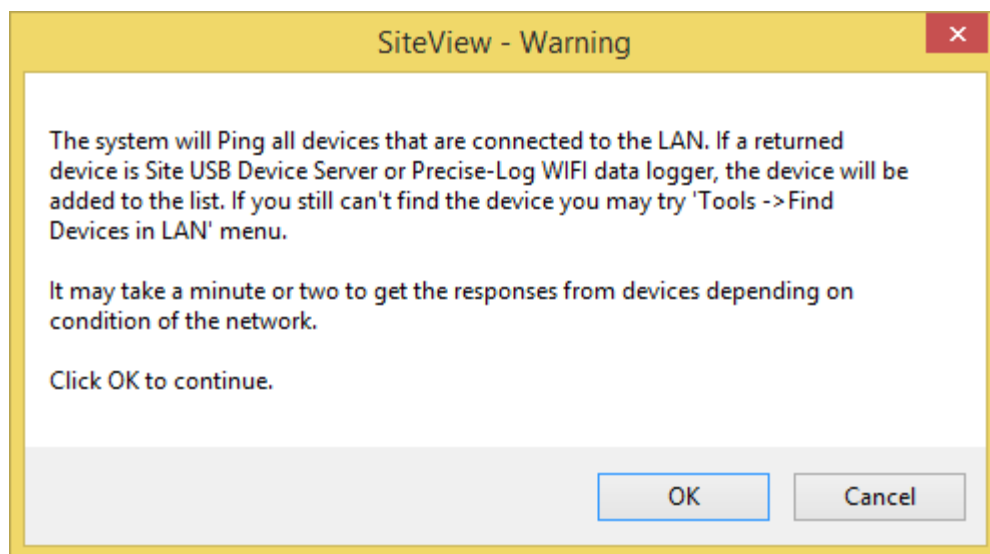
If PRECISE-LOG is connected to PC, you can find the IP address of it from the logger's status window. Please refer to logger status section for details.

SiteView can scan for the network and find both Site USB Device Servers or PRECISE-LOG data loggers.

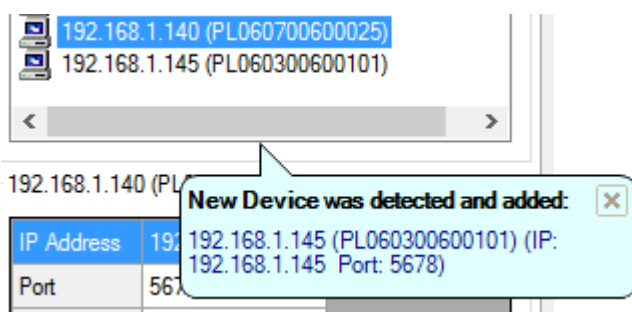
Click "Search" button and click "OK" button to continue.



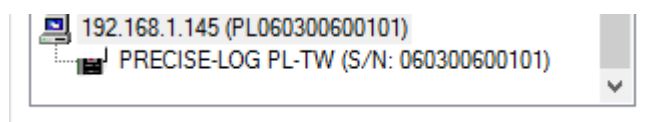




Within 30 seconds if a connection was found it will be added to the list:



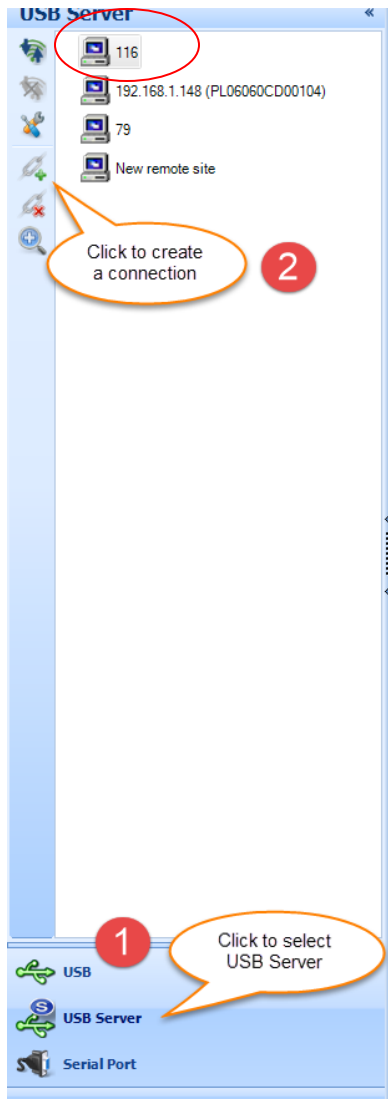
Double click the new added connection to establish the connection with the device. If the communication succeeded the data loggers will be listed under the connection:



## Start Communication

**To communicate with the USB Device Server:**

1. Launch SiteView. Click USB Device Server tab in the Communication panel



2. Click **New** button to create a new Ethernet connection:  
In the following pop-up dialog, enter the IP address and the port of the Site USB Device Server. Give a meaningful description of the connection, enter the password and click **OK** button to close the dialog.

192.168.0.120

Description:  
New remote site

IP Address  
192.168.0.120

Port:  
5678  
(1024 to 65535)

Packet Size:  
500 Bytes  
(1 - 5000)

Timeout:  
8000 Milliseconds  
(100 - 10000)

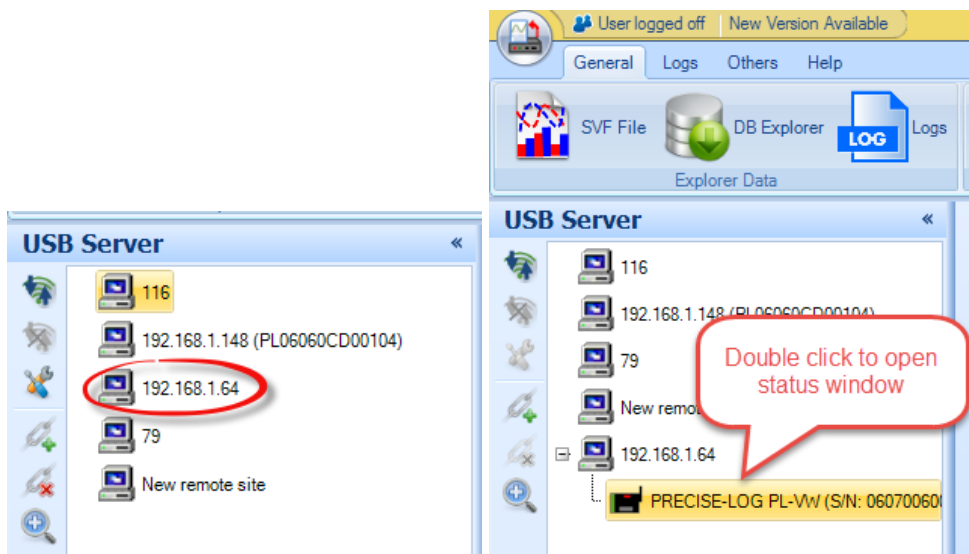
Retry:  
5 Times  
(1 - 10)

Password:  
\*\*\*\*\*  
(4 - 10 characters or numbers)

Confirm Password:  
\*\*\*\*\*

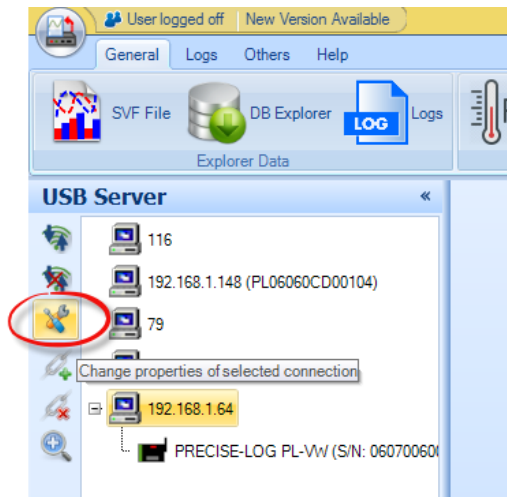
Help OK Cancel

- Double click on the icon to start the communication. If the communication is successful the logger's icon will appear under the connection you just created. Double click on the logger icon the logger status page will appear.



## Adjust Ethernet Settings

You can click Configure button to change the settings of the current selected connection.

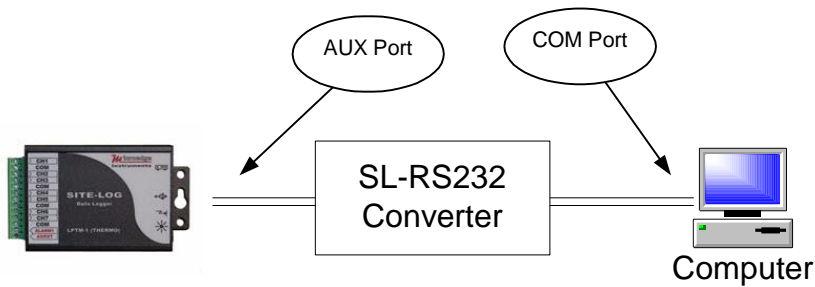


## Serial Port Connection

### Start Communication

To communicate with the logger via Serial Port:

4. Connect one side of SL-RS232 Converter to the logger's AUX port, connect another side to one of the computer's COM port. If your computer does not have a COM port you may need to use a USB-Serial Converter.



5. Launch SiteView application by double clicking on SiteView icon on the desktop:



SiteView application starts running. Click **Serial Port** tab in the communication panel,



6. Double click on the correct COM port. If the communication is successful the logger's status page will be displayed.

## CHAPTER 4 - VIEW STATUS OF LOGGER

### What is the Status of Logger

The status of a logger is a set of properties that are saved inside the logger. The properties are used by the logger and SiteView software. When SiteView communicates with the logger, it first retrieves all properties of the logger, parses them into meaningful information and populates them on the graphical user interface.

If the communications between SiteView and the logger was established successfully from the above chapter, the status of the logger appears in a tab page illustrated below:

**General**

SITE-LOG LPTH-1 (S/N: 010601000234)

☐ LED light when sampling

**Description:**  
New Logger

**Sampling Interval:**  
5 Seconds

**Start Time:**  
2018-04-12 8:56:51 PM

**End Time:**  
2018-04-12 10:18:01 PM

**The logger was last configured at:**  
2018-04-12 8:56:46 PM

**Logging Method:**  
Stop logging when memory full

**Total Memory:**  
4192256 Readings 30 Days 7 Hours 49 Minutes 20 Seconds

**User Selected Memory:**  
321504 Readings 2 Days 7 Hours 49 Minutes

**Used Memory:**  
7800 Readings 1 Hours 21 Minutes 15 Seconds (0.2%)

**Device Info:**

**Firmware:**  
2.26

**Board ID:**  
SL RHT-F-5

**Battery Level:**  
3.66V (100%)

**Channels:**

Channel #	Enabled	Description	Equation	Cali. Low	Cali. High
0 [ Thermistor ]	<input checked="" type="checkbox"/>	CH0	Temperature	0	0
1 [ External Thermistor ]	<input checked="" type="checkbox"/>	CH1	Resistance	0	0
2 [ External Thermistor ]	<input checked="" type="checkbox"/>	CH2	Resistance	0	0
3 [ External Thermistor ]	<input checked="" type="checkbox"/>	CH3	Resistance	0	0
4 [ External Thermistor ]	<input checked="" type="checkbox"/>	CH4	Resistance	0	0
5 [ External Thermistor ]	<input checked="" type="checkbox"/>	CH5	Resistance	0	0
6 [ External Thermistor ]	<input checked="" type="checkbox"/>	CH6	Resistance	0	0
7 [ External Thermistor ]	<input checked="" type="checkbox"/>	CH7	Resistance	0	0

The tab page caption shows the name and the serial number of the logger to identify this tab page.

The status page shows the general, the channel level, the alarm and excitation properties grouped in sub-tab pages.

The status page is for viewing purpose only. To edit and save the properties, please go to **Logger Configuration** dialog by clicking the **Configure** tool bar button.

Through the tool bar buttons you can finish other tasks described in the following chapters.

Please refer to **User Interface References** chapter for the detailed explanation of each field.

## General Status

---

This page specifies the basic logger status information like start and end time, memory usage, logging mode etc.

Channel properties specify how many channels the logger has and each channel's information such as if the channel is enabled or disabled, the description and the applied equation etc.

## Alarm and Excitation Status

---

This page specifies how the logger acts if there is an alarm: dial-out to a Modem and send out the alarm notifications or send out the alarm notification directly via the port, or ignore the alarm. It also shows how each channel affects the alarm conditions.

Excitation Control status is displayed in this page like Excitation Warm-up Delay and if the excitation control connects to the terminal pole.

Please refer to **Receive Alarm Notifications** chapter for detailed instructions on how to set up the alarm information properly and receive alarm notifications within SiteView.

The screenshot shows the SiteView software interface for a SITE-LOG LPV-1 (S/N: 010101000100) logger. The top toolbar includes buttons for Real-Time, Refresh, Download, Clear, Configure, Calibrate, and Add to Schedule Download. The 'Alarm & Excitation' tab is selected, showing settings for Alarm Excitation Selection, Excitation Warm-up Delay, Alarm-On Delay, and Alarm-Off Delay. A table titled 'Channel Alarm Settings' displays the alarm thresholds for eight channels.

Channel #	Enabled	Low Alarm	High Alarm	Unit
0 [ Thermis...	<input type="checkbox"/>	202.95	-122.07	°C
1 [ 20V ]	<input type="checkbox"/>	297.246	21956.512	mV
2 [ 20V ]	<input type="checkbox"/>	0.000	20000.000	mV
3 [ 20V ]	<input type="checkbox"/>	0.000	20000.000	mV
4 [ 20V ]	<input type="checkbox"/>	0.000	0.000	mV
5 [ 20V ]	<input type="checkbox"/>	0.000	0.000	mV
6 [ 20V ]	<input type="checkbox"/>	0.000	0.000	mV
7 [ 20V ]	<input type="checkbox"/>	0.000	0.000	mV

Logger in No Alarm state

## Know If Logger Operate Properly?

---

It is important to know that the logger is operating properly. What status can we use to tell if the logger has stopped logging data and is operating abnormally?

The first status you should look at is the blue bold section just above the Channel information:

**The logger is currently logging data**

This status tells you if the logger is logging data or has stopped. Other information it reports can be:

**1. The logger has not started logging data. It will start at XXXX.**

The logger is in start-delay mode and is counting down the timer. Once the timer goes to zero the logger will start logging data.

If you set **Time to Start** field to a time in the future you will see the above status. If you want the logger to record data right after the logger is configured you can set this field to now or a time in the past.

**2. The logger has stopped logging data and has been dormant for XXXX.**

If the logger is in dormant mode, it stops logging data and waits for SiteView to download the data.

Usually, this is because the **When Memory Full** field was set to **Stop Logging** when the logger was configured, and when the memory is full the logger will stop logging and in dormant mode.

If you want the logger to keep recording data you can set **When Memory Full** field to **Continue Logging**.

**3. Data has rolled over and in FIFO mode**

If the logger is in First-In-First-Out mode, the logger keeps overwriting the oldest data with the new measured data.

If you are only interested in a specific time frame, you may need to set **When Memory Full** field to **Stop Logging**. In this case, the logger will stop logging when the time passed the **Time to End** parameter.

Another status you should focus is the battery level. If the on-board battery level is too low you will get the red warning sign indicating it's time to replace the battery.



## CHAPTER 5 - DOWNLOAD LOGGER DATA

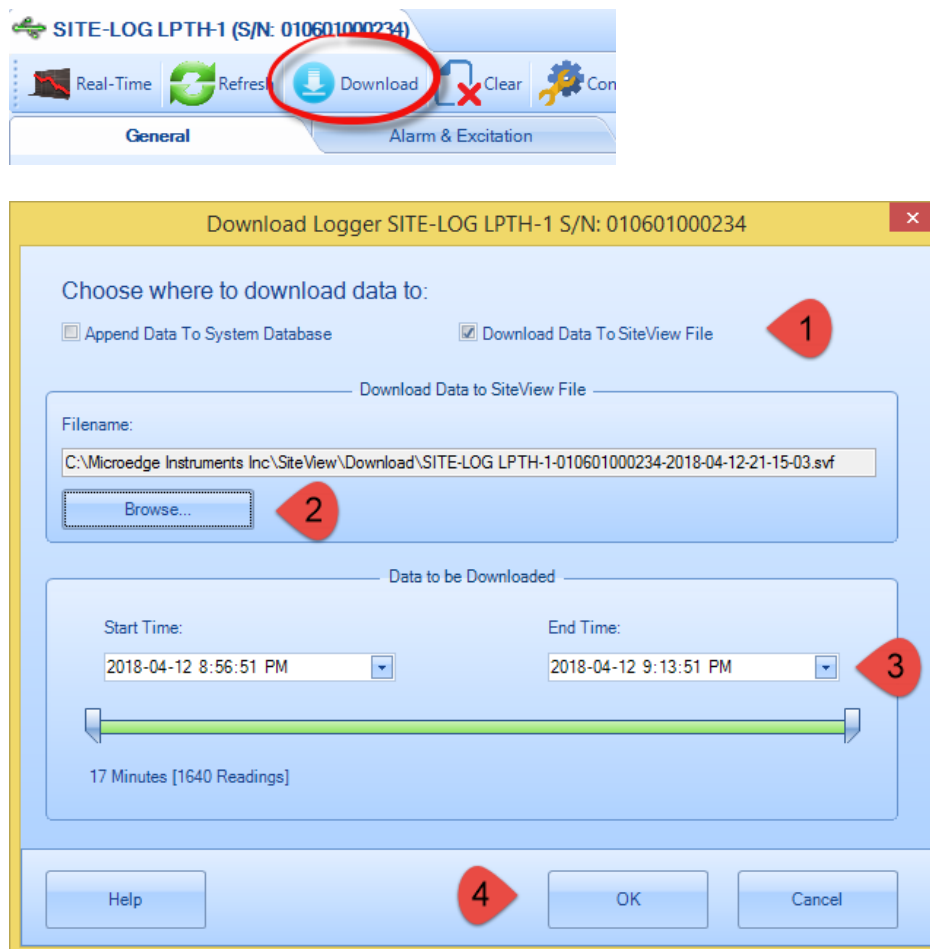
Downloading Logger Data is the process transferring the recorded measurements inside the logger to the computer and saving them in a file that SiteView can recognize – SiteView file (.svf).

If the logger is in normal sampling mode (sampling interval  $\geq 5$  seconds), the downloading process does not interrupt the logging operation. If the logger is in fast sampling mode (sampling interval is less than 5 seconds) logger will stop logging data from the time SiteView communicates with the logger.

SiteView can choose to download whole available data or only the interesting section for the specific period of time.

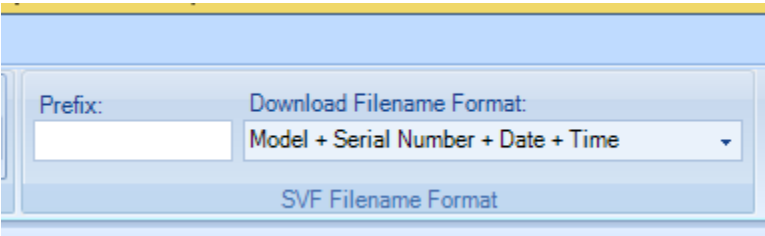
### Choose Filename and Time Span

If you are already in logger status page, click **Download** button, **Download Logger** dialog window will appear:

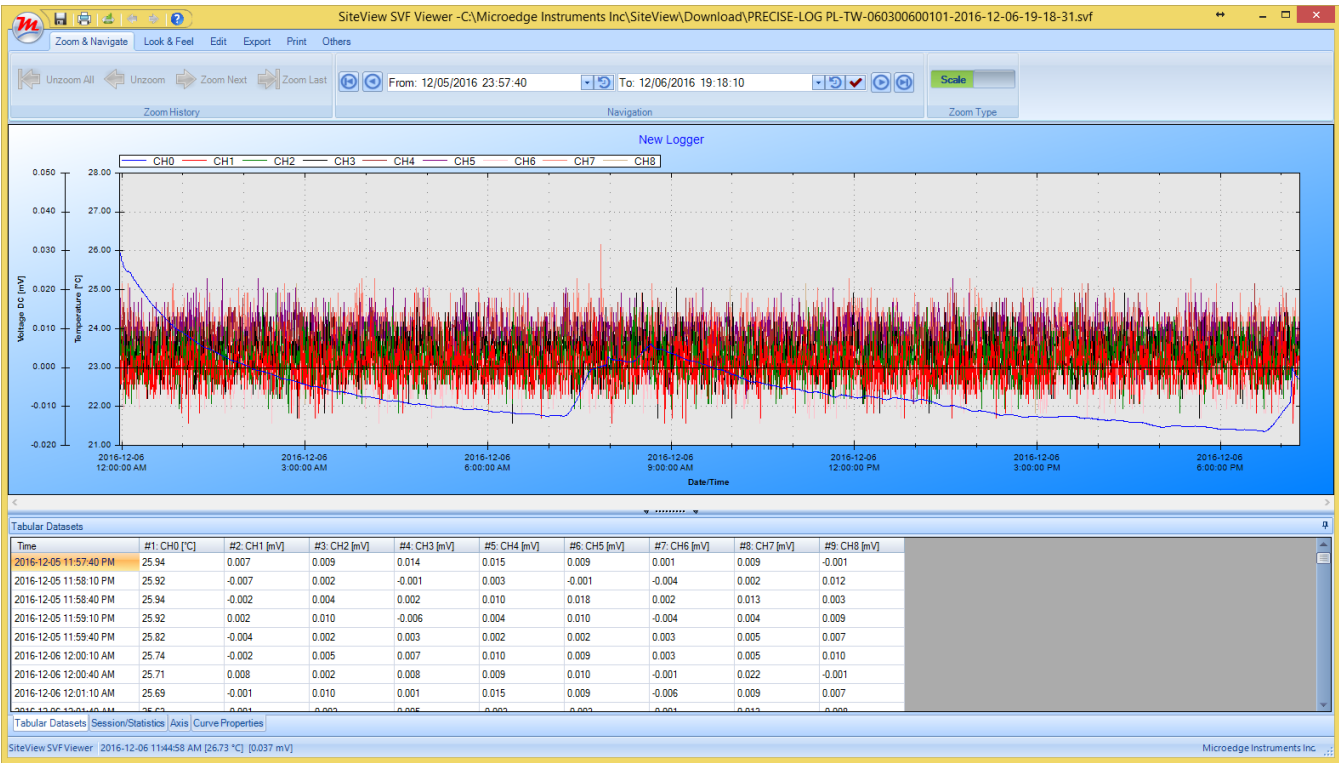


You can choose to download the data to a separate SVF file or to the system database by choosing the section#1 checkboxes. If you choose to download to SVF, you can browse for a filename in section#2. You may want also choose to download whole logger or just partial data by changing the fields in section#3. Then click OK button to start downloading data.

Each time when **Download Logger** dialog appears a default filename is created based on the properties on the main ribbon control:



After the download the plot and the tabular data will appear:

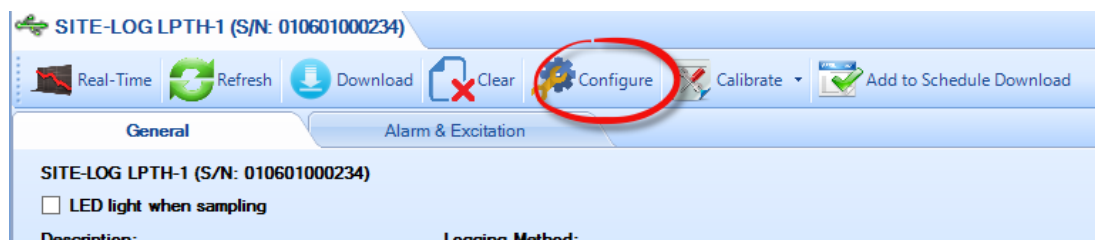


## CHAPTER 6 - CONFIGURE LOGGER

**WARNING:** By clicking OK or Apply buttons, all recorded data in the logger will be lost. If the data is important please ALWAYS download the data before configuring the logger.

Configuration of the logger is the procedure to change the properties of the logger and start a new session of logging.

If you are already in the Logger Status page, clicking on the **Configure** button will bring up the **Logger Configuration** dialog:



Logger Configuration SITE-LOG LPTH-1 (S/N: 010601000234)

**General** | Alarm & Excitation

**Description:** New Logger

**Sampling Interval:** 5 Seconds

**On-Board LED:** ☐ Light When Sampling

**When Memory Full:** ☒ Stop Logging ☐ Continue Logging

**Time To Start:** 2018-04-13, 7:34:20 AM

**Time To End:** 2018-04-15, 3:23:20 PM

**Total Time Span:**

Years	Months	Days
0	0	2
Hours	Minutes	Seconds
7	49	0

**Memory Usage:** 7.67%

**Current Time:** 2018-04-13 7:35:09 AM

**Real-Time:**

Channel #	Reading	Unit

**Channels:**

#	Channel Type/Input Range	Enabled	Description	Equation	Cali. Low	Cali. High
0	Thermistor	<input checked="" type="checkbox"/>	CH0	Temperature	0	0
1	External Thermistor	<input checked="" type="checkbox"/>	CH1	Resistance	0	0
2	External Thermistor	<input checked="" type="checkbox"/>	CH2	Resistance	0	0
3	External Thermistor	<input checked="" type="checkbox"/>	CH3	Resistance	0	0
4	External Thermistor	<input checked="" type="checkbox"/>	CH4	Resistance	0	0
5	External Thermistor	<input checked="" type="checkbox"/>	CH5	Resistance	0	0
6	External Thermistor	<input checked="" type="checkbox"/>	CH6	Resistance	0	0
7	External Thermistor	<input checked="" type="checkbox"/>	CH7	Resistance	0	0

Buttons: Help, Real-Time, Load Template, Save As Template, Apply, OK, Cancel

## Clock of Data Logger

---

Each data logger synchronizes its clock with the computer which is used to configure the data logger. If you have multiple computers used to configure data loggers please make sure all computers are synchronized with the same clock source. Or only one computer will be used to start new logging session.

## Decide When To Start and When To Stop Logging

---

The new session can be started immediately after the logger is configured or start in the future by adjusting the **Time to Start** field.

**If you want the logger to stop at a specific time:**

1. Adjust **Time to End** field to a time later than **Time to Start** field.
2. Set **When Memory Full** to **Stop Logging**.

**If you want the logger to stop logging after a specific period of time:**

1. Adjust **Total Time Span** to desired period of time.
2. Set **When Memory Full** to **Stop Logging**.

**If you want the logger to continue logging for a specific period of time:**

1. Adjust **Time to End** field to the time later than **Time to Start** field. You will see **Total Time Span** fields updated with the new set of values. Or you can adjust **Total Time Span** to a desired period of time.
2. Set **When Memory Full** to **Continue Logging**.

**If the start time is unknown and you want to activate the new session in the field:**

1. Adjust **Time to Start** field to a time far beyond the estimated start time (for example, one year ahead) so the logger will be in start-delay mode.
2. Adjust **Total Time Span** to desired period of time.
3. Set **When Memory Full** to **Stop Logging** or **Continue Logging** based on your application.
4. When you decide to activate the session, press the activation button located on the logger until the LED starts to blink. Release the button.

---

**NOTE:**    **The activation button is used for starting the session, not for stopping the session. Once the logger has started logging, the activation button is ignored.**

---

## Decide How Often the Logger Samples Sources

---

When the logger is operating, the logger samples the source channels in a pre-set time interval (sampling interval). Most of SITE-LOG and iLOG loggers can run as fast as sampling one channel every 20 milliseconds, or as slow as sampling all channels every 12 hours. PRECISE-LOG's sampling interval can be from one second to 12 hours.

For SITE-LOG / iLOG loggers:

if the sampling interval is set 1 second or bigger, the logger will operate in normal sampling mode. In this mode, if the logger is logging data, the logger will continue operating while it is communicating with the host device.

If the sampling interval is set below 5 seconds, the logger will operate in fast sampling mode. In this mode, the logger needs the external power supply for the logging period and the communications with the logger will force the logger to stop logging.

You can power the logger via its USB port with either a standard 5VDC wall adapter or the computer where the logger is connected to.

PRECISE-LOG series do not have fast sampling mode.

---

**TIPS:**     **The proper steps to configure the logger for fast sampling mode is:**

1. Adjust the sampling interval to less than 1 second.
2. Adjust **Time to Start** to the time when you want the logger to start logging.
3. Apply the external supply to the logger before the logger starts logging.

If the logger tries to start fast logging and the external power supply is not applied, the logger will stop. Then you have to reconfigure the logger.

---

## Decide Which Channels To Log On

---

When the logger is operating, the logger measures the input of each **ENABLED** channel. Be sure to enable the channel if you want the channel be recorded.

If one channel's measurement relies on other channels' measurements (A custom equation may use other channels' measurements for the current channel's calculation), be sure to enable those dependent channels.

Some of the Site-Log loggers are featured with software programmable channels. The input range of those channels can be changed via SiteView. When the range is changed to better fit the actual input signal's range, better resolution and accuracy can be obtained.

For instance, changing the **Input Range** of a programmable voltage channel to 0 – 2 V will get better resolution if you know the input source's range will be within 0 – 2 V.

## Decide How to Convert To Physical Measurement

---

When the logger saves the data the logger saves the data in digital format. SiteView converts the digital values to the physical measurements after the data is downloaded to the computer.

### Role of Equation

SiteView does the data conversions by using equations. An equation is a software entity handling the conversion from one data format to another. SiteView contains the built-in equations for those predefined channel types and the customer-defined equations that can be applied to all channel types.

A custome-defined equation (custom equation) is a piece of script (C# source code) in the format of function implementing the data conversion.

When a channel is configured, an equation is applied to the channel. After SiteView has retrieved the logger status SiteView locates the equation entity by the equation name saved inside the logger. Once the equation entity is identified the equation entity will handle the data conversion.

### Decide What Equation to Use

This depends on the physical measurement and the input source parameters. If you are using 0 – 10 VDC channel to record a voltage source, you can use a built-in equation “VoltageDC”. If you are recording a 0 – 10 VDC transducer as the source input, and the transducer has the measurement range of 0 – 5000 PPM CO<sub>2</sub>, you need to write your custom equation like this:

```
public double CO2Equation(double Input)
{
    double output;
    output = 5000 * Input / 10 ;
    return output;
}
```

The above equation implements the relationship between the input voltage value and the output physical PPM value. A voltage is converted proportionally to a PPM value.

Please refer to **Work with Equations** chapter for detailed instructions on how to write a custom equation.

## Manage Alarm and Excitation Control

---

### Configure Channel Alarms

When the logger is recording data, it compares the current reading with Low/High Alarm values that is previously saved in the logger for each channel. If all the following conditions are met, the logger will be in Alarm state:

1. The current reading is beyond the Low/High Alarm values.
2. Alarm is enabled for that channel.
3. Alarm-On Delay's counter is counted down to zero.

In the figure illustrated below, you can check “Alarm Enabled” check-box if you want to enable the Alarm of the channel. And you can adjust “Low Alarm” and “High Alarm” values so that when the measurement is below “Low Alarm” or above “High Alarm” it will trigger the alarm.

Channel #	Enabled	Low Alarm	High Alarm	Unit
0 [ Thermistor ]	<input type="checkbox"/>	1171.95	-91.65	°C
1 [ External Ther...	<input type="checkbox"/>	0.000	38540000.000	Ohm
2 [ External Ther...	<input type="checkbox"/>	0.000	65525000.000	Ohm
3 [ External Ther...	<input type="checkbox"/>	0.000	655340000.000	Ohm
4 [ External Ther...	<input type="checkbox"/>	0.000	655340000.000	Ohm
5 [ External Ther...	<input type="checkbox"/>	2.137	655340000.000	Ohm
6 [ External Ther...	<input type="checkbox"/>	0.000	54602500.000	Ohm
7 [ External Ther...	<input type="checkbox"/>	0.000	655340000.000	Ohm

## Decide what to do when in Alarm State

If the logger is alarm state, the logger can energize Alarm1 and/or A2/E terminals in order to control the external devices like siren auto dialer etc.

At the left side of the above figure, you can change **Alarm/Excitation Selection** to decide which terminals the logger will work with when there is an alarm.

## Configure Excitation Control

Excitation output is used when you need to save the electric power of the device that provides the signal source to the data logger. When there is no local power available and a battery pack is used to power the transducer, excitation control greatly reduces power consumption by turning on the transducer only when it samples the data and turning off the transducer after the sampling.

A2/E on the terminal strips can be configured by for excitation purpose.

In order to enable A2/E, one of the following **Alarm/Excitation Selection** must be selected:

- Excitation control to A2/E, both high and low alarm to Alarm1
- Excitation control to A2/E, low alarm to Alarm1
- Excitation control to A2/E, high alarm to Alarm1

**Excitation Warm-up Delay** is used to specify how much delay will be set after the excitation terminal is activated and before the logger is taking the sample. If the measurement source device needs certain time to stabilize the signal output you may need to set this parameter so the logger will wait certain time before it takes the sample.

Please refer to **User Interface References** for the detailed explanation of each field.

## **Quick Way to Calibrate Logger**

---

Although you can go through the procedure in **Calibrate Logger** chapter to calibrate a logger, you can also use **Logger Configuration** dialog to do a quick calibration for all channels of the logger.

### **Understand Cali. Low & Cali. High**

These two fields specify the calibration values that are used for measurement adjustment.

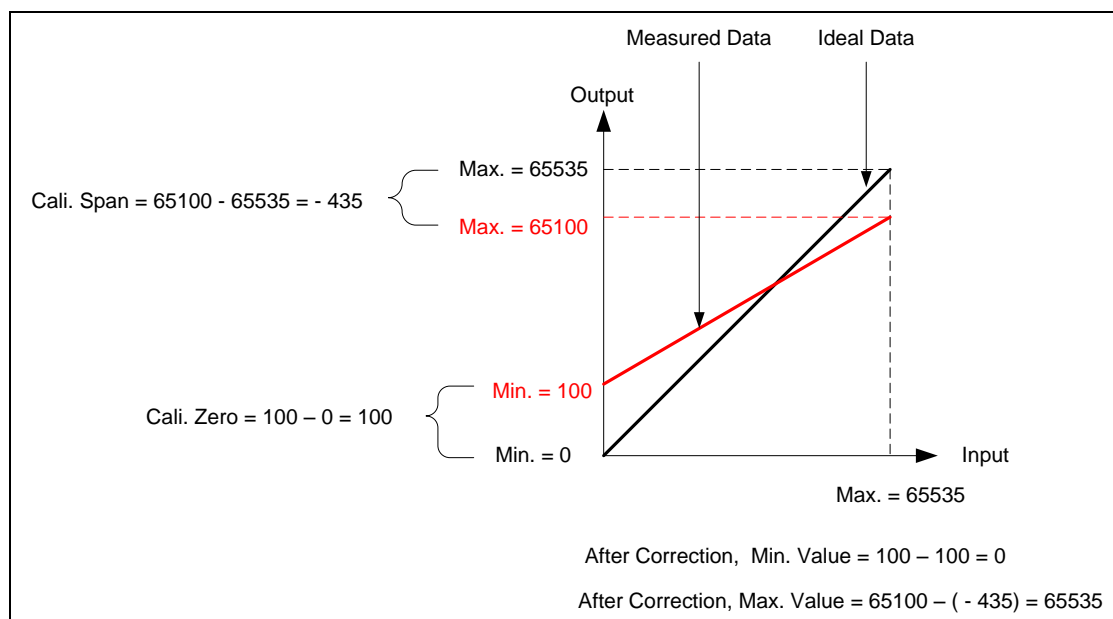
Cali. Low value specifies the digital value that is over zero when the input value is the lowest value (for 0 – 5 VDC channel the lowest value is zero volt). For instance, if you apply zero volt input and the logger measured 100 as the digital value, then Cali. Low should be 100 digits. The equation entity will subtract this value when resolving the correct lowest digital value.

Cali. High value specifies the digital value that is over 65535 when the input value is the highest value (for 0 – 5VDC channel the high range is 5 volt). For instance, if you apply 5 volt voltage to the channel and the logger measured 65100 as the digital value. Then Cali. High is “- 435” (calculated from  $65100 - 65535$ ). The equation entity will subtract this value (-435) from the digital value when resolving the highest digital value.

The valid range for these two parameters is from -32768 to 32767.

The following figure illustrates the relationship between an ideal data line and a measured data line and how Cali. Low and Cali. High correct the measured data line.





## Calibrate Channel

**Cali. Low** and **Cali. High** parameters for each channel are editable in **Logger Configuration** dialog. You can simply change them and use real-time table to check if the parameters are changed correctly.

### To calibrate a channel:

1. Click **Real-Time** button to enable **Real-Time** table. Notice the real-time readings are updated in **Reading** cells for all channels.
2. Check the difference between the reading you see and the reading it is supposed to be. Adjust **Cali. Low** and **Cali. High** parameters to make the readings as close as to the desired value.
3. If you are satisfied, click **Apply** button to save the parameters to the logger or click **OK** button to save the parameters and close the dialog.

## Save Settings and Start New Session

Once you have finished making changes to the available settings, you can click **OK** button to save the settings to the logger. The logger will start to record data from the **Time to Start** field you have set.

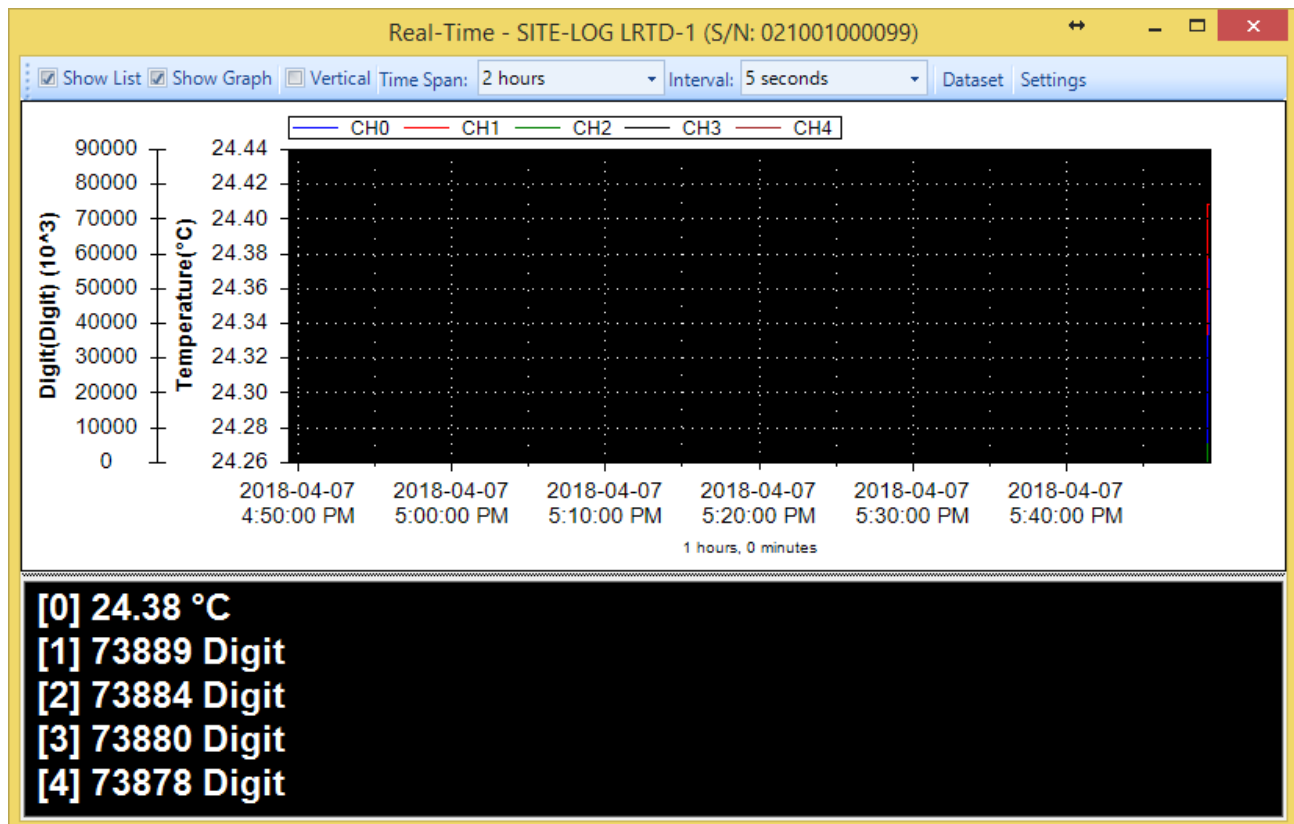
Please refer to **User Interface References** for the detailed explanation of each field.

## CHAPTER 7 - REAL-TIME CHART VIEWING/RECORDING

If the logger is in normal sampling mode, SiteView can view the real-time measurements while the logger is still logging data. The real-time display shows the list of the latest real-time measurements of all enabled channels, and the trend chart of the real-time measurements for a given latest period of time.

### Display Real-Time Dialog

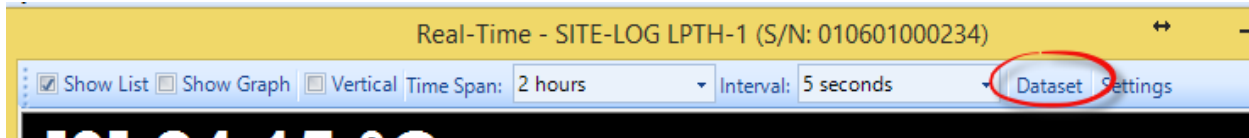
The **Real-Time** dialog can be displayed by clicking on **Real-Time** tool bar button in the logger status page.



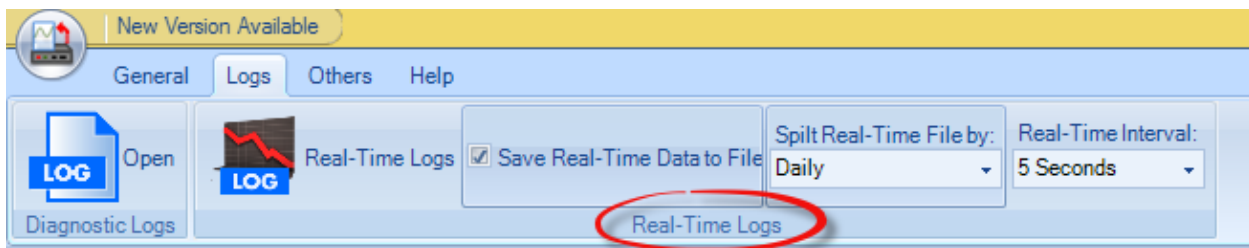
## Save Real-Time Data

---

The real-time data can be saved in the pre-defined file and the tabular data can be viewed by clicking on **Dataset** button.



**Real-Time Log** section specifies if, where and how the real-time data will be saved.



If you are real-time logging the data for more than a day, the real-time file can be split either daily or monthly.

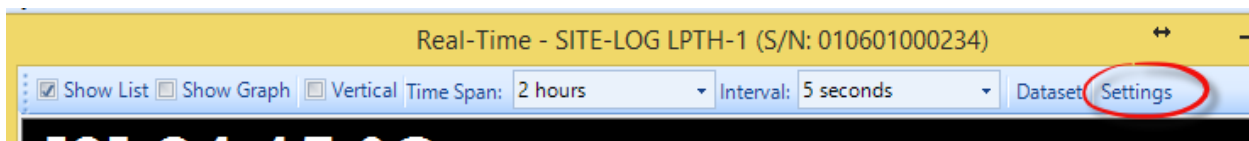
You can specify the folder to save the real-time data file.

## Change Views Properties

---

Both List and Chart views can be displayed or hidden by toggling **List View Visible** and **Chart View Visible** buttons. They can be displayed either vertically or horizontally by switching between **Vertical View** and **Horizontal View** buttons.

More properties can be edited by clicking on **Settings** button:



**Real-Time Settings**

**Line Properties:**

Channel #	Visible	Width	Color
0	<input checked="" type="checkbox"/>	1	Blue
1	<input checked="" type="checkbox"/>	1	Red
2	<input checked="" type="checkbox"/>	1	Green
3	<input checked="" type="checkbox"/>	1	Black
4	<input checked="" type="checkbox"/>	1	Brown
5	<input checked="" type="checkbox"/>	1	Purple
6	<input checked="" type="checkbox"/>	1	Pink
7	<input checked="" type="checkbox"/>	1	Orange

**Axis Properties:**

Name	Visible	Auto Scale	Min	Max
Celsius (°C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0	10
Ohm (Ohm)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0	10000

**List View Properties**

- ☒ Channel Index Visible
- ☐ Channel Description Visible
- ☐ Apply Channel Color To List

Buttons: Help, OK, Cancel

**Line Properties** table specifies if a line will be displayed, the width and the colour of the line.

**Axis Properties** table specifies if a Y-Axis will be displayed, how the Y-axis scales the reading: **Auto Scale** or **Manual Scale** on the given **Min** and **Max** range.

List Properties section specifies if the channel index and description will be displayed and if the line colour will be applied to the colour of the list text.

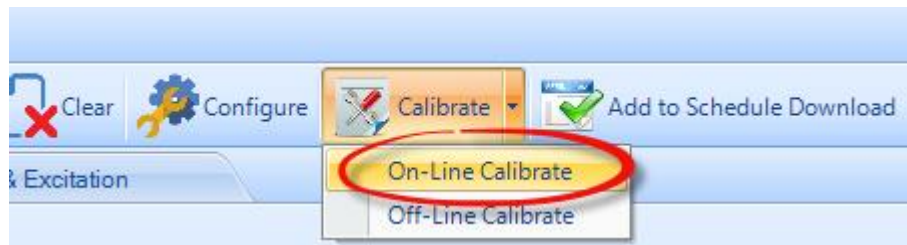
Click **OK** button to save the changes.

## CHAPTER 8 - CALIBRATE LOGGER

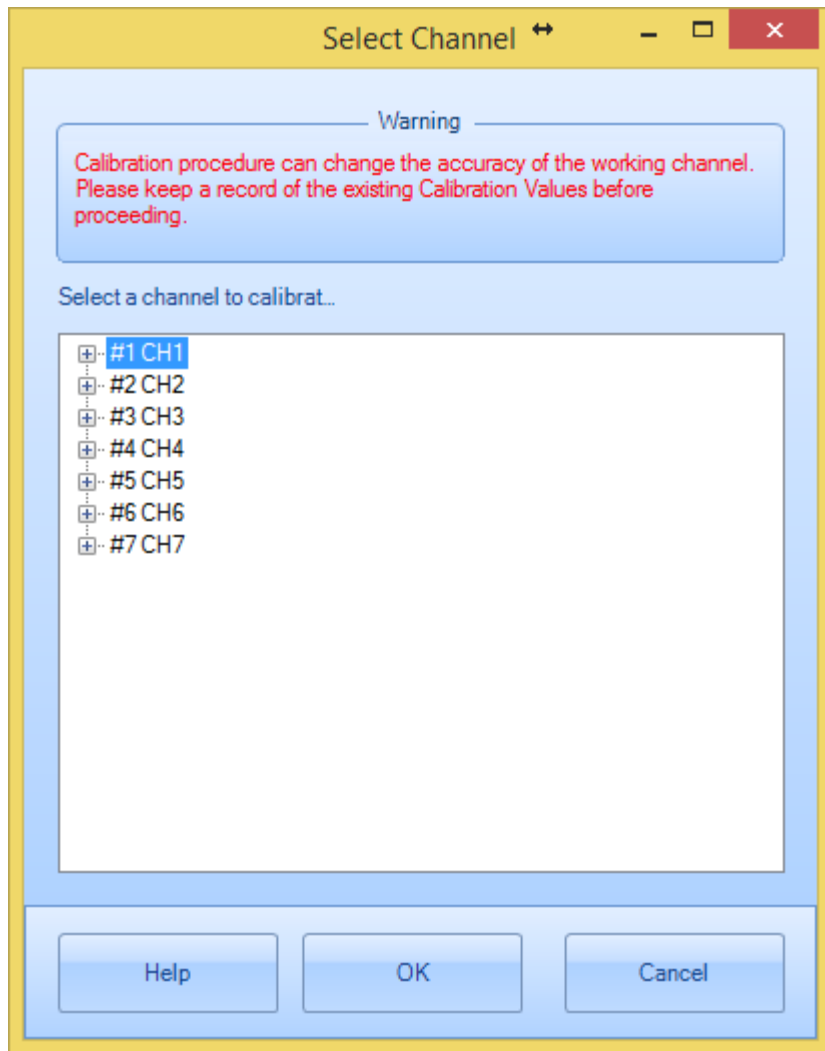
SiteView software provides two-point calibration for most of the loggers. If the source signal like voltage or current can be connected to the logger while the logger is connecting to the computer, you can calibrate the logger on-line. If the source signal like a temperature or relative humidity is not available for on-line calibration, you can calibrate the logger off-line after the logger has recorded the low and high point data.

### On-Line Calibrate

Click **Calibrate** button on the top of the logger status page in SiteView and choose **On-Line Calibrate** menu.



The following dialog appears:



Select the channel you want to calibrate on and click **OK** button. The following dialog appears:

Channel Calibration Wizard - Channel:1

### Step 1: Low Point Calibration

Based on the equation the channel is using, the range of the channel is:

0 MilliVolt(mV) To 20000 MilliVolt(mV)

Please type in the low point value of the source input that is connected to the channel:

**Input Low Reference Value**

10 MilliVolt(mV)

Click "Start Calibration" button to start the calibration. When you see the current reading is stable you can click "Stop Calibration" button to stop this procedure. (Minimum 3 readings)

Start Calibration Current Reading MilliVolt(mV)

Click "Next >>" button to proceed for High Point Calibration.

Timer: 00:00:16 seconds. 3 readings

Help Previous Next >> Cancel

The above page allows you to calibrate the low point. Please adjust your input which connects to the channel terminal strip to a low point value closes enough to the lowest value of the channel. In the above example “0” is the lowest value.

Click **Start Calibration** button to start the low point calibration. After the click, **Start Calibration** button changed to **Stop Calibration**.

During the calibration process the current real-time value is showing in **Current Reading** field. If you think this value is stable you may click **Stop Calibration** button.

Click **Next** to proceed to the next page.

Channel Calibration Wizard - Channel:1

## Step 2: High Point Calibration

Based on the equation the channel is using, the input range of the channel is:

0 MilliVolt(mV) To 20000 MilliVolt(mV)

Please type in the high point value of the source input that is connected to the channel:

**Input High Reference Value**

800 MilliVolt(mV)

Click "Start Calibration" button to start the calibration. When you see the current reading is stable you can click "Stop Calibration" button to stop this procedure. (Minimum 3 readings)

Start Calibration Current Reading MilliVolt(mV)

Click "Next >>" button to proceed for the result.

Timer: 00:00:16 seconds. 3 readings

Help Previous Next >> Cancel

The above page allows you to calibrate the high point. Please adjust your input which connects to the channel terminal strip to a high point value closes enough to the highest value of the channel. In the above example "50000" mV is the highest value.

Click **Start Calibration** button to start the high point calibration. After the click, **Start Calibration** button changed to **Stop Calibration**.

During the calibration process the current real-time value is showing in **Current Reading** field. If you think this value is stable you may click **Stop Calibration** button.

Click **Next>>** to proceed to the next page.



Channel Calibration Wizard - Channel:1

### Step 3: Calibration Result

**Given Parameters:**

Channel Range	<input type="text" value="0"/> MilliVolt(mV)	To	<input type="text" value="20000"/> MilliVolt(mV)
Input Low Reference Value	<input type="text" value="0.000"/> MilliVolt(mV)	Input High Reference Value	<input type="text" value="900.000"/> MilliVolt(mV)

**Calculated Parameters**

Measured Input Low Digit	<input type="text" value="2289"/>	Measured Input High Digit	<input type="text" value="2290"/>
<b>Calibration Low Value</b>	<input type="text" value="2288"/>	<b>Calibration High Value</b>	<input type="text" value="-63224"/>

The above page shows all parameters you have input as well as the values the system have calculated. Two important values can be saved back to the logger by clicking **Save Parameters to the logger**. Those two parameters are: **Calibration Low Value** and **Calibration High Value**.

If you click **Save Parameters to the logger** button you will get the below warning dialog. Click Yes to confirm the saving process.

**SiteView**

New Calibration Parameters will be saved to the logger. All existing parameters in the logger will be lost. Continue?

If the system saved the parameters back to the logger successfully, at the bottom side of the dialog **The calibration is finished!** will appear.

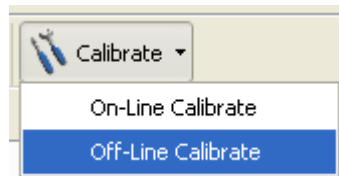
**The calibration is finished!**

You may click **Done** button to close the dialog.  
On the logger status page the Cali. Low and Cali High values for this channel were updated with the new values.

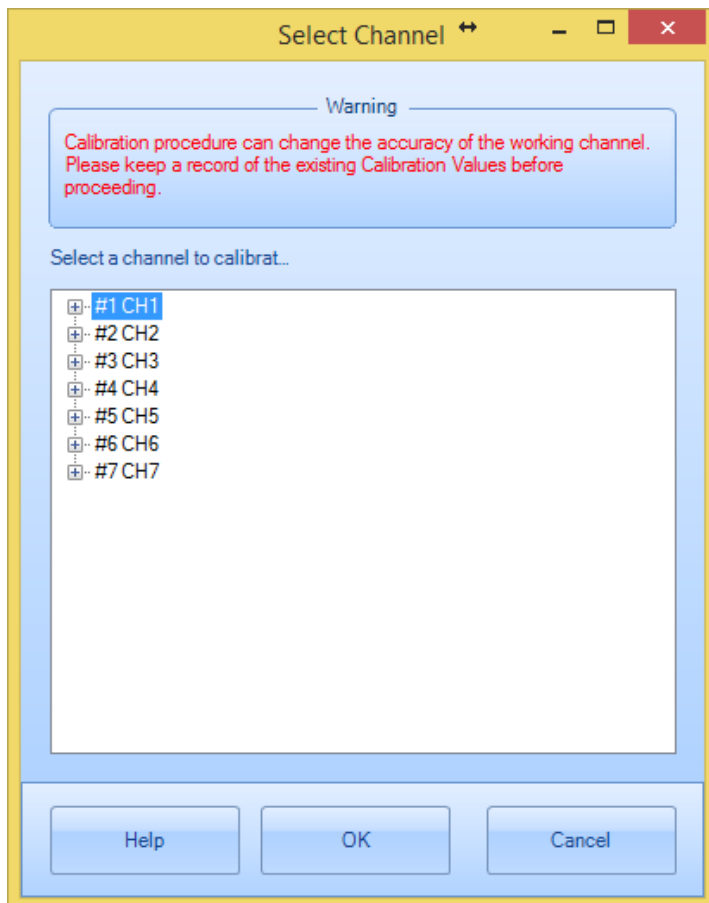
The calibration is finished!

## Off-Line Calibrate

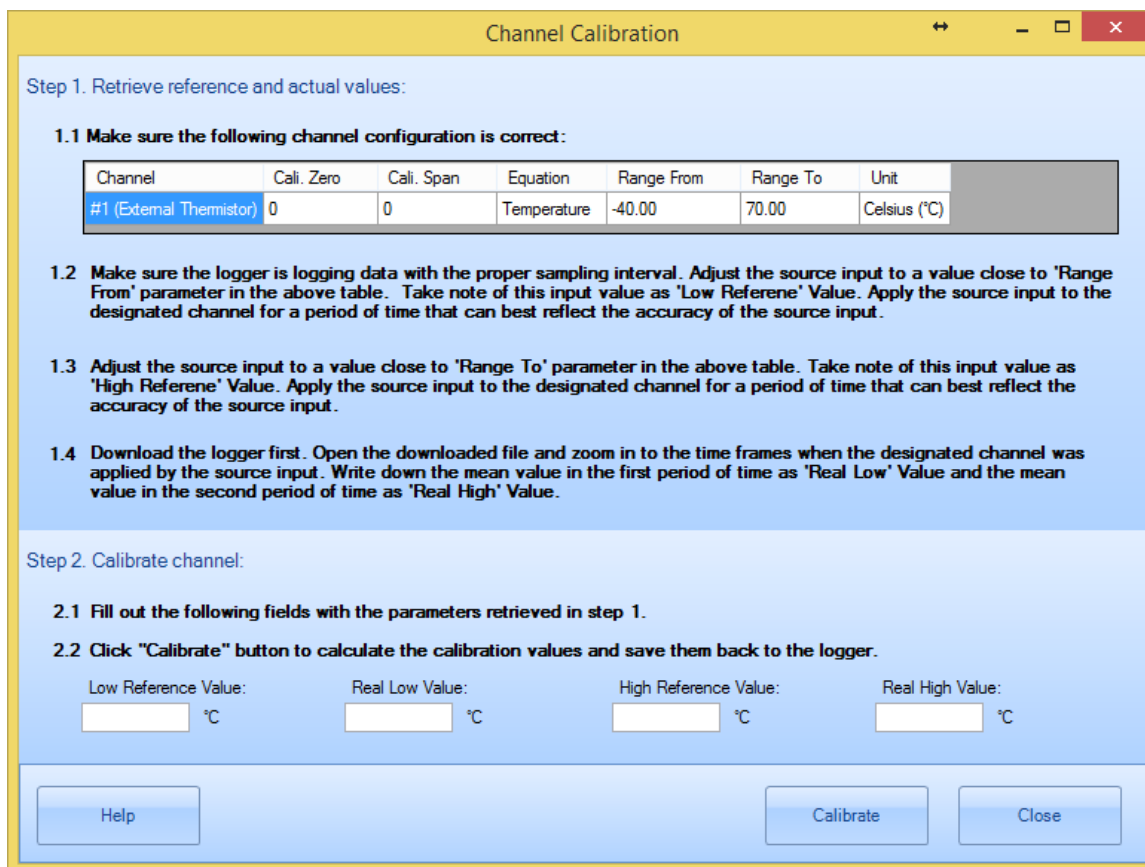
Click **Calibrate** button on the top of the logger status page in SiteView and choose **Off-Line Calibrate** menu.



The following dialog appears:



Choose a channel and click OK button. The following dialog shows:



The 'Channel Calibration' dialog box is divided into two main sections: Step 1 and Step 2.

**Step 1. Retrieve reference and actual values:**

1.1 Make sure the following channel configuration is correct:

Channel	Cali. Zero	Cali. Span	Equation	Range From	Range To	Unit
#1 (External Thermistor)	0	0	Temperature	-40.00	70.00	Celsius (°C)

1.2 Make sure the logger is logging data with the proper sampling interval. Adjust the source input to a value close to 'Range From' parameter in the above table. Take note of this input value as 'Low Reference' Value. Apply the source input to the designated channel for a period of time that can best reflect the accuracy of the source input.

1.3 Adjust the source input to a value close to 'Range To' parameter in the above table. Take note of this input value as 'High Reference' Value. Apply the source input to the designated channel for a period of time that can best reflect the accuracy of the source input.

1.4 Download the logger first. Open the downloaded file and zoom in to the time frames when the designated channel was applied by the source input. Write down the mean value in the first period of time as 'Real Low' Value and the mean value in the second period of time as 'Real High' Value.

**Step 2. Calibrate channel:**

2.1 Fill out the following fields with the parameters retrieved in step 1.

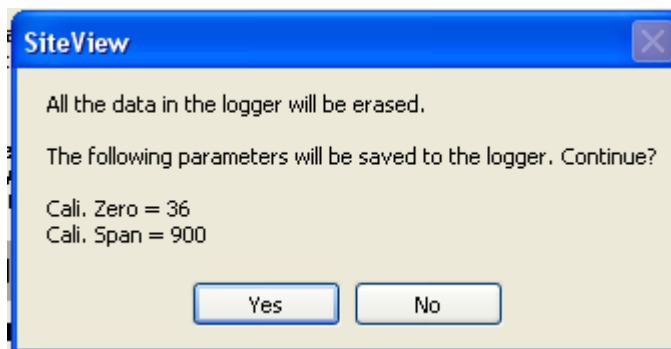
2.2 Click "Calibrate" button to calculate the calibration values and save them back to the logger.

Low Reference Value:  °C      Real Low Value:  °C      High Reference Value:  °C      Real High Value:  °C

Buttons: Help, Calibrate, Close

In Step 1, it instructs you how to configure the logger to record low and high point values and retrieve them in the downloaded file.

Once you have obtained those four parameters, enter them into their fields respectively. Click Calibrate button to calculate the final parameters and save them back to the logger. The following dialog appears:



The 'SiteView' dialog box contains the following text:

All the data in the logger will be erased.

The following parameters will be saved to the logger. Continue?

Cali. Zero = 36  
Cali. Span = 900

Buttons: Yes, No

Click Yes button to save the parameters.

The calibration is finished!

## CHAPTER 9 - WORK WITH EQUATIONS

### What is Equation

Data logger records a channel input measurement in digital value, which does not represent the physical measurement. In order to do the correct conversion Equation is introduced.

Equation is a software functionality handling the conversion from one data format to another. SiteView uses equation name up to 16 characters to identify an equation. Each time when SiteView loads status of the logger it locates the equation by the equation name saved in the logger. If the equation is predefined (built-in equation), SiteView uses predefined function to convert the data. If the equation is customer defined (custom equation), SiteView loads the contents of the equation from the equation file and does the conversion.

### Built-In Equations

The following tables contain all built-in equations:

#### Equations for Temperature Channels

Channel Type	Equation Name	Equation Description
<b>Internal Thermistor</b>		
	Temperature	Temperature
	Resistance	Resistance
<b>External Thermistor</b>		
	Temperature	Temperature
	Resistance	Resistance
<b>PT100/500/1000</b>		
	RTD_TCR_385	Temperature
	RTD_TCR_392	Temperature
<b>Thermocouple</b>		
	ThermocoupleB ThermocoupleE ThermocoupleJ ThermocoupleK ThermocoupleN ThermocoupleR ThermocoupleS ThermocoupleT	Thermocouple Equations
	VoltageDC	Voltage DC

## Equations for Relative Humidity Channel

Channel Type	Equation Name	Equation Description
Relative Humidity	RelativeHumidity	Relative Humidity

## Equations for Voltage Channels

Channel Range	Equation Name	Equation Description
0-2 VDC	VoltageDC	Voltage DC
0-5 VDC	VoltageDC	Voltage DC
0-10 VDC	VoltageDC	Voltage DC
0-20 VDC	VoltageDC	Voltage DC
-5 to + 5 VDC	VoltageDC	Voltage DC
-2 to +2 VDC	VoltageDC	Voltage DC

## Equations for Current Channels

Channel Range	Equation Name	Equation Description
4-20 mA	Current DC	Current DC
0-50 mA	CurrentDC	Current DC

## Equations for Pulse/State/Event Channels

Channel Type	Equation Name	Equation Description
Pulse	Pulse	Pulse
State	State	State
Event	Event	Event

If the physical measurement is same as the measurement that the built-in equation generates, you can pick the built-in equation when you configure the channel.

If built-in equations do not meet the requirement, you can create a custom equation.

## Temperature Equation For Thermistor

A thermistor is a type of resistor whose resistance varies significantly with temperature. All Site-Log data loggers except LRHT-1/2 have on-board thermistor channel to record the ambient temperature. External thermistor channels of LPTH-1 are for user to connect nearly any type thermistors.

The Steinhart-Hart equation is widely used for thermistors for a wide range of temperatures with high precision:

$$T = \frac{1}{a + b \ln(R) + c \ln^3(R)} - 273.15$$

When you use 'Temperature' equation for an external thermistor channel, you need to specify a, b and c coefficients which you can get from the thermistor manufacturer or let the system to calculate for you.

#	Channel Type/Input Range	Enabled	Description	Equation	Cali. Low	Cali. High	Action
0	Thermistor	<input type="checkbox"/>	CH0	Temperature	0	0	
1	External Thermistor	<input checked="" type="checkbox"/>	CH1	Temperature	192	-176	Change Coefficients
2	External Thermistor	<input checked="" type="checkbox"/>	CH2	Resistance	39	-11	
3	Resistance (8K)	<input checked="" type="checkbox"/>	CH3	Resistance	10	11	
4	Resistance (8K)	<input type="checkbox"/>	CH4	Resistance	0	0	
5	Resistance (8K)	<input type="checkbox"/>	CH5	Resistance	0	0	
6	Resistance (8K)	<input type="checkbox"/>	CH6	Resistance	0	0	
7	Resistance (8K)	<input type="checkbox"/>	CH7	Resistance	0	0	

The above screenshot is part of Logger Configuration dialog. After you selected "Temperature" as the equation for channel #1 External Thermistor, "Change Coefficients" button will display in "Action" column to allow you change those a, b and c values:

Thermistor Coefficients

A thermistor is a type of resistor whose resistance varies significantly with temperature.

The Steinhart-Hart equation is widely used for thermistors for a wide range of temperatures with high precision:

$$T = \frac{1}{a + b \ln(R) + c \ln^3(R)} - 273.15$$

Where: T is temperature in Celsius  
a, b and c are called the Steinhart-Hart parameters also called temperature coefficients  
R is resistance in ohms

When you use 'Temperature' equation for any external thermistor channel, you need to specify a, b and c coefficients which you can get from the thermistor manufacturer.

**Please enter the following temperature coefficient values:**

a:  b:  c:

If you know three temperature values and their resistance values you can use below button to generate the coefficients.

Calculate Thermistor Coefficients and Fill the Above Fields

Help OK Cancel

After you changed those values and click "OK" button the above dialog will close. Then in the Logger Configuration Dialog once you applied the changes the equation will be transferred to the logger.

Click “Calculate Thermistor....” button if you need the system to calculate those a,b and c values:

The screenshot shows a dialog box titled "Thermistor Coefficient Calculator" with a yellow header bar and a red close button. The dialog is divided into two main sections. The first section, "1. Please specify the following parameters:", contains three columns of input fields. The first column, "Low Temperature Parameters", has fields for "Low Temperature (Celsius):" and "Resistance (OHM):". The second column, "Mid Temperature Parameters", has fields for "Mid Temperature (Celsius):" and "Resistance (OHM):". The third column, "High Temperature Parameters", has fields for "High Temperature (Celsius):" and "Resistance (OHM):". The second section, "2. Click the button to calculate coefficients", features a "Calculate Thermistor Coefficients" button and a "Result:" label above a large text area currently displaying "N/A". At the bottom of the dialog are three buttons: "Help", "OK", and "Cancel".

Fill out the above fields and click Calculate Thermistor Coefficients button. The result will be in Result field. You can copy them to the Configuration dialog.

## Custom Equation

A custom equation is a piece of script that user can create to implement the physical measurement conversion. SiteView uses .Net C# language as the script. The script or the source code is in the format of function call.

A function specifies the name of the function, the types and number of parameters it expects to receive, and its return type. The body of the function implements the conversion from one unit measurement to another. A simple custom equation looks like this:

```
public double CO2Equation(double Input)
{
    double output;
    output = (5000 / 10 ) * Input ;
}
```

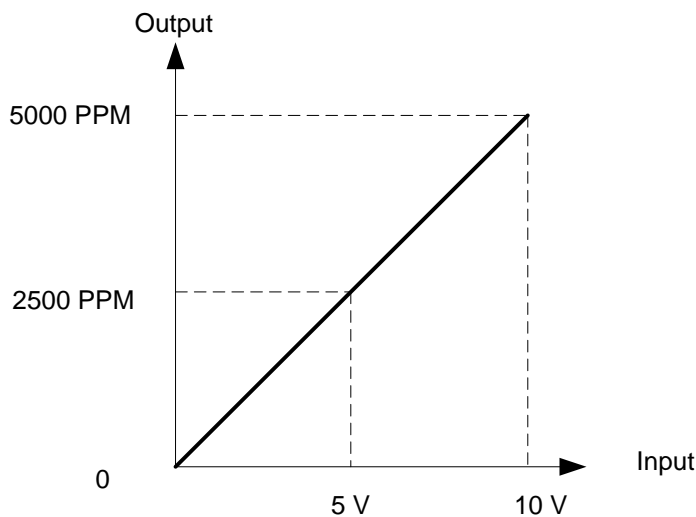
```
    return output;  
}
```

The above equation has the name “CO2Equation”. The name must be unique and with maximum of 16 characters.

The function has one parameter named **Input**. This value is read-only and it is the result of the caller function or the conversion from digital value to the unit measurement for that channel type if there is no caller function. In the latter case, **Input** refers to a value within the range of 0 – 10 volt for a 0 – 10 VDC channel type.

The function must return a value, which is the result of the conversion.

The above equation is illustrated below. It indicates that for the input range 0 – 10, the output is proportional to the range of 0 – 5000. For instance, A CO2 transducer has output of 0 – 10 VDC representing 0 – 5000 PPM of CO2. The transducer is connected to the 0 – 10 VDC channel of the logger. When the transducer outputs 0 Volt, the physical measurement should be 0 PPM of CO2. When the transducer outputs 10Volt, the physical measurement should be 5000 PPM of CO2. When you apply the above equation to the channel you should get the correct conversion.



$$\text{Output} = (5000 / 10) * \text{Input}$$

## Create Equation

---

To create a custom equation:

- ❑ Click **Equation** button from Main tool bar.



- ❑ In the equation dialog, click **Create** button to create a new equation:

**New Equation**

Step 1: Input Equation Name:

Equation Name must meet the following requirements:

1. Must be alphabetical characters and numbers.
2. Number (Nemeric characters) can not be at beginning.
3. Maximum length is 16.

Reserved Equation Names:

Step 2: Input Equation Description:

Give meaningful description about what the equation is for.

Step 3: Specify Input and Output Range:

Minimum Input Value  Maximum Input Value

Minimum Output Value  Maximum Output Value

If the equation is linear equation you may fill out the input value pair and outpub value pair.

You may leave them blank if you know how to write your own

Minimum and Maximum Output Values refer to the output range.

You may leave them blank if you know how to write your own equation.

Step 4: Select Unit:

If no unit meets your requirement you may create a new unit first and come back to this page later.

In the pop-up dialog, enter the name and description of the equation.

If the equation is a linear equation, type in the Input Value pair and Output Value pair. In the above example, the correct parameters are:

Minimum Input Value = 0  
Maximum Input Value = 10

Minimum Output Value = 0  
Maximum Output Value = 5000

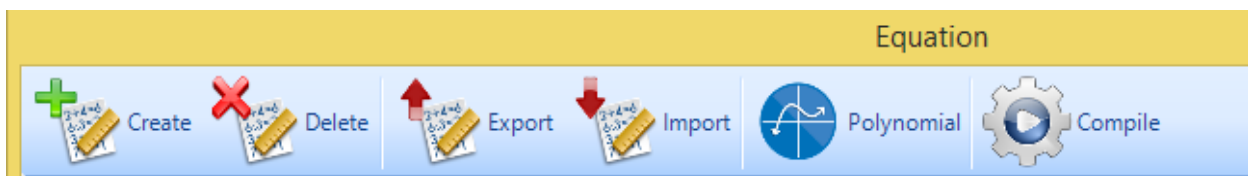
You need to choose a unit for the new equation. If this is a new unit you need to use **Unit Dialog** to create a unit prior to this dialog.

Click **OK** button to close the dialog and return to the Equation dialog.

The new equation is added to the equation list on the left-hand side and the contents of the equation are displayed on the right-hand side panel.

- ❑ Click **Apply** button to save the new created equation.

## Import/Export Equations

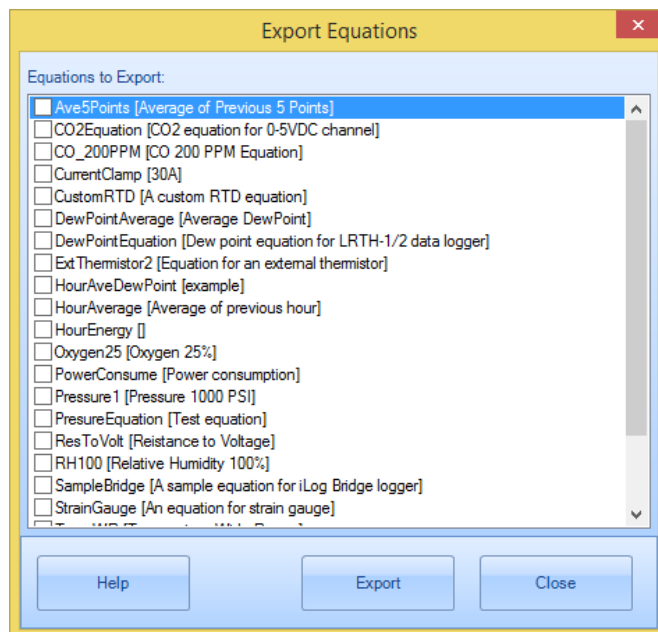


Import/export equation function is used when a batch of equations need to be copied from one SiteView system in one computer to another SiteView system in another computer.

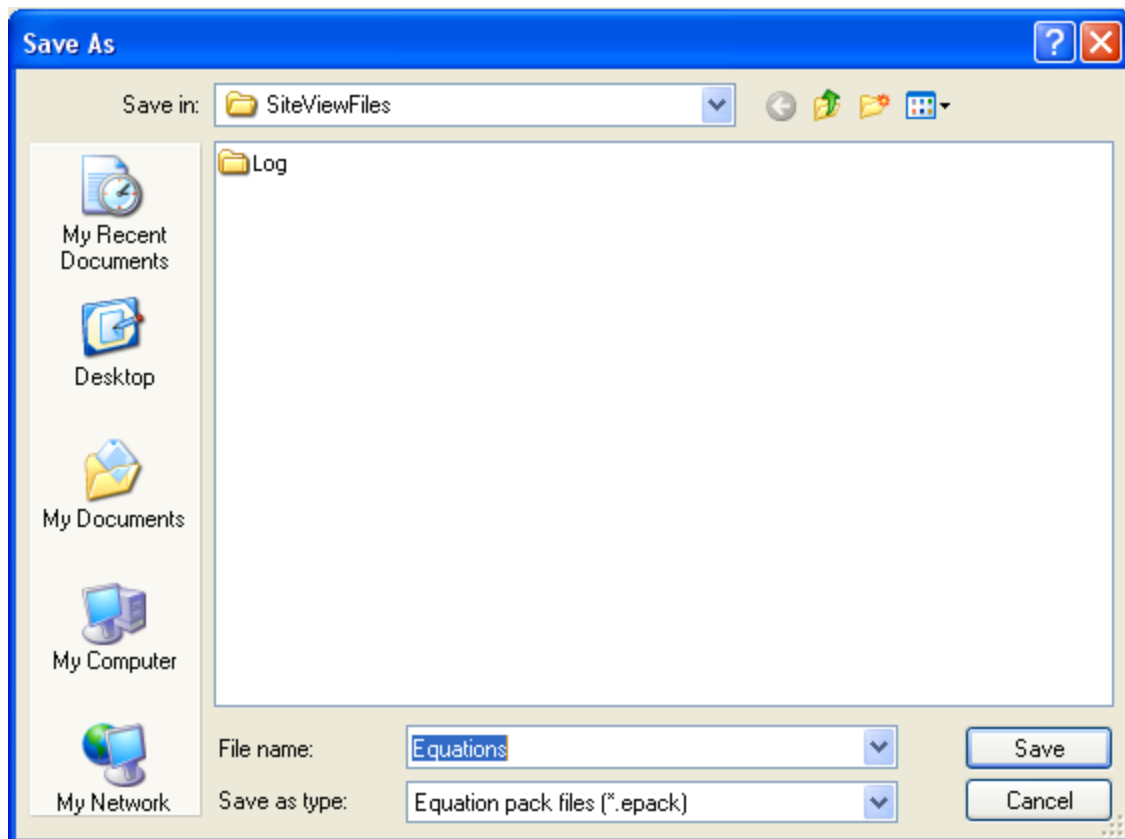
To export a series of equations:

- ❑ Click **Export** button.

In the pop-up Export Equations dialog, check each equation you want to export and click **Export** button.



- ❑ In the **Save As** dialog give a filename to save and click **Save** button to close file-save dialog.

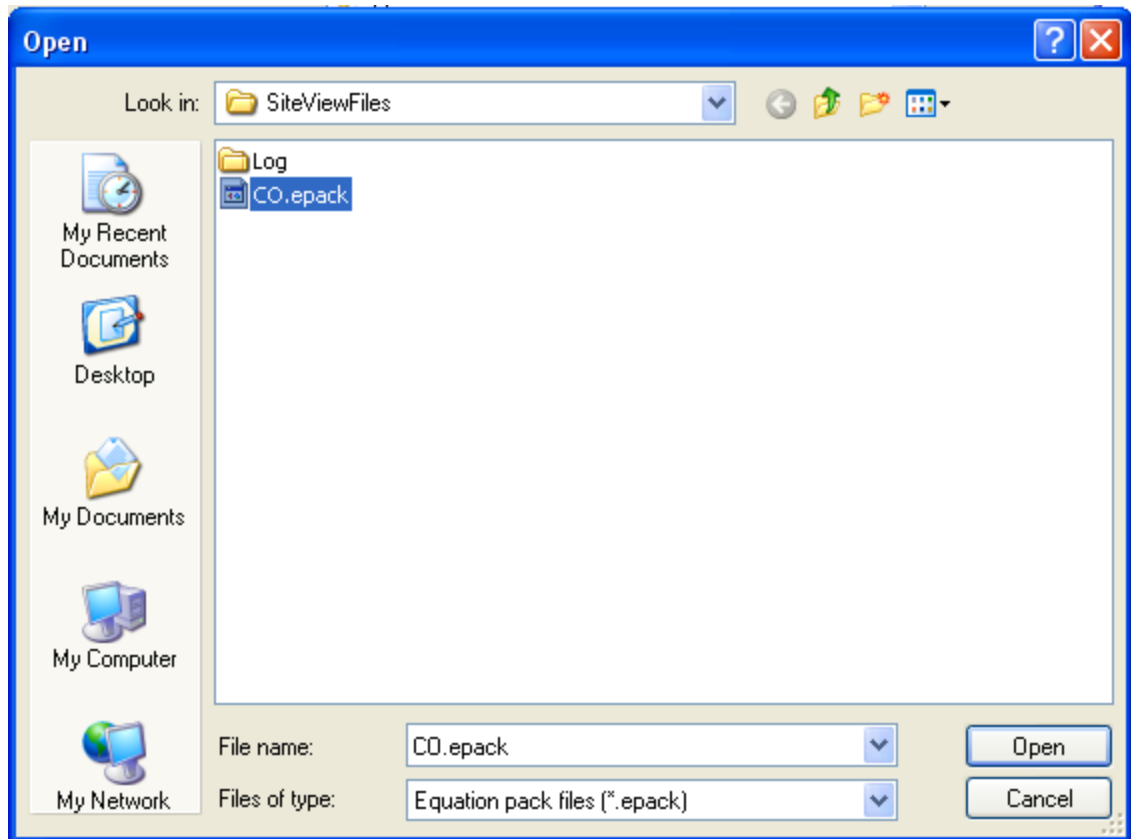


The equations were exported to an equation package file, which can be imported to other SiteView system.

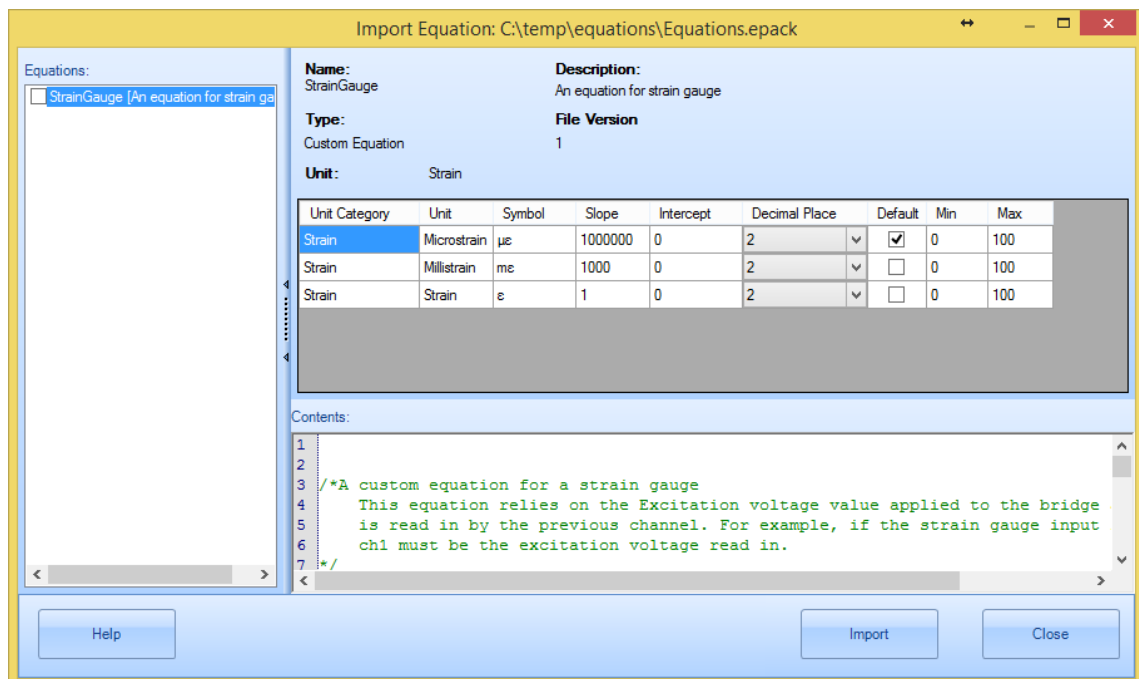
To import an equation package:

- ❑ Click **Import** button.

Browse for the equation package file and click **Open** button to choose the file and close the File-Open dialog.



The following Import Equation dialog appears:







- ❑ Check the equations you want to import from the left-hand side list and click **Import** button to import.

- ❑ Click **Close** button to close the Import Equation dialog.

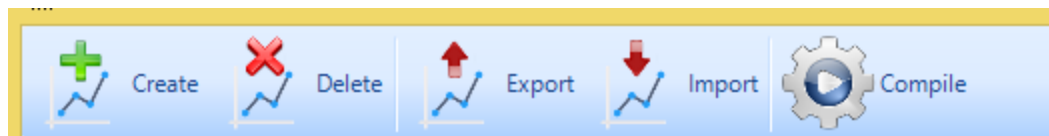
## Apply Equation to Logger

If you are in Logger Configuration dialog, when you click on the combo-list in the Equation column cell, all custom equations will be displayed in the list. Choose the one and click Apply button to save the equation information to the logger.

Channels: Custom Channel Actions:    

Channel #	Channel Type/Input Range	Enabled	Description	Equation
0	PT103J2 Thermistor	<input checked="" type="checkbox"/>	CH0	Temperature [Temperature]
1	20V	<input checked="" type="checkbox"/>	CH1	VoltageDC [VoltageDC]
2	20V	<input checked="" type="checkbox"/>	CH2	VoltageDC [VoltageDC]
3	5V	<input checked="" type="checkbox"/>	CH3	Digit [ADC Digit Value]
4	5V	<input checked="" type="checkbox"/>	CH4	Ave5Points [Average of Previous 5 Points]
5	5V	<input checked="" type="checkbox"/>	CH5	CO2Equation [this is a test equation]
6	5V	<input checked="" type="checkbox"/>	CH6	CO_200PPM [CO 200 PPM]
7	5V	<input checked="" type="checkbox"/>	CH7	DewPointAverage [Average DewPoint]
				DewPointEquation [Dew point of the air]
				ExtThermistor2 [Equation for an external thermistor]
				VoltageDC [VoltageDC]

## Create Custom-Line Equation

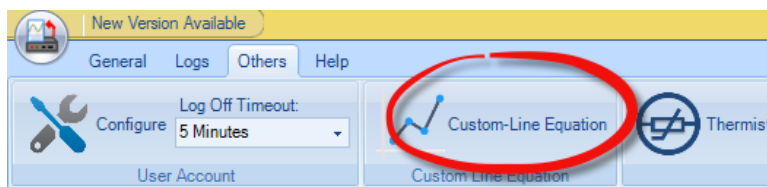


A custom-line equation is used when you add a custom line to the plot. The value of the new line relates to the values of other existing lines on the plot. The relationship is specified in the custom-line equation.

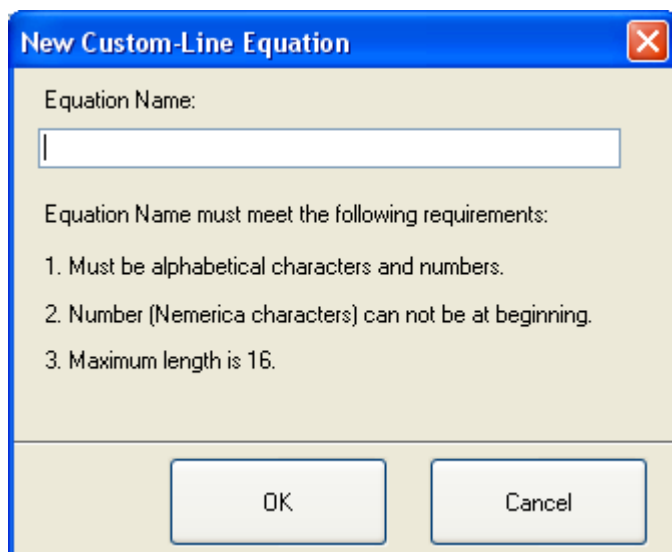
A custom-line equation is similar to a standard custom equation. The only difference is a custom equation accesses **Lines** object instead of **Logger** and **Channels** objects.

**To create a custom-line equation:**

- ❑ Click **Custom-Line Equation** button from Main tool bar.



- ❑ In the Custom-Line Equation dialog, click **Create** button to create a new equation:



In the pop-up dialog, type in the name and click “OK” button.

The new equation is added to the equation list on the left-hand side and the contents of the equation are displayed on the right-hand side panel.

You may update the description of the equation and add your source code in the body of the equation.

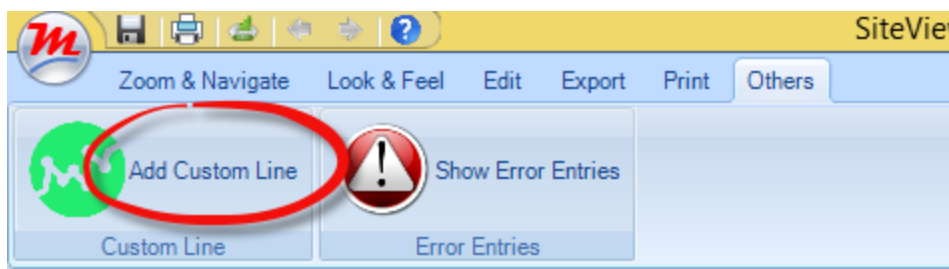
- ❑ Click **Apply** button to save the new created equation.

## Add Custom-Line Equation to Plot

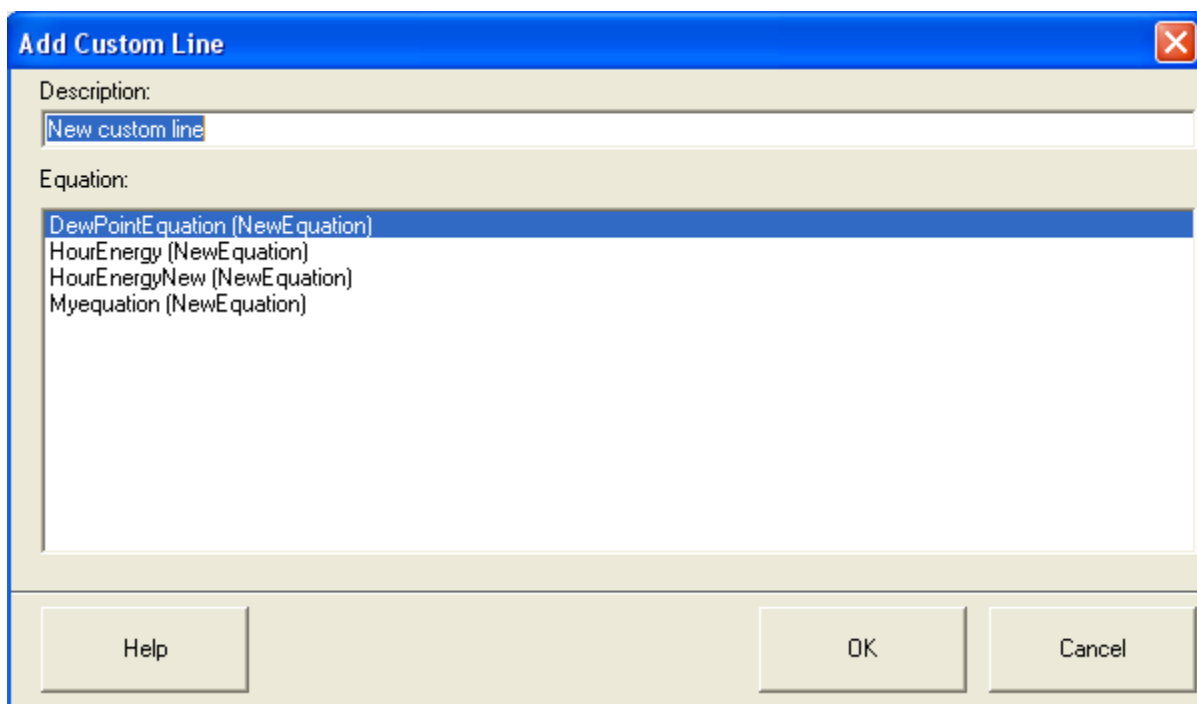
---

If you have created a custom line equation, you can apply it to a new created line:

1. Open a SiteView file that you want to add a new custom line to.
2. Click on **Add Custom Line** button under Other tab of the Graph View:



3. In the pop-up **Add Custom-Line** dialog pick the custom line equation you want to apply to the current plot and click **OK** button:

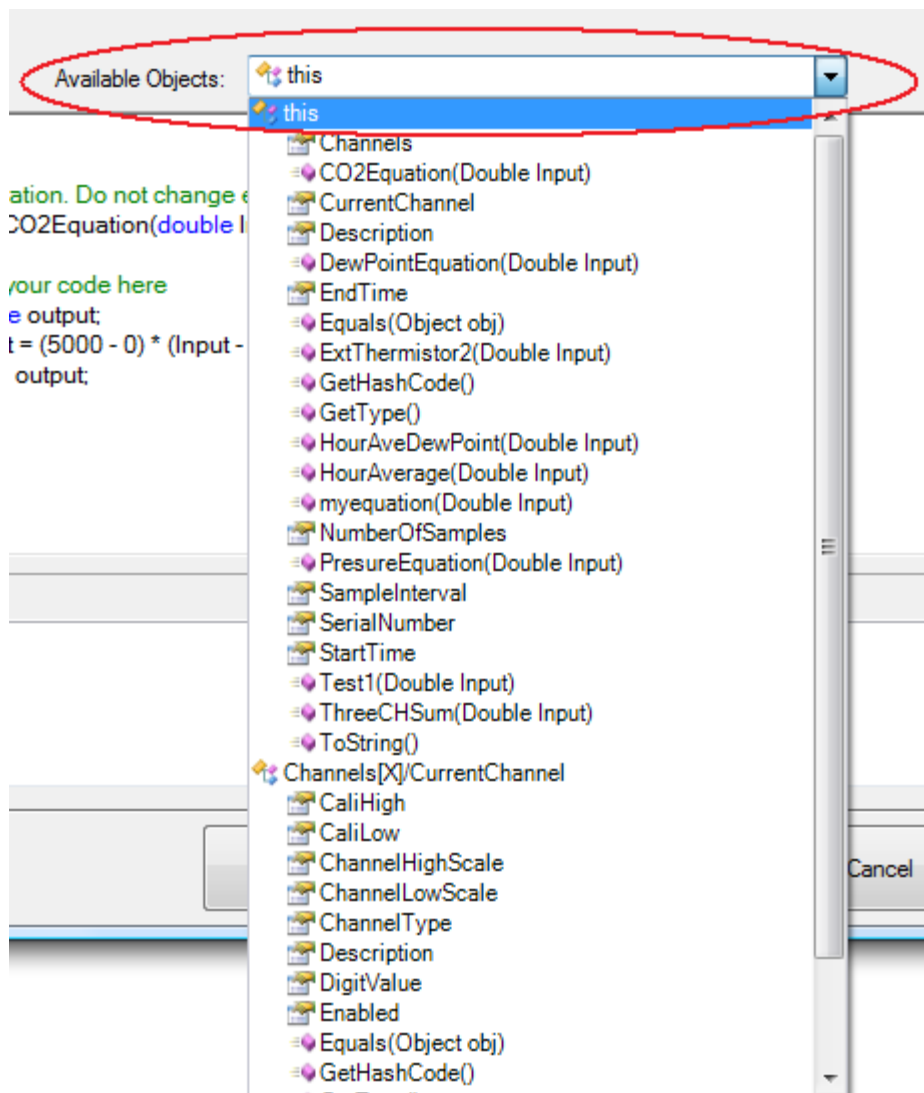


A new line was added to the plot.

## Call/Invoke Other Custom Equations

If you have created a custom equation for certain measurement conversion and this conversion may be useful to other custom equations, then you can call/invoke this equation inside other equations.

All available custom equations are listed under **Available Objects** list:



For example, if you have created **DewPointEquation** to calculate the dew point value and **HourAverage** equation to calculate the previous hour average value, you can create a third equation to call these two equations for the previous hour average value of the dew point values like this:

```
//A custom equation for previous hour average of dew point.
public double HourAveDewPoint(double Input)
{
    double val = DewPointEquation(Input);
    val = HourAverage(val);
    return val;
}
```



## CHAPTER 10 - WORK WITH UNITS

### What is Unit

A Unit is a definite magnitude of a physical quantity, defined and adopted by convention and/or by law, that is used as a standard for measurement of the same physical quantity.

For example, Temperature is a physical quantity or a Unit Category. The Celsius is a unit of Temperature that represents a definite predetermined temperature. When we say 25 Celsius (or 25°C), we actually mean 25 times the definite predetermined temperature called "Celsius".

A unit category may have multiple units associated to it. For example, Fahrenheit and Kelvin are other two units under temperature category and their relationships are:

$$\text{Fahrenheit} = 1.8 * \text{Celsius} + 32$$

$$\text{Kelvin} = \text{Celsius} + 273$$

In the SiteView system, each unit category can have only one primary unit. In the above example, Celsius is defined as the primary unit. Only the primary unit has its slope = 1 and intercept = 0. All other units under the same unit category relate to the primary unit.

In SiteView system, each unit category can have one user selectable default unit. For example, if you are in the United States you may choose Fahrenheit as your default unit.

The following tables specify the SiteView built-in units for some unit category:

Temperature Category:

Unit	Slop	Intercept	
Celsius	1	0	
Fahrenheit	1.8	32	
Kelvin	1	273	

Voltage Category:

Unit	Slop	Intercept	
Volt	1	0	
Kilovolt	0.001	0	
Millivolt	1000	0	
Microvolt	1000000	0	

Current Category:

Unit	Slop	Intercept	
Amp	1	0	
Milloamp	1000	0	

Microamp	1000000	0	
----------	---------	---	--

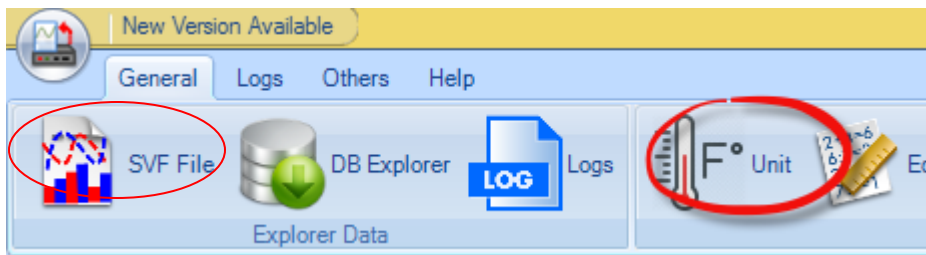
Relative Humidity Category:

Unit	Slop	Intercept	
RH	1	0	

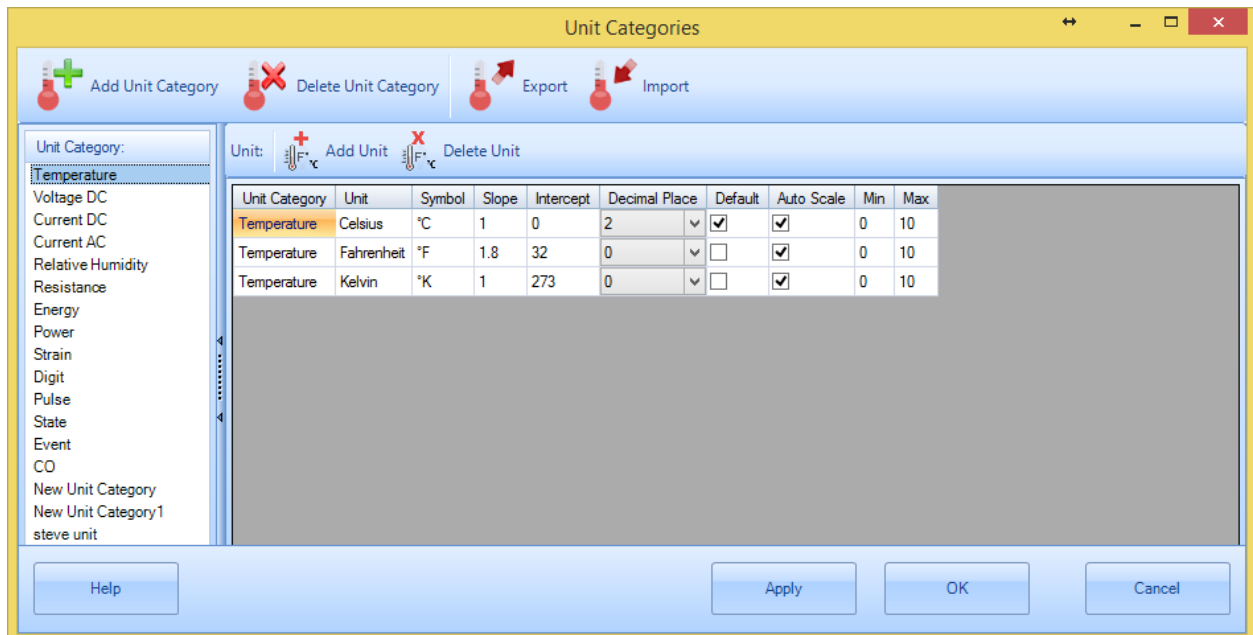
Unit category is used by an equation. Without the unit, the measurement calculated by the equation does not have meaning.

## Open Unit Category Dialog

Click **Unit Category** button on main tool bar:



The following **Unit Category** dialog appears:

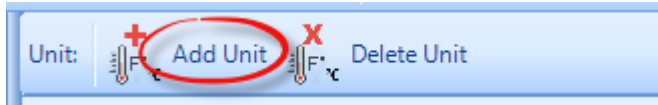


## Create Unit

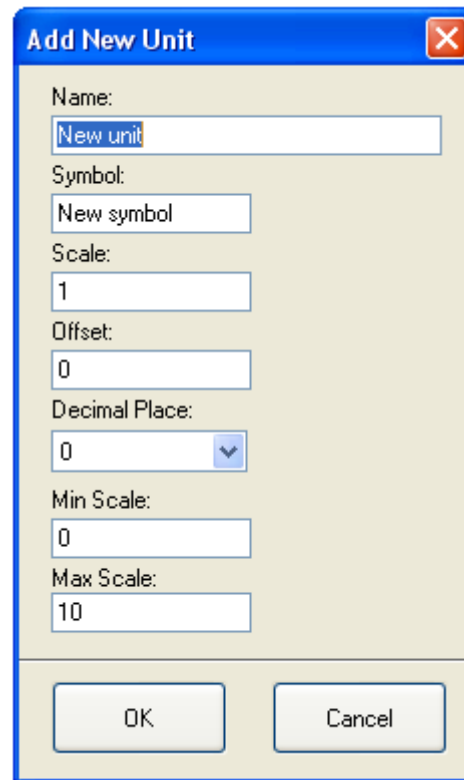
---

To create a unit under existing unit category:

- ❑ Click **Add Unit** button in **Unit Category** dialog:



The following **Add New Unit** dialog appears:

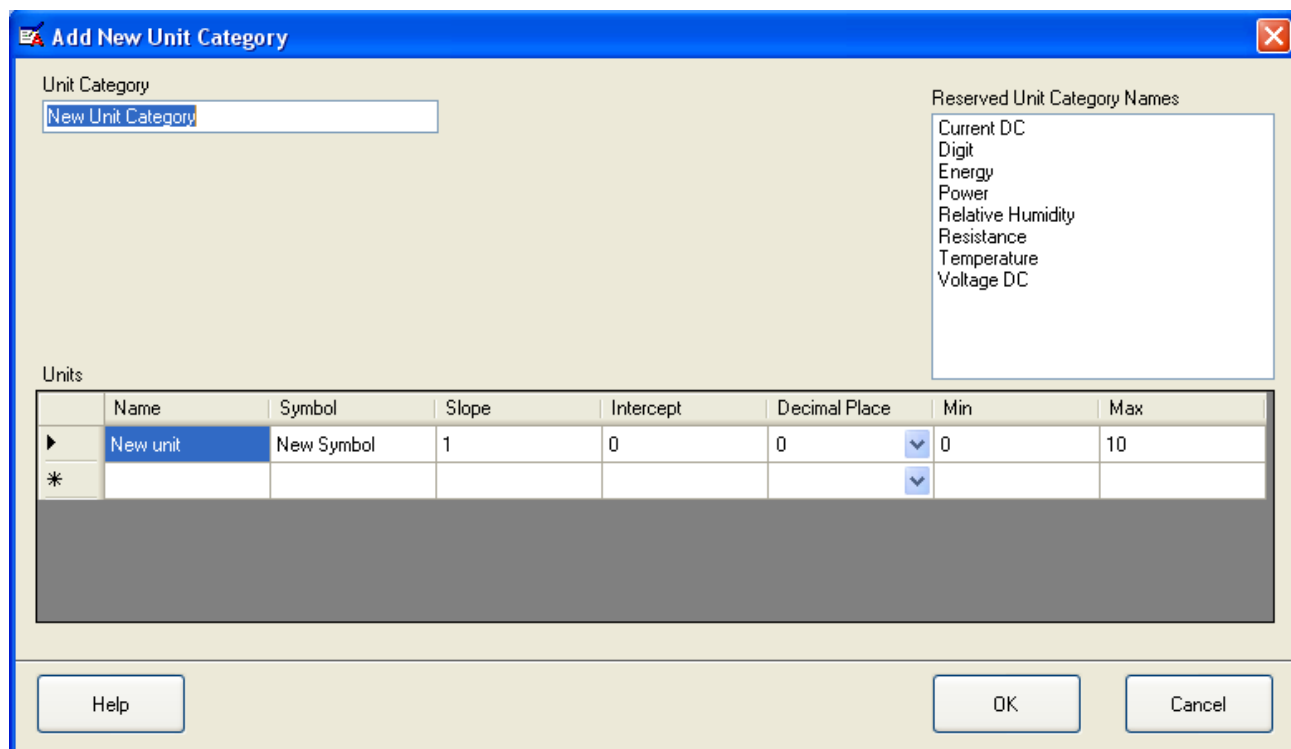
A screenshot of the 'Add New Unit' dialog box. It has a blue title bar with the text 'Add New Unit' and a red 'X' button. The dialog has a light beige background. It contains several text input fields and a dropdown menu. The fields are labeled 'Name:', 'Symbol:', 'Scale:', 'Offset:', 'Decimal Place:', 'Min Scale:', and 'Max Scale:'. The 'Name' field contains the text 'New unit'. The 'Symbol' field contains the text 'New symbol'. The 'Scale' field contains the text '1'. The 'Offset' field contains the text '0'. The 'Decimal Place' field is a dropdown menu with '0' selected. The 'Min Scale' field contains the text '0'. The 'Max Scale' field contains the text '10'. At the bottom of the dialog are two buttons: 'OK' and 'Cancel'.

- ❑ Fill out the fields in the above dialog and click “OK” button to close **Add New Unit** dialog.

To create a unit and unit category:

- ❑ Click **Add Unit Category** button in **Unit Category** dialog:

The following **Add New Unit Category** dialog appears:



Add each unit under the new category and click **OK** button to close **Add New Unit Category** dialog.

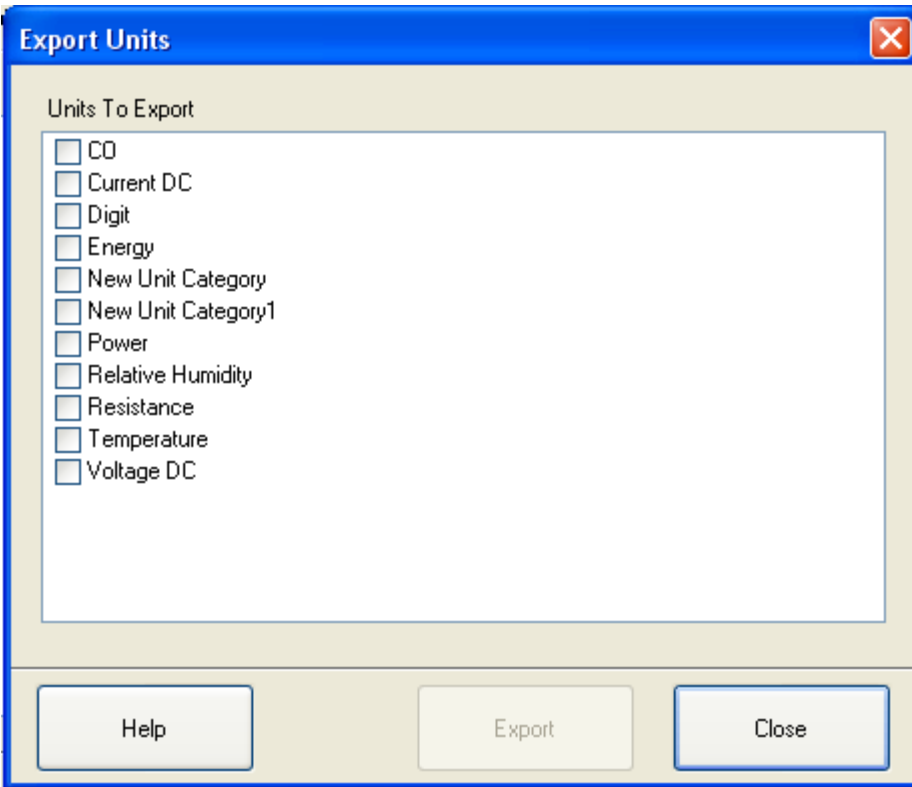
## Import/Export Units

---

**To export unit package:**

Click **Export Units** button in **Unit Category** dialog:

The following **Export Units** dialog appears:

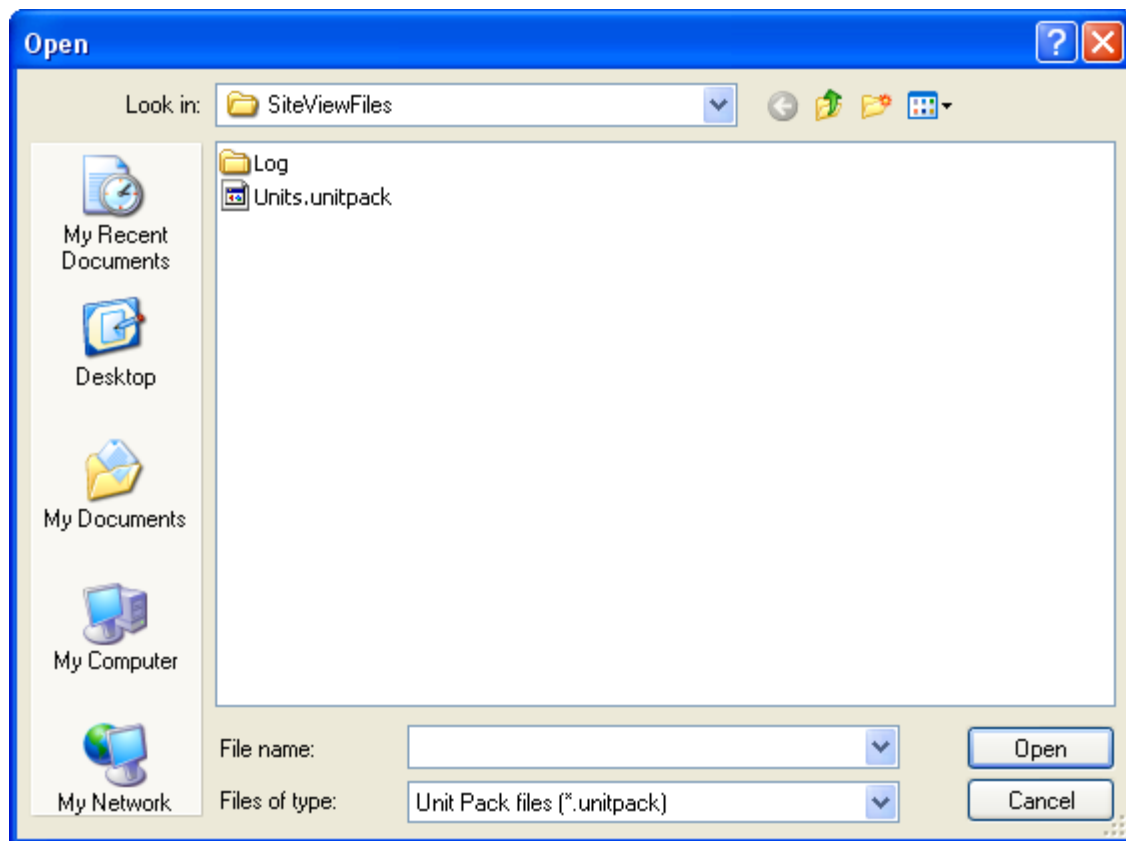


Check the units you want to export and click **Export** button to choose a file to save.

Click **Close** button to close **Export Units** dialog.

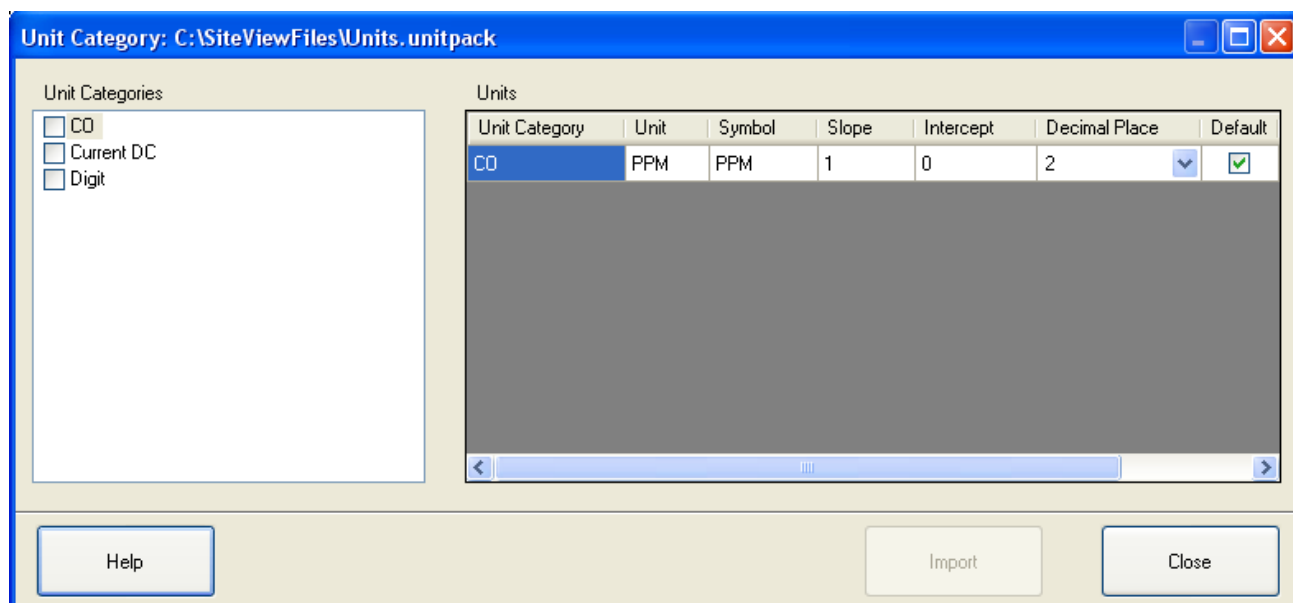
#### **To import a unit package:**

Click **Import Units** button in **Unit Category** dialog. The following Open dialog appears:



Browse for the unit package file in **Open** dialog.

The following **Import Unit** dialog appears:

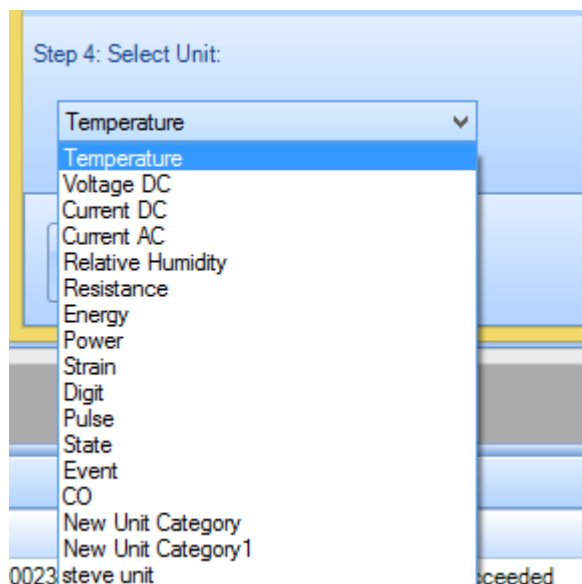


Check units you want to import to and click **Import** button to add the units to the system.

## Use Unit

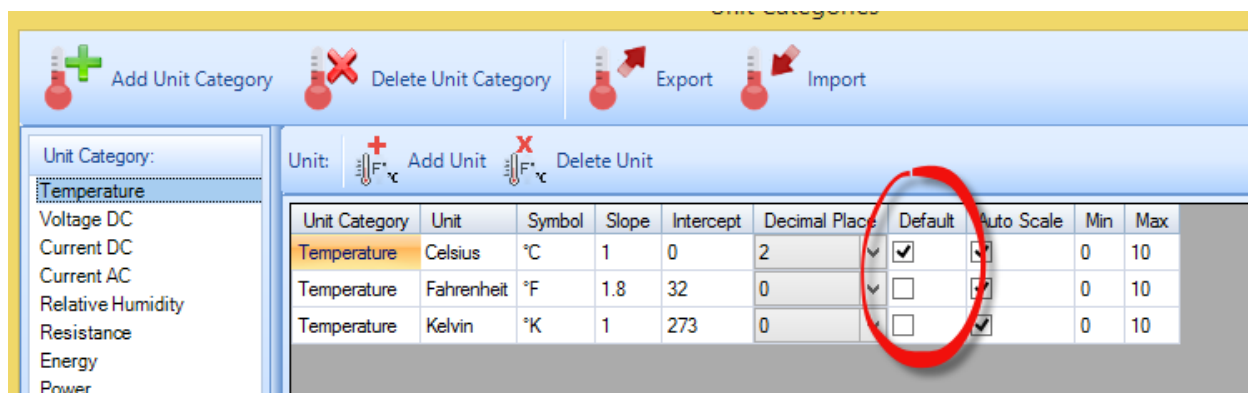
### Apply Unit Category in Equation

A unit category is used by an equation. When you create an equation you need to specify what unit category you want the equation to use. You choose the unit in Step 4 of **New Equation** dialog:



### Change Unit

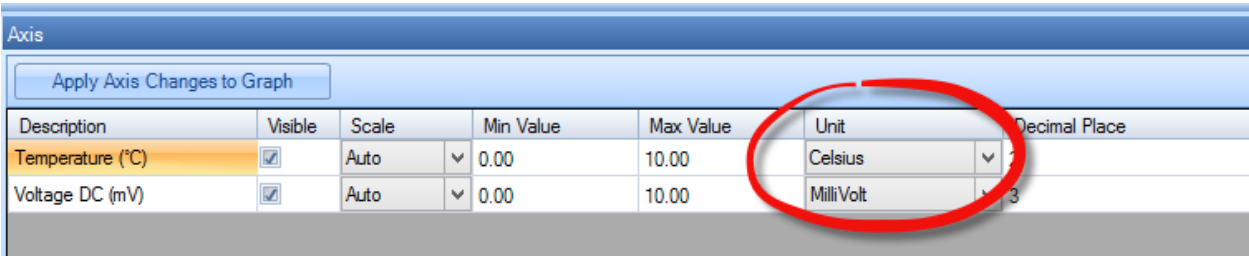
If you prefer other unit other than the existing default unit under Unit Category, you can change it in **Unit Category** dialog:



In the above diagram, unit Celsius is the current default unit under Temperature category. You can change this setting by checking Default check box for Fahrenheit or Kelvin row.

## Change Unit in Plot

If you prefer a different unit for a channel displayed in the plot, you can change this by selecting a different unit under Unit column in Axis Tab:



The screenshot shows the 'Axis' configuration window. At the top, there is a button labeled 'Apply Axis Changes to Graph'. Below it is a table with columns: Description, Visible, Scale, Min Value, Max Value, Unit, and Decimal Place. The 'Temperature (°C)' row is highlighted in orange. The 'Unit' column for both rows has a dropdown arrow, and a red circle is drawn around this column header and its dropdown arrows.

Description	Visible	Scale	Min Value	Max Value	Unit	Decimal Place
Temperature (°C)	<input checked="" type="checkbox"/>	Auto	0.00	10.00	Celsius	2
Voltage DC (mV)	<input checked="" type="checkbox"/>	Auto	0.00	10.00	MilliVolt	3



# CHAPTER 11 - WORK WITH SETTINGS & PREFERENCES

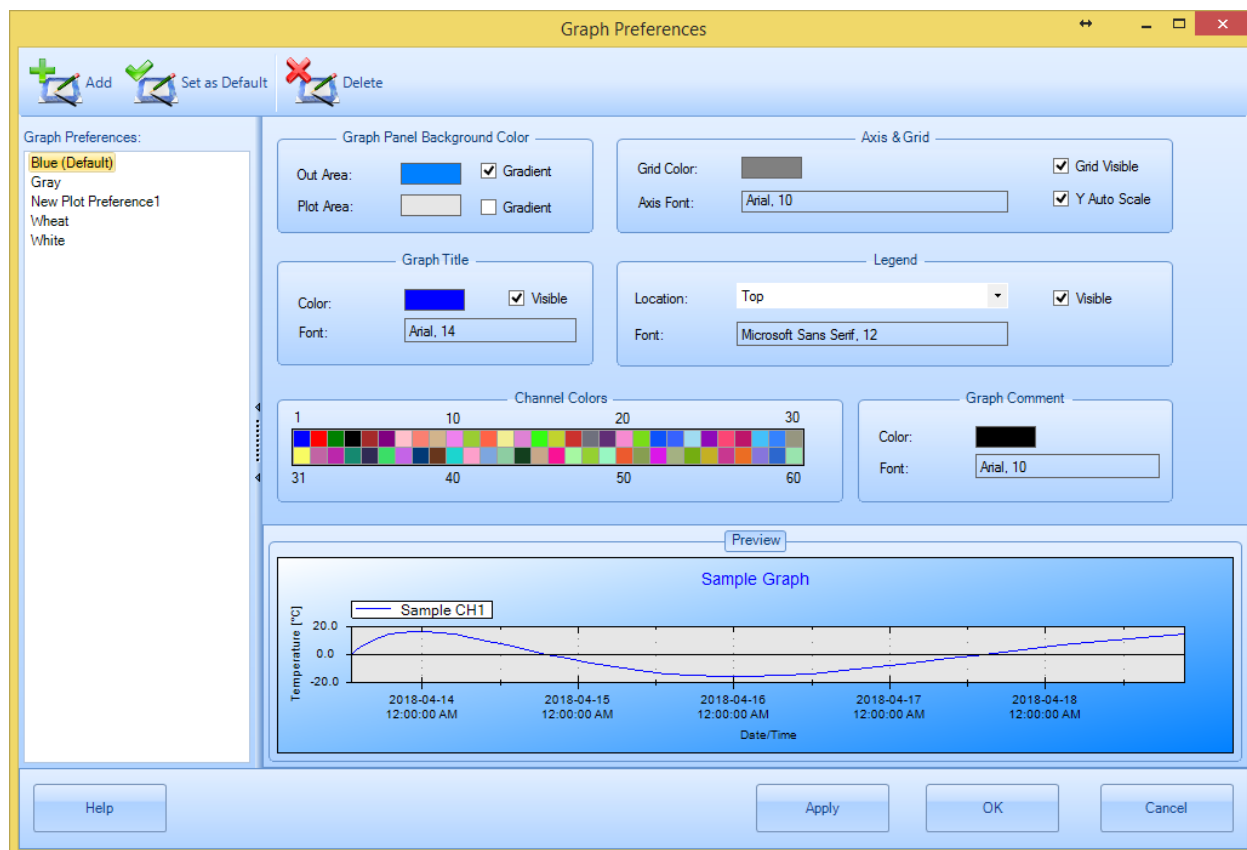
## Graph Preferences

Graph Preferences are the properties regarding SiteView plot view. The default Graph Preferences are applied in a new created SiteView file.

All graph preferences are managed in **Graph Preferences** dialog opened by clicking **Graph Preferences** main tool bar button:



The following Plot Preferences appears:



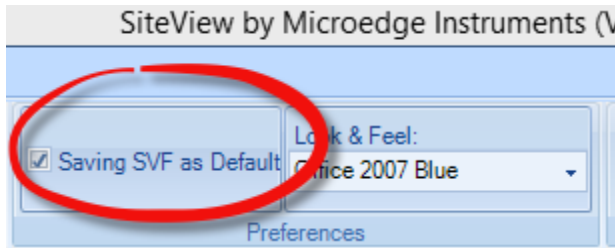
You may add, delete and set default for the selected plot preferences item in the left-hand side list.

Any property you changed will reflect the changes in the Preview plot.

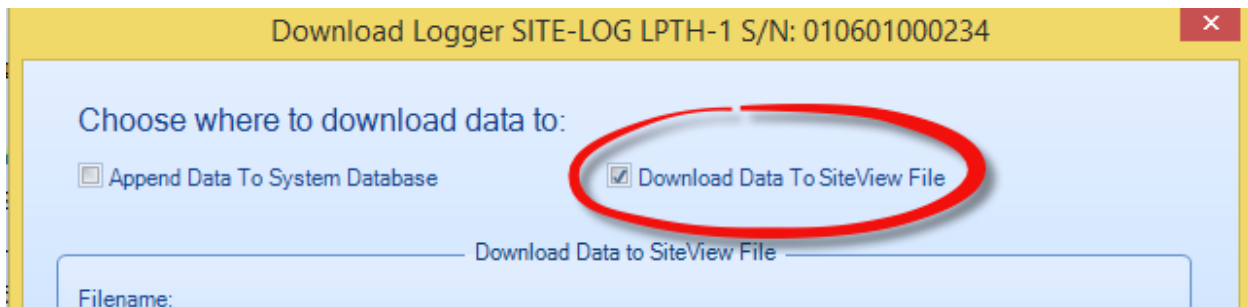
Click **OK** or **Apply** button to save the changes.

## Saving SiteView File (SVF)

---



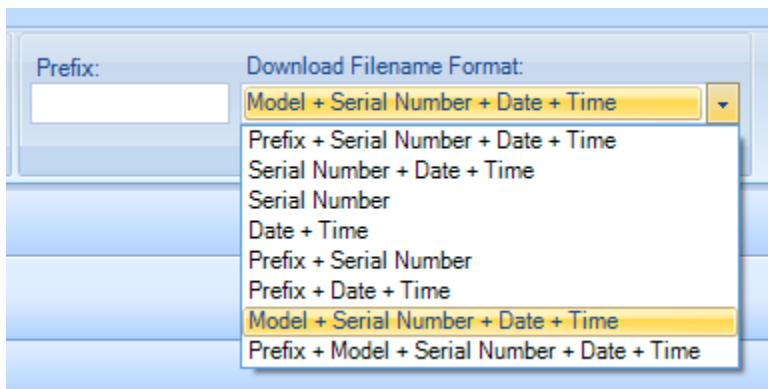
If you check “Saving SVF as Default” on the main ribbon control, in the download dialog, it will be selected as the default option:



## SVF Filename Structure

---

Under main ribbon control, there are two settings specify how the default SVF filename structured.

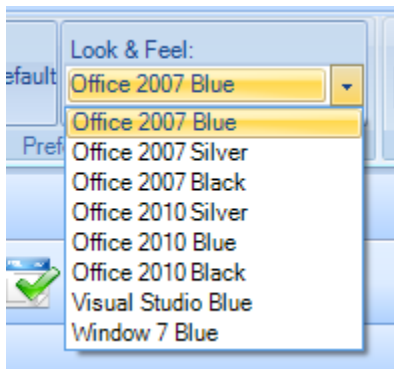


Each time when you download logger and if you choose to download to SVF, the default SVF filename will be structured based on the above settings.

## Look and Feel (Skin)

---

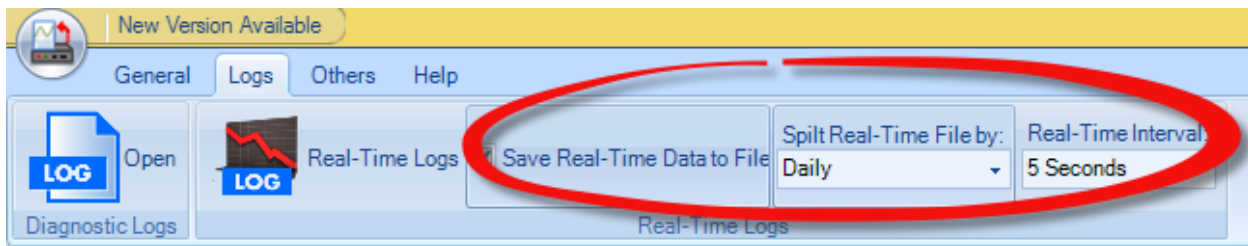
You may change the looks and feels of the application by selecting one of the available skins:



## Real-Time Settings

---

The following settings specifies if you want to save the real-time data, how fast you want to sample the logger when doing the real-time and how you want to split the real-time log files.

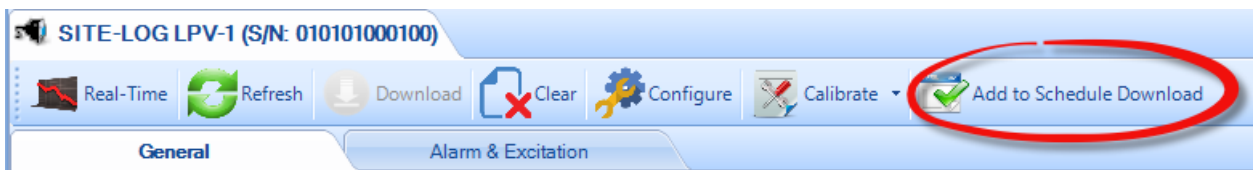


## CHAPTER 12 - WORK WITH SCHEDULE DOWNLOAD

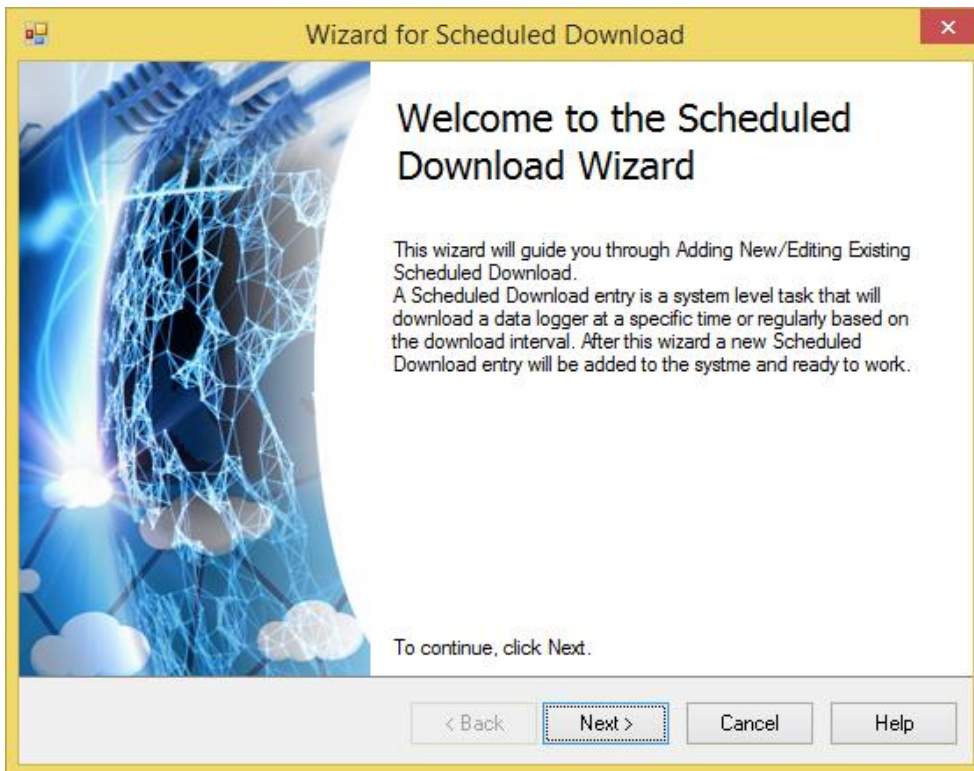
A scheduled download entry is a system level task that will automatically download a data logger at a specific time or regularly based on the download interval.

### Add Schedule Download

- With logger's status window opened, click "Add to Schedule Download" button:



- Go through the Wizard:



Click "Next" button to continue.

**Wizard for Scheduled Download**

**Step 1/4: Choose Connection/Data Logger**

Please choose the correct connection the data logger is connected to and the serial number of the data logger.


Type of Connection:  
 USB Port

Connection:

Data Logger Serial Number:  
 010301000101

Choose From Connected Loggers

Choose From History



< Back   Next >   Cancel   Help

Click “Next” button to continue.

**Wizard for Scheduled Download**

**Step 2/4: Select Time and Download Interval**

Choose when you want the download to start and how frequent the job will be.

Time to Download:  
 2016-01-03 12:00:00 AM

Make sure at this time, the data logger is accessible from this PC.

Download Interval:  
☒ Regularly   ☐ One Time Job

Download Data Every Day

Download Data Every Hour

Download Data Every Two Hours

Download Data Every Six Hours

Download Data Every 12 Hours

Download Data Every Day

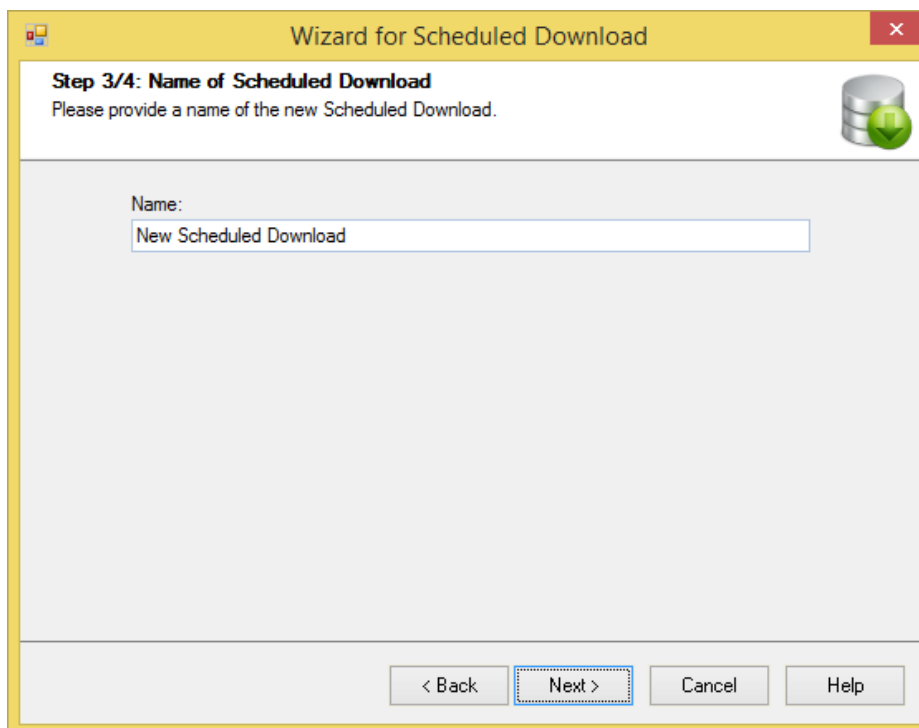
Download Data Every Week

Download Data Every Month

Download Data Every 10 Minutes

< Back   Next >   Cancel   Help

Choose a time to download the logger. Choose either is regular download with a download interval or a one time job. Then click “Next” button

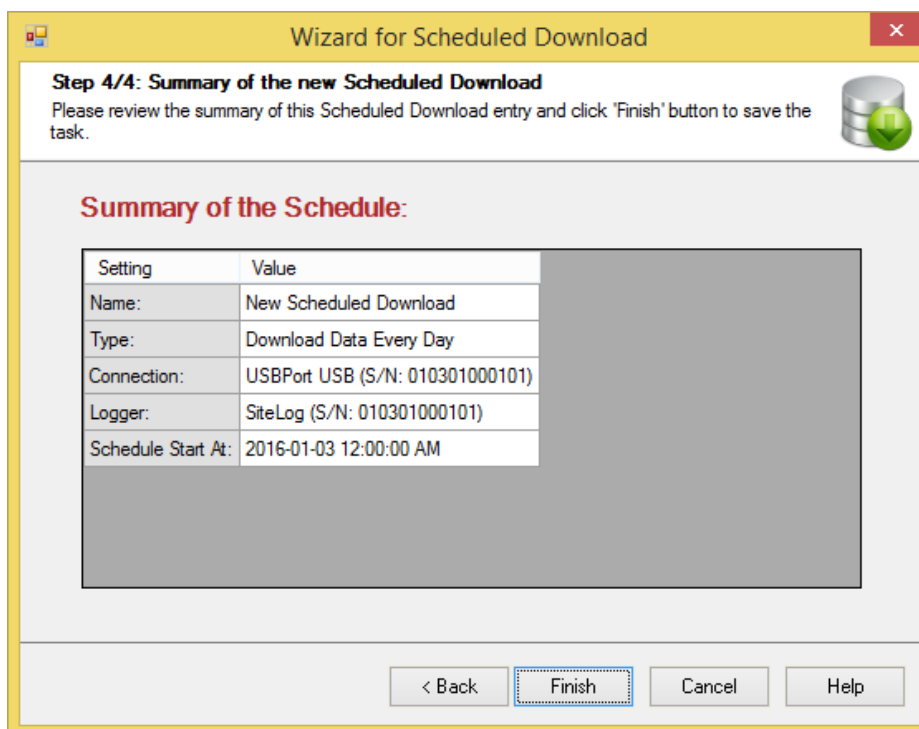


**Step 3/4: Name of Scheduled Download**  
Please provide a name of the new Scheduled Download.

Name:  
New Scheduled Download

< Back   Next >   Cancel   Help

Give a name of this entry and click “Next” button.



**Step 4/4: Summary of the new Scheduled Download**  
Please review the summary of this Scheduled Download entry and click 'Finish' button to save the task.

**Summary of the Schedule:**

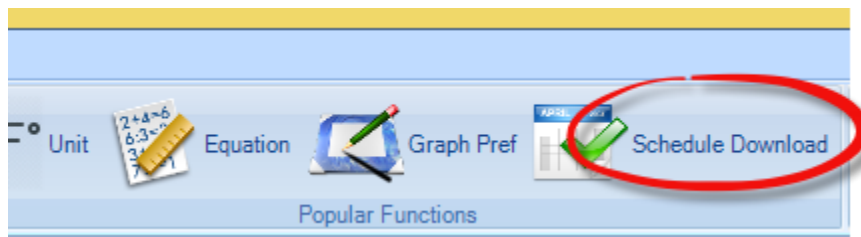
Setting	Value
Name:	New Scheduled Download
Type:	Download Data Every Day
Connection:	USBPort USB (S/N: 010301000101)
Logger:	SiteLog (S/N: 010301000101)
Schedule Start At:	2016-01-03 12:00:00 AM

< Back   Finish   Cancel   Help

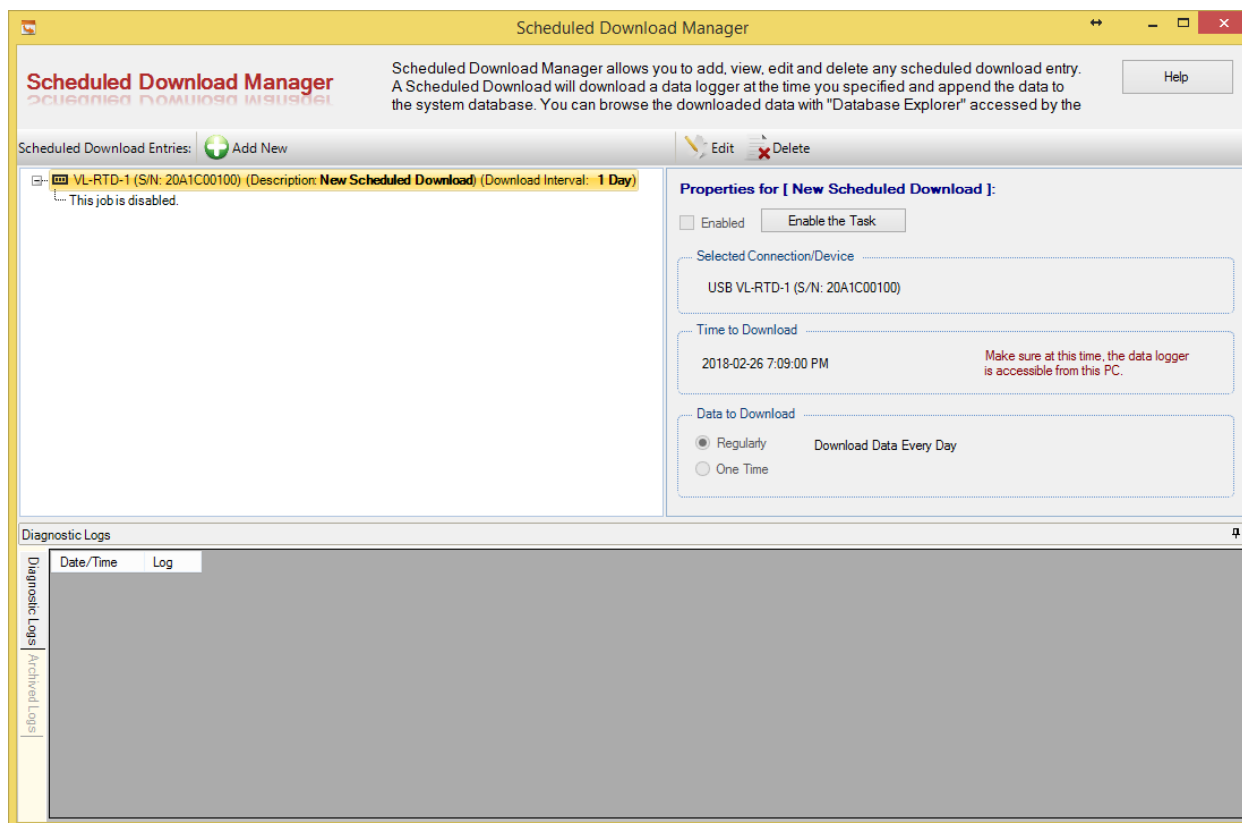
Review the summary of the entry and click “Finish” button to add the entry to the system.

## Manage Schedule Download


To manage all scheduled downloads, on the main tool bar, click “Schedule Downloads” button:




The following dialog shows:



Left side pane lists all scheduled download entries. Each entry contains the data logger serial number, the entry name and the download interval. If the entry is active it will show a progress bar indicating the remaining time left to the next download.



Scheduled Download Entries:  Add New

 SiteLog (S/N: 010301000101) (Description: **New Scheduled Download**) (Download Interval: **1 Day**)

Last contacted at: [0001-01-01 12:00:00 AM](#) -- The next download will start at: [2016-01-03 12:00:00 AM](#)

8 Hours 49 Minutes 15 Seconds remaining

Right side pane shows the detailed information about the currently selected scheduled download:

 Edit  Delete

**Properties for [ New Scheduled Download ]:**

☒ Enabled Disable the Task

Selected Connection/Device

USB SiteLog (S/N: 010301000101)

Time to Download

2016-01-03 12:00:00 AM Make sure at this time, the data logger is accessible from this PC.

Data to Download

☒ Regularly Download Data Every Day

☐ One Time

You can edit, delete, disable or enable the entry.

Bottom side pane shows the diagnostic logs:

Diagnostic Logs		
	Date/Time	Log
Diagnostic Logs	2016-01-03 12:00:08 AM	SiteLog (S/N: 010301000101): Time to check Scheduled Download: [New Scheduled Download]
	2016-01-03 12:00:16 AM	Data Downloaded From: 2016-01-02 12:34:04 PM To : 2016-01-02 6:07:24 PM
	2016-01-03 12:00:18 AM	Site-Log LPTM-1 (S/N: 010301000101): Time to check Scheduled Download: [New Scheduled Download]
	2016-01-03 12:00:26 AM	Data Downloaded From: 2016-01-02 6:07:34 PM To : 2016-01-02 11:40:54 PM
	2016-01-03 12:00:28 AM	Site-Log LPTM-1 (S/N: 010301000101): Time to check Scheduled Download: [New Scheduled Download]
	2016-01-03 12:00:30 AM	Data Downloaded From: 2016-01-02 11:41:04 PM To : 2016-01-03 12:00:24 AM
Archived Logs		



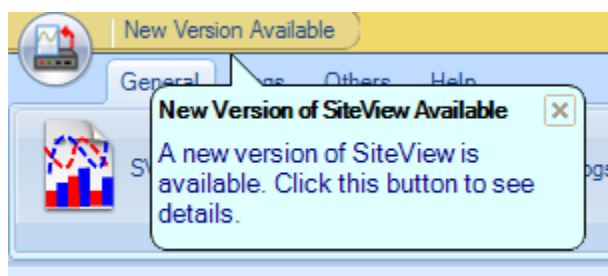
## CHAPTER 13 – UPGRADE SITEVIEW AND FIRMWARE

### Upgrade SiteView

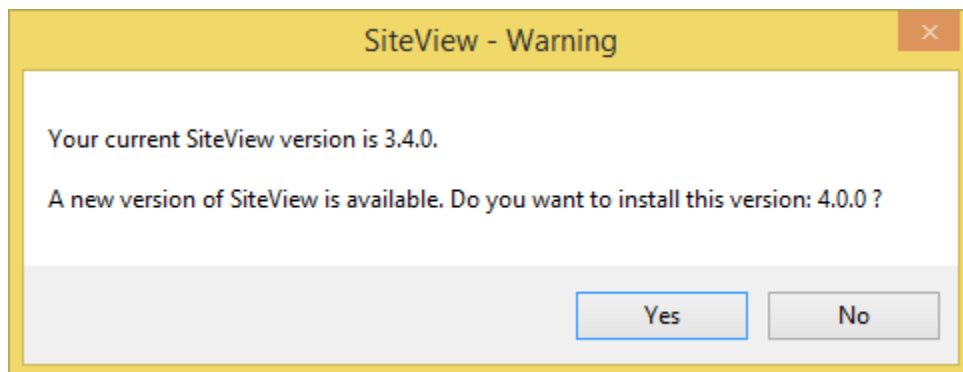
---

SiteView 4 or above has a new feature to automatically download the new version of SiteView if your computer has internet access and notify user for upgrading.

After you launch SiteView, if there is an update available, it will provide the notification like this:



If you click “New Version Available” button, the following dialog shows:

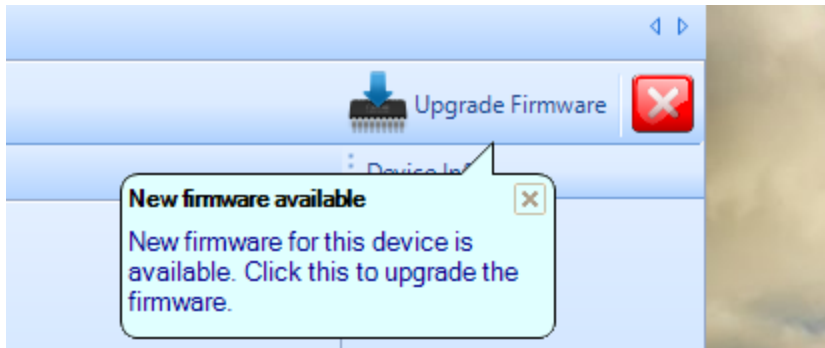


If you click “Yes” button, the system will start upgrading SiteView.

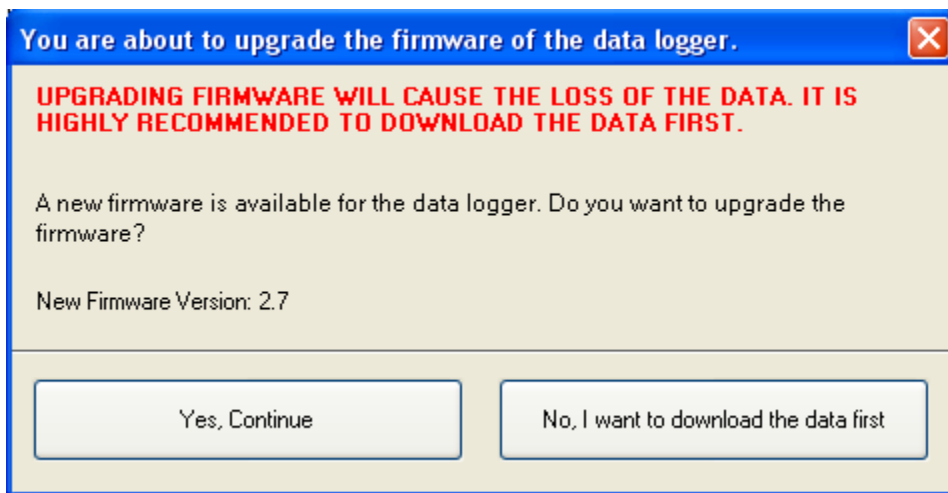
### Upgrade Firmware

---

If SiteView found the current firmware of the connected data logger is older than the firmware SiteView has, SiteView will show “Upgrade Firmware” button at the right side of the status form and notify user for upgrading:



If you would like to upgrade the firmware click “Upgrade Firmware” button. The following dialog will show. If you decide to upgrade the firmware be sure to download the data first. Upgrading of the firmware will cause clearing of the data in the logger.

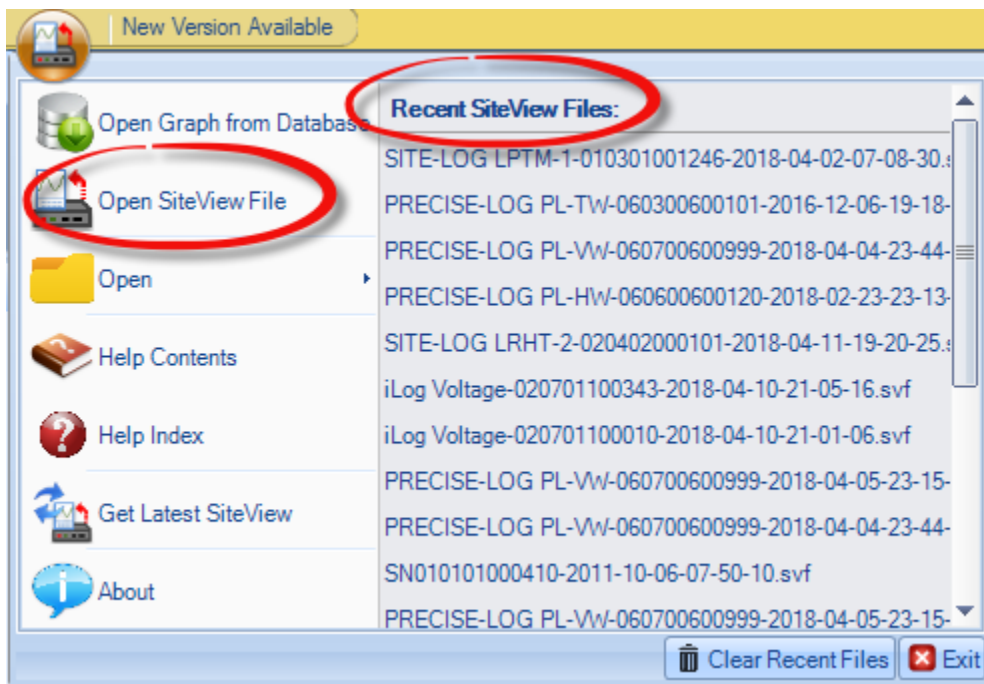


Click **Yes** button to upgrade the firmware.

## CHAPTER 14 - WORK WITH PLOT

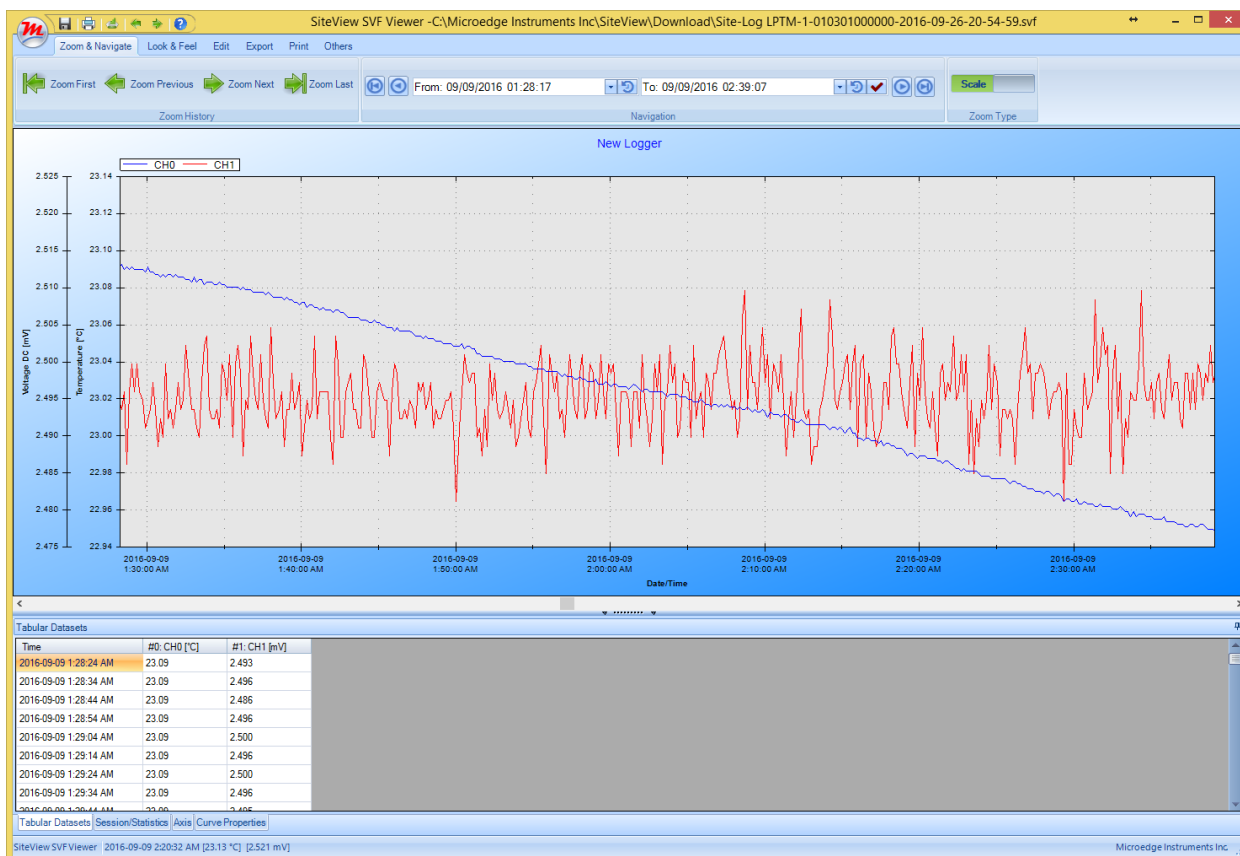
You can download data to either SVF file or database. The graph views for both downloadings are similar and we use SiteView SVF Viewer as an example.

From SiteView main frame, you can open a SVF from the application button:



You can click “Open SiteView File” to choose a file or click one of the files in “Recent SiteView Files” list.

Here is the user interface of SiteView SVF Viewer:

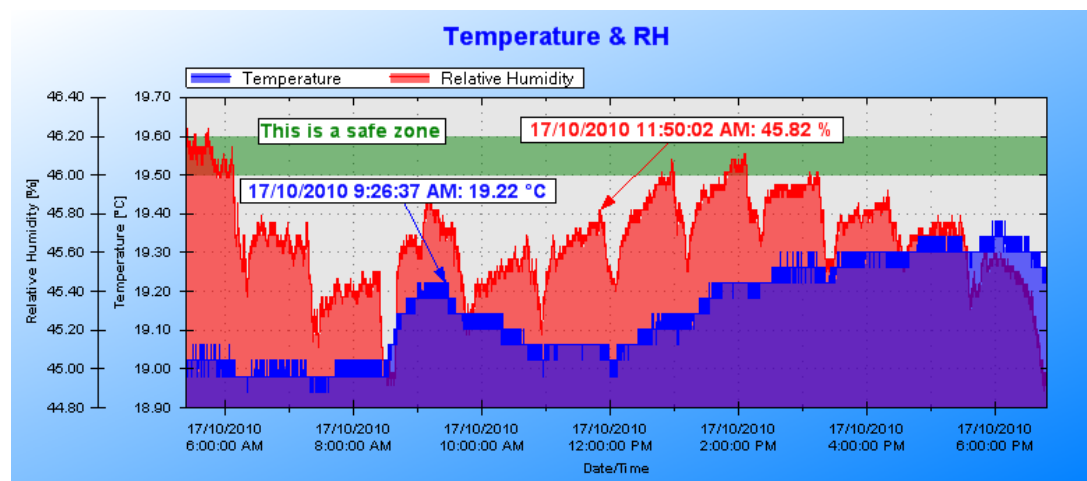


The top section is the plot view and the bottom section contains **Dataset**, **Statistics**, **Axis** settings, and **Line/Curve** settings.

## Basic Views

The view of the plot contains Plot View, Tabular View and Statistics.

### Plot View



The above plot view shows the downloaded data of a logger. X axis shows the date and time the data is within. Two Y axes show the measurement ranges with the units in the current time frame. Title of the plot is located at the top section. Below the Title is the Legend, then the actual plot. You can add curve annotations and labels in the plot area.

You can change the looks and feels by going through Change plot settings page.

## Tabular View

Tabular Datasets		
Time	#0: CH0 [°C]	#1: CH1 [mV]
2016-08-25 5:04:34 PM	27.14	2.502
2016-08-25 5:04:44 PM	27.14	2.498
2016-08-25 5:04:54 PM	27.14	2.502
2016-08-25 5:05:04 PM	27.14	2.503
2016-08-25 5:05:14 PM	27.14	2.500
2016-08-25 5:05:24 PM	27.14	2.497
2016-08-25 5:05:34 PM	27.15	2.500
2016-08-25 5:05:44 PM	27.15	2.495
2016-08-25 5:05:54 PM	27.15	2.498

The above tabular view shows the downloaded data of the logger in the detailed tabular format. The first column shows the date and time when the measurement was taken, the following columns display the data values of all recorded channels.

## Statistics

Plot statistics are a set of properties about the opened SiteView files and the current plot view. The statistics are under **Statistics** tab page:

Session/Statistics

SITE-LOG LPTM-1 - C:\Microedge Instruments Inc\SiteView\Download\Site-Log LPTM-1-010301000000-2016-09-26-20-54-59.svf

Session Info

Session Time	Description	From	To	Duration	Sampling Interval	Enabled CHs	Readings/CH	Total Readings
2016-03-11 7:26:24 AM	New Logger	2016-08-25 5:04:34 PM	2016-09-26 8:03:24 PM	32.02:58:50	00:00:10	2	277554	555108

Zoomed Area

Zoomed From	Zoomed To	Zoomed Duration	Zoomed Readings/CH	Zoomed Total Readings
2016-08-25 5:04:34 PM	2016-09-26 8:03:24 PM	32.02:58:50	277554	555108

Channels

#	Channel Type	Cali. Low	Cali High	Min Value	Mean Value	Max Value	Value Span	Unit	Equation	Description
0	Thermistor	0	0	20.55	23.32	28.33	7.78	Celsius(°C)	Temperature	CH0
1	TC Range1(-8 to +73mV)	0	0	2.451	2.496	2.538	0.087	MilliVolt(mV)	VoltageDC	CH1

Tabular Datasets

Session/Statistics

Axis

Curve Properties

If you opened multiple files, each statistics information associated with its file is listed separately. Each statistics information starts with its file name. Then it specifies the logger type, sampling interval, logged time and total data points. If you have zoomed the plot, it specifies the properties for the zoomed view. At last it specifies the properties about each channel: channel type, calibration information, minimum, mean and maximum values etc.

## Add More SiteView Files

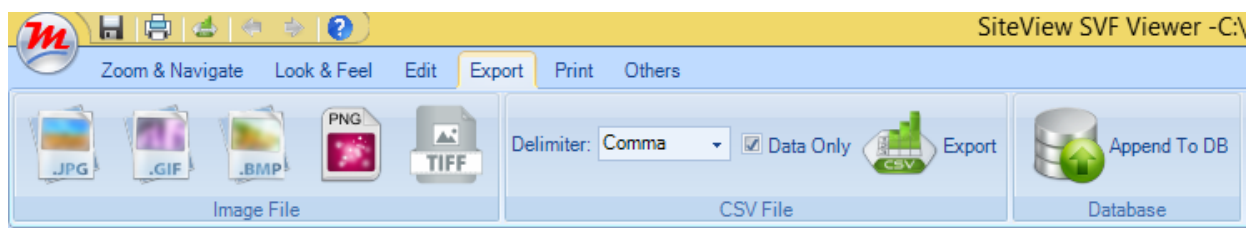
---

If you are already in a SiteView SVF Viewer, you can add another SiteView files to the existing plot by clicking **Add SVF** button.



## Export

---



### Save As Image File

The plot view can be saved to the following image file formats:

- Enhanced Metafile Format (EMF)
- Portable Network Graphics (PNG)
- Graphics Interchange Format (GIF)

Joint Photographic Experts Group (JPEG)  
Tagged Image File Format (TIFF)  
Bitmat (BMP)

Click one of the buttons in Image File section to save the graph as an image file.

## Save as CSV File

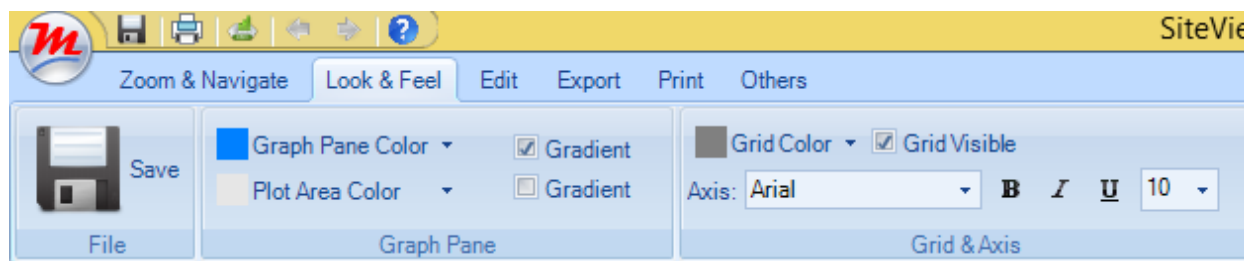
The logger and channel properties and the current tabular data can be saved in CSV file format. Choose a delimiter (Comma or Tab), check if exporting statistics as well and click “Export” button to save the graph as a CSV file.

## Save as CSV File

You can append the graph to the system’s database by clicking “Append to DB” button.

## Change Look and Feel

---



When a SiteView file was first created, the current default Graph Preferences entry was used to generate the properties of the plot view.

You can change those settings under Look and Feel ribbon control.

## Change Graph Pane Settings:

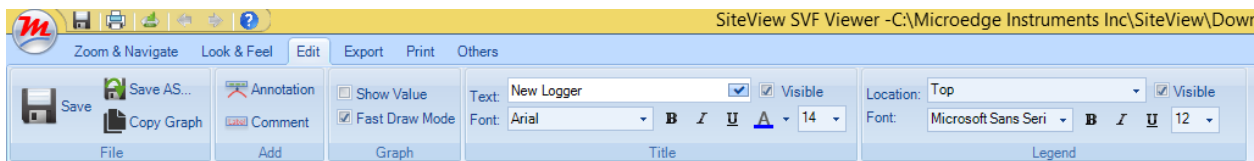
You can change graph pane’s color, graph area’s color, change the color gradient settings by clicking on related buttons/checkboxes under Graph Pane.

## Save as CSV File

You can change Grid and Axis’s settings like color, visibility, font’s name, size, color bold, italic, underline settings by changing related fields under Grid and Axis.

## Edit the Graph

---



## Add Annotation:

An annotation is a note (label) that user can add to the plot area to explain an associated data point. A comment is a note (label) that user can add to the plot area to explain the plot. The difference between an annotation and a comment are:

1. An annotation goes with the data point. If the data point is zoomed off the plot area, the associated annotation will be off the plot area. Whereas a comment does not associate to any data point, it associates to the plot. Thus the location of a comment refers to the coordinates of the plot area.
2. An annotation has an arrow links the annotation to the data point. Whereas a comment does not have an arrow.

To add an annotation, click “Annotation” button, move the mouse over a data point of a plot curve. Once the mouse pointer changed to + icon, click to add an annotation.

Then highlight the added annotation, on the Annotation tab section, you can change the related settings of it or delete it:



## Add Comment:

Click “Comment” button to add a comment on the graph. Refer to Add Annotation section for details.

## Change Title:

Plot Title is the text that is displayed on the top of the plot view. When the SiteView file was first created the description of the logger was chosen to be the plot title.

You can change title’s text, font, visible etc. from the related fields under Title.

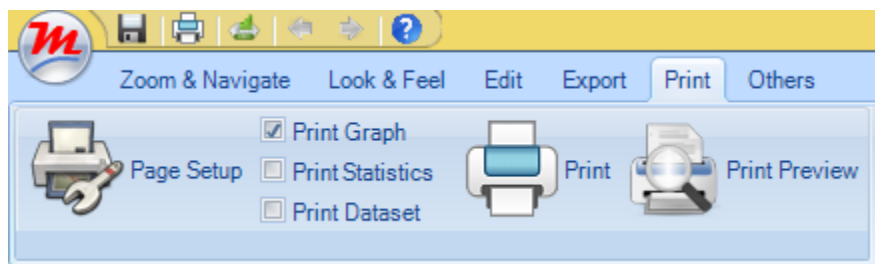
## Change Legend:

Each plot view contains a legend shows each line’s name/description. By default the descriptions of all channels were selected to be the legend when the SiteView file was first created.

You can change legend’s location, font, visible from the related fields under Legend.



## Print Plot



There are three sections that SiteView can print: The graph, the statistics and the dataset. In Print ribbon section you can change Page's setting, choose which sections you want to print, review the print and print the document.

## Change Plot Settings

### Change Axis Settings

Axis											
Apply Axis Changes to Graph											
Description	Visible	Scale	Min Value	Max Value	Unit	Decimal Place	Alarm Zone	Low Alarm	Color	High Alarm	Safe Zoom Color
Temperature (°C)	<input checked="" type="checkbox"/>	Auto	0.00	10.00	Celsius	2	Hide Both Alarm Zones	325.86	Blue	-122.07	
Voltage DC (mV)	<input checked="" type="checkbox"/>	Auto	0.00	20,000.00	MilliVolt	3	Hide Both Alarm Zones	-8.000	Red	-0.008	Green

A plot view contains one X Axis indicating the time frame of the current view and one or more Y Axis indicating the current line scales of the current view.

Each plot curve/line must associate to one X axis and one Y axis, if multiple lines share the same unit they will share the same Y axis.

A Y axis can be visible or hidden by toggling “Show” check box.

A Y axis can be in **Auto Scale** mode: the Y axis will automatically scale to the current range of the line. Or **Manual Scale** mode: the Y axis will use “Min Value” and “Max Value” as the scale.

The Y axis can use different unit under the same unit category. For example you can choose Fahrenheit or Celsius as the unit for a temperature axis.

### Change Line/Curve Settings

Curve Properties													
Apply Curve Changes to Graph													
Index	Visible	Description	Equation	Cal. Low	Cal. High	Width (1-20)	Color	Style	Point Symbol	Symbol Size	Fill Below-Line	Fill Color	Action
G.0 [L-0]	<input checked="" type="checkbox"/>	CH0	Temperature	0	0	1	Blue	—	None	7	<input type="checkbox"/>		
G.1 [L-1]	<input checked="" type="checkbox"/>	CH1	VoltageDC	0	0	1	Red	—	None	7	<input type="checkbox"/>	Red	

A line is the representation of the readings of a channel for the current time frame.

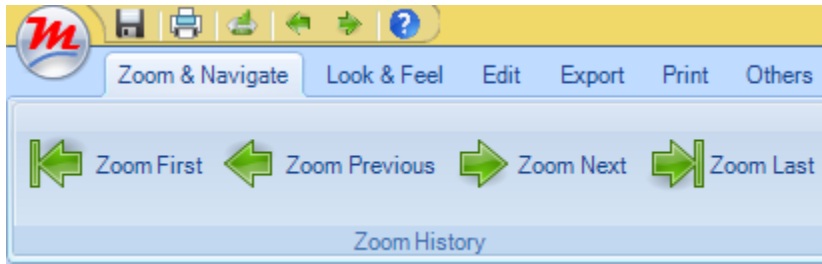
The line can be visible or hidden by toggling **Visible** check box.

The description of the line shows in the legend area of the plot.

You may change to a different equation to force the readings of the line to be recalculated based on the new equation.

## Zoom Plot

---



Zooming of the plot is to adjust the scales of axes.

### Zoom-In

Zoom-In is to focus on one section of the plot so it can be displayed in details.

There are two types of Zoom-In:

---

#### Box Zoom:

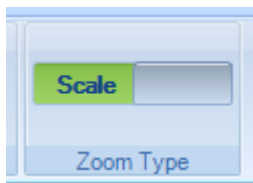
Zoom the plot to the enclosed area, which involves both X and Y axes' changing.

---

#### Scale Zoom:

Zoom the plot to the enclosed area, which only affects the time axis (X axis). The Y axis will be automatically adjusted based on the scale settings.

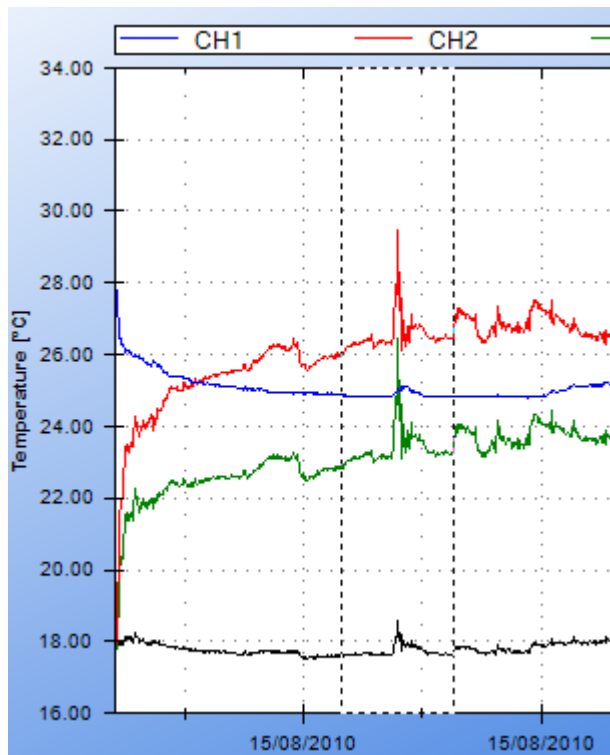
Switching between Box Zoom and Scale Zoom can be achieved by toggling Zoom Type button:



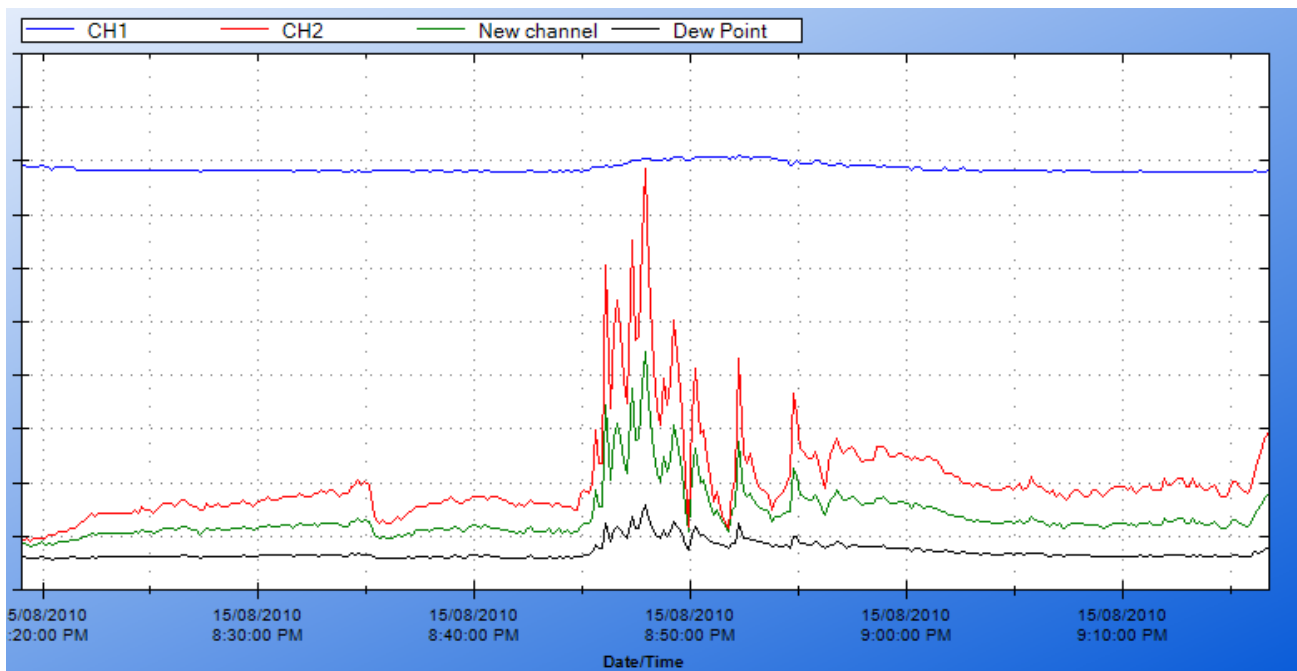
### To Zoom In:

Press down the mouse at a spot of the plot, drag the mouse to make a rectangle, release the mouse. The plot will be zoomed into the enclosed area:

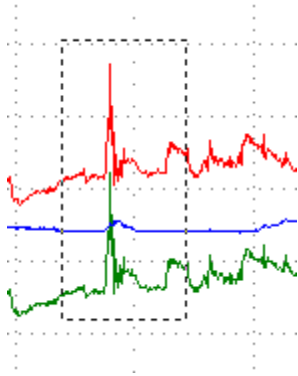
Before Scale Zoom:



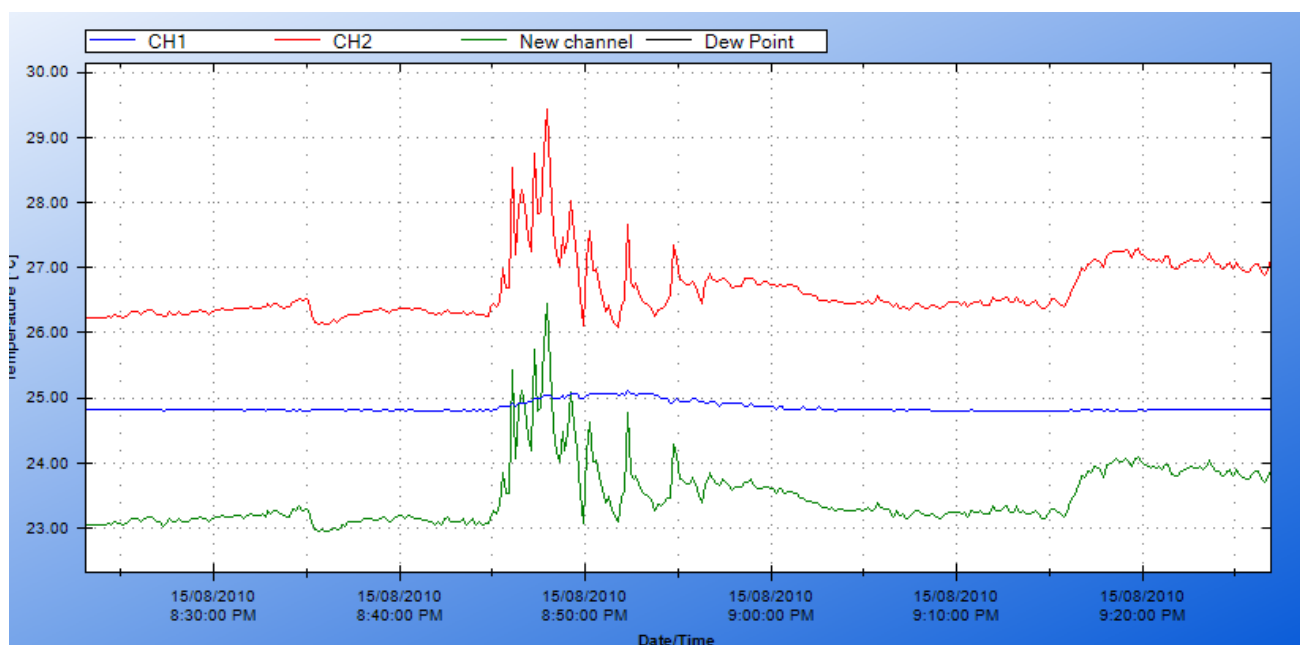
After Scale Zoom:



Before Box Zoom:



After Box Zoom:



## Zoom Previous/Unzoom All

Click to restore the axes' scales to the previous view.

## Zoom First

Click to restore the axes' scales to the first view.

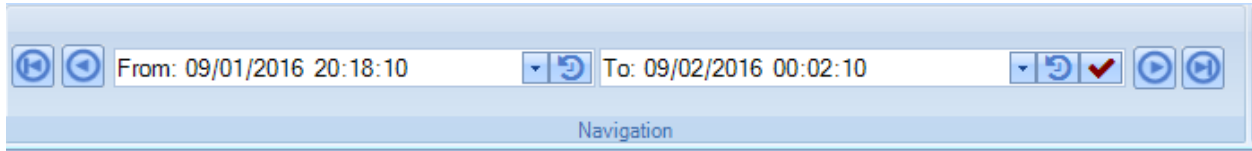
## Zoom Next

Click to zoom to the next view.

## Zoom Last

Click to zoom to the last view.

## Navigate / Time-Zoom



You use the above fields to navigate the graph to a specific time frame.

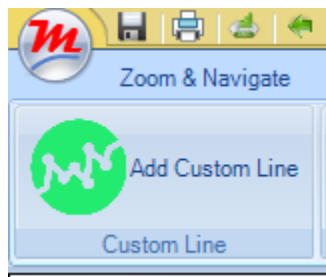
## Add Custom Lines

---

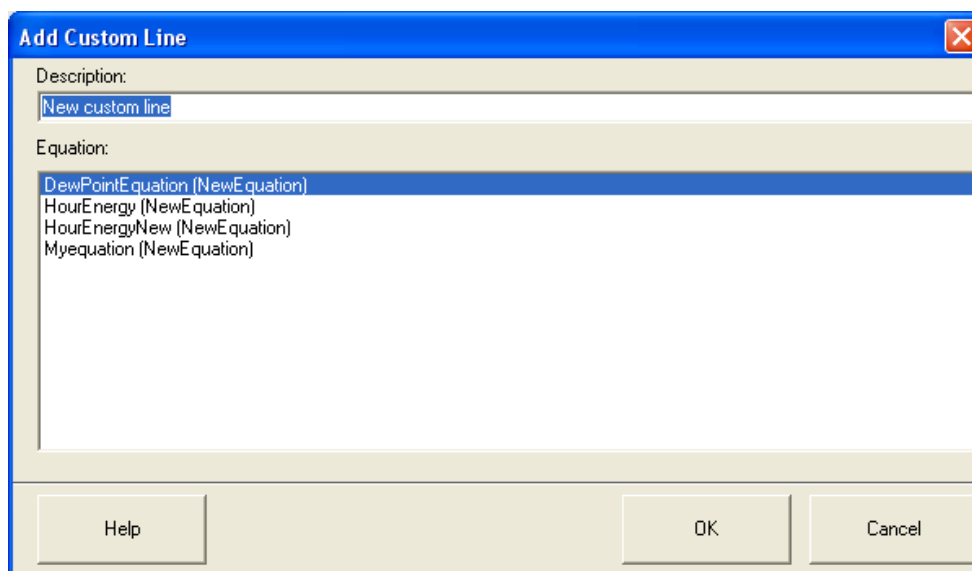
A custom Line is a line/curve that can be added to the plot and resolves its line values from the existing lines in the plot. For example, if there are two lines representing voltage and current readings, you can add the third line representing the power consumption for the current time frame.

**To add a custom Line:**

- ❑ Click **Add Custom Line** menu item under **Tools** menu:



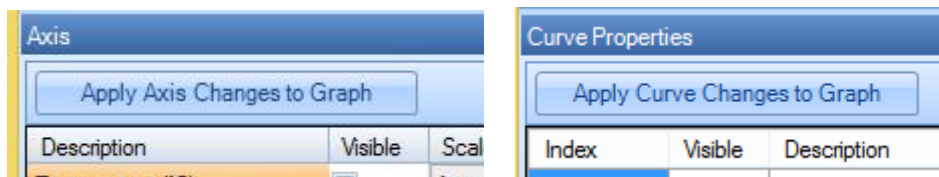
- ❑ Choose an equation in **Add Custom Line** dialog and click **OK** button:



## Other Features of Plot

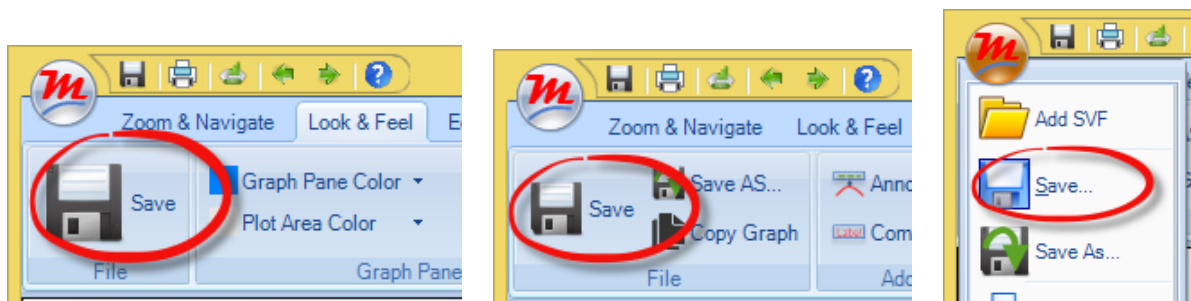
### Apply Changes to Graph

In both Axis and Curve tabs, after you changed the settings you need to click Apply Changes button to apply the changes to the graph:



### Save Changes to SVF File

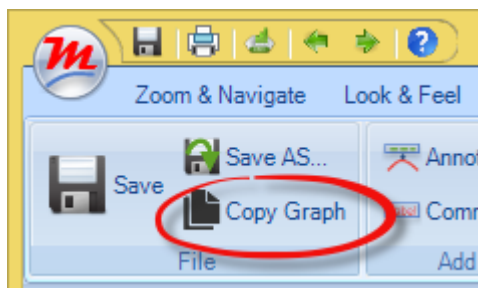
In multiple places, you can find “Save” buttons:



They are used to save the changes in the graph to the SVF file.

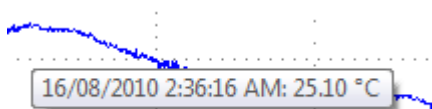
## Copy Graph to Clipboard

The plot view can be copied to the clipboard by clicking on **Copy Graph** button:

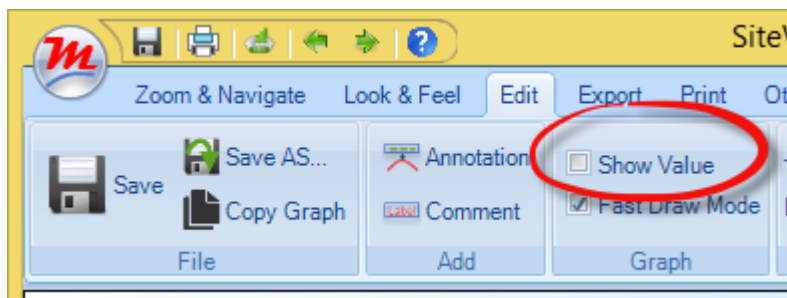


## Show Value

If you turn on **Show Value**, when the mouse is hovering on any data point on the plot the time and the value will be displayed in the tip box:

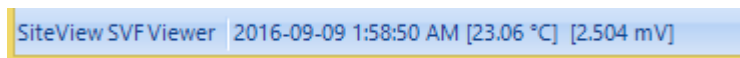


To toggle on/off **Show Value** property, check/uncheck **Show Value** check box:



## View Mouse-Point Values

When the mouse is moving on the plot area, the status bar of the plot window will display each line's value at the time stamp where the mouse is pointing at:



## Fast Draw Mode

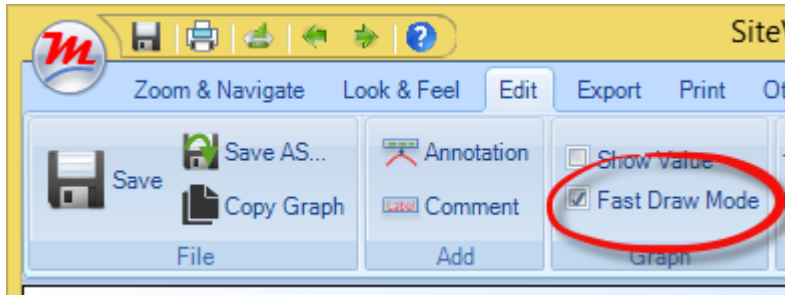
If the plot is in **Fast Draw Mode**, the plot will figure out the appropriate number of points to draw based on the current view port size. This will save dramatic drawing time if the plot contains big amount of data points.

---

**Note:** In Fast Draw Mode, there is a chance where some spike data points may be missed out.

---

To toggle on/off **Fast Draw Mode**, check/uncheck **Fast Draw Mode** check box:





# CHAPTER 15 - EQUATION REFERENCES

## C# Language Source Code References

### Basic data types

Name	Description	Size (byte)
int	Signed Integral type	4
uint	Unsigned integral type	4
short	Signed short integral type (-32768 to + 32767)	2
ushort	Unsigned short integral type (0 to 65535)	2
long	Signed long integral type	8
ulong	Unsigned long integral type	8
double	64-bit floating point type	8
float	32-bit floating point type	4
String/string	A sequence of zero or more Unicode characters.	
Byte/byte	0 – 255 integral value	1
Char/char	Unicode character	2
Boolean/bool	Boolean type (true or false)	
enum	Enumeration type	
Object/object	Any type	

### Basic Operators

Name	Description	Example
.	The dot operator (.) is used for member access. The dot operator specifies a member of a type or namespace	Class1.y = 1;
()	Parentheses specify the order of operations in an expression. Parentheses are used to specify casts, or type conversions	Y = (1 + 2) / 3; double value1 = 1.5; int value2 = (int) value1;
[]	Square brackets ([]) are used for arrays, indexers, and attributes. They can also be used with pointers.	Int [] array = new int[5];
++	The increment operator (++) increments its operand by 1. The increment operator can appear before or after its operand:	Int i = 0; I++;
--	The decrement operator (--) decrements its	Int I = 0;

	operand by 1.	i--;
new	Used to create objects and invoke constructors	Class1 c = new Class1();
+	<p>The <b>+</b> operator can function as either a unary or a binary operator.</p> <p>Unary <b>+</b> operators are predefined for all numeric types. The result of a unary <b>+</b> operation on a numeric type is just the value of the operand.</p> <p>Binary <b>+</b> operators are predefined for numeric and string types. For numeric types, <b>+</b> computes the sum of its two operands. When one or both operands are of type string, <b>+</b> concatenates the string representations of the operands.</p>	<pre>Int a; a = 5 + 5;</pre>
-	The <b>-</b> operator can function as either a unary or a binary operator.	<pre>Int a; a = 5 - 5;</pre>
!	The logical negation operator ( <b>!</b> ) is a unary operator that negates its operand. It is defined for <b>bool</b> and returns <b>true</b> if and only if its operand is <b>false</b> .	<pre>bool val = true; if(!val) { }</pre>
~	The <b>~</b> operator performs a bitwise complement operation on its operand, which has the effect of reversing each bit	<pre>byte a = 0x10; a = ~a;</pre>
&	<p>The <b>&amp;</b> operator can function as either a unary or a binary operator.</p> <p>The unary <b>&amp;</b> operator returns the address of its operand.</p> <p>Binary <b>&amp;</b> operators are predefined for the integral types and <b>bool</b>. For integral types, <b>&amp;</b> computes the logical bitwise AND of its operands. For <b>bool</b> operands, <b>&amp;</b> computes the logical AND of its operands; that is, the result is <b>true</b> if and only if both its operands are <b>true</b>.</p>	<pre>byte a = 0x10; a = a &amp; 0x01;</pre>
*	The multiplication operator ( <b>*</b> ), which computes the product of its operands. Also, the dereference operator, which allows reading and writing to a pointer.	<pre>int a = 1; a = 5 * 10;</pre>
/	The division operator ( <b>/</b> ) divides its first operand by its second. All numeric types have predefined division operators.	<pre>int a; a = 10 / 5;</pre>
%	The modulus operator ( <b>%</b> ) computes the remainder after dividing its first operand by its second. All numeric types have predefined modulus operators.	<pre>int a ; a = 10 % 5;</pre>
<<	The left-shift operator ( <b>&lt;&lt;</b> ) shifts its first operand left by the number of bits specified by its second operand.	<pre>int a = 10; a &lt;&lt;= 8;</pre>
>>	The right-shift operator ( <b>&gt;&gt;</b> ) shifts its first operand	<pre>int a = 10;</pre>

	right by the number of bits specified by its second operand.	<code>a &gt;&gt;= 1;</code>
<code>&lt;</code>	All numeric and enumeration types define a "less than" relational operator ( <code>&lt;</code> ) that returns <b>true</b> if the first operand is less than the second, <b>false</b> otherwise.	<code>int a = 1; if(a &lt; 2) {  }</code>
<code>&gt;</code>	All numeric and enumeration types define a "greater than" relational operator ( <code>&gt;</code> ) that returns <b>true</b> if the first operand is greater than the second, <b>false</b> otherwise.	<code>int a = 1; if(a &gt; 2) {  }</code>
<code>&lt;=</code>	All numeric and enumeration types define a "less than or equal" relational operator ( <code>&lt;=</code> ) that returns <b>true</b> if the first operand is less than or equal to the second, <b>false</b> otherwise.	<code>int a = 1; if(a &lt;= 2) {  }</code>
<code>&gt;=</code>	All numeric and enumeration types define a "greater than or equal" relational operator, <code>&gt;=</code> that returns <b>true</b> if the first operand is greater than or equal to the second, <b>false</b> otherwise.	<code>int a = 1; if(a &gt;= 2) {  }</code>
<code>==</code>	For predefined value types, the equality operator ( <code>==</code> ) returns true if the values of its operands are equal, <b>false</b> otherwise. For reference types other than string, <code>==</code> returns <b>true</b> if its two operands refer to the same object. For the <b>string</b> type, <code>==</code> compares the values of the strings.	<code>int a = 1; if(a == 2) {  }</code>
<code>!=</code>	The inequality operator ( <code>!=</code> ) returns false if its operands are equal, true otherwise. Inequality operators are predefined for all types, including string and object. User-defined types can overload the <code>!=</code> operator.	<code>int a = 1; if(a != 2) {  }</code>
<code>&amp;</code>	The <code>&amp;</code> operator can function as either a unary or a binary operator.  Binary <code>&amp;</code> operators are predefined for the integral types and <b>bool</b> . For integral types, <code>&amp;</code> computes the logical bitwise AND of its operands. For <b>bool</b> operands, <code>&amp;</code> computes the logical AND of its operands; that is, the result is <b>true</b> if and only if both its operands are <b>true</b> .	<code>int a = 1; a = a &amp; 0x03;</code>
<code>^</code>	Binary <code>^</code> operators are predefined for the integral types and <b>bool</b> . For integral types, <code>^</code> computes the bitwise exclusive-OR of its operands. For <b>bool</b> operands, <code>^</code> computes the logical exclusive-or of its operands; that is, the result is <b>true</b> if and only if exactly one of its operands is <b>true</b> .	<code>byte a = 0xf8; a = a ^ 0x3f; (a = 0xc7 )</code>

	Binary <b> </b> operators are predefined for the integral types and <b>bool</b> . For integral types, <b> </b> computes the bitwise OR of its operands. For <b>bool</b> operands, <b> </b> computes the logical OR of its operands; that is, the result is <b>false</b> if and only if both its operands are <b>false</b> .	byte a = 1; a = a   2; (a = 3)
&&	The conditional-AND operator ( <b>&amp;&amp;</b> ) performs a logical-AND of its <b>bool</b> operands, but only evaluates its second operand if necessary.	byte a = 1, b = 0; if(a == 1 && b == 0) {  }
	The conditional-OR operator ( <b>  </b> ) performs a logical-OR of its <b>bool</b> operands, but only evaluates its second operand if necessary.	byte a = 1, b = 0; if(a == 1    b == 0) {  }
=	The assignment operator ( <b>=</b> ) stores the value of its right-hand operand in the storage location, property, or indexer denoted by its left-hand operand and returns the value as its result. The operands must be of the same type (or the right-hand operand must be implicitly convertible to the type of the left-hand operand).	byte a = 1, b; b = a;
+=	The addition assignment operator.	int a = 1; a += 2; (a = 3)
-=	The subtraction assignment operator.	int a = 1; a -= 1; (a = 0)
*=	The binary multiplication assignment operator.	int a = 2; a *= 5; (a = 10)
/=	The division assignment operator.	int a = 20; a /= 5; (a = 4)
%=	The modulus assignment operator.	int a = 20; a %= 2; (a = 0)
&=	The AND assignment operator.	byte a = 0x0f; a &= 0xf0; (a = 0)
=	The OR assignment operator.	byte a = 0x0f; a  = 0xf0; (a = 0xff)

<code>^=</code>	The exclusive-OR assignment operator.	byte a = 0x0f; a ^= 0xf0; (a = 0xff)
<code>&lt;&lt;=</code>	The left-shift assignment operator.	byte a = 0x0f; a <<= 4; (a = 0xf0)
<code>&gt;&gt;=</code>	The right-shift assignment operator.	byte a = 0x0f; a >>= 1; (a = 0x07)

## Basic Math Methods

Name	Description	Example
Abs	Returns the absolute value of a specified number	int a = -10; a = Math.Abs(a);
Acos	Returns the angle whose cosine is the specified number.	
Asin	Return the angle whose sine in the specified number.	
Atan	Returns the angle whose tangent is the specified number.	
Cos	Returns the cosine of the specified angle.	
Exp	Return e raised to the specified power.	double a ; a = Math.Exp(1);
Floor	Returns the largest integer less than or equal to the specified number.	double a; a = Math.Floor(2);
Log	Returns the logarithm of a specified number.	double a; a = Math.Log(2);
Log10	Returns the base 10 logarithm of a specified number.	double a; a = Math.Log10(2);
Max	Returns the larger of two specified numbers.	int a = Math.Max(1,2);
Min	Returns the smaller of two numbers.	int a = Math.Min(1, 2);
Pow	Returns a specified number raised to the specified power.	double a = Math.Pow(10,2);
Round	Rounds a value to the nearest integer or specified number of decimal places.	
Sign	Returns a value indicating the sign of a number.	
Sin	Returns the sine of the specified angle.	
Sinh	Returns the hyperbolic sine of the specified number.	
Sqrt	Returns the square root of a specified	

	number.	
Tan	Returns the tangent of the specified angle.	
Tanh	Returns the hyperbolic tangent of the specified angle.	
Truncate	Calculates the integral part of a number.	

## Accessible Objects

---

When you write a custom equation, the following objects can be accessed:

For Custom Equation:

Name	Description
this	Current logger object.
Channels	The collection of all channels.
Channels[x]	The channel object specified by the index x.
this.Channels	Same as Channels.
this.CurrentChannel	The current channel object.
this.Description	The description of the current logger object.
this.StartTime	The data start time in DateTime data type.
this.EndTime	The data end time in DateTime data type.
this.NumberOfSamples	The total number of samples the logger contain.
this.SampleInterval	The sampling interval in second the logger has.
this.SerialNumber	The serial number of the logger in string data type.
this.Channel[x].CaliLow	The low calibration value of the specified channel.
this.Channels[x].CaliHigh	The high calibration value of the specified channel.
this.Channels[x].ChannelHighScale	The high scale value of the specified channel.
this.Channels[x].ChannelLowScale	The low scale value of the specified channel.
this.Channels[x].ChannelType	The channel type of the specified channel.
this.Channels[x].Description	The description of the specified channel.
this.Channels[x].DigitValue	The digital value of the specified channel.
this.Channels[x].Enabled	If the specified channel is enabled or disabled.
this.Channels[x].Index	The index of the specified channel.
this.Channels[x].Measurement	The physical measurement of the specified channel.

For Custom-Line Equation:

Name	Description
this	Current logger object.
Lines	The collection of all lines.
Lines[x]	The line object specified by the index x.
this.Description	The description of the current logger object.
this.StartTime	The data start time in DateTime data type.
this.EndTime	The data end time in DateTime data type.
this.NumberOfSamples	The total number of samples the logger contain.

this.SampleInterval	The sampling interval in second the logger has.
this.Linesl[x].Value	The physical measurement of the specified line.

## Equation Examples

---

### Dew Point Temperature

The dew point temperature is the temperature at which the air can now longer hold all of its water vapour, and some of the water vapour must condense into liquid water.

Because dew point temperature can be derived from the relative humidity and the temperature readings, the following equation can be used for the dew point temperature measurement.

This equation is for Site-Log LRHT-1/2 data logger. In the Logger Configuration dialog, add a new custom channel to the logger and apply this equation to the channel.

```
// A custom equation for dew point temperature.
// Condition:
//     channel#0 of the logger must be for temperature.
//     channel#1 of the logger must be for relative humidity.
//     both channels must be enabled.
public double DewPointEquation(double Input)
{
    double logEx, dew_point, rh, temperature;
    temperature = Channels[0].Measurement;
    rh = Channels[1].Measurement;

    logEx = 0.66077 + 7.5 * temperature / (237.3 + temperature) +
(Math.Log10(rh) - 2);
    dew_point = (logEx - 0.66077) * 237.3 / (0.66077 + 7.5 - logEx);
    return dew_point;
}
```

### Carbon Dioxide Transmitter (0 – 5000 PPM)

This equation is for a CO2 transmitter with the following specifications:

Measurement Range: 0– 5000 PPM of CO2  
Output 0 – 10 VDC

This equation can be used on 0 – 10 VDC or 0 – 20 VDC channel.

```
//A custom equation for CO2 transmitter
// Transmitter specifications
//     Measurement Range: 0 - 5000 PPM
//     Output: 0 - 10 VDC
public double CO2Equation(double Input)
{
    double output;
    output = 5000 * Input / 10;
    return output;
}
```

## External Thermistor

This equation can be used for any of the external channel of LRTH-1 data logger. The logger has seven external thermistor channels that can accommodate any kind of thermistors.

The key parameters in this equation are a, b and c coefficients that can be obtained from the thermistor manufacturer. You may change them based on the thermistor type you are using.

```
//A custom equation for thermistor temperature
public double ExtThermistor2(double Input)
{
    //digit value must be 65534
    double dig_range = 65535;
    //load resistor must be 10000 ohm
    double load_resistor = 10000;
    double a, b, c, lgr, Output = 0;
    //different thermistor will have different a, b, c values
    a = 0.001028444; ;
    b = 0.000239244;
    c = 0.000000156;

    Output = CurrentChannel.DigitValue;

    if (Input >= dig_range)
        Output = dig_range - 1;
    if (Input < 1)
        Output = 1;

    double Rt = load_resistor * Output / (dig_range - Output);

    lgr = Math.Log(Rt);

    Output = 1f / (a + b * lgr + c * lgr * lgr * lgr) - 273.15f;

    return Output;
}
```

## Previous Hour Average

This equation can be used to calculate the averaged value for the previous hours. It can be easily modified for a day or other time frame averages.

```
DateTime CurrentTime;
bool FirstIn = true;
int HourIndex = 0;
double AverageValue = 0;
double SumValue = 0;
int PreviousHour = 0;
//Equation to calculate the average value of the previous hour
public double HourAverage(double Input)
{
    //first time get in this function, initialize some variables.
```



```

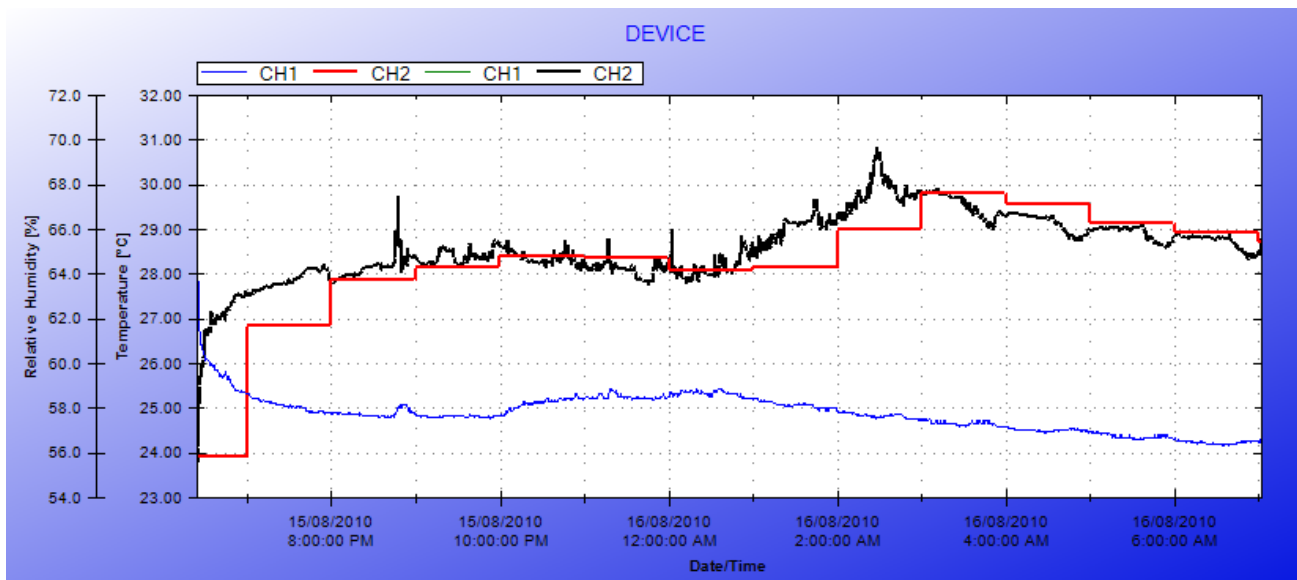
if (FirstIn)
{
    FirstIn = false;
    SumValue = Input;
    AverageValue = Input;
    PreviousHour = this.StartTime.Hour;
    CurrentTime = this.StartTime;
}
else
{
    CurrentTime = CurrentTime.AddSeconds(this.SampleInterval);
    if (CurrentTime.Hour != PreviousHour)
    {
        PreviousHour = CurrentTime.Hour;
        AverageValue = SumValue / HourIndex;
        SumValue = 0;
        HourIndex = 0;
    }

    SumValue += Input;
}

HourIndex++;
//Average value of the previous hour.
//Note: the first hours value is always the first reading
return AverageValue;
}

```

The following figure illustrates the result after the above equation is applied:



Note the red curve is the hour average of the black curve.