

***FlowVision*2.0**

User Manual

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Welcome to FlowVision 2.0™!

Introduction

FlowVision 2.0™ is a graphic based software package that enables you to operate any Alicat flow or pressure instrument via a graphical user interface. FlowVision 2.0™ is the latest version of Alicat Scientific's FlowVision™ software, and can be used to:

- Access information from your Alicat instruments
- Make configuration changes to your Alicat instruments
- Monitor performance
- Log data
- Chart data
- Script/automate device operations
- Communicate directly with the unit via a terminal window

✓ *Note: Identifiers and scripts from earlier versions of FlowVision™ are not recognized by FlowVision 2.0™*

System requirements

- Microsoft Windows Vista, Windows 7, Windows 8/8.1, Windows 10
- Microsoft .NET Core 3.1*
- An internet connection (if installing via web)
- Serial port**

* Microsoft .NET Core 3.1 can be downloaded at: <https://dotnet.microsoft.com/download/dotnet/3.1/runtime>

**Some laptops are not equipped with serial ports. A virtual serial port can be created using a USB to serial adapter.

Section 1: Getting started with FlowVision 2.0™

In this section, you will learn how to install and start using FlowVision 2.0™ on the computer you will use to communicate with your Alicat device.

Installing the software

- ✓ *Note: On some newer versions of Windows, an additional security feature must be bypassed before starting installation. When a window saying “Windows protected your PC” is displayed, click “More info” below the warning text to display the “Run Anyway” button. Click “Run Anyway” to continue.*
 - ! *Caution: Do not turn off or restart the computer during the installation process, as this will cause FlowVision 2.0™ to not install properly and may damage your computer.*
1. Using a computer with internet connection, open a browser and visit the FlowVision™ software page on the Alicat Scientific website, located here: <https://www.alicat.com/models/flow-vision-software/>
 2. Scroll down to the “Downloads and System Requirements” section and download the latest version of FlowVision 2.0™ that is supported by your operating system. Your file will be saved as a .ZIP or a .EXE.
 - a. **If the downloaded file is a .EXE:** Double-click the .EXE file starting with “Setup_FlowVision2.0”.
 - b. **If the downloaded file is a .ZIP:** First, open the folder containing the ZIP file. Then, right-click on the ZIP file, select “Extract all...”, and choose a file destination for the extracted files. Finally, double-click the .EXE file starting with “Setup_FlowVision2.0”.
 3. When the FlowVision 2.0™ Installer screen appears, click “Next”. The “End User License Agreement” will be shown. Please read the agreement carefully and if you agree to the terms, mark “I agree”. Then click “Next” to continue.
 4. The next screen will ask which directory you would like to install the FlowVision 2.0™ software into. By default, the program will create a program folder and subfolder in the “AppData” folder in your user directory. Click “Next” to proceed to the next step. If you are using a computer at your company and are unsure of the appropriate location for installation, please request assistance from your company’s IT department.
 5. The next screen will inform you that FlowVision 2.0™ is ready to be installed. You can take this opportunity to go back and make changes or cancel the installation. Once you are satisfied with your choices, click “Next” to continue with the installation.
 6. When the installation process is complete, a screen will appear indicating FlowVision 2.0™ has been successfully installed on your computer. To exit this screen and the installation process, click “Close”.

Launching FlowVision 2.0™

To start the FlowVision 2.0™ program, select the FlowVision 2.0™ program shortcut from the Start Menu: Start > Alicat Scientific > FlowVision 2.0

If “Alicat Scientific” does not show in the Start Menu list of applications, it may be displayed under “(Default)” on the top of the start menu: Start > (Default) > FlowVision 2.0

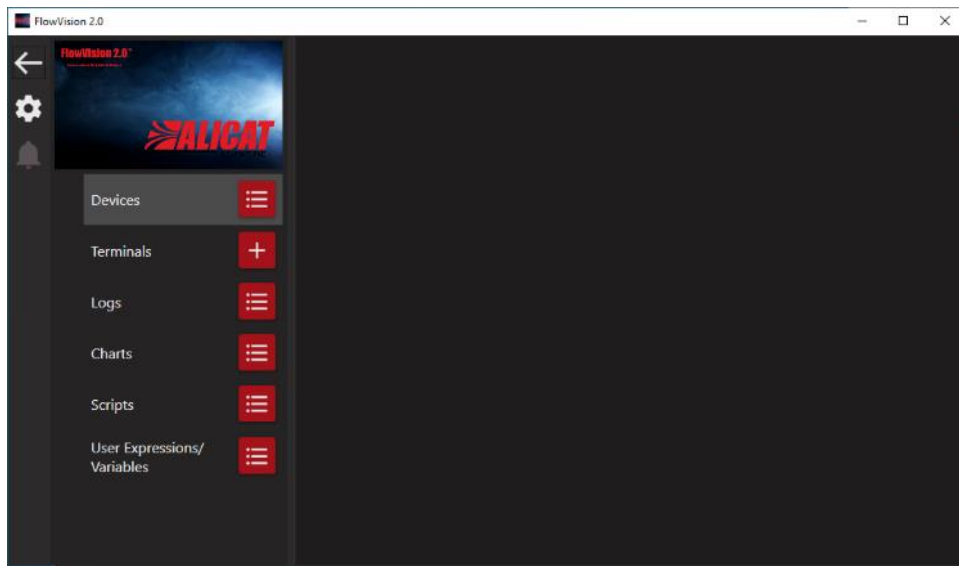
- ✓ *Note: The first launch of FlowVision 2.0™ may be slow as the application will gather information about the available COM ports on your computer. All subsequent launches of the program will load more quickly.*

Section 2: Setting up the FlowVision 2.0™ layout

FlowVision 2.0™ is a modular program with several options for screen configurations, enabling you to customize the layout to best suit your needs. In this section, you will learn about the layout of the workspace and available functions.

Module panel

When FlowVision 2.0™ is started for the first time, the program will display a panel of modules on the left-hand side (see right). These modules are the main components of the software that will allow you to interact with your Alicat instruments.



Collapsing and expanding the module panel

The module panel can be collapsed at any time to give you some extra room in the main workspace.

- **To collapse the module panel**, click the left-facing arrow at the top of the panel. The arrow icon will transform into a menu icon.
- To expand the panel out again, click the menu button at the top of the panel.

Viewing and hiding module entries

Each module has a module title and a manage button (red icon to right of module title).

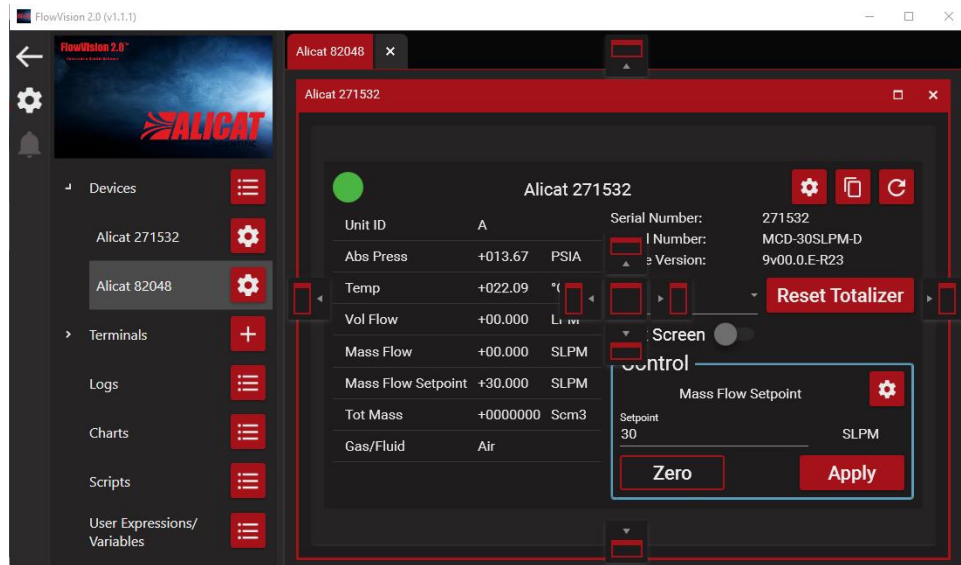
- **To add/remove an entry to/from a module**, click the **red list icon** to the right of the module title. This will open the **Manage Devices** window where you can manage the module's entries. You can use the **Manage Devices** window to add your own Alicat devices (see section 3).
- **To view or hide the list of entries under a module**, click its module title (i.e. **Devices**).

Tabs/Workspace

To quickly demonstrate the workspace, we will add two Alicat demo devices with different measurement types (**Alicat 271532** and **Alicat 82048**). Note that some functions and features may appear different or be entirely missing from your screen, depending on your Alicat model and settings.

The main workspace is found to the right of the module panel. This is where the information for each module entry is displayed. When multiple module entry windows are opened at once, the workspace will organize them into tabs that can be separated or closed individually.

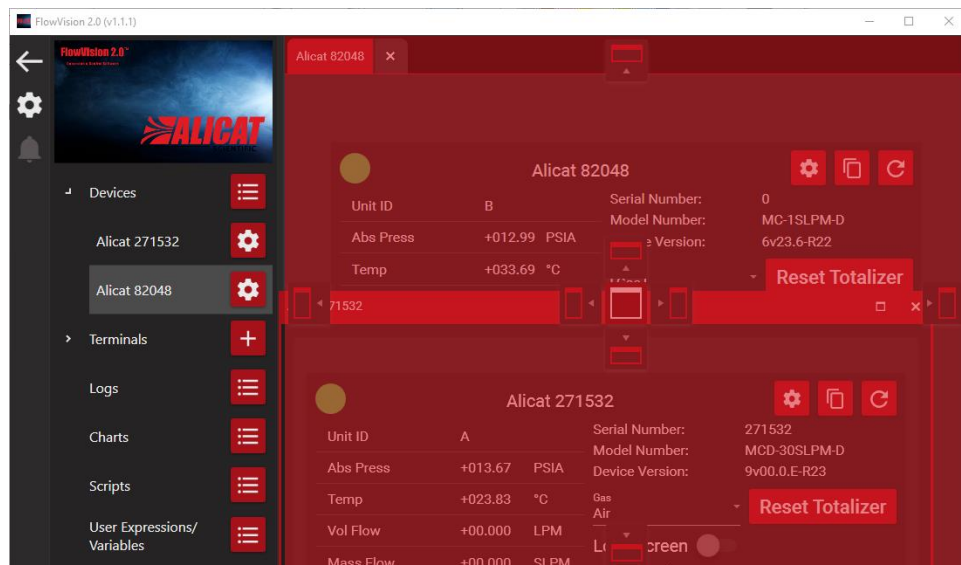
- **To open a module entry window**, click its title in the module panel. This will add a corresponding tab to the top of the workspace. You can then view the entry by clicking the tab, or by clicking its name in the module list.
- **To close an entry window**, click the white X (close) icon to the right of the tab's title. You can reopen the tab at any point by clicking the module entry.
- **To separate an entry window**, click and drag the tab's title away from the other tabs until the window breaks apart and floats on its own (see below for arranging separated windows).



Arranging and docking module entries

Separated module entry windows can be individually maximized, resized, docked to a side of the screen, or re-attached to the tabs group.

- **To dock a separated window to a side of the screen**, click the window's title and drag it around the main workspace area. An overlay with available docking options will appear in the middle of your screen. Drag the window over the floating icon in the location you want to dock to. When the floating icon turns white and the background behind it turns red, you can release the mouse to drop the window into that dock.
- **To re-attach the window to the tabs group at the top of the workspace**, drop the window onto the floating icon at the top center of your screen.



Section 3: Communicating with a device

In this section, you will learn about the various ways you can communicate with an Alicat device in FlowVision 2.0™. To communicate with your device, you will need to connect your Alicat instrument to your computer. You can connect your Alicat using an Alicat accessory cable MD8DB9, or you can make a cable ([directions in the Alicat instrument manual](#)).

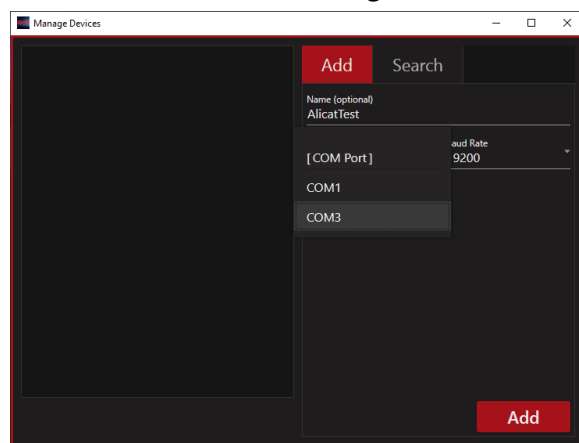
Connecting to an instrument and receiving data

To start using FlowVision 2.0™ with an instrument, you will need to add the instrument to the **Devices** module list. There are two ways to add devices to FlowVision 2.0™.

Option 1: Adding a device on a known COM port

If you are adding a single device on a known COM port, use this option.

1. With your device connected to your computer and powered up, click the **red list icon** to the right of the **Devices** module title to bring up the **Manage Devices** window.
2. Make sure the **Add** tab is highlighted. Then use the dropdown menus to specify which COM port your device is attached to and the baud rate of the device.
3. By default, the device name will be the value of the device's ID, model, and serial number. You can add a custom name if you prefer ([see page 10](#)). The device should now appear as an entry under the **Devices** module.



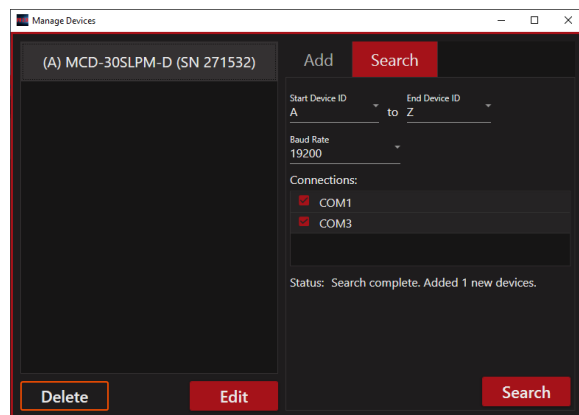
Alicat devices use a default baud rate of 19200, unless otherwise specified. If your computer has a built-in serial port, it will typically be registered as **COM1**. USB to serial adapters will determine the next available COM port name and register it as such (**COM3** in this example).

If the device cannot be detected by FlowVision 2.0™, a new window will appear asking if you still want to add the device or cancel. If the device is properly connected to the computer, but is still not showing up in the **Devices** module, try searching for the device instead.

Option 2: Searching for devices

If you have multiple devices or you are unsure which port your device is connected to, use this option.

1. With your device connected to your computer and powered up, click the **red list icon** to the right of the **Devices** module title to bring up the **Manage Devices** window.
2. With your device connected to your computer and powered up, click the **red list icon** to the right of **Devices** to bring up the **Manage Devices** window.
3. Select the **Search** tab at the top of the window, then click **Search** at the bottom right of the window to begin searching for available devices. The status box will show the current progress of the search, and will display when a device has been found and is being added. **(Optional)** You can define a starting and ending range of IDs to search, COM ports to search, and the baud rate for the connected interface.



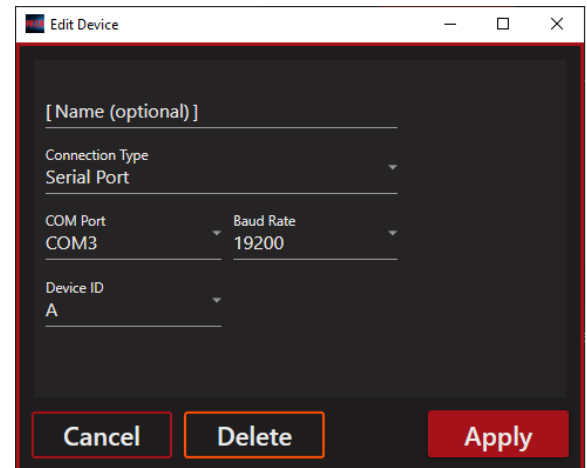
- When the search is complete, the status will display the number of new devices added. Each device should now appear as an entry under the **Devices** module. By default, the device name will be the value of the device's ID, model, and serial number. To rename a device, [see page 10](#).

Alicat devices use a default baud rate of 19200, unless otherwise specified. If your computer has a built-in serial port, it will typically be registered as **COM1**. USB to serial adapters will determine the next available COM port name and register it as such (**COM3** in this example).

Renaming a device

To change a device name from the default:

- Highlight the device in the **Devices** module list and click the **red gear icon** to the right to open the **Edit Device** window.
- You can change the device's name from the default value by typing a new name into the **Name (optional)** field.
- Click **Apply** when finished.



Removing a device

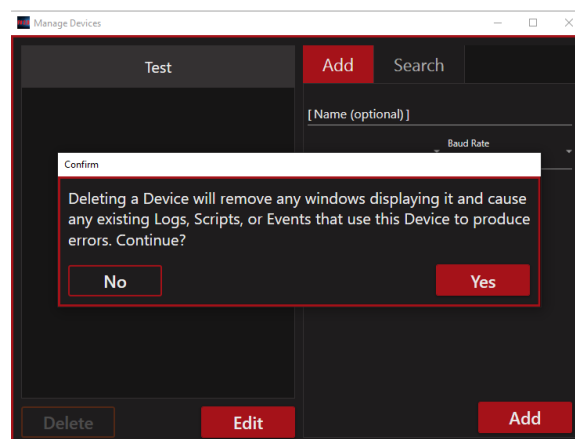
You can remove a device from the **Devices** module using either the **Manage Devices** window or the **Edit Device** window.

Removing a device using the Manage Devices window

- Click the **red list icon** to the right of the **Devices** module title to open the **Manage Devices** window. All available devices will be displayed.
- Highlight the device you wish to remove, and click the orange **Delete** button. Before you can delete a device, a warning will display on your screen. Click **No** to cancel or **Yes** to delete the device.

Removing a device using the Edit Device window

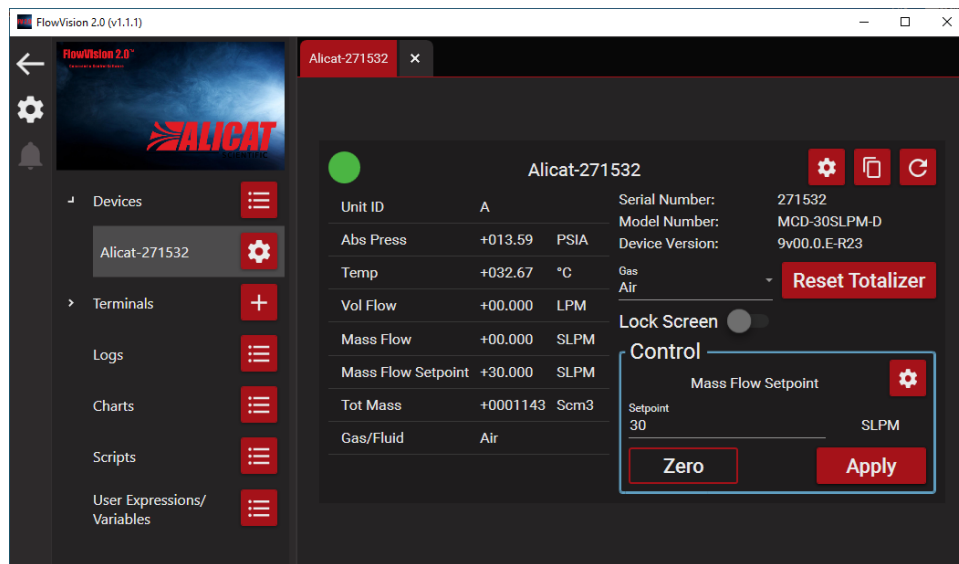
- Find the device you wish to remove in the **Devices** module list. Click the **red gear icon** to the right of the device entry to open the **Edit Device** window.
- Verify this is the device you want to remove, then click the orange **Delete** button. Before you can delete a device, a warning will display on your screen. Click **No** to cancel or **Yes** to delete the device.



Opening a device window

To open a device window, click a device's name under the **Devices** list in the module panel. This will open a new tab if one isn't yet open, and will focus to the tab if it is already open.

- When the status indicator (colored circle) is green, the window is receiving and displaying live data from the device.
- The left side of the window shows live measurements being made by the instrument.
- The right side has buttons that you can use to control the instrument.



Changing gas type using Gas Select™

To change the gas type being measured by the instrument:

1. Select your device from the **Devices** module list to open the **Device Window**.
2. Click the drop down menu under **Gas** and scroll down until you see the gas that you will be flowing. Select the gas. Your chosen gas should now be displayed in the drop down menu.

! **Caution:** Do not flow gases that are not on the gas list without factory approval. Doing so will void your warranty and may cause permanent damage to your flow instrument.

✓ **Note:** If you do not see the gas you will be flowing on the list, please contact the factory before proceeding to verify if your unit is compatible with the gas.

Resetting the totalizer

Some devices are equipped with a totalizer to track the total mass and volume flowed through the instrument. If your Alicat instrument is equipped with a totalizer, the **Reset Totalizer** button will appear to the right of the **Gas** dropdown in the **Device Window**.

- To reset the totalizer, click **Reset Totalizer**. The value will reset immediately, without confirmation.

Locking/Unlocking the screen

If your Alicat device is equipped with a screen, it can be locked and unlocked using FlowVision 2.0™. The **Lock Screen** option is located below the **Gas** dropdown menu in the **Device Window**.

- To lock/unlock the screen, toggle the **Lock Screen** button. When the button is active (red), the lock is enabled and the instrument will display LCK on its screen. When the button is inactive (gray), the screen is unlocked.

Taring your device

The tare function is used to set the zero on the instrument. This is located in the **Device Window**.

! *Caution: Tare only when there is no gas flow going to the unit.*

Tare function on meters

The **Zero** button is located to the right of the **Lock Screen** toggle button.

- To tare the meter, click the **Zero** button. Taring will occur immediately.

Tare function on controllers

The **Zero** button is located to under the **Control** section of the advanced settings (see more below).

- To tare the controller, click the **Zero** button. Taring will occur immediately.

The tare function is discussed in detail in the instruction manual for your instrument.

Control section (controllers only)

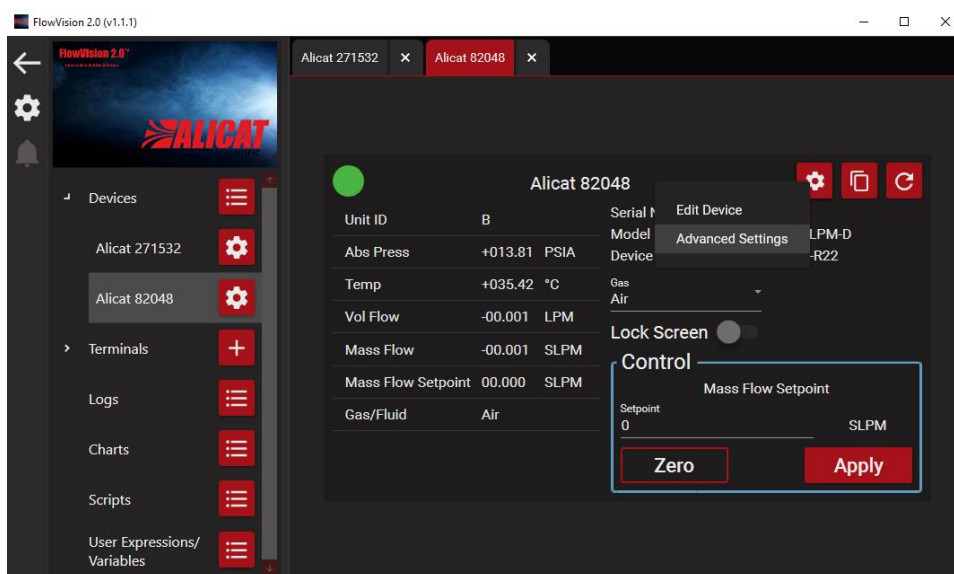
The control section allows you to change the setpoint on your controller. The type of setpoint is displayed in the **Control** section located on the bottom right of the **Device Window**. In the example below, we are setting the mass flow setpoint.

- To change the setpoint, enter your desired value in the setpoint text box located below the **Control** section. Then click **Apply**.
- To immediately reset the setpoint to a value of zero, click **Zero**.

Advanced device settings

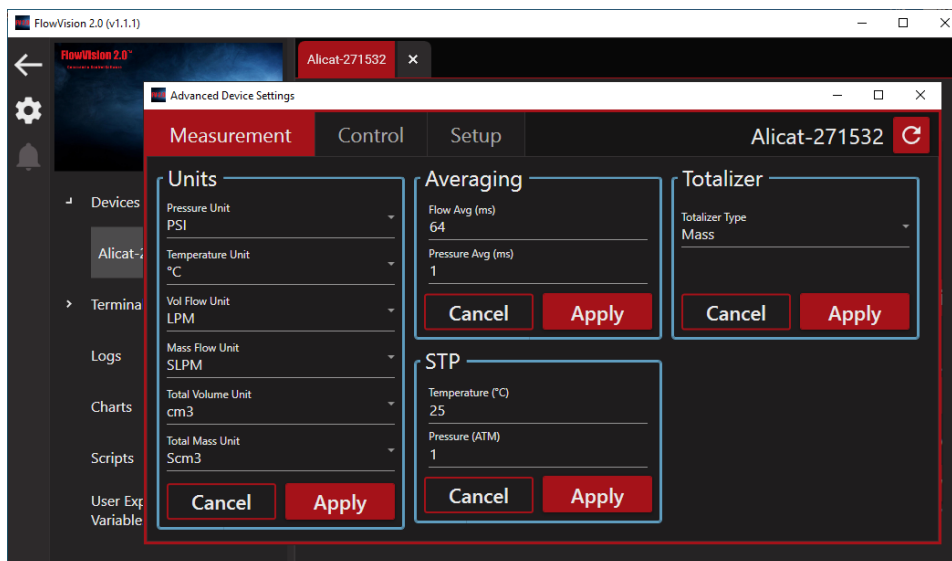
To access the advanced settings for a particular device:

1. Click the device's name in the **Devices** module list to open/focus its **Device Window**.
2. In the **Device Window**, click the **red gear icon** to the right of the device name (see below).
3. Click **Advanced Settings** to open the **Advanced Device Settings** window.



Measurement settings

The **Measurement** tab in the **Advanced Device Settings** window allows you to adjust units of measurement, averaging, and STP/NTP settings for an Alicat instrument.



Units

You can adjust the desired units for each type of measurement displayed by your Alicat instrument. By default, only related units of measurement are displayed in each dropdown menu.

- **To change the unit of measurement**, select a new unit from the dropdown menu underneath each measurement type, and click **Apply**. The device will update to display the new unit of measurement.

Averaging

Averaging the flow over a longer time may be useful in smoothing fluctuating readings. Values roughly correspond to the time constant (in milliseconds) of the averaged values. Higher numbers generate a greater smoothing effect, to a maximum of 255 ms.

- **To adjust the averaging**, set the number in the one of the **Avg** textboxes to your desired time in milliseconds (ms), and click **Apply**.

STP/NTP

If your device measures mass flow, you can adjust the STP (Standard Temperature and Pressure) or NTP (Normal Temperature and Pressure) values of a device for use in a controlled environment. When the unit of measurement for mass flow is set to a standardized unit such as SLPM, the STP settings will be displayed. However when the unit of measurement is set to a Normalized unit such as NLPM, the NTP settings will be shown instead.

- **To adjust the STP or NTP**, set the number in the **Temperature** textbox to your desired value in °C, and set the number in the **Pressure** textbox to your desired value in ATM. Then click **Apply**.

Totalizer

If your device is equipped with a totalizer, you can change its setting to measure total mass or volume.

- **To adjust the type of measurement**, click the dropdown menu under **Totalizer Type** and select either **Mass** or **Volume**, then click **Apply**. The totalizer will then begin to total the new type of measurement.

Control settings (controllers only)

The **Control** tab in the **Advanced Device Settings** window allows you to adjust the setpoint source, auto-tare function, and valve tuning of an Alicat controller.

Setpoint

You can adjust the source and the type of setpoint used by a device. The settings for adjusting setpoint are found in the **Control** section of the **Control** tab.

- **To adjust the source**, click the dropdown menu under **Setpoint Source** and select a source, then click **Apply**. The source of the setpoint will then be set to your desired value.
- **To adjust the setpoint type**, click the **Setpoint Type** dropdown menu and select a type of setpoint, then click **Apply**. The setpoint will be updated to your selected type.

PID

If you require specialized valve tuning, you may do this by adjusting the PID values of a device. Adjustment of PID values will change how the valve responds, valve stability and valve speed. The settings for adjusting setpoint are found in the **PID** section of the **Control** tab in the **Advanced Device Settings** window.

! ***Caution:** It is **strongly recommended** that adjustments to PID settings **not be made** unless you have some experience with proportional valve tuning. Changing these PID values runs the risk of **permanently damaging** device control valves.*

- **To adjust PID tuning**, click the **PID Type** dropdown menu and select the type of parameters you want to tune, either **PD/PDF** or **PDDI**. Set the new values for each parameter in the fields below, then click **Apply**.

Valve offset

Gas pressure in the system exerts a mechanical force on the control valve that, depending upon the gas pressure, may slow its response when opening from a zero setpoint. To compensate for this mechanical force, you can adjust the valve offset (or “preload”) to speed up integration time. The settings for adjusting valve offset are found in the **Valve Offset** section of the **Control** tab in the **Advanced Device Settings** window.

- **To adjust valve offset**, adjust the value of the number under the Valve Offset label, then click **Apply**.

Adjusting valve offset may help your Alicat controller respond more quickly when moving away from a zero setpoint. Valve offset is a percentage value between 0 and 100, with 0 being little to no offset and 100 being maximum offset.

Setup settings

The **Setup** settings tab is found in the **Advanced Device Settings** window of a device. This tab allows you to choose whether the setpoint and gas type values are saved to the device’s EEPROM (electronically-erasable programmable read-only memory).

1. Under the **EEPROM** section, click the button to the right of each setting to toggle it on or off. When the button is active (red), the setting will be saved to EEPROM and will be remembered when the device powers on. When the button is inactive (gray), the setting will not be saved and will reset to the default value when the device powers on.
2. Click **Apply** to apply the new settings, or **Cancel** to revert back to the original settings.

Section 4: Optional modules

FlowVision 2.0™ is a modular program, allowing you to add or remove modules based on your intended use. There are a series of optional modules for advanced options.

Terminals

The **Terminals** module allows for communication with an Alicat instrument through an ASCII terminal without leaving FlowVision 2.0™.

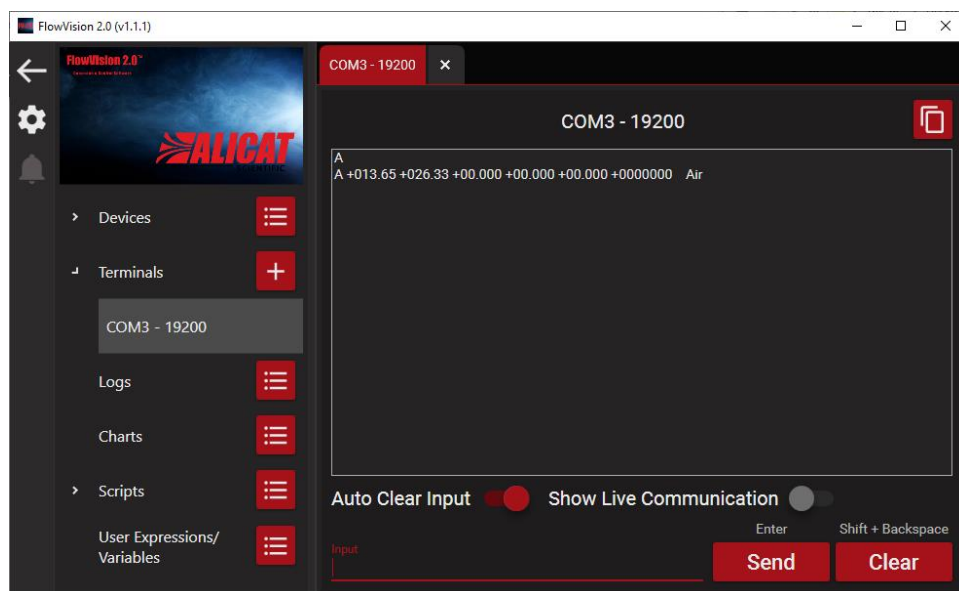
If you have any active instruments available in the **Devices** module, a new terminal will automatically be created for each COM port being used by those devices, and will be displayed under the **Terminals** module.

- **To begin a new terminal session**, click the **red plus icon** to the right of the **Terminals** module title. This will open a new terminal tab and allow you to specify the COM port you wish to connect to, and the baud rate for the device. Once you have specified a COM port and Baud Rate, click **Connect** to attempt connection to the device.

If unsuccessful, an error window will be displayed asking you to verify that the settings were entered correctly. If successful, the terminal will be assigned a default name with its COM port and baud rate displayed under the **Terminals** module.

The **Output** box is where you will see data returned from the device. This takes up the majority of the space on a terminal window. The **Input** box, located below, is where you will enter the command to be sent to the device.

- **To send a command to the device**, click **Send**.
- **To erase everything in the in the input or output box**, click **Clear**.
- **To automatically clear the input box upon entering a new command**, toggle **Auto Clear Input**.
- **To show the live communication on the serial interface**, toggle **Show Live Communication**.



You can now communicate with the instrument as you would normally via a terminal window. Please refer to your instrument's instruction manual for instructions on communicating with your device via a terminal window.

Logs

Data logs can be created to keep records of measured data over a period of time. Data logs are useful because they can be viewed outside of FlowVision 2.0™ or incorporated into an external database to create an accurate history of data received by the device.

Creating a data log

1. To create a data log, click the **red list icon** to the right of **Logs** module title to open the **Manage Logs** window. In the **[Name]** textbox, define a name for the new log and click **Add**.
2. The **Edit Log** window will appear, allowing you to configure the new log. The name you entered in the previous step will be already filled in, but can still be changed if you'd like. To the right of the **Name** textbox are four number fields that can be used to set the rate at which the logger should run.
3. Below these fields is the **Log Type** option in a dropdown menu. You can select either a **CSV File** or a **Database** to write the log data to.
 - a. If you select **CSV File**, specify a file path under **File** that your computer has permission to write to. Clicking the **red folder icon** to the right of the **File** textbox will open a window allowing you to browse for a location to save on your computer. By default, FlowVision 2.0™ will continuously write to this file, which depending on the rate and amount of data being logged, may quickly exhaust the space on your hard drive. You can also opt to split the CSV file into smaller pieces so that the data is more manageable. To do so, click the toggle button between the **No Split** and **Split Every** so that **Split Every** is highlighted, and set the rate.
 - b. If you select **Database**, you will have to specify the type of database from the dropdown menu (only Microsoft SQL Server, MySQL Server, and PostgreSQL are currently supported). Then provide a connection string with credentials for connecting to the database, and the name of the table in the database you'd like to log to. Note that since these type of logs are handled by external programs that aren't affected by file size, the splitting functionality is disabled for database types.

The screenshot shows the 'Edit Log' window. It has a title bar with 'Edit Log' and standard window controls. The main area contains the following fields and controls:

- Name:** A text box containing 'Log'.
- Rate:** Four numeric input fields for 'Days' (0), 'Hours' (0), 'Mins' (0), and 'Secs' (5).
- Log Type:** A dropdown menu currently set to 'CSV File'.
- File:** A text box containing 'C:\Users\Public\Documents\Alicat...'. To its right is a red folder icon.
- Splitting:** A toggle between 'No Split' (unselected) and 'Split Every' (selected). To the right of 'Split Every' are four numeric input fields for 'Days' (0), 'Hours' (0), 'Mins' (5), and 'Secs' (0).
- Entries:** A panel with a large empty text area and a red 'Add' button on the right.
- Buttons:** At the bottom are 'Cancel', 'Delete', and 'Apply' buttons.

Editing log entry

Beneath the options in the **Edit Log** section is the **Entries** panel, where you can add the data you wish to be logged. Each item in the **Entries** panel will be a column in the output CSV file or database table, and a timestamp of when the row was recorded will automatically be used as the value of the first column.

1. To add a new entry to the log, click **Add** on the right side of the Entries panel. The **Edit Log Entry** window will open and will allow you to define a name for the entry column, and the value of the entry.
2. If you wish to use an automatically generated name for the entry, you can click the toggle button between the **[Name]** field and **Auto Generate** label so that the **[Name]** field becomes grayed out and the **Auto Generate** label is highlighted. This will assign a name with the device's ID, serial number, and entry value type. Occasionally if the value type is too complex to generate a name automatically, an error will show asking you to manually enter a name.

3. In the **Value** section, you can define a device measurement, constant, variable, or expression to be recorded by the logger. There are many features and data values available for use by this system in highly-complex scenarios ([see pages 20-21](#)).
4. From the first dropdown menu select the measurement type you want to be recorded. For the purpose of this example, a simple **Device Measurement** of **Temperature** in **Default (°C)** will be used.
5. Then, from the **[Device]** dropdown menu, select the device you want to log data from. Once a valid device has been selected, the **[Value]** dropdown menu will be populated with data types that can be collected from the device.
6. Click the **[Value]** dropdown menu to select a value to be recorded – for our example, we are logging the **Temperature** measurement from the device.
7. In the **[Unit]** dropdown menu, the valid units of measurement will be displayed. The default unit of measurement for the given measurement type in the **[Value]** dropdown menu will automatically be selected. Select the unit of measurement you want logged, and click the **Apply** when finished. The entry will be added to the **Entries** list back in the **Edit Log** window.
8. Repeat this process for every data point you want to be recorded by the logger.
9. When you have finished adding entries, click **Apply** on the **Edit Log** window to save the log. The log will be added to the **Logs** module and can be enabled or disabled by clicking its toggle button. Note that a log will continue to run at the specified interval until stopped manually or until the program exits.

Charts

FlowVision 2.0™ allows you to create charts to display data.

1. **To create a chart**, click the **red list icon** to the right of the **Charts** module title to open the **Manage Charts** window.
2. In the **Manage Charts** window, name the chart by typing it in the **[Name]** field and clicking **Add**.
3. The **Edit Chart** window will appear, allowing you to add data series for the chart. The name you entered in the previous step will be already filled in, but can still be changed if you'd like.
4. To add a data series to the chart, click **Add** to the right of the **Series** panel. This will open a new **Edit Chart Series** window, where you can set up the data series.
5. If you wish to use an automatically generated name for the entry, you can click the toggle button between the **[Name]** field and **Auto Generate** label so that the **[Name]** field becomes grayed out and the **Auto Generate** label is highlighted. This will assign a name with the device's ID, serial number, and entry value type. Occasionally if the value type is too complex to generate a name automatically, an error will show asking you to manually enter a name.
6. Below the **[Name]** field is the **Color** picker. Clicking the colored box will open a popup letting you choose a new color for the data series. Clicking outside the popup will set the **Color** text

field's value with the chosen color's hex code, prefixed by a pound sign/hashtag (#). You can optionally manually define a color by typing its hex code in the **Color** text field instead of using the picker.

7. In the **Value** section, you can define a device measurement, constant, variable, or expression to be recorded by the logger. This is the same system available for use in the **Logs** module. There are many features and data values available for use by this system in highly-complex scenarios ([see pages 20-21](#)).
8. For the sake of simplicity, we will re-use our example shown previously in the **Logs** module: **Device Measurement** of **Temperature** in **Default (°C)**. From the first dropdown menu select the measurement type you want to be recorded.
9. Then, from the **[Device]** dropdown menu, select the device you want to chart data from. Once a valid device has been selected, the **[Value]** dropdown menu will be populated with data types that can be collected from the device.
10. Click the **[Value]** dropdown menu to select a value to be charted – for our example, we are logging the **Temperature** measurement from the device.
11. In the **[Unit]** dropdown menu, the valid units of measurement will be displayed. The default unit of measurement for the given measurement type in the **[Value]** dropdown menu will automatically be selected. Select the unit of measurement you want displayed in your chart, and click the **Apply** when finished. The series will be added to the **Series** list back in the **Edit Chart** window.
12. Repeat this process for every data series you want charted.
13. When you have finished adding series, click **Apply** to save the chart. The chart will open in a new tab window and will start displaying data immediately.
14. By default, new data will be charted every 50 milliseconds, but this can be sped up or slowed down by adjusting the value of the **Rate** text field. The new rate will take effect upon hitting the Enter key or upon clicking outside the **Rate** field. Note the chart will continue to receive and display data until its window/tab is closed or until FlowVision 2.0™ exits.

Zoom functions

There are several parameters you can modify within the **Zoom** panel.

- You can zoom in and out of the chart by using the **red plus** and **red minus** buttons, or by hovering over the chart and scrolling with the mouse wheel.
- You can enable/disable zooming on one or both axes by clicking the toggle button to the right of the **Y-Axis** or **X-Axis**.
- You can reset the zoom scale of the **Y-Axis** back to the current minimum/maximum values of data by clicking **Reset**.



By default, the chart will track data while moving the **X-Axis** forward so that the latest data is continuously presented.

- **To enable/disable this functionality**, click the **Track Data** toggle switch at the top left of the chart. Disabling this option will prevent FlowVision 2.0™ from moving the **X-Axis** but will not prevent it from receiving or charting new

data, and will be disabled automatically only while zooming in and out of the chart. This can be useful to take a measurement or screenshot from a specific point in time on the chart.

Hovering over the chart will display the labels of the data series and their charted values at a given moment in time, which is visible along the **X-Axis** in green.

- To disable this functionality, you can toggle the **Show Labels** option underneath the **Track Data** label at the top left of the chart panel.

Other charts module functions

Above the **Zoom** panel are some functions you can use to interact with this chart.

- The **red camera icon** can be used to save a screenshot image of the chart to the hard drive. It is recommended you disable **Track Data** temporarily so that the chart isn't moving while saving an image.
- The **red gear icon** will open the **Edit Chart** window and allow you to edit the data series for this chart.
- The **red duplicate icon** will create a copy of the current chart in a new tab window, allowing you to view and interact with different series simultaneously on the same source chart.
- The **red refresh/reload icon** will reset the scale of the **Y-Axis** to the current minimum and maximum values in the data series, but will not clear any existing data points already added to the chart.

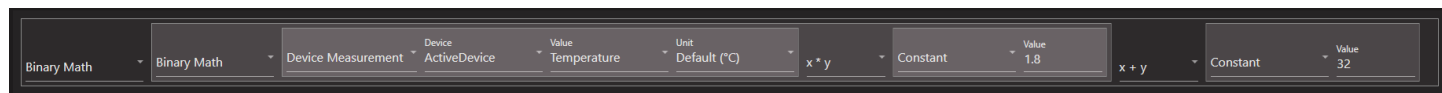
User expressions/variables

Expressions and variables let you re-use expressions, formulae, equations, and data variables inside FlowVision 2.0™ modules.

Expressions

Suppose we want to change the temperature display units from °C to °F. To do this we will create an expression.

1. Click the **red list icon** to the right of the **User Expressions/Variables** module to open the **Manage User Expressions/Variables** window.
2. In the **Manage User Expressions/Variables** window, give a new name for the expression by typing it in the **[Name]** field.
3. Select the **Numeric Expression** option from the **[Type]** dropdown menu and click **Add**. The **Edit User Expression/Variable** window will open and you will be able to define a value for the expression.
4. In our example, we'll name our expression "DegreesInFahrenheit" and use a simple binary math type to calculate Fahrenheit from the device's measurement in Celsius. From the first dropdown menu, set the type to **Binary Math**. This will create more dropdown menus to select options for the operands.
5. Our first operand group will be the measurement from an Alicat device in degrees Celsius, multiplied by 1.8. Since this will be an equation itself, we will select **Binary Math** again from the second dropdown menu.
6. Then third dropdown menu should say **Device Measurement**. In the options to the right, select the **[Device]** and **[Value]** to read from. In our example, we are connecting to Alicat-271532 and getting the value of temperature.
7. Finally, set the **Unit** to **Default (°C)**. We will then take that value and multiply it by 1.8 before calculating the other operand. Set the operator in the first group to multiply ($x * y$), and the value as a **Constant** value of 1.8. The left-hand side of our expression is complete.
8. Now we will take the value of the first operand group and add 32. Set the operator between the two operands to add ($x + y$), and the value as a Constant of 32. Our expression should now look like this:



((Alicat-271532's Temperature in C) * 1.8) + 32 = DegreesInFahrenheit

9. Click **Apply** below to save this expression and close the **Edit User Expression/Variable** window. The new expression will be displayed in the **Manage User Expression/Variable** window.

Variables

Suppose we want to change our previous equation so that it may be reused by a device other than Alicat-271532, without having to modify the expression every time. We can do this by using a device variable.

1. Click the **red list icon** to the right of the **User Expressions/Variables** module to open the **Manage User Expressions/Variables** window.
2. In the **Manage User Expressions/Variables** window, give a new name for the expression by typing it in the **[Name]** field.
3. Select the **Device Variable** option from the **[Type]** dropdown menu and click **Add**. The **Edit User Expression/Variable** window will open and you will be able to define a value for the device.

In our example, we are calling this variable “ActiveDevice” and are setting it to the example instrument, Alicat-271532. Now, instead of each expression or variable using the exact device Alicat-271532, we can point them to use our newly-created “ActiveDevice” variable instead. Then, changing the “ActiveDevice” variable will update all the expressions in which it’s used.

There are two other types of variables we can use: a **Conditional Variable** or **Numerical Variable**. A conditional variable can hold a Boolean value (true or false), and a numerical variable can hold a number (integer or decimal). These variables can then be used across equations just like a device variable would be used.

Scripts

Scripts allow users to create automated command sets in FlowVision 2.0™. The **Scripts** module is a very powerful feature that you can use to program FlowVision 2.0™ to send or receive data to your connected flow instruments. You can specify a script to be run at specified time intervals, or when a certain set of conditions have been met. This allows you to implement custom functions that are not built into FlowVision 2.0™.

To create a script:

1. Click the **red list icon** to the right of **Scripts** module to open the **Manage Scripts** window.
2. In the **[Name]** textbox, type a name for the new script and click **Add**. This will open the **Edit Script** window where you can set the parameters that the script will use to run. A parameter can combine time, conditions, variables, actions, and values to run highly detailed operations quickly. You can even run a script from within another script.

Script actions

Apply Setpoint: Change the setpoint of a controller instrument

Change Gas: Change the gas type of an instrument

Tare: Set the zero on an instrument

! *Caution: Tare only when there is no gas flow going to the unit.*

Reset Totalizer: Reset the totalizer to zero, if one is equipped on your instrument

Display Data Frame: Display a single frame of data from an instrument

Log Action: Run or stop a log, or write a single line to a log

Delay: Wait a specific amount of time before performing the next action

Conditional Actions: Evaluate a condition and perform actions based on the evaluated result

Display Numeric Value: Display a number in the script output window

Display Condition: Display a condition (true/false) in the script output window

Display Message: Display an arbitrary message in the script output window

Loop: Run this script in a loop for a number of times or while a condition is met

Run Script: Run another script saved in FlowVision 2.0™

Change Conditional Variable: Change the value of a conditional variable (true/false)

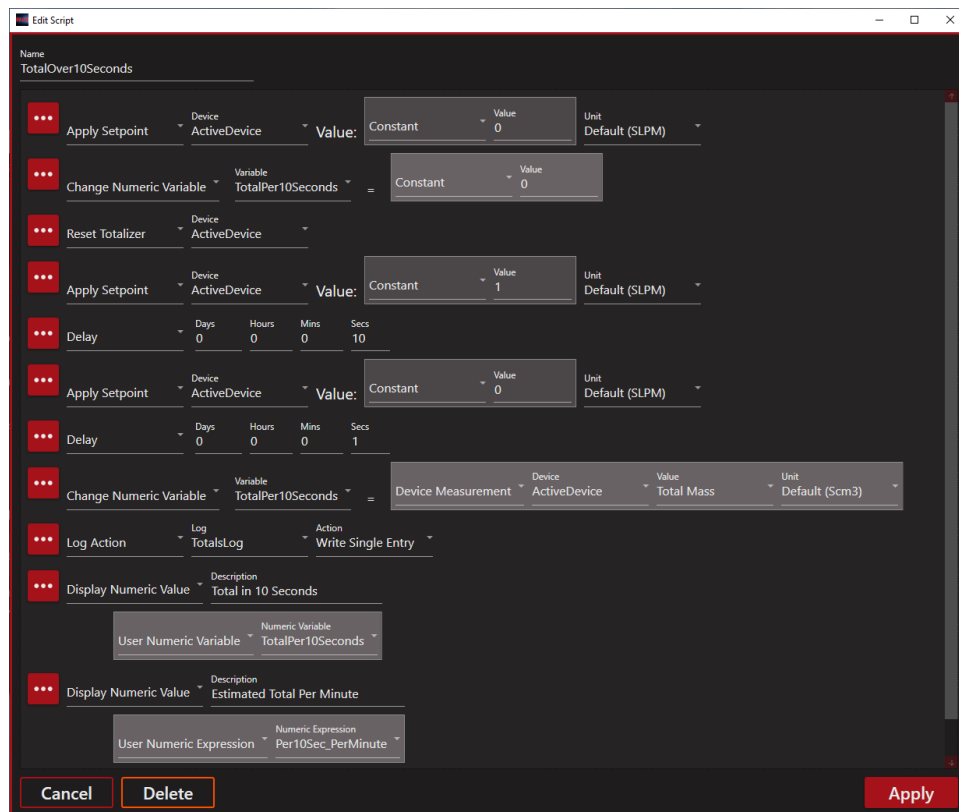
Change Numeric Variable: Change the value of a number variable

Change Device Variable: Change the value of a device variable

Sample script

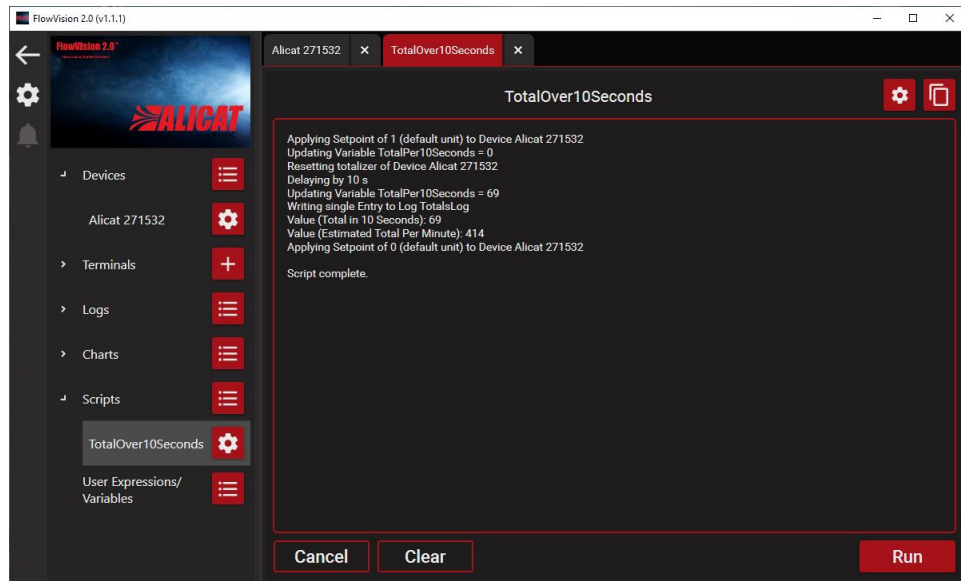
Suppose we have an instrument equipped with a totalizer and want to measure the total flow over a duration of time. Below is a sample script that will do the following:

1. Apply a Setpoint of 0 to the instrument
2. Reset the numeric variable and totalizer of the instrument
3. Apply a Setpoint of 1 to the instrument
4. Wait for the set amount of time (10 seconds)
5. Apply a Setpoint of 0 to the instrument
6. Wait for system to equalize (1 second)
7. Save the total to user variable
8. Write the value of the variable to a log
9. Use the variable value in a mathematic expression
10. Display the result to the user.



In this example, we are using the “ActiveDevice” variable we set up previously to use the Alicat-271532 device. We are also using a new **Numeric Variable** called “TotalPer10Seconds” to hold the measured value from the device and write it to a log. Since the logger uses the same “TotalPer10Seconds” variable our script uses, we can set it to simply write a single entry to the log to record the same value that will be displayed to the user. Finally, a new **Numeric Expression** called “Per10Sec_PerMinute” is added, which is just a **Binary Math** expression of the “TotalPer10Seconds” multiplied by a constant of 6 to get the per minute value.

- Click **Apply** to add “TotalOver10Seconds” to the **Scripts** module. Clicking the name of the script underneath the **Scripts** module list will open a tab window allowing you to interact with the script.



The title of the script is displayed at the center-top of the tab, and to the right of its title are two buttons: **Edit** and **Duplicate**.

- The **Edit** button will open the **Edit Script** window to change the parameters of the script.
- The **Duplicate** button will create a new window tab of the same script allowing it to be run separately from the first instance.

The center of the window will display the output information from the script as it's received. Below the output information are three additional buttons.

- The **Run** button will begin execution of the script
- The **Cancel** button will stop execution of the script.
- The **Clear** button will clear all the output information currently displayed by that script.

Troubleshooting and FAQs

Uninstalling FlowVision 2.0™

To uninstall FlowVision 2.0™, use the Add and Remove Programs function from your Windows Control Panel. FlowVision 2.0™ can be selected from the program group and uninstalled. If you are unfamiliar with the Add and Remove Programs function of Windows, please consult your system administrator or refer to your Windows operating manual.

My Alicat device will not connect to FlowVision 2.0™.

1. Check all connections between Alicat device and computer
2. Make sure the Alicat unit is powered.
3. Verify the communication cable is built and installed correctly.
4. Verify that a connection can be made with the computer using Windows HyperTerminal and by following the instructions in the manual that accompanied your flow device.

FlowVision 2.0™ will not start when I connect the flash drive.

1. Open Windows Explorer and browse to My Computer (“This PC” on Windows 10 computers).
2. Double-click the flash drive icon under Devices and Drives.
3. Double-click “Setup_FlowVision2.0.exe” to run the installer.

FlowVision 2.0™ will not install properly.

1. Verify that your computer meets the minimum requirements to run FlowVision 2.0™.
2. If your computer meets the requirements and the problem persists, please contact Alicat directly for support.

FlowVision 2.0™ and the display on my Alicat device don’t always match.

1. Alicat devices incorporate a small amount of averaging built into their physical display to reduce fluctuations. They also incorporate a zero band where any measurement less than a certain percentage of full scale will register as zero. The FlowVision 2.0™ digital display is not subject to the same rules as the physical display and will show small differences in measurement fluctuations as well as zero values.

I can’t find my captured log data.

1. Click the **red gear icon** to the right of the log in the modules panel.
2. In the **Edit Log** window that appears, click the **open folder icon** to the right of the **[File]** text field.

For more information or support regarding FlowVision 2.0™ or any Alicat product, please contact Alicat (see page 2).

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