DATA LOGGING

CHAPTER
4

In this Chapter...

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This manual covers the StrideLinx platform available from 2017 through 2021.

For details covering the StrideLinx Cloud 2.0 platform available after April 2021, please click here to link to that manual.

The StrideLinx Cloud 2.0 manual includes details describing the Activation Code model of Data Logging, Cloud Notify and other add-on features.

For information on the migration wizard from the original platform to StrideLinx Cloud 2.0, click here.

Cloud Data Logging

NOTE: Model SE-SL3001 does not support data logging.

Why Cloud Data Logging?

Cloud data logging gathers remote data from your control components. The data is transmitted in the StrideLinx platform for administrative, monitoring and analytical purposes. Our goal is to give you an insight in the performance of your machine and/or installation.

How Does the Cloud Data Logger Work?

The Cloud data logger is a completely cloud-based solution. All the values you have programmed in the PLC can be logged by the StrideLinx logger, easily and securely.

Once the data tags are added to the StrideLinx platform, you are prompted to push the configuration changes to the router. The router then transfers the data to our server where it will be stored in our database.

The PLC is not used by using cloud data logging; the router is doing all the work.

The StrideLinx platform has a crucial role in the functioning of the Cloud data logger. All settings and data points to be logged are set via the StrideLinx platform.

Refer to the following subsection or the video to the right (https://www.AutomationDirect.com/VID-CM-0032) for details to set up Data Reports and Live Monitors for datalogging.

NOTE: This chapter uses Modbus protocol to illustrate data logging configuration. Refer to Appendix G, H, I, J and K for Siemens S7, OPC UA, EtherNet/IP, BACnet, and MELSEC protocols, respectively.

## Configure Cloud Data Logging On Your Device

Cloud datalogging setup requires:

1. Set up datalogging subscription.
   1a. Enter credit card information and subscribe to the Cloud datalogging add-on service sized to suit your needs.
2. Set up data sources for a specific protocol (Modbus, Siemens S7, OPC UA, etc.)
   2a. Configure the address and protocol for the PLC (where the data is located).
   2b. Configure the data tags.
3. Test data tags to verify correct configuration
4. Design the data dashboard to display your data.

Each of these steps are detailed as follows.

Set Up Datalogging Subscription

Enter credit card information and subscribe to the Cloud datalogging add-on service sized to suit your needs

Click the account name (1) to toggle the menu list and show the Billing option (2). Click Billing and click the Edit Billing Info icon (3) to enter credit card information.
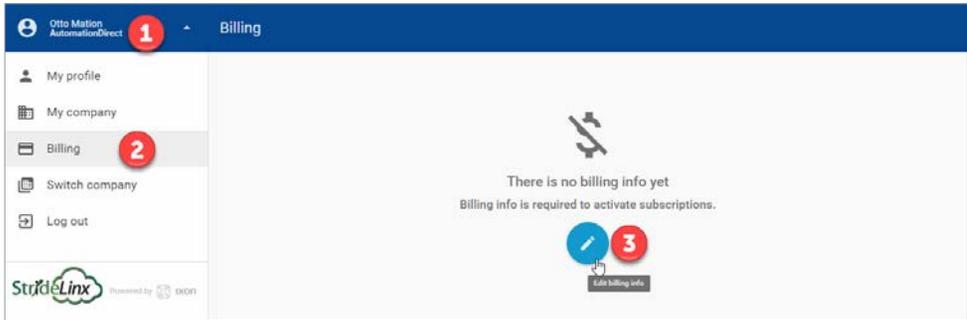
Click on Devices (4), click the desired router (5), click the SUBSCRIPTIONS tab (5), then click ACTIVATE.
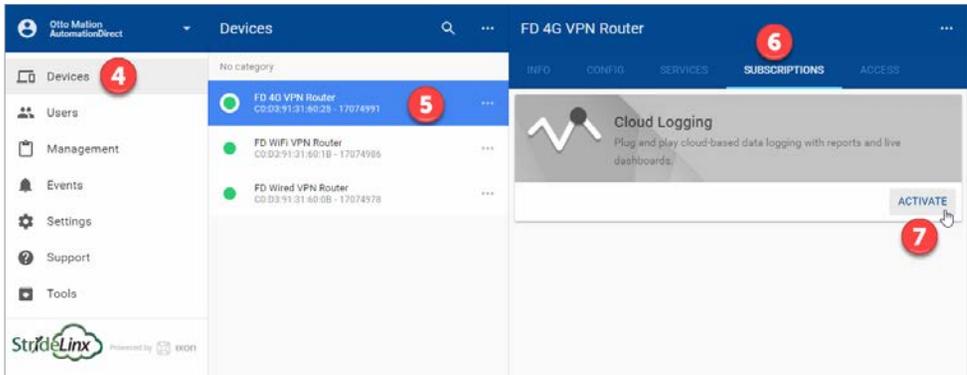
Select the subscription that will suit your data recording requirements (8). Click PURCHASE AND ACTIVATE (9).
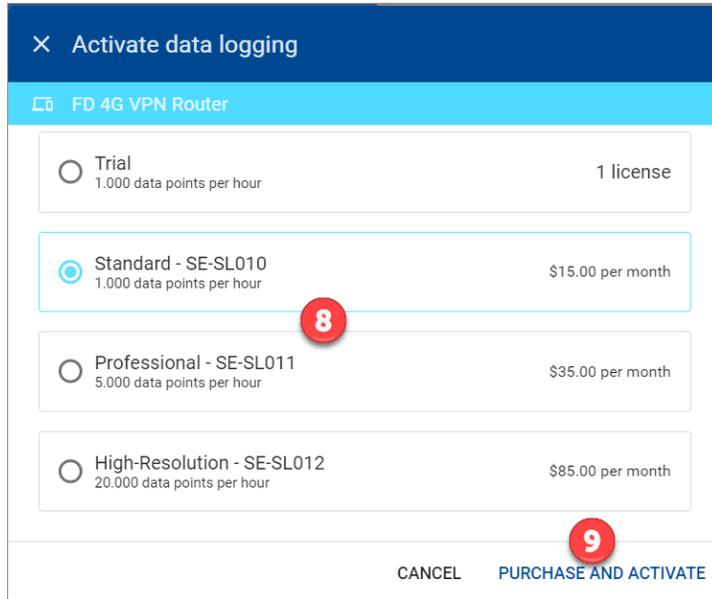
Set Up Data Sources for a Device Using Modbus Protocol

NOTE: *Refer to Appendix G, H, I, J and K for Siemens S7, OPC UA, EtherNet/IP, BACnet, and MELSEC protocols, respectively.*

Configure the address and protocol for the PLC from which data will be read

Click on the SERVICES tab (10). Click the +(Add) button (11).

Add a Name and the IP Address of the PLC where the data resides. Click NEXT.

Select DATA SOURCE.

Select the Modbus protocol. If the Port must be changed, or a Slave ID must be entered for the device from which data will be logged, enter those values, then click ADD to continue.

Configure the data tags

To add a data tag, go to the SERVICES tab for the router, and click the Edit services (pencil) icon next to the device for which you want to add the data tag.
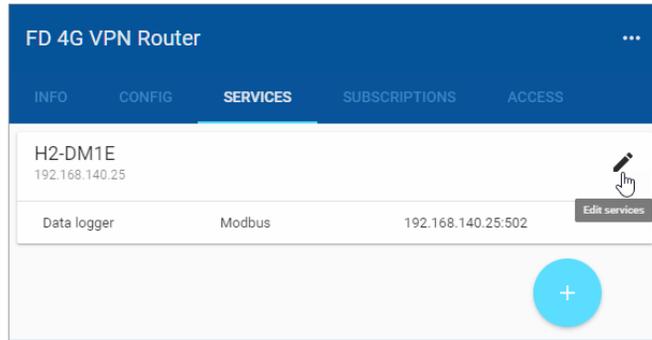
This opens the Edit services dialog. Click the name of the existing device for which you would like to add a data tag.
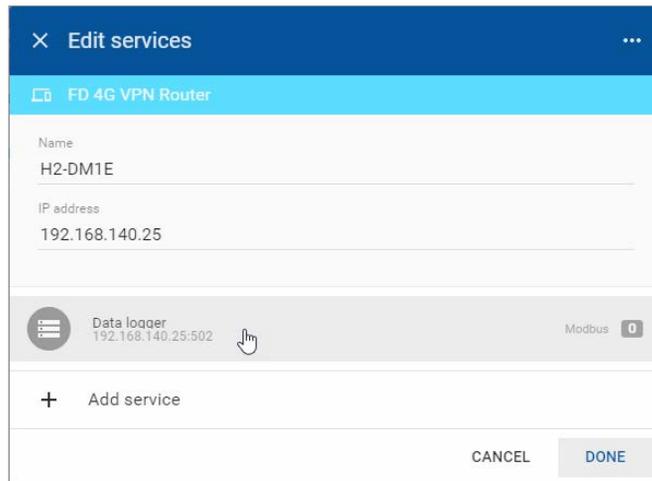
NOTE: *It is advisable to enter data tags in small batches, and test the variables periodically to verify the entries. The entries can be tested by clicking "RUN TEST" in the Configurator, or from the Cloud Logging Web App as described in the* Data Logger Test Utility *section. Please refresh your browser if the information on screen appears to not be updated properly at any time.*

The resulting "Edit service" screen displays the parameters for the data source, plus a count of existing data tags. Click OPEN CONFIGURATOR to add or edit tags.
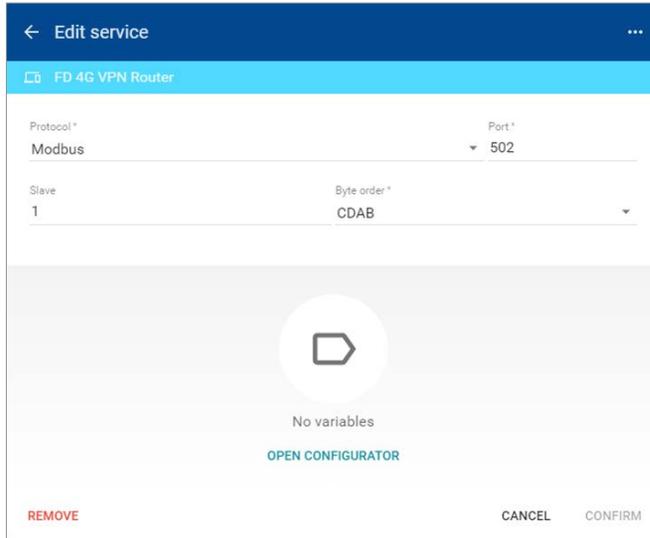
Data tags can be entered interactively, or a set of tags can be imported from a previously-exported CSV file. Export of sets of data tags is discussed later in the "Export Data Tags" subsection. For this example, select "Add new variable" to manually enter tags.
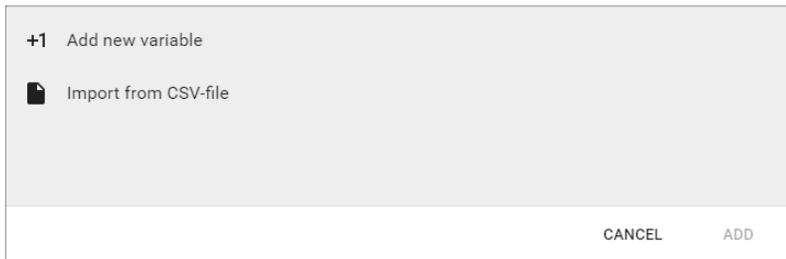
A data entry screen opens, with one new data tag ready to be entered. Set the relevant parameters for the new data tag. Additional data tags can be entered in this round by clicking "+1" in the lower left corner of the screen. When all the desired tags have been entered click ADD.

Data tag input fields are described in the following two tables. Also see the Modbus address translation chart in Appendix D for the key to enter addresses for AutomationDirect products. Refer to Appendix G, H, I, J and K for details on setting up Siemens S7, OPC UA, EtherNet/IP, BACnet and MELSEC protocols, respectively.

Data Tag Input Fields	
Field	Description
Name	Give the data tag a logical name.
Address	For Modbus protocol, the data tag address is the Modbus address (e.g., 412). Please see Appendix D for address mapping for AutomationDirect PLCs.
Select a data type	See next table for the available data types.
Unit (optional)	Here you can assign a value to a unit, for example, gallons or psi.
Factor (optional)	This allows you to multiply by a value. For example, factor 0.01 divides the data value by 100. If a Factor is set for a widget in a dashboard, that Factor will override the global Factor configured here in the Data Configurator for the data as displayed in that widget only.

NOTE: Additional data tag parameters related specifically to data logging (i.e., sampling interval, data retention policy, and logging only when changed) can be set from the Cloud Logging web app discussed later in this chapter.

Data Types Supported
Bool
Float32
Float64
Int8
Int16
Int32
Int64
Uint8
Uint16
Uint32
Uint64

Once you have added all the data tags you want to log, you will be prompted to push the configuration to the router.
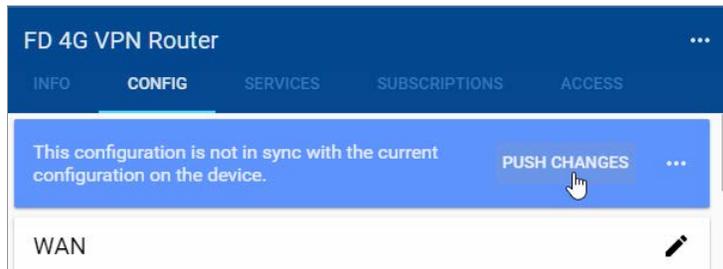
The Cloud Logging web app can now be used to set up data dashboards and to adjust additional data tag parameters related specifically to data logging.

Export data tags

Data tag configurations can be exported in CSV format. The CSV file is downloaded to your local PC, and can later be imported to set up another StrideLinx router.

Select data tags to be exported by clicking the icon for each data tag, or select all data tags at once from the More Options (**...**) menu in the upper right corner of the screen. The selected data tags can then be deleted, duplicated, or exported from the pop up menu at the bottom of the screen.

Cloud Logging Web App

The Cloud Logging web app is found under the SUBSCRIPTIONS tab after selecting a StrideLinx device. Note that model SE-SL3001 does not support Cloud Logging.
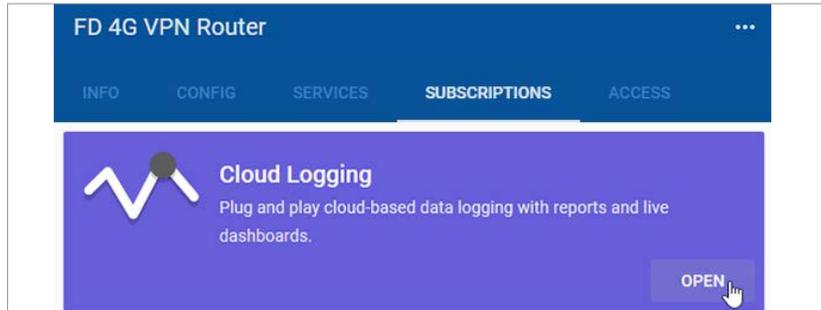
The web app provides a central location to manage your data logging subscription, data tags, and data dashboards.

Dashboards

The dashboards tab provides access to add, remove, edit and view both live monitors and data reports.

If a Factor is set for a widget in a dashboard, that Factor will override the Factor set for that data point in the Data Configurator for the data as displayed in that widget only. That is, the configuration of the widget changed the display of the data there but any other widget will use the default of the Configurator setting or the setting within each other widget.

Add a Live Monitor or Historical Data Report

Click the "+" symbol in the lower right corner of the dashboard screen to begin creating a new Live Monitor or Data Report.
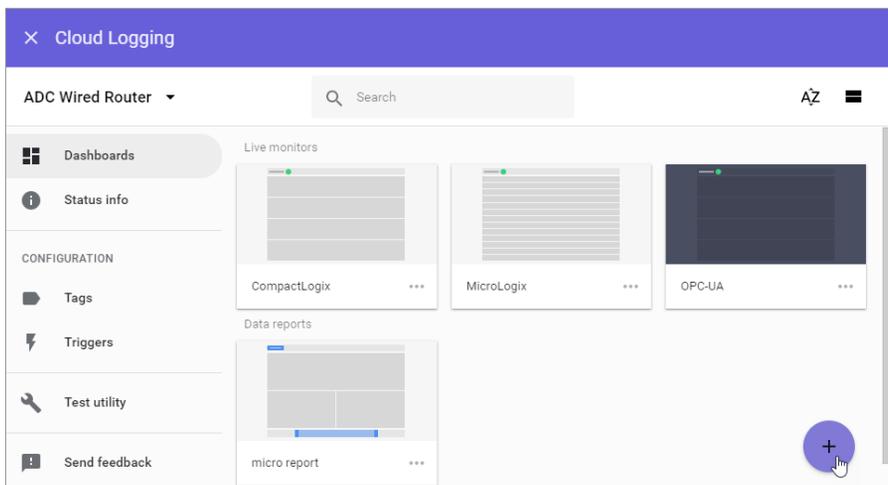
Select "Live Monitor" or "Data Report" to continue. The differences between the two are explained later in this chapter.
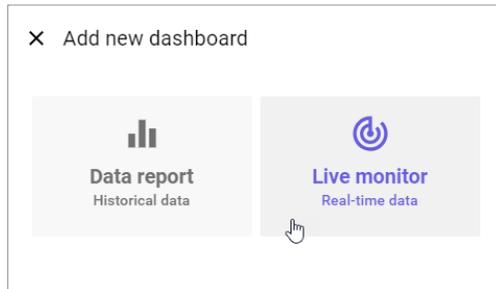
Give your dashboard a name and pick the black or white background then click ADD.
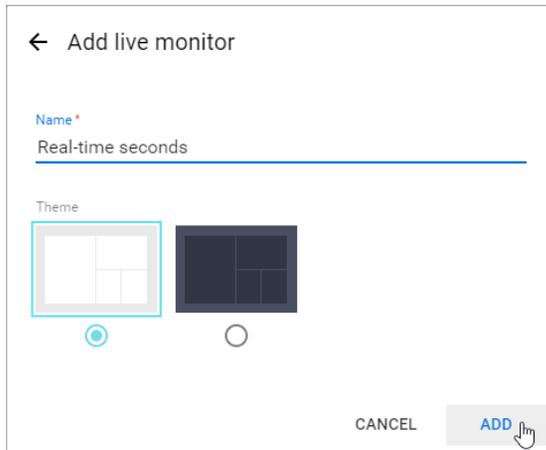
Pick a layout template as a starting point.
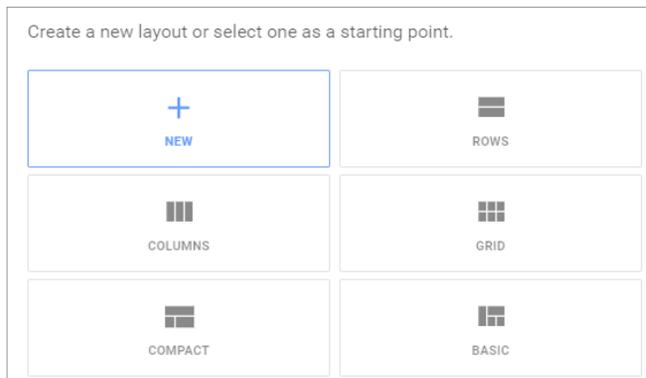
Click on a widget option to display the data.
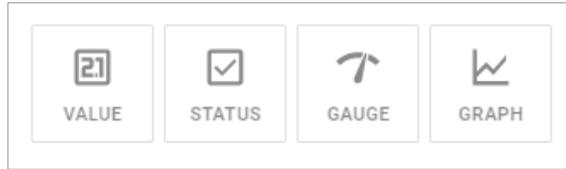
Enter the information requested for the widget type you've selected and click CONFIRM.

Add more widgets if you would like. When finished, click the VIEW button to display the Live Monitor or Data Report, or click the X to return to the main Cloud Logging page. The new dashboard is available on the router INFO tab as well as within the Cloud Logging web app.
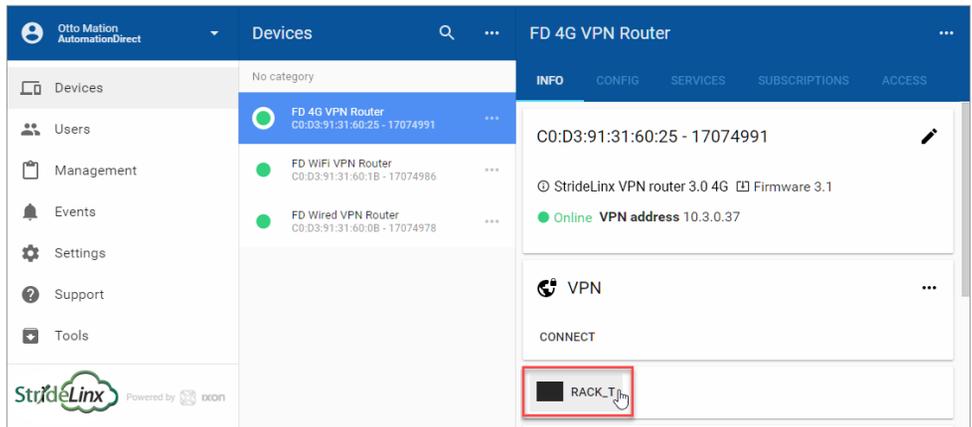
Live Monitor

The live monitor displays real-time data. It gives you an insight into how the machine is operating at the moment.

Widgets

We use widgets to display the data. In our live monitor we have four widget options:

Data Visualization Widgets		
Widget	**Description**	**Setup**
Value	Shows the current value of the data tag.	When you select the "Value" widget you give the widget a name and choose the data tag you want to be shown. Click CONFIRM.
Status	Relevant only to Boolean data, shows true or false.	When you select the "Status" widget you give the widget a name, label and choose the data tag you want to be shown. You may customize the display (for example True and False). Click CONFIRM.
Gauge	Relevant only to numeric data types. Select a range between numbers "X" and "Y". The gauge (meter) shows you the current value of the data tag in comparison to the numbers X and Y.	When you select the "Gauge" widget you name the widget and select the data tag you want to be shown. Enter the numbers for the bottom and top values of the gauge and drag the red bar to the left or the right. Click CONFIRM.
Graph	Shows the current value of the data tag(s) on a graph.	When you select the "Graph" widget you name the graph and select the data tags you want to be shown. Click on the color dot to customize the display. You can add as many data tags as you wish. Click CONFIRM.

A selection of templates is available to make creating your data dashboard more convenient. Example of a live monitor:
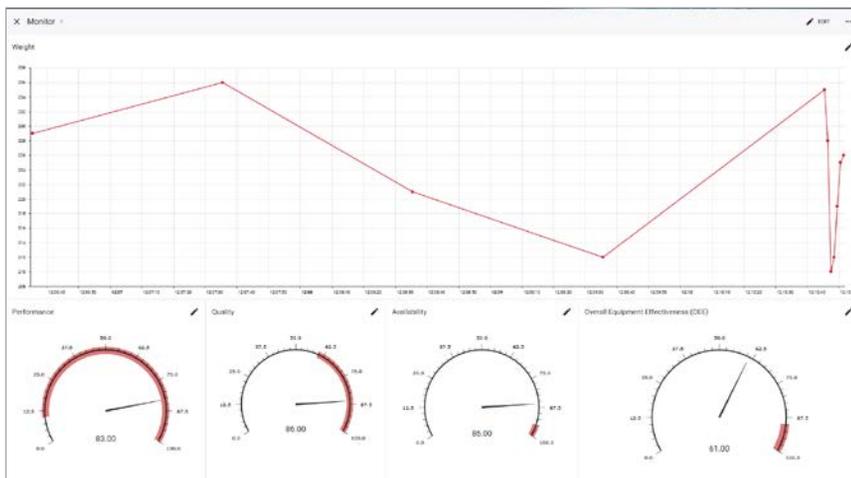
NOTE: *The little dot next to the monitor's name shows the status of the monitor. When the dot is blinking grey/green the monitor is working (you can hover over the dot and see the date and time when the monitor checks the status). When the dot is grey, the monitor cannot connect to the PLC or the data tags are not configured properly. If you have configured a dashboard but no data is displaying, please refresh your browser. If that doesn't solve the issue, check your tags using the Data Logger Test utility. If one or more tags are configured incorrectly, no data will display.*

Data Reports

Historical data reports show the data that is logged over a period of time selected by you. The following is a step-by-step guide on how to configure a data report.

Widgets

We use widgets to display the data. In our data report we have five widget options:

Data Visualization Widgets		
Widget	**Description**	**Setup**
Value	Shows the value of the data tag logged, depending on the configured formula.	When you choose the Value widget you can give a name to the value, select the data tag and enter the formula. More information about available formulas can be found in the next table.
Status	Shows a bar indicating status of a single data tag over time	Indicates status by color. Can be used with a boolean (i.e. true/false) or a threshold can be set on an integer or float (i.e. if value >= 5.4).
Period	Shows an advanced bar chart in which the data period is classified in fixed time intervals	Multiple variables can be stacked or displayed in separate bars. A formula can be set. More information about available formulas can be found in the next table.
Table	Shows a table of data tags and the logged value.	When you choose the table widget you can give a name to the widget and select data tags that the table should contain. Press CONFIRM to add the table to the data report.
Graph	Shows a bar of the data tags and the logged value.	The graph widget shows a chart where all the data points logged will be shown over the selected period of time. Enter a name for the chart and select which data tags you want to show in the chart. Chose a color for the data tags and click CONFIRM.

Formula

You can select one of the following formulas:

Data Report Formulas	
Formula	**Description**
Average	Shows the average value over the time period selected
Min	Shows the minimum logged value in the time period selected
Max	Shows the maximum logged value in the time period selected
Median	The middle number of the logged numbers in the time period selected
Mode	Most common value in the time period selected
Range	Shows the difference between the minimum and the maximum logged value in the time period selected
Sum	Adds all the logged values in the time period selected
First	Shows the first logged value of the time period selected
Last	Shows the last logged value of the time period selected

Example of a data report:
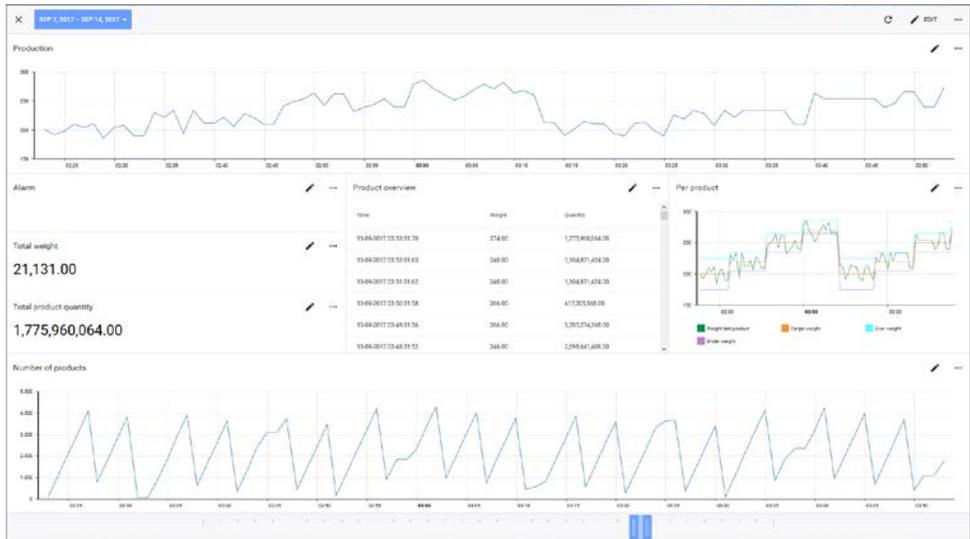
As you can see in the image above, there are three dots located in the top-right of every widget. If you click on these three dots, you can export the raw data (i.e., the data directly logged from your PLC into the database, without any scaling factor applied).

NOTE: If you have configured a dashboard but no data is displaying, please refresh your browser. If that doesn't solve the issue, check your tags using the Data Logger Test utility. If one or more tags are configured incorrectly, no data will display.

Download Logged Data

Data that has been stored as a Data Report may be downloaded and saved locally.

Data is downloaded from the WIDGET configured in a data report. For this reason, a TABLE widget may be a good choice to log data that you expect to download. Configure the table with all tags that you expect to save. This may make downloading data more efficient since tags will be collected together in a single widget, allowing a single download.

While your subscription is active, view the Data Report that records the data you wish to save locally. Then (1) click on the ellipsis in the Widget that is configured with the desired tags.

Click on the (2) Export to CSV option. The data file will save to the local path where Windows ordinarily downloads files. The file will be named (3) export.csv.
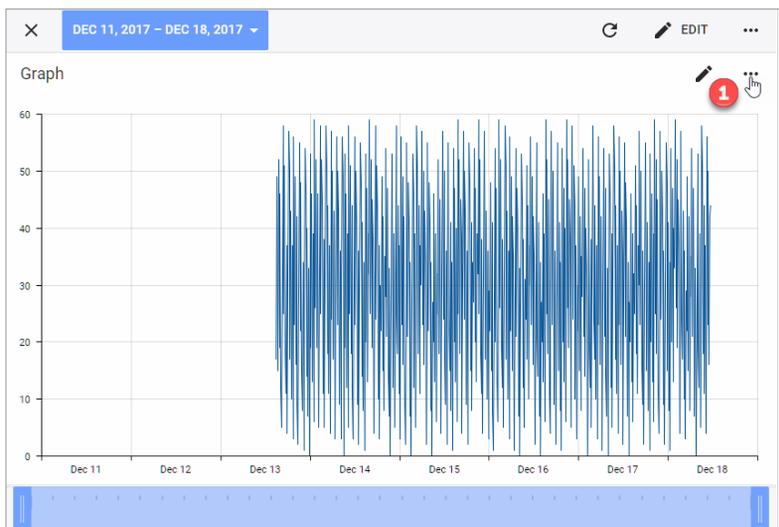
Status Info

The Status Info tab provides an overview of the usage of the data logging subscription, and allows the subscription to be upgraded, paused, or deactivated. The Cloug Logging Introduction button will open a brief slideshow outlining the top-level steps needed to set up data logging.
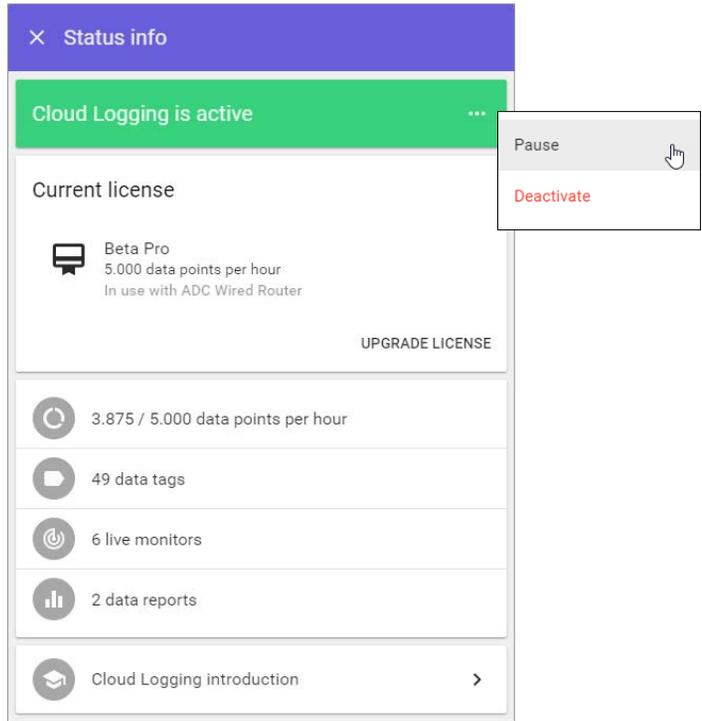
Tag Configuration

The Tag Configuration tab provides an easy method to add, edit, copy, or export data tags from all defined data sources.

NOTE: The purpose of the tags export feature is to clone the set of tags in another router.

The Tag Configuration section displays all the data sources defined for the presently selected StrideLinx router in the left-hand column. Selecting a data source will display all defined data tags for that data source, sorted by data type by default. The display can also be switched to a table view showing a concise overview of the data logging parameters for each tag.

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New tags can be added by clicking the "+" icon in the lower right of the screen, which presents the choice to add a new data tag or import tags from a CSV file. Selecting "Add new data tag" will open a blank new tag dialog as discussed previously in this chapter. Importing from a CSV file is discussed in the following subsection.

The configuration of any data tag can be edited by clicking the downward chevron at the right of the tag. Clicking the ellipsis at the right of a tag will allow the tag to be duplicated, removed or selected for group operations.

Tags can be logged on a time interval, when the value changes, or when a trigger condition is met.

Logging on Time Interval

When Log on Interval is selected, a time interval must be selected. At least one value must be logged per hour and a maximum of 10 values per second may be logged. The logging formula can be selected to log the last value received, or the minimum, maximum or mean value over the time interval.

The Retention Policy for the logged data must be set. Valid options are 6 months, 2 years, 5 years, or 7 years.

Logging on Change

When Log on Change is selected, the maximum number of logged values per hour must be selected. Options range from 5 values per hour to 20,000 values per hour. Select a limit appropriate for your application and data subscription. Logging only when the value changes or on value change plus once each hour of unchanged value can be selected.

The Retention Policy for the logged data must be set. Valid options are 6 months, 2 years, 5 years, or 7 years.

Logging on Trigger

To log a batch of variables at the same time, 'log on change' is not sufficient. With the Log on Trigger system you can select a variable to act as a trigger (one-shot). You then associate other variables to this trigger variable. When that trigger variable changes, all attached variables are logged once.

When Log on Trigger is selected, the value is logged each time a custom trigger condition is met. The value will not be logged again until the trigger condition is false and then true again. The maximum number of logged values per hour must also be selected. Options range from 5 values per hour to 20,000 values per hour. Select a limit appropriate for your application and data subscription.

Trigger conditions can be created using any variable, and you can use the same trigger in multiple data tags. Creation of triggers is discussed under "Trigger Configuration" on page 4-21.

The Retention Policy for the logged data must be set. Valid options are 6 months, 2 years, 5 years, or 7 years.

Tags can also be selected for further operations by clicking the icon at the left side of the tag. The selected set of tags can then be deleted, duplicated, or exported. Tags are exported as a comma-delimited text file.
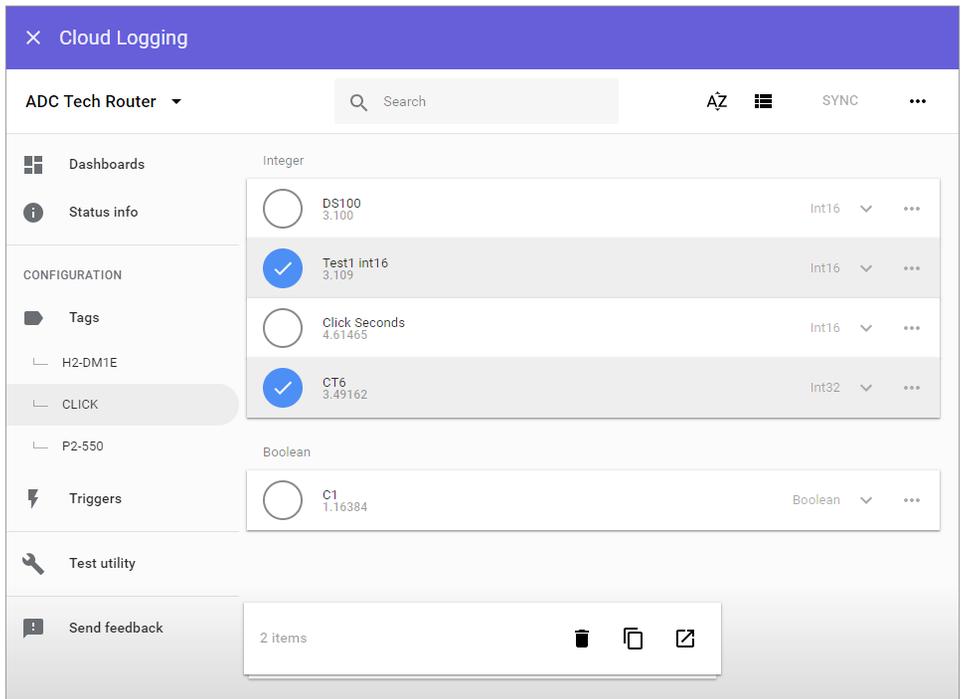
Importing Data Tags From CSV File

After clicking "Import from CSV File," a file open dialog is presented. Select a previously exported data tag file, which by default is named "export.csv."

The CSV file will be opened, displaying the configuration data for all data tags in the file.

When ready to import the data tags, click the ADD button in the lower right.

If any data tags conflict with tags already configured on the device, the conflicting tag will be highlighted on the screen and the import will not be completed. Delete any conflicting data tag from the import list and click ADD. The new data tags are then added to any existing data tags.

Trigger Configuration

A Trigger allows logging of one or more data tags when a specified condition of another variable is met.

The Trigger Configuration tab provides an easy method to add, edit, copy, or export trigger conditions from all defined data sources. To begin, click Triggers

The Trigger Configuration section displays all the data sources defined for the presently selected StrideLinx router in the left-hand column. Selecting a data source will display all defined triggers for that data source. The display can also be switched to a table view showing a concise overview of the triggers for each data source.
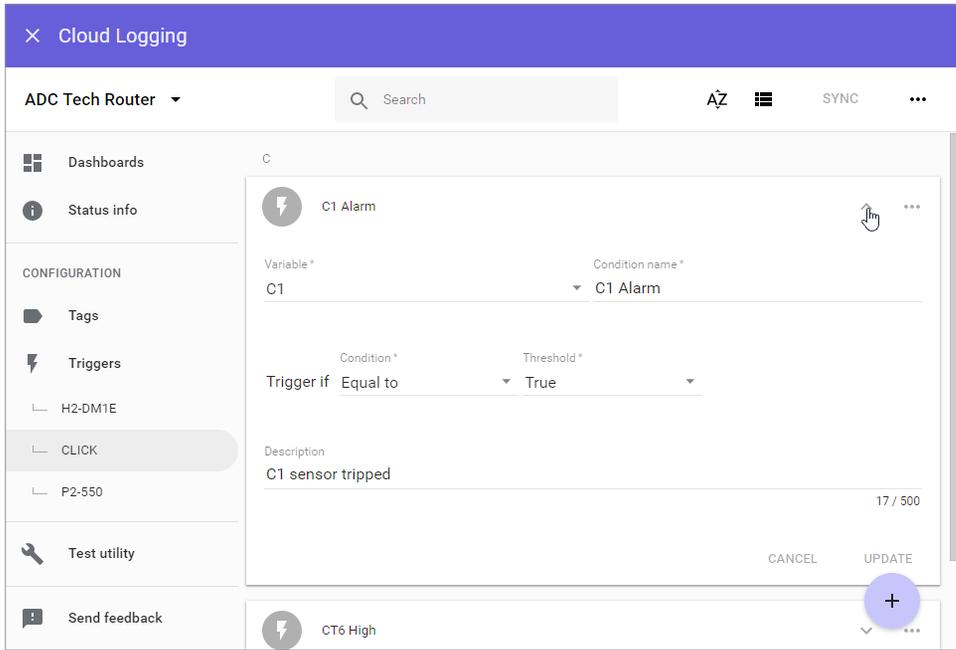
New triggers can be added by clicking the "+" icon in the lower right of the screen, which presents the choice to add a new trigger or import triggers from a CSV file. Selecting "Add new trigger" will open a blank new trigger dialog. Importing from a CSV file is discussed in the following subsection.

The configuration of any trigger can be edited by clicking the downward chevron at the right of the trigger. Clicking the ellipsis at the right of a trigger will allow the trigger to be duplicated, removed or selected for group operations.

For each trigger, select a variable from the list of configured variables in the current data source, give the trigger a name, and select the condition to be met and threshold value. Optionally, a description of up to 500 characters can be added.

Importing Data Triggers From CSV File

After clicking "Import from CSV File," a file open dialog is presented. Select a previously exported trigger file. The CSV file will be opened, displaying the configuration data for all triggers in the file. When ready to import the triggers, click the ADD button in the lower right.

Test Utility

The Data Logger Test Utility will test the configuration of each tag on a selected data source device and communication with the device. If you have configured a dashboard but no data is displaying, refresh/reload your browser. If data still does not display, one or more tags may be configured incorrectly. Please use this utility to verify your tags.

Click START TEST beside the data logger you wish to test.

If an error exists in any of the data tags, the first error encountered by the utility is displayed.

If the set of data tags passes the tests, "No errors" is displayed, as shown below. Tags which were successfully retrieved show a green check mark in the status column, and display the latest value.

NOTE: *To ensure Data Logger Test Utility provides accurate results, please update/refresh your browser prior to running the test, and make sure you have pushed the latest configuration to your router. The Test Utility displays raw data; Factor doesn't affect the data shown.*

Pausing, Deactivating, & Terminating Your Datalogging Subscription

Explanation of the Pause/Resume, Activate/Deactivate and Terminate Options for the Datalogging Subscriptions.

Activate / Deactivate Datalogging

To begin a datalogging subscription, it must first be activated on the router. Go to Devices – SUBSCRIPTIONS – Activate. You will be given a choice of datalogging options including Trial (one free 30-day trial per company account), Standard (1K points per hour), Professional (5K points per hour), and High-Resolution (20K points per hour). Once you activate your subscription you may follow the instructions in this chapter to begin datalogging.

To Deactivate datalogging, you return to the same menu and select Deactivate. This will end your datalogging subscription on this router and permanently delete your data. It is recommended that you first save the data to your local machine before Deactivating. Once you have deactivated a router, the datalogging subscription will still be active and available to activate on another router. You will continue to be charged for its monthly use. If you wish to terminate the subscription from your company account, please refer to the Terminate Datalogging section below.

Pause / Resume Datalogging

Once the data logger is configured and you are logging data, you may pause if you temporarily don't need to collect data (i.e. during periods of maintenance or scheduled downtime). To Pause data gathering, click on the ellipses in the Devices – SUBSCRIPTIONS page and select "Pause". If you plan to pause the data logging for a long period of time you may wish to push the changes to the router from the CONFIG tab so that the router will stop collecting data.

Once you are ready to resume data logging, simply select "Resume". If you had pushed the pause changes to the router, then you should proceed with pushing these changes as well.

Terminating a Subscription

To terminate a subscription, navigate to the Billing – Subscriptions and "Edit Subscriptions". It is important to note that even though you may Deactivate a cloud data logging subscription, you must still terminate it or you will continue to be billed. You cannot terminate an activated data logging subscription. It must first be deactivated at the router and then can be terminated in the Billing – Subscriptions settings. You may want to continue the data logging subscription if you have data stored in the platform that you wish to remain active and available. Terminating your subscription will permanently erase the stored data. Be sure to save any data before permanently deleting it.

WARNING: Data is only stored for as long as you maintain your paid subscription. ALL data will be lost if your subscription lapses or is terminated. Data for a specific device will be lost if a subscription is removed from that device. Data is also only stored for a maximum of 7 years. If data older than 7 years is important, please archive your data locally before the 7-year limit is reached.