1848ETC-HST

Allen-Bradley Historian

Product User Guide

Revision: 1.25

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Revision History

Version	Date	Notes
0.10.0	9/15/24	Bug Fixes 1. Fixed an issue where tag discovery would fail in PLCs with more than 1000 tags.
0.18.0	10/15/24	Features Added 1. Added Rescan button to PLC discovery window. 2. Added ability to clear stored records via the webpage. 3. Configuring an MQTT Client is now optional. 4. Records will now be saved to USB automatically whenever a drive is connected. Bug Fixes 1. Fixed an issue with PLC discovery. 2. Fixed an issue with PLC tag discovery. 3. Fixed an issue where configuration could not be saved after reverting to manufacturing defaults 4. Fixed issues with network settings.
1.20	3/3/2025	Features Added 1. Moved Download of the Database from the Record Handling Page to the Home Page for easier access. 2. Moved Clear of the Database to the System Settings Page. 3. Discard notifications to confirm the discard was intentional. Bug Fixes 1. Fixed storing a Record by Triggering. 2. Default values for the Delay Between Scan Loops (ms) and Sampling Rate (ms) to be more useful out of box. 3. Removed the Start / Stop button as the Historian supports configuration changes while running communication is occurring.
1.23	3/17/2025	Bug Fixes 1. Fixed an issue with MicroLogix, SLC, PLC5E Data Validity. 2. Fixed an issue with MicroLogix, SLC, PLC5E Communications.
1.24	3/31/2025	Bug Fixes 1. Downloading the Database that causes the database to be invalid upon a SQL query being performed
1.25	4/16/2025	Features Added 1. Added a manual setting of the Clock. 2. Added a New Historian Discovery Tool in an install package. Bug Fixes 1. More than one Historian communicating to the same PLC would fail. 2. Storing data to 3 different databases at 100ms rates now accurate at 100ms. 3. CompactLogix and ControlLogix with a Slot other than 0 cannot browse for tags in the PLC. 4. MicroLogix, SLC, or PLC5E with an invalid File configured, the Historian would reboot. 5. MicroLogix, SLC, or PLC5E now handles the limits for a Boolean Array, INT, and FLOAT file.

Overview

RTA's Allen-Bradley Historian is the easiest way to log data from A-B PLCs. It is uniquely designed to store data in closed OT networks. The Historian allows control engineers and operators to gather time series logs of data from their A-B PLCs. These data sets allow for an increase in efficiency and to avoid unnecessary downtime.

Tools and documents are available online: https://www.rtautomation.com/historian-support/

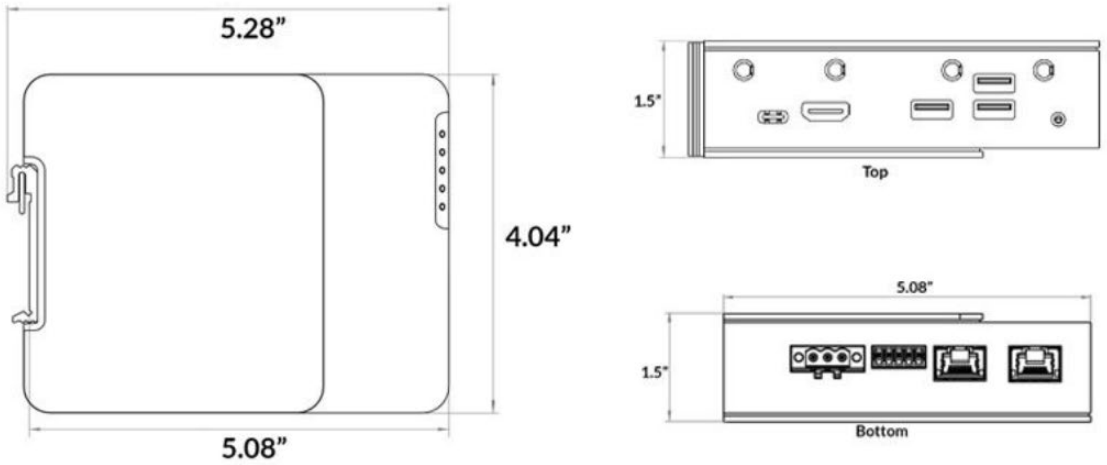
If you require further assistance at any time, do not hesitate to call Real Time Automation support.

Support Hours are Monday-Friday 8am-5pm CST

Toll free: 800-249-1612

Email: support@rtautomation.com

Hardware



Powering the Historian

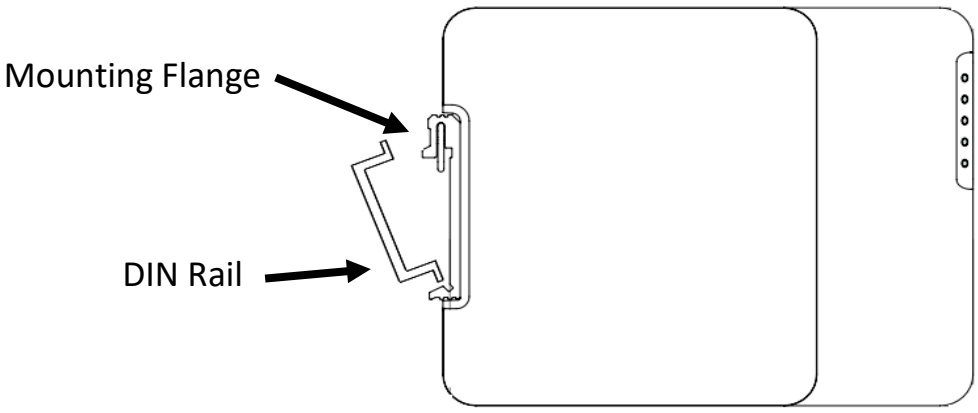
- The Historian requires an 8-24 VDC power source Red = (+) Black = (-).
- The unit draws 100mA @ 12VDC
- The unit draws 50mA @24VDC

Mounting with a DIN Rail

Installing

Follow these steps to install the unit:

1. Mount the DIN rail.
2. Hook the top mounting flange under the DIN rail.
3. While pressing the 1848ETC-HST against the rail, press up to engage the spring-loaded lower clip and rotate the unit parallel to the DIN rail.
4. Release upward pressure.

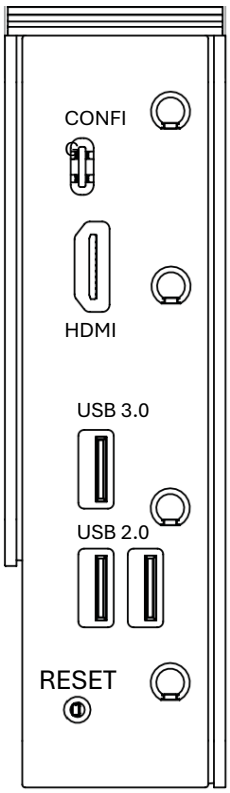


Removing

Follow these steps to remove the unit:

1. Press up on the unit to engage the spring-loaded lower clip.
2. Swing top of the unit away from the DIN rail.

Port Connections

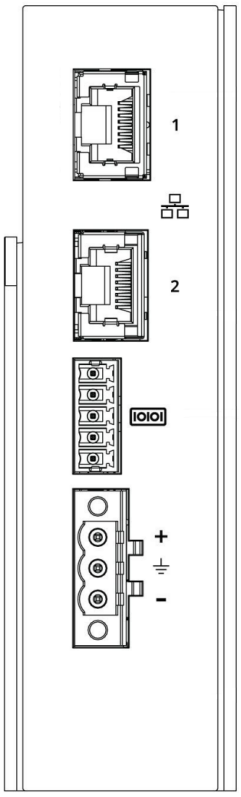


USB-C Port (CM4 Update)

HDMI

USB 3.2 Gen

USB 2.0



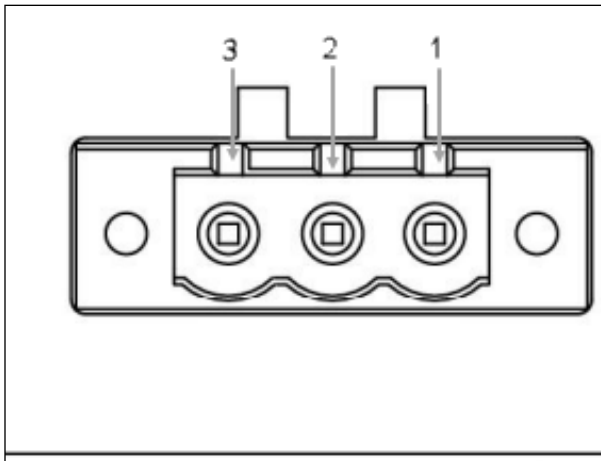
1GbE

1GbE LAN

Serial Port: RS-232/485/422

Power

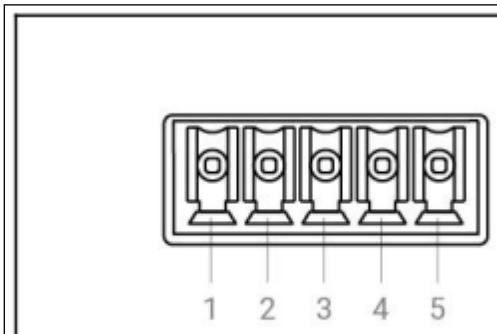
3-Pin Power Connector



Pin	Definition
1	GND
2	Chassis/Earth GND
3	12~24V VDC Input

3-Pin terminal power pinout

5-Pin COM Connector



Pin	RS-232	RS-422	RS-485
1	GND	GND	GND
2	NC	TX-	TX-/RX-
3	NC	RX-	NC
4	RX	TX+	TX+/RX+
5	TX	RX+	NC

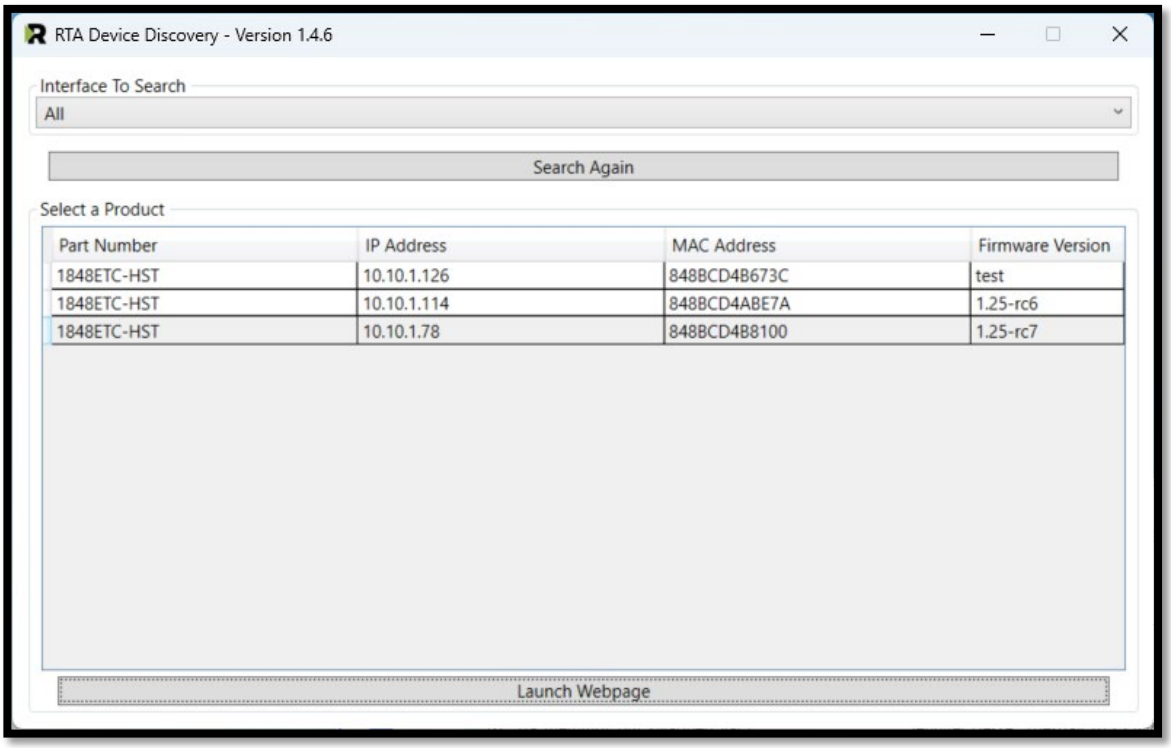
COM terminal pinout

Accessing the Home Page

The following steps will go over how to access the browser-based configuration of the Historian. By default, the Historian is at the static IP of 192.168.0.100/255.255.255.0 on port 1 and DHCP on port 2.

Required Items:

1. Network enabled PC
2. Historian unit
3. The Device Discovery utility
4. Navigate to https://www.rtautomation.com/historian-support/ and download Device Discovery tool. This is an installation package.



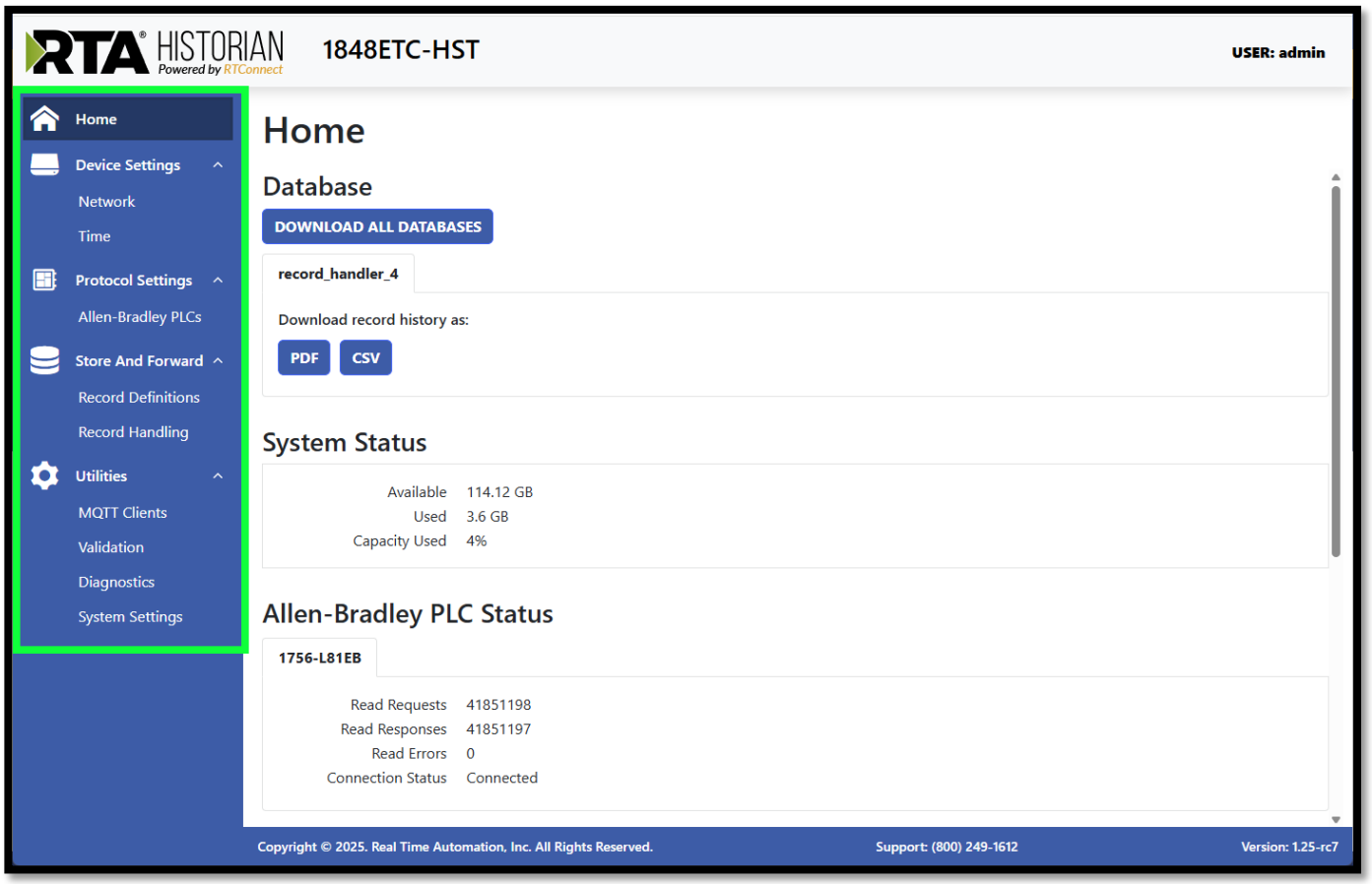
5. Set the network enabled PC to be on the 192.168.0.X/255.255.255.0 network and ensure the PC is connected to port 1.
6. Run the Device Discovery Tool.
7. Find unit under “Select a Unit”.
8. If the Historian is not shown in this tool, check that the computer is on the 192.168.0.X/255.255.255.0 network.
9. Relaunch the Device Discovery tool to see if Historian can be discovered now.
10. Click **Launch Webpage**. The Home page will appear.
11. You will be prompted to Login with the default username and password of admin/admin.

Home Page

The home page is where important information about the Historian and its connections are displayed. This includes options to download the database and information such as current available storage, Allen-Bradley PLC Status, and MQTT Status if configured.

Navigation (Green box below):

Easily navigate between pages (Home, Device Settings, Protocol Settings, Store And Forward, and Utilities pages) using the buttons on the left-hand side.



Device Settings

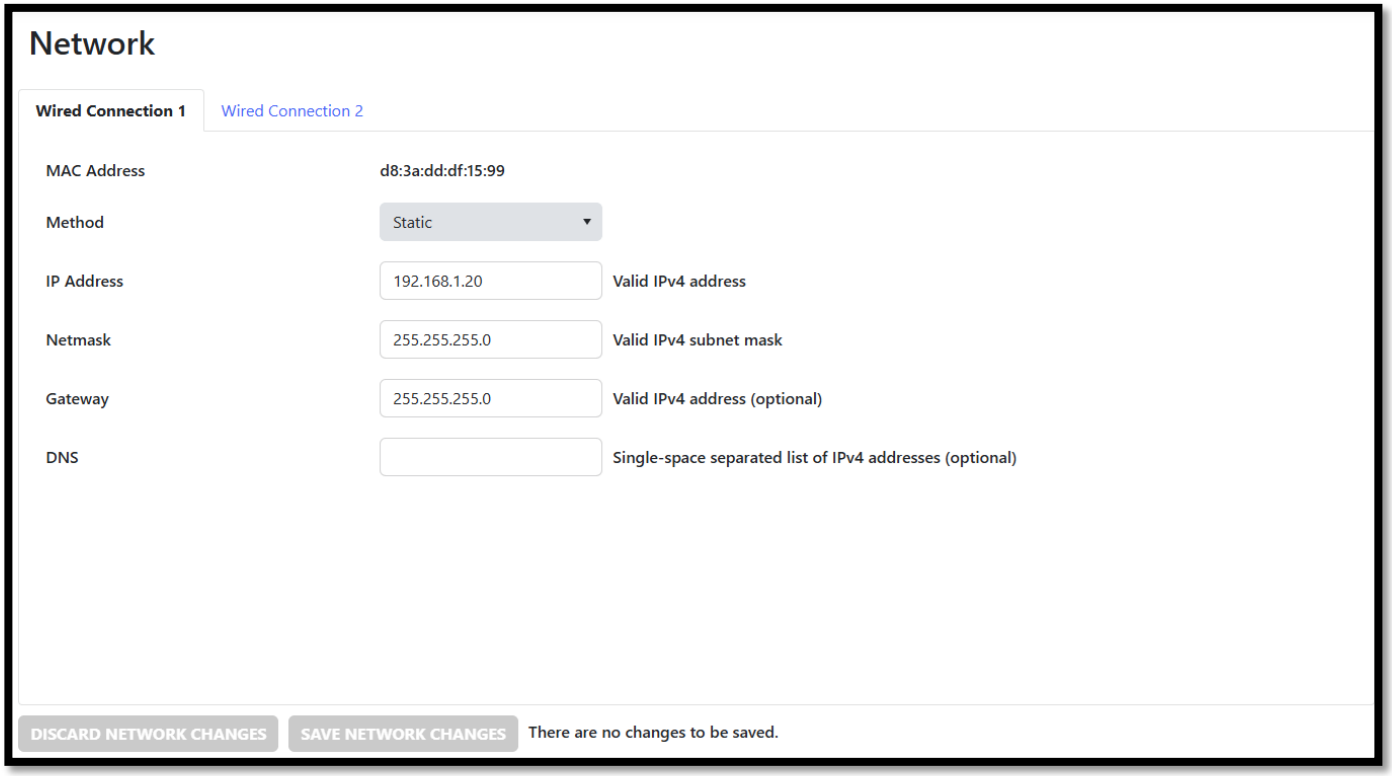
Network

The network configuration area is where the network settings for wired connection 1 and 2 are assigned.

When changing the IP address of the Historian, the change will take effect as soon as changes are saved. The unit may still be accessible at the previous IP after saving changes for a short time.

To set the IP address statically:

1. Ensure the connection is set to static.
2. Enter the IP address and Netmask.
3. Enter gateway and DNS information if required.
4. To save network changes, click the **SAVE NETWORK CHANGES** button below.



Time

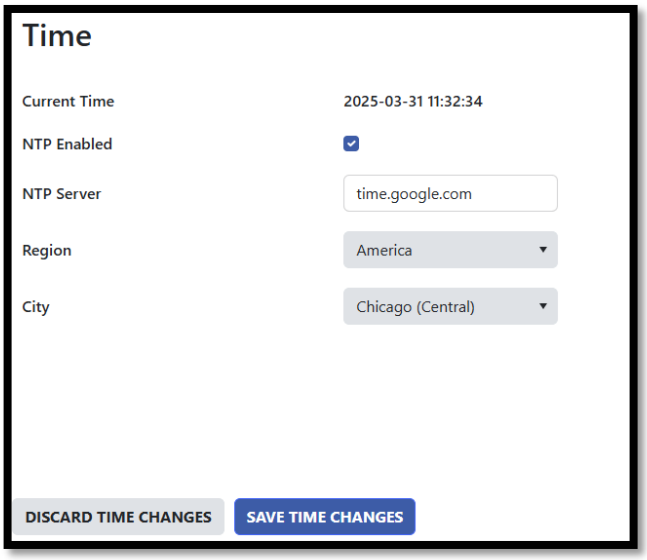
The time configuration area is where the Network Time Protocol (NTP) or to manually set the Historian's clock.

When changing the NTP Server, the change will take effect as soon as changes are saved.

NTP is used to set the internal clock of the Historian. The time is used with the stored data to display the exact time your data is stored. The Current Time that is used is displayed.

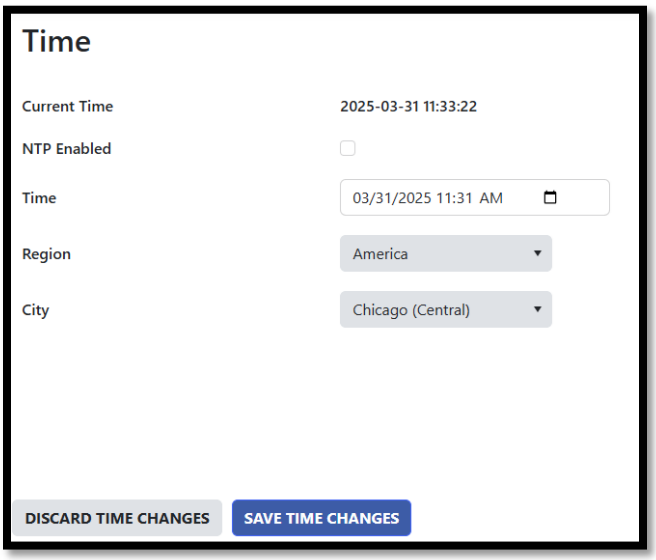
To set the clock with NTP:

1. Enable the NTP Enabled.
2. Enter the NTP Server's name and verify the DNS is entered in the Wired Connection.
3. Select the Region and City to adjust the clock.
4. To save time changes, click the **SAVE TIME CHANGES** button below.



To set the clock manually:

1. Disable the NTP Enabled.
2. Select the Day/Month/Year Hour:Minute and AM/PM to use for the time.
3. Select the Region and City to adjust the clock.
4. To save time changes, click the **SAVE TIME CHANGES** button below.



Protocol Settings

Allen-Bradley PLCs

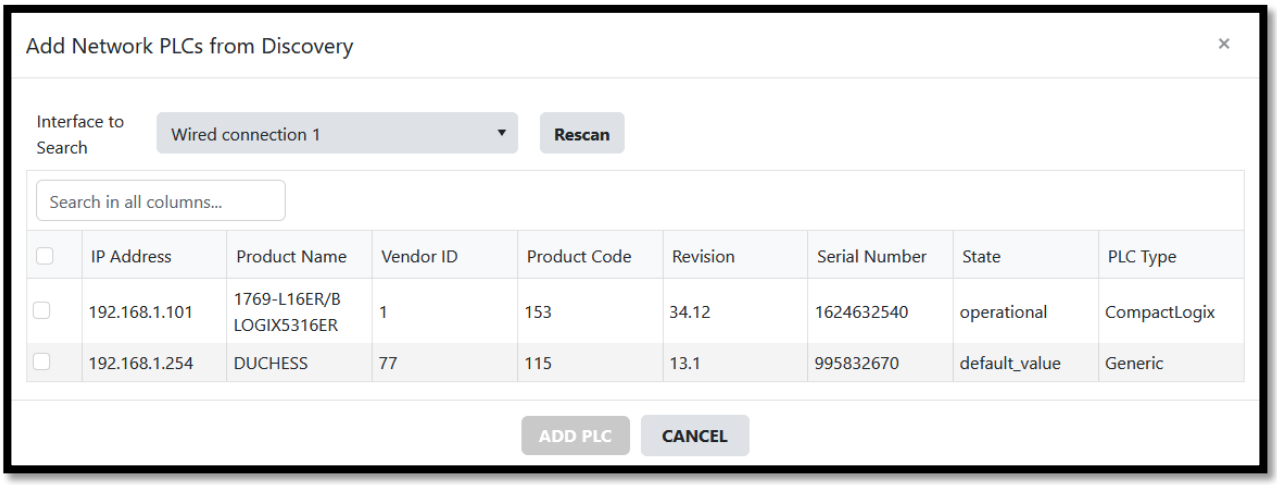
Adding an Allen-Bradley PLC

The Historian can automatically discover up to 10 Allen-Bradley PLCs.

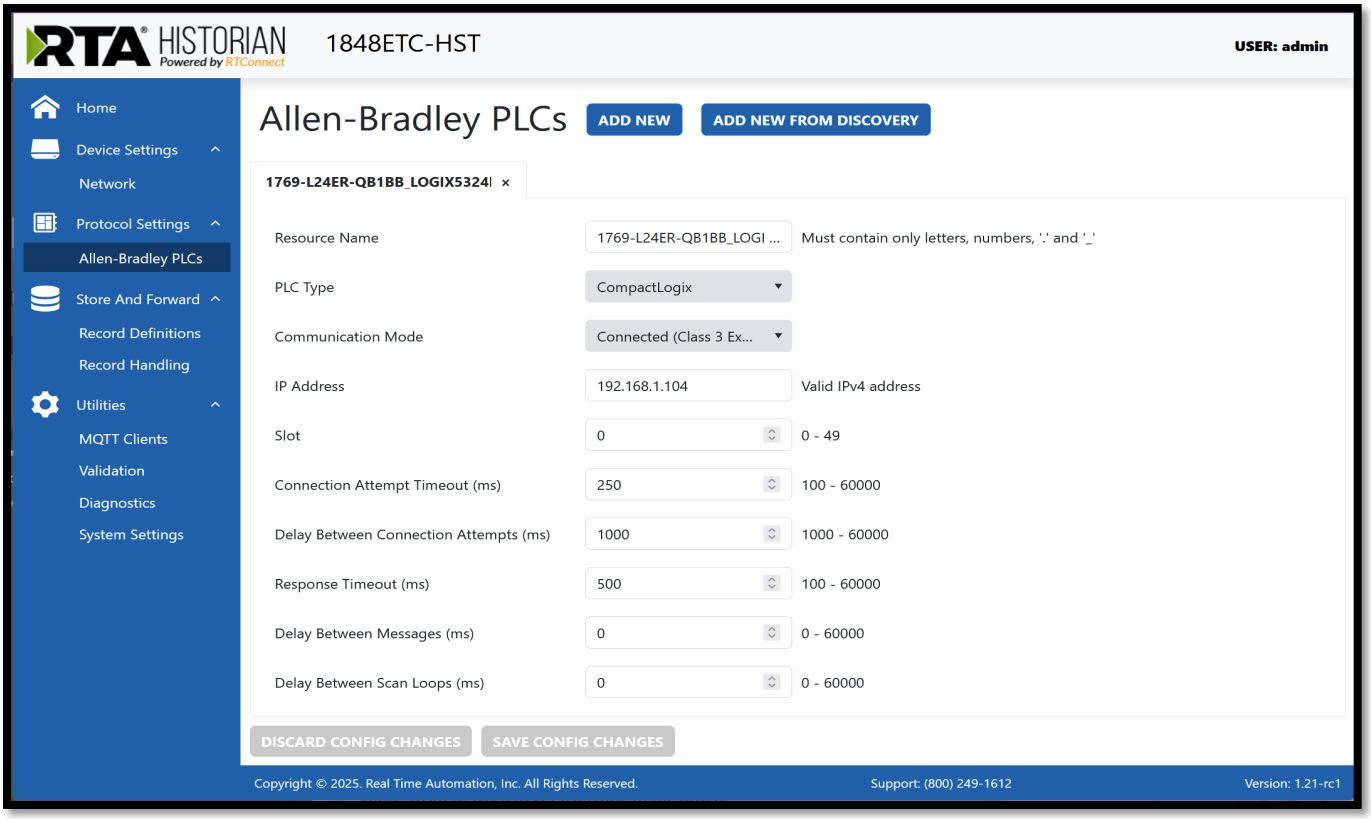
Click **ADD NEW** to manually add a PLC that is on the network.

—Or—

Click **ADD NEW FROM DISCOVERY** to see the available PLCs on the network.



Select the PLC to discover and click **ADD PLC**. This will automatically configure the PLC Type and IP Address.



Allen-Bradly PLC configuration

1. **Resource Name:** Internal reference to the Historian.

2. **PLC Type:** Select the PLC type of CompactLogix, ControlLogix, MicroLogix, SLC, PLC5E, or Generic. Generic is used for any EtherNet/IP discoverable device.

3. **Communication Mode: Connected (Class 3 Explicit)** messaging relies on reserved resources to transfer data to/from the PLC. **Connected (Class 3 Explicit)** messaging is recommended if you are reading and writing and always want to keep that connection open to the PLC.

   Unconnected (UCMM) messaging relies on shared resources to transfer data to the PLC. This could result in message timeouts if there are a lot of devices fighting for these shared buffers. If you don't want the RTA gateway to constantly keep the connection open to the PLC but only maintain a connection when there is data needed to be transferred, then Unconnected (UCMM) will work best if you are only writing to the PLC.

4. **IP Address:** Enter the IP address of the PLC.

5. **Slot:** Enter in the slot that the controller is in. For Embedded Ethernet, enter in a value of 0. All MicroLogix, SLC, and PLC5E should be set to 0.

6. **Connection Attempt Timeout (ms):** How long to wait for PLC to accept the connection before timing out the attempt.

7. **Delay Between Connect Attempts (ms):** Delay between failed connection attempts.

8. **Response Timeout (ms):** Enter the amount of time the Historian should wait before a timeout is issued for a read/write request.

9. **Delay Between Messages (ms):** The Delay Between Messages is a forced delay for each request the Historian sends to the PLC.

    a. This setting will affect the speed at which a message is delivered and the amount of traffic the Historian adds to the network.
    b. If set to 0, the Historian will communicate as fast as possible to the PLC and generate the most traffic.
    c. In applications with a heavy network, it is recommended to increase this delay to limit network traffic.

10. **Delay Between Scan Loops (ms):** Enter the length of time to delay between last read request to the first request defined.

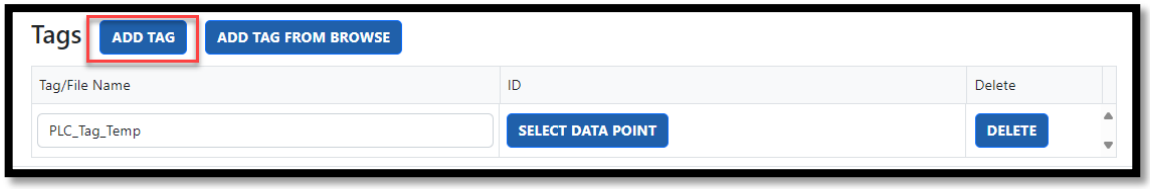
Configuring Tags

PLC Tags can be added manually or added via discovery. The process for both can be found in the section below.

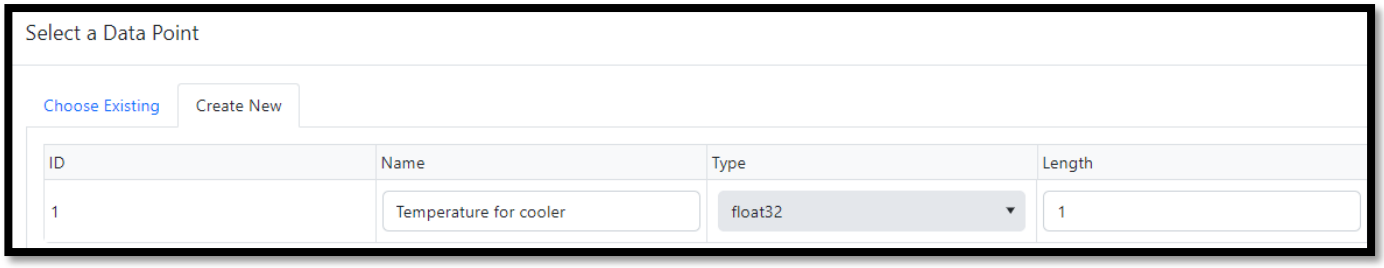
Note: Tag discovery is not supported for CompactLogix and ControlLogix Version 20 or older, SLC, MicroLogix, and PLC5E.

Add Tags Manually

1. Click **ADD NEW** to manually add a tag on the PLC.



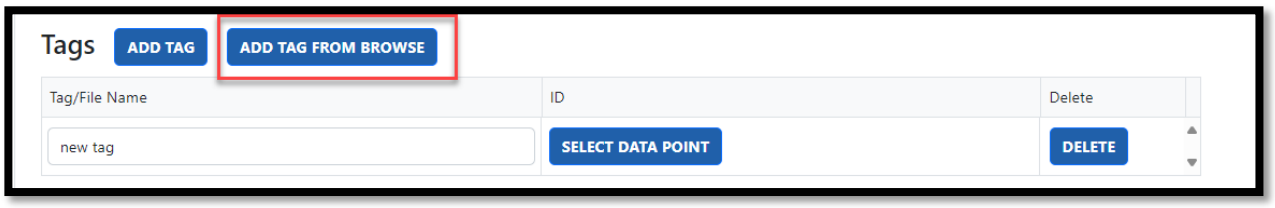
2. In the Tag/File Name in PLC column enter the tag or file to be read from the PLC.
    a. If accessing a tag, this should be the tag name exactly as it appears in the PLC.
    b. If accessing a file, the format should be the file type, followed by the file number, and then the offset. For example, N7:0 would read integer file 7 at offset 0.
3. In the Tag/File Alias column click the **SELECT DATA POINT** button. The Select a Data Point window should open.
4. Navigate to the **CREATE NEW** tab in the Select a Data Point window.



5. In the Name column enter the label this data should have when being stored locally.
6. In the Type column enter the data type of the tag or file.
7. In the length column enter the array size of the tag or file.
8. Press Ok in the Select a Data Point window to finish creating the tag.

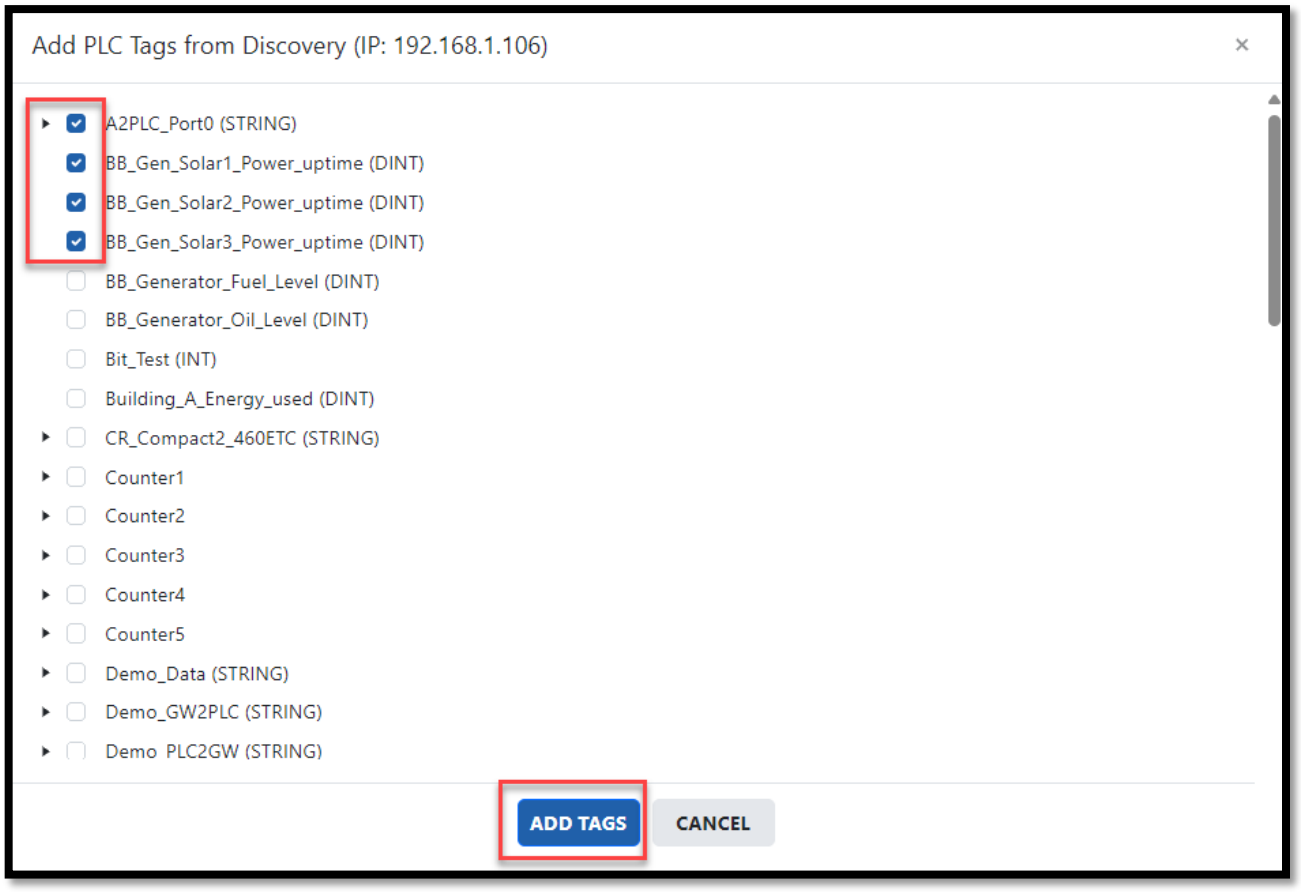
Add Tags Via Discovery

1. Click the **ADD TAG FROM DISCOVERY** button, the add PLC tags from discovery window should open.

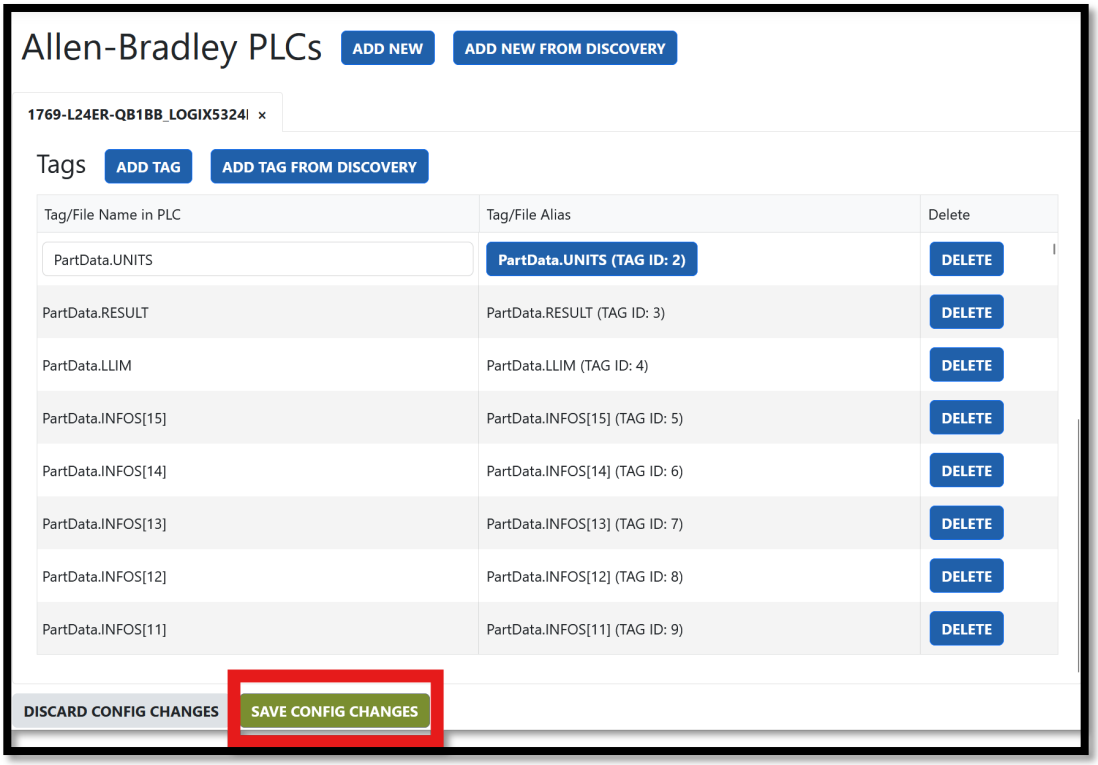


2. Select the tags to add by clicking the checkbox next to the tag name. Arrays and UDTs can be expanded to select specific points or the root can be selected to select all points.

3. Click the **ADD TAGS** button to add the selected points to the configuration.



4. All tags that were selected will be displayed (shown below). Once completed click **SAVE CONFIG CHANGES**.



Store And Forward

Record Definitions

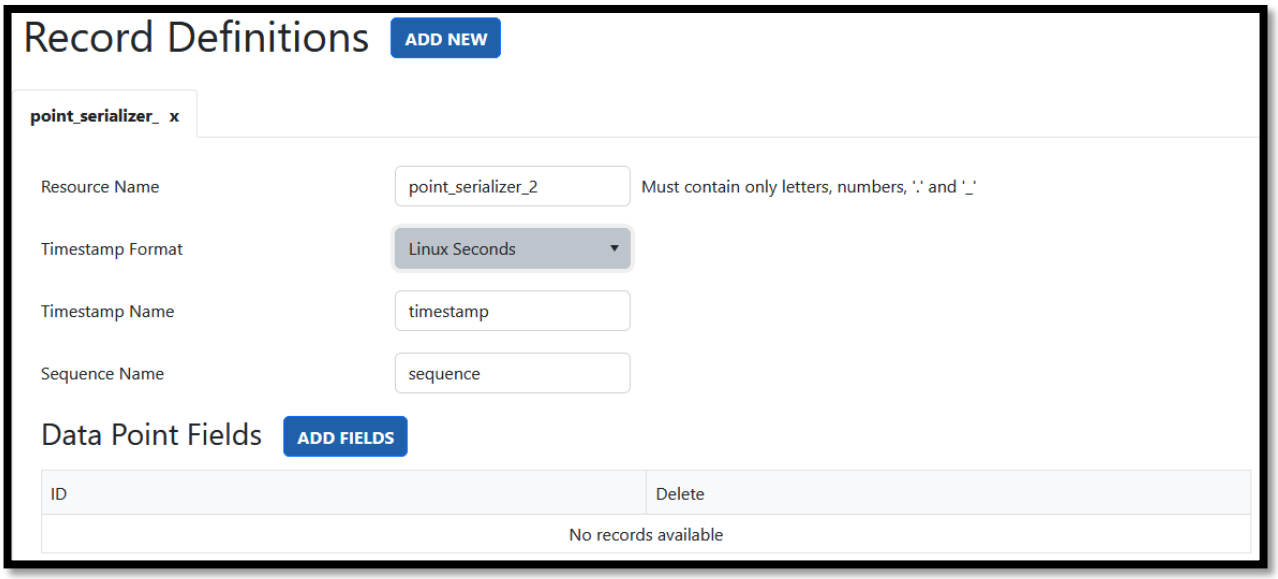
The Record Definitions page is used to group data points that are stored as a record in the database. If forwarding is configured, the Record Definition is published to MQTT in a JSON formatted payload.

Click the **ADD NEW** button next to Record Definitions to add a new Record Definition.

1. **Resource Name:** Enter the resource name to be used when referencing this Record Definition.
2. **Timestamp Format:** Select the format for the timestamp in the record.
    a. **Linux Seconds:** Seconds since Jan-1st-1970
    b. **Linux Milliseconds:** Milliseconds since Jan-1st-1970

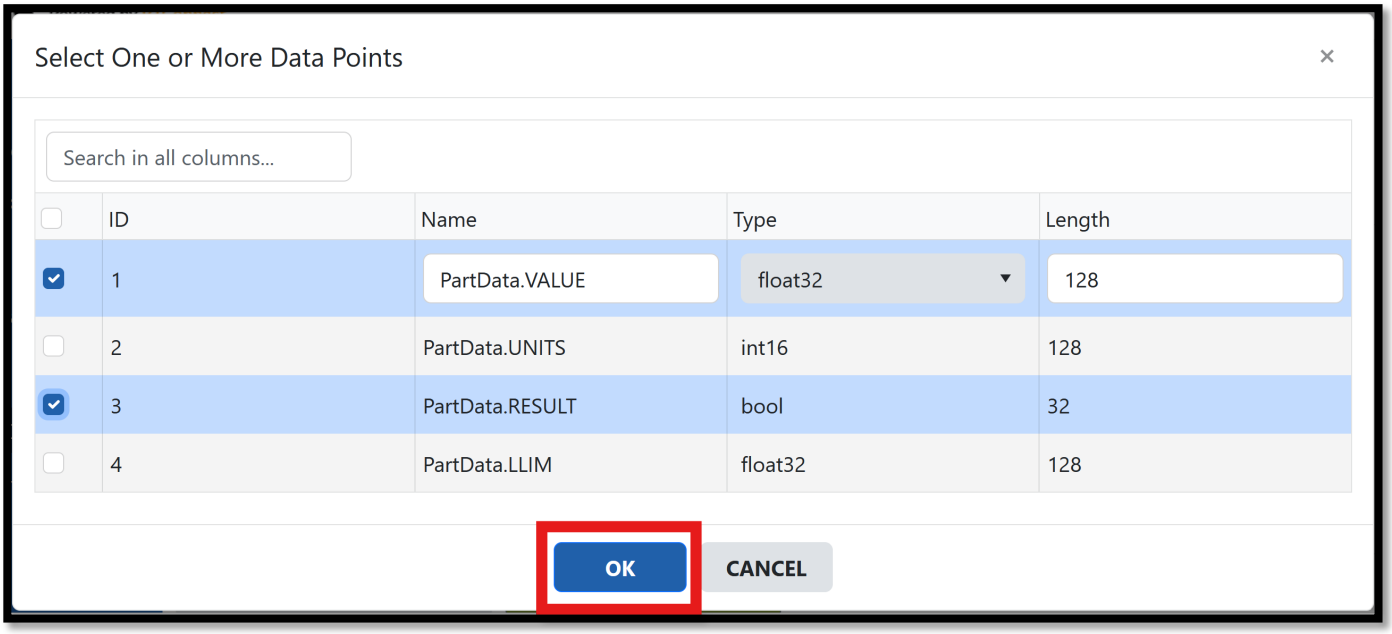
a. **Date Time Milliseconds:** Current date formatted as YYYY-MM-DD.hh.mm.ss.ms

3. **Timestamp Name:** Enter the name/label for the timestamp in the record.
4. **Sequence Name:** Enter the name/label for the sequence number in the record.



5. Click the **ADD FIELDS** button to add PLC tags to the record. The **Select One or More Data Points** window should pop up. The table is populated with tags from the configured PLCs.

6. Select the tags to add to the Record Definition by clicking the checkbox on the left and clicking **OK**.

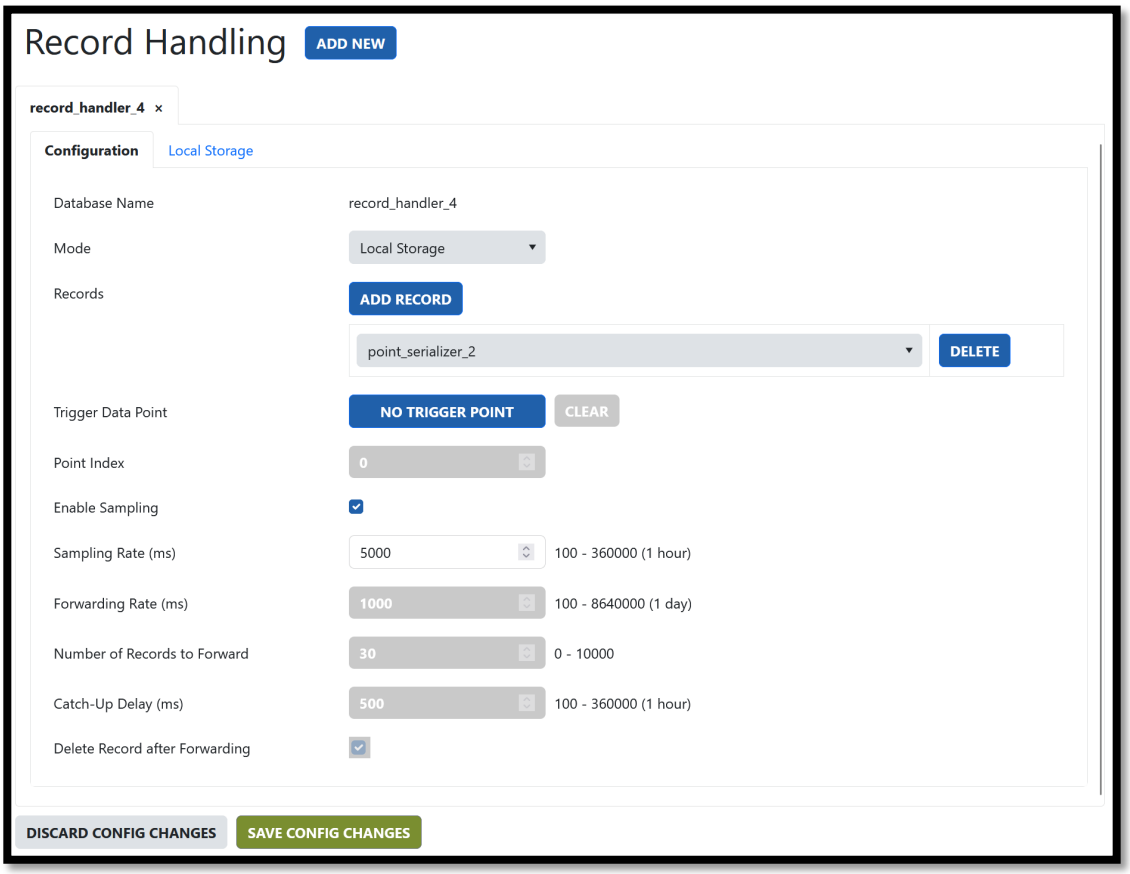


Record Handling

The Record Handling page is used to configure when or how the Record Definition is stored as a record in the database. If forwarding is configured, the Record Definition selected is forwarded to the specific MQTT connection also selected in a JSON format.

Click the **ADD NEW** button next to Historians to add a new Historian configuration.

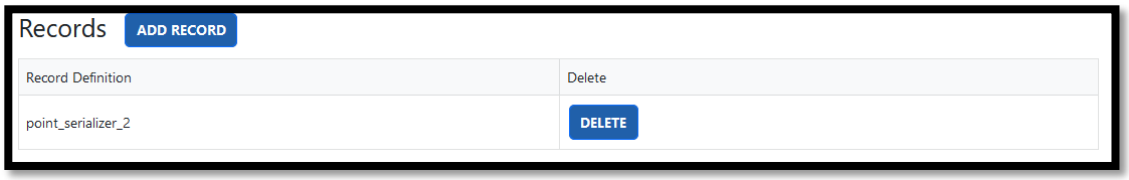
Configuration



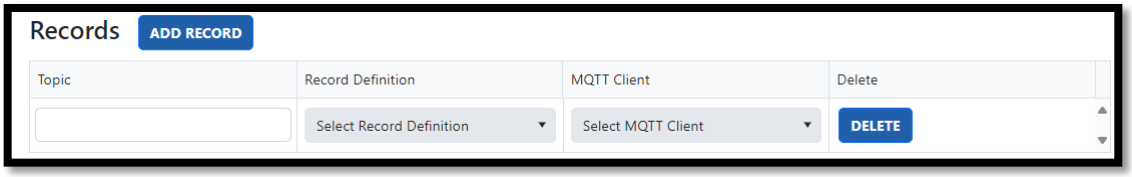
1. **Database Name:** Enter the name used when referring to this Historian.
2. **Mode:** Select what to do with the records when triggered or cyclic.
   a. **Forward:** Forward data to MQTT without storing any data locally on the Historian.
   b. **Forward and Local Storage:** Store the record locally and Forward it to via MQTT.
   c. **Local Storage** Store the record locally only, do not forward to MQTT.

3. Click the **ADD RECORD** button to add a record which will be used to associate a Record Definition with this record handler. If the mode configuration is set to Forward or Forward and Local storage the record is also used to assocaiate an MQTT topic and an MQTT client. The configuration will look different depending on the selection as shown below.

Local Storage Record Configuration:



Forward or Forward and Local Storage Record Configuration:



Record Definition: Use the dropdown to select the Record Definition to be stored locally or forwarded to MQTT.

MQTT Client: Select the MQTT Client to be used when publishing data to MQTT.

Topic: Enter the MQTT topic the record should be published to if mode is set to forward or forward and local storage.

4. **Trigger Data Point:** Select a data point to act as a trigger for storing records. When the selected data point changes value, all configured data points current values will be captured and stored as records. This allows for greater PLC control over when records are captured.

   This will operate alongside normal sampling unless the enable sampling checkbox is disabled. This configuration is optional. The clear button can be pressed to clear the point selected in this configuration.

5. **Point Index:** Used to configure the array index of the trigger point if required. For example, if the trigger data point is a tag with 10 values in it, the point index can be set to 9 to target the last value in the array. Only takes affect if a trigger data point is configured.

6. **Enable Sampling:** Enable the cyclic sampling of configured data points to store as a record or forward to MQTT.

7. **Sampling Rate (ms):** Enter how long to wait between sampling data to log to the Historian in milliseconds.

8. **Forwarding Rate (ms):** Enter how long to delay between cyclic publishes to the MQTT Broker in milliseconds. Only takes affect if an MQTT client is configured and mode is set to Forward or Forward and Local Storage.

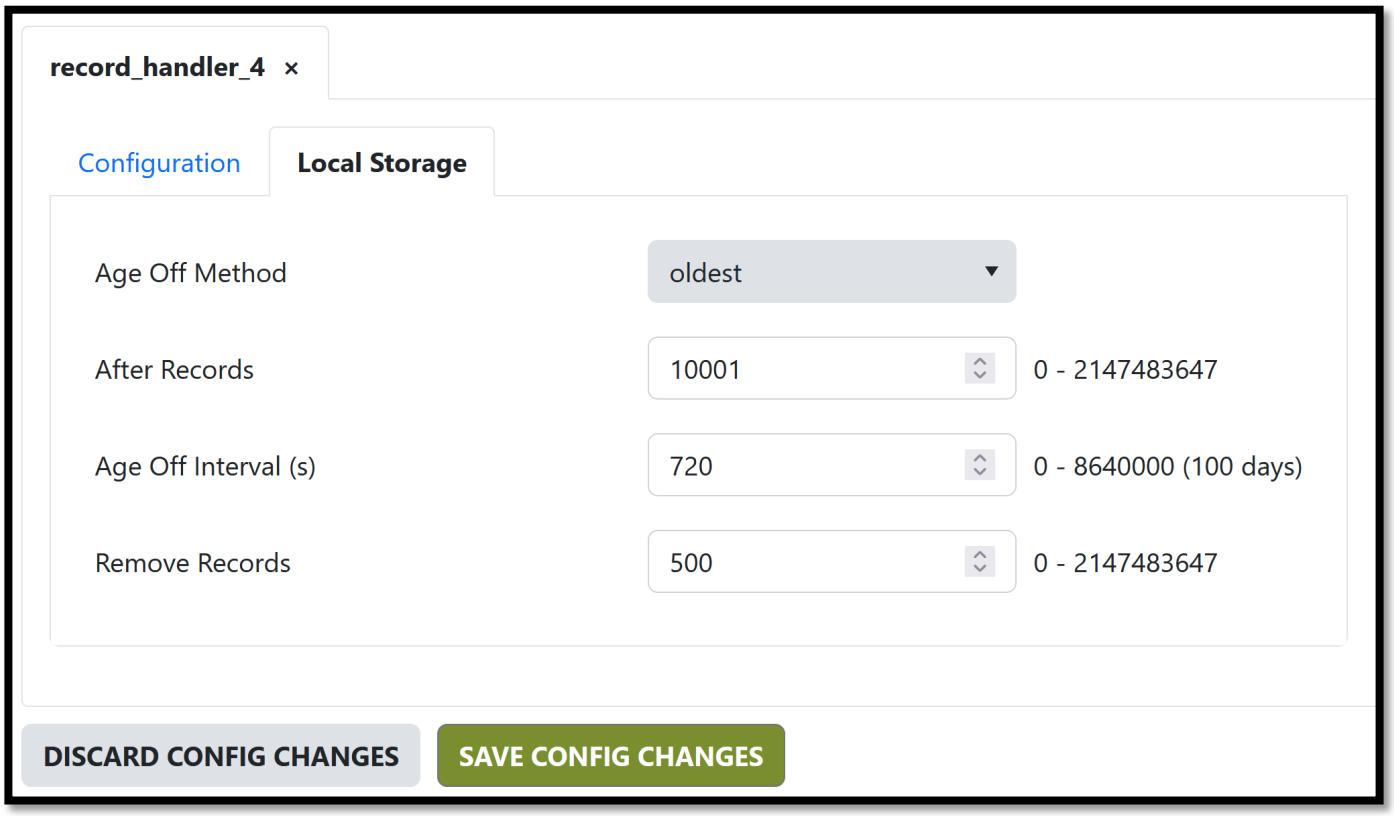
9. **Number of Records to Forward:** Enter the maximum number of records that can be forwarded to MQTT in one publish. Only takes affect if an MQTT client is configured and mode is set to Forward or Forward and Local Storage.

10. **Catch-Up Delay (ms):** The forwarding rate to use after a disconnect has occurred to catch up to the most recent records. This should always be lower than the Forwarding Rate. Only takes affect if an MQTT client is configured and mode is set to Forward or Forward and Local Storage.

11. **Delete Record after Forwarding:** Select whether to delete a record from local storage after it has been forwarded to MQTT. Only takes affect if an MQTT client is configured and mode is set to Forward or Forward and Local Storage.

Local Storage

The local storage tab is used to define how to delete records from the database.



1. **Age Off Method:**

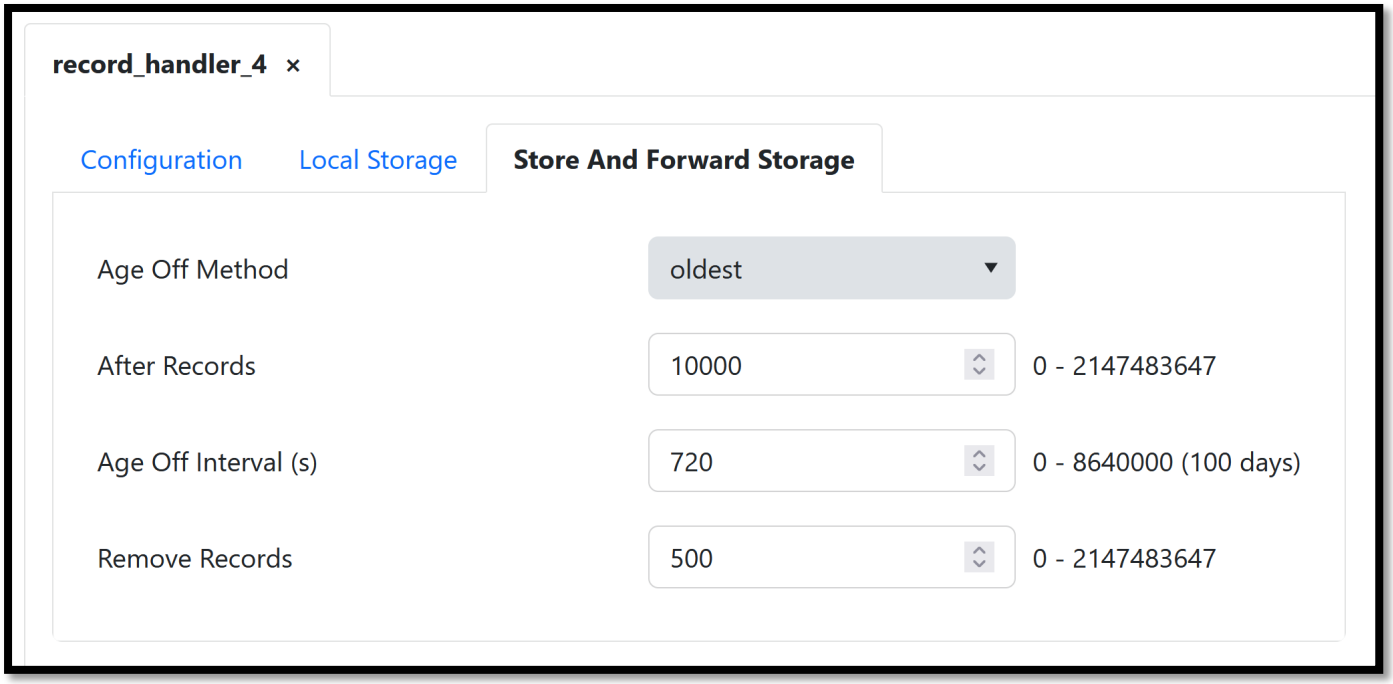
   a. **Oldest:** When set to oldest, the oldest records will be aged off and removed from the record database.
   b. **Newest:** When set to newest, the newest records will be aged off and removed from the record database.

2. **After Records:** The maximum number of records that can be stored by this Historian before records start getting aged off. If there are more records than the configured number, the Historian will age off the number of records configured in the Remove Records configuration until there is fewer records than the configured number.

3. **Age Off Interval (s):** The interval at which the Historian will age off records. Every time this interval is hit, the Historian will age off the number of records defined in the Remove Records configuration.
4. **Remove Records:** The number of records that will be aged off when hitting the age off interval or max number of records.

Store And Forward Storage

The Store and Forward tab is used to define the parameters for data that will be forwarded to MQTT. They'll be stored locally and temporarily stored if no MQTT connection is available.



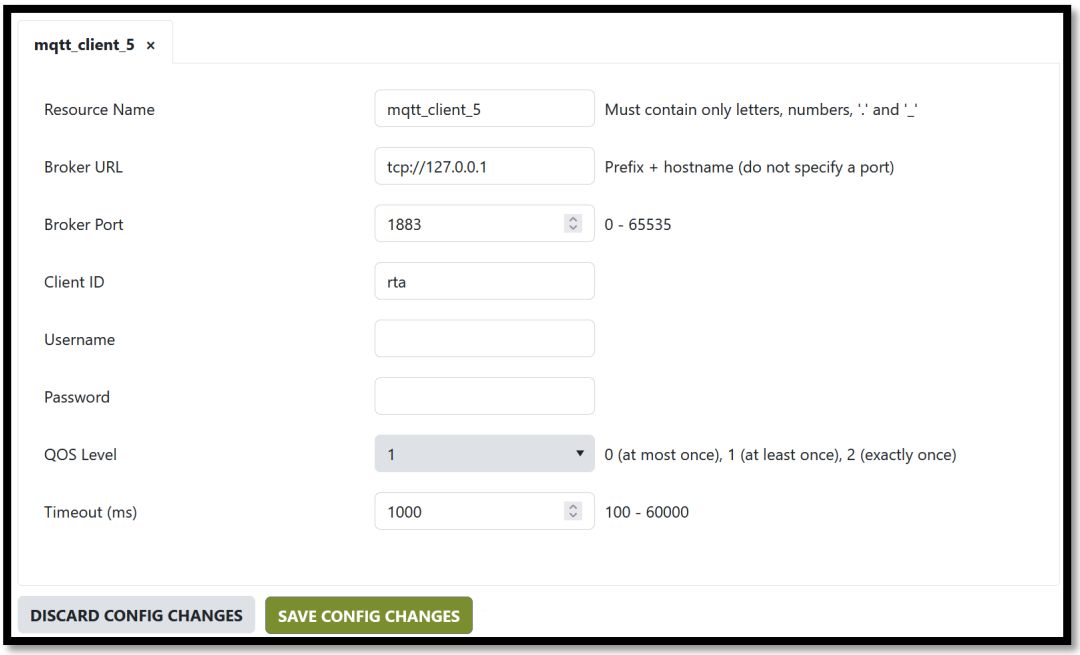
1. **Age Off Method:**
   a. **Oldest:** When set to oldest, the oldest records will be aged off and removed from the record database.
   b. **Newest:** When set to newest, the newest records will be aged off and removed from the record database.
2. **After Records:** The maximum number of records that can be stored by this Historian before records start getting aged off. If there are more records than the configured number, the Historian will age off the number of records configured in the Remove Records configuration until there is fewer records than the configured number.
3. **Age Off Interval (s):** The interval at which the Historian will age off records. Every time this interval is hit, the Historian will age off the number of records defined in the Remove Records configuration.
4. **Remove Records:** The number of records that will be aged off when hitting the age off interval or max number of records.

Utilities

MQTT Clients

The MQTT Clients configuration is an optional configuration that can be used to publish data to an MQTT broker. The MQTT Client will only be used if the Mode configuration on a record handler is set to Forward or Forward and Local Storage.

Click **ADD NEW** to add a MQTT Client. MQTT can support up to 10 connections.

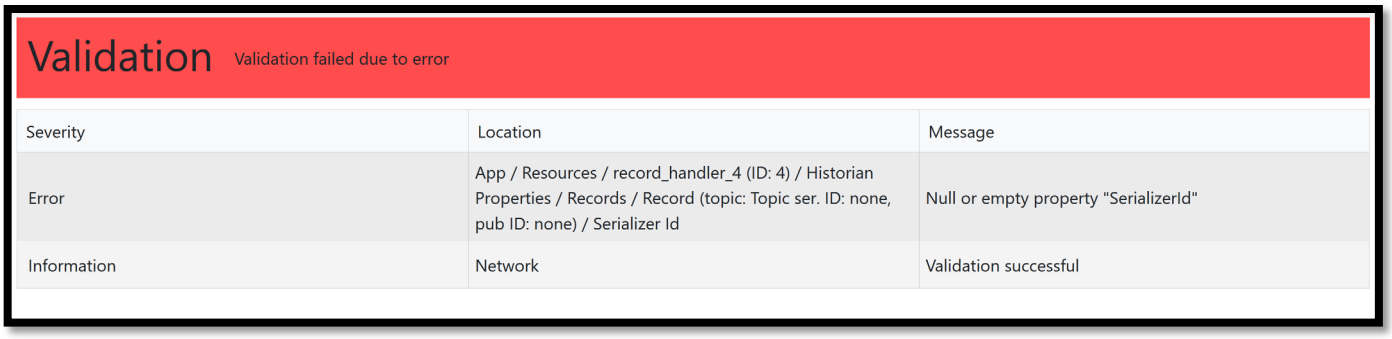


MQTT Configuration

1. **Resource Name:** Enter the name to be used when referring to this MQTT Client.
2. **Broker URL:** Enter the unique MQTT broker IP address/URL.
3. **Broker Port:** Enter the TCP port for the MQTT broker to open the connection.
4. **Client ID:** Enter the Client ID to be used when connecting to the broker.
5. **Username and Password:** Enter if authentication to the MQTT broker is required.
6. **QOS Level:** Select the QOS Level the MQTT Messages should be published with.
7. **Timeout (ms):** Enter the amount of time in milliseconds (ms) to wait before closing the connection if communication with the broker is lost.

Validation

The Validation page is used to easily view any errors in the configuration. If the **SAVE CONFIG CHANGES** button is greyed out and/or says “The application has validation errors. Check validation page for details” come to this page to easily review any errors that may be preventing the configuration from saving and running.



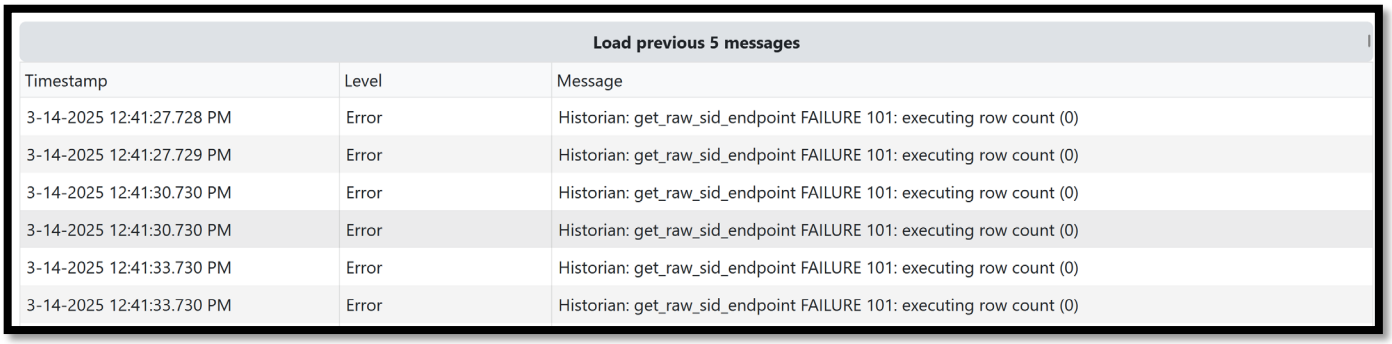
Validation — Validation failed due to error

Severity	Location	Message
Error	App / Resources / record_handler_4 (ID: 4) / Historian Properties / Records / Record (topic: Topic ser. ID: none, pub ID: none) / Serializer Id	Null or empty property "SerializerId"
Information	Network	Validation successful

Diagnostics

The Diagnostics page can be used to see messages while the Historian is running. These messages include items such as:

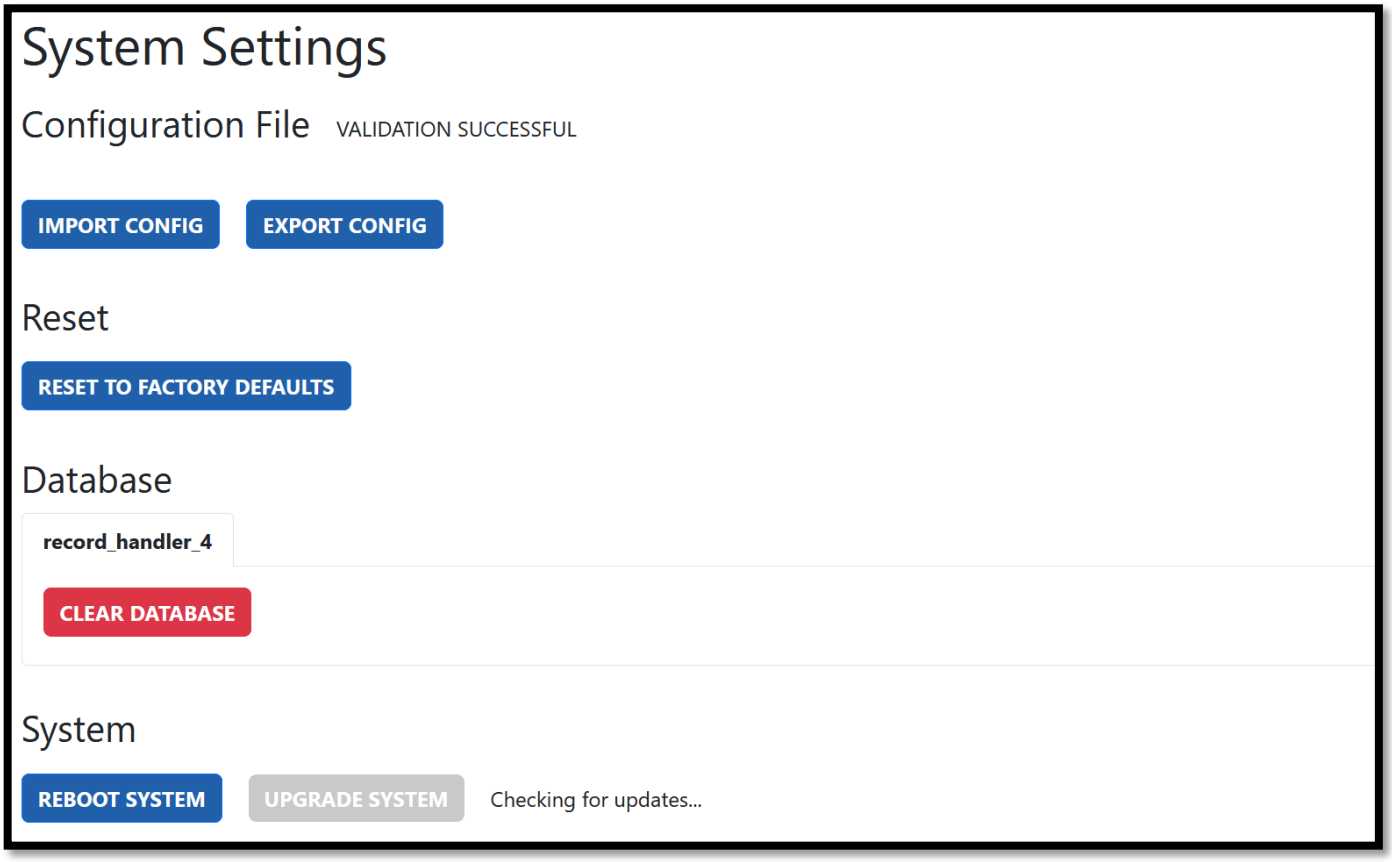
1. **Errors:** Failure to connect to a configured PLC or MQTT Broker.
2. **Information:** Application information such as process starting or stopping, records being aged off, data successfully being published to MQTT, etc.



Load previous 5 messages

Timestamp	Level	Message
3-14-2025 12:41:27.728 PM	Error	Historian: get_raw_sid_endpoint FAILURE 101: executing row count (0)
3-14-2025 12:41:27.729 PM	Error	Historian: get_raw_sid_endpoint FAILURE 101: executing row count (0)
3-14-2025 12:41:30.730 PM	Error	Historian: get_raw_sid_endpoint FAILURE 101: executing row count (0)
3-14-2025 12:41:30.730 PM	Error	Historian: get_raw_sid_endpoint FAILURE 101: executing row count (0)
3-14-2025 12:41:33.730 PM	Error	Historian: get_raw_sid_endpoint FAILURE 101: executing row count (0)
3-14-2025 12:41:33.730 PM	Error	Historian: get_raw_sid_endpoint FAILURE 101: executing row count (0)

System Settings



1. **Import Config:** Import an existing configuration.
    a. **Import Application:** Import only application configurations, does not affect network configurations
    b. **Import Network:** Import only network configurations, does not affect application configurations.
    c. **Import All:** Import both Network and Application configurations.
2. **Export Config:** Saves the configuration to a file called User_Config.json.
3. **Reset to Factory Defaults:** Reverts the Historian to shipped defaults, this will cause the loss of all configurations except network settings.
4. **Clear Database:** Clears the database of all its stored records.
5. **Reboot System:** Shuts down and then reboots the Historian device.
6. **Upgrade System:** When connected to the internet, the Historian is able to check for updates and can be updated to the latest version if a newer version is available by pressing the **UPGRADE SYSTEM** button. More information in the Updating Firmware section below.

Change Username & Password

Default Username and Password

Username: admin
Password: admin
Note: Username and Password are case sensitive

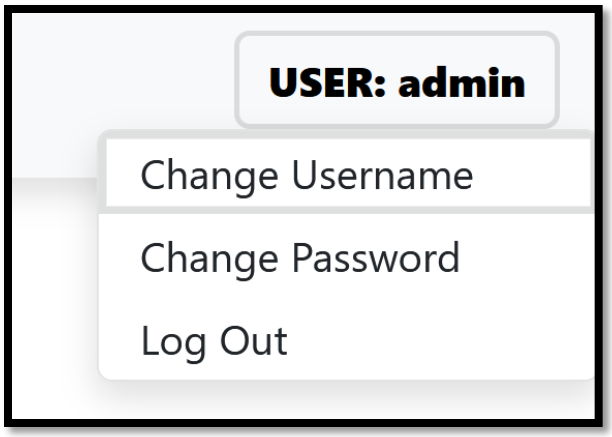
Recovering Lost Username or Password

In the event of a lost username or password please reach out to RTA at 1-800-249-1612 or support@rtautomation.com for instructions on recovering the username and password.

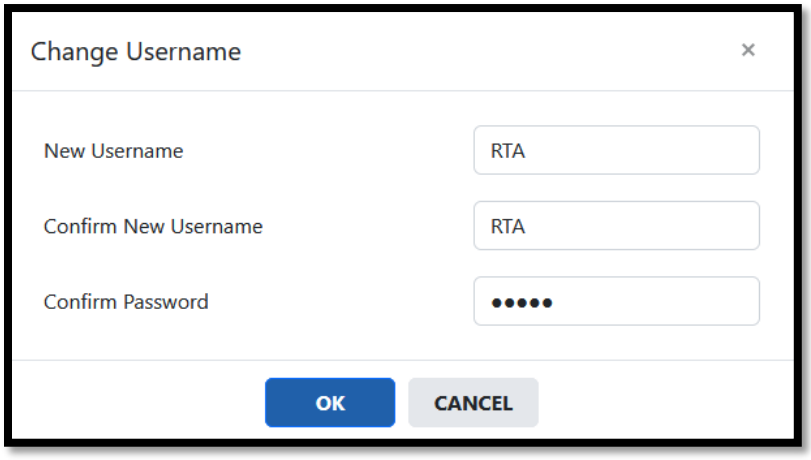
Please note the MAC address of Ethernet port 1 of the Historian as this will be required to reset the username and password. This information can be found on the Network page or on the back of the unit.

Changing Username and Password

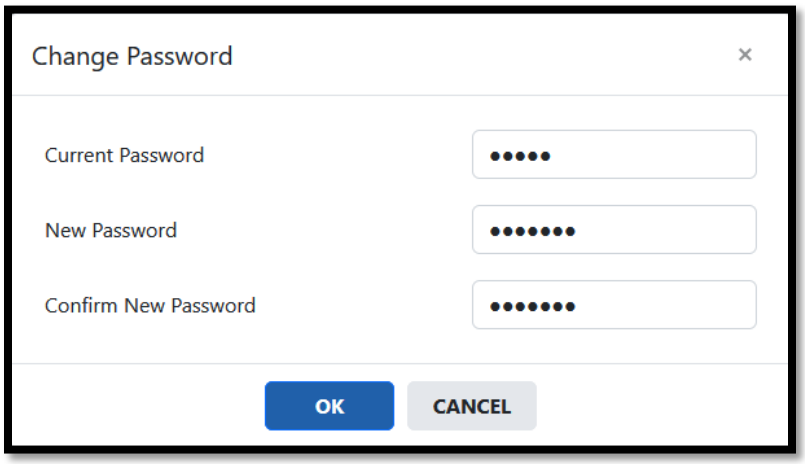
Changing the Username or Password can be done by clicking on the user in the top right corner of the webpage and selecting either Change Username or Change Password.



When changing the username, the new username will need to be entered twice followed by the current password as shown below. Upon making this change the user will be logged out and will need to log in again to continue making changes.



When changing the password, the new password will need to be entered twice as well as the current password as shown below. Upon making this change the user will be logged out and will need to log in again to continue making changes.



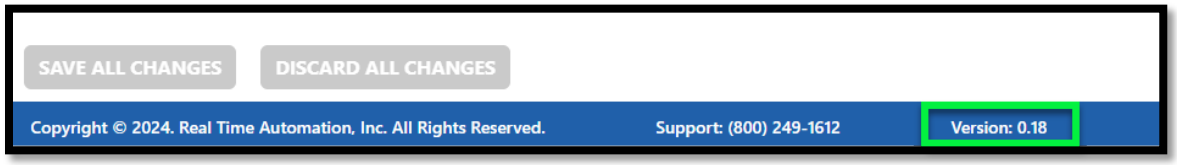
Updating Firmware

Updating Firmware From the Webpage

To check for updates and update the Historian firmware from the web-based configuration:

1. Ensure the Historian has access to the internet.
2. Navigate to the System Settings page.
3. Under the System section it should say "Checking for updates…" as shown below.

4. After a moment of scanning, "Checking for updates…" should update to either "Updates Available:" or "Currently running latest:" followed by some revision information.
5. If updates are available, stop the historian and click the Upgrade System button to update to the latest version. Please note that this update may take anywhere from 5 to 30 minutes, depending on connection speeds and the webpage will become unavailable during the update.
6. Once complete the Version number will be updated.



Updating Firmware From a USB

If updating directly from a connected USB device is required, please reach out to RTA Support. Once you receive the Firmware from RTA the upgrade should take 5 minutes, and the web browser will refresh automatically.

Support Hours are Monday-Friday 8am-5pm CST
Toll free: 800-249-1612
Email: support@rtautomation.com

Downloading Records to USB Storage Device

When storing records locally they can be downloaded to a USB storage device automatically simply by plugging the storage device into one of the three available USB ports. No configuration or interaction with the webpage is required to initiate this download.

Once the USB storage device has been plugged in, it should be left in place for at least 5 seconds to ensure the historian has time to download to the storage device. All downloaded files will be provided in CSV format. Database and PDF formats are not supported via the USB download method.

Note: New records captured while downloading to a USB storage device may be lost.