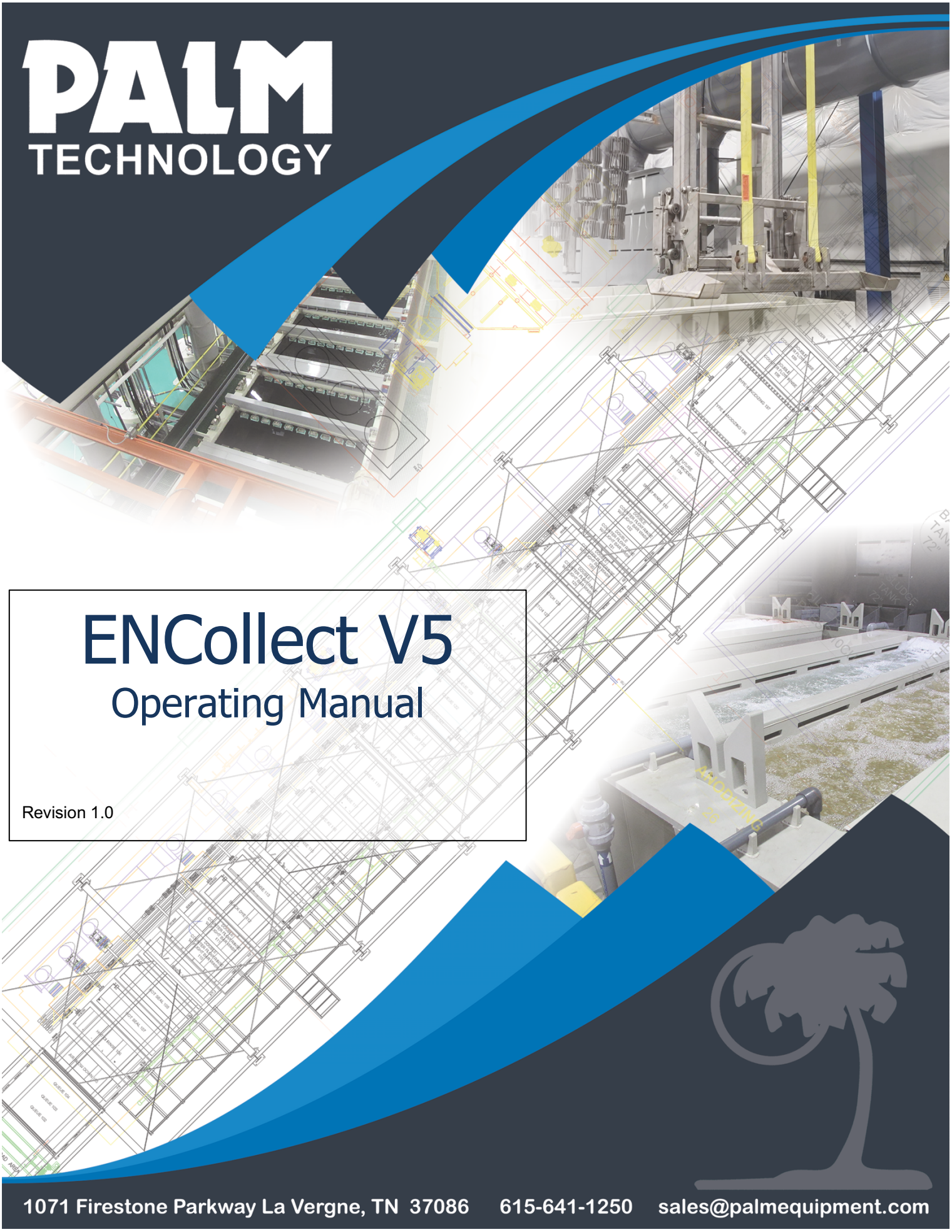
PALM TECHNOLOGY



ENCollect V5

Operating Manual

Revision 1.0

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Welcome

ENCollect Version 5 – Enhanced Performance & Features

ENCollect V5 builds upon previous versions, introducing new capabilities to enhance user experience and functionality.

Designed for the **ENControl 3300 - Electroless Nickel Controller** data management, ENCollect offers a comprehensive solution for real-time monitoring, recording, and analysis.

Key features include:
- Live Data Tracking – Monitor system performance in real time.
- Statistical Analysis – Gain insights through advanced data processing.
- Graphical Visualization – Interpret trends with intuitive charts.
- Data Import/Export – Seamlessly integrate with other systems.

This documentation provides detailed guidance on utilizing ENCollect's major functions efficiently.

System Requirement: ENCollect V5.0 requires ENControl 3300 software V2.0 or higher.

What's new

What’s New in ENCollect V5

ENCollect V5 brings powerful new features and enhancements to streamline data collection, improve analysis, and expand connectivity with the 3300 controller.

Here’s what’s new:

Expanded Communication Options: Connect to the 3300 using Serial (Legacy least preferred), USB flash disk, or Network TCP/IP, offering greater flexibility in data retrieval.

Enhanced SPC Charting: New statistical process control (SPC) charting capabilities provide deeper insights into process stability and trends.

Database Maintenance: Built-in tools help manage and optimize database performance, ensuring smooth operation over time.

Seamless Data Import from V4: Easily migrate data from ENCollect V4, preserving historical records and minimizing transition time.

Chemical Consumption Tracking: Monitor and analyze chemical usage over time to improve efficiency and cost management.

Alarm Data Integration: Compare alarm data received directly from the 3300 with alarm conditions programmed into the software, helping to fine-tune system responses.

System requirements

Minimum Requirements

Operating System: Windows 10 or higher
Memory (RAM): 8 GB
Storage: 500 MB of available hard disk space
Graphics: Dedicated or integrated graphics card
Connectivity: Network (TCP/IP), Serial, or USB interface

For best performance, we recommend using a modern PC with an updated operating system and drivers. Ensure that all necessary communication interfaces are properly configured for seamless data transfer.

Icon Ribbon Bar

Navigation Icon Ribbon Bar – Overview

The **Navigation Icon Ribbon Bar** provides quick access to essential features in ENCollect, allowing users to efficiently manage, monitor, and analyze data. Each icon represents a specific function, streamlining workflow and improving usability.

Icon Functions:

1. **Import USB Data** – Transfer recorded data from a USB flash drive into ENCollect.
2. **Serial Monitor** – View and manage data received via a serial connection.
3. **Network Monitor** – Track incoming data from networked devices.
4. **Data Lookup** – Search and analyze collected data efficiently.
5. **Graph Data** – Generate and view graphical representations of data trends.
6. **SPC Charting** – Perform advanced statistical computations on collected data.
7. **Chemical Charting** – View Chemical usage over time with charts and cost calculations.
8. **Monitor Last Database Entry** – View a large-format display of the most recent measurement ***recorded in the database*** for a selected unit.
9. **Export to Excel** – Save and export collected data to an Excel file for further analysis.

This ribbon bar provides a **user-friendly** interface for accessing core ENCollect functionalities with a single click, enhancing data monitoring and control efficiency.

Company Setup

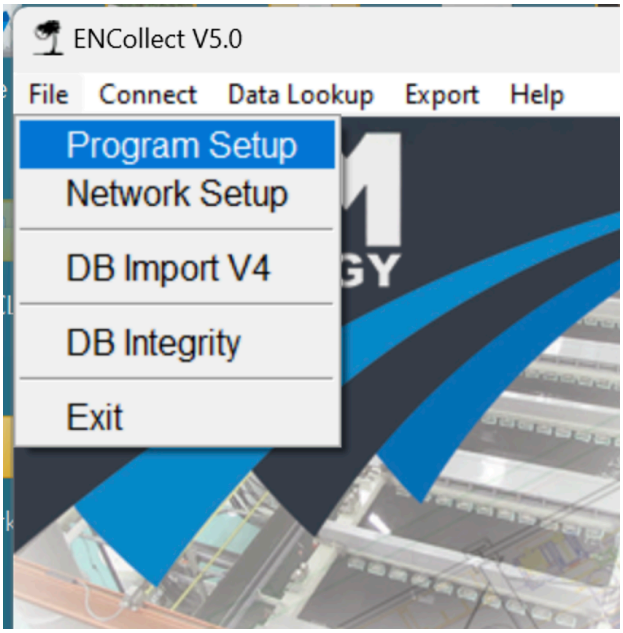
ENCollect Program - Company Setup Guide

Overview

The **Company Setup** section in ENCollect allows users to enter and manage essential company details, ensuring the program is properly licensed and configured. This setup is critical for program functionality, including license validation and communication settings.

Step 1: Accessing Company Setup

1. Open the **ENCollect** program.
2. Click on the **File** menu.
3. Select **Program Setup** from the dropdown list.
4. The **Company Setup** window will appear, where you can enter or update your company information.

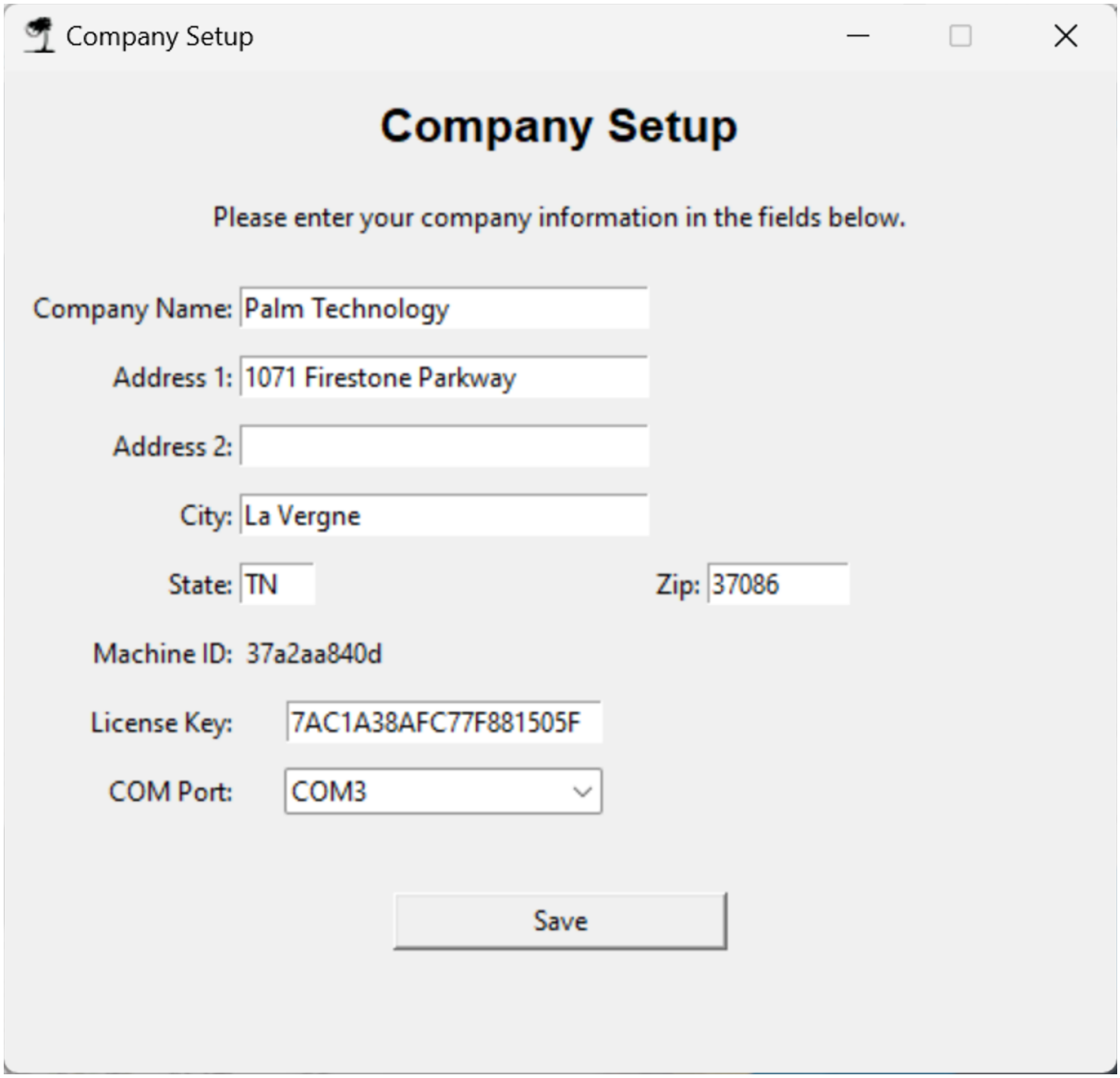


Step 2: Company Setup Fields

The following fields are available in the **Company Setup** window:

- **Company Name** – Enter the name of your company.
- **Address 1 & Address 2** – Input the company's physical address.
- **City** – Enter the city where the company is located.
- **State** – Select or type the state abbreviation.
- **Zip Code** – Provide the postal zip code for the company location.
- **Machine ID** – A unique identifier assigned to your machine (auto-generated and not editable).
- **License Key** – Enter the license key provided with the software to activate the program.
- **COM Port** (Optional) – Select the correct COM port if using serial communication.

After filling in the details, click **Save** to store the company information.



Step 3: Data Import Options

ENCollect supports three different methods to receive data from the **ENControl - Electroless Nickel Controller (3300 series)**, depending on how it is connected:

1. **USB Drive Importing** – Data is transferred via a USB drive that is manually moved between the 3300 controller and the PC running ENCollect.
2. **Serial Communication (COM Port)** – Data is received via a direct serial connection.
3. **Ethernet via TCP/IP** – Data is sent over a network connection, allowing remote access.

For any of these methods to work, the necessary **hardware must be installed in the 3300 controller**. Additionally, the **3300 must be running firmware version 2.0 or higher**.

Step 4: Functionality Behind the Setup

- The **Machine ID** is automatically generated and cannot be changed by the user.
- The **License Key** must be valid to ensure proper program operation.
- The **COM Port** selection is only required if using **serial communication**.
- Clicking **Save** stores the details in the system for future use.

Troubleshooting

- **Invalid License Key**: Ensure that the license key is entered correctly without spaces.
- **Incorrect COM Port**: If using serial communication, verify the connected hardware and ensure the correct COM port is selected.
- **Ethernet Connection Issues**: Ensure the **TCP/IP settings** are correctly configured and that the network connection is stable.
- **USB Drive Not Recognized**: Verify that the drive is formatted correctly and that the 3300 has saved the data properly.
- **Changes Not Saving**: Run the program as an administrator to ensure proper write permissions.

Network Setup

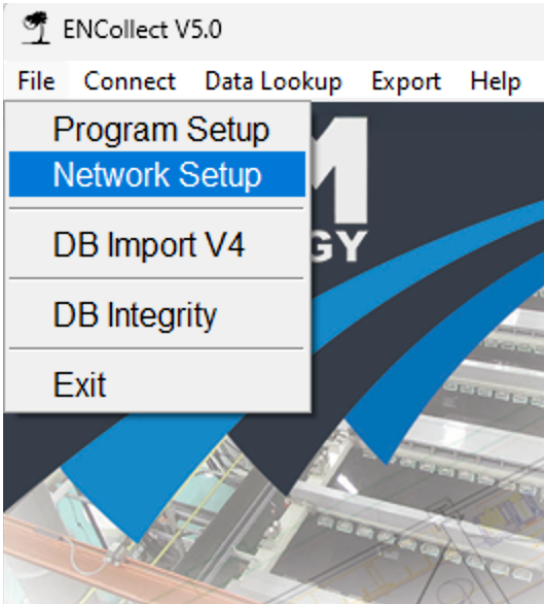
ENCollect Program - Ethernet Network (TCP/IP) Setup Guide

Overview

The **Network Setup** section in ENCollect allows users to configure **Ethernet (TCP/IP) communication** for the **ENControl - Electroless Nickel Controller (3300 series)**. This setup enables the program to receive data directly from controllers over a network, reducing the need for manual data transfers.

Step 1: Accessing Network Setup

1. Open the **ENCollect** program.
2. Click on the **File** menu.
3. Select **Network Setup** from the dropdown list.
4. The **Network Configuration** window will appear, displaying a list of configured devices.



Step 2: Network Configuration Fields

The **Network Configuration** window contains the following field:

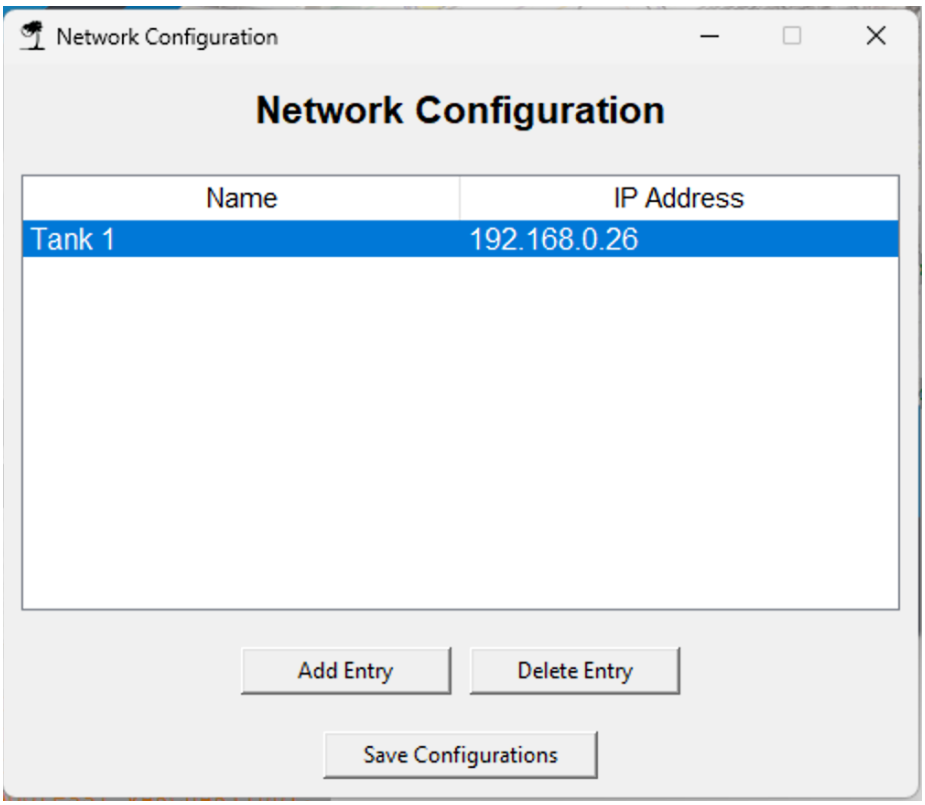
- **IP Address** – The unique network address assigned to the controller.

Step 3: Buttons and Their Functions

- **Add Entry** – Adds a new controller entry with a name and IP address.
- **Delete Entry** – Removes the selected controller entry from the list.
- **Save Configurations** – Saves all changes to the network configuration.

Step 4: Configuring an Ethernet Connection

1. Click **Add Entry** to add a new device.
2. Input the controller's **IP Address** (e.g., 192.168.0.26).
3. Click **Save Configurations** to store the settings.



Step 5: Requirements for Ethernet Communication

- The **3300 controller must have the necessary Ethernet hardware installed**.
- The **3300 must be running firmware version 2.0 or higher**.
- The **controller's IP address must be correctly assigned** and reachable from the PC running ENCollect.
- The **PC and the controller must be on the same network** for communication to work.

Troubleshooting

- **Unable to Connect to the Controller**
  - Verify that the **controller is powered on** and properly connected to the network.
  - Ensure the **IP address is correct** and that there are no conflicts on the network.
  - Try **pinging the IP address** from the PC to check connectivity (ping 192.168.x.x in the command prompt).
- **Network Configuration Not Saving**
  - Run ENCollect as an **administrator** to ensure it has permission to write settings.
- **Data Not Updating**
  - Ensure the **3300 is actively sending data** and that network settings match.

Unit Number Setup

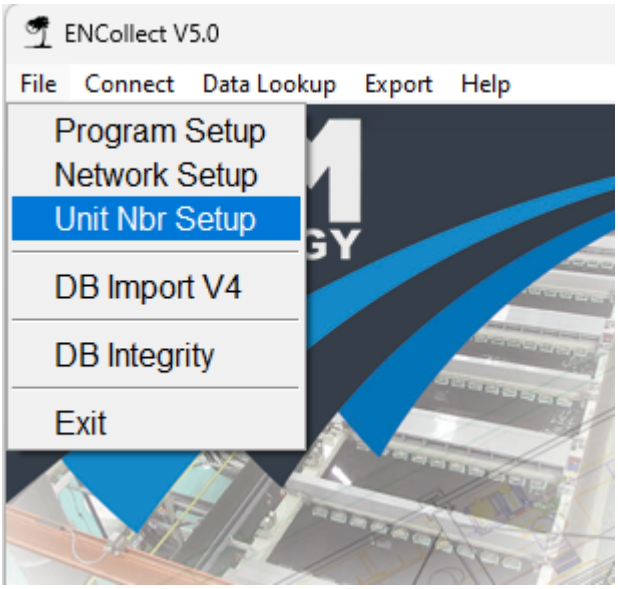
Unit Number Setup in ENCollect V5.0

Overview

The **Unit Number Setup** feature in ENCollect V5.0 allows users to manage unit assignments by mapping **tank names to unit numbers**. This setup ensures that each **unit number** corresponds to a specific **tank**, making it easier to reference and analyze data.

Step 1: Accessing the Unit Number Setup

1. Open **ENCollect V5.0**.
2. Click **File → Unit Nbr Setup**.

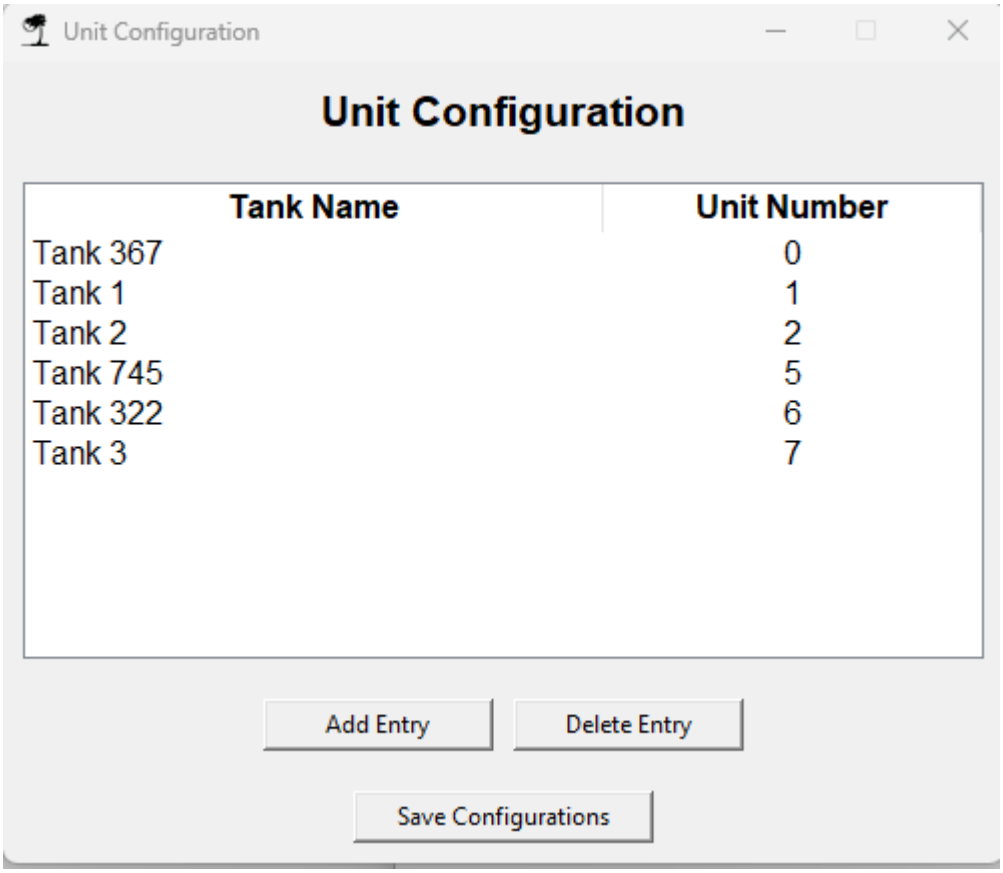


Step 2: Understanding the Unit Configuration Table

The **Unit Configuration Table** consists of:

- **Tank Name**: The identifier for the tank (e.g., "Tank 1", "Tank 367").
- **Unit Number**: The numeric ID assigned to the tank (e.g., 0, 1, 2).

This setup ensures **consistency** across data collection, visualization, and monitoring features.



Step 3: Adding a New Unit Entry

1. Click **Add Entry**.
2. Enter the **Tank Name** and assign a **Unit Number**.
3. Click **Save Configurations** to store the new unit.

Step 4: Deleting an Existing Unit Entry

1. Select the entry from the **Unit Configuration Table**.
2. Click **Delete Entry** to remove it.
3. Click **Save Configurations** to confirm changes.

Step 5: Saving the Configuration

- Once changes are made, clicking **Save Configurations** ensures that updates persist for future use.
- The system **automatically updates all related logs and monitoring tools** with the new unit assignments.

Step 6: Use Cases for Unit Number Setup

- **Ensures accurate unit-to-tank mapping** in monitoring and data logging.
- **Allows flexible reconfiguration** when tanks are reassigned.
- **Improves organization** for users managing multiple units.

Troubleshooting Tips

- If unit assignments **do not appear**, restart ENCollect V5.0.
- Ensure that **each unit number is unique** and not duplicated.
- If an entry **fails to save**, check for **database write permissions**.

Network Scan

ENControl Network Scanner – User Guide

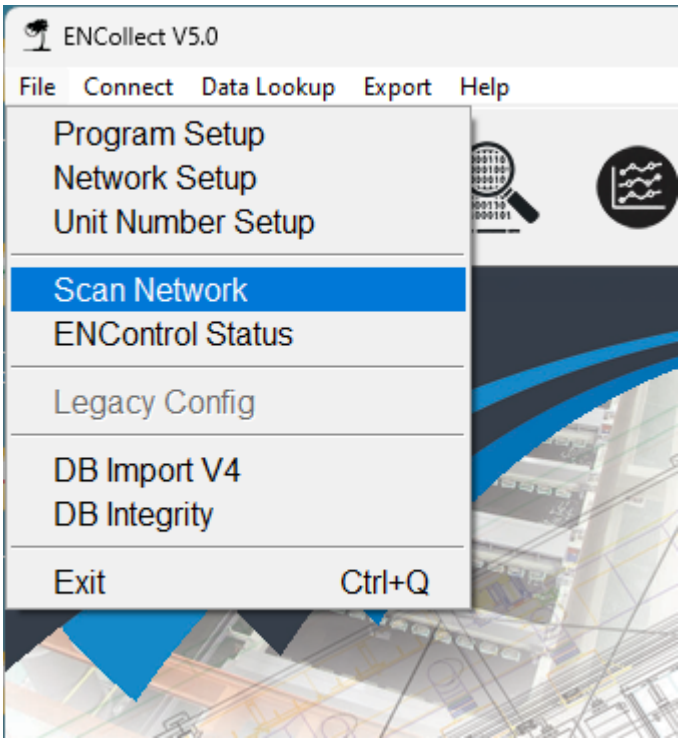
This guide will help you scan for ENControl devices on your network and configure them using the ENControl Network Scanner feature. All ENControl devices with the Ethernet option enabled are shipped from the factory with **DHCP enabled** by default. To use the ENCollect V5 software, a **fixed IP address** is required for the controller.

There are two ways to set a fixed IP address:

1. **Directly from the ENControl 3300** – Navigate to **Setup → Communications** on the device. For detailed instructions, refer to the ENControl software manual.
2. **Over the Network using the ENCollect Network Scanner** – This method allows you to configure the IP address remotely through the Ethernet port. Follow the steps below to complete the process using ENCollect.

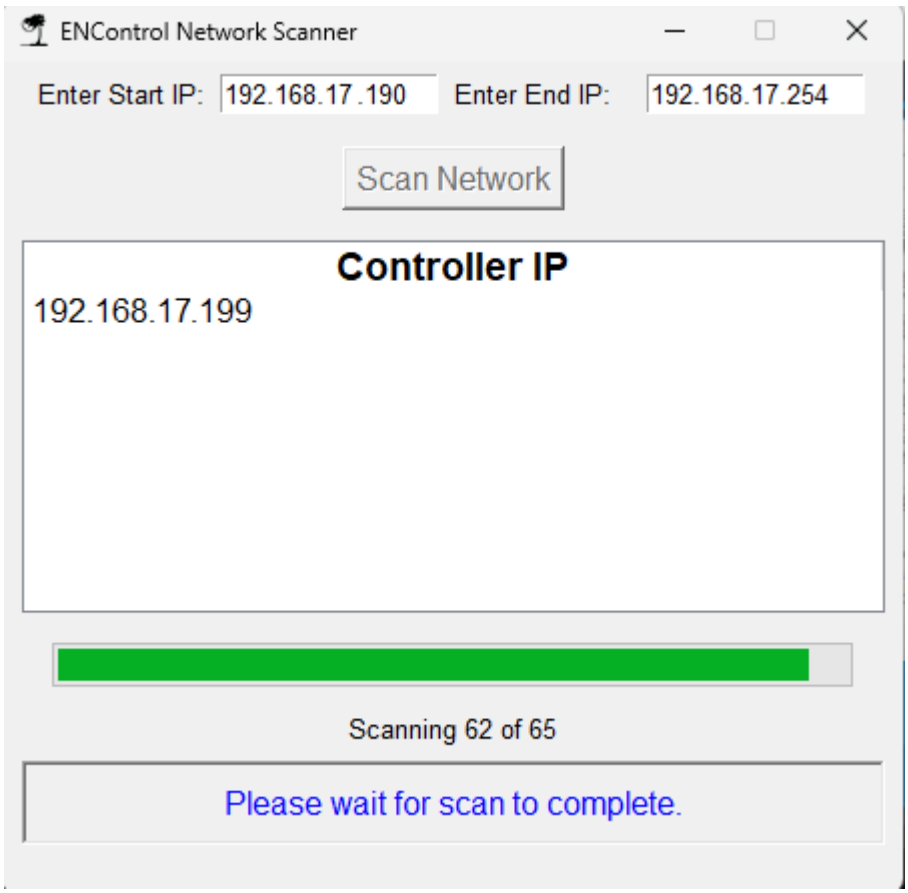
Step 1: Open ENControl Network Scanner

1. Launch the **ENCollect V5.0** program.
2. In the menu bar, navigate to **File → Scan Network** (as shown in *SN1.png*).
3. This will open the **ENControl Network Scanner** window.



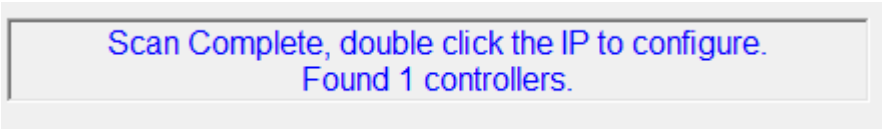
Step 2: Configure the IP Range for Scanning

1. In the scanner window, locate the **"Enter Start IP"** and **"Enter End IP"** fields.
2. By default, the program will detect the network's IP range and auto-fill the fields.
3. If needed, manually adjust the IP range to scan a specific subnet.
    - Example: Start IP → 192.168.17.190, End IP → 192.168.17.254 (as shown in *SN2.png*).



Step 3: Start the Network Scan

1. Click the **"Scan Network"** button to begin scanning the selected IP range.
2. The program will:
   - Check each IP address within the specified range.
   - Identify active controllers by attempting a connection.
   - Display detected controllers in the **"Controller IP"** list.
3. Wait for the progress bar to reach 100% (as shown in *SN3.png*).
4. Once completed, the scanner will display the message:
   "Scan Complete, double click the IP to configure. Found X controllers."

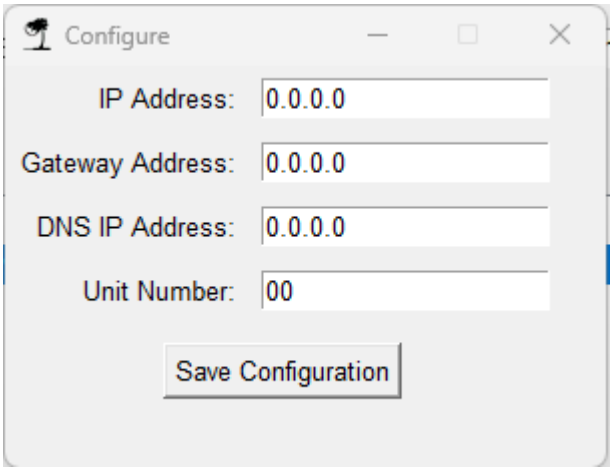


Step 4: Configure a Detected Controller

1. Locate the detected controller in the list.
2. **Double-click** the IP address to open the configuration window.
3. The **"Configure"** window will appear (as shown in *SN5.png*), allowing you to edit:
   - **IP Address** – Set a new static IP.
   - **Gateway Address** – Define the network gateway.
   - **DNS IP Address** – Enter the DNS server address.

- **Unit Number** – Assign a unique unit number.

4. After making changes, click **"Save Configuration"** to apply the settings.



Step 5: Finalizing Configuration

1. The program will send the updated settings to the controller.
2. It will confirm the changes and attempt to communicate with the controller.
3. If successful, the controller will restart with the new settings.
4. If an error occurs, check your network connection and repeat the process.

Troubleshooting Tips

- If no controllers are found, verify the IP range and check network connectivity.
- Ensure the controller is powered on and connected to the same subnet.
- If the new settings do not apply, restart the controller and scan again.

ENControl Status

ENControl Status in ENCollect V5.0

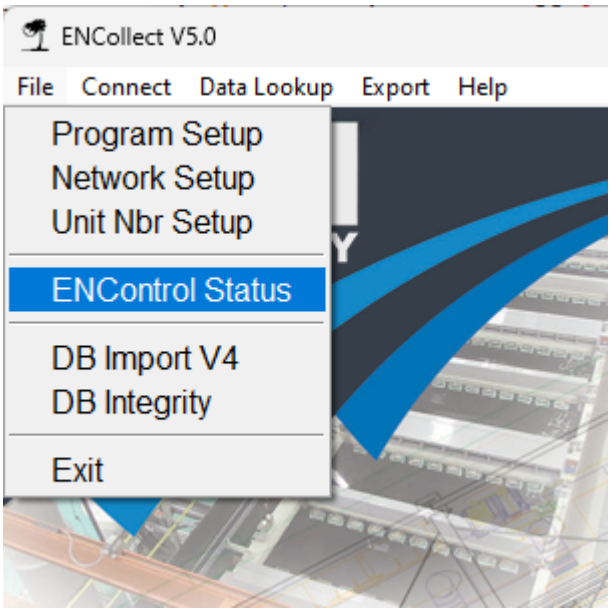
Overview

The **ENControl Status** feature in ENCollect V5.0 provides a real-time status report of the connected **3300 Electroless Nickel Controller**. This function allows users to retrieve and view critical operational parameters by selecting the **controller IP address** from the dropdown list and clicking **Get Status**.

Additionally, the user can **set the controller clock** to synchronize the controller's internal time with the computer's system clock.

Step 1: Accessing the ENControl Status Feature

1. Open **ENCollect V5.0**.
2. Click **File** → **ENControl Status**.

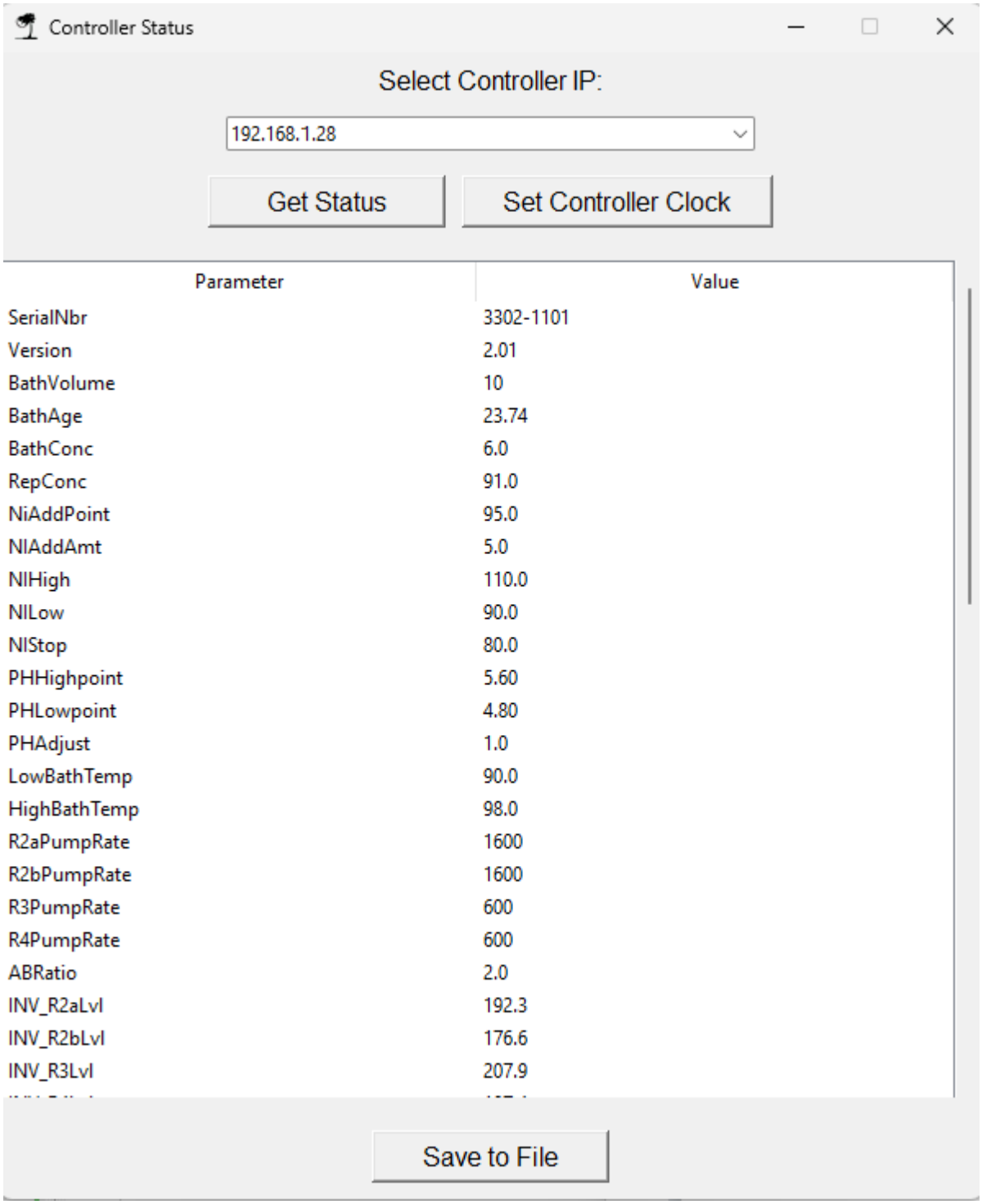


Step 2: Retrieving Controller Status

- The user selects the **Controller IP** from the dropdown list.
- Clicking **Get Status** initiates a connection with the controller and retrieves its latest **operational parameters**.

Step 3: Understanding the Retrieved Data

The retrieved data includes essential bath and system parameters that are programmed into the ENControl 3300, this information can be saved to a file for future reference. This file might be requested by Palm Technology to help troubleshoot issues with a controller.



Step 4: Setting the Controller Clock

- The user can **synchronize the controller's internal clock** with the computer's current time.
- This function ensures that timestamps on recorded data remain accurate.
- Click **Set Controller Clock** to update the controller's internal clock.
- A confirmation message will appear once the clock has been successfully set.

Step 5: Saving Data to File

- Clicking **Save to File** exports the **retrieved controller status** to a text file for record-keeping or troubleshooting.
- The exported file can be reviewed later for **process validation or maintenance logs**.

Step 6: Use Cases for ENControl Status

- **Monitor process conditions remotely**.
- **Verify system setpoints and limits**.
- **Log controller status for maintenance records**.
- **Troubleshoot abnormal bath behavior**.
- **Ensure accurate timestamping by synchronizing the controller clock**.

Troubleshooting Tips

- If no data appears, **verify network connectivity** to the controller.
- If the IP address list is empty, ensure that the **controller is powered on and reachable**.
- If parameters are incorrect, check **controller settings and recalibrate if necessary**.
- If the **controller clock does not update**, verify network communication and retry.
- If errors persist, restart ENCollect V5.0 and attempt the connection again.

Import V4 Data

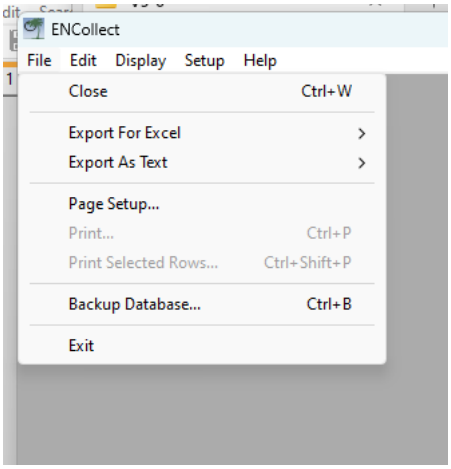
Database Import Guide: Importing Data from ENCollect V4 to ENControl V5

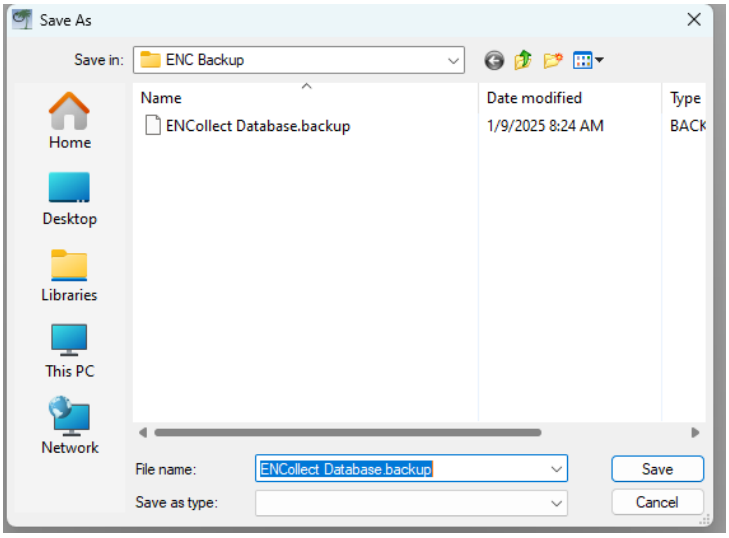
Overview

This guide explains how to transfer data from an **ENCollect V4.X** database backup to **ENControl V5.0** using the Database Transfer Tool. After the import, users will be prompted to enter the Bath Concentration value in g/L to match the new format in V5.

Step 1: Backup the Database in ENCollect V4.X

1. **Open ENCollect V4.X.**
2. Click on **File → Backup Database...**
3. Choose a destination to save the backup file (e.g., C:\ENC Backup\).
4. Click **Save** to generate the .backup file.

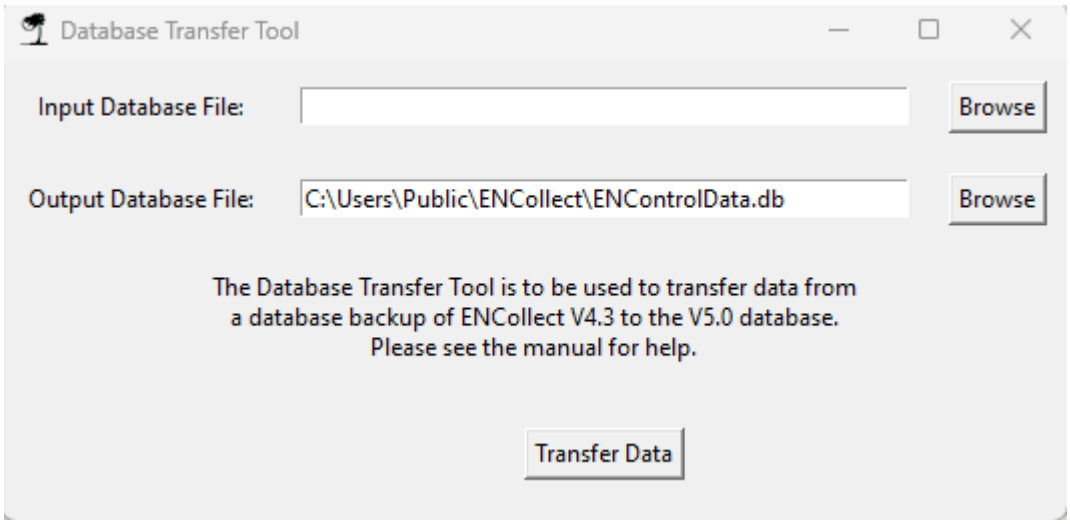




Step 2: Locate and Import the Backup in ENControl V5.0

1. **Open ENCollect V5.0.**
2. Click on **File → DB Import V4.**
3. The "Database Transfer Tool" will open.

4. Click **Browse** under "Input Database File" and select the .backup file created in Step 1.
5. Ensure the "Output Database File" path is set to:
   C:\Users\Public\ENCollect\ENControlData.db
6. Click **Transfer Data** to start the import.



Step 3: Handling the Bath Concentration Prompt

- After the transfer completes, a prompt will appear asking:

  "Enter Bath Concentration in g/L (e.g., 6.0):"
- Enter the correct Bath Concentration value as grams per liter (g/L).
- This step ensures compatibility with V5.0, where Bath Concentration can be viewed in percent, g/L, or both.
- Click **OK** to finalize the import.

Troubleshooting Tips

- If the backup file is missing, ensure you performed **Step 1** correctly.
- If the transfer fails, verify that the backup file is from **ENCollect V4.X**.
- Ensure that **ENControlData.db** is not open in another program during import.

Serial Monitor

ENCollect V5.0 - Serial Monitor Help Guide

Getting Data into ENCollect

ENCollect offers multiple options for importing and monitoring data from external sources, providing users with efficient data collection methods and seamless system integration. There are three primary ways to transfer data into ENCollect, depending on the available options on your controller:

1. **Serial (RS232):** Standard on all **3300 ENControl units manufactured since 2008**, this built-in feature provides a reliable method for data transfer. However its limited in its cable lenth and a maximum of 4 controllers on a combo-box option.
2. **USB Flash Drive:** Available as an **optional upgrade starting in 2025**, this method offers a convenient way to import data.
3. **Ethernet IP:** This option can be **factory-installed on new units** or added as an **upgrade to existing units** by sending them to the factory for modification.

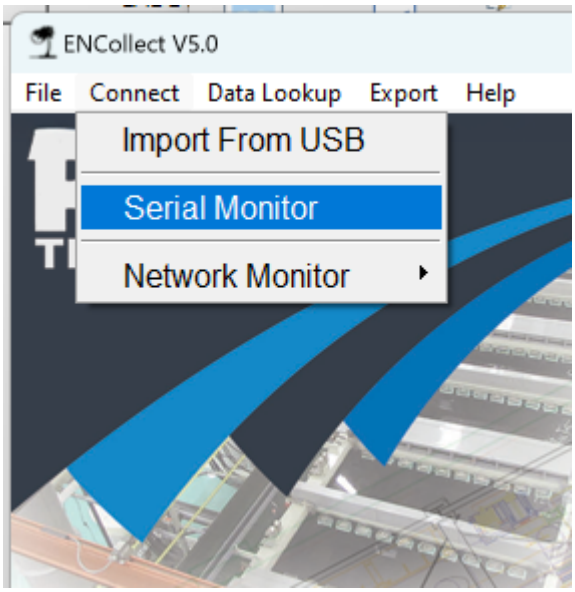
These flexible data transfer options ensure that ENCollect adapts to your specific needs, enhancing system efficiency and usability. The most preferred method which offers the best flexibility is Ethernet IP.

Overview

The Serial Monitor in ENCollect V5.0 allows real-time monitoring of data transmitted from Palm Technology 3300 controllers. This feature provides users with a detailed log of the received data, enabling analysis and troubleshooting of the plating process.

Step 1: Accessing the Serial Monitor

1. Open ENCollect V5.0.
2. Navigate to the **Connect** menu.
3. Select **Serial Monitor**.
4. The Serial Monitor window will open, displaying real-time data as it is received from the 3300 controllers.



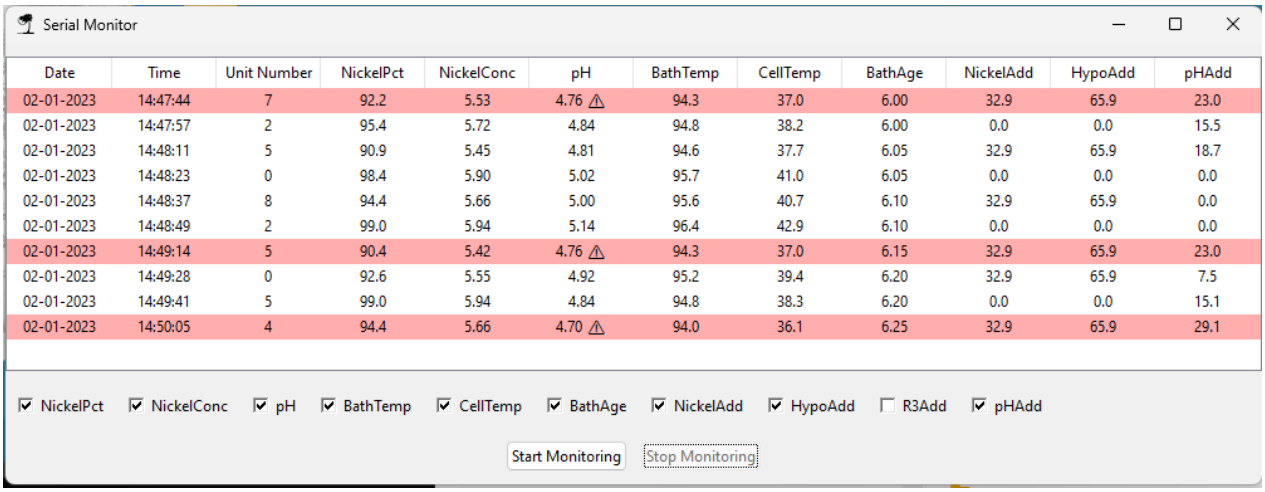
Step 2: Setting Up the Serial Monitor

Before using the Serial Monitor, ensure the following requirements are met:

- The COM port has been properly configured in the **Program Setup** section of ENCollect.
- The 3300 controller is connected to the computer via a serial interface.
- If monitoring multiple 3300 controllers (up to 4), a **Palm Technology Data Gang Box** is required.

Step 3: Starting Data Monitoring

1. Click **Start Monitoring** to begin listening on the selected COM port.
2. The Serial Monitor will capture and display incoming data records from the connected 3300 controllers.
3. Data fields include Date, Time, Unit Number, NickelPct, NickelConc, pH, BathTemp, CellTemp, BathAge, NickelAdd, HypoAdd, and pHAdd.
4. If any values exceed preset thresholds, they will be highlighted in red to indicate an issue requiring attention.



Step 4: Stopping Data Monitoring

- Click **Stop Monitoring** to cease data acquisition from the controllers.

Step 5: Compatibility Requirements

- **3300 Firmware Version:** Must be **2.0 or higher**.
- **Controller Settings:** Navigate to **Settings** → **Communications** → **Format** and ensure **Version 2** of the data format is selected.
    - *Version 1 format is only compatible with ENCollect V3 and V4.*

Step 6: Data Display and Filters

- Users can enable or disable specific data columns using the checkboxes below the data table.
- Only selected data points will be displayed in the Serial Monitor.

Troubleshooting

- **No Data Received**: Check COM port settings and ensure the 3300 is properly connected.
- **Incorrect Data Format**: Verify that the controller is set to **Version 2 format** under Communications settings.
- **Multiple Controllers Not Detected**: Ensure the **Palm Technology Data Gang Box** is being used and all connections are secure.

Additional Features

- Data can be logged for review and export.
- Alerts may be triggered for out-of-range values (highlighted in red).

Import USB Flash Drive

Importing Data from the 3300 Electroless Nickel Controller

Getting Data into ENCollect

ENCollect offers multiple options for importing and monitoring data from external sources, providing users with efficient data collection methods and seamless system integration. There are three primary ways to transfer data into ENCollect, depending on the available options on your controller:

1. **Serial (RS232):** Standard on all **3300 ENControl units manufactured since 2008**, this built-in feature provides a reliable method for data transfer. However its limited in its cable lenth and a maximum of 4 controllers on a combo-box option.
2. **USB Flash Drive:** Available as an **optional upgrade starting in 2025**, this method offers a convenient way to import data.
3. **Ethernet IP:** This option can be **factory-installed on new units** or added as an **upgrade to existing units** by sending them to the factory for modification.

These flexible data transfer options ensure that ENCollect adapts to your specific needs, enhancing system efficiency

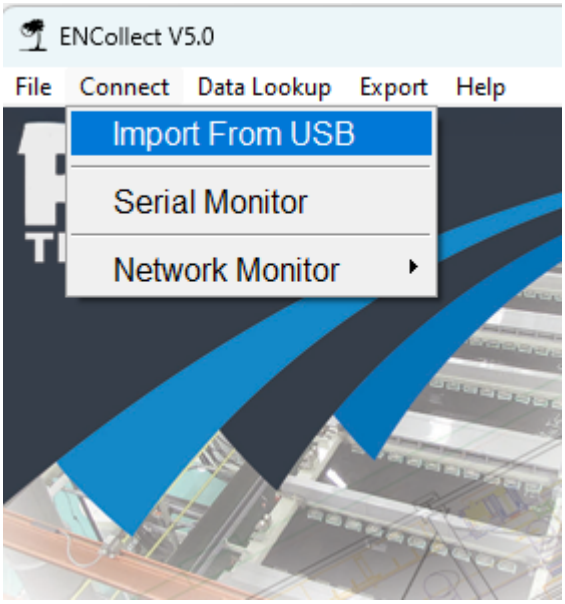
Overview

This guide outlines the process for importing data from a **3300 Electroless Nickel Controller** into **ENCollect V5.0** using the **Import From USB** feature. The 3300 controller saves data on a USB drive in monthly folder in the format YYYYMMM, which contains CSV files for each days recordss. These can then imported into the ENCollect database.

Step 1: Prepare the USB Drive

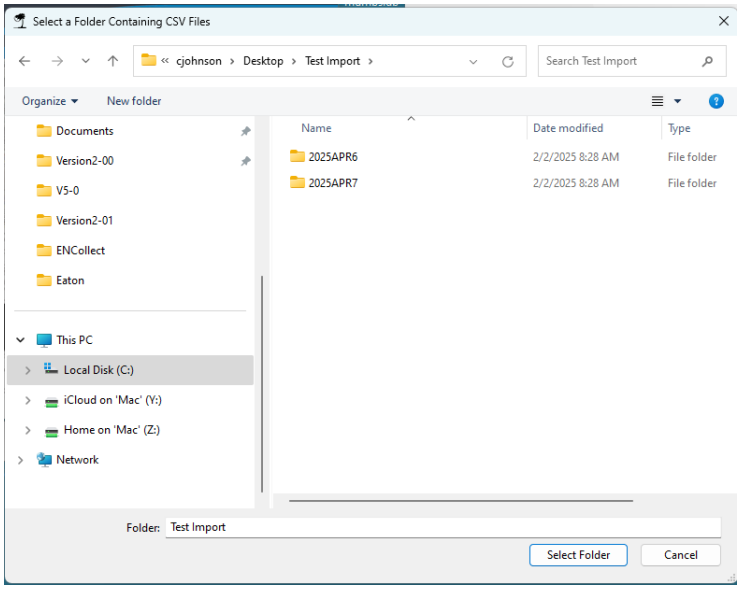
1. **Safely remove** the USB from the 3300 Controller by powering down the 3300 first.
2. Insert the USB into the computer running **ENCollect V5.0**.
3. Open **File Explorer** and navigate to the USB drive to confirm the data is present.

Step 2: Importing Data into ENCollect V5.0



1. Open **ENCollect V5.0**.
2. Click **Connect → Import From USB**

3. The USB Importer window will appear, click the select folder button
4. A folder selection dialog will appear.



5. Navigate to the **USB drive** and select the appropriate folder (formatted as YYYYMMM) or preferably select the root folder of the USB drive and the program will recuse all the folders on the drive.
6. Click **Select Folder** to begin the import process.

Step 3: Processing and Database Update

- ENCollect V5.0 scans the selected folder and **imports all CSV files**.
- The system automatically maps the data into **ENControlData.db**.
- Once each file is imported it will be renamed **Imported - Original Filename.csv**
    - Future imports will not be processed for files beginning with Imported
    - The ENControl 3300 saves its data to daily files, if the USB is returned to the controller a new file for the same day will be created and will also be allowed to be imported later because its name does not begin with Imported.
    - ENCollect V5.0 also checks the data its importing does not match an already existing data in the database and will not import duplicate records.
- A message box appears displaying the **number of records imported if any duplicates or skipped records are found they will also be displayed in this message box**.

Important Notes:

- Ensure all required CSV files are in the selected folder before importing.
- If a CSV file is already imported, the system generates a **unique filename proceeding with Imported** to prevent future imports.
- Do not remove the USB drive during the import process.

Troubleshooting Tips

- If no files are found, verify the **correct folder** was selected.
- If data is not imported, ensure CSV files **follow the expected format**.
- If an error occurs, restart ENCollect V5.0 and attempt the import again.

Network Monitor

ENCollect V5.0 - Network Monitor Help Guide

Getting Data into ENCollect

ENCollect offers multiple options for importing and monitoring data from external sources, providing users with efficient data collection methods and seamless system integration. There are three primary ways to transfer data into ENCollect, depending on the available options on your controller:

1. **Serial (RS232):** Standard on all **3300 ENControl units manufactured since 2008**, this built-in feature provides a reliable method for data transfer. However its limited in its cable lenth and a maximum of 4 controllers on a combo-box option.
2. **USB Flash Drive:** Available as an **optional upgrade starting in 2025**, this method offers a convenient way to import data.
3. **Ethernet IP:** This option can be **factory-installed on new units** or added as an **upgrade to existing units** by sending them to the factory for modification.

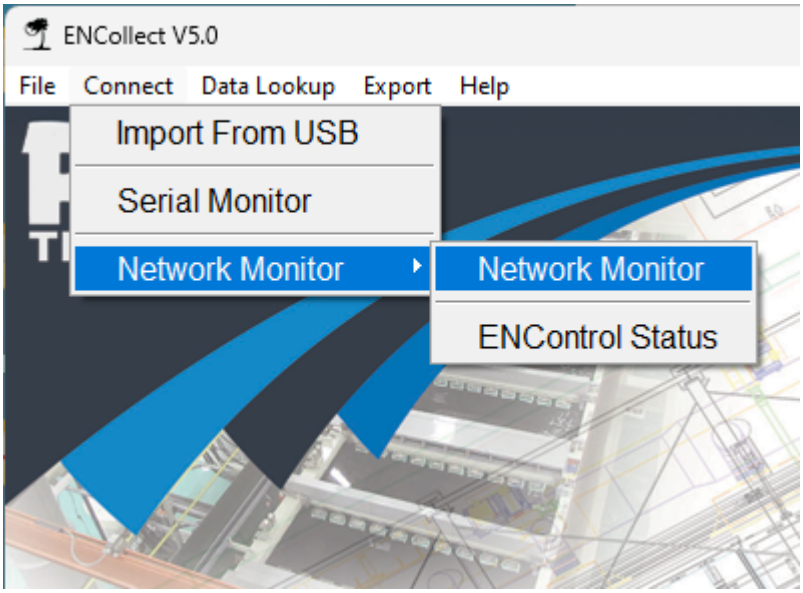
These flexible data transfer options ensure that ENCollect adapts to your specific needs, enhancing system efficiency

Overview

The Network Monitor in ENCollect V5.0 enables real-time monitoring of data transmitted over a network from ENControl units. This feature allows users to view and analyze incoming process data for multiple controllers connected via TCP/IP.

Step 1: Accessing the Network Monitor

1. Open ENCollect V5.0.
2. Navigate to the **Connect** menu.
3. Select **Network Monitor → Network Monitor**.
4. The Network Monitor window will open, displaying real-time data as it is received from ENControl units.



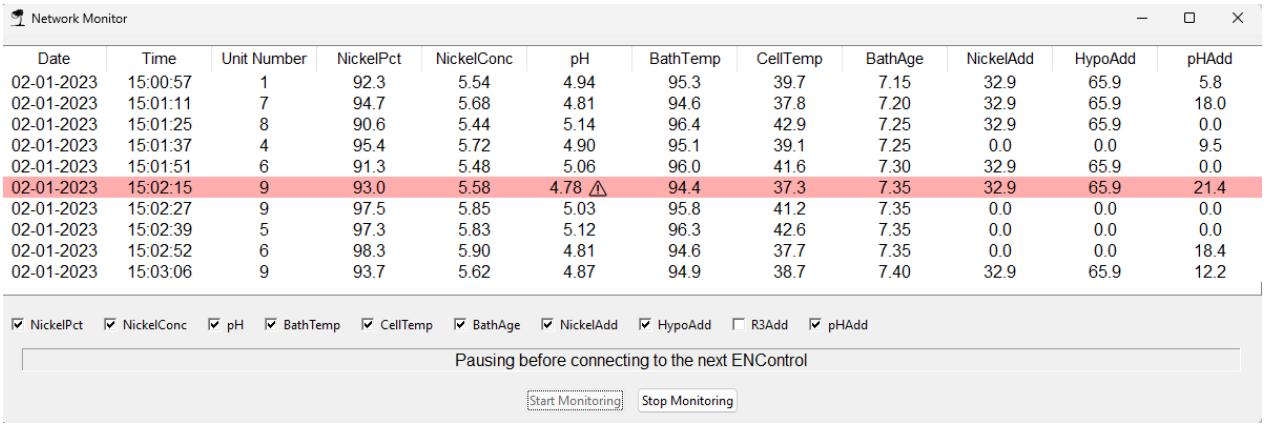
Step 2: Setting Up the Network Monitor

Before using the Network Monitor, ensure the following requirements are met:

- **IP addresses of the ENControl units** must be properly configured in the **Network Setup** section of ENCollect.
- The ENControl units must be accessible via the network and correctly configured to transmit data.
- Proper firewall and network settings should allow ENCollect to receive data from the ENControl units.

Step 3: Starting Data Monitoring

1. Click **Start Monitoring** to begin listening for incoming network data.
2. The Network Monitor will capture and display data from all connected ENControl units.
3. Data fields include Date, Time, Unit Number, NickelPct, NickelConc, pH, BathTemp, CellTemp, BathAge, NickelAdd, HypoAdd, and pHAdd.
4. If any values exceed preset thresholds, they will be highlighted in red to indicate an issue requiring attention.



Step 4: Stopping Data Monitoring

- Click **Stop Monitoring** to cease data acquisition from the networked ENControl units.

Step 5: Compatibility Requirements

- Ensure each ENControl unit is properly connected to the network and reachable from the PC running ENCollect.
- Each ENControl unit must be configured to send data using the appropriate communication format.
- The **IP address** in ENCollect must match those assigned to the ENControl units.

Step 6: Data Display and Filters

- Users can enable or disable specific data columns using the checkboxes below the data table.
- Only selected data points will be displayed in the Network Monitor.

Troubleshooting

- **No Data Received**: Verify that the ENControl units are properly configured and that their IP addresses are correctly set in ENCollect.
- **Connection Issues**: Check firewall settings and ensure there is no network interference preventing

communication.

- **Incorrect Data Format**: Verify the ENControl communication settings are set to transmit the correct data format.

Additional Features

- Data logging for historical analysis and export.
- Alerts for out-of-range values (highlighted in red).
- Automatic reconnection in case of network interruptions.

View Data

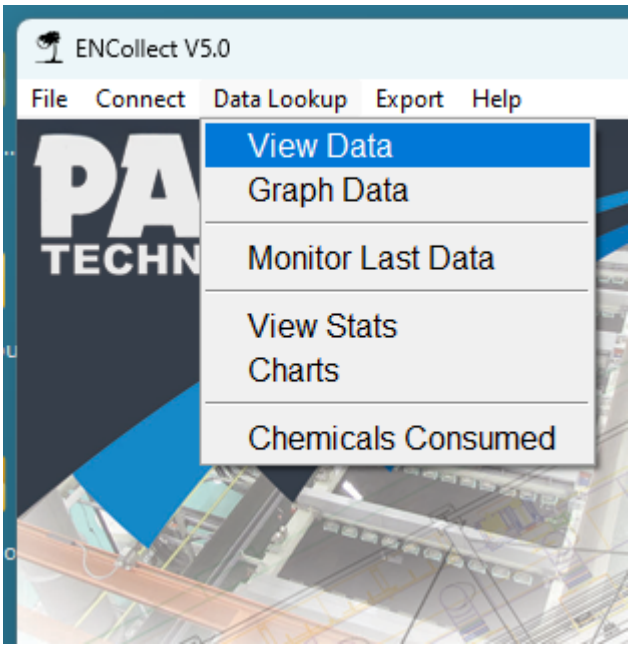
Viewing and Printing Data in ENCollect V5.0

Overview

The **View Data** feature in ENCollect V5.0 allows users to filter and display recorded data based on unit numbers, date ranges, and selected parameters. Users can also print a report of the displayed data.

Step 1: Accessing the View Data Feature

1. Open **ENCollect V5.0**.
2. Click **Data Lookup** → **View Data**.



Step 2: Selecting a Unit Number

- Use the **Unit Nbr** dropdown to select the specific unit whose data you want to view.
- The dropdown dynamically populates with available unit numbers.

Step 3: Choosing a Date Range

1. Click on the **Date Start** field to set the starting date.
2. Click on the **Date End** field to set the ending date.
3. Use the **calendar button (C)** next to each field to open a calendar and select a date.

Step 4: Selecting Parameters to Display

Check or uncheck the boxes to include/exclude specific parameters:

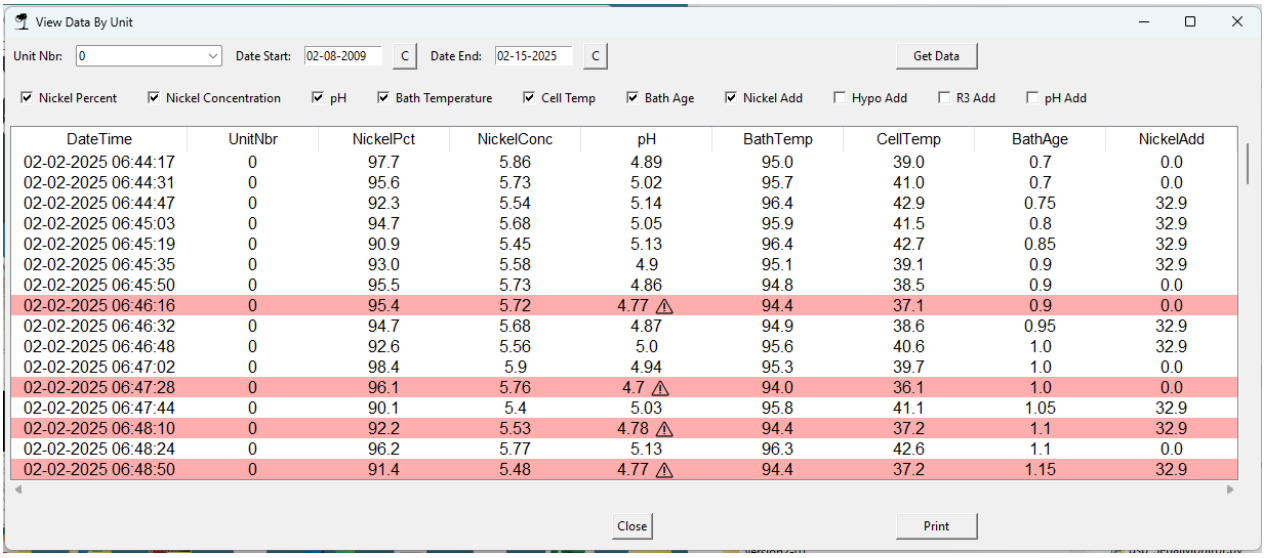
- **Nickel Percent**
- **Nickel Concentration**
- **pH**
- **Bath Temperature**
- **Cell Temperature**
- **Bath Age**
- **Nickel Additions**
- **Hypo Add**
- **R3 Add**

- **pH Add**

Only selected parameters will be shown in the data table.

Step 5: Fetching Data

1. Click the **Get Data** button.
2. The system retrieves and displays data based on the selected unit, date range, and parameters.
3. Any values exceeding predefined limits (e.g., pH) are **highlighted in red**.



DateTime	UnitNbr	NickelPct	NickelConc	pH	BathTemp	CellTemp	BathAge	NickelAdd
02-02-2025 06:44:17	0	97.7	5.86	4.89	95.0	39.0	0.7	0.0
02-02-2025 06:44:31	0	95.6	5.73	5.02	95.7	41.0	0.7	0.0
02-02-2025 06:44:47	0	92.3	5.54	5.14	96.4	42.9	0.75	32.9
02-02-2025 06:45:03	0	94.7	5.68	5.05	95.9	41.5	0.8	32.9
02-02-2025 06:45:19	0	90.9	5.45	5.13	96.4	42.7	0.85	32.9
02-02-2025 06:45:35	0	93.0	5.58	4.9	95.1	39.1	0.9	32.9
02-02-2025 06:45:50	0	95.5	5.73	4.86	94.8	38.5	0.9	0.0
02-02-2025 06:46:16	0	95.4	5.72	4.77 ⚠	94.4	37.1	0.9	0.0
02-02-2025 06:46:32	0	94.7	5.68	4.87	94.9	38.6	0.95	32.9
02-02-2025 06:46:48	0	92.6	5.56	5.0	95.6	40.6	1.0	32.9
02-02-2025 06:47:02	0	98.4	5.9	4.94	95.3	39.7	1.0	0.0
02-02-2025 06:47:28	0	96.1	5.76	4.7 ⚠	94.0	36.1	1.0	0.0
02-02-2025 06:47:44	0	90.1	5.4	5.03	95.8	41.1	1.05	32.9
02-02-2025 06:48:10	0	92.2	5.53	4.78 ⚠	94.4	37.2	1.1	32.9
02-02-2025 06:48:24	0	96.2	5.77	5.13	96.3	42.6	1.1	0.0
02-02-2025 06:48:50	0	91.4	5.48	4.77 ⚠	94.4	37.2	1.15	32.9

Step 6: Printing the Report

1. Click the **Print** button.
2. A **formatted PDF report** is generated.
3. The report includes:
    - **Company header**
    - **Selected date range & unit number**
    - **Formatted data table**
4. The generated PDF automatically **opens in a web browser** for preview and printing.

ENControl Report - 02-08-2009 to 02-15-2025 - Unit 0

Palm Technology - 1071 Firestone Parkway | La Vergne , TN 37086

DateTime	UnitNbr	NickelPct	NickelConc	pH	BathTemp	CellTemp	BathAge	NickelAdd
02-02-2025 06:44:17	0	97.7	5.86	4.89	95.0	39.0	0.7	0.0
02-02-2025 06:44:31	0	95.6	5.73	5.02	95.7	41.0	0.7	0.0
02-02-2025 06:44:47	0	92.3	5.54	5.14	96.4	42.9	0.75	32.9
02-02-2025 06:45:03	0	94.7	5.68	5.05	95.9	41.5	0.8	32.9
02-02-2025 06:45:19	0	90.9	5.45	5.13	96.4	42.7	0.85	32.9
02-02-2025 06:45:35	0	93.0	5.58	4.9	95.1	39.1	0.9	32.9
02-02-2025 06:45:50	0	95.5	5.73	4.86	94.8	38.5	0.9	0.0
02-02-2025 06:46:16	0	95.4	5.72	4.77	94.4	37.1	0.9	0.0
02-02-2025 06:46:32	0	94.7	5.68	4.87	94.9	38.6	0.95	32.9
02-02-2025 06:46:48	0	92.6	5.56	5.0	95.6	40.6	1.0	32.9
02-02-2025 06:47:02	0	98.4	5.9	4.94	95.3	39.7	1.0	0.0
02-02-2025 06:47:28	0	96.1	5.76	4.7	94.0	36.1	1.0	0.0
02-02-2025 06:47:44	0	90.1	5.4	5.03	95.8	41.1	1.05	32.9
02-02-2025 06:48:10	0	92.2	5.53	4.78	94.4	37.2	1.1	32.9
02-02-2025 06:48:24	0	96.2	5.77	5.13	96.3	42.6	1.1	0.0
02-02-2025 06:48:50	0	91.4	5.48	4.77	94.4	37.2	1.15	32.9
02-02-2025 06:49:06	0	91.0	5.46	4.89	95.0	38.9	1.2	32.9
02-02-2025 06:49:22	0	90.5	5.43	4.97	95.5	40.2	1.25	32.9
02-02-2025 06:49:48	0	95.7	5.74	4.7	94.0	36.0	1.25	0.0
02-02-2025 06:50:04	0	92.1	5.52	5.12	96.3	42.6	1.3	32.9
02-02-2025 06:50:21	0	92.4	5.54	4.98	95.5	40.4	1.35	32.9
02-02-2025 06:50:47	0	91.2	5.47	4.79	94.5	37.5	1.4	32.9
02-02-2025 06:51:01	0	99.5	5.97	4.9	95.1	39.2	1.4	0.0
02-02-2025 06:51:17	0	91.5	5.49	4.89	95.0	39.0	1.45	32.9
02-02-2025 06:51:33	0	90.8	5.44	5.01	95.7	40.9	1.5	32.9
02-02-2025 06:51:49	0	91.9	5.51	4.98	95.5	40.4	1.55	32.9
02-02-2025 06:52:05	0	93.8	5.62	5.02	95.8	41.0	1.6	32.9
02-02-2025 06:52:19	0	96.2	5.77	4.97	95.5	40.3	1.6	0.0
02-02-2025 06:52:34	0	99.5	5.97	4.85	94.8	38.4	1.6	0.0

Troubleshooting Tips

- If no data appears, ensure that the **correct unit and date range** are selected.
- If an error occurs, restart ENCollect V5.0 and try again.
- Ensure the **Print Preview** is visible before printing.

Graph Data

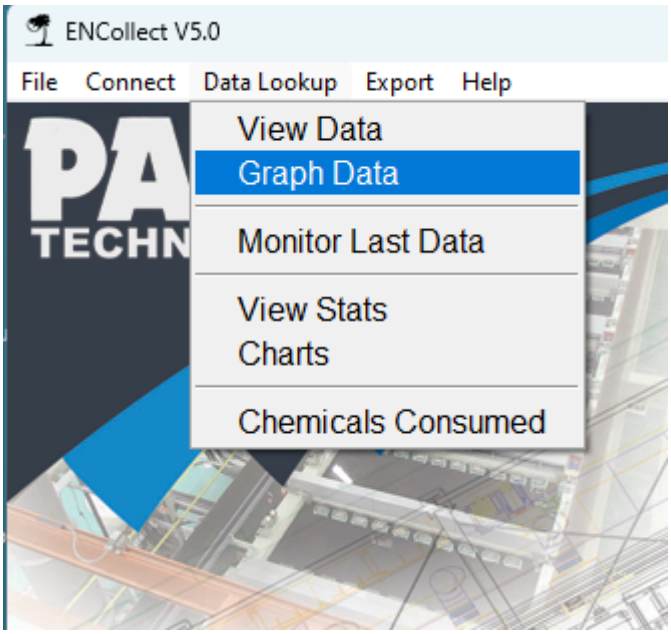
Graphing Data in ENCollect V5.0

Overview

The **Graph Data** feature in ENCollect V5.0 allows users to visualize data trends over time for different units. Users can filter by unit number, date range, and selected parameters. The results are displayed as line graphs and can be printed as a report.

Step 1: Accessing the Graph Data Feature

1. Open **ENCollect V5.0**.
2. Click **Data Lookup** → **Graph Data**.



Step 2: Selecting a Unit Number

- Use the **Unit Nbr** dropdown to select the specific unit whose data you want to graph.
- The dropdown dynamically populates with available unit numbers.

Step 3: Choosing a Date Range

1. Click on the **Date Start** field to set the starting date.
2. Click on the **Date End** field to set the ending date.
3. Use the **calendar button (C)** next to each field to open a calendar and select a date.

Step 4: Selecting Parameters to Graph

Check or uncheck the boxes to include/exclude specific parameters:

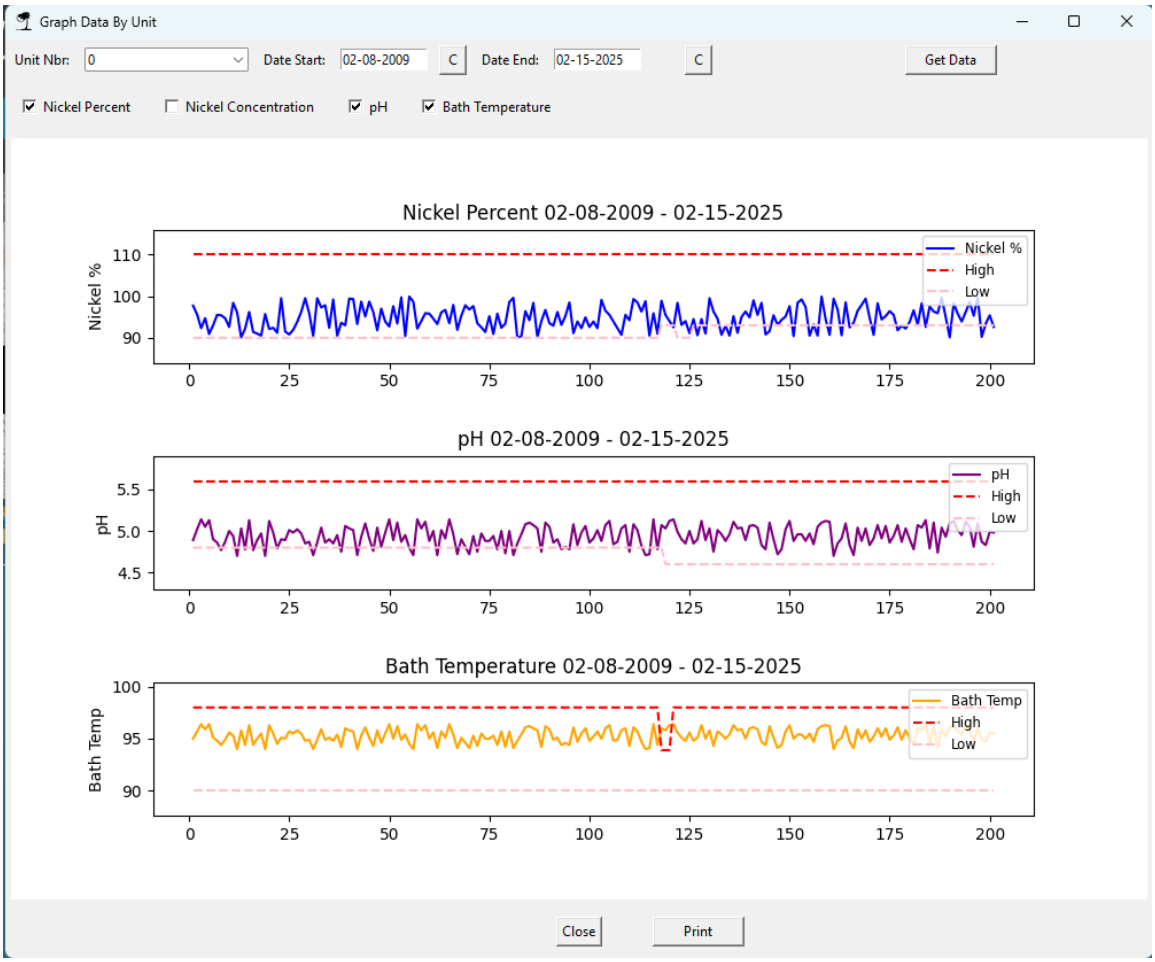
- **Nickel Percent**
- **Nickel Concentration**
- **pH**
- **Bath Temperature**

Only selected parameters will be plotted.

Step 5: Fetching Data and Viewing Graphs

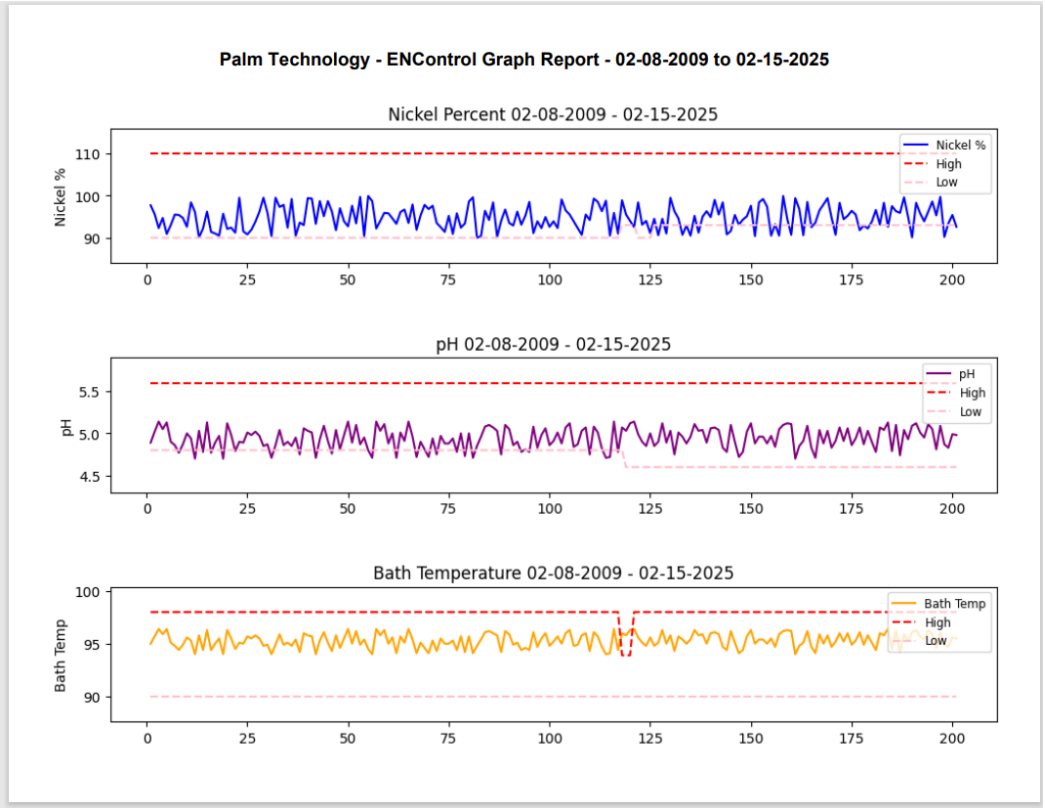
1. Click the **Get Data** button.

2. The system retrieves and graphs the data based on the selected filters.
3. Each selected parameter appears as a **separate line graph**.
4. **High and low threshold lines** are included for reference.



Step 6: Printing the Graph Report

1. Click the **Print** button.
2. A **formatted PDF report** is generated.
3. The report includes:
    - **Company header**
    - **Selected date range & unit number**
    - **Generated line graphs**
4. The generated PDF automatically **opens in a web browser** for preview and printing.



Troubleshooting Tips

- If no data appears, ensure that the **correct unit and date range** are selected.
- If an error occurs, restart ENCollect V5.0 and try again.
- Ensure the **Print Preview** is visible before printing.

Monitor Last Data

Monitor Last Data in ENCollect V5.0

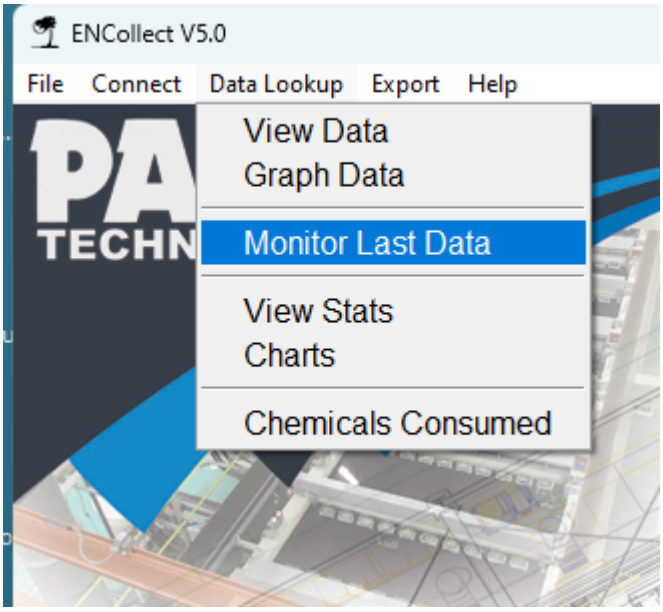
Overview

The **Monitor Last Data** feature in ENCollect V5.0 provides a large-format display of the **most recent measurement *recorded in the database*** for a selected unit. This feature is designed for remote monitoring, allowing users to view key parameters from a distance.

Unlike the **Serial Monitor** or **Network Monitor**, which is in charge of getting the data into the database but it also display the **last 10 records**, the **Monitor Last Data** window shows only **the most recent record in the database, NOTE: It does not bring NEW data into the program so it should be used in conjunction with either the Serial Monitor or the Network Monitor. To ensure the displayed data remains up-to-date, the Serial Monitor or Network Monitor must be running to import data into the database in real time**.

Step 1: Accessing the Monitor Last Data Feature

1. Open **ENCollect V5.0**.
2. Click **Data Lookup → Monitor Last Data**.



Step 2: Displaying the Latest Data

- Select a **Unit Number** from the dropdown menu.
- The system retrieves and displays **the last imported record** for the selected unit.
- The **Serial Monitor or Network Monitor must be running** for new data to appear.

Key Parameters Displayed:

- **Nickel Concentration (% and g/L)**
- **pH**
- **Bath Temperature (°C)**
- **Last Update Timestamp**
- **Countdown to Next Update**

Step 3: Large-Format Display for Remote Monitoring

- The data is displayed in a **large font** for **easy readability from a distance**.
- **Critical values are color-coded**:

  - **Red**: Readings outside the normal range.
  - **Black**: Readings within acceptable limits.
- This makes it ideal for monitoring **from across the room or on a secondary screen**.

Step 4: Using Multiple Monitoring Windows

- Users can **open multiple instances** of the Monitor Last Data window.
- This allows for simultaneous monitoring of **several units on separate screens**.
- Each window operates independently, showing the latest reading for a **specific unit number**.

Troubleshooting Tips

- If no data appears, ensure the **Serial Monitor or Network Monitor is running**.
- If readings are outdated, verify that **new data is being imported into the database**.
- To monitor multiple units, **open additional Monitor Last Data windows**.
- If values are incorrect, check the **unit number selection**.

View Stats

ENCollect V5.0 - View Stats Help

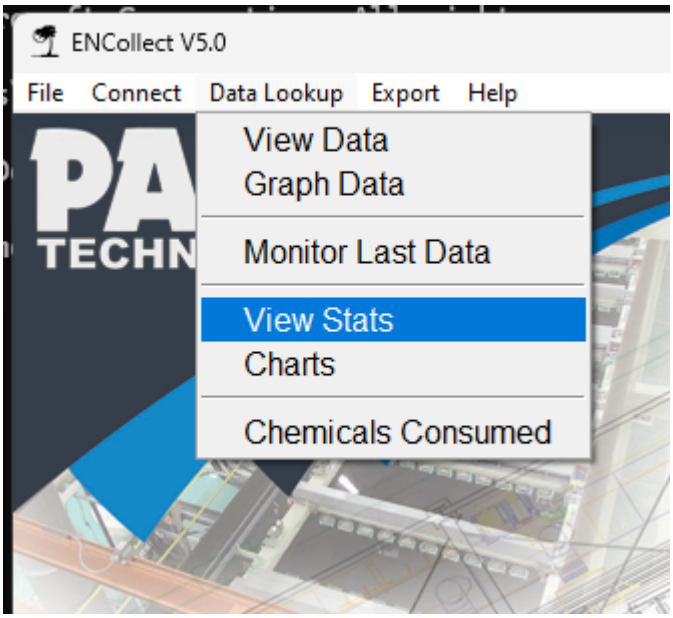
Overview

The **View Stats** function in ENCollect V5.0 provides operational statistics for monitored parameters, such as Nickel concentration, pH, and Bath Temperature. Users can view alarm statistics, high/low values, and average metrics over a selected date range.

Step 1: Accessing View Stats

To access the View Stats feature:

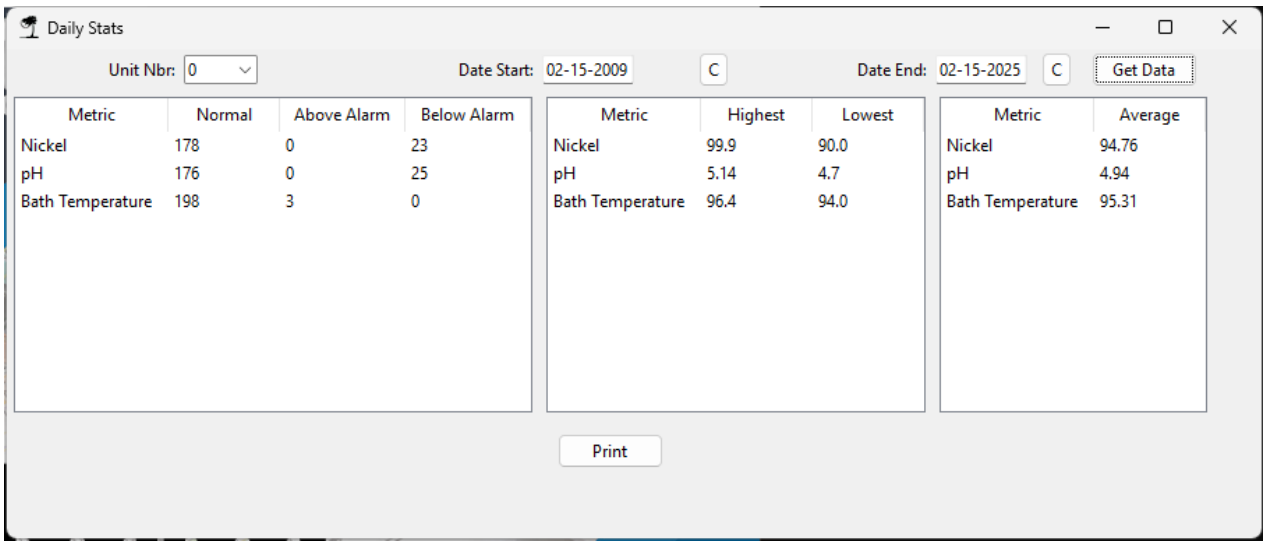
1. Click on the **Data Lookup** menu.
2. Select **View Stats** from the dropdown list.
3. The **Daily Stats** window will appear.



Step 2: Interface Overview

The **Daily Stats** window consists of:

- **Unit Number Selector**: Choose the unit for which statistics should be displayed.
- **Date Range Selectors**: Specify the start and end dates for the data retrieval.
- **Metric Statistics (Alarm Stats)**:
  - Displays the number of normal, above alarm, and below alarm readings.
- **High/Low Statistics**:
  - Displays the highest and lowest recorded values for each metric.
- **Average Statistics**:
  - Displays the average recorded values for each metric.
- **Get Data Button**: Fetches the statistics based on the selected unit and date range.
- **Print Button**: Prints the displayed statistics.



Step 3: How to Use View Stats

1. **Select a Unit Number** from the dropdown.
2. **Set the Date Range** by selecting the start and end dates.
3. Click **Get Data** to retrieve the statistics.
4. Review the displayed metrics, including:
    - Alarm statistics for each parameter.
    - High and low values recorded.
    - Average values over the specified period.
5. Click **Print** to generate a report.

ENControl Operational Statistics

Date Start: 02-15-2009 Date End: 02-15-2025 Unit #: 0

Palm Technology
1071 Firestone Parkway
La Vergne, TN 37086

Metric Statistics (Alarm Stats)

Metric	Normal	Above Alarm	Below Alarm
Nickel	178	0	23
pH	176	0	25
Bath Temperature	198	3	0

High/Low Statistics

Metric	Highest	Lowest
Nickel	99.9	90.0
pH	5.14	4.7
Bath Temperature	96.4	94.0

Average Statistics

Metric	Average
Nickel	94.76
pH	4.94
Bath Temperature	95.31

Notes

- The system automatically formats and generates a report based on the selected statistics.
- Ensure the date range covers a valid period to obtain meaningful statistics.
- If no data appears, verify that the selected unit and date range contain recorded values.

Chemicals Consumed

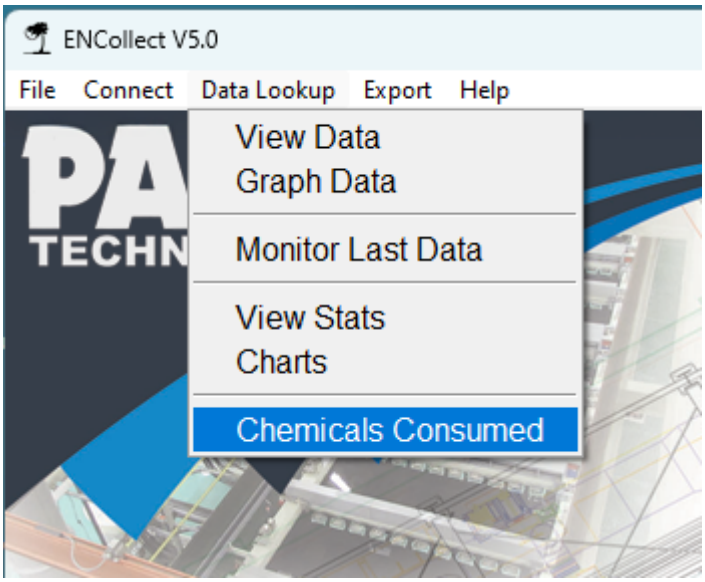
Tracking Chemical Consumption in ENCollect V5.0

Overview

The **Chemicals Consumed** feature in ENCollect V5.0 allows users to track the volume of chemicals added to a selected unit over a specified date range. The data is displayed in multiple units (mL, Liters, and Gallons) and is calculated based on selected parameters.

Step 1: Accessing the Chemicals Consumed Feature

1. Open **ENCollect V5.0**.
2. Click **Data Lookup → Chemicals Consumed**.



Step 2: Selecting a Unit Number

- Use the **Unit Nbr** dropdown to select the specific unit whose chemical consumption you want to track.
- The dropdown dynamically populates with available unit numbers.

Step 3: Choosing a Date Range

1. Click on the **Date Start** field to set the starting date.
2. Click on the **Date End** field to set the ending date.
3. Use the **calendar button (C)** next to each field to open a calendar and select a date.

Step 4: Selecting Chemicals to Track

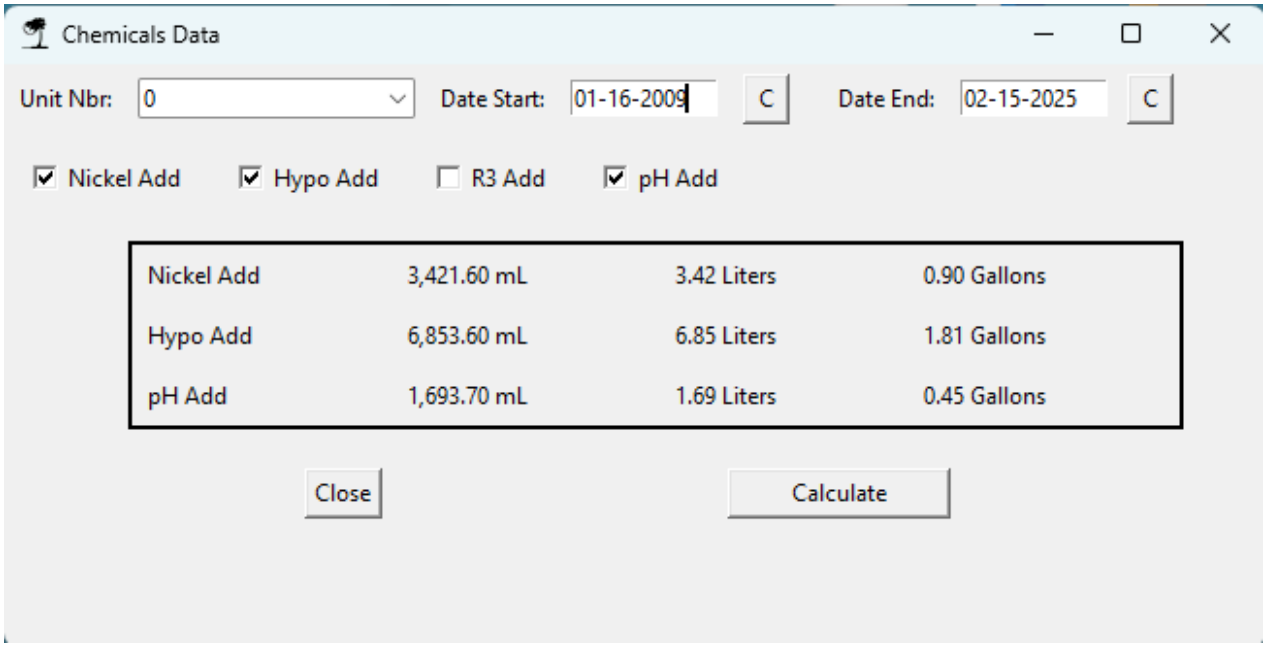
Check or uncheck the boxes to include/exclude specific chemical additions:

- **Nickel Add**
- **Hypo Add**
- **R3 Add**
- **pH Add**

Only selected parameters will be included in the results.

Step 5: Calculating Chemical Consumption

1. Click the **Calculate** button.
2. The system retrieves and calculates the total volume of each selected chemical.
3. The results are displayed in:
    - **mL** (Milliliters)
    - **Liters**
    - **Gallons**



Step 6: Closing the Window

- Click the **Close** button to exit the feature.

Troubleshooting Tips

- If no data appears, ensure that the **correct unit and date range** are selected.
- If an error occurs, restart ENCollect V5.0 and try again.
- Ensure that **at least one parameter** is selected before calculating.

Chemical Usage Charting

Chemical Usage Charting in ENCollect V5.0

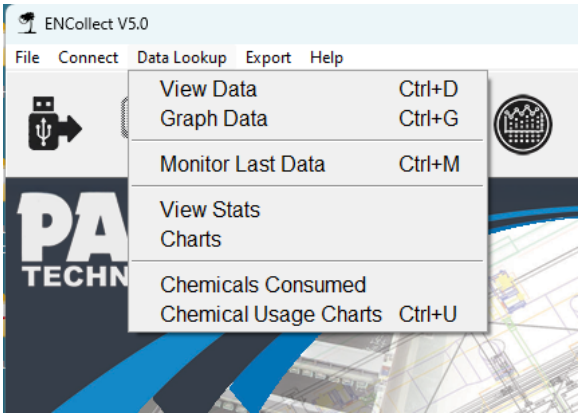
Overview

The **Chemical Usage Charting** feature in ENCollect V5.0 provides a visual and tabular representation of daily chemical additions for a selected unit. This tool allows users to monitor **Nickel, Hypo, pH Adjust, and R3 chemical additions** over a specified date range, helping track usage trends and optimize chemical costs.

Users can analyze data in **both tabular and graphical formats**, switch between unit measurements, and export reports for further analysis.

Step 1: Accessing the Chemical Usage Charts

1. Open **ENCollect V5.0**.
2. Click **Data Lookup → Chemical Usage Charts**.



Step 2: Selecting a Unit Number and Date Range

- Use the **Unit Nbr** dropdown to select the tank/unit for analysis.
- Click on the **Date Start** and **Date End** fields to define the period for analysis.
- Use the **calendar button (C)** to quickly select dates.

Step 3: Configuring Chemical Cost Values

- Enter **Nickel(A) Cost**, **Hypo(C) Cost**, **pH Adj Cost**, and **R3 Cost** in the respective fields.
- These values will be used to **calculate total chemical expenses**.

Step 4: Selecting Chemical Additions to Display

- Use the **checkboxes** to include or exclude specific chemical additions:
  - **Nickel Add** – Tracks Nickel additions.
  - **Hypo Add** – Tracks Hypo additions.
  - **pH Add** – Tracks pH adjustments.
  - **R3 Add** – Tracks R3 additions.

Step 5: Choosing Unit of Measurement

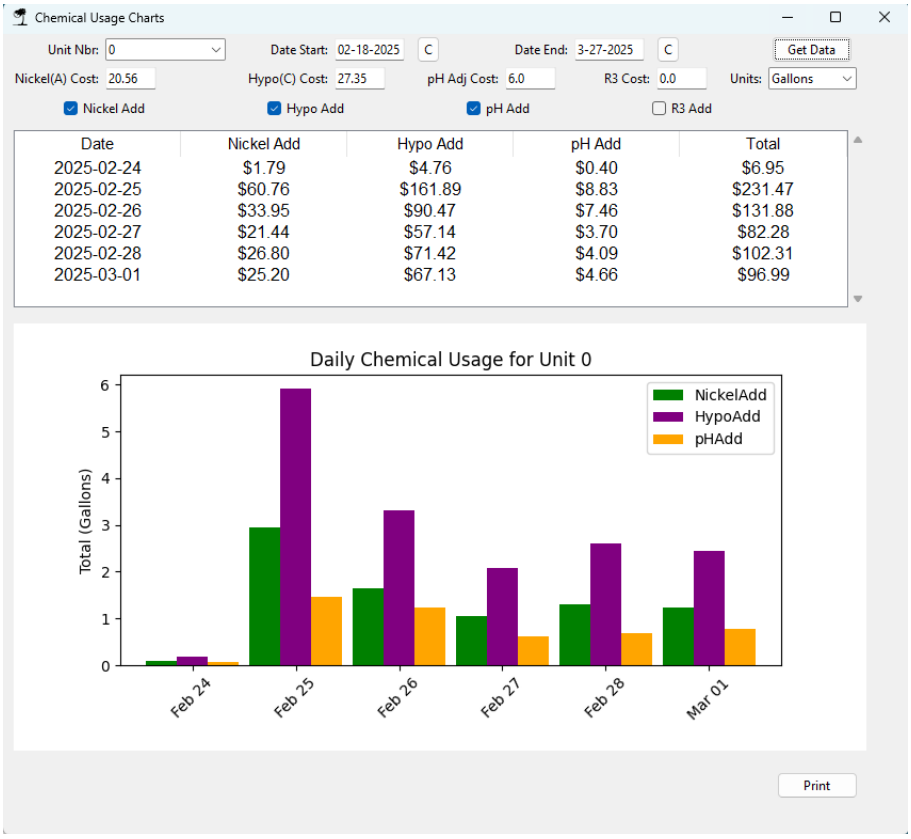
- Use the **Units** dropdown to switch between different measurement units (e.g., **Gallons, Liters**).

Step 6: Generating the Data Chart

1. Click **Get Data** to fetch and display chemical usage data.
2. The **upper table** will populate with daily chemical addition values and total costs.
3. The **bar chart** at the bottom will update, showing the total chemical usage for each day.

Step 7: Understanding the Chart & Table Data

- **Table Data**
  - Displays daily chemical additions **in cost format** based on entered chemical prices.
- **Bar Chart**
  - Represents daily **total chemical usage in selected units**.
  - Each chemical is represented by a distinct color:
    - **Nickel Add – Green**
    - **Hypo Add – Purple**
    - **pH Add – Orange**



Step 8: Printing Reports

- Click **Print** to generate a **PDF report**.
- The report includes:
  - **Company header**
  - **Selected unit and date range**
  - **Tabular chemical usage data**
  - **Bar chart visualization**

The **generated PDF** automatically opens for preview and printing.

Use Cases for Chemical Usage Charting

Tracking Chemical Consumption – Monitor trends in daily chemical usage.
Optimizing Costs – Identify excessive chemical consumption and adjust processes.
Comparing Different Time Periods – Analyze chemical usage efficiency over time.
Generating Reports for Documentation – Export data for record-keeping or audits.

The **Chemical Usage Charting** feature in **ENCollect V5.0** enhances chemical process management by providing **accurate, real-time data visualization**.

Charts

ENCollect V5.0 - Charts Help Guide

Overview

The **Charts** section in ENCollect V5.0 provides users with advanced data visualization tools for statistical and process analysis. These charts help identify trends, distributions, and variations in process data, assisting with quality control and process optimization.

Available Charts

1. X-Bar Chart

- Used to monitor the mean of a process over time.
- Helps detect shifts and trends in the process.
- Typically used for continuous quality improvement.

2. Normal Distribution Chart

- Displays the distribution of a dataset compared to a normal (Gaussian) curve.
- Useful for understanding process variation and detecting outliers.
- Helps assess if data follows a normal distribution.

3. KDE - Kernel Density Estimation

- A non-parametric method for estimating the probability density function of a dataset.
- Provides a smooth curve that represents the data distribution.
- Useful for identifying multiple modes or clusters within the data.

4. I-MR Chart (Individuals & Moving Range Chart)

- Monitors individual data points and their moving range over time.
- Useful for processes with infrequent measurements or when subgrouping is not possible.
- Helps detect sudden shifts or variability in the process.

5. CUSUM Chart (Cumulative Sum Control Chart)

- Tracks the cumulative sum of deviations from a target value.
- More sensitive to small shifts in the process mean than standard control charts.
- Used to detect gradual changes in process performance over time.

6. Heat Map

- A graphical representation of data where values are depicted by color intensity.
- Useful for identifying patterns, correlations, and anomalies in large datasets.
- Often used in risk assessment, quality control, and customer segmentation.

7. Bullseye Chart

- A circular chart that visually represents performance metrics in concentric rings.
- Used to indicate target achievement levels, with the center representing optimal performance.
- Effective for displaying goal tracking, risk assessment, and performance monitoring.

X-Bar

Charts & Statistical Process Control (SPC) in ENCollect V5.0

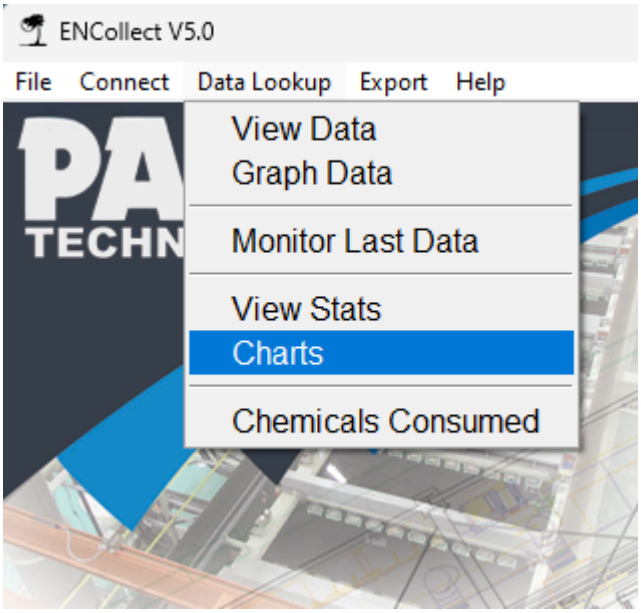
Overview

The **Charts (SPC - Statistical Process Control)** feature in ENCollect V5.0 provides multiple statistical tools to analyze data distributions, process stability, and trends over time. These charts help users make data-driven decisions for process optimization, control process variation, and detect anomalies before they become critical issues.

SPC charts are essential for quality control and process improvement. They help in understanding whether a process is in control (stable and predictable) or out of control (variability beyond acceptable limits). These charts use statistical thresholds such as **Upper Control Limit (UCL)**, **Lower Control Limit (LCL)**, and **Central Line (CL)** to assess process stability.

Step 1: Accessing the Charts Feature

1. Open **ENCollect V5.0**.
2. Click **Data Lookup** → **Charts**.



Step 2: Selecting a Unit Number and Date Range

- Use the **Unit Nbr** dropdown to select the specific unit.
- Click on the **Date Start** and **Date End** fields to set the date range.
- Use the **calendar button (C)** next to each field to open a calendar and select a date.
- Click **Run Chart** to retrieve the dataset.

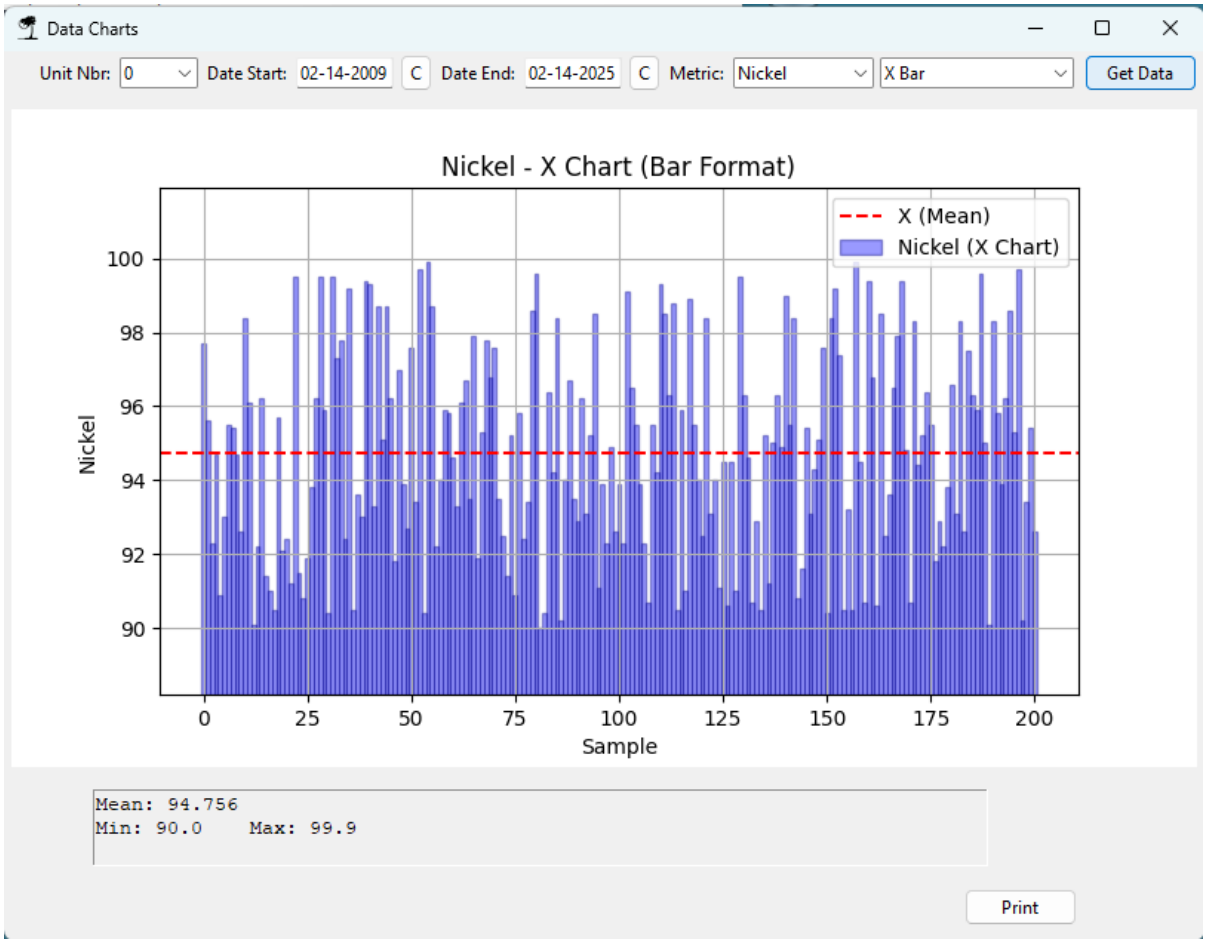
Step 3: Selecting a Chart Type

Users can choose from several chart types, each with a unique **SPC function**:

A. X Bar Chart (Mean Chart)

- **Purpose**: Tracks the **mean value** of a process over time.
- **Advantages & Benefits**:
    - Helps identify **long-term trends** and shifts in process mean.
    - Useful for **detecting process drift** before major issues arise.

    - Reduces **variation-driven waste** by ensuring process consistency.
- **SPC Function**:
    - Detects **shifts or trends** in the process mean.
    - Displays **mean value (red dashed line)** as a reference.
    - Identifies special cause variations beyond normal process fluctuations.
    - Helps distinguish **common cause variation** (random, natural variation) from **special cause variation** (abnormal, unexpected variation).
- **Statistical Summary**:
    - **Mean**: The average value of the dataset.
    - **Min & Max**: The lowest and highest recorded values.
    - **Control Limits (UCL/LCL)**: Define the expected range of process variability.



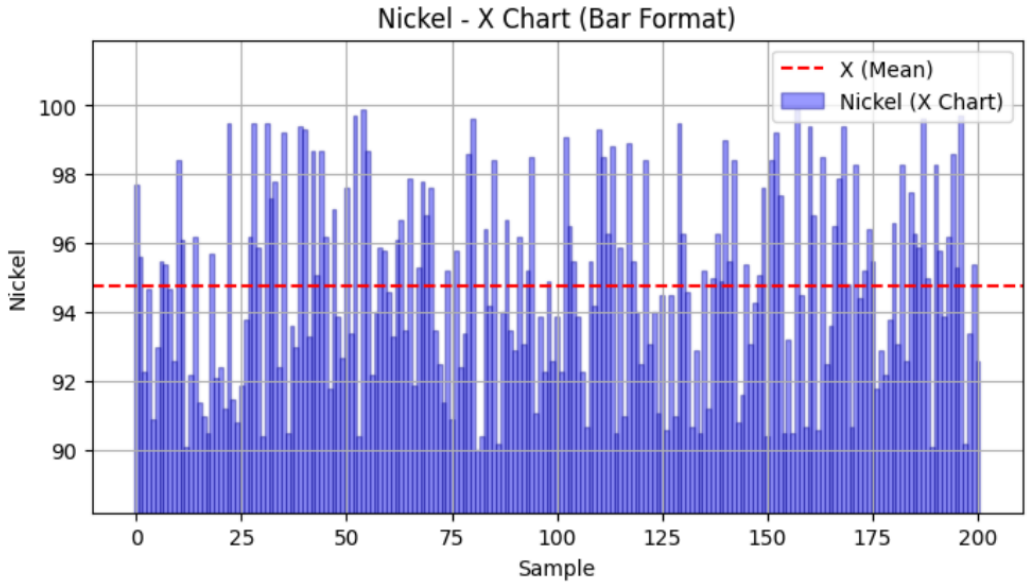
Step 4: Printing Reports

- Click **Print** to generate a **PDF report**.
- The report includes:
    - **Company header**
    - **Date range & unit number**
    - **Selected chart**
    - **Statistical summary with interpretations**
- The generated PDF automatically **opens in a web browser** for preview and printing.

ENControl X Bar Statistics

Date Start: 02-14-2009 Date End: 02-14-2025 Unit #: 0

Palm Technology
1071 Firestone Parkway
La Vergne, TN 37086



Mean: 94.756
Min: 90.0 Max: 99.9

Normal Distribution

Charts & Statistical Process Control (SPC) in ENCollect V5.0

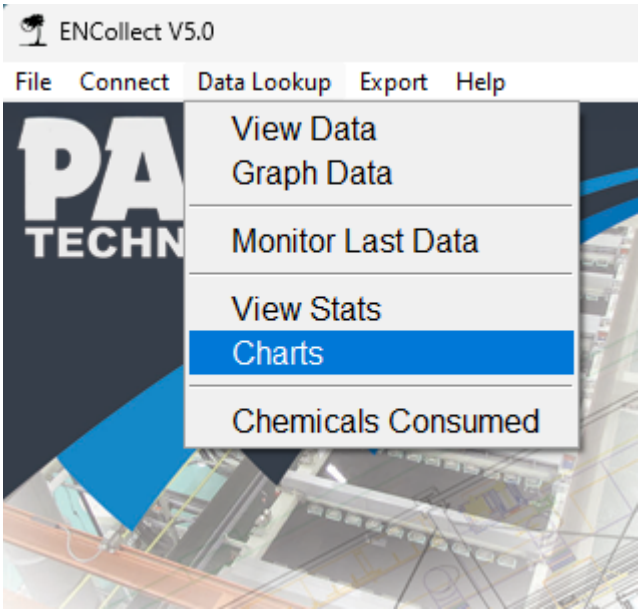
Overview

The **Charts (SPC - Statistical Process Control)** feature in ENCollect V5.0 provides multiple statistical tools to analyze data distributions, process stability, and trends over time. These charts help users make data-driven decisions for process optimization, control process variation, and detect anomalies before they become critical issues.

SPC charts are essential for quality control and process improvement. They help in understanding whether a process is in control (stable and predictable) or out of control (variability beyond acceptable limits). These charts use statistical thresholds such as **Upper Control Limit (UCL)**, **Lower Control Limit (LCL)**, and **Central Line (CL)** to assess process stability.

Step 1: Accessing the Charts Feature

1. Open **ENCollect V5.0**.
2. Click **Data Lookup** → **Charts**.



Step 2: Selecting a Unit Number and Date Range

- Use the **Unit Nbr** dropdown to select the specific unit.
- Click on the **Date Start** and **Date End** fields to set the date range.
- Use the **calendar button (C)** next to each field to open a calendar and select a date.
- Click **Run Chart** to retrieve the dataset.

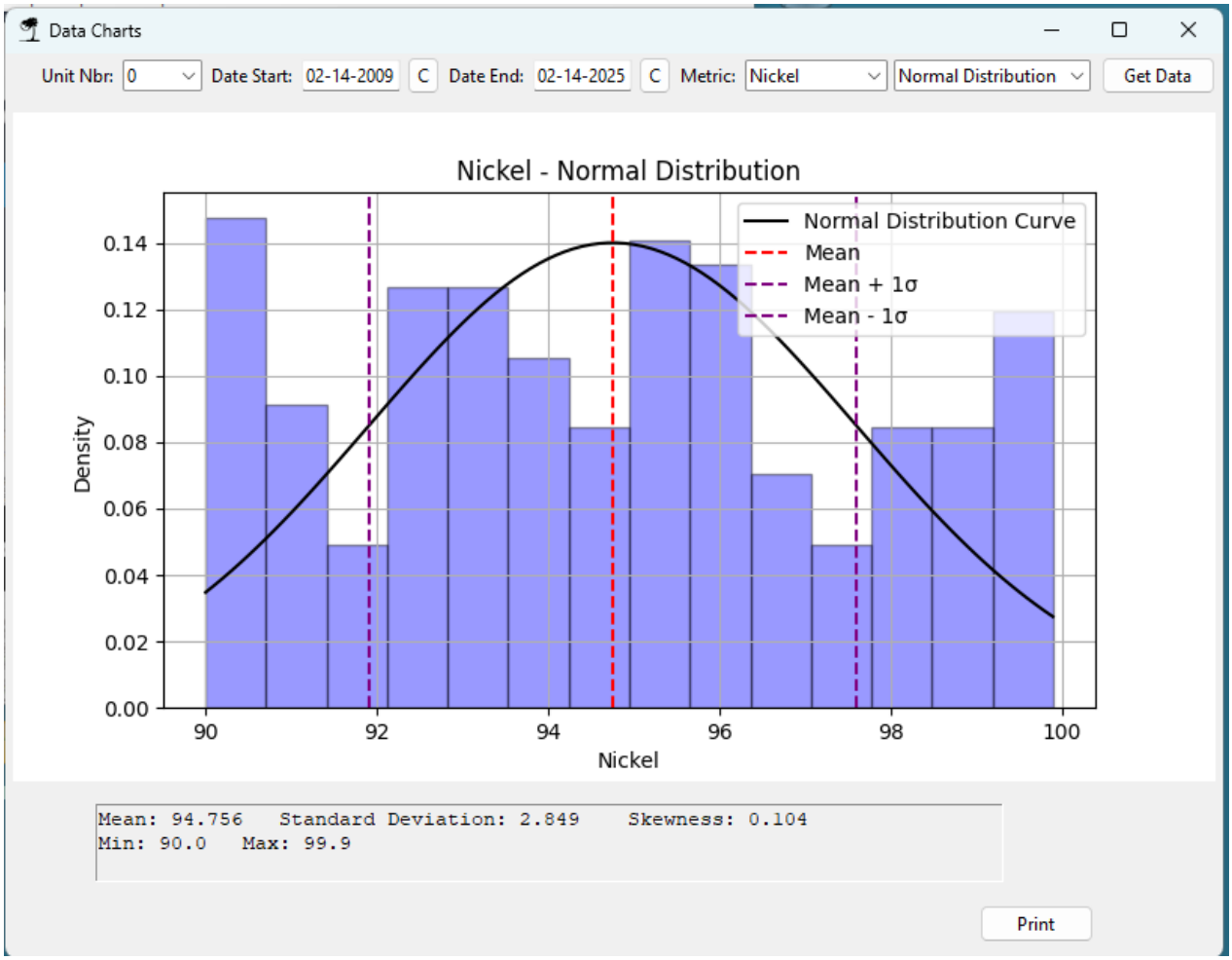
Step 3: Selecting a Chart Type

Users can choose from several chart types, each with a unique **SPC function**:

B. Normal Distribution Chart

- **Purpose**: Visualizes the data's **distribution relative to a standard normal curve**.
- **Advantages & Benefits**:
    - Allows for **quick assessment of process capability**.

    - Helps in predicting **future process outcomes**.
    - Used in **quality control** for understanding defect rates.
- **SPC Function**:
    - Evaluates how well data follows a **normal distribution**.
    - Highlights the **mean (red dashed line)** and **standard deviation markers**.
    - Helps in assessing **process capability** by comparing the spread of data to expected norms.
- **Statistical Summary**:
    - **Standard Deviation (σ)**: Measures the variation of data from the mean.
    - **Skewness**: Indicates if the data is **symmetrical or skewed** towards higher or lower values.
    - **Kurtosis**: Describes the **peakedness or flatness** of the distribution.



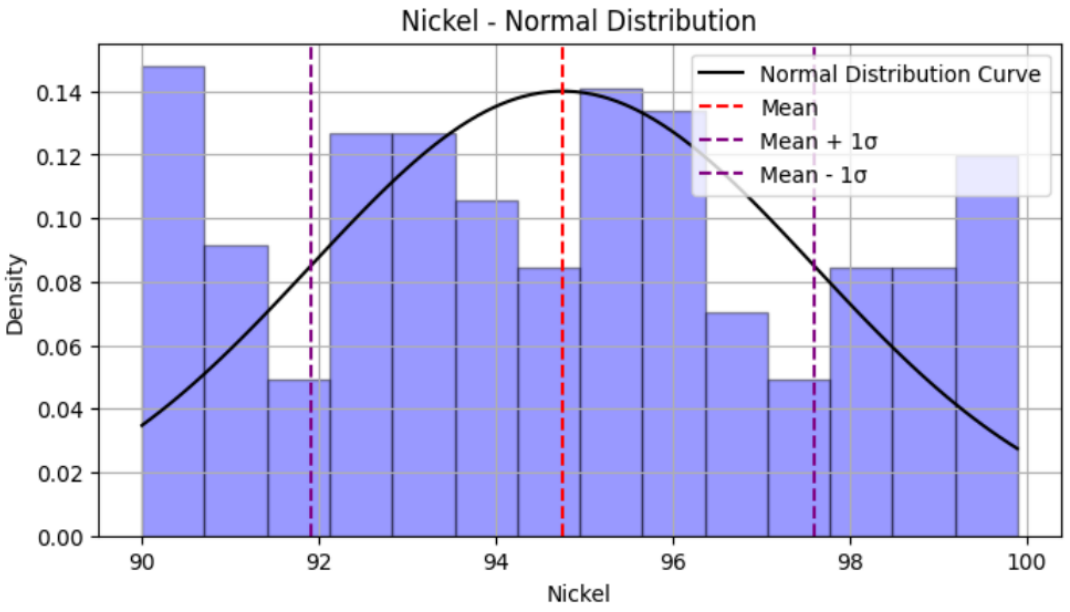
Step 4: Printing Reports

- Click **Print** to generate a **PDF report**.
- The report includes:
    - **Company header**
    - **Date range & unit number**
    - **Selected chart**
    - **Statistical summary with interpretations**
- The generated PDF automatically **opens in a web browser** for preview and printing.

ENControl Normal Distribution Statistics

Date Start: 02-14-2009 Date End: 02-14-2025 Unit #: 0

Palm Technology
1071 Firestone Parkway
La Vergne, TN 37086



Mean: 94.756 Standard Deviation: 2.849 Skewness: 0.104
Min: 90.0 Max: 99.9

KDE-Kernel Density Estimation

Charts & Statistical Process Control (SPC) in ENCollect V5.0

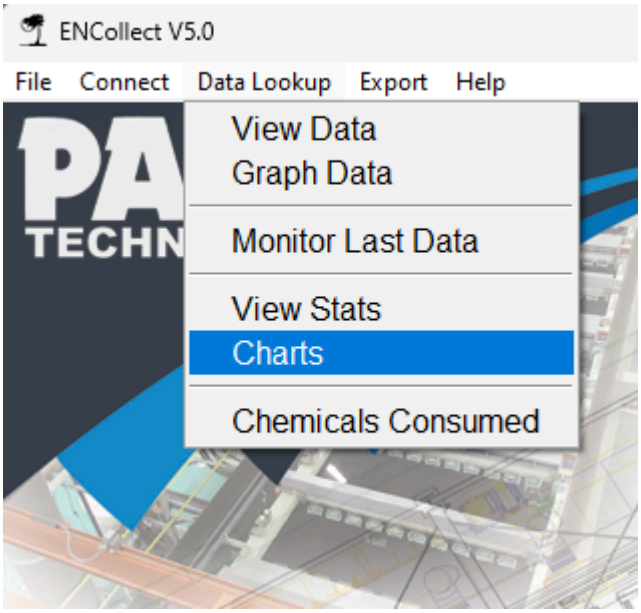
Overview

The **Charts (SPC - Statistical Process Control)** feature in ENCollect V5.0 provides multiple statistical tools to analyze data distributions, process stability, and trends over time. These charts help users make data-driven decisions for process optimization, control process variation, and detect anomalies before they become critical issues.

SPC charts are essential for quality control and process improvement. They help in understanding whether a process is in control (stable and predictable) or out of control (variability beyond acceptable limits). These charts use statistical thresholds such as **Upper Control Limit (UCL)**, **Lower Control Limit (LCL)**, and **Central Line (CL)** to assess process stability.

Step 1: Accessing the Charts Feature

1. Open **ENCollect V5.0**.
2. Click **Data Lookup** → **Charts**.



Step 2: Selecting a Unit Number and Date Range

- Use the **Unit Nbr** dropdown to select the specific unit.
- Click on the **Date Start** and **Date End** fields to set the date range.
- Use the **calendar button (C)** next to each field to open a calendar and select a date.
- Click **Run Chart** to retrieve the dataset.

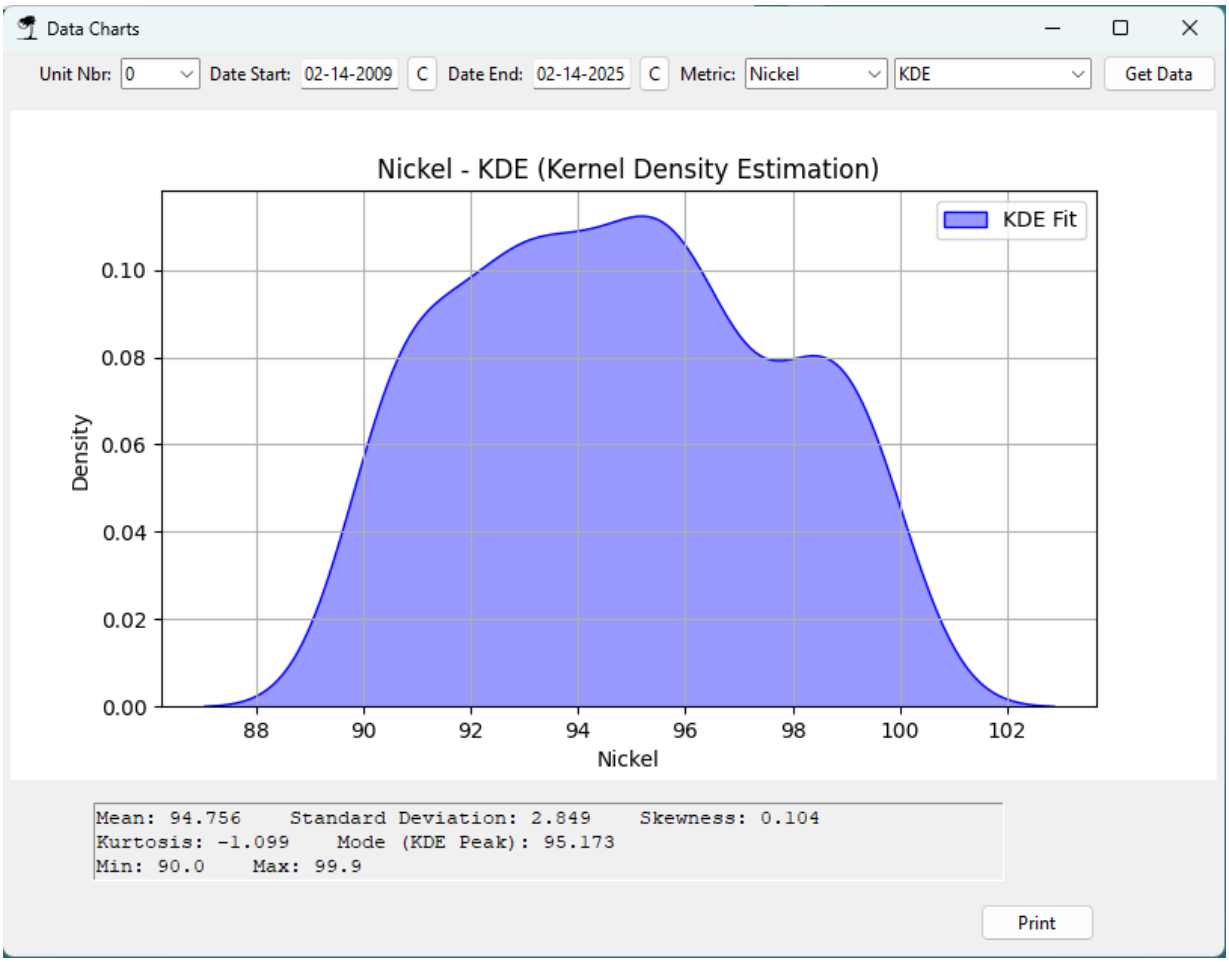
Step 3: Selecting a Chart Type

Users can choose from several chart types, each with a unique **SPC function**:

C. Kernel Density Estimation (KDE) Chart

- **Purpose**: Provides a **smooth probability density function (PDF)**.
- **Advantages & Benefits**:
    - Offers a more detailed view of **data distribution** than histograms.
    - Helps identify **data clusters, outliers, and distribution anomalies**.

    - Useful in **modeling continuous data distributions**.
- **SPC Function**:
    - Alternative to histogram, revealing **data distribution shape**.
    - Detects **skewness, multimodal distributions, and data clusters**.
    - Helps identify **outliers and abnormal process deviations**.
- **Statistical Summary**:
    - **Mode (KDE Peak)**: The most frequently occurring value in the dataset.
    - **Kurtosis**: High values suggest a sharp peak, while low values indicate a flatter distribution.



Step 4: Printing Reports

- Click **Print** to generate a **PDF report**.
- The report includes:
    - **Company header**
    - **Date range & unit number**
    - **Selected chart**
    - **Statistical summary with interpretations**
- The generated PDF automatically **opens in a web browser** for preview and printing.

I-MR

Charts & Statistical Process Control (SPC) in ENCollect V5.0

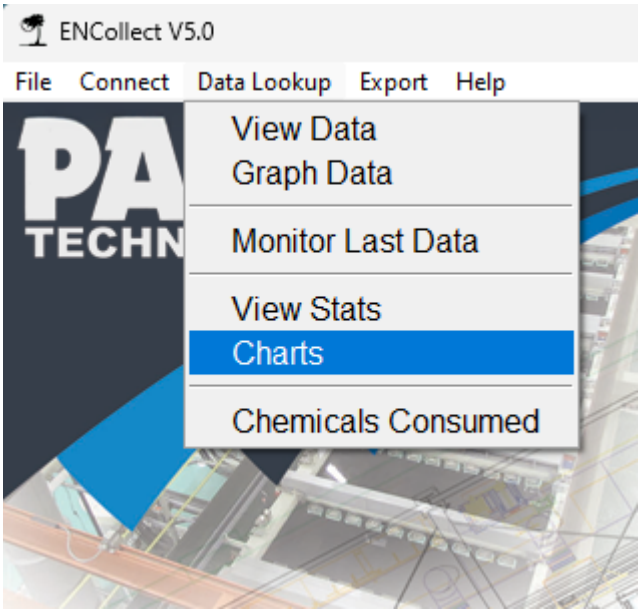
Overview

The **Charts (SPC - Statistical Process Control)** feature in ENCollect V5.0 provides multiple statistical tools to analyze data distributions, process stability, and trends over time. These charts help users make data-driven decisions for process optimization, control process variation, and detect anomalies before they become critical issues.

SPC charts are essential for quality control and process improvement. They help in understanding whether a process is in control (stable and predictable) or out of control (variability beyond acceptable limits). These charts use statistical thresholds such as **Upper Control Limit (UCL)**, **Lower Control Limit (LCL)**, and **Central Line (CL)** to assess process stability.

Step 1: Accessing the Charts Feature

1. Open **ENCollect V5.0**.
2. Click **Data Lookup → Charts**.



Step 2: Selecting a Unit Number and Date Range

- Use the **Unit Nbr** dropdown to select the specific unit.
- Click on the **Date Start** and **Date End** fields to set the date range.
- Use the **calendar button (C)** next to each field to open a calendar and select a date.
- Click **Run Chart** to retrieve the dataset.

Step 3: Selecting a Chart Type

Users can choose from several chart types, each with a unique **SPC function**:

D. Individual & Moving Range (I-MR) Chart

- **Purpose**: Monitors **individual measurements** and **range between consecutive values**.
- **Advantages & Benefits**:
    - Ideal for **small sample sizes** where subgroup analysis is impractical.

    - Detects **both short-term and long-term variability**.
    - Helps in **root cause analysis** for process deviations.
- **SPC Function**:
    - **I-Chart** shows **process stability over time**.
    - **MR-Chart** helps identify **sudden process changes**.
    - Displays **Upper and Lower Control Limits (UCL & LCL)**.
    - Used for **small sample sizes** where traditional SPC charts are ineffective.
- **Statistical Summary**:
    - **Mean Moving Range (MR)**: The average range of successive measurements.
    - **Control Limits (UCL MR/LCL MR)**: Determine acceptable process variation.
    - **Process Stability Assessment**: If points fall outside control limits, the process may require investigation.

Step 4: Printing Reports

- Click **Print** to generate a **PDF report**.
- The report includes:
    - **Company header**
    - **Date range & unit number**
    - **Selected chart**
    - **Statistical summary with interpretations**
- The generated PDF automatically **opens in a web browser** for preview and printing.

CUSUM

Charts & Statistical Process Control (SPC) in ENCollect V5.0

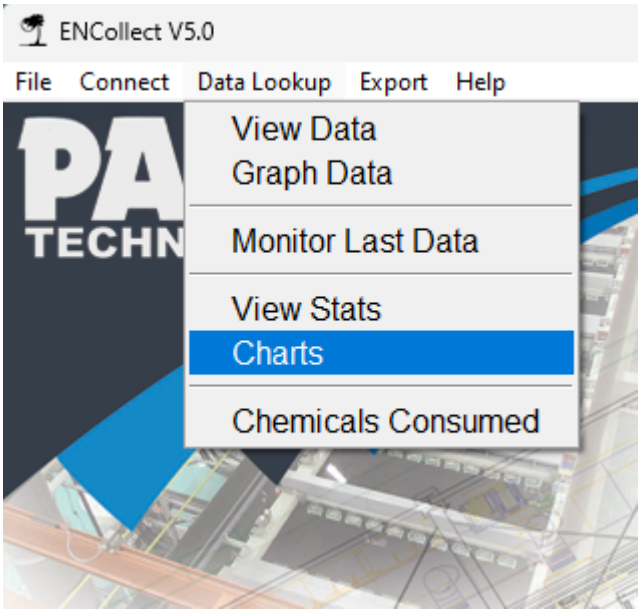
Overview

The **Charts (SPC - Statistical Process Control)** feature in ENCollect V5.0 provides multiple statistical tools to analyze data distributions, process stability, and trends over time. These charts help users make data-driven decisions for process optimization, control process variation, and detect anomalies before they become critical issues.

SPC charts are essential for quality control and process improvement. They help in understanding whether a process is in control (stable and predictable) or out of control (variability beyond acceptable limits). These charts use statistical thresholds such as **Upper Control Limit (UCL)**, **Lower Control Limit (LCL)**, and **Central Line (CL)** to assess process stability.

Step 1: Accessing the Charts Feature

1. Open **ENCollect V5.0**.
2. Click **Data Lookup** → **Charts**.



Step 2: Selecting a Unit Number and Date Range

- Use the **Unit Nbr** dropdown to select the specific unit.
- Click on the **Date Start** and **Date End** fields to set the date range.
- Use the **calendar button (C)** next to each field to open a calendar and select a date.
- Click **Run Chart** to retrieve the dataset.

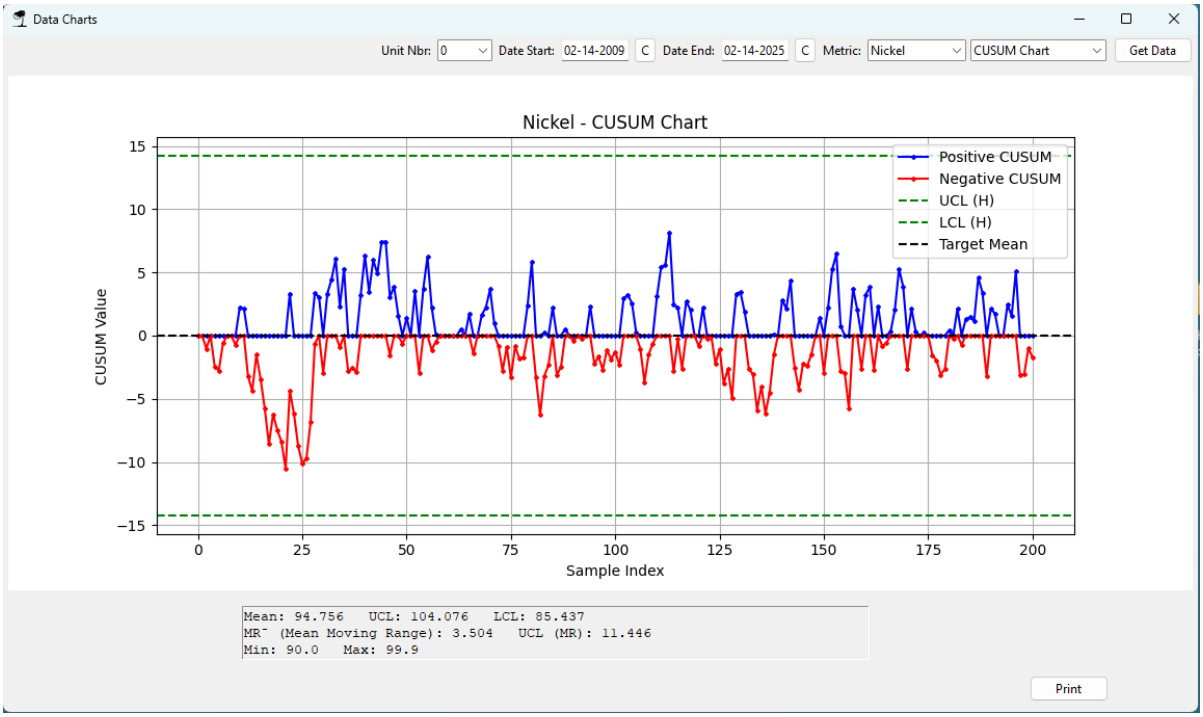
Step 3: Selecting a Chart Type

Users can choose from several chart types, each with a unique **SPC function**:

E. CUSUM (Cumulative Sum) Chart

- **Purpose**: Detects **small shifts in the process mean**.
- **Advantages & Benefits**:
    - More sensitive to **gradual process shifts** than X-Bar charts.
    - Allows for **earlier intervention** before problems escalate.

    - Useful for detecting **consistent patterns of variation**.
- **SPC Function**:
    - Tracks deviations from the **target mean**.
    - Positive and negative CUSUM curves indicate **trending increases or decreases**.
    - More sensitive than X-Bar charts for detecting gradual process drift.
- **Statistical Summary**:
    - **Target Mean**: The expected process average.
    - **Cumulative Sum (CUSUM Values)**: Running total of deviations from the mean.
    - **Upper and Lower Control Limits (UCL/LCL)**: Define boundaries for process deviations.



Step 4: Printing Reports

- Click **Print** to generate a **PDF report**.
- The report includes:
    - **Company header**
    - **Date range & unit number**
    - **Selected chart**
    - **Statistical summary with interpretations**
- The generated PDF automatically **opens in a web browser** for preview and printing.

Heatmap

Heatmap Charting in ENCollect V5.0

Overview

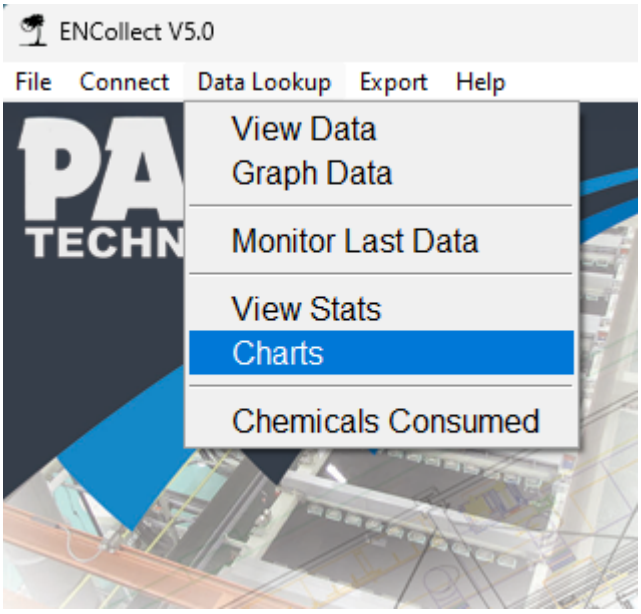
The **Heatmap Charting** feature in ENCollect V5.0 provides a **color-coded visualization** of data trends over time, allowing users to quickly identify variations, detect anomalies, and analyze process stability. Heatmaps are particularly useful for spotting patterns in **Nickel concentration, pH levels, temperature fluctuations, and other key metrics**.
Heatmaps represent data using a gradient color scale, where:

- **Darker shades** indicate **higher values**.
- **Lighter shades** indicate **lower values**.

This visualization helps operators and engineers monitor **process performance**, ensuring data-driven decision-making for **quality control and process optimization**.

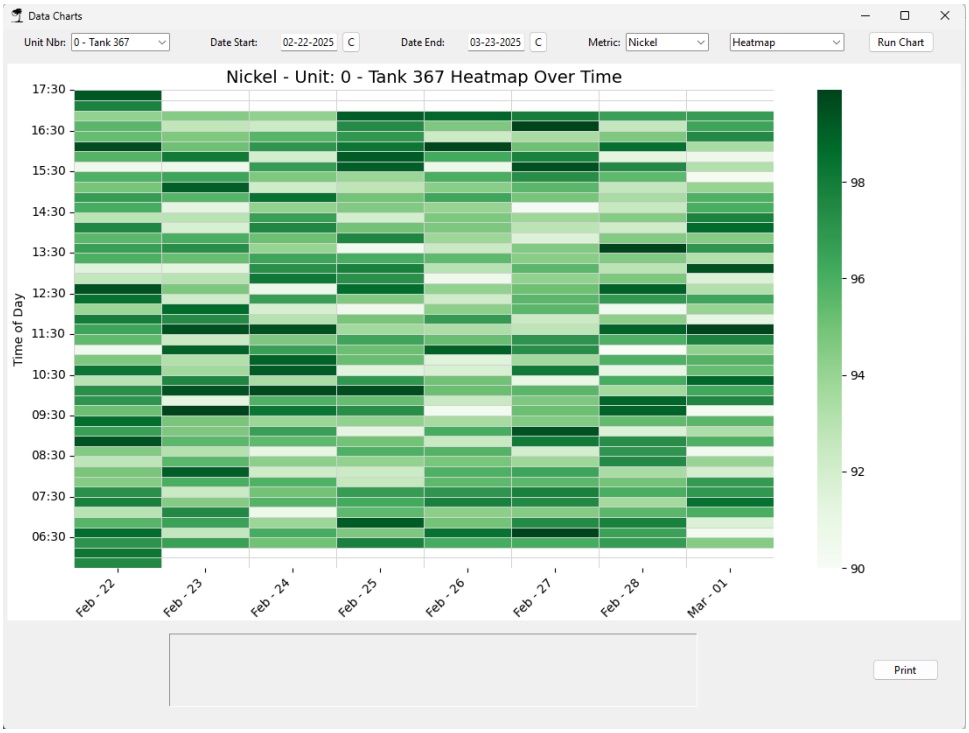
Step 1: Accessing the Heatmap Chart Feature

1. Open **ENCollect V5.0**.
2. Click **Data Lookup** → **Charts**.



Step 2: Selecting a Unit Number and Date Range

- Use the **Unit Nbr** dropdown to select the specific unit or tank.
- Click on the **Date Start** and **Date End** fields to set the desired time range.
- Use the **calendar button (C)** next to each field to open a calendar for quick selection.
- Click **Run Chart** to retrieve and display the dataset.



Step 3: Generating a Heatmap Chart

1. **Select Metric:** Choose a process parameter from the **Metric** dropdown (e.g., Nickel, pH, Temperature).
2. **Choose Chart Type:** From the chart type dropdown, select **Heatmap**.
3. **Run Chart:** Click **Run Chart** to generate the heatmap visualization.

Step 4: Understanding the Heatmap Chart

- **X-Axis (Horizontal):** Represents **dates**, showing process trends over time.
- **Y-Axis (Vertical):** Represents **time of day**, displaying measurements at different intervals.
- **Color Gradient:**
    - **Darkest shades** indicate the **highest recorded values**.
    - **Lightest shades** indicate the **lowest recorded values**.
    - The **legend on the right** helps interpret the range of values.

Heatmaps help users quickly assess fluctuations and **detect patterns**, such as **seasonal variations, process drift, or sudden deviations**.

Step 5: Printing Reports

- Click **Print** to generate a **PDF report**.
- The report includes:
  - **Company header**
  - **Date range & unit number**
  - **Heatmap chart**
  - **Color legend for reference**
- The **generated PDF** automatically opens in a web browser for **preview and printing**.

Use Cases for Heatmap Charting

- **Nickel Concentration Analysis:** Tracks chemical stability across shifts.
- **pH Monitoring:** Helps identify fluctuations and maintain process consistency.
- **Temperature Control:** Detects heating or cooling variations in the tank.
- **Trend Identification:** Provides an intuitive view of long-term process changes.

The **Heatmap Charting** feature in **ENCollect V5.0** enhances **data visualization and decision-making**, ensuring smooth and stable process operations.

Bullseye

Bullseye Charting in ENCollect V5.0

Overview

The **Bullseye Chart** in ENCollect V5.0 provides a **circular data visualization** that helps users identify process trends, variations, and anomalies over a **24-hour period**. This specialized **SPC (Statistical Process Control) chart** presents data in a **radial format**, making it easier to spot time-based deviations and process consistency issues.
This chart is particularly useful for:

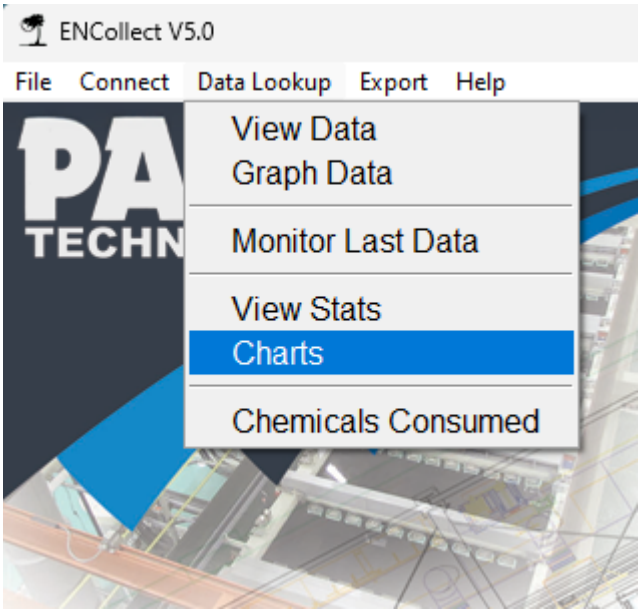
- **Visualizing Daily Process Trends** – Shows fluctuations over an entire day in a **compact, intuitive format**.
- **Identifying Outliers** – Highlights data points that fall outside expected process control limits.
- **Comparing Different Time Periods** – Allows operators to analyze variations at specific hours of the day.

The **color gradient** represents data intensity:

- **Red hues indicate higher values.**
- **Blue hues indicate lower values.**
- **Neutral shades (gray/white) indicate mid-range values.**

Step 1: Accessing the Bullseye Chart Feature

1. Open **ENCollect V5.0**.
2. Click **Data Lookup** → **Charts**.

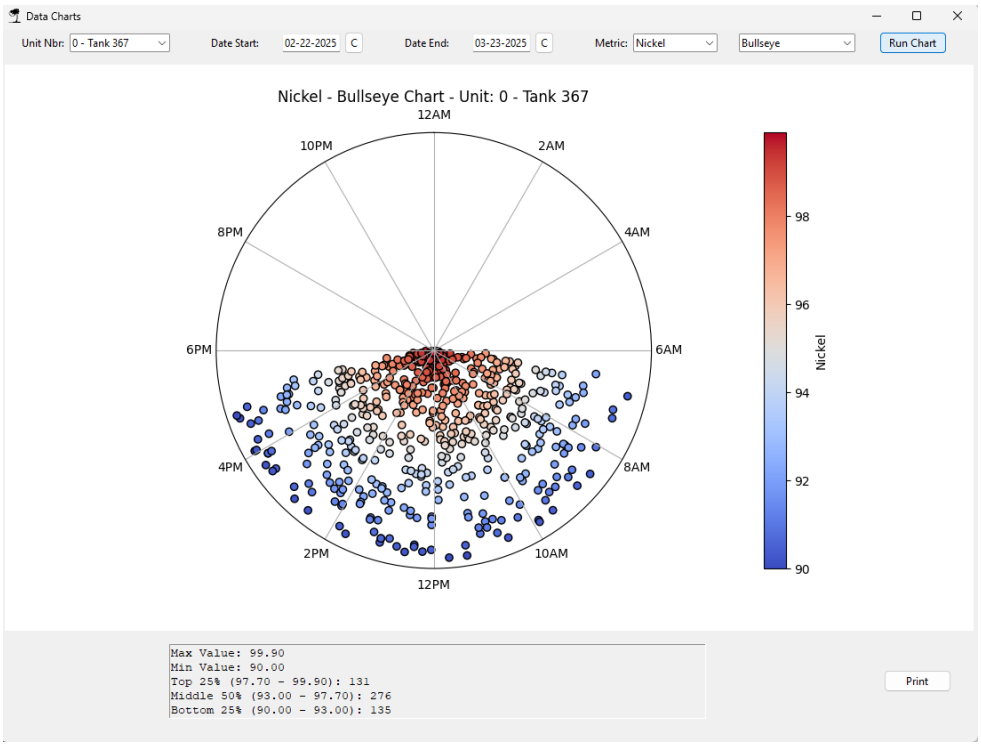


Step 2: Selecting a Unit Number and Date Range

- Use the **Unit Nbr** dropdown to select the desired unit or tank.
- Click the **Date Start** and **Date End** fields to define the time period for analysis.
- Use the **calendar button (C)** next to each field for date selection.

Step 3: Generating a Bullseye Chart

1. **Select Metric:** Choose a process parameter (e.g., Nickel, pH, Temperature).
2. **Choose Chart Type:** From the chart type dropdown, select **Bullseye**.
3. **Run Chart:** Click **Run Chart** to generate the Bullseye visualization.



Step 4: Understanding the Bullseye Chart

- **Radial Axis (Clock Face Format):** Displays **time of day** (e.g., 12AM, 6AM, 12PM, 6PM).
- **Data Points (Colored Circles):** Represent recorded values at different times.
- **Color Gradient:**
  - **Red (Upper Range):** Values near the high threshold.
  - **White/Gray (Mid Range):** Values within the acceptable process range.
  - **Blue (Lower Range):** Values near the low threshold.

Below the chart, a **statistical summary** provides key insights:

- **Max Value & Min Value** – The highest and lowest recorded readings.
- **Top 25%** – Number of readings in the upper quartile.
- **Middle 50%** – Data points within the interquartile range (most stable values).
- **Bottom 25%** – Number of readings in the lower quartile.

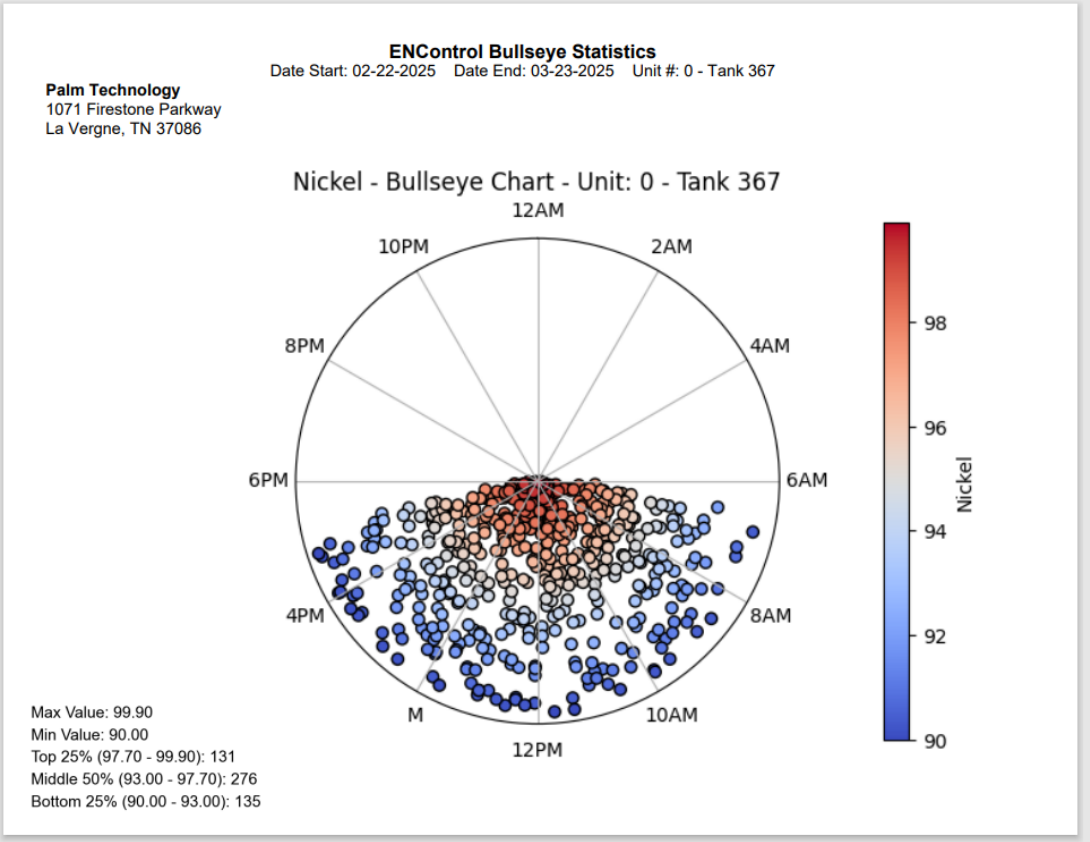
This allows users to quickly assess whether their process is **stable or fluctuating** beyond acceptable limits.

Step 5: Printing Reports

- Click **Print** to generate a **PDF report**.
- The report includes:

- **Company header**
- **Date range & unit number**
- **Bullseye chart visualization**
- **Statistical breakdown**

- The **generated PDF** automatically opens in a web browser for **preview and printing**.



Use Cases for Bullseye Charting

- **Electroless Nickel Bath Monitoring:** Track nickel concentration shifts throughout the day.
- **pH Trend Analysis:** Identify fluctuations in pH levels at specific times.
- **Temperature Stability:** Detect heating and cooling inconsistencies.
- **Process Consistency:** Determine if variations occur during specific production shifts.

The **Bullseye Chart** in **ENCollect V5.0** provides a **clear, time-based visualization** of process trends, making it an essential tool for **statistical process control and quality assurance**.

Export Data

Exporting Data in ENCollect V5.0

Overview

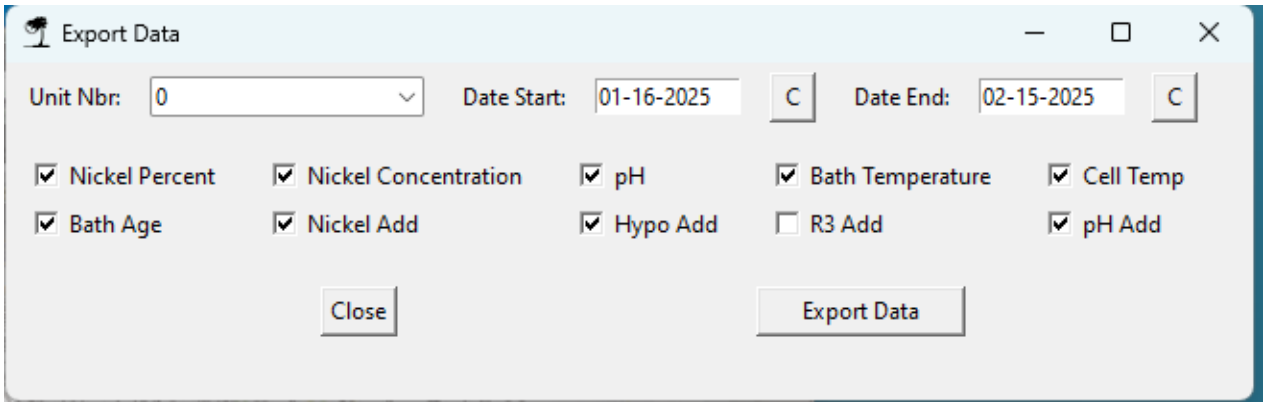
The **Export Data** feature in ENCollect V5.0 allows users to extract specific datasets based on unit number, date range, and selected parameters. The exported data can be saved in **CSV format** for further analysis in external applications like Microsoft Excel or statistical software.

Step 1: Accessing the Export Data Feature

1. Open **ENCollect V5.0**.
2. Click **Export** → **Export Data**.

Step 2: Selecting a Unit Number and Date Range

- Use the **Unit Nbr** dropdown to select the specific unit.
- Click on the **Date Start** and **Date End** fields to set the date range.
- Use the **calendar button (C)** next to each field to open a calendar and select a date.
- Click **Export Data** to retrieve the dataset.



Step 3: Selecting Parameters for Export

Check or uncheck the boxes to include/exclude specific parameters:

- **Nickel Percent**
- **Nickel Concentration**
- **pH**

- **Bath Temperature**
- **Cell Temperature**
- **Bath Age**
- **Nickel Add**
- **Hypo Add**
- **R3 Add**
- **pH Add**

Only selected parameters will be included in the exported file.

Step 4: Saving the Exported Data

1. Click the **Export Data** button.
2. A **file save dialog** appears where you can specify:
    - **File name**
    - **Destination folder**
    - **File format (CSV)**
3. The system generates a **CSV file** containing the selected dataset.

Step 5: Using the Exported Data

- The exported **CSV file** is **comma-separated** and can be opened in:
    - **Microsoft Excel**
    - **Google Sheets**
    - **Data analysis tools (Python, R, MATLAB, etc.)**

Use Cases for Exported Data:

- **Long-term data archiving**.
- **Custom report generation**.
- **Advanced statistical analysis**.
- **Integration with other monitoring and control systems**.

Troubleshooting Tips

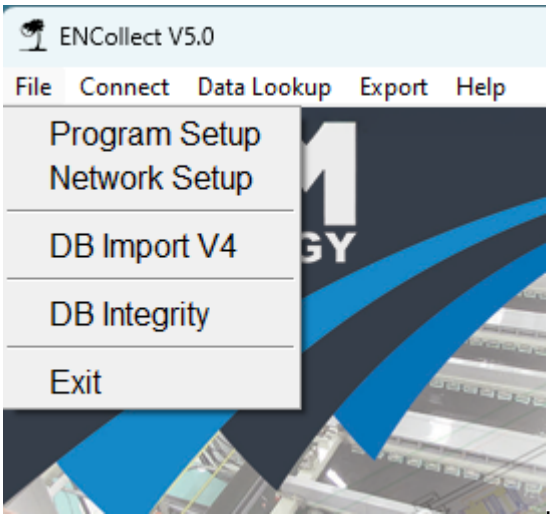
- If no data appears, ensure the **correct unit and date range** are selected.
- If an error occurs, verify that the **destination folder** is accessible.
- If exported data is incomplete, confirm the **right parameters** are checked before exporting.
- Ensure that no special characters are in the **file name** or **folder path** to avoid file-saving errors.

Database Integrity

Database Maintenance in ENCollect V5.0

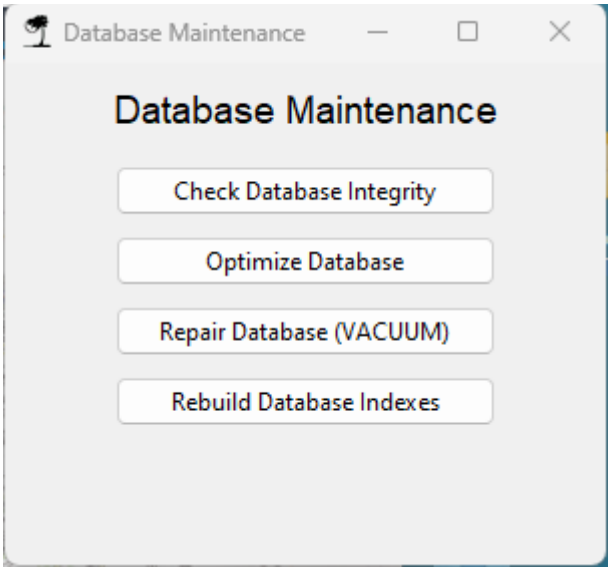
Overview

The **Database Maintenance** feature in ENCollect V5.0 provides essential tools for ensuring the **integrity, optimization, and performance** of the database. These functions help maintain **data reliability** and **prevent corruption** over time, ensuring that ENCollect V5.0 runs smoothly



Step 1: Accessing Database Maintenance

1. Open **ENCollect V5.0**.
2. Click **File → DB Integrity** to open the Database Maintenance window.



Step 2: Understanding Database Maintenance Functions

A. Check Database Integrity

- **Purpose**: Ensures the database is free from corruption or structural issues.
- **How it Works**:
  - Runs an **integrity check** on the database.
  - Detects **missing records, damaged indexes, or corrupt data blocks**.
  - If issues are found, a **warning message** is displayed.

- **When to Use**:
    - If the system behaves unexpectedly (e.g., missing data, crashes).
    - As a **routine check** to prevent database failures.

B. Optimize Database

- **Purpose**: Improves database **performance** by reorganizing and compacting data.
- **How it Works**:
    - Reorders and defragments database tables.
    - Reduces **file size** and **increases query speed**.
- **When to Use**:
    - If the database becomes **slower over time**.
    - After a large **import/export operation**.

C. Repair Database (VACUUM)

- **Purpose**: Reclaims unused space and optimizes internal database structure.
- **How it Works**:
    - Removes **unnecessary data fragments**.
    - Rebuilds the database **for efficiency**.
- **When to Use**:
    - If the database **size is unusually large**.
    - If performance **declines after many deletions or updates**.

D. Rebuild Database Indexes

- **Purpose**: Ensures database indexes remain efficient.
- **How it Works**:
    - Regenerates indexes to **speed up queries**.
    - Fixes **damaged or outdated indexes**.
- **When to Use**:
    - If searches and data lookups **become slower**.
    - If integrity checks suggest **index corruption**.

Step 3: Best Practices for Database Maintenance

- Perform **Check Database Integrity weekly** to detect early issues.
- Run **Optimize Database** monthly to maintain performance.
- Use **Repair Database (VACUUM)** after major changes (e.g., bulk imports).
- Rebuild indexes **if lookups are slow**.

Troubleshooting Tips

- If integrity checks fail, **backup the database** before taking corrective action.
- If the database is slow even after maintenance, check **hardware or disk space**.
- If errors persist, **contact support** for further diagnostics.

Getting help

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