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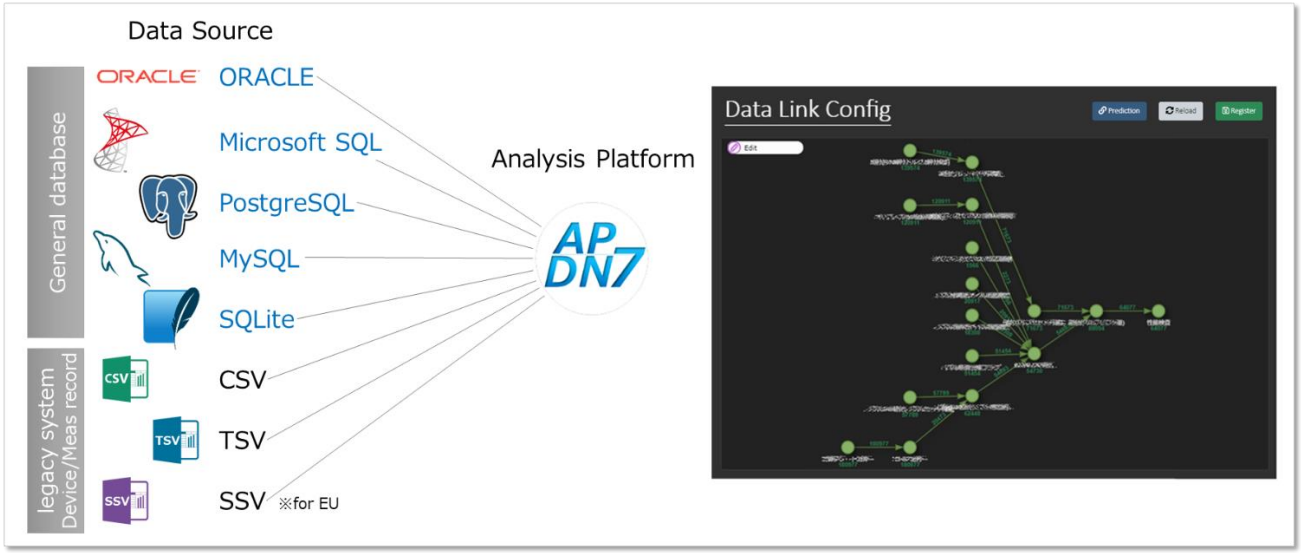
Analysis Platform + DN7
AP+DN7

Data importing & Data link setting

AP+DN7 supports many data sources, including existing equipment and systems within the factory.

If there is common information such as serial numbers, various data such as materials, production management, logistics, and MaaS can be connected and linked. Simple GUI, or the Auto link function can be used to automatically set the linkage settings.

In addition to the new IoT-enabled line, we can aggregate and link old legacy systems and accumulated data to provide a one-stop integrated data analysis environment where "you can start analyzing right away with AP+DN7”.



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  Register information of the data source from which data will be imported. AP+DN7 does not retrieve data stored in various data sources (databases or CSV/TS/SSV files) from them each time a graph is plotted. Instead, AP+DN7 imports the data into the internal database as a buffer in advance, enabling high-speed graph plotting.

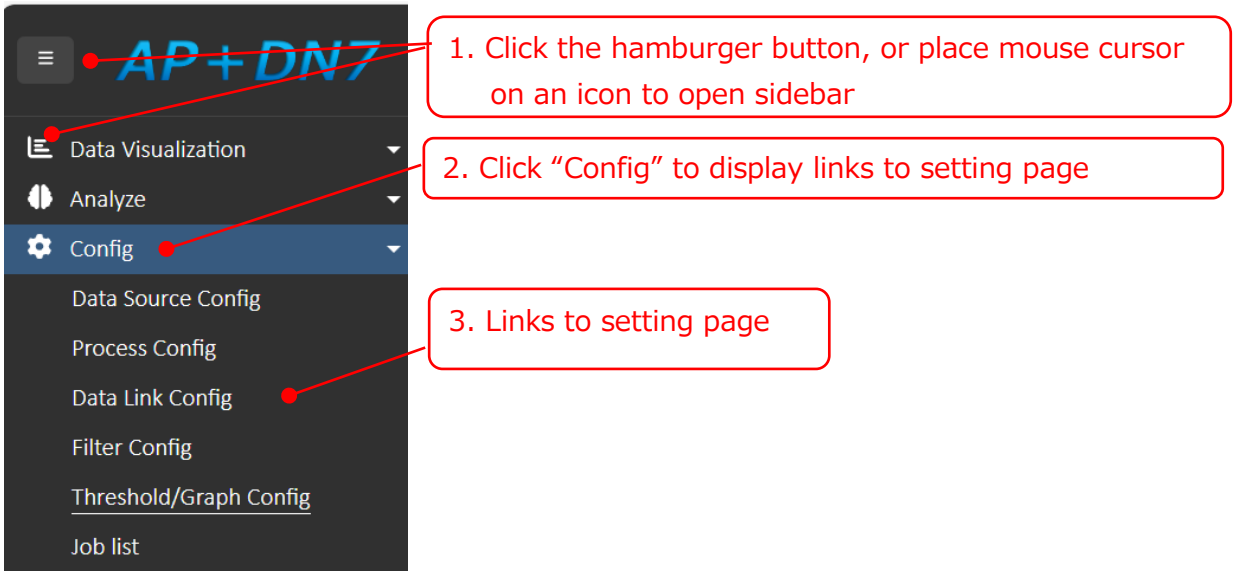
- **Process Config**
  This section allows you to configure more detailed settings for importing data. You can set the tables and columns to be loaded, their data types, and the names to be displayed.

- **Data Link Config**
  Data between different processes can be linked.

- **Filter Config**
  Setup filters, to narrow down the data to be plotted in a graph using data such as equipment and part numbers (Explained in another manual)

- **Threshold/Graph Config**
  Set the threshold to be displayed on the plot (upper threshold/lower threshold, upper threshold in process/lower threshold in process) and plot display range (y-axis maximum value/minimum value). (explained in another manual)

How to move to each setting page



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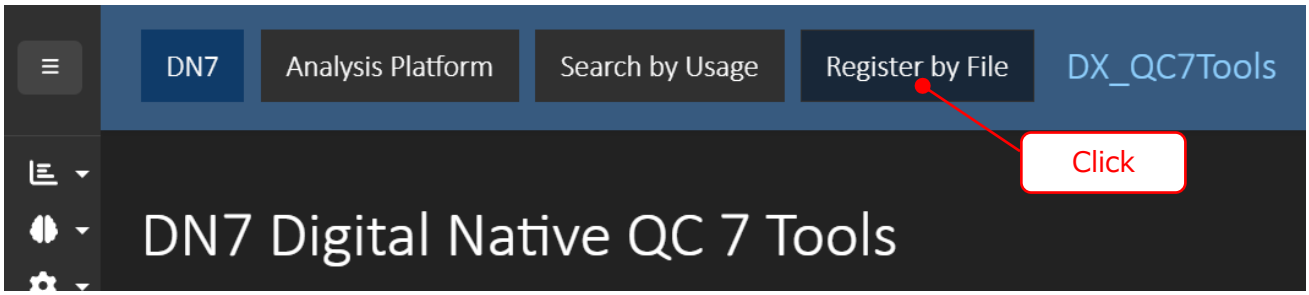
(Only for CSV/TSV/SSV) Easy import with “Register by File”

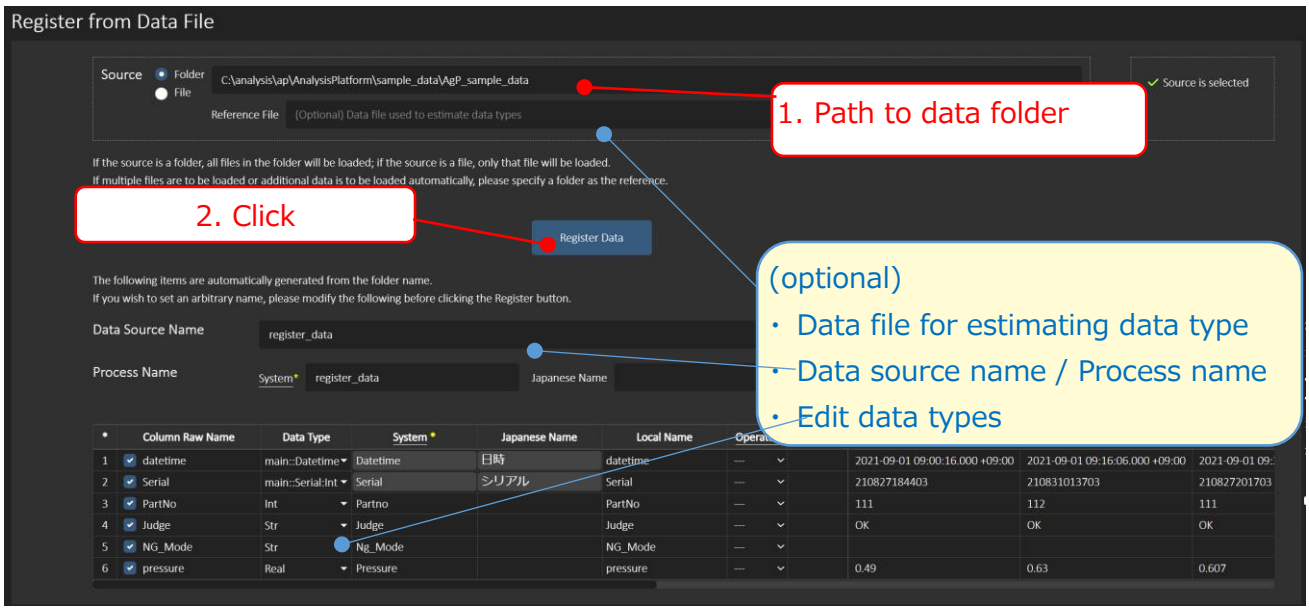
The "Register by File" page allows you to skip the detailed settings and import your data to immediately start your data analysis with the AP+DN7. This page can be accessed from the navigation bar at the top of the screen. For detailed settings, see Section 2.1.



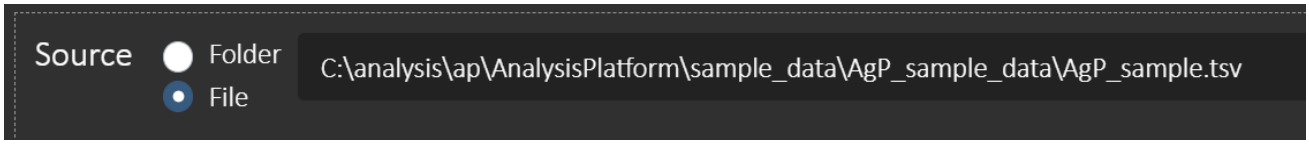
On this page, you can register and load data by simply entering either of the following to the “Source” field, and clicking the "Register Data" button:

- The path to the folder where the data you want to import is stored
- The path to the data you want to import

The path can be either an absolute or relative path. Optionally, you can specify the file to be used for data type estimation, specify the name of the file to be registered, and modify the estimated data type; see Section 2.1 for the folder structure allowed by AP+DN7.



If you select “File” in “Source” field and fill in a path to a data file, you can import only that file.



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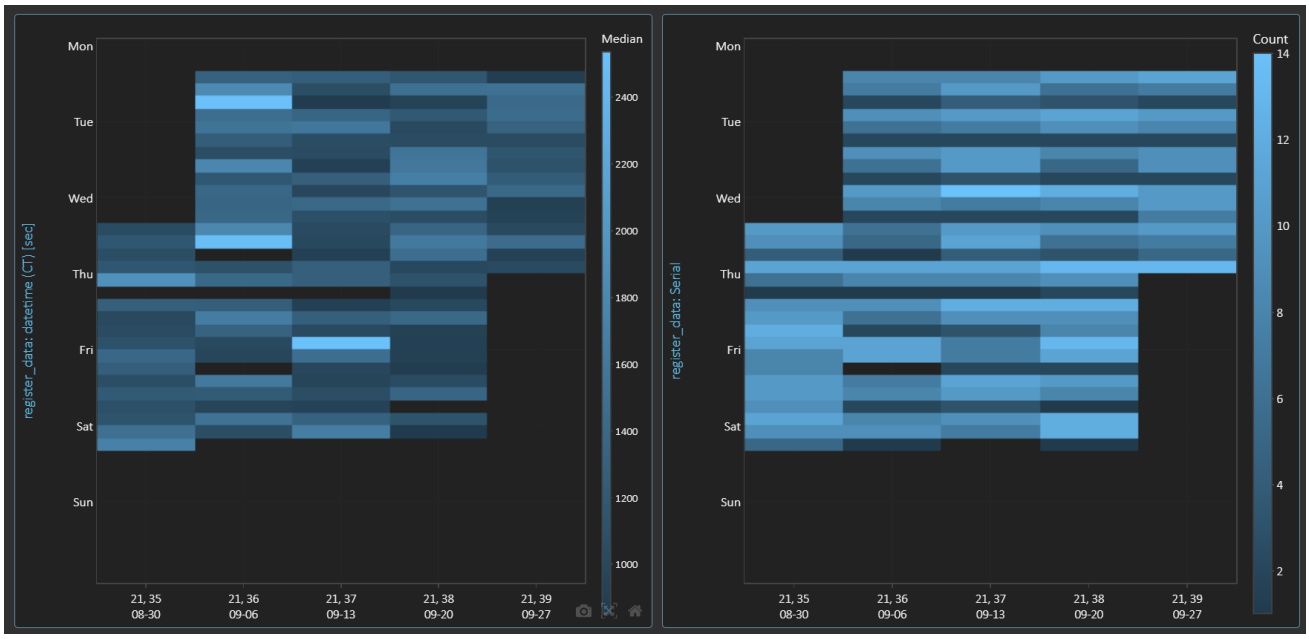
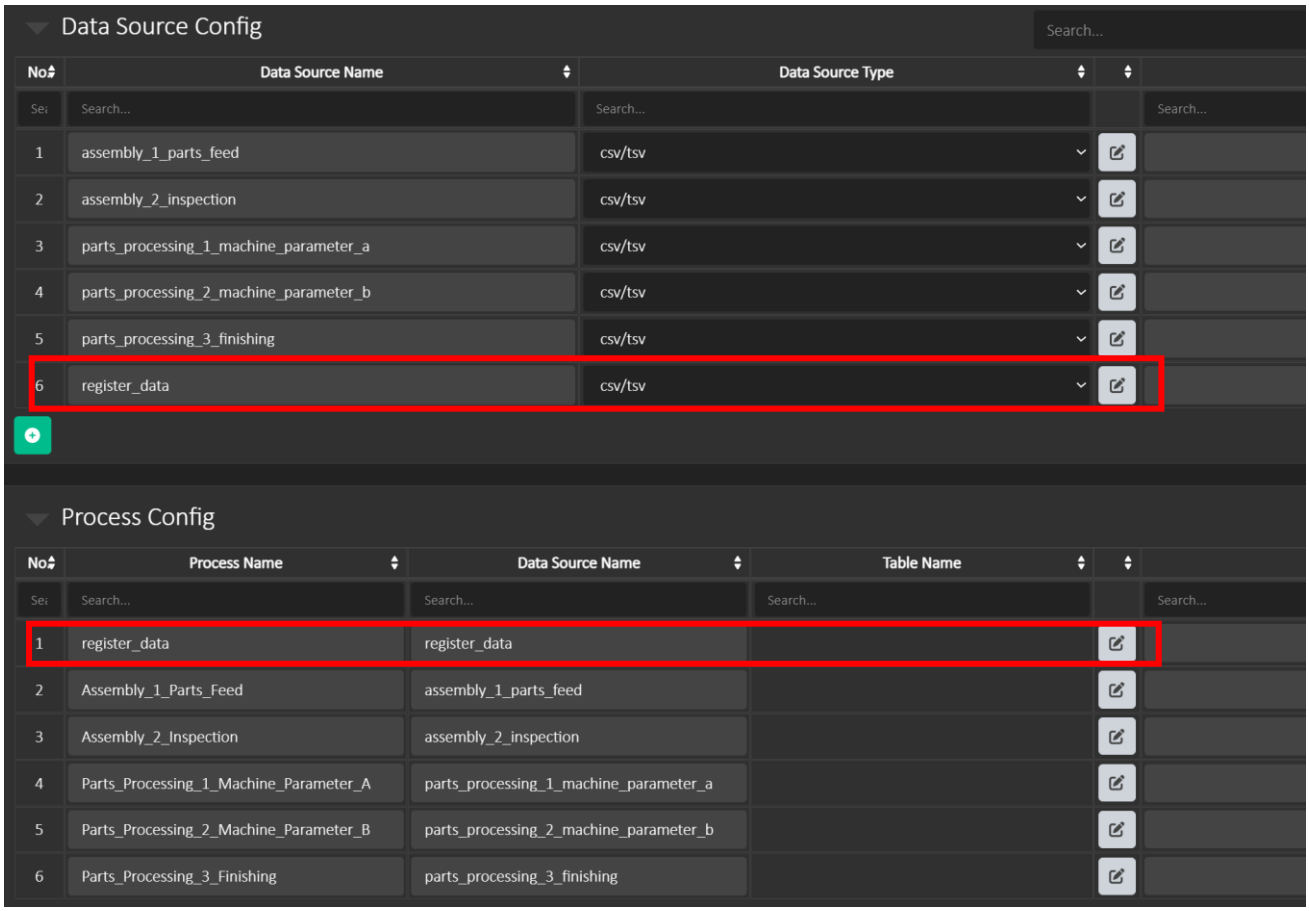
When the "Register Data" button is clicked, the file structure is checked, and then AP+DN7 will start importing the data. Four seconds after the first file is imported, the imported data so far is automatically visualized in a calendar heatmap.



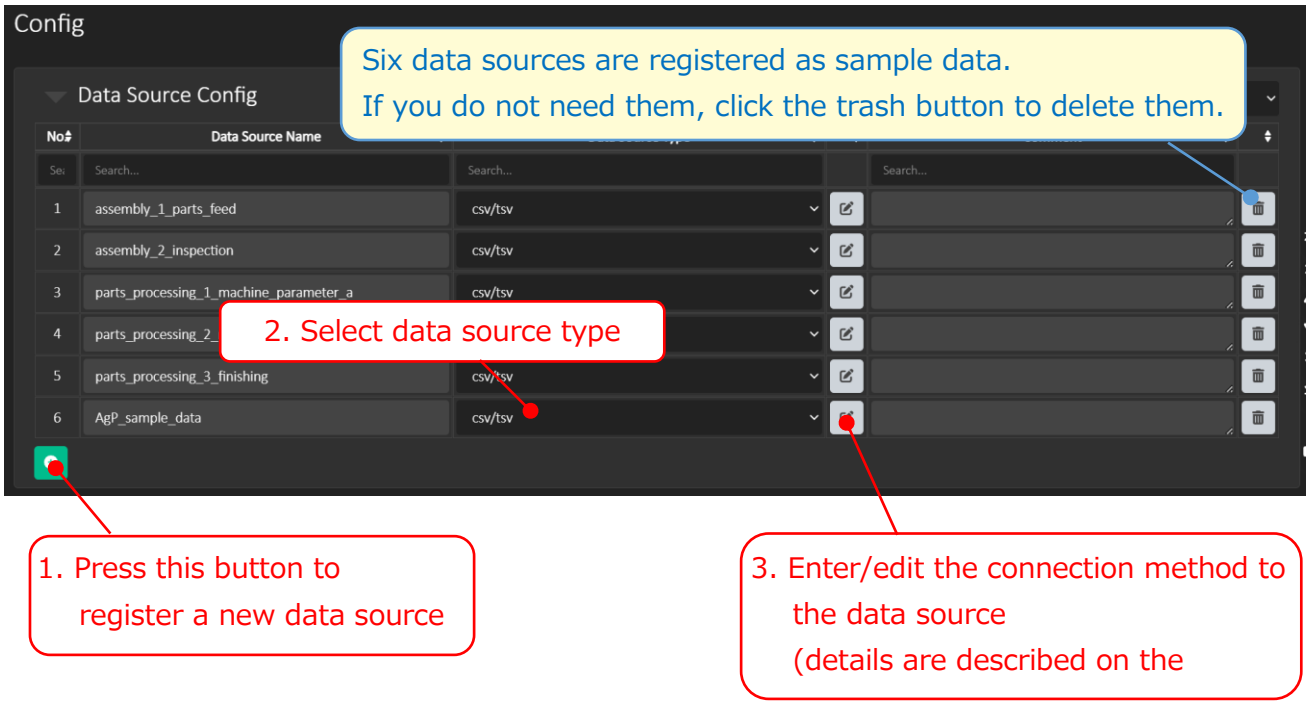
You can check/edit registered settings from config page.



2. Data Source Config

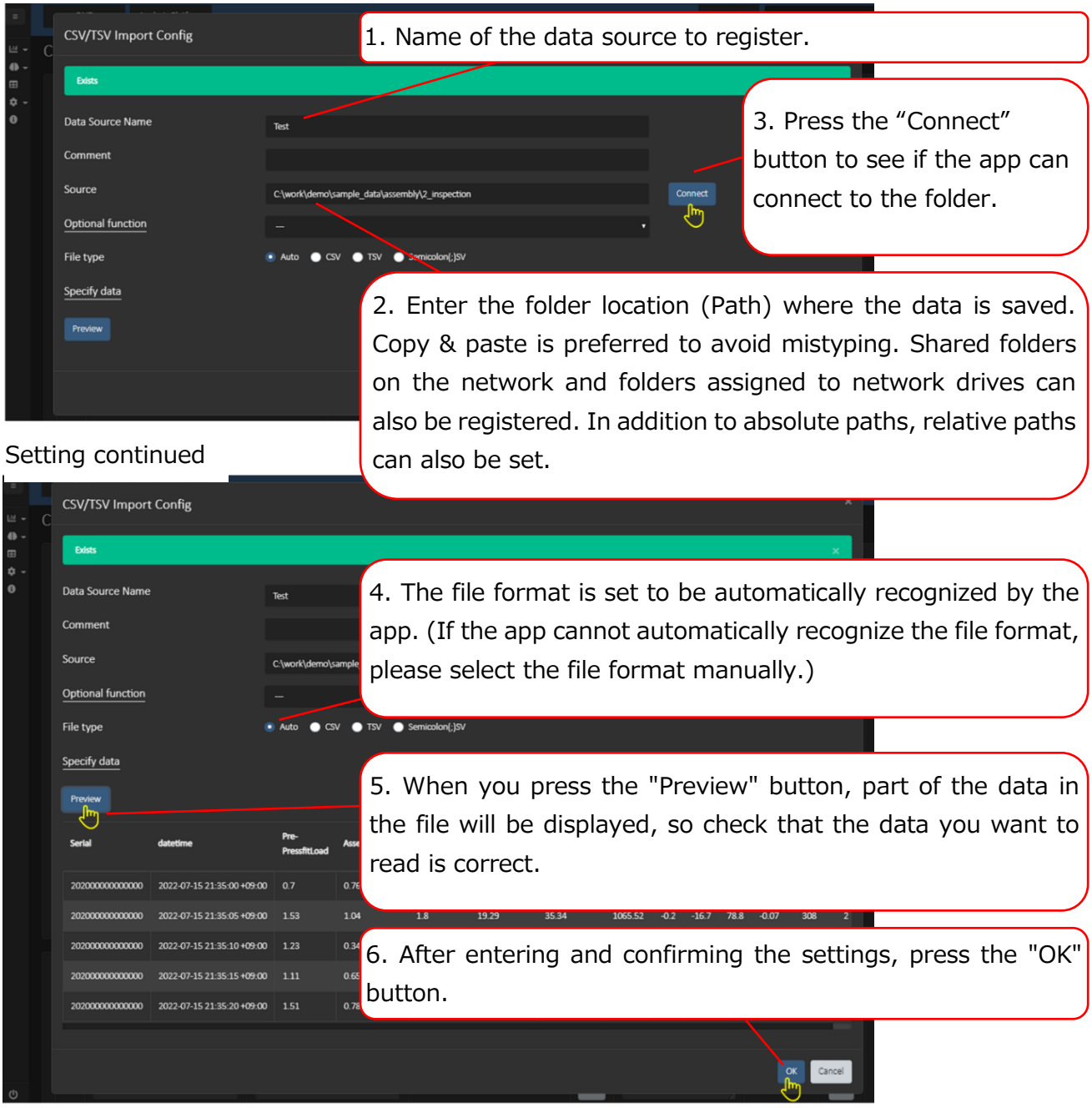
In this config, users can register information of the data source from which data will be imported. AP+DN7 does not retrieve data stored in various data sources (databases or CSV/TS/SSV files) from them each time a graph is plotted. Instead, AP+DN7 imports the data into the internal database as a buffer in advance, enabling high-speed graph plotting.

Use the buttons below to add/edit data source settings. Since the setting method differs depending on the type of data source, the setting method for each data source is explained from the next page.



2.1. Importing from CSV/TSV/SSV file

To register a CSV/TSV/SSV file, first give the data source any name. Next, enter the location of the folder where the CSV/TSV file is stored. The target folder can be a shared folder on the network or a folder assigned to a network drive. In addition to absolute paths, relative paths (e.g., .¥sample_data¥assembly¥2_inspection) as well as absolute paths. After that, preview the data, and if the data you want to read is correct, click the "OK" button to register the data source.



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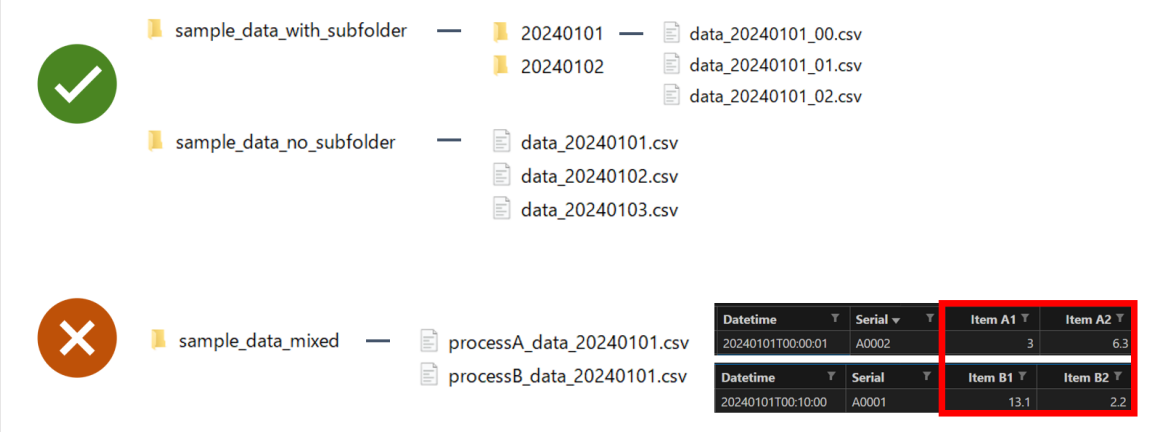
Note: Folder structure

When importing CSV/TSV/SSV, all files contained in the specified folder will be read. At this time, data will be read even if subfolders exist within the specified folder. If files with different column structures are mixed in the specified folder, the data cannot be read properly.



Note: Data those did not have been imported

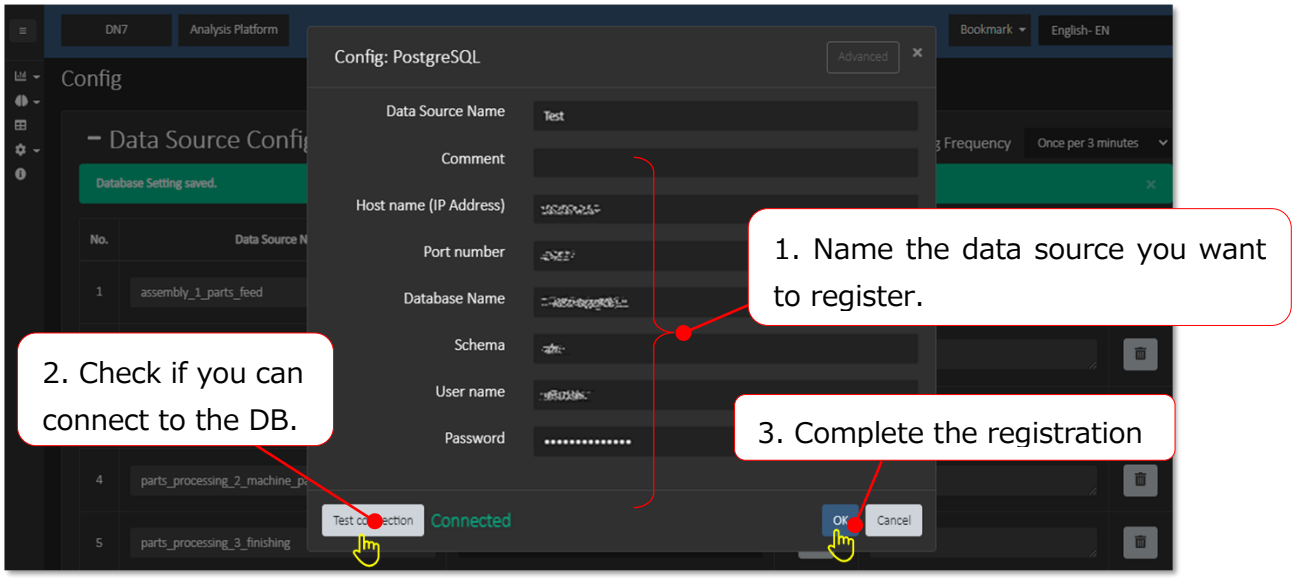
When a folder with CSV/TSV/SSV files is registered as a data source, all files stored in the target **folder** are read. If the selected column does not exist in the target file, or if data other than the set data type exists, that file or data will not be read.

The unread data will be saved in the application's error folder (. /error/trace) so you can check the contents. If duplicate data exists in all files in the target folder, the app automatically detects the duplicate data and outputs it to the error folder instead of reading the duplicate data.

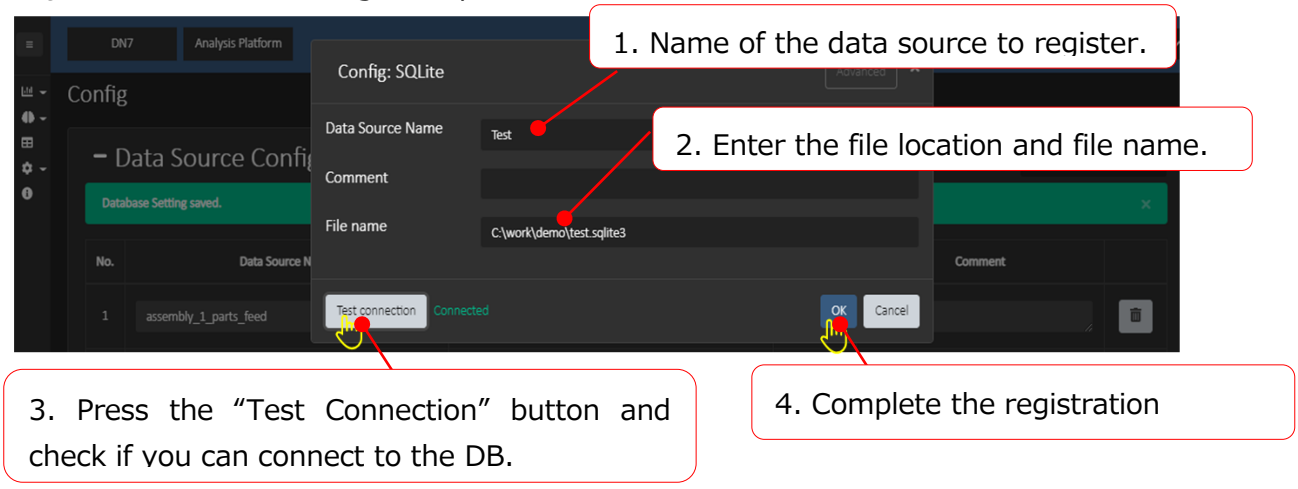
2.2. Importing from Database

Give an arbitrary name to the data source to be registered, enter the connection information to the database (hereafter referred to as DB), confirm that the connection to the DB can be made without problems, and then press the "OK" button to register the data source.

PostgreSQL data source setting example (same setting for ORACLE/mssql etc.)



SQLite data source setting example



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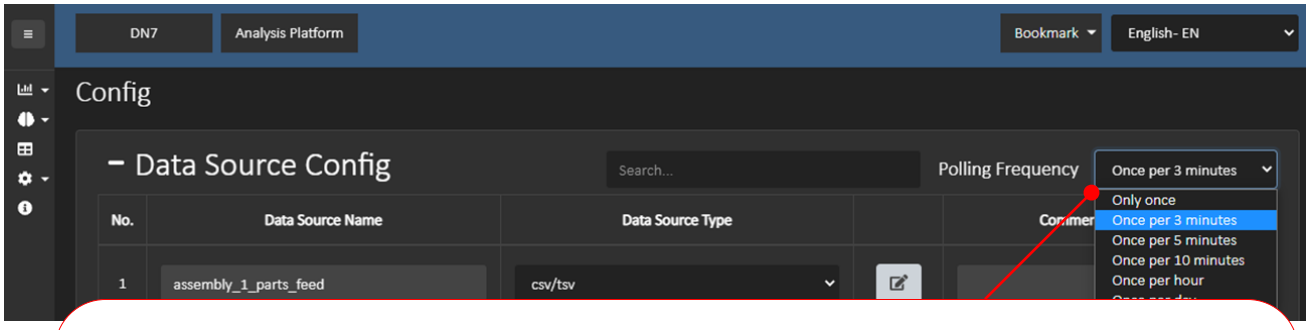
Tips: Data periodic loading settings

In many cases, new data is constantly being added to the database; in the case of CSV, new rows may be created, or a new CSV file may be generated every day, etc. AP+DN7 checks the registered data sources once every 3 minutes by default to see if new data exists and reads it. and read them in.

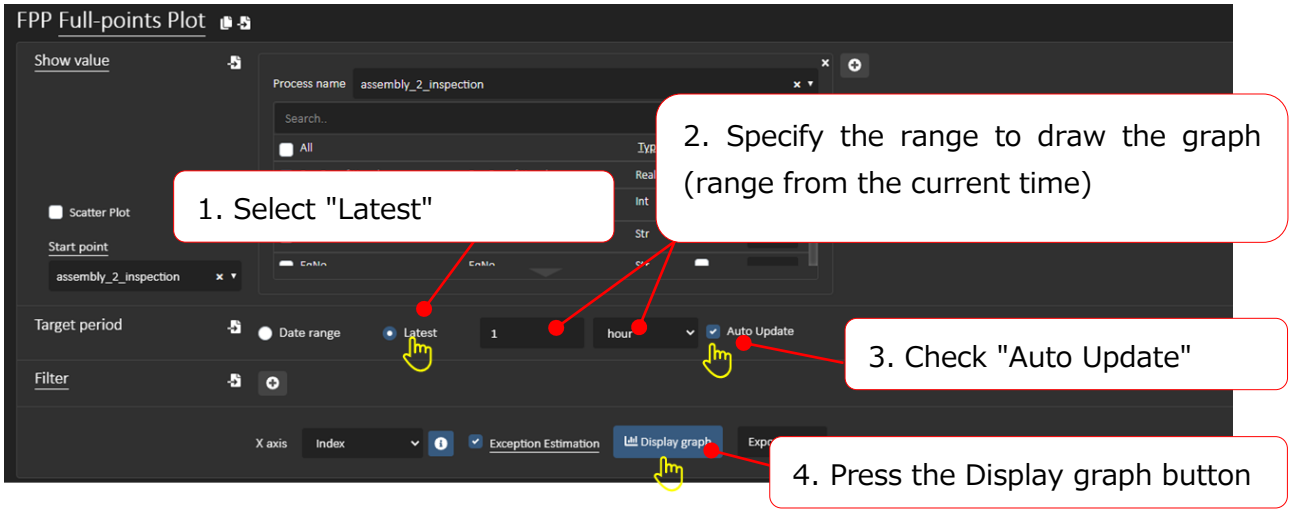


From the "Polling Frequency" pull-down menu, you can set the cycle for automatically reading the updated data of the registered data source.

At least once every 3 minutes, the data source registered by the application is searched for updated data, and if there is updated data, it is automatically loaded into the application's DB.

New data automatically loaded by AP+DN7 can be automatically plotted on the graph screen. For example, on the Plot All page, select "Newest" for the period of interest, specify the range of data to be plotted, and check the "Auto Update" checkbox to automatically update the graph at the update period selected in the Data Source settings.

Auto-update settings for graph drawing (Example on FPP: Full Points Plot)



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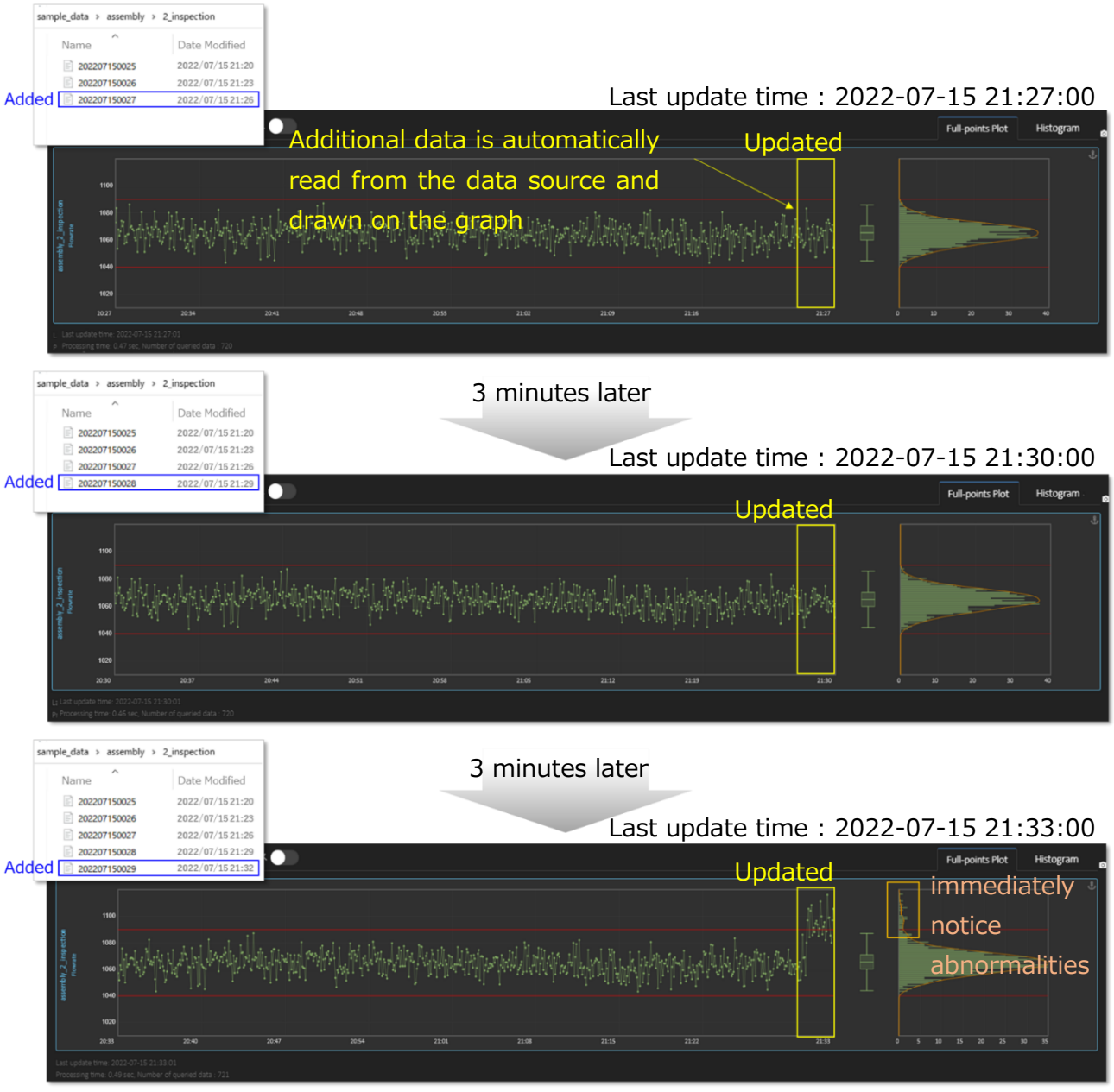
The application automatically reads the updated data of the data source, and the updated data can be automatically drawn in plots, so it can be used to monitor the process as a process Andon.

When updating data, for example, even if new data is added to the CSV file and the file is overwritten, the application can read the added data as updated data and automatically draw the plot. The figure below is an example of automatic updating of all plots when the periodical update of the data source is set to "Once every 3 minutes". (In the example below, only one plot is drawn, but even if you set to draw multiple plots, the plot can be automatically updated in the same way, so it is the most suitable function for process Andon.)

Example of auto-update FPP when auto-update of data source is set to "Once every 3 minutes"

Update data source CSV file



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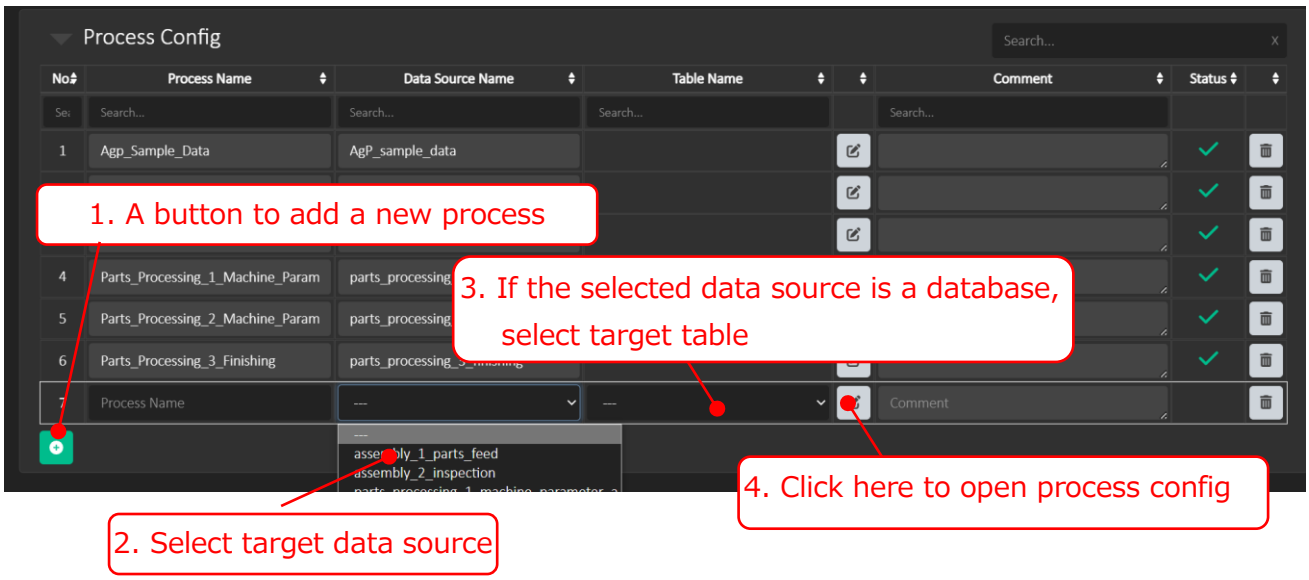
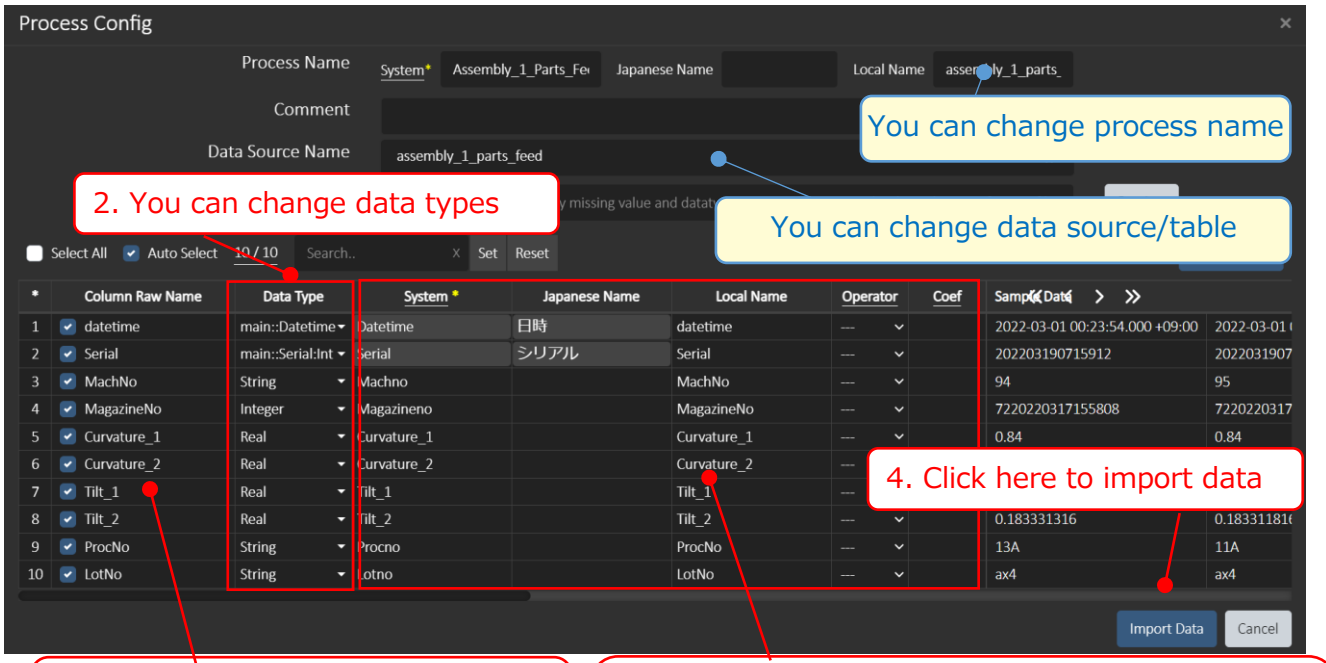
3. Process Config

After registering the data source of the factory that is the target of data utilization in "Data source settings", the columns to be imported can be configured in "Process settings".

First, register the process as follows.



Clicking the Edit button opens a page with detailed settings. If you have selected a data source/table, some of the data will automatically be previewed. On this page, you can select the columns for which you want to load data, check the data type, and then set the properties of the target columns before starting to import the data. If you have selected to load the data periodically in the "Data Source Config" section, once you click the "Import Data" button, the application will automatically load the data periodically from then on.



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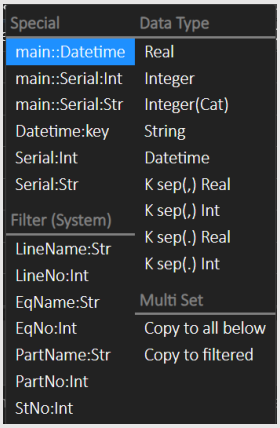
Tips: Special data types

AP+DN7 provides special data types for efficient data processing.

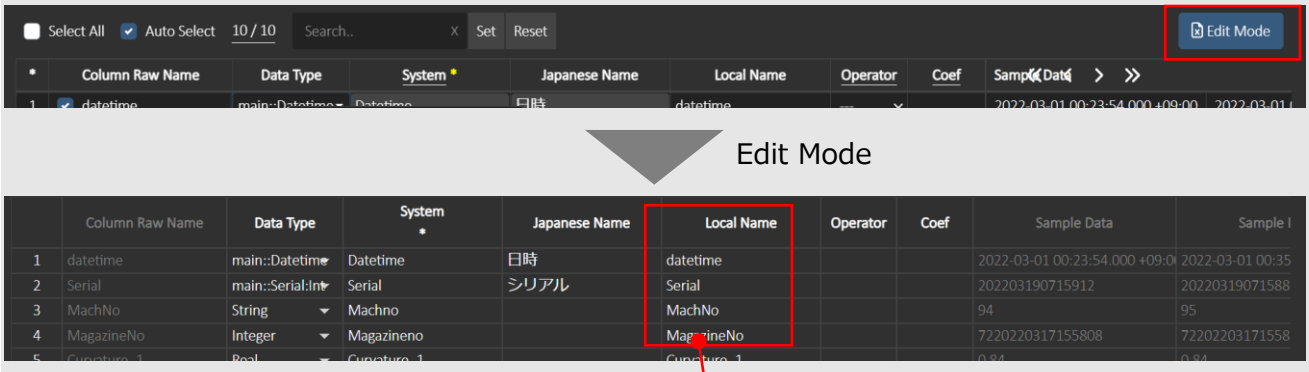
Basically, the data is automatically estimated from the data/column name, but please change the setting if necessary, for example, if the estimation results are different from expectation.



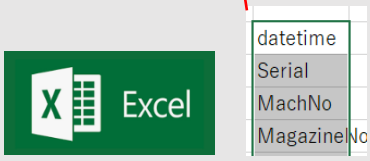
- main::Datetime (required) ･･･ A column to be used as the datetime (only 1 column)
- main::Serial、Datetime:key ･･･ Columns used to link data between processes
- Serial ･･･ Please select when using multiple columns to link processes
- LineName/LineNo/EqName/etc ･･･ If applicable columns are available, If selected, these columns can be used to apply filters after the graph is plotted

Tips: Copy settings specified in spreadsheets

If the list of display names is managed in a spreadsheet such as an Excel file for "Process Config", you can copy and paste the data to and from the Excel file in "Edit Mode".

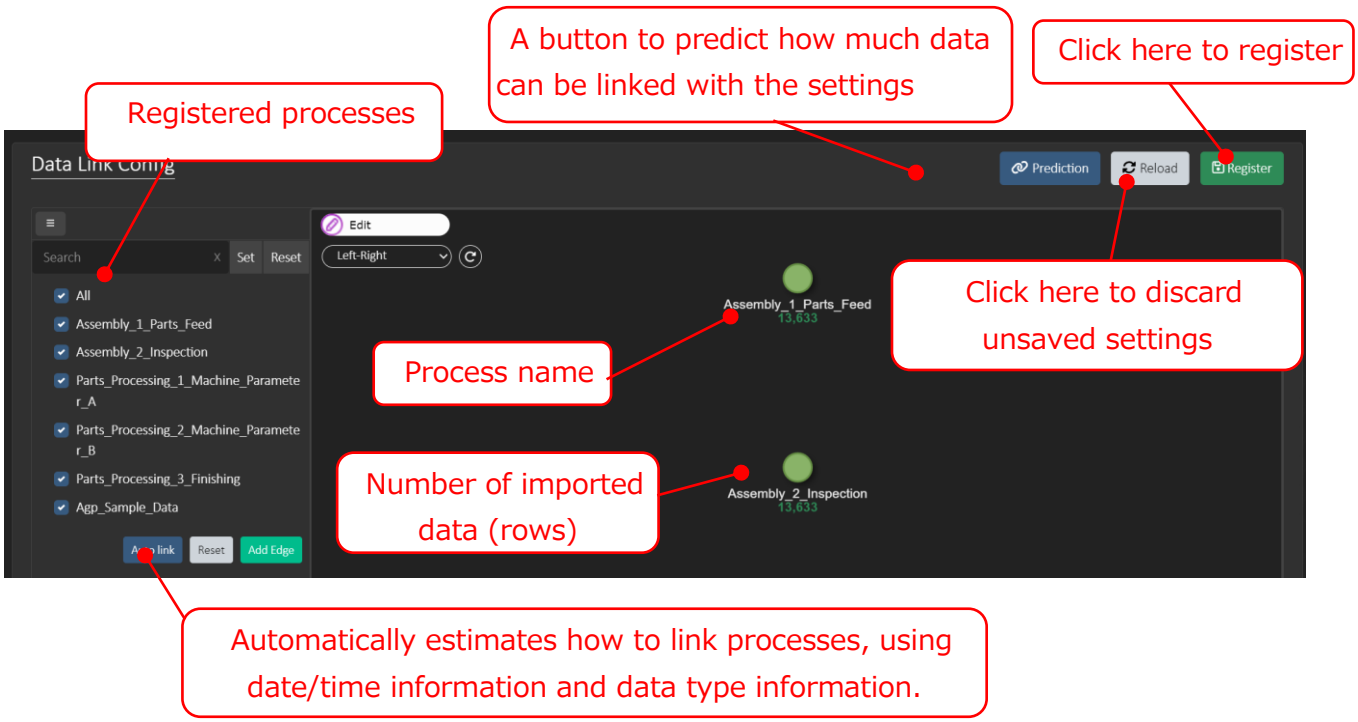


Data can be exchanged with Excel (copy & paste)



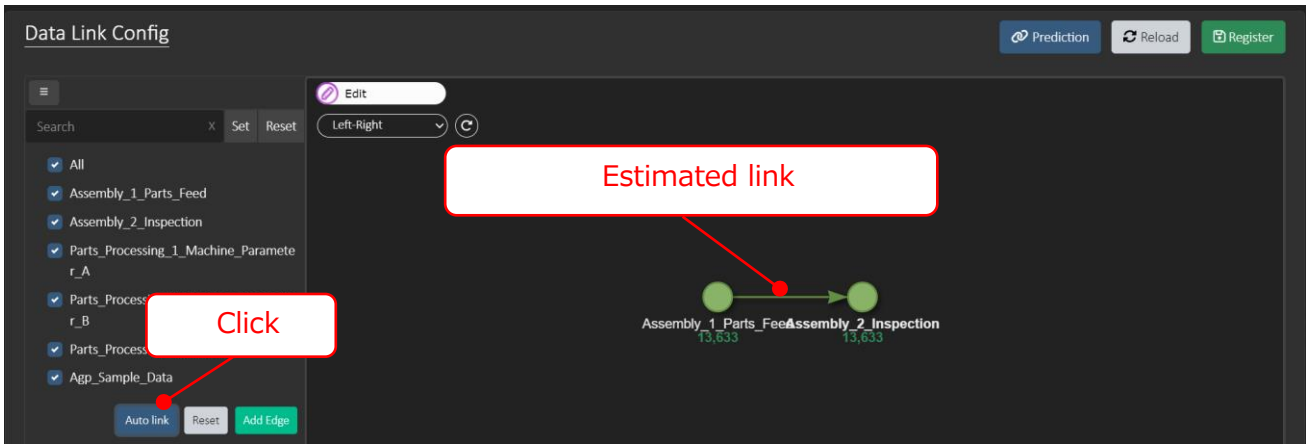
4. Data Link Config

After the “Process Config”, the data can be visualized. In addition, when data is read from multiple data sources and multiple processes are set up, data can be linked between processes if there is a common ID for those processes. The explanation of each button etc. displayed on the "Data Link Config" screen is as follows.



4.1. Auto link: Automatically estimate how to link processes

The easiest way to do this is to click on the "Auto link" button that appears in the sidebar. Clicking this button will automatically estimate the order relationship and linking method for each process using the date/time and data type information of the data. At this point, no linkage information has been saved yet.



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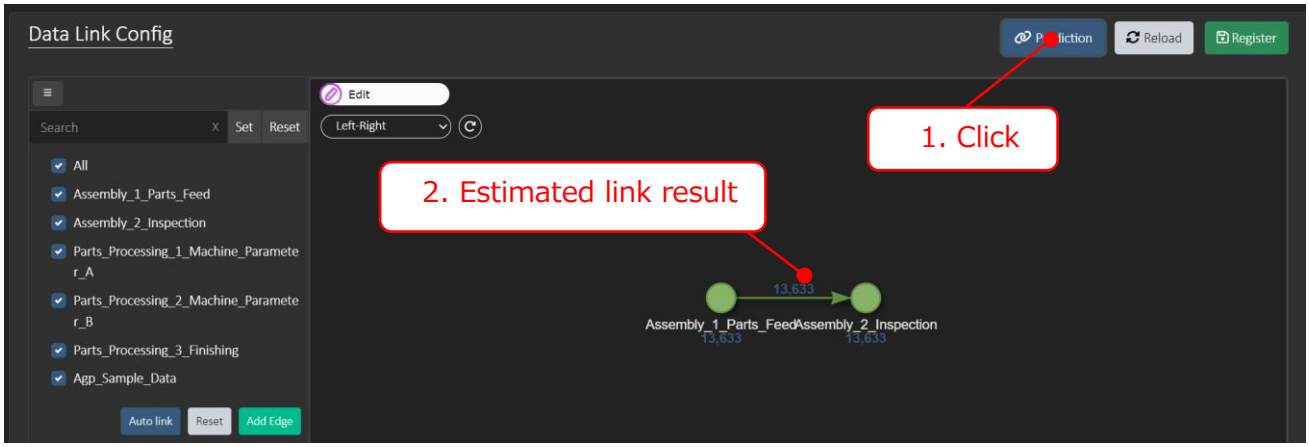
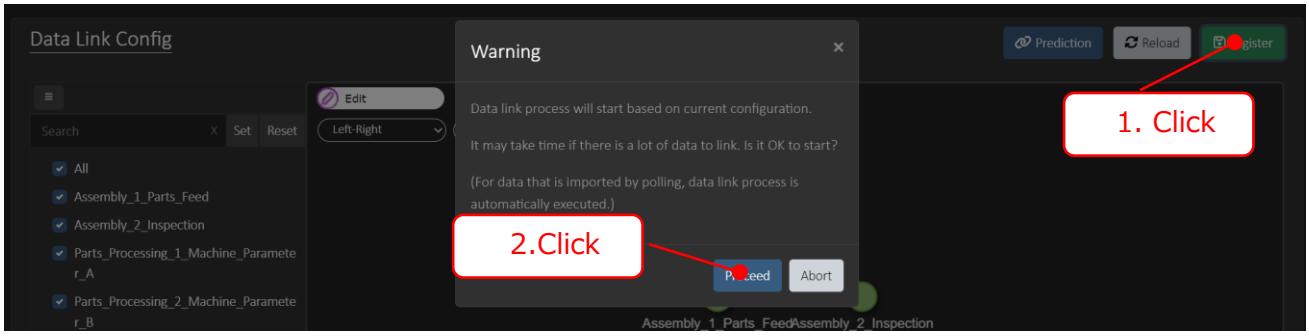
You can check if the current setting is valid by clicking the “Prediction" button. The blue numbers displayed on the arrow lines between processes indicate the number of data between processes could actually be linked. *If there is a large amount of data, only a portion of it is used, so it is shown in blue.



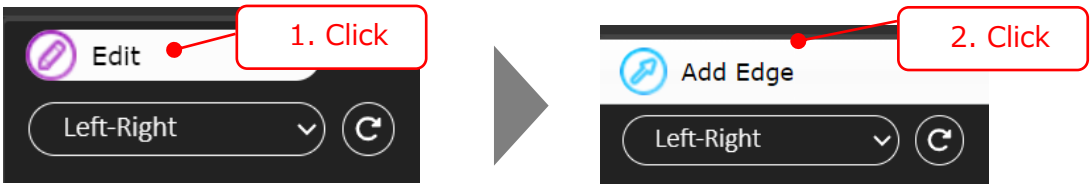
To save settings, click the green “Register” button, and click “Proceed” button.

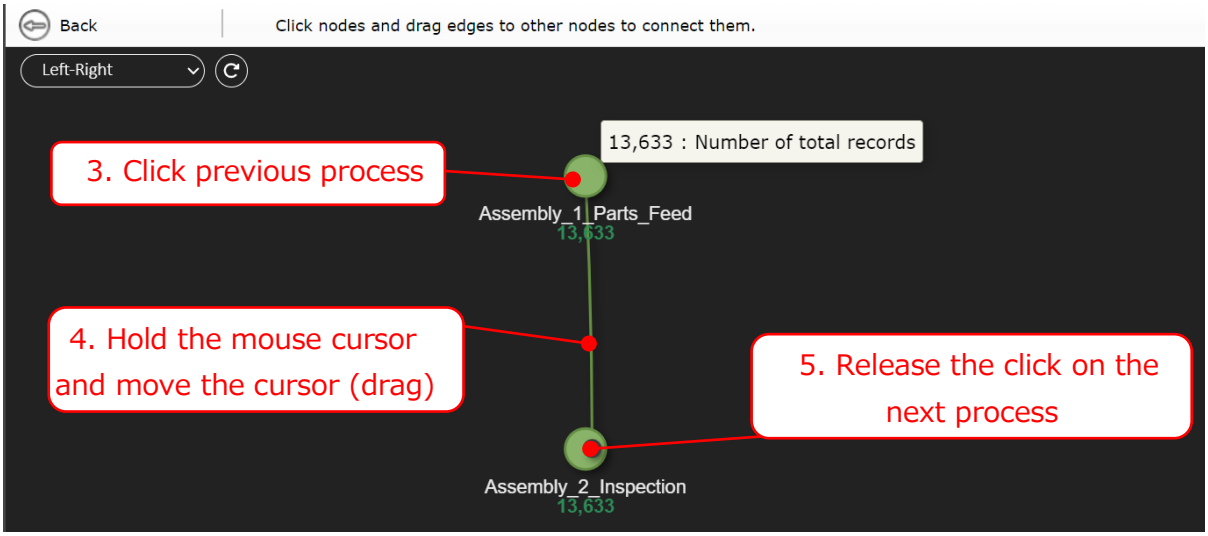


4.2. Configure data link manually

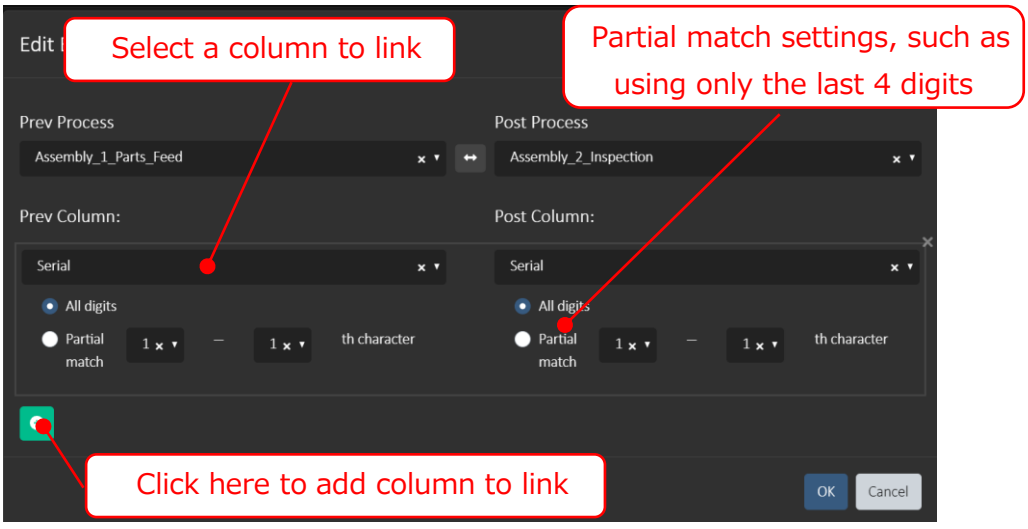
Next, we will explain how to manually configure the data links, in case Auto link does not work, or if you want to modify the linkage results. First, click "Edit" in the upper left corner of the link setting screen, followed by "Add Link". Then, click and hold the mouse cursor on the process you wish to link to, and move (drag) the mouse cursor.

An arrow line will appear, and release the click on the process to which you want to add the link.



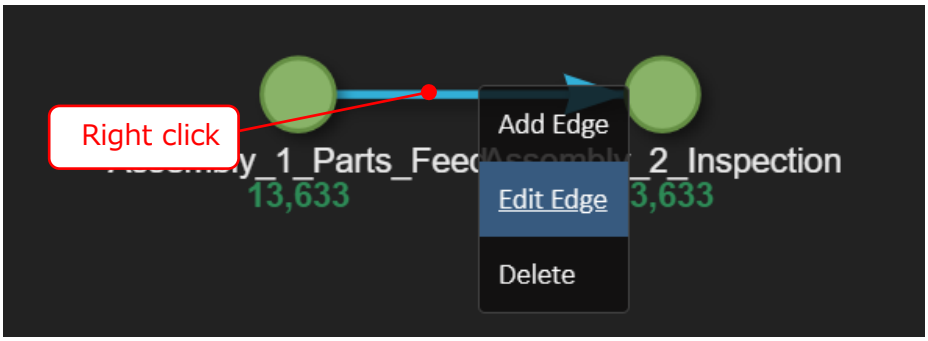


The “Edit Edge” screen will appear. Here, you can set the columns to be used for the data link, whether all digits should be matched, etc. After completing the settings, click "OK. Then, as with Auto link, click the "Register" button to save the settings.



4.3. Edit/Delete existing settings

To edit or delete an existing data link settings, right-click on the target link (arrow line), and click the edit/delete options shown.



If you have accidentally edited or deleted a file, you can use the "Reload" button to restore the file to its original state before registration.