

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".

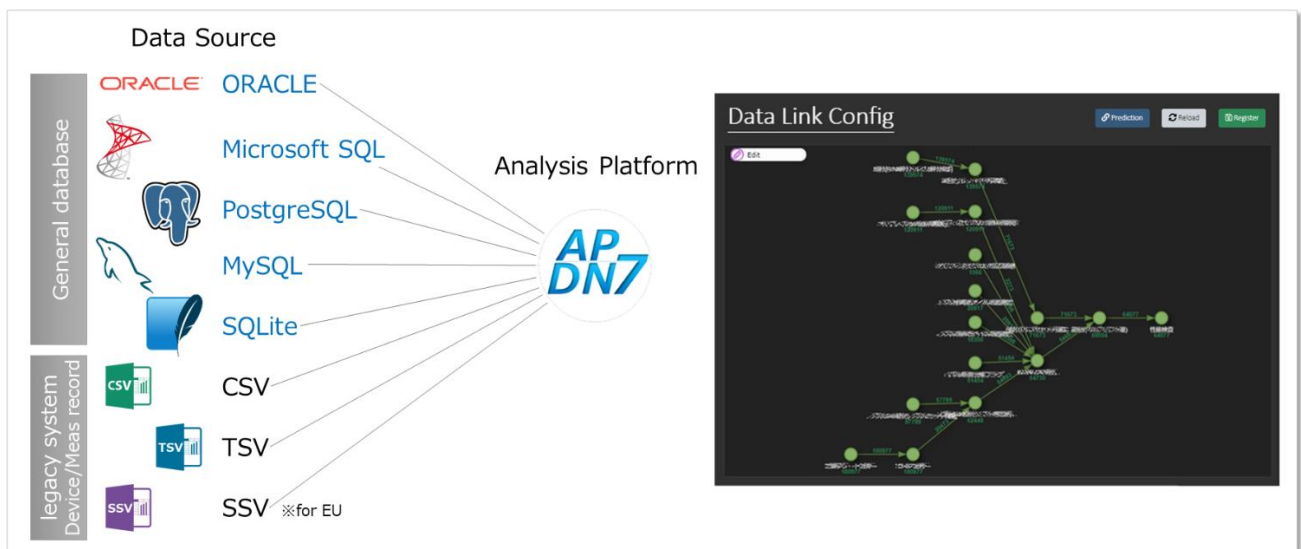


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1. Overview of each setting page

- **Data Source Config**

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.

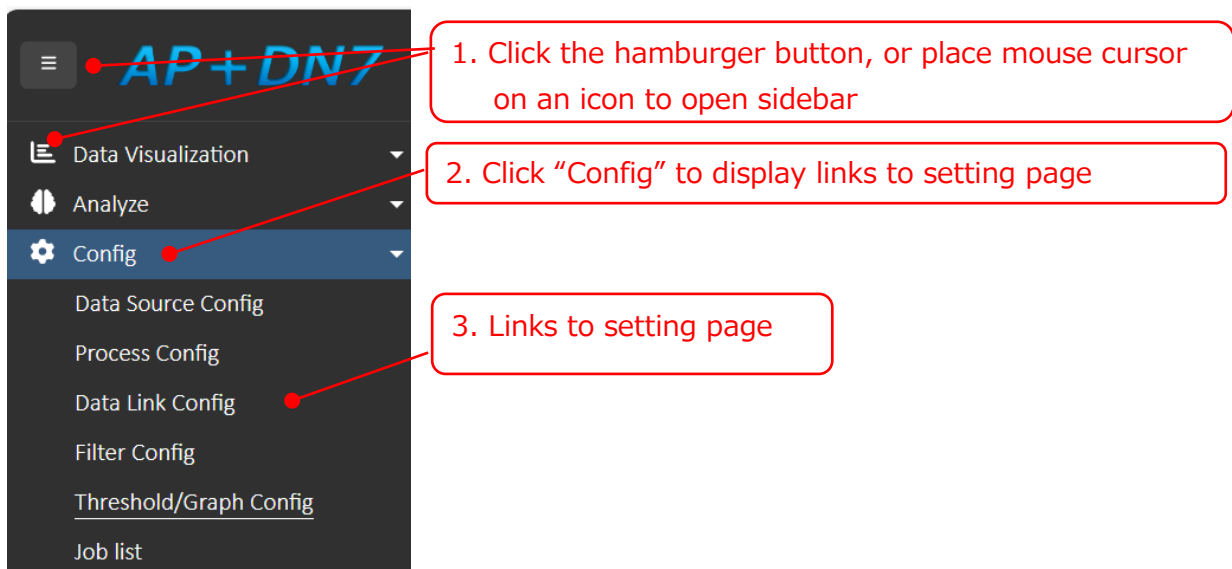
- **Filter Config**

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**

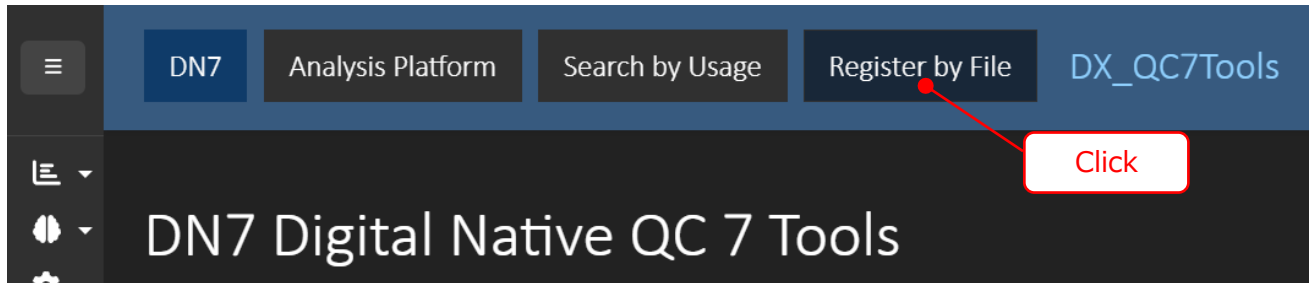
Set the threshold to be displayed on the plot (upper threshold/lower threshold, upper threshold in process/lower threshold in process) and plot display range (y-axis maximum value/minimum value). (explained in another manual)

How to move to each setting page



(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.

Register from Data File

Source Folder File C:\analysis\ap\AnalysisPlatform\sample_data\AgP_sample_data

Reference File (Optional) Data file used to estimate data types

If the source is a folder, all files in the folder will be loaded; if the source is a file, only that file will be loaded.
If multiple files are to be loaded or additional data is to be loaded automatically, please specify a folder as the reference.

1. Path to data folder

2. Click Register Data

The following items are automatically generated from the folder name.
If you wish to set an arbitrary name, please modify the following before clicking the Register button.

Data Source Name register_data

Process Name System* register_data Japanese Name

(optional)

- Data file for estimating data type
- Data source name / Process name
- Edit data types

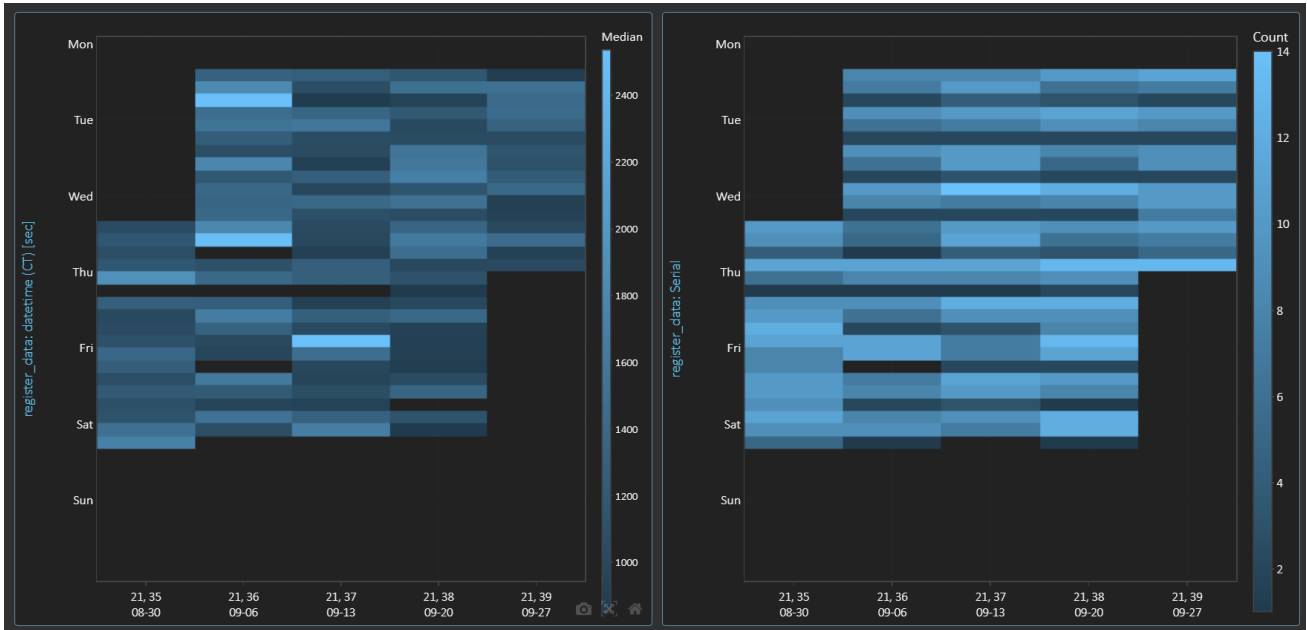
* Column Raw Name	Data Type	System *	Japanese Name	Local Name	Operat			
1 <input checked="" type="checkbox"/> datetime	main::Datetime	Datetime	日時	datetime	---	2021-09-01 09:00:16.000 +09:00	2021-09-01 09:16:06.000 +09:00	2021-09-01 09:...
2 <input checked="" type="checkbox"/> Serial	main::Serial:Int	Serial	シリアル	Serial	---	210827184403	210831013703	210827201703
3 <input checked="" type="checkbox"/> PartNo	Int	Partno		PartNo	---	111	112	111
4 <input checked="" type="checkbox"/> Judge	Str	Judge		Judge	---	OK	OK	OK
5 <input checked="" type="checkbox"/> NG_Mode	Str	Ng_Mode		NG_Mode	---			
6 <input checked="" type="checkbox"/> pressure	Real	Pressure		pressure	---	0.49	0.63	0.607

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

Source Folder File C:\analysis\ap\AnalysisPlatform\sample_data\AgP_sample_data\AgP_sample.tsv

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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.

Data Source Config				
No	Data Source Name	Data Source Type		
1	assembly_1_parts_feed	csv/tsv		
2	assembly_2_inspection	csv/tsv		
3	parts_processing_1_machine_parameter_a	csv/tsv		
4	parts_processing_2_machine_parameter_b	csv/tsv		
5	parts_processing_3_finishing	csv/tsv		
6	register_data	csv/tsv		

Process Config				
No	Process Name	Data Source Name	Table Name	
1	register_data	register_data		
2	Assembly_1_Parts_Feed	assembly_1_parts_feed		
3	Assembly_2_Inspection	assembly_2_inspection		
4	Parts_Processing_1_Machine_Parameter_A	parts_processing_1_machine_parameter_a		
5	Parts_Processing_2_Machine_Parameter_B	parts_processing_2_machine_parameter_b		
6	Parts_Processing_3_Finishing	parts_processing_3_finishing		

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.

The screenshot shows a 'Data Source Config' window with a table of six data sources. A yellow callout box at the top states: 'Six data sources are registered as sample data. If you do not need them, click the trash button to delete them.' Three red callout boxes provide instructions: '1. Press this button to register a new data source' (pointing to a green plus icon), '2. Select data source type' (pointing to a dropdown menu), and '3. Enter/edit the connection method to the data source (details are described on the' (pointing to an edit icon).

No#	Data Source Name	Search...	Search...	Search...
1	assembly_1_parts_feed	csv/tsv		
2	assembly_2_inspection	csv/tsv		
3	parts_processing_1_machine_parameter_a	csv/tsv		
4	parts_processing_2_			
5	parts_processing_3_finishing	csv/tsv		
6	AgP_sample_data	csv/tsv		

1. Press this button to register a new data source

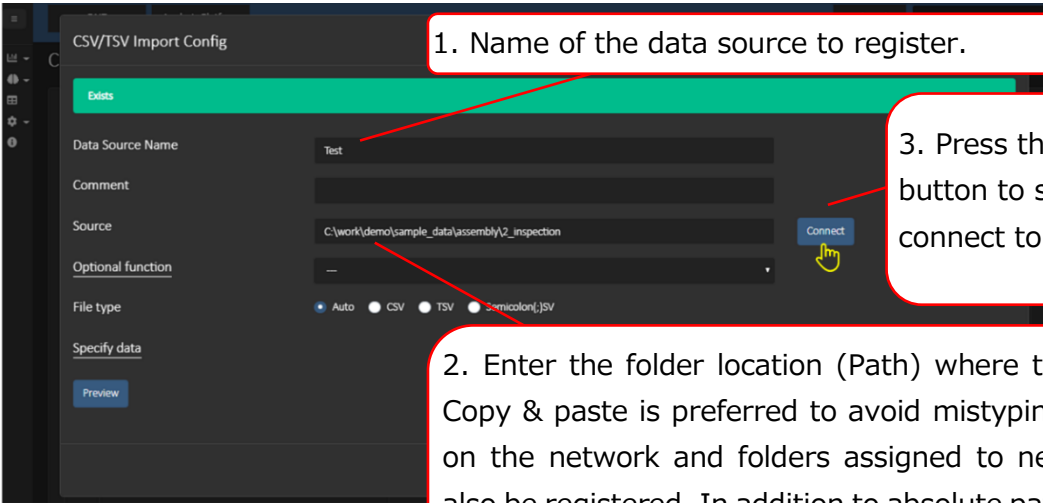
2. Select data source type

3. Enter/edit the connection method to the data source (details are described on the

Six data sources are registered as sample data. If you do not need them, click the trash button to delete them.

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.

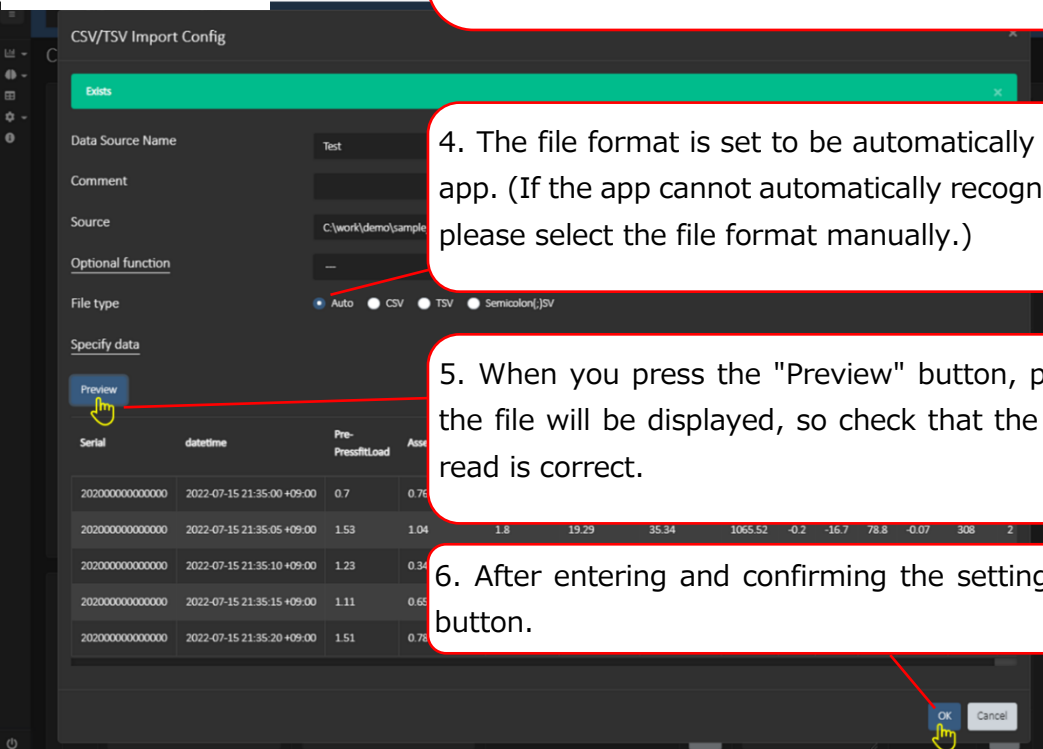


1. Name of the data source to register.

2. Enter the folder location (Path) where the data is saved. Copy & paste is preferred to avoid mistyping. Shared folders on the network and folders assigned to network drives can also be registered. In addition to absolute paths, relative paths can also be set.

3. Press the "Connect" button to see if the app can connect to the folder.

Setting continued



4. The file format is set to be automatically recognized by the app. (If the app cannot automatically recognize the file format, please select the file format manually.)

5. When you press the "Preview" button, part of the data in the file will be displayed, so check that the data you want to read is correct.

Serial	datetime	Pre-PressFit_Load	Assesment
2020000000000000	2022-07-15 21:35:00 +09:00	0.7	0.76
2020000000000000	2022-07-15 21:35:05 +09:00	1.53	1.04
2020000000000000	2022-07-15 21:35:10 +09:00	1.23	0.34
2020000000000000	2022-07-15 21:35:15 +09:00	1.11	0.65
2020000000000000	2022-07-15 21:35:20 +09:00	1.51	0.78

6. After entering and confirming the settings, press the "OK" button.

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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.

sample_data_with_subfolder — 20240101 — data_20240101_00.csv
20240102 — data_20240101_01.csv
data_20240101_02.csv

sample_data_no_subfolder — data_20240101.csv
data_20240102.csv
data_20240103.csv

sample_data_mixed — processA_data_20240101.csv
processB_data_20240101.csv

Datetime	Serial	Item A1	Item A2
20240101T00:00:01	A0002	3	6.3

Datetime	Serial	Item B1	Item B2
20240101T00:10:00	A0001	13.1	2.2

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.

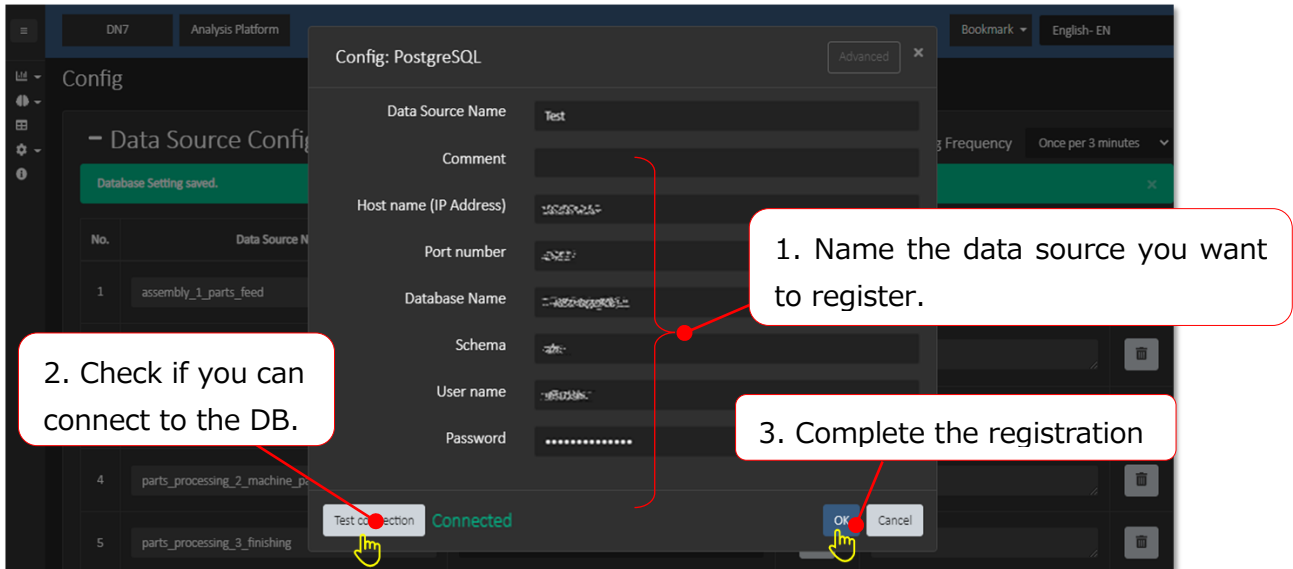
The unread data will be saved in the application's error folder (. /error/trace) so you can check the contents. If duplicate data exists in all files in the target folder, the app automatically detects the duplicate data and outputs it to the error folder instead of reading the duplicate data.

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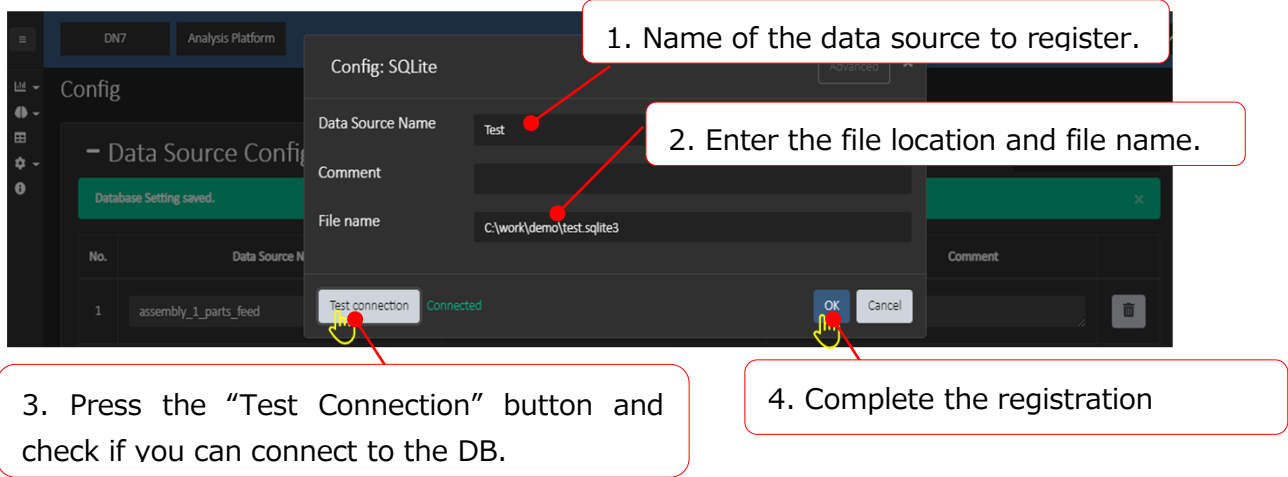
2.2. Importing from Database

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.)



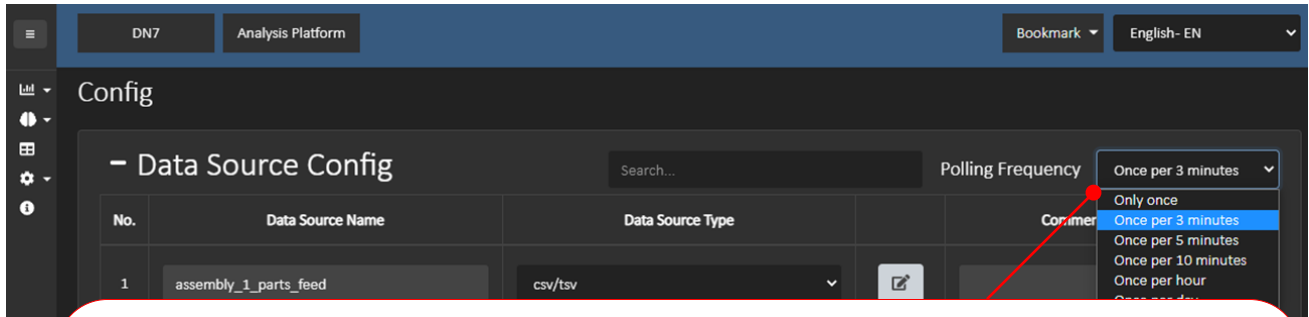
SQLite data source setting example



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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.

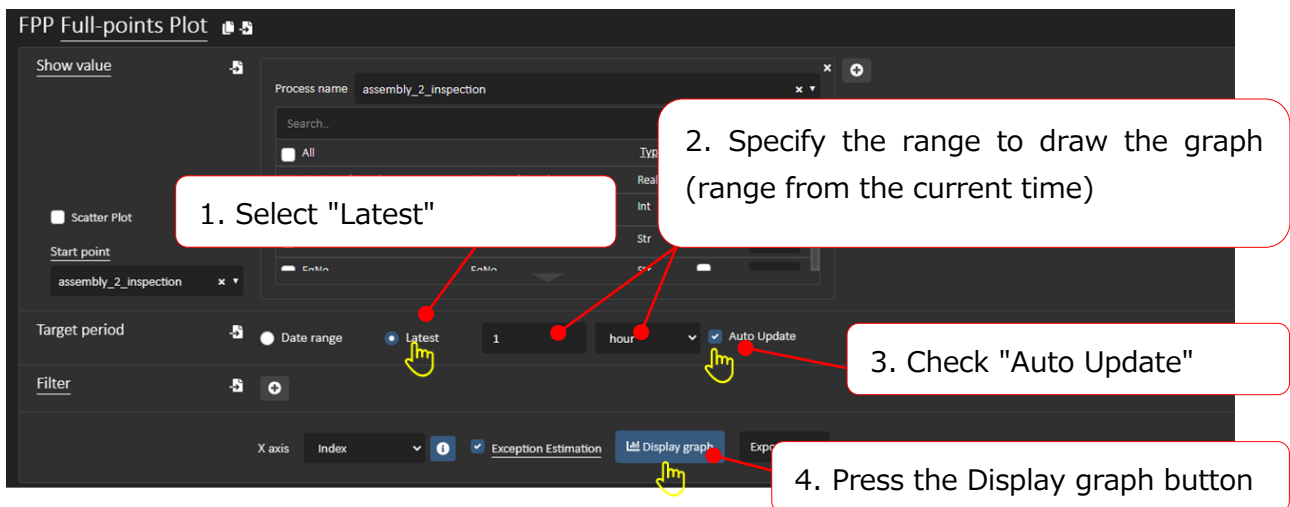


From the "Polling Frequency" pull-down menu, you can set the cycle for automatically reading the updated data of the registered data source.

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)



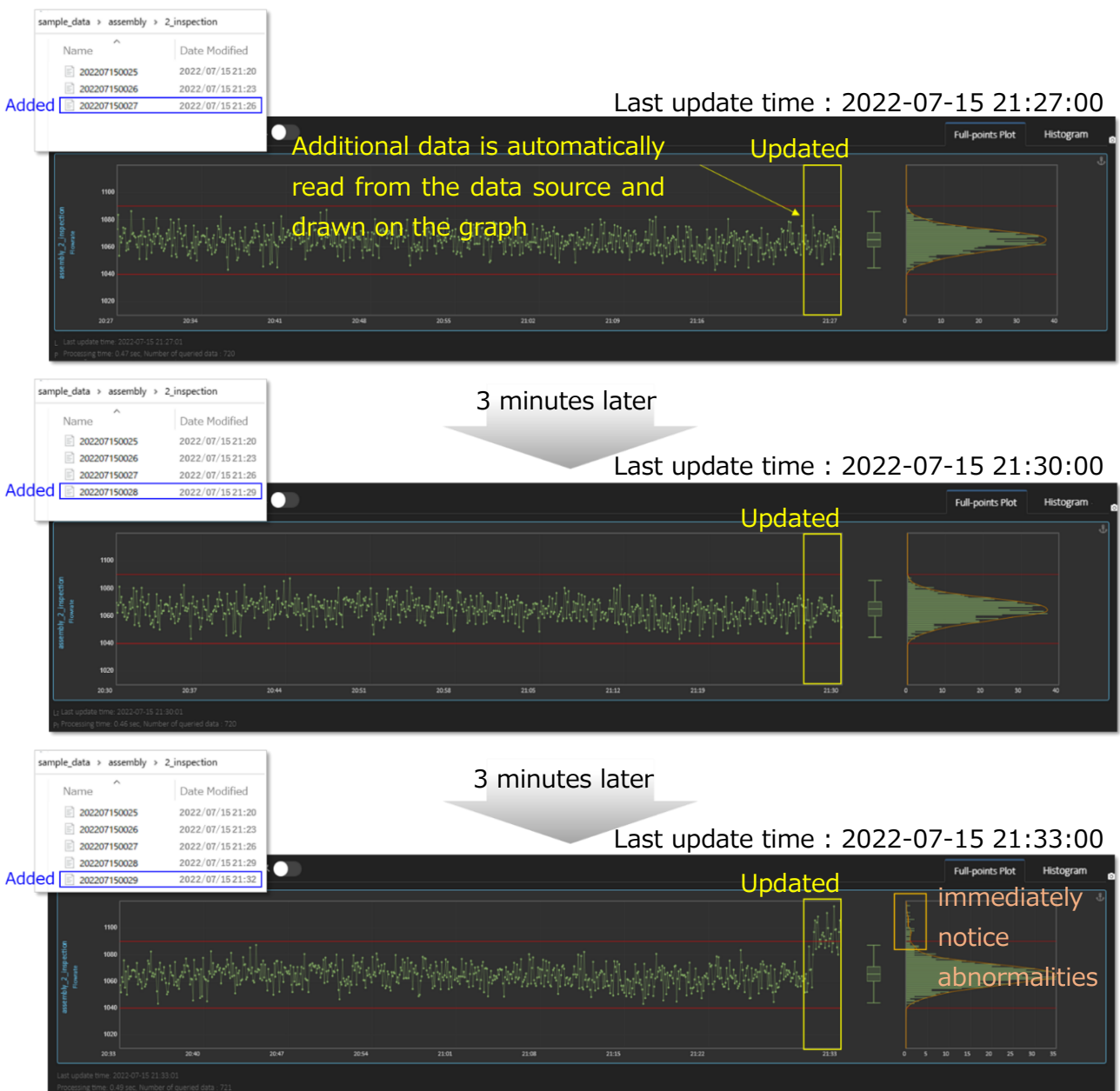
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The application automatically reads the updated data of the data source, and the updated data can be automatically drawn in plots, so it can be used to monitor the process as a process Andon.

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"

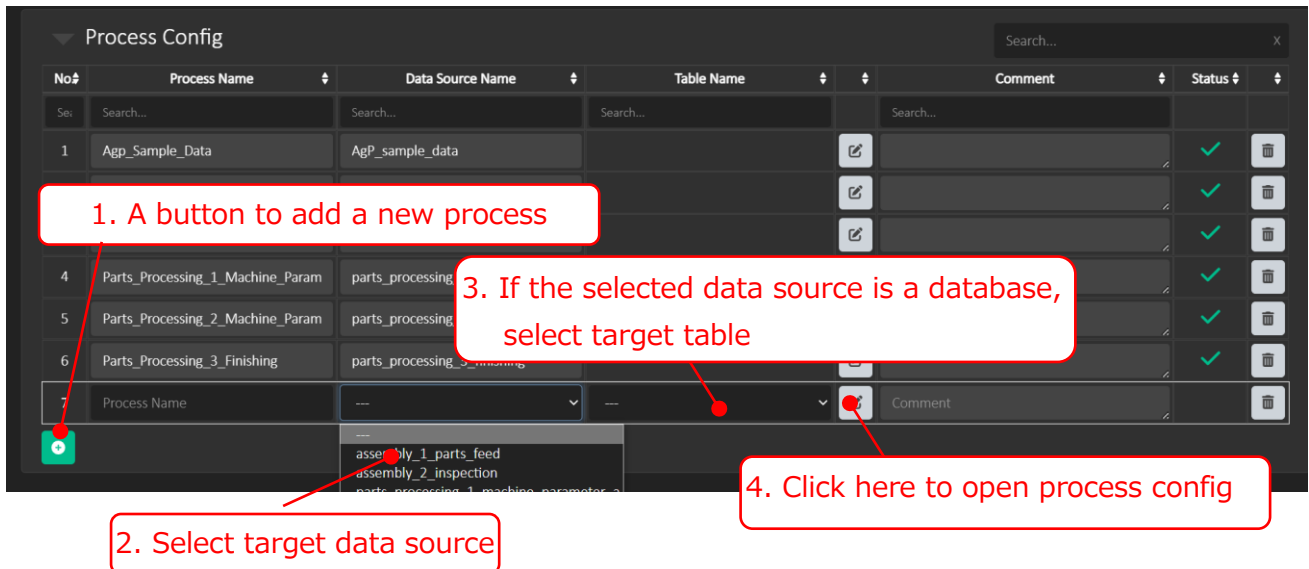
Update data source CSV file



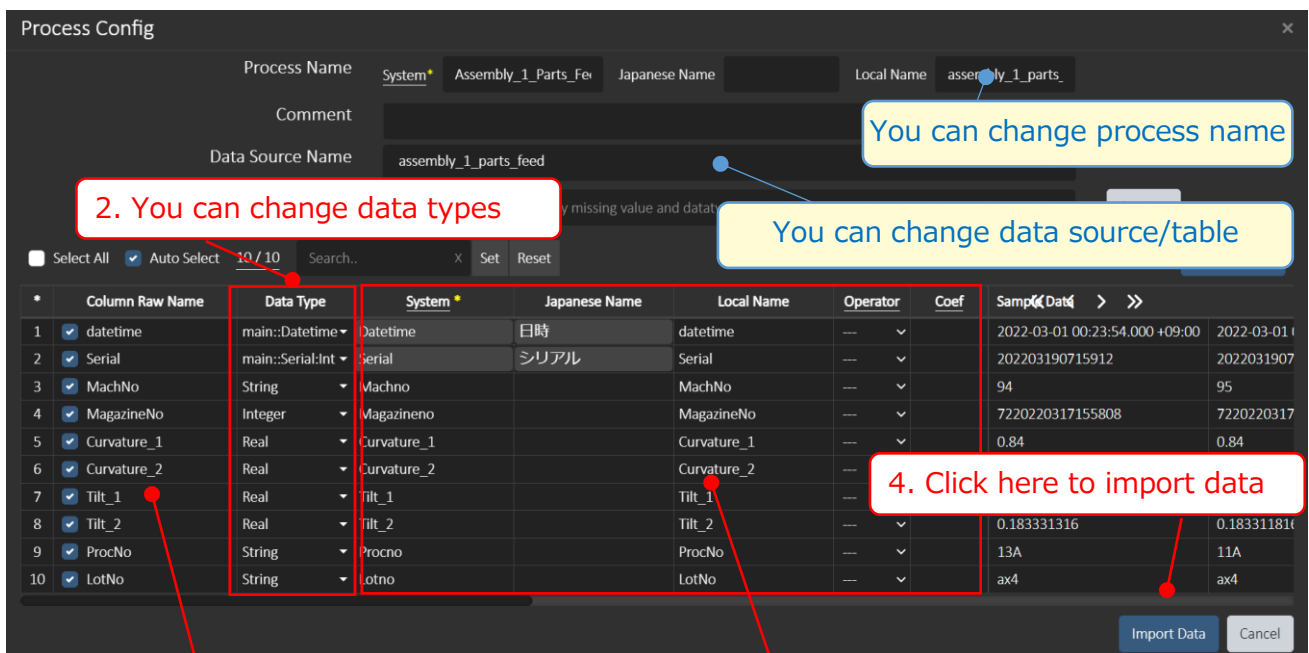
3. Process Config

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.



1. Select column to import (Default: Auto select)

3. You can set column names Using the operator and the coef, you can transform values (for example, x10, /10)

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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.

Special	Data Type
main::Datetime	Real
main::Serial:Int	Integer
main::Serial:Str	Integer(Cat)
Datetime:key	String
Serial:Int	Datetime
Serial:Str	K sep(,) Real
Filter (System)	K sep(,) Int
LineName:Str	K sep(,) Real
LineNo:Int	K sep(,) Int
EqName:Str	Multi Set
EqNo:Int	Copy to all below
PartName:Str	Copy to filtered
PartNo:Int	
StNo:Int	

- 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".

The screenshot shows a software interface with a table of column settings. The table has columns: Column Raw Name, Data Type, System, Japanese Name, Local Name, Operator, Coef, Sample Data, and Sample I. The 'Local Name' column is highlighted with a red box. An 'Edit Mode' button is also highlighted with a red box. Below the table, the text 'Data can be exchanged with Excel (copy & paste)' is displayed, along with an Excel icon and a small table showing the 'Local Name' values: datetime, Serial, MachNo, MagazineNo.

Column Raw Name	Data Type	System	Japanese Name	Local Name	Operator	Coef	Sample Data	Sample I
datetime	main::Datetime	Datetime	日時	datetime			2022-03-01 00:23:54.000 +09:00	2022-03-01 00:35
Serial	main::Serial:Int	Serial	シリアル	Serial			202203190715912	20220319071588
MachNo	String	Machno		MachNo		94	95	
MagazineNo	Integer	Magazineno		MagazineNo		7220220317155808	72202203171558	
Cuperture_1	Real	Cuperture_1		Cuperture_1		0.34	0.34	

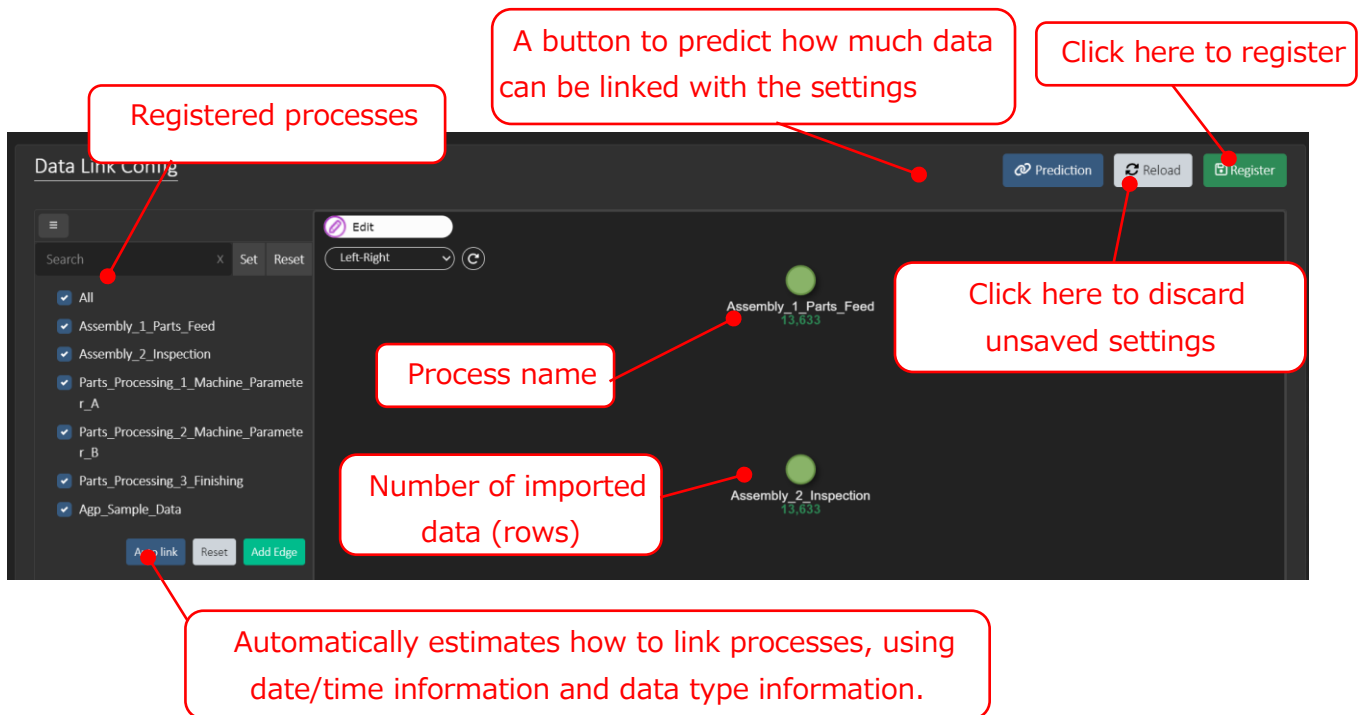
Data can be exchanged with
Excel (copy & paste)



datetime
Serial
MachNo
MagazineNo

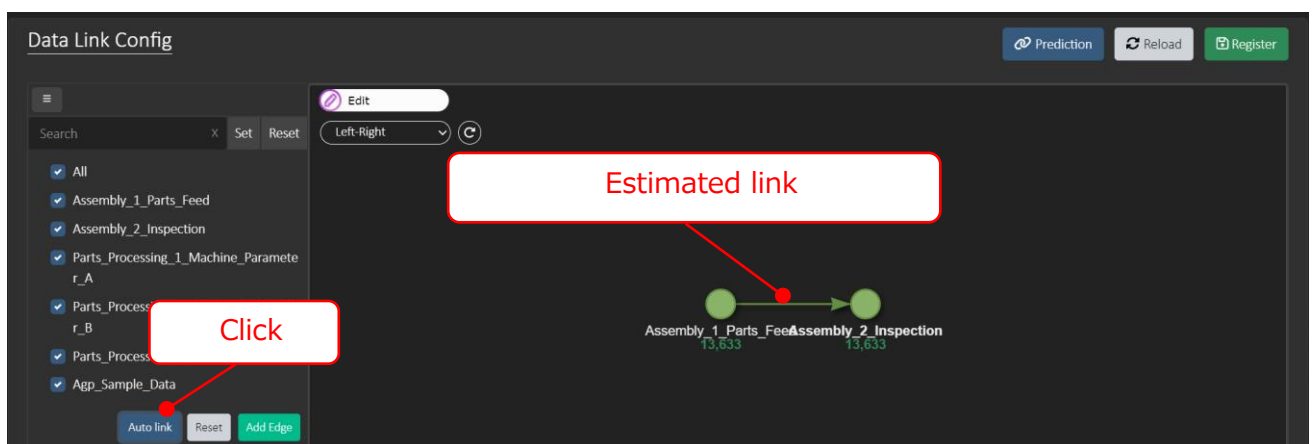
4. Data Link Config

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.



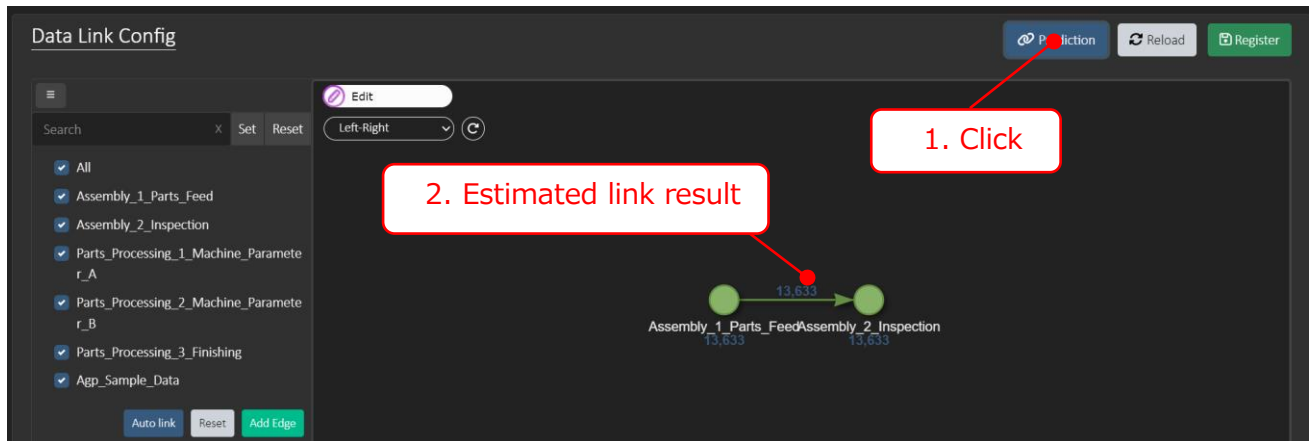
4.1. Auto link: Automatically estimate how to link processes

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.

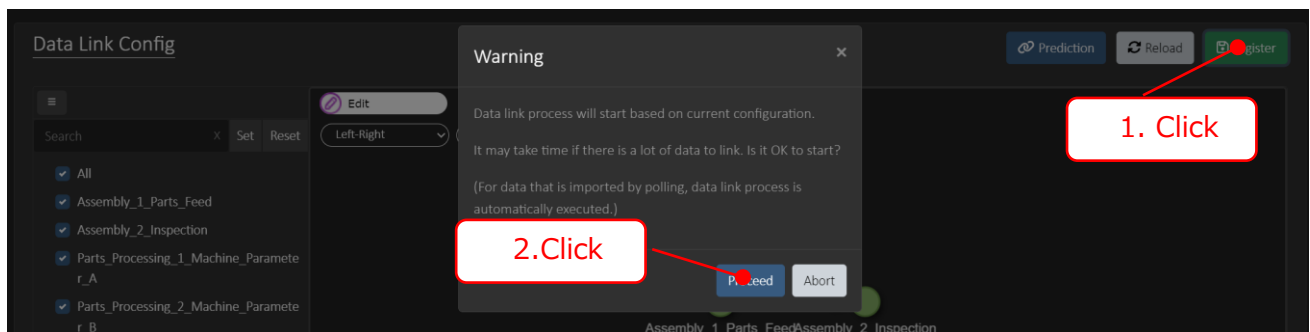


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You can check if the current setting is valid by clicking the "Prediction" button. The blue numbers displayed on the arrow lines between processes indicate the number of data between processes could actually be linked. *If there is a large amount of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

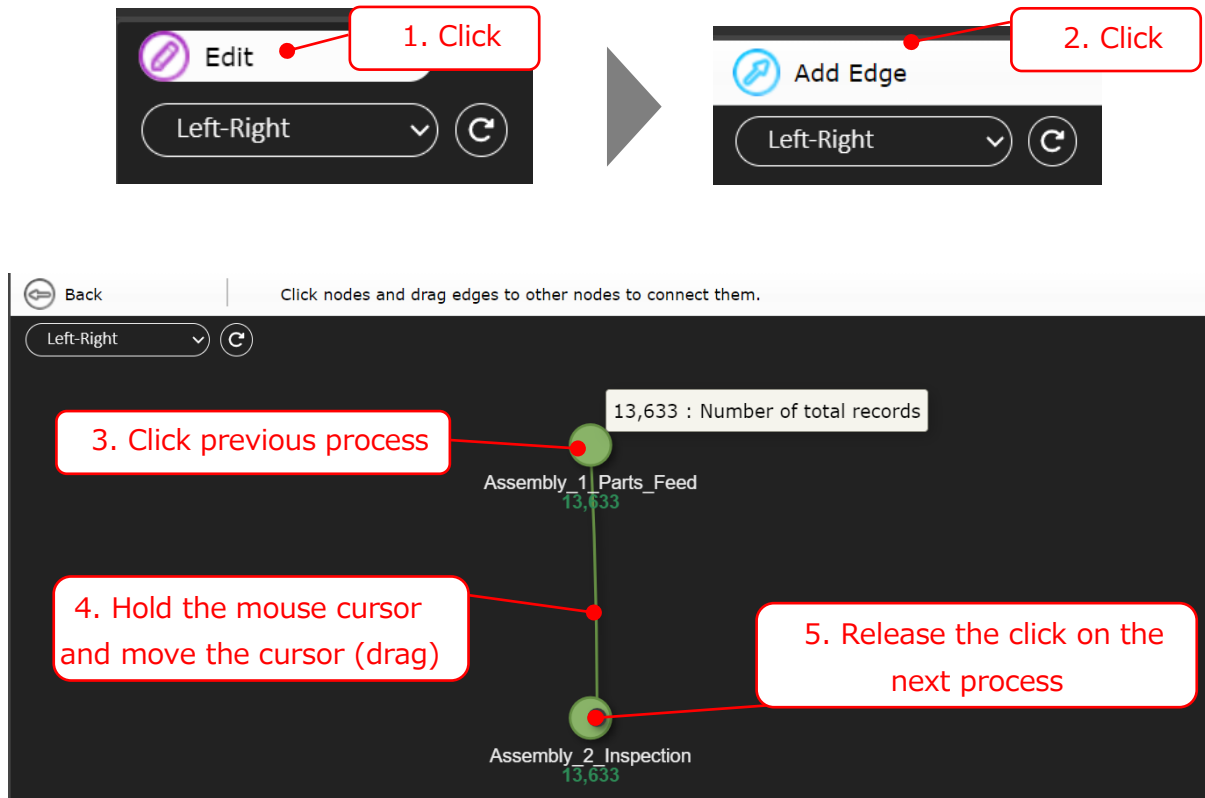


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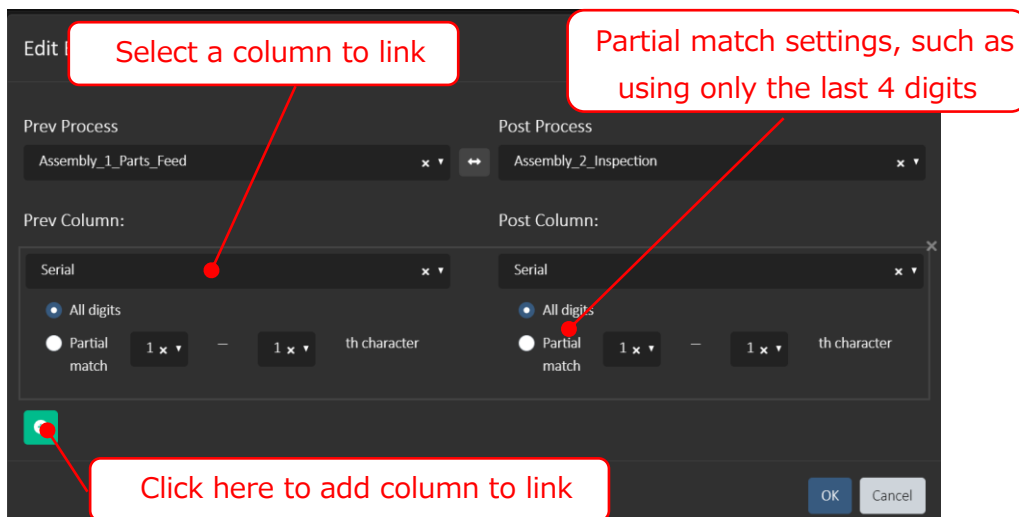
4.2. Configure data link manually

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.



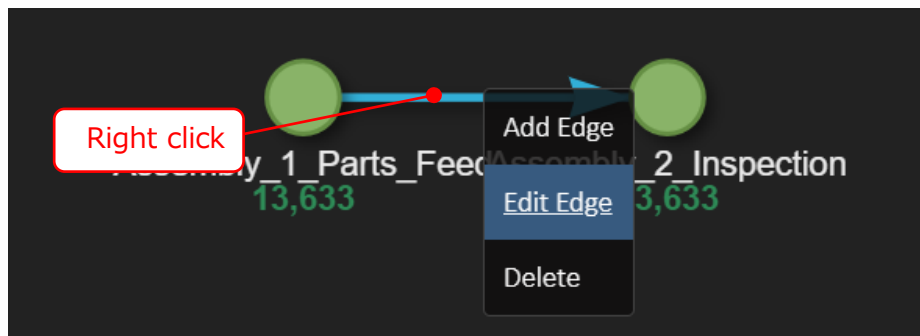
The "Edit Edge" screen will appear. Here, you can set the columns to be used for the data link, whether all digits should be matched, etc. After completing the settings, click "OK". Then, as with Auto link, click the "Register" button to save the settings.



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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.

