# Automated Synthesizer for production process study

AltaFlow

DFC Co., Ltd.

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Device for Flow Chemistry

# External appearance

AltaFlow

**4 Line Configuration**


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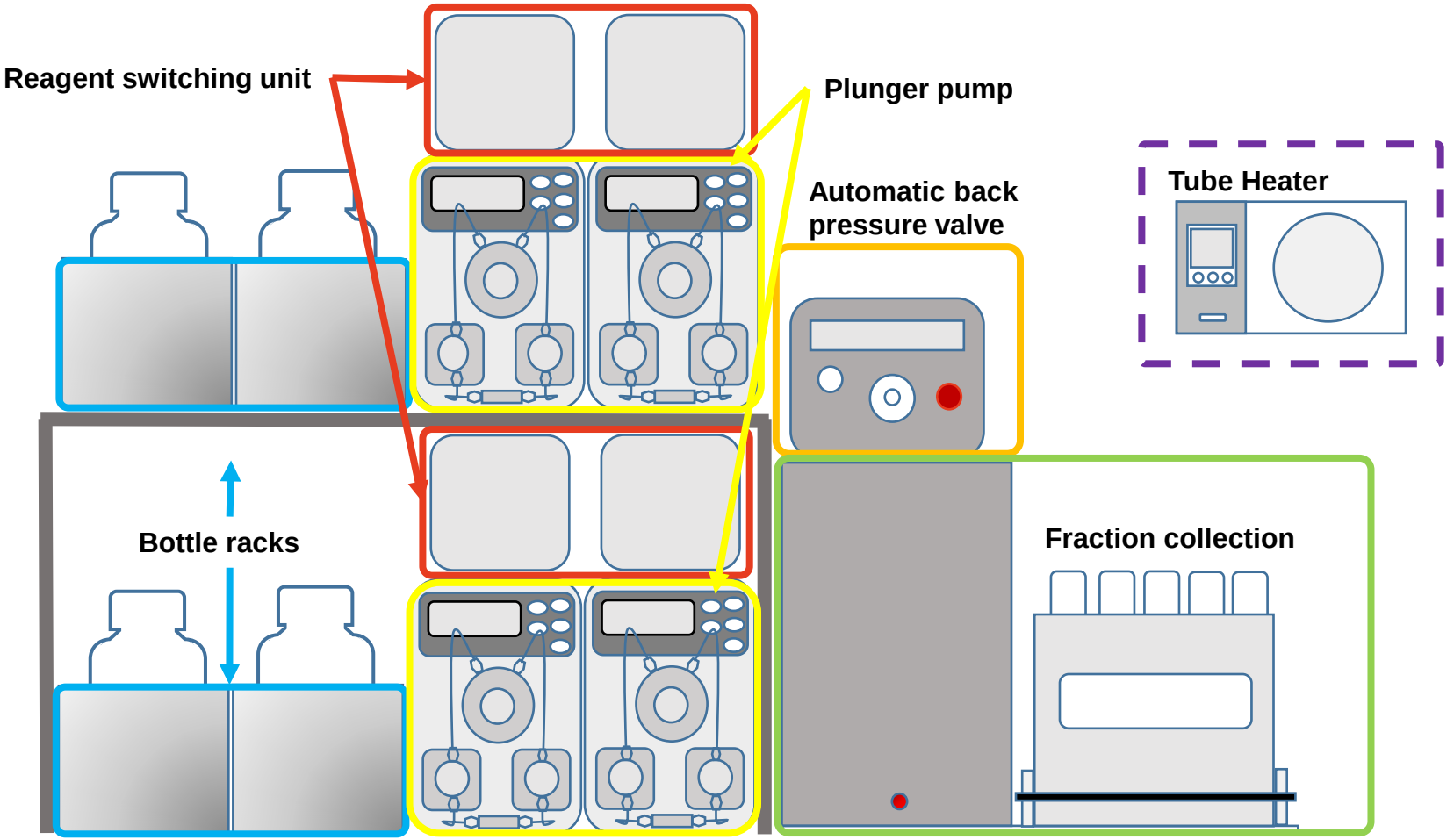
# Component Configuration

AltaFlow

## Components

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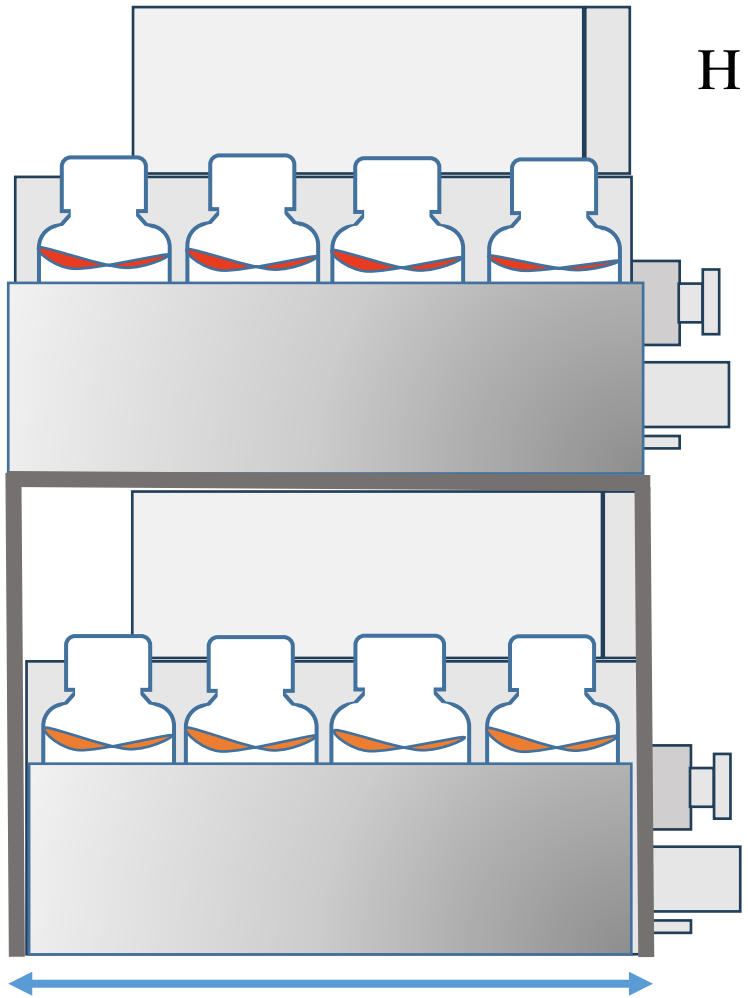
# Sizes

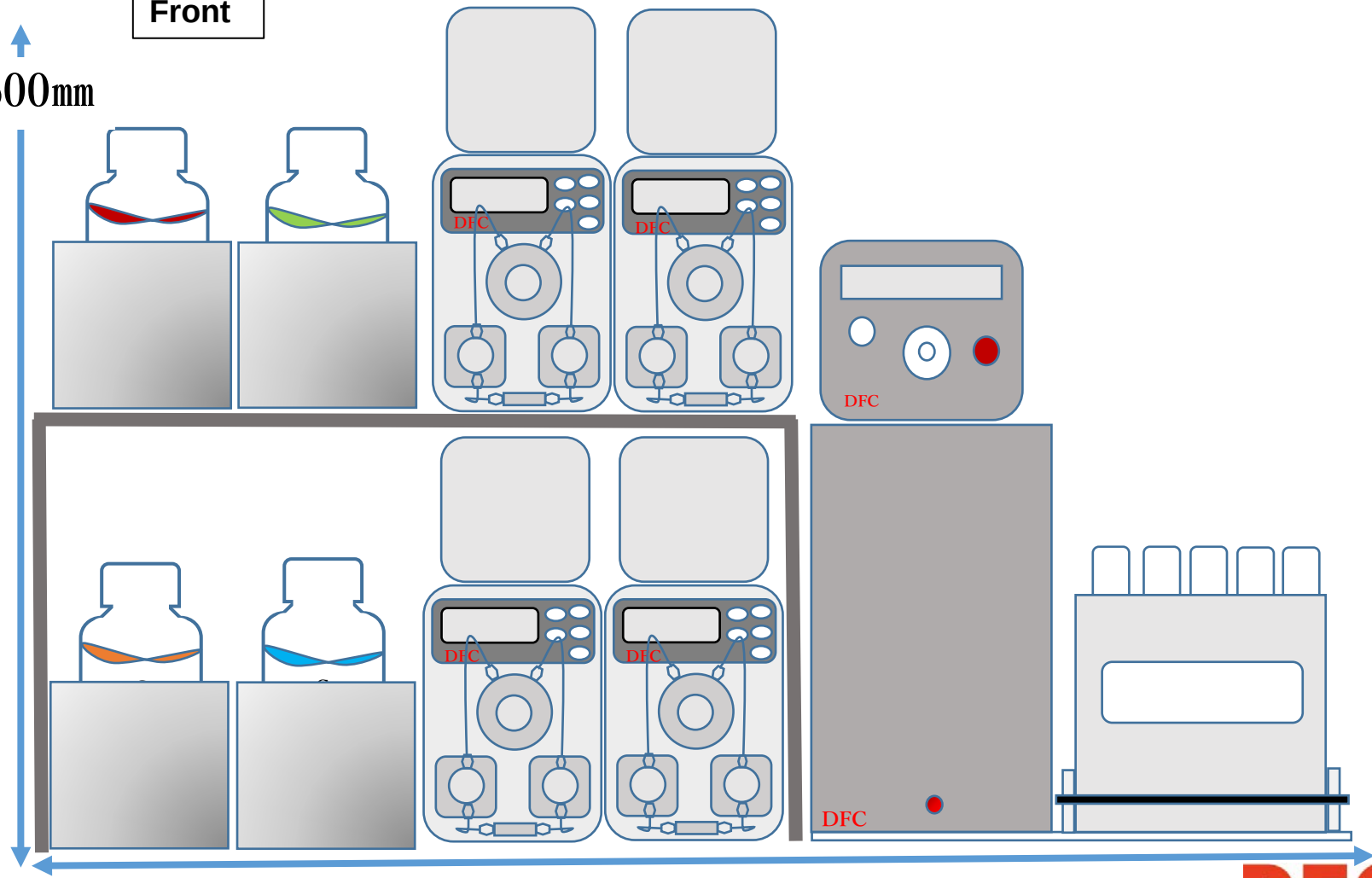
## 4 Line configuration

Side



D：550㎜

Front




W：820㎜

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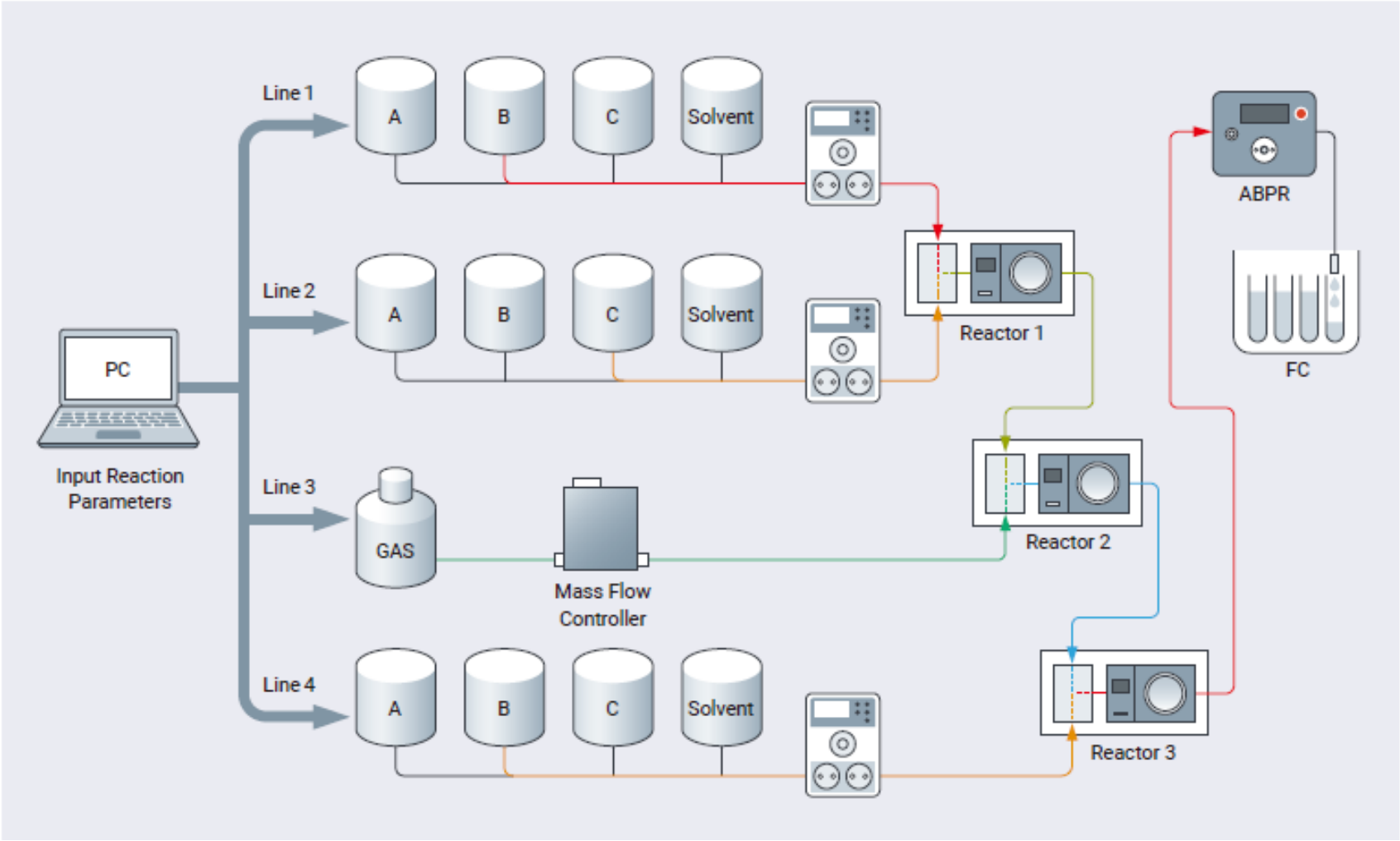
# Flow of synthesis

Each line selects one sample (reagent) from 3 to 4 types and performs synthesis in the reactor.
Any line can also be configured for mass flow control.




**Note:**
**Solvent can be changed to reagent**

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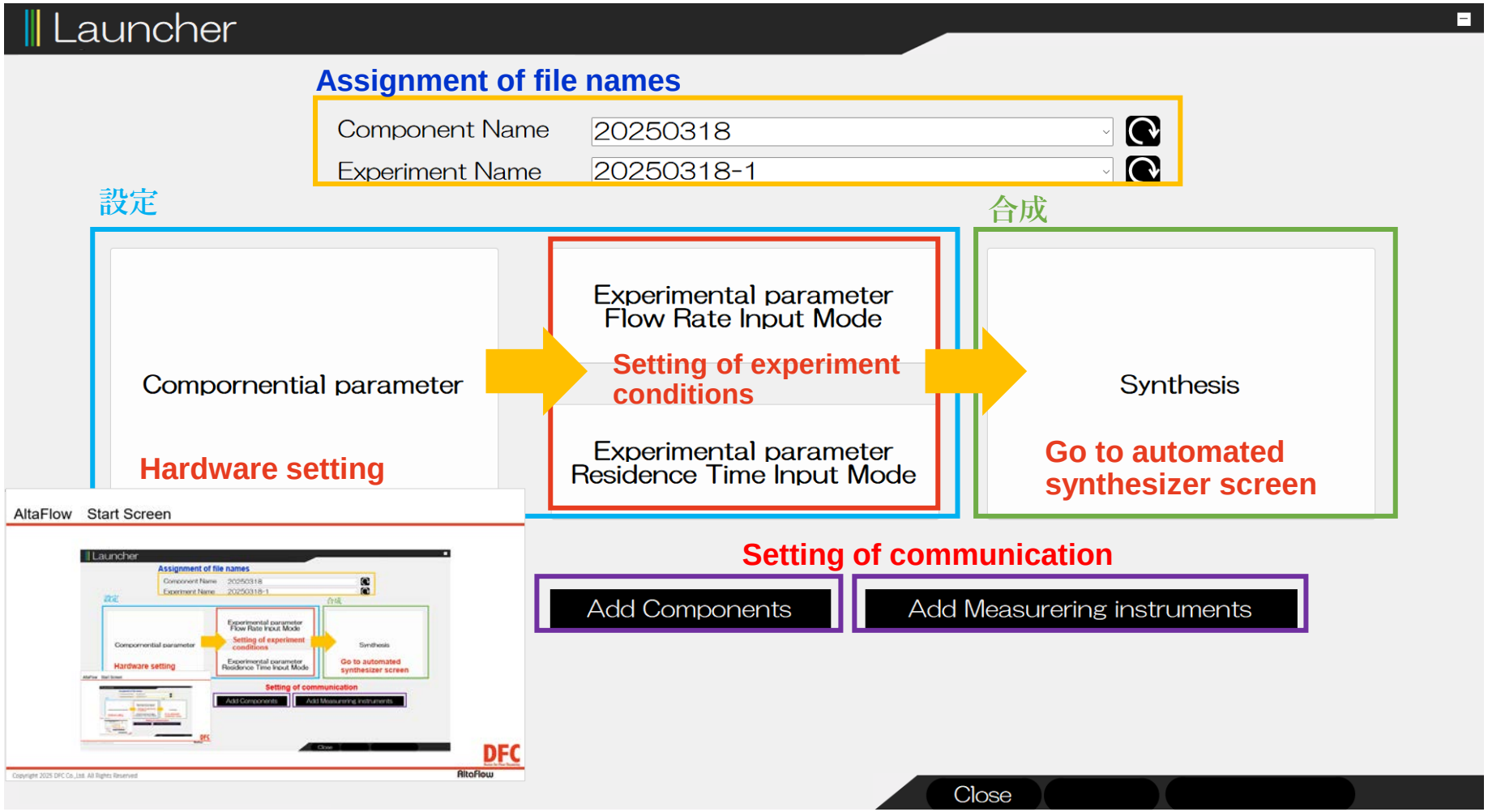
AltaFlow

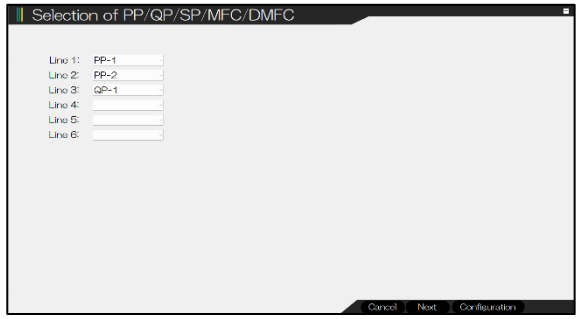
# AltaFlow　Start Screen



# AltaFlow　Compo.Parameter Setting

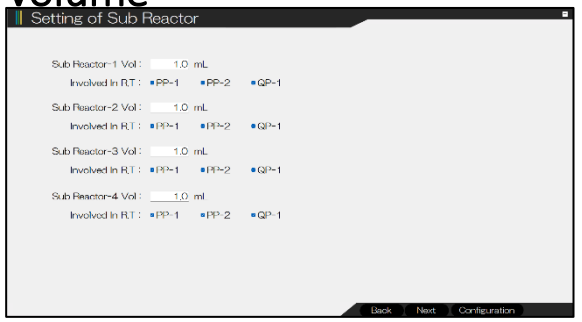
## Connection setting and setting confirmation of each hardware

Selection of feeding unit



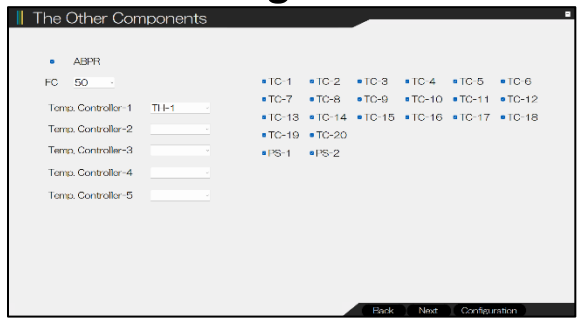

Selection of main reactor and entry of volume


Selection of sub-reactor and entry of volume

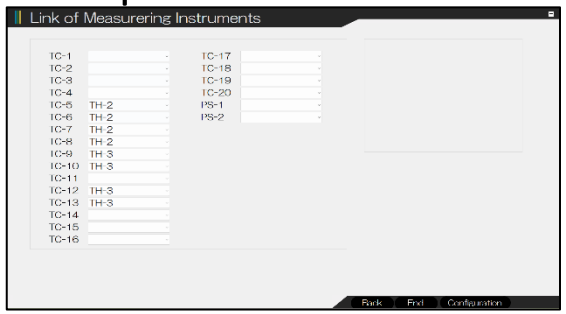



(This procedure can be skipped)

Setting of other hardware and connecting device




Linking of measuring device and operation unit



# AltaFlow　2 major experimental parameters

**Users can specify detailed experimental parameters by selecting either [Flow Rate] or [Residence Time]. Synthesis conditions can be configured based on user's choice of  either [Flow Rate] or [Residence Time].**

- Flow Rate (ml/min)
- Residence Time
- Reagent Concentration
- Molar Ratio of Reagents

| | | | | | |
|---|---|---|---|---|---|
| Flow Rate Line-1 (mL/min) | 100.000 | 100.000 | 100.000 | 100.000 | 100.000 |
| Flow Rate Line-2 (mL/min) | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| Flow Rate Line-3 (mL/min) | 1.0 | 1.0 | 1.3 | 1.0 | 1.0 |
| Residence Time(min) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Conc Of Reagent 1 (M) | 0.5000 | 0.5000 | 0.5000 | 0.5000 | 0.5000 |
| Conc Of Reagent 2 (M) | 0.5000 | 0.5000 | 0.5000 | 0.5000 | 0.5000 |
| Conc Of Reagent 3 (M) | 0.5000 | 0.5000 | 0.5000 | 0.5000 | 0.5000 |
| MolRatio of Reagent 1 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| MolRatio of Reagent 2 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| MolRatio of Reagent 3 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

## [ Flow Rate ]

Synthesis is performed by setting the flow rate.

## [ Residence Time ]

Synthesis is performed by calculating the flow rate based on the residence time, reagent concentration, and molar ratio.

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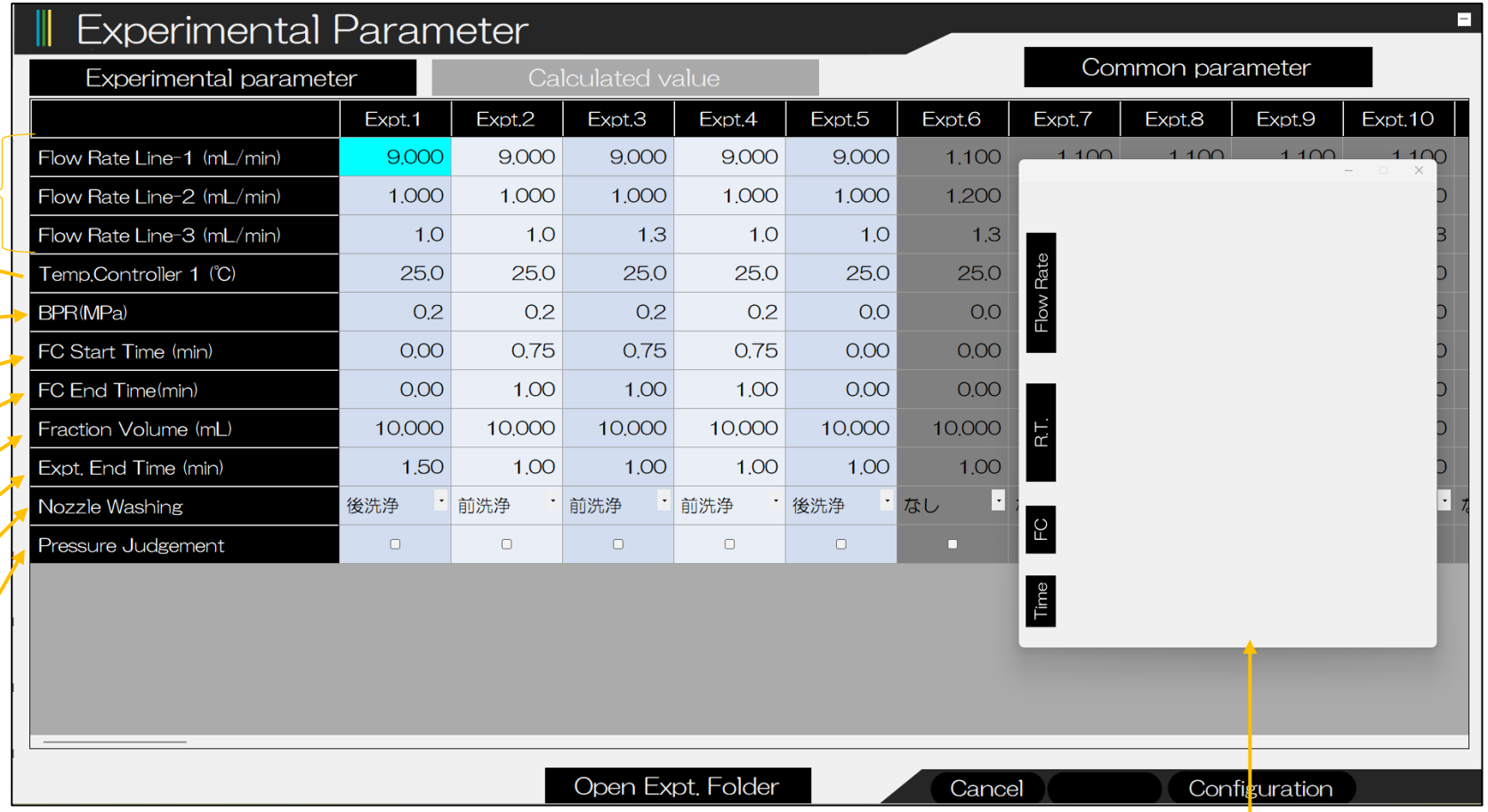
# AltaFlow　Experimental Parameter setting screen

- Flow rate
- Temperature
- Back pressure
- Collection start time
- Collection end time
- Fraction volume
- Experiment end time
- Nozzle washing　yes/no

  Nozzle washing: Before or after collection
- Pressure check　OK/NG



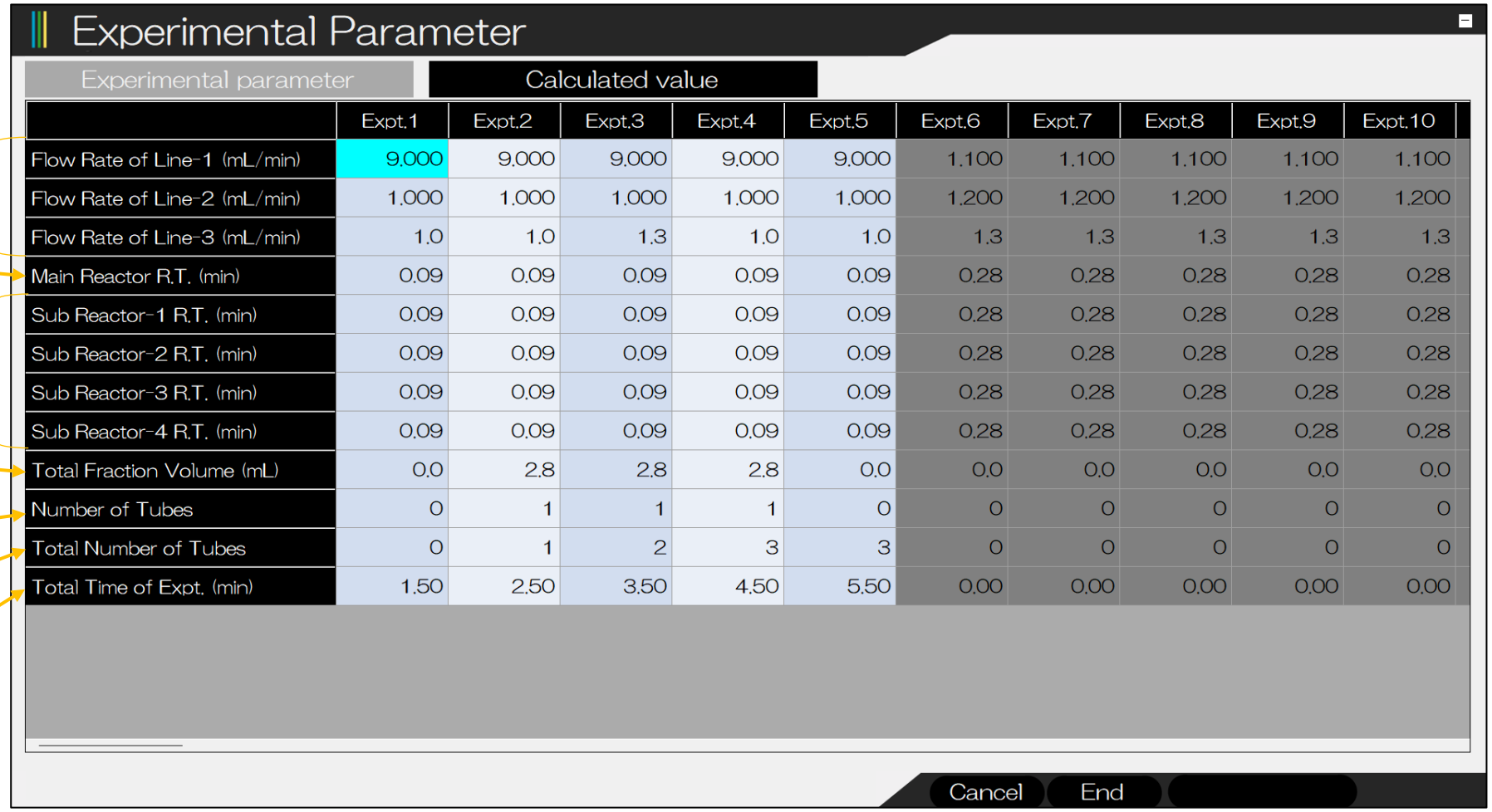

実験1回分の計算値が一覧表示

**Note:**

**Conditions corresponding to devices can be set for max. continuous 100 experiments.**

# AltaFlow　Calculated values [Results]

- Flow rate of each line
- Main reactor resident time
- Sub-rector resident time
- Total fraction volume
- Number of tubes
- Total number of tubes
- Total time of experiment




| | Expt.1 | Expt.2 | Expt.3 | Expt.4 | Expt.5 | Expt.6 | Expt.7 | Expt.8 | Expt.9 | Expt.10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate of Line-1 (mL/min) | 9.000 | 9.000 | 9.000 | 9.000 | 9.000 | 1.100 | 1.100 | 1.100 | 1.100 | 1.100 |
| Flow Rate of Line-2 (mL/min) | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.200 | 1.200 | 1.200 | 1.200 | 1.200 |
| Flow Rate of Line-3 (mL/min) | 1.0 | 1.0 | 1.3 | 1.0 | 1.0 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| Main Reactor R.T. (min) | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 |
| Sub Reactor-1 R.T. (min) | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 |
| Sub Reactor-2 R.T. (min) | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 |
| Sub Reactor-3 R.T. (min) | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 |
| Sub Reactor-4 R.T. (min) | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 |
| Total Fraction Volume (mL) | 0.0 | 2.8 | 2.8 | 2.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Number of Tubes | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Number of Tubes | 0 | 1 | 2 | 3 | 3 | 0 | 0 | 0 | 0 | 0 |
| Total Time of Expt. (min) | 1.50 | 2.50 | 3.50 | 4.50 | 5.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

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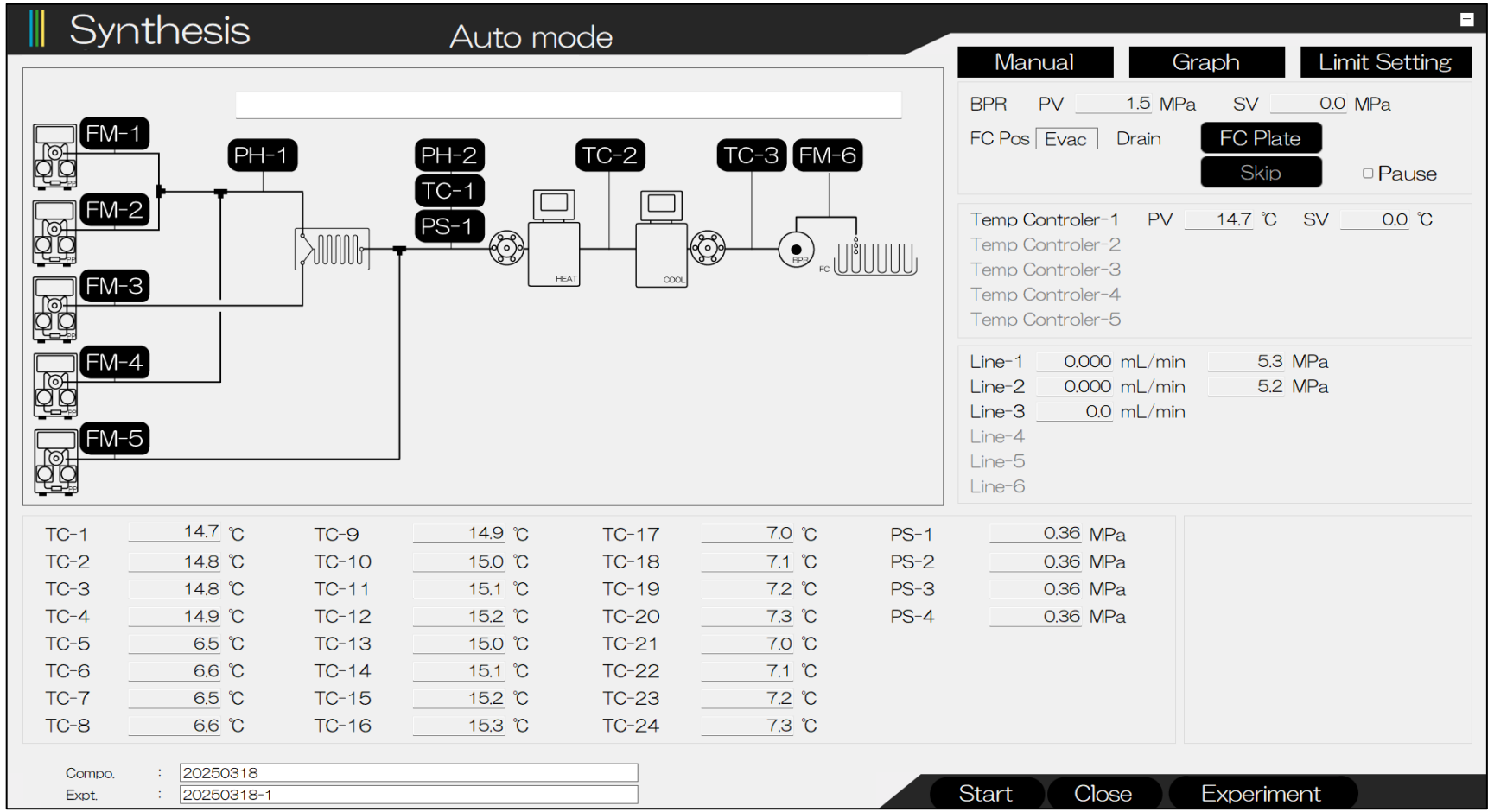
# AltaFlow　Synthesis Operation screen

## Operations available in this screen

- Start and Stop (Close)
- Flow rate setting
- Display and resetting of Experiment name
- Operation of temp. control device
- Display of FC Plate (Fraction control panel)
- Switching to Limit Setting screen
- Switching to Graph screen



# AltaFlow　Limit setting

**Limit settings allow the system to trigger a [Warning] or [Stop] in response to detected abnormalities.**

Settings / Parameters

Pop up

Warning: The system does not stop automatically but displays the error message on screen.

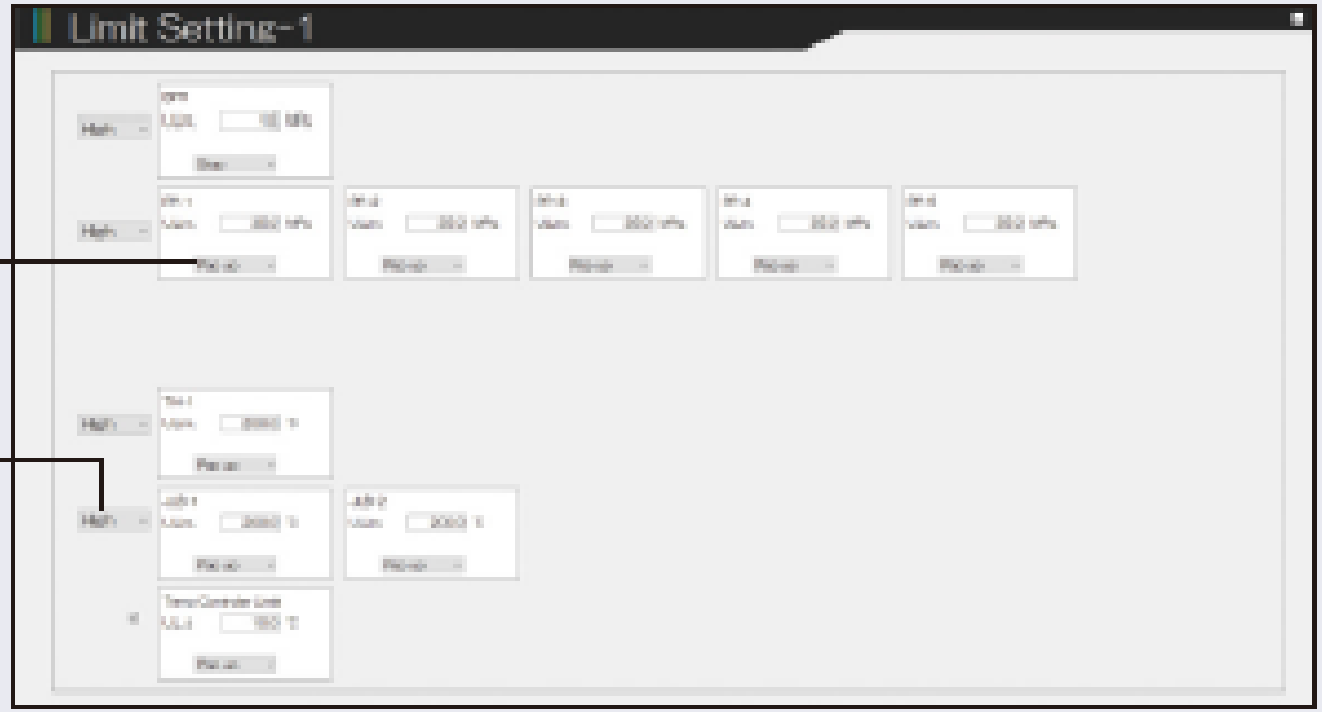
Stop

Stop: The error message is displayed on the screen, and the unit stops operation.

Sensitivity Parameter

| | |
|---|---|
| High | Immediate |
| Mid | 5 seconds |
| Low | 10 seconds |

You can choose from three levels




Limit Setting Screen

**Note:**
**Items are monitored either all the time or only the during operation. User can make a choice for a monitoring time.**

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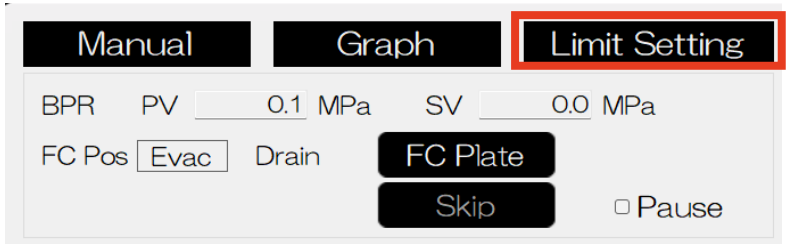
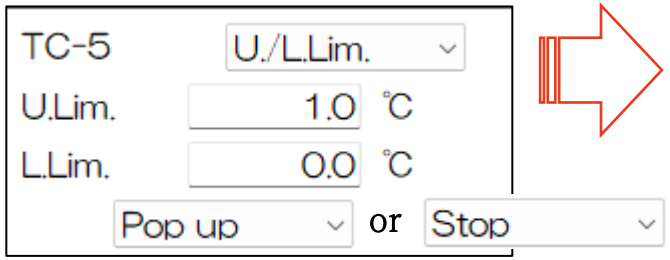
# AltaFlow　Various limit settings

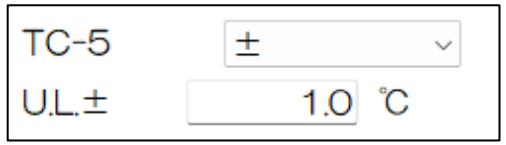
**To set the limit, press “Limit Setting” in the right upper corner of Synthesis operation screen**



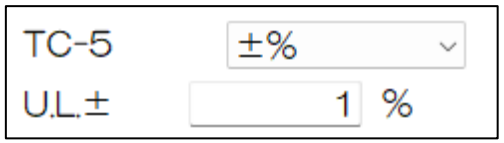

**In “Limit Setting”, a user can select what operation to take when an actual value exceeds the upper limit.**




**Monitoring until the value exceeds U.L. 1℃**




**Monitoring based on the allowable range ±1℃ from U.L.**




**Monitoring based on the allowable range ±1% from U.L.**

# AltaFlow　Data Logging and Graph Display

**The system logs synthesis data (e.g., flow rate, back pressure, liquid temperature) and visualizes it in real-time graphs. Selecting “Reload” allows you to refresh and view the latest graph data during operation.**

**Selection of group**

**Switch the display by selecting the group**

**Selection of Expt.**

**Select which data to display**

**Display or non-display of the graph**

**Selection of checks enables a user to narrow down to a necessary display**

**Note:**
**Collected portion (collection location) can be checked in FC pallet.**

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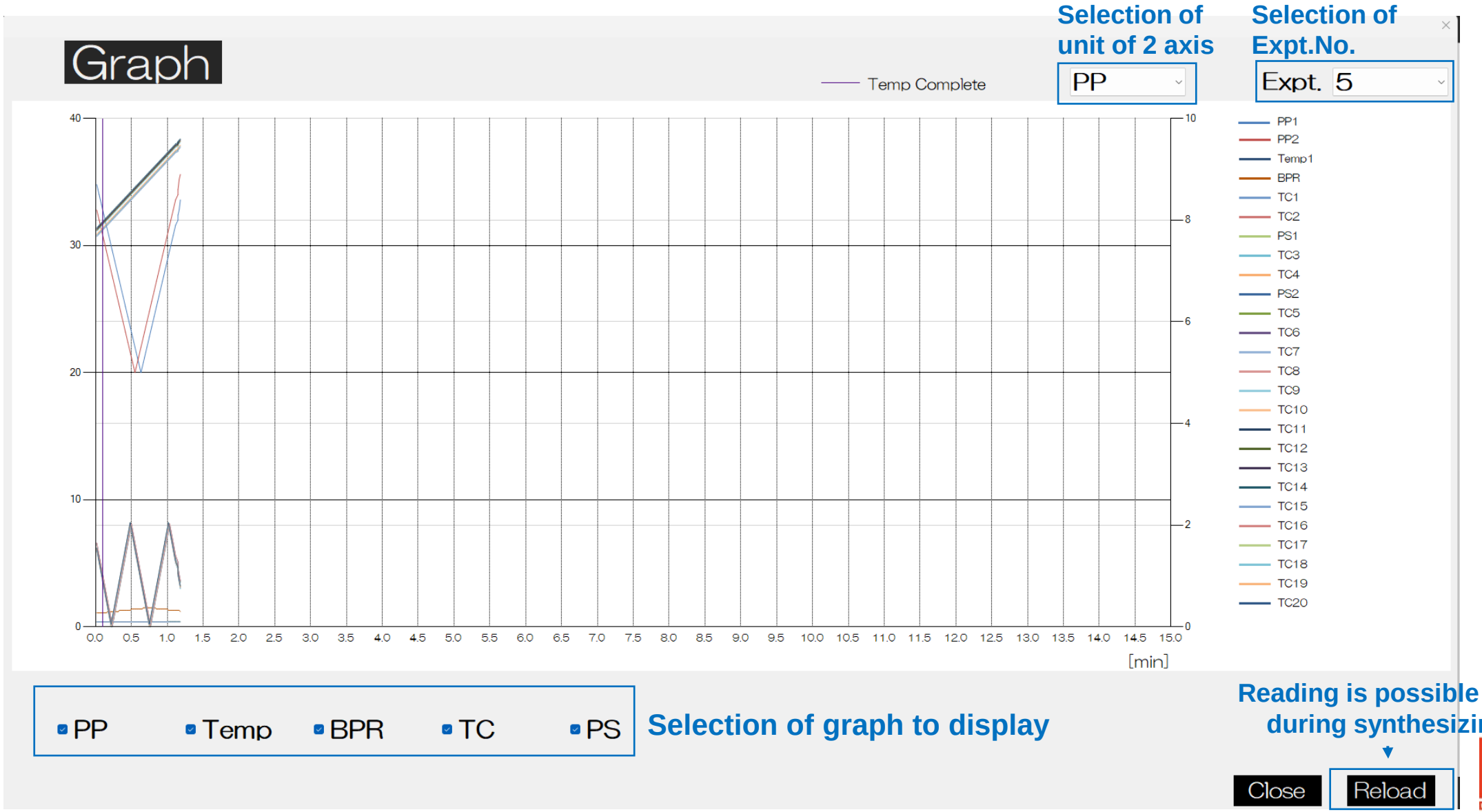
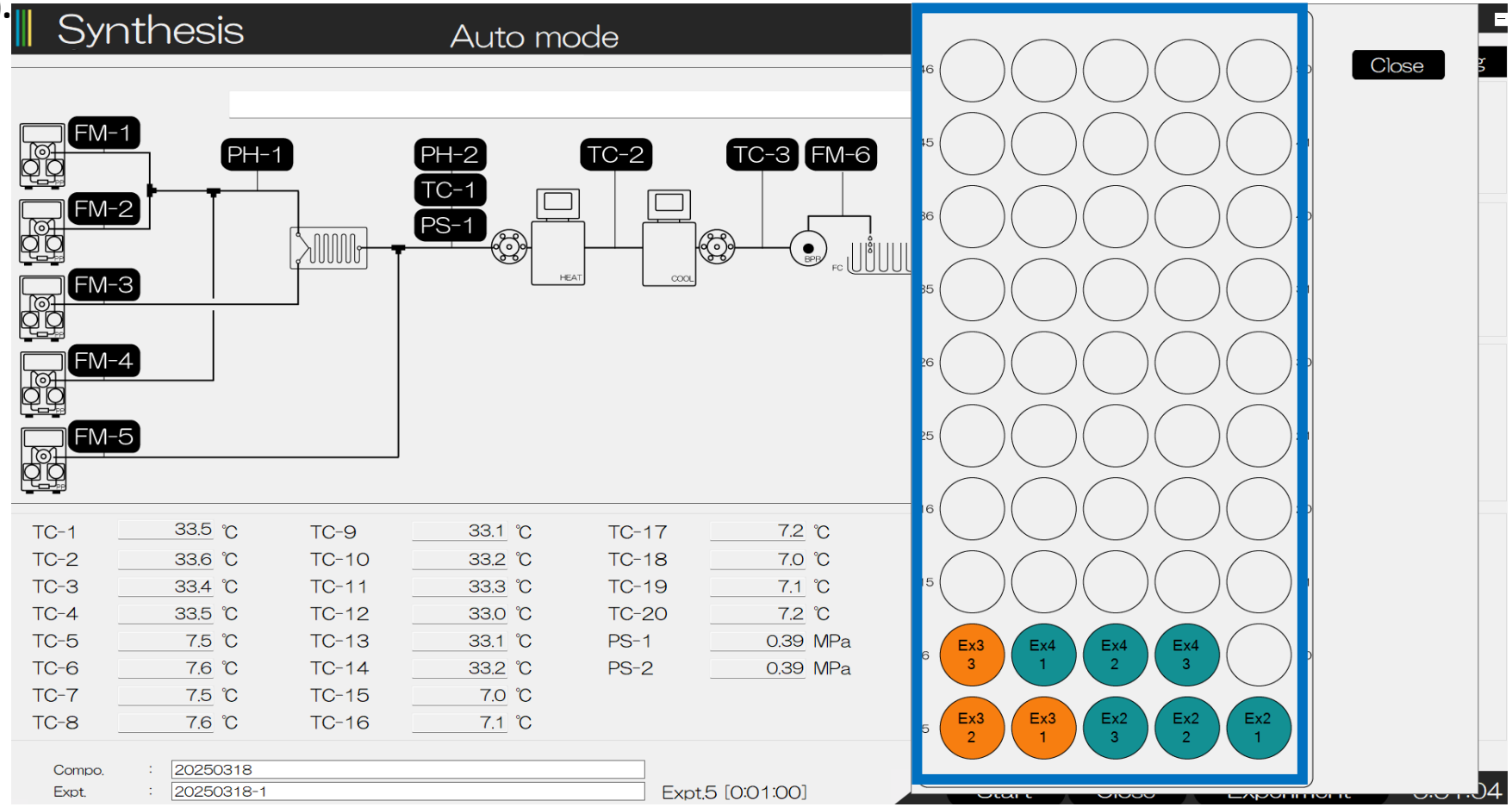
# AltaFlow　Record of logging and graph



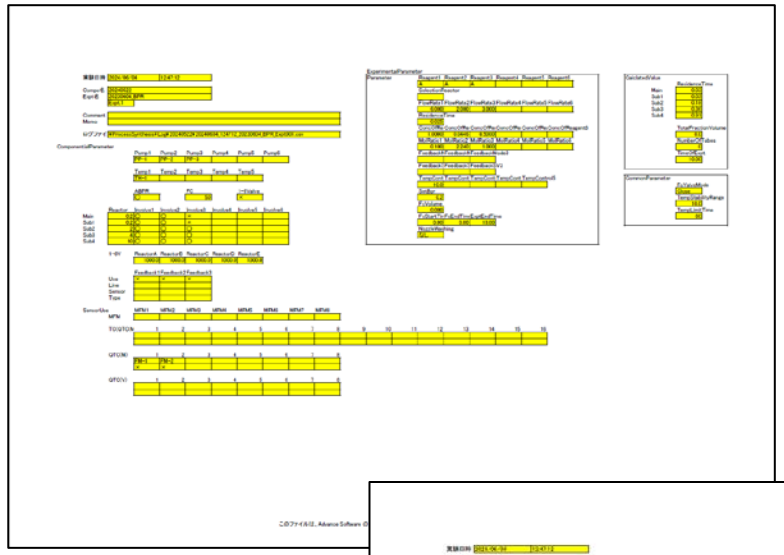
# AltaFlow　Display of FC Plate

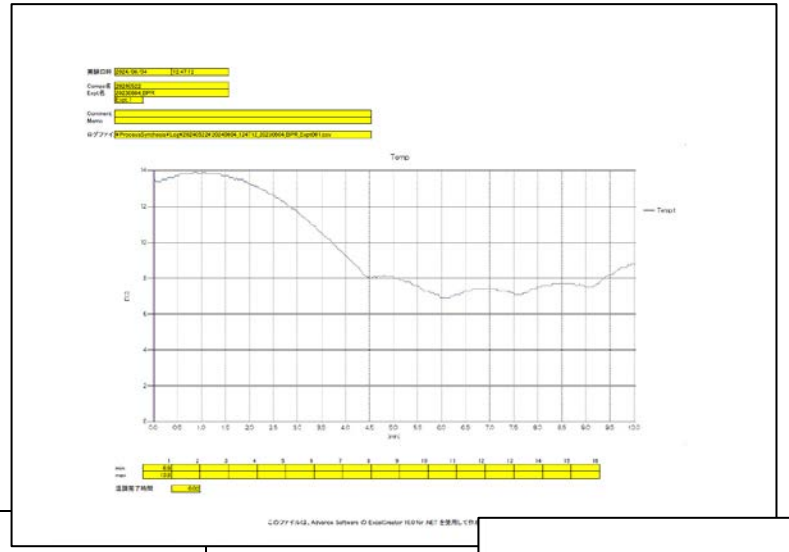
◎The following screen, which is launched in the automatic synthesis screen (Synthesis), shows the collected portion of the compound in each synthesis experiment. The color changes for each synthesis experiment to indicate the collect position.　In the example below, the results of three synthesis experiments are shown: in the first experiment, the first row of three test tubes are selected (in green), in the second experiment, the first and second row of three test tubes are selected (in orange) and in the third experiment, the second row of three test tubes are  selected (in green).

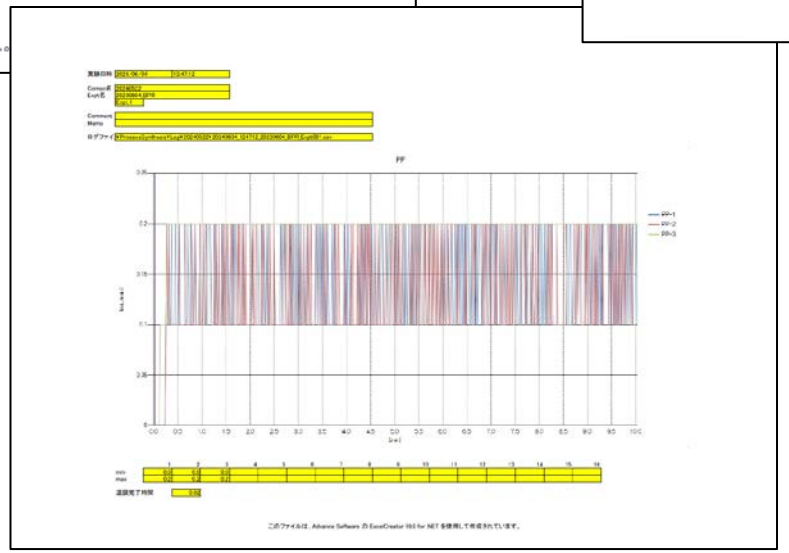


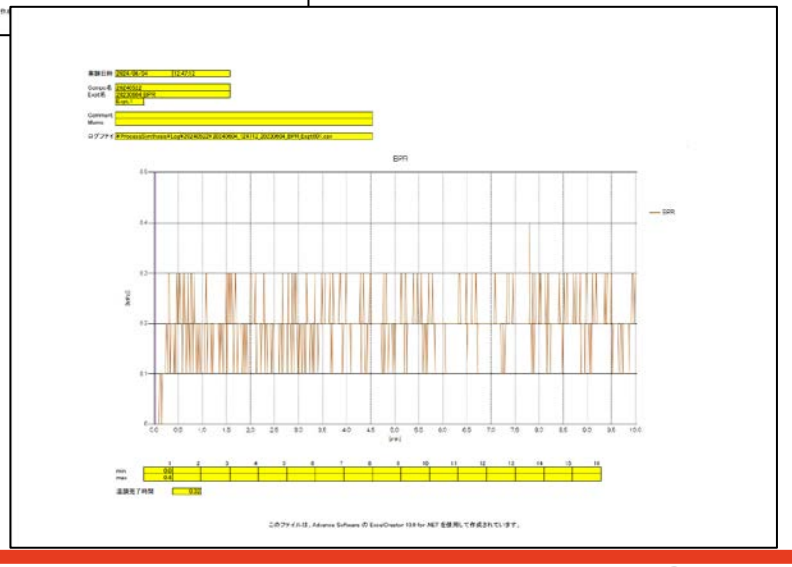
# AltaFlow Automatic Report Generation

**After synthesis is completed, the system automatically generates a report using the collected data and exports it as a PDF**



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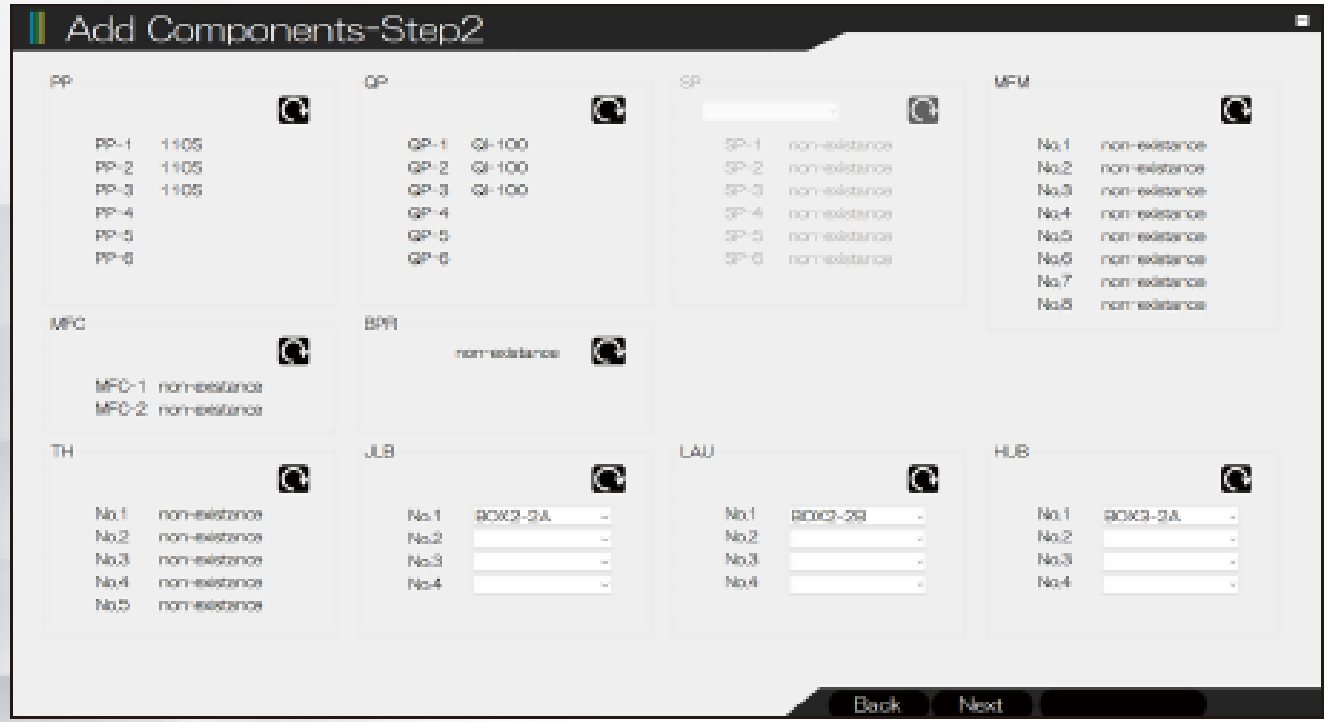
# AltaFlow Supplemental Information (1)

## Compatible with External Device Integration

AltaFlow is designed to flexibly accommodate a variety of system configurations through integration with external devices. With a proven track record of connecting to third-party devices, AltaFlow offers excellent expandability and system integration capabilities.




Device Integration Control Panel

### ■ List of Device Integration Examples

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# AltaFlow Supplemental Information (2)

## ■ List of Device Integration Examples

Device Integration Control Panel

| | | | | | |
|---|---|---|---|---|---|
| Pumps | DFC | FC-F/RP Series | Temperature Controllers | DFC | FC-TH Series Column Heater Uni |
| | TACMINA | Q Pump Series | | Julabo | CORIO CD Series DYNEO DD Series |
| | YMC | YSP Series | | YMC | Coil Reactor Unit Column Reactor Unit |
| | Harvard | PDH ULTRA CP Series | | | Mixing Block Unit |
| | Fuji Techno Ind. | SMP Series | | LAUDA | Circulating Constant Temperature Bath PRO Series, |
| | Bronkhorst | miniCORI-FLOW Gear Pump | | | etc. |
| Mass Flow ontrollers | KOFLOC | EX-250 Series | Sensors | | |
| | Bronkhorst | F-201CV / F-211CV Series | | DFC | Inline Temp. Sensor, Pressure Sensor |
| Electrochemical Reactors | EC FRONTIER | ECSTATsyn-700Dx | | Bronkhorst | miniCORI-FLOW |
| | | | | Surpass Ind. | NTF Series |

*If you are considering integration with other external devices, please feel free to contact us.

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https://dfc-kyoto.co.jp



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