

A faint, light-colored icon of a lightbulb with a hand holding it, positioned on the left side of the slide.

Automated Synthesizer for
production process study

AltaFlow

DFC Co., Ltd.

DFC
Device for Flow Chemistry

AltaFlow

External appearance

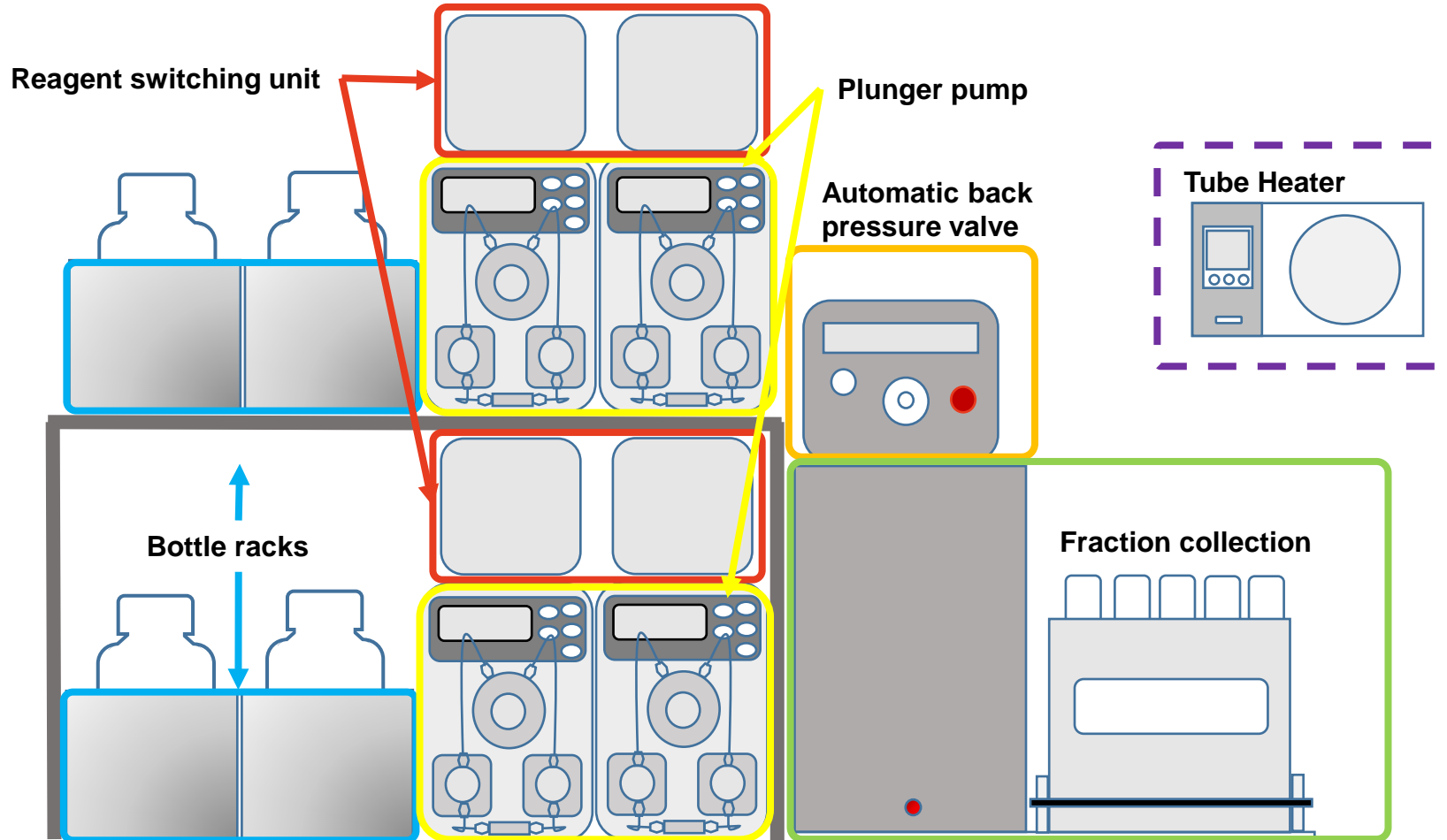
AltaFlow

4 Line Configuration



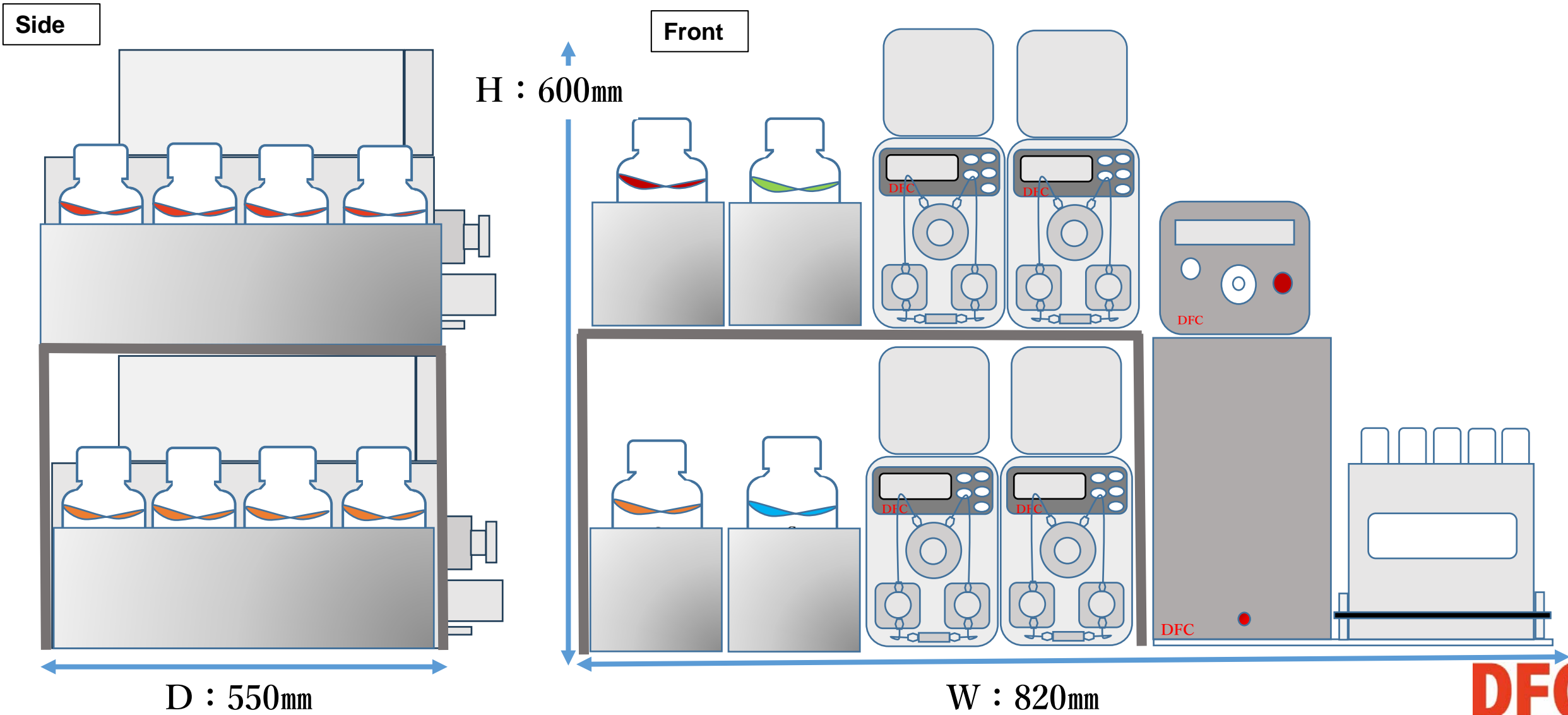
Component Configuration

AltaFlow Components



Sizes

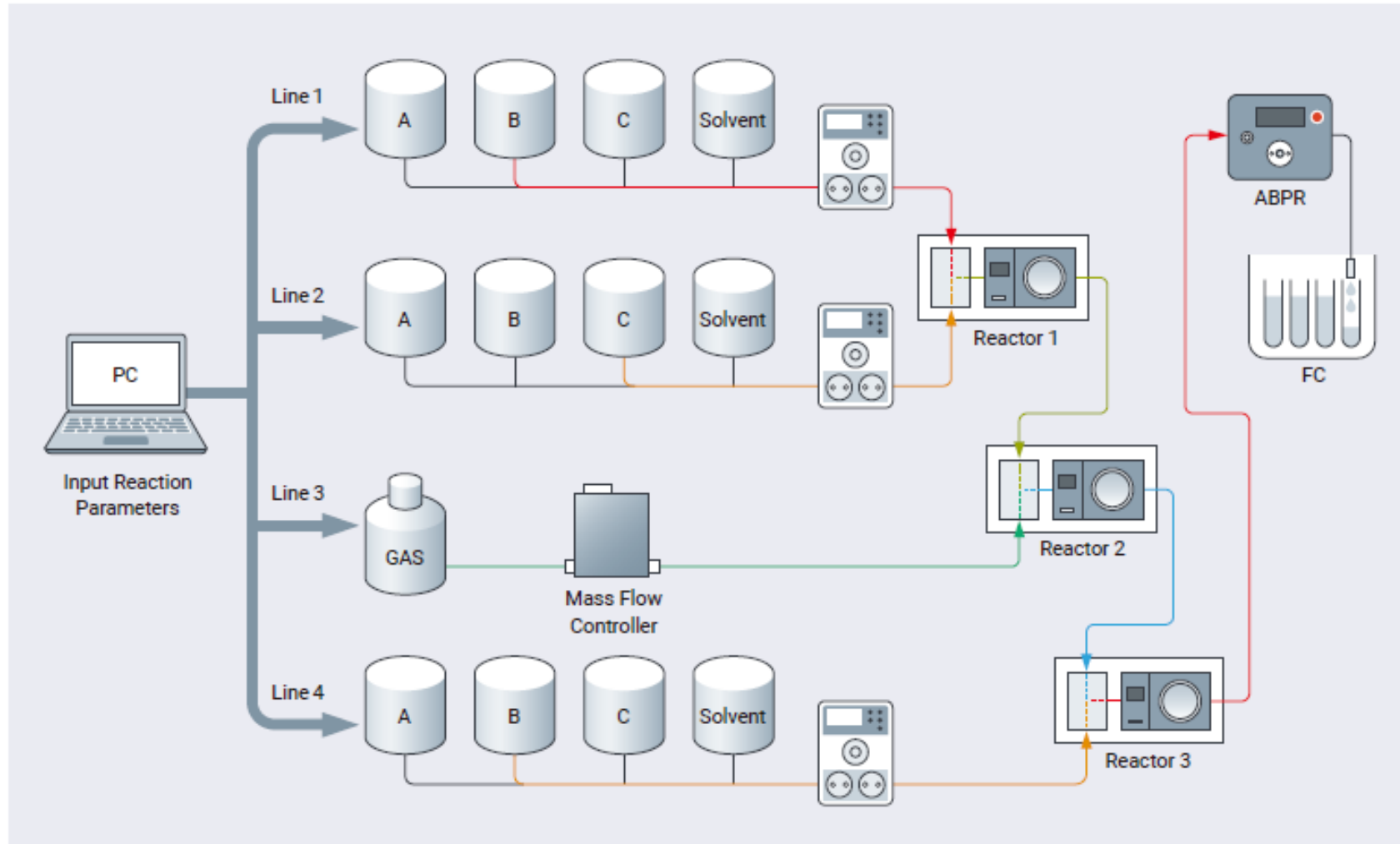
4 Line configuration



AltaFlow

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

AltaFlow Start Screen

The screenshot displays the 'Launcher' window with the following elements:

- Assignment of file names:** A yellow-bordered box containing two dropdown menus. The first is labeled 'Component Name' with the value '20250318'. The second is labeled 'Experiment Name' with the value '20250318-1'. Both have refresh icons to their right.
- Workflow Diagram:** A central flow diagram with three main stages:
 - 設定 (Setting):** A blue-bordered box containing 'Componential parameter' and 'Hardware setting'.
 - Setting of experiment conditions:** A red-bordered box containing 'Experimental parameter Flow Rate Input Mode' and 'Experimental parameter Residence Time Input Mode'. A yellow arrow points from the '設定' box to this stage.
 - 合成 (Synthesis):** A green-bordered box containing 'Synthesis' and 'Go to automated synthesizer screen'. A yellow arrow points from the 'Setting of experiment conditions' box to this stage.
- Setting of communication:** A purple-bordered box containing two buttons: 'Add Components' and 'Add Measuring instruments'.
- Thumbnail:** A smaller version of the current screen is shown in the bottom-left corner.
- Footer:** 'AltaFlow Start Screen' is written in the top-left of the window. 'DFC Device for Flow Chemistry' is in the bottom-right. 'Close' is in the bottom-right of the window.

AltaFlow Compo.Parameter Setting

Connection setting and setting confirmation of each hardware

Selection of feeding unit

Selection of PP/QP/SP/MFC/DMFC

Line 1: PP-1
Line 2: PP-2
Line 3: QP-1
Line 4:
Line 5:
Line 6:

Cancel Next Configuration



Selection of main reactor and entry of volume

Setting of Main Reactor

Involved in RT: RT-1 RT-2 QP-1
Main Reactor-1 Vol: 1.0 mL

Back Next Configuration



Selection of sub-reactor and entry of volume

Setting of Sub Reactor

Sub Reactor-1 Vol: 1.0 mL
Involved in RT: RT-1 RT-2 QP-1
Sub Reactor-2 Vol: 1.0 mL
Involved in RT: RT-1 RT-2 QP-1
Sub Reactor-3 Vol: 1.0 mL
Involved in RT: RT-1 RT-2 QP-1
Sub Reactor-4 Vol: 1.0 mL
Involved in RT: RT-1 RT-2 QP-1

Back Next Configuration

(This procedure can be skipped)

Setting of other hardware and connecting device

The Other Components

ASRR
FC: 50
Temp. Controller-1 TH-1
Temp. Controller-2
Temp. Controller-3
Temp. Controller-4
Temp. Controller-5

TC-1 TC-2 TC-3 TC-4 TC-5 TC-6
TC-7 TC-8 TC-9 TC-10 TC-11 TC-12
TC-13 TC-14 TC-15 TC-16 TC-17 TC-18
TC-19 TC-20
PS-1 PS-2

Back Next Configuration



Linking of measuring device and operation unit

Link of Measuring Instruments

IC-1 TH-1 IC-17 PS-1
IC-2 TH-1 IC-18 PS-2
IC-3 TH-1 IC-19
IC-4 TH-1 IC-20
IC-5 TH-2
IC-6 TH-2
IC-7 TH-2
IC-8 TH-2
IC-9 TH-3
IC-10 TH-3
IC-11 TH-3
IC-12 TH-3
IC-13 TH-3
IC-14
IC-15
IC-16

Back Next Configuration

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)		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		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
■ Reagent Concentration		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
■ Molar Ratio of Reagents		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.

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

Experimental Parameter										
Experimental parameter	Calculated value					Common parameter				
	Expt.1	Expt.2	Expt.3	Expt.4	Expt.5	Expt.6	Expt.7	Expt.8	Expt.9	Expt.10
Flow Rate 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 Line-2 (mL/min)	1,000	1,000	1,000	1,000	1,000	1,200				
Flow Rate Line-3 (mL/min)	1.0	1.0	1.3	1.0	1.0	1.3				
Temp.Controller 1 (°C)	25.0	25.0	25.0	25.0	25.0	25.0				
BPR(MPa)	0.2	0.2	0.2	0.2	0.0	0.0				
FC Start Time (min)	0.00	0.75	0.75	0.75	0.00	0.00				
FC End Time(min)	0.00	1.00	1.00	1.00	0.00	0.00				
Fraction Volume (mL)	10,000	10,000	10,000	10,000	10,000	10,000				
Expt. End Time (min)	1.50	1.00	1.00	1.00	1.00	1.00				
Nozzle Washing	後洗浄	前洗浄	前洗浄	前洗浄	後洗浄	なし				
Pressure Judgement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

Flow Rate

R.T.

FC

Time

Note:

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

実験1回分の計算値が一覧表示



AltaFlow Calculated values [Results]

Experimental Parameter										
Experimental parameter	Calculated value									
	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

• Flow rate of each line

• Main reactor resident time

• Sub-reactor resident time

• Total fraction volume

• Number of tubes

• Total number of tubes

• Total time of experiment

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

Synthesis Auto mode

Manual Graph Limit Setting

BPR PV 1.5 MPa SV 0.0 MPa

FC Pos Pause

Temp Controller-1 PV 14.7 °C SV 0.0 °C

Temp Controller-2

Temp Controller-3

Temp Controller-4

Temp Controller-5

Line-1 0.000 mL/min 5.3 MPa

Line-2 0.000 mL/min 5.2 MPa

Line-3 0.0 mL/min

Line-4

Line-5

Line-6

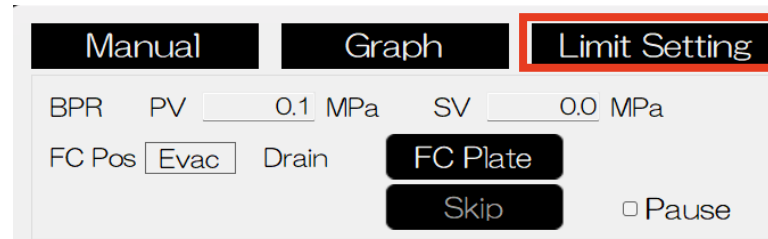
TC-1	14.7 °C	TC-9	14.9 °C	TC-17	7.0 °C	PS-1	0.36 MPa
TC-2	14.8 °C	TC-10	15.0 °C	TC-18	7.1 °C	PS-2	0.36 MPa
TC-3	14.8 °C	TC-11	15.1 °C	TC-19	7.2 °C	PS-3	0.36 MPa
TC-4	14.9 °C	TC-12	15.2 °C	TC-20	7.3 °C	PS-4	0.36 MPa
TC-5	6.5 °C	TC-13	15.0 °C	TC-21	7.0 °C		
TC-6	6.6 °C	TC-14	15.1 °C	TC-22	7.1 °C		
TC-7	6.5 °C	TC-15	15.2 °C	TC-23	7.2 °C		
TC-8	6.6 °C	TC-16	15.3 °C	TC-24	7.3 °C		

Compo. : 20250318

Expt. : 20250318-1

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.

A screenshot of the "Limit Setting" interface for TC-5. It features a dropdown menu for "U./LLim." with a downward arrow. Below it are two input fields: "U.Lim." with the value "1.0 °C" and "LLim." with the value "0.0 °C". At the bottom, there are two dropdown menus for actions: "Pop up" and "Stop", separated by the word "or".

Monitoring until the value exceeds U.L. 1°C

A screenshot of the "Limit Setting" interface for TC-5. It features a dropdown menu for "±" with a downward arrow. Below it is an input field for "U.L.±" with the value "1.0 °C".

Monitoring based on the allowable range $\pm 1^\circ\text{C}$ from U.L.

A screenshot of the "Limit Setting" interface for TC-5. It features a dropdown menu for "±%" with a downward arrow. Below it is an input field for "U.L.±" with the value "1 %".

Monitoring based on the allowable range $\pm 1\%$ 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

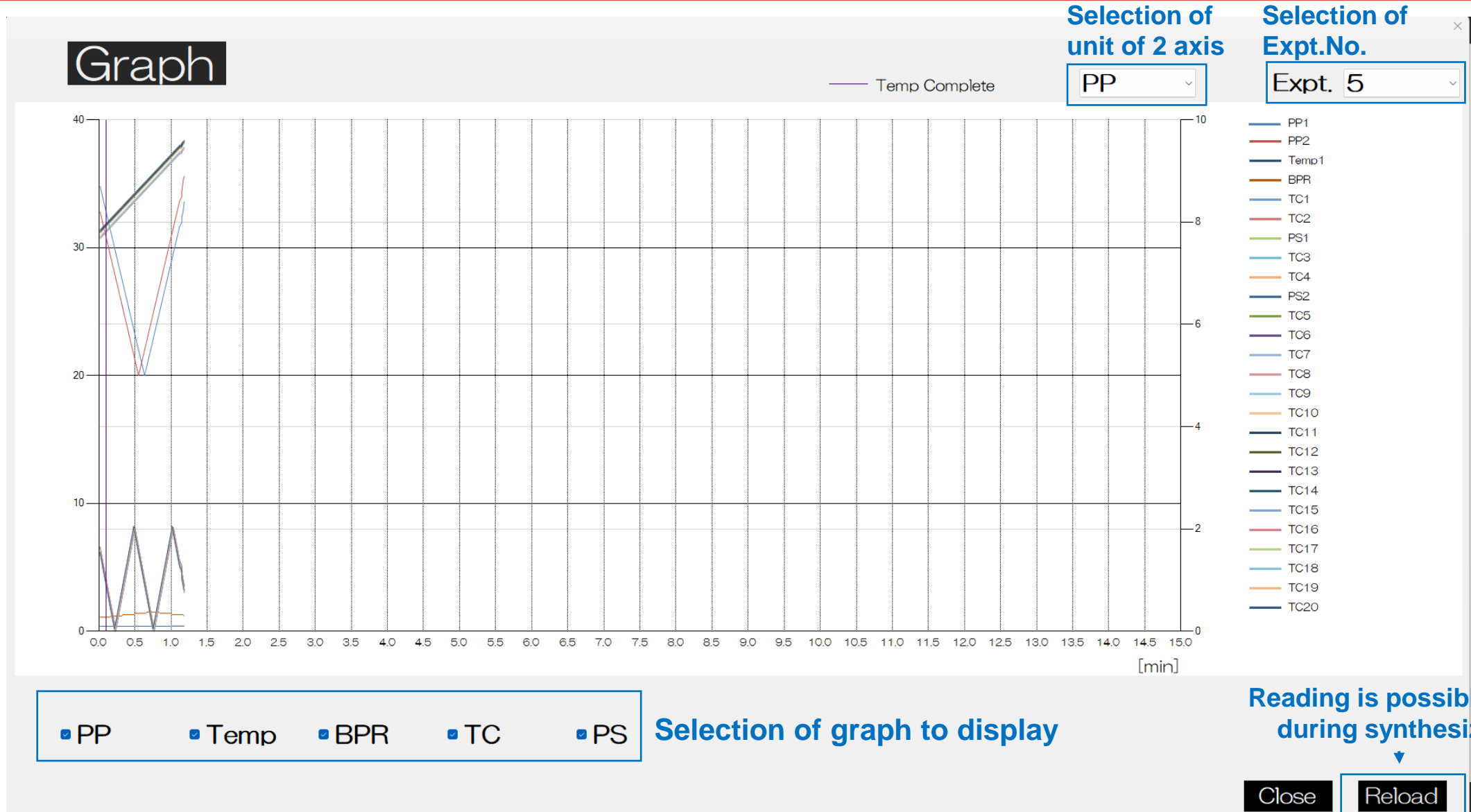
Display or non-display of the graph

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

Note:

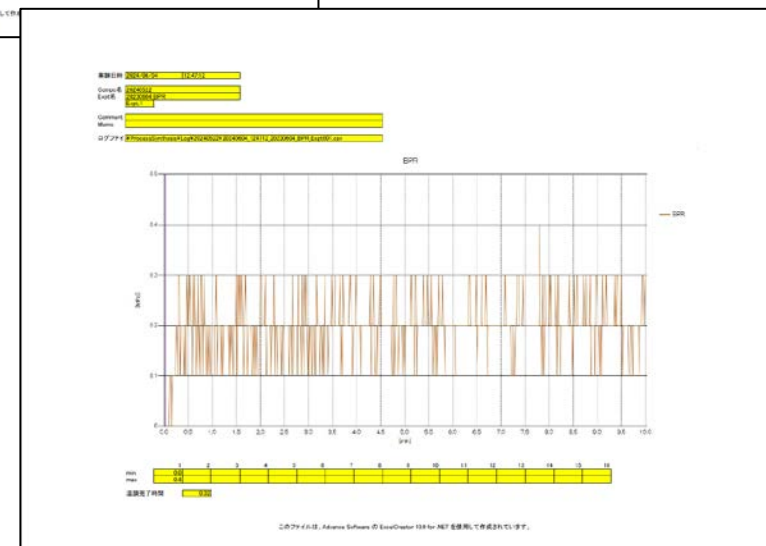
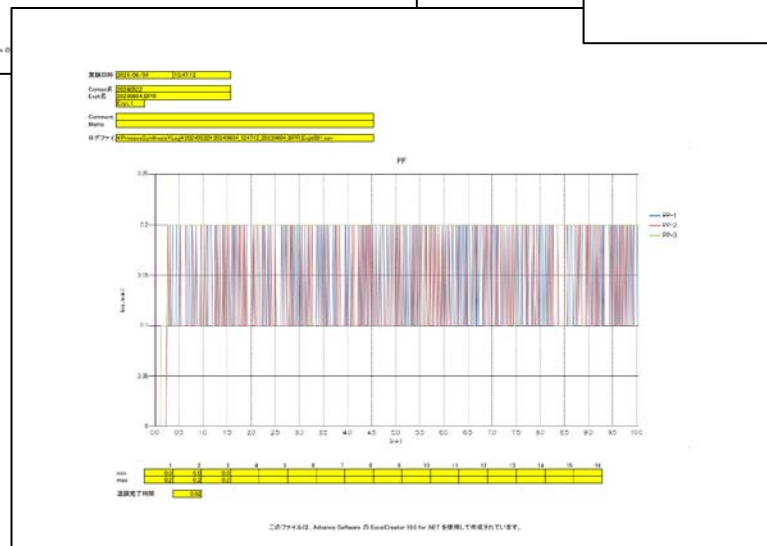
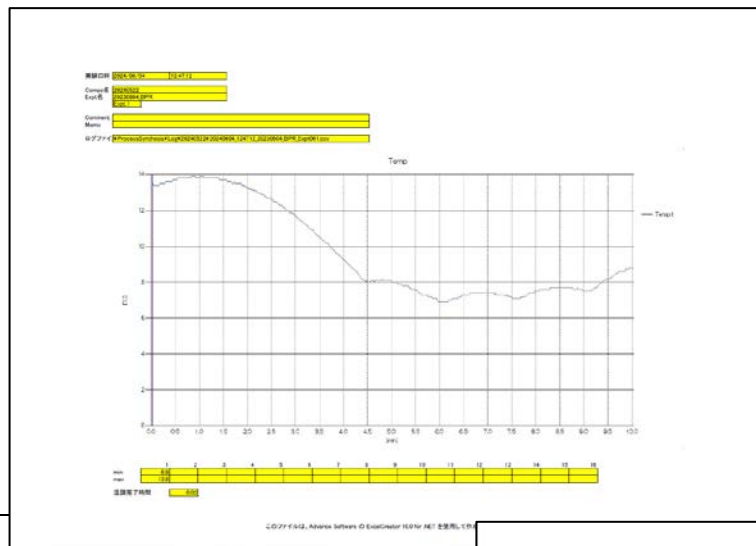
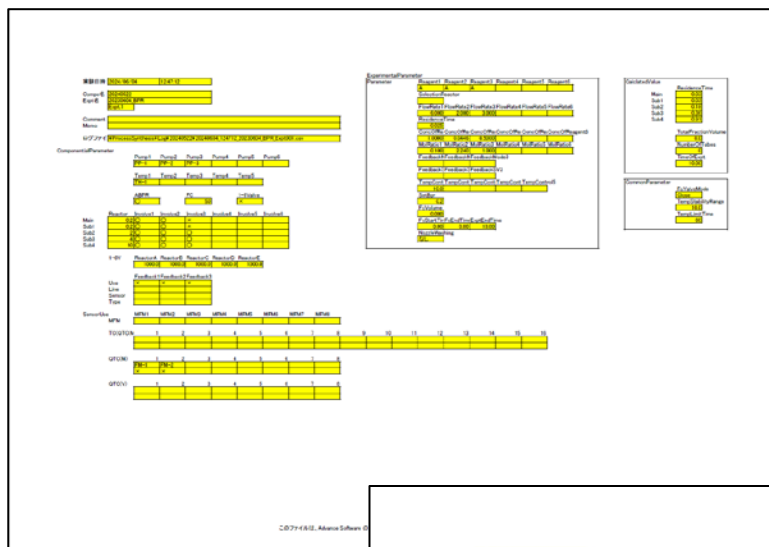
Collected portion (collection location) can be checked in FC pallet.

AltaFlow Record of logging and graph



AltaFlow Automatic Report Generation

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



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.



■ List of Device Integration Examples

Device Integration Control Panel

AltaFlow Supplemental Information (2)

■ List of Device Integration Examples

Device Integration Control Panel

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

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





<https://dfc-kyoto.co.jp>