

Easy to use FlowView^{※1}

With this software (FlowView) of the blood flow sensor, basic data such as blood flow signals can be sent to a PC via Bluetooth, and the data can be displayed as a graph and saved on the PC.

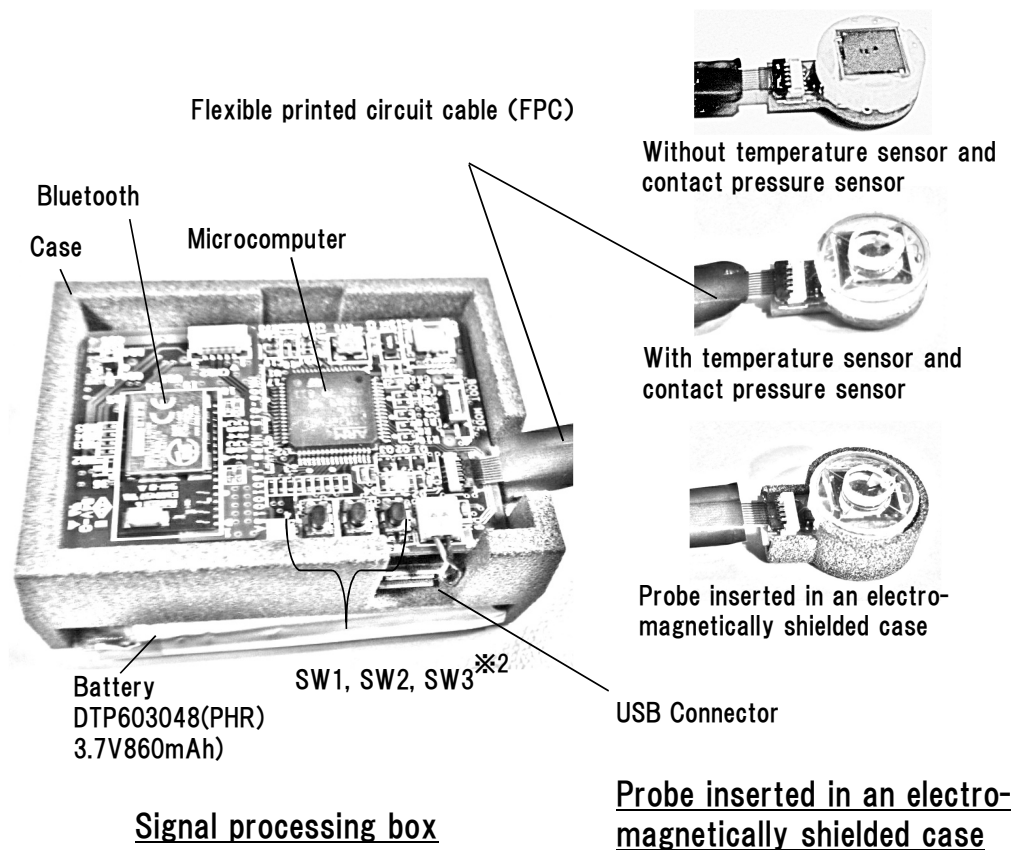
As an option, laser pulse drive, direct data storage in SD memory, and actuator drive command function can be added.

FlowView software has a Japanese version and an English version. This manual is the English version.



※1 Software for blood flow sensor created by Hiko Laboratory

Sensor appearance



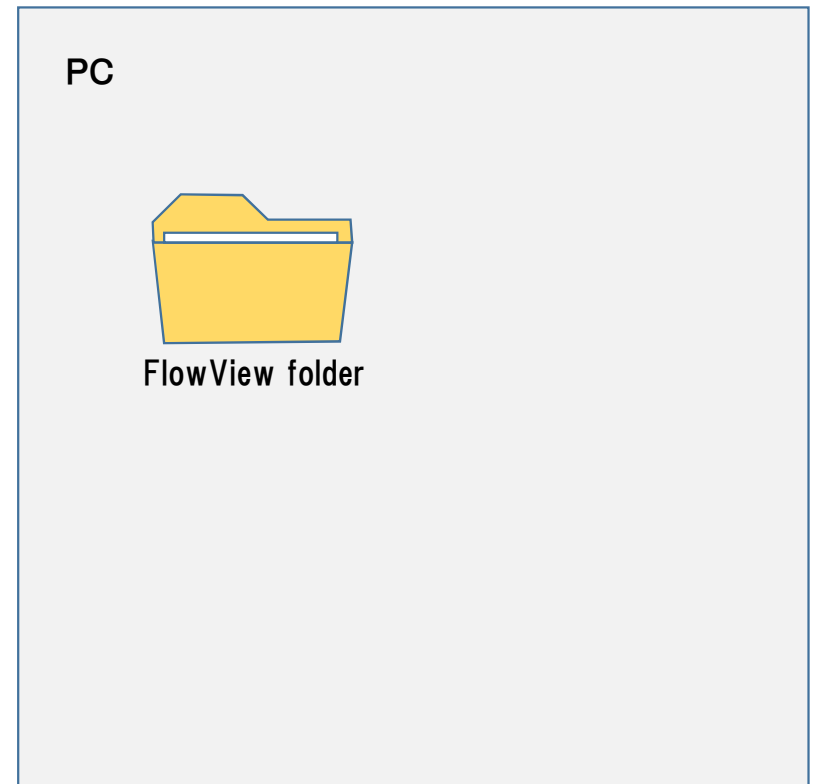
※1 Cable lengths are 150mm, 250mm, 600mm.

※2 SW3 switch is not normally used.

Initial settings

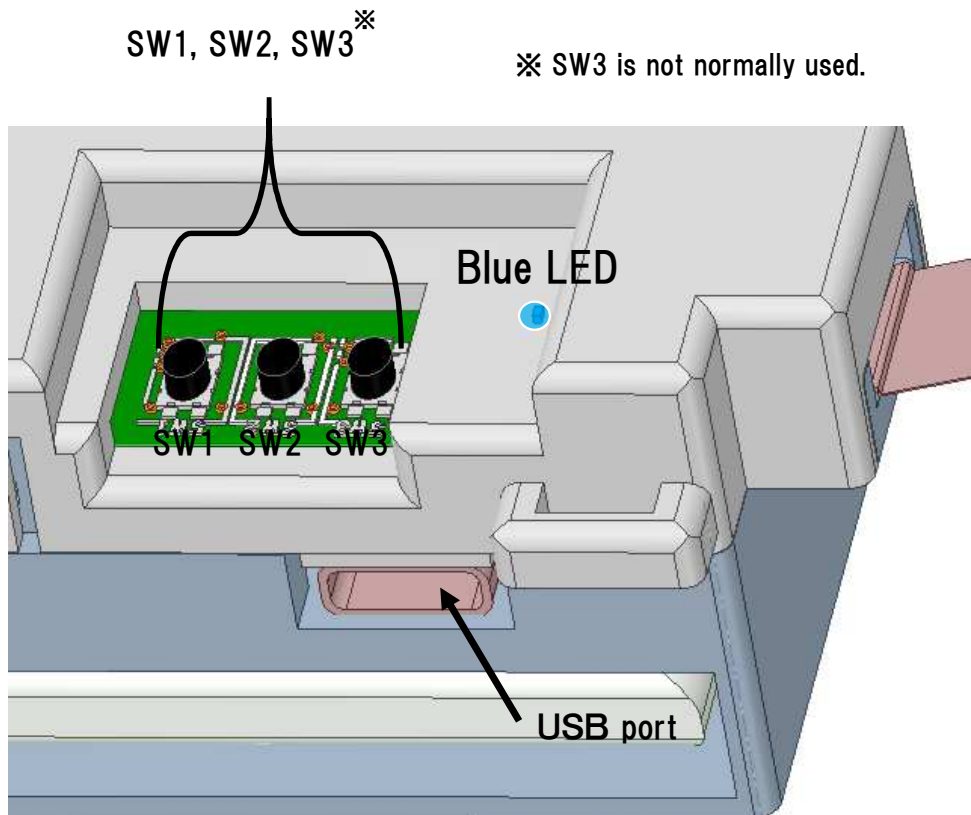
Install FlowView software

To install FlowView software, copy the FlowView folder to your computer.



USB charging

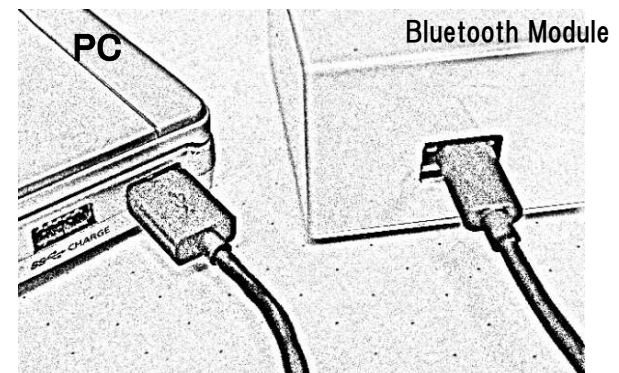
The blue LED lights up when charging with USB, and turns off when charging is complete.



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Connect Bluetooth module to PC

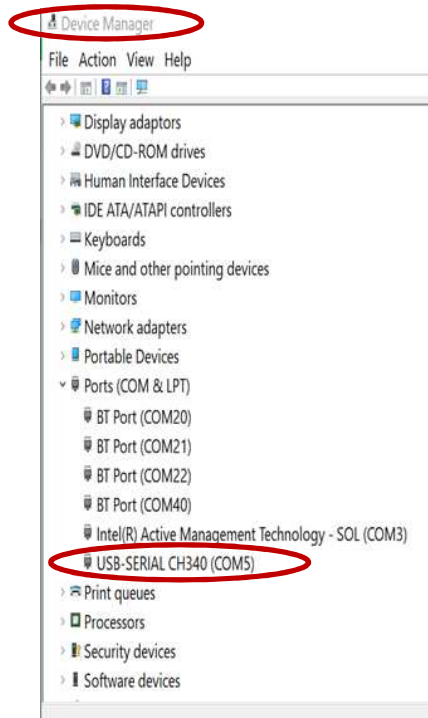
If you connect the included Bluetooth module to your computer using a USB cable (Type C on the Bluetooth side), a serial driver is installed and a COM port (the port name: CH340) is created. The COM number is displayed in Device Manager in the control panel.



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Confirmation of Bluetooth port No.xx

Click 'Windows System Tools' →
Click 'Control Panel' →
Click 'Hardware and Sound' →
Click 'Device Manager' →
Click 'Ports (COM and LPT)' to display CH340 (COMxx) and get port number xx.



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Start FlowView software

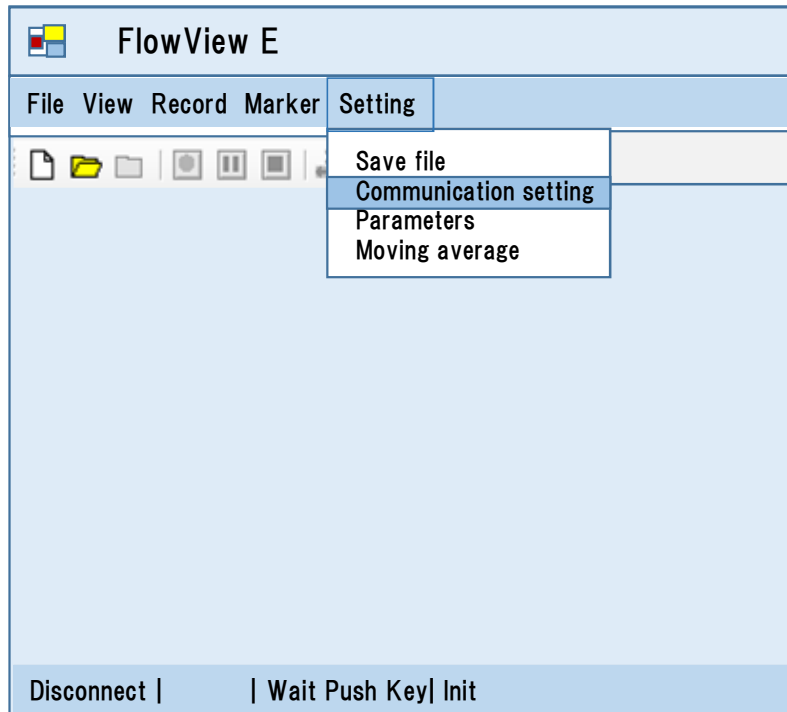
Click on the FlowView file on your computer to display the FlowView screen.

Name	Date modified	Type	Size
FlowView.exe	2021.02.0	Application	280KB
FlowView.pdb	2021.02.0	Application	280KB
▼ Marker 1.ico	2021.02.0	Application	280KB

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Setting of Bluetooth (1)

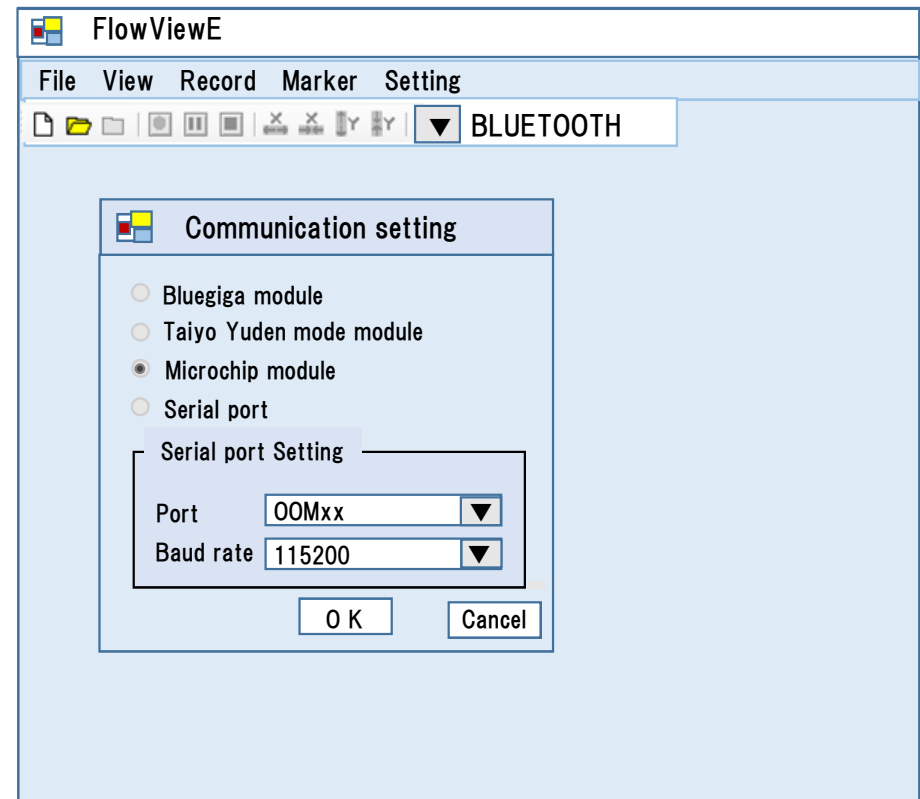
First of all, in the initial setting, it is necessary to set Bluetooth in 'Communication setting'.



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Setting of Bluetooth (2)

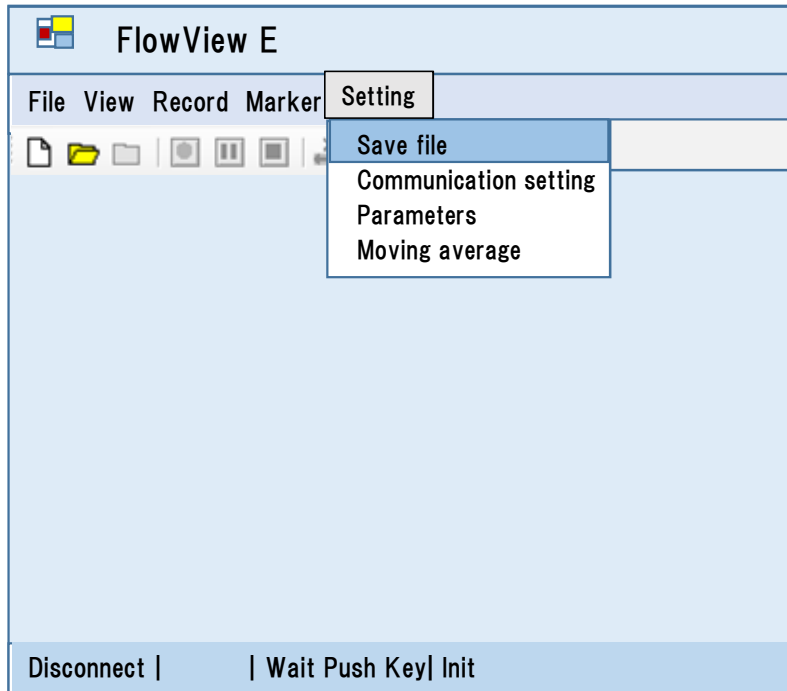
Select 'Microchip module', and for the port, select the COM number obtained from Device Manager, Baud rate 115200.



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Setting of Storage destination folder(1)

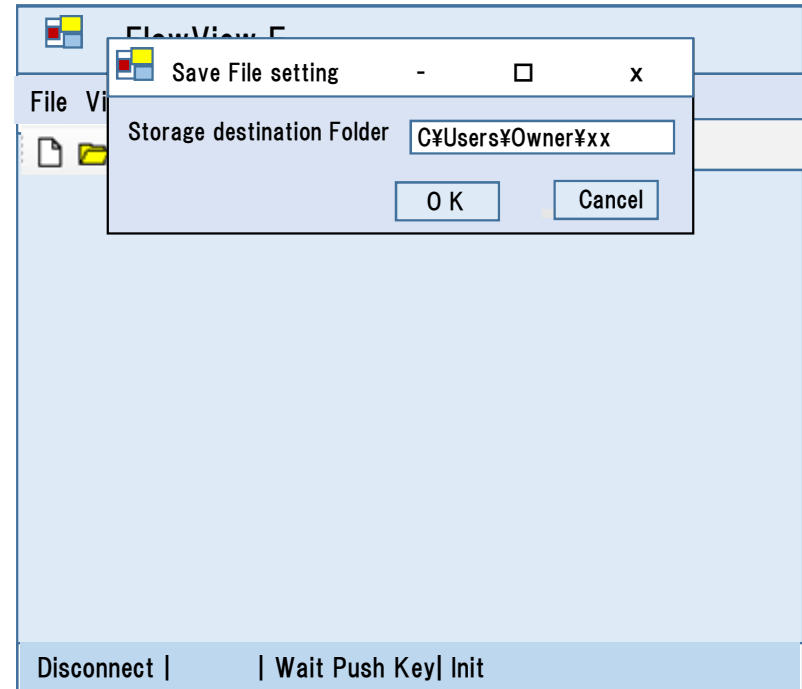
In the settings, in addition to the communication setting, you can create or change the data file save destination, and moving average. Click on "Settings" and then 'Data storage file' to create a new storage folder or select an existing folder



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Setting of Storage destination folder(2)

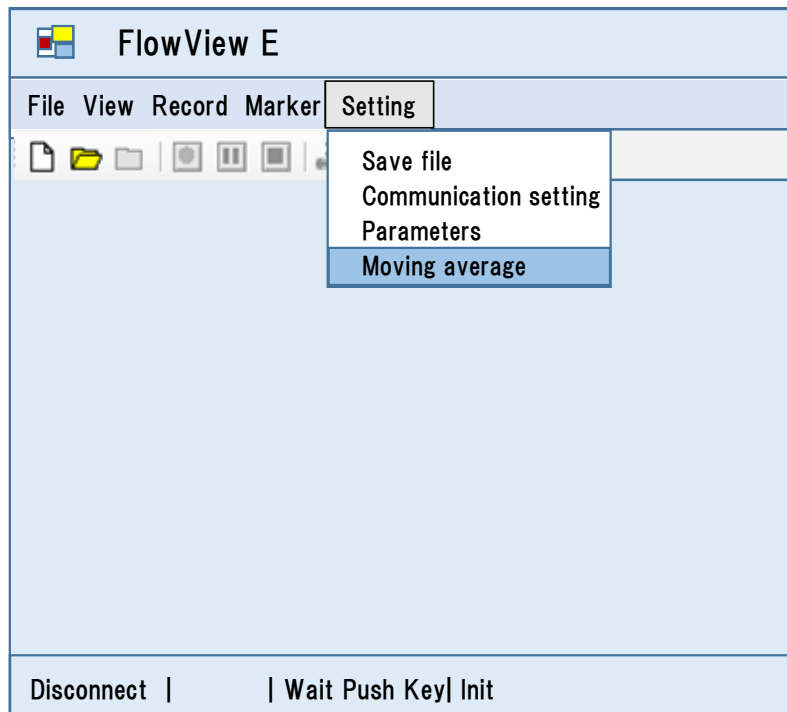
To set a save file, click 'Save file' and select an existing folder or create a new one.



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Setting of Moving average (1)

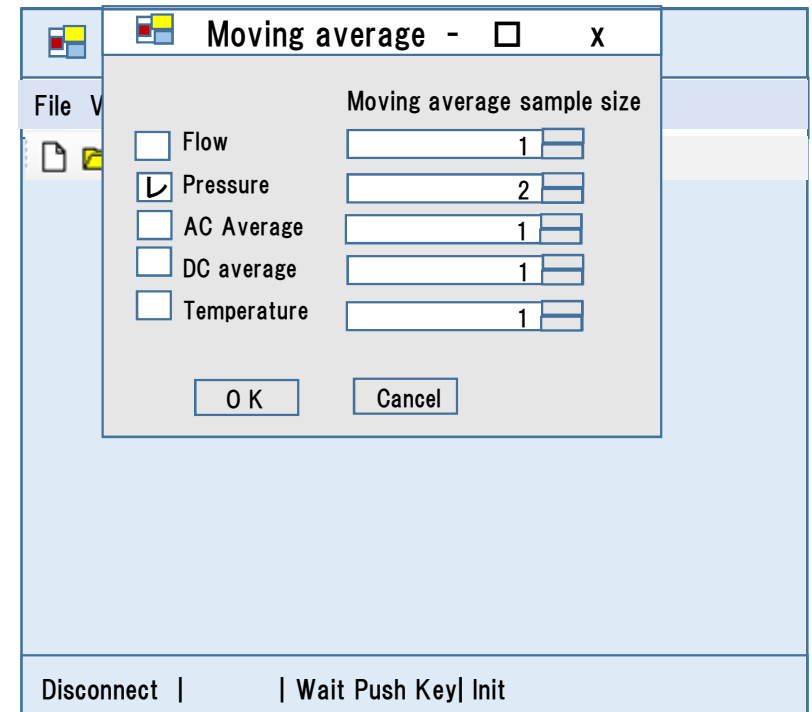
If you want a moving average, click on 'Moving average'.



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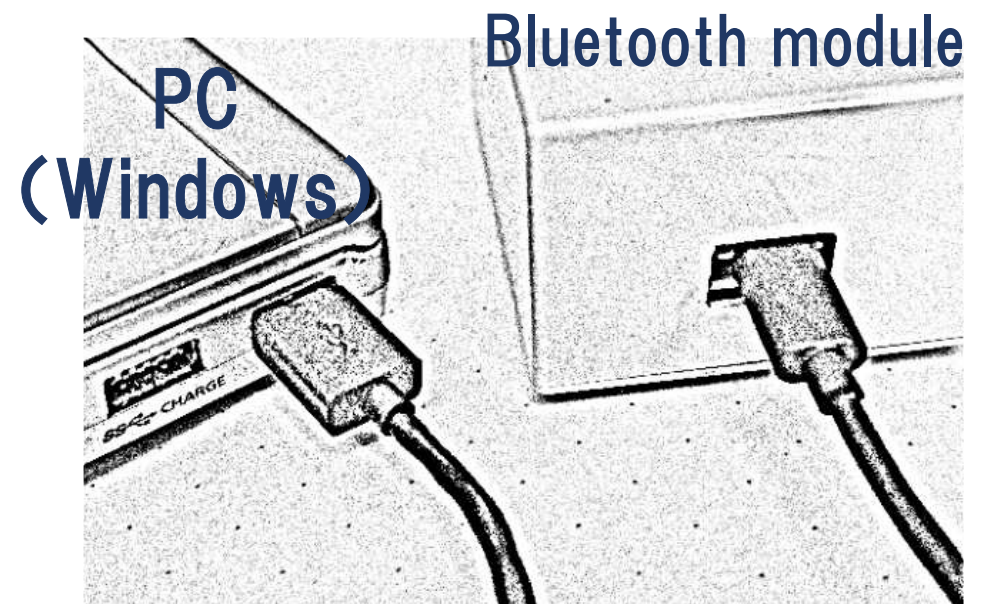
Setting of Moving average (2)

Select parameters such as blood flow, contact pressure for which you want a moving average, and select the sample size. Normally, the sample size is 1 and no moving average is performed. If a check mark is added and the sample size is 2 or more, the moved average is performed.



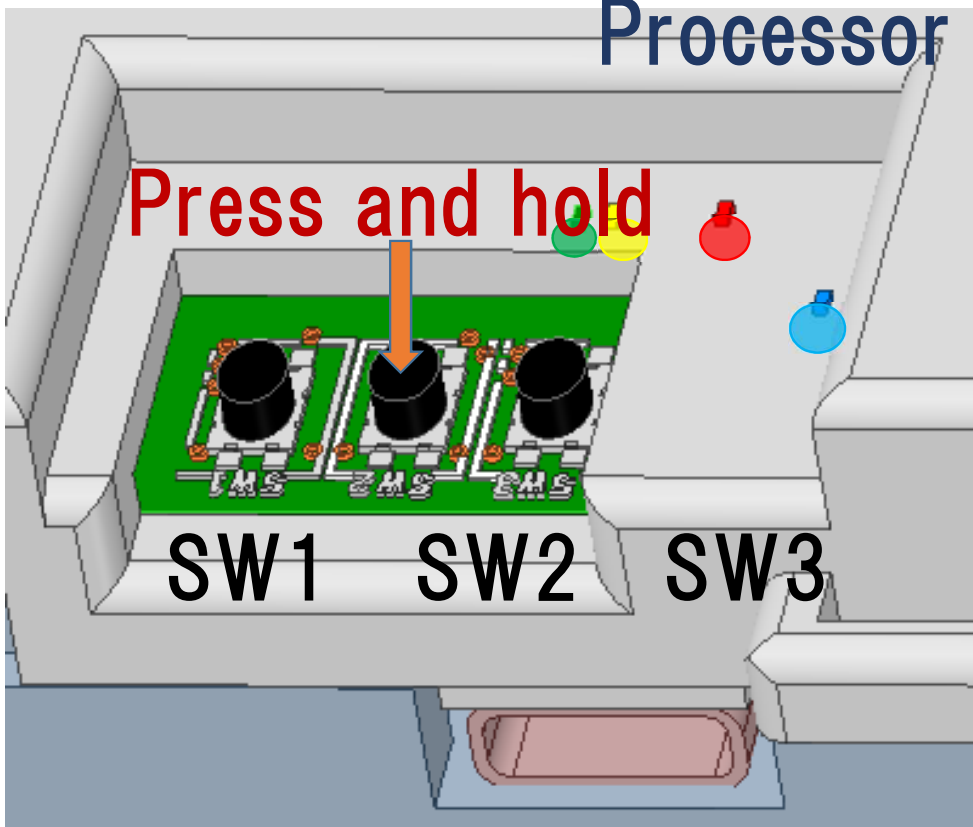
- X| -

Measurement and data storage



Processor




Press and hold



Start FlowView software

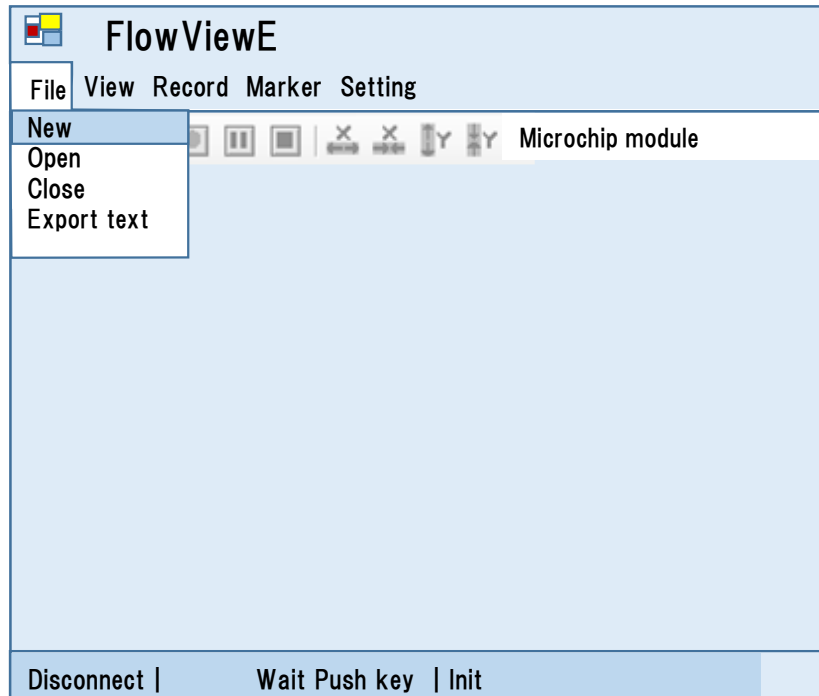
Click on the FlowView file on your computer to display the FlowView screen.

FlowViewE3.15

Name	Date modified	Type	Size
 FlowView.exe	2021.02.0	Application	280KB
 FlowView.pdb	2021.02.0	Application	280KB
 Marker 1.ico	2021.02.0	Application	280KB

Open FlowView file

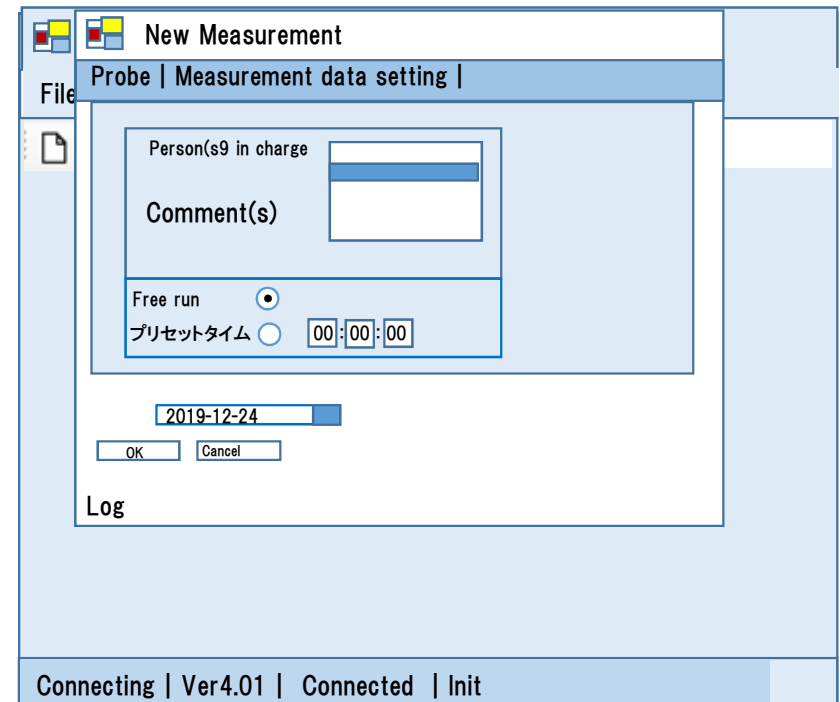
Click on "New" in the FlowView file.



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"New Measurement" pops up

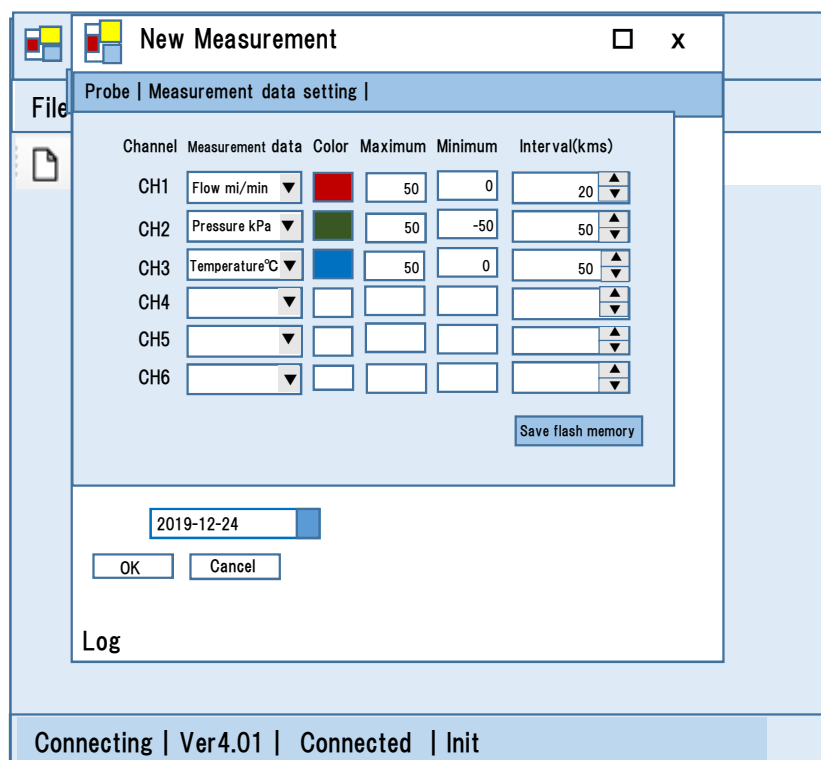
When the Bluetooth connection is established, "Connecting" in the display below will become "Connected" and "New Measurement" will pop up. Select the probe information, fill in the person (s) in charge or comment(s) if any, and click on OK.



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Measurement data setting

Click on “Measurement data settings” and select the measurement data and color. Also, change the maximum and minimum values in some cases. When you have finished making settings, click on “Save to Flash” and then “OK”. Then, “Data File” will pop up, so click on “OK”.

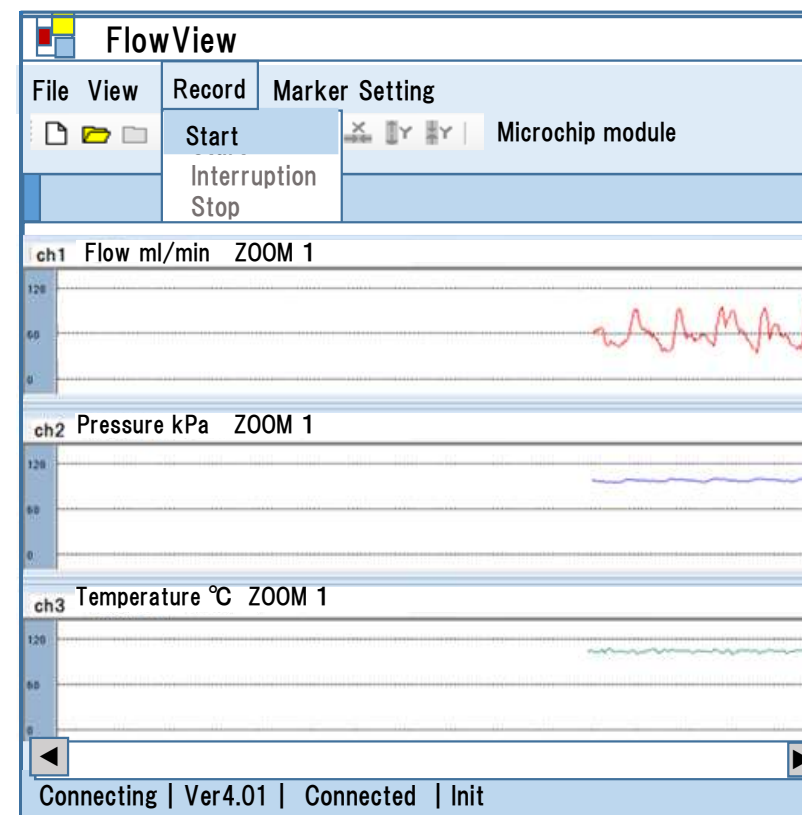


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Start recording*2

Click on “Record” and then “Start” to start laser oscillation and display the data graph.

※2 Do not charge via USB during measurement



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Precautions when using the blood flow sensor with a built-in contact pressure sensor

The significance of contact pressure measurement is to make sure that the change in the blood flow at the measurement site is not based on the change in the contact pressure. When handling a blood flow sensor with a built-in contact pressure sensor, please pay attention to the following four points.

1. Depending on the sensor, the displayed value may change to the positive direction (Fig.b) or in the negative direction (Fig.a)
2. In order to perform control such as making contact pressure constant, it is necessary to fix the sensor or install it.
3. When the contact pressure changes rapidly, a large pulse-shaped signal is output as a blood flow signal (It can be removed by software). When using a blood flow sensor with built-in contact pressure sensor, please be aware that a large pulse-shaped signal is generated in the blood flow in response to a sudden change in contact pressure, as shown in figure b. As shown in Fig. a, this does not occur when the contact pressure changes slowly.
4. When the contact pressure is zero, the measurement data does not always match the origin (zero value), and an offset Δp may occur. The actual contact pressure corresponds to the amount of change from the offset (the value obtained by subtracting Δp from the displayed value p). It is possible to set the offset to zero in the parameter setting.

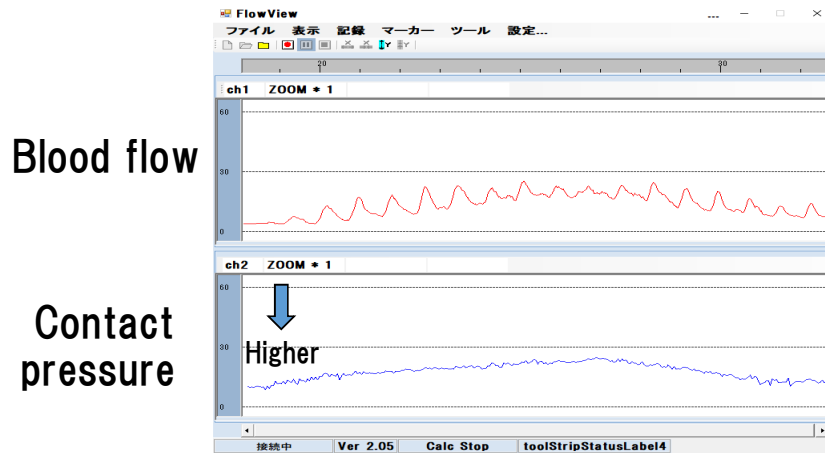


Fig.a

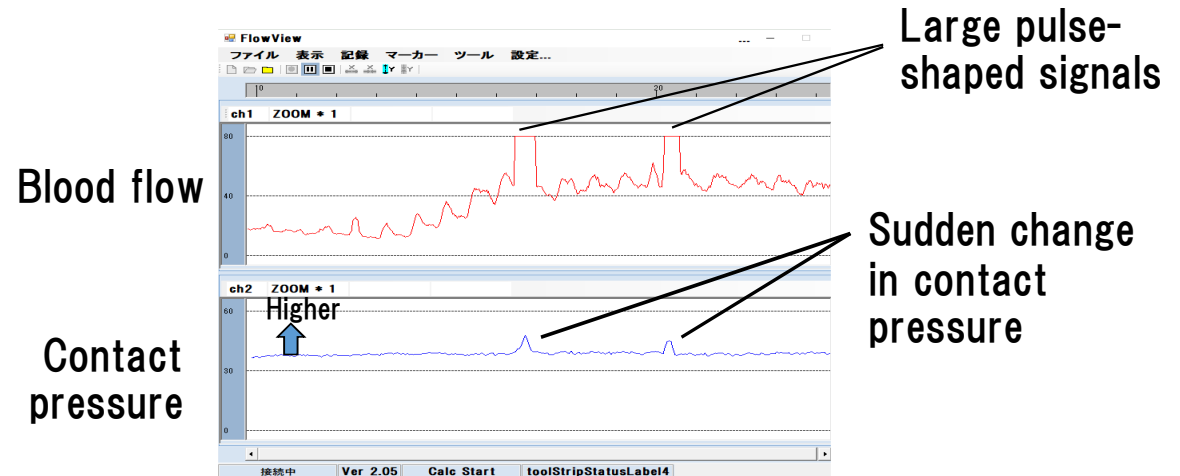
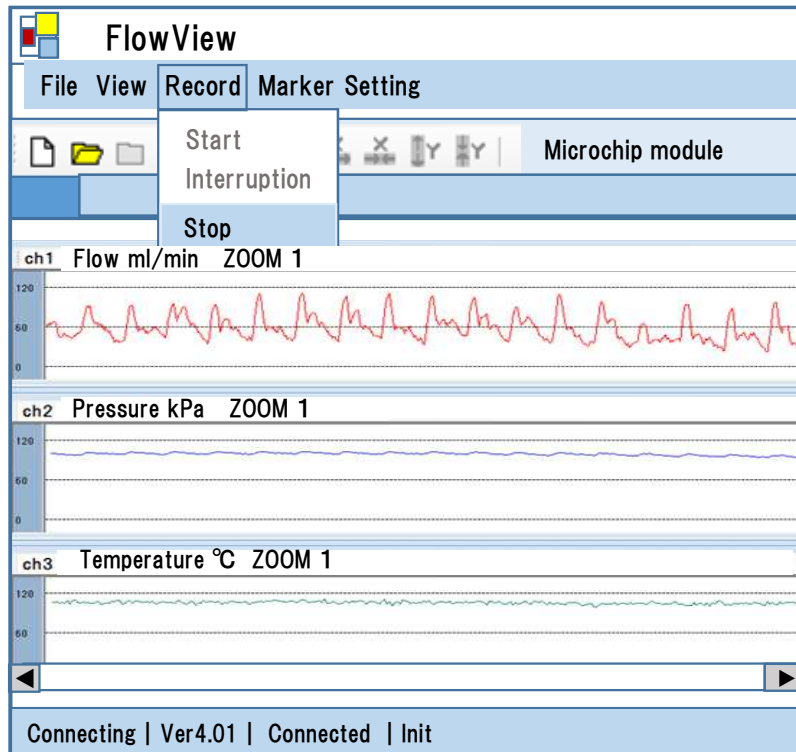


Fig.b

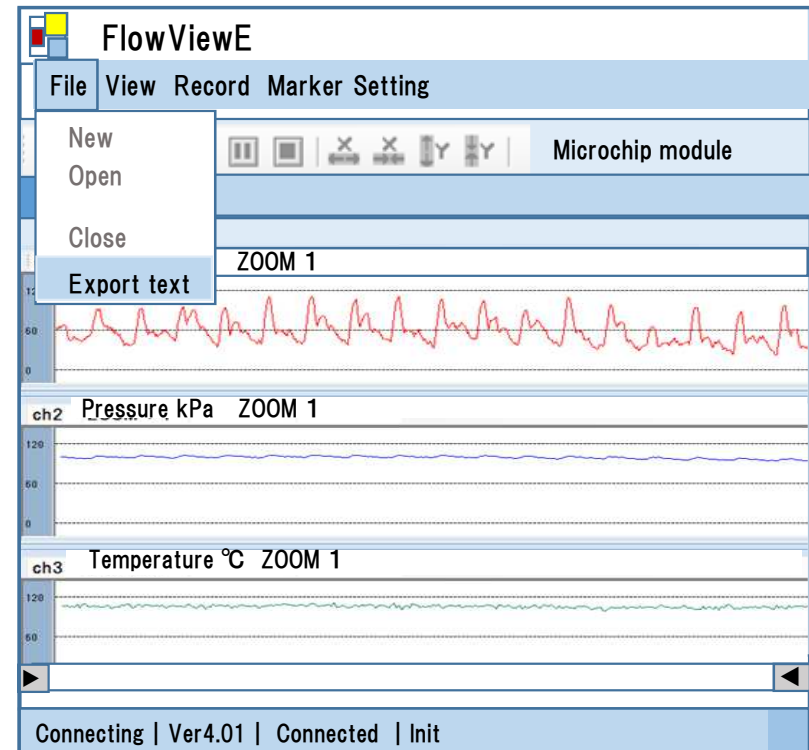
Stop recording

Click on “Stop” to stop the laser oscillation and finish the measurement.



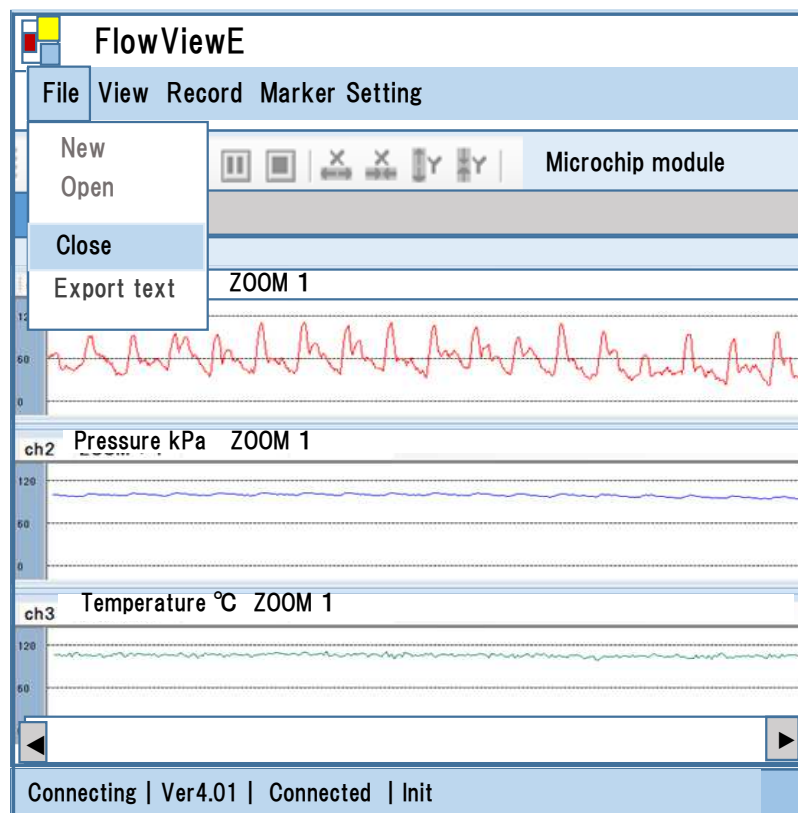
Export text data

Immediately after the measurement, you can create a text file consisting of time series data by clicking “Export text”. Also, after opening FlowView, you can view the recorded data as a graph by opening the saved data that was recorded as Binary data.



Close FlowView file

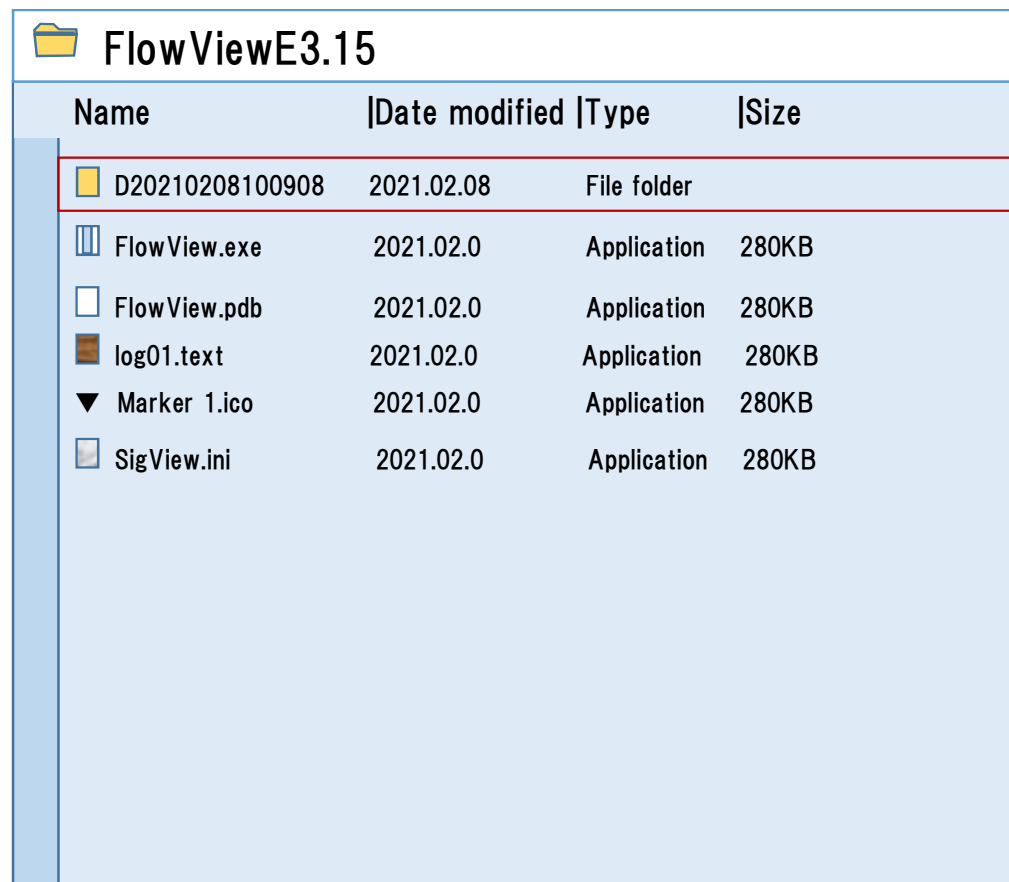
Click on "Close" of the file to close the FlowView screen.



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Open data storage folder

Click the folder with a D at the beginning of the folder name to open the text file and Binary data file (dat file).



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Text file and Binary data file (dat file)

Text data and dat data of measurement values

Name	Date modified	Type	Size
Dat data file			
data_202100203_221034.dat	2022.02.03.	DAT File	2KB
data_202100203_2211231_CH1.txt	2022.02.03	Text Document	11KB
data_202100203_2211231_CH2.txt	2022.02.03	Text Document	5KB
data_202100203_2211231_CH3.txt	2022.02.03	Text Document	5KB
data_202100203_2211231_CH4.txt	2022.02.03	Text Document	1KB
data_202100203_2211231_CH5.txt	2022.02.03	Text Document	1KB
data_202100203_2211231_CH6.txt	2022.02.03	Text Document	1KB
data_202100203_2211231_CH7.txt	2022.02.03	Text Document	1KB
data_202100203_2211231_CH8.txt	2022.02.03	Text Document	1KB

Text data of blood flow (One example)

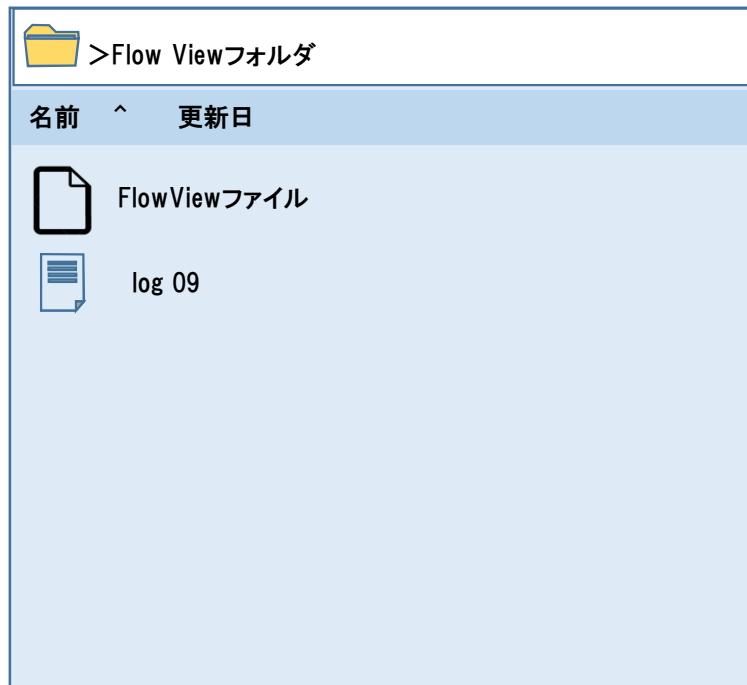
```

data_20210203_221231_CH1.txt - Notepad
File Edit Format View Help
FlowView TEXT DATA FILE
DATE 2021/02/03 22:12:31
OPERATOR
COMMENT
CHI Flow
INTERVAL 20msec
LOWER LEVEL 0.000000
UPPER LEVEL 50.000000

00:00:00.000 42.9
00:00:00.020 42.9
00:00:00.040 42.9
00:00:00.060 21.3
00:00:00.080 42.1
00:00:00.100 57.5
00:00:00.120 71.5
00:00:00.140 83.5
00:00:00.160 93.2
00:00:00.180 104.0
00:00:00.200 113.5
00:00:00.220 59.1
00:00:00.240 49.3
00:00:00.260 45.3
00:00:00.280 39.9
00:00:00.300 37.1
00:00:00.320 34.9
00:00:00.340 34.1
00:00:00.360 33.1
00:00:00.380 34.4
00:00:00.400 32.4
00:00:00.420 29.4
00:00:00.440 29.6
00:00:00.460 28.0
00:00:00.480 29.2
00:00:00.500 25.3
00:00:00.520 25.2
00:00:00.540 23.0
00:00:00.560 21.5
00:00:00.580 21.0
00:00:00.600 20.5
00:00:00.620 20.0
00:00:00.640 18.3
00:00:00.660 20.5
00:00:00.680 17.9
00:00:00.700 18.1
00:00:00.720 18.4
00:00:00.740 20.0
00:00:00.760 20.5
00:00:00.780 23.3
00:00:00.800 25.2
00:00:00.820 26.4
    
```

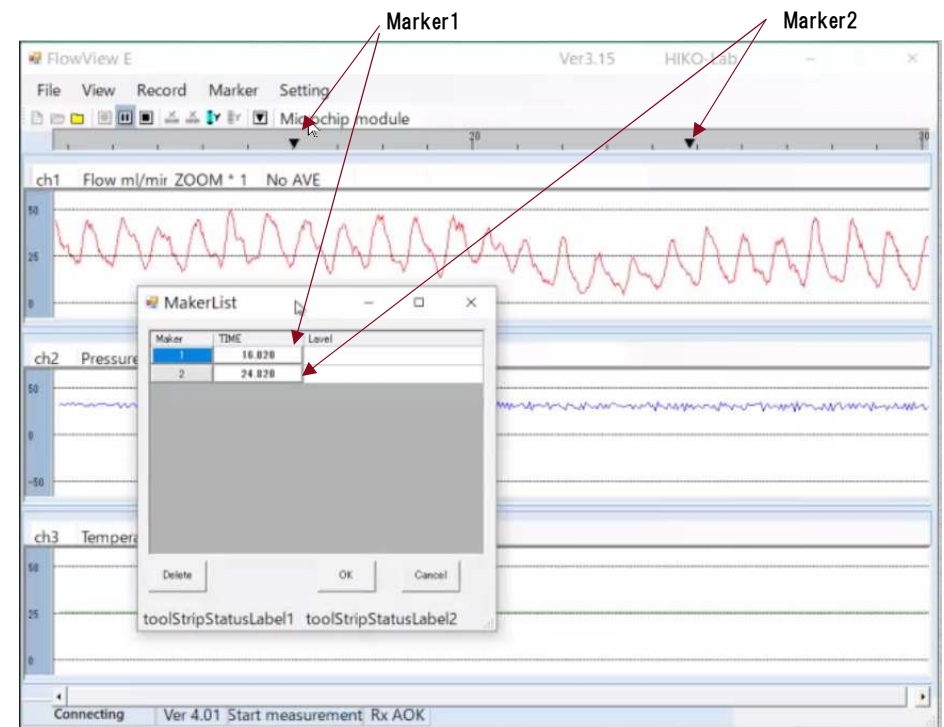
Log file

The log data is stored in the FlowView folder (in this example, it is stored in the log09 file).



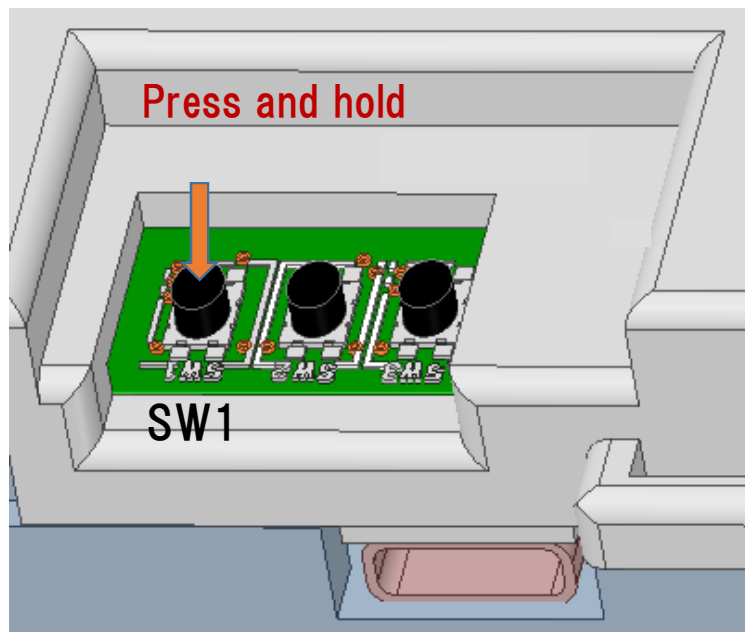
Marker Insertion

- ① During measurement: Click “▼” or “Marker Insert” to add a marker at the cursor position and to display marker list.
- ② When saving data : Data on marker is also saved.
- ③ When opening data file : Marker is displayed → Click marker list time to move to marker position → Click Graph display to move the cursor.



Bluetooth stop

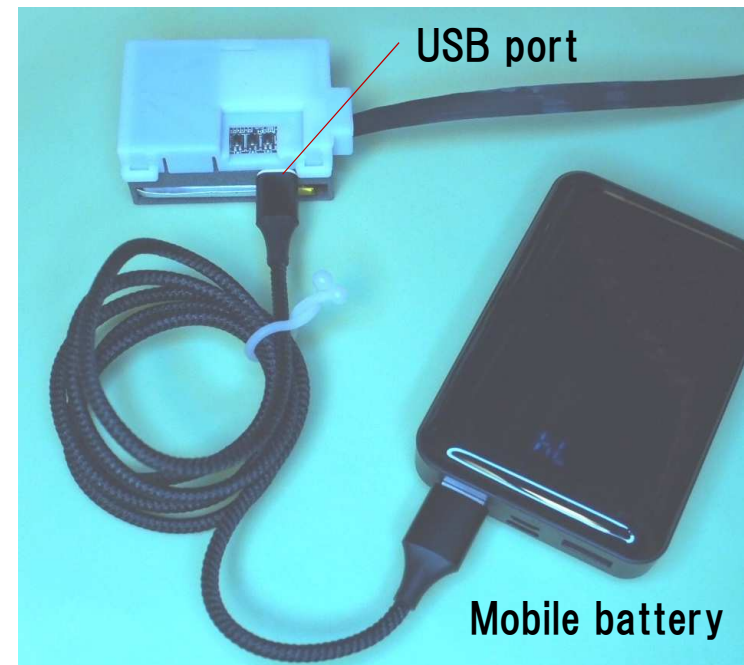
Press and hold the left switch SW1 in the signal processing box(processor) to stop Bluetooth transmission and turn off.



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Long-term measurement

Longer measurement can be achieved by increasing the capacity of the internal battery, but it can also be achieved by connecting a large capacity mobile battery via USB.



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Settings or change for parameters (Immediately before measurement)

Parameters

Parameter can be set, changed, saved to a file, and retrieved from an existing file, while the processing circuit (processor) and the computer are connected via Bluetooth. Click "Parameters" in the setting.

The screenshot displays the FlowView E software interface. At the top, there is a title bar with a window icon and the text "FlowView E". Below this is a menu bar with "File", "View", "Record", "Marker", and "Setting". A dropdown menu is open under "Setting", showing options: "Save file", "Communication setting", "Parameters" (highlighted in blue), and "Moving average". Below the menu bar is a toolbar with icons for file operations and a zoom control. The main area contains three data channels: "ch1 Flow ml/min ZOOM 1", "ch2 Pressure kPa ZOOM 1", and "ch3 Temperature °C ZOOM 1". Each channel has a vertical axis with a scale from 0 to 120. At the bottom, a status bar shows "Connecting | Ver4.01 | Connected| Rx AOK".

Enter or change parameters, and create parameter save file

The screenshot shows the FlowView E software interface (Ver3.15 HIKO-Lab) with the PrmfForm dialog box open. The dialog box contains the following elements:

- Parameters No:** A dropdown menu with a downward arrow.
- Set value:** Two input fields, one containing '60' and another containing '50'.
- Buttons:** 'SET', 'Load File', 'Save File', 'Initial Parameters', 'Save flash memory', and 'Close'.
- Text:** '2019-12-1 5.1.03.PM' and 'Setting time'.
- Status:** 'Complete getting sensor parameters |'.

Three callout boxes provide instructions:

- Parameter No.** Select a parameter, enter a value and "Set" and "Save flash memory". Finally, click on "Close".
Be careful not to allow excess current to flow to the laser when changing the parameter "0008 laser current".
- Save File** Click here to save newly set or changed parameters and specify the save destination.
- Load file** Click here to get back parameters in an existing file.

The background shows three channels (ch1, ch2, ch3) with graphs and a status bar at the bottom indicating 'Connecting | Ver4.01 | Connected | Rx AOK'.

Specifications

1) Size

-Probe: The diameter of the cylindrical part is 11.2 mm, and the protruding part is 4 mm (excluding the electromagnetic wave shielding case).

-Calculation box: 35mmx55mmx26mm (including 860mAh capacity battery).

2) Recommended environment for use

- Skin temperature and ambient temperature: 0-60 °C.

-Relative humidity: ~ 80%. As it is, it cannot be used in the bath and water.

- Do not apply a load of 500g or more to the protrusion.

3) Power consumption

- Data transmission by Bluetooth

At the time of measurement: 610 mW. Battery-powered at 860mAh for approximately 5 hours of continuous measurement time.

- When saving to SD memory (optional)

Battery life of 860mAh, continuous measurement time of about 5.5 hours

-Approximately 22 hours of continuous measurement time with a battery capacity of 3500 mAh (3.7 V).

4)USB charging

-Voltage 4~5.2V。 Current 0.25A~2A。

-Bluetooth transmission is possible while the green LED is lit up to 50% duty blinking.

5) Cable

- FPC length: 15 cm (option), 25 cm, 60 cm (option), width: 4 mm, thickness 0.5 mm or less, electromagnetic shield tape, electromagnetic shield sleeve (option).

6) Actuator drive (optional)

7) Various parameters can be set.

8) Analog signal extraction lead wire for contact pressure and blood flow (optional)

Detailed specifications

A) The resolution of blood flow signal: 0.02 seconds (0.002 seconds is possible as a option).

B) The resolution of contact pressure and temperature can be changed by the user in the parameter settings.

C) Laser oscillation current can be changed by the user in the case of experimental specifications. However, we still recommend that you do not change it yourself and use the preset values.