SM Sample Application Manual

Overview

The SM Sample Application (this application) can perform the following operations on the SM7110, SM7120 and SM7420:

● Measuring instrument settings

● Time Interval Measurement (By setting up the time interval)

● Voltage sweep measurement (measurement using a varying voltage)
   *SM7110 and SM7120 only

● Loading by Return key (Single Measurement)

● Acquisition of measured values and saving in Excel or CSV format

● Graph display

● Testing communications command transmit/receive functionality

● Backing up and restoring instrument settings

System requirements

● CPU: Operating speed of 1 GHz or greater

● RAM: 512 MB or greater

● Operating system: Windows 10, Windows 8.1, Windows 8, or Windows 7
   (32-bit/64-bit)

● Microsoft .NET Framework 4.0

● Interface: RS-232C, USB, RS232-C

● Monitor resolution: 1,024 × 768 or greater

● Hard drive: Free space of 5 MB or greater (If .NET Framework 4.0 has not yet
   been installed, about 900 MB more free space will be required.)
   Additional free space for saving recorded data

Installing this application

1. Double click the downloaded file"setup_SM Sample Application.exe"

setup_SM Sample Application.exe

2. Click Next every time when it appears.

3. The installation will be started. When it is completed, a shortcut, as shown in the right, will be created on the desktop.

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Uninstalling the application

The application can be uninstalled by opening the Control Panel, choosing Programs, and then choosing Programs and Features.
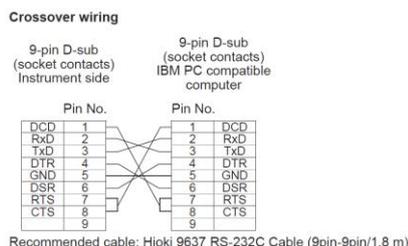
Connecting the instrument to your computer

● Connecting the instrument via USB
You'll need to use a dedicated USB driver the first time you connect the instrument to your PC. This driver can be found on the CD-R disc that came with the instrument. It can also be downloaded from Hioki's website.

● Connecting the instrument via RS-232C
Connect the computer to the ST5520 with a D-sub 9-pin female to D-sub 9-pin female cross cable.
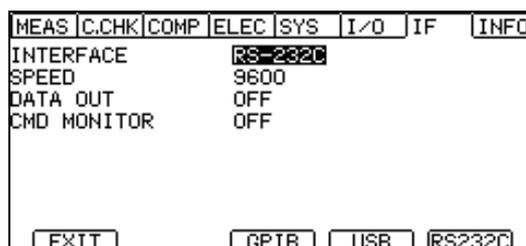Recommended cable: HIOKI 9637 RS-232C Cable (9pin-9pin/1.8m)

Crossover wiring

9-pin D-sub (socket contacts) Instrument side | 9-pin D-sub (socket contacts) IBM PC compatible computer

Recommended cable: Hioki 9637 RS-232C Cable (9pin-9pin/1.8 m)

● Connecting the instrument via GP-IB
Recommended cable: 9151-02 GP-IB Connector Cable (2 m in length)

● Instrument's interface setting
The instrument does not support simultaneous use of multiple interfaces. The interface set on the IF screen, which can be accessed from the instrument's MENU key, serves as the active interface.


```
MEAS C.CHK COMP ELEC SYS  I/O  IF   INFO
INTERFACE        RS-232C
SPEED            9600
DATA OUT         OFF
CMD MONITOR      OFF



[ EXIT ]          [ GPIB ] [ USB ] [RS232C]
```

Launching and connecting to the application

1. Double-click the application's shortcut on the desktop. The measurement screen will be displayed.
    The Connection screen will be displayed.

2. Select an interface and click [Connect].
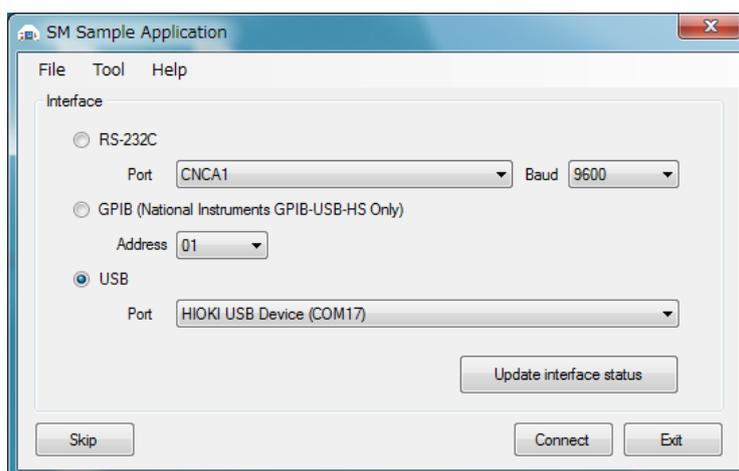
    You can also proceed to the Measurement screen without connecting to the instrument by clicking [Skip]. If you do so, you will only be able to edit and save the sweep list.

3. If an error message such as the following is displayed, verify that the instrument's interface setting has been configured properly, that you are using the correct port, and that the speed matches the instrument's setting.
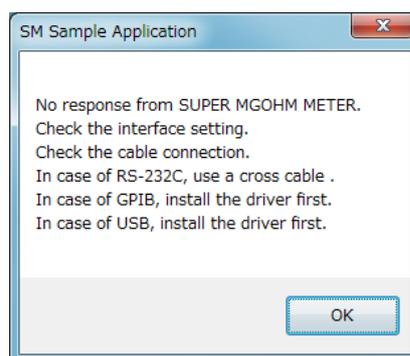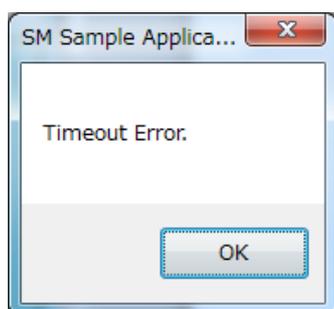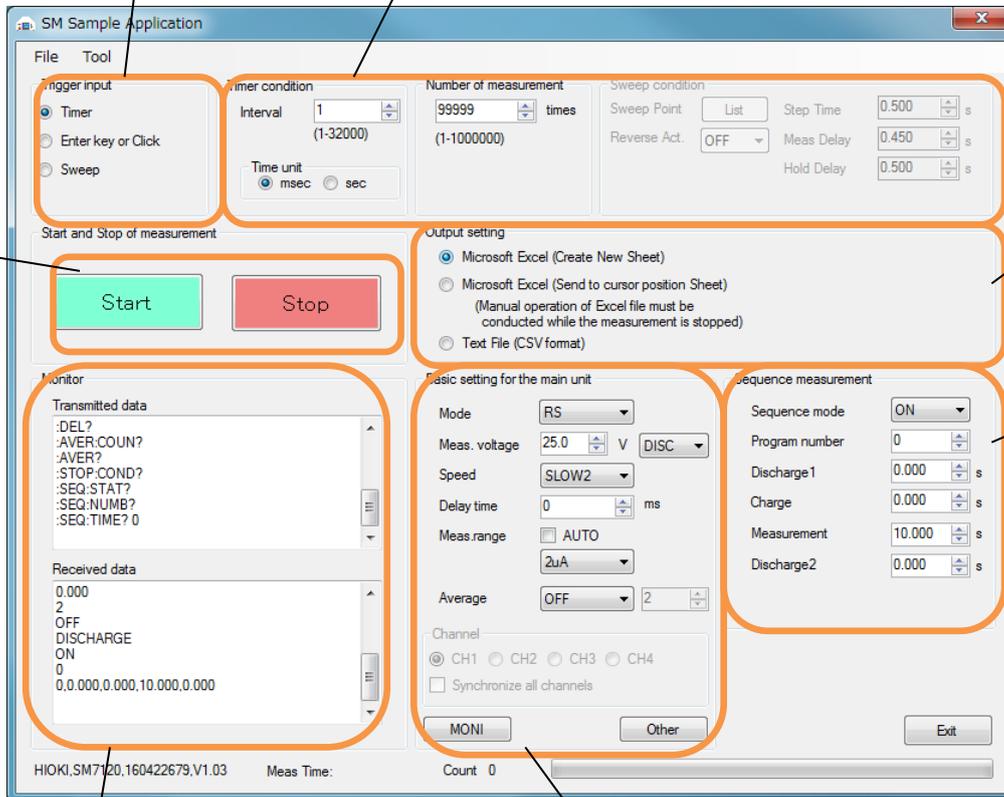
Application interface

Sets the test method.

Sets the measurement conditions.

Selects how to output measurement data.

Starts and stops measurement.

Configures the instrument's sequence settings (SM7110 and SM7120 only).

SM Sample Application

File   Tool

Trigger input
- ⦿ Timer
- ○ Enter key or Click
- ○ Sweep

Timer condition
Interval 1
(1-32000)
Time unit
⦿ msec ○ sec

Number of measurement
99999 times
(1-1000000)

Sweep condition
Sweep Point   List   Step Time 0.500 s
Reverse Act. OFF   Meas Delay 0.450 s
Hold Delay 0.500 s

Start and Stop of measurement
[Start]   [Stop]

Output setting
- ⦿ Microsoft Excel (Create New Sheet)
- ○ Microsoft Excel (Send to cursor position Sheet)
  (Manual operation of Excel file must be conducted while the measurement is stopped)
- ○ Text File (CSV format)

Monitor
Transmitted data
:DEL?
:AVER:COUN?
:AVER?
:STOP:COND?
:SEQ:STAT?
:SEQ:NUMB?
:SEQ:TIME? 0

Received data
0.000
2
OFF
DISCHARGE
ON
0
0,0.000,0.000,10.000,0.000

Basic setting for the main unit
Mode RS
Meas. voltage 25.0 V DISC
Speed SLOW2
Delay time 0 ms
Meas.range ☐ AUTO
  2uA
Average OFF 2

Channel
⦿ CH1 ○ CH2 ○ CH3 ○ CH4
☐ Synchronize all channels

[MONI]   [Other]

Sequence measurement
Sequence mode ON
Program number 0
Discharge1 0.000 s
Charge 0.000 s
Measurement 10.000 s
Discharge2 0.000 s

[Exit]

HIOKI,SM7120,160422679,V1.03   Meas Time: Count 0

Displays communications commands that have been sent and received between the application and instrument.

Configures the instrument's settings. You can also change other settings by clicking [Other].

Interval measurement

1. Select [Timer] under [Trigger input].
2. Set the measurement conditions (timer conditions and measurement count).
3. Select how to output measurement data under [Output setting].
4. Click [Start].

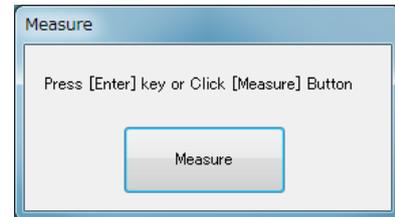   Interval measurement will start.

    Measured values will be acquired each time the set

    interval time elapses.
5. A graph will be displayed during measurement.

    Measurement data will be saved automatically while measurement is in progress.
6. To stop testing, click [Stop].

    (Testing will stop automatically once the set measurement count has been

    reached.)

    When performing measurement over an extended period of time, exercise caution
    to ensure that the computer does not enter the sleep state.

Acquiring measured values by pressing the ENTER key (one-time measurement)

1. Select [Enter key or Click] under [Trigger input].
2. Set the test conditions (measurement count).
3. Select how to output measurement data under [Output setting].
4. Click [Start].

    The dialog box shown to the right will be displayed.

    Press the ENTER key or click the [Measure] button while the dialog box shown to

    the right is active.

    One-time measurement will be performed.
5. A graph will be displayed during measurement.

    Measurement data will be saved automatically while measurement is in progress.
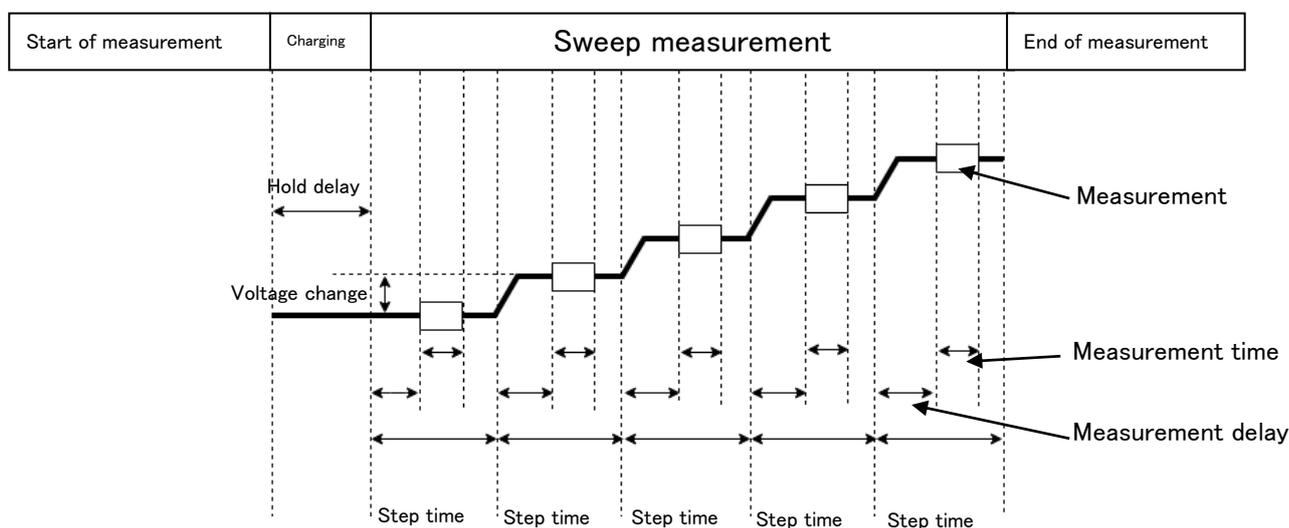6. To stop testing, click [Stop].

    (Testing will stop automatically once the set measurement count has been

    reached.)

    Do not change the instrument's settings while measurement is in progress. To
    change the settings, first click the [Stop] button to stop measurement.

Sweep measurement (SM7110 and SM7120 only)

- Sweep setting parameters
  - ■ Step Time···This is the time that is allowed to elapse from the start of measurement or from the time the voltage is changed to the next voltage change.
  - ■ Meas Delay···This is the time that is allowed to elapse after charging or after the voltage is changed until measurement.
  - ■ Hold Delay···This is the charge time that only occurs before the first measurement after measurement starts.
  - ■ Reverse Act···When [Reverse Act.] is set to ON, the voltage sweep will be repeated in reverse order after it completes.

| Start of measurement | Charging | Sweep measurement | End of measurement |

Hold delay

Voltage change

Measurement

Measurement time

Measurement delay

Step time Step time Step time Step time Step time

- About measurement methods
1. Select [Sweep] under [Trigger input].
2. Set the measurement conditions (measurement count and sweep settings).
3. Click the [List] button under the sweep list to set the list.
   (See "Sweep list" on p.6 for more information.)
4. Select how to output measurement data under [Output setting].
5. Click [Start].
   Sweep measurement will start.
6. Measured values will be acquired while sweeping through the voltage values that have been set in the list.
7. A graph will be displayed during testing.
   Measurement data will be saved automatically while measurement is in progress.

8. To stop testing, click [Stop].

（Testing will stop automatically once the set measurement count has been reached.）

9. If an error message such as the following is displayed, increase the step time so that it is greater than the total of the measurement time and the measurement delay time.

The voltage cannot be changed before or during measurement.

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Step Time:0.150s
MeasDelay:0.120s MeasTimes:0.043s Processing time:0.007s
Total:0.170s
Lengthen Step Time from Measure Delay ＋ Meas Time＋Processing Time.

OK
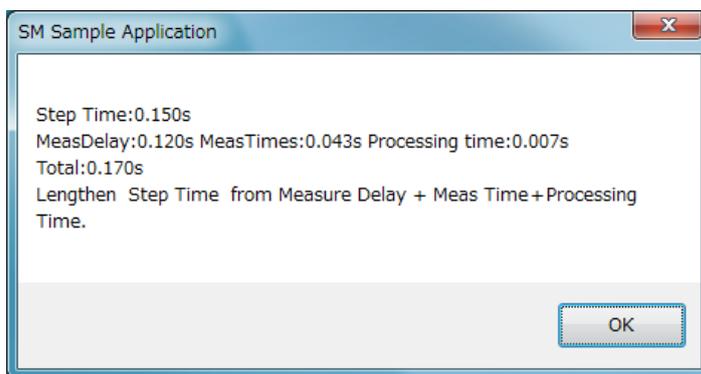
If measurement stops, the following issues may be responsible:

■   An increase in the measurement time due to measurement self−calibration

■   An increase in the measurement time due to auto−range operation

■   An increase in the measurement time due to averaging

Sweep list

Displays a list of the voltage values through which measurement will sweep. You can enter the

Saves the currently displayed list as a text file.

Loads a list from a text file.

Adds a row above selected entries in the currently displayed.

Creates a list based on a series of parameters that you have configured.

Sets limit values that will be used to stop measurement, for example in the event of an insulation breakdown.
(See "Limit function" on p.7 for more information.)

Delete selected entries in the currently displayed.

Deletes all entries in the currently displayed.

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Sweep List

No.	Voltage[V]
0001	0.1
0002	1.2
0003	2.3
0004	3.4
0005	4.5
0006	5.6
0007	6.7
0008	7.8
0009	8.9
0010	10.0

Auto Setup List

START-STOP | START-STEP

Start Voltage 0.1 V
Stop Voltage 10.0 V
NUM 10
(2-20000)
⦿ LINEAR ○ LOG

Auto Setup

LIMIT
☐ ON
Limit Value
1E+10 ± 10 %
Over   Limit Over
Under   Limit Under

Load   Save
Add   Delete
Clear   Close

The displayed sweep list will be saved by the application when you click the [Start] button or the [Auto Setup] button.

Limit function

1. Determine the upper and lower limit values by setting a limit value or percentage.
2. When the limit function is triggered, measurement will either stop (if the reverse function is disabled) or reverse from the current point (if the reverse function is enabled).

   The limit function will be triggered under the following circumstances:

● Resistance value measurement

   The limit function will be triggered if the resistance value first exceeds the upper limit value ("limit over") and then subsequently falls beneath the lower limit value ("limit under").

・ Example

The limit function is not triggered since the resistance value is not less than the lower limit value.

The limit function is triggered.

The limit function is not triggered since the upper limit value has not yet been exceeded.

Upper limit value

Lower limit value

7.2000E+09

Resistance

Voltage[V]

── Limit Over ── Limit Under
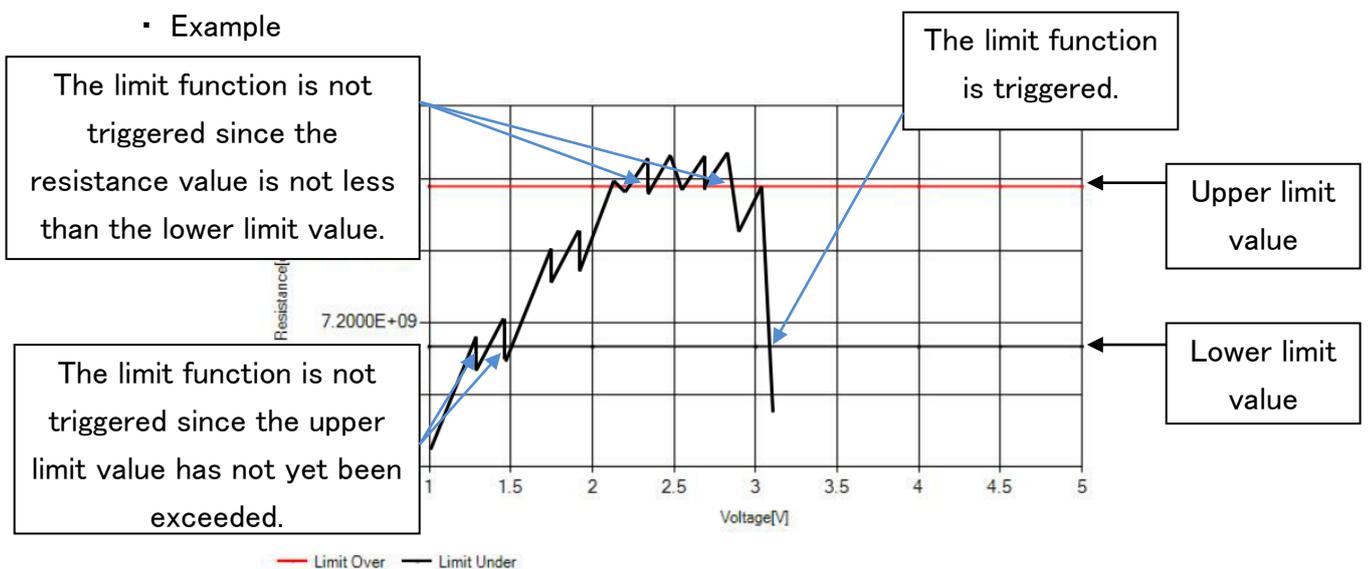
● Current value measurement

   The limit function will be triggered in the opposite manner from resistance value measurement. Specifically, the limit function will be triggered if the current value first falls beneath the lower limit value ("limit under") and then subsequently exceeds the upper limit value ("limit over").

The limit function will not be triggered during reverse operation (while sweeping through voltage values in reverse order). If the measurement count has been set to at least 2, the limit function will not be triggered if the conditions are not satisfied during a single measurement. For example, the limit function will not be triggered during

resistance value measurement if the measured value exceeds the upper limit value during the first measurement and then falls beneath the lower limit value without first exceeding the upper limit value during the second measurement.
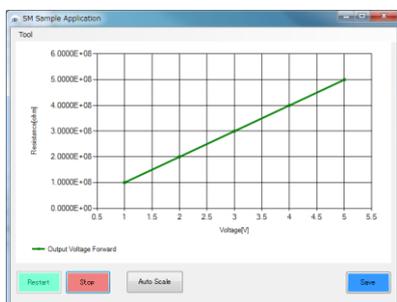
Graph display and settings

● Graph display

The graph is displayed automatically when measurement starts, but you can also display it manually by choosing [Graph] on the [Tool] menu.
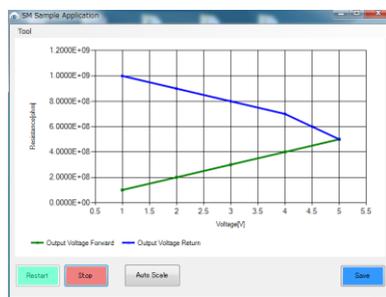
Changes auto-scaling.

Stops and restarts rendering of the graph.

Saves the currently displayed graph.

The following initial graphs are shown prior to measurement:

When connected to the SM7110 or SM7120   SM7420

Measured values that are less than 0 are shown as 1E-28 on the graph, while measured values greater than 1E+28 are shown as 1E+28 on the graph.
(Measured values are included without modification in output data.)

Up to 40,000 measurement data points can be displayed in a graph.
If you take more measurements, the oldest measurement data will disappear.

● Graph settings

You can control the graph by choosing [Graph Set] on the [Tool] menu.

Sets the scale for the X-axis and Y-axis.

Sets the maximum and minimum values for the X-axis and Y-axis.

Sets the line color.

Sets whether to display lines. At least one line must be enabled.

Sets the line type.

Arbitrary command test

You can send or receive arbitrary commands from the application.

Choose[Send Arbitrary Command] on the [Tool] menu.

Allows you to enter a command.

Sends the command.

Displays the results received from the instrument.

Backing up and restoring instrument settings

The application can back up instrument settings as a settings file. Settings files have the extension ".bak."

Backing up settings: On the Tool menu, click Backup.

Restoring settings: On the Tool menu, click Restore.

Choose the settings file here.

Choose the settings to back up here.

Click to back up the selected settings.

Choose the settings to restore.

Click to restore the selected settings.
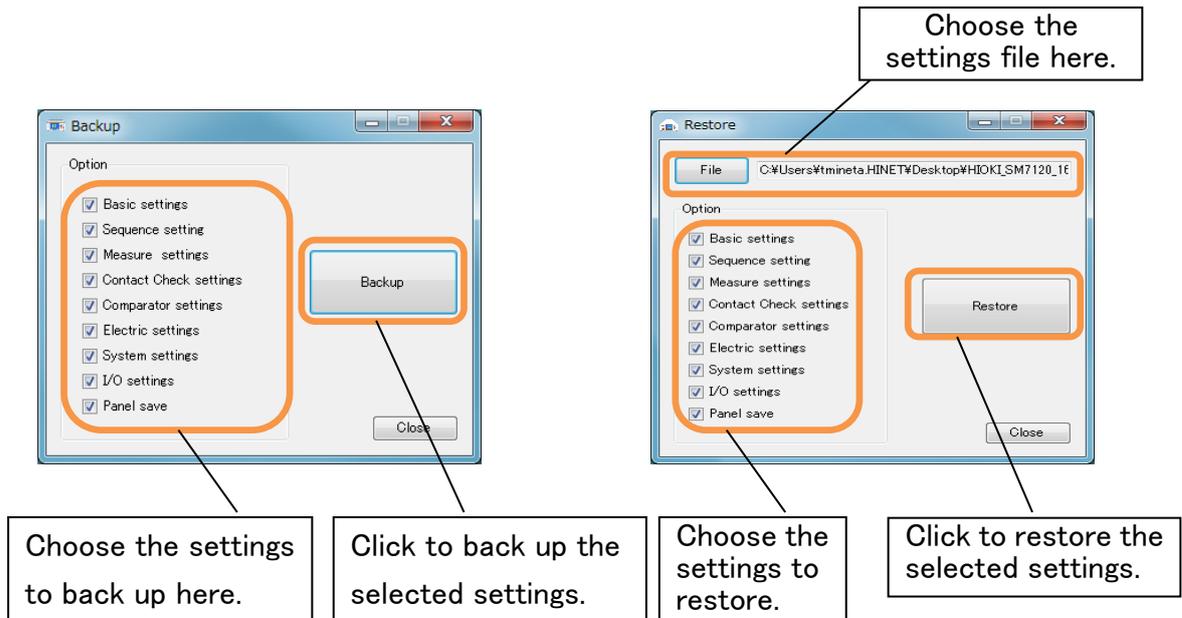
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