QUICK START GUIDE
TO
MINI-SPECTROMETERS

Thank you for purchasing a Hamamatsu TG/TG-COOLED/TM/TG-CCD/
TM-CCD/ TG-RAMAN series mini-spectrometer.
This quick start guide shows you what you need to do to use this mini-spectrometer for the first time. For detailed information on how to use this mini-spectrometer, refer to the instruction manual that will be installed in your PC along with the software as explained in section 3, "Installing the software in your PC, in this guide.

1. Precautions before use

■This mini-spectrometer is high-precision equipment. Do not apply any excessive vibrations or shocks to this mini-spectrometer. Avoid using or storing this mini-spectrometer in outdoor locations exposed to excessive dust or dampness.

■Always first install the software before connecting the mini-spectrometer to your PC. Otherwise, the software installation may fail.

■The software runs Windows 7 Professional 32bit, 64bit Windows 8 Professional 32bit, 64bit. Windows 10 Pro 32bit, 64bit Operation on Windows 98 and Windows Me, Windows 2000, Windows XP Professional SP3, Windows Vista is not guaranteed.

■Moreover, the evaluation software before the evaluation software CD-ROM Ver11.00.0000 for RC series cannot exist simultaneously with this evaluation software. Whenever the relevant evaluation software exists, please install this evaluation software after uninstalling it. Please install the evaluation software for RC series by using CD-ROM after Ver10.00.0001 in case the evaluation software for RC series should exist at the same time with its for TG series, TG-COOLED and TM series.

■In case of using USB3.0 port,it may not work definitely depending on the
connection of the PC to be operated by forword compatibility.

2. Checking the package contents

This product comes with the following items. Check that all items are included after unpacking. If any item is missing, please contact our sales office or sales representative you purchased this product from.

■**Mini-spectrometer: 1 piece**

TG Series
  TG-NIR C9406GC

TG-COOLED Series
  TG-COOLED NIR-I C9913GC
  TG-COOLED NIR-II C9914GB

TM Series
  TM-UV/VIS C10082MD
  TM-VIS/NIR C10083MD

TG-CCD Series
 TG-UV CCD   C9404CA,C9404CAH
 TG-SWNIR CCD   C9405CC

TM-CCD Series
 TM-UV/VIS C10082CA,C10082CAH
 TM-VIS/NIR C10083CA,C10083CAH

TG-RAMAN Series
 C11713CA
 C11714CA,C11714CB

Attachment
■CD-ROM: 2 piece(32bit,64bit)
Contains related software and documents such as the instruction manual.

■USB cable (1.5 m): 1 piece
Use this USB cable to connect the mini-spectrometer to the PC.

■Connector for external power supply: 1 piece
(TG-COOLED series only)

■Documents
· Quick Start Guide: 1 copy (this guide)
· Test sheet: 1 copy

■AC adaptor: 1 piece
(only with TG-CCD,TM-CCD, TG-RAMAN series)

3. Installing the software in your PC

This section explains how to install the software (supplied on the CD-ROM) in your PC to perform the basic operations of the mini-spectrometer. The related documents will also be stored in your PC when you install the software.

[When installing the evaluation software into your PC for the first time]

(1) After Windows has started, insert the supplied CD-ROM into the CD-ROM drive of your PC.

  <<Tips>>
    The software installation automatically starts when the auto run for the CD is enabled. If the auto run for the CD is not enabled, click "Start"→"Run".
    In the Run dialog box that appears, type "drive:\Setup.exe" (drive is the drive letter of your CD-ROM), for example, "D:\Setup.exe" when the CD-ROM drive is "D". Then click [OK].
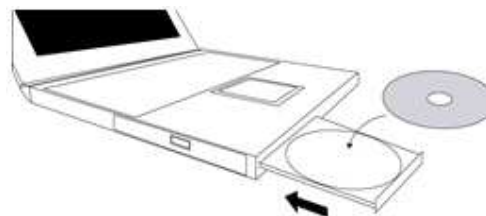
(2) The Installer starts.
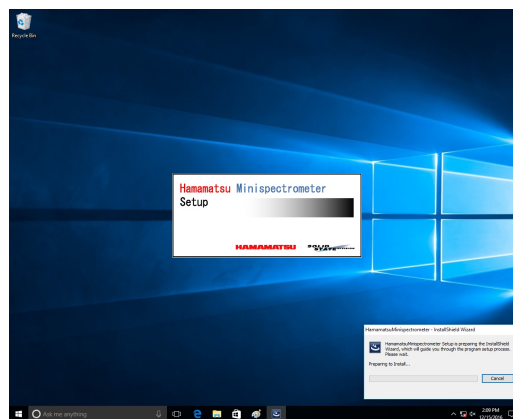
(3) Click [Next] to continue.
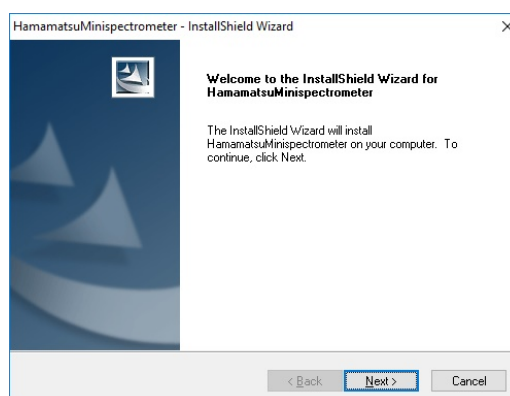
3. Installing the software in your PC (cont'd)

(4) When the license agreement screen appears, read through the contents carefully. If you accept the agreement, click [Yes].

    <<Note>>
    You may not install this software unless you accept the terms of the license agreement.
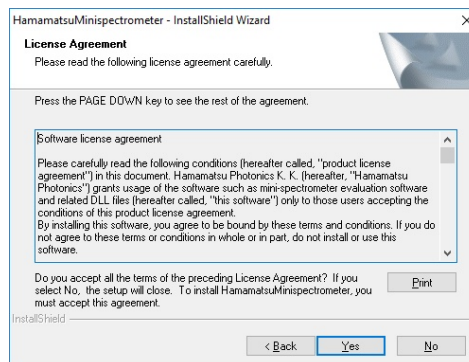
(5) Select the components you want to install. Select "Complete" in most cases.

    <<Note>>
    The CD-ROM contains device drivers, evaluation software, documents for various mini-spectrometers, and development files that will be needed to create your own software. These are grouped according to use. Each group is called a component. For detailed information on each component, refer to the software instruction manual that you can view after installing the software. Each component can be added or deleted even after installation.

(6) This confirmation screen appears before you start copying files. It shows a list of the components that will be installed. Click [Next] to continue.
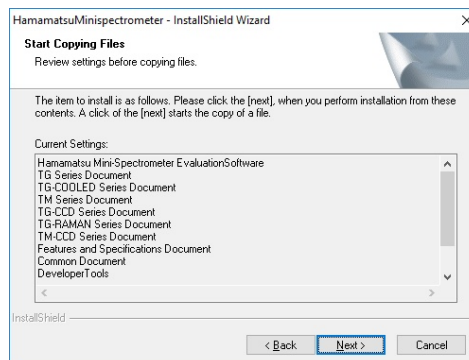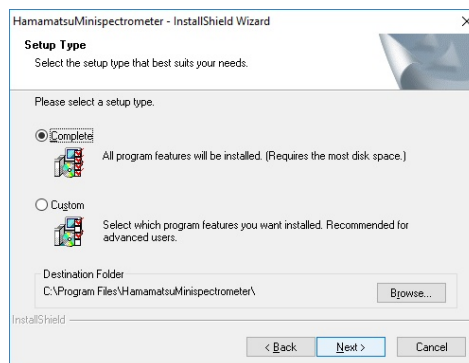
(7) If the mini-spectrometer is connected to the PC, disconnect it from the PC and then click [OK].
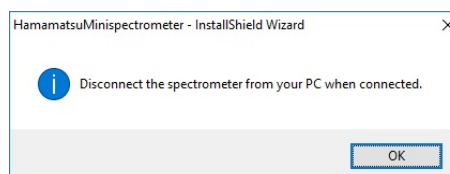
(8) This screen appears when the installation is complete. Click [Finish].
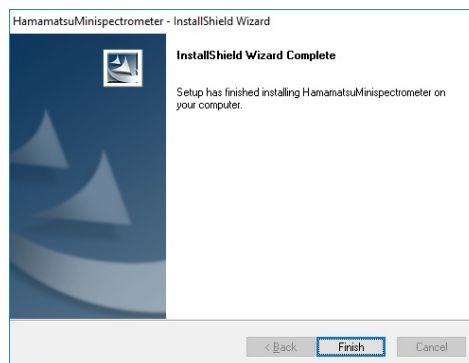
(9) Remove the CD-ROM from the CD-ROM drive.

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4. Installing the device driver when connecting to the mini-spectrometer

When you have just connected the mini-spectrometer to your PC, Windows may ask you to install the mini-spectrometer device driver as needed. When the mini-spectrometer is connected with PC, the driver is automatically installed.

5. Using the evaluation program

When the software installation is complete, you can now run the evaluation program from the PC. Let's start the evaluation program to make a simple measurement using the mini-spectrometer (one unit) you have connected to the PC.
For detailed information, refer to the "software instruction manual" and "hardware instruction manual" for each series of mini-spectrometers, which were stored in your PC along with the software.

(1) Using the USB cable, connect the mini-spectrometer to the PC.

   <<Note>>
   When you are using a mini-spectrometer of the TG-COOLED series, you must also connect it to an external power supply by using the supplied connector. For detailed information, refer to the TG-COOLED series hardware instruction manual.

   When you are using a mini-spectrometer of the TG-CCD/TM-CCD series, you must also connect it to an power supply by using the supplied AC adaptor. For detailed information, refer to the TG-CCD or TM-CCD hardware instruction manual.
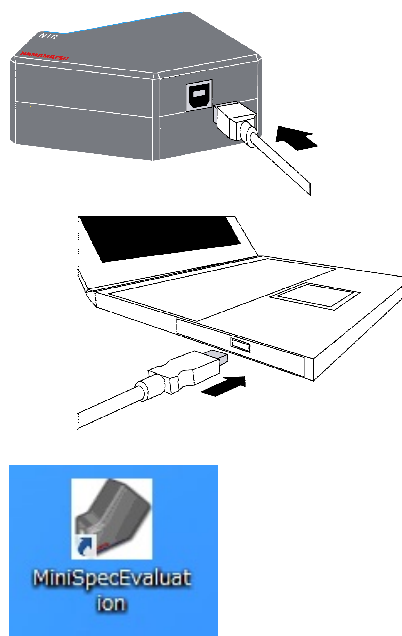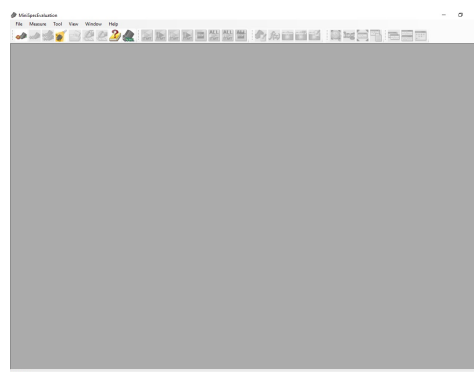
(2) Double-click the short-cut icon on the desktop to start the evaluation program.

5. Using the evaluation program (cont'd)

(3) When the evaluation program has started,

click the ⬛ button on the toolbar or select "Open spectrometer" from the "File" menu in the main window.

(4) The dialog box for selecting the mini-spectrometer appears.
Make sure that the correct mini-spectrometer is selected and click [Open].
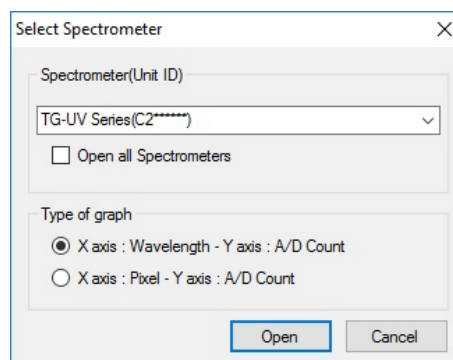
  <<Tips>>
If two or more mini-spectrometers are connected to the PC, you can select any of them the drop-down list.

  <<Note>>
When you click [Open] while using a mini-spectrometer of the TG-COOLED series, you may see a message asking you to wait for cooling. After this message has disappeared, do the next operation.

(5) A graph window then appears as shown on the right.
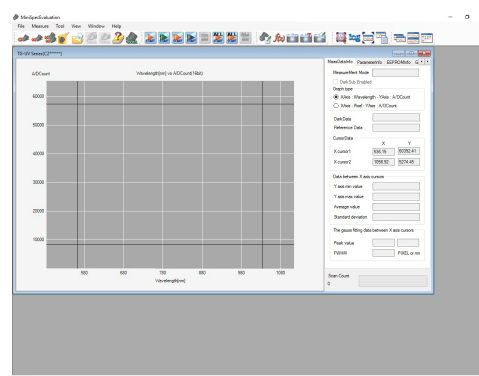
(6) First of all, let's make measurements in a dark state with no light incident on the mini-spectrometer.
After making sure the cap is still attached to the optical connector of the mini-spectrometer, click the [START]

▶ button on the toolbar or select "Start Monitor mode" from the "Measure" menu in the main window.
Measurement data will be displayed as a red line in the graph.

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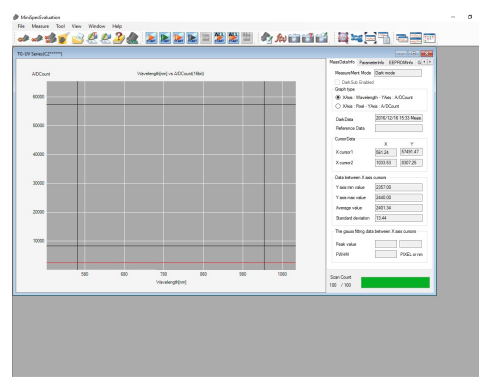
5. Using the evaluation program (cont'd)

<<Tips>>
About dark output:
There is a small output from the image sensor and circuit even though measurements were made in a dark state. This dark output varies depending on the ambient conditions. The evaluation program has the "dark subtraction function" that subtracts the dark output from the measurement data.

To stop the dark output measurement, click the [STOP] button on the toolbar or select "Stop measurement" from the "Measure" menu.

(7) Next, let's measure an optical spectrum by allowing light to enter the mini-spectrometer.
Remove the cap from the optical connector of the mini-spectrometer and attach an optical fiber cable to it.

<<Tips>>
For information about suitable optical fiber cables, see the mini-spectrometer hardware instruction manual. Hamamatsu also provides optical fiber cables as optional accessories.

Point the other end of the optical fiber cable toward a light source such as a fluorescent lamp and then start measurement with the [START] button. Measurement data will be displayed as shown on the right.
Try changing the pointing direction of the optical fiber cable or the distance to the light source, to make sure the mini-spectrometer output changes accordingly.

<<Tips>>
The spectrum of a fluorescent lamp consists of discrete, narrow lines of specific wavelengths called "line spectra" superimposed on a wide continuous spectrum whose intensity changes gradually.
On the other hand, the spectrum of an ordinary light bulb (incandescent lamp) consists only of a wide continuous spectrum whose intensity changes gradually.
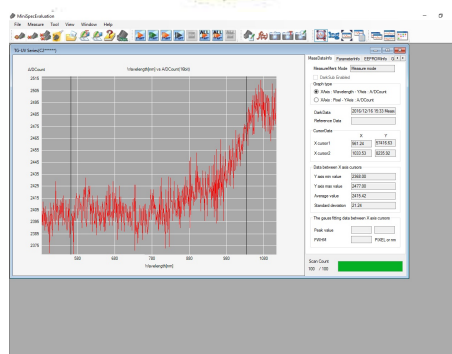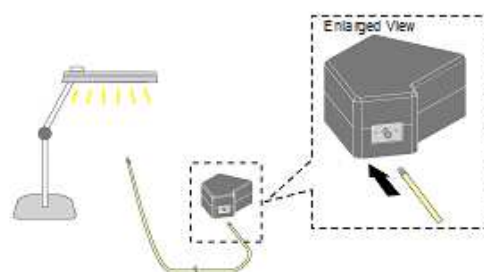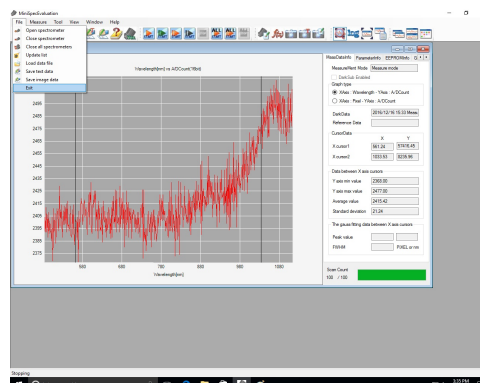
Data measured with TM-UV/VIS: C10082MD

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5. Using the evaluation program (cont'd)

(8) Quit the evaluation program.
To quit the software, click the [×] button in the upper right corner of the window, or select "Exit" from the "File" menu.
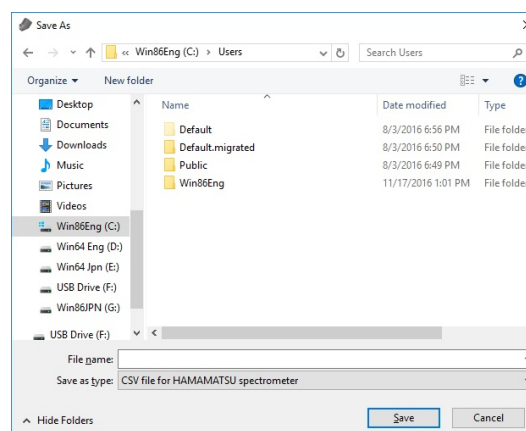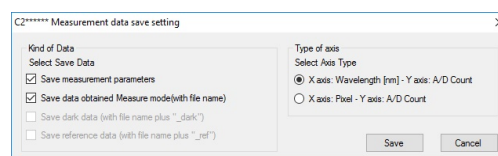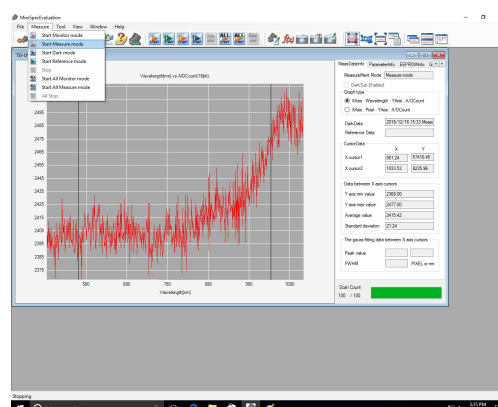

6. FAQ (Frequently asked questions)

Q.1 How do I save measurement data?

A.1 To save data, it must be measured in "Measure" mode.
To enter "Measure" mode, click "Start Measure mode" from the "Measure" menu in the main window.
Measurement automatically stops when the specified scan count is reached.

After acquiring data in "Measure" mode,

click the ⬚ button on the toolbar or select "Save text data" from the "File" menu. The dialog box for saving data then appears. Specify the type of data and the parameter on the horizontal axis (X axis). Then click the [Save] button. Text data is saved in CSV format so you can open it in Excel to perform graphic and arithmetic processing.

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6. FAQ (Frequently asked questions) (cont'd)
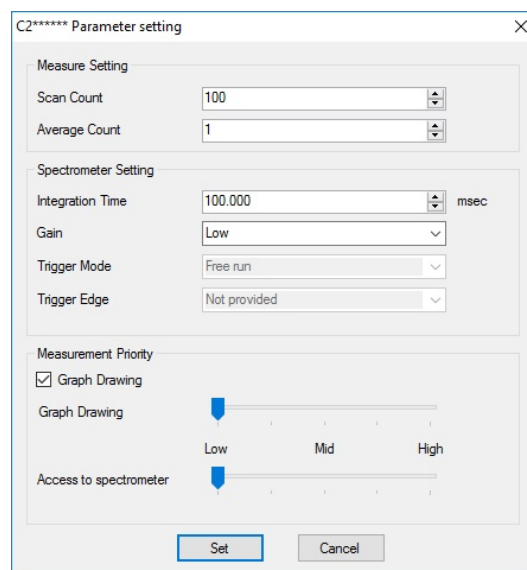
Q.2 How do I change measurement
conditions?

A.2 You can change measurement
conditions on the parameter setup
screen or on the measurement setup
screen.

The parameter setup screen allows you
to set various parameters that
determine mini-spectrometer operation.

To open this screen, click the
button on the toolbar or select
"Parameter" from the "Tool" menu in the
main window.
You can set parameters such as scan
count,averaging count, integration time,
gain and priority of measurement
operations.

Q.3 Where can I find more detail information
than this quick start guide?

A.3 When the software has been installed, you can view the following documents installed
in the PC. From the [Install-Folder]→[HamamatsuMiniSpectrometer]→[Document] or
[EvaluationSoftware] open the desired document.
   • Mini-spectrometer hardware instruction manual
   • Mini-spectrometer software instruction manual
   • Mini-spectrometer technical manual
   • Development files

6. FAQ (Frequently asked questions) (cont'd)

Q.4 What specifications do optional optical fiber cables have?

A.4 The following optical fiber cables are available as options. For ordering information, contact our sales office or sales representative you purchased this product from.

Type No.	Product name	Specifications
A15362-01	Optical fiber for UV/visible range (resistance to UV)	Core diameter 600 μm, N.A.=0.22 Length 1.5 m, with SMA905D connector at both ends
A15363-01	Optical fiber for visible/near infrared range	Core diameter 600 μm, N.A.=0.22 Length 1.5 m, with SMA905D connector at both ends

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