



VISIBLE SPECTROPHOTOMETER

USER MANUAL



Spectral range
420-640 nm



Bluetooth and USB
connectivity



Absorbance and
Transmittance
measurements



Software for
Windows and
Android

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1. Introduction

Thank you for purchasing the GIGAIE/VISS visible spectrophotometer.

The GIGAIE/VISS is a portable visible spectrophotometer designed to measure absorbance and transmittance over the 420 to 640 nm spectral range. Its compact design, ease of use, and Bluetooth and USB connectivity make it suitable for laboratories, universities, research, education, and quality control.

The instrument includes software for Windows and an Android application for displaying spectra, saving results, and exporting data.

Read this manual carefully before using the instrument to obtain the best possible performance.

Main features

- Spectral range: 420-640 nm
- Spectral resolution: 0.5 nm
- Wavelength accuracy: ± 2 nm
- Absorbance and transmittance
- Compatible with 10 mm optical cuvettes
- Compatible with microscope slides
- Bluetooth and USB
- Software for Windows
- Android application
- CSV and image export

2. Safety information

Read the following instructions before using the GIGAIE/VISS spectrophotometer:

- Place the instrument on a stable, clean, and dry surface.
- Keep it away from liquids, moisture, dust, extreme temperatures, and direct sunlight.
- Do not use the instrument if the cable, connectors, or enclosure show visible damage.
- Disconnect the instrument before cleaning it. Do not disassemble or attempt to repair it.
- Wear gloves, safety glasses, and a laboratory coat when required by the samples being handled.
- Do not insert wet or damaged cuvettes, or cuvettes with liquid on their outer surfaces.
- Handle cuvettes and microscope slides carefully and avoid touching their optical surfaces.
- If a spill occurs, disconnect the instrument immediately.

The GIGAIE/VISS is not designed for medical diagnosis or safety-critical applications.

3. Package contents

When opening the package, verify that the following components are included:

- 1 GIGAIE/VISS visible spectrophotometer with integrated USB cable
- 3 optical 10 mm cuvettes
- 3 Pasteur pipettes

Online user manual

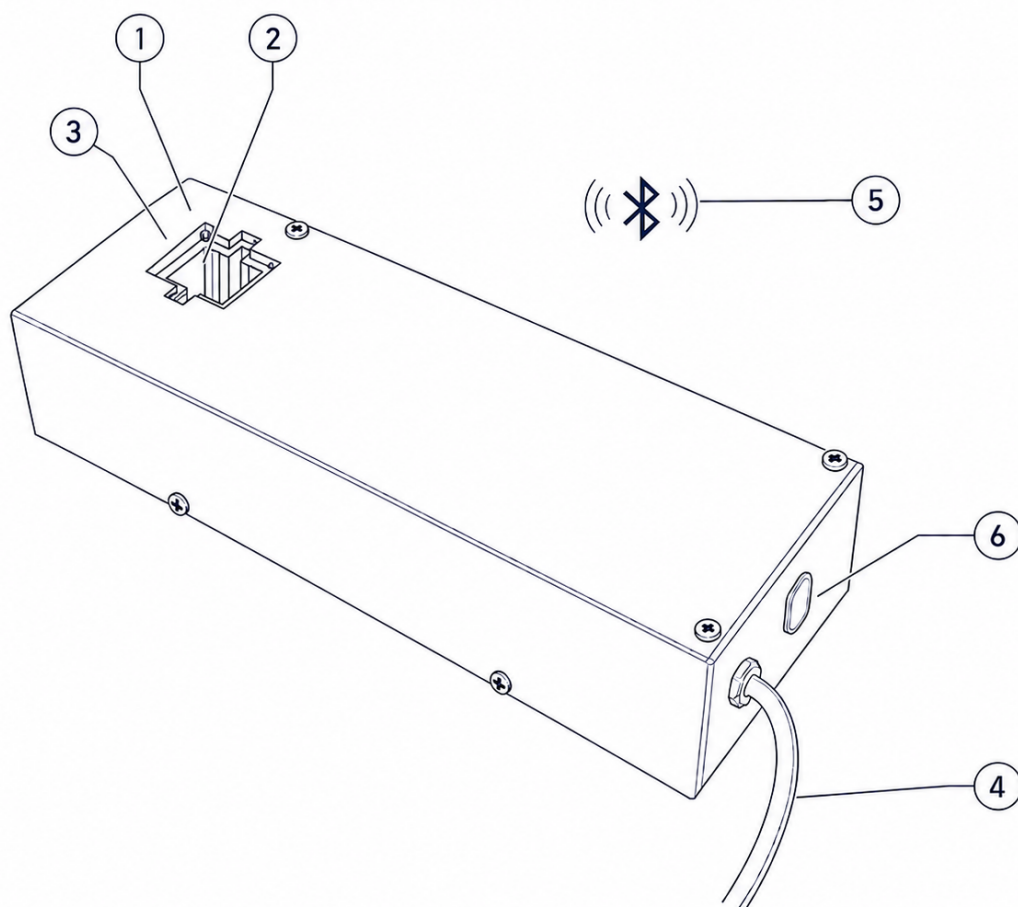
The current user manual is available at:

<https://www.gigaie.com/viss>

Keep the original packaging for safe storage or transportation of the instrument.

4. Instrument overview

The GIGAIE/VISS integrates the optical system, illumination source, and electronic components required to measure absorbance and transmittance.



Main components

- | | |
|----------------------------|---------------------------|
| 1. Measurement compartment | 4. Integrated USB cable |
| 2. Cuvette holder | 5. Bluetooth connectivity |
| 3. Microscope-slide holder | 6. Status indicator |

5. Technical specifications

Characteristic	Specification
Spectral range	420 to 640 nm
Spectral resolution	0.5 nm
Wavelength accuracy	+/-2 nm
Data points per measurement	440
Measurement modes	Absorbance and transmittance
Liquid sample holder	Standard 10 mm optical cuvette
Solid samples	Compatible with microscope slides for thin films
Computer communication	USB
Wireless communication	Bluetooth
Compatible software	Windows and Android
Result export	CSV file and image
Dimensions	21 x 6.3 x 4.4 cm (length x width x height)
Weight	210 g
Power supply	5 VDC through USB
Current consumption	100 mA

6. Installation and operation on a Windows PC

6.1 Installation

1. Connect the instrument to a USB port on the Windows computer.
2. Download the installation file from: <https://downloads.gigaie.com/downloads/PCinstall.zip>
3. Extract the downloaded ZIP file.
4. Install the USB driver by running CH341SER.EXE.
5. Open the PC_UserInterface folder and run setup.exe to install the user interface.

After installation is complete, the program is ready to connect to the spectrophotometer.

6. Installation and operation on a Windows PC

6.2 Using the Windows PC interface

1. Open the GIGAIE_VISS program.
2. Press CONNECT and wait until the button displays CONNECTED.
3. Insert the reference blank, such as a cuvette containing deionized water or a clean microscope slide.
4. Press SCAN.
5. Wait for the reference spectrum measurement to finish.
6. Press STORE BASELINE to save the reference data.
7. Remove the blank and insert the sample to be measured.
8. Press SCAN and wait for the sample measurement to finish.

After the scan is complete, the results are displayed on the interface graph.

6.2 Using the Windows PC interface

Additional functions

- The PC version can display up to seven measurements on the same graph.
- Use the selection boxes to switch between absorbance and transmittance measurements.
- The graph includes zoom-in and zoom-out functions.
- SAVE PLOT IMAGE saves an image of the measurement graphs.
- SAVE DATA saves the selected data (Baseline, Raw Values, Absorbance, or Transmittance) in CSV format.
- Press CLEAN to erase the current measurements and begin a new series.
- To recalibrate the reference measurement, press CONNECT again and repeat steps 3 through 6.

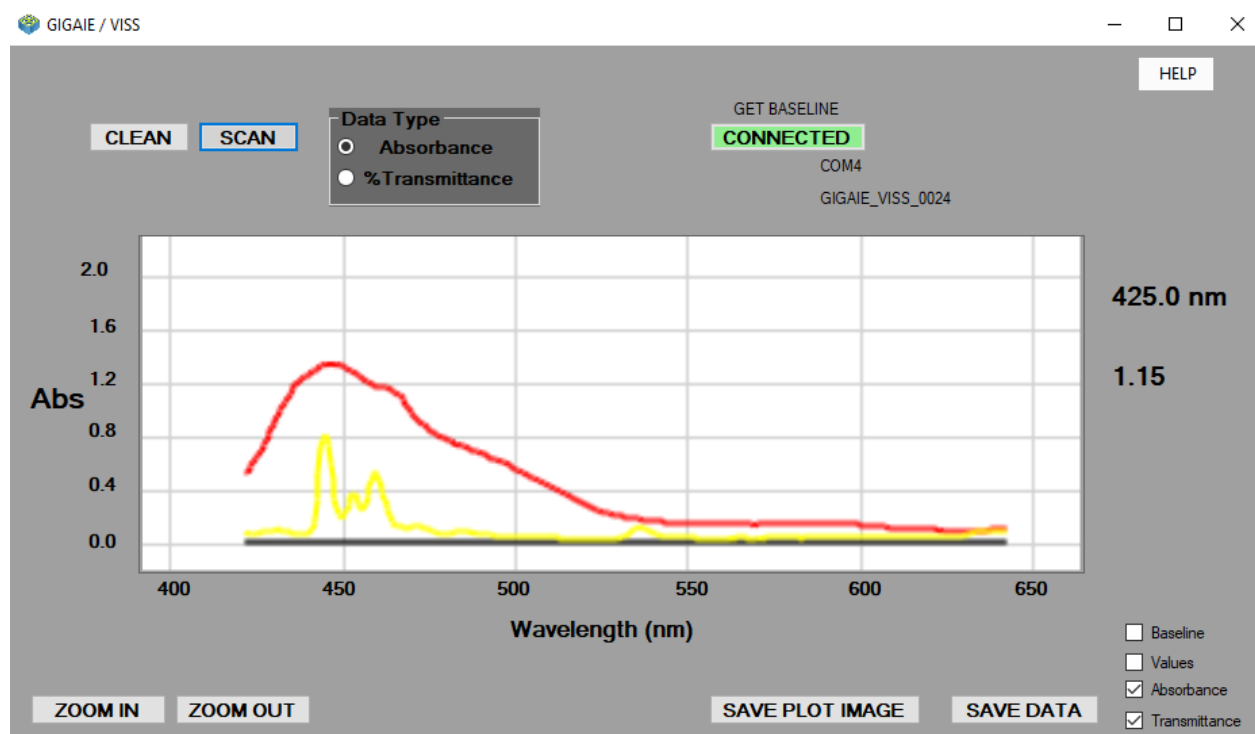


Figure 6.1. GIGAIE/VISS user interface for a Windows PC.

7. Installation and operation on Android

7.1 Installing the Android application

1. Download the GIGAIE/VISS application from Google Play:

https://play.google.com/store/apps/details?id=appinventor.ai_alexjgimenez.gigaievisBLEV7

2. Open the GIGAIE/VISS application on the Android device.
3. In the SN field, enter the instrument serial number shown on the rear label. Enter only the four numeric characters; for example: 0029.
This step is required only during the first use. The serial number is stored for subsequent connections.
4. During the first connection, allow the application to access Bluetooth and Location when requested by the device.
5. Wait until the button turns green and displays CONNECTED.

The instrument is now connected and ready to use.



Figure 7.1. QR code for downloading GIGAIE/VISS from Google Play.

7. Installation and operation on Android

7.2 Using the Android application

1. Open the GIGAIE_VISS application on the Android device.
2. Press CONNECT and wait until the button turns green and displays CONNECTED.
3. Insert the reference blank, such as a cuvette containing deionized water or a clean microscope slide.
4. Press GET BASELINE and wait until the reference spectrum appears on the screen.
5. Remove the reference blank and insert the sample to be measured.
6. Press CAPTURE and wait until the sample spectrum appears on the screen.

Additional functions

- The Android version can display up to four measurements on the same graph.
- Use the selection boxes to display results as absorbance or transmittance.
- Use touch gestures on the screen to zoom the graph in or out.
- SHARE PLOT generates a PNG image of the graph and allows it to be shared.
- SHARE DATA generates a CSV file containing the measurement data and allows it to be shared.
- Depending on the installed applications, files can be shared by email, WhatsApp, or other available options.
- CLEAR erases the current measurements and starts a new series.

User interface

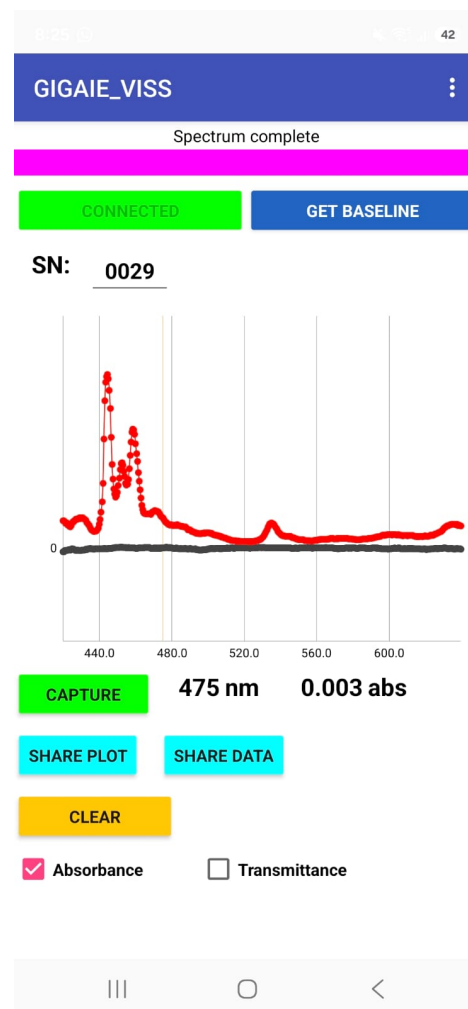


Figure 7.2. GIGAIE/VISS user interface for Android.

8. Measurement preparation

8.1 Liquid samples

1. Select a clean, undamaged 10 mm optical cuvette.
2. Prepare the reference blank using the same solvent used in the sample. Deionized water may be used for aqueous solutions.
3. Fill the cuvette with enough liquid to completely cover the region crossed by the light beam.
4. Check that there are no bubbles, suspended particles, or residues on the optical faces.
5. Clean the outside of the cuvette with lens paper or a soft lint-free cloth.
6. Insert the cuvette into the measurement compartment with its transparent faces oriented along the light path.
7. Measure the reference blank first and then measure the sample.
8. Keep the cuvette in the same orientation for all measurements.

Important: Do not place a wet, overfilled cuvette or a cuvette with liquid on its outer surface inside the instrument.

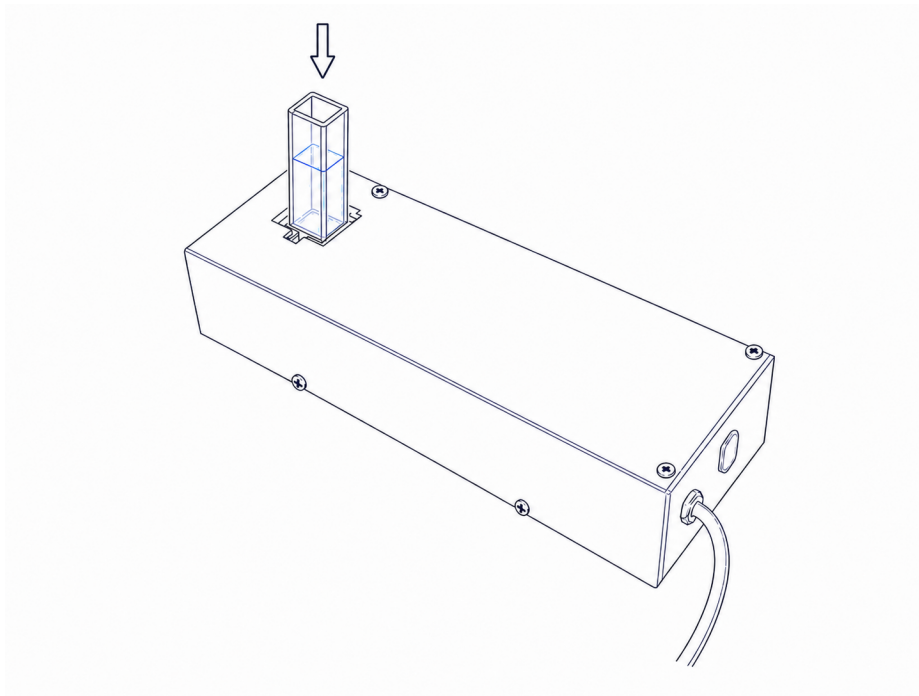


Figure 8.1. Inserting an optical cuvette containing a liquid sample.

8. Measurement preparation

8.2 Thin-film samples

1. Use a clean, uncoated microscope slide as the reference blank.
2. The reference slide must be made of the same material and have the same thickness as the film substrate.
3. Clean the slide with a soft lint-free cloth and verify that it is free of dust, fingerprints, and residues.
4. Insert the reference slide into the slot and measure the baseline spectrum.
5. Remove the reference slide and insert the slide containing the thin film.
6. Position the coated area so it completely covers the region crossed by the light beam.
7. Keep the slide in the same orientation and position during all measurements.
8. Perform the measurement and select transmittance to display the results.

Important: Handle microscope slides by the edges and avoid touching, scratching, or contaminating the film surface.

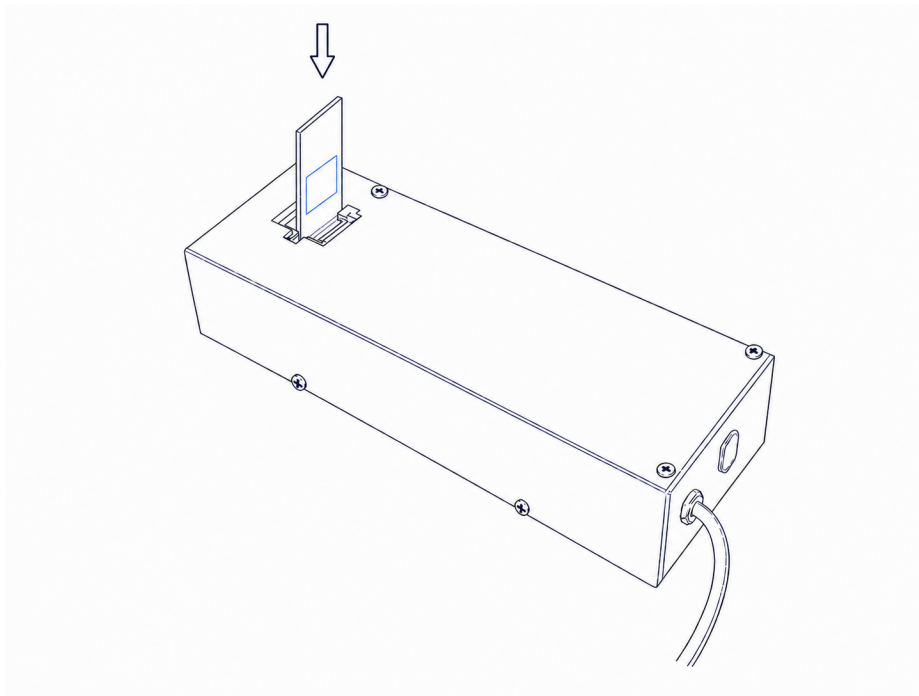


Figure 8.2. Inserting a microscope slide containing a thin-film sample.

9. Absorbance measurement

Absorbance indicates how much light a sample absorbs at each wavelength. It is calculated by comparing the intensity transmitted through the sample with the intensity obtained from the reference blank.

$$A(\lambda) = -\log_{10}\left(\frac{I(\lambda)}{I_0(\lambda)}\right)$$

It can also be written as:

$$A(\lambda) = \log_{10}\left(\frac{I_0(\lambda)}{I(\lambda)}\right)$$

Where:

- A: absorbance at a given wavelength.
- I₀: intensity measured using the reference blank.
- I: intensity transmitted through the sample.

Absorbance is dimensionless. The GIGAIE/VISS software performs this calculation automatically using the stored reference spectrum.

10. Transmittance measurement

Transmittance indicates the proportion of light that passes through a sample at each wavelength. It is calculated by comparing the intensity transmitted through the sample with the intensity obtained from the reference blank.

$$T(\lambda) = \frac{I(\lambda)}{I_0(\lambda)}$$

To express transmittance as a percentage:

$$\%T(\lambda) = 100\left(\frac{I(\lambda)}{I_0(\lambda)}\right)$$

Where:

- T: transmittance at a given wavelength.
 - %T: percent transmittance.
 - I₀: intensity measured using the reference blank.
 - I: intensity transmitted through the sample.
-
- The PC interface displays results as percent transmittance (%T), generally from 0 to 100 %.
 - The Android application displays transmittance as a decimal ratio (T), generally from 0 to 1.

$$\%T = 100T$$

For example, T = 0.75 on Android is equivalent to 75 % on the PC interface.

11. Saving and exporting data

Results can be exported in CSV format. This format organizes data in columns and can be opened, analyzed, and plotted using many software packages.

Compatible software

- Microsoft Excel
- Google Sheets
- LibreOffice Calc
- Origin
- MATLAB
- Python (Pandas and Matplotlib)
- R and RStudio

On a Windows PC

1. Select the data to export: Baseline, Raw Values, Absorbance, or Transmittance.
2. Press SAVE DATA.
3. Select the name and location of the CSV file.
4. To save the graph as an image, press SAVE PLOT IMAGE.

On Android

1. Press SHARE DATA to generate and share the CSV file.
2. Select an available application, such as email, WhatsApp, or file storage.
3. To generate a PNG image of the graph, press SHARE PLOT.

The available sharing options depend on the applications installed and configured on the Android device.

12. Maintenance and cleaning

The GIGAIE/VISS spectrophotometer requires little maintenance. Follow these recommendations to keep it in good condition:

- Disconnect the instrument from the USB port before cleaning it.
- Clean the enclosure with a soft, dry, or slightly damp cloth.
- Do not use solvents or abrasive products, and do not apply liquids directly to the instrument.
- Keep the sample opening free of dust, residues, and liquids.
- Do not insert objects or cleaning materials into the optical system.
- Clean cuvettes and microscope slides after each use and store them protected from dust.
- Do not disassemble the instrument. Internal repairs and adjustments must be performed by authorized personnel.
- When the instrument is not in use, store it in a clean, dry location, preferably in its original packaging.

13. Troubleshooting

Most operating problems are related to communication between the instrument and the connected device.

Connection indicator

Flashing indicator

The instrument is powered on and waiting for a connection.

Steady indicator

The connection has been successfully established.

13.1 Troubleshooting a PC connection

- After connecting the instrument to a USB port, open Windows Device Manager and verify that a new port appears under Ports (COM & LPT).
- The port may be identified as a CH340/CH341 USB Serial device and will have an assigned number, for example, COM4.
- If the COM port does not appear, disconnect the instrument, reinstall the driver by running CH341SER.EXE, and reconnect the instrument.
- Close any other program that may be using the COM port, such as a serial monitor or other communication software.
- Try another USB port on the computer and avoid using USB hubs or extension cables.
- If the indicator continues flashing after CONNECT is pressed, the connection has not been established. After a successful connection, the indicator remains steadily lit.

13. Troubleshooting

13.2 Troubleshooting a Bluetooth connection

- Verify that the number entered in the SN field matches the serial number on the rear label. Enter only the four numeric characters.
- Check that Bluetooth is enabled and that the application has permission to use Bluetooth and Location.
- Keep the Android device close to the spectrophotometer during connection.
- Verify that the instrument is not connected by Bluetooth to another phone or tablet.
- If the application cannot find the instrument, close the application completely, disconnect the instrument from USB power, and wait 30 seconds. Reconnect the instrument, reopen the application, and try again.
- If the connection is interrupted during a measurement, restart the connection and acquire a new reference spectrum before measuring again.

After a Bluetooth connection is successfully established, the indicator stops flashing and remains steadily lit.

14. Technical recommendations

- To maintain better measurement linearity, dilute samples when necessary to obtain absorbance values below 1. Record the dilution factor for use during data analysis.
- For colorimetry and Beer-Lambert analysis, avoid wavelengths near the ends of the spectral range. Operation from 430 to 630 nm is recommended.
- Use the same solvent and the same type of cuvette or substrate for the reference blank and the samples.
- Acquire a new reference spectrum whenever the solvent, cuvette, microscope slide, or measurement conditions change.
- Keep the cuvette or microscope slide in the same orientation and position to reduce measurement variation.
- Ensure that liquid samples are homogeneous and free of bubbles, precipitates, or large particles, as these may scatter light and affect the results.
- When greater precision is required, perform at least three measurements of each sample and use the average result.

15. Warranty

The GIGAIE/VISS spectrophotometer includes a one-year warranty against manufacturing defects.

The warranty is void if the warranty seal has been altered, removed, or damaged. Do not open or disassemble the instrument.

Opening the instrument may change the alignment of its optical components and cause permanent loss of calibration, affecting measurement accuracy.

Internal repairs and adjustments must be performed exclusively by authorized personnel.

16. Contact information

For technical support, warranty information, or assistance related to the GIGAIE/VISS spectrophotometer, contact:

GIGA IE

Email:	info@gigaie.com
Website:	https://www.gigaie.com
Product and manual:	https://www.gigaie.com/viss

Information requested for support

- Instrument serial number.
- Warranty-label number.
- Detailed description of the problem.
- Photographs or screenshots, when possible.
- Proof and date of purchase for warranty claims.