Spec-Imaging

IC-VIS Colorimeter

06/2024, V1.0

Safety manual

1 CONTENT

2 GENERAL INFORMATION

2.1 TECHNICAL DESCRIPTION

The IC-VIS is a portable colorimeter that enables attenuation and turbidity measurements at the wavelengths of 420 nm, 520 nm, 560 nm and 610 nm generated by a LED light source in combination with interference filters. The attenuation of light through the liquid sample is converted to a concentration of a certain chemical component, depending on the reagent used. Turbidity (as Formazine turbidity unit, FTU) is measured simultaneously with all measurements.

2.2 SAFETY

2.2.1 Symbols

Symbol	Description
	This symbol indicates that there is a risk for fire present.
	This symbol indicates that there is a risk for chemical exposure and that only authorized personnel should perform tasks in relation to equipment maintenance and handling of chemicals.
	This symbol indicates explosion hazard.

2.2.2 Safety instructions

Below are the 4 used hazard warnings.

⚠ DANGER

Indicates an imminent or potentially hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates an imminent or potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

Indicates a situation which, if not avoided, may result in malfunction or damage of the instrument. Information that clarifies facts in the text and that requires special attention.

2.3 COMPLIANCE AND CERTIFICATION

CE

The CE marking declares that the product complies with the following European Community harmonisation legislation:

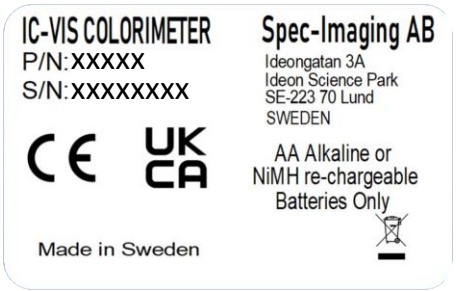
Electromagnetic Compatibility (EMC) Directive 2014/30/EU.

Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU and 2015/863.

Directive 2012/19/EU on waste electrical and electronic equipment (WEEE).

You can obtain a copy of the original declaration of conformity from Spec-Imaging AB. Contact information can be found in Section 10.4.

2.4 PRODUCT LABEL



3 SPECIFICATIONS

The IC-VIS specifications are listed below

Specifications	Details
Battery	4 AA, around 2 months @ 10 measurements/day (5 days/week)
Certifications	CE
Content	Colorimeter, lid, cuvette holders, cuvette collar sample lid, blank cuvettes, batteries, start-guide
Cuvette compatibility	10 mm square, 13 and 16 mm round

Data logging/transfer	50 latest measurements/QR-code for data transfer
Detector	CMOS
Dimensions	215 mm x 96 mm x 60 mm
Display	LCD-IPS, backlit
Language	English
Light source	LED
Measurement type	Concentration, absorbance/OD, turbidity
Methods	Preprogrammed and programmable
Operating temperature	0-40 °C (max relative humidity 90% non-condensing; max 2000m)

Photometric accuracy/ range	±0.03 abs / 0-3[a] abs
Photometric repeatability	±0.01 abs
Power requirement	4 AA LR6 alkaline batteries or HR6 NiMH AA rechargeable batteries
Protection class	Class III
Turbidity range	0-1000 FTU
Turbidity compensation range	0-400[b] FTU
Turbidity accuracy	±15 FTU[c]
Storage temperature	-25-48 °C (max relative humidity 90% non-condensing)
Warranty	1 year
Wavelength selection	Method dependent - automatic

Wavelengths/Bandwith	420 nm/10nm, 520 nm/10nm, 560 nm/10nm, 610 nm/10 nm
Weight	690 g

a – Up to 1 abs for 520, 560 and 610 nm. Up to 2 abs for 420 nm.
b – for measurements done at 520, 560 and 610 nm. For measurements done at 420 nm the range is 0-200 FTU.
c- for turbidity measurements at 420 nm.

4 INSTALLATION

4.1 PRODUCT OVERVIEW

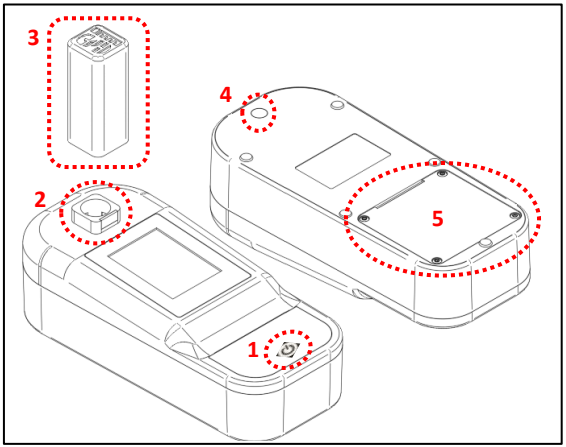


Figure 1. IC-VIS overview.

The IC-VIS is shown in Figure 1 with indicated details, listed below.

1	Power button	4	QR-code camera
2	Sample compartment	5	Battery compartment
3	Universal lid		

⚠ WARNING

It is under no circumstances allowed to open the device enclosure beyond battery replacement, as operator may be exposed to a strong light source or moving parts. Opening the enclosure is considered as improper use of the device and voids the warranty of the device.

4.2 SCOPE OF DELIVERY

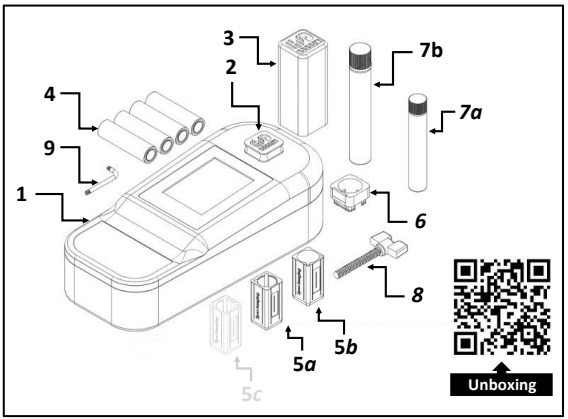


Figure 2. Overview of all parts delivered.

The components included in the package are shown in Figure 2 and listed below. Please contact Spec-Imaging if any components are missing upon delivery. Components marked

not included are not shipped with the standard set.

1. IC-VIS Colorimeter
2. Unit Cover
3. Sample Cover
4. 4 AA LR6 Alkaline batteries
5. Cuvette holders
   a. 1x 13mm round (mounted)
   b. 1x 16mm round
   c. 1x 10mm square *(not included)*
6. Cuvette Collar
7. Blank cuvettes
   a. 13 mm
   b. 16 mm
8. Extraction Tool
9. Torx T10 L-key

- Cleaning tissue for cuvettes
- Quick start guide

4.3 BATTERY INSTALLATION

⚠ WARNING

Fire hazard: Use only battery types specified to avoid risk of fire.

⚠ WARNING

Explosion hazard: Ensure that batteries are of specified type and installed in the correct orientation. Mixing old and new batteries are to be avoided.

⚠ CAUTION

Use LR6 Alkaline AA or HR6 NiMH AA rechargeable batteries exclusively. Never use FR6 Lithium AA batteries.

⚠ CAUTION

Make sure to indicate the battery type in the IC-VIS settings for optimal battery lifetime and device performance.

The Spec-Imaging product is powered by four AA batteries, which can be replaced by the user as needed. Make sure that all batteries are oriented in the correct direction as indicated in the battery compartment. See Figure 3.

For optimal battery lifetime and accurate device performance, make sure to set the correct battery type in the device settings. Main Menu → Settings → Battery.

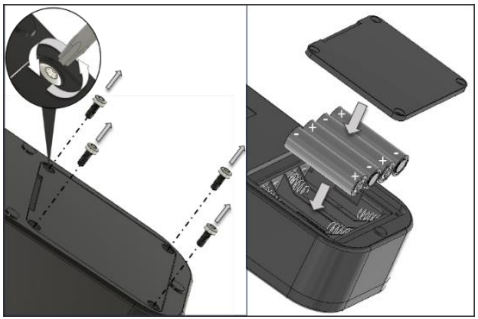


Figure 3. Battery installation.

The Spec-Imaging product uses a 3.0 V CR2032 lithium battery as the power supply for its internal real-time clock (RTC).

⚠ CAUTION

Do not replace the RTC battery yourself. Contact Spec-Imaging support if there is need for a battery change.

4.4 INSTALL SAMPLE HOLDER

The device has 3 types of sample holders (for 10 mm square, 13 and 16 mm round cuvettes) which should be installed with the cuvette holder clips pointing towards the scren, see Figure 4.

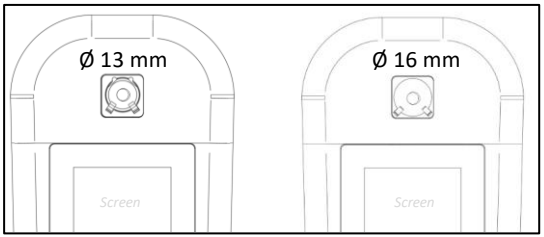


Figure 4. Cuvette holder orientation.

The sample holder needs to be inspected with regular intervals to make sure it is good condition and the cuvette is kept in position for accurate measurement procedure.

NOTICE

The correct orientation and position of the cuvette holders are crucial for correct operation of the device.

A cuvette collar is used to keep the cuvette holder in position. Make sure to align the collar with the grey side pointing towards the screen in the correct orientation as shown in Figure 5.

To swap cuvette holder, use the Extraction Tool (8) shown in Figure 2 to remove the mounted holder. When getting a grip, screw the Extraction tool in the center hole of the cuvette holder 1.5 full turns and pull it out of the device.

Figure 5. Positioning of the cuvette cover.

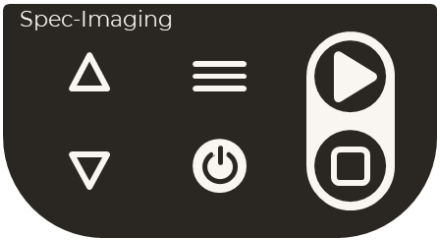


Figure 6. Overview of the button pad.

5 UI AND NAVIGATION

5.1 KEYPAD

The keypad consists of 6 keys shown in Figure 6 and described below.

	Power on / power off*.
	Go to MENU. If in Menu, press for returning to main screen. Read QR-code*.
	For BLANK measurement. If in menu, press for BACK.

	For MEASUREMENT of sample after blank is performed. If in menu, press to SELECT.
	UP if in list mode. Change unit if in main screen.
	DOWN if in list mode. Enter FAVORITES LIST in Main Screen. Swap sub-metod* if in main screen.

*longpress

5.2 DISPLAY

The main screen is shown in Figure 7 and detailed description is outlined below.

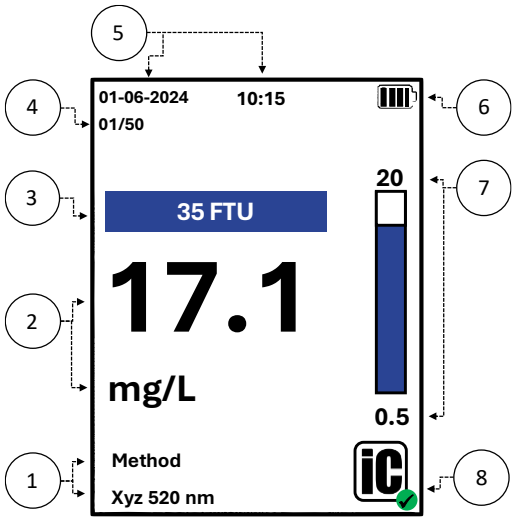


Figure 7. Overview of the main screen.

1- Parameter and method ID
2- Measurement value and unit
3- Turbidity reading
4- Measurement number
5- Date and time
6- Battery indicator
7- Method range
8- iC mode status

6 START-UP

6.1 TURN DEVICE ON

When turning on the unit, press the power button and wait until main screen appears. Start screen is shown in Figure 7 with detailed description of indicators in section 5.2.

6.2 CONFIGURATION

The basic configuration of the device can be done by visiting the IC-VIS configuration page www.spec-imaging.com/ic-vis-configurator.

6.2.1 General settings

The general settings of the device can be set on the above specified IC-VIS configuration page.

Language: ENG

Sleep time: 5/10/20/30/45/60/90/120 min

Number of measurement points in QR-code exporting: 1-20 points

Color theme

Chose the preferred settings and scan the displayed QR-code by long-pressing the menu button . Confirmation of the new settings will be displayed as a message on the screen.

6.2.2 Date-time

Set the date and time of the device by visiting the IC-VIS configuration page and select **Set date/time**. Longpress the menu button to scan the QR-code. Make sure the correct date and time is set on the top of the main screen.

7 STANDARD OPERATION

The device is delivered with a list of 4 basic methods and can be further configured to contain up to 20 additional methods of any method provider.

7.1 SELECT METHOD

Measurements of a sample need to be done using the correct method which can be chosen in the following ways.

7.1.1 Using QR-code reader

A method can be selected by reading a method-specific QR-code which can be downloaded from the IC-VIS configurator (www.spec-imaging.com/ic-vis-configurator).

7.1.2 Via menu

A method can be selected by entering the list of methods in main menu → select method.

7.1.3 Favourites

Favourite methods list can be accessed by pressing DOWN, see Figure 8. Favourites can then be stepped through using the arrows and , and selected with SELECT . Methods can be added to the favourites list by viewing a method in the methods list and long-pressing SELECT until a star appears to the right of the method. The same procedure can be repeated to remove a method from the favourites list.

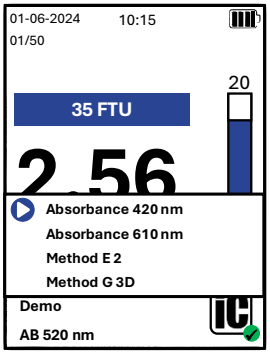


Figure 8. Favourites list shown when pressing DOWN when in main screen.

7.2 ADD NEW METHODS

New methods can be added to a device by importing them from the IC-VIS Configurator, using the QR-code camera of the device.

7.2.1 Method from method library

There are pre-calibrated methods in the **Methods library** which can be found on the IC-VIS Configurator page www.spec-imaging.com/ic-vis-configurator.

7.2.2 Method from calibration

It is also possible to do a method calibration manually and then adding it as a method in your device, through the IC-VIS Configurator page www.spec-imaging.com/ic-vis-configurator.

7.3 Perform measurement

A measurement is performed by following the instructions on the main screen.

Insert blank – insert a blank sample and press Measure .

Insert sample – insert the sample (prepared according to method specific description) and press Measure .

NOTICE
Make sure that the correct sample holder is in the correct orientation for reliable measurement results. For further guidance see Section 4.4.

The result, measurement value and turbidity, will be displayed with the corresponding unit.

7.4 Procedure for correct values

To obtain correct values from a measurement, it is crucial to follow the outlined steps:

- Ensure that the cuvette slot is installed correctly (Section 4.4) and that it is kept clean.

- Ensure that the cuvette is free from defects and wiped off in a thorough manner.

- Ensure that the method instructions have been carefully followed.

- Ensure that quality checks are made internally using calibration standards for both absorbance and turbidity and that method calibration curves are performed regularly.

- Ensure that your IC-VIS device is operating according to specifications and if malfunction is observed, contact Spec-Imaging for

technical support.

⚠ CAUTION
Spec-Imaging cannot guarantee the safety of the operator if not following the instructions of the chemical method, indicated by the method instruction.

7.5 IC – Instant Clarity turbidity compensation

Performing colorimetric analysis directly in turbid liquid with a conventional colorimetric system is problematic as measurement results will be biased due to scattering.

By enabling the iC turbidity compensation for the different measurement methods, the results displayed is compensated reducing the bias caused by turbidity. The iC feature can be enabled/disabled by entering MENU → Settings → Instant Clarity ON/OFF. The feature status is indicated in the Main Screen according to the icon shown below in Figure 9.

Figure 9. The iC Instant Clarity icon, iC enabled to the left, iC disabled to the right.

7.6 Turbidity measurement

The turbidity measurement is done at any wavelength, in transmission configuration. The device is calibrated at production using Formazine solutions and gives a turbidity

reading which agrees with the NTU reading from an ISO 7072 standard turbidimeter when measuring a Formazine sample.

NOTICE
Note that turbidity is measured in a transmission configuration and will hence show different turbidity readings compared to a standard nephelometric turbidimeter if measurements are performed on standards different from Formazine.

7.6.1 Turbidity calibration

⚠ CAUTION	
	Chemical exposure: Spec-Imaging cannot guarantee the safety of the operator if not following the instructions in the safety data sheet of the chemicals which may be used for turbidity calibration.

Turbidity can be re-calibrated with Formazine or other secondary turbidity standard at any time. Visit the IC-VIS configurator for instructions.

8 MAINTENANCE

⚠ WARNING

Multiple hazards. Maintenance should be done according to the safety precautions described in this section.

8.1 INSTRUMENT CLEANING

NOTICE

Do only use a damp cloth with water and regular dish soap to clean the device exterior.

⚠ WARNING

Fire hazard: Do not use flammable detergent or solvents for any cleaning of the device.

⚠ WARNING

Chemical exposure: Maintain the cleanliness of the cuvette slot in order to maintain reliable measurement results and to prevent operator from chemical exposure.

Keep the device clean and inspect the cleanliness of the cuvette slot with regular intervals to ensure the prerequisites for accurately performed measurements.

The device can be wiped off with a damp cloth and some regular dish soap. Use a lint-free cloth both for the device and the cuvettes when performing measurements.

If device is exposed to splashes of samples, wipe off immediately.

8.2 BATTERY REPLACEMENT

⚠ WARNING	
	Fire hazard: Only use LR6 Alkaline AA or HR6 NiMH AA rechargeable batteries exclusively. Refrain from using other substitutes.

⚠ WARNING
Explosion risk: Do not intermingle new and used batteries and make sure not to use expired batteries. Do not store unit for long periods with batteries installed.

9 TROUBLESHOOTING

If your IC-VIS is not functioning as expected and you are in need of technical support, please contact support@spec-imaging.com and check online for an updated version of the Troubleshooting section in the latest IC-VIS manual.

10 SERVICE

10.1 REPLACEMENT PARTS AND ACCESSORIES

⚠ WARNING
Using other spare parts than the ones by Spec-Imaging is considered as improper use of the device and voids the warranty of the device.

10.2 Disposal

When this product reaches the end of its useful life, it should be disposed of in accordance with local laws and regulations. To find your nearest designated collection point, please contact your local waste disposal authority.

Spec-Imaging takes back old devices and disposes it free of charge.

Please be aware that incorrect disposal of this waste may result in penalties in accordance with local legislation.

10.3 Warranty, liability and complaints

Warranty Summary for Spec-Imaging Products

Warranty Terms:

- **Duration:** 1 year from the date of shipment.
- **Eligibility:** Original purchaser only; non-transferable.
- **Coverage:** Includes defects in materials and workmanship under normal use.
- **Remedies:** Spec-Imaging may repair, replace, or refund the defective product, excluding shipping costs.

Warranty Exclusions:

- Damages from improper installation, misuse, or maintenance.
- Accidents, disasters, or external causes.
- Unauthorized modifications or repairs.
- Non-compliance with product instructions.
- Normal wear and tear.

Claim Process:

- Contact Spec-Imaging for return authorization before sending back any product.
- Product inspection is required to confirm the defect and claim validity.

Limitations:

- Repaired or replaced products are covered for the remainder of the original warranty period.
- Purchaser’s legal rights may vary by jurisdiction.

Liability and Indemnification:

- **Limitation of Liability:** Company's liability is limited to the product's purchase price. No coverage for indirect, incidental, or consequential damages.
- **No Extended Warranties:** Only covers defects in materials and workmanship; excludes all other warranties, express or implied.
- **Indemnification:** Purchaser to defend and indemnify Spec-Imaging against any claims arising from product

misuse or non-compliance with usage instructions.
- **Governing Law:** Laws of Sweden apply.

This summary is part of Spec-Imaging's Terms and Conditions and acceptance of the product constitutes agreement to these terms.

10.4 CONTACT

If you have questions not answered in this manual, then please contact us, see our details below:

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10.5 VERSION HISTORY

Manual IC-VIS Colorimeter ENG, V1.0, June 2024