UVsolo touch, UVsolo 2 touch

Imagers

Operating manual

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Contents

1 Basic information

1.1 User manual notes

The Imagers are intended for operation by qualified specialist personnel observing this user manual.

The user manual informs about the design and function of the Imagers and provides the necessary know-how for the safe handling of the device and its components to personnel familiar with analysis. The user manual further includes notes on the maintenance and service of the equipment.

Instructions for action which occur in chronological order are numbered and combined into action units and furnished with the corresponding results.

Lists which are not in chronological order are shown as itemized lists, sub-listings as bullet points.

Safety notes are indicated by pictographs and signal words. The type and source of the danger are stated together with notes on preventing the danger. The meaning of the pictographs and signal words used is explained in the chapter "Safety instructions".

1.2 Intended use

The UVsolo touch Imaging System enables simple documentation of fluorescent and non-fluorescent gels, membranes, blots, film plates and assays with the ability to save images to a USB flash drive or network location for later quantitative analysis or enhancement for publication.

Images are saved in a variety of selectable formats, allowing saved images to be read by most PC or Mac programs. The UVsolo touch System is a cost effective solution for capturing quality images in a compact standalone package. No external computer is required.

The UVsolo touch comes standard with the **GelCam 315 camera**, which includes 5 MP (2592 x 1944) resolution, an 8 - 48 mm f/1.2 zoom lens, and 16-bit file bit depth. Two transillumination options are available: single UV (302 nm) with illumination areas of 20 cm x 20 cm or 25 cm x 26 cm.

1.3 Warranty and liability

The warranty duration and liability comply with the legal requirements and the provisions in the general terms and conditions of Analytik Jena AG. Tubes and filters are warranted for 90 days.

Deviations from the intended use described in this user manual result in limitations of warranty and liability during a damage event. Damage to wearing parts is not included in the warranty.

Warranty and liability claims are excluded for personal injury and property damage due to one or several of the following causes:

- ❑ use of the Imager other than intended

- ❑ improper commissioning, operation and service of the device

- ❑ modifications of the equipment without prior consultation with Analytik Jena AG

- ❑ unauthorized intervention in the equipment

- ❑ operation of the device with faulty safety equipment or improperly fitted safety and protection equipment

- ❑ inadequate monitoring of the equipment components subject to wear

- ❑ use of other than original spare parts, wearing parts or consumables

- ❑ improper repairs

- ❑ faults due to the non-observance of this user manual

2 Technical data

2.1 Specifications

General technical data		
Wavelength	302 nm	
No. of Tubes	4 x 8 W	
Dimensions (W x D x H)	361 mm x 338 mm x 780 mm	
Weight	22 kg	
UV Intensity Style	variable	
Interfaces	5 x USB 2.0	
Fuses for Darkroom	2 x 2 amp/250 V, 5 x 20 mm, not slow-blo	
Fuses for UV table	1 x 2 amp/250 V, slow-blo	
Pollution Degree	2	
Installation Category	II	
Environmental conditions	5 °C - 40 °C, max. 80 % air humidity for temperatures up to 31 °C, decreasing linearly to 50 % maximum relative humidity at 40 °C. Max. 2000 m NN	
UVsolo touch		
UV Filter Size	200 mm x 200 mm	
Part Number	849-00502-4	849-00502-2
Power supply	100/115 V AC, 60 Hz	230 V AC, 50/60 Hz
UVsolo 2 touch		
UV Filter Size	250 mm x 260 mm	
Part Number	849-00503-4	849-00503-2
Power supply	100/115 V AC, 60 Hz	230 V AC, 50/60 Hz

Main supply voltage fluctuations are not to exceed 10 percent of the nominal supply voltage.

2.2 Built-In Touch Screen Computer

Operating System:	Windows® 10, 32 bit
Connectivity Ports:	1 USB 2.0 (front of system) 4 USB 2.0 (rear of system)
Wireless Network Capability	802.11 b/g/n Wi-Fi and Bluetooth 4.0
Internal Hard Drive:	64 GB (minimum)
Screen	Multi-touch, 1280 x 800 pixels
Software:	VisionWorks *touch* 4.13 or higher

3 Safety instructions

3.1 General notes

For your own safety and to ensure error-free and safe operation of the Imaging System, please read this chapter carefully before commissioning.

Observe all safety notes listed in this user manual.

Besides the safety instructions in this user manual and the local safety regulations that apply to the operation of the device the general applicable regulations regarding accident prevention, occupational health and safety and environmental protection have to be observed and complied with.

References to potential dangers do not replace the work protection regulations which must be observed.

3.2 Symbols and signal words used

The user manual uses the following symbols and signal words to indicate hazards or instructions. The safety instructions are always placed before an action.

CAUTION

Indicates a potentially hazardous situation.

If it is not prevented light or minor injuries and material damage can result.

IMPORTANT

Indicates application hints and other especially useful information without any resulting hazardous or damaging situations.

3.3 Safety markings at the Imaging System

Safety symbols have been attached to the Ultraviolet Transilluminator whose content must always be observed. Damaged or missing safety symbols can cause incorrect actions leading to personal injury or material damage! The safety symbols must not be removed! Damaged safety symbols must be replaced without delay!

The following safety symbols have been attached to the Ultraviolet Transilluminators:

General warning   Caution: Radiation,
                         ultraviolet

3.4 Technical condition

The Imaging System corresponds in its design and construction to the current state of the art technology. Unauthorized modifications or changes, especially such that affect the safety of the staff and the environment, are generally not allowed.

Observe the following notes:

❑ The operator must only operate the device in a sound and operationally safe condition. The technical condition must always comply with the legal requirements and regulations.

❑ Prior to every use the device must be checked for damage and sound condition.

❑ Any changes in the device affecting its safety must be reported by the operating personnel to the operator without delay.

3.5 Requirements for the operating personnel

Observe the following notes:

❑ The device must only be commissioned, operated and serviced by trained personnel instructed in technical safety.

❑ The operation or servicing of the device by minors or individuals under the influence of alcohol, drugs or medication is not permitted.

❑ It must be ensured that only authorized personnel works at the device.

❑ The operating personnel must be familiar with the dangers arising from samples to be used. The appropriate protective equipment must be used.

❑ The unit may include shortwave UV, which is a powerful source of UV radiation that will cause damage to unprotected eyes and skin. Before operating any unit, ensure all personnel in the area are properly protected and that instructions for use of this equipment are followed.

3.6 Safety instructions – transport and assembly

❑ Clean and decontaminate the Imaging System.

❑ Allow for a sufficient cool-down of the light tubes of the transilluminator before transport.

❑ Protect the filter glass of the transilluminator against scratches and breakage by a suitable padding.

❑ Protect the instrument against moisture.

3.7   Safety instructions – operation

The Imaging System is designed with function, reliability, and safety in mind. The unit may include shortwave UV, which is a powerful source of UV radiation that will cause damage to unprotected eyes and skin.

For your own safety observe the following notes:

- ❑ The device must only be operated if all protective equipment is present, properly installed and fully operational. Special care must be taken that the UV protection lid is closed. Protective and safety equipment must never be removed, modified or decommissioned during operation.

- ❑ The sound condition of the protection and safety equipment must be checked regularly. Any defects must be corrected as soon as they occur.

- ❑ The Imaging System must only be connected to a power supply with the indicated voltage (100/115 V or 230 V).

- ❑ Free access to the power plug on the back of the unit must be ensured.

- ❑ Covered vents may cause the device to break down or may cause damage to it.

3.8   Handling of auxiliary and operating materials

The operator is responsible for the selection of substances used in the process as well as for their safe handling. This is particularly important for radioactive, infectious, poisonous, corrosive, combustible, explosive and otherwise dangerous substances.

Observe the following notes:

- ❑ Hazardous substances have to be handled according to the biosafety level of the laboratory. The relevant regulations and the notes in the EC safety data sheets of the manufacturers have to be observed as well as the national and international guidelines (WHO, "Laboratory Biosafety Manual").

- ❑ Wear protective equipment when operating the UV light.

- ❑ Obey all security instructions for decontaminating the Imaging System.

3.9   Safety instructions – maintenance

Observe the following notes:

- ❑ Disconnect the power supply before servicing the Imaging System.

- ❑ Allow for a sufficient cool-down of the light tubes of the transilluminator before maintaining them.

To clean the unit:

- ❏ Use only mild soap and a damp soft cloth or damp sponge to clean the unit surface.

- ❏ Never use organic based compounds, Alcohol, or Ammonia containing cleaners.

- ❏ Do not use abrasive pads or cleaners, they could damage the UV filter surface of the transilluminator.

3.10 Behavior during emergencies

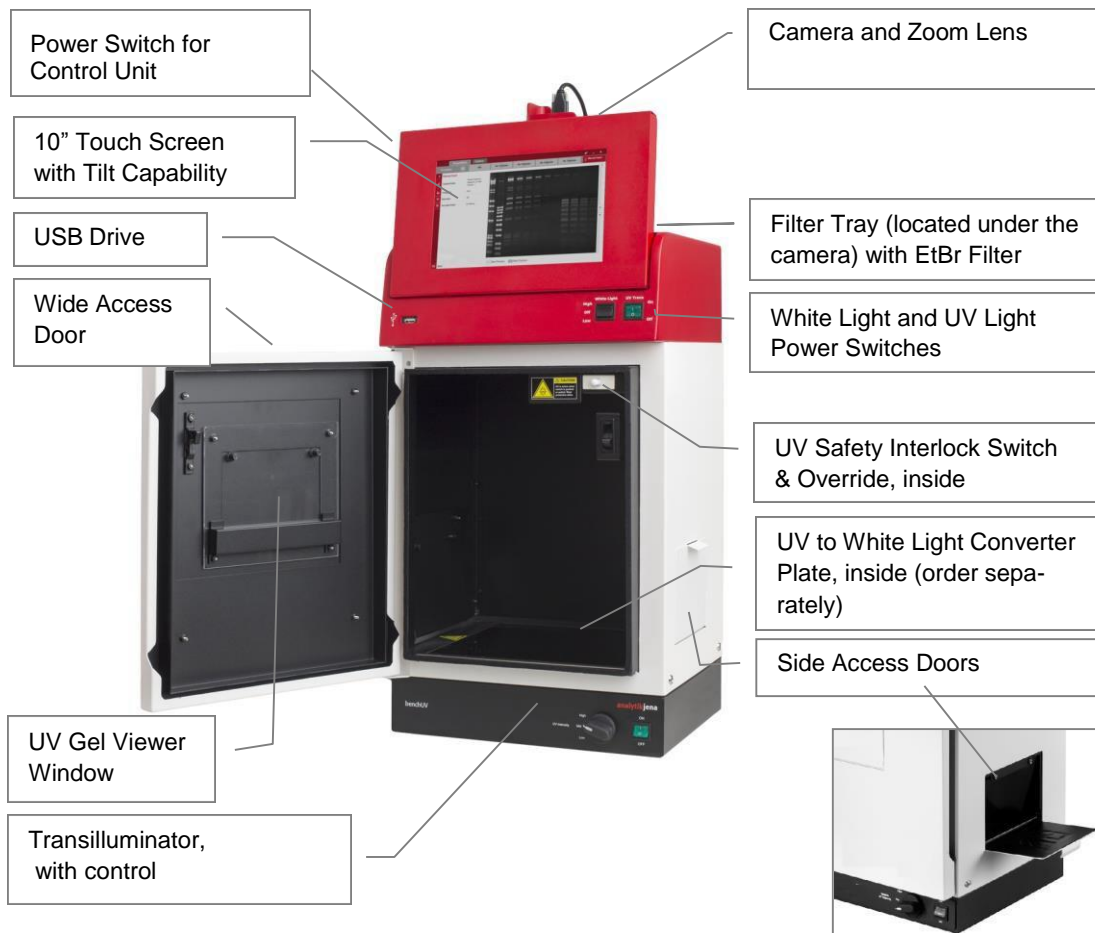- ❏ In case of emergency disconnect immediately the plug of the Imaging System from the outlet!

Because a rapid response can save lives during an emergency, the following has to be ensured:

- ❏ The operating staff must be familiar with the location of safety equipment, accident and danger alarms, first aid and rescue equipment as well as their handling.

- ❏ The operator is responsible for the respective training of the operating staff.

- ❏ All equipment for first aid (first-aid kit, eyewash bottles, stretcher, etc.) as well as equipment for firefighting (fire extinguishers) must be within reach and easy to access. All equipment has to be in a sound condition and should be checked at regular intervals.

4 System design

4.1 Components

Refer to the packing slip and pictured components for specific parts and components included with the system.

Power Switch for Control Unit

Camera and Zoom Lens

10" Touch Screen with Tilt Capability

USB Drive

Filter Tray (located under the camera) with EtBr Filter

Wide Access Door

White Light and UV Light Power Switches

UV Safety Interlock Switch & Override, inside

UV to White Light Converter Plate, inside (order separately)

Side Access Doors

UV Gel Viewer Window

Transilluminator, with control

4.2 Camera

The monochrome camera (5.0 megapixel resolution) uses a USB 2.0 interface. All camera settings are factory pre-set for optimum performance when viewing gels, films, or membranes under low light level conditions. Analytik Jena Technical Support should be contacted before making adjustments to the camera settings.

4.3 Lens

The 8 - 48 mm f/1.2 zoom lens is fitted with a close-up diopter and step-up ring. The diopter is for focusing on objects at the focus length of the UVsolo system.

4.4 Ethidium Bromide (EtBr) emission filter

The Ethidium Bromide UV blocking bandpass interference filter (50 mm sq.) blocks UV and IR radiation emitted from the transilluminator.

The filter is placed in the filter tray below the camera assembly.

The filter allows visualization of fluorophores from 580 – 630 nm, targeting the EtBr emission which peaks at 605 nm. The EtBr filter can be substituted for other specific fluorophore filters or removed when imaging non-fluorescent media (protein gels, colony plates, etc.) in order to produce brighter images.

4.5　Darkroom

The darkroom is light tight to provide optimal imaging conditions. Darkroom features include:

- ❑ UV-safe gel viewer window built into the darkroom door
- ❑ Overhead LED white light
- ❑ Wide access doors with UV safety switch
- ❑ Side doors for easys access to the interior of the darkroom (for placement or excision of samples)
- ❑ UV safety interlock switch to disable UV transillumination when the main darkroom door is opened.
- ❑ Filter slider
- ❑ Integrated transilluminator

4.6　Transilluminator

The 302 nm UV transilluminator has either a 20 cm x 20 cm or 25 cm x 26 cm filter and a UV intensity selector.

4.7　Touch Screen

The display is a 10-inch colour touch screen connected to the darkroom cabinet with tilt adjustment. The touch screen allows the user to perform a variety of tasks, including previewing, capturing, saving and printing images, as well as selecting preference options, without the use of an external mouse or keyboard.

A stylus pen is included for increased pointer control for selecting software options on the touch screen.

For users who prefer not to use the touch screen interface, an external keyboard and mouse can be used via any available system USB ports.

4.8   Removable USB Stick

The removable USB stick has 8 GB memory (minimum) included with the system which connects to the system allowing for saving and transferring of images.

4.9   Fluorescent Focus Target

The Analytik Jena Fluorescent Focus Target fluoresces when placed on a UV transilluminator or when exposed to overhead UV. The Target provides sharp fluorescent images to aid in adjusting the lens and camera settings for ideal imaging results.

Remove the blue protection film from the Target.

Fluorescent Focus Target

4.10   Optional equipment

Analytik Jena offers a variety of optional equipment to support the needs of varying laboratory environments. Refer to "Replacement parts and accessories" at the end of this manual for optional equipment part numbers.

4.10.1   Thermal Printer

The thermal printer provides archive quality, 256 grayscale prints and five optional cost-effective print sizes.

Thermal Printer

4.10.2   Converter Plates

The **UV/White Converter Plate** allows imaging of non-fluorescent stained media with an ultraviolet transilluminator. The converter plate is specially coated to convert 302 nm UV to white light.

The **Converter Plate Visi-Blue™** (not shown) converts UV to a safe 460 – 470 nm wavelength designed for use with blue excitation samples and SYBR® Green, SYPRO® Orange and GFP stains.

UV/White Converter Plate

5 Set-Up

5.1 Scope of supply

When unpacking the UVsolo touch and UVsolo 2 touch, the following items will be included:

- ❑ UVsolo touch darkroom

- ❑ Camera with zoom lens, bracket, close-up lens, adapter ring, UV filter

- ❑ Ethidium bromide (EtBr) emission filter

- ❑ Transilluminator

- ❑ Main power cord, jumper cord, USB camera cable

- ❑ USB flash drive, stylus for touch screen

- ❑ Supporting documentation

- ❑ USB flash drive with VisionWorks *touch* Software

- ❑ USB flash drive containing VisionWorks Acquisition and Analysis Software (only for use on an external computer)

Unpack and carefully examine the instrument. Report any damage to Analytik Jena. Do not attempt to operate this device if physical damage is present.

Please keep the original packing material for return shipment in case of service issues.

Place the UVsolo on a stable, flat surface in a dry, safe environment.

CAUTION! Risk of short circuits!

Do not attempt to perform any setup procedures while the system is plugged in or powered on unless otherwise instructed.

IMPORTANT

Do not install the system in areas with high moisture, dust or high temperatures. Keep the equipment away from motors or any other large magnetic equipment apparatus. This system is designed for indoor use only.

5.2 Connecting the power cables

1. Plug the main power cable into the back of the darkroom and the other end into a surge-protected power outlet.

2. Connect the jumper cable from the darkroom to the rear of the transilluminator.

Connection for the main darkroom power

Connection for jumper cord to the transilluminator

5.3   Installing emission filters

UVsolo Systems include a 50 mm sq Ethidium Bromide (EtBr) filter. To install the 50 mm sq EtBr) filter:

1. Carefully remove the filter from the protective plastic case, holding the filter at the edges to prevent fingerprints.

2. The 2-position filter tray is located at the top of the system, below the camera lens hole. Place the emission filter in the desired position by inserting the filter through the camera lens hole and into the desired filter tray position.

    Note: The camera and lens must be removed to access the filter port.

5.4   Camera setup

5.5   The camera and zoom lens are pre-assembled.
Note: Camera and lens may appear different than pictured.

Camera assembly bracket

Step-up ring and diopter

1. Remove the cap from the lens.

2. If not already assembled, attach the step-up ring and diopter to the lens. The step-up ring and diopter will only fit one way.

3. Using the two brass thumb nuts provided, secure the camera assembly bracket to the darkroom bracket located on the top of the UVsolo. Ensure that a light-tight seal is made between the end of the lens and the rubber gasket beneath the darkroom bracket.

4. Plug the camera cable into the top of the camera and the other end into a USB port on back of the darkroom.

Darkroom bracket

Brass thumb nut

Camera bracket

Camera USB cable

Camera and lens assembly

Rubber gasket
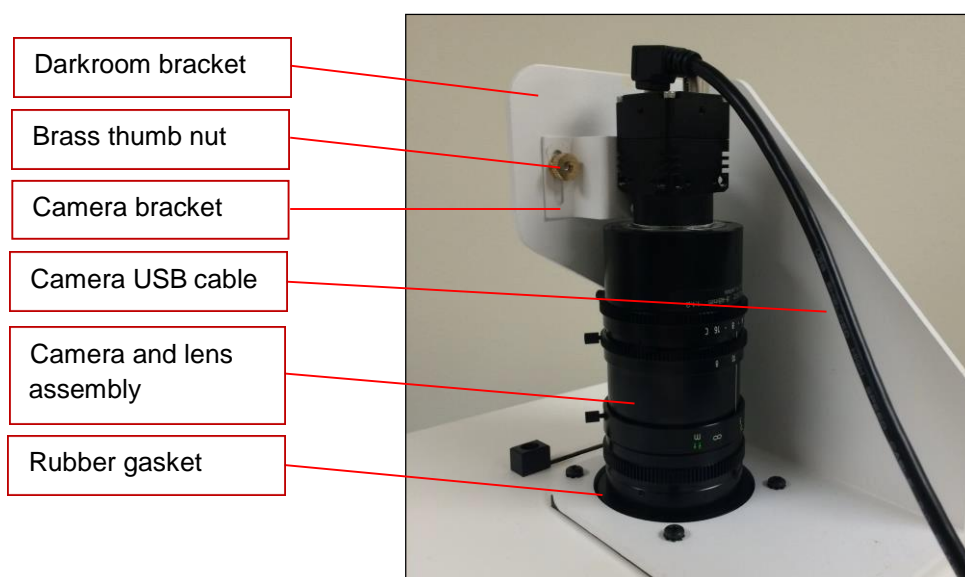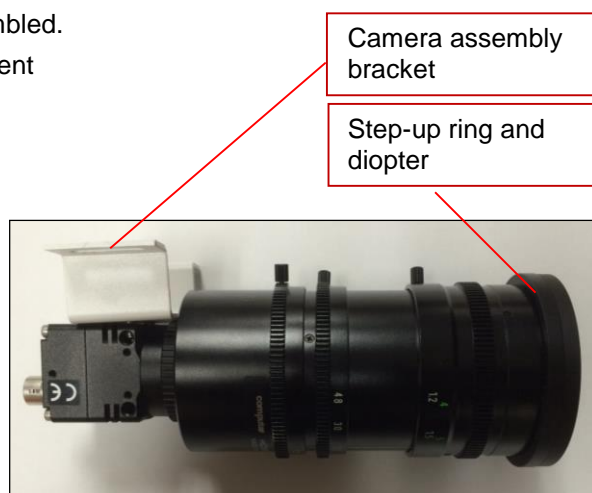
5.5 Stylus and holder

The screen is touch sensitive. Use the stylus included with the system to select the software controls. For easy access to the stylus when operating the system, remove the tape from the back of the holder and adhere it to the UVsolo. Slide the stylus into the holder.

5.6 Optional components

5.6.1 Connecting a printer

It is possible to connect a printer with USB 2.0 interface directly to one of the USB 2.0 ports on the back of the UVsolo.

We recommend to use a thermal printer as e.g. Mitsubishi P95DE. This printer provides high resolution prints very similar to the TFT screen display. For installation please transfer the required drivers to a USB stick.

5.6.2 Install drivers or additional software, e.g. drivers for a printer

In the event that additional drivers need to be installed in the system, exit the software interface and go to Microsoft Windows by pressing the **Close ("X")** button located in the upper-right corner of the main screen.

To install drivers or additional software, copy them to a USB storage device, open Windows Explorer, navigate to the appropriate folder and run the desired program.

5.6.3 Connecting an external keyboard and mouse

It is possible to connect an external computer keyboard and mouse by USB cable to the USB 2.0 ports in the back of the UVsolo. But for typical image acquisition purposes it is not necessary.

5.7 Connecting to a network

UVsolo touch Imaging Systems have built-in wireless networking capability. While it is fairly simple to connect the system to a network, it is highly recommend to obtain assistance from a network administrator to ensure that the process is completed properly.

Follow Microsoft or local standard network protocols for network configuration. To minimize the software interface and access Microsoft Windows for network configuration, press the **Minimize** ("_") button in the upper-right corner of the software.

5.8 General computer settings

For correct display and storing of date and time with the gel images it is necessary to set first the current date and time in the computer settings.

Please switch to the Windows desktop, choose "Start", "Control Panel", "Date and Time" and set the correct data.

6　Using the imaging system

6.1　Powering up the tablet computer

1. Firmly press the **POWER** button on the upper left of the system, and hold for 3 seconds to power on the internal computer. Wait for the Windows startup screen. This may take a few moments.

2. Once the computer completely boots, the software will load automatically. If it does not, double click on the desktop software icon.

3. To SHUT DOWN the computer, briefly press the POWER button.

Note: The tablet will remain on battery power if the main power cable to the whole system is unplugged.

6.2　Operating the VisionWorks *touch* Interface

Upon startup, the internal computer will proceed through the boot-up process. When complete, the Windows desktop will appear. Click the VisionWorks *touch* icon, to open the software.
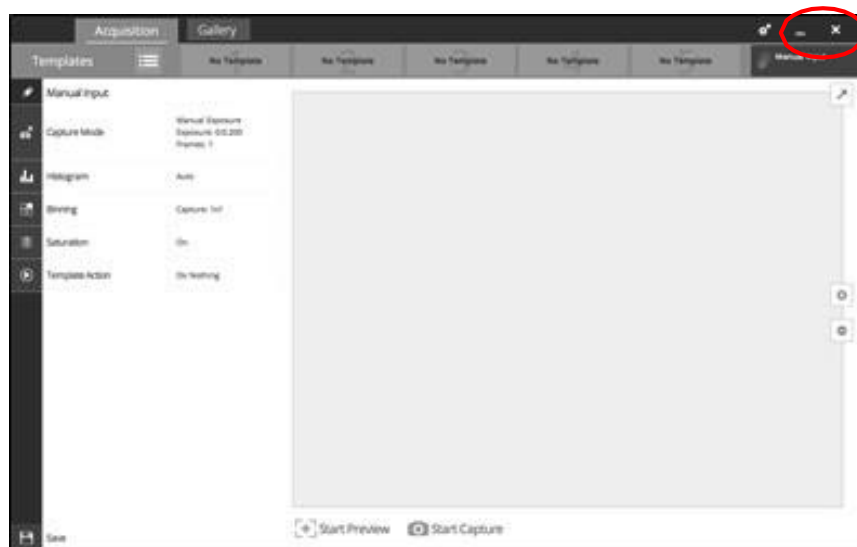
To exit the software interface, press either the close (**X**) or minimize (_) buttons at the top right corner of the software (see red circle above). To power down the system, briefly press the **POWER** button located on the upper left of the UVsolo touch screen.

Refer to **Touch Screen Interface** in this manual for further instructions on using the software.

6.3　Adjusting the screen angle

1. To adjust the angle of the screen, loosen the knobs on each side of the monitor a bit.

   Twist each knob counter-clockwise (note that you will actually be turning each knob in the opposite direction from each other).

2. Tilt the screen to the desired angle.

3. Turn each knob clockwise to tighten.

6.4 Using the transilluminator

Once the UVsolo darkroom power is turned on, power is supplied to all components including the jumper power cable that supplies power to the transilluminator.

To use the transilluminator, turn the transilluminator power on. (The main power switch located on the front of the transilluminator should always be left in ON (I) position).

Use the rotary knob on the front of the transilluminator to select the desired intensity.

Variable intensity settings as follows:

- ❑ **High:** allows for UV excitation of fluorophores on gels for routine photography and for excitation of gels with low sample concentration

- ❑ **Medium:** Excellent for viewing and quick single-band excision

- ❑ **Low:** Allows for positioning and preparation of gels, excising multiple bands and focusing for photography

Locate the UV power button on the front of the UVsolo touch system and turn it on.

After viewing/photographing the sample, turn the transilluminator off.

Note: The UVsolo touch integrates a UV interlock switch which will inactivate the UV transilluminator when the main darkroom door is open. This switch is located on the upper right corner of the darkroom door opening and is only accessible when the main door is open.

6.5 Using the Epi (Overhead) White Light

Locate the **White** power button on the front of the UVsolo system. Switch it to the desired position.

6.6 Using the UV Gel Viewer Window

The **UV Gel Viewer Window**, built into the main darkroom door, allows users to view the interior of the darkroom without opening the main door. The window glass is UV blocking while providing a clear view to the transilluminator surface for sample viewing.

To open the window cover, pull down on the metal tab. The cover will pop open. To close the cover, pivot it up until it reengages with the two small magnets.

NOTE: Close the UV Gel Viewer Window prior to capturing light-sensitive images.

6.7 Image focusing

Prior to capturing any images, prepare the image focus capabilities of the system:

- ❑ Turn on the transilluminator and place the gel on the transilluminator surface.
  Note: The UVsolo darkroom has a UV safety switch that turns the transilluminator off when the door is open. After closing the door, be sure the overhead white light switch is turned off.

❑ Using the software press **Start Preview** to begin viewing the sample within the system.

❑ While watching the screen, rotate the lens f-stop adjustment so that the image is bright enough to see on the screen.

❑ Rotate the lens focus adjustment on the lens. Adjust this so that the image appears in clear focus on the monitor.

Note: Once the proper zoom range is set, the lens will have to be refocused when zoomed in completely.

6.8 Image Zooming

The UVsolo touch is equipped with an optical zoom lens, meaning that the system uses the lens' optics to make the sample appear closer/larger on the screen. Optical zoom is adjusted using the **Zoom** ring on the camera lens.

However, it may be desirable to use digital zooming to move in closer on the image. Digital zoom enlarges a portion of the image, simulating optical zoom. Thus, the camera crops a portion of the image and enlarges the cropped portion to fill the imaging area on the screen.

To use digital zoom functionality:

1. With a preview or captured image on the screen, use the **"+"** and **"–"** buttons located on the right side of the image.

2. Tap and drag to move around on the zoomed-in image.

Notes regarding digital zoom operation:

• The software's digital zoom feature utilizes WYSIWYG, or "what you see is what you get," meaning that a zoomed preview image will result in a zoomed capture image.

• A zoomed capture image will save and print as shown on the screen (WYSIWYG).

Refer to the **Digital Zoom** section of **Touch Screen Interface** in this manual for further information.

Using maximum optical zoom and at the same time the largest lens aperture (small number) may lead to an image that is not properly focussed. In that case please reduce the lens aperture (larger number) to achieve a larger depth of focus. Now it is possible to get a properly focussed image.

❑ Rotate the zoom lens adjustment on the lens, so that the image is as big as possible. Readjust the focus ring on the lens, making the image clear. Adjust the zoom so that the object of interest is within the picture on the monitor.

6.9　Touch Screen Interface

6.9.1　Setting User Preferences

The **Settings** portion of the software allows the user to select preferences which are normally set once and rarely changed. Such settings include image save format and image save location. Access the user preferences by pressing the **Settings** button in the upper-right corner of the main touch screen and selecting from the following tabs:

- **General Settings**
- **Post-Processing**
- **Saving**

The following pop-up screen will appear:
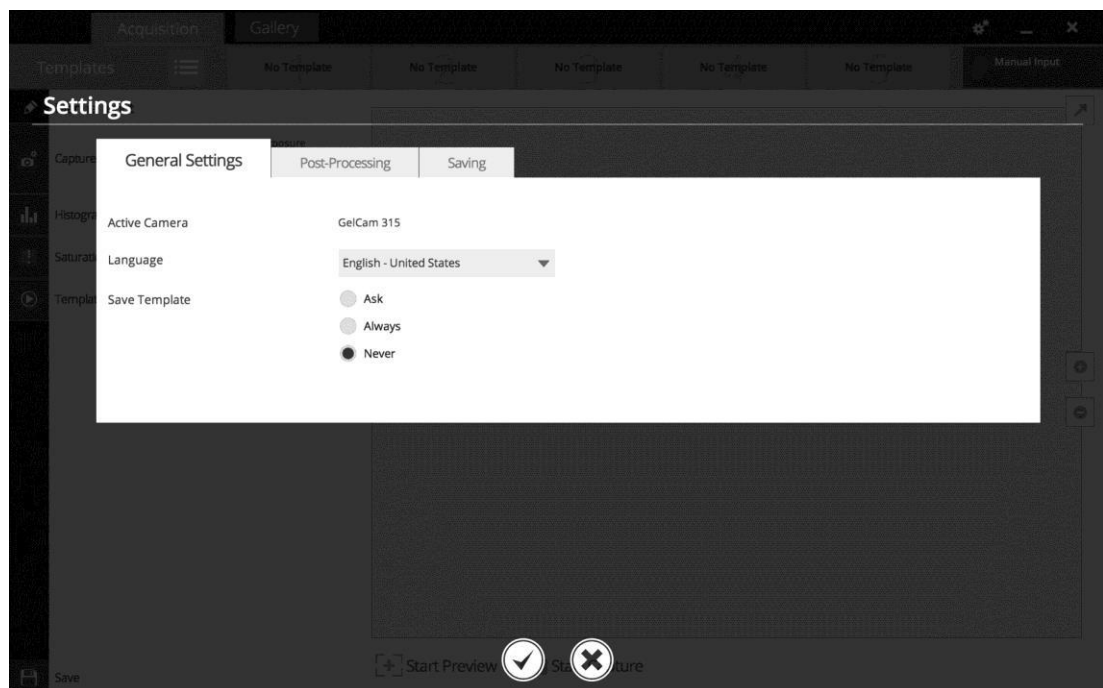
6.9.2　General Settings Tab

Language: Use the drop-down arrow to select the desired language for the software interface. Multiple language options are available including English (US), Chinese (simplified), Turkish, Japanese, Korean, Russian, Portuguese, Spanish and German.

Save Template: Select from **Ask**, **Always** or **Never** to choose whether the software should ask to save any changes to a template, always save the changes automatically without asking, or never save the changes automatically.

6.9.3 Post-Processing Tab

Auto Rotate: Set Auto Rotate to **ON** to automatically rotate the image to the desired degree upon image capture. *Note: "Auto Rotate" must be set to **ON** in order to rotate images during image capture, as images cannot be rotated after capture using the software.*

To select the degree of image rotation, press the down arrow from the drop-down menu and choose to rotate the image 90 degrees clockwise, 90 degrees counterclockwise, or 180 degrees (upside down). *Note: "Auto Rotate" must first be turned **ON** before selecting a rotation setting.*

Auto Invert Image: Set Auto Invert Image to **ON** to automatically invert the image upon image capture. *Note: "Auto Invert Image" must be set to **ON** in order to invert images during image capture; captured images can also be inverted in the Gallery view.*

Noise Subtraction: Set Noise Subtraction to **ON** to reduce the amount of background and ambient ("white") noise within the image. In most circumstances, this setting should be left **ON**. *Note: "Noise Subtraction" must be set to **ON** in order to subtract noise from images during image capture, as noise cannot be subtracted from images after capture using the software.*

6.9.4 Saving Tab

Save Format: Press the down arrow to select the desired file save format from the drop-down menu. Save images in **JPEG**, **TIFF**, **BMP** or **PNG** file formats.

From the drop-down menu to the right of the chosen file format, choose **Save Selected Format** to save the image only in the chosen format. Or, select **Save Selected & Original Formats** to save in both the selected format as well as in an uncompressed TIFF format (note: two separate files will be saved using this method).

*Note: If the TIFF file format is selected and **Save Selected & Original Formats** is also selected, both compressed and uncompressed TIFF files will be saved.*

Save Images To: Select the location where images are to be saved. The black dot within the radio button indicates which selection is activated.

1. Select **USB** to save the file to the USB drive if one is currently inserted. If a USB device is not present, the user will be notified that a USB drive is not present when attempting to save an image.

2. Select **Prompt for Location** to prompt the user to select a file save location when attempting to save an image. This setting will also allow the user to save using a custom file name.

3. Choose **Select Folder** to define where the file will be saved when attempting to save an image. Select from any local or network drive by pressing the folder icon to the right of the file path display. *Note: The **Select Folder** radio icon must first be selected prior to defining the save location.*

Auto Save After Capture: Set **Auto Save After Capture** to **ON** to automatically save the image after capture. The image will automatically save to the location selected in **Save Images To** and in the format selected in **Save Format**, as described above.

NOTE: If the **Auto Save After Capture** function is set to **OFF**, press the **Save** button in the Gallery view to manually save an image.

Auto Print After Capture: Select **ON** to automatically send the captured image to the default printer after an image is captured. If a default printer is not installed, the Windows "Printers and Faxes" dialog will automatically appear after the image is captured. Select the desired printer in the "Printers and Faxes" dialog box and press **OK** on the dialog box to print the image.

6.9.5   Accept or Cancel Settings

Once all Preferences settings have been made, press the **Checkmark** button at the bottom of the Preferences screen to save all preferences and go back to the main TS screen. Or, press the **"X"** button to go back to the main TS screen without saving changes.

6.10   Identifying the Touch Screen Buttons and Functions

Using the UVsolo touch touch screen allows for convenient selection of all system functions, including image capture, save and print. Following is a list of buttons on the touch screen and their individual functions.

TS Button	**Function**
"Off" and **"On"** Sliders	Throughout the TS interface, the **"Off" and "On" Sliders** are used to turn settings either off or on. To toggle between off and on, tap the Slider; the Slider will autmatically move between the "X" (off) and the checkmark (on).
"Acquisition" Tab	To access system acquisition settings, press to select the **Acquisition** tab.
Settings	Access user preferences by pressing the **Settings** button in the upper-right corner of the main TS screen. The **Settings** screen allows the user to select settings which are normally chosen once and rarely changed, such as interface language and image save format. See the **Setting User Preferences** section of this manual for further information.
Templates	Press the **Templates** button to access the list of templates. Press again to close the list of templates. For more information on templates, see the **Using Templates** section of this manual.
Start Preview	To view a preview of the image prior to capturing, press the **Start Preview** button. This function is active when the button's text and pictogram are shown in purple and read "Stop Preview". When active, press the button again to deactivate live preview.
Maximize **Minimize**	When an image preview is open, press the **Maximize** button to show the image in full-screen mode. Press the **Minimize** button to close full-screen.
Start Capture	To capture an image with user-defined settings, press the **Start Capture** button. For longer exposures, the amount of time remaining for the capture to complete will appear to the right of the "Start Capture" button. This function is active when the button reads "Stop Capture" in purple lettering. **NOTE**: When using the Start Capture button, if the **Auto Save After Capture** function is enabled in Preferences, the image will automatically be saved to the preset location (see "Saving Tab" under **Setting User**

	Preferences in this manual).
Marker **Slider Bar** **+** **−**	Use the **slider bar** to adjust various settings. To adjust the settings, do one of the following: • Press and drag the marker (small triangle) to the desired position; • Touch anywhere along the gray slider bar and the marker will automatically "snap" to that position (not applicable to Histogram); or • Press the **"+"** and **"−"** buttons to make fine adjustments to the settings (not applicable to Histogram).
⊕ ⊖ **Digital Zoom**	To digitally zoom in on previewed or captured images, use the **Digital Zoom Buttons** (**"+"** and **"−"**) located to the right of the active image. Tap and drag to move around on the zoomed-in image.
Capture Mode	Press the **Capture Mode** button to access exposure time adjustment for live image preview and capture, as well as to select modes for image capture. Use the vertical **slider bars** and/or the **"+"** and **"−"** buttons to make adjustments to the desired portion of the exposure time (**sec**, **ms** or **microseconds**). To adjust capture modes, select the desired mode from the drop-down menu. Capture modes include: • **Manual Exposure:** Captures one (or more) images with a pre-selected exposure time. If desired, select the **Number of Frames** to be captured. Use the **"+"** and **"−"** buttons to select the desired number of frames. • **Auto Exposure:** Captures an image with an ideal exposure time determined automatically by the system prior to image capture. (**NOTE**: When using the Auto Exposure function, any exposure time settings made by the user prior to image capture will be changed.) After selecting **Auto Exposure**, select from one of the following image acquisition settings: 1. **Best (Longer Exposure)** exposes the image to the maximum value of the histogram (65,000 gray levels). 2. **Better** exposes to fill the histogram 50 % so the brightest portion of the image is at 32,000 gray levels. 3. **Good** exposes to fill the histogram to 25 % or 16,000 gray levels. 4. **Minimum (Fast Exposure)** exposes to fill the histogram to 10 % over background.

Histogram	Press the **Histogram** button to access image histogram adjustment. Use the pointers on the vertical **slider bar** to make adjustments to this setting. Slide the top marker down to darken the image, or slide the bottom marker up to lighten the image. Push the "Reset" button to reset the markers to the top and bottom of the slider bar, showing the image's full histogram range. Turn **Auto Adjust** on to automatically adjust the image histogram for ideal imaging results. **NOTE:** Histogram settings also apply to the Gallery view, discussed later in this manual.
Saturation Warning	Turn on **Saturation Warning** to provide a bright yellow or red image overlay on oversaturated areas of the image during Live Preview. Yellow indicates mild overexposure while red indicates extreme overexposure. To capture an ideally exposed image, decrease the aperture or exposure time until the yellow or red overlay disappears. To activate saturation warning, press the **Saturation Warning** slider until the check mark appears.
Action	Press the **Template Action** button to select which action the UVsolo will take when a template is selected. Available actions include: • **Start Capture:** When a template includes this Action, all system settings will be adjusted according to the template and then the image will automatically be captured. • **Start Preview:** When a template includes this Action, all system settings will be adjusted according to the template and an image preview will automatically be shown. • **Do Nothing:** When a template includes this Action, all system settings will be adjusted according to the template; no image preview or capture will occur.
Done and **Save**	After all template settings have been made, press the **Done** (checkmark) button. Then, to save the selected settings as a template for future use, press the **Save** (disk) icon. A window will appear prompting the user to enter a template name using the on-screen keyboard. After the name has been entered, press the **Checkmark** button to accept the name or the **"X"** button to cancel.
Gallery **"Gallery" Tab**	To access the photo gallery, press to select the **Gallery** tab. Once active, select the desired image from the top of the Gallery screen.

Open Image	To open a previously-saved image, press the **Open Image** button. Pressing this button will open the Windows file/folder navigation screen. Select the desired file and press **Open**.
Gallery Navigation	Use the **Gallery Navigation** buttons to navigate through the image gallery. When multiple "pages" of images appear in the gallery: • Press **Previous** to go to the previous page. • Press **Next** to go to the next page. • Press **Last** to go to the newest picture in the Gallery. • Press **Active** to go to the active image shown on the main image screen.
Maximize **Minimize**	When an image is open in the Gallery, press the **Maximize** button to show the image in full-screen mode. Press the **Minimize** button to close full-screen mode.
Close	Press the **Close** button to the right of the image to close the active image. If the image is unsaved, the user will be prompted to save the image before closing.
Information	Press the "**i**" (**Information**) button to view information pertaining to the open image, such as exposure time. Press the "**i**" button again to close the image information screen. **NOTE:** Image information is only available for images captured using the UVsolo touch.
Digital Zoom Buttons	Use the **"+"** and **"–"** buttons located to the right of the active image to digitally zoom in or out on Gallery images. Tap and drag to move around on the zoomed-in image.
Save Burned **Save**	Press the **Save Burned** button to save the image with all modifications (such as time stamp and histogram modifications) embedded in the image. Or, press the **Save** button to save the raw image without any modifications embedded. Images will be saved to the location specified in **Preferences**. The file name is automatically assigned by the software as **yyyy-mm-dd_hh-mm-ss**, with "yyyy-mm-dd" being the date of image capture and "hh-mm-ss" being the time of image capture. **NOTE**: To manually change the file name when saving an image, select **Prompt for Location** under the **Saving** tab in **Settings** prior to saving. Then, each time the Save button is pressed, the user will be

	prompted to select a file save location and can enter a custom file name. **NOTE:** If **Save Selected & Original Formats** is selected in the **Settings** menu (described earlier in this manual) and the **Save** button is pressed, both the selected and original formats will be saved. However, if the **Save Burned** button is pressed, only the selected format will be saved.
Print	Press the **Print** button to print the current image on the default printer. If a default printer is not installed, pressing the **Print** button will place the print request in queue.
Histogram	See the **Histogram** section in the **Acquisition** portion of this manual for information on using the histogram in Gallery view.
Time Stamp	To add a date stamp to the captured image, press the **Time Stamp** button, then press the slider until the check mark appears. This will add **mmm/dd/yyyy hh:mm:ss** to the bottom right corner of the image. **NOTE:** The time stamp is not saved to the image unless **Save Burned** is selected (as described earlier in this manual).
Pseudocolor and **Invert**	Press the **Pseudocolor** button to access a variety of Pseudocolor options for captured images. Pseudocolor options include **in vivo**, **oversaturation** (shows yellow to indicate mild overexposure and red to indicate extreme overexposure), **yellow**, **red**, **green** and **blue**. Press the appropriate radio button to select the desired pseudocolor. Press the **Invert** button to access image inversion selection. Under **Invert**, touch the slider until the check mark appears to activate image inversion. **NOTE:** Pseudocolors and image inversion are not saved to the image unless **Save Burned** is selected (as described earlier in this manual).
Minimize and **Close**	Press the **Minimize** ("_") button in the upper-right corner of the screen to minimize the software. Press the **Close** ("**X**") button in the upper-right corner of the screen to close the software. If any unsaved images are open prior to closing the software, the user will be prompted to choose one of the following: 1. Save the current image 2. Not save the current image 3. Cancel closing the software 4. Save none of the images 5. Save all images The user will also be prompted to **Save Selected Format** or **Save Selected & Original Formats**. See the "Preferences" section of this manual for more information.

6.11 Using Templates

The UVsolo touch is capable of utilizing templates to recall pre-saved systems settings for repeat experiments. An unlimited number of templates can be saved in the system, with up to five quick-access templates available at the top of the main system screen for easy access.

To create a template:

1. Set the various system settings as desired following the instructions shown in the **Identifying the Touch Screen Buttons and Functions** section of this manual.

2. Once all desired settings have been selected, press **Done** at the bottom left of the screen. A summary of all settings will be shown. Then, press **Save** to save the template:

   a. For new templates, a popup will appear requesting for the template to be assigned a name.

   b. For existing templates, the keyboard will appear with the template name shown. The user can then accept the current name by pressing the **Checkmark** button, enter a new template name then press the **Checkmark** button, or press the **"X"** button to cancel saving.

3. To access saved templates, press the **Templates** button as shown:

4. To select the quick-access templates to be shown at the top of the TS screen, press the **Templates** button until the list of saved templates is shown. Then, drag the template to the desired quick-access position.

To run a template, either:

1. Select the desired template from the **Templates** menu by pressing the gray check box icon to the right of the template name, or

2. Select the template from the quick-access area.

Once the template is selected, all template settings and actions will automatically be performed on the system.

A template is active when the template button shows white letters on a purple background. A template is inactive when black letters are shown on a gray background.

To edit a template name, press the gray pencil icon to the right of the template name in the list of saved templates. The template settings will be shown. Press the pencil icon in the upper-left corner of the screen to the left of the template name. An on-screen keyboard will appear. Use the keyboard to enter the desired template name. Press the **Checkmark** button to accept the revised name, or press the **"X"** button to cancel.

To delete a template, press the gray trash can icon to the right of the template name.

To disregard a template and enter settings and actions manually, press the **Manual Input** button located at the top right of the software:

6.12   Using the gel viewing window

The glass is UV blocking while providing a clear view to the transilluminator surface for visibility of samples without opening the door.

Working for a longer time directly with the UV light it is recommended to additionally use UV protection spectacles.

The Gel Viewer has a pressure-sensitive clasp. Press firmly to open the viewer.

6.13   Cutting out of gels

Place the gel on top of the UV transilluminator. Close the door of the darkhood. Open the gel viewing window and both side access doors of the darkhood.

Switch the UV light on, recommended is reduced UV intensity of "Medium" or "Low".

Now you can take your arms through the side access doors for cutting the gel. The gel viewing window allows a safe view to the gel.

CAUTION

UV Transilluminators are powerful sources of UV radiation that will cause damage to unprotected eyes and skin. Before operating any unit, be sure all personnel in the area are properly protected.

Protect your arms and hands by long-sleeved, tightly woven clothes and suitable gloves when working above UV radiation.

6.14   System shutdown

To shut down the software, firmly press the power button located on the upper right of the touch screen.

To turn the whole system off, press the power switch button, located on the back of the darkroom.

7 Maintenance, replacement parts/accessories

7.1 Care and cleaning

CAUTION! Risk of electrical shock!

Ensure that the system is turned OFF and unplugged during cleaning.

❑ Clean unit surface with a damp soft cloth or sponge. Use mild soap or detergent solution.

Never use abrasive cleaners (can damage the UV filter surface of the transilluminator). Do NOT use oil- or petroleum-based cleaners for the cabinet.

❑ Clean the instrument only from outside.

The imaging system or the transilluminator must not be dipped into water or other liquids!

Transilluminator

❑ To protect the filter glass and minimize moisture and liquids on the glass, it is recommended that you use a UV transmitting Gel-Tray. Refer to the Replacement Parts for ordering information.

❑ When the transilluminator features a UV Blocking Cover only cleaning with a damp cloth is allowed.

Alcohol and glass cleaner detergents attack the plastic and damage the UV protection shield.

❑ Pay attention to wearing appropriate gloves when cleaning areas (as UV filter plate of the transilluminator, switches of the darkhood, darkhood door) which may have been in contact with carcinogens or toxic reagents (e.g. dye ethidium bromide)!

7.2 Replacement parts and accessories

Replacement parts and accessories are listed below. Only authorized Analytik Jena service personnel should perform repairs or replacements other than specified in these procedures.

For replacement parts of the transilluminator please refer the manual of the transilluminator.

For replacement parts or components not shown here, please call Analytik Jena Customer Service or place of purchase. Please have the transilluminator model number available when you call.

Emission Filters	
Filter, Ethidium Bromide, 50 mm Square	849-00400-0
Filter, SYBR® Green, 50 mm Square	849-00401-0
Filter, SYBR® Gold, 50 mm Square	849-00402-0

Transillumination Accessories	
Converter Plate UV-to-white, 21 cm x 26 cm	849-20510-0
Converter Plate UV-to-white, 25 cm x 26 cm	849-20511-0
Converter Plate UV-to-blue "Visi-Blue", 21 cm x 26 cm	849-20520-0
Converter Plate UV-to-blue "Visi-Blue", 25 cm x 26 cm	849-20521-0
Converter Plate UV302-to-UV365, 25 cm x 26 cm	849-20523-0
Gel Accessories and Protective Equipment	
Gel Cutter (2 pieces)	849-20603-0
Gel Scooper, scoop area 14 cm x 15 cm, UV transparent	846-057-013
Gel Tray, 29 cm x 23 cm, UV transparent	849-20605-0
Gel Ruler, UV fluoresent (2 pieces)	849-20600-0
Faceshield, UV blocking	849-20602-0
Safety spectacles, UV blocking	846-055-002
Accessories	
USB-to-Ethernet Adapter	849-20607-0

7.3 Replacing tubes in the transilluminator

CAUTION! Risk of electrical shock!

Ensure that the system is turned OFF and unplugged during cleaning.

IMPORTANT

Allow for a sufficient cool-down of the light tubes before maintaining them.

1. Remove the darkroom from the transilluminator:

2. Remove the four screws (two at each side) from the sides of the unit.

3. Lift the darkroom off the transilluminator.

4. Take care that the steel frame with UV filter is not also lifted off.

5. Remove the filter cover from the base. Now the four UV lamps are visible.

6. Remove the reflector on the left and optionally also on the right side of the unit: Slide the reflectors up out of the unit.
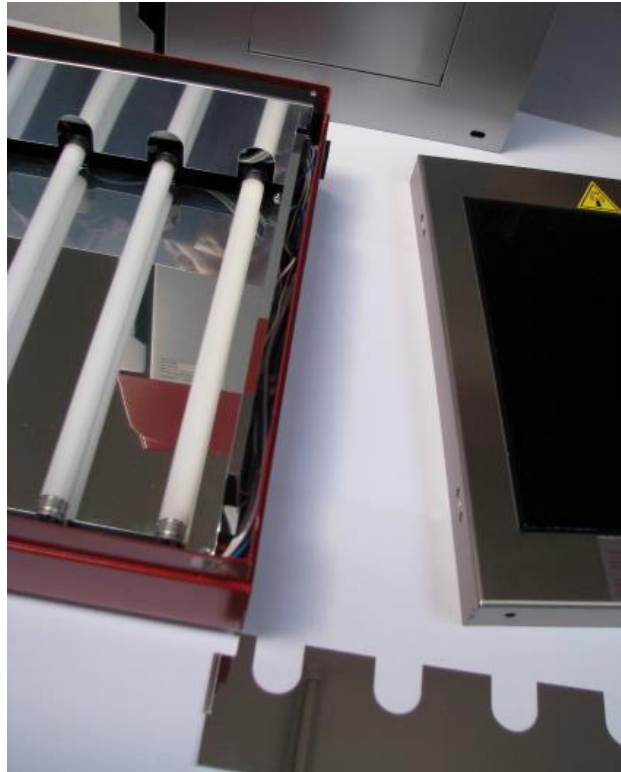
7. Remove the tubes:

8. Carefully rotate the tube a quarter turn and slide it out of the socket. Replace with a new tube by sliding the tube into the socket and rotating into place by a quarter turn.

9. Insert the reflectors back into place.

10. Please take care that the small square plate at the side of the reflectors is placed inside the fixed re-flectors.

11. Please slide the reflector over the guide strips of the fixed reflector.

12. The small, right angle bent edge of the reflector shall be directed towards the outer side of the transilluminator.

13. Replace the filter cover, and reattach the darkroom with 4 screws and washers.

Disposal of UV lamps!

- The lamps are containing substances hazardous for health and environment!
- Handle the lamps with cautious to avoid breaking.
- The bulbs must not be discarded to the normal domestic waste but must be passed to the local disposal center for hazardous waste.

8 Troubleshooting

8.1 No power to the darkroom

Recheck main power cord connections to the darkroom.

Check fuses, located at the back of the unit, near the power port. Two fuses "2 Ampere Slow Blow" are included.

You will need a flat-head screwdriver. Turn the cap and the fuse holder will "pop-out". Inspect the thin wire within the glass fuse to see if there is a break in the wire. If so, replace fuse(s).

If fuses are blown repeatedly, contact Technical Support Department for additional troubleshooting.

8.2 No image on the touch screen

To power up the software, firmly push the POWER button, for 3 seconds. It is located on the right side of the unit.

8.3 Transilluminator will not turn on

Be sure the darkroom cabinet's door is completely closed. There is a UV exposure safety cut-off switch that turns the transilluminator off when the darkroom cabinet's door is opened.

Be sure the darkroom cabinet's main power switch is lit. If not, refer to "No power to darkroom cabinet."

The transilluminator itself has a power switch; make sure that the transilluminator switch is in the On position.

Be sure the transilluminator's power jumper cord is securely connected at both the ends of the cable.

Check fuses, located at the back of the unit, near the power port.

9 Disposal

At the end of its service life the Imaging System and all its electronic components must be disposed of in accordance with the applicable regulations as electronic waste.