VWR® Gel Documentation System Smart

Instruction Manual

European Catalogue Number(s):

VWR® Gel Documentation system Smart: 730-1381
VWR® Transilluminator: 730-1382/1383/1384

Version 1
Issued: 01/2015

Legal Address of Manufacturer

Europe
VWR International bvba
Researchpark Haasrode 2020
Geldenaaksebaan 464
B-3001 Leuven
+32 16 385011
http://be.vwr.com

Country of Origin UK

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Warning Notices

Within this user guide WARNINGS are used to highlight information or instructions that must be followed in order to avoid personal injury to yourself or other people in the vicinity, e.g. switch off the mains voltage and remove mains cord before cleaning.

Safety Information

Be sure that the voltage of the VWR® Smart instrument corresponds to the voltage used in your laboratory.

Never remove the side or back panels of the VWR® Smart instrument without shutting down the instrument and disconnecting the instrument power cord from line power.

If possible, avoid any adjustment, maintenance or repair to the instrument while it is open and operative. However, if any adjustment, maintenance or repair is necessary while the instrument is open, this must be done by a skilled person who is aware of the hazards involved.

Whenever circumstances arise that mean your VWR® Smart System may be unsafe, make it inoperative. In particular, a VWR® Smart System may be unsafe if it:

- Shows visible damage
- Fails to perform the intended measurement
- Has been subjected to severe transport stresses
- Has been subjected to prolonged storage in unfavorable conditions

Environmental conditions

- The instrument should only be used under the following conditions:
- Indoors
- Altitudes below 2000m
- Ambient temperature between 5°C and 40°C
- Relative humidity below 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C
- Electrical supply fluctuations not exceeding ±10% of the nominal voltage.

The protection provided by the equipment may be impaired if the operating conditions do not lie within these parameters.

Electrical safety

The instrument has been designed to protect the operator from potential electrical hazards. This section describes some recommended electrical safety practices.

Lethal voltages are present at certain points within the instrument.

When the instrument is connected to line power, removing the instrument covers is likely to expose live parts.

Even when the power switch is off, high voltages can still be present – capacitors within the instrument may still be charged even if the instrument has been disconnected from all voltage sources.

The instrument must be correctly connected to a suitable electrical supply. The supply must have a correctly installed protective conductor (earth ground) and must be installed or checked by a qualified electrician before connecting the instrument.

Any interruption of the protective conductor (earth ground) inside or outside the instrument, or disconnection of the protective conductor terminal is likely to make the instrument dangerous.

Intentional interruption of the protective conductor is prohibited.

Ensure that the electricity supply inlets on the instrument are not obstructed, i.e. leave a gap to allow easy disconnection from the electricity supply.

When working with the instrument:

- Connect the instrument to a correctly installed line power outlet that has a protective conductor connection (earth ground).
- Do not operate the instrument with any covers or internal parts removed.
- Do not attempt to make internal adjustments or replacements except as directed in the manuals.

- Disconnect the instrument from all voltage sources before opening it for any adjustment, replacement, maintenance or repair. If the opened instrument must be operated for further adjustment, maintenance or repair, this must *only* be done by your supplier's Service Engineer.

- Whenever it is possible that the instrument is no longer electrically safe for use, make the instrument inoperative and secure it against any unauthorized or unintentional operation. The electrical safety of the instrument is likely to be impaired if, for example, the instrument:

- Shows visible damage
- Has been subjected to prolonged storage under favorable conditions
- Has been subjected to severe stress during transportation

Electrical protection

- Insulation: Class I rating for external circuits. Only connect equipment that meets the requirements of IEC 61010-1:2010, IEC 60950-1:2005, AMD1:2009 and AMD2:2013 or equivalent standards.

- Installation Category: The instruments are able to withstand transient over voltages typically present on the MAINS supply. The normal level of transient over voltages is impulse withstand (overvoltage) category II of IEC 60664-1:2007.

- Pollution Degree 2: Normally only non-conductive POLLUTION occurs. Occasionally, however, temporary conductivity caused by condensation must be expected.

Package contents

Camera	12/16 bit
CCD	1/3 inch
Zoom	Manual zoom 6.5-39, F1.4 , aperture and focus
Display	8” colour touch screen
Filter Draw	Yes UV filter as standard
Max gel size	20 x 20 cm
Data types	TIFF and JPEG
CCD resolution	2M pixels
Image storage	USB
Image enhancements	Rotation and inversion, sharpen, smooth and many more
Illumination	Slide in and out UV transilluminator, visible light converter and blue LED transilluminator (Ultra-Slim), Epi white LED

Darkroom

The darkroom has a sliding door. The darkroom features:

- Slide out mid wave 302nm UV transilluminator
- Internal white light LED
- Safety switch to protect from accidental UV exposure

UV Transilluminator

The UV transilluminator will excite many fluorescent stains such as Ethidium bromide, SYBR™ stains, Gel Red™. The standard wavelength is 302nm.
To protect users from accidental exposure, the UV light is automatically shut off if the door is opened. The transilluminator can be slid easily in and out of the cabinet.

Filter Drawer

Interchange a range of filters for extensive choice of fluorescent applications.

LCD Touch Screen

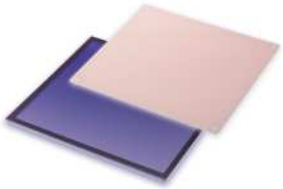
A built-in 8 inch VGA colour LCD touch-screen allows users to preview, capture, print and save images, as well as to select various processing functions, without the connection of an external keyboard or mouse.

USB Flash Drive

The USB flash drive on the front of the VWR® Smart system for the easy storage of images.

Accessories (optional)

Visible light converter (European Catalogue number: GE-CONVERT5)



VWR offers a visible light converter that can be placed on top of the UV transilluminator for imaging coomassie and silver stained gels.

Blue LED transilluminator (European Catalogue number: ULTRA-SLIM)

The UltraSlim blue LED transilluminator is ideal for safely imaging gels stained with SYBR Safe, Gold and Green, GelGreen and UltraSafe blue.

Thermal printer (European Catalogue number: 730-1260)

You may attach a thermal printer, either Mitsubishi P95DW or Sony UPD897.

When you first attach the printer you will see the following window

Select ‘No, not this time’ and press Next button
The drivers will automatically install.

Analysis software (European Catalogue number: 730-3026)

The VWR® Smart system is supplied with a copy of VWR® Gel Doc Software analysis software. This may be loaded on a PC of your choice. Please see the loading instructions within the CD cover.

Unpacking Instructions

Original packing of
A. VWR® Smart

B. Flip the box upside down and open the box. Turn the box the other way up and lift up the box to remove the VWR® Smart

C. Remove the foam from the top of the VWR® Smart

D. Remove the plastic covering from the VWR® Smart

E. Remove the foam from underneath the VWR® Smart

F. VWR® Smart is now unpacked

Installation

Installing the VWR®Transilluminator

Place the UV transilluminator inside and connect it to the free flying mains lead inside the VWR® Smart system

Camera Set-up

Connect the USB cable from the camera to the back of the VWR® Smart unit

Installing the filter

Place the UV filter with the thread pointing upwards in the filter drawer (found below the camera and on top of the VWR® Smart system). This filter can be interchanged with other filters for different dyes.

Turning the power on

Connect the mains lead from the VWR® Smart system to the mains power supply and switch on. Power on momentarily pressing the round black button on the rear of the unit. There will be a 1-2 second delay as the system boots. After a few seconds a display will appear.

Select Regional power frequency

From the first screen select ‘Preferences’ icon

Select either 50 or60Hz

or

Intended Use

The VWR® Smart system has been designed to make your gel imaging simple, quick and easy. This system is the perfect choice for a low budget gel imaging system and features a compact darkroom which has a sliding front door and internal LED white light.

The VWR® Smart system supports multiple applications including DNA/RNA gel imaging such as EtBr, SYBR Green and visible stained gels i.e. coomassie blue and silver stain.

Applications supported

Transilluminator UV	Visible Light Converter	Blue LED Transilluminator
Ethidium Bromide SYBR Green SYBR Gold SYBR Safe Gel Green Gel Red SYPRO Ruby	Coomassie blue stain Copper stain Zinc stain Silver stain	SYBR Gold SYBR Green SYBR Safe UltraSafe blue

Getting started

Capturing an image of an agarose EtBr or similar gel

(For rapid capture see Quick Guide-Capture)

Step One

Position the sample on the centre of the transilluminator, close the door, ensure the UV filter has been placed in the filter draw and then manually turn UV on by pressing the 'UV On' switch on the front of the unit. Then press the 'Live' button icon.

Figure 1- LIVE view icon

Step Two

Manually adjust the camera settings such as the aperture, zoom and focus. Adjust the aperture, zoom and focus settings until a suitable image is displayed, preferably with the sample filling the screen for maximum resolution.

Please note that opening the aperture too far may result in areas of the sample being saturated.

Figure 2- Lens control

Step Three

The exposure time can either be set manually or automatically. Adjusting the exposure time will alter the brightness of the image. To manually increase or decrease the exposure time use the following icons.

Figure 3- Manual Exposure controls

The auto-exposure function sets the exposure time to a level that ensures no saturation of the image occurs. To use the auto-exposure function select the following icon.

Figure 4- Auto Expose icon

Step Four

To capture the image press the Capture button. If you have selected auto-expose then you will not need to press the Capture button.

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Figure 5- Capture button

Capturing an image of a protein gel (coomassie, silver stained) or other white light image (Colony plate, autorad, microtitre plate etc)

Step One

Make sure that you place the visible light converter on top of the transilluminator. Position your sample on the center of the visible light converter and close the door. Manually turn on UV by pressing the 'UV On' switch.

Step Two

Manually adjust the camera settings such as the aperture, zoom and focus. Adjust the aperture, zoom and focus settings until a suitable image is displayed, preferably with the sample filling the screen for maximum resolution.

Please note that opening the aperture too far may result in areas of the sample being saturated.

Figure 6- Lens control

Step Three

The exposure time can either be set manually or automatically. Adjusting the exposure time will alter the brightness of the image. To manually increase or decrease the exposure time use the following icons.

Figure 7- Manual Exposure controls

The auto-exposure function sets the exposure time to a level that ensures no saturation of the image occurs. To use the auto-exposure function select the following icon.

Figure 8- Auto Expose icon

Step Four

To capture the image press the Capture button. If you have selected auto expose then you will not need to press the Capture button.

.

Figure 9- Capture button

Saving/ Opening and Printing Images

Saving images

To save a captured image press the ‘Save’ button. **N.B.** You can only save an image to a USB device or your local area network (LAN). Images can be saved in the following formats TIFF and JPEG.

Figure 10- Save Button

Opening Images

From the front screen select ‘Open Image’ to browse captured images.

Figure 11- Open Images Icon

Printing Images

If you have a thermal printer attached to your VWR® Smart press the following button.

Figure 12- Print button

Image Enhancement

The VWR® Smart system offers a variety of functions ranging from image enhancement to annotation.

Image enhancement

To access the enhance functions select the Enhance button via the Edit Menu button. From this menu you can select to smooth, sharpen, invert or rotate your image.

Figure 13- Enhance icon

Click on this icon to apply a smoothing filter. This is useful when the image has specks of dust or bubbles present. However, this will make bands appear less sharp.

Click on this icon to apply a sharpening filter to your image. When this filter has been applied band edges should become more pronounced but you may also observe an increase in the graininess of the image.

The Invert icon will reverse the image to give black bands on a white background or vice versa. This icon is particularly useful when trying to see faint bands.

To freely rotate your images press the Rotate icon.

Press the Undo button to remove any enhancement that you may have performed.

Use the Back button to navigate between the menus.

Annotate

To access the annotation functions select the Annotate button via the Edit Menu button. From this menu you can add text, change the font, select to have your text horizontal or vertical or remove text.

Figure 14- Annotate button

Use this icon to add text to your image. Press or place the mouse cursor on your image and type your text.

To change the font style press this icon.

If you wish to have your text displayed horizontally select this button.

If you wish to have your text displayed vertically select this button.

To remove any annotation select this button.

Use the Back button to navigate between menus.

Digital Zoom

To zoom in or out on your image select the Zoom button from the screen once you have captured your image.

Figure 15- Zoom button

Digitally zoom in on your image to see faint bands.

Digitally zoom out on your sample.

Zoom settings can reset at any time.

Use the Back button to navigate between the menus.

User Preferences

To access VWR® Smart settings and set user preferences for neutral fielding, EDR, to view external keyboard and to set regional power frequency settings.

Figure 16- Preferences icon

You will be directed to a new screen (**Figure 17**).

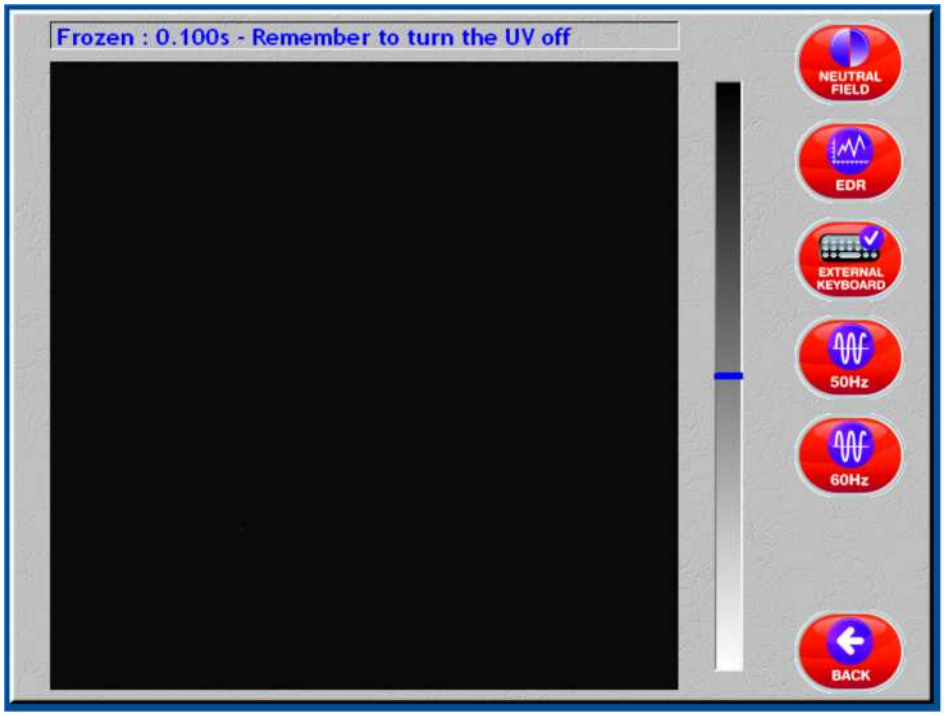

Figure 17- Preferences screen

Neutral fielding

The neutral field function is based on powerful algorithms which corrects for uneven illumination. This results in an image with a flat, even background whilst maintaining GLP compliance. To neutral field check the box (**Figure 18**) then follow the on-screen instructions (**Figure 19**)

Figure 18- Neutral fielding button

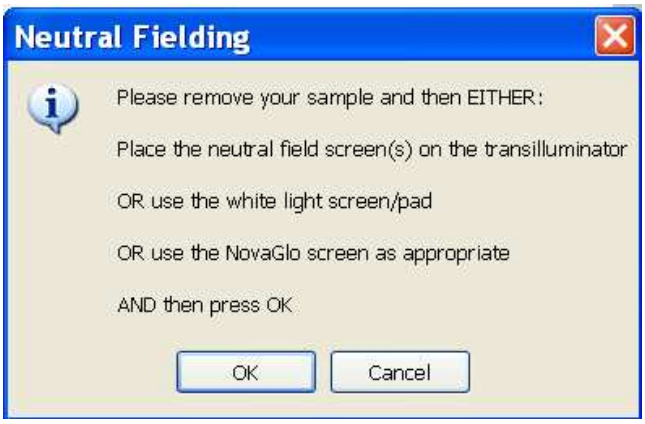

Figure 19- Neutral fielding on-screen instructions

Extended Dynamic Range (EDR)

Many gels contain areas that are too bright or too dark to be successfully captured. Closing the iris to cut down the light may prevent the viewing of dark or faint bands, whilst opening it may lead to saturation. EDR solves this problem by automatically capturing a series of images of different exposure times. The content of each image is assessed and those areas that are within the dynamic range of the camera are combined. The result is an image with a large dynamic range (up to 65536 grey levels) that encompasses all the brightness ranges existing within the sample without saturation.

Figure 20- EDR button

External Keyboard

If you wish to connect an external keyboard to the VWR® Smart system select this button.

Figure 21- External Keyboard button

Regional Power Frequency Settings

Select your regional power frequency settings - choose between 50Hz or 60Hz.

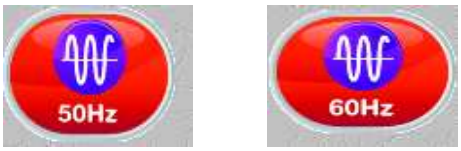

Figure 22- Regional Power Frequency Settings buttons

Troubleshooting

Troubleshooting

No power to the darkroom

- Check connection of main power cord to main power port on the rear of the VWR® Smart.
- Try another power socket within lab.

Transilluminator will not turn on

- Check power cord by sliding transilluminator fully out from cabinet. If loose push back in.
- If still not on, remove power cord and attach another one plugged in elsewhere. If transilluminator comes on there is an electrical supply problem within the VWR® Smart. If it still does not come on it is likely the transilluminator has failed. Contact your local VWR distributor.

Repair and Maintenance

Technical Service

Web resources

Visit the VWR's website at www.vwr.com for:

- Complete technical service contact information
- Access to VWR's Online Catalogue, and information about accessories and related products
- Additional product information and special offers

Contact us: For more information or technical assistance contact your local VWR representative or visit www.vwr.com

Warranty

VWR international warrants that this product will be free from defects in material and workmanship for a period of two (2) years from date of delivery. If a defect is present , VWR will, at its option and cost, repair, replace, or refund the purchase price of this product to the customer, provided it is returned during the warranty period. This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication, or from ordinary wear and tear. If the required maintenance and inspection services are not performed according to the manuals and any local regulations, such warranty turns invalid, except to the extent, the defect of the product is not due to such non-performance.

Items being returned must be insured by the customer against possible damage or loss. This warranty shall be limited to the aforementioned remedies. IT IS EXPRESSLY AGREED THAT THIS WARRANTY WILL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND IN LIEU OF THE WARRANTY OF MERCHANTABILITY.

Compliance with local laws and regulations

The customer is responsible for applying for and obtaining the necessary regulatory approvals or other authorisations necessary to run or use the Product in its local environment. VWR will not be held liable for any related omission or for not obtaining the required approval or authorization, unless any refusal is due to a defect of the product.

Equipment disposal

The Waste Electrical and Electronic Equipment (WEEE) Directive

This equipment conforms to the WEEE (European Directive 2002/96/EC and its recast 2012/19/EU) and RoHS2 (European Directive 2011/65/EU). This equipment is marked with the crossed out wheeled bin symbol to indicate that this equipment must not be disposed of with unsorted waste.

Instead it's your responsibility to correctly dispose of your equipment at lifecycle -end by handling it over to an authorized facility for separate collection and recycling. It's also your responsibility to decontaminate the equipment in case of biological, chemical and/or radiological contamination, so as to protect from health hazards the persons involved in the disposal and recycling of the equipment.

For more information about where you can drop off your waste of equipment, please contact your local dealer from whom you originally purchased this equipment.

By doing so, you will help to conserve natural and environmental resources and you will ensure that your equipment is recycled in a manner that protects human health.

Thank you

Your Distributor

Australia
VWR International Pty.LTD
Unit 1/31 Archimedes Place
Murarrie
QLD 4172 Australia
Tel.: 1300 727 696

Austria
VWR International GmbH
Graumanngasse 7
1150 Vienna
Tel.: +43 1 97 002 0
Email: info@at.vwr.com

Belgium
VWR International bvba
Researchpark Haasrode 2020
Geldenaaksebaan 464
3001 Leuven
Tel.: 016 385 011
Email: vwrbe@be.vwr.com

China
VWR International China Co., Ltd
2nd Floor, Building 4,
Lane 998, Halei Rd,
Zhangjiang Hi-tech Park
Shanghai, 201203
Tel.: +86-21 589 868 88
Email: info_china@vwr.com

Czech Republic
VWR International s. r. o.
Veetee Business Park
Pražská 442
CZ - 281 67 Stříbrná Skalice
Tel.: +420 321 570 321
info@cz.vwr.com

Denmark
VWR - Bie & Berntsen
Transformervej 8
2730 Herlev
Tel.: 43 86 87 88
Email: info@dk.vwr.com

Finland
VWR International Oy
Valimotie 9
00380 Helsinki
Tel.: 09 80 45 51
Email: info@fi.vwr.com

France
VWR International S.A.S.
Le Périgares – Bâtiment B
201, rue Carnot
94126 Fontenay-sous-Bois cedex
Tel.: 0 825 02 30 30 (0,15 EUR TTC/min)
Email: info@fr.vwr.com

Germany
VWR International GmbH
Hilpertstraße 20a
D - 64295 Darmstadt
Freecall: 0800 702 00 07
Email: info@de.vwr.com

Hungary
VWR International Kft.
Simon László u. 4.
4034 Debrecen
Tel.: (52) 521-130
Email: info@hu.vwr.com

India
VWR Lab Products Private Limited
135/12, Brigade Towers, 2nd Floor
Front wing, Brigade Road,
Bengaluru , India – 560 025
Tel.: +91-80-41117125/26 (Bengaluru)
Tel.: +91-2522-647911/922 (Mumbai)
Email: vwr_india@vwr.com

Ireland / Northern Ireland
VWR International Ltd / VWR International (Northern Ireland) Ltd
Orion Business Campus
Northwest Business Park
Ballycoolin
Dublin 15
Tel.: 01 88 22 222
Email sales@ie.vwr.com

Italy
VWR International PBI S.r.l.
Via San Giusto 85
20153 Milano (MI)
Tel.: 02-3320311/02-487791
Email: info@it.vwr.com

The Netherlands
VWR International B.V.
Postbus 8198
1005 AD Amsterdam
Tel.: 020 4808 400
Email: info@nl.vwr.com

New Zealand
VWR International LP
241 Bush Road
Albany 0632, Auckland
Tel.: 0800 734 100
Email: sales@globalscience.co.nz

Norway
VWR International AS
Haavard Martinsens vei 30
0978 Oslo
Tel.: 02290
Email: info@no.vwr.com

Poland
VWR International Sp. z o.o.
Limbowa 5
80-175 Gdansk
Tel.: 058 32 38 210
Email: labart@pl.vwr.com

Portugal
VWR International –
Material de Laboratório, Lda
Edifício Neopark
Av. Tomás Ribeiro, 43- 3 D
2790-221 Carnaxide
Tel.: 21 3600 770
Email: info@pt.vwr.com

Singapore
VWR Singapore Pte Ltd
18 Gul Drive
Singapore 629468
Tel: +65 6505 0760
Email: sales@sg.vwr.com

Spain
VWR International Eurolab S.L.
C/ Tecnología 5-17
A-7 Llinars Park
08450 - Llinars del Vallès
Barcelona
Tel.: 902 222 897
Email: info@es.vwr.com

Sweden
VWR International AB
Fagerstagatan 18a
163 94 Stockholm
Tel.: 08 621 34 00
Email: info@se.vwr.com

Switzerland
VWR International AG
Lerzenstrasse 16/18
8953 Dietikon
Tel.: 044 745 13 13
Email: info@ch.vwr.com

Turkey
VWR International Laboratuar
Teknolojileri Ltd.Şti.
Orta Mah. Cemal Gürsel Caddesi
Ördekcioglu Işmerkezi No.32/1
34896 Pendik - Istanbul
Tel.: +90216 598 2900
Email: info@pro-lab.com.tr

UK
VWR International Ltd
Customer Service Centre
Hunter Boulevard
Magna Park
Lutterworth
Leicestershire
LE17 4XN
Tel.: 0800 22 33 44
Email: uksales@uk.vwr.com