Dual-video spectral comparator Regula 4308

The device is intended for advanced authenticity verification of passports, ID cards, travel documents, passport stamps, banknotes, driver's licenses, vehicle registration certificates and other vehicle related documents, signatures and handwritten records, paintings, revenue stamps and other security documents.

The device is made as a single unit for desktop use. It is used with a built-in PC (may be connected to an external PC via USB 3.0) and fully controlled through "Regula Forensic Studio" software interface (supplied with a unit). The device is equipped with a high resolution spectrometer, hyperspectral imaging module, light source for anti-Stokes luminescence, XY translation stage, modules for reading MRZ, RFID chips, hidden image (IPI), 1D and 2D barcodes.

Best in class

Being the best in class for advanced document examination, Regula 4308 has been developed and produced with the use of the latest hi-tech innovations.

Its high functionality is achieved due to over 30 types of light sources, over 20 light filters, a self-developed precision optical system and 2 high-resolution cameras.

Technical innovations

The comparator allows working with large format documents. Due to side flaps and widened internal space examined objects can be conveniently placed inside.

The extended field of view and updated algorithms of image stitching make it easy to obtain the whole image of an A4 page.

A unique motorized system of oblique lighting, which allows changing the light source angle of incidence, provides a wide range of opportunities for examining microrelief of a document in the visible and infrared spectrum range.

Advanced algorithms of image capture

Advanced system for capturing high-resolution images preserves all tiny elements precious for further object examination.

New algorithms and the enhanced optical scheme make it possible to obtain a multi-focus image in one click. Such an image takes on a new level of detail as the whole frame turns out to be in focus independent of the size of its relief.

Software

Regula Forensic Studio software is a key to outstanding performance of Regula 4308. It forms a duet of personal computer and the comparator and creates a laboratory for forensic examination. Efficient and intuitive interface of the software helps the user easily operate the device and manage obtained data.

Extended functionality of Regula Forensic Studio offers an extraordinary experience to those who are involved in security document analysis. Now it is possible to build a 3D-model of a document fragment. And this is what makes the difference when examining overlapping objects such as a signature and a stamp or a signature and some text.

In addition, it is worth taking advantage of the information reference system "Secure Documents Ultimate" which provides access to images and descriptions of documents and banknotes from all over the world. During the device lifetime, Regula Forensic Studio software is updated free of charge.

Functionality

- **Examinations under high magnification on different levels:**
  - **protection of the document basis**
    - paper opacity, watermarks, security fibers, planchettes, security threads, foil stamping, pole feature, all types of windows, transparent varnish coating, shadow images, etc.
  - **printing methods**
    - *intaglio*: texts, guilloche frames, rosettes and vignettes, microprinting, latent images and moire patterns, signs for the visually impaired, blind embossing, colour shifting ink, including OVI with

embossing and latent images, etc.
- *letterpress*: serial numbers, texts, barcodes, etc.
- offset printing including Orlov and rainbow printing: texts, microprinting, moire patterns, background and anti-copy patterns, etc.
- screen printing: security features with optically variable effects, etc.
- see-through register
- perforation
- **physicochemical protection**
  - anti-Stokes luminescence
  - UV luminescence with different wavelength
  - IR luminescence
  - security features with magnetic properties, etc.
- **complex security features**
  - holographic images, OVD
  - retroreflective protection
  - security features with IR-metameric ink
  - special polymer coating of security laminates
  - metallized coating
  - laser engraving
- **Additional examination of:**
  - fragments of document images depending on the degree of absorption or reflection of IR light
  - document alterations such as erasure, etching etc.
  - traces of signature forgery
  - extraneous lines (do not originally belong to the examined object) that are performed with IR opaque inks
  - blurred, crossed out entries, texts and images
  - document mechanical defects such as cuts, tears, folds, etc.
- Comparison of two images in different combinations (two saved images, saved image against live video, saved images against etalon image from information reference systems, etc.)
- Automatic reading of:
  - Textual information from machine readable zone of ICAO compliant documents (ID-1, ID-2, ID-3)
  - 1D and 2D barcodes
  - Information from RFID chips in eDocuments (DG1 to DG15, BAC, EAC, AA, PA, TA, PACE) and verification of those chips

Application

- Border control and immigration services
- Customs authorities
- Law-enforcement agencies
- Forensic laboratories
- Financial institutions
- Other agencies and organizations authorized to check documents
- Document examiners

Light sources		
Top optical system		
Incident white		
Halogen lamp (20 W) for spectroscopy		
D50 (LED) for spectroscopy		
Ultraviolet	UVA LEDs – 395 nm	
	UVA LEDs – 365 nm	
	UVB – 313 nm	
	UVC – 254 nm	
Infrared	LEDs	700 nm
		780 nm
		850 nm
		950 nm
		1030 nm
High-intensity LEDs Total – 4095 combinations	Violet – 395 nm	
	Violet – 420 nm	
	Royal Blue – 450 nm	
	Blue – 470 nm	
	Cyan – 505 nm	
	Green – 530 nm	
	Amber – 590 nm	
	Red-orange – 615 nm	
	Red – 635 nm	
	Deep Red – 660 nm	
	IR – 700 nm	
	Far IR Red – 735 nm	
Transmitted LEDs	incident white	
	UVA – 365 nm	
	IR – 870 nm	
	spot high-intensity visible	
	spot high-intensity IR – 780–900 nm	
Oblique Light Motorized LEDs (130 mm distance)	visible	
	IR – 850 nm	
For OVD visualization, LEDs	horizontal – 31 white LEDs	
	vertical – 16 white LEDs	
Polarized, LEDs	top visible linear polarization	
	top visible left-hand circular polarization	
	top visible right-hand circular polarization	
Bottom optical system (LED)		
Incident white		
Retroreflective/Coaxial light		
High-intensity IR for Anti-Stokes Luminescence		
Infrared 870 nm		
Ultraviolet UVA 365 nm		

High-intensity Cyan 505 nm

Filters	Top optical system	Bottom optical system
IR High-pass 515 nm	+	–
IR High-pass 530 nm	+	–
IR High-pass 550 nm	+	–
IR High-pass 570 nm	+	–
IR High-pass 590 nm	+	–
IR High-pass 610 nm	+	–
IR High-pass 630 nm	+	–
IR High-pass 645 nm	+	–
IR High-pass 665 nm	+	–
IR High-pass 695 nm	+	+
IR High-pass 715 nm	+	–
IR High-pass 730 nm	+	–
IR High-pass 780 nm	+	–
IR High-pass 830 nm	+	–
IR High-pass 850 nm	+	–
IR High-pass 920 nm	+	–
Visible pass 370–700 nm	+	+
UV cut off 450–700 nm	+	–
UV cut off 450–1100 nm, fixed	–	+
UV Low-pass 400 nm	+	–
Linear polarized, motorized	+	–
Neutral	+	–

Optical parameters		Top optical system	Bottom optical system
Digital camera	sensor type	CMOS, Backside Illumination	
	spectral range, nm	345–1100	
	resolution, Mp, not less than	14	12
	frame size, pixels	4416×3312	4016×2760
Field of view	minimum, mm	0,8×0,6	8×5
	maximum, mm	228×171	155×90
	maximum (with X–Y translation stage), mm	310×220	265×160
	maximum (with the raised lifting system of the top optical path 110 mm), mm	330×250	–
Maximum resolution, ppi, not less than		140 000	14 200

**Hyperspectral imaging module – 395–1000 nm
with a step of 1 nm**
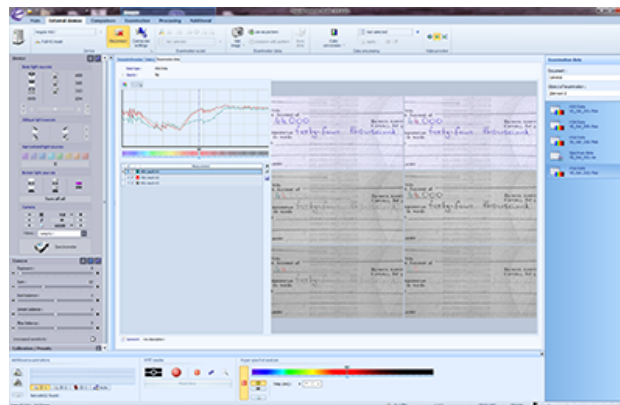
High resolution spectrometer(microspectrophotometer) for measurement of absorbtion, reflectance, transmission, and fluorescent features
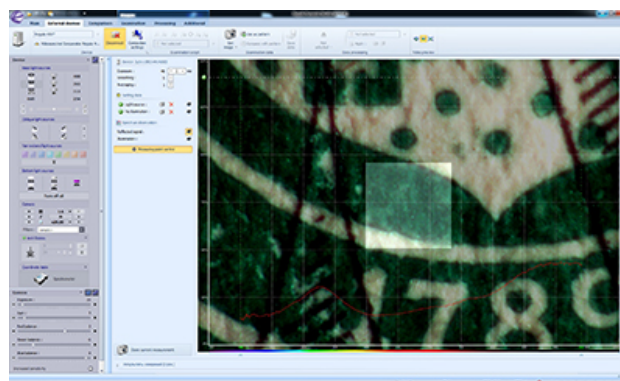
Wavelength range: 350–1000 nm

Optical resolution: 3 nm

Field of view: 2–0,05 mm

Signal-to-noise ratio: 250:1 (at full signal)

Dynamic range: 8.5×107 (system); 1300:1 for a single acquisition

Integration time: 1 ms to 65 seconds

XY translation stage for high-performance positioning along multiple axes and image stitching

Maximum displacement along the X-axis, not less than, mm — 110±2

Maximum displacement along the Y-axis, not less than, mm — 70±2

Step width, mm — 0,01

Built-in PC

CPU — Intel® Core™ i7

RAM — not less than 16 Gb

SSD — not less than 256 Gb

ID and passport processing module

ICAO MRZ reading for ID-1, ID-2, ID-3 documents

RFID reader (ISO 14443)

1D, 2D and QR codes processing

Position locked panels

All side panels can be locked in the position to accommodate larger items.

Built in sensors will prevent unintended exposure from high intensity UV and IR light if any of side panels is not properly closed.

Additional hardware specifications

Lifting Handles for move and setup

Water resistant cover

Quartz Glass Holding Plate (length×width×height), mm — 200×200×5

Maximal document size (length×width), mm — 620×550

Device overall dimensions (length×width×height), mm — 900×650×580

Weight, kg — 105 (netto)

Power supply, V; Hz — 110-240; 50-60

Output signal / Interface — USB 3.1 Gen 1

Software modules

Device operation — Regula Forensic Studio software

Software updates — Lifetime free update

Multilingual interface

Software functionality

Automatic and manual focus, iris, white balance

Multi focus

Chromaticity diagram

3D modeling of the selected area

Polarisafe feature — Polarised visible LEDs for viewing birefringent security features plus a linearly polarised LED crossed with the polarising filter

IR Luminescence light — 4095 combinations

IR luminescence vizualization

Letterscreen++

Pulsed 365 nm UV LEDs for differentiating fluorescent and phosphorescent security ink

Super Resolution Imaging

http://www.regulaforensics.com/

Visualization of 3M™ Confirm™ laminate

Visualization of Invisible Personal Information (IPI - Hidden image)

Visualization of Optically Variable Inks (OVI)

Both vertical and horizontal scanning of Diffractive Optically-Variable Devices/Holograms

Integration with Regula Information Reference Systems

Additional software functionality

Image stitching (with X-Y Translation stage)

Saved document format — .BMP, .JPG, .TGA, .TIFF

Measuring various parameters: length, path, area, angle, diameter, etc. Ability to save with the image the types of lighting, filters used, shooting date, etc.

Accumulation of images (camera integration time) — up to 50 frames

Video recording

2 USB ports 3.0 and 1 USB port 2.0 on the front panel for external devices

Image post processing

Recommended PC and monitor requirements (minimum)

Intel Core i7 processor or equivalent	RAM, Gb, min — 16
SSD, Gb, min — 520 (1TB recommended)	Graphics card with a minimum of 1GB Ram
32-inch 4K UHD Flat Panel Monitor	Operation System – Windows 10