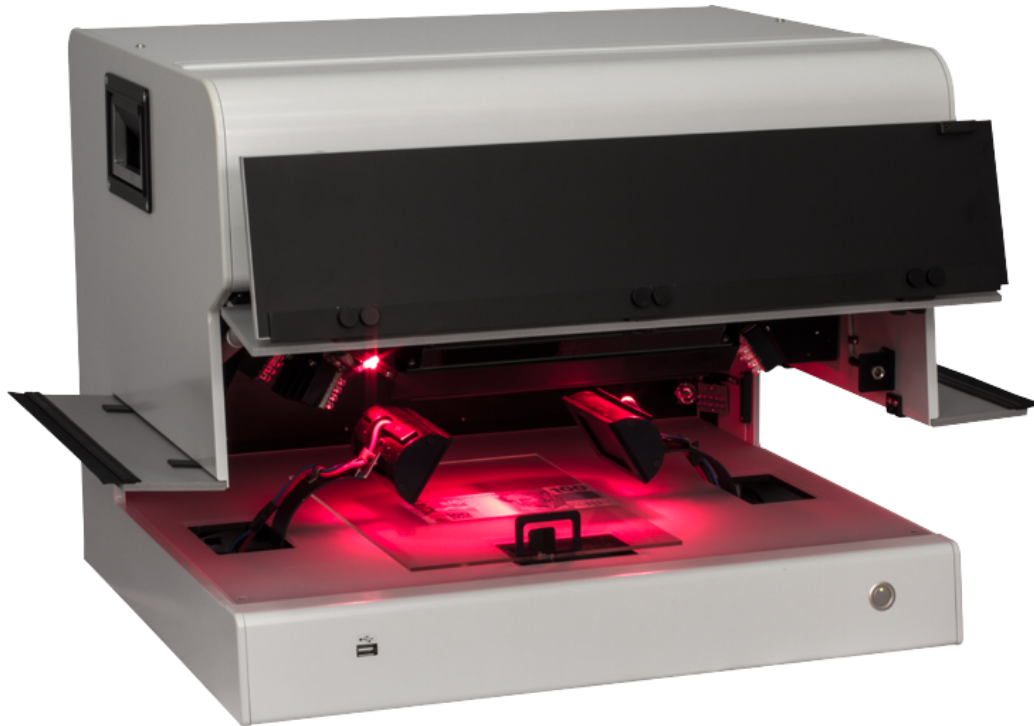




Video spectral comparator Regula 4307



The device is intended for advanced authenticity verification of passports, ID cards, travel documents, passport stamps, banknotes, driving licences, vehicle registration certificates and other vehicle related documents, signatures and handwriting fragments, paintings, revenue stamps and other security documents.



The device is made as a single unit for desktop use. It is used with a PC (model **Regula 4307MC.XXXX** is supplied with Built-in PC) and fully controlled through "[Regula Forensic Studio](#)" software interface (supplied with a unit). The video spectral comparator enables to capture, process and store digital images of examined objects. All models are equipped with a hyperspectral imaging module, modules for reading MRZ, RFID chips, hidden image (IPI), 1D and 2D barcodes. Regula 4307 is supplied with a Spectral luminescent magnifier **Regula 4147**, information reference systems "[Passport](#)", "[Autodocs](#)", "[Currency](#)" (Brief versions).

Regula 4307 has a set of light sources of visible, infrared, ultraviolet spectral ranges and imaging filters used for carrying out forensic examinations.

The comparator can optionally be equipped with a high resolution spectrometer, a light source for anti-Stokes luminescence, an XY translation stage, a built-in PC.

Features

- Magnification up to 200x (for 30 inch monitor)
- Connection interface — USB 3.0
- Protective shields against harmful UV radiation
- Big size/thick documents examination option
- Possibility to use with additional equipment (magnetic ink visualizer [Regula 4197](#), spectral luminescent magnifier [Regula 4177](#) and [information reference systems](#) on travel documents and banknotes)

Functionality

- **Examinations under high magnification on different levels:**
 - **protection of the document basis**
 - paper opacity, watermarks, security fibers, planchetes, security threads, foil stamping, pole feature, all types of windows, transparent vanish 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



Functionality		
Light sources	incident	ultraviolet 365 nm
		ultraviolet 313 nm
		ultraviolet 254 nm
		ultraviolet 400 nm*
		400 nm*
		450 nm*
		470 nm*
		505 nm*
		530 nm*
		590 nm*
		620 nm*
		640 nm*
		infrared 700 nm
		infrared 780 nm
		infrared 860 nm
		infrared 940 nm
		white
		<i>All light sources are LEDs except ultraviolet 313, 254 nm</i>
		<i>* – separate LEDs, can be used in combinations (255 combinations)</i>
		convertable infrared 800-1100 nm for Anti-Stokes (optional)
	transmitted	white
		infrared
		ultraviolet 365 nm
		spot white
		spot infrared
		<i>All light sources are LEDs</i>
	oblique	6×white
		6×infrared
		<i>All light sources are LEDs</i>
	coaxial polarized	white LED
	OVD	horizontal: 31 LEDs
		vertical: 9 LEDs
	back light	white LEDs

Camera filters:

- IR High pass 580 nm
- IR High pass 600 nm
- IR High pass 630 nm
- IR High pass 650 nm
- IR High pass 670 nm
- IR High pass 685 nm



- IR High pass 700 nm
- IR High pass 715 nm
- IR High pass 730 nm
- IR High pass 780 nm
- IR High pass 850 nm
- Visible pass 370-700 nm
- UV cut off 450-1100 nm
- Polarization

Filters:

- Visible pass 390-410 nm
- Visible pass 440-460 nm
- Visible pass 460-480 nm
- Visible pass 495-515 nm
- Visible pass 520-540 nm
- Visible pass 580-600 nm
- Visible pass 605-635 nm
- Visible pass 625-655 nm
- Neutral

Video camera* — 5 Mp, CMOS

Spectral response — 350-1100 nm

Frame size, pixels:

- 2592×1944 (Full Frame)
- 2592×1460 (16:9; Extra Full HD)

** – optional installation of a 14 Mp CMOS camera is available (frame size: 4416×3312 pixels)*

Magnification:

- optical — 30x
- digital — 2x (optionally up to 8x)
- for a 32 inch (81 cm) monitor* — 1,7x to 840x

Fields of view:

- 196×147 mm to 6,5×4,9 mm ± 5% (Full Frame)
- 196×110 mm to 6,5×3,6 mm ± 5% (16:9; Extra Full HD)
- 240×190 mm to 6.5×4.9 mm ± 5% (with X-Y Translation stage)

** – all magnifications are approximate*

Maximal document size (length×width), mm — 530×400

Output signal / Interface — USB 3.0

Control — Software

Software update — life update

Integration rate to increase sensitivity to faint images — Yes



Polarisafe feature — Optionally

IR Luminescence light — 255 combinations

IR luminescence vizualization — Yes

Letterscreen++ — Yes

Phosphorescent inks — Yes

Super Resolution Imaging — Yes

Image stitching (with X-Y Translation stage) — Yes

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

Ability to save with the image the types of lighting, filters used, shooting date, etc. — Yes

Accumulation of images (camera integration time) — up to 50 frames (up to 180 sec)

Video recording — Yes

Operational System — Windows

Built-in PC — Optionally

USB port 2.0 on the front panel for external devices — Yes

Image post processing — Yes

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

RFID reader (ISO 14443) — Yes (built-in)

1D and 2D Barcodes — Yes

QR — Yes

Automatic and manual focus, iris, white balance — Yes

Multi focus — Yes

Database — Yes (with full software integration)

3M™ Confirm™ laminate — Yes

Hidden image (IPI) — Yes

OVI — Yes

OVD — Yes

Water resistant cover — Yes

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

Multilingual interface — Yes



Device overall dimensions (length×width×height), mm — 580×495×450

Weight, kg — 36 (netto)

Lifting Handles — two suitable handles for easy move and setup

Power supply, V; Hz — 110-240; 50-60

Power consumption, W — 200

Spectral luminescent magnifier Regula 4147

Light sources:

- incident white
- 2 high-intensity infrared 980 nm: spot and flood

Field of view, mm — 11,1×8,1

Sensor:

- type — CMOS
- megapixels — 3,1:
 - resolution, ppi — 4700
 - frame size, pixels — 2048×1536
- dynamic range, dB — 61

Camera filters — IR high-pass with threshold, nm — 660

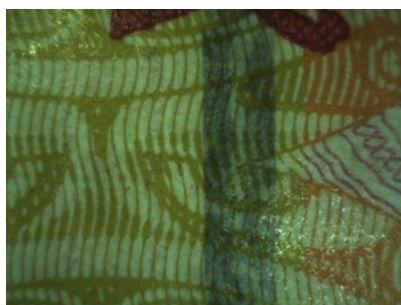
Connection interface — USB 2.0

Dimensions (length×width×height), mm, not more than — 94×62×52

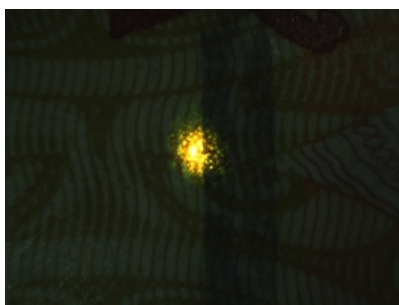
Weight, kg, not more than — 0,2

Power supply voltage, V — 5

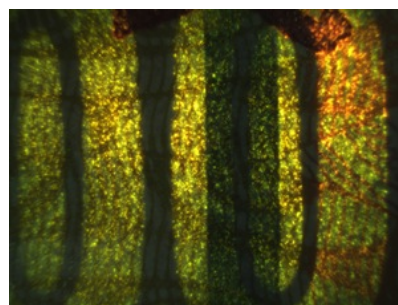
Power consumption, W, not more than — 12,5



Incident white



High-intensity infrared 980 nm:
spot

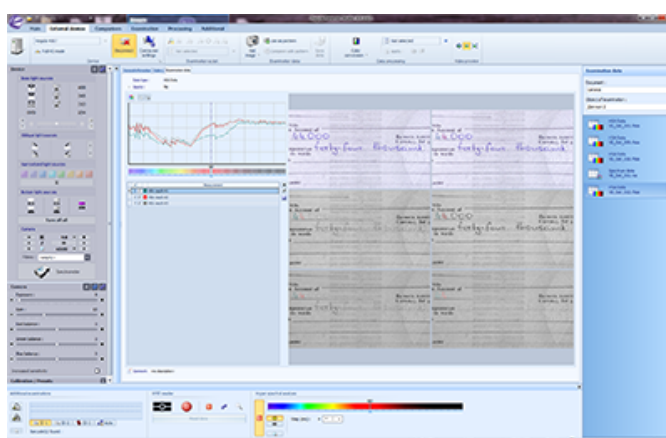


High-intensity infrared 980 nm:
flood



Functionality	Model				
	4307.1XXX	4307.11XX	4307.1X1X	4307.1XX1	4307MC.1XXX
Hyperspectral imaging module	+	+	+	+	+
High resolution spectrometer		+			
Light source for anti-Stokes luminescence			+		
XY translation stage				+	
Built-in PC					+

Hyperspectral imaging module – 400–940 nm with a step of 1 nm



High resolution spectrometer (microspectrophotometer) for measurement of absorption, reflectance, transmission, and fluorescent features

Wavelength range: 350–1000 nm

Optical resolution: ~0.3-10.0 nm

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

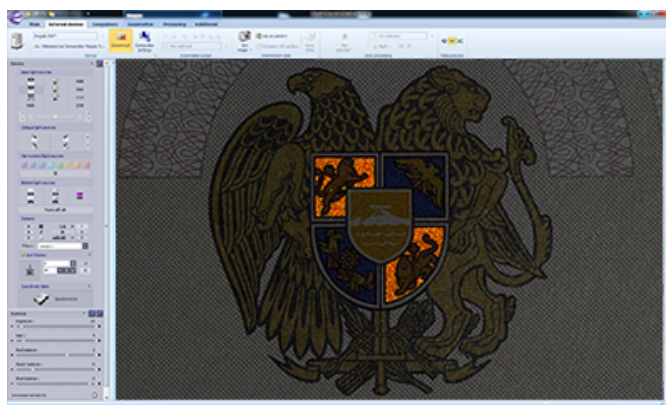
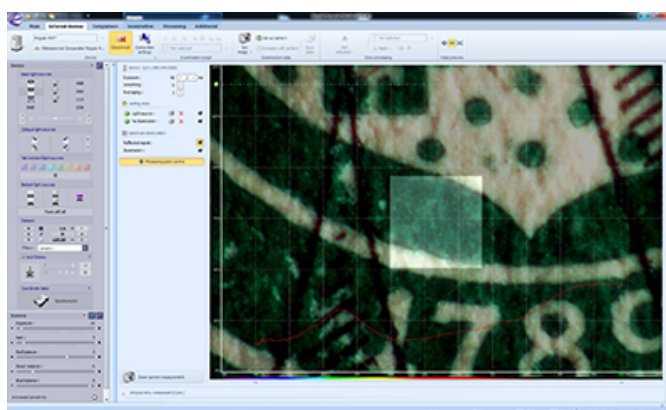
Dynamic range: 8.5×10^7 (system); 1300:1 for a single acquisition

Integration time: 1 ms to 65 seconds

Light source for anti-Stokes luminescence

Power, J — 160

Wavelength range, nm — 800–1100





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

4th generation Intel® Core™ i5-4250U processor with active fan heatsink

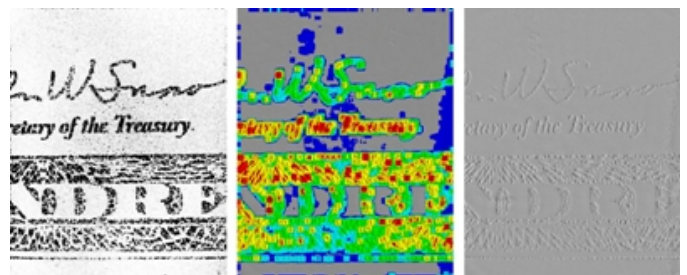
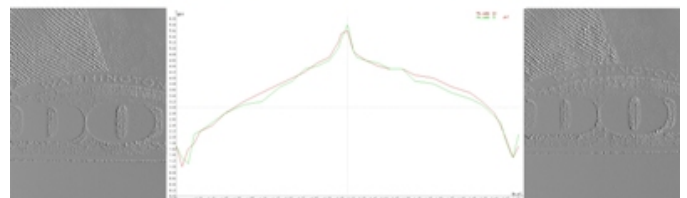
Two SO-DIMM slots supporting up to 16 GB of 1600/1333 MHz 1.35V DDR3L memory

Optional Accessories:

1. [Visualizer of magnetic properties Regula 4197](#)

Functionality

- Examination of magnetic security features in banknotes and travel documents in the mode of live video
- Visualization of magnetically hard and magnetically soft materials
- Possibility to distinguish magnetic inks by residual magnetization
- Carrying out non-destructive examination of objects with “hard” magnetic properties
- Reading latent magnetic strokes and codes
- Examination of damaged documents: reading blurred and crossed out texts printed with magnetic ink
- *Possibility to take magnetic ink intensity measurements in tesla (T)*



Black & White. Colour (magnetization intensity pattern).
Raw.

Field of view, mm — 14×18

Spatial resolution of the optical input system, mkm:

- frame size 1024×1280 pixel — 14
- frame size 512×640 pixel — 28

Connection interface — USB

OS — Microsoft Windows XP (SP3), Windows Vista, Windows 7, Windows 8

Dimensions (length×width×height), mm — 59×113×50

Weight, kg — 0,49

Power supply voltage from a USB port, V — 5

Power consumption, W, max — 2,5



2. Thermostage Regula 4168

Functionality

- Examination of images and elements of banknotes and travel documents containing thermochromic ink at different temperatures.
- Examination of a composite security feature Feel®-ID developed by Giesecke & Devrient company. Feel®-ID is based on optically variable and thermochromic effect.



Temperature range, °C — +30...+80 with a step of 1 °C

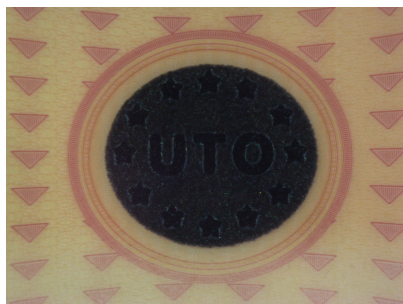
Heated area (length×width), mm — 78×48

Dimensions (length×width×height), mm — 170×78×16

Weight, kg — 0,25

Power supply voltage: powered by the USB port of the video comparator, V — 5

Power consumption, W, max — 15



Temperature +20 °C



Temperature +35 °C



Temperature +50 °C



3. Trinocular Stereo Microscope Regula 5003

Functionality

- Examination of security features in banknotes and travel documents in the mode of live video
- The microscope is based on the Greenough optical system which allows obtaining stereo images of examination objects
- Smooth magnification adjustment
- Coarse and fine focus adjustment
- Additional optical path for the digital video camera
- Document clamps

A ring-shaped LED illuminator (white light) with variable intensity control

Colour camera:

- type — CMOS
- effective pixels — 5 MP
- frame size, pixels — 2592×1944 (Full Frame)
- connection interface — USB 3.0

Magnification:

- optical — 0,8x to 14x
- objective magnification with 10x eyepieces — 8x to 140x
- objective magnification with 30x eyepieces — 24x to 420x
- for a 30 inch (75 cm) monitor* — 26x to 1330x

** – all magnifications are approximate*

Diopter adjustment, dptr — ± 6

Interpupillary distance, mm — 52...76

Dimensions (length×width×height), mm — 285×285×450

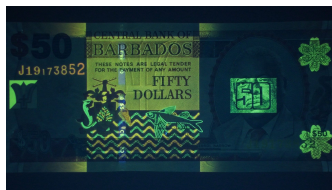
Weight, kg, not more than — 5

Power consumption, W, not more than — 15





Document examination in different operating modes



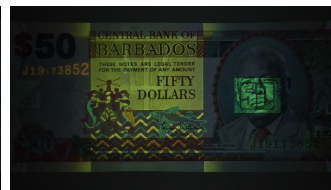
UV 365 – 1,3x magnification



UV 313 – 1,3x magnification



UV 254 – 1,3x magnification



UV 400 – 1,3x magnification



Visible light range – reflected light – 1x magnification



Visible light range – reflected light – 4x magnification



Visible light range – reflected light – 10x magnification



Visible light range – reflected light – 29x magnification



Incident royal blue 450 nm – 3,39x magnification



Incident blue 470 nm – 4,29x magnification



IR top 870 nm – 1,49x magnification



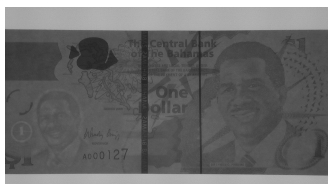
IR top 950 nm – 1,49x magnification



Incident cyan 505 nm – 1,6x magnification



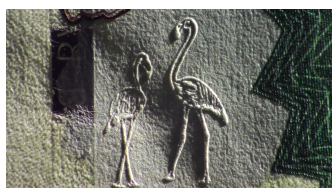
Bottom white – 1,2x magnification



Bottom IR 870 – 1,2x magnification



Bottom UV 365 nm – 2,2x magnification



Oblique white light – 7,49x magnification



Oblique white light – 7,49x magnification



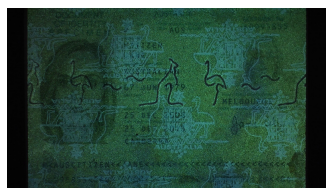
Oblique IR light 870 – 9x magnification



Oblique IR light 870 – 9x magnification



Coaxial polarized white – 1,3x magnification



Coaxial polarized white – 1,3x magnification



Hologram