



INFRARED CAMERAS

Contour IR Digital





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Safety requirements

- The customer is responsible for ensuring safety measures while working with a light source and using the camera as a standalone device or integrated into system.
- While using camera in direct exposure please use caution and appropriate attenuation not to harm sensor.
- While assembling or operating camera, do not stare at the direct laser (or other source) light even with safety goggles.
- Electrical safety requirements must be complied while operating this device.
- Before plugging camera to the PC be sure if USB cable is in working condition.
- Always operate camera in dry conditions, use protective measures while operating in foggy or dusty environment.

About

The design of CONTOUR IR Digital camera is intended for observation, registration and recording of radiation in the near-infrared spectrum 400-1700 nm. Direct exposure to light source is possible but only with appropriate safe measures such as ND filter, iris diaphragm or external attenuator. The CONTOUR IR Digital camera could be used for infrared microscopy, infrared luminescence, an examination of documents, forensics, art restoration (infrared reflectography), instrument alignment and optical assembly, pharmacology, food testing and sorting, agronomy, surveillance, etc., applications.

The base of the camera is the newest technology CMOS sensor with increased sensitivity, micro lenses on photocells and intensifying cascades in each element. Camera is connected to PC via USB 2.0 (or USB 3.0) interface.





Operation

CAUTION! Do not use direct powerful laser radiation on a sensor.

CAUTION! Use filters, attenuators, or beam splitters to decrease high laser radiation.

1. Install the camera driver and software from provided USB key.
2. Connect camera to PC.
3. Start CONTOUR-IR application.
4. Observing the image on monitor, focus the objective lens of the camera. If necessary, switch on/off automatic exposure and gain control, arrange parameters of the camera (brightness, contrast, saturation, sharpness) and if it is required change a format of the image or refresh rate.
5. For low power infrared illumination observation decrease any external light background to increase noise to signal contrast. Use cut-off or interference filters for better contrast.





- 1. Mini-B USB video output
- 2. Tripod thread $\frac{1}{4}$ inch
- 3. IR cut-off filter
- 4. Focus ring
- 5. Diaphragm
- 6. C-mount ring

Figure 1. ABRIS M 1X viewer



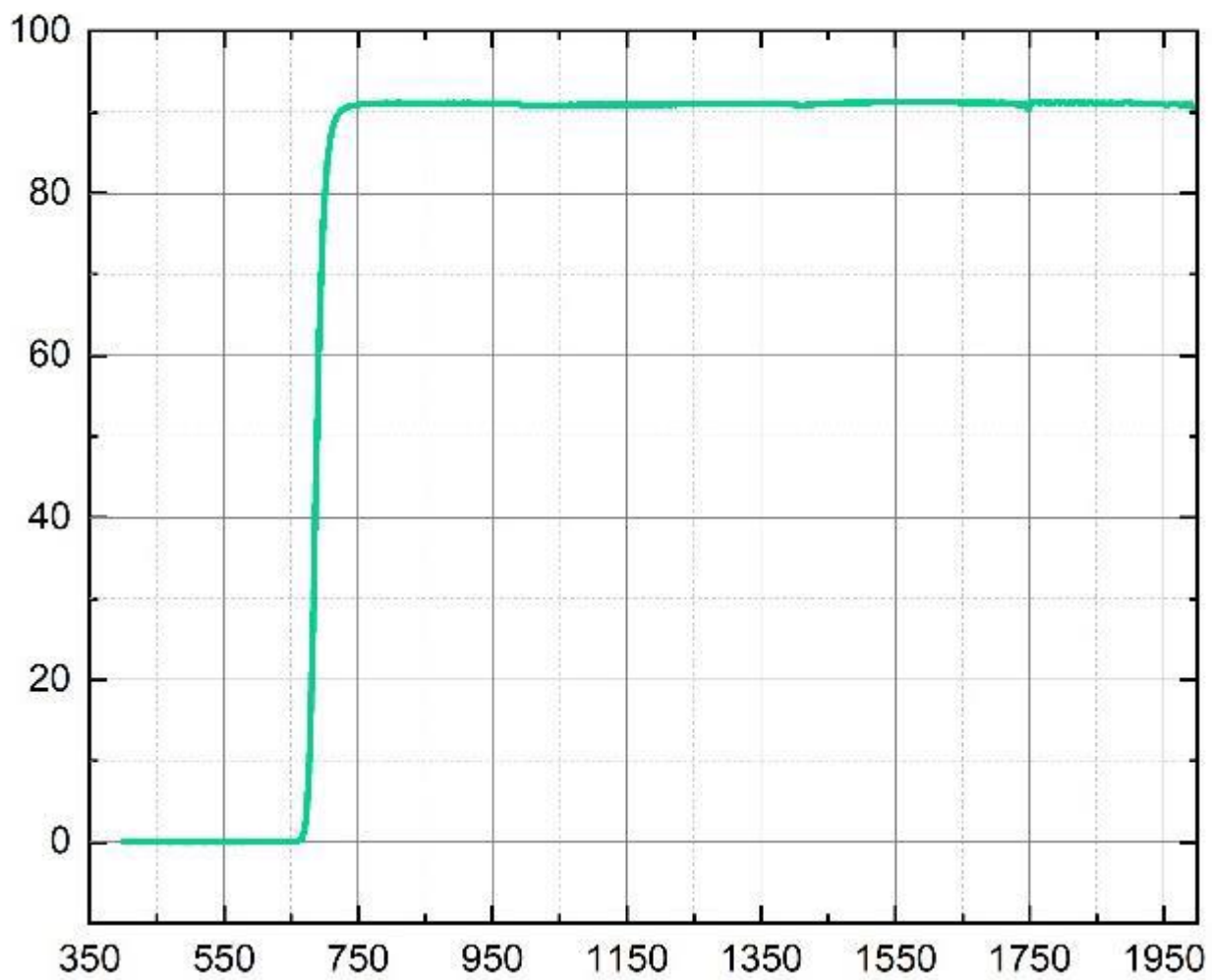


Figure 2. IR cut-off filter transmittance





Minimal PC requirements

- Processor at least 1 GHz
- At least 512 MB RAM
- USB 2.0 or higher port
- OS Microsoft Windows 7 or higher (USB 2.0 Host, root concentrators and Direct-X drivers shall be installed)
- Microsoft .NET 4.6 Framework (installed with software if not present)

To install the CONTOUR-IR software, you must have administrator rights on your computer. During installation camera drivers depending on your operating system will be installed. To run CONTOUR-IR application Microsoft .NET 4.6 Framework or later must be installed. The installer detects if .NET framework is missing and prompts its installation.

NOTE: High performance computer is recommended for the best motion picture without stuttering. Otherwise, you might need to reduce frame rate or choose lower resolution, to get optimal preview. Camera transfers data in RAW Data format to a personal computer or laptop, so computer must be able to process large amount of data in real-time.



Software usage

1. Launch the CONTOUR-IR program using icon on the desktop. After program starts it automatically detects camera devices and enumerates them in "Device" list box.
2. To start the capture, select your camera in the list. After selection, the software will read camera's allowed settings and update the interface according to present settings.
3. Use the software provided functionalities shown in Fig. 3 to suit your application needs.

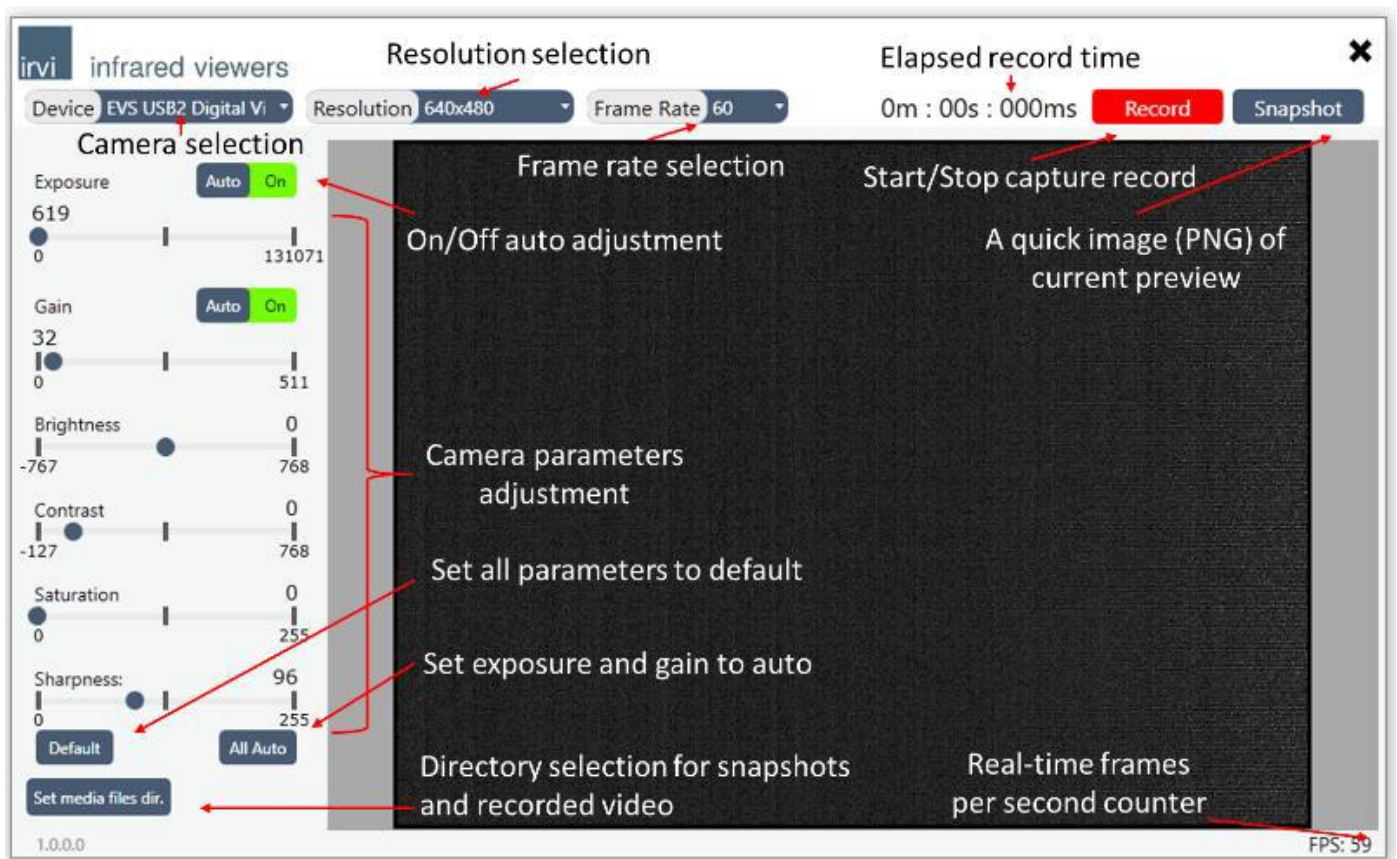


Figure 3. Software controls description.



Software set and features

- WDM driver suitable for Windows XP/7/10 (32 and 64bit).
- Use CONTOUR-IR for single picture capture and video recording.
- The Contour-IR digital camera is supplied with software controlling following functions: exposure time, gain factor, gamma correction, etc.
- The electronic shutter is in the Rolling Shutter. The operation in pulse mode with short exposures is useless – there will be visible just one or several lines of the entire frame.
- Gain factor is 30 dB.
- Gamma correction can be deactivated from the driver bookmark.
- There is no external synchronization.
- Uncompressed video record function is available.

Applications development by the customer

The Contour-IR digital camera is supplied with the WDM driver that implements the Microsoft Direct Show technology, which is the Windows SDK (Microsoft Direct X) component.

>> Download Windows SDK here

(<https://developer.microsoft.com/en-gb/windows/downloads/windows-10-sdk/>)

It allows working with a large array of commercial and free-ware software, supports technology, such as U lead Video Studio, Adobe Premier, Am Cap, Virtual Dub, etc.

For personal applications development, the customer must use Microsoft Windows SDK or other software libraries like Open CV or Direct Show Lib.





Any computer vision library that supports Direct Show technology is suitable.

More information about Direct Show technology and its usage can be found in Microsoft website.

>>DirectShow

(<https://docs.microsoft.com/en-us/windows/win32/directshow/directshow>).

The Maintenance instruction

- Keep device away from mechanical damage and moisture.
- Always use a protective case while the transporting equipment and make sure it is properly closed so dirt and dust cannot get in.
- While changing an objective do it in clean environment to reduce chances of dust particles falling onto the sensor.
- Protect the lenses from dirt and grease which might deteriorate the image quality. If necessary, clean the external lens of an objective with a lens cleaning tissue dipped in alcohol substance. Dust removal from the sensor might be done applying the same technique if removing dust particles with a duster does not help.
- Do not touch the sensor while performing cleaning operations.
- To avoid any possible scratches, use a soft mat for placing camera gear when cleaning operations applied.
- Do not use any household cleaning products which are not suitable for camera cleaning operations. These products may cause serious damages of sensor, electrical board, or lens.





Troubleshooting

The Contour-IR Digital camera can experience some image flickering and connection loss. In this case try to reconnect camera as many times as it takes. Before that end, all related tasks with Contour software in “Windows Task Manager”. If camera experiencing image flickering after performing described actions, try to lower the “Frame rate” and “Resolution” through the software.

These actions may not help if your PC does not support Contour software. In this case try to run Contour-IR Digital camera with another PC.





Spectral sensitivity

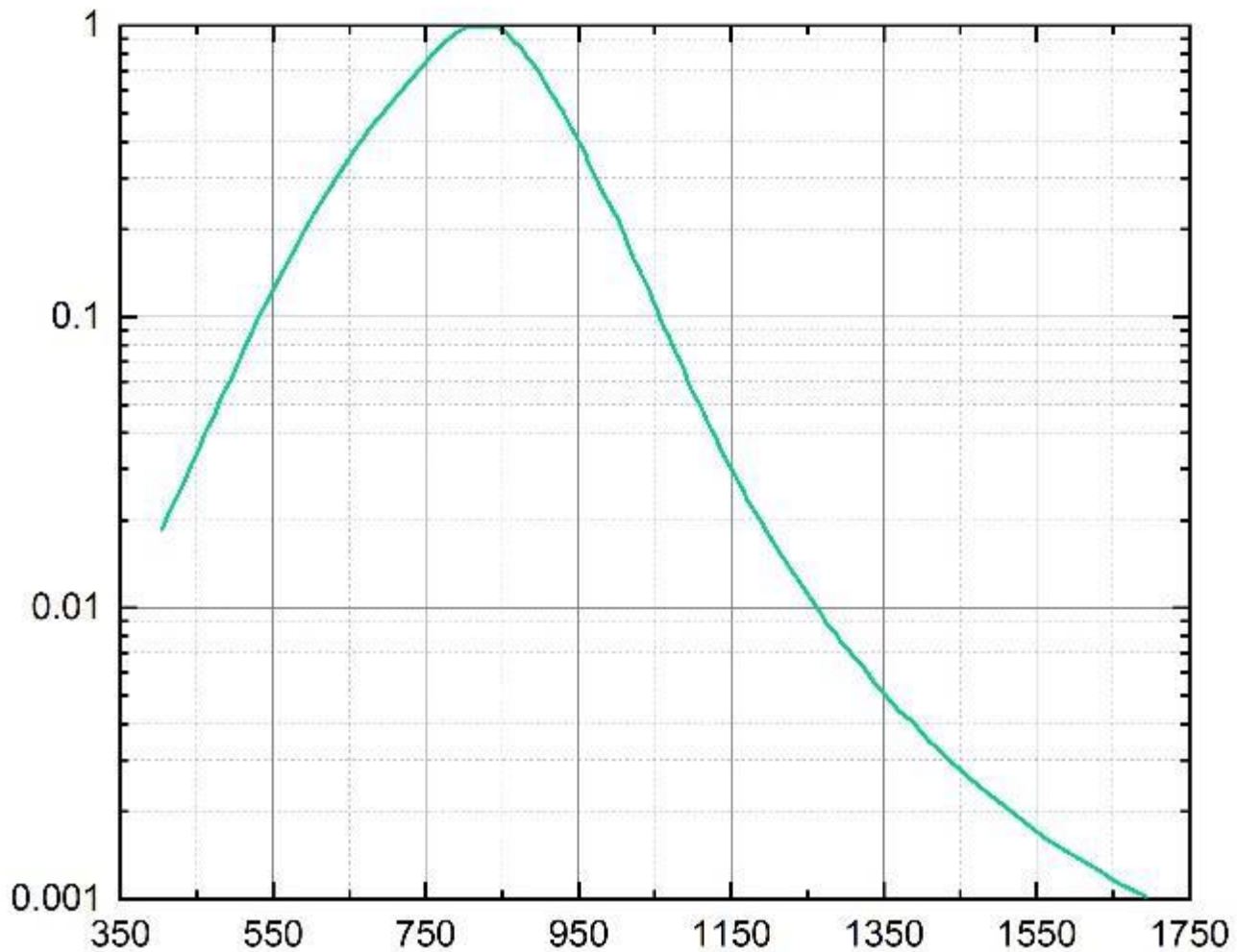


Figure 4. Spectral sensitivity (Contour IR digital camera)





Power density

The approximate minimum of power density of radiation on an object at the signal-to-noise ratio=10 (20dB) on a 0,15m distance:

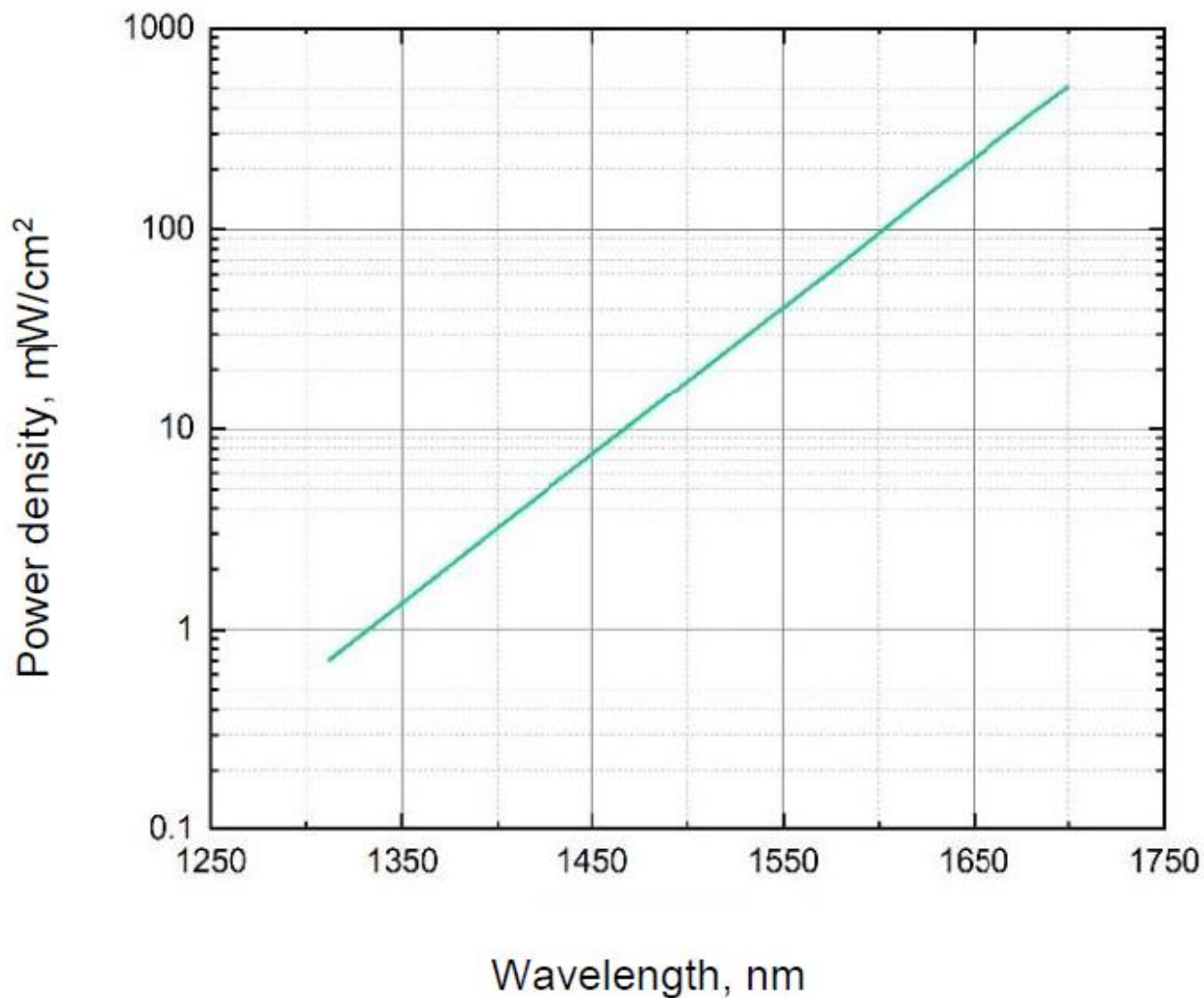


Figure 5. Power density (Contour IR digital camera)

Minimum required power densities values for detecting infrared light source:

500 $\mu\text{W}/\text{cm}^2$ at 1310nm; 30 mW/cm^2 at 1550nm; 400 mW/cm^2 at 1700nm.





Technical information

Spectral sensitivity	400-1700 nm
Sensor size	1/3 inches, 6.0 mm x 4,96 mm
Lens	F1.4/25 mm with iris, CS/C-mount*
Field of view	10°
Focusing range	0.05 m to inf
Sensor	CMOS 1/3" 1280 (h) x 960 (w)
Size of pixel	3,75 x 3,75 µm
Dynamic range	60 dB
Relation signal to noise	54 dB
Format 1	1280 x 960 (4, 8, 12,5, 16, 25, 30 Hz)
Format 2	1280 x 720 (5, 10, 15, 20, 30, 40 Hz)
Format 3	800 x 600 (6.25, 12,5, 20, 30, 40, 50 Hz)
Format 4	640x480 (8, 16, 25, 32, 50, 64 Hz)
Range of exposure	34 µs – 34 ms
Temperature range	+5... +40°C
Weight	0,2 kg
Dimensions	49 x 49 x 75 mm

* C-mount adapter included





Standard kit includes:

- IR camera with F1.4/25mm with internal iris
- C-mount adapter
- Mounted IR cut-off filter
- USB cable
- USB key with software and drivers
- Manual
- Tripod
- Case



Figure 6. Standard camera kit





Accessories available upon request:

- Neutral density filter for lens 1X (1.5% - 2% @ 1064nm)

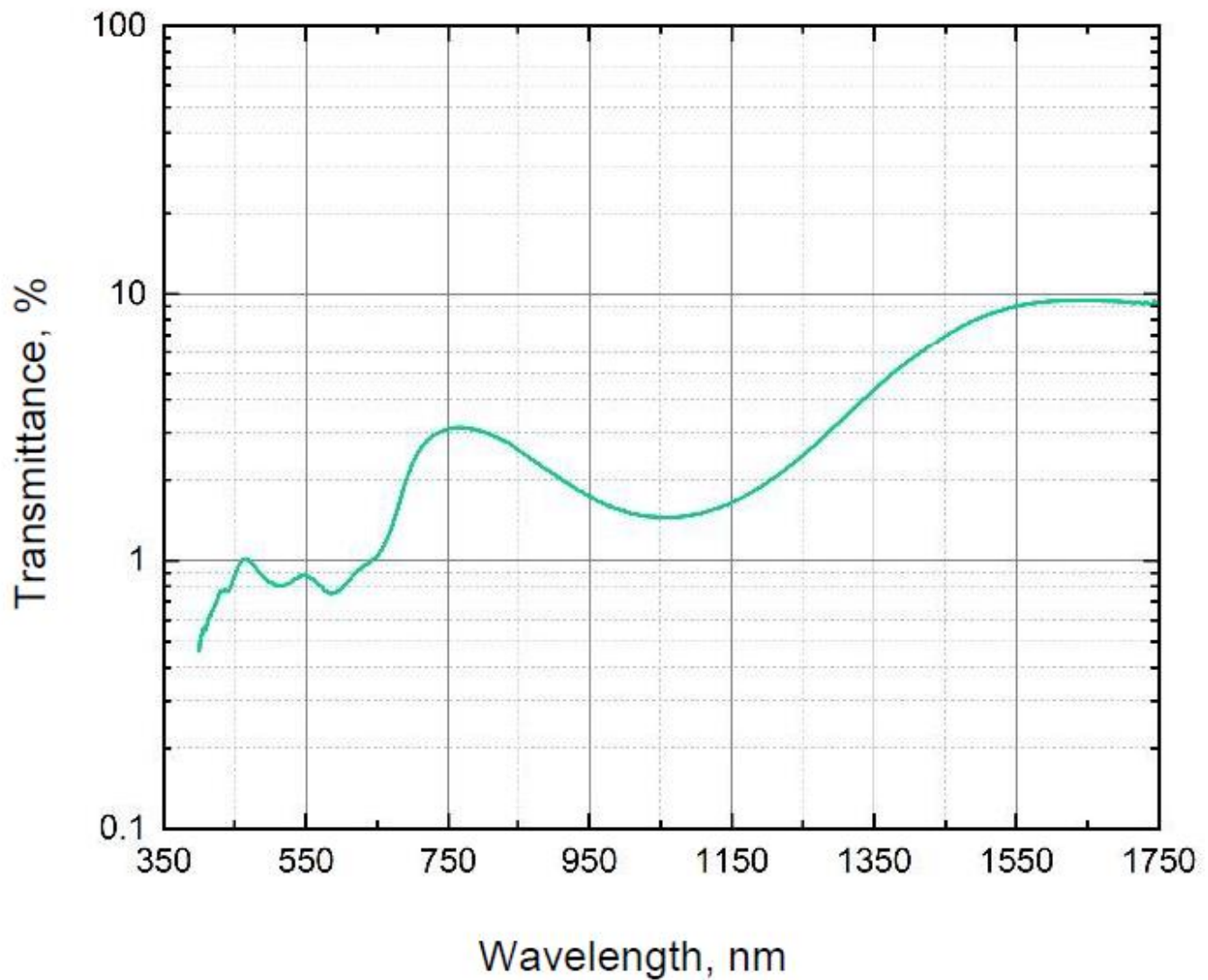


Figure 7. Neutral density filter transmittance





- Zooming lens 5-50mm, FOV (50° - 5.5°)



Figure 8. Neutral density filter transmittance

1. IR cut-off filter
2. Zooming or magnification (1X-10X)
3. Diaphragm
4. Focusing ring
5. CS mount (thread 1"-32)





Warranty

Infrared viewing device CONTOUR-IR Digital meets specifications of the manufacturer and declared operation.

The warranty period of the device is 24 months from the date it was sold to the consumer.

Claims not accepted, and warranty repair are not made, because of the improper use or incorrect service and maintenance of product instructions. The company shall not accept warranty claim:

- non-authorized alteration,
- disassembling of device,
- mechanical or any external damages,
- if 2-year warranty term has expired.

Serial No.

Version No.

Spectral range

Date of Invoice

