



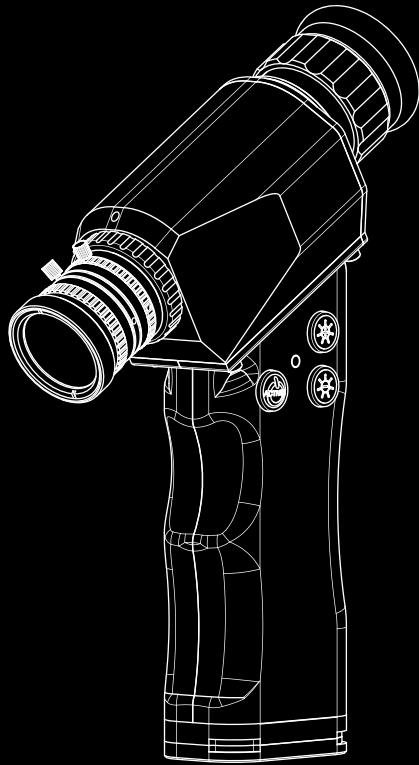
OPTOGAMA



MANUAL

DIG

CE RoHS



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About

High performance viewers DIG, based on multiphoton absorption is designed to observe indirect radiation of infrared laser, light emitting diodes (LED), dye and other IR-sources in up to 1500nm spectral region. The lightweight, compact device can be used hand-held, or tripod mount with the 1/4-20 thread for hands free operation.

Also, it can be used with a CCD camera adapter for PC and video registration of the image.

This device allows viewing continuous lasers radiation as well as pulsed lasers radiation with pulse duration from ps to μ s without synchronization.

Applications

- Laser alignment and measurements. IR viewers are ideal for alignment of infrared laser beam and optical components in near infrared systems.
- Semiconductors wafer inspection
- Forensics and art restoration
- Photo processing
- Food sorting
- Vein and blood vessel observation under the skin
- Fluid inspection
- Identification of stray IR reflectations
- Observation of GaAs laser diodes, IR LED's, dye and other IR-sources

Safety requirements

- The customer is responsible for light source safety while using a viewer as a standalone device or integrated into system.
- While assembling or operating viewer, 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.



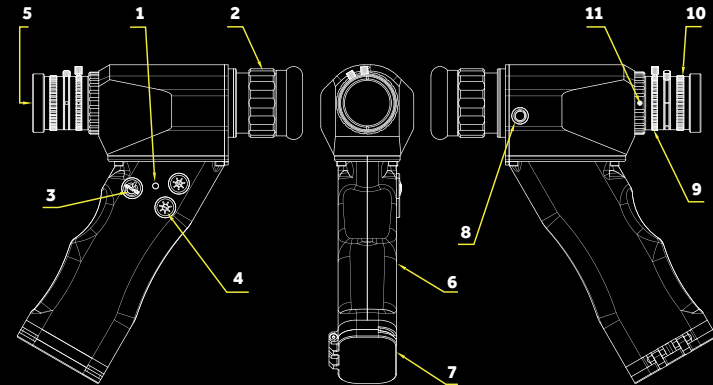
Operation

CAUTION! Direct viewer exposure to radiation may cause permanent damage to sensor.

1. To utilize a hands-free system, screw the viewer's body onto the tripod thread (8).
2. To switch the unit on, press button (3).
3. Rotate focus adjustment ring (10) to focus the lens. For adjustment of diaphragm, adjust the diaphragm adjustment ring (9). Turn the eyepiece focus ring (2) for eyepiece focus adjustment.
4. For viewing reflected radiation, use reflective or diffusive surface.

Figure 1. DIG viewer

LED codes	Battery Status
Continuous illumination	Full
Gradual flashing	Acceptable (50% remaining battery)
Rapid flashing	Low (> 10% remaining battery)



- 1. LED
- 2. Eyepiece, thread M34x0.75
- 3. Button ACTIVATE
- 4. Screen brightness adjustment buttons
- 5. Filter adapter, thread M30x0.75
- 6. Handle
- 7. Battery cover
- 8. Tripod thread
- 9. Diaphragm adjustment ring
- 10. Focus adjustment ring
- 11. Lens locking screw

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Installing the Battery:

1. Open the device battery cover (1) to access the battery compartment;
2. Insert two 3.6 V lithium-ion 18650 model batteries (2), ensuring correct polarity alignment as indicated on the battery cover (1);
3. Close the battery cover (1) securely;
4. Turn on the device by pushing ACTIVATE button (3)

Warning:

Dispose of used batteries according to local regulations. Do not expose batteries to heat or flame. Keep batteries out of the reach of children; they are choking hazards and are very dangerous if swallowed.

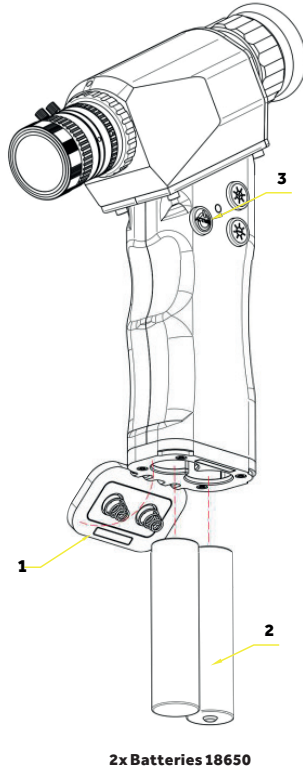


Figure 2. Lenses F1.4/16 mm (right) and F1.3/8 mm (left)



Visualization of beam in “mid-air”

It is a misconception that an IR viewer can be used to view infrared laser beams in “mid-air” (400– 1700 nm). However, if dust particles are in the beam path, the beam will become partly visible. Basically, IR viewers can be used to see the projection of the infrared beam spot on a flat diffusing surface such as a white card or metallic surface.

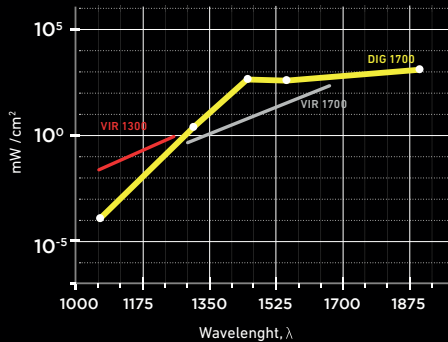
The maintenance instruction

1. Keep away viewer from mechanical damage and moisture.
2. Protect the lenses from dirt. If necessary, clean them with clean soft cloth; remove oiled spots or deposit with cotton wool slightly wetted in rectified alcohol or with alcohol-ether mixture.



Power density

Threshold power density dependence on wavelength. The threshold power density is defined by measuring a laser beam spot on a paper, which exhibits 20% of the overall brightness (calculated as $255 \times 20\% = 51$), in contrast to the background. The measurements were taken with the camera positioned 1.15 meters away from the piece of paper.



Brightness levels

--- 1310 - - - 1450 ····· 1550 - - - 1900

Normalised brightness dependence on power difference from the minimum value. The power level of 0 signifies the theoretical minimal value at which the laser beam spot becomes observable on a piece of paper. It's worth noting that the camera exhibits lower sensitivity to laser light at 1450nm compared to 1550nm or even 1900nm.

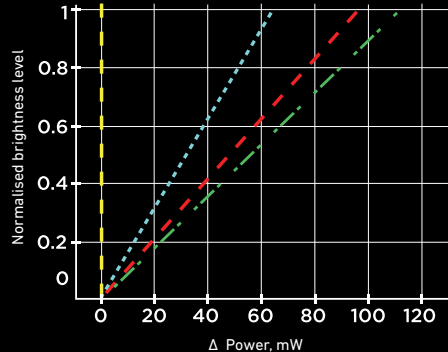


Figure 3. Spectral sensitivity (DIG viewers)

Photosensitivity

The minimum detectable signal for a near-infrared viewer depends on:

- Power density;
- Wavelength of incident radiation;
- Effective aperture of the objective lens;
- Distance between observed target and the viewer;
- Time duration of the signal (pulsed or continuous);
- Reflectivity of the diffusing surface;
- Sensitivity of human eye or device used in viewing the output of the IR viewer.

Approximate minimum of power densities required for observing an infrared laser source from a distance of one meter:

- $0.1 \mu\text{W}/\text{cm}^2$ for a 1060 nm; $500 \mu\text{W}/\text{cm}^2$ for a 1300 nm.

IR viewer can be used to view $1.7 \mu\text{m}$ laser beam at minimum power density $1\text{W}/\text{cm}^2$. When operated in the $>1300 \text{ nm}$ range, IR viewer has a low spectral response, therefore observations can be performed when the following requirements are met:

1. Use an IR cut-off filter or interference filter and darken the room to reduce external background;
2. Use a metallic surface for observation reflected radiation, as any other material might absorb infrared radiation.



Technical information

Version	MODEL (1X)	MODEL (2X)
Spectral sensitivity	DIG 400-1700 nm	
Resolution (center)	30 Lp/mm	
Field of view	38°	19°
Magnification	1X	2X
Objective filter tread	F1.3/8mm M25.5x0.5	F1.4/16 mm M27x0.5
Objective thread	C-Mount 1"-32 UN	
Adjustable iris	Included	
Minimum object distance	0.1 m to ∞ *	0.5m (0.15m) to ∞ *
Distortion of image	0.5%	
Batteries	2x18650 (300-500 charge cycles)	
Battery life fully charged	Continuously 9h	
Weight	0.36 kg	
Dimensions	153x175x51 mm	
Tripod thread	¼"-20 UNC	

* - MOD can be customized upon request

Lenses 1X (F1.3/8 mm) and 2X (F1.4/16 mm) are exchangeable.

Standard kit for version 1X includes:

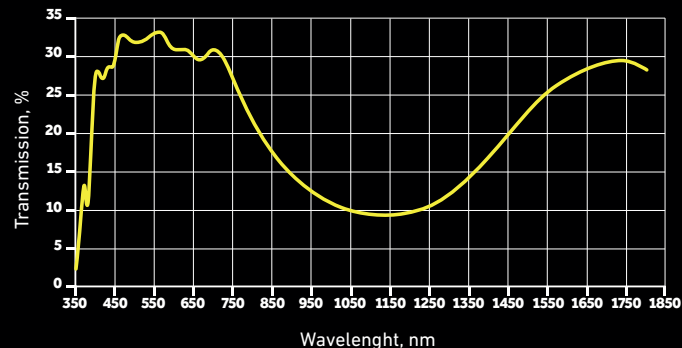
- IR viewer;
- Lens 1X;
- Batteries charger;
- Case;
- ND filters: OD1 and OD2;
- IR Longpass filter 760nm

Standard kit for version 2X includes:

- IR viewer;
- Lens 2X;
- Batteries charger;
- Case;
- ND filters: OD1 and OD2;
- IR Longpass filter 760nm

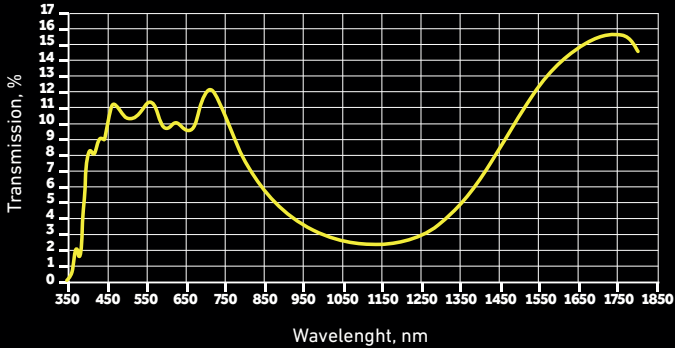
< > Neutral density filters transmission curves

OD1

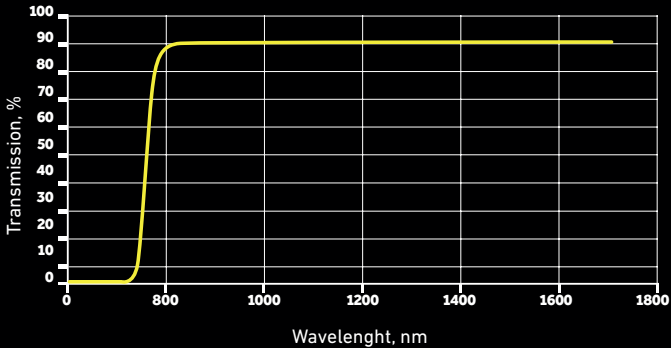




OD2



< > Longpass Filter 760nm



Warranty

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 years warranty term has expired.

SERIAL NO.

SPECTRAL RANGE

DATE OF INVOICE



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