Model IRVH-1700 Hybrid Infrared Viewer

Introduction

The IRVH-1700 infrared viewing device is an advanced, high performance, hybrid intensified CCD camera with an infrared image converter. The IRVH features an integrated 4-inch monochromatic TFT-LCD display and is designed for viewing radiation in the 350 to 1700nm spectral region. The device enables recording and digitization of images using a PC and may be hand-held or used with a tripod.

Common applications

- Observing, recording, and digitization of images emitted by IR sources, such as IR LEDs and GaAs and solid-state lasers
- Laser beam alignment and inspection, optical fiber alignment, telecommunications, inspection of silicon surfaces
- Surveillance and investigation in botany, biophysics, and medicine
- Forensics and art restoration; examination of documents, records, engravings, and paintings for hidden differences; viewing of aged, worn, or charred documents; studying of plant pathologies; examination of fossils and segments; characterization and examination of inks and pigments; examination of obliterated/censored documents
- Infrared microscopy, infrared luminescence (by ultraviolet stimulation), fluorescence

Specifications

Spectral response (nm)	350-1700
Lens	1X (F1.4/26mm)
Optional lens	2.5X (F2/58mm)
Resolution (horizontal)	300 TV lines
S/N ratio (dB)	>40
Video output	RCA connector
Power supply (VDC/mA max.)	12/350
Battery type	4 x AA rechargeable (for TFT-LCD display), 1 x AAA (for image converter)
Battery life (hours, minimum, continuous)	1.4 (AA rechargeable batteries), 50 (AAA alkaline battery)
Monitor	4-inch monochromatic TFT-LCD display, 480x240 dots
Temperature range (°C)	0 to 40
Dimensions (mm)	230 x 100 x 105
Field of view (degrees)	25 with standard 1X lens, 12 with 2.5X lens
Focus (m)	0.15 with standard 1X lens, 0.25 with 2.5X lens
Weight	0.9 kg (1.98 lb) with standard 1X lens, 1.2 kg (2.65 lb) with 2.5X lens

Standard kit includes IR video camera (F1.4/26mm lens), IR cut-off filter, C-mount ring, handle, tripod, battery compartment, AC adapter, and case.

Caution!

- Do not use the camera for direct beam viewing. Damage to the highly sensitive photocathode material will occur if the incident light on the objective lens exceeds 10mW/cm^2.
- Never attempt your own maintenance. This product contains high voltage components.
- Avoid water and dust. Do not use thinners or other chemical cleaners. Do not expose to temperature extremes or direct sunlight.
- Avoid dropping and strong impact. When you do not use your camera for an extended period, be sure to remove the batteries.

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1. Battery compartment on viewer itself
2. ON/OFF button
3. Rotary switch for ON/OFF/VIN
4. Lens with IR filter
5. Brightness & contrast controls
6. Tripod
7. Handle
8. IR viewer body
9. Video output
10. Socket for AC/DC adapter or battery compartment cable
11. Battery compartment cable

Operation of IRVH-1700

1. Locate the R1/4" mounting holes on the bottom of the IRVH. The hole on the viewer body itself is for attaching the handle (7). The hole to the rear of the unit, located on the metal piece attached to the monitor, is for attaching the tripod (6).
2. Install four AA rechargeable batteries into the battery compartment, observing the polarity. The IRVH-1700 battery compartment is detachable and optionally fastened to the bottom of the camera monitor via screw through a ¼"-20 threaded hole. Users may also use an AC/DC (110V/12V) adapter for feed from a standard wall outlet. Socket 10 (see below) is intended for connection of AC/DC adaptor or of battery compartment cable (11).
3. Install one AAA battery (observing polarity) into the cell compartment (1) of the body of the viewer.
4. To turn the camera on, press button (2), and turn the rotary switch (3) clockwise into the middle position (ON). In position ON, the video output (9) is switched on automatically. In position VIN (far right position), the video input is switched on for displaying of images from external video sources.
5. Focus the objective lens (4) to achieve a clear picture of your object.
6. Use the brightness and contrast controls (5) to adjust the brightness and contrast of the picture. The brightness of the screen varies with the viewing angle.
7. For the spectral range of 1100 to 1700nm, the IRVH has limited sensitivity. To increase contrast, external illumination of approximately 50 lx is recommended. Users may also consider employing an IR cut-off filter (included) or an interference filter (available from the company) to increase contrast of the viewing object in the infrared region. The IR cut-off filter offers spectral transmission from 680 to 1700nm. **Please note: When viewing reflected radiation, use a metallic or glass surface, as paper will absorb the radiation. Be careful not to reflect beam directly into viewer.**
8. Press button (2) and turn rotary switch (3) to OFF position when viewer is not in use.

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Please note

You may notice an occasional small black spot on the viewer screen. These spots do not affect performance or reliability of the viewer and are due to cosmetic blemishes in the image converter. They are inherent in the manufacturing process.

Accessories available upon request:

1. Neutral density filter (T=2-5%)
2. Microscope adapter
3. 2.5X lens with IR filter and distance ring

Spectral sensitivity of IRVH-1700

Please note that the minimum detectable signal for a near-infrared viewer depends on the following.

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

The minimum power densities required to view an IR beam from a distance of one meter are approximately

- 20μW/cm^2 for 1.0μm
- 500μW/cm^2 for 1.3μm
- 3mW/cm^2 for 1.5μm
- 50mW/cm^2 for 1.7μm

To determine the minimum power density in mW/cm^2 required to yield a detectable signal, use the following procedure. Divide the laser power in milliWatts by the area of the beam at the distance to be measured. For an elliptical beam, the area is equal to 2/3 x w x h. For example, if h = 10mm and w = 40mm, then the area of the beam = 2/3 x 10mm x 40mm = 2/3 x 400mm^2 = 266.7mm^2. To convert to cm^2, divide by 100. Therefore, the area = approximately 2.7cm^2. To determine the required power density, divide the laser power by the 2.7 cm^2 figure. For example, if the laser output is 5mW, the required power density will be 5mW/2.7 cm^2, or 1.85mW/ cm^2.

For a circular beam, area is equal to $\pi \mathbf{x r^2}$, where r = the radius of the beam. For example, if both the height and width of a beam at the distance to be measured are 5mm, then the area of a beam at this distance = 3.14 x 2.5mm^2 (half the diameter, squared) = 3.14 x 6.25mm = 19.6mm. Divide by 100 to convert to cm^2, so the area = approximately 0.19cm^2. Now divide laser power by 0.19cm^2 to determine the required power density. For example, if the laser output is 5mW, the required power density will be 5mW/0.19cm^2, or 26.31mW/cm^2.

The drawing on the following page illustrates the typical spectral response of our IRVH-1700 viewer.

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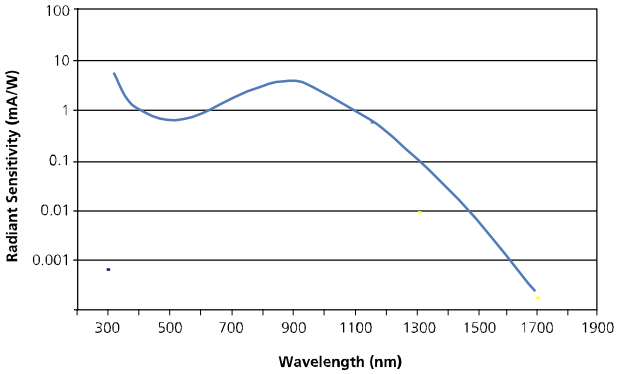

Warranty and repair return policy

IRVC Series viewers are warranted for twelve (12) months for all parts and twelve (12) months for all labor from the date of the first consumer purchase.

No return of merchandise will be accepted by PTI without an RMA, Return Material Authorization, number, issued by the factory and prominently displayed on the return package.

No return shipments will be accepted "Collect" or "COD". On warranty returns PTI will pay for shipping charges on return of merchandise to the customer.

When contacting the factory for an RMA number, please have the following information available: model number, serial numbers, and a description of the problem.

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