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BEAM FINDER III

Instruction Manual

Thank you for purchasing the BEAM FINDER III.
Before using your equipment, please read this manual carefully, to make sure you use your unit properly.
If you have any questions concerning the contents, please contact your nearest HAMAMATSU sales representative.

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OVERVIEW

The Beam Finder III Series is a compact, lightweight CCTV camera with built-in 2/3-inch infrared vidicon and ultraviolet Chalnicon It can photograph images in the world of infrared and ultraviolet light that cannot be perceived by the human eye. The BEAM FINDER III Series consists of four models, classified by type of imaging tube, allowing the user to select the type best suited to the application. A liquid crystal 3-inch monitor set is available as an option so that the Beam Finder III can be used outdoors.

CONFIGURATION

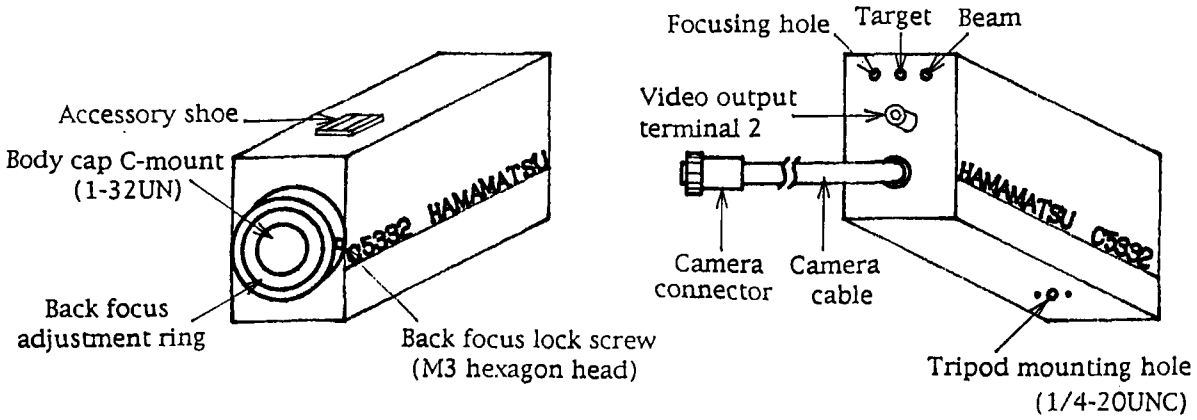
1. Camera Head C5332 Series
2. Camera Control Set C5489

ACCESSORIES

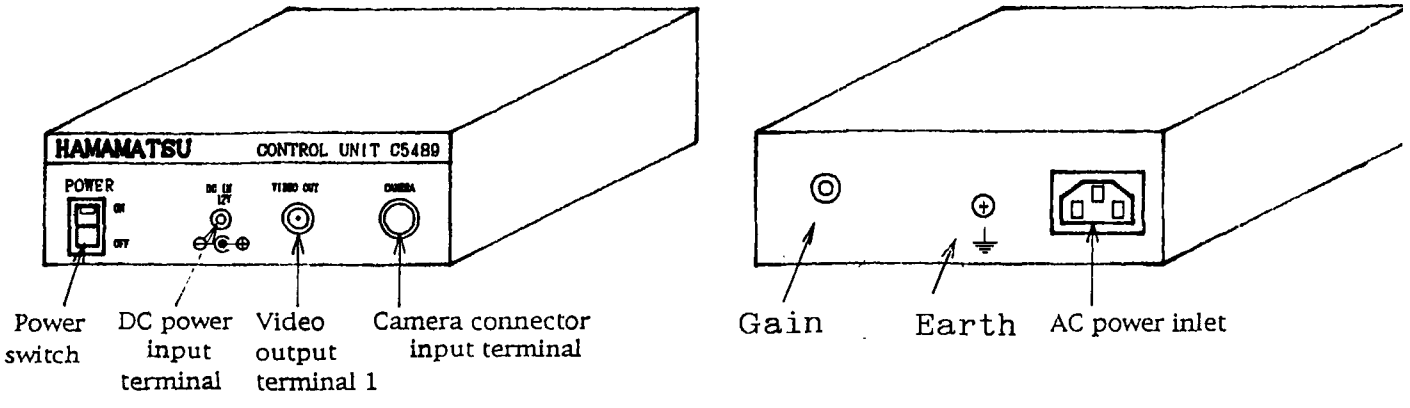
3. Body cap (mounted on camera head)
4. 75Ω coaxial cable w/BNC plug at both ends, length 3 m
5. MP-BNCJ conversion adapter
6. Power cable, length 2 m
7. Instruction manual

Names and Functions of Parts

Camera Head C5332 Series



Camera Control Set



ASSEMBLY AND CONNECTIONS

The BEAM FINDER III assembly and connection procedures are described below.
Read this section while referring to the figures on the preceding page.

1. Installing the lens

Any model of C-mount lens can be used.
Remove the camera head body cap, turning it counterclockwise. Then screw the lens firmly into the opening provided for it, turning it clockwise. If the lens is not tightened firmly enough, the image may be out of focus, or noise may be produced in the image.
To filter out visible light rays, it is recommended that a visible light cut filter be left in place at the lens at all times.

2. Connecting the camera head and camera control unit

Plug the camera head camera connector into the camera control unit (CCU) camera connector terminal and lock it in place by turning the ring.

3. Connecting the monitor TV

Using the accessory signal cable, connect CCU video output terminal 1 to the monitor video input terminal. Set the monitor input impedance to 75Ω.

4. Connecting the power supply

Make sure that the AC line voltage is within the usable voltage range shown in the table at the right and that the CCU POWER switch has been turned off before connecting the AC inlet to the AC line with the accessory power cable.

Voltage selector	Usable voltage range

5. Installing the camera head

Install the tripod using the screw (1/4-20UNC) on the bottom of the camera head.

OPERATION PROCEDURE

When the above operations have been completed, use the following procedure to operate the equipment.

1. Close the lens aperture all the way, and attach the lens cap.
2. Turn on the CCU POWER switch. (The switch pilot lamp should light, indicating that power is being supplied.)
3. The equipment will be warmed up and ready for image acquisition within 30 seconds after the power is turned on.
Remove the lens cap and point the lens at the object to be photographed.
4. While watching the monitor TV, gradually open the lens aperture. The image is displayed on the screen.
5. Use the lens focus ring to adjust the focus of the image and continue the image acquisition process.
6. At the end of image acquisition, close the lens aperture all the way and attach the lens cap. Then turn off the CCU POWER switch.

(Note 1) If the image cannot be focused by lens focus adjustment, perform flange back focus adjustment by loosening the camera head back focus M3 hexagon head lock screw, and focus the image by turning the back focus ring.
(Note 2) If the image is blurry even when the optical focusing described in the above steps was performed, obtain a perfect image by slowly turning the semifixed variable resistor inside the focusing current adjustment hole of the camera head with a precision screwdriver.
(Note 3) Never remove the camera head cover. There are dangerously high voltages inside the camera head.
(Note 4) Always turn off the CCU POWER switch before attaching and removing the lens.
(Note 5) When using the equipment in a location where the temperature and/or humidity is extremely high, where there are corrosive or combustible gases, or where the ambient environment is

extremely dusty, a special camera housing is required to prevent accidents and to protect the camera. Please contact the Sales Division of HAMAMATSU.

PRECAUTIONS CONCERNING THE BUILT-IN VIDICON

1. The imaging tube (vidicon) used with the BEAM FINDER III is extremely sensitive even in the visible light region. Use the dedicated filter (IR-D80A, IR-D70) to remove visible light.
2. Pointing the lens toward the sun, or exposing it for long periods of time to excessive incident light or spotlights can burn the imaging tube (vidicon) photocathode, inhibiting image acquisition with that part of the equipment.
3. Close the lens aperture as far as possible when using the equipment.

Under normal usage conditions, a small amount of burning occurs on the lens. This happens because the incident light energy to the camera adversely effects the performance of the vidicon photocathode surface.

Consequently, to obtain good image quality with little after-burn over a long period of time, the lens aperture should be closed as far as possible without hindering image acquisition, and the volume of incident light directed at the vidicon photocathode should be minimized. The user should develop the habit of keeping the lens cap on whenever image acquisition is not required.

4. Never subject the equipment to strong impact with the lens pointing downward. Placing the equipment in a location where it is susceptible to strong vibration, or transporting it with the lens pointing downward, can damage the imaging tube photocathode.
5. The vidicon photocathode is the most important part of the camera. Be careful not to get it dirty. If the camera is used when there is dust or dirt on the photocathode, a ghost image will appear on the screen. If this occurs, carefully clean the photocathode surface with a clean cotton swab moistened with a small amount of ethyl alcohol.
6. The camera head target voltage and beam strength are adjusted to the optimum values at the factory. Leave any readjustments to the service engineer; never try to adjust them yourself.

BUILT-IN VIDICON FEATURES AND SPECIFICATIONS

1. Characteristics by type of camera head

1. Item Type
2. Built-in imaging tube*
3. 2/3" highly sensitive IR vidicon N2634
4. 2/3" highly sensitive IR vidicon N2635
5. 2/3" highly sensitive IR vidicon N2634-01
6. 2/3" highly sensitive UV Chalnicon N3120
7. Spectral response**
8. Resolution
9. Horizontal center: 700 TV lines min., vertical center: 350 TV lines min.
10. Decay lag
11. 55% max. after 3 fields
12. 55% max. after 3 fields
13. 10% max. after 3 fields

*Spot standard for the N2634 and N2634-01 is based on the table of values listed below for the image tubes.
**Values for the C5332, C5332-01, and C5332-03 are the values when a Toshiba IR-D80A infrared filter was used.

2. Imaging tube specifications

A white test chart like that shown below is imaged and judgment is based on the size and quantity of spots appearing in Zone 1 and Zone 2. The allowable spot quantity conforms to the table below.
Spot standard: Test pattern used for evaluation

N2634, N2635

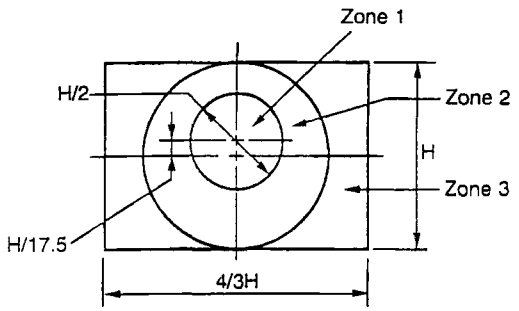
Spot size diameter (no. of scanning lines)	Number allowed	
	Zone 1+ Zone 2	Zone 3
D > 8	0	0
8 ≧ D > 6	2	3
6 ≧ D > 4	4	5
4 ≧ D > 1	8	10
1 ≧ D	*	*

D= Diameter of spot

N2634-01

Spot size diameter (no. of scanning lines)	Number allowed	
	Zone 1	Zone 2
D > 10	0	0
10 ≧ D > 8	0	2
8 ≧ D > 6	2	4
6 ≧ D > 4	4	8
4 ≧ D > 2	6	8
2 ≧ D > 1	8	10
1 ≧ D	*	*

Spot standard: Test pattern used for evaluati



N3120

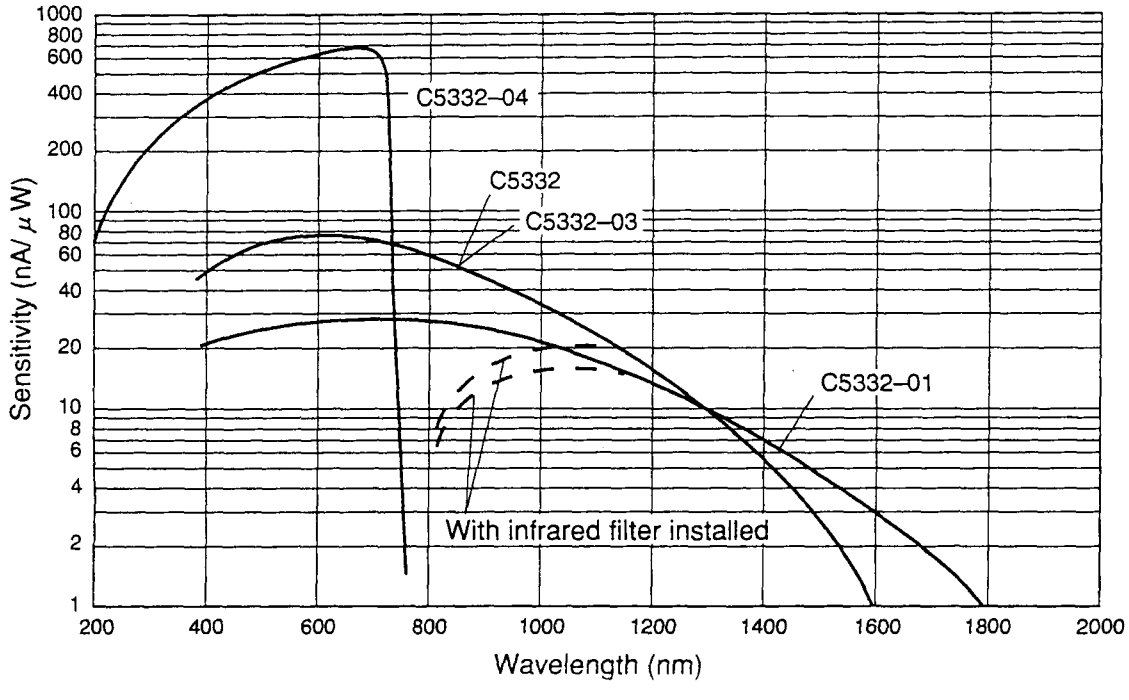
Spot size diameter (no. of scanning lines)	Number allowed		
	Zone 1	Zone 2	Zone 3
D > 6	0	0	0
6 ≧ D > 4	0	1	2
4 ≧ D > 1	1	2	3
1 ≧ D	*	*	*

Caution:
Items which do not reach the following contrast ratios cannot be counted as spots: for black spots, 2 : 1, and for white spots, 1.5 : 1.

3. Spectral response

Sensitive wavelength area
1. Sensitivity (nA/μW)
2. With infrared filter installed
3. Wavelength (nm)

Spectral Response



SPECIFICATIONS

BEAM FINDER III SERIES SPECIFICATIONS

1. Input power supply AC 100, 120, 220, 240 V 50/60 Hz (CCU rear panel tap switching)
DC 12 V (11 to 15 V)
2. Imaging tube 2/3" vidicon (8844 type)
3. Focusing and Deflection Electromagnetic focusing/Electro-method/Magnetic deflection
4. Scanning frequency
Horizontal 15.734 kHz
Vertical 60 Hz
5. Number of scanning lines 525 lines
6. Scanning method 2:1 interlace
7. Synchronization method Crystal-controlled internal synchronization
8. Aspect ratio 3:4
9. Imaging tube scan size 6.6 mm x 8.8 mm
10. Horizontal resolution 700 lines min.
11. Graphic distortion Within ±2% in a circle with the height of the screen as its diameter
12. Output signal Composite image signal 1.0 Vp-p (75Ω)
13. Signal-to-noise ratio 45 dB min.
14. Power consumption 8 W max.
15. Usage time Continuous
16. Ambient operating environment
Temperature 0°C to +40°C
Humidity 90% max (with no condensation)
17. Lens mount C-mount (F/B adjustment ±2 mm)
18. Weight
Camera head 550 g
Camera controller 1740 g

19. External dimensions
Camera head 55 mm x 80 mm x 142 mm
Camera controller 200 mm x 150 mm x 71 mm

GUIDE TO OPTIONS

Various options are available to allow use of the BEAM FINDER III in a wide range of applications.

1. Liquid Crystal Monitor Set C5490
The Liquid Crystal Monitor Set consists of a 3-inch liquid crystal color monitor, a battery pack, and a battery charger. The lens image can be conveniently monitored by mounting this set to the accessory shoe on the top of the camera head and connecting it to video output terminal 2 (camera head) with the accessory cable.
*BEAM FINDER III images are monochrome images.

2. Lenses
Recommended standard lens A3591 f25 mm F1.8
UV lens A4869 f50 mm F3.5
An A2095 C-mount converter is also available to fit camera lenses from different manufacturers.

3. Close-up ring A2263
Close-ups can be taken by inserting 0.5 mm to 20 mm thick rings between the camera head and lens.

4. Optical filters
Bandpass filters and other optical filters are available, besides the recommended A3592 (IR-D80A) and A3592-01 (IR-D70) filters.

5. Handgrip A3594

The handgrip is used by attaching it to the tripod hole in the camera head. It can also be easily used as a mini tripod by pulling out a compact built-in tripod.

6. Carrying Case A3598
This case is used to carry the BEAM FINDER III and its options.

WARRANTY

1. Warranty period
One year from the date of delivery.
However, this warranty is limited to
repair or replacement of the pertinent parts.
Electron tubes shall be warranted for 1 year or
1000 hours, whichever occurs first.

2. Exceptions
The following shall be repaired for a
charge even if they occur within the warranty
period:
_ Damage due to earthquake, lightning, typhoon,
tidal wave, fire, and other disasters
_ If the user has made any modifications that
affect the functions of the equipment
_ When the equipment was handled in a manner contrary to that
described in the instruction manual
_ Accidents due to use in an adverse environment
(high temperature and humidity, very low
temperature, corrosive gas, vibration, shock,
etc.)

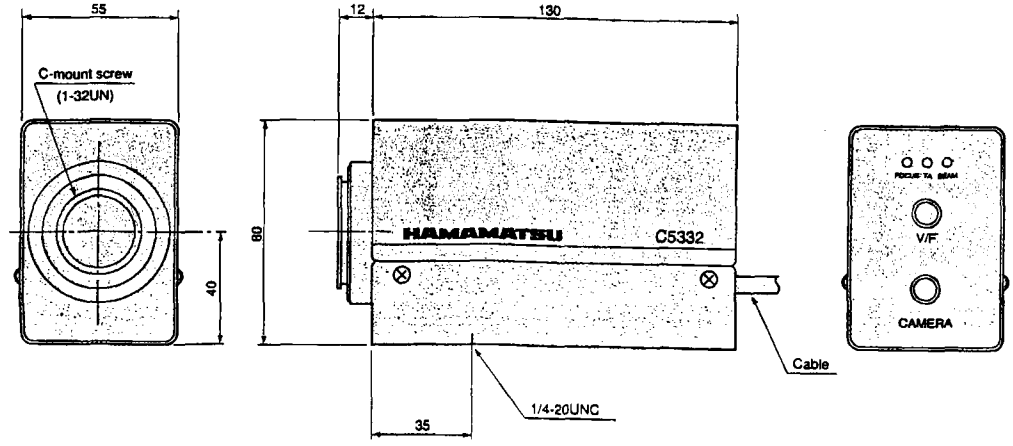
3. Repair and inspection after expiration of warranty period
Repairs and inspection shall be performed for a charge. Please
contact the Hamamatsu Sales Division or your Hamamatsu dealer.
When requesting repair or inspection, please provide the following
information along with the equipment:
Your address
Your name
Your telephone number

Product name
Serial No.
Name of store where purchased
Date purchased
Description of problem (in as much detail as possible)

DIAGRAMS

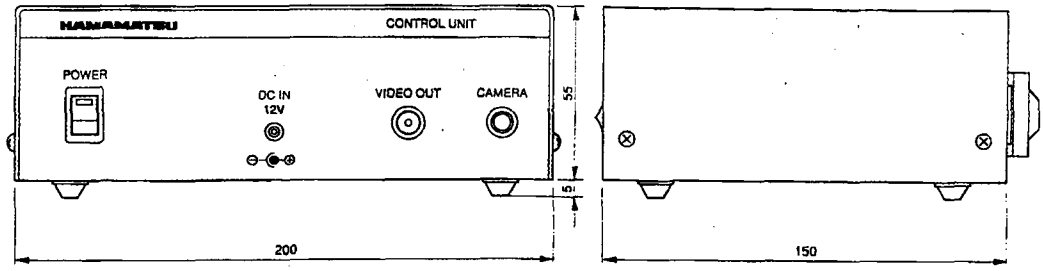
Camera Head C5332

Unit: mm



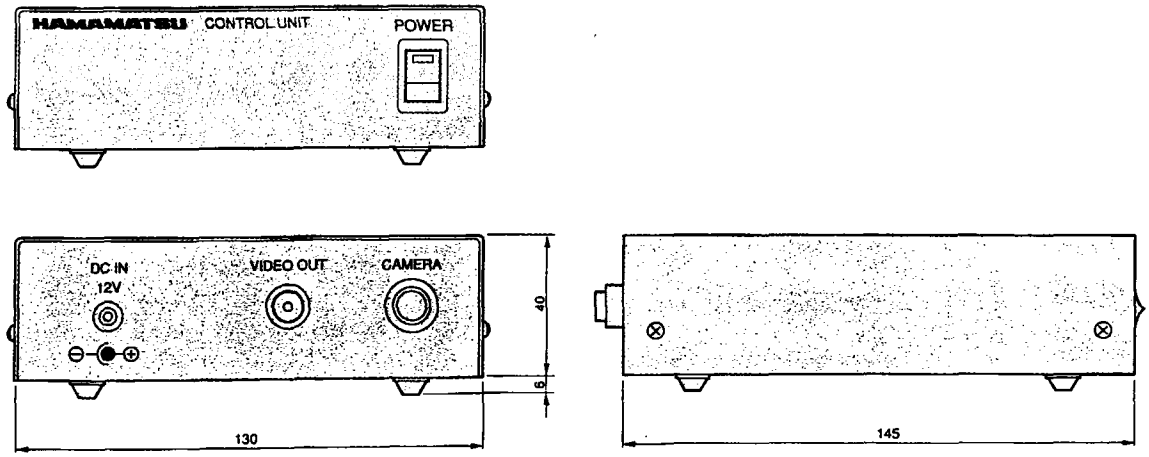
Weight: 550g

Camera Control Unit (AC/DC Input)



Weight: 1740g

Portable Camera Control Unit (DC Input)



Weight: 660g

• Specifications and external appearance are subject to change without notice.

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