



SeeUV®

# V.I.B.E.S.® Cart Inspection System

**EM14839** - Operation & Service Manual  
(Original Instruction Manual)



To avoid injury, read and understand documentation for each system component prior to operation. Direct any questions about operation to InterTest at (908) 496-8008 or [service@intertest.com](mailto:service@intertest.com)

**Shot**



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*\*optional accessory*

# 1.0 Introduction

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Congratulations on your investment in VIBES, InterTest's portable visual inspection and bore examination system. All VIBES systems combine a high-resolution color camera with precision position hardware. An operator can conduct on-the-spot white light, magnetic particle and fluorescent particle inspection of intricate components with minimal fixturing.

Many features enhance VIBES system performance and versatility. These include:

## ***Generous Movement Envelope***

Controlled by either hand wheels or optional motors, the camera boom typically travels 72 inches\* horizontally and 16 inches\* vertically.

## ***Illumination Control***

In order to attain a more thorough remote visual examination of component internals, the VIBES systems have been designed with both white and UV light capability. Intensity is controlled independently and operation can be simultaneous.

## ***Robust Video Camera***

All SeeUV VIBES systems have remote control of focus to ensure crisp, high-resolution video images. They capture color video at a resolution of 460 horizontal TV lines (PAL) or 470 horizontal TV line (NTSC).

## ***High Resolution Color Images***

Illumination, optics, and CCD imager are optimized for life-like video reproduction of the target surfaces. Color rendition replicates direct viewing of surfaces.

\* See specifications on page 15 for as-built values.

## ***2.0 Customer Support***

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Service and support for all InterTest products is available by calling (908) 496-8008. We also welcome comments, suggestions and technical inquiries by fax at (908) 496-8004 or email at [service@intertest.com](mailto:service@intertest.com).

Page 5 explains InterTest's one-year limited warranty on parts and materials. Be sure to read all warranty information, register your product on-line at [www.intertest.com](http://www.intertest.com) and save this manual for future reference.

If your system requires service, please contact our Customer Service team at:

InterTest, Inc.  
303 Route 94  
Columbia, NJ 07832

908-496-8008  
Toll free in the USA: 800-535-3626  
[service@intertest.com](mailto:service@intertest.com)  
[www.intertest.com](http://www.intertest.com)

## 3.0 Warranty

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InterTest, Inc. guarantees the custom products manufactured by InterTest, Inc. to be free from defects in materials and workmanship for a period of one (1) year, from the date of original purchase. Any and all other products not manufactured by InterTest, Inc. will carry the OEM's limited warranty, which will be passed to the purchaser through and supported by InterTest, Inc. InterTest, Inc.'s obligation under this limited warranty shall be confined to the repair or exchange of any part, or parts thereof, that prove defective under normal use and service for which the product was intended and/or designed for.

This limited warranty covers conditions that upon our examination, at our facility, shall disclose, to our satisfaction, to be defective.

This limited warranty is in lieu of all other warranties, express or implied, including the warranties of merchantability and fitness for use and of all other obligations or liabilities on our part, and we neither assume, nor authorize any other person to assume for us, any other liabilities in connection with the sale of InterTest, Inc. equipment. This warranty shall not apply to any equipment that has been subject to accident, negligence, alteration, abuse, unauthorized repair, improper storage, or other misuse.

This limited warranty applies only to the original purchaser and cannot be assigned or transferred to any third party without express written consent from InterTest, Inc.

This limited warranty does not apply to consumable items, expendable items or normal wear and tear, nor does it apply to failure due to radiation, overheating and / or below freezing temperatures.

Additionally, InterTest, Inc. assumes no responsibility, either expressed or implied, regarding the improper usage of this equipment or interpretation of test data derived from this product. InterTest, Inc.'s responsibility and obligations, in all cases, are limited strictly to the repair and/or replacement costs outlined above.

The laws of the State of New Jersey shall govern this warranty.

*Note: In the event that the equipment can not be returned to InterTest, Inc., for whatever reason, the customer agrees to pay for all travel and living expenses incurred to have an InterTest, Inc. Representative evaluate, assess or affect a warranty repair in the field.*

## ***4.0 Unpacking & Examination***

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Before setting up the VIBES system, verify that all components and subassemblies are present and that none has suffered physical damage in transit.

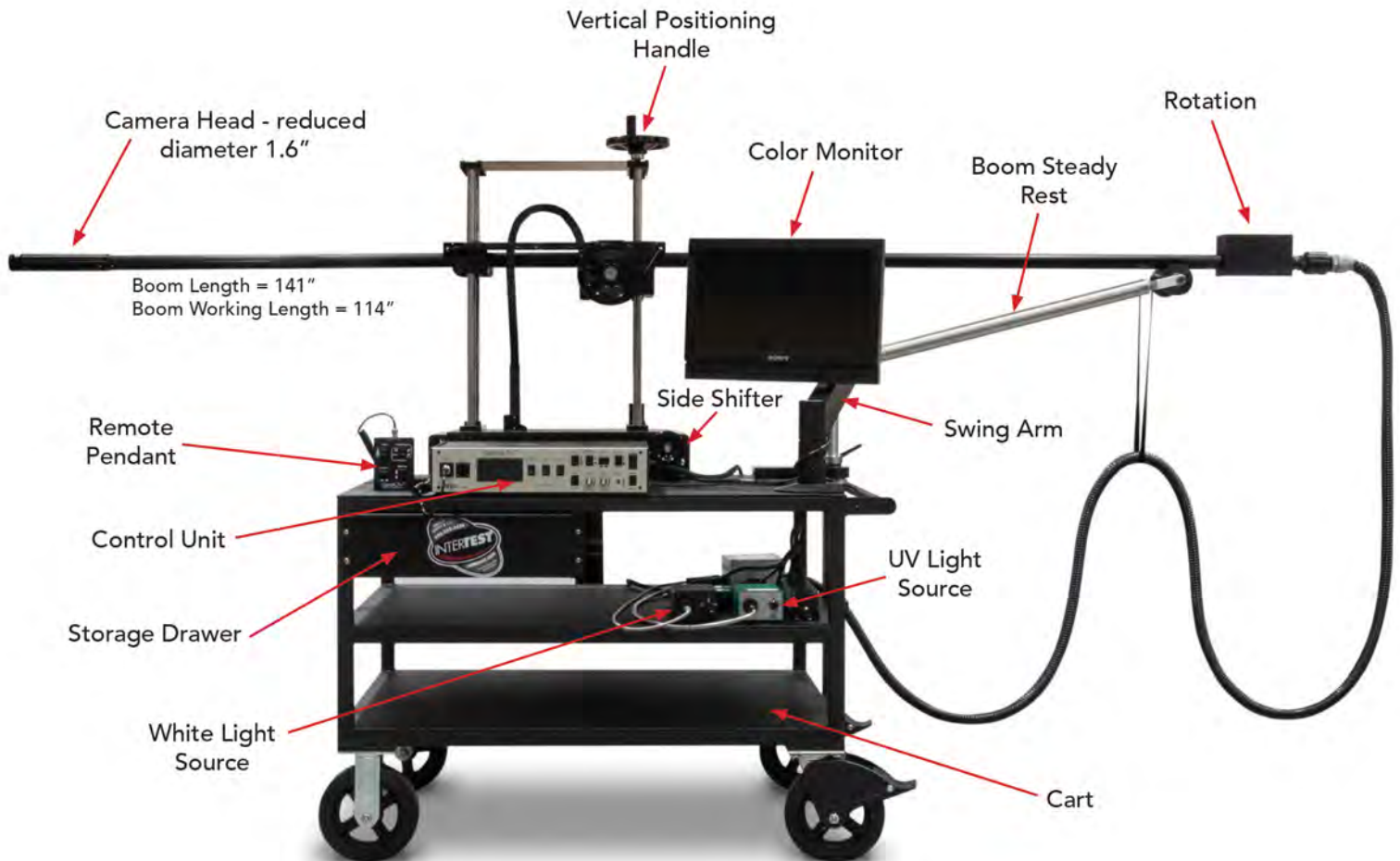
The shipment contains:

- Camera boom and boom positioning mechanisms
  - Horizontal, vertical and side control
- Camera Control Unit (CCU)
- Monitor with Swing Arm
- Ultraviolet Light Source
- White Light Source
- Necessary Power Cords and Video Cables
- Remote Pendant
- Cart

Remove all tape and packing material from the unit and individual components. Next, carefully inspect each piece for damage and/or missing parts. Inspect all control panel knobs and switches for proper operation. If any portion of the system has suffered damage during shipment, please notify InterTest at once.

Retain all packing material for use in the event that the system or system components need to be shipped in the future.

# 4.0 Unpacking & Examination (con't)



**Figure 1**

# 5.0 Assembly

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## 5.1 Assembly Precautions

After examining the individual components, you are ready to assemble the system. Be sure to follow these safety precautions as you work:

- To unplug a power cord, pull using the plug body and not the cord.
- Connect cables and cords for the system first before plugging the power strip into main power.
- When disassembling VIBES, make disconnecting the main power your first step after shutting down all individual component power.
- Never plug VIBES into an ungrounded outlet.

## 5.2 Equipment Placement

The controls for the CCU and light sources should be within easy reach for an operator standing in front of the VIBES monitor.

Place cart in a open, unobstructed inspection area so the boom can freely extend and retract.

## 5.3 General Assembly

Attach the boom's light guides to the ULB-35RVI ultraviolet and white light sources. Make sure the liquid light guide is paired with the ULB-35RVI (Figure 2).

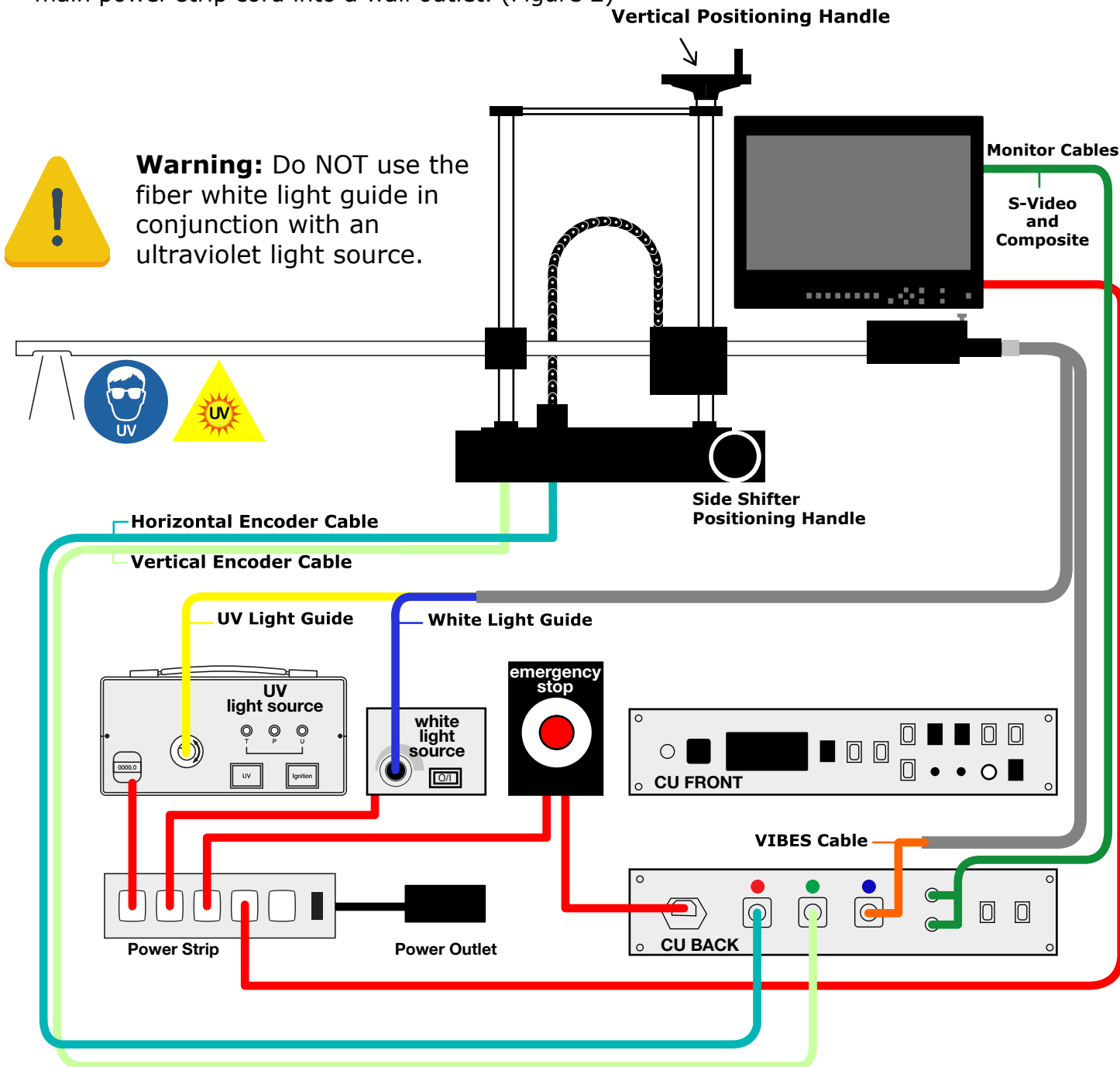
 **Do NOT use the fiber white light guide in conjunction with an ultraviolet light source.** 

**See Page 9, Figure 2 for a detailed diagram on connections.**



# 5.0 Assembly

Connect the VIBES control (main) cable to the Control Box panel input, then connect the video output from the Control Box to the monitor's VIDEO IN jack using either the supplied S-Video or BNC cable. On VIBES systems with motorized control, plug the Motor Control cables into the Control Box inputs. Connect all Power cables to the power strip. Finally, plug the main power strip cord into a wall outlet. (Figure 2)

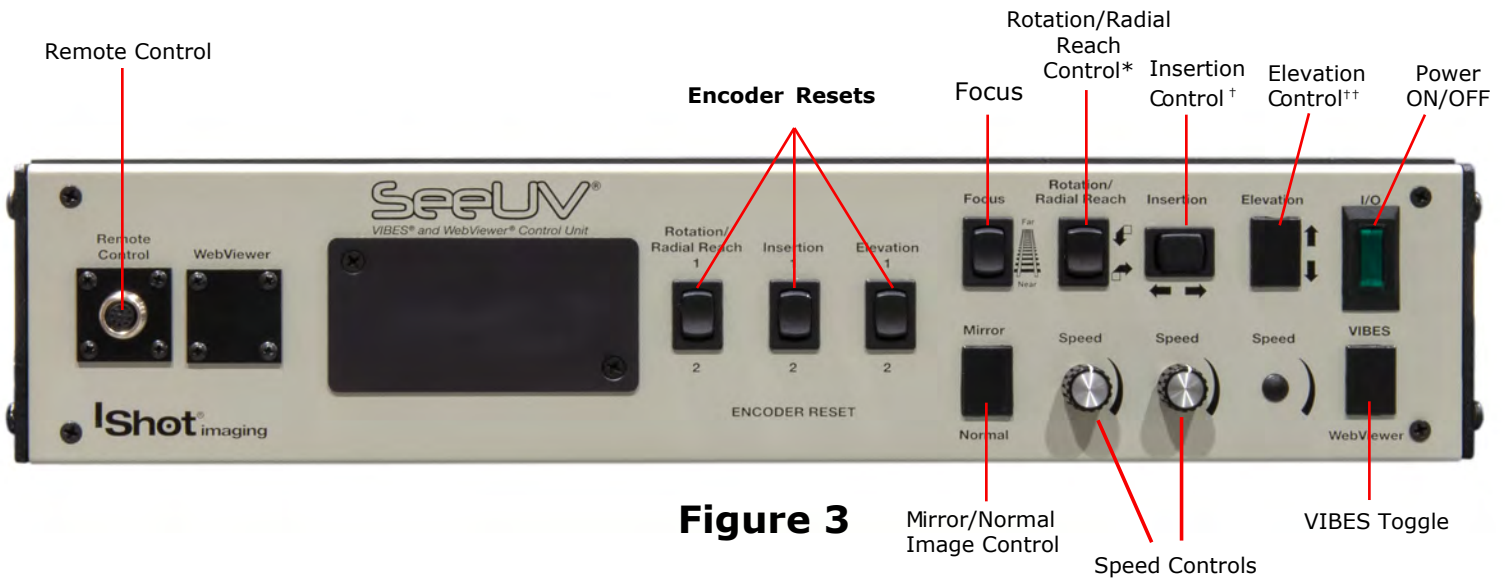


**Figure 2**

Illustration not to scale. Specifications may be different than pictured above.

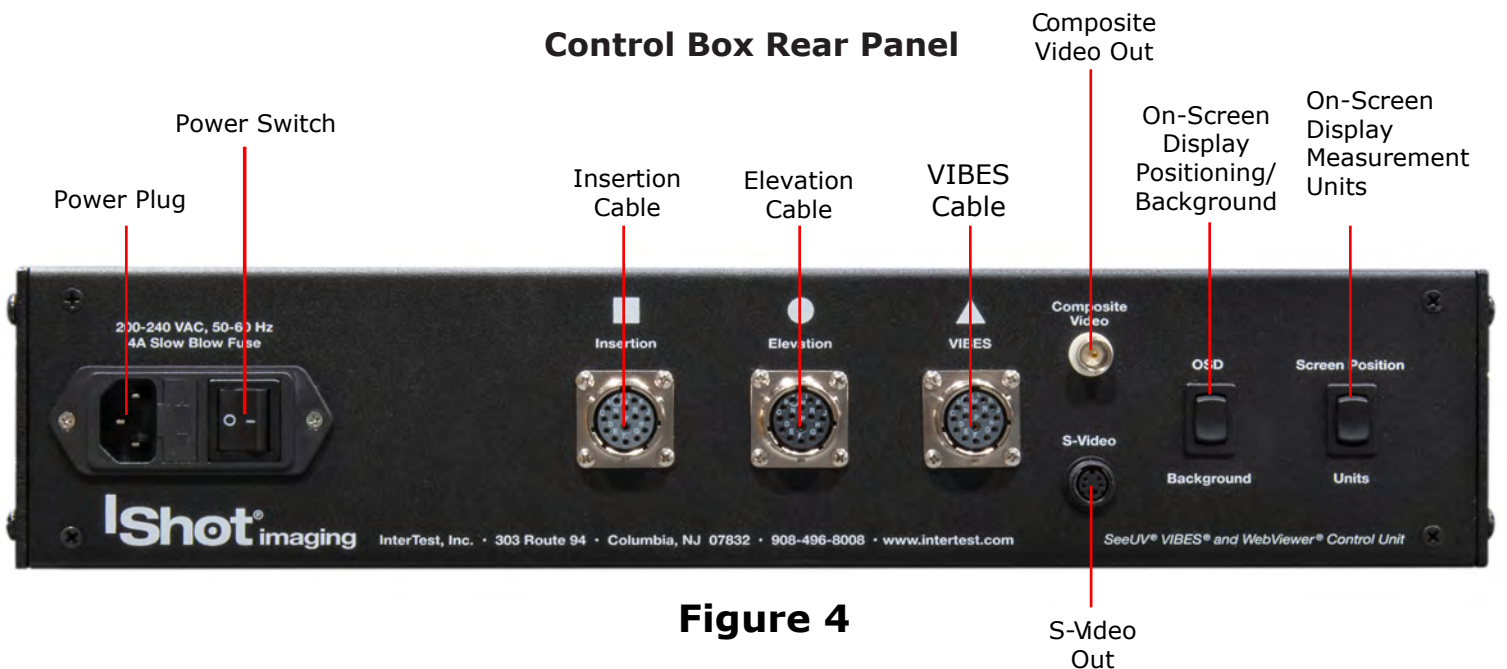
# 6.0 Operation

## Control Box Front Panel - VIBES Only, WebViewer Components not installed.



**Figure 3**

## Control Box Rear Panel



**Figure 4**

Note: Specifications may be different than pictured above.

- \* Rotational control in EM14839
- † Motorized Insertion control in EM14839
- †† NO Motorized Elevation control in EM14839

# 6.0 Operation

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## 6.1 Boom Controls

- Position the VIBES unit so that the camera boom, when extended, enters the test piece directly.\*
- Position the boom camera (both insertion and rotation) using the positioning handwheels or rocker switches on the Control Box (for motorized versions).
- For multi-camera systems, adjusting any of a camera's controls will activate that camera for video output.
- When adjusting elevation, release and push Steady Rest to side so that it does not interfere with movement. Replace Steady Rest to support boom after elevation is adjusted.

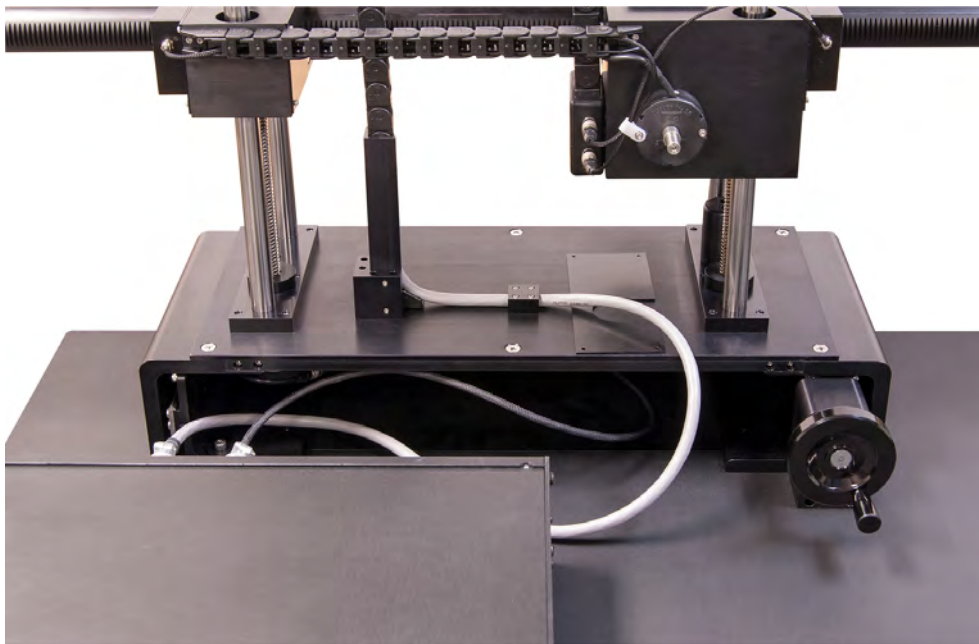


Figure 5 \*Optional VIBES Side Shifter Component

### Figure 5

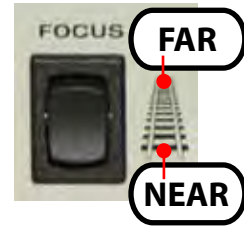
\*Optional VIBES Side Shifter (Figure 5) to assist entering test piece directly. Use VIBES side shifter located at the base of the VIBES camera boom apparatus to finely adjust camera boom entry. Adjustment ranges +/- 50 mm from center position.

- CLOCKWISE ROTATION moves VIBES camera boom away from operator
- COUNTER-CLOCKWISE ROTATION moves VIBES camera boom towards operator







# 6.0 Operation

## 6.2 Changing Boom Optics

**Before changing optical adapters move focus to the near position using the focus control switch on the control unit.**



The VIBES system has two optical adapters. One provides direct viewing (down bore - Figure 5) and another provides side viewing (right angle to bore axis - Figure 8). In order to change these, remove the cap screws on the end of the boom. Change to the desired optic as shown in the figures below.

Removing Direct Viewing Optic			Removing Right Angle Viewing Optic		
					
Remove 4-40 cap screws using 3/32 hex wrench.	Slide forward optical adapter off of boom.	(Boom end without optical adapters)	Remove 4-40 cap screws from end cover of right angle adapter.	Remove 4-40 cap screws from right angle adapter.	Slip off right angle adapter off of boom.

## 6.3 Camera Controls

- Adjust the camera's focus using the focus control located on the Control Box or Remote Pendant.
- Complete circumferential inspection can be accomplished by rotating the boom either using the positioning hand-wheels or rocker switches on the Control Box (for motorized versions).

## 6.4 Encoder Controls

- Rotation/Radial Reach, Insertion, and Elevation encoders can be reset by depressing the rocker switch. Press up (1) on rocker switch to reset left delta value and down (2) to reset right delta value.
- By default, the VIBES' encoder reading will appear on-screen against a background. This can be changed by using the 'OSD Background' switch typically located on the back of the Control Box.
- On-screen display positioning can be changed by using the 'Screen Position' rocker switch typically located on the back of the Control Box.
- Measurement units can be changed from inches to centimeters by using the rocker switch labeled "units" typically located on the back of the Control Box.

# 7.0 Safety, Care & Maintenance

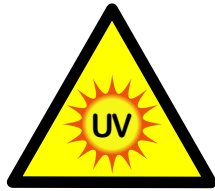
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## Boom Hazard

- Use care when moving the VIBES System. Boom protrudes well past the end of the cart.
- Always retract boom before moving unit.
- Do not subject to loads. Do not jar.
- Ensure rotation box does not collide with Steady Rest during insertion. Steady Rest should be disengaged when necessary.

## Light Sources & Light Guides

- Do not look directly at UV light; damage to your eyes may occur.



- Use care when removing light guides from light sources

after use, they will be very hot.



- Do not expose to moisture or direct sunlight.
- Do not expose positioning mechanism to abrasive particulate or environments with airborne debris.
- Always replace blown fuses with identically rated ones.
- Never bypass the grounding circuits of system components.
- Bundle all excess cordage to prevent snagging.
- Do not operate near intense electromagnetic fields.
- With the exception of lamp and fuse replacement, refer all service to InterTest technicians.

## Cart

- Always engage both wheel locks prior to system operation.

# 7.0 Safety, Care & Maintenance

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## Light Guides

- Do not pull or otherwise exert tensional force.
- Do not subject to tight bend radii.
- Never use a fiber-based light guide with an ultraviolet light source.
- Do not allow light guide jack to strike floor.

## Monitor

- Clean as needed using a cloth dampened with glass-cleaning solution.
- Do not block ventilation ports.
- Refer to owner's manual before adjusting monitor settings.

## Lubricant

- Lubricate the taper roller bearing at the bottom of the elevation lead screws. Use NLGI #2 or equivalent bearing grease.
- Use a small amount annually.

## Control Unit

- Clean intake and exhaust fans on a regular basis. keep free from dust.

## Remote Pendant (optional)

If remote pendant becomes disconnected:

1. Power down the VIBES System.
2. Reconnect the remote pendant.
3. Reboot the VIBES System.

# 8.0 System Specifications

## General Specifications

Camera		Illumination - White Light	
Sensor Type	1/3" IT CCD	Light Source	LED
Sensor Format	NTSC or PAL	Average Rated Life	5000 Hours
Effective Pixels	768H X 494V	Light Guide	Glass, 4mm Active Area
Resolution (h)	>470 lines	Illumination - UV Light	
White Balance	Automatic or Manual	Light Source	LED
Shutter	Automatic or Manual	Average Rated Life	10000 Hours
Focus Method	Remote via Control Box	Light Guide	Liquid, 5mm Active Area
Display		Peak Output	Approximately 365nm
Size	14-inch diagonal	Intensity	>2000 uW/sq cm @ 8-inches (20cm)
Resolution (h)	>470 lines		

## Specific System Specifications

VIBES System	VIBES-Standard	VIBES-Landing Gear	VIBES-XR	VIBES-XR-L
Boom Diameter	1.75-in (4.5-cm)	1.75-in (4.5-cm)	1.75-in (4.5-cm)	1.75-in (4.5-cm)
Boom Length*	98-in (2.5-M)	118-in (3-M)	137-in (3.48-M)	141-in (3.58-M)
Insertion Length*	60-in (1.53-M)	72-in (1.83-M)	114-in (2.9-M)	114-in (2.9-M)
Insertion Control	Manual**	Manual**	Manual**	Manual**
Elevation Range*	36-in to 52-in (91-cm to 132-cm)†	36-in to 52-in (91-cm to 132-cm)†	36-in to 52-in (91-cm to 132-cm)†	36-in to 52-in (91-cm to 132-cm)†
Elevation Control	Manual**	Manual**	Manual**	Manual**
Rotation Range	Fixed	+/- 180°	+/- 180°	+/- 180°
Rotation Control	N/A	Manual**	N/A	Manual**

\*Other Ranges Available

† Add 2" of elevation if VIBES Side Shifter Accessory being used

\*\*Motorized Option Available

## 9.0 Uncrating and Assembly

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Starting with crate 1 of 2 (taller), remove the top lid screws around the circumference of the crate (**GREEN** in picture) and remove lid. Remove all screws along the short ends of crate next (**GREEN** in picture). Remove the two ends and finally remove the remaining screws at the bottoms of longer sides (Circled **RED** in picture). Remove the two sides of crate.



Take all boxes off the cart. Release the two ratchet straps. Remove the 2" x 4" brace pieces from the bottom of the crate with a motorized drill. Unlock the two wheels so the cart can move freely. Place the cart in an accessible position and re-lock the two wheels for final assembly.



## 9.0 Crating and Uncrating

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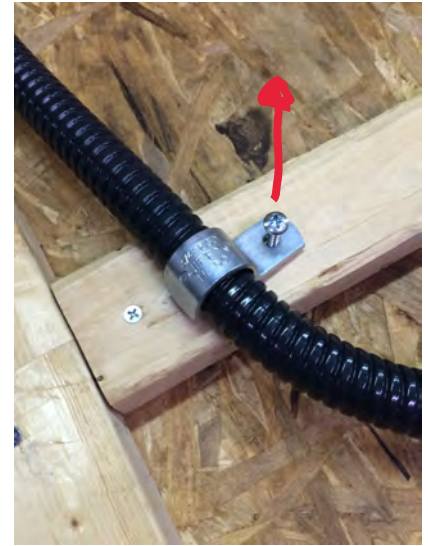
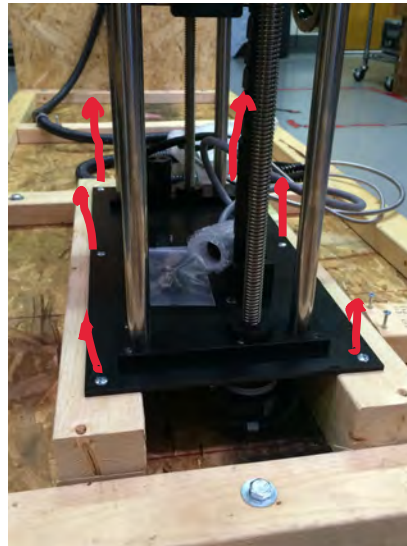
With crate 2 of 2 (longer, shorter), remove screws around the circumference of the top first and remove lid (**GREEN** in picture). Next, remove screws on short ends and remove ends (**GREEN** in picture).



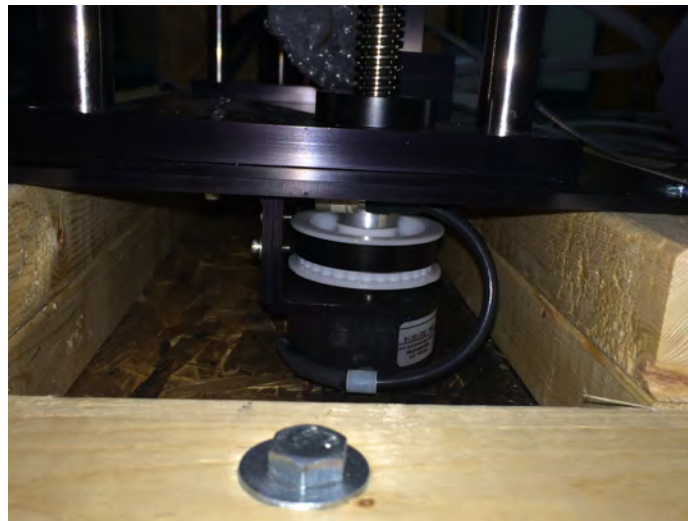
Be sure to remove the screws in the outside of the middle of the side panels (Circled in **RED** in the picture). These hold two 2" x 4" brace pieces internally. Remove the two 2" x 4" and the two sides of crate. Remove the remaining screws at the bottoms of longer sides (**GREEN** in picture).

## 9.0 Crating and Uncrating

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Remove the small scrap 2" x 4" piece holding down the electronic component junction box. Remove the 6 hold screws of the VIBES boom as marked in the picture above. The VIBES boom is now free: **USE CAUTION** when removing the base from the crate. The bottom has an encoder component sticking out. Remove VIBES Boom and place on cart to begin assembly.



# ***10.0 Specifications & Declarations of Conformance***

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## **System Specification for iShot<sup>®</sup> SeeUV<sup>®</sup> VIBES<sup>®</sup>-XR-L**

### Complete System Specifications:

- 300 kg gross weight
- Do Not Lift

### Camera Sensor Specifications:

- 1/3 inch interline transfer CCD color imager
- NTSC video format
- 768H X 494 effective pixels
- Resolution > 470 T Lines
- Automatic or manual white balance
- Capable of viewing a .254 mm (.010") TAM 135273 fluorescing indication at 114 mm (4.5") from probe surface
- Non-inverted image right angle viewing
- Automatic shutter
- Remote focusing via control module on cart
- Operating Temperature 0°C to 40°C (32°F to 104°F)

### Illumination System Specifications:

- Utilizes EM14465 iShot UV LED Light Source and EM18404 LED-35 White Light Source
- 8.5 m light guide for UV transmission, 5 mm active area
- 8.5 m light guide for white light transmission, 4 mm active area
- UV light peak output at 365 nm
- White light cut filter at 390 nm for UV operation
- UV intensity > 2000  $\mu\text{W}/\text{cm}^2$  at 203 mm (8.0") from the camera head
- White and UV have full range variable intensity; simultaneous and independent operation

### Camera Head Features:

- 40 mm (1.59") diameter head dimensions
- Motorized remote control of focus
- 0° DIRECT view adapter: - 3 mm lens - Field of View: 91° x 69° (H x V) - Viewing resolution: .25 mm (.010") indication at a 114 mm (4.5") distance
- 90° SIDE view adapter: - 11 mm lens - Field of View: 25° x 19° (H x V) - Viewing resolution: .25 mm (.010") indication at a 114 mm (4.5") distance

# ***10.0 Specifications & Declarations of Conformance***

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## Delivery System Specifications:

- Probe movement X-axis (insertion) and Y-axis (elevation) via hand wheel control (motorized options available)
- 114" range of X-axis movement for part inspection (60" and 72" range also available)
- X-axis limit switches prevent overextension
- Hand wheel controlling X-axis movement located to permit operation from either side of system platform
- 16" range of Y-axis movement (custom range on request)
- Mechanical stops prevent overextension in Y direction
- Encoded horizontal position written to screen, two datums available for reset
- Encoded vertical position written to screen, two datums available for reset
- +/- 180° head rotation
- Encoded rotation position written to screen, two datums available for reset
- On/off user selectable on-screen display of encoder information
- Switch between SI and English units
- On screen location of encoder information user selectable (four positions available)
- Heavy duty welded steel tube cart, black powder coat with solid hard tires
- Table top 34" high (custom height on request)
- Storage drawer
- Emergency stop to shut down power to all components

## Display Specifications:

- Monitor 17" diagonal TFT active matrix LCD
- Composite, SDI, and HDMI input
- NTSC (480/60i)
- Capable of Full HD resolution (1920 X 1080 pixels)
- Swing Arm mounted for ease of viewing

## Other Specifications:

- Component dust covers for camera head, monitor and control unit provided

## Options Specifications:

- Encoded Insertion (X-axis) either Motorized or Manual
- Encoded Elevation (Y-axis) either Motorized or Manual
- Encoded Rotation either Motorized or Manual
- Controller Power options: either 110VAC or 220VAC
- Remote Pendant option for Motorized control
- Manual Side Shifter allows for 100 mm travel along Z-axis
  - Table top 30" high when side shifter included

# 10.0 Specifications & Declarations of Conformance

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EC DECLARATION OF CONFORMITY  
EU DECLARATION OF CONFORMITY



InterTest, Inc.  
303 State Route 94  
Columbia, NJ 07832  
USA

Name and address of the company established in European Community and authorized to compile the Technical File:

ACC - Services Contact  
105 route des pommiers  
Centre Ubidoca  
74370 St Martin Bellevue  
FRANCE

InterTest, Inc. declares under our sole responsibility that the product described as:

Equipment Name: iShot See UV VIBES XR-L Inspection System  
Model /Type: EM14839  
Serial number(s): S58136

Complies with the requirements of the following European Directives:

Machinery Directive 2006/42/EC;  
Electromagnetic Compatibility Directive 2014/30/EU.

Main standards considered:

EN ISO 12100:2010  
EN 60204-1:2018  
EN 61000-6-2:2016  
EN 61000-6-4:2007 + A1:2011

Date: 19 July 2019 At: InterTest, Inc., 303 State Route 94, Columbia, NJ 07832, USA

Name of authorized company representative: William J. Habermann

Signature

A handwritten signature in black ink that reads "William J. Habermann".

# 10.0 Specifications & Declarations of Conformance



## EU DECLARATION OF CONFORMITY

Product **ULB-35i, ULB-35p, ULB-35ndt, ULB-35rvi**

Manufacturer's name Ushio America Inc. Oregon Operations Division  
Business Address Ushio America Inc. 5440 Cerritos Ave., Cypress, CA 90630

This declaration of Conformity is issued under the sole responsibility of the manufacturer.

Object of declaration **Model Number (not sensitive to spaces, dashes, suffix or case):**  
ULB-35i, ULB-35p, ULB-35ndt, ULB-35rvi  
**Model Description:** Midori LED Light Source, Fiber Optic Illuminator,

The object of the declaration described above is in conformity with the relevant Union harmonization Legislation:

2011/65/EU  
2014/30/EU  
2014/35/EU

Reference to the relevant harmonizes standards used or references to other technical specifications in relation to which the conformity is declared:

EN/IEC 61010-1: 2010  
EN / 61326-1: 2006 /IEC 61326-1: 2012  
UL61010-1: 2012  
IEC 62471- 2006  
EN50581

Additional Information: Safety Test Report Number: Intertek 101301344 LAX-001  
Safety Test (UL) Report Number: Intertek 101301344 LAX-002  
EMC Test Report Number: Intertek 101301344 LAX-005  
Photobiological Report number: Intertek 101301344 LAX-004  
Technical File: Maintained by Ushio America Inc. TF-010

Signed for and on behalf of: Ushio America Inc.

Place and date of issue: Cypress, CA, USA  
May 25, 2017

Name, Function: Vinay Prakash  
Q.C. Manager



Signature:

# 10.0 Specifications & Declarations of Conformance

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**SONY**

Sony Belgium, bijkantoor van Sony Europe Limited  
Da Vincilaan 7 – D1, B-1935 Zaventem  
Phone: +32 (0) 2 706 43 11 - Fax : +32 (0) 2 706 43 20

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## EU DECLARATION OF CONFORMITY

1. Model No.:  
**XC-505**

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2. Name and address of the manufacturer's authorised representative:  
**Sony Belgium, bijkantoor van Sony Europe Limited, Da Vincilaan 7-D1, 1935 Zaventem, Belgium**

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3. This declaration of conformity is issued under the sole responsibility of the manufacturer:  
**Sony Corporation, 1-7-1 Konan, Minato-ku Tokyo, 108-0075 Japan**

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4. Object of the declaration:  
**Color Video Camera Module**

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5. The object of the declaration described above is in conformity with:  
**2014/30/EU, EMC**

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6. Where applicable, references to the relevant harmonised standards used or references to the technical specifications in relation to which conformity is declared:  
**EN 61326-1:2013 Class A**

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7. Where applicable, the notified body (name and number)  
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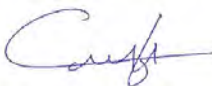
8. Additional information:  
-

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Signed for and on behalf of: **Sony Belgium, bijkantoor van Sony Europe Limited**

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Zaventem, 2016-04-22



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David Choudin  
Director  
Branch Manager

Sony Europe Limited. A company registered in England and Wales  
Registered Address: The Heights, Brooklands, Weybridge, Surrey. KT13 OXW, United Kingdom. – Registered company number: 2422874

# 10.0 Specifications & Declarations of Conformance

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**SONY**

Sony Belgium, bijkantoor van Sony Europe Limited  
Da Vincilaan 7 – D1, B-1935 Zaventem  
Phone: +32 (0) 2 706 43 11 - Fax : +32 (0) 2 706 43 20

---

## EU DECLARATION OF CONFORMITY

1. Model No.:

**XC-505**

---

2. Name and address of the manufacturer's authorised representative:

**Sony Belgium, bijkantoor van Sony Europe Limited, Da Vincilaan 7-D1, 1935 Zaventem, Belgium**

---

3. This declaration of conformity is issued under the sole responsibility of the manufacturer:

**Sony Corporation, 7-1, Konan 1-chome, Minato-ku, Tokyo 108-0075, Japan**

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4. Object of the declaration:

**Color Video Camera Module**

---

5. The object of the declaration described above is in conformity with:

**2011/65/EU, RoHS**

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6. Where applicable, references to the relevant harmonised standards used or references to the technical specifications in relation to which conformity is declared:

**EN 50581:2012**

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7. Additional information:

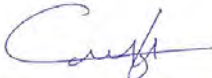
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Signed for and on behalf of: **Sony Belgium, bijkantoor van Sony Europe Limited**

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Zaventem, 2016-04-22



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David Choudin  
Director  
Branch Manager

Sony Europe Limited. A company registered in England and Wales  
Registered Address: The Heights, Brooklands, Weybridge, Surrey. KT13 OXW, United Kingdom. – Registered company number: 2422874



# **10.0 Specifications & Declarations of Conformance**

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## **Equipment Label**



# 11.0 Service Records

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Product: iShot® SeeUV® VIBES® XR-L  
EM Number: EM14839  
Serial Number: S58136  
Date of Purchase: \_\_\_\_\_

Date	Service Performed
<u> / /</u>	_____ _____ _____
<u> / /</u>	_____ _____ _____
<u> / /</u>	_____ _____ _____
<u> / /</u>	_____ _____ _____
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# ***Color Video Camera Module***

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**Technical Manual**



**XC-505/505P**

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## RS-232C Command List

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# Overview

The XC-505/505P is a small color video camera module that incorporates a 1/3-type IT CCD.

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## Main Features

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### Small Size and Lightweight

The camera is so small and light that you can install it anywhere: even in locations where conventional video cameras cannot be installed.

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### High Sensitivity

A built-in Super HAD II (Hole Accumulated Diode II) sensor, allows high sensitivity, low smear images. You can shoot, even under poor lighting conditions.

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### Simple Configuration via DIP Switch

Gain, shutter speed, and white balance can be configured using the 8-bit DIP switch located on the side of the unit.

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### Five White Balance Adjustment Settings

Using the white balance DIP switches, you can choose from among five white balance modes (3200K/5600K/One Push WB/ATW/MAN) to choose the best settings for shooting conditions, and the most appropriate color compensation.

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### Electronic Shutter with a Wide Range of Operating Speeds

Using the electronic shutter DIP switches, these levels of shutter speed (OFF, 1/1,000, and FLICKERLESS) are

available to allow you to match the shutter speed to the shooting conditions.

When you set the DIP switches for the CCD IRIS function, the shutter speed is adjusted automatically, based on the amount of light allowed to enter, ensuring the most appropriate level of image signal.

Advanced settings can be configured via RS-232C serial communication. For details, see “Communication Specifications” on page 14.

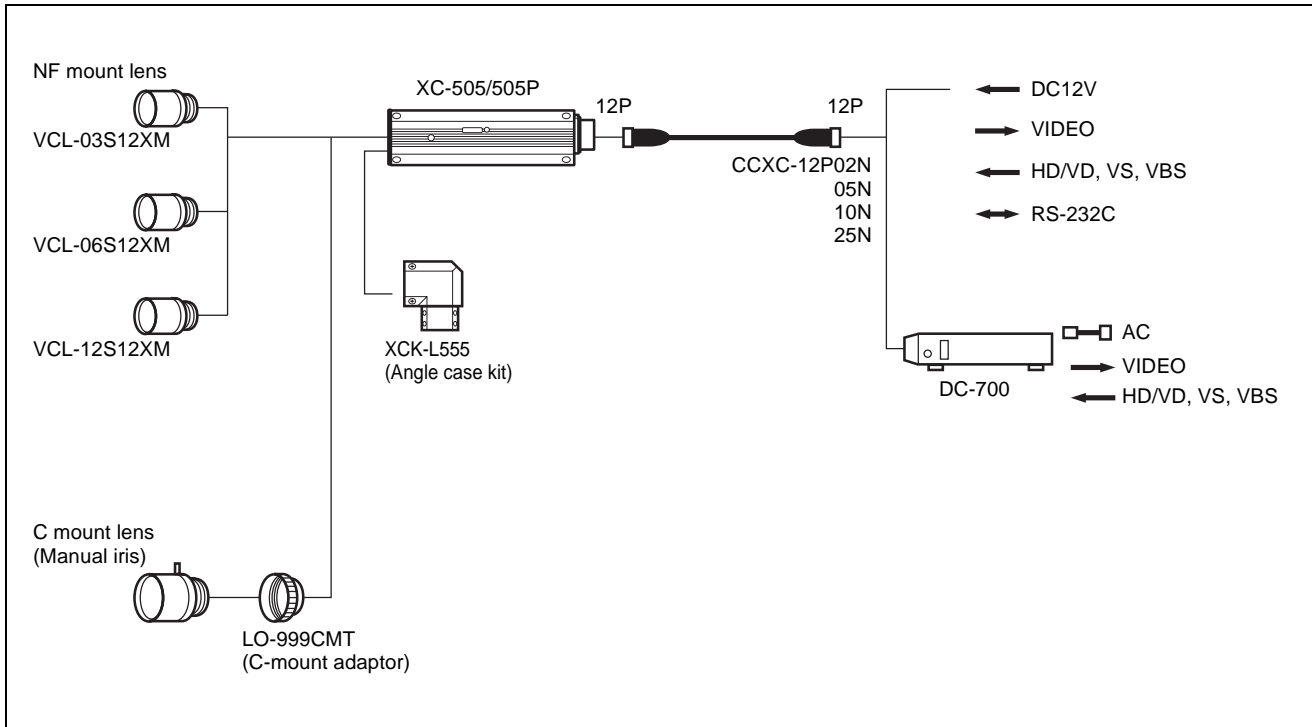
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### Function Setting via RS-232C Transmissions

Using computer communications software such as HyperTerminal and Tera Term, function switching can be performed.

A variety of functions such as NR (2D/3D), edge enhancement,  $\gamma$ , Nega/Posi, and Flip can be set via serial communication. For details, see “Communication Specifications” on page 14.

# Connection Diagram



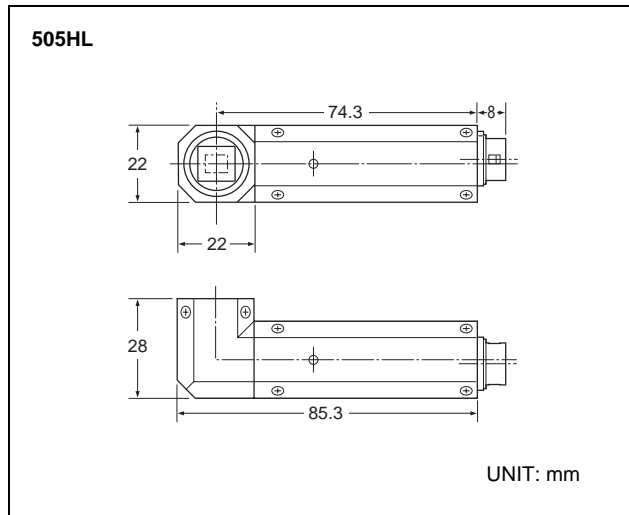
## XCK-L555 Angle Case Kit

The XCK-L555 allows you to bend the XC-505/505P 90 degrees horizontally (HL).

### Note

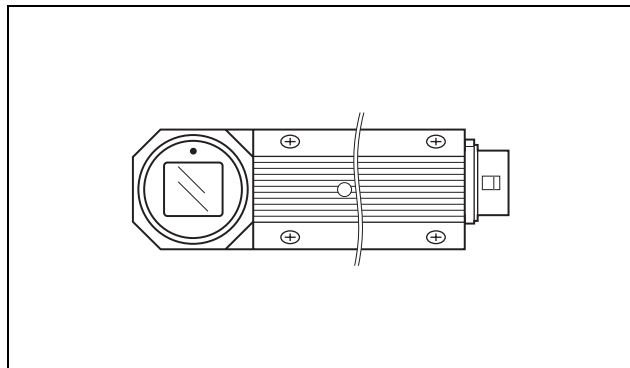
You can install XC-505/505P in only HL (horizontal) directions. VL (vertical) is not available with this model.

## Dimensions



## Angle type

On the upper position of the Front block ● is located. Set the direction correctly while looking at the Front block from the front so that ● is in the upper position.  
Dip switch: rear

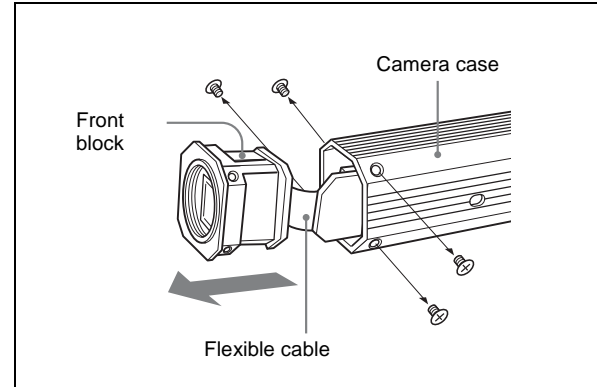


## Installation

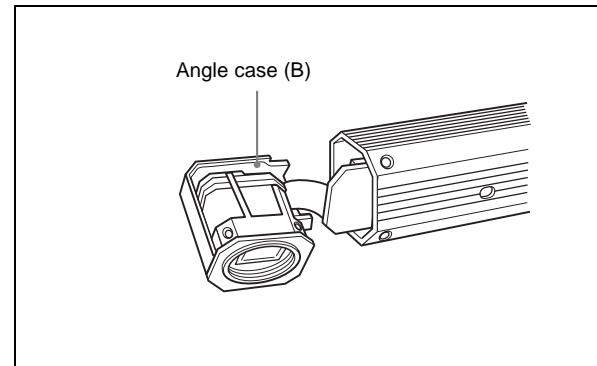
Use angle case A/B and screws.

- 1 Remove the four screws (+PM1.7 × 3) from the front panel.

The front block will pop out due to pressure from the flexible cable.



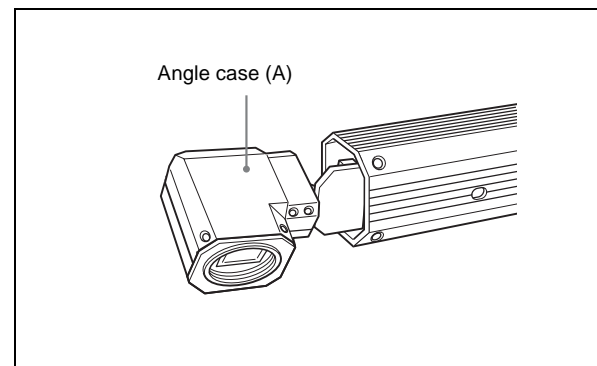
- 2 Attach the angle case (B) to the underside of the front block.



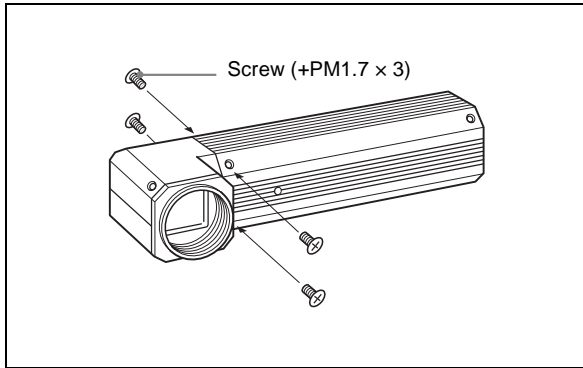
### Note

Do not pull the front block out forcibly. If you do so, you may damage the flexible cable.

- 3 Attach the angle case (A) to the front block.



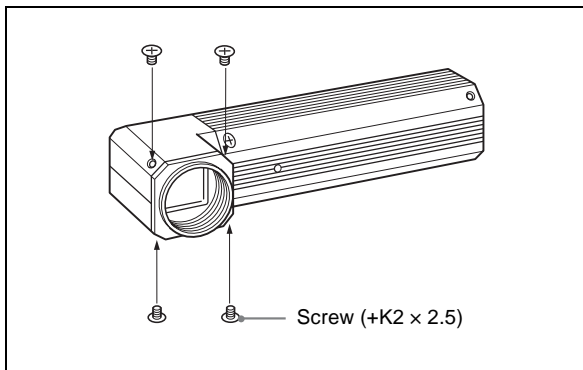
- 4** Insert the front block into the camera case, and attach it securely using the four screws (+PM1.7 × 3) removed in step 1.



**Note**

Tighten the screws to a torque level of 0.15 N•m for the XC-505/505P.

- 5** Using the four screws (+K2 × 2.5) provided, attach the angle case (A/B) and the front block securely.

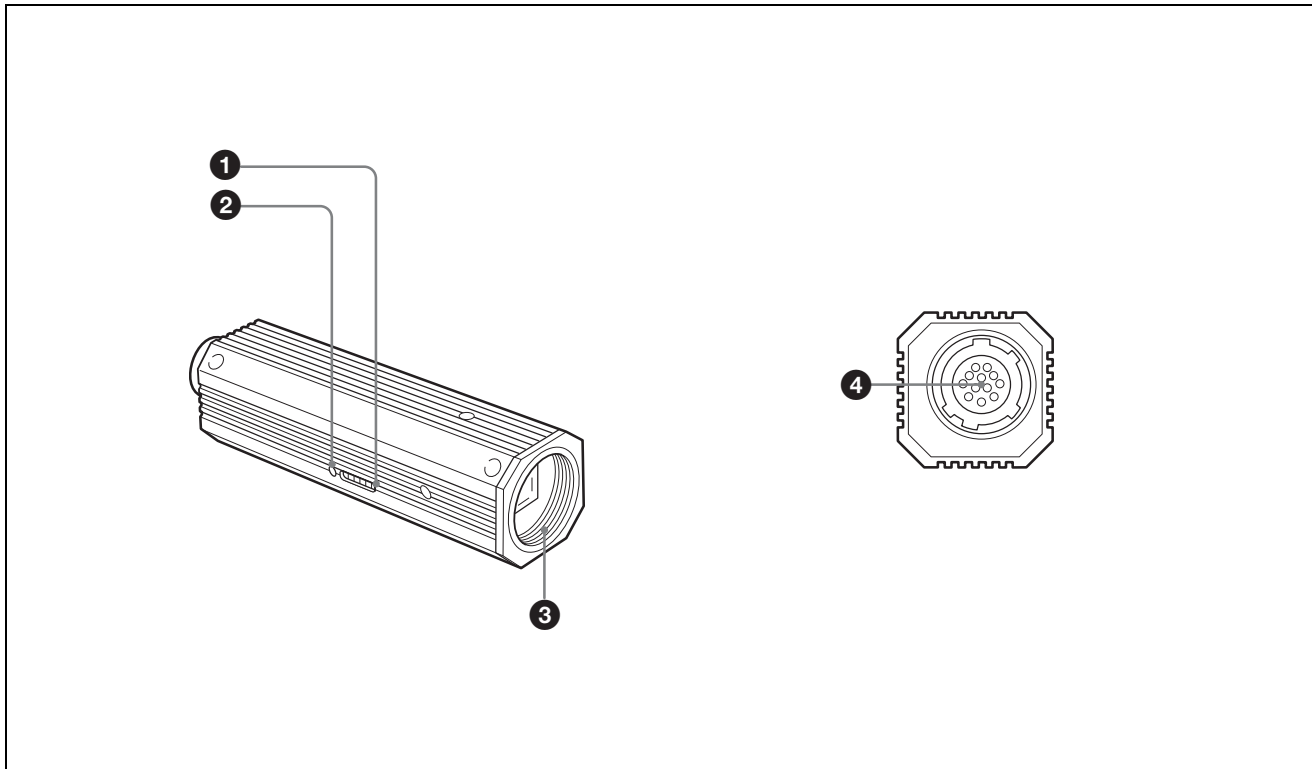


**Note**

Tighten the screws to a torque level of 0.18•Em.



# Location of Parts and Operation



## ❶ Dip switches for setting functions

This switches are used to adjust white balance and shutter speed; and to flip AGC (ON/OFF) and output signals (Y/C/VBS).

For details, see “Mode Setting by Dip Switch” on page 8.

## ❷ One Push WB switch

One Push white balance functions when the white balance adjustment mode is set to One Push WB. The white balance is automatically adjusted when this switch is pressed, and the color balance is retained after adjustment.

## ❸ NF mount

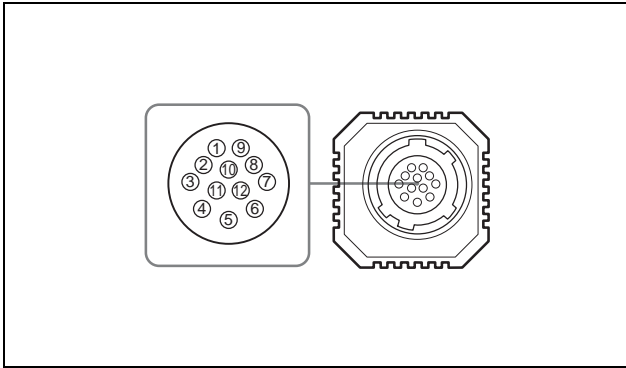
## ❹ DC IN/SYNC/VIDEO connector (multi 12-pin)

This connector inputs DC 12 V power and outputs the video signal when the CCXC-12P02N/12P05N/12P10N/12P25N camera cable is connected.

If the unit is connected to devices that originate a synchronized signal, the external synchronous signal (VS, VBS, HD/VD) can be used to move the color camera module.

VBS signals input as external synchronized signals perform the same functions as VS signals. (Burst signals are not locked and are free running.)

## Pin Assignment of the DC IN/SYNC/ VIDEO Connector



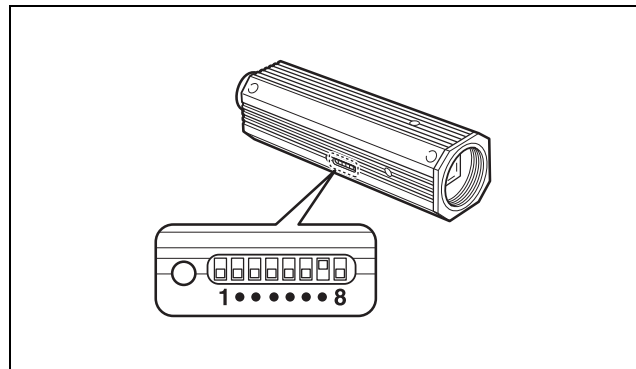
Signal Rin No.	Sync signal types		
	External Sync signal		Internal Sync signal
	HD, VD	VS/VBS Input	
1	GND	GND	GND
2	+12 V	+12 V	+12 V
3	VBS/Y Output (GND)	VBS/Y Output (GND)	VBS/Y Output (GND)
4	VBS/Y Output (signal)	VBS/Y Output (signal)	VBS/Y Output (signal)
5	HD Input (GND)	–	–
6	HD Input (signal)	–	–
7	VD Input (signal)	VS/VBS Input (signal)	–
8	GND (–/C)	GND (–/C)	GND (–/C)
9	–/C Output (signal)	–/C Output (signal)	–/C Output (signal)
10	RS-232C (TXD)		
11	RS-232C (RXD)		
12	VD Input (GND)	VD Input (GND)	GND
	RS-232C (GND)		

## Mode Setting by Dip Switch

By flipping the DIP switches located on the side of this camera, you can adjust the following functions.

### Note

Each switch is assigned to a function. The switches that should be set to adjust a certain function (white balance, shutter speed), to switch the AGC (ON/OFF), or to switch the output signals (Y/C/VBS) are specified and indicated by shading in the illustrations of the corresponding descriptions of the function. The switches that are not shaded are not related to these functions.






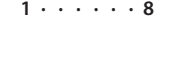


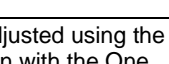

## Factory Settings

White balance: ATW  
 Shutter speed: OFF  
 AGC: ON  
 Output signal (Y/C/VBS): VBS

## To Adjust the White Balance

Select the white balance setting according to the lighting conditions.

To adjust the white balance, use bitXX (the shaded switches).

	Lighting condition	DIP switch setting
3200K (fixed)	For indoor shooting under incandescent light.	 1 . . . . . 8
5600K (fixed)	For outdoor shooting on sunny days.	 1 . . . . . 8
One Push WB (One Push white balance)	The white balance is automatically adjusted when the One Push WB switch is pressed, and the color balance is retained after adjustment.	 1 . . . . . 8
ATW (auto tracing white balance)	The white balance is adjusted according to the color temperature transition of the subject. This mode is suitable for shooting with variable lighting (factory setting).	 1 . . . . . 8
MAN (manual)	Manual white balance is adjusted using the DIP switches in combination with the One Push WB switch.	
	Red hues are subdued with each press of the One Push WB switch.	 1 . . . . . 8
	Red hues are enhanced with each press of the One Push WB switch.	 1 . . . . . 8
	Blue hues are subdued with each press of the One Push WB switch.	 1 . . . . . 8
	Blue hues are enhanced with each press of the One Push WB switch.	 1 . . . . . 8

### Note





The correct white balance is obtained when a white subject is shot on the whole detection area.

The correct color reproduction may not be obtained during a normal scene shooting.

## To Adjust the Shutter Speed



Set the shutter speed switches to select the desired shutter speed. Using the CCD IRIS function, set the CCD IRIS mode.

To adjust the shutter speed, use the shaded switches.

	Shutter speed	DIP switch setting
OFF	1/60 sec. (XC-505) 1/50 sec. (XC-505P) (factory setting)	 1 . . . . . 8
1/1000	1/1,000 sec.	 1 . . . . . 8
CCD IRIS	Set the CCD IRIS mode.	 1 . . . . . 8
FLICKERLESS	1/100 sec.	 1 . . . . . 8

## AGC (Auto Gain Control) ON/OFF



To switch the AGC on or off, use the shaded switch.

	Gain	DIP switch setting
ON	Auto gain control (factory setting)	 1 . . . . . 8
OFF	0 dB	 1 . . . . . 8

## To Switch the Output Signals (Y/C/VBS)

Select the camera output signal.

To switch the output signals (Y/C/VBS), use the shaded switch.

	Output signal	DIP switch setting
VBS	Select this position to output the VBS signal from the DC IN/VIDEO (factory setting).	 1 . . . . . 8
Y/C	Select this position to output the Y/C separated signal from the DC IN/VIDEO connector.	 1 . . . . . 8

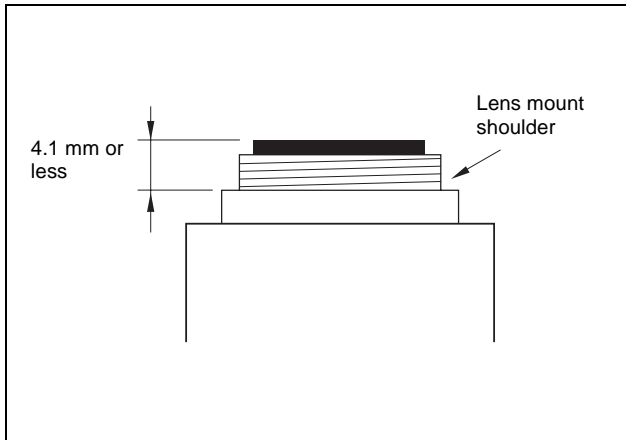
# Installation

## Usable Lenses

- NF-mount lens
  - VCL-06S12XM (f=6 mm)
  - VCL-03S12XM (f=3.5 mm)
  - VCL-12S12XM (f=12 mm)

The mounting thread of the NF-mount lens should not extend more than 4.1 mm from the lens mount shoulder (See below).

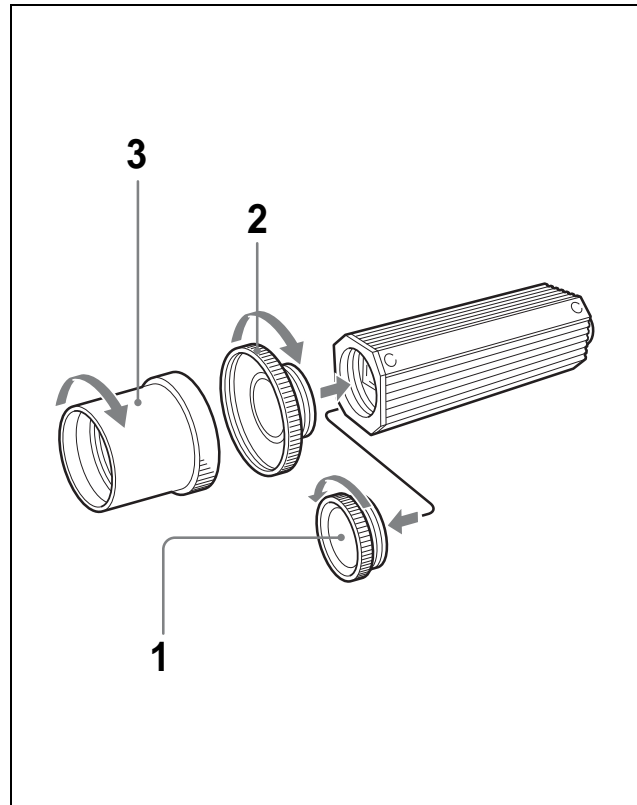
- C-mount lens  
C-mount lens for 1/3-type sensor (The mounting thread should not extend more than 4.1 mm from the lens mount shoulder) (See below). When a C-mount type lens is attached, a C-mount adaptor (LO-999CMT) is required.



### Notes

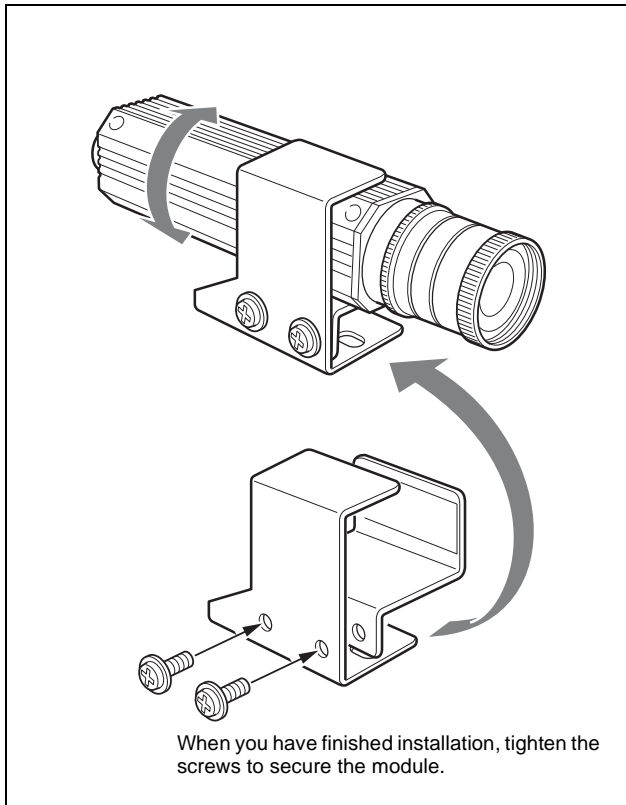
- When connecting a heavy lens, make sure that it is supported properly.
- When connecting heavy lens, make sure that it is not subject to shocks or vibration.

## To Attach a Lens



- 1** Remove the lens mount cap by turning it counterclockwise.
- 2** Screw the C-mount adaptor (LO-999CMT) into the lens mount of the camera. (only when using a C mount lens)
- 3** Screw the lens.

## To Install the Camera on a Tripod

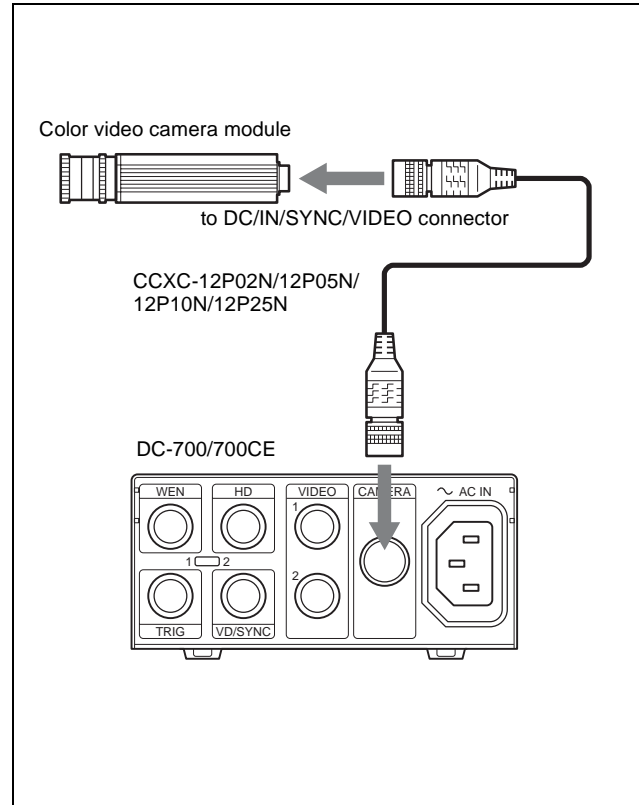


When mounting the camera on a tripod, use the supplied tripod adaptor.

- 1 Assemble the tripod adaptor parts.
- 2 Mount the video camera module on the tripod adaptor.

## Connections

An example of the assembly of the DC-700/700CE Camera Adaptor.



### Notes

- Make sure to turn off the power to the units you are connecting or their components may be damaged.
- When disconnecting the cord, pull it out by the plug. Never pull the cord itself.
- Connect the power cord after completing all other connections.

---

# Genlock

The color video camera module is designed so that internal sync and external sync are switched automatically. When the color video camera module receives the following external sync signal, the camera is synchronized to that external sync signal.

Connection example	External sync signal		
	HD/VD	VS	VBS
Connection of the camera and the DC-700/DC-700CE	Genlock		Genlock (However, burst signals not locked. Same function as VS lock.)

**Note**

Use a synchronous signal meeting the specifications given in this Technical Manual. For details on the specifications, see page 31.

# RS-232C Command List

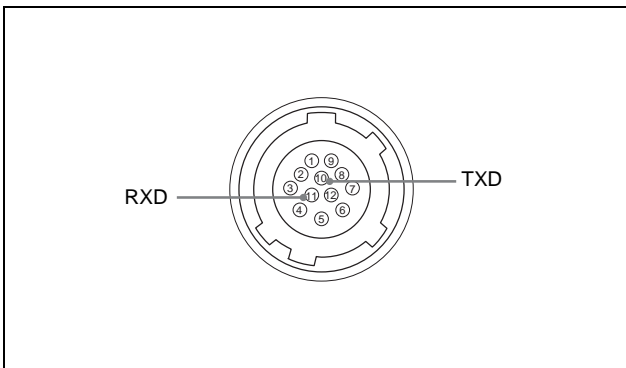
Hardware and software can be damaged by RS-232C control programs developed using this command list. Sony shall accept no liability for any such damage.

You can externally control various camera functions by sending commands via the camera's RS-232C interface. Setting values for various functions can be stored in the camera's internal memory. The non-volatile internal memory preserves data even without power, so you can resume operation with the same settings when power is restored.

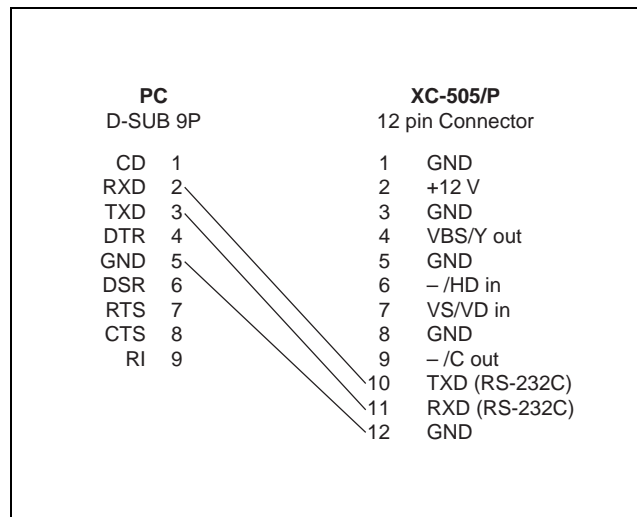
## RS-232C Command Usage Precautions

Keep the following in mind regarding the RS-232C TXD and RXD pins:

- Do not apply voltage exceeding  $\pm 10$  V to RXD pin 11 of the 12-pin connector.
- The output voltage on TXD pin 10 of the 12-pin connector is typically within  $\pm 5.4$  V. Do not apply external voltage to this pin.



## RS-232C Connector Pinouts



# Communication Specifications

## Serial Communication Specifications

The camera uses an RS-232C-conforming start-stop synchronous serial interface.

Sent commands are remotely echoed back.

Baud rate: 38400/19200/9600 bps  
Default: 38400 bps

Data length: 8 bits

Parity: none

Stop bit: 1 bit

Flow control: none

## Command Format

Sent commands, consisting of a command name and appended parameters, are input when followed by a carriage return ASCII code.

### Input syntax

```
command param1 param2 param3 [ENTER]
```

### Input example

```
GAIN-STEP 18<CR>
```

## Command Input and Response Status

### Command Input

The camera accepts the following characters strings as valid.

When the camera receives a valid character string, it is remotely echoed back.

Item	Character	ASCII Value	Remarks
Alphabetics	'A' to 'Z'	0x41 to 0x5A	Strings are not case-sensitive.
	'a' to 'z'	0x61 to 0x7A	
Numerics	'0' to '9'	0x30 to 0x39	—

Item	Character	ASCII Value	Remarks
Symbols	'-'	0x2D	Numerical values may be prepended by a sign character. '+' is allowed, but is ignored.
	'+'	0x2B	
Space	' '	0x20	Not allowed at the beginning of a line.
[BackSpace]	BS (control character)	0x08	none
[ENTER]	CR (control character)	0x0D	none

### Note

Commands may contain up to 64 characters (excluding the ending CR).

## Parameter Entry

Only base-10 (numerical) parameter values are accepted. Valid values depend on the particular input command. Commands with non-decimal parameter characters cannot be processed.

### Example. AE-REF (when received with a base-10 parameter)

<<Accepted normally >>

```
AE-REF 1023<CR>
```

<<Returns the "ERROR PARAMETER" response status>>

```
AE-REF 3FF<CR>
```

<<Returns the "ERROR PARAMETER" response status>>

```
AE-REF ABC<CR>
```

```
AE-REF 1023ABC<CR>
```

## Sign Operators

A "+" or "-" sign may be prepended to a parameter.

<<Accepted normally>>

```
GAIN-FINE +10<CR>
```

```
GAIN-FINE -10<CR>
```

<<Returns the "ERROR PARAMETER" response status>>

```
GAIN-FINE +-10<CR>
```

```
GAIN-FINE 10-3<CR>
```



## Omitted and Extra Parameters

Commands with omitted or extra parameters are ignored. Also, entering a CR without any other input only changes to the next line.

### Example. SSHUTTER command with two parameters

<<Accepted normally>>

```
SSHUTTER 0 1<CR>
```

<<Returns the “ERROR PARAMETER” response status>>

```
SSHUTTER 0 1 1<CR>
SSHUTTER 0<CR>
```

## Response Status

When an input command has finished processing, the camera returns the response status to notify the user whether it succeeded.

<<Input>>

```
AGAIN-STEP 12<CR>
```

<<Screen Output>>

```
ERROR SYNTAX<CR><LF>
```

## Response Status from the Camera

Response Status	Description
OK	OK appears at the end of the screen when command execution finishes normally.
ERROR SYNTAX	Appears when an invalid command name is input.
ERROR STATUS	Appears when command execution fails to finish normally.
ERROR PARAMETER	Appears when a command's parameter value is invalid.
ERROR EEPROM	Appears when an error occurs while reading or writing a parameter in EEPROM.
ERROR EXECUTE	Appears when an over-detection error occurs during WPC-EXE execution.
ERROR BUSY	Appears when a command is sent to the camera before the response status for the previous command has been returned. This message is not displayed until at least 40 ms after the previous ERROR BUSY was returned.
(Current setting value)	Sending a parameter setting command with no parameter causes the current setting value to be displayed. Sending the HELP command with no parameter displays the command list.
AWB OK	Appears when One-Push AWB execution succeeds.

Response Status	Description
AWB TIMEOUT	Appears when One-Push AWB execution times out.
AWB ERROR	Appears when One-Push AWB execution fails.

# Camera Control Command List

Category	Command	Setting Value			Color Bar <sup>4)</sup> Displaying
		INIT Object <sup>1)</sup>	SAVE Object <sup>2)</sup>	Auto Saving <sup>3)</sup>	
AE	AE-MODE	○	○	×	×
	AGCMAX-STEP	○	○	×	×
	AGCMAX-FINE	○	○	×	×
	CCDIRIS-MAX	○	○	×	×
	SSHUTTER-MAX	○	○	×	×
	AE-SPEED	○	○	×	×
	AE-REF	○	○	×	×
	GAIN-STEP	○	○	×	×
	GAIN-FINE	○	○	×	×
	SHUTTER	○	○	×	×
	SSHUTTER	○	○	×	×
WB	WB-MODE	○	○	×	×
	AUTOWB	×	×	×	×
	RGAIN	○	○	×	×
	BGAIN	○	○	×	×
	ATW-SPEED	○	○	×	×
	CRS-MODE	○	○	×	×
PICTURE	DTL-MODE	○	○	×	×
	DTL-ENHANCER	○	○	×	×
	2DNR-MODE	○	○	×	×
	3DNR-MODE	○	○	×	×
	PEDESTAL	○	○	×	×
	GAMMA-MODE	○	○	×	×
	NEGAPOSI	○	○	×	×
	WHITECLIP	○	○	×	×
WPC	WPC-MODE	○	○	×	×
	WPC-EXE	×	×	×	×
	WPC-DISP	○	×	×	×
OPD	OPD-DISP	○	×	×	×
	OPD-AE-POS	○	○	×	×
	OPD-AE-SIZE	○	○	×	×
	OPD-AWB-POS	○	○	×	×
	OPD-AWB-SIZE	○	○	×	×

Category	Command	Setting Value			Color Bar <sup>4)</sup> Displaying
		INIT Object <sup>1)</sup>	SAVE Object <sup>2)</sup>	Auto Saving <sup>3)</sup>	
I/O	VOUTSEL	○	○	×	○
	HPHASE	○	○	×	○
	VPHASE	○	○	×	○
	COLORBAR	○	×	×	○
	FLIP	○	○	×	○
	BRATE	×	×	○	○
	OSD	○	○	×	○
	MEMO-CAPTURE	×	×	×	○
	MEMO-DISPLAY	○	×	×	○
Other	INIT	×	×	×	○
	SAVE	×	×	×	○
	LOAD	×	×	○	○
	RMEM	×	×	×	○
	VERSION	×	×	×	○
	HELP	×	×	×	○

<sup>1)</sup> The INIT command initializes this command's setting.

<sup>2)</sup> The SAVE and LOAD commands apply to this command's setting.

<sup>3)</sup> When this command is sent, its setting is automatically saved to EEPROM.

<sup>4)</sup> Commands are limited when the color bar is displayed: AE, WB, PICTURE, WPC, and OPD category commands return status errors.

# Camera Control Commands

Camera control commands are categorized as follows:

AE (Auto Exposure): Auto-exposure setting (page 18)

WB (White Balance): White balance setting (page 20)

PIC (Picture): Sharpness (aperture compensation), noise reduction, and video process settings (page 21)

WPC (White Pixel Compensation): White point detection and compensation settings (page 22)

OPD (Optical Detector): AE and AWB detection frame settings (page 23)

IN/OUT: Input/output settings (page 23)

MEMO: Memo function settings (page 24)

## AE (Auto Exposure)

### AE Operation Mode Setting

Command Name	AE-MODE
Parameter 1	Operation Mode, 0 to 5 0: Fixed electronic shutter + fixed gain 1: Fixed electronic slow shutter + fixed gain 2: Fixed electronic shutter + AGC 3: CCD IRIS 4: CCD IRIS + Auto slow shutter 5: CCD IRIS + AGC Default is Mode 2
Conditions	None
Process	0 and 1 select the ME operation mode, and other values set the AE mode.

### AGC Maximum Gain Setting (STEP)

Command Name	AGCMAX-STEP
Parameter 1	Gain: 6 to 18 [dB] Default is 18 [dB]
Conditions	Valid when AE-MODE parameter 2 and 5.
Process	Sets the upper gain limit for AGC.

### AGC Maximum Gain Setting (FINE)

Command Name	AGCMAX-FINE
Parameter 1	Gain: 22 to 67 Default is 67
Conditions	Valid when AE-MODE parameter 2 and 5.
Process	Sets the upper gain limit for AGC.

The relationship between gain and fine settings are as follows:

FINE Setting	Gain (dB)
22	6
26	7
30	8
33	9
37	10
41	11
44	12
48	13
52	14
56	15
59	16
63	17
67	18

### CCD Iris Electronic Shutter Maximum Speed Setting

Command Name	CCDIRIS-MAX
Parameter 1	Max. electronic shutter speed: 0 to 8 0: 1/100 [s] 1: 1/120 [s] 2: 1/250 [s] 3: 1/500 [s] 4: 1/1000 [s] 5: 1/4000 [s] 6: 1/10000 [s] 7: 1/50000 [s] 8: 1/100000 [s] Default is 5
Conditions	Valid when AE-MODE is 3 to 5.
Process	Sets the maximum speed of auto electronic shutter control.

## Slow Shutter Maximum Frame Count Setting

<b>Command Name</b>	<b>SSHUTTER-MAX</b>
Parameter 1	Max. frame count: 1 to 255 Default is 6 [frames]
Conditions	Valid when AE-MODE is 4.
Process	Sets the maximum accumulatable frame count for auto slow shutter.

### Note

The white point is higher with larger frame count settings, but this is an artifact of the CCD and not a defect.

## AE Convergence Speed Setting

<b>Command Name</b>	<b>AE-SPEED</b>
Parameter 1	Convergence speed: 0 to 2 0: Slow 1: Normal 2: Fast Default is 1
Conditions	Valid when AE-MODE is 2 to 5.
Process	Sets the AE convergence speed.

## AE Reference Level Setting

<b>Command Name</b>	<b>AE-REF</b>
Parameter 1	Reference Level: 0 to 1023 0: Minimum to 100: Standard to 1023: Maximum Default is 120
Conditions	Valid when AE-MODE is 2 to 5.
Process	Sets the AE reference level

## Fixed Step Gain Setting (STEP)

<b>Command Name</b>	<b>GAIN-STEP</b>
Parameter 1	Gain: -3 to +18 [dB] Default is 0 [dB]
Conditions	Valid when AE-MODE is 0 to 1.
Process	Sets fixed AGC gain.

## Fixed Step Gain Setting (FINE)

<b>Command Name</b>	<b>GAIN-FINE</b>
Parameter 1	Gain: -79 to +474 Default is 0
Conditions	Valid when AE-MODE is 0 to 1.
Process	Sets fixed AGC gain.

The relationship between gain and fine settings are as follows:

<b>FINE Setting</b>	<b>Gain (dB)</b>
-79	-3
-53	-2
-26	-1
0	0
26	1
53	2
79	3
105	4
132	5
158	6
184	7
211	8
237	9
263	10
289	11
316	12
342	13
368	14
395	15
421	16
447	17
474	18

## Fixed Electronic Shutter Speed Setting

Command Name	SHUTTER
Parameter 1	Electronic shutter speed: 0 to 12 0: OFF (1/60 [s] for NTSC, 1/50 [s] for PAL) 1: 1/100 [s] (Flickerless NTSC operation) 2: 1/120 [s] (Flickerless PAL operation) 3: 1/250 [s] 4: 1/500 [s] 5: 1/1000 [s] 6: 1/2000 [s] 7: 1/4000 [s] 8: 1/10000 [s] 9: 1/50000 [s] 10: 1/100000 [s] 11: Arbitrary electronic shutter setting Default is 0
Parameter 2	This is the electronic shutter speed adjustment value when parameter 1 is "11: Arbitrary electronic shutter setting" NTSC: 0 to 261 PAL: 0 to 311
Parameter 3	This is the electronic shutter fine adjustment value when parameter 1 is "11: Arbitrary electronic shutter setting" NTSC: 0 to 910 PAL: 0 to 908 However, when parameter 2 is 0 (NTSC or PAL), the range for this parameter is as follows: NTSC: 143 to 910 PAL: 142 to 908
Conditions	Valid when AE-MODE is 0 and 2.
Process	Sets the AE electronic shutter speed When parameter 1 is set to "11: Arbitrary electronic shutter setting," electronic shutter timing is calculated as follows: NTSC: (parameter 2) × 63.49 [μs] + (parameter 3) × 69.84 [ns] PAL: (parameter 2) × 64.00 [μs] + (parameter 3) × 70.48 [ns]

## Fixed Electronic Slow Shutter Speed Setting

Command Name	SSHUTTER
Parameter 1	Fixed electronic slow shutter adjustment value NTSC: 0 to 255 PAL: 0 to 255 Default is 3
Parameter 2	Fixed electronic slow shutter fine adjustment value NTSC: 0 to 524 PAL: 0 to 624 However, when parameter 1 is 0 (NTSC or PAL), the range for this parameter is as follows: NTSC: 262 to 524 PAL: 312 to 624
Conditions	Valid when AE-MODE is 1.
Process	The fixed electronic slow shutter time is calculated as follows: NTSC: (parameter 1) × 33.268 [ms] + (parameter 2) × 63.49 [μs] PAL: (parameter 1) × 39.936 [ms] + (parameter 2) × 64.00 [μs]

## WB (White Balance)

### WB Mode Setting

Command Name	WB-MODE
Parameter 1	WB Mode: 0 to 4 0: One Push AWB 1: ATW 2: Manual 3: Preset 3200K 4: Preset 5600K Default is 1
Conditions	None
Process	Sets the WB mode.

### Manual R Gain Setting

Command Name	RGAIN
Parameter 1	R gain: 0 to 4095 0: Minimum 4095: Maximum Default R gain is 3200K
Conditions	Valid when WB-MODE is 2.
Process	Sets the R gain when WB Mode is "2: Manual."

## Manual B Gain Setting

<b>Command Name</b>	<b>BGAIN</b>
Parameter 1	B gain: 0 to 4095 0: Minimum to 4095: Maximum Default B gain is 3200K
Conditions	Valid when WB-MODE is 2.
Process	Sets the B gain when WB Mode is "2: Manual."

## One-Push AWB Execution

<b>Command Name</b>	<b>AUTOWB</b>
Parameter	None
Conditions	Valid when WB-MODE is 0.
Process	Starts One-Push AWB processing. When processing is finished, one of the following is returned: AWB OK: Normal finish AWB TIMEOUT: Time-out failure AWB ERROR: Other failure

## ATW Entrainment Speed Setting

<b>Command Name</b>	<b>ATW-SPEED</b>
Parameter 1	Entrainment speed: 0 to 2 0: Slow 1: Normal 2: Fast Default is 1
Conditions	Valid when WB-MODE is 1.
Process	Sets the entrainment speed for ATW/CRS.

## CRS Setting during ATW

<b>Command Name</b>	<b>CRS-MODE</b>
Parameter 1	CRS Mode, 0 to 1 0: OFF 1: ON Default is 0
Conditions	Valid when WB-MODE is 1.
Process	Enables or disables the CRS function.

## PIC (Picture)

### Aperture Compensation Mode Setting

<b>Command Name</b>	<b>DTL-MODE</b>
Parameter 1	Aperture Compensation Mode: 0 to 4 0: Off 1: Vertical aperture compensation 2: Horizontal aperture compensation 3: Vertical + horizontal aperture compensation 4: Highlight aperture compensation Default is 2
Conditions	None
Process	Sets the aperture compensation mode. Increases sharpness by emphasizing image contours.

### Detail Enhancer Setting

<b>Command Name</b>	<b>DTL-ENHANCER</b>
Parameter 1	Detail enhancer enable/disable setting: 0 to 1 0: OFF 1: ON Default is 0
Conditions	None
Process	Enhances signal details that may be obscured by normal contour emphasis (aperture compensation) processing.

### 2D-NR Setting

<b>Command Name</b>	<b>2DNR-MODE</b>
Parameter 1	Filter selection: 0 to 3 0: 2D-NR disabled 1: Mild 2D-NR 2: Moderate 2D-NR 3: Strong 2D-NR Default is 1
Conditions	None
Process	Sets the strength of 2D-NR noise suppression. Higher noise suppression corresponds to lower resolution. The 2D-NR function performs spatial filtering on an image to suppress noise effects within a specific range.

### 3D-NR Setting

<b>Command Name</b>	<b>3DNR-MODE</b>
Parameter 1	Filter selection: 0 to 3 0: 3D-NR disabled 1: Mild 3D-NR 2: Moderate 3D-NR 3: Strong 3D-NR Default is 0
Conditions	None
Process	Sets the strength of 3D-NR noise suppression. Higher noise suppression corresponds to lower dynamic resolution as the afterimage becomes more visible.

### Pedestal Setting

<b>Command Name</b>	<b>PEDESTAL</b>
Parameter 1	0 to 22 (corresponds to NTSC: 0 to 10 [IRE], and PAL: PAL 0 to 70 [mV]) Default is 11 (NTSC: 5 [IRE], and PAL: 35 [mV])
Conditions	None
Process	Adjusts the pedestal. Does not affect gamma-curve compensation.

### Gamma Table Setting

<b>Command Name</b>	<b>GAMMA-MODE</b>
Parameter 1	Gamma curve: 0 to 2 0: $\gamma = 1.0$ 1: $\gamma = 0.45(\gamma = 1/2.2)$ 2: $\gamma = 0.6(\gamma = 1/1.6)$ Default is 1
Conditions	None
Process	Specifies the gamma curve of the YC signal (the specified C is used regardless of the GAMMA-MODE setting.)

### Polarity (Nega/Posi) Setting

<b>Command Name</b>	<b>NEGAPOSI</b>
Parameter 1	Polarity: 0 to 1 0: Positive 1: Negative Default is 0
Conditions	None
Process	Inverts the YC signal after gamma curve compensation.

### High Brightness Clipping Setting

<b>Command Name</b>	<b>WHITECLIP</b>
Parameter 1	Brightness signal clipping level: 0 to 63 0: Minimum to 1: Maximum (no clipping) Default is 63
Conditions	None
Process	Clips brightness exceeding the specified level in the final output of the Y signal. Use this function to avoid image whiteout.

### WPC (White Pixel Compensation)

#### Enable/Disable White Point Detection Compensation

<b>Command Name</b>	<b>WPC-MODE</b>
Parameter 1	White point detection compensation enable/disable: 0 to 1 0: OFF 1: ON Default is 1
Conditions	None
Process	Enables or disables auto detection of white point compensation.

#### Execute Auto White Point Detection

<b>Command Name</b>	<b>WPC-EXE</b>
Parameter	None
Conditions	None
Process	Starts auto white point detection processing. Execute with the lens covered, such as by a lens cap.

#### White Point Compensation Marker Setting

<b>Command Name</b>	<b>WPC-DISP</b>
Parameter 1	Marker display/non-display: 0 to 1 0: OFF 1: ON Default is 0
Conditions	Display is only possible when WPC-MODE is 1.
Process	The marker indicates the white point location on the object of compensation.



## OPD (Optical Detector)

### OPD Frame Display Setting

Command Name	OPD-DISP
Parameter 1	OPD frame display: 0 to 2 0: OFF 1: AE 2: AWB Default is 0
Conditions	None
Process	Displays the detection frame for AE or AWB.

### OPD-AE Position Setting

Command Name	PD-AE-POS
Parameter 1	X-coordinate of center of OPD frame [%] Settable range is 25 to 75 Default is 50
Parameter 2	Y-coordinate of center of OPD frame [%] Settable range is 25 to 75 Default is 50
Conditions	None
Process	Sets the position of the AE detection frame.

### OPD-AE Size Setting

Command Name	OPD-AE-SIZE
Parameter 1	OPD frame width Settable range is 50 to 100 Default is 50
Parameter 2	Y-coordinate of center of OPD frame [%] Settable range is 50 to 100 Default is 50
Conditions	None
Process	Sets the size of the AE detection frame.

### OPD-AWB Position Setting

Command Name	OPD-AWB-POS
Parameter 1	X-coordinate of center of OPD frame [%] Settable range is 25 to 75 Default is 50
Parameter 2	Y-coordinate of center of OPD frame [%] Settable range is 25 to 75 Default is 50
Conditions	None
Process	Sets the position of the AWB detection frame.

### OPD-AWB Size Setting

Command Name	OPD-AWB-SIZE
Parameter 1	OPD frame width Settable range is 50 to 100 Default is 50
Parameter 2	Y-coordinate of center of OPD frame [%] Settable range is 50 to 100 Default is 50
Conditions	None
Process	Sets the size of the AWB detection frame.

## IN/OUT

### VBS/YC Output Selection

Command Name	VOUTSEL
Parameter 1	Output signal: 0 to 1 0: VBS 1: Y/C Default is 0
Conditions	None
Process	Selects VBS or YC output signal format.

### H-Phase Setting

Command Name	HPHASE
Parameter 1	H-phase setting value: 0 to 910 (NTSC) 0 to 908 (PAL) Default is 104
Conditions	Valid only when the camera is operated with external synchronization.
Process	Sets the H-phase adjustment value when using external synchronization.

### V-Phase Setting

Command Name	VPHASE
Parameter 1	V-phase setting value: 0 to 262 (NTSC) 0 to 312 (PAL) Default is 10
Conditions	Valid only when the camera is operated with external synchronization.
Process	Sets the V-phase adjustment value when using external synchronization.

## Internal Color Bar Output Setting

<b>Command Name</b>	<b>COLORBAR</b>
Parameter 1	Color bar output setting ON/OFF: 0 to 1 0: ON 1: OFF Default is 0
Conditions	None
Process	Enables or disables color bar output. When ON, the display shows 100% color bars.

## Flip Output Setting

<b>Command Name</b>	<b>FLIP</b>
Parameter 1	Flip setting: 0 to 3 0: OFF 1: Flip horizontally 2: Flip vertically 3: Flip horizontally and vertically Default is 0
Conditions	None
Process	Sets the flip output mode. The output image can be flipped horizontally and vertically.

## Serial Communication Speed Setting

<b>Command Name</b>	<b>BRATE</b>
Parameter 1	Baud rate: 0 to 2 0: 9600 [bps] 1: 19200 [bps] 2: 38400 [bps] Default is 2
Conditions	None
Process	Sets the serial communication speed. Unique to this command, the baud rate is changed after the "OK" response has been sent.

## OSD Output Setting

<b>Command Name</b>	<b>OSD</b>
Parameter 1	OSD output ON/OFF setting: 0 to 1 0: OFF 1: ON Default is 0
Conditions	None
Process	Sets the OSD output mode.
Remarks	The only command with OSD output is AUTOWB (One Push).

## MEMO

### Memo Saving

<b>Command Name</b>	<b>MEMO-CAPTURE</b>
Parameter 1	Memo save destination: 0 to 1 0: Memo 1 1: Memo 2 Default is 0
Conditions	Saving is available only when MEMO-DISPLAY is "1: Still Image". Otherwise, ERROR STATUS is returned.
Process	Saves a still image as a memo.
Remarks	The memo image is lost when power turns off.

### Memo Display

<b>Command Name</b>	<b>MEMO-DISPLAY</b>
Parameter 1	Display selection: 0 to 3 0: Native image 1: Still image 2: Memo 1 image 3: Memo 2 image Default is 0
Conditions	Memo 1 and 2 images are not selectable until saved (ERROR STATUS is returned). Switching from a memo image to another still image is not possible.
Process	Selects the image for output.
Remarks	The Still function can capture the processed image of internal color bars and the OPD frame state.

## Miscellaneous

### Setting Value Control Commands

The setting value control commands control camera setting data stored in the EEPROM. The following command types are available:

Type	Description
Setting Initialization	Resets user's camera control settings to their factory default values.
Setting Saving	Writes user's camera control settings to the EEPROM.
Setting Loading	Loads user's camera control settings from the EEPROM.
View Setting Values	Displays the current user settings for each command.

## Settings Affected by INIT, SAVE, and LOAD Commands

The following commands apply to camera setting data.

Command	Remarks
AE-MODE	INIT initializes to fixed value.
AGCMAX-STEP	INIT initializes to fixed value.
AGCMAX-FINE	INIT initializes to fixed value.
CCDIRIS-MAX	INIT initializes to fixed value.
SSHUTTER-MAX	INIT initializes to fixed value.
AE-SPEED	INIT initializes to fixed value.
AE-REF	INIT initializes to fixed value.
GAIN-STEP	INIT initializes to fixed value.
GAIN-FINE	INIT initializes to fixed value.
SHUTTER	INIT initializes to fixed value.
WB-MODE	INIT initializes to fixed value.
RGAIN	INIT initializes to factory default value.
BGAIN	INIT initializes to factory default value.
ATW-SPEED	INIT initializes to fixed value.
CRS-MODE	INIT initializes to fixed value.
DTL-MODE	INIT initializes to fixed value.
DTL-ENHANCER	INIT initializes to fixed value.
2DNR-MODE	INIT initializes to fixed value.
3DNR-MODE	INIT initializes to fixed value.
PEDESTAL	INIT initializes to fixed value.
GAMMA-MODE	INIT initializes to fixed value.
NEGAPOSI	INIT initializes to fixed value.
WHITECLIP	INIT initializes to fixed value.
WPC-MODE	INIT initializes to fixed value.
OPD-DISP	INIT initializes to fixed value.
OPD-AE-POS	INIT initializes to fixed value.
OPD-AE-SIZE	INIT initializes to fixed value.
OPD-AWB-POS	INIT initializes to fixed value.
OPD-AWB-SIZE	INIT initializes to fixed value.
VOUTSEL	INIT initializes to fixed value.
HPHASE	INIT initializes to factory default value.
VPHASE	INIT initializes to factory default value.
COLORBAR	INIT initializes to fixed value.
FLIP	INIT initializes to fixed value.
OSD	INIT initializes to fixed value.
MEMO-DISPLAY	INIT initializes to fixed value.

## Setting Value Initialization

Command Name	INIT
Parameter	None
Conditions	None
Process	Returns the camera's user memory to its factory default state. The last loaded user memory is not changed.
Remarks	The communication speed is not initialized.

## Setting Value Saving

Command Name	SAVE
Parameter 1	User memory save destination: 0 to 1 0: User memory A 1: User memory B
Conditions	None
Process	Writes to user memory A or B.

## Setting Value Loading

Command Name	LOAD
Parameter 1	Load original user memory: 0 to 2 0: User memory A 1: User memory B 2: Stand-alone user memory
Conditions	None
Process	Loads user's camera control command settings, and saves them as the last loaded user memory selection information. These user memory settings are loaded the next time the camera is turned on.

## View Setting Values

Command Name	RMEM
Parameter	None
Conditions	None
Process	Sends all data that can be set with camera information. The setting value of each camera control command is displayed one command per line, with comma separators.

## Version Display

Command Name	VERSION
Parameter	None
Conditions	None
Process	Displays the following items: <ul style="list-style-type: none"> <li>• Camera model name</li> <li>• Firmware version</li> <li>• Serial number</li> </ul>

<<Input>>

```
VERSION<CR>
```

<<Screen Output Example (NTSC)>>

```
XC-505<CR><LF>
Version 1.00<CR><LF>
S/N 100001<CR><LF>
```

<<Screen Output Example (PAL)>>

```
XC-505P<CR><LF>
Version 1.00<CR><LF>
S/N 100001<CR><LF>
```

## Help Display

Command Name	HELP
Parameter 1	Command Name
Conditions	None
Process	Display help for the command specified by parameter 1. If parameter 1 is omitted, displays the list of usable commands.

```
HELP
AE-MODE,
AGCMAX-STEP,
AGCMAX-FINE,
CCDIRIS-MAX,
SSHUTTER-MAX,
AE-SPEED,
AE-REF,
GAIN-STEP,
GAIN-FINE,
SHUTTER,
SSHUTTER,
WB-MODE,
AUTOWB,
RGAIN,
BGAIN,
ATW-SPEED,
CRS-MODE,
PICTURE,
DTL-MODE,
DTL-ENHANCER,
```

```
2DNR-MODE,
3DNR-MODE,
PEDESTAL,
GAMMA-MODE,
NEGAPOSI,
WHITECLIP,
WPC-MODE,
WPC-DISP,
WPC-EXE,
OPD-DISP,
OPD-AE-POS,
OPD-AE-SIZE,
OPD-AWB-POS,
OPD-AWB-SIZE,
VOUTSEL,
HPHASE,
VPHASE,
COLORBAR,
FLIP,
BRATE,
OSD,
MEMO-CAPTURE,
MEMO-DISPLAY,
INIT,
SAVE,
LOAD,
RMEM,
VERSION,
HELP
OK
```

## Camera Control Command List

For parameters 1 and 2, numerical values in parenthesis ( ) indicate default values.

Category	INIT Object	SAVE Object	Auto Save	Command	Command String	Parameter 1	Parameter 2	Parameter 3	Remarks
AE	○	○	×	Auto exposure mode setting	AE-MODE	Mode0 to 5 (2) 0 : Fixed electronic shutter 1 : Fixed electronic shutter + fixed gain 2 : Fixed electronic slow shutter + fixed gain 3 : CCD IRIS 4 : CCD IRIS + Auto slow shutter 5 : CCD IRIS + AGC	×	×	
	○	○	×	Max. auto gain control setting (dB)	AGCMAX-STEP	dB units 6 to 18 (18)	×	×	AGCMAX-STEP and AGCMAX-FINE values are linked
	○	○	×	Max. auto gain control setting (step)	AGCMAX-FINE	Step units 22 to 67 (67)	×	×	AGCMAX-STEP and AGCMAX-FINE values are linked
	○	○	×	Electronic shutter max. adjustment value	CCDIRIS-MAX	Preset Number 0 to 8 (5) 0 : 1/100s 1 : 1/120s 2 : 1/250s 3 : 1/500s 4 : 1/1000s 5 : 1/4000s 6 : 1/10000s 7 : 1/50000s 8 : 1/100000s	×	×	
	○	○	×	Slow shutter max. adjustment value	SSHUTTER-MAX	Frame count 1 to 255 (6)	×	×	
	○	○	×	AE Convergence Speed Setting	AE-SPEED	Speed (Slow/Normal/Fast) 0, 1, 2 (1)	×	×	
	○	○	×	AE Reference Level Setting	AE-REF	Reference Level 0 to 1023 (120)	×	×	
	○	○	×	Gain setting (dB)	GAIN-STEP	dB units -3 to 18 (0)	×	×	GAIN-STEP and GAIN-FINE values are linked
	○	○	×	Gain setting (step)	GAIN-FINE	Step units -79 to 474 (0)	×	×	GAIN-STEP and GAIN-FINE values are linked

Category	INIT Object	SAVE Object	Auto Save	Command	Command String	Parameter 1	Parameter 2	Parameter 3	Remarks
AE	○	○	×	Fixed electronic shutter speed	SHUTTER	Preset Number	Arbitrary Parameter 1	Arbitrary Parameter 2	
						NTSC (0) 0 : 1/60s 1 : 1/100s 2 : 1/120s 3 : 1/250s 4 : 1/500s 5 : 1/1000s 6 : 1/2000s 7 : 1/4000s 8 : 1/10000s 9 : 1/50000s 10 : 1/100000s  PAL(0) 0 : 1/50s 1 : 1/100s 2 : 1/120s 3 : 1/250s 4 : 1/500s 5 : 1/1000s 6 : 1/2000s 7 : 1/4000s 8 : 1/10000s 9 : 1/50000s 10 : 1/100000s	×	×	
				11	0 to 261 NTSC 0 to 311 PAL	0 to 910 NTSC 0 to 908 PAL	NTSC When parameter 2 is 0, the range for parameter 3 is 143 to 910.  PAL When parameter 2 is 0, the range for parameter 3 is 142 to 908.		
				Fixed electronic slow shutter speed	SSHUTTER	0 to 255 (3) NTSC 0 to 255 (3) PAL	0 to 524 (0) NTSC 0 to 624 (0) PAL	×	NTSC When parameter 1 is 0, the range for parameter 2 is 262 to 524.  PAL When parameter 1 is 0, the range for parameter 2 is 312 to 624.
WB	○	○	×	White balance mode setting	WB-MODE	One Push/ATW/ Manual/3200K/5600K 0,1,2,3,4(1)	×	×	
	×	×	×	One Push white balance execution	AUTOWB	×	×	×	Only when WB-MODE = 0
	○	○	×	Manual R gain	RGAIN	Step units 0 to 4095 (factory)	×	×	Only when WB-MODE = 2 Default R gain is 3200 [K].
	○	○	×	Manual B gain	BGAIN	Step units 0 to 4095 (factory)	×	×	Only when WB-MODE = 2 Default B gain is 3200 [K].
	○	○	×	ATW Entrainment speed adjustment	ATW-SPEED	Speed (Slow/Normal/ Fast) 0,1,2 (1)	×	×	

Category	INIT Object	SAVE Object	Auto Save	Command	Command String	Parameter 1	Parameter 2	Parameter 3	Remarks
WB	○	○	×	Switch CRS during ATW	CRS-MODE	Mode (Off/On) 0,1 (0)	×	×	Only when WB-MODE = 1
PICTURE	○	○	×	Contour emphasis mode	DTL-MODE	MODE (Off, V, H, V+H, Highlight) 0,1,2,3,4 (2)	×	×	
	○	○	×	Detail enhancer	DTL-ENHANCER	Mode (Off/On) 0,1 (0)	×	×	
	○	○	×	2-D noise reduction setting	2DNR-MODE	Off, Mild, Moderate, Strong 0,1,2,3 (1)	×	×	
	○	○	×	3-D noise reduction setting	3DNR-MODE	Off, Mild, Moderate, Strong 0,1,2,3 (0)	×	×	
	○	○	×	Pedestal adjustment	PEDESTAL	Step units 0 to 22 (11)	×	×	
	○	○	×	Gamma compensation setting	GAMMA-MODE	Off/ $\gamma = 0.45/\gamma = 0.60$ 0,1,2 (1)	×	×	
	○	○	×	Positive-negative reverse	NEGAPOSI	Positive/Negative 0,1 (0)	×	×	
	○	○	×	High Brightness Clipping Setting	WHITECLIP	Step units 0 to 63 (63)	×	×	
WPC	○	○	×	White point detection mode	WPC-MODE	Mode (Off/On) 0,1 (1)	×	×	
	×	×	×	Auto white point detection compensation execution	WPC-EXE	×	×	×	Execute with the lens covered, such as by a lens cap.
	○	×	×	White point compensation position default is 0	WPC-DISP	OFF/ON 0,1 (0)	×	×	Displays only when WPC-MODE is 1.
OPD	○	×	×	Detection frame display switching	OPD-DISP	Off/AE/WB 0,1,2 (0)	×	×	
	○	○	×	AE frame center coordinates	OPD-AE-POS	x-coordinate 25 to 75 (50)	y-coordinate 25 to 75 (50)	×	
	○	○	×	AE frame width and height	OPD-AE-SIZE	width 50 to 100 (50)	height 50 to 100 (factory)	×	
	○	○	×	AWB frame center coordinates	OPD-AWB-POS	x-coordinate 25 to 75 (50)	y-coordinate 25 to 75 (50)	×	
	○	○	×	AWB frame width and height	OPD-AWB-SIZE	width 50 to 100 (50)	height 50 to 100 (50)	×	

Category	INIT Object	SAVE Object	Auto Save	Command	Command String	Parameter 1	Parameter 2	Parameter 3	Remarks
I/O	○	○	×	VBS/YC Output Selection	VOUTSEL	VBS or separate Y/C 0,1(0)	×	×	
	○	○	×	Horizontal phase adjustment	HPHASE	Adjustment Step 0 to 910 (factory) NTSC 0 to 908 (factory) PAL	×	×	
	○	○	×	Vertical phase adjustment	VPHASE	Adjustment Step 0 to 262 (factory) NTSC 0 to 312 (factory) PAL	×	×	
	○	×	×	Color bar output	COLORBAR	Off/On 0,1 (0)	×	×	
	○	○	×	Reverse image display	FLIP	Reverse mode (None, horizontal, vertical, 180 deg.) 0,1,2,3 (0)	×	×	
	×	×	○	Serial communication speed changing	BRATE	Baud rate selection (9600/19200/38400) 0,1,2 (2)	×	×	
	○	○	×	OSD Display	OSD	Off/On 0,1	×	×	
	×	×	×	Screen memo saving	MEMO-CAPTURE	Save destination (0 or 1) 0,1 (0)	×	×	Saving is possible with still image displayed
	○	×	×	Memo Display	MEMO-DISPLAY	Off/still/memo1/ memo2 0,1,2,3 (0)	×	×	
Miscellaneous	×	×	×	Setting Value Initialization	INIT	×	×	×	
	×	×	×	Setting Value Saving	SAVE	Save destination selection (A or B) 0,1	×	×	
	×	×	○	Load settings from destination upon next restart	LOAD	Load source selection (A, B, or stand-alone) 0,1,2 (2)	×	×	Subsequently starts from last loaded slot
	×	×	×	Read setting values	RMEM	×	×	×	
	×	×	×	Version Display	VERSION	×	×	×	
	×	×	×	Help Display	HELP	Command Name string	×	×	Lists commands when parameter 1 is omitted



# Specifications

## Photographic Components

Image sensor	1/3-type interline transfer CCD
Color filter	Complementary color mosaic
Effective pixels	XC-505: Approx. 380,000 dots (768 [H] × 494 [V]) XC-505P: Approx. 440,000 dots (752 [H] × 582 [V])
Video output pixels	XC-505: 756 [H] × 485 [V] XC-505P: 739 [H] × 575 [V]
Cell size	XC-505: 6.35 [H] × 7.40 [V] μm XC-505P: 6.50 [H] × 6.25 [V] μm

## Optics & Miscellaneous

Lens mount	Dedicated (NF) mount
Signal format	XC-505: EIA standard NTSC color XC-505P: CCIR standard PAL color
Scan format	XC-505: 525 lines, 2:1 interlace, 30 frames/s XC-505P: 625 lines, 2:1 interlace, 25 frames/s
Sync method	Internal or external (auto-switching)
External sync input	HD/VD or VS
Horizontal resolution	XC-505: 470 TV lines XC-505P: 460 TV lines
Minimum illumination	1.5 lx (F1.4, AGC: ON)
Sensitivity	2000 lx (F11, AGC: OFF [0 dB])
Video output	VBS or Y/C (switch-selectable) VBS: 1 V <sub>p-p</sub> , 75 Ω, negative sync Y: 1 V <sub>p-p</sub> , 75 Ω C: composite video output dependent
Video S/N	XC-505: 48 dB (standard), AGC: OFF (0 dB) XC-505P: 46 dB (standard), AGC: OFF (0 dB)
Shutter speed (4 modes)	1/60 s (OFF): XC-505 1/50 s: XC-505P (OFF), 1/1000 s, CCD IRIS, and Flickerless (1/00)
CCD IRIS	XC-505: 1/60 s to 1/4000 s XC-505P: 1/50 s to 1/4000 s
White balance (5 modes)	ATW, One Push WB, 3200K, 5600K, and MAN
Gain control (2 modes)	AGC (0 dB to 18 dB), and fixed (0 dB)

Output connector  
12-pin DC IN, SYNC, and VIDEO

## External VS (sync) input

Input level	XC-505: Video signal = 0 V <sub>pp</sub> to 1.4 V <sub>pp</sub> CSYNC signal = 0.15 V <sub>pp</sub> to 0.6 V <sub>pp</sub> XC-505P: Video signal = 0 V <sub>pp</sub> to 1.4 V <sub>pp</sub> CSYNC signal = 0.15 V <sub>pp</sub> to 0.6 V <sub>pp</sub>
Horizontal input frequency	XC-505: 15734 Hz ±0.236 Hz XC-505P: 15,625 Hz ±0.234 Hz
Vertical input frequency	XC-505: 59.94 Hz ±0.00089 Hz XC-505P: 50 Hz ±0.00075 Hz
Termination	Camera-internal 75 Ω
H jitter	20 ns or less

## External HD/VD sync input

Input level	same for XC-505 and XC-505P High: 4.0 V to 5.0 V DC Low: 0 V to 0.5 V DC Negative polarity
HD input frequency	XC-505: 15734 Hz ±0.236 Hz XC-505P: 15,625 Hz ±0.234 Hz
VD input frequency	XC-505: 59.94 Hz ±0.00089 Hz XC-505P: 50 Hz ±0.00075 Hz
Termination	Camera-internal 75 Ω
H jitter	20 ns or less

## General

Power requirement	10.5 V to 15 V DC
Power consumption	1.5 W
Operating temperature	0 °C to 40 °C (32 °F to 104 °F)
Storage temperature	-30 °C to +60 °C (-22 °F to +140 °F)
Operating humidity	20% to 80% (non-condensing)
Storage humidity	20% to 90% (non-condensing)
Shock resistance	70 G
MTBF	81,880 hours (approx. 9.3 years)

## Physical characteristics

Mass Approx. 51 g (1.8 oz)

Dimensions 22 (W) × 22 (H) × 64 (D) mm  
 (7/8 (W) × 7/8 (H) × 2 5/8 (D) inches)  
 (excluding protrusions)

### Supplied accessories

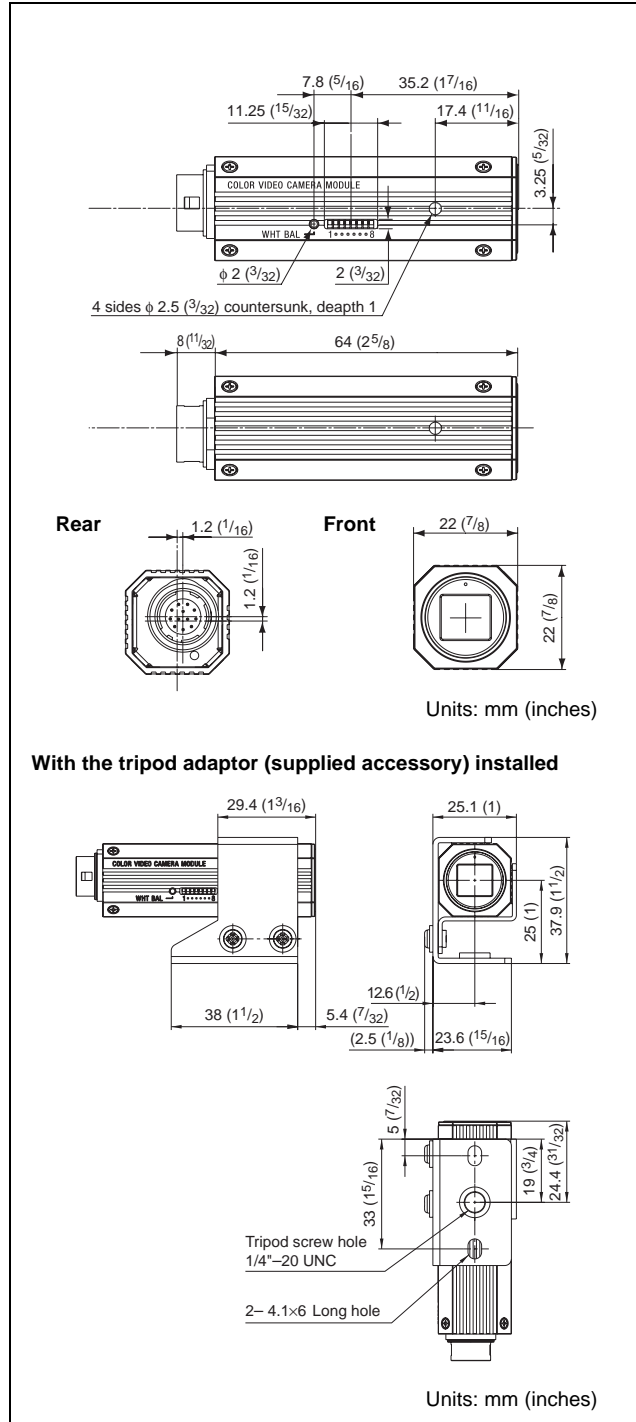
- Lens mount cap (1)
- Tripod adaptor (1 set)
- Operating Instructions (1)

### Optional accessories

- Camera adaptor DC-700, DC-700CE
- Compatible lenses
  - NF-mount
    - VCL-12S12XM (f=12 mm)
    - VCL-06S12XM (f=6 mm)
    - VCL-03S12XM (f=3.5 mm)
  - C-mount LO-999CMT
- Cable (12-pin) CCXC-12P02N (2 m)/12P05N (5 m)/  
12P10N (10 m)/12P25N (25 m)
- Angle case kit XCK-L555

Design and specifications are subject to change without notice.

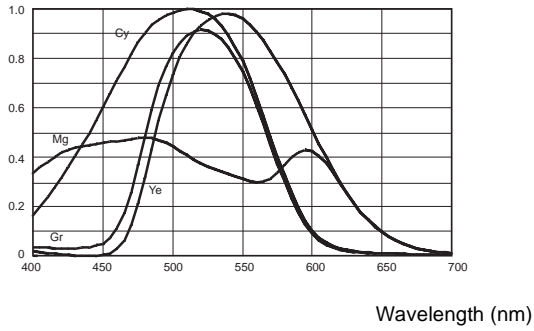
## Dimensions



# Spectral Sensitivity Characteristics (typical)

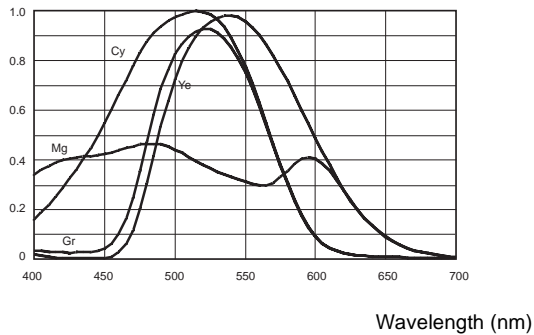
## XC-505

Relative sensitivity



## XC-505P

Relative sensitivity



Characteristics of the lens and light source are excluded.

# MIDORI™

## ULB-35 SERIES LED LIGHT SOURCE



## OPERATING MANUAL

## Preface

Thank you for purchasing the Midori™ fiber optic illuminator which utilizes state-of-the-art solid-state illumination technology. The light source is a high output, efficient, compact and lightweight fiber optic light source for industrial applications where space is a premium. The ULB-35 series fiber illuminators utilize eco-friendly solid state LED lighting technology, exhibits instant-on and electronic intensity dimming capability with long operating lifetime. The Midori™ ULB-35 LED fiber illuminator is equipped with an ACMI fiber receptacle with separate Storz and Olympus style screw-in adapters available to accommodate these other common fiber cable types. The ULB-35 accepts 12V DC input voltage for portable battery operation as well. Please read this operating manual in its entirety before using this product.

---

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## System Symbol Descriptions



Caution: Consult accompanying documentation



Caution: Hot Surface



Caution



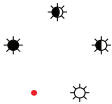
Hazard Warning



Lamp On



Lamp Off



Light; Lighting; Illumination Intensity



Bright Light



Storage Humidity



Transport Temperature



Alternating Current



Direct Current



Manufacturer



Do Not Immerse in Any Liquid



Do not dispose of this product as unsorted municipal waste. Prepare this product for reuse or separate collection as specified by Directive 2002/96/EC of the European Parliament and the Council of the European Union on Waste Electronic and Electrical Equipment (WEEE). If this product is contaminated, this directive does not apply.

## Warning and Precautions / Mises en garde et précautions



WARNING /  
MISE EN GARDE

There are no user serviceable or replacement parts. Do not attempt to dismantle box or remove top cover. / Aucune pièce ne peut être réparée ou remplacée par l'utilisateur. Ne pas essayer de démonter la boîte ou de retirer le couvercle du dessus.



WARNING /  
MISE EN GARDE

Only qualified personnel should make electrical inspections and repair of the LED Light Source. / Seul le personnel qualifié doit effectuer les vérifications électriques et les réparations de cette source de lumière à DEL.

The high intensity light at the front of the LED Light Source and at the tip of the fiber-optic bundle will create high temperatures and bright light. To minimize the risk of injury, avoid direct viewing or contact. / La lampe à haute intensité, située sur le devant de la source de lumière à DEL et sur le bout du faisceau de fibres optiques, générera beaucoup de chaleur et une lumière vive. Afin de réduire les risques de blessures, éviter de toucher l'appareil ou d'exposer directement l'œil à la lumière de la lampe.

WARNING /  
MISE EN GARDE

To prevent temporary blinding and contact with heated parts, always plug the fiber optic bundle into the LED Light Source before turning the power on. / Pour éviter tout aveuglement temporaire ou contact avec les pièces chauffées, toujours brancher le faisceau de fibres optiques dans la source de lumière à DEL avant la mise en marche.

WARNING /  
MISE EN GARDE

Do not use the LED Light Source directly in medical applications. / Ne pas utiliser une source de lumière à DEL directe à des fins médicales.



WARNING /  
MISE EN GARDE

UNIT MAY BE HOT. Allow to cool before handling. / L'appareil PEUT ÊTRE CHAUD. Il est important de le laisser refroidir avant d'y toucher.



CAUTION /  
AVERTISSEMENT

Preferred operation is in the horizontal position. Other operating orientations are permitted. / L'appareil fonctionne de façon optimale à l'horizontale. Les autres orientations sont permises.

CAUTION /  
AVERTISSEMENT

Any changes or modifications made to this device that are not expressly approved by manufacturer may void the user's authority to operate the equipment. / Toute modification apportée à cet appareil et non expressément approuvée par le fabricant peut priver l'utilisateur de son droit d'usage.

CAUTION /  
AVERTISSEMENT

PROVIDE ADEQUATE VENTILATION TO PREVENT OVER HEATING. Do not drape this light source. Provide a 1.5 inch (3.8 cm) distance between LED Light Source and any solid objects. / ASSURER UNE VENTILATION ADEQUATE AFIN D'ÉVITER LA SURCHAUFFE DE L'APPAREIL. Ne pas couvrir la source de lumière. Laisser au moins 3,8 cm (1,5 po) de distance entre la source de lumière à DEL et tout objet.



CAUTION /  
AVERTISSEMENT

DO NOT IMMERSE or store liquids above or on the LED Light Source. / NE PAS IMMERGER la source de lumière à DEL dans des liquides ou placer des liquides au-dessus de celle-ci.

CAUTION /  
AVERTISSEMENT

Do not operate device without the cover in place. / Ne pas faire fonctionner l'appareil sans son couvercle.

CAUTION /  
AVERTISSEMENT

DO NOT obstruct the airway paths for sufficient cooling is required. / NE PAS obstruer les voies d'aération afin de permettre le refroidissement adéquat de l'appareil.

CAUTION /  
AVERTISSEMENT

Please read this entire manual prior to operation. / Lire le présent guide en entier avant d'utiliser l'appareil.



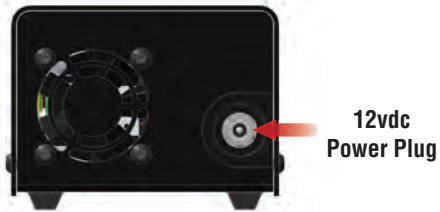
CAUTION /  
AVERTISSEMENT

Protection provided by the equipment maybe impaired if not used in accordance with the manufacture recommendations. / La protection assurée par l'équipement risque d'être altérée si l'appareil n'est pas utilisé conformément aux recommandations du fabricant.

## System Description and Operation

1. The light source power switch should be in the OFF position. Plug the external 12vdc power supply into the 12vdc connector. **Figure 1.**
2. Plug the external power supply cord into AC receptacle main power.
3. Plug the fiber-optic bundle into the light port and connect the opposite end to the equipment being used. **Figure 2.**
4. Turn the power switch to the ON position. LED indicator light will turn on when light source is powered. **Figure 3.**
5. Adjust the intensity control to set the light intensity to the desired light output level. **Figure 3.**
6. Turn unit OFF when not in use. **Figure 3.**

**Figure 1. Back View**



**Figure 2. Fiber-Optic Bundle**



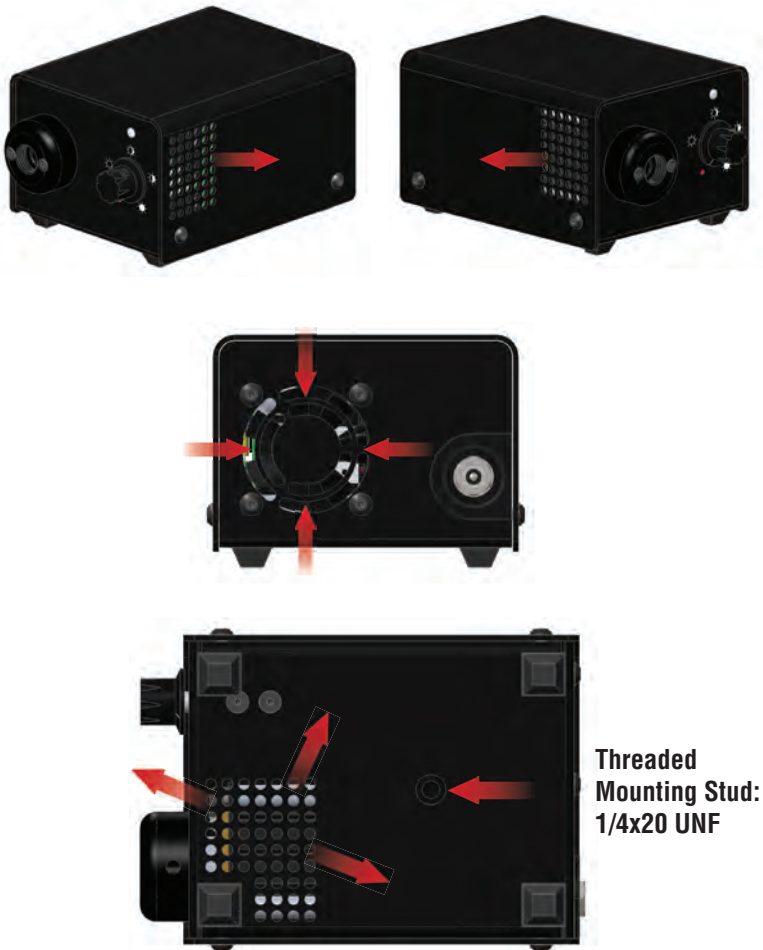
**Figure 3. Front View**





## Figure 4. Cooling and Air Flow Paths

1. Do not obstruct air flow paths. This device is designed to have proper forced air cooling paths to maintain thermal stable operation.
2. Place in an area that provides adequate ventilation to prevent unit from overheating. Do not drape the LED Light Source with cloth or objects restricting airflow.
3. Airflow outlets are shown in below red arrow graphics.
4. 1/4-20 UNF mounting stud located in the middle of box bottom side.



## Maintenance and Cleaning



1. Turn the LED Light Source off and unplug the power cord from both the wall outlet and the rear of the unit.
2. Wipe the external surfaces clean with a cloth dampened with mild soap and water. **DO NOT IMMERSE.**
3. Wipe the power cords clean with a cloth dampened with mild soap and water. **DO NOT IMMERSE. DO NOT RECONNECT WET.**
4. **DO NOT** plug the power source into a wall outlet until it is thoroughly dry.
5. It is recommended to periodically clean the reflective optical surface near the LED. Please use a soft cotton Q-tip dipped in Isopropyl Alcohol and wipe the reflective optic surfaces and allow to thoroughly dry prior to use.

## Troubleshooting Suggestions

In the event the unit stops functioning, try the following steps to operate light source. The power supply exhibits internal protection circuitry for user safety precautions and will shutdown during certain instances. This equipment has been tested to ESD conditions according to IEC 61326-1 and performs to performance criterion C. This means, that under certain conditions the overvoltage protection of the power supply may turn the power supply output and the unit off to prevent damage to the unit. In such case the power supply must be disconnected from main power to reset this fault condition. In the event the unit suddenly turns off, turn the unit off. Unplug the power supply from mains voltage (120V/ 230V). Wait ~5 seconds and plug the power supply back into mains voltage. Turn the unit on.

1. Turn OFF light source by rotating intensity control knob counterclockwise until the switch clicks off.
2. Completely disconnect power supply from both light source and mains (power plug into ac outlet).
3. Wait for ~5 seconds until power supply discharges as observed on the power supply LED indicator will turn off.
4. Reconnect power supply to both ac to main voltage and dc connector to light source.
5. Turn ON light source by rotating knob clockwise until clicks on and LED indicator light is on.
6. Rotate knob to increase light output intensity to desired output.

## Repair

For repair information, please contact Customer Service at:

Telephone: (714) 236-8600

Email: [customerservice@ushio.com](mailto:customerservice@ushio.com)

## Manufacture Contact Information

Supplier Name:	Ushio America, Inc.
Address:	5440 Cerritos Ave. Cypress, CA 90630
Telephone:	714-236-8600
Email	customerservice@ushio.com
Website:	www.ushio.com
Model or Type:	ULB-35



## Environment Ratings

Operating Temperature:	41° F to 104° F (5° C to 40° C)
Humidity:	0 to 95% rh (non-condensing)
Storage Temperature:	-10° F to 140° F (-20° C to 60° C)
Humidity:	30 to 75% rh
Atmospheric Pressure:	700 hpa to 1060 hpa
Mode of Operation:	Continuous
Safety System Classification:	Class II
System Pollution Degree:	2
Installation Category:	II

## Electrical Ratings

### External Power Supply Ratings:

Input:	100 - 240 V~, 50/60 Hz, 1.4 A max
Output:	+12 V $\overline{\text{---}}$ , 5.0 A
Recommended PS:	UAI Part: UPS-00

### ULB-35 Power Ratings:

Voltage:	+12V DC; 14V DC maximum
Current:	3.4 amp

**Battery:** Ushio America, Inc. recommends using a UR (or other recognized testing laboratory) recognized battery rated at 12V/9Ah or equivalent with a minimum 3.5 amp current limit rating.

## Dimensions

Length:	127MM (5.0")
Width:	90MM (3.5")
Height:	68MM (2.7")
Weight:	0.45 kg (1.0 lbs)



## Illumination Source

Type:	LED Custom Module
Color Temperature:	5700 K - 6500 K Nominal
Power:	35 Watts
Average LED Life*:	50,000+ Hours

\* Based on LED manufacturer rated wattage and thermal operation.

## Product Ordering Information

Product ID	Description	Order Code
ULB-35p	35W LED Light Source; OEM Black	1003883
UPS-00	Universal Input Power Supply	1003879
UPC-US	US power cord; EN60320-C7	1003881
UPC-EU	EU Power cord EN60320-C7	1003880
UPC-UK	UK Power cord EN60320-C7	1003882
UPC-AU	AU Power Cord; EN60320-C7	1004095
50159	Storz Fiber Adapter; screw-in	50159
50160	Olympus Fiber Adapter; screw-in	50160
LB-CLP	12vdc Car Power Plug Adapter	LB-CLP
UAC-01	Portable Light Case	5002496
UPS-03	12vdc LiP Battery Pack	5002493

## Approvals



The CE mark on this product indicates that it has been tested to and conforms to the provisions noted within the following directives:

Low Voltage: 2014/35/EU  
EMC: 2014/30/EU  
RoHS 2: 2011/65/EU

In accordance with the following standards:

EN61010-1  
IEC 61326-1  
EN 61326-1  
IEC 62471  
IEC/EN 61000 3-2  
IEC/EN 61000 3-3  
EN 50581



**Intertek**  
**4009043**

Conforms to UL Std 61010-1  
Certified to CSA Std C22.2 No. 61010-1



WEEE  
([www.lamprecycle.org](http://www.lamprecycle.org))

## Limited Warranty

USHIO America warrants the LED Light Source, when new, to be free of defects in material and workmanship and to perform in accordance with the manufacturer's specifications when subject to normal use and service for a period of two years from the date of purchase from USHIO America or an authorized agent. USHIO America will either repair or replace any components found to be defective or at variance from the manufacturer's specifications within this time at no cost to the customer. It shall be the purchaser's responsibility to return the instrument to the authorized distributor, agent, or service representative.

This limited warranty does not cover the breakage or failure due to tampering, misuse, neglect, accidents, improper installation, modification, shipping, or to improper maintenance, service, and cleaning procedures. This limited warranty is also void if the instrument is not used in accordance with the manufacturer's recommendations or if required service is performed by anyone other than USHIO America or an authorized agent. The purchase date determines limited warranty requirements. No other express or implied limited warranty is given.

## Agency Compliance Statements

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## FCC Class A Compliance Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.



### CAUTION

Any changes or modifications made to this device that are not expressly approved may void the user's authority to operate the equipment.

### NOTE

To maintain compliance with FCC Rules and Regulations, cables connected to this device must be shielded cables, in which the cable shield wire(s) have been grounded (tied) to the connector shell.

## Canadian Notice

This equipment does not exceed the Class A limits for radio noise emissions as described in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la classe A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.



## Preface

Thank you for purchasing the iShot® UV-LED Light Source Kit which utilizes state-of-the-art solid-state illumination technology. The light source is a high output, efficient, compact and lightweight fiber optic light source for industrial applications where space is a premium. The iShot® UV-LED Light Source Kit utilize eco-friendly solid state LED lighting technology, exhibits instant-on and electronic intensity dimming capability with long operating lifetime. The iShot® UV-LED Light Source Kit is equipped with a Machida fiber receptacle. The iShot® UV-LED Light Source Kit accepts 12V DC input voltage for portable battery operation as well. Please read this operating manual in its entirety before using this product.

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## System Symbol Descriptions



Caution: Consult accompanying documentation



Caution: Hot Surface



Caution



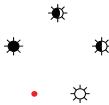
Hazard Warning



Lamp On



Lamp Off



Light; Lighting; Illumination Intensity



UV Light Warning



Storage Humidity



Transport Temperature



Alternating Current



Direct Current



Manufacturer



Do Not Immerse in Any Liquid



Do not dispose of this product as unsorted municipal waste. Prepare this product for reuse or separate collection as specified by Directive 2002/96/EC of the European Parliament and the Council of the European Union on Waste Electronic and Electrical Equipment (WEEE). If this product is contaminated, this directive does not apply.



## Warning and Precautions / Mises en garde et précautions



WARNING /  
MISE EN GARDE

There are no user serviceable or replacement parts. Do not attempt to dismantle box or remove top cover. / Aucune pièce ne peut être réparée ou remplacée par l'utilisateur. Ne pas essayer de démonter la boîte ou de retirer le couvercle du dessus.

WARNING /  
MISE EN GARDE

Only qualified personnel should make electrical inspections and repair of the LED Light Source. / Seul le personnel qualifié doit effectuer les vérifications électriques et les réparations de cette source de lumière à DEL.



WARNING /  
MISE EN GARDE

UV light is emitted from this product, Avoid eye and skin exposure to unshielded product. High intensity light at the front of the LED Light Source and at the tip of the fiber-optic bundle will create high temperatures and UV light. To minimize the risk of injury, avoid direct viewing or contact. / L'ultraviolet (UV) est émis par ce produit. Évitez le contact avec les yeux ou la peau. La lampe à haute intensité, située sur le devant de la source de lumière à DEL et sur le bout du faisceau de fibres optiques, va générer beaucoup de chaleur et une lumière vive. Afin de réduire les risques de blessures, évitez de toucher l'appareil ou d'exposer directement l'oeil à la lumière de la lampe."



WARNING /  
MISE EN GARDE

To prevent temporary blinding and contact with heated parts, always plug the fiber optic bundle into the LED Light Source before turning the power on. / Pour éviter tout aveuglement temporaire ou contact avec les pièces chauffées, toujours brancher le faisceau de fibres optiques dans la source de lumière à DEL avant la mise en marche.

WARNING /  
MISE EN GARDE

Do not use the LED Light Source directly in medical applications. / Ne pas utiliser une source de lumière à DEL directe à des fins médicales.



WARNING /  
MISE EN GARDE

Unit MAY BE HOT. Allow to cool before handling. / L'appareil PEUT ÊTRE CHAUD. Il est important de le laisser refroidir avant d'y toucher.



CAUTION /  
AVERTISSEMENT

Preferred operation is in the horizontal position. Other operating orientations are permitted. / L'appareil fonctionne de façon optimale à l'horizontale. Les autres orientations sont permises.

CAUTION /  
AVERTISSEMENT

Any changes or modifications made to this device that are not expressly approved by manufacturer may void the user's authority to operate the equipment. / Toute modification apportée à cet appareil et non expressément approuvée par le fabricant peut priver l'utilisateur de son droit d'usage.

CAUTION /  
AVERTISSEMENT

PROVIDE ADEQUATE VENTILATION TO PREVENT OVER HEATING. Do not drape this light source. Provide a 1.5 inch (3.8 cm) distance between LED Light Source and any solid objects. / ASSURER UNE VENTILATION ADEQUATE AFIN D'ÉVITER LA SURCHAUFFE DE L'APPAREIL. Ne pas couvrir la source de lumière. Laisser au moins 3,8 cm (1,5 po) de distance entre la source de lumière à DEL et tout objet.



CAUTION /  
AVERTISSEMENT

DO NOT IMMERSE or store liquids above or on the LED Light Source. / NE PAS IMMERGER la source de lumière à DEL dans des liquides ou placer des liquides au-dessus de celle-ci.

CAUTION /  
AVERTISSEMENT

Do not operate device without the cover in place. / Ne pas faire fonctionner l'appareil sans son couvercle.

CAUTION /  
AVERTISSEMENT

DO NOT obstruct the airway paths for sufficient cooling is required. / NE PAS obstruer les voies d'aération afin de permettre le refroidissement adéquat de l'appareil.

CAUTION /  
AVERTISSEMENT

Please read this entire manual prior to operation. / Lire le présent guide en entier avant d'utiliser l'appareil.



CAUTION /  
AVERTISSEMENT

Protection provided by the equipment maybe impaired if not used in accordance with the manufacture recommendations. / La protection assurée par l'équipement risque d'être altérée si l'appareil n'est pas utilisé conformément aux recommandations du fabricant.



## System Description and Operation

1. The light source power switch should be in the OFF position. Plug the external 12vdc power supply into the 12vdc connector. **Figure 1.**
2. Plug the external power supply cord into AC receptacle main power.
3. Plug the fiber-optic bundle into the light port and connect the opposite end to the equipment being used. **Figure 2.**
4. Turn the power switch to the ON position. LED indicator light will turn on when light source is powered. **Figure 3.**
5. Adjust the intensity control to set the light intensity to the desired light output level. **Figure 3.**
6. Turn unit OFF when not in use. **Figure 3.**
7. This unit is equipped with a fiber sense interlock feature. The device will not emit light unless fiber cable is completely inserted into the front adapter. Please ensure fiber cable is fully seated into receptacle.

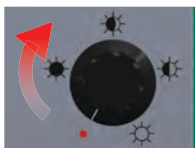
**Figure 1. Back View**



**Figure 2. Fiber-Optic Bundle**



**Figure 3. Front View**



**Light Intensity  
Knob**



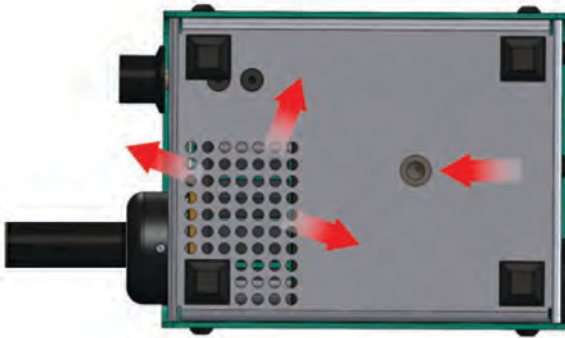
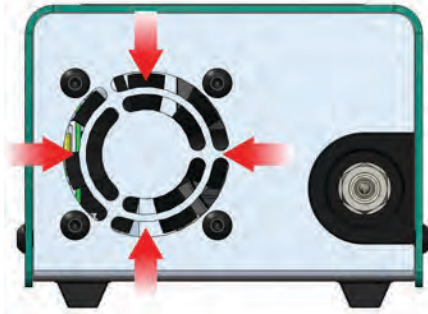
**ON/OFF Indicator**

**Power ON/OFF  
Rotate Knob**



## Figure 4. Cooling and Air Flow Paths

1. Do not obstruct air flow paths. This device is designed to have proper forced air cooling paths to maintain thermal stable operation.
2. Place in an area that provides adequate ventilation to prevent unit from overheating. Do not drape the LED Light Source with cloth or objects restricting airflow.
3. Airflow outlets are shown in below red arrow graphics.
4. 1/4-20 UNC mounting stud located in the middle of box bottom side.



**Threaded  
Mounting Stud:  
1/4-20 UNC**

## Maintenance and Cleaning



1. Turn the LED Light Source off and unplug the power cord from both the wall outlet and the rear of the unit.
2. Wipe the external surfaces clean with a cloth dampened with mild soap and water. **DO NOT IMMERSE.**
3. Wipe the power cords clean with a cloth dampened with mild soap and water. **DO NOT IMMERSE. DO NOT RECONNECT WET.**
4. DO NOT plug the power source into a wall outlet until it is thoroughly dry.
5. It is recommended to periodically clean the optical surface near the LED. Please use a soft cotton swab dipped in Isopropyl Alcohol and wipe the optic surfaces and allow to thoroughly dry prior to use.

## Troubleshooting Suggestions

In the event the unit stops functioning, try the following steps to operate light source. The power supply exhibits internal protection circuitry for user safety precautions and will shutdown during certain instances. This equipment has been tested to ESD conditions according IEC 61326-1 and performs to performance criterion C. This means, that under certain conditions the overvoltage protection of the power supply may turn the power supply output and the unit off to prevent damage to the unit. In such case the power supply must be disconnected from main power to reset this fault condition. In the event the unit suddenly turns off, turn the unit off. Unplug the power supply from mains voltage (120V/ 230V). Wait ~5 seconds and plug the power supply back into mains voltage. Turn the unit on.

1. Turn OFF light source by rotating intensity control knob counterclockwise until the switch clicks off.
2. Completely disconnect power supply from both light source and mains (power plug into ac outlet).
3. Wait for ~5 seconds until power supply discharges as observed on the power supply LED indicator will turn off.
4. Reconnect power supply to both ac to main voltage and dc connector to light source.
5. Turn ON light source by rotating knob clockwise until clicks on and LED indicator light is on.
6. Insert fiber cable completely to deactivate fiber sense interlock feature.
7. Rotate knob to increase light output intensity to desired output.

## Repair

For repair information, please contact our team at:

Phone: Office: 908-496-8008

Email: [support@intertest.com](mailto:support@intertest.com)



## Manufacture Information

Supplier Name: USHIO America, Inc.  
Address: 5440 Cerritos Ave.  
Cypress, CA 90630  
  
Model or Type: ULB-35rvi




## Environment Ratings

Operating Temperature: 41° F to 104° F (5° C to 40° C)  
Humidity: 0 to 95% rh (non-condensing)  
Storage Temperature: -10° F to 140° F (-20° C to 60° C)  
Humidity: 30 to 75% rh  
Atmospheric Pressure: 700 hpa to 1060 hpa  
Mode of Operation: Continuous  
Safety System Classification: Class II  
System Pollution Degree: 2  
Installation Category: II

## Electrical Ratings

### External Power Supply Ratings:

Input: 100 - 240 V~, 50/60 Hz, 1.4 A max  
Output: +12 V , 5.0 A  
Recommended PS: UAI Part: UPS-00

### ULB-35 Power Ratings:

Voltage: +12V DC; 14V DC maximum  
Current: 5.0 amp

Battery: USHIO America, Inc. recommends using a UR (or other recognized testing laboratory) recognized battery rated at 12V/8Ahr or equivalent with a minimum 5.0 amp current limit rating.



## Dimensions

Length:	127MM (5.0")
Width:	90MM (3.5")
Height:	68MM (2.7")
Weight:	0.45 kg (1.0 lbs)



## Illumination Source

Type:	LED Custom Module
Wavelength:	365-370nm Peak
Power:	50 Watts
Average LED Life*:	10,000+ Hours

\* Based on LED manufacturer rated wattage and thermal operation.

## Product Ordering Information

Part Number	Description
EM14366	35W RVI UV LED Light Source, Machida
EM66693	Universal Input Power Supply (60W 12V P/S)
EM11890	US power cord (NEMA 5-15P to IEC C13)



## Approvals



The CE mark on this product indicates that it has been tested to and conforms to the provisions noted within the following directives:

Low Voltage: 2014/35/EU  
EMC: 2014/30/EU  
RoHS 2: 2011/65/EU

In accordance with the following standards:

EN 61010-1  
IEC 61326-1  
EN 61326-1  
IEC/EN 61000 3-2  
IEC/EN 61000 3-3  
EN 50581  
IEC/EN 62471:2006 LED Photobiological safety lamp standard, categorized as Risk Group 3 (High-Risk).



Conforms to UL Std 61010-1  
Certified to CSA Std C22.2 No. 61010-1

**Intertek**  
**4009043**



WEEE  
([www.lamprecycle.org](http://www.lamprecycle.org))

## Limited Warranty

USHIO America warrants the LED Light Source, when new, to be free of defects in material and workmanship and to perform in accordance with the manufacturer's specifications when subject to normal use and service for a period of one year from the date of purchase from USHIO America or an authorized agent. USHIO America will either repair or replace any components found to be defective or at variance from the manufacturer's specifications within this time at no cost to the customer. It shall be the purchaser's responsibility to return the instrument to the authorized distributor, agent, or service representative.

This limited warranty does not cover the breakage or failure due to tampering, misuse, neglect, accidents, improper installation, modification, shipping, or to improper maintenance, service, and cleaning procedures. This limited warranty is also void if the instrument is not used in accordance with the manufacturer's recommendations or if required service is performed by anyone other than USHIO America or an authorized agent. The purchase date determines limited warranty requirements. No other express or implied limited warranty is given.





## Agency Compliance Statements

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### FCC Class A Compliance Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.



#### CAUTION

Any changes or modifications made to this device that are not expressly approved may void the user's authority to operate the equipment.

#### NOTE

To maintain compliance with FCC Rules and Regulations, cables connected to this device must be shielded cables, in which the cable shield wire(s) have been grounded (tied) to the connector shell.

### Canadian Notice

This equipment does not exceed the Class A limits for radio noise emissions as described in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques dépassant les limites applicables aux appareils numeriques de la classe A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministre des Communications du Canada.



**Sold By:**



**[www.intertest.com](http://www.intertest.com)**

303 State Route 94  
Columbia, NJ 07832 USA  
Office: 908-496-8008  
Toll Free (U.S.): 800-535-3626  
Fax: 908-496-8004



MADE IN USA

Rev1-091517



# Model 7500

Floating Flat Panel Arm



2002  
Design Award Winner

The award-winning 7500 Radial Arm is a remarkable work tool. Effortlessly position your monitor exactly where you want it, and add flexibility to your work style. Suspend your flat panel above the desk surface and reclaim your valuable space. Innovative cable management routes cables inside the arm, in order to keep your desk organized. You'll never work the old and cluttered way again!

## FEATURES

- ▲ Reposition the monitor with one hand – no knobs to turn
- ▲ Extends up to 27", folds to just 3", vertical range of 18"
- ▲ Tilt monitor up to 200 degrees
- ▲ Includes FLEXmount™ – six different mounting options in one kit
- ▲ Compatible with all VESA® monitors – includes 75mm and 100mm VESA® mounting plates
- ▲ Includes cable management system – cables concealed in arm



Folds into 3" of space



18" of vertical range



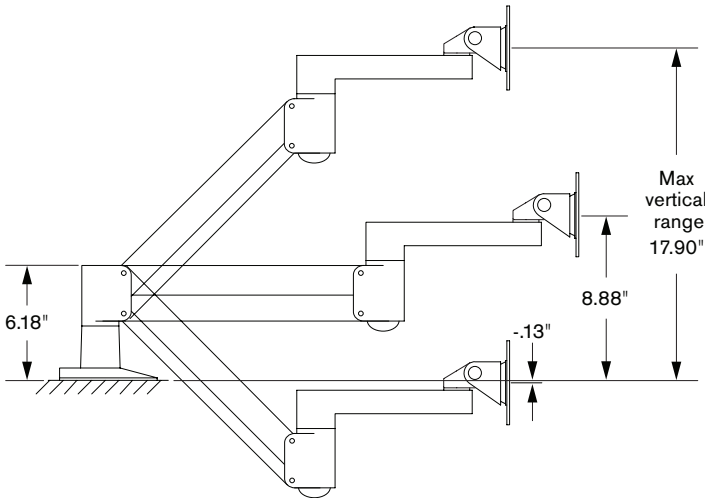
Over 200 degrees of monitor tilt



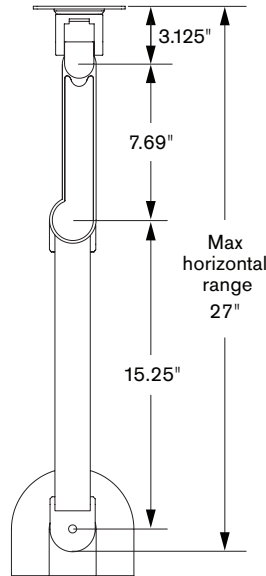
# Model 7500



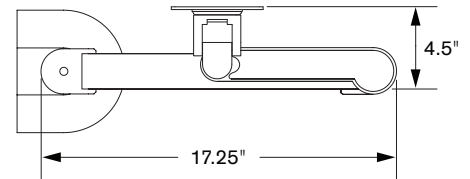
## Specifications



**SIDE VIEW**  
Vertical Range



**TOP VIEW**  
Horizontal Range

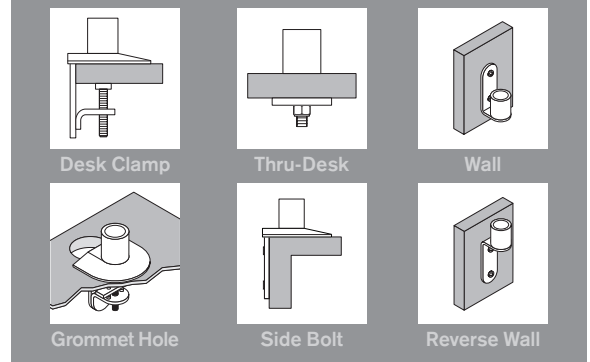


**TOP VIEW**  
Arm Folded

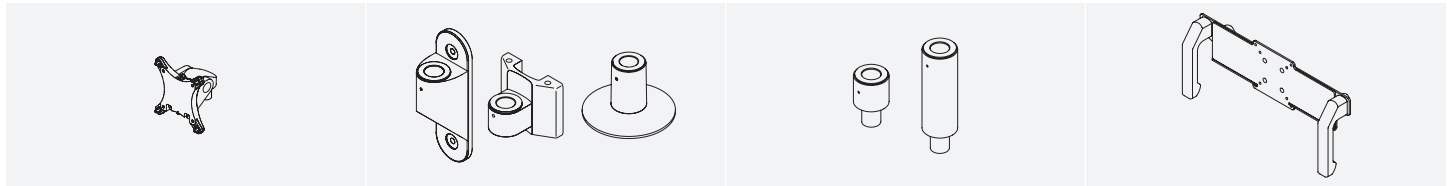
## CAPABILITIES

<b>Vertical range</b> .....	18" (+/- 9" from horizontal)
<b>Horizontal range</b> .....	27"
<b>Rotation</b> .....	360 degrees at three joints
<b>Monitor tilt</b> .....	200 degrees
<b>Monitor pivot</b> .....	Landscape to portrait
<b>Monitor compatibility</b> .....	VESA® 75mm and 100mm
<b>Cable management</b> .....	Cables are concealed in arm
<b>Mounting options</b> .....	FLEXmount™, Slatwall, Wall, Thru-Desk
<b>Monitor weight/model number</b> .....	2 - 13 lbs / 7500-500
	6 - 21 lbs / 7500-800
	8 - 27 lbs / 7500-1000
	13.5 - 44 lbs / 7500-1500

## FLEXMOUNT™ CONFIGURATIONS



## OPTIONAL ACCESSORIES



**QUICK RELEASE ADAPTERS**  
Allows for quick attach and release of monitor (8336-QR).

**MOUNTS**  
Wall (8325), slatwall (8246) and thru-desk (8312).

**EXTENDER TUBES**  
Raise the height of your arm. 2" (8171-75-2) and 6" (8171-75-6) extensions available.

**HANDLE SET**  
Provides convenient handles to reposition monitor (8291).

Phone: 800.888.6024 | Fax: 541.779.0829 | E-mail: info@ergoindemand.com | Web: www.ergoindemand.com

This product is protected by one or more of the following U.S. Patent Nos. and other United States and foreign patents applied for: 119,345, 119,346, 1,324,842, 2,470,525, 6,076,785, 6,273,383, 6,409,134, 6,478,274, 6,499,704, 6,505,988, 6,609,691, 6,191,606, 6,719,253, 6,726,167, 6,736,364, 6,783,105, 6,854,698, 6,915,994, 6,935,883, 6,955,328, 6,983,917, 6,986,489, 7,014,157, 7,017,874, 7,048,242, 7,059,574, 7,063,296, 7,066,433, 7,066,435, 7,389,965, D435,852, D491,952, D492,893, D570,853, D575,293.

# LMD-B170

LCD Picture Monitors



17-inch cost-effective, lightweight Full HD Basic grade LCD monitor for versatile use

## Main Features

- Industry standard 17" screen size and Full HD resolution
- Lightweight and compact with lower power consumption
- Simple all-in-one design style
- Front stereo speakers and Natural ventilation system
- Optimised low-latency I/P conversion
- Video input / Computer input versatility
- Waveform monitor, vector scope and audio level meter display
- User-friendly operability and user interface consistent with PVM/LMD-A Series monitors.
- Camera focus function
- Time code function
- On-screen tally
- User reset, Key inhibit, User Short-cut to function key configuration
- Side by side function
- Flip function
- AC/DC operation with DC Low Power indicator
- Wall-mount capability

Picture Performance	
Panel	a-Si TFT Active Matrix LCD
Picture size (diagonal)	438.2 mm (17 3/8 inches)
Effective picture size (H x V)	381.9 x 214.8 mm (15 1/8 x 8 1/2 inches)
Resolution (H x V)	1920 x 1080 pixels (Full HD)
Aspect	16:9
Colors	Approx. 16.7 million colors
Viewing angle (Panel specification)	80°/60°/80°/80° (typical) (up/down/left/right contrast > 10:1)
Input	
Composite input	BNC (x1), 1.0 Vp-p ±3 dB, sync negative
SDI input	BNC (x2)
HDMI input	HDMI (x1) (HDCP correspondence)
Audio input	Stereo mini jack (x1), -5 dBu 47 kΩ or higher
Parallel remote	RJ-45 Modular connector 8-pin (x1) (Pin-assignable)
DC input	XLR-type 4-pin (male) (x1) DC 12 V to 17 V (output impedance 0.05 Ω or less)
Output	
Composite output	BNC (x1), loop-through, with 75 Ω automatic terminal function
SDI output	BNC (x1)*1 Output signal amplitude: 800 mVp-p ±10% Output impedance: 75 Ω unbalanced
Audio monitor output	Stereo mini jack (x1)
Speaker (built-in) output	2.0 W + 2.0 W (Stereo)
Headphones output	Stereo mini jack (x1)
General	
Power requirements	AC 100 V to 240 V, 0.4 A to 0.3 A, 50/60 Hz DC 12 V to 17 V, 2.7 A to 1.9 A
Power consumption	Approx. 38 W (max.) Approx. 28 W (average power consumption in the default status)
Operating temperature	0°C to 35°C (32°F to 95°F) Recommended: 20°C to 30°C (68°F to 86°F)
Operating humidity	30% to 85% (no condensation)
Storage / Transport temperature	-20°C to +60°C (-4°F to +140°F)
Storage / Transport humidity	0% to 90%
Operating / Storage / Transport pressure	700 hPa to 1060 hPa
Dimensions (W x H x D)*2	423.2 x 303.8 x 68.0 mm (16 3/4 x 12 x 2 3/4 inches) (without monitor feet) 423.2 x 346.5 x 264.4 mm (16 3/4 x 13 3/4 x 10 1/2 inches) (with monitor feet)
Mass	4.1 kg (9 lb 0.6 oz) (without monitor feet) 5.9 kg (13 lb 0.1 oz) (with monitor feet)
Supplied accessories	AC power cord (1), AC plug holder (1), Before Using This Unit (1), CD-ROM (1)

\*1 Output from SDI 1 only.

\*2 The values for mass and dimensions are approximate.

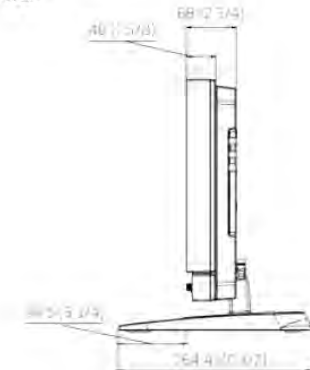


## Dimensions

Front



Side



Unit: mm (inches)

# LMD-B170

LCD Picture Monitors

## Industry standard 17" screen size and Full HD resolution

Industry standard 17" screen is a most user-friendly size to be suitable from a desk-top use to a wall-mounting use, an arm-mounting use and an outfield shooting. The Full HD(1920x1080) resolution is approximately 200% higher resolution than Wide-XGA(1366x768 or 1280x768). FHD is today's minimum requirement for a video production and versatile monitoring purposes of many industries to get a sharp focus and make a pixel to pixel check of a Full HD video with no scaling. The LMD-B170 satisfies both requirements with an excellent cost-performance ratio.



## Lightweight and compact with lower power consumption

The LMD-B170 monitor incorporate a lightweight, compact body. The LMD-B170 inherits their all-in-one design style from the PVM/LMD-A series. It has the mandatory interfaces such as SDI, HDMI and composite video with stereo analog audio. You can monitor both embedded audio signals of SDI signal and analog audio signals on the audio level meters of the screen. And also, it has the supplied stand with the tilt function and a wall mounting function for desktop editing, office viewing, etc.



## Front stereo speakers and Natural ventilation system



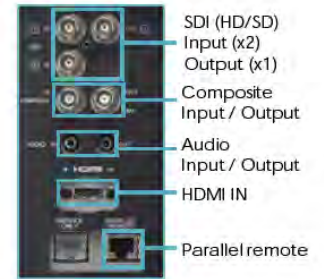
2W+2W front stereo speakers are more powerful than a monaural speaker or a rear speaker system and you can get a good stereophonic effect from them. You can select audio sources from either embedded audio or analog audio. There is no cooling fan inside and it is suitable for a video shooting and critical audio operation.

## Optimized Low-latency I/P Conversion

The I/P conversion system delivers automatically optimized signal processing according to input signals with low-latency (less than 0.5 field). This system helps users to edit and monitor for a live production.

## Video input / Computer input versatility

The LMD-B170 monitor is equipped with built-in standard input interfaces: HD/SD-SDI (x2), HDMI (HDCP) input (x1) and composite (x1). Multiple computer signals can be received via an HDMI/DVI\* interface; the resolution range is from 640 x 480 to 1680 x 1050 pixels. \*HDMI-DVI conversion cable required.



## User-friendly Operability and User Interface

A rotary-type switch and seven function-assignable buttons allow users quick and intuitive operation. Operation buttons with LED indicators enable error-free operation, even in dark environments.\* The LMD-B170 monitor offer the same functions and operability as PVM-A/ LMD-A Series. This means that both types of monitor can be operated and controlled in the same way. \*LED lights can be switched on/off.



Front control panel: Consistent design between the PVM-A and LMD-A Series.

# LMD-B170

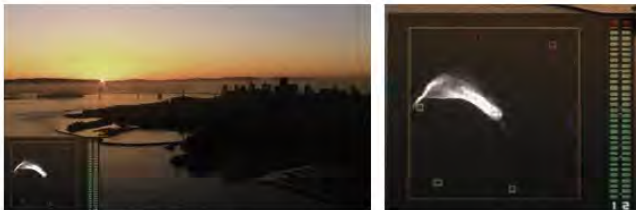
## LCD Picture Monitors

### Waveform monitor, vector scope and audio level meter display

An input signal's waveform and vector scope with an SDI embedded 2-channel audio level meter can be displayed on screen. The waveform of a specified line can also be displayed. In conjunction with the Picture & Picture function\*, the waveform monitor and vector scope display can monitor two camera signals. In addition, an audio level meter can display the embedded audio signal from the SDI or HDMI input. It can display on screen the ch1 to ch8 or ch9 to ch16.



Waveform monitor



Vector scope

### Camera Focus Function

The LMD-B170 monitor can control the aperture level of a video signal, and display images on screen with sharpened edges to help camera focus operation. Further to this, the sharpened edges can be displayed in user-selectable colors (white, red, green, blue, and yellow) for more precise focusing.



Camera focus image

### Time code

Tally information can be displayed on screen.



Time code and waveform monitor



Time code, on-screen tally, and 93% area marker

### On-screen Tally

The on-screen tally can display in three colors. The position of the tally display can be changed to either the upper or lower section of the screen.



On-screen tally (upper)



On-screen tally (lower)

### User reset, Key inhibit, User Short-cut to function key configuration

When multiple users share the same monitor, you need to reset it in a quick operation. User reset function quickly returns the unit to the default settings. Key inhibit protects the required settings of it from any inadvertent operations. For improving speed of the function key configuration, the user can take a short-cut to the settings menu screen by simply holding down one of the Function keys.

# LMD-B170

LCD Picture Monitors

## Side-by-side

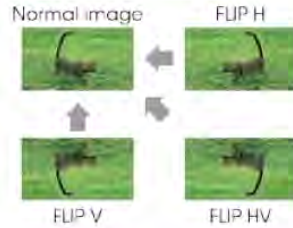
The two picture images\* are downsampled using a digital filter and displayed side-by-side. This feature is convenient when making white balance adjustments or determining shooting angles between two cameras. You can use this with the waveform monitor or vector. You can use this with the waveform monitor or vector.

\*Two signals must be synchronized.



## Flip Function

The Flip function turns the reversed image to a normal view, horizontally or vertically.



## Wall-mount capability

There are also wall-mount 100 mm pitch holes on each monitor's rear panel. Built-in AC circuit allows it to install more easily and flexibly.

## DVI Input Signals\*

System	HDMI/DVI		
	Resolution	Dot clock (MHz)	TV (Hz)
	640 × 480	25.175	31.5
	1280 × 768	68.25	47.4
	1280 × 1024	108.000	64.0
	1360 × 768	85.500	47.7
	1440 × 900	88.750	55.5
	1680 × 1050	119.000	64.7

\* A DVI-HDMI conversion cable is required.

The sides of the displayed picture may be hidden depending on the input signal.

## Signal Formats

System	Signal standard				
	Analog composite	SDI			HDMI
		SD/HD	Dual link	3G	
575/50i (PAL)	O	O	-	-	O
480/60i (NTSC)*1	O	O	-	-	O
576/50p	-	-	-	-	O
480/60p*1	-	-	-	-	O
640 x 480/60p*1	-	-	-	-	O
1920 x 1080/24PsF*1*2	-	O	-	-	-
1920 x 1080/25PsF*2	-	O	-	-	-
1920 x 1080/30PsF*1*2	-	O	-	-	-
1920 x 1080/24p*1	-	O	-	-	O
1920 x 1080/25p	-	O	-	-	O
1920 x 1080/30p*1	-	O	-	-	O
1920 x 1080/50i	-	O	-	-	O
1920 x 1080/60i*1	-	O	-	-	O
1920 x 1080/50p	-	-	-	-	O
1920 x 1080/60p*1	-	-	-	-	O
1280 x 720/24p*1	-	O	-	-	-
1280 x 720/25p	-	O	-	-	-
1280 x 720/30p*1	-	O	-	-	-
1280 x 720/50p	-	O	-	-	O
1280 x 720/60p*1	-	O	-	-	O
2048 x 1080/24PsF	-	O	-	-	-
2048 x 1080/25PsF	-	-	-	-	-
2048 x 1080/30PsF	-	-	-	-	-
2048 x 1080/24p	-	-	-	-	-
2048 x 1080/25p	-	-	-	-	-
2048 x 1080/30p	-	-	-	-	-
2048 x 1080/48p	-	-	-	-	-
2048 x 1080/50p	-	-	-	-	-
2048 x 1080/60p	-	-	-	-	-

\*1 Compatible with 1/1.001 frame rates.

\*2 LMD-B170: 1080/25PsF, 30PsF are displayed as 1080/25PsF, 30PsF on the screen if the Payload ID is added to the video signal, or displayed as 1080/50i, 60i if the ID is not added.

