

SeeUV®

# V.I.B.E.S.® Cart Inspection System

Operation & Service 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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# 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 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 minimum fixturing.

Many features enhance the VIBES' systems performance and versatility. These include:

## ***Generous Movement Envelope***

Controlled by either hand wheels or using optional motors the camera boom travels typically 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 CCTV 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 mechanism
- Camera Control Unit (CCU)
- Monitor with Swing Arm
- Ultraviolet/White Light Source
- White Light Source
- Necessary Power Cords and Video Cables
- Remote Pendant (optional)

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)

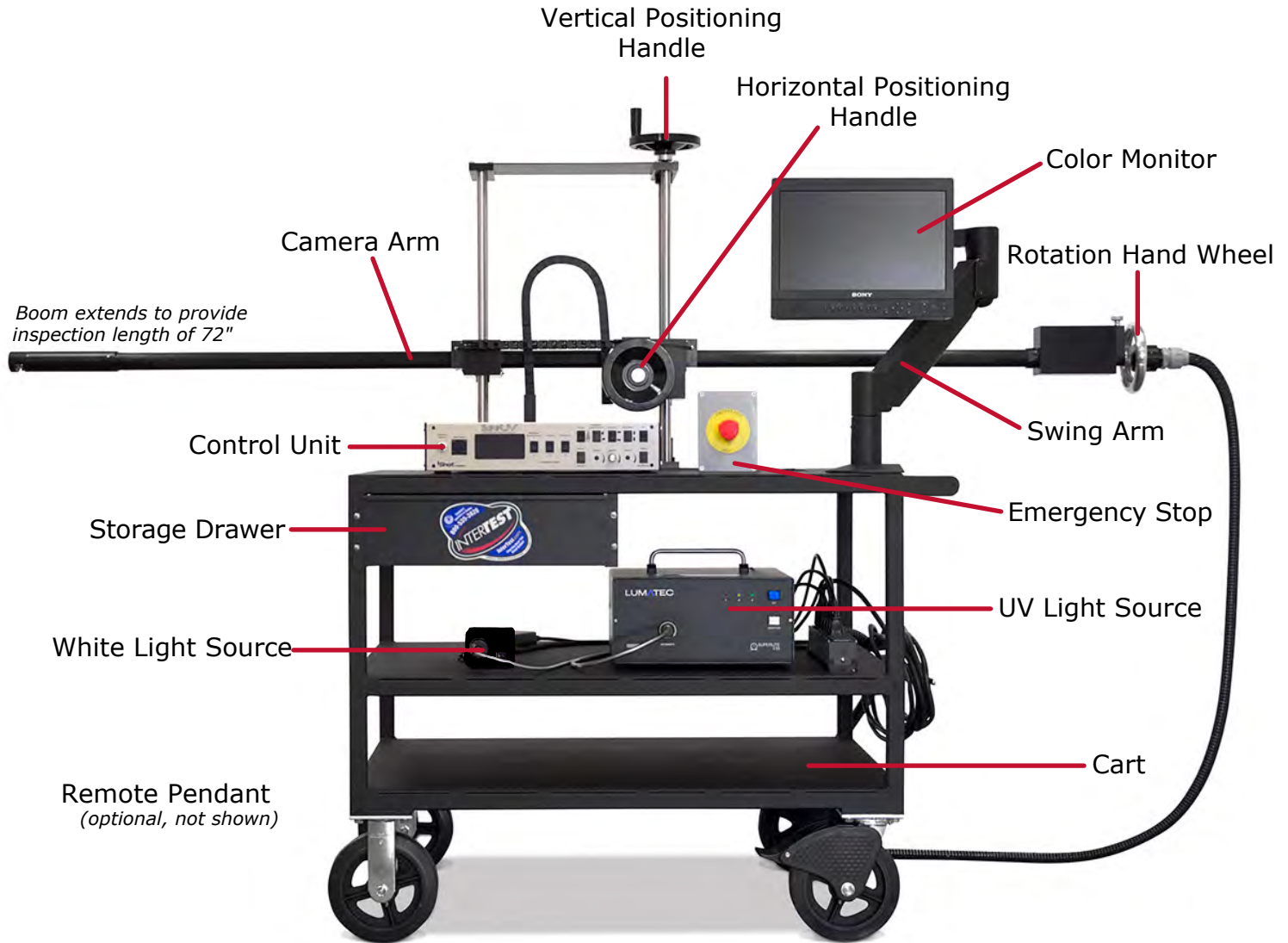


Figure 1\*

\*This is a typical configuration of a VIBES system. Your system may be slightly different from this photograph. Subject to change without notice.

# 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 mains power.
- When disassembling VIBES, make disconnecting the mains power your first step after shutting down all individual components 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 SUV-DC-E ultraviolet/white light and 35-watt LED white light sources. Make sure the liquid light guide is paired with the SUV-DC-E (Figure 2).

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

**See Page 8, 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)

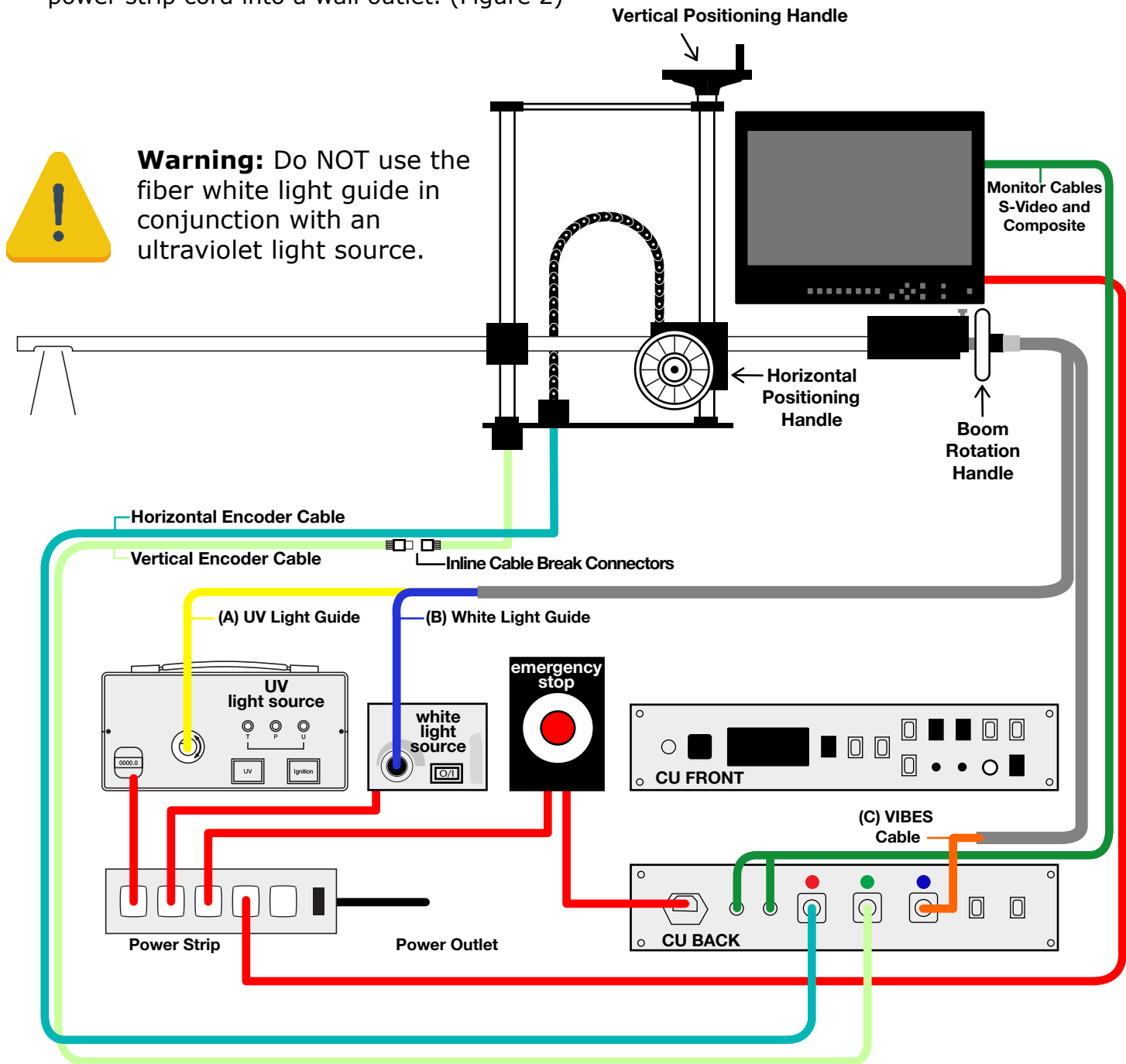
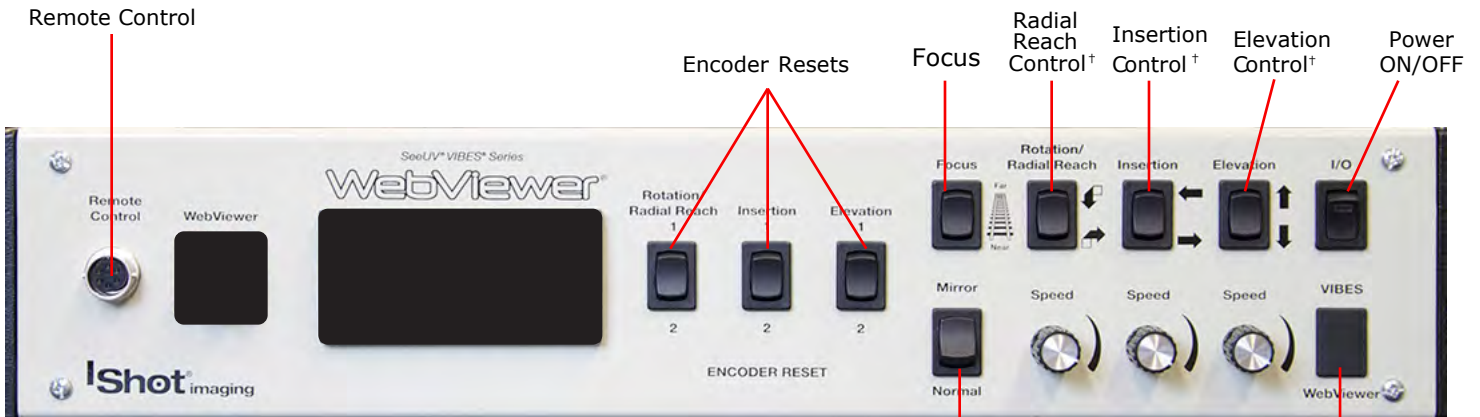


Figure 2

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

# 6.0 Operation

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

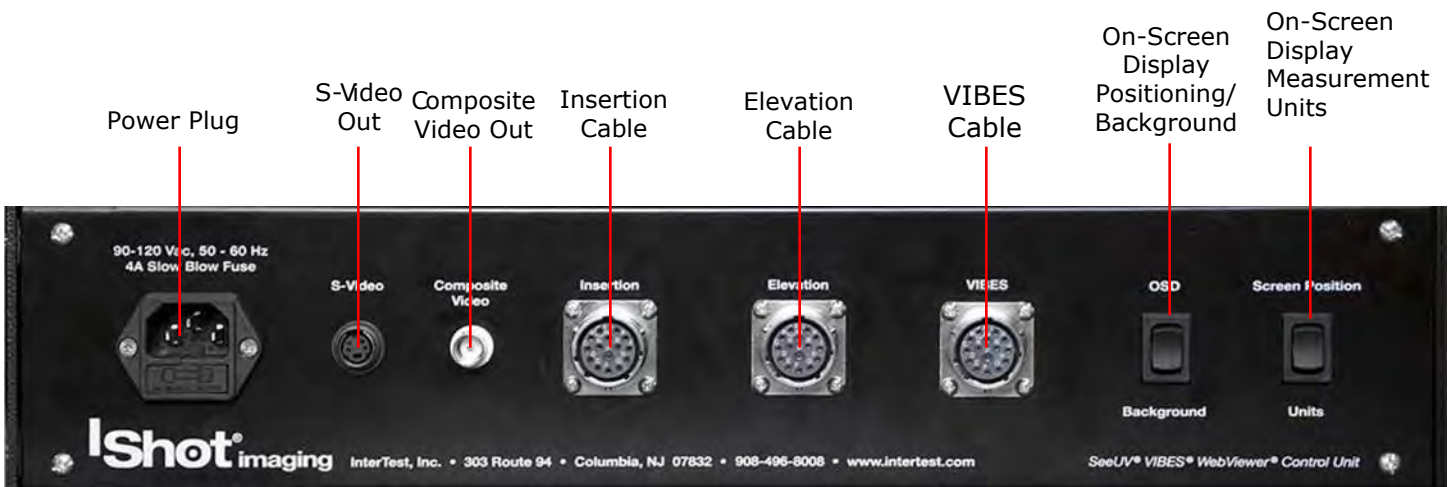


**Figure 3**

Mirror/Normal Image Control

VIBES/WebViewer Control Selection\*

## Control Box Rear Panel



**Figure 4**

Note: Specifications may be different than pictured above.

\* To operate the Free Standing WebViewer® Inspection System, push down on the rocker switch labeled VIBES/WebViewer on the lower right side of the control box.

† Motorized, Insertion, and Elevation controls are added options.

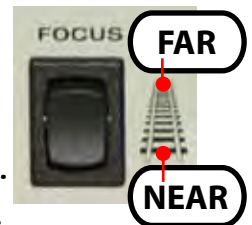
# 6.0 Operation

## 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.

## 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 found on the Control Box.
- Complete circumferential inspection can be accomplished by rotating the boom either using the positioning handwheels or rocker switches on the Control Box (for motorized versions).

# 6.0 Operation

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## 6.4 Encoder Controls

- Insertion or Rotation encoders can be reset by depressing the rocker switch for the designated camera. Depressing both encoder resets at once will reset the 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 found 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 'Inch'/'Centimeter' typically found on the back of the Control Box.

# 7.0 Safety, Care & Maintenance

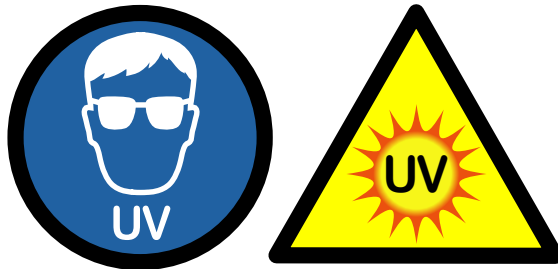
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## Boom Hazard

- Use care when moving the WebViewer. Boom protrudes well past the end of the cart.
- Always retract boom before moving unit
- Do not subject to loads. Do not jar

## 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.

# 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. Re-Boot the VIBES System.

# 8.0 System Specifications

## General Specifications

| Camera           |                        | Illumination - White Light |                                     |
|------------------|------------------------|----------------------------|-------------------------------------|
| Sensor Type      | 1/3" IT CCD            | Light Source               | 24-watt Metal Halide                |
| Sensor Format    | NTSC or PAL            | Bulb Life                  | 500 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               | 200-watt Mercury Arc                |
| Shutter          | Automatic or Manual    | Bulb Life                  | 1000 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 @<br>8-inches (20cm) |
| Resolution (h)   | >470 lines             |                            |                                     |

## Specific System Specifications

| VIBES System      | VIBES-Standard                      | VIBES-Landing Gear                  | VIBES-XR                            |
|-------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| Boom Diameter     | 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)                        | 150-in (3.81-M)                     |
| Insertion Length* | 60-in (1.53-M)                      | 72-in (1.83-M)                      | 114-in (2.9-M)                      |
| Insertion Control | Manual**                            | Manual**                            | Manual**                            |
| Elevation Range*  | 36-in to 52-in<br>(91-cm to 132-cm) | 36-in to 52-in<br>(91-cm to 132-cm) | 36-in to 52-in<br>(91-cm to 132-cm) |
| Elevation Control | Manual**                            | Manual**                            | Manual**                            |
| Rotation Range    | Fixed                               | +/- 180°                            | +/- 180°                            |
| Rotation Control  | N/A                                 | Manual**                            | Manual**                            |

\*Other Ranges Available

\*\*Motorized Option Available

# 9.0 Service Records

---

Product: \_\_\_\_\_  
EM Number: \_\_\_\_\_  
Serial Number: \_\_\_\_\_  
Date of Purchase: \_\_\_\_\_

| Date  | Service Performed |
|-------|-------------------|
| / /   | _____             |
|       | _____             |
|       | _____             |
| / /   | _____             |
|       | _____             |
|       | _____             |
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|       | _____             |
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| _____ | _____             |



# ***Color Video Camera Module***

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**Technical Manual**



**XC-505/505P**

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## Overview

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## RS-232C Command List

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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.

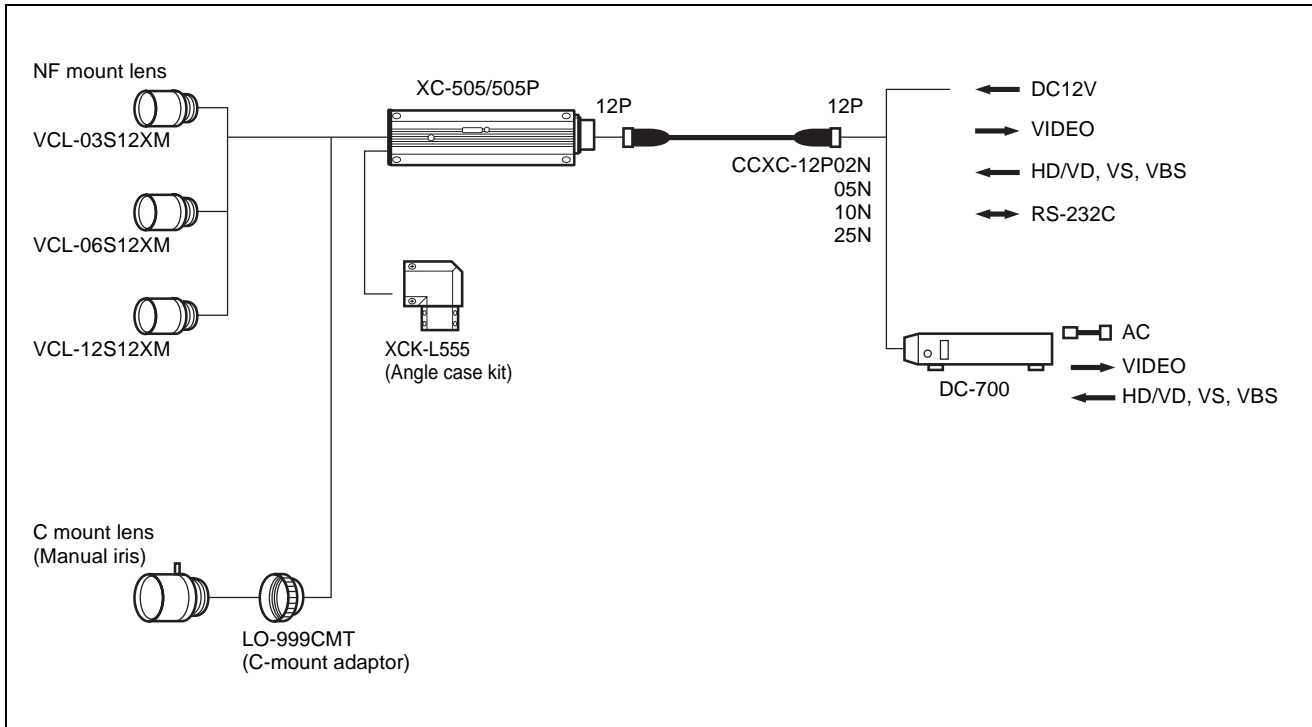
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### Function Setting via RS-232C Transmissions

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



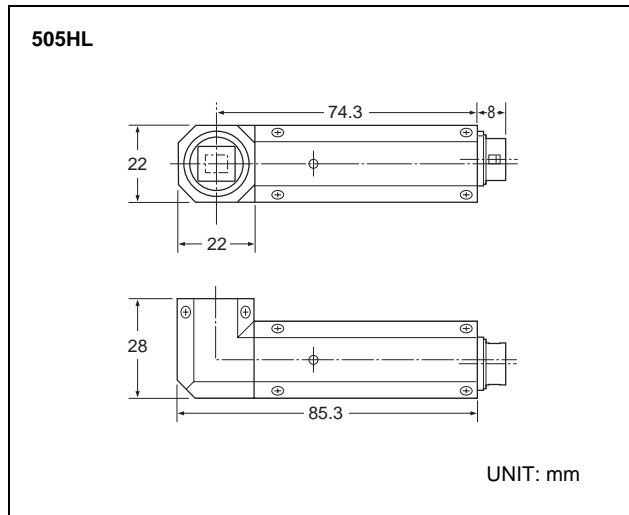
## XCK-L555 Angle Case Kit

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

### Note

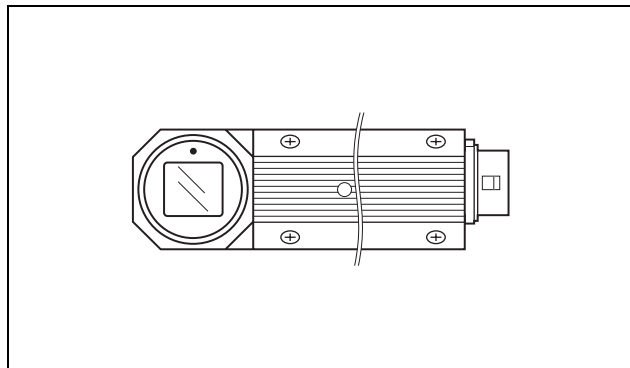
You can install XC-505/505P in only HL (horizontal) directions. VL (vertical) is not available with this model.

## 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

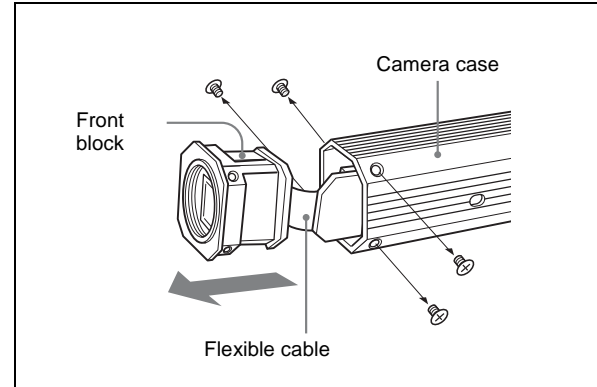


## Installation

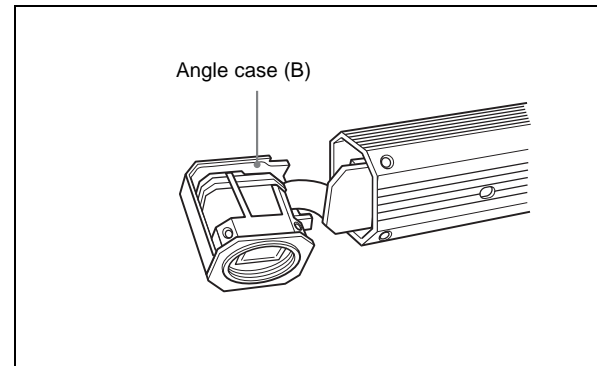
Use angle case A/B and screws.

- 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.



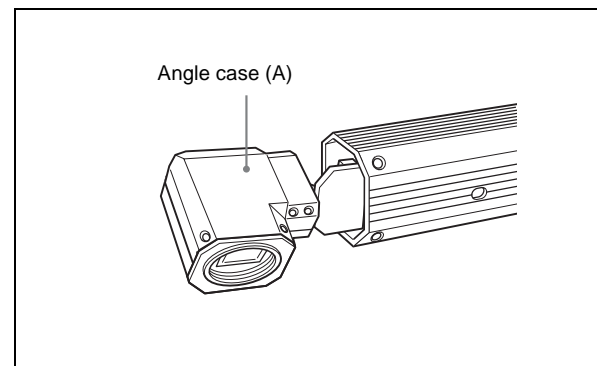
- 2 Attach the angle case (B) to the underside of the front block.



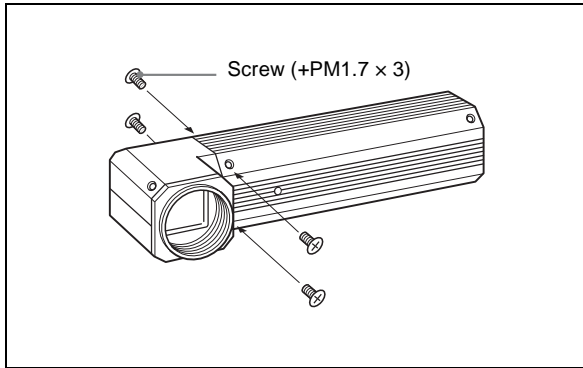
### Note

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.



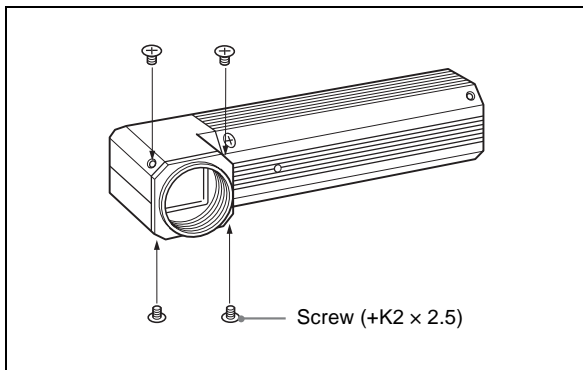
- 4** Insert the front block into the camera case, and attach it securely using the four screws (+PM1.7 × 3) removed in step 1.



**Note**

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

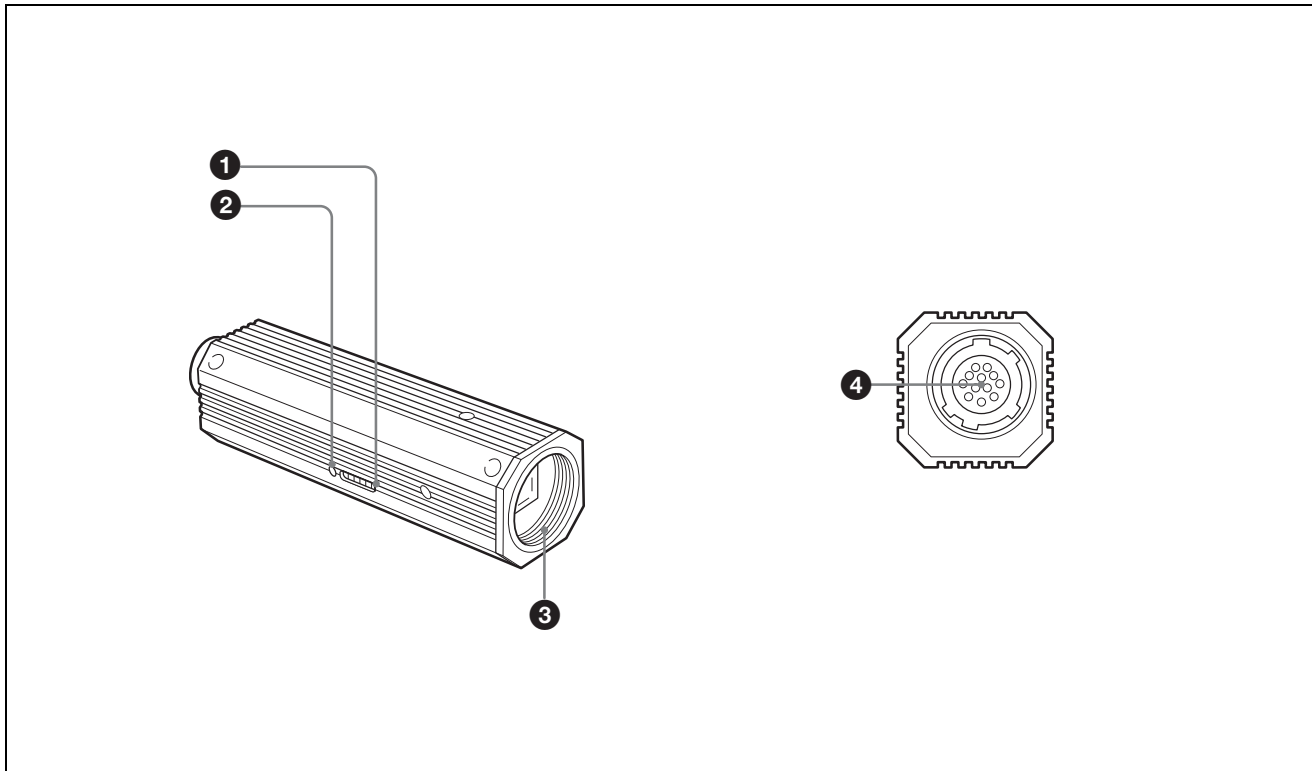
- 5** Using the four screws (+K2 × 2.5) provided, attach the angle case (A/B) and the front block securely.



**Note**

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

# Location of Parts and Operation



## ❶ Dip switches for setting functions

These 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

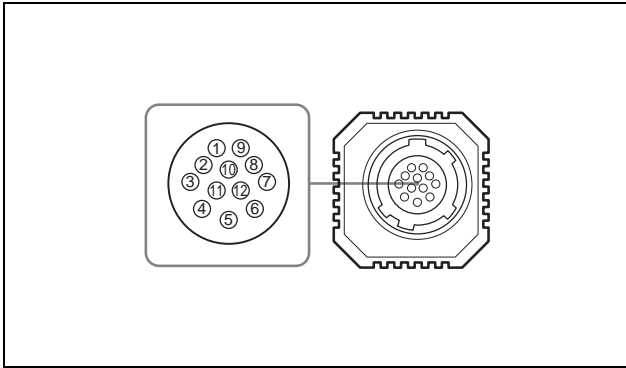
## ❹ DC IN/SYNC/VIDEO connector (multi 12-pin)

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



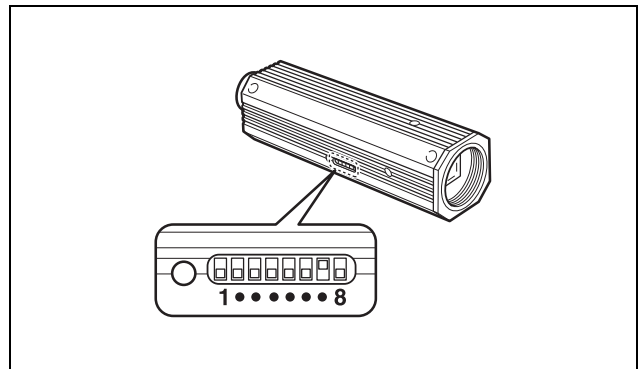
| Signal<br>Rin No. | Sync signal types     |                       |                       |
|-------------------|-----------------------|-----------------------|-----------------------|
|                   | External Sync signal  |                       | Internal Sync signal  |
|                   | 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




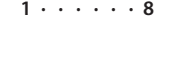


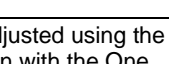

White balance: ATW  
 Shutter speed: OFF  
 AGC: ON  
 Output signal (Y/C/VBS): VBS



## 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.  | <br>1 . . . . . 8   |
| 5600K (fixed)                        | For outdoor shooting on sunny days.  | <br>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.                                  | <br>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). | <br>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.  | <br>1 . . . . . 8   |
|                                      | Red hues are enhanced with each press of the One Push WB switch.   | <br>1 . . . . . 8   |
|                                      | Blue hues are subdued with each press of the One Push WB switch.   | <br>1 . . . . . 8   |
|                                      | Blue hues are enhanced with each press of the One Push WB switch.  | <br>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)<br>1/50 sec. (XC-505P)<br>(factory setting) | <br>1 . . . . . 8 |
| 1/1000      | 1/1,000 sec.   | <br>1 . . . . . 8 |
| CCD IRIS    | Set the CCD IRIS mode.   | <br>1 . . . . . 8 |
| FLICKERLESS | 1/100 sec.   | <br>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<br>(factory setting) | <br>1 . . . . . 8 |
| OFF | 0 dB                                   | <br>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).   | <br>1 . . . . . 8 |
| Y/C | Select this position to output the Y/C separated signal from the DC IN/VIDEO connector. | <br>1 . . . . . 8 |

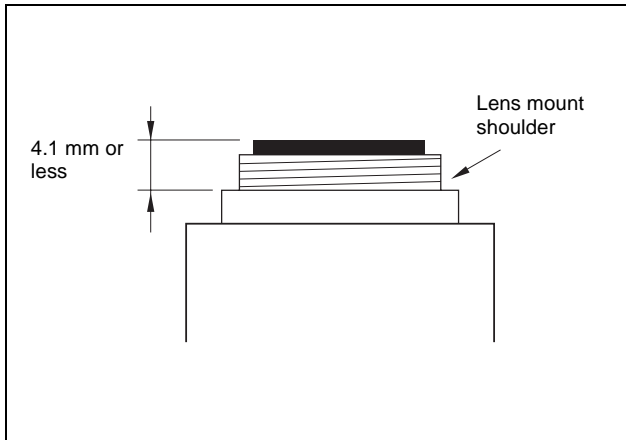
# Installation

## 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).

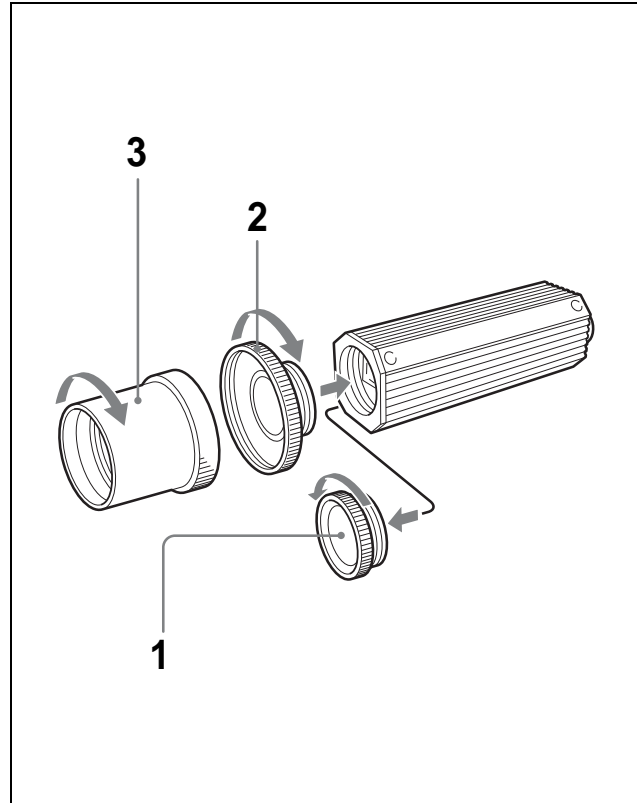
- C-mount lens  
C-mount lens for 1/3-type sensor (The mounting thread should not extend more than 4.1 mm from the lens mount shoulder) (See below). When a C-mount type lens is attached, a C-mount adaptor (LO-999CMT) is required.



### Notes

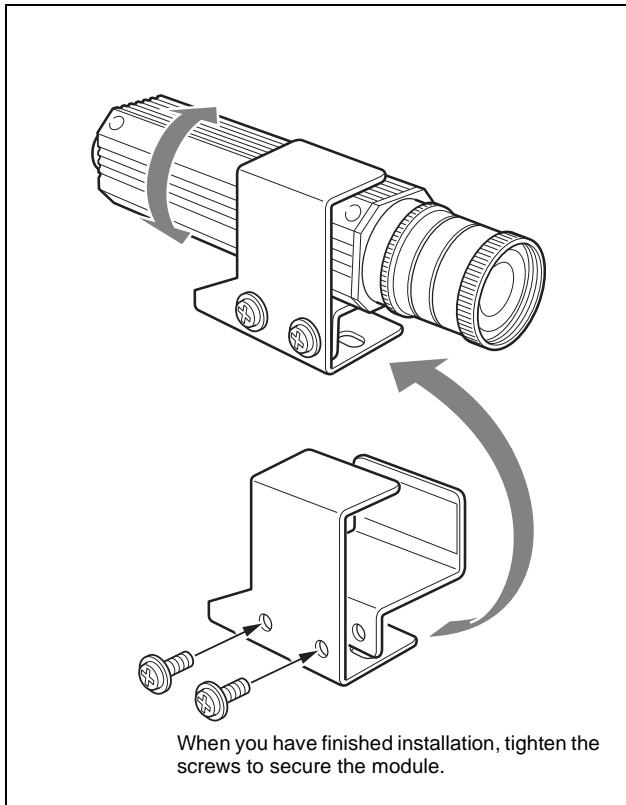
- When connecting a heavy lens, make sure that it is supported properly.
- When connecting heavy lens, make sure that it is not subject to shocks or vibration.

## 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

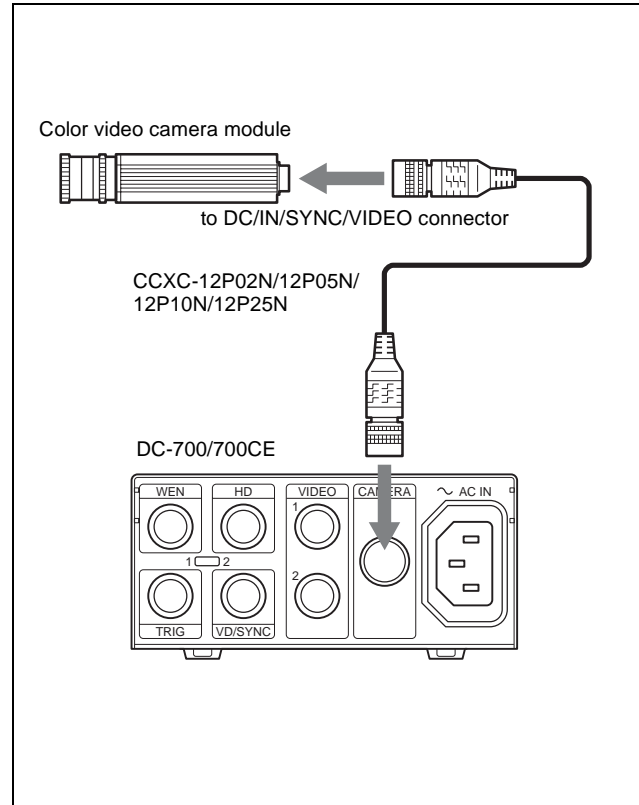


When mounting the camera on a tripod, use the supplied tripod adaptor.

- 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

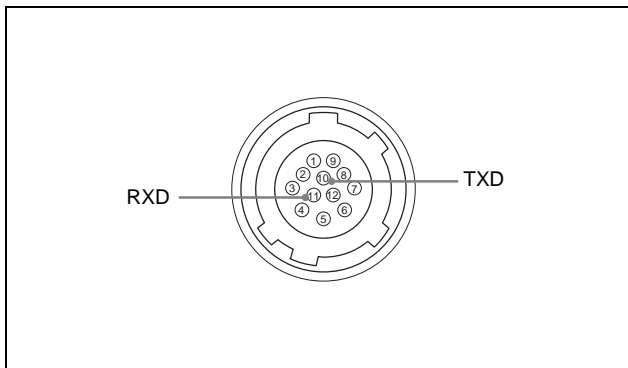
Hardware and software can be damaged by RS-232C control programs developed using this command list. Sony shall accept no liability for any such damage.

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.

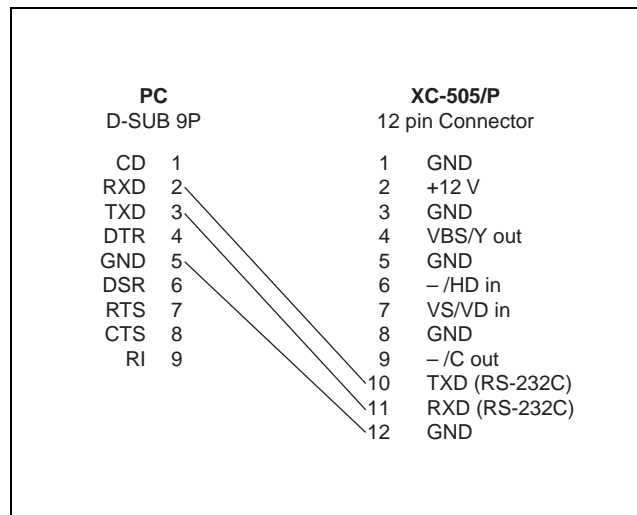
## RS-232C Command Usage Precautions

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.<br>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><br>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><br>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<br>0: Fixed electronic shutter + fixed gain<br>1: Fixed electronic slow shutter + fixed gain<br>2: Fixed electronic shutter + AGC<br>3: CCD IRIS<br>4: CCD IRIS + Auto slow shutter<br>5: CCD IRIS + AGC<br>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]<br>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<br>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<br>0: 1/100 [s]<br>1: 1/120 [s]<br>2: 1/250 [s]<br>3: 1/500 [s]<br>4: 1/1000 [s]<br>5: 1/4000 [s]<br>6: 1/10000 [s]<br>7: 1/50000 [s]<br>8: 1/100000 [s]<br>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<br>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<br>0: Slow<br>1: Normal<br>2: Fast<br>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<br>0: Minimum to<br>100: Standard to<br>1023: Maximum<br>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]<br>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<br>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<br>0: OFF (1/60 [s] for NTSC, 1/50 [s] for PAL)<br>1: 1/100 [s] (Flickerless NTSC operation)<br>2: 1/120 [s] (Flickerless PAL operation)<br>3: 1/250 [s]<br>4: 1/500 [s]<br>5: 1/1000 [s]<br>6: 1/2000 [s]<br>7: 1/4000 [s]<br>8: 1/10000 [s]<br>9: 1/50000 [s]<br>10: 1/100000 [s]<br>11: Arbitrary electronic shutter setting<br>Default is 0 |
| Parameter 2  | This is the electronic shutter speed adjustment value when parameter 1 is "11: Arbitrary electronic shutter setting"<br>NTSC: 0 to 261<br>PAL: 0 to 311   |
| Parameter 3  | This is the electronic shutter fine adjustment value when parameter 1 is "11: Arbitrary electronic shutter setting"<br>NTSC: 0 to 910<br>PAL: 0 to 908<br>However, when parameter 2 is 0 (NTSC or PAL), the range for this parameter is as follows:<br>NTSC: 143 to 910<br>PAL: 142 to 908  |
| Conditions   | Valid when AE-MODE is 0 and 2.  |
| Process      | Sets the AE electronic shutter speed<br>When parameter 1 is set to "11: Arbitrary electronic shutter setting," electronic shutter timing is calculated as follows:<br>NTSC: (parameter 2) × 63.49 [μs] + (parameter 3) × 69.84 [ns]<br>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<br>NTSC: 0 to 255<br>PAL: 0 to 255<br>Default is 3  |
| Parameter 2  | Fixed electronic slow shutter fine adjustment value<br>NTSC: 0 to 524<br>PAL: 0 to 624<br>However, when parameter 1 is 0 (NTSC or PAL), the range for this parameter is as follows:<br>NTSC: 262 to 524<br>PAL: 312 to 624 |
| Conditions   | Valid when AE-MODE is 1.   |
| Process      | The fixed electronic slow shutter time is calculated as follows:<br>NTSC: (parameter 1) × 33.268 [ms] + (parameter 2) × 63.49 [μs]<br>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<br>0: One Push AWB<br>1: ATW<br>2: Manual<br>3: Preset 3200K<br>4: Preset 5600K<br>Default is 1 |
| Conditions   | None  |
| Process      | Sets the WB mode.   |

### Manual R Gain Setting

| Command Name | RGAIN   |
|--------------|---|
| Parameter 1  | R gain: 0 to 4095<br>0: Minimum<br>4095: Maximum<br>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<br>0: Minimum to 4095: Maximum<br>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:<br>AWB OK: Normal finish<br>AWB TIMEOUT: Time-out failure<br>AWB ERROR: Other failure |

## ATW Entrainment Speed Setting

|                     |  |
|---------------------|--|
| <b>Command Name</b> | <b>ATW-SPEED</b>   |
| Parameter 1         | Entrainment speed: 0 to 2<br>0: Slow<br>1: Normal<br>2: Fast<br>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<br>0: OFF<br>1: ON<br>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<br>0: Off<br>1: Vertical aperture compensation<br>2: Horizontal aperture compensation<br>3: Vertical + horizontal aperture compensation<br>4: Highlight aperture compensation<br>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<br>0: OFF<br>1: ON<br>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<br>0: 2D-NR disabled<br>1: Mild 2D-NR<br>2: Moderate 2D-NR<br>3: Strong 2D-NR<br>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<br>0: 3D-NR disabled<br>1: Mild 3D-NR<br>2: Moderate 3D-NR<br>3: Strong 3D-NR<br>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])<br>Default is 11 (NTSC: 5 [IRE], and PAL: 35 [mV]) |
| Conditions          | None   |
| Process             | Adjusts the pedestal.<br>Does not affect gamma-curve compensation.   |

### Gamma Table Setting

|                     |   |
|---------------------|---|
| <b>Command Name</b> | <b>GAMMA-MODE</b>   |
| Parameter 1         | Gamma curve: 0 to 2<br>0: $\gamma = 1.0$<br>1: $\gamma = 0.45(\gamma = 1/2.2)$<br>2: $\gamma = 0.6(\gamma = 1/1.6)$<br>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<br>0: Positive<br>1: Negative<br>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<br>0: Minimum to<br>1: Maximum (no clipping)<br>Default is 63                           |
| Conditions          | None  |
| Process             | Clips brightness exceeding the specified level in the final output of the Y signal.<br>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<br>0: OFF<br>1: ON<br>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.<br>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<br>0: OFF<br>1: ON<br>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<br>0: OFF<br>1: AE<br>2: AWB<br>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 [%]<br>Settable range is 25 to 75<br>Default is 50 |
| Parameter 2  | Y-coordinate of center of OPD frame [%]<br>Settable range is 25 to 75<br>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<br>Settable range is 50 to 100<br>Default is 50                         |
| Parameter 2  | Y-coordinate of center of OPD frame [%]<br>Settable range is 50 to 100<br>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 [%]<br>Settable range is 25 to 75<br>Default is 50 |
| Parameter 2  | Y-coordinate of center of OPD frame [%]<br>Settable range is 25 to 75<br>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<br>Settable range is 50 to 100<br>Default is 50                         |
| Parameter 2  | Y-coordinate of center of OPD frame [%]<br>Settable range is 50 to 100<br>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<br>0: VBS<br>1: Y/C<br>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:<br>0 to 910 (NTSC)<br>0 to 908 (PAL)<br>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:<br>0 to 262 (NTSC)<br>0 to 312 (PAL)<br>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<br>0: ON<br>1: OFF<br>Default is 0           |
| Conditions          | None   |
| Process             | Enables or disables color bar output.<br>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<br>0: OFF<br>1: Flip horizontally<br>2: Flip vertically<br>3: Flip horizontally and vertically<br>Default is 0 |
| Conditions          | None  |
| Process             | Sets the flip output mode.<br>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<br>0: 9600 [bps]<br>1: 19200 [bps]<br>2: 38400 [bps]<br>Default is 2  |
| Conditions          | None  |
| Process             | Sets the serial communication speed.<br>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<br>0: OFF<br>1: ON<br>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<br>0: Memo 1<br>1: Memo 2<br>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<br>0: Native image<br>1: Still image<br>2: Memo 1 image<br>3: Memo 2 image<br>Default is 0                                  |
| Conditions          | Memo 1 and 2 images are not selectable until saved (ERROR STATUS is returned).<br>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.           |
| VOUSEL       | 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.<br>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<br>0: User memory A<br>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<br>0: User memory A<br>1: User memory B<br>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.<br>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.<br>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)<br>0 : Fixed electronic shutter<br>1 : Fixed electronic shutter + fixed gain<br>2 : Fixed electronic slow shutter + fixed gain<br>3 : CCD IRIS<br>4 : CCD IRIS + Auto slow shutter<br>5 : CCD IRIS + AGC | ×           | ×           |   |
|          | ○           | ○           | ×         | Max. auto gain control setting (dB)      | AGCMAX-STEP    | dB units<br>6 to 18 (18)  | ×           | ×           | AGCMAX-STEP and AGCMAX-FINE values are linked |
|          | ○           | ○           | ×         | Max. auto gain control setting (step)    | AGCMAX-FINE    | Step units<br>22 to 67 (67)   | ×           | ×           | AGCMAX-STEP and AGCMAX-FINE values are linked |
|          | ○           | ○           | ×         | Electronic shutter max. adjustment value | CCDIRIS-MAX    | Preset Number<br>0 to 8 (5)<br>0 : 1/100s<br>1 : 1/120s<br>2 : 1/250s<br>3 : 1/500s<br>4 : 1/1000s<br>5 : 1/4000s<br>6 : 1/10000s<br>7 : 1/50000s<br>8 : 1/100000s  | ×           | ×           |   |
|          | ○           | ○           | ×         | Slow shutter max. adjustment value       | SSHUTTER-MAX   | Frame count<br>1 to 255 (6)   | ×           | ×           |   |
|          | ○           | ○           | ×         | AE Convergence Speed Setting             | AE-SPEED       | Speed (Slow/Normal/Fast)<br>0, 1, 2 (1)   | ×           | ×           |   |
|          | ○           | ○           | ×         | AE Reference Level Setting               | AE-REF         | Reference Level<br>0 to 1023 (120)  | ×           | ×           |   |
|          | ○           | ○           | ×         | Gain setting (dB)                        | GAIN-STEP      | dB units<br>-3 to 18 (0)  | ×           | ×           | GAIN-STEP and GAIN-FINE values are linked     |
|          | ○           | ○           | ×         | Gain setting (step)                      | GAIN-FINE      | Step units<br>-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)<br>0 : 1/60s<br>1 : 1/100s<br>2 : 1/120s<br>3 : 1/250s<br>4 : 1/500s<br>5 : 1/1000s<br>6 : 1/2000s<br>7 : 1/4000s<br>8 : 1/10000s<br>9 : 1/50000s<br>10 : 1/100000s<br><br>PAL(0)<br>0 : 1/50s<br>1 : 1/100s<br>2 : 1/120s<br>3 : 1/250s<br>4 : 1/500s<br>5 : 1/1000s<br>6 : 1/2000s<br>7 : 1/4000s<br>8 : 1/10000s<br>9 : 1/50000s<br>10 : 1/100000s | ×   | ×                     |   |
|          |             |             |           | 11                                  | 0 to 261 NTSC<br>0 to 311 PAL | 0 to 910 NTSC<br>0 to 908 PAL  | NTSC<br>When parameter 2 is 0, the range for parameter 3 is 143 to 910.<br><br>PAL<br>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<br>0 to 255 (3) PAL  | 0 to 524 (0) NTSC<br>0 to 624 (0) PAL   | ×                     | NTSC<br>When parameter 1 is 0, the range for parameter 2 is 262 to 524.<br><br>PAL<br>When parameter 1 is 0, the range for parameter 2 is 312 to 624. |
| WB       | ○           | ○           | ×         | White balance mode setting          | WB-MODE                       | One Push/ATW/<br>Manual/3200K/5600K<br>0,1,2,3,4(1)  | ×   | ×                     |   |
|          | ×           | ×           | ×         | One Push white balance execution    | AUTOWB                        | ×  | ×   | ×                     | Only when WB-MODE = 0   |
|          | ○           | ○           | ×         | Manual R gain                       | RGAIN                         | Step units<br>0 to 4095 (factory)  | ×   | ×                     | Only when WB-MODE = 2<br>Default R gain is 3200 [K].  |
|          | ○           | ○           | ×         | Manual B gain                       | BGAIN                         | Step units<br>0 to 4095 (factory)  | ×   | ×                     | Only when WB-MODE = 2<br>Default B gain is 3200 [K].  |
|          | ○           | ○           | ×         | ATW Entrainment speed adjustment    | ATW-SPEED                     | Speed (Slow/Normal/<br>Fast)<br>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)<br>0,1 (0)                          | ×                             | ×           | Only when WB-MODE = 1                                 |
| PICTURE  | ○           | ○           | ×         | Contour emphasis mode                             | DTL-MODE       | MODE (Off, V, H, V+H, Highlight)<br>0,1,2,3,4 (2) | ×                             | ×           |   |
|          | ○           | ○           | ×         | Detail enhancer                                   | DTL-ENHANCER   | Mode (Off/On)<br>0,1 (0)                          | ×                             | ×           |   |
|          | ○           | ○           | ×         | 2-D noise reduction setting                       | 2DNR-MODE      | Off, Mild, Moderate, Strong<br>0,1,2,3 (1)        | ×                             | ×           |   |
|          | ○           | ○           | ×         | 3-D noise reduction setting                       | 3DNR-MODE      | Off, Mild, Moderate, Strong<br>0,1,2,3 (0)        | ×                             | ×           |   |
|          | ○           | ○           | ×         | Pedestal adjustment                               | PEDESTAL       | Step units<br>0 to 22 (11)                        | ×                             | ×           |   |
|          | ○           | ○           | ×         | Gamma compensation setting                        | GAMMA-MODE     | Off/ $\gamma = 0.45/\gamma = 0.60$<br>0,1,2 (1)   | ×                             | ×           |   |
|          | ○           | ○           | ×         | Positive-negative reverse                         | NEGAPOSI       | Positive/Negative<br>0,1 (0)                      | ×                             | ×           |   |
|          | ○           | ○           | ×         | High Brightness Clipping Setting                  | WHITECLIP      | Step units<br>0 to 63 (63)                        | ×                             | ×           |   |
| WPC      | ○           | ○           | ×         | White point detection mode                        | WPC-MODE       | Mode (Off/On)<br>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<br>0,1 (0)                                 | ×                             | ×           | Displays only when WPC-MODE is 1.                     |
| OPD      | ○           | ×           | ×         | Detection frame display switching                 | OPD-DISP       | Off/AE/WB<br>0,1,2 (0)                            | ×                             | ×           |   |
|          | ○           | ○           | ×         | AE frame center coordinates                       | OPD-AE-POS     | x-coordinate<br>25 to 75 (50)                     | y-coordinate<br>25 to 75 (50) | ×           |   |
|          | ○           | ○           | ×         | AE frame width and height                         | OPD-AE-SIZE    | width<br>50 to 100 (50)                           | height<br>50 to 100 (factory) | ×           |   |
|          | ○           | ○           | ×         | AWB frame center coordinates                      | OPD-AWB-POS    | x-coordinate<br>25 to 75 (50)                     | y-coordinate<br>25 to 75 (50) | ×           |   |
|          | ○           | ○           | ×         | AWB frame width and height                        | OPD-AWB-SIZE   | width<br>50 to 100 (50)                           | height<br>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<br>0,1(0)  | ×           | ×           |   |
|               | ○           | ○           | ×         | Horizontal phase adjustment                      | HPHASE         | Adjustment Step<br>0 to 910 (factory)<br>NTSC<br>0 to 908 (factory) PAL  | ×           | ×           |   |
|               | ○           | ○           | ×         | Vertical phase adjustment                        | VPHASE         | Adjustment Step<br>0 to 262 (factory)<br>NTSC<br>0 to 312 (factory) PAL  | ×           | ×           |   |
|               | ○           | ×           | ×         | Color bar output                                 | COLORBAR       | Off/On<br>0,1 (0)  | ×           | ×           |   |
|               | ○           | ○           | ×         | Reverse image display                            | FLIP           | Reverse mode<br>(None, horizontal,<br>vertical, 180 deg.)<br>0,1,2,3 (0) | ×           | ×           |   |
|               | ×           | ×           | ○         | Serial communication speed changing              | BRATE          | Baud rate selection<br>(9600/19200/38400)<br>0,1,2 (2)                   | ×           | ×           |   |
|               | ○           | ○           | ×         | OSD Display                                      | OSD            | Off/On<br>0,1  | ×           | ×           |   |
|               | ×           | ×           | ×         | Screen memo saving                               | MEMO-CAPTURE   | Save destination<br>(0 or 1)<br>0,1 (0)                                  | ×           | ×           | Saving is possible with still image displayed |
|               | ○           | ×           | ×         | Memo Display                                     | MEMO-DISPLAY   | Off/still/memo1/<br>memo2<br>0,1,2,3 (0)                                 | ×           | ×           |   |
| Miscellaneous | ×           | ×           | ×         | Setting Value Initialization                     | INIT           | ×  | ×           | ×           |   |
|               | ×           | ×           | ×         | Setting Value Saving                             | SAVE           | Save destination selection (A or B)<br>0,1                               | ×           | ×           |   |
|               | ×           | ×           | ○         | Load settings from destination upon next restart | LOAD           | Load source selection (A, B, or stand-alone)<br>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:<br>Approx. 380,000 dots (768 [H] × 494 [V])<br>XC-505P:<br>Approx. 440,000 dots (752 [H] × 582 [V]) |
| Video output pixels | XC-505: 756 [H] × 485 [V]<br>XC-505P: 739 [H] × 575 [V]   |
| Cell size           | XC-505: 6.35 [H] × 7.40 [V] μm<br>XC-505P: 6.50 [H] × 6.25 [V] μm   |

## Optics & Miscellaneous

|                         |  |
|-------------------------|--|
| Lens mount              | Dedicated (NF) mount   |
| Signal format           | XC-505: EIA standard NTSC color<br>XC-505P: CCIR standard PAL color  |
| Scan format             | XC-505: 525 lines, 2:1 interlace,<br>30 frames/s<br>XC-505P: 625 lines, 2:1 interlace,<br>25 frames/s  |
| Sync method             | Internal or external (auto-switching)  |
| External sync input     | HD/VD or VS  |
| Horizontal resolution   | XC-505: 470 TV lines<br>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)<br>VBS: 1 V <sub>p-p</sub> , 75 Ω, negative sync<br>Y: 1 V <sub>p-p</sub> , 75 Ω<br>C: composite video output dependent |
| Video S/N               | XC-505: 48 dB (standard), AGC: OFF (0 dB)<br>XC-505P: 46 dB (standard), AGC: OFF (0 dB)  |
| Shutter speed (4 modes) | 1/60 s (OFF): XC-505<br>1/50 s: XC-505P (OFF), 1/1000 s,<br>CCD IRIS, and Flickerless (1/00)   |
| CCD IRIS                | XC-505: 1/60 s to 1/4000 s<br>XC-505P: 1/50 s to 1/4000 s  |
| White balance (5 modes) | ATW, One Push WB, 3200K, 5600K,<br>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:<br>Video signal = 0 V <sub>pp</sub> to 1.4 V <sub>pp</sub><br>CSYNC signal = 0.15 V <sub>pp</sub> to 0.6 V <sub>pp</sub><br>XC-505P:<br>Video signal = 0 V <sub>pp</sub> to 1.4 V <sub>pp</sub><br>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<br>XC-505P: 15,625 Hz ±0.234 Hz  |
| Vertical input frequency   | XC-505: 59.94 Hz ±0.00089 Hz<br>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<br>High: 4.0 V to 5.0 V DC<br>Low: 0 V to 0.5 V DC<br>Negative polarity |
| HD input frequency | XC-505: 15734 Hz ±0.236 Hz<br>XC-505P: 15,625 Hz ±0.234 Hz  |
| VD input frequency | XC-505: 59.94 Hz ±0.00089 Hz<br>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

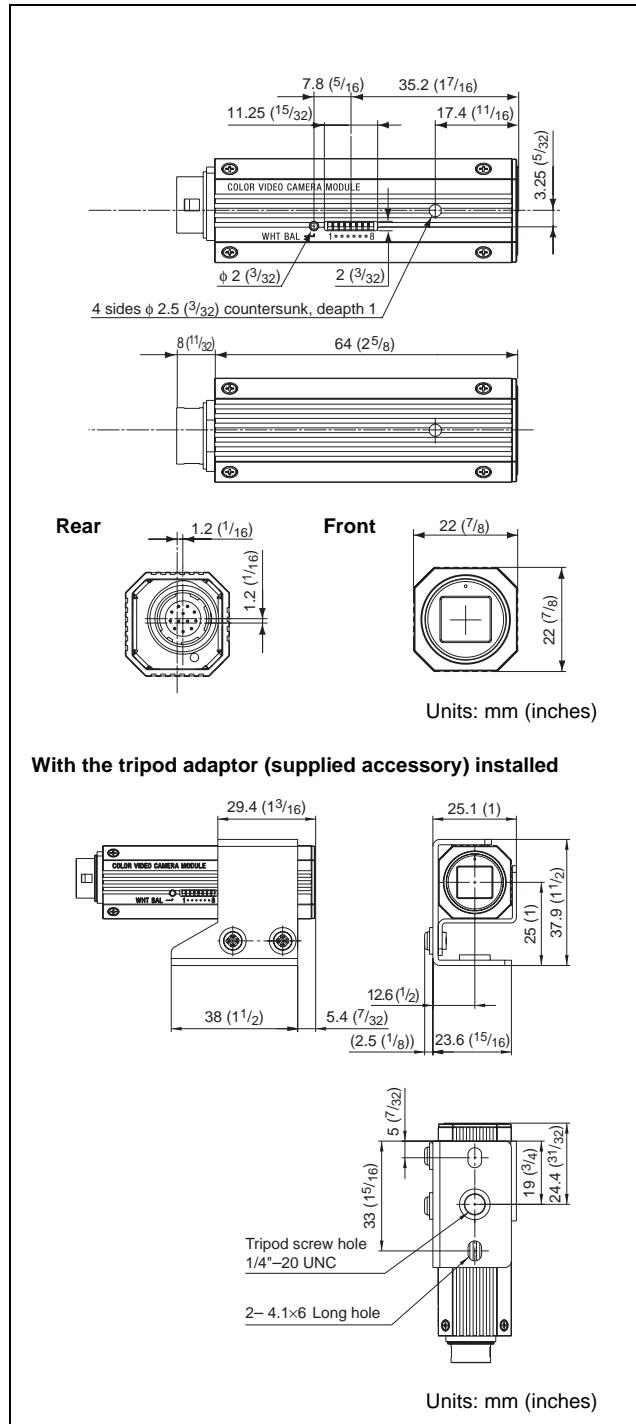
- Lens mount cap (1)
- Tripod adaptor (1 set)
- Operating Instructions (1)

### 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

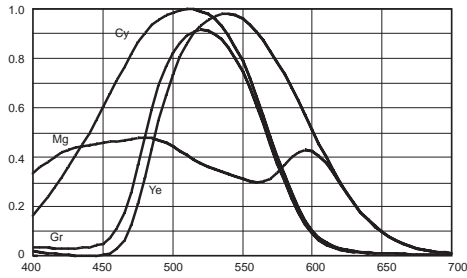




# Spectral Sensitivity Characteristics (typical)

## XC-505

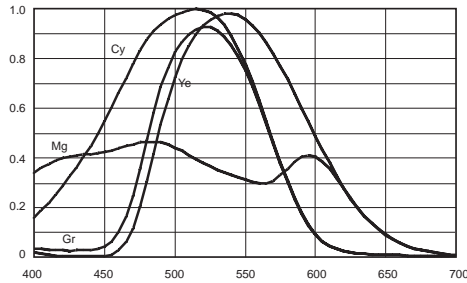
Relative sensitivity



Wavelength (nm)

## XC-505P

Relative sensitivity



Wavelength (nm)

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.

---

## Contents

|  |    |
|--|----|
| System Symbol Descriptions .....       | 3  |
| Warning and Precautions.....           | 4  |
| System Assembly and Operation .....    | 5  |
| Air Flow Paths.....                    | 6  |
| Maintenance and Cleaning .....         | 7  |
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## System Symbol Descriptions



Caution: Consult accompanying documentation



Caution: Hot Surface



Caution



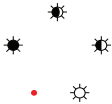
Hazard Warning



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.



WARNING /  
MISE EN GARDE

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.



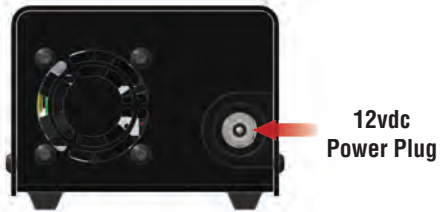
CAUTION /  
AVERTISSEMENT

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**

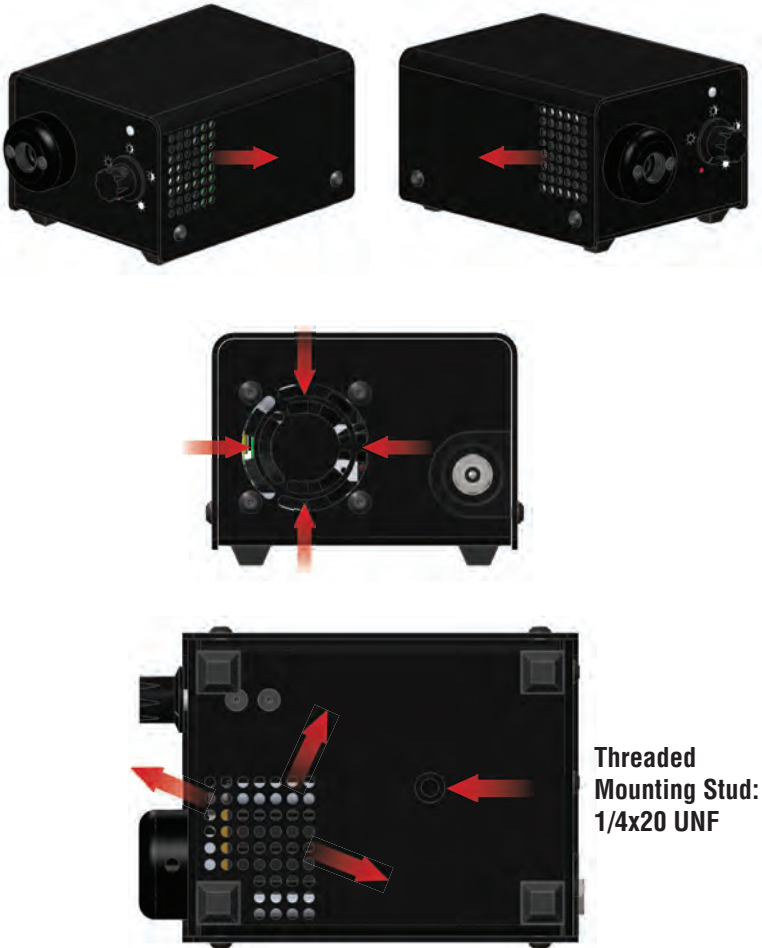


**Figure 3. Front View**



## 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.<br>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.

# LUMATEC

UV-TECHNOLOGY

## OPERATING MANUAL FOR SUPERLITE I05-DC-E

Retain this manual  
near operating site  
for future reference



## Contents

Before operating your SUPERLITE I05-DC-E read and understand this manual in full.

|   | Page |
|---|------|
| <i>Diagram</i> Front Panel                  | 3    |
| Rear Panel                                  |      |
| <i>Diagram</i> Exchanging the Lamp Module   | 4    |
| Exchanging the Dust Filter                  |      |
| 1. Safety Warnings                          | 5    |
| 2. Prior to Operation                       | 5    |
| 3. Operation                                | 6    |
| 4. Special Instructions                     | 7    |
| 5. Changing the Lamp Module and Dust Filter | 8    |
| 6. Remote Control                           | 9    |
| 7. Accessories and Spare Parts              | 10   |
| 8. Technical Data                           | 10   |

### Explanation of Safety Symbols

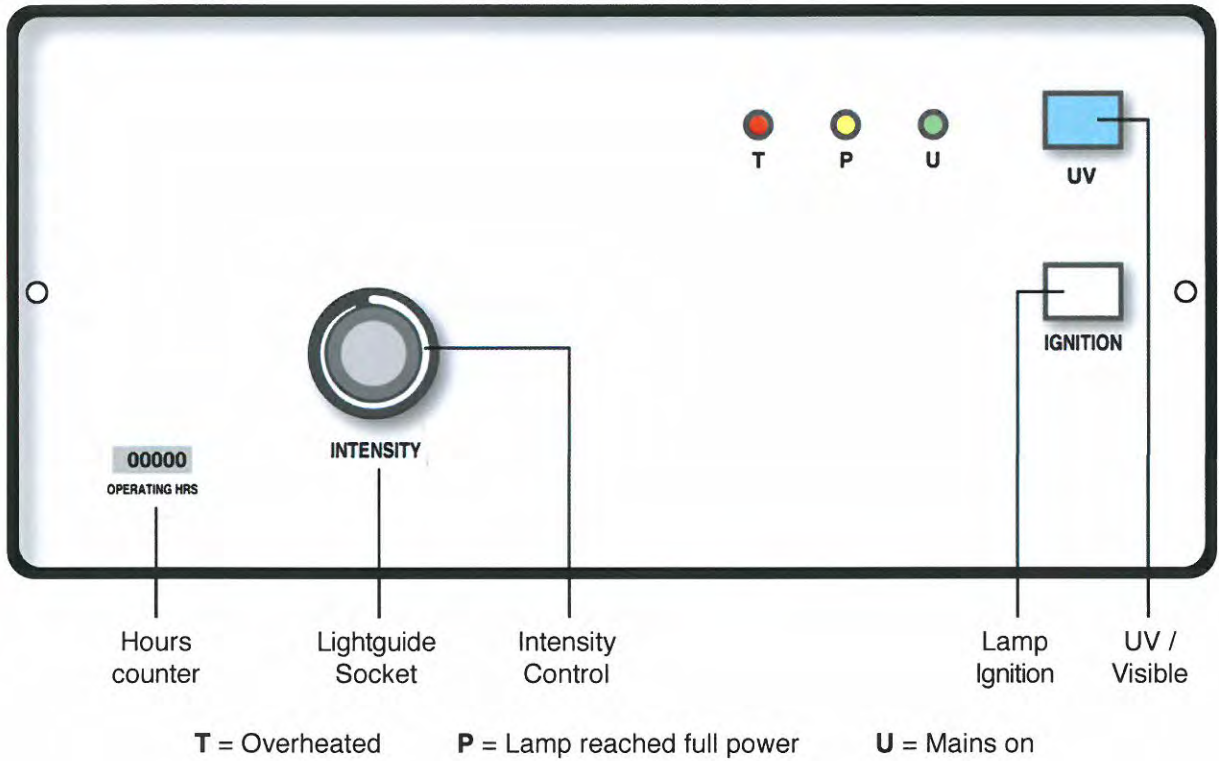


Warning! Danger for life and health.

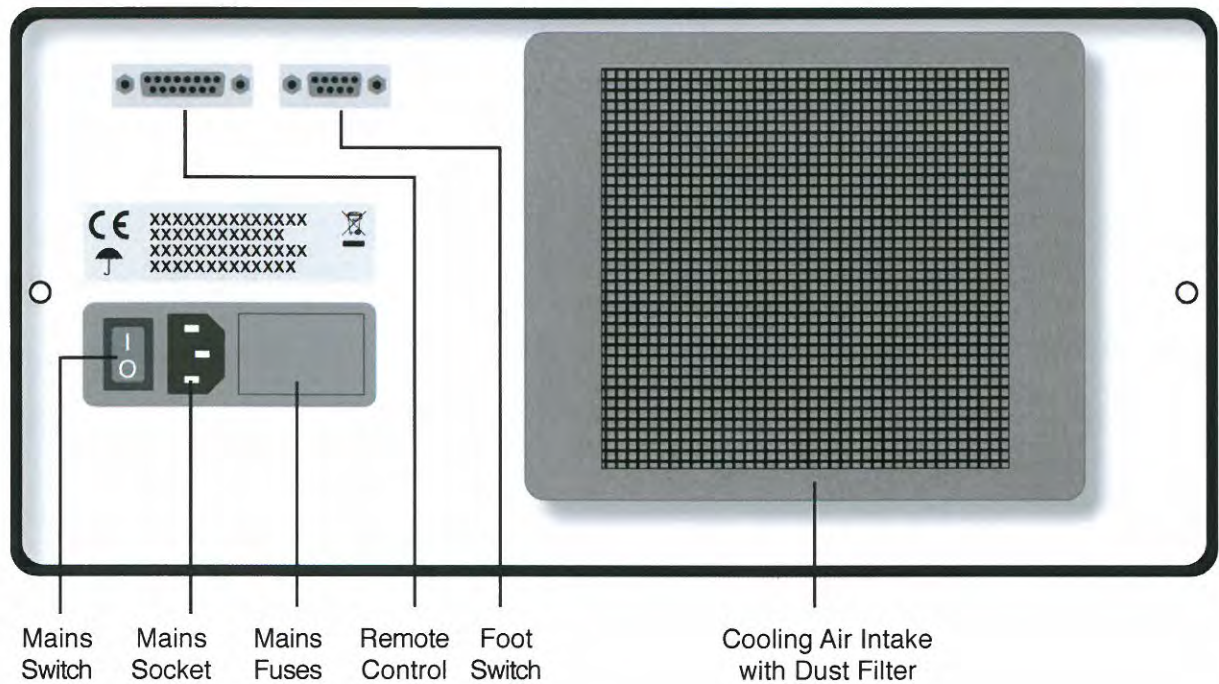


Important safeguards to prevent material damage.

## FRONT PANEL



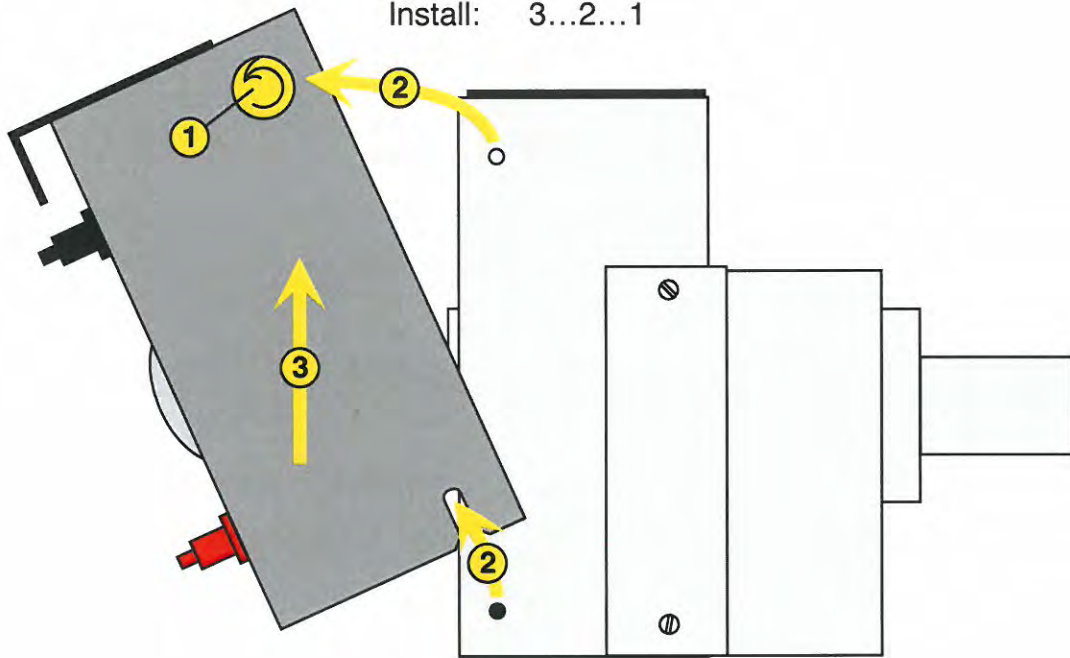
## REAR PANEL



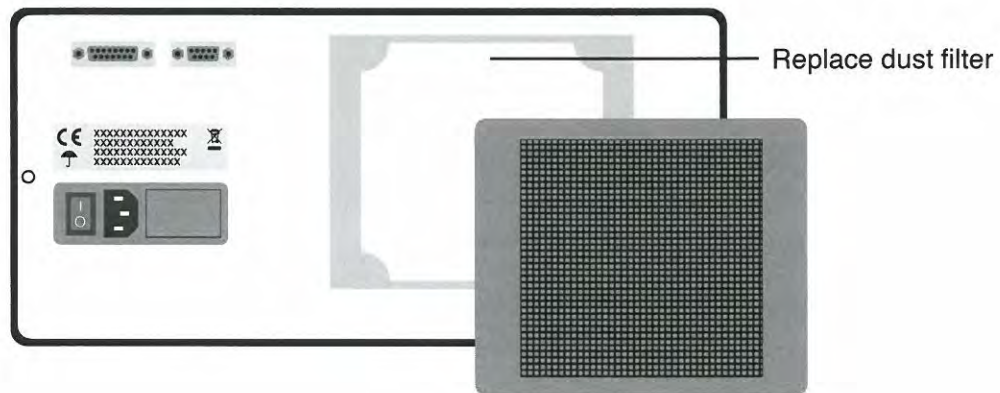
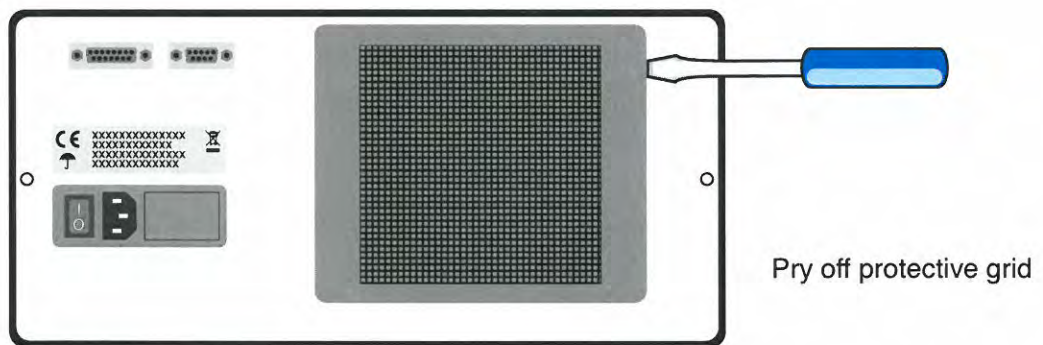
## CHANGING THE LAMP MODULE

Remove: 1...2...3

Install: 3...2...1



## CHANGING THE DUST FILTER





## 1 Safety Warnings



### **Mains Supply**

The intelligent electronic power supply of the unit will adapt automatically to all AC currents from 110 to 240 Volts and 50 to 60 Hz. Connect power cord to a properly grounded AC outlet.

### **Explosive Surroundings**

This unit is not meant for operation in explosive surroundings.

### **Humid Surroundings**

This unit is only intended for use in dry environments.

### **Protection against UV-Radiation**

To avoid tissue damage do not expose the unprotected eye or skin to the ultraviolet light. When work under unshielded UV radiation is necessary wear UV protection goggles and gloves.

### **Explosion of the Mercury Vapour Lamp**

In very rare occasions the lamp may burst and set free mercury to the environment. Remove all personnel from the room and ventilate thoroughly for 30 minutes. Any remains of mercury in the unit must be removed with mercury absorbent agent.

### **Danger of Fire**

Do not deposit the lightguide or endoscope on inflammable objects like for instance cloth or paper. The intensive radiation, especially in the “visible” mode, may be sufficient to set these objects on fire.

## 2 Prior to Operation

### **Intended Use**

The light source SUPERLITE I05-DC-E is solely intended for **Non Destructive Test-**ing and fluorescence excitation in industrial applications.

### **Ventilation**

Cooling air is sucked through an opening at the rear of the unit, hot air is expelled at the bottom. Both openings may not be obstructed in order to allow free ventilation. Obstruction of these openings or failure of the fan will cause unit to overheat. In this case the lamp is switched off and indicator lamp “T” will light up (see chapter 4).

## UV-Light Guide

Fully insert the flexible LIQUID LIGHTGUIDE with the Ø16mm fitting into the lightguide socket in the front panel of the light source. Treat the lightguide with care, it is an optical instrument. Do not kink or crush it and do not bend it too sharply to avoid light losses.

When using a **dual branch LIQUID LIGHTGUIDE** the two branches must be positioned vertically above each other in the lightguide socket in the front panel. Only this position ensures maximum radiation output. Insert the lightguide *all the way* into the socket and rotate it until it snaps into vertical position. For technical reasons the radiated power of the two branches may differ up to a ratio of 40:60 percent

## 3 Operation

### Switching on

Turn on the mains supply through the switch on the rear panel next to the power cord. The green indicator lamp “U” will light up on the front panel and the fan will begin to operate.

### Lamp Ignition

Press and hold the white ignition button for a few seconds. As soon as the lamp has ignited and stabilised the ignition button will light up, and you may then release it. After ignition this button is without function. After approximately 3 minutes the lamp reaches its rated power of 200W, and the yellow indicator lamp “P” will light up. If the unit is switched off, wait at least 3 minutes prior to re-ignition.

### Wavelength Selection

This unit has two sets of filters allowing you to select either visible or ultraviolet radiation. By pressing the blue “UV” button these filters are changed over electromagnetically. In the UV mode the blue button will light up. The foot switch which can be connected to the rear panel has the same function as the blue “UV” button.

### Intensity Control

By rotating the black collar around the lightguide socket the light intensity can be adjusted continuously, without changing the colour temperature.

### Switching off

The mains switch will power off the lamp and separate the unit from the mains. After switching off the unit you should wait 3 minutes before re-igniting the lamp.

## 4 Special Instructions

### Lamp Life

Assuming an average duty cycle of 8 hours the lamp has a minimum lifetime of 1500 hours. The lamp should not be ignited more often than necessary as each ignition shortens lamp life. We recommend not to turn off the lamp if it is needed again within the next three hours. As the lamp has a high internal pressure it is possible that the envelope bursts in very rare occasions, especially if the lamp is very old. In this case mercury is emitted (see "Safety Warnings", chapter 1).



### Overheating

If the maximum operating temperature is exceeded the lamp is automatically switched off and the red indicator lamp "T" lights up, the fan, however, continues to run. After the unit has cooled off sufficiently the indicator lamp "T" will go out and the lamp can be ignited again. Reasons for overheating can be obstruction of ventilation openings or high ambient temperatures.



### Vapours of Solvents

Vapours of fluorinated or chlorinated hydrocarbon solvents will corrode the lamp and the quartz lenses – even in small concentrations. Avoid these solvents in the vicinity of the unit. If you cannot avoid them, place the unit as high as possible, as vapours are heavier than air.



### Repairs and Service

Caution, high voltages are present inside unit. Always disconnect power cord before opening up the unit. Do not attempt any repairs other than exchanging the lamp module and dust filter (see chapter 5). Refer all other repairs to an authorised service facility.



## 5 Exchanging the Lamp Module and Dust Filter

Exchanging of the **lamp module** should be done only after the lamp has completely cooled off. Please proceed as follows (see diagram page 4):



- Disconnect the power cord.
- Unscrew the two upper screws on the left and right hand side of the unit respectively, carefully lift cover and disconnect ground wire. Loosen the knurled screw on the side of the lamp module.
- Unplug the lamp module connectors and remove the module carefully by a simultaneous backwards and upwards movement.
- Insert new lamp module by vice-versa procedure.
- Connect the red wire at the bottom and the black wire at the top of the lamp module. Never leave the red wire disconnected as the power supply will be destroyed when the ignition button is pressed.
- When replacing the top cover, make sure the activating arm for the circuit breakers is on the *right hand side*, otherwise the unit will not operate.
- Used lamps contain mercury and must be disposed of as hazardous waste or be recycled.

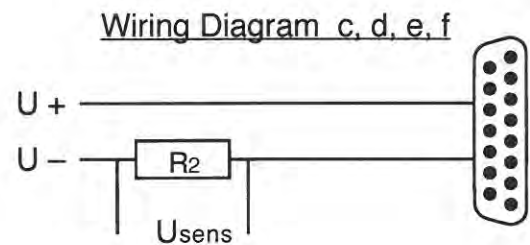
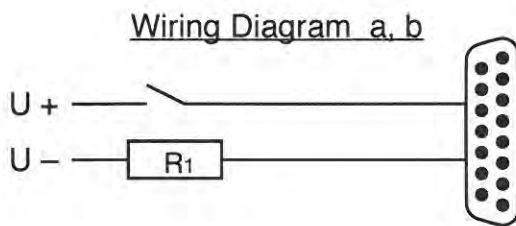


In order to exchange the **dust filter** pry off the protective grid from the rear panel with a screw driver (see diagram page 4). Exchange the filter pad and snap the protective grid back on. We recommend to exchange the filter pad with every new lamp. However, a different cycle may be appropriate based on local conditions.

## 6 Remote Control

This unit is equipped with a PLC (Programmable Logic Control) interface. This interface permits you to control and monitor six important system parameters via programmable remote control units. The interface is galvanically isolated from the mains by photo-couplers, and is read out by means of the external voltage supplied by the controlling computer. The following functions are available:

|                    |   | Function   | + Pin | - Pin |
|--------------------|---|--|-------|-------|
| Action<br>(Input)  | a | Lamp ignition (= white ignition button) <sup>1</sup> | 9     | 10    |
|                    | b | White / UV light (= blue UV button) <sup>2</sup>     | 11    | 10    |
| Signal<br>(Output) | c | System overheated (= red LED)                        | 2     | 1     |
|                    | d | Lamp ready / full power (= yellow LED)               | 3     | 4     |
|                    | e | UV active (UV signal on)                             | 6     | 5     |
|                    | f | Ignition successful (= white button lamp)            | 7     | 15    |



| Adaptation to computer system voltages |                |                |
|--|----------------|----------------|
| U                                      | R <sub>1</sub> | R <sub>2</sub> |
| 5 V <sub>DC</sub>                      | not needed     | 270 Ω / 0.5 W  |
| 12 V <sub>DC</sub>                     | 330 Ω / 0.5 W  | 620 Ω / 0.5 W  |
| 24 V <sub>DC</sub>                     | 1 KΩ / 0.5 W   | 1.2 KΩ / 0.5 W |

- 1) On special request the unit can be converted to “automatic lamp ignition when main switch is turned on” by means of a jumper on the printed circuit board. However, this jumper must always be removed prior to repairs (by authorised service personnel only) on the open unit.
- 2) Remote control of the UV filter is also possible by means of the foot switch terminal. Use a shielded cable and a galvanically isolated closing contact. The cable should be fitted with a ferrite clip to prevent electromagnetic interference.

## 7 Accessories and Spare Parts

- Accessories: Power cord  
Foot switch with cable and connector  
15-pin Sub-D connector for remote control (PLC)  
Liquid Lightguide (type optional)
- Spare Parts: Pre-aligned snap-in lamp module new 3611  
Pre-aligned snap-in lamp module exchange 3612  
Dust filter 3607

## 8 Technical Data

Model: **SUPERLITE I05-DC-E** Serial no.: \_\_\_\_\_  
Mains Voltage: 110 - 240V ( $\pm 10\%$ ) , 50 - 60 Hz  
Current: max. 3.3 A  
Power input: max. 380VA  
Fuses: 3.15 A slow blow (2 required)  
Lamp type: 200W DC superpressure mercury arc lamp  
Lamp power stabilisation: better than 1%  
Lamp life: approx. 1500 – 2000 hours  
Foot switch terminal: galvanically separated from mains; max. current 1mA  
PLC terminal: galvanically separated from mains  
Dimensions: width 340mm, height 160mm, depth 310mm  
Weight: 7,5 kg  
Spectral range: 380nm – 700nm = visible range  
320nm – 400nm = UVA range



**Declaration of conformity:** This unit conforms to all applicable EC Directives and corresponding harmonised standards. A written declaration of conformity can be supplied on request.

LUMATEC GMBH • LINIENSTRASSE 9-13 • 82041 DEISENHOFEN • GERMANY  
TEL +49-89-7428220 • FAX +49-89-742822-64 • SALES@LUMATEC.DE  
WWW.LUMATEC.EU • WEEE-REG-NR: DE67508364



# 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



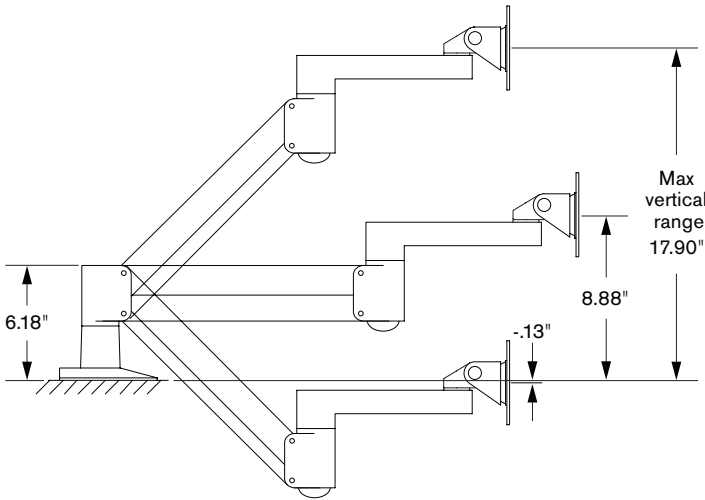
Over 200 degrees of monitor tilt



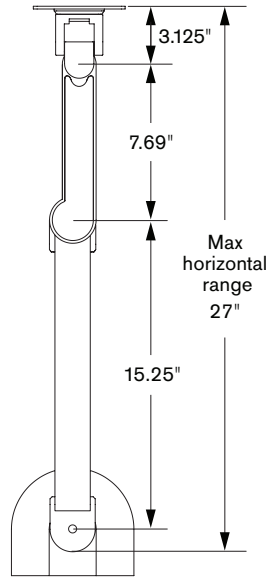
# Model 7500



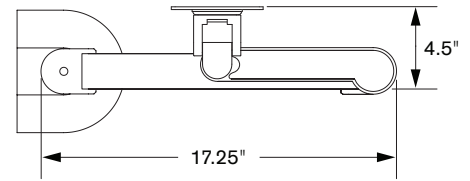
## Specifications



**SIDE VIEW**  
Vertical Range



**TOP VIEW**  
Horizontal Range

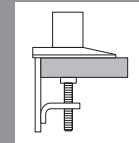


**TOP VIEW**  
Arm Folded

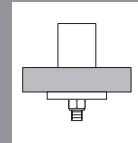
## CAPABILITIES

|  |                                       |
|--|---------------------------------------|
| <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             |

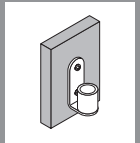
## FLEXMOUNT™ CONFIGURATIONS



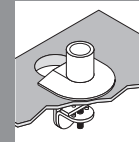
Desk Clamp



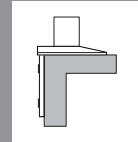
Thru-Desk



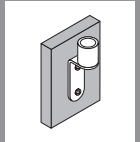
Wall



Grommet Hole



Side Bolt

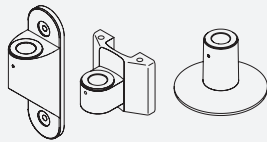


Reverse Wall

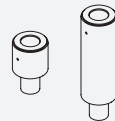
## OPTIONAL ACCESSORIES



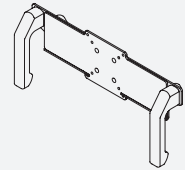
**QUICK RELEASE ADAPTERS**  
Allows for quick attach and release of monitor (8336-QR).



**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



# LCD Monitor

## Operating Instructions

Before operating the unit, please read this manual thoroughly and retain it for future reference.

LMD-1530W




## Owner's Record

The model and serial numbers are located at the rear. Record these numbers in the spaces provided below. Refer to these numbers whenever you call upon your Sony dealer regarding this product.

Model No. \_\_\_\_\_  
Serial No. \_\_\_\_\_

### Important Safety Instructions

- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water.
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus.  When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

## WARNING

**To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.**

**To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.**

**WARNING**  
**THIS APPARATUS MUST BE EARTHED.**

### WARNING

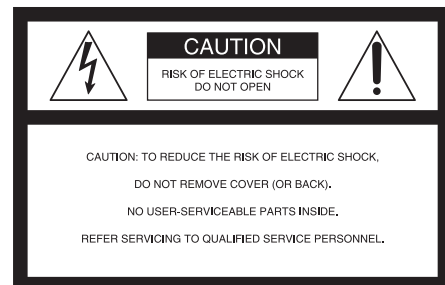
When installing the unit, incorporate a readily accessible disconnect device in the fixed wiring, or connect the power plug to an easily accessible socket-outlet near the unit. If a fault should occur during operation of the unit, operate the disconnect device to switch the power supply off, or disconnect the power plug.

### CAUTION

The apparatus shall not be exposed to dripping or splashing. No objects filled with liquids, such as vases, shall be placed on the apparatus.

### WARNING

Make sure the surface is wide enough so that this apparatus's width and depth don't exceed the surface's edges. If not, this apparatus may lean or fall over and cause an injury.



This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

### Attention-when the product is installed in Rack:

#### 1. Prevention against overloading of branch circuit

When this product is installed in a rack and is supplied power from an outlet on the rack, please

make sure that the rack does not overload the supply circuit.

## 2. Providing protective earth

When this product is installed in a rack and is supplied power from an outlet on the rack, please confirm that the outlet is provided with a suitable protective earth connection.

## 3. Internal air ambient temperature of the rack

When this product is installed in a rack, please make sure that the internal air ambient temperature of the rack is within the specified limit of this product.

## 4. Prevention against achieving hazardous condition due to uneven mechanical loading

When this product is installed in a rack, please make sure that the rack does not achieve hazardous condition due to uneven mechanical loading.

## 5. Install the equipment while taking the operating temperature of the equipment into consideration

For the operating temperature of the equipment, refer to the specifications of the Operation Manual.

## 6. When performing the installation, keep the following space away from walls in order to obtain proper exhaust and radiation of heat.

**Lower, Upper: 4.4 cm (1 3/4 inches) or more**

### For kundene i Norge

Dette utstyret kan kobles til et IT-strømfordelingssystem.

Apparatet må tilkoples jordet stikkontakt

### Suomessa asuville asiakkaille

Laite on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan

### För kunderna i Sverige

Apparaten skall anslutas till jordat uttag

### For the customers in the U.S.A.

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.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

All interface cables used to connect peripherals must be shielded in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of FCC Rules.

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.

### WARNING

Using this unit at a voltage other than 120 V may require the use of a different line cord or attachment plug, or both. To reduce the risk of fire or electric shock, refer servicing to qualified service personnel.

### For the customers in Canada

This Class A digital apparatus complies with Canadian ICES-003.

### For the customers in Europe

This product with the CE marking complies with the EMC Directive issued by the Commission of the European Community.

Compliance with this directive implies conformity to the following European standards:

- EN55103-1 : Electromagnetic Interference (Emission)
- EN55103-2 : Electromagnetic Susceptibility (Immunity)

This product is intended for use in the following Electromagnetic Environments: E1 (residential), E2 (commercial and light industrial), E3 (urban outdoors), E4 (controlled EMC environment, ex. TV studio).

### For the customers in Europe

The manufacturer of this product is Sony Corporation, 1-7-1 Konan, Minato-ku, Tokyo, Japan.

The Authorized Representative for EMC and product safety is Sony Deutschland GmbH, Hedelfinger Strasse 61, 70327 Stuttgart, Germany. For any service or guarantee matters please refer to the addresses given in separate service or guarantee documents.

### For the customers in the USA

Lamp in this product contains mercury. Disposal of these materials may be regulated due to environmental considerations. For disposal or recycling information, please contact your local authorities or the Telecommunications Industry Association ([www.eiae.org](http://www.eiae.org)).

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# Precaution

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## On Safety

- Operate the unit only with a power source as specified in the “Specifications” section.
- A nameplate indicating operating voltage, etc., is located on the rear panel.
- Should any solid object or liquid fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- Do not drop or place heavy objects on the power cord. If the power cord is damaged, turn off the power immediately. It is dangerous to use the unit with a damaged power cord.
- Unplug the unit from the wall outlet if it is not to be used for several days or more.
- Disconnect the power cord from the AC outlet by grasping the plug, not by pulling the cord.
- The socket-outlet shall be installed near the equipment and shall be easily accessible.

---

## On Installation

- Allow adequate air circulation to prevent internal heat build-up.  
Do not place the unit on surfaces (rugs, blankets, etc.) or near materials (curtains, draperies) that may block the ventilation holes.
- Do not install the unit in a location near heat sources such as radiators or air ducts, or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.

---

## Handling the LCD Screen

- The LCD panel fitted to this unit is manufactured with high precision technology, giving a functioning pixel ratio of at least 99.99%. Thus a very small proportion of pixels may be “stuck”, either always off (black), always on (red, green, or blue), or flashing. In addition, over a long period of use, because of the physical characteristics of the liquid crystal display, such “stuck” pixels may appear spontaneously. These problems are not a malfunction.
- Do not leave the LCD screen facing the sun as it can damage the LCD screen. Take care when you place the unit by a window.
- Do not push or scratch the LCD screen. Do not place a heavy object on the LCD screen. This may cause the screen to lose uniformity.

- If the unit is used in a cold place, horizontal lines or a residual image may appear on the screen. This is not a malfunction. When the monitor becomes warm, the screen returns to normal.
- The screen and the cabinet become warm during operation. This is not a malfunction.

---

## On Burn-in

For LCD panel, permanent burn-in may occur if still images are displayed in the same position on the screen continuously, or repeatedly over extended periods.

Images that may cause burn-in

- Masked images with aspect ratios other than 15:9
- Color bars or images that remain static for a long time
- Character or message displays that indicate settings or the operating state

### To reduce the risk of burn-in

- Turn off the character displays  
Press the MENU button to turn off the character displays. To turn off the character displays of the connected equipment, operate the connected equipment accordingly. For details, refer to the operation manual of the connected equipment.
- Turn off the power when not in use  
Turn off the power if the viewfinder is not to be used for a prolonged period of time.

---

## On a Long Period of Use

Due to the characteristics of LCD panel, displaying static images for extended periods, or using the unit repeatedly in a high temperature/high humidity environments may cause image smearing, burn-in, areas of which brightness is permanently changed, lines, or a decrease in overall brightness.

In particular, continued display of an image smaller than the monitor screen, such as in a different aspect ratio, may shorten the life of the unit. Avoid displaying a still image for an extended period, or using the unit repeatedly in a high temperature/high humidity environment such as an airtight room, or around the outlet of an air conditioner.

To prevent any of the above issues, we recommend reducing brightness slightly, and to turn off the power whenever the unit is not in use.

---

## On Cleaning

### Before cleaning

Be sure to disconnect the AC power cord from the AC outlet.

### On cleaning the monitor screen

The monitor screen surface is especially treated to reduce reflection of light.

As incorrect maintenance may impair the performance of the monitor, take care with respect to the following:

- Wipe the screen gently with a soft cloth such as a cleaning cloth or glass cleaning cloth.
- Stubborn stains may be removed with a soft cloth such as a cleaning cloth or glass cleaning cloth lightly dampened with water.
- Never use solvent such as alcohol, benzene or thinner, or acid, alkaline or abrasive detergent, or chemical cleaning cloth, as they will damage the screen surface.

### On cleaning the cabinet

- Clean the cabinet gently with a soft dry cloth. Stubborn stains may be removed with a cloth lightly dampened with mild detergent solution, followed by wiping with a soft dry cloth.
- Use of alcohol, benzene, thinner or insecticide may damage the finish of the cabinet or remove the indications on the cabinet. Do not use these chemicals.
- If you rub on the cabinet with a stained cloth, the cabinet may be scratched.
- If the cabinet is in contact with a rubber or vinyl resin product for a long period of time, the finish of the cabinet may deteriorate or the coating may come off.

---

## On Moisture Condensation

If the unit is brought directly from a cold place to a warm place, or the unit is warm and the ambient temperature cools suddenly (by air-conditioning, for example), moisture may condense on the surface or inside of the unit, or create a mist residue inside the protection plate if it is installed to the unit.

This is called moisture condensation, and is not a malfunction of the product itself, although it may cause damage to the unit.

Leave the unit in a condensation free area.

If moisture condensation has occurred, turn off the unit and do not use it until moisture condensation has evaporated.

---

## On Repacking

Do not throw away the carton and packing materials. They make an ideal container which to transport the unit.

---

## On Mounting on a Rack

Leave 1U space empty above and below the monitor to ensure adequate air circulation or install a fan to maintain the monitor's performance.

If you have any questions about this unit, contact your authorized Sony dealer.

---

## On Fan Error

The fan for cooling the unit is built in. When the fan stops and the KEY INHIBIT indicator on the front panel blinks for fan error indication, turn off the power and contact an authorized Sony dealer.

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# Features

The LMD-1530W (15.3-type) is a multiple format LCD monitor for broadcast/professional use featuring a precise image and high performance. Supporting digital/analog main broadcast signals, and HDMI<sup>1)</sup> input, it can be used under various lighting conditions.

<sup>1)</sup> HDMI, the HDMI logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing LLC.

## High brightness LCD panel

Because of precise image, wide viewing angle technology and high speed response, real color image can be reproduced.

## Multi-format

The monitor supports the video, Y/C, RGB, component and HDMI input signals.

Both NTSC and PAL color systems are supported, and the appropriate color system is selected automatically. SDI signals can be available when input adaptor BKM-320D (optional) is used.

HD/SD-SDI signals can be available when input adaptor BKM-341HS (optional) is used.

*For more information, see “Video signal formats” (page 24).*

## External sync input

When the EXT SYNC button is in the on position, the unit can be operated on the sync signal supplied from an external sync generator.

## Automatic termination (connector with mark only)

The input connector is terminated internally at 75 ohms when nothing has been connected to the output connector. If a cable is connected to the output connector, the internal terminal is automatically released and the signals input to the input connector are output to the output connector (loop-through).

## External remote control function

You can directly select the input signal, aspect, etc., by operating the equipment connected to the PARALLEL REMOTE connector.

## Monitor stand with tilt function

A monitor stand with tilt function is equipped for desk top use. It shall be removed when mounted on the rack.

## Rack mount

The monitor supports the VESA (100 × 100 mm) standard.

It can be mounted on an EIA standard 19-inch rack (using an optional mounting bracket).

*For more information, see “Installing to the Rack” (page 11).*

Consult with Sony qualified personnel for wall mount installation.

## 3-color tally lamp

The tally lamp lights in red, green or amber to monitor each input picture and check the on-air mode.

## Blue only mode

In the blue only mode, a monochrome display is obtained with all three of the R/G/B picture elements driven with a blue signal. This mode is convenient for chroma and phase adjustments and monitoring of signal noise.

## Marker function

SAFETY AREA marker, CENTER MARKER, 16:9 MARKER for the 4:3 aspect ratio or 4:3 MARKER for the 16:9 aspect ratio can be displayed.

## Scan setting

You can set the display size to normal scan, over scan or full screen mode.

## Select color temperature and gamma mode

You can select the color temperature from among two (HIGH and LOW) settings.

You can select the gamma mode from among five settings.

## Aspect setting

You can set the monitor to 4:3 or 16:9 display mode according to the input video signal.

## On-screen menus

You can set the appropriate settings according to the connected system by using the on-screen menus.

## Select language display

You can select from seven display languages, English, French, German, Spanish, Italian, Japanese and Chinese.

## Key inhibit function

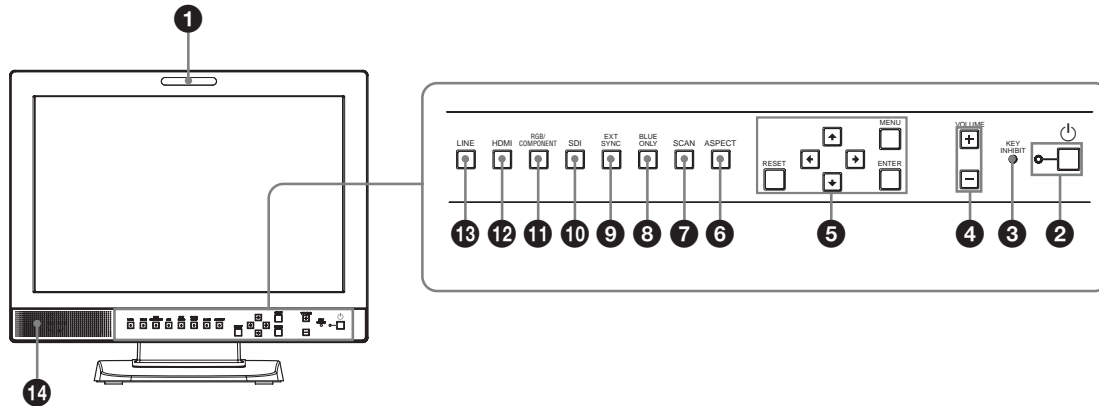
You can inhibit a key function to prevent missing an operation.

## I/P mode setting

This unit is equipped with an I/P mode setting function that is used to minimize picture delay due to the signal conversion process.

# Location and Function of Parts and Controls

## Front Panel



### 1 Tally lamp

You can check the status of the monitor by the color of the tally lamp.

The tally lamp lights in red, green or amber according to the setting of the REMOTE menu.

### 2 (standby) switch and indicator

Press to turn on the power when this unit is in standby mode. The indicator turns on. Press again to set the monitor in standby mode. The indicator goes out.

### 3 KEY INHIBIT indicator

Lights when the key inhibit function works. The indicator blinks when fan error occurs.

*For details on the key inhibit, see “KEY INHIBIT menu” (page 21).*

### 4 VOLUME buttons

Press the + button to increase the volume or the – button to decrease it.

### 5 Menu operation buttons

Displays or sets the on-screen menu.

#### (arrow) buttons

Select the menu or make various adjustments.

#### MENU button

Press to display the on-screen menu.

Press again to clear the menu.

#### RESET button

Resets the value of an item back to the previous value.

This button functions when the menu item is adjusted (displayed) on the screen.

### ENTER button

Press to confirm a selected item on the menu.

### 6 ASPECT select button

Sets the aspect ratio of the picture, 4:3 or 16:9.

### 7 SCAN select button

You can change the scan size of the picture.

Press to change the scan size among over (5% over scan), normal (0% scan) and full screen set on the SCAN menu (page 19).

### 8 BLUE ONLY button

Press to eliminate the red and green signals. Only blue signal is displayed as a monochrome picture on the screen. This mode is convenient for chroma and phase adjustments and monitoring of signal noise.

### 9 EXT SYNC (external sync) button

Press to operate the unit on an external sync signal through the EXT SYNC IN connector.

The EXT SYNC button works when the component/RGB signals are input.

### 10 SDI button

Press to monitor the signal through the OPTION IN connector.

### 11 RGB/COMPONENT button

Press to monitor the signal through the RGB/COMPONENT input connector.

### 12 HDMI button

Press to monitor the signal through the HDMI IN connector.



**13 LINE button**

Press to monitor the signal through the LINE input connector.

**14 Speaker**

The audio signal selected by the input select button (10 SDI button, 11 RGB/COMPONENT button, 12 HDMI button or 13 LINE button) on the front panel is output.

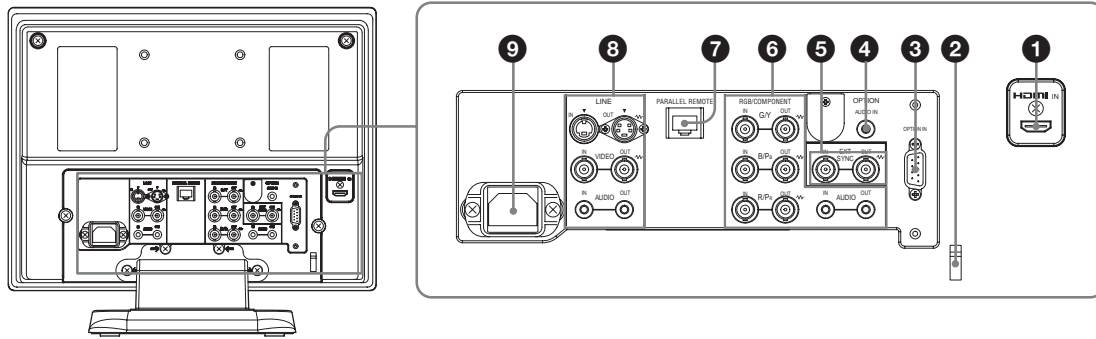
## Input Signals and Adjustable/Setting Items

| Item                              | Input signal |                |                |     |     |     |       |      |     |       |
|-----------------------------------|--------------|----------------|----------------|-----|-----|-----|-------|------|-----|-------|
|                                   | Video, Y/C   | B & W          | Component      |     | RGB |     | SDI*4 | HDMI |     |       |
|                                   |              |                | SD             | HD  | SD  | HD  | SD/HD | SD   | HD  | DVI*5 |
| CONTRAST                          | ○            | ○              | ○              | ○   | ○   | ○   | ○     | ○    | ○   | ○     |
| BRIGHT                            | ○            | ○              | ○              | ○   | ○   | ○   | ○     | ○    | ○   | ○     |
| CHROMA                            | ○            | ×              | ○              | ○   | ×   | ×   | ○     | ○    | ○   | ×     |
| PHASE                             | ○<br>(NTSC)  | ×              | ×              | ×   | ×   | ×   | ×     | ×    | ×   | ×     |
| APERTURE                          | ○            | ○              | ○              | ○   | ○   | ○   | ○     | ○    | ○   | ×     |
| COLOR TEMP                        | ○            | ○              | ○              | ○   | ○   | ○   | ○     | ○    | ○   | ○     |
| COMPONENT LEVEL*1                 | ×            | ×              | ○<br>(480/60I) | ×   | ×   | ×   | ×     | ×    | ×   | ×     |
| NTSC SETUP                        | ○<br>(NTSC)  | ○<br>(480/60I) | ×              | ×   | ×   | ×   | ×     | ×    | ×   | ×     |
| GAMMA                             | ○            | ○              | ○              | ○   | ○   | ○   | ○     | ○    | ○   | ○     |
| SCAN                              | ○            | ○              | ○              | ○   | ○   | ○   | ○     | ○    | ○   | ×     |
| ASPECT                            | ○            | ○              | ○              | ○*2 | ○   | ○*2 | ○     | ○    | ○*2 | ×     |
| MARKER                            | ○            | ○              | ○              | ○   | ○   | ○   | ○     | ○    | ○   | ×     |
| BLUE ONLY                         | ○            | ×              | ○              | ○   | ○   | ○   | ○     | ○    | ○   | ×     |
| I/P MODE*3                        | ○            | ○              | ○              | ○   | ○   | ○   | ○     | ○    | ○   | ×     |
| EXT SYNC                          | ×            | ×              | ○              | ○   | ○   | ○   | ×     | ×    | ×   | ×     |
| SD PIXEL MAPPING<br>COMPOSITE&Y/C | ○            | ○              | ×              | ×   | ×   | ×   | ×     | ×    | ×   | ×     |
| SD PIXEL MAPPING<br>RGB/COMPONENT | ×            | ×              | ○              | ×   | ○   | ×   | ×     | ×    | ×   | ×     |

○ : Adjustable/can be set  
 × : Not adjustable/cannot be set

- \*1 When a component signal (480/60I) is input, this can be switchable.
- \*2 When a 480/60P or 576/50P signal is input, this can be switchable.
- \*3 When an interlace signal is input, this can be switchable.
- \*4 When BKM-320D or BKM-341HS is used, SDI signals can be input.
- \*5 When a PC signal is input to the HDMI IN connector using a DVI conversion cable, this can be adjusted.

## Rear Panel



### 1 HDMI IN connector

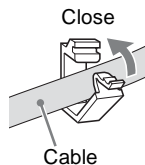
HDMI (High-Definition Multimedia Interface) is an interface that supports both video and audio on a single digital connection, allowing you to enjoy high quality digital picture and sound. The HDMI specification supports HDCP (High-bandwidth Digital Content Protection), a copy protection technology that incorporates coding technology for digital video signals.

#### Notes

- Use HDMI compliant cable (optional) with HDMI logo.
- Color noise may appear on the edge of the screen depending on the connected device. This is not a malfunction.

### 2 HDMI cable holder

Secures the HDMI cable (Ø7 mm or less).



### 3 OPTION IN connector (D-sub 9-pin, female)

Inputs SD-SDI signals when optional Sony BKM-320D is connected. Inputs HD/SD-SDI signals when optional Sony BKM-341HS is connected.

Press the SDI button to select the signal.

#### Note

Do not connect the equipment other than BKM-320D or BKM-341HS. It causes damage to the unit or the equipment.

### 4 OPTION AUDIO IN connector (phono jack)

Inputs an audio signal if the BKM-320D or BKM-341HS is connected to the OPTION IN connector.

Press the SDI button to monitor the audio signal.

### 5 EXT SYNC IN/OUT (external sync) connectors (BNC)

Press the EXT SYNC button to use the sync signal through this connector.

#### IN connector

When this unit operates on an external sync signal, connect the reference signal from a sync generator to this connector.

#### Note

When inputting a video signal with the jitters, etc. the picture may be disturbed. We recommend using the TBC (time base corrector).

#### OUT connector

Loop-through output of the IN connector. Connect to the external sync input of video equipment to be synchronized with this unit.

When the cable is connected to this connector, the 75-ohms termination of the input is automatically released, and the signal input to the IN connector is output from this connector.

### 6 RGB/COMPONENT connectors

Analog RGB signal or component (Y/P<sub>B</sub>/P<sub>R</sub>) signal input connectors and their loop-through output connectors.

Press the RGB/COMPONENT button to monitor the signal input through these connectors.

#### G/Y, B/P<sub>B</sub>, R/P<sub>R</sub> IN/OUT (BNC)

These are the input/output connectors for an analog RGB and a component (Y/P<sub>B</sub>/P<sub>R</sub>) signal. Unless an external sync signal is input, the monitor is synchronized with the sync signal contained in the G/Y signal.

#### AUDIO IN/OUT (phono jack)

When using an analog RGB or a component signal as a video signal, use these jacks for the input/

output of an audio signal. Connect them to the audio input/output jacks on equipment such as a VCR.

**7 PARALLEL REMOTE connector (modular connector, 8-pin)**

Forms a parallel switch and controls the monitor externally.

*For details on the pin assignment and factory setting function assigned to each pin, see page 23.*

**CAUTION**

For safety, do not connect the connector for peripheral device wiring that might have excessive voltage to this port. Follow the instructions for this port.

**8 LINE connectors**

Line input connectors for Y/C separate, composite video and audio signals and their loop-through output connectors.

Press the LINE button to monitor the signal input through these connectors.

If you input signals to both Y/C IN and VIDEO IN, the signal input to the Y/C IN is selected.

**Y/C IN/OUT (4-pin mini-DIN)**

These are the input/output connectors for a Y/C separate signal. Connect them to the Y/C separate input/output connectors on equipment such as a VCR, video camera, or another monitor.

**VIDEO IN/OUT (BNC)**

These are the input/output connectors for a composite video signal. Connect them to the composite video input/output connectors on equipment such as a VCR, video camera, or another monitor.

**AUDIO IN/OUT (phono jack)**

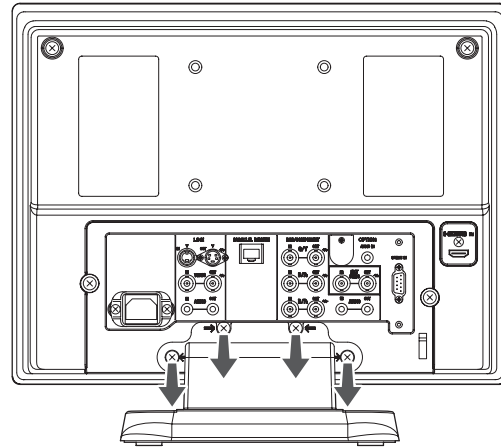
These are the input/output jacks for an audio signal. Connect them to the audio input/output jacks on equipment such as a VCR.

**9 AC IN socket**

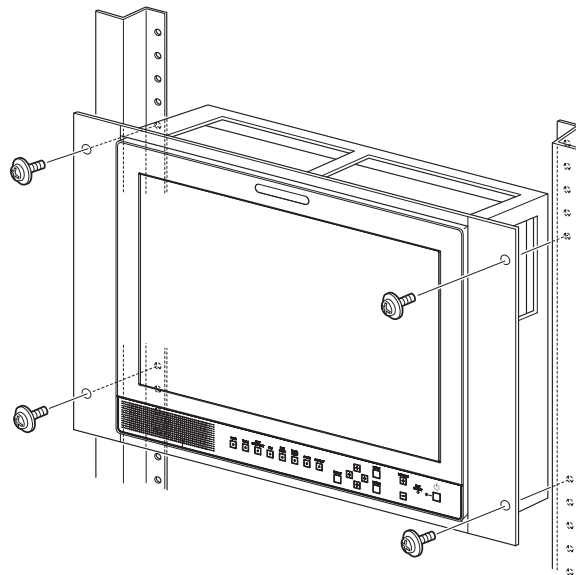
Connect the supplied AC power cord.

## Installing to the Rack

- 1** Remove the screws (4) to remove the stand.

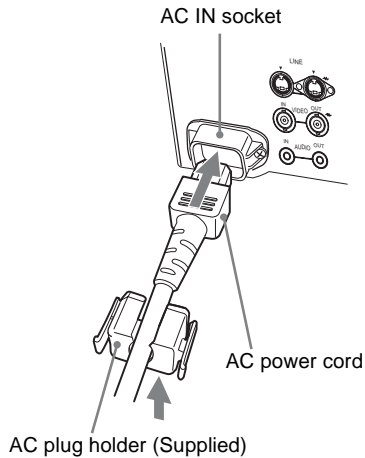


- 2** Attach the unit to the rack using the mounting bracket.

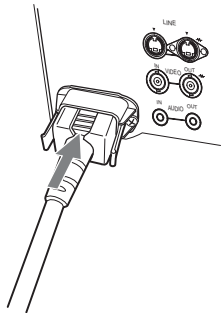


## Connecting the AC Power Cord

- 1 Plug the AC power cord into the AC IN socket on the rear panel. Then, attach the AC plug holder (supplied) to the AC power cord.



- 2 Slide the AC plug holder over the cord until it locks.



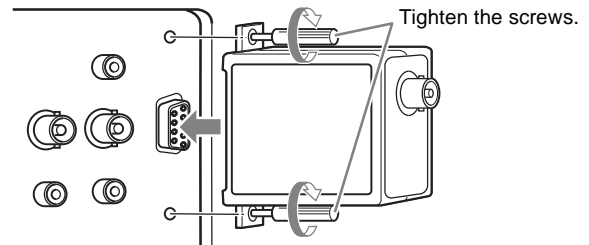
### To disconnect the AC power cord

Pull out the AC plug holder while pressing the lock levers.

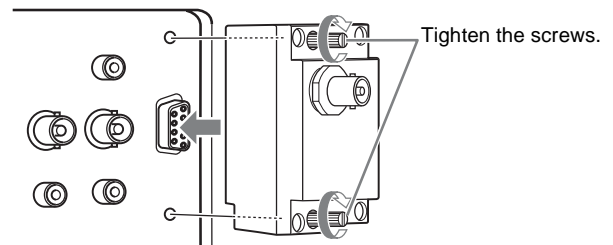
## Attaching the Input Adaptor

Before attaching the input adaptor, disconnect the power cord.

### BKM-320D



### BKM-341HS



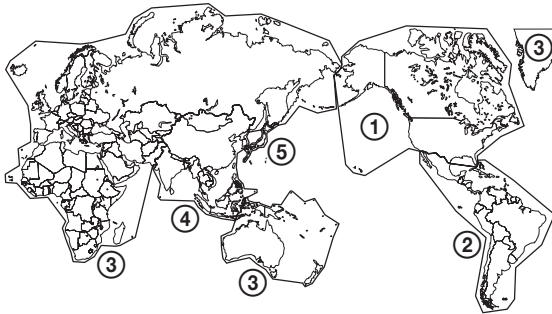
### Note

Do not connect the equipment other than BKM-320D or BKM-341HS. It causes damage to the unit or the equipment.

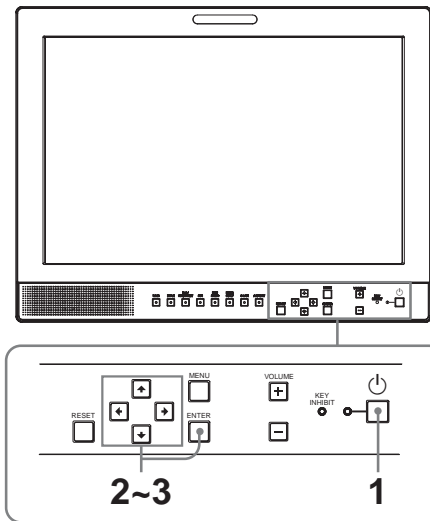
# Selecting the Default Settings

When you turn on the unit for the first time after purchasing it, select the area where you intend to use this unit from among the options.

The default setting values for each area

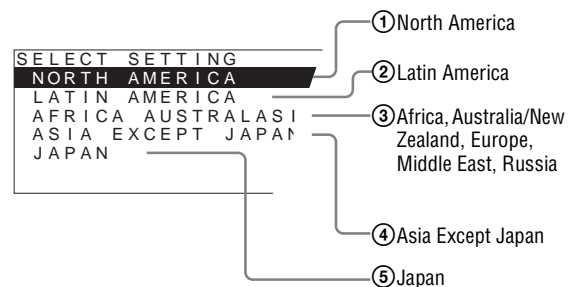


|  |                               | COLOR TEMP | COMPONENT LEVEL | NTSC SETUP |
|--|-------------------------------|------------|-----------------|------------|
| ① NORTH AMERICA                            |                               | LOW        | BETA7.5         | 7.5        |
| ② LATIN AMERICA                            | ARGENTINA                     | LOW        | SMPTE           | 0          |
|  | PAL&PAL-N AREA<br>PARAGUAY    | LOW        | SMPTE           | 0          |
|  | URUGUAY                       | LOW        | SMPTE           | 0          |
|  | NTSC&PAL-M AREA<br>OTHER AREA | LOW        | BETA7.5         | 7.5        |
| ③ AFRICA AUSTRALASIA<br>EUROPE MIDDLE-EAST |                               | LOW        | SMPTE           | 0          |
| ④ ASIA EXCEPT<br>JAPAN                     | NTSC AREA                     | LOW        | BETA7.5         | 7.5        |
|  | PAL AREA                      | LOW        | SMPTE           | 0          |
| ⑤ JAPAN                                    |                               | HIGH       | SMPTE           | 0          |



1 Press the ⏻ (standby) switch.

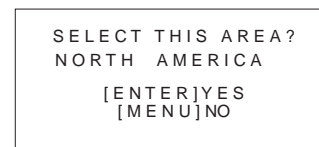
The power is turned on and the SELECT SETTING screen appears.



2 Press the ↑ or ↓ button to select the area where you intend to use the unit and press the → or ENTER button.

**If you select either ①, ③ or ⑤**

The confirmation screen is displayed. Confirm the selected area. When the setting is wrong, press the ← button to return to the previous screen.

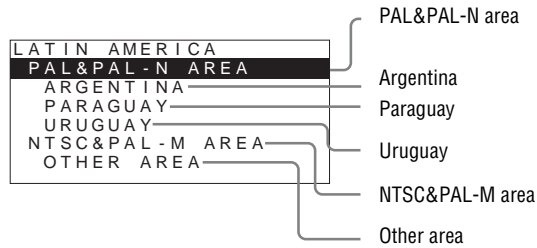


**If you select either ② or ④**

One of the following screens appears. Press the ↑ or ↓ button to narrow the area further and then press the → or ENTER button.

The confirmation screen is displayed. Confirm the selected area. When the setting is wrong, press the ← button to return to the previous screen.

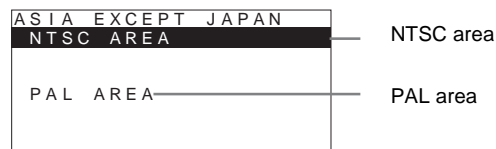
② If LATIN AMERICA is selected:



④ If ASIA EXCEPT JAPAN is selected:

Customers who will use this unit in the shaded areas shown in the map below should select NTSC AREA.

Other customers should select PAL AREA.



- 3 Press the **↑** or **↓** button to narrow the area further and then press the **→** or ENTER button.

The SELECT SETTING screen disappears and the menu item settings suitable for the selected area are applied.

**Note**

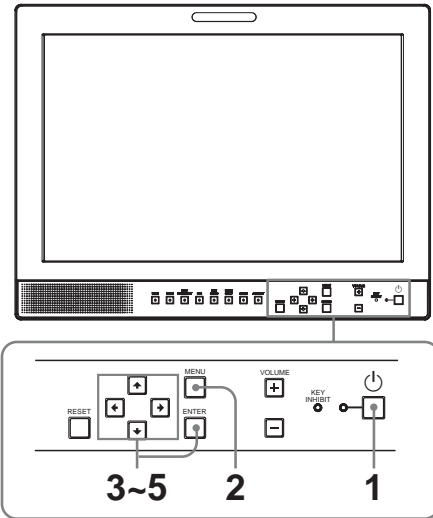
When you have selected the wrong area, set the following items using the menu.

- COLOR TEMP (on page 17)
- COMPONENT LEVEL (on page 18)
- NTSC SETUP (on page 18)

See “The default setting values for each area” (page 13) on the setting value.

## Selecting the Menu Language

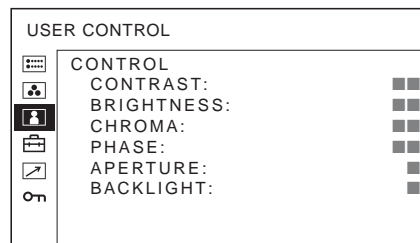
You can select one of seven languages (English, French, German, Spanish, Italian, Japanese, Chinese) for displaying the menu and other on-screen displays. “ENGLISH (English)” is selected in the default setting. The current settings are displayed in place of the ■ marks on the illustrations of the menu screen.



- 1 Press the **⏻** (standby) switch to turn on the unit.
- 2 Press the MENU button.

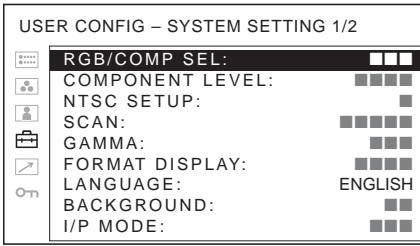
The menu appears.

The menu presently selected is shown in yellow.



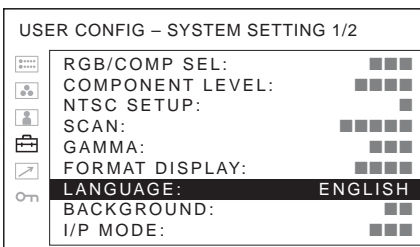
- 3 Press the **↑** or **↓** button to select SYSTEM SETTING of the USER CONFIG (User Configuration) menu, then press the **→** or ENTER button.

The setting items (icons) in the selected menu are displayed in yellow.



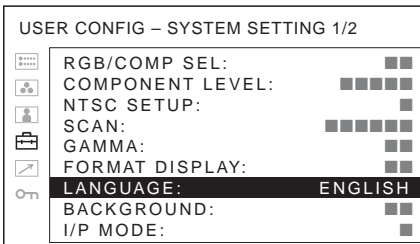
- 4** Press the **↑** or **↓** button to select “LANGUAGE,” then press the **→** or ENTER button.

The selected item is displayed in yellow.



- 5** Press the **↑** or **↓** button to select a language, then press the **→** or ENTER button.

The menu changes to the selected language.



### To clear the menu

Press the MENU button.

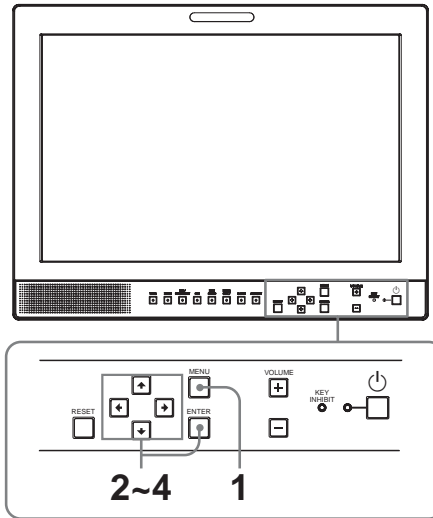
The menu disappears automatically if a button is not pressed for one minute.

## Using the Menu

The unit is equipped with an on-screen menu for making various adjustments and settings such as picture control, input setting, set setting change, etc. You can also change the menu language displayed in the on-screen menu.

To change the menu language, see “Selecting the Menu Language” on page 14.

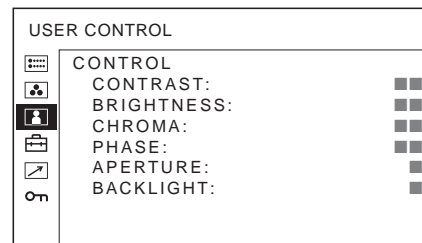
The current settings are displayed in place of the **■** marks on the illustrations of the menu screen.



- 1** Press the MENU button.

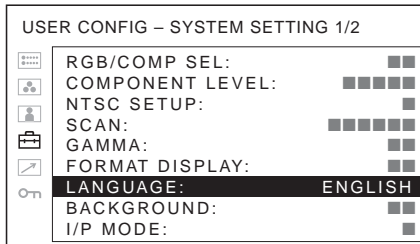
The menu appears.

The menu presently selected is shown in yellow.



- 2** Press the **↑** or **↓** button to select a menu, then press the **→** or ENTER button.

The menu icon presently selected is shown in yellow and setting items are displayed.



### 3 Select an item.

Press the **↑** or **↓** button to select the item, then press the **→** or ENTER button.  
The item to be changed is displayed in yellow.

#### Note

If the menu consists of multiple pages, press **↑** or **↓** button to go to the desired menu page.

### 4 Make the setting or adjustment on an item.

#### When changing the adjustment level:

To increase the number, press the **↑** button.  
To decrease the number, press the **↓** button.  
Press the ENTER button to confirm the number, then restore the original screen.

#### When changing the setting:

Press the **↑** or **↓** button to change the setting.  
Press the ENTER button to confirm the setting.

#### Notes

- An item displayed in black cannot be accessed. You can access the item if it is displayed in white.
- If the key inhibit has been turned on, all items are displayed in black. To change any of the items, turn the key inhibit to OFF first.

*For details on the key inhibit, see “KEY INHIBIT menu” (page 21).*

### To clear the menu

Press the MENU button.  
The menu disappears automatically if a button is not pressed for one minute.

### About the memory of the settings

The settings are automatically stored in the monitor memory.

### To reset items that have been adjusted

Pressing the RESET button while you are adjusting any of the menu items resets the menu item to the previous setting.

# Adjustment Using the Menus

## Items

The screen menu of this monitor consists of the following items.

### **STATUS** (the items indicate the current settings.)

#### For the video input

FORMAT  
COLOR TEMP  
GAMMA  
COMPONENT LEVEL  
NTSC SETUP  
RGB/COMP SEL  
SCAN MODE  
Model name and serial number  
OPTION

#### For the DVI input

FORMAT  
fH  
fV  
COLOR TEMP  
Model name and serial number  
OPTION

### **COLOR TEMP/BAL**

COLOR TEMP  
MANUAL ADJUSTMENT

### **USER CONTROL**

CONTROL

### **USER CONFIG**

SYSTEM SETTING  
RGB/COMP SEL  
COMPONENT LEVEL  
NTSC SETUP  
SCAN  
GAMMA  
FORMAT DISPLAY  
LANGUAGE  
BACKGROUND  
I/P MODE  
SD PIXEL MAPPING  
MARKER SETTING  
MARKER ENABLE



MARKER SELECT  
 CENTER MARKER  
 SAFETY AREA  
 MARKER LEVEL

 **REMOTE**

- PARALLEL REMOTE
- 1PIN
- 2PIN
- 3PIN
- 4PIN
- 6PIN
- 7PIN
- 8PIN

 **KEY INHIBIT**

KEY INHIBIT

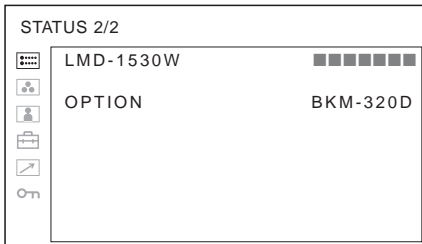
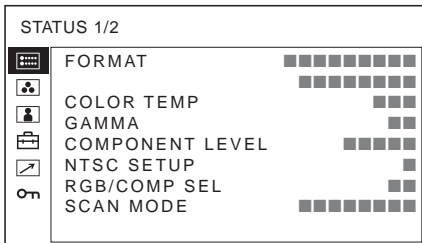
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## Adjusting and Changing the Settings

 **STATUS menu**

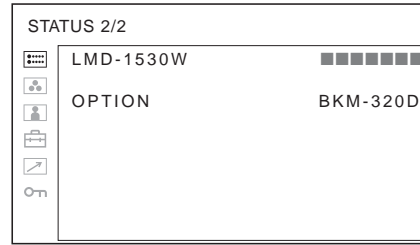
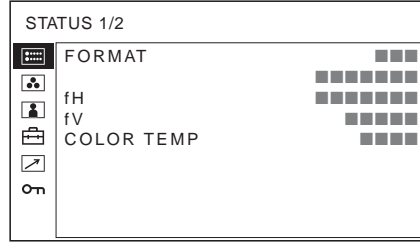
The STATUS menu is used to display the current status of the unit. The following items are displayed:

**For the video input**



- Signal format
- Color temperature
- Gamma
- Component level
- NTSC setup
- RGB/Component select
- Scan mode
- Model name and serial number
- Option

**For the DVI input**



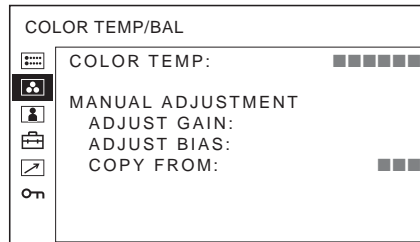
- Signal format
- fH
- fV
- Color temperature
- Model name and serial number
- Option

 **COLOR TEMP/BAL menu**

The COLOR TEMP/BAL menu is used for adjusting the picture white balance.

You need to use the measurement instrument to adjust the white balance.

Recommended: Konica Minolta color analyzer CA-210



| Submenu    | Setting  |
|------------|--|
| COLOR TEMP | Selects the color temperature from among HIGH, LOW and USER setting. |

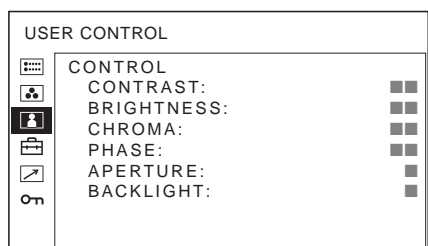
| Submenu           | Setting   |
|-------------------|---|
| MANUAL ADJUSTMENT | <p>If you set the COLOR TEMP to USER setting, the item displayed is changed from black to white, which means you can adjust the color temperature.</p> <ul style="list-style-type: none"> <li>• <b>ADJUST GAIN:</b> Adjusts the color balance (GAIN).</li> <li>• <b>ADJUST BIAS:</b> Adjusts the color balance (BIAS).</li> <li>• <b>COPY FROM:</b> If you select HIGH or LOW, the white balance data for the selected color temperature will be copied in the USER setting.</li> </ul> |

## USER CONTROL menu

The USER CONTROL menu is used for adjusting the picture.

Items that cannot be adjusted depending on the input signal are displayed in black.

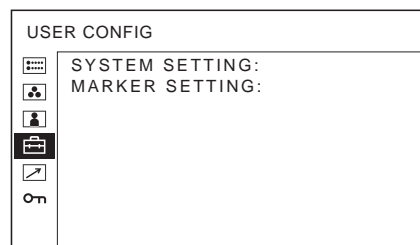
For details of input signal and adjustable / setting items, see page 9.



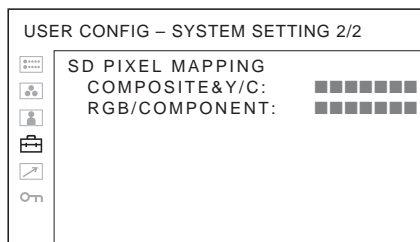
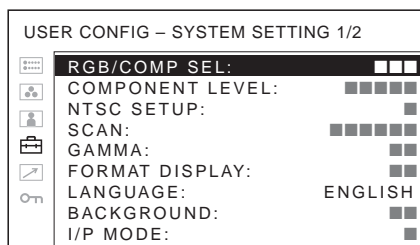
| Submenu | Setting  |
|---------|--|
| CONTROL | <p>You can adjust the picture.</p> <ul style="list-style-type: none"> <li>• <b>CONTRAST:</b> Adjusts the picture contrast.</li> <li>• <b>BRIGHTNESS:</b> Adjusts the picture brightness.</li> <li>• <b>CHROMA:</b> Adjusts color intensity. The higher the setting, the greater the intensity. The lower the setting, the lower the intensity.</li> <li>• <b>PHASE:</b> Adjusts color tones. The higher the setting, the more greenish the picture. The lower the setting, the more purplish the picture.</li> <li>• <b>APERTURE:</b> Adjusts the picture sharpness. The higher the setting, the sharper the picture. The lower the setting, the softer the picture.</li> <li>• <b>BACKLIGHT:</b> Adjusts the backlight. When the setting is changed, the brightness of the backlight is changed.</li> </ul> |

## USER CONFIG menu

The USER CONFIG menu is used for setting the system and marker. You can set the display language and so on. Items that cannot be adjusted depending on the input signal are displayed in black.



## SYSTEM SETTING



| Submenu         | Setting   |
|-----------------|---|
| RGB/COMP SEL    | When a signal input via the RGB/COMPONENT connector is being monitored, based on the signal being input, select RGB or COMP (component).  |
| COMPONENT LEVEL | <p>Selects the component level from among three modes.</p> <ul style="list-style-type: none"> <li>• <b>SMPTE:</b> for 100/0/100/0 signal</li> <li>• <b>BETA0:</b> for 100/0/75/0 signal</li> <li>• <b>BETA7.5:</b> for 100/7.5/75/7.5 signal</li> </ul> |
| NTSC SETUP      | <p>Selects the NTSC setup level from two modes.</p> <p>The 7.5 setup level is used mainly in North America. The 0 setup level is used mainly in Japan.</p>  |

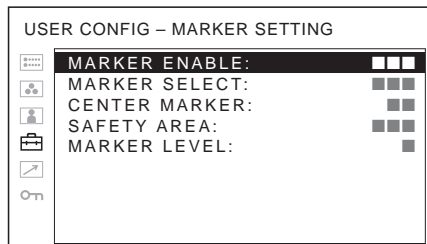
| Submenu                          | Setting  |
|----------------------------------|--|
| SCAN                             | <p>Sets the scan size of the picture. Select from OFF and FULL. The display format changes depending on the mode selected. (See “Scan mode image” on page 20)</p> <ul style="list-style-type: none"> <li>• <b>OFF</b>: Changes between over scan and normal scan.</li> <li>• <b>FULL</b>: Changes to over scan, normal scan or full screen.</li> </ul>   |
| GAMMA                            | <p>Select the appropriate gamma mode. You can select from among five settings. When “3” is selected, the setting is roughly same as the gamma mode of the CRT (2.2).</p>   |
| FORMAT DISPLAY                   | <p>Selects the display mode of the signal format.</p> <ul style="list-style-type: none"> <li>• <b>ON</b>: The format is always displayed.</li> <li>• <b>OFF</b>: The display is hidden.</li> <li>• <b>AUTO</b>: The format is displayed for about five seconds when the input of the signal starts.</li> </ul>   |
| LANGUAGE                         | <p>Selects the menu or message language from among seven languages.</p> <ul style="list-style-type: none"> <li>• <b>ENGLISH</b>: English</li> <li>• <b>FRANÇAIS</b>: French</li> <li>• <b>DEUTSCH</b>: German</li> <li>• <b>ESPAÑOL</b>: Spanish</li> <li>• <b>ITALIANO</b>: Italian</li> <li>• 日本語 : Japanese</li> <li>• 中文 : Chinese</li> </ul>  |
| BACKGROUND                       | <p>Sets the brightness of the black bars appearing in the upper and lower positions of the screen, or on the sides of the screen.</p> <ul style="list-style-type: none"> <li>• <b>OFF</b>: Displays a darker bar (black).</li> <li>• <b>ON</b>: Displays a brighter bar (gray).</li> </ul>   |
| I/P MODE (picture delay minimum) | <p>Select to set the delay by the picture processing to the minimum level when the signal is input.</p> <ul style="list-style-type: none"> <li>• <b>INTER-FIELD</b>: Performs interpolation depending on the movement of the images between the fields. It takes longer than “LINE DOUBLER” for processing the picture. “INTER-FIELD” is the factory setting.</li> <li>• <b>LINE DOUBLER</b>: The processing time is shorter. Performs interpolation by repeating each line in the data receiving sequence regardless of the field. As the line flicker is displayed in this mode, it is available for checking the line flicker of the telop work and so on.</li> </ul> |

| Submenu          | Setting   |
|------------------|---|
| SD PIXEL MAPPING | <p>Selects SD picture size (pixels) according to input signal format.</p> <ul style="list-style-type: none"> <li>• <b>COMPOSITE&amp;Y/C</b>: Set to monitor the signal input through the LINE connector (VIDEO IN or Y/C IN connector).</li> <li>• <b>RGB/COMPONENT</b>: Set to monitor the signal input through the RGB/COMPONENT connector.</li> </ul> <p><b>When picture signals in the size of 720 × 576 (50i) (or 720 × 487 (60i)) are input</b><br/> Select 720 × 576 (or 720 × 487). This is the default setting.<br/> When 702 × 576 (or 712 × 483) is selected, all sides of the input picture are cut off by several pixels.</p> <p><b>When picture signals in the size of 702 × 576 (50i) (or 712 × 483 (60i)) or equivalent are input</b><br/> Select 702 × 576 (or 712 × 483).<br/> When 720 × 576 (or 720 × 487) is selected, a black border (of several pixels wide) appears around the input picture.</p> |

## Scan mode image

|        |                          | Input |  |
|--------|--------------------------|-------|--|
|        |                          |       |  |
| Output | OVER SCAN (5% OVER SCAN) |       |  |
|        | NORMAL SCAN (0% SCAN)    |       |  |
|        | FULL                     |       |  |

## MARKER SETTING

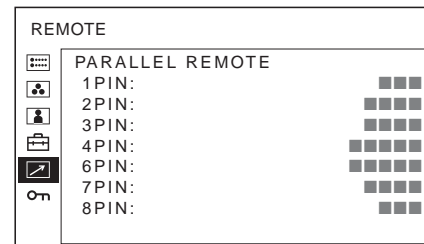


| Submenu       | Setting   |
|---------------|---|
| MARKER ENABLE | Selects ON to display the marker and OFF not to display.  |
| MARKER SELECT | When the frame of the film is displayed on the screen, select the aspect ratio according to the film.<br><b>When 16:9 aspect ratio is selected with the ASPECT select button</b><br>You can select either 4:3 or OFF.<br><b>When 4:3 aspect ratio is selected with the ASPECT select button</b><br>You can select either 16:9 or OFF. |

| Submenu       | Setting   |
|---------------|---|
| CENTER MARKER | Select ON to display the center mark of the picture and OFF not to display.   |
| SAFETY AREA   | Selects the safe area size for the aspect ratio determined by the button which the aspect function is assigned.<br>You can select from among OFF, 80%, 85%, 88%, 90% and 93%.<br>When the marker is displayed, the safe area for the marker is displayed. |
| MARKER LEVEL  | Sets the luminance to display the MARKER SELECT, CENTER MARKER and SAFETY AREA.<br>When the setting is low, the marker is displayed dark.   |

## REMOTE menu

Select the PARALLEL REMOTE connector pins for which you want to change the function.



You can assign various functions to 1 to 4 pins and 6 to 8 pins. The following lists the functions you can assign to the pins.

### REMOTE

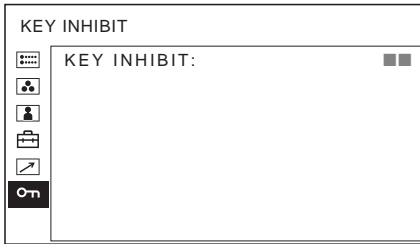
- --- ("---": No function is assigned.)
- LINE
- HDMI
- RGB/COMP
- 16:9
- 4:3
- NORMAL
- OVER
- FULL
- TALLY R
- TALLY G
- EXT SYNC
- BLUE ONLY
- 16:9 MARKER
- 4:3 MARKER
- CENTER MARKER
- SAFE AREA 80%
- SAFE AREA 85%
- SAFE AREA 88%
- SAFE AREA 90%
- SAFE AREA 93%

- SDI

If you use the PARALLEL REMOTE function, you need to connect cables.

*For more details, see page 23.*

## ON KEY INHIBIT menu



You can lock the setting so that they cannot be changed by an unauthorized user.

Select OFF or ON.

If you set to ON, all items are displayed in black, indicating the items are locked.

---

# Troubleshooting

This section may help you isolate the cause of a problem and as a result, eliminate the need to contact technical support.

- **The display is colored in green or purple** → Select the correct input from the RGB/COMP SEL setting in the USER CONFIG menu (page 18).
- **The unit cannot be operated** → The key protection function works. Set the KEY INHIBIT setting to OFF in the KEY INHIBIT menu.

# Specifications

## Picture performance

|  |   |
|--|---|
| LCD panel                                | a-Si TFT Active Matrix  |
| Picture size                             | 15.3 type<br>334 × 200, 390 mm<br>(W/H, Diagonal)<br>(13 <sup>1</sup> / <sub>4</sub> × 7 <sup>7</sup> / <sub>8</sub> , 15 <sup>3</sup> / <sub>8</sub> inches) |
| Resolution                               | 1280 × 768 dots (WXGA)  |
| Viewing angle (LCD panel specifications) | (up/down/left/right, contrast > 10:1)<br>89°/89°/89°/89° (typical)  |
| Scan                                     | Normal 0%<br>Over 5%  |
| Aspect                                   | 15:9  |
| Display color                            | 16,770,000  |

## Input/output connectors

### Input

#### LINE input connectors

|             |  |
|-------------|--|
| Y/C input   | 4-pin mini-DIN (1)   |
| VIDEO input | BNC type (1), 1 V <sub>p-p</sub> ±3 dB, negative synchronization |

#### AUDIO input

Phono jack (1), -5 dBu 47 kΩ or higher

#### RGB/COMPONENT input connectors

|           |   |
|-----------|---|
| BNC type  | (3)   |
| RGB input | 0.7 V <sub>p-p</sub> ±3 dB, (Sync On Green,<br>0.3 V <sub>p-p</sub> negative sync.) |

#### Component input

0.7 V<sub>p-p</sub> ±3 dB, (75% chrominance standard color bar signal)

#### AUDIO input

Phono jack (1), -5 dBu 47 kΩ or higher

#### OPTION IN connector

D-sub 9-pin (1), female

#### OPTION AUDIO IN connector

Phono jack (1), -5 dBu 47 kΩ or higher

#### External synchronized input connector

BNC type (1), 0.3 to 4 V<sub>p-p</sub>  
± bipolarity ternary or negative  
polarity binary

#### HDMI IN connector

HDMI (1)

#### PARALLEL REMOTE input connector

Parallel remote  
Modular connector 8-pin (1)

### Output

#### LINE output connectors

Y/C output 4-pin mini-DIN (1), Loop-through,  
with 75 Ω automatic terminal  
function

#### VIDEO output

BNC type (1), Loop-through, with  
75 Ω automatic terminal function

#### AUDIO output

Phono jack (1), Loop-through

#### RGB/COMPONENT output connectors

#### RGB/Component output

BNC type (3), Loop-through, with  
75 Ω automatic terminal function

#### AUDIO output

Phono jack (1), Loop-through

#### External synchronized output connector

BNC type (1), Loop-through, with  
75 Ω automatic terminal function

#### Built-in speaker output

0.5 W (mono)

## General

Power AC 100 to 240 V, 50/60 Hz

#### Power consumption

Maximum: approx. 50 W, 1.0 A to  
0.5 A

#### Inrush current (1) Maximum possible inrush current

at initial switch-on (Voltage  
changes caused by manual  
switching):  
63A peak, 0.4A r.m.s. (240V AC)

(2) Inrush current after a mains  
interruption of five seconds  
(Voltage changes caused at zero-  
crossing):  
51A peak, 0.3A r.m.s. (240V AC)

#### Operating conditions

##### Temperature

0 °C to 35 °C (32 °F to 95 °F)

##### Recommended temperature

20 °C to 30 °C (68 °F to 86 °F)

##### Humidity

30% to 85% (no condensation)

##### Pressure

700 hPa to 1060 hPa

#### Storage and transport conditions

##### Temperature

-20 °C to +60 °C (-4 °F to +140 °F)

##### Humidity

0% to 90%

##### Pressure

700 hPa to 1060 hPa

#### Accessories supplied

AC power cord (1)  
AC plug holder (1)  
Operating Instructions (1)  
CD-ROM (1)  
Using the CD-ROM Manual (1)

#### Optional accessories

Mounting bracket MB-533  
SDI input adaptor BKM-320D

## HD/SD-SDI input adaptor BKM-341HS

Design and specifications are subject to change without notice.

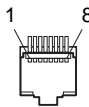
### Note

Always verify that the unit is operating properly before use. SONY WILL NOT BE LIABLE FOR DAMAGES OF ANY KIND INCLUDING, BUT NOT LIMITED TO, COMPENSATION OR REIMBURSEMENT ON ACCOUNT OF THE LOSS OF PRESENT OR PROSPECTIVE PROFITS DUE TO FAILURE OF THIS UNIT, EITHER DURING THE WARRANTY PERIOD OR AFTER EXPIRATION OF THE WARRANTY, OR FOR ANY OTHER REASON WHATSOEVER.

## Pin assignment

### PARALLEL REMOTE connector

Modular connector  
(8-pin)



| Pin number | Functions                              |
|------------|--|
| 1          | Designating LINE input signal          |
| 2          | Designating HDMI input signal          |
| 3          | Designating RGB/COMPONENT input signal |
| 4          | 16:9                                   |
| 5          | GND                                    |
| 6          | 4:3                                    |
| 7          | Selecting NORMAL                       |
| 8          | Selecting OVER                         |

*For details on function allocations, see REMOTE menu (page 20).*

### Wiring required to use the Remote Control

Connect the function you want to use with a Remote Control to the Ground (Pin 5).

## Video signal formats

The unit is applicable to the following signal formats.

| System            | Total lines | Active lines | Frame rate | Scanning format | Aspect ratio | Signal standard                  |
|-------------------|-------------|--------------|------------|-----------------|--------------|----------------------------------|
| 575/50I (PAL)     | 625         | 575          | 25         | 2:1 interlace   | 16:9/4:3     | EBU N10<br>(PAL: ITU-R BT.624)   |
| 480/60I (NTSC) *1 | 525         | 483          | 30         | 2:1 interlace   | 16:9/4:3     | SMPTE 253M<br>(NTSC: SMPTE 170M) |
| 576/50P           | 625         | 576          | 50         | Progressive     | 16:9/4:3     | ITU-R BT.1358                    |
| 480/60P           | 525         | 483          | 60         | Progressive     | 16:9/4:3     | SMPTE 293M                       |
| 1080/24P *1       | 1125        | 1080         | 24         | Progressive     | 16:9         | SMPTE 274M                       |
| 1080/25P          | 1125        | 1080         | 25         | Progressive     | 16:9         | SMPTE 274M                       |
| 1080/30P *1       | 1125        | 1080         | 30         | Progressive     | 16:9         | SMPTE 274M                       |
| 1080/50I          | 1125        | 1080         | 25         | 2:1 interlace   | 16:9         | SMPTE 274M                       |
| 1080/60I *1       | 1125        | 1080         | 30         | 2:1 interlace   | 16:9         | SMPTE 274M/BTA S-001B            |
| 720/50P           | 750         | 720          | 50         | Progressive     | 16:9         | SMPTE 296M                       |
| 720/60P *1        | 750         | 720          | 60         | Progressive     | 16:9         | SMPTE 296M                       |

\*1 Also supports frame rate 1/1.001.

### Applicable DVI input signals

When a PC signal is input to the HDMI IN connector using a DVI conversion cable

| Resolution      | Dot clock (MHz) | fH (kHz) | fV (Hz) |
|-----------------|-----------------|----------|---------|
| 720 × 400 70Hz  | 28.322          | 31.469   | 70.087  |
| 800 × 600 56Hz  | 36.000          | 35.156   | 56.250  |
| 800 × 600 60Hz  | 40.000          | 37.879   | 60.317  |
| 1024 × 768 60Hz | 65.000          | 48.363   | 60.004  |
| 1280 × 768 60Hz | 79.500          | 47.776   | 59.870  |

#### Note

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

When an optional input adaptor is connected, the unit is applicable to the following signal formats.

### When BKM-320D/BKM-341HS is connected

| Input         |          |           |                 |
|---------------|----------|-----------|-----------------|
| System        | BKM-320D | BKM-341HS | Signal standard |
| 575/50I       | ○        | ○         | SMPTE 259M      |
| 480/60I *1    | ○        | ○         | SMPTE 259M      |
| 1080/24PsF *1 | –        | ○         | SMPTE 292M      |
| 1080/25PsF    | –        | ○         | SMPTE 292M      |
| 1080/24P *1   | –        | ○         | SMPTE 292M      |
| 1080/25P      | –        | ○         | SMPTE 292M      |
| 1080/30P *1   | –        | ○         | SMPTE 292M      |

| Input       |          |           |                 |
|-------------|----------|-----------|-----------------|
| System      | BKM-320D | BKM-341HS | Signal standard |
| 1080/50I    | –        | ○         | SMPTE 292M      |
| 1080/60I *1 | –        | ○         | SMPTE 292M      |
| 720/50P     | –        | ○         | SMPTE 292M      |
| 720/60P *1  | –        | ○         | SMPTE 292M      |

○ : Can be input

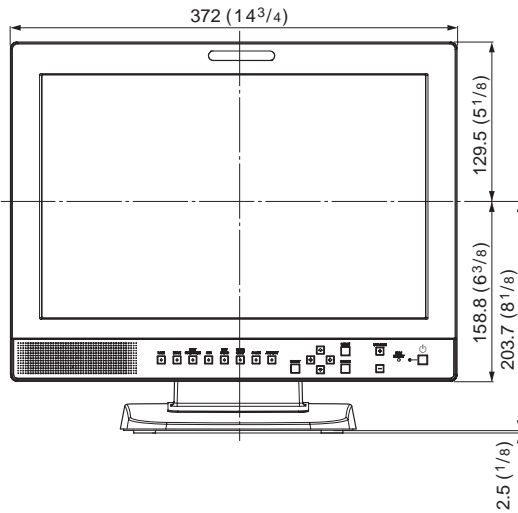
– : Cannot be input

\*1 The frame rate is also compatible with 1/1.001.

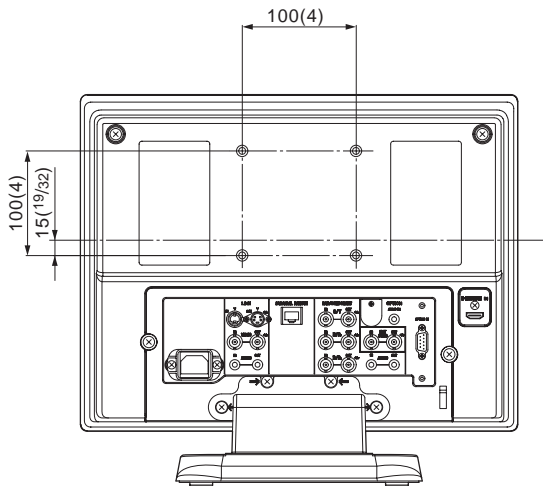


# Dimensions

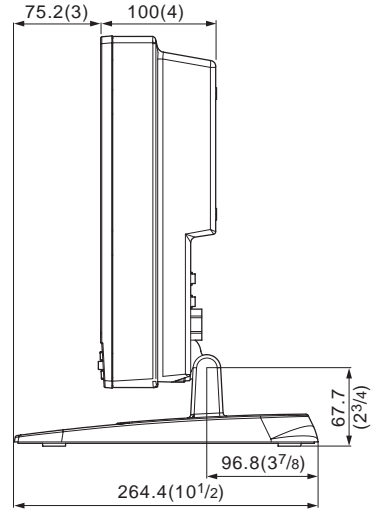
**Front**



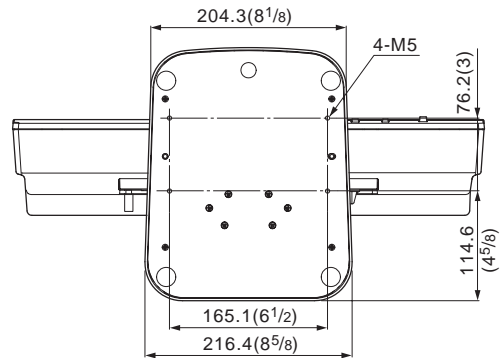
**Rear**



**Side**



**Bottom**



Unit: mm (inches)

Mass:  
Approx. 5.9 kg (13 lb)

# 3.6 inch Monitor and DVR User Manual\*



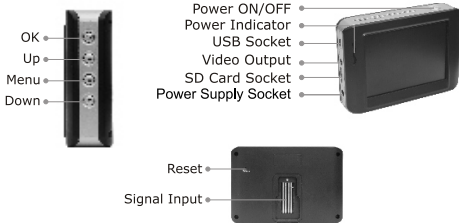
\*manual applies to the following part numbers:

EM16797 - iShot® Sidewinder™ 3.6 inch Monitor and DVR Wedge Mount Kit

EM16627 - iShot® Sidewinder™ 3.6 inch Monitor and DVR Wrist Mount Kit

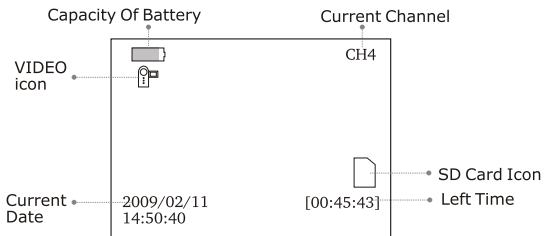
EM15651 - iShot® Sidewinder™ 3.6 inch Monitor and DVR

## Monitor/DVR

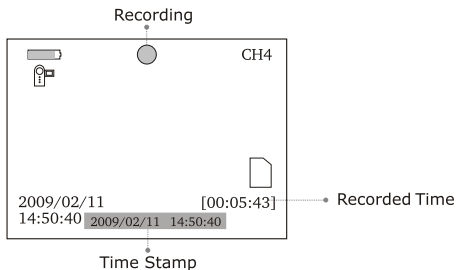


## Record Video

1. During operation, press button to enter VIDEO mode:



2. Press OK button to record:



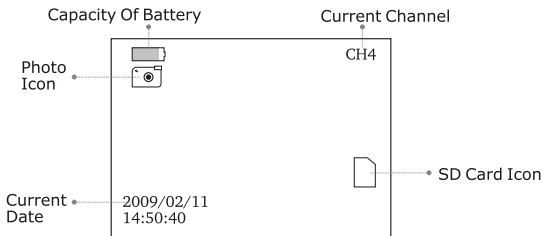
3. Press OK button again to stop recording.

**Notice!**

- \* The Video will be automatically saved as a file every 30 minutes.
- \* SD card is full when the SD card icon changes to “**F**” .

## Take Photo

1. During operation, press **⬆** button to switch to photo mode:



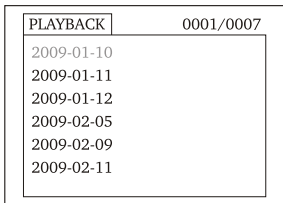
2. Press OK button to take photo.

**Notice!**

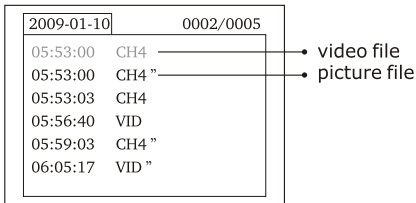
when the SD card icon changes to “**F**” the SD card is full

## Play Video/Picture

1. During operation, press  button to display:



2. Press  or  button to select folder, then press OK button:



3. *For Video:*

Press  or  button to select video, then press OK button to play



Pause: press OK button in playing status to pause;  
press again to resume;  
Fast Forward: press ▲ button in playing status;  
Fast Backward: press ▼ button in playing status;  
Stop/Exit: press ≡ button.

*For Picture:*

Press ▲ or ▼ button to select picture, then press OK button to display, press OK button again to exit.

## Delete Video/Picture

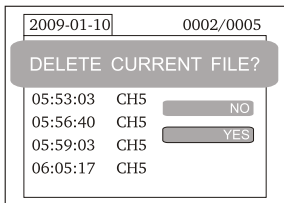
1. During operation, press ≡ button to display:

|            |           |
|------------|-----------|
| PLAYBACK   | 0001/0007 |
| 2009-01-10 |           |
| 2009-01-11 |           |
| 2009-01-12 |           |
| 2009-02-05 |           |
| 2009-02-09 |           |
| 2009-02-11 |           |

2. Press ▲ or ▼ button to select folder, then press OK button :

|            |           |
|------------|-----------|
| 2009-01-10 | 0002/0005 |
| 05:53:00   | CH4 ”     |
| 05:53:00   | CH4       |
| 05:53:03   | CH4       |
| 05:56:40   | VID       |
| 05:59:03   | CH4 ”     |
| 06:05:17   | VID ”     |

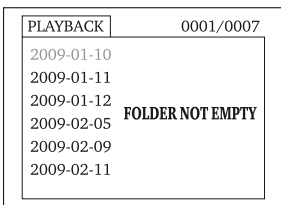
3. Press ▲ or ▼ button to select file, press and hold ⏻ button for 2 seconds:



4. Press ▲ or ▼ button to select "YES", then press OK button to delete selected file; press "NO" to exit.

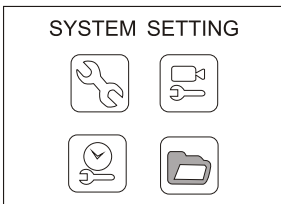
## Delete Folder

To delete a folder, follow the same procedures as deleting a file. Make sure the folder is empty, otherwise it will not delete and a warning will appear.



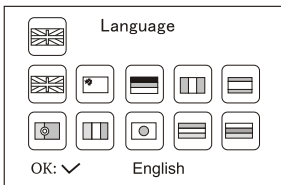
## How To Enter The Setting Mode

During operation, press and hold ⏻ button for about 1-2 seconds to enter into the setting interface:



## Language Setting

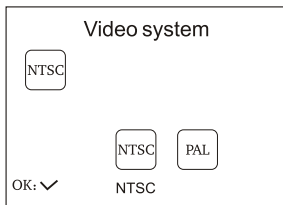
1. In the setting mode, press ▲ or ▼ button to select “SYSTEM SETTING”, press OK button to enter;
2. Press ▲ or ▼ button to select “Language”, press the OK button:



3. Press ▲ or ▼ button to select a suitable language;
4. Press OK button to confirm and exit.

## Video System Setting

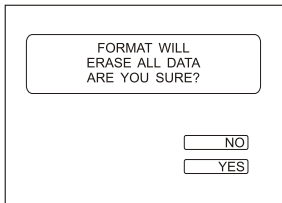
1. In the setting mode, press ▲ or ▼ button to select “SYSTEM SETTING”, press OK button to enter;
2. Press ▲ or ▼ button to select “Video System”, press OK button:



3. Press ▲ or ▼ button to select right type, press OK button to confirm and exit.

## Format

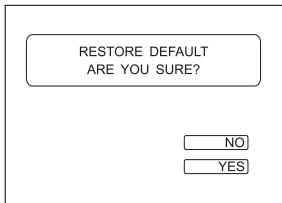
1. In the setting mode, press ▲ or ▼ button to select “SYSTEM SETTING”, press OK button to enter;
2. Press ▲ or ▼ button to select “Format”, press OK button:



3. Press ▲ or ▼ button to select “YES”, then press OK button to erase all data. Press "NO" to exit.

## Default Setup

1. In the setting mode, press ▲ or ▼ button to select “SYSTEM SETTING”, press OK button to enter;
2. Press ▲ or ▼ button to select “Default Setup”, press OK button:



3. Press ▲ or ▼ button to select “YES”, then press OK button to restore default; Press "NO" to exit.

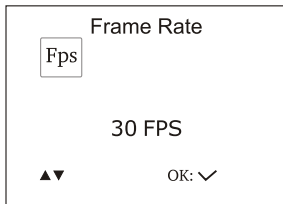


## View Version Information

1. In the setting mode ,press ▲ or ▼ button to select “SYSTEM SETTING”, then press OK button to enter;
2. Press ▲ or ▼ button to select “Version”, press OK button to enter and view the version of product.

## Frame Rate Setting

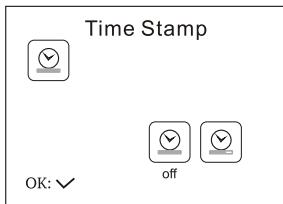
1. In the setting mode, press ▲ or ▼ button to select “RECORDER SETTING”, press OK button to enter;
2. Press ▲ or ▼ button to select “Frame Rate”, press OK button :



3. Press ▲ or ▼ button to select suitable frame rate;
4. Press OK button to confirm and exit.

## Time Stamp Setting

1. In the setting mode, press ▲ or ▼ button to select “RECORDER SETTING”, press OK button to enter;
2. Press ▲ or ▼ button to select “Time Stamp”, press OK button :

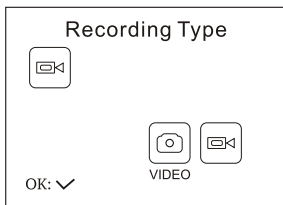


3. Press ▲ or ▼ button to select “Off”, “On”, press OK button to confirm and exit.

## Recording Type

1. In the setting mode, press ▲ or ▼ button to select “RECORDER SETTING”, press OK button to enter;
2. Press ▲ or ▼ button to select “Recording Type”, press OK button:

Select  
“VIDEO”  
or  
“STILL”



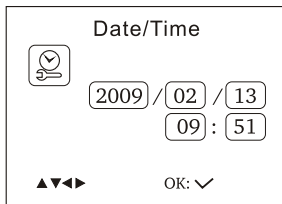
3. Press ▲ or ▼ button to select “STILL”, “VIDEO”, press OK button to confirm and exit.

**Notice!**

when in “STILL” mode, you cannot record video

## Date/Time Setting

1. In the setting mode, press ▲ or ▼ button to select “Date/Time”, press OK :



2. Press OK button to select Date or Time; press ▲ or ▼ button to modify; press ⏸ button to confirm and exit.

## EVENT PLAYBACK

1. In the setting mode, press ▲ or ▼ button to select “EVENT PLAYBACK”, press OK button to enter;
2. Other operation see “Play Video/Picture”, “Delete Video/Picture”, “Delete Folder” section.

# SPECIFICATIONS

## **Monitor/ Recorder**

|                  |  |   |
|------------------|--|---|
| <i>screen</i>    | type . . . . .                                     | 3.6" TFT LCD w/ anti-reflective coating |
|                  | pixels . . . . .                                   | 640 × 480                               |
|                  | viewing angle . . . . .                            | 50 degrees                              |
| <i>recording</i> | media . . . . .                                    | micro SD card (up to 32 GB)             |
|                  | video . . . . .                                    | AVI at 640 × 480 and up to 30 fps       |
|                  | images . . . . .                                   | JPG at 640 × 480                        |
| <i>outputs</i>   | phono . . . . .                                    | (analog video)                          |
|                  | mini USB . . . . .                                 | (digital video files)                   |
| <i>wireless</i>  | range . . . . .                                    | up to 32'                               |
|                  | format . . . . .                                   | 2.4 GHz at FM                           |
|                  | charge/operating time . . . . .                    | 3 hr. / 1.5–3 hr.                       |
| features . . .   | time/date stamp, 10 languages, selectable PAL/NTSC |   |

\* Actual transmission range may vary according to the weather, location, interference and building construction.

\* All the specifications are subject to minor change without prior notice.

## WARRANTY INFORMATION

### Consumer Warranty

This Sidewinder™ inspection camera is warranted to the original purchaser for a period of one year from the date of original purchase against all defects in materials and workmanship. This limited warranty is void if the unit is abused, modified, installed improperly, or if the housing and/or serial numbers have been removed. There are no express warranties covering this product other than those set forth in this warranty. All express or implied warranties for this product are limited to the above time. Peerless Creations LLC is not liable for damages arising from the use, misuse, or operation of this product. During the warranty period, defective units will be repaired without charge to the purchaser when returned with a dated receipt to the address below. Units returned without a dated receipt will be handled as described in section "Service Out of Warranty".

*Note: Damage caused by incorrect battery placement or battery leakage is not covered under this warranty.*

When returning a unit for service, please follow these instructions:

1. Ship the unit in the original carton or in a suitable sturdy equivalent, fully insured, with return receipt request to: Sidewinder™ Repair Dept.

1705 US Highway 46  
Ledgewood, NJ 07852

Please allow 3 weeks turnaround time.

**Important: Peerless Creations will not assume responsibility for loss or damage incurred in shipping. Therefore, please ship your unit insured with return receipt requested. CODs will not be accepted!**

2. Include with your unit the following information, clearly printed:

- Your name and street address (for shipping via UPS, FedEx or DHL), a daytime telephone number and an email address.
- A detailed description of the problem (e.g., "Cannot adjust brightness").
- A copy of your dated receipt or bill of sale.

3. Be certain your unit is returned with its serial number. For reference, please write your unit's serial numbers in the following spaces: Monitor S/N:                      Reel S/N:

Units without serial numbers are not covered under warranty. Important: To validate that your unit is within the warranty period, make sure you keep a copy of your dated receipt. You may register your warranty by sending an email to [warranty@sidewindercam.com](mailto:warranty@sidewindercam.com)

### Service Out of Warranty

Units will be repaired at "out of warranty" service rates when:

- The unit's original warranty has expired.
- A dated receipt is not supplied.
- The unit has been returned without its serial number.
- The unit has been abused, modified, installed improperly, or had its housing removed.

# FCC INFORMATION

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,
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: Changes or modifications not expressly approved could void the user's authority to operate the equipment.

## EU Environmental Protection

Waste electrical products should not be disposed of with household waste. Please recycle where facilities exist. Check with your Local Authority or retailer for recycling advice.



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