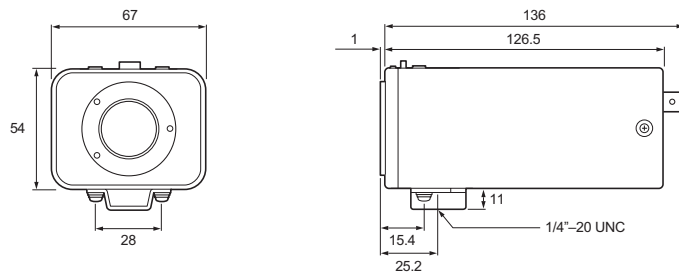


COLOR CCD camera

**About this manual**

Before installing and using the camera, please read this manual carefully. Be sure to keep it handy for later reference.

**● Dimensions: mm**



Depending on the conditions of use, installation and environment, please be sure to make the appropriate settings and adjustments. If you need help with installation and/or settings, please consult your dealer.

## INFORMATION TO USER

### Safety Guard



**THIS SYMBOL INDICATES THAT THERE ARE IMPORTANT OPERATING AND MAINTENANCE INSTRUCTIONS IN THE LITERATURE ACCOMPANYING THIS UNIT.**

**WARNING:**  
**TO PREVENT THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.**

**For the customers in Canada**  
This Class B digital apparatus complies with Canadian ICES-003.  
**Pour la clientèle canadienne**  
Cet appareil numérique de la Classe B est conforme à la norme NMB-003 du Canada.

This installation should be made by a qualified service person and should conform to all local codes.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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.

Changes or modifications not expressly approved by Sanyo may void the user's authority to operate this camera.

## PRECAUTIONS

**■ In case of problem**

Do not use the camera if smoke or strange odors come from the unit, or if it seems not to function correctly. Disconnect the power cord immediately, and consult your dealer or a Sanyo Authorized Service Center.

**■ Do not open or modify**

Do not open the cabinet, as it may be dangerous and cause damage to the unit. For internal settings and repairs, consult your dealer or a Sanyo Authorized Service Center.

**■ Do not put objects inside the unit**

Make sure that no metal objects or flammable substances get inside the camera. If used with a foreign object inside, it could cause fire, short-circuits or damage. If water or liquid gets inside the camera, disconnect the power cord immediately, and consult your dealer or a Sanyo Authorized Service Center. Be careful to protect the camera from rain, sea water, etc.

**■ Be careful when handling the unit**

To prevent damage, do not drop the camera or subject it to strong shock or vibration.

**■ Install away from electric or magnetic fields**

If installed close to a TV, radio transmitter, magnet, electric motor, transformer, or audio speakers, the magnetic field they generate will distort the image.

**■ Protect from humidity and dust**

To prevent damage to the camera, do not install it where there is greasy smoke or steam, where the humidity may get too high, or where there is a lot of dust.

**■ Protect from high temperatures**

Do not install close to stoves, or other heat generating devices, such as spotlights, etc., or where it could be subject to direct sunlight, as that could cause deformation, discoloration or other damage.

Be careful when installing close to the ceiling, in a kitchen or boiler room, as the temperature may raise to high levels. Install where the temperature range will stay between -10°C (14°F) and 50°C (122°F). (no condensation)

**■ Cleaning**

- Dirt can be removed from the cabinet by wiping it with a soft cloth. To remove stains, use a soft cloth moistened with a soft detergent solution and wrung dry, then dry by wiping with a soft dry cloth.
- Do not use benzine, thinner or other chemical products on the cabinet, as they may cause deformation and paint peeling. Before using a chemical cloth, make sure to read all accompanying instructions. Make sure that no plastic or rubber material comes in contact with the cabinet for extended periods, as that may cause damage or paint peeling.

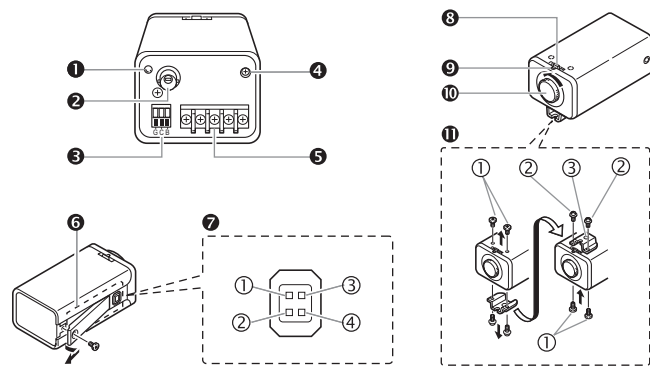
Printed on recycled paper

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L5AN4/US (0307TR-SY)



SANYO Electric Co., Ltd.  
Printed in Japan

## NAMES AND FUNCTIONS OF PARTS



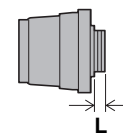
- 1 POWER (power indicator)**  
Lights when the camera power is ON.
- 2 VIDEO OUT (video output terminal: BNC connector)**  
Connects to the VIDEO IN (video input) terminal on the VCR or monitor.
- 3 CONTROL (Manual color/black and white setting terminal)**
  - G (ground) terminal
  - C (color) terminal
  - B (black and white) terminal
- 4 LINE PHASE (Line phase adjustment volume)**  
When using two cameras or more, the image on the monitor may roll vertically when switching sources. This rolling can be minimized by turning this volume.
- 5 GND, AC24V, DC12V (ground terminal, 24V AC or 12V DC input terminal)**
- 6 Camera adjustment/setting panel**  
Contains camera adjustment dials and setting switches.
- 7 LENS (lens iris output terminal)**  
Used to connect the lens plug when the lens is attached.
  - ① Brake coil (-)    ② Brake coil (+)
  - ③ Drive coil (+)    ④ Drive coil (-)

- 8 Flange-back adjustment lever**
- 9 Flange-back lock screw**
- 10 Lens cap**  
Protects the lens from damage.
- 11 Camera installation bracket**  
The bracket can be secured at the top or bottom of the camera. When securing the bracket, use the long screws and use the short screws on the opposite side to seal the openings.
  - ① Short screws: M3 x 4
  - ② Long screws: M3 x 6
  - ③ Camera mounting screw hole: 1/4"-20 UNC

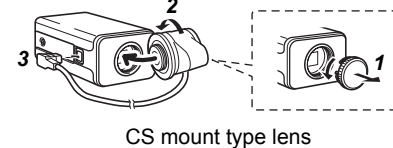
**! CAUTION**  
When installing the camera support, select a location that can support the total weight of the camera and accessories.

**● Attaching the lens**  
Use a DC type auto-iris lens (sold separately).

- ! CAUTION**
  - Do not use a lens if length "L" is more than 5 mm. Otherwise, it may damage the camera and prevent proper installation.
  - When attaching a C mount lens, attach the lens to the camera after inserting the C mount ring (option).



- 1 Remove the lens mount cap from the camera.**
- 2 Install the auto-iris lens.**
- 3 Connect the lens plug to the lens iris output connector (LENS) on the side of the camera.**



## TROUBLESHOOTING

Before sending the camera out for repair, check the items below. If the problem persists after checking these items, contact your place of purchase or a Sanyo Authorized Service Center.

- If no image appears**
  - Is the coaxial cable attached securely?
  - Are the power and voltage normal?
  - Has the iris of the lens inside the camera been adjusted correctly (with the iris dial)?
  - Is there adequate illumination?
- If the image is unclear**
  - Is the lens in focus?
  - Is the lens dirty?  
Dirt or fingerprints on the lens can adversely affect the image. Gently wipe any dirt or fingerprints off the lens with a soft cloth or lens cleaning paper and cleaning fluid (commercially available).
  - Is the monitor adjusted correctly?

## SERVICE

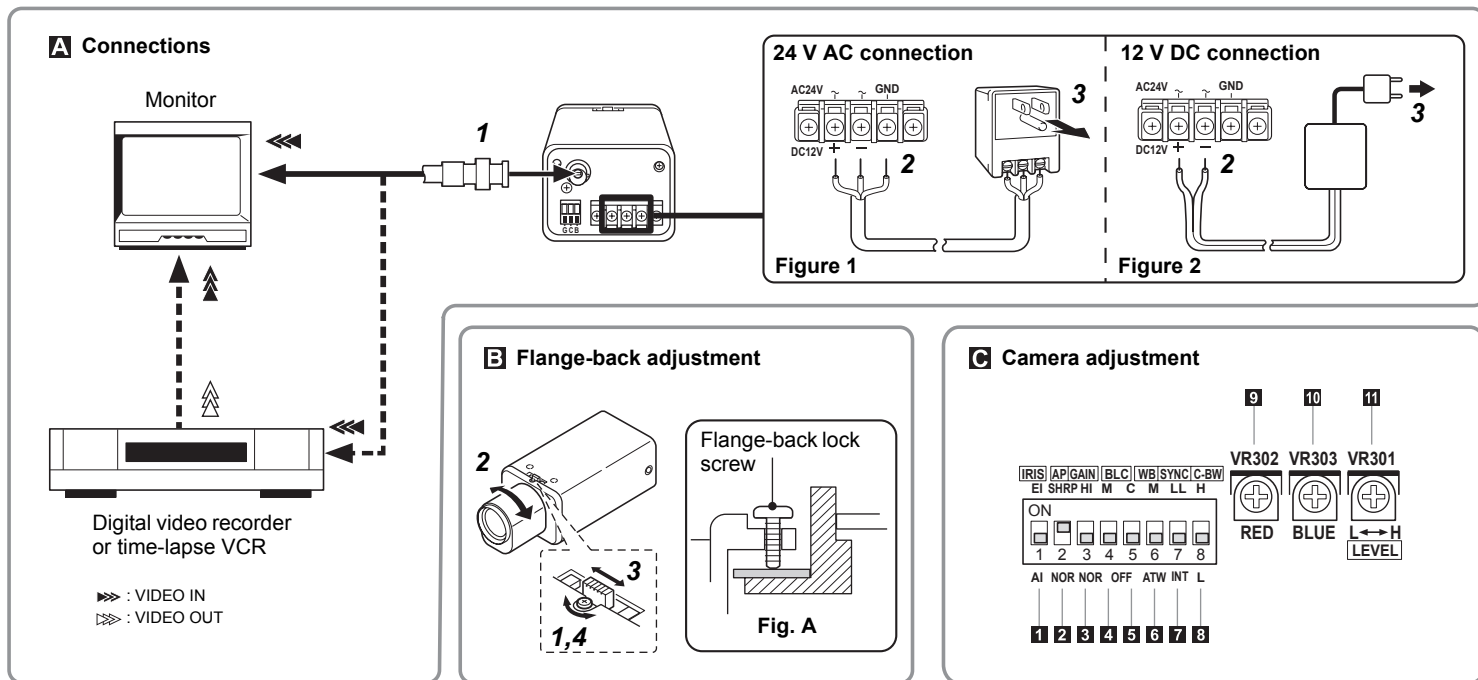
The camera is a precision instrument. Handle it carefully and always follow the safety precautions. If the camera requires service, never try to repair it yourself or open the casing. For servicing, maintenance, or repairs, contact your place of purchase or a Sanyo Authorized Service Center.

## SPECIFICATIONS

Scanning system	: NTSC standard TV system (525 TV lines, 30 frames/sec.)
Interface	: PLL 2:1 interlace
Image device	: 1/4 inch solid state image device CCD
Picture elements	: 537 (H) x 505 (V)
Effective picture elements	: 510 (H) x 492 (V)
Synchronizing system	: Internal sync, Line lock manually switchable
Resolution	: 350 TV lines horizontally (color mode), 380 TV lines horizontally (B/W mode), 350 TV lines vertically
Video output level	: 1.0 Vp-p/75 ohms, composite
Video S/N ratio	: More than 48 dB
Minimum required illumination	: Approx. 0.05 lux with a F 1.2 lens (B/W mode), Approx. 0.9 lux with a F 1.2 lens (color mode), (incandescent lighting)
Day/Night	: AUTO/MANUAL (at CONTROL terminal)
Control terminal	: Manual color/black and white setting
Backlight compensation	: MULTI/OFF switching CENT/OFF switching (Active when using an auto-iris lens)
Iris function	: EI/AI switching
Auto-iris lens output	: DC output (variable DC level), 4-pin terminal
Electronic iris range	: 0.9 lux to 45000 lux (F 1.2 lens: color mode)
Flange-back	: 12.5 mm ±0.5 mm
White balance	: ATW/Manual switching
Gain up	: HI (high)/ NOR (Normal) switching
Lens mount	: CS mount
Environmental conditions	: Temperature: -10°C – +50°C Humidity: less than 90% (no condensation)
Power supply	: 12 – 15 VDC/24 VAC, 60 Hz (±10%)
Power consumption	: 3.2 W (with auto iris lens)
Weight	: Approx. 430 g (without lens)

Appearance and specifications are subject to change without prior notice.

# CONNECTIONS



## A CONNECTIONS

### What you need

- Peripheral equipment (such as monitor, digital video recorder or time-lapse VCR)
- Cables for connecting peripheral equipment and camera (coaxial cables, connecting plugs)
- Power adapter (24 V AC or 12 V DC)

### Supported coaxial cables

- You can use any of the following coaxial cables:
- RG-59U (3C-2V) Length: About 250 m max.
  - RG-6U (5C-2V) Length: About 500 m max.
  - RG-11U (7C-2V) Length: About 600 m max.

### CAUTION

- When using an RG-59U (3C-2V) cable, do not use it on piping or air wiring.
- Select the cable according to the distance between the devices you wish to connect.
- If you use a cable other than the types above, the image or sync signal will be attenuated and will not be transmitted correctly.

### Making connections

- Connect the camera and peripheral equipment.
- Connect the power cable.
  - <When using a 24 V AC adapter> Connect 3 wire grounded cable (use 18AWG+) to the ground (GND) terminal as shown in Figure 1.
  - <When using a 12 V DC adapter> Connect the cable as shown in Figure 2.

### CAUTION

- When connecting the power cable to the camera, check that the polarity is correct.
  - To prevent a fire hazard use any UL listed wire rated VW-1 for the 24 V AC cable input terminal.
- Insert the power adapter plug into the wall outlet. The power indicator (POWER) lights.

### Color/black and white setting

Connect each pin of the CONTROL terminal as indicated below, to set the image to color or black and white manually. You can adjust the image by remote control.

- Color image setting**  
Connect the C (color) and the G (ground) pins.
- Black and white setting**  
Connect the B (black and white) and the G (ground) pins.

CONTROL terminal		Image
C	B	Auto
OFF	OFF	Auto
OFF	ON	Black and white
ON	OFF	Color
ON	ON	Auto

ON: Close OFF: Open

### CAUTION

- The maximum length of cable for the CONTROL terminal is 400 m (AWG24).
- During optical filter switching, even if the manual switching operation is complete, you cannot determine if the image is color or black and white. Manual switching will have to be performed one more time.

## B FLANGE-BACK ADJUSTMENT

If the pick-up surface is not correctly positioned with relation to the lens focal point, the picture will be out of focus (in particular when using auto-iris power zoom lenses, sold separately). If that is the case, adjust the flange-back position as described below.

- Using a + screwdriver, loosen the flange-back lock screw (M2:+).
- Set the zoom lens to the maximum telephoto position and set the focus using the focus ring on the lens.
- Set the zoom lens to the maximum wide angle position and set the focus using the flange-back adjustment lever.
- Repeat steps 2 and 3, until the image stays in focus when changing from a telephoto shot to a wide angle shot. When the setting is complete, tighten the flange-back lock screw.

### CAUTION

When the flange-back lock screw is completely tightened it will protrude slightly as shown in the illustration (Fig. A). Do not tighten the screw further.

## C CAMERA ADJUSTMENTS/SETTINGS

The camera comes pre-adjusted and ready to install at time of factory shipment, but you may want to make adjustments or settings to adapt to the operating conditions or installation environment. If you have trouble adjusting the camera, contact your place of purchase or a Sanyo Authorized Service Center.

### Iris setting

Change Iris setting when using either lens below.

EI (for indoor use)	When using a manual or fixed iris lens and the electronic iris function is on. * Set the lens aperture to the shortest F stop.
AI	When using an auto-iris lens.

### CAUTION

- The electronic iris is suitable for normal indoor use. When switch 1 (IRIS) is set to the up (EI) position, do not use an auto-iris lens.
- If used under fluorescent light, the image may flicker. In such a case, change to incandescent lighting or set switch 1 (IRIS) to the down (AI) position and use an auto-iris lens.
- When shooting bright subjects, pay attention to the light angle in order to avoid or minimize the smear effect.
- If conditions are outside the electronic iris operation range or more than the maximum illumination, the CCD will be saturated. In that case, use the auto iris lens.

### Aperture (outline compensation)

If object outlines appear too strongly, set to "NORM".

SHRP	Emphasizes object outlines.
NORM	Normal setting

### Gain control (AGC)

For adjusting the sensitivity of the camera. Use this setting for shooting in dark environments.

HI	Increased sensitivity allows shots to be taken in dark environments.
NORM	Normal setting

### CAUTION

The HI setting causes noise generation and a grainy image.

### Backlight compensation

This camera has two different backlight compensation functions: Normally backlight compensation switch 4 and 5 are set to the down (OFF) position. Change the backlight compensation switch settings depending on the conditions.

<p>4 5</p> <p>When there is backlight in the entire screen</p>	<p><b>Multi-spot metering</b></p> <p><b>CAUTION</b></p> <p>If the background of the object is extremely dark, the center of the object may be too bright. In this case, set center-weighted metering mode.</p>
<p>4 5</p> <p>When there is backlight only in the background</p>	<p><b>Center-weighted metering</b></p> <p>Only the center of the image is metered and backlight-compensated.</p> <p><b>CAUTION</b></p> <p>Do not set switches 4 and 5 both to "ON". Compensation will not be performed correctly with this setting.</p>

### White balance (color compensation)

MANU	Lets you fine-tune the white balance manually.	
	WB	• R (Red) dial 9: Turn clockwise to augment screen red. • B (Blue) dial 10: Turn clockwise to augment screen blue.
ATW	Compensation is performed automatically.	

### Sync setting

Vertical sync disturbance may occur when a selector is used to switch between multiple cameras connected to one monitor. To prevent vertical sync disturbance, set to "LL."

LL (external sync)	Adjust PHASE dial to eliminate sync disturbance.
INT (internal sync)	Internal Sync

- LL (Line-Lock): Synchronizes the unit with power frequency.



### CAUTION

If image disturbance doesn't disappear after adjusting the PHASE dial on the second and subsequent cameras, adjust the PHASE dial on the first camera. If the problem persists, check that all the devices have been connected with the correct power cable polarity.

### Color/black and white switch setting

This switch lets you select the timing of the automatic switching of the optical filter to color image or black and white image, according to the subject brightness.

H	For a brighter setting than L
L	Standard setting

When the power is turned off and then on, switching will restart from color.

### CAUTION

- A sound of the optical filter may be heard when the color image or black and white image is switched. Also, the image will be distorted (black lines may appear on the screen). This is normal and does not indicate a problem.
- When using infrared lighting, and if there is a strong reflection on the subject, the optical filter may switch from black and white to color mode.
- The focus setting may be different in color and black and white mode. Please check and adjust the focus setting in both modes.

### Iris dial (lens iris)

If the entire image is too dark or too bright, adjust the LEVEL dial.

L (Low)	Closes the lens iris, making the entire image darker.
H (High)	Opens the lens iris, making the entire image brighter.

## SANYO INDUSTRIAL VIDEO COLOR VIDEO CAMERA LIMITED WARRANTY

### OBLIGATIONS

In order to obtain warranty service, the product must be delivered to and picked up from an Authorized Sanyo Service Center at the user's expense, unless specifically stated otherwise in this warranty. The names and addresses of Authorized Sanyo Service Centers may be obtained by calling the toll-free number listed below.

For product operation, authorized service center referral, service assistance or problem resolution, call

**CUSTOMER INFORMATION 1-800-421-5013**  
Weekdays 8:30 AM - 5:00 PM Pacific Time

For accessories and/or parts, call  
**PARTS ORDER INFORMATION 1-800-726-9662**  
Weekdays 8:30 AM - 5:00 PM Pacific Time

THIS WARRANTY IS VALID ONLY ON SANYO PRODUCTS PURCHASED OR RENTED IN THE UNITED STATES OF AMERICA, EXCLUDING ALL U.S. TERRITORIES AND PROTECTORATES. THIS WARRANTY APPLIES ONLY TO THE ORIGINAL RETAIL PURCHASER OR END-USER. THE ORIGINAL DATED BILL OF SALE, SALES SLIP OR RENTAL AGREEMENT MUST BE SUBMITTED TO THE AUTHORIZED SANYO SERVICE CENTER AT THE TIME WARRANTY SERVICE IS REQUESTED.

Subject to the OBLIGATIONS above and EXCLUSIONS below, SANYO Fisher Company warrants this SANYO product against defects in materials and workmanship for the periods specified below. SFC will repair or replace (at its option) the product and any of its parts which fail to conform to this warranty. The warranty period commences on the date the product was first purchased or rented at retail.

LABOR	PARTS	IMAGE DEVICE
3 YEARS	3 YEARS	3 YEARS

### EXCLUSIONS

This warranty does not cover (A) the adjustment of customer-operated controls as explained in the appropriate model's instruction manual, or (B) the repair of any product whose serial number has been altered, defaced or removed. This warranty shall not apply to the cabinet or cosmetic parts, batteries or routine maintenance. This warranty does not apply to uncrating, setup, installation, removal of the product for repair or reinstallation of the product after repair. This warranty does not apply to repairs or replacements necessitated by any cause beyond the control of SFC including, but not limited to, any malfunction, defect or failure caused by or resulting from unauthorized service or parts, improper maintenance, operation contrary to furnished instructions, shipping or transit accidents, modification or repair by the user, abuse, misuse, neglect, accident, incorrect power line voltage, fire, flood or other Acts of God, or normal wear and tear.

The foregoing is in lieu of all other expressed warranties and SFC does not assume or authorize any party to assume for it any other obligation or liability. SFC DISCLAIMS ALL OTHER WARRANTIES EXPRESS OR IMPLIED, WITH REGARD TO THIS PRODUCT (INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS). IN NO EVENT SHALL SFC BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING FROM THE OWNERSHIP OR USE OF THIS PRODUCT OR FOR ANY DELAY IN THE PERFORMANCE OF ITS OBLIGATIONS UNDER THIS WARRANTY DUE TO CAUSES BEYOND ITS CONTROL. SFC'S LIABILITY FOR ANY AND ALL LOSSES AND DAMAGES RESULTING FROM ANY CAUSE WHATSOEVER, ARISING OUT OF OR IN CONNECTION WITH THE SALE, USE OR OWNERSHIP OF THIS PRODUCT INCLUDING WARRANTY OR NEGLIGENCE, ALLEGED DAMAGED OR DEFECTIVE GOODS, WHETHER SUCH DEFECTS ARE DISCOVERABLE OR LATENT, SHALL IN NO EVENT EXCEED THE PURCHASE PRICE OF THE PRODUCT.

### ATTENTION

For your protection in the event of theft or loss of this product, please fill in the information below for your own personal records.

Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_  
(Located on back or bottom side of unit.)  
Date of Purchase \_\_\_\_\_ Purchase Price \_\_\_\_\_  
Where Purchased \_\_\_\_\_