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CCD Monochrome Video Camera

CS8320B (E I A)
CS8320BC (CCIR)

Operation Manual

For customer Use

Enter below the Serial No. which is located on the bottom chassis of the camera.

Retain this information for future reference,

Model No. CS _____

Serial No. _____

CAUTION

To prevent electric shock, do not use the polarized plug of the AC Power adapter with an extension cord, receptacle or other outlet unless the blades can be fully inserted to prevent blade exposure.

When the camera is used within an electromagnetic field, beat interference (vertical, horizontal or diagonal stripes) may be created in the video output. If this occurs, take measures on the source of the electromagnetic waves to prevent the emissions from affecting the video output.

Such measures are particularly necessary on systems with servo motors, inverters and other equipment that tends to generate electromagnetic waves.

Do not subject the camera to strong shocks, as this may result in failure or breakage.

When the camera is used on systems which subject the camera connector to strong shocks, the camera connector may suffer damage. If the camera is used on such systems, the connector plug should be fastened to the camera with the optional camera connector bracket.

TOKYO ELECTRONIC INDUSTRY CO.,LTD:

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WARNING

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

This equipment should be used with DC12V only. Do not use any other power source.

INFORMATION

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. If does so, 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:

the receiving antenna ;
Relocate this equipment with respect to the receiver ;
Move this equipment away from the receiver ;
Plug this equipment into a different outlet so that this equipment and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.

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Thank you for purchasing the **TELI** CS8330B/CS8330BCCS8311BC TV B/W camera featuring compact and light weight.

To take best advantage and gain the most service from your camera, read this operation manual carefully and thoroughly.

1. FEATURES

* Compact and light weight.
* Available External sync-operation.
* One piece configuration.
* Equipped with AGC (Automatic Gain Control) which allows wide dynamic range from bright to dark subjects.
* Equipped with an electronic shutter for fast moving subjects for better definition picture.
* Using the Restart-Reset function, it is possible to acquire the image at any timing according to the R.R pulse input (VD input). (This function can be turned ON/OFF by an internal switch.)
* Using the special shutter function, it is possible to acquire the image at any shutter timing or shutter speed according to the shutter trigger and R.R pulse inputs. (This function can be turned ON/OFF by an internal switch.)

2. PRECAUTION

(1) This equipment should be used with DC12V only.
To prevent electric shocks and fire hazards, do not use any other power source.

(2) The CS8330B/CS8330BC is designed to be used with EIA/CCIR monochrome television signals. It cannot be used for playback with a television of a different standard.

(3) Please handle the equipments carefully.

(4) Do not point your camera lens directly into sunlight or strong artificial light. This might cause irreparable damage to the image sensor.
Also, be sure to use the lens cap when the camera is not in use.

(5) Do not expose the camera unit to high temperatures. For example, do not place it near a stove for long periods, or in direct sunshine or in a car in hot weather. Heat may cause some malfunction.

(6) Keep the camera clean. Dust can damage the camera and cause trouble in moving parts.
Take particular care to avoid the entry of sand or grit when changing the camera lens.

(7) Avoid jolting the equipments or exposing it to vibration.

(8) Never attempt to dismantle the equipments.

(9) Avoid folding or stretching the camera cable or other connection cable between equipments.

(10) When the cabinet is dusty, clean by gently wiping with a soft cloth. And avoid the use of strong cleaning agents such as benzine or alcohol as they may damage the cabinet.

IMPORTANT

The camera provides four screw holes at the bottom chassis which are used to mount the attachment plate for tripod and so on.

Do not use longer screws over 4mm. Because there is a printed circuit board closed to the bottom chassis, and the PC board may cause damage it.

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3. CONTROLS AND ADJUSTMENTS

Get to know the name and function of every part of your camera. That way, you can take advantage of every applications to take beautiful pictures.

The body and accessories shown below.

3-1. Lens

(1) Iris ring

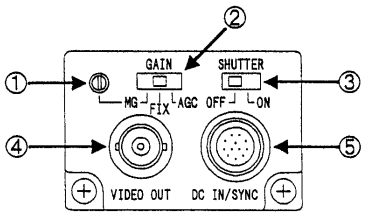
(Aperture ring) for use at manual operation. To reduce aperture, rotate the iris ring toward CLOSE (clockwise). To increase aperture, rotate the iris ring toward OPEN (counter clockwise). Adjust the lens aperture according to the amount of light entering the lens so that correct exposure is obtained.

(2) Focus ring

Take the focus with the ring to focus for the sharpest picture.

* CS8330B/CS8330BC camera is equipped with "C" mount lens, and you can use any C-mount lenses according to your applications.
* No lens is included in the provided accessories, make choice of the most appropriate lens as necessary.

3-2. Camera Rear Panel



①GAIN adjustment pot.

Turn it clockwise to increase video gain.

②GAIN selection switch

When the gain selection switch of this camera is set to the right position (AGC), the AGC function becomes effective. The gain becomes fixed when this switch is at the middle position (FIX). When this switch is set to the left position (MG ; Manual Gain), the gain can be adjusted manually by rotating the gain adjustment knob ①

(The switch is set to the FIX position when shipped from the factory.)

③ SHUTTER (Electronic Shutter)

The camera incorporates an electronic shutter with a variable speed function ranging from 1/50 to 1/10,000th seconds, allowing for better definition of a subject moving at a high speed. Normally, put it "OFF" position at the left side, which is set a shutter speed of 1/60 (EIA) or 1/50 (CCIR) seconds. When required electronic shutter, put it "ON" position and select any speed required the system by the switch on PC board in the camera.

④ VIDEO OUT connector

The composite video signal is come out from this connector which is employed with BNC type.

⑤DC IN/SYNC connector

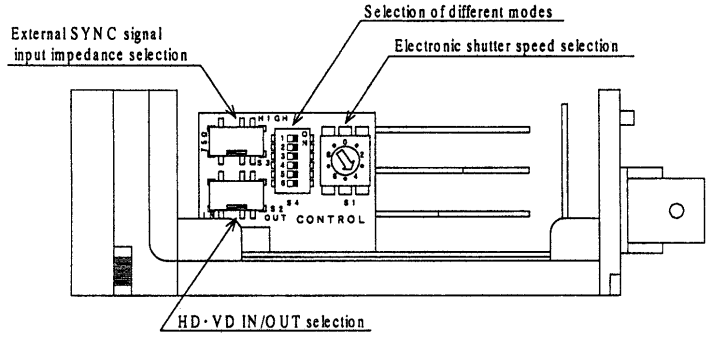
This connector is composed of 12 pins, and DC12V, HD, VD-inputs, Clock pulse, Video output and so on, their assignment are as the table in page 12 for more detail.

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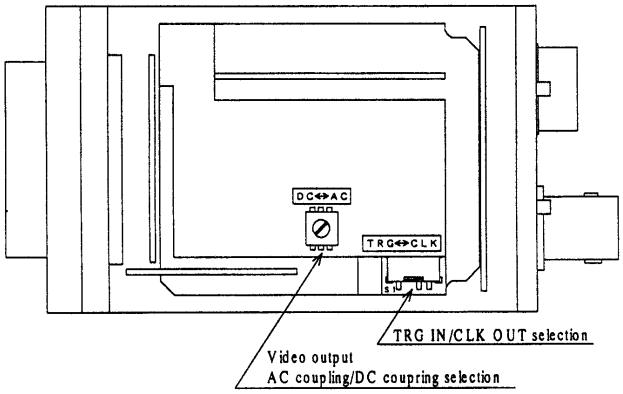
3-3. Explanation of internal selection switches

The internal structure of this camera is as shown in the figure below.

● Side view after opening the camera cover



● Top view after opening the camera cover



(1) Method of setting the different modes

The different modes can be set using the switch S4 in the CONTROL board. The mode can be selected by moving the DIP switches 1 to 6 to the left or the right position.
Each switch becomes OFF in the left position and ON in the right position. At the time of shipment from the factory, all the switches will have been set to the left position.

No.	Function name	Switch setting position	
		OFF	ON
1	gamma correction	1.0	0.45
2	CCD operation mode	Frame store	Field store
3	Restart-Reset	OFF	ON
4	Special shutter	OFF	ON
5	Not used	----------	----------
6	VD/FLD output	VD output	FLD output

(2) "GAMMA" (Gamma correction)

Generally, TV camera provides gamma correction in the video-process amplifiers which make up opposite side for non-linear characteristics based on CRT's electron gun in TV receiver, and the total performances of the video system have linear (gamma ; 1.0). Usually, use the gamma correction "ON" position which set the standard camera gamma-value of 0.45. And if required gamma "OFF" (gamma value ; 1.0) with the system, turn it to "OFF" position.

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(3) Shutter speed

When required electronic shutter, put SHUTTER switch on the rear panel to "ON" position and select any speed.

(4) "F.L" (Flicker-Less)

Where the illumination of fluorescent lamps are used in the power frequency area of 50Hz (EIA) or 60Hz (CCIR), a flicker may appear on the picture. And if set S1 to "F.L" position according to the table, it will be set the shutter speed 1/100 seconds or 1/120 seconds, resulting in decrease the flicker on the picture.

(5) Method of setting the electronic shutter speed

The shutter speed can be set using the switch S1 in the CONTROL board.

The relationship between the switch position and the shutter speed is as follows.

No.	Shutter speed (sec.)
0	Normal mode
1	1/125
2	1/250
3	1/500
4	1/1000
5	1/2000
6	1/4000
7	1/10000
8	Flicker-less
9	Flicker-less

(6) HD-VD output

HD and VD pulses are come out from pin 6-5 (GND) for HD, and pin 7-12 (GND) for VD of DC IN/SYNC connector on the rear panel by the following measures when the system is required.

(7) HD-VD IN/OUT selection method

The HD-VD IN/OUT selection can be made using the switch S2 in the CONTROL board.

This switch will have been set to the HD-VD IN position at the time of shipment from the factory. To change this setting to HD-VD OUT, set S2 as shown in the figure below.



HD · VD IN　　HD · VD OUT

(8) Clock pulse

The clock pulse is come out from pin 9-8 (GND) of DC IN/SYNC connector on the rear panel by the following measures, as necessary.

(9) TRG IN/CLK OUT selection method

The TRG IN/CLK OUT selection can be made using the switch S1 in the SYNC board.

This switch will have been set to the TRG IN position at the time of shipment from the factory. To change this setting to CLK OUT, set S1 as shown in the figure below.



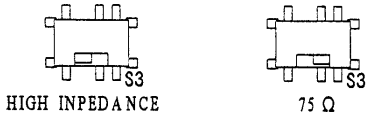
TRG IN　　CLK OUT

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(10) External SYNC signal input impedance selection method

The external SYNC signal input impedance can be selected using the switch S3 in the CONTROL board.

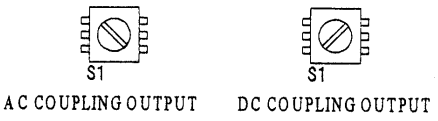
At the time of shipment from the factory, this switch will have been set to the High Impedance position. To change this setting to 75 Ω , set the switch S3 as shown in the figure below.



(11) Video output AC coupling/DC coupling selection method

The AC coupling/DC coupling selection can be made using the switch S1 in the PROCESS board.

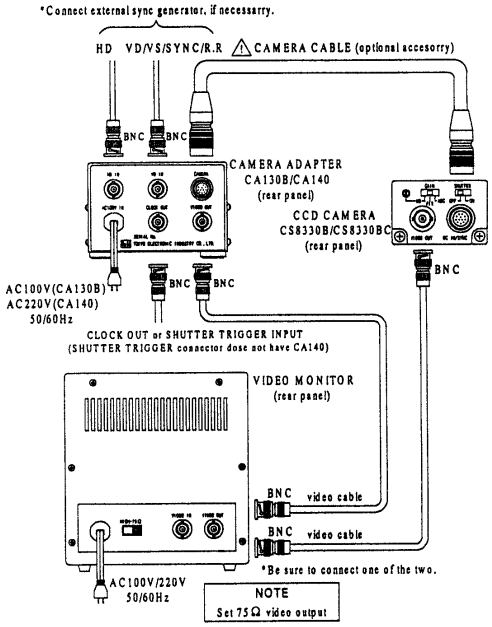
This switch will have been set to the AC coupling position at the time of shipment from the factory. To change this setting to DC coupling, set S1 as shown in the figure below.



4. CONNECTION

When installing the CS8330B/CS8330BC camera to your system, you have to connect between equipments.

4-1. Typical connection.



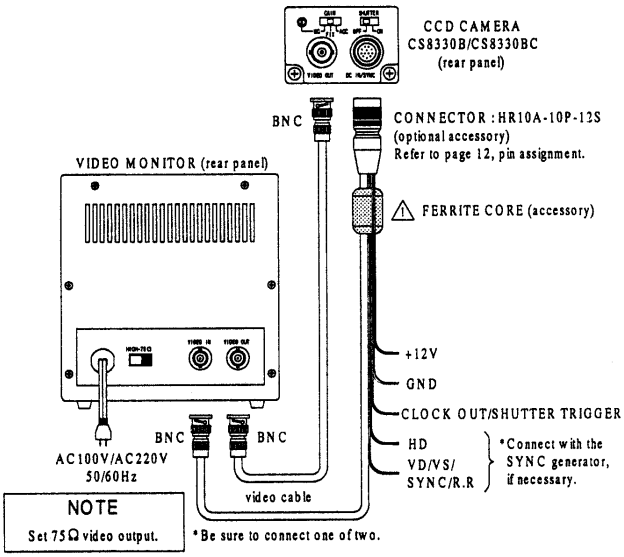
* AC adapter CA130B/140B is an optional accessory, make choice of the most appropriate power supply system, depending on the application.
* Typical connection of CS8330B/CS8330BC. There are two connectors of "VIDEO OUT", and "DC-IN/SYNC" at the rear panel on the camera.

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⚠ CAUTION

When using the camera on systems that accept EC (EMC) instructions, be sure to use the optional shielded camera cable (CPSC3000 or equivalent).

4-2. Connection Between Other Equipments Excluding CA130B/CA140B



⚠ CAUTION

When using the camera on systems that accept EC (EMC) instructions, be sure to attach the ferrite core (included as an accessory) to the camera end of the camera cable.

4-3. DC IN/SYNC connector pin assignment

The connector is combined with DC12V input, and some other, and recommended to use the system including an image processor.

They are composed of 12pins, and the pin assignment is as followings.

● Camera connector ; HR10A-10P-12P (Maker ; Hirose denki)

Pin No.	External synchronization			Internal Synchronization
	HD and VD	VS/SYNC	Restart-Reset	
1	GND	GND	GND	GND
2	+12V	+12V	+12V	+12V
3	Video output (GND)	Video output (GND)	Video output (GND)	Video output (GND)
4	Video output (signal)	Video output (signal)	Video output (signal)	Video output (signal)
5	HD input (GND)	---------- -	HD input (GND)	HD output (GND)
6	HD input (signal)	---------- -	HD input (signal)	HD output (signal)
7	VD input (signal)	VS/SYNC input (signal)	R.R input (signal)	VD output (signal)
8	Shutter trigger input/ Clock output (GND)	Shutter trigger input/ Clock output (GND)	Shutter trigger input/ Clock output (GND)	Shutter trigger input/ Clock output (GND)
9	Shutter trigger input/ Clock output (signal)	Shutter trigger input/ Clock output (signal)	Shutter trigger input/ Clock output (signal)	Shutter trigger input/ Clock output (signal)
10	GND	GND	GND	GND
11	+12V	+12V	+12V	+12V
12	VD input (GND)	VS/SYNC input (GND)	R.R input (GND)	VD output (GND)

* HD,VD output is available for internal switch selection.

* Clock output is available for internal switch selection.

The clock output cannot be made when the shutter trigger is being input (when the special shutter function is being used).

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(1) DC12V input

Connect pin number 2 and/or 11 for DC12V (HOT) and Pin 1 and/or 10 for GND.

(2) Video output

Composite EIA or CCIR video output (VS) is output from 4 (HOT) and 3 (GND).

> **CAUTION**
>
> There are two video output which are from VIDEO OUT (BNC) and DC IN/SYNC pin 4-3 (GND).
>
> Do not use both of them at the same time, because it may occur double termination with the video output, and the video output will be half.

(3) Input pulses for external sync

When required external sync-operation between other equipments, use either one of pulses for HD/VD, VS or SYNC. And input HD pulse from pin number 6-5 (GND) and VD from pin 7-12 (GND) for HD/VD external sync operation. And input VS or SYNC from pin 7 and 12 (GND) for external sync operation by VS or SYNC.

(4) Clock pulse

Clock Pulse is come out from pin 9-8(GND) when the system required it, refer to page 8.

5. OPERATION

(1) After the connection between equipments, turn the power switches for the video monitor on at the first.
(2) Turn the power switch for the camera to ON, and make sure the image appears on the monitor screen.
(3) Adjust the lens aperture for the proper image brightness.
(4) Adjust the focus ring on the lens for the sharpest picture looking at the monitor.

6. SUPPLEMENTAL INFORMATIONS

(1) Illuminance for better picture

"illuminance" (also called "luminance") is intensity or brightness of light, expressed in lux.

The CS8330B/CS8330BC is designed to provide best pictures under the conditions of a 1500 lux illuminance, although shooting is possible all the way down to 2 lux with the GAIN switch while AGC position.

To obtain good pictures under very bright object, the use of an ND (neutral density) filter is recommended.

(2) Smear

When the strong light hits the CCD image sensor, the image of bands in vertical direction may appear above and under the spot. This is called smear. Especially if the camera shoots under the noon sun or its reflections, a candlelight in the dark, or headlights of cars, this smears may stand out in the picture.

The CCD used with the CS8330B/CS8330BC is designed against the smear. However, watch out for smear when shooting involves a strong light sources.

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(3) Lenses

Generally, there are many kind of C-mount lenses for the video camera on the market, for example, different aperture (iris), different focal distance, zoom lenses and so on. Those having a shorter focal distance are called "wide-angle" lenses, and those having a longer focal distance are called "telephoto". Lenses of different focal distances have special characteristics and you can take advantage of these in shooting. When the camera is fit with a zoom lens, it is extremely easy to vary the focal distance. Anyhow, make choice of the most appropriate lens for your application or system.

IMPORTANT

To ensure maximum performance, be sure to keep the inside of lens and inner part of camera module free from dust or fingerprint.

CAUTION

If the lens (C-mount) size exceeds 100mm in diameter, 170mm in length and 1Kg in weight, both the camera and lens should be secured.

Because the camera housing-strength is not enough to support such a weight or stress, may cause damage it.

7. TROUBLE-SHOOTING GUIDE

What may initially appear to be trouble is not always a real problem. Make sure first according to the following table before requesting service.

Symptoms	Check points
Power No power is supplied	* Is the power supply unit correctly connected ? * Is the POWER switch of the connected AC adapter set to ON ?
No picture	* Lens cap on. * Is it extremely dark on subjects ? * Improper connection or setting. * Other system equipments work properly. * Connection cables between equipments are properly. * Camera setting (switches and others) are right position.
Focus or picture not sharp	* Dirt on camera lens. * Lens improperly focused. * Is proper lens installed or set ?
Picture not satisfactory	* Exposure of camera lens to extremely bright, does ND filter need * Inadequate lighting (dark).

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8. SPECIFICATIONS

(1) TV system	
CS8320B	Based on RS-170 standard
CS8320BC	Based on CCIR standard
(2) Image sensor	Interline CCD
Active pixel	
CS8320B	768 (H) X 494 (V)
CS8320BC	752 (H) X 582 (V)
Chip size	
CS8320B	8.4 μ m x 9.8 μm
CS8320BC	8.6 μ m x 8.3 μm
Active image area	6.4 mm (H) x 4.8 mm (V) (equivalent to 1/2" normal optical image size respectively.)
(3) Number of scanning lines	
CS8320B	525 lines
CS8320BC	625 lines
(4) Scanning system	2 : 1 interlace
(5) Sync. system	Internal/External (automatic change over)
(6) Scanning frequencies	
Horizontal drive (H)	
CS8320BB	15.734 kHz
CS8320BC	15.625 kHz
Vertical drive (V)	
CS8320B	59.94 Hz
CS8320BC	50 Hz
(7) Aspect ratio	4 : 3

(8) Sensitivity	
Standard	100 lx at F4, 3200 K GAIN; FIX, Gamma = 1.0
Minimum	0.5 lx at F1.4 Gain max., Gamma = 0.45
(9) Video output	
VS (Video + SYNC)	1.0 Vp-p/75 Ω
(10) Resolution	
Horizontal direction	
CS8320B	570 TV lines
CS8320BC	560 TV lines
Vertical direction	
CS8320B	485 TV lines
CS8320BC	575 TV lines
(11) S/N (luminance)	56 dB(p-p)/rms or more (GAIN; FIX Gamma = 1.0)
(12) Input signal	
External sync pulses	
HD, VD, R.R and SYNC	4.0 ± 2.0 V(p-p)
VS	1.0 V(p-p) (SYNC 0.3 Vp-p)
Input impedance	75 Ω / HIGH selection can be made using the internal switch. (Factory setting ; HIGH)
Pulse polarity	Negative polarity
Pulse width	
HD	6.4 X 3 μs
VD	150 to 800 μs

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Frequency

Horizontal (f_H)

CS8320B	15.734 kHz ± 2 %
CS8320BC	15.625 kHz ± 2 %

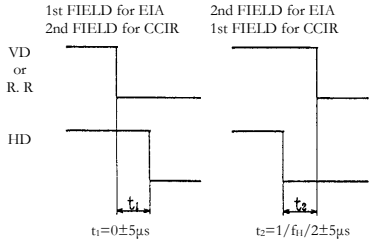
Vertical (f_V)

CS8320B	$2f_H/525$
CS8320BC	$2f_H/625$

Number of scanning lines

CS8320B	525 lines
CS8320BC	625 lines

Phase between HD/VD — The phase relation between HD and VD should be as shown below.



(13) Output signal

Clock pulse	The clock pulse is available, if necessary.
Pulse level	2.5 Vp-p/high impedance
Frequency	
CS8320B	14.318181 MHz ± 100 ppm
CS8320BC	14.1875 MHz ± 100 ppm

HD/VD pulses

Pulse level	4.5 Vp-p/high impedance
Interlace	2 : 1
Polarity	Negative
Pulse width	
HD	
CS8320B	6.36 ± 0.1µs
CS8320BC	6.41 ± 0.1µs
VD	
CS8320B	572 ± 1µs
CS8320BC	480 ± 1µs
Frequency	
Horizontal (f_H)	
CS8320B	15.73426 kHz ± 2 Hz
CS8320BC	15.625 kHz ± 2 Hz
Vertical (f_V)	
CS8320B	$2f_H/525$
CS8320BC	$2f_H/625$

(14) Sensitivity setting — The following modes can be set using the panel selection switch. (Factory setting ; FIX)
FIX (FIX Gain); Standard sensitivity setting.
AGC (Automatic Gain Control)
MGC (Manual Gain Control)

(15) AGC

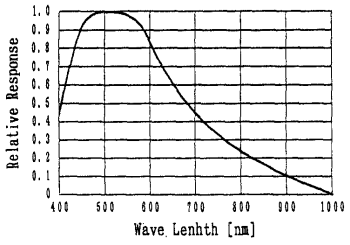
Operating range — Stabilized by AGC within 2 dB for ± 6dB of the output signal variation.

(16) MGC — Sensitivity can be set manually.

(17) Gamma correction — 0.45/1.0 selectable

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(18) White clip	Clip level should be set for 1.0V at factory, excluding SYNC tip.
(19) Electronic shutter	ON/OFF selectable
Shutter speed	1/125, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000 sec. and flicker-less (1/100 or 1/120)
(20) Special shutter	Any shutter timing and shutter speed can be set according to the shutter trigger and R.R pulse inputs. This function can be turned ON/OFF by an internal switch. (Factory setting ; OFF)
(21) CCD operation mode	Field or frame store mode can Be selected as necessary. (initially preset frame mode in factory)
(22) Restart	Provides ON/OFF switch inside of the camera.
(23) Spectral response	Refer below.



(24) Power source	DC12V ± 10 % (within 10mVp-p ripple)
(25) Power consumption	approx. 230 mA
(26) Ambient condition	
Temperature	0 °C to +40 °C
Humidity	less than 90 %
(27) Lens mount	C-mount
(28) Dimensions	44 (W) X 29 (H) X 78 (D) mm (refer to pages 25)
(29) Weight	approx. 120 g

* Design and specifications are subject to change without notice.

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9. CONSTITUTION

(1) Camera module (without lens) 1 pc.

(2) Provided accessories

Operation manual 1 pc.

Ferrite core 1 pc.

(3) Optional Accessories

Purchase the following optional accessories depending on your system as necessary.

•AC power adapter

CA130B	AC 100V ± 10 %
CA140	AC 220V ± 10 %
	DC12V, 0.9A
Dimensions	
CA130B	92 (W) X 68 (H) X 120 (D) mm
CA140	125 (W) X 60 (H) X 130 (D) mm
Weight	approx. 1 kg

•Cable for AC power adapter CPC3440-03 (3m)
CPC3440-05 (5m)
CPC3440-10 (10m)

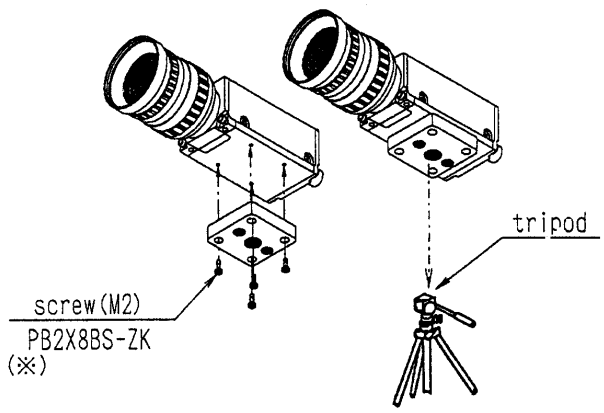
•BNC video cable

* Make choice of the most appropriate cables, according to your system or application.

10. HOW TO FIX CAMERA

(1) Use tripod

If you use tripod, use camera mounting kit (optional) and fix camera.



(※) Cross recessed pan head machine screws

(2) Use fixing holes on camera

If you use fixing holes on camera flange (2 holes), Please use screw (M3). Please use screw length less then 4mm.

(3) Use fixing holes on the bottom of camera

If you use fixing holes on the bottom of camera, Please use screw (M2).

Please use screw length less then 3mm.

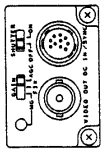
CAUTION

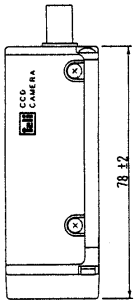
If the screw is long, it touches with printed circuit board, and it causes some trouble and accident.

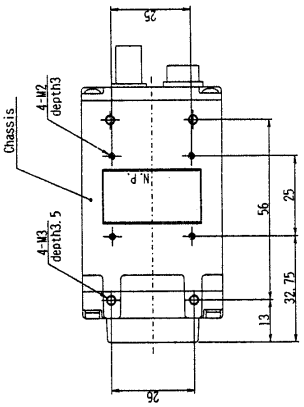
* If you fix camera, we recommend to use both item (2) and (3).

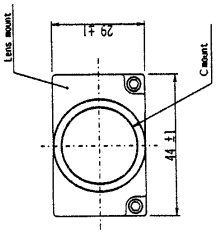
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11. APPEARANCES









Specifications

Material	
Lensmount	: Galvanized dicust
Chassing, Rear panel	: Aluminumed dicust
Cover	: Aluminum steel plate
Color	: Black (munsell N1.5 leather satin)

12. MAINTENANCE

(1) Cleaning should be done only after the battery pack has been removed or other power units have been disconnected.

(2) When the cabinet is dusty, clean by gently wiping with a soft cloth. And avoid the use of strong cleaning agents such as benzine or alcohol as they may damage the cabinet.

(3) If malfunctioning occurs, stop using equipment immediately and consult **TELI**-service shop, the dealer purchased from or qualified personnel.

(4) Upon completion of any service or repairs, request the service technicians that only Factory Authorized Replacement Parts that have the same characteristics as the original parts were used, and that routine safety checks have been performed to determine that the video product is in safe operating condition. Unauthorized parts may result in fire, electrical shock, or other hazards.

(5) When you send the product to a service center, you must use the original carton box and packing materials, then insert the original carton box containing the unit into another carton, using more packing materials.

(6) When requesting services, the following information is necessary.
* Your name, address and telephone number.
* Model number, serial number and date of purchase.
* Explain the damage, malfunction or other symptoms as precisely as possible.

(7) The minimum availability period for repairs (parts necessary to keep unit functioning) is 8 years after the end of producing the model.

(8) If you have any question regarding after-sales service, etc., please contact the nearest service center.

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