



CCD COLOR CAMERA CS9001/CS9001P SERIES Specifications

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TOSHIBA TELI CORPORATION

CASES FOR INDEMNITY (LIMITED WARRANTY)

We shall be exempted from taking responsibility and held harmless for damage or losses incurred by the user in the following cases.

- In the case damage or losses are caused by fire, earthquake, or other acts of God, acts by a third party, deliberate or accidental misuse by the user, or use under extreme operating conditions.
- In the case of indirect, additional, consequential damages (loss of business interests, suspension of business activities) are incurred as result of malfunction or non-function of the equipment, we shall be exempted from responsibility for such damages.
- In the case damage or losses are caused by failure to observe the information contained in the instructions in this instruction manual and specifications.
- In the case damage or losses are caused by use contrary to the instructions in this instruction manual and specifications.
- In the case damage or losses are caused by malfunction or other problems resulting from use of equipment or software that is not specified.
- In the case damage or losses are caused by repair or modification conducted by the customer or any unauthorized third party (such as an unauthorized service representative).
- Expenses we bear on this product shall be limited to the individual price of the product.

RESTRICTION FOR USE

- Should the equipment be used in the following conditions or environments, give consideration to safety measures and inform us of such usage:
 1. Use of the equipment in the conditions or environment contrary to those specified, or use outdoors.
 2. Use of the equipment in applications expected to cause potential hazard to people or property, which require special safety measures to be adopted.
- This product can be used under diverse operating conditions. Determination of applicability of equipment or devices concerned shall be determined after analysis or testing as necessary by the designer of such equipment or devices, or personnel related to the specifications. Such designer or personnel shall assure the performance and safety of the equipment or devices.
- This product is not designed or manufactured to be used for control of equipment directly concerned with human life (*1) or equipment relating to maintenance of public services/functions involving factors of safety (*2). Therefore, the product shall not be used for such applications.
 - (*1): Equipment directly concerned with human life refers to.
 - Medical equipment such as life-support systems, equipment for operating theaters.
 - Exhaust control equipment for exhaust gases such as toxic fumes or smoke.
 - Equipment mandatory to be installed by various laws and regulations such as the Fire Act or Building Standard Law
 - Equipment related to the above
 - (*2): Equipment relating to maintenance of public services/functions involving factors of safety refers to.
 - Traffic control systems for air transportation, railways, roads, or marine transportation
 - Equipment for nuclear power generation
 - Equipment related to the above

1. Introduction

The CS9001/CS9001P Series is an NTSC/PAL separation method remote head type color camera and is adaptable to a variety of camera heads realizing ultra-small size and light weight.

2. Features

(1) DC12 V Drive

Power voltage of this product is DC12 V suitable for assembly within a device. When the product is to be used under 100 to 240 VAC, it is recommended that you use an optional power adapter.

(2) Camera head (the shape of CCU is common)

Four types of camera heads are provided to correspond to the size of CCD: 1/2, 1/3, 1/4 and 1/6.

For the shape of the head, ϕ 17 cylindrical type and ϕ 29 C-mount type are provided for Type 1/2, ϕ 12 cylindrical type for Type 1/3, ϕ 12 cylindrical type (camera cable directly connected) for Type 1/4, and ϕ 7 cylindrical type (camera cable directly connected) for Type 1/6. These combinations of camera heads can be used for a wide range of applications.

* However, the camera head for Type 1/6 is used only for NTSC only.

(3) External synchronization (Only CS91(P)E)**

Using an external synchronization signal as input, the synchronization method is automatically changed to remote mode.

When VBS, SYNC, HD/VD signal is used as the external synchronization signal, the horizontal and the vertical phases will be synchronized.

(4) ALC (automatic light control)

Optimum image against extensive light intensity variation can be obtained with microcomputer-based control combining the high speed electronic shutter (ELC) with max speed of 100 hundred thousandth of a second and the automatic gain control (AGC). This is suitable for microscope applications with no lens aperture control or applications where brightness changes extensively.

(5) Auto white balance

Burdensome white balance adjustment is not required by means of auto follow-up full automatic control that maintains appropriate white balance by detecting the color temperature variation of the subject at all times.

In addition, the set function to memorize and maintain the balanced white condition as well as the manual control of white balance can be made, which is convenient to obtain images under illumination with fixed color temperature used for image processing etc.

(6) S terminal output

Y/C separation signal output (S terminal) is provided as well as VBS output.

By connecting the signal to an imaging device equipped with S terminal color monitor, clear images with less cross color can be obtained.

(7) RGB output (Only CS91(P)E)**

RSB output useful for image processing is provided.

(8) Various camera cables

Camera cables for ϕ 17, ϕ 12 cylindrical type (for Type 1/3) and C-mount type camera head include optional 3 m and 5 m length cables and they are available for each type.

In addition, camera cables for ϕ 12 cylindrical type (for Type 1/4) and ϕ 7 cylindrical type camera head are 3 m and 5 m length directly connected cables.

Furthermore, these can be combined with an extension camera cable of 7 m.

3. Components

3.1. Naming of these products

(Example) CS 9 4 0 1 P E -03
 (1) (2) (3) (4) (5) (6) (7) (8)

(1) Trade mark

CS : camera system (camera head + camera controller)

CSH : camera head

CSU : camera controller

(2) "9" fixed

(3) Size of CCD

2 : 1/2 inches

3 : 1/3 inches

4 : 1/4 inches

5 : 1/6 inches

(4) Appearance of the camera head

0 : Round type

2 : Round type (C mount)

(5) "1" fixed

(6) TV system

- : NTSC

P : PAL

(7) OPTION (external synchronization and RGB output)

- : none

E : provided

(8) Cable length connected directly from the camera head

-03 : 3m

-05 : 5m

3.2. CS9001 Series (NTSC)

The lineup of CS9001 Series is shown in the following table. Please specify the desired combination to our sales distributor when ordering.

Product Name	Camera head			Camera controller		Camera cable	
	Individual name	CCD Size	Dimensions	Individual name	Option		
CS9201	CSH9201	Type 1/2	φ 17mm	CSU9201		The following camera cable (option) can be connected. - 3 m: CPRC4000B-03 - 5 m: CPRC4000B-05 - Extension 7 m: CPRC4000B-07J	
CS9201E				CSU9201E	○		
CS9221	CSH9221	Type 1/2	φ 29mm (C mount)	CSU9201			
CS9221E				CSU9201E	○		
CS9301	CSH9301	Type 1/3	φ 12mm	CSU9301			
CS9301E				CSU9301E	○		
CS9401-03	CSH9401-03	Type 1/4	φ 12mm	CSU9401			3m and 5m cables are connected directly from the camera head. - 3 m : 03 (the last 2 digits of product name) - 5 m : 05 (the last 2 digits of product name) In addition, the cable can be extended with the cable below (option). - Extension 7 m: CPC4000B-07J
CS9401-05	CSH9401-05						
CS9401E-03	CSH9401-03			CSU9401E	○		
CS9401E-05	CSH9401-05						
CS9501-03	CSH9501-03	Type 1/6	φ 7mm	CSU9501			
CS9501-05	CSH9501-05						
CS9501E-03	CSH9501-03			CSU9501E	○		
CS9501E-05	CSH9501-05						

3.3. CS9001P Series (PAL)

The lineup of CS9001P Series is shown in the following table. Please specify the desired combination to our sales distributor when ordering.

Product Name	Camera head			Camera controller		Camera cable	
	Individual name	CCD Size	Dimensions	Individual name	Option		
CS9201P	CSH9201P	Type 1/2	φ 17mm	CSU9201P		The following camera cable (option) can be connected. - 3 m: CPRC4000B-03 - 5 m: CPRC4000B-05 - Extension 7 m: CPRC4000B-07J	
CS9201PE				CSU9201PE	○		
CS9221P	CSH9221P	Type 1/2	φ 29mm (C mount)	CSU9201P			
CS9221PE				CSU9201PE	○		
CS9301P	CSH9301P	Type 1/3	φ 12mm	CSU9301P			
CS9301PE				CSU9301PE	○		
CS9401P-03	CSH9401P-03	Type 1/4	φ 12mm	CSU9401P			3m and 5m cables are connected directly from the camera head. - 3 m : 03 (the last 2 digits of product name) - 5 m : 05 (the last 2 digits of product name) In addition, the cable can be extended with the cable below (option). - Extension 7 m: CPC4000B-07J
CS9401P-05	CSH9401P-05						
CS9401PE-03	CSH9401P-03			CSU9401PE	○		
CS9401PE-05	CSH9401P-05						

3.4. Option

The following products are provided as option. (For details, contact our sales distributor.)

- (1) Camera cable : CPRC4000B-03 (3m)
: CPRC4000B-05 (5m)
- (2) Extension camera cable : CPC4000B-07J (7m)
- (3) AC adapter : CA300
- (4) AC cord : APC1025-01P[for AC100V](2.5m)
- (5) RGB output cable (for CS9**1(P)E)
- (6) Lens
- (7) Camera head fixture
- (8) C-mount adapter (for ϕ 17 mm, ϕ 12 mm)

NOTE: About option parts and EMC performance

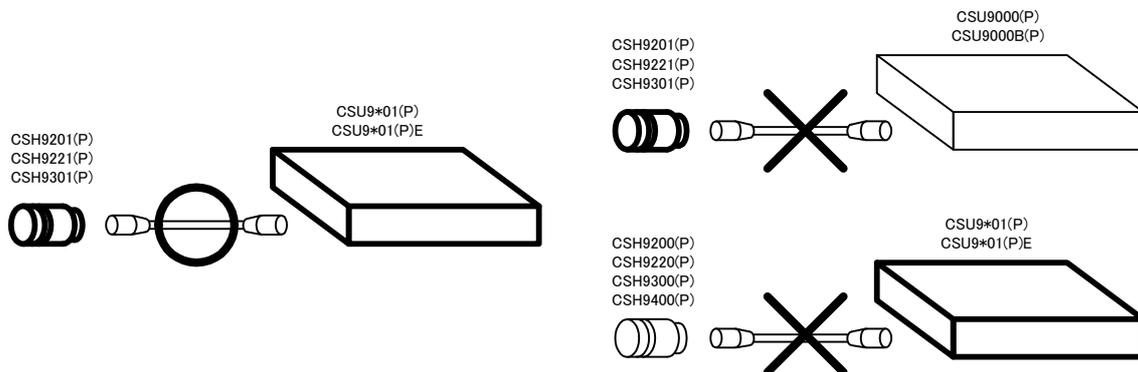
EMC performance of this product is guaranteed only when this product is combined with the option parts shown above. EMC performance when this product is combined with parts other than the ones specified by Teli shall not be guaranteed.

NOTE: About combination of camera heads and camera controller

Be sure to use the CSH9**1(P) (camera head) combining with the CSU9*01(P) or CSU9*01(P)E (camera controller).

Please do not combine the Teli's conventional CS9000(P) series with them.

To do so might cause a malfunction.

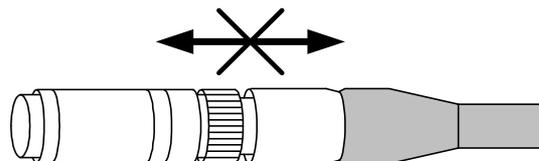


NOTE: About the camera head of CS9401**-**

The camera head of CS9401**-** is structured with its cable connected directly.

Disassembly of the connector part is strictly prohibited.

NEVER pull apart



4. Specifications

* For items with no indication, the specification is combined with a camera cable of 3 m.

No.	Item	CS9001 Series	CS9001P Series
1	TV system	NTSC	PAL
2	Image sensor		
	①CSH9201(P)	Type 1/2 Interline CCD	
	②CSH9221(P)	Type 1/2 Interline CCD	
	③CSH9301(P)	Type 1/3 Interline CCD	
	④CSH9401(P)-**	Type 1/4 Interline CCD	
	⑤CSH9501-**	Type 1/6 Interline CCD	
	Scanning area		
	①CSH9201(P)	6.45mm(H) × 4.84mm(V)	6.47mm(H) × 4.83mm(V)
	②CSH9221(P)	6.45mm(H) × 4.84mm(V)	6.47mm(H) × 4.83mm(V)
	③CSH9301(P)	4.88mm(H) × 3.66mm(V)	4.89mm(H) × 3.63mm(V)
	④CSH9401(P)-**	3.65mm(H) × 2.74mm(V)	3.65mm(H) × 2.71mm(V)
	⑤CSH9501-**	2.46mm(H) × 1.84mm(V)	
	Pixel size		
	①CSH9201(P)	8.40 μm(H) × 9.80 μm(V)	8.60 μm(H) × 8.30 μm(V)
	②CSH9221(P)	8.40 μm(H) × 9.80 μm(V)	8.60 μm(H) × 8.30 μm(V)
	③CSH9301(P)	6.35 μm(H) × 7.40 μm(V)	6.50 μm(H) × 6.25 μm(V)
	④CSH9401(P)-**	4.75 μm(H) × 5.55 μm(V)	4.85 μm(H) × 4.65 μm(V)
⑤CSH9501-**	3.20 μm(H) × 3.73 μm(V)		
Total pixels	811(H) × 508(V)	795(H) × 596(V)	
Active pixels	768(H) × 494(V)	752(H) × 582(V)	
Color filter	Corrective mosaic filter (Ye, Cy, Mg, G)		
CCD integration	Field integration (Field-electrical-charge-storage)		
3	Scanning lines	525 lines	625 lines
4	Scanning system	2:1 interlace	
5	Scanning frequency		
	Horizontal frequency	15.734kHz	15.625kHz
	Vertical frequency	59.94Hz	50Hz
6	Sync system		
	①CSU9*01(P)	Internal	
	②CSU9*01(P)E	Internal/External automatic switch-over	
7	External sync input	※Only CS9**1(P)E	
	HD	4 ± 2V(p-p)/High Negative polarity 15.734kHz ± 50ppm	4 ± 2V(p-p)/High Negative polarity 15.625kHz ± 30ppm
	VD	4 ± 2V(p-p)/High Negative polarity 59.94Hz ± 50ppm	4 ± 2V(p-p)/High Negative polarity 50Hz ± 30ppm
	SYNC	2 ± 1 V(p-p)/75 Ω Negative polarity fH = 15.734kHz ± 50ppm fV = 59.94Hz ± 50ppm	2 ± 1 V(p-p)/75 Ω Negative polarity fH = 15.625kHz ± 30ppm fV = 50Hz ± 30ppm
	VBS	1 V(p-p)/75 Ω Negative polarity fH = 15.734kHz ± 50ppm fV = 59.94Hz ± 50ppm	1 V(p-p)/75 Ω Negative polarity fH = 15.625kHz ± 30ppm fV = 50Hz ± 30ppm
8	Aspect ratio	4:3	

No.	Item	CS9001 Series	CS9001P Series
9	Video output	※Only for CS9**1(P)E, a RGB output is.	
	VBS	1.0 V(p-p)/75 Ω Positive polarity	
	Y/C VS	1.0 V(p-p)/75 Ω Positive polarity	
	C	0.286V(p-p)/75 Ω	0.3V(p-p)/75 Ω
	RGB VS	1.0 V(p-p)/75 Ω Positive polarity (Only G signal)	
	Y	0.714V(p-p)/75 Ω Positive polarity	0.7V(p-p)/75 Ω Positive polarity
10	External sync output	※Only CS9**1(P)E	
	SYNC	TTL level Negative polarity	
11	Sensitivity	F8, 3000K	
	①CSH9201(P)	700 lx	
	②CSH9221(P)	700 lx	
	③CSH9301(P)	950 lx	
	④CSH9401(P)-**	2000 lx	
	⑤CSH9501-**	3000 lx	
12	Minimum subject illumination	F1.4, 3000K,GAIN +12dB, Output level: Approx. 50%	
	①CSH9201(P)	3 lx	
	②CSH9221(P)	3 lx	
	③CSH9301(P)	5 lx	
	④CSH9401(P)-**	8 lx	
	⑤CSH9501-**	12 lx	
13	S/N	46dB(p-p)/rms	
14	Resolution		
	Horizontal resolution	470 TV lines	460 TV lines
	Vertical resolution	350 TV lines	420 TV lines
15	Gamma	ON:0.45 / OFF:1 Selectable (Initial factory setting: ON :0.45)	
16	White balance	AUTO/SET/MANU (Initial factory setting: MANU)	
	Corrective range	2500K~6000K((Detection area: Full screen)	
17	ALC	ALC/AGC/MANU selectable (Initial factory setting: MANU)	
	ALC setting	Corrective range: -6dB~+60dB	
		Detection area: Full screen/Wind (Initial factory setting: Full screen)	
	AGC setting	Corrective range: -6dB~0dB	
		Detection area: Full screen	
Electronic shutter: 8 step selectable (1/60, 1/100, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000s)		Electronic shutter: 8 step selectable (1/50 , 1/120 , 1/250 , 1/500 , 1/1000 , 1/2000 , 1/4000 , 1/10000s)	
MANU setting	Gain: 0dB/+6dB/+12dB selectable (Initial factory setting: 0dB)		
	Electronic shutter: 8 step selectable (1/60, 1/100, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000s)	Electronic shutter: 8 step selectable (1/50 , 1/120 , 1/250 , 1/500 , 1/1000 , 1/2000 , 1/4000 , 1/10000s)	
18	Pedestal	16 step selectable [2~8 IRE] (Initial factory setting: 8=5IRE)	
19	Enhance	16 step selectable (Initial factory setting: 2)	
20	Lens mount		
	①CSH9201(P)	M15.5 P0.5 (Male thread)	
	②CSH9221(P)	C-mount	
	③CSH9301(P)	M10.5 P0.5 (Male thread)	
	④CSH9401(P)-**	M10.5 P0.5 (Male thread)	
	⑤CSH9501-**	M6.3 P0.5 (Female thread)	

No.	Item	CS9001 Series	CS9001P Series
21	Power source	DC12V ± 10% (Ripple voltage : 50mV(p-p))	
22	Power consumption	(DC12V)	
	①CS9**1(P)	Approx. 550mA	
	②CS9**1(P)E	Approx. 680mA	
23	Ambient condition		
	Temperature	0°C ~ 40°C	
	Humidity	10~90% (No condensation)	
	Atmospheric pressure	500~1060hPa	
24	Outside size	Refer to outside drawing	
25	Weight		
	·Camera head		
	①CSH9201(P)	Approx. 16g	
	②CSH9221(P)	Approx. 45g	
	③CSH9301(P)	Approx. 11g	
	④CSH9401(P)-**	Approx. 9g (Cable is not included)	
	⑤CSH9501-**	Approx. 3g (Cable is not included)	
	·Camera controller		
	①CSU9*01(P)	Approx. 600g	
	②CSU9*01(P)E	Approx. 800g	
26	Application standard		
	CE	EMI	EN50081-1/1997
		EMS	EN61000-6-2/1999
	FCC	FCC Part15 subpart B Class A	

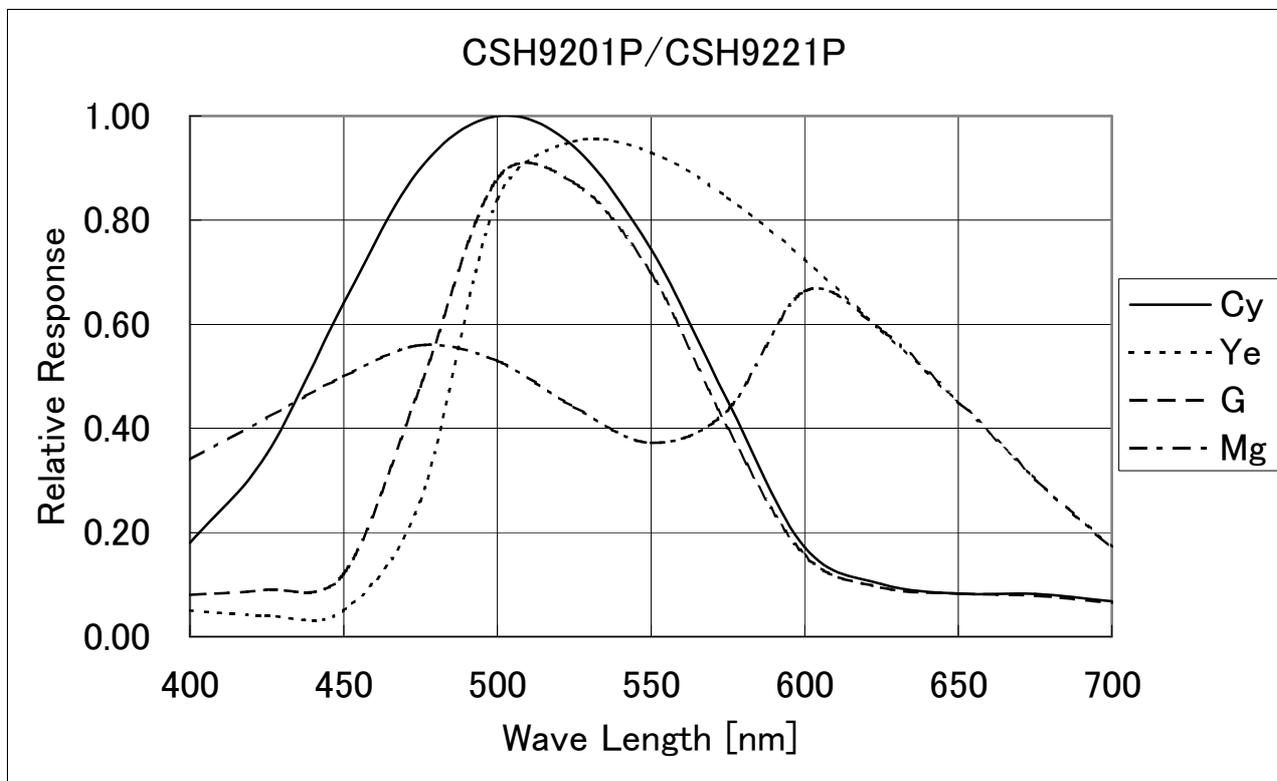
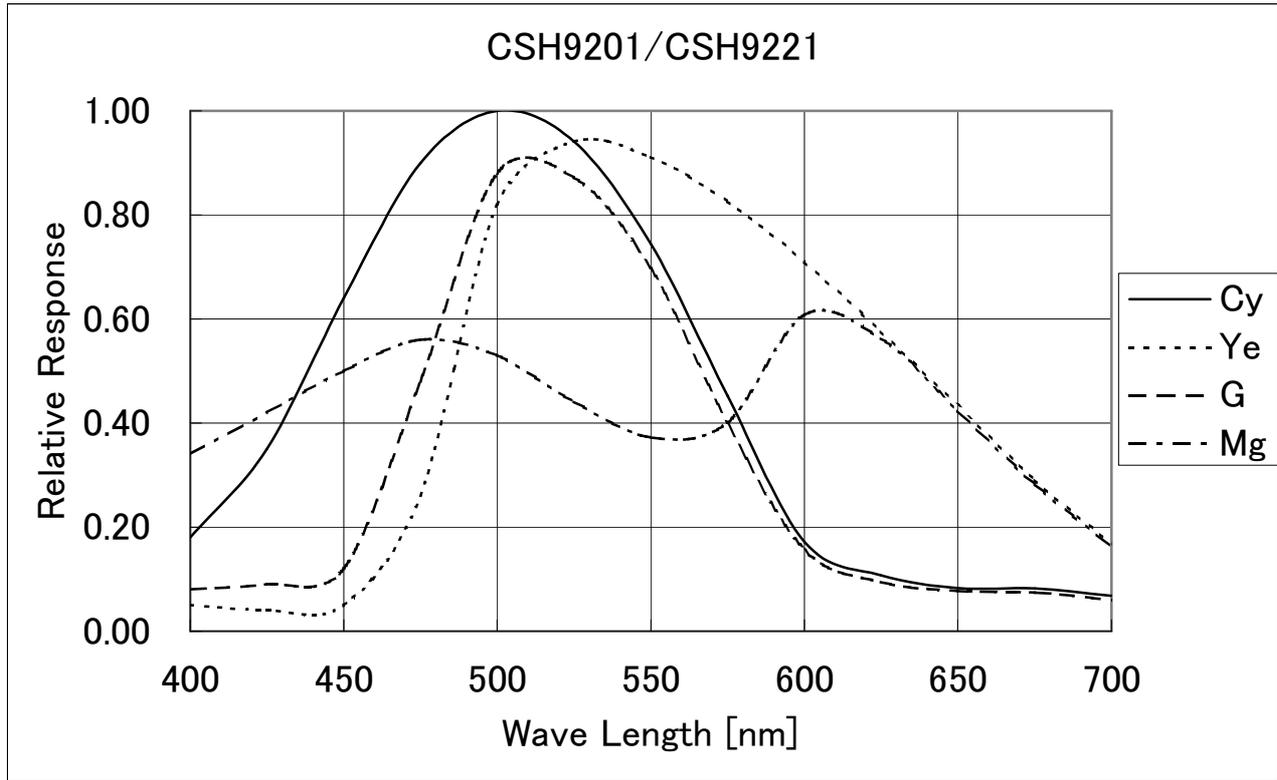
5. Menu Display Details

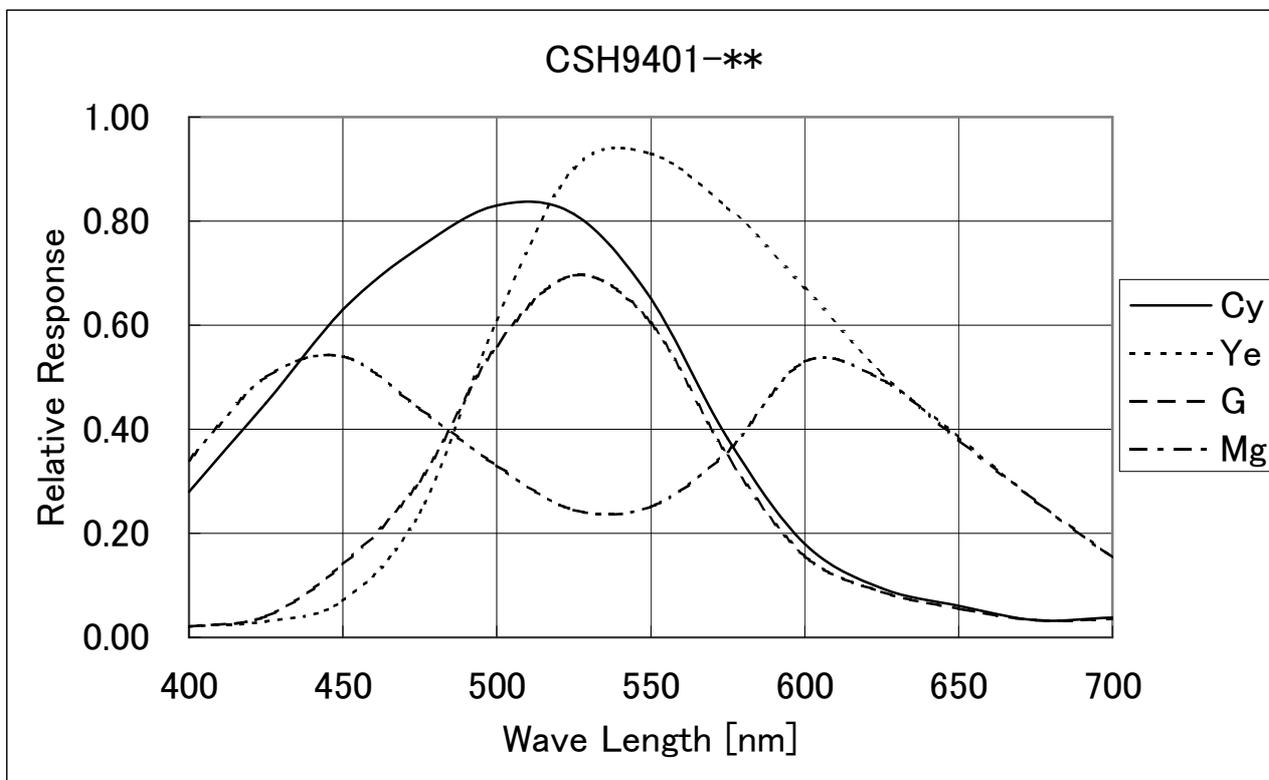
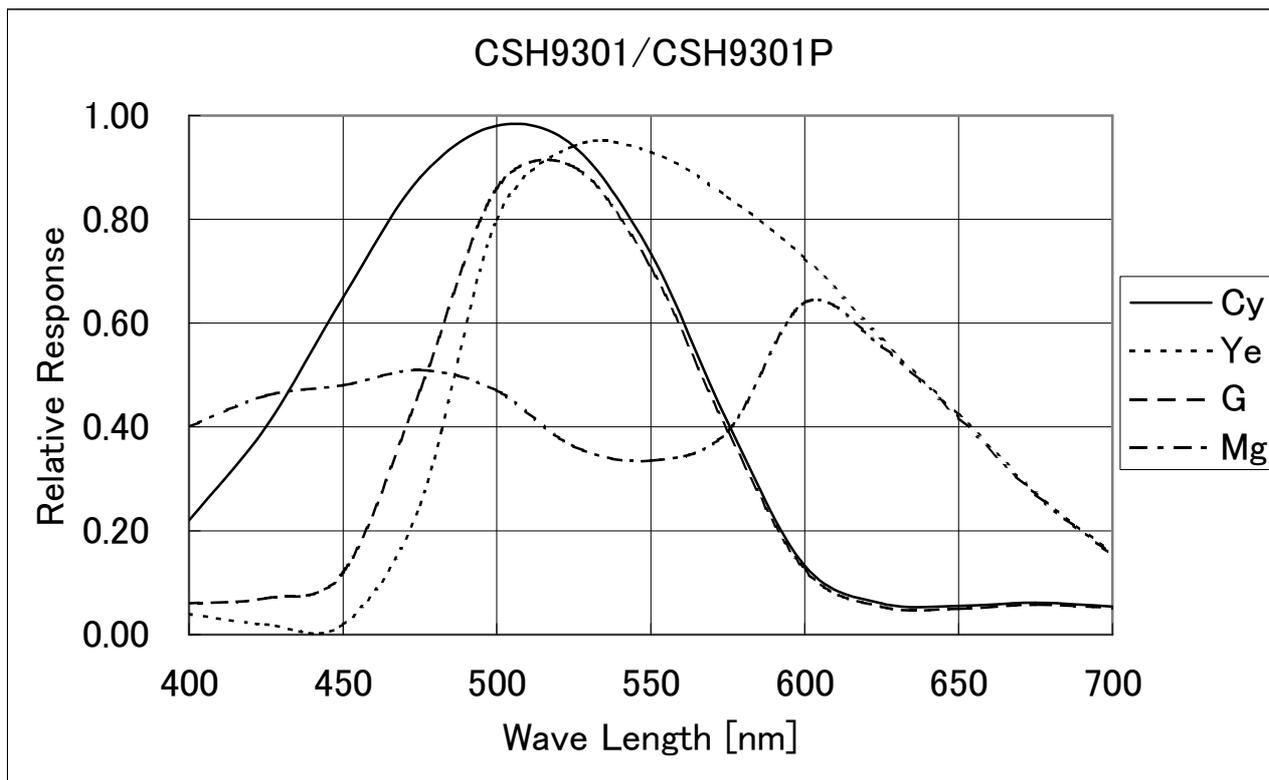
SELECT Pressing the / key once shows menu at the bottom right of the screen.
Pressing the key as many times as necessary to display the desired item and change the setting with
DATA / key.

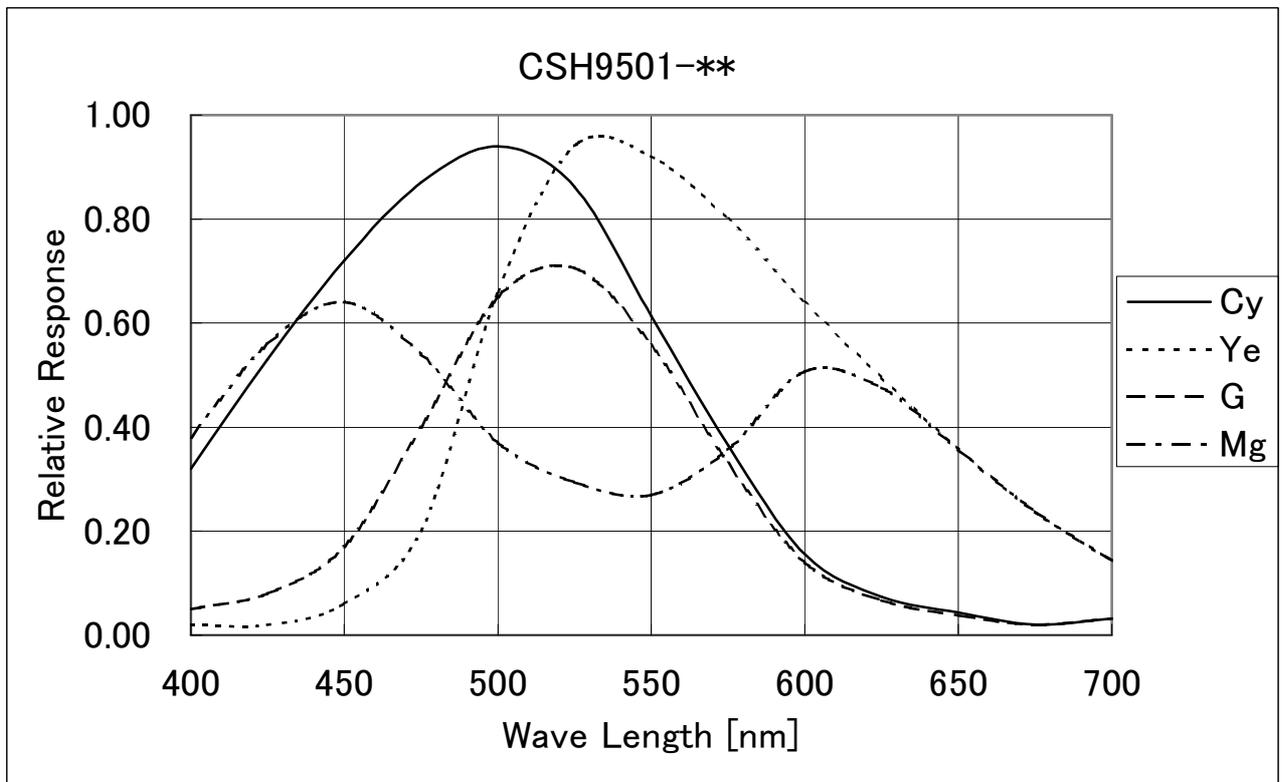
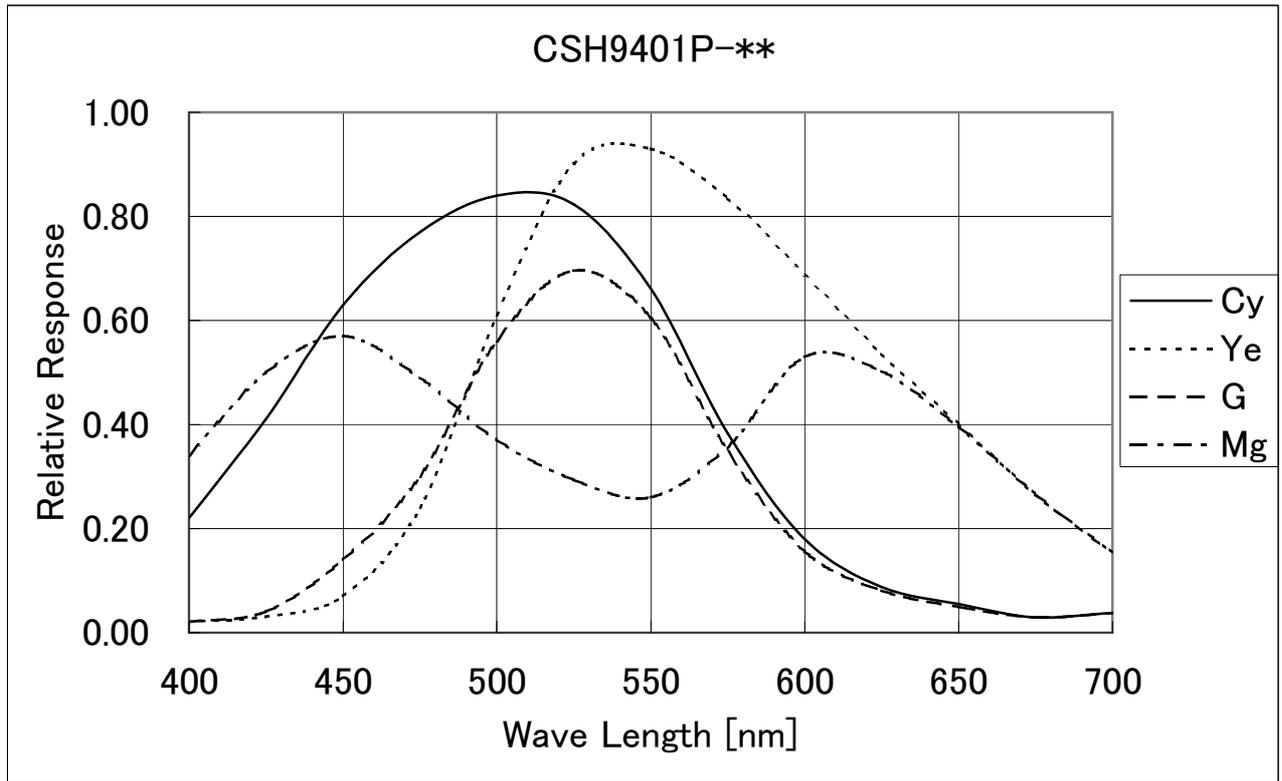
No.	Display item	Details
1	DISP Clear	Clears the displayed item.
2	Shutter	Sets the shutter speed. * <u>ALC MODE: Effective when AGC/MANU [ALC LED: lights (orange), unlit]</u> 0 = OFF CS9001 Series : 1/60(S) CS9001P Series: 1/50(S) 1 = F. L CS9001 Series : 1/100(S) CS9001P Series: 1/120(S) 2 = 1/250(S) 3 = 1/500(S) 4 = 1/1000(S) 5 = 1/2000(S) 6 = 1/4000(S) 7 = 1/10000(S)
3	Gain	Sets the gain of video signals. * <u>ALC MODE: Effective when MANU [ALC LED: unlit]</u> 0 = 0 dB (×1) 1 = +6 dB (×2) 2 = +12 dB (×4)
4	ALC Level	Sets the ALC / AGC video signal level. * <u>ALC MODE: Effective when ALC/AGC [ALC LED: lights (green, orange)]</u> 0 (dark) to 5 (factory shipped data) to 12 (bright)
5	W.B. RED	Sets the white balance RED. * <u>White balance: Effective when MANU [W. BAL LED: unlit]</u> +32(R direction) to 0 (center: factory shipped data) to -32 (CY direction)
6	W.B. BULE	Sets the white balance BULE. * <u>White balance: Effective when MANU [W.BAL LED: unlit]</u> +50 (B direction) to 0 (center: factory shipped data) to -50 (YL direction)
7	AREA	Sets the ALC detection area. * <u>ALC MODE: Effective when ALC [ALC LED: lights (green)]</u> OFF = Full screen (factory shipped data) ON = WIND (Fixed) (No window display)
8	ENHANCE	Sets the contour compensation level (H and V shared). 0 (OFF) to 2 (factory shipped data) to 15
9	SETUP	Sets the setup (pedestal) value. 0 to 8 (5 IRE: factory shipped data) to 15
10	Gamma	Sets the gamma value. OFF: $\gamma = 1$ ON : $\gamma = 0.45$ (factory shipped data)
11	Save	Saves NO. 2 to No. 10 setting data to memory (USER AREA). This is executed with DATA <input type="button" value="+"/> key or <input type="button" value="-"/> key. <u>CAUTION: If power is turned off without executing this command, the changed data becomes invalid.</u>
12	Reset	Read out the factory set data to memory (USER AREA). This is executed with DATA <input type="button" value="+"/> key or <input type="button" value="-"/> key. <u>CAUTION: If power is turned off without executing Save command, the factory set data will not be saved to memory (USER AREA).</u>

6. Typical spectral response

The lens characteristics and light source characteristics is not reflected in table.



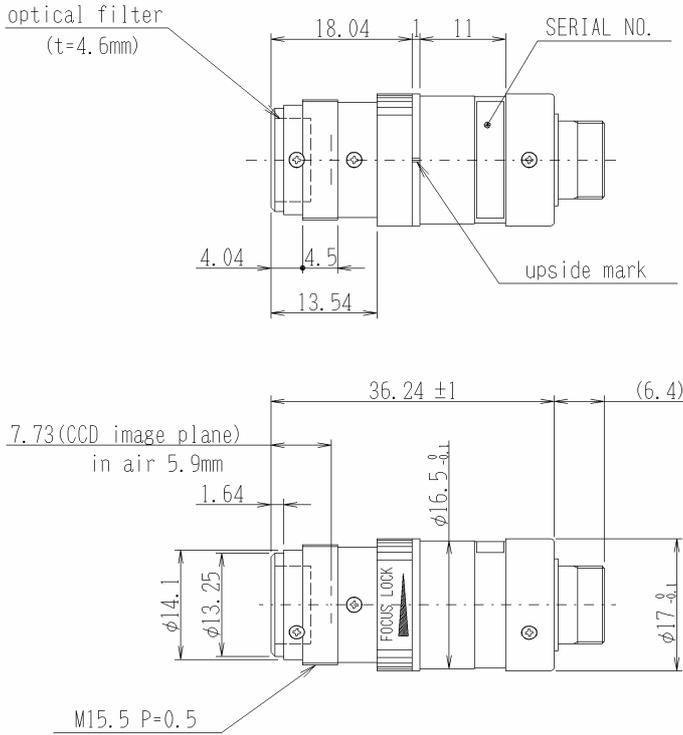




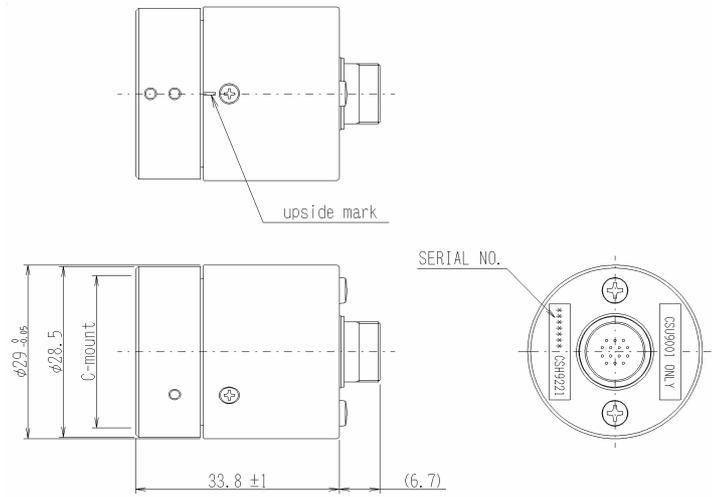
7. Attached Drawings

7.1. Camera Head Dimensions.

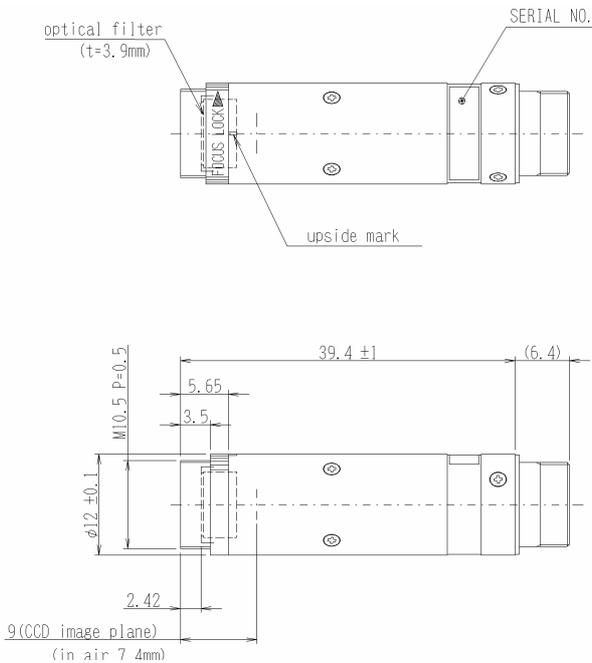
① CSH9201(P)



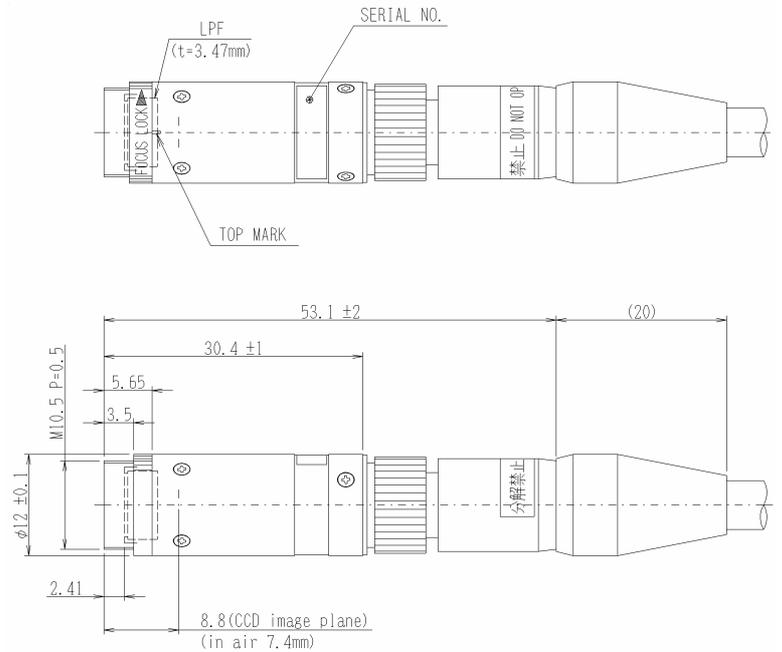
② CSH9221(P)



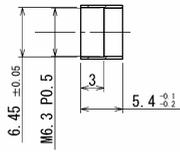
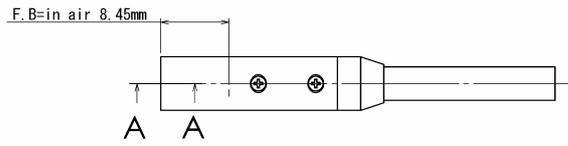
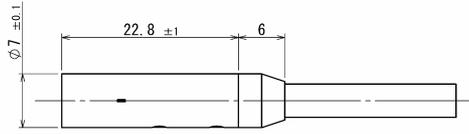
③ CSH9301(P)



④ CSH9401(P)-**



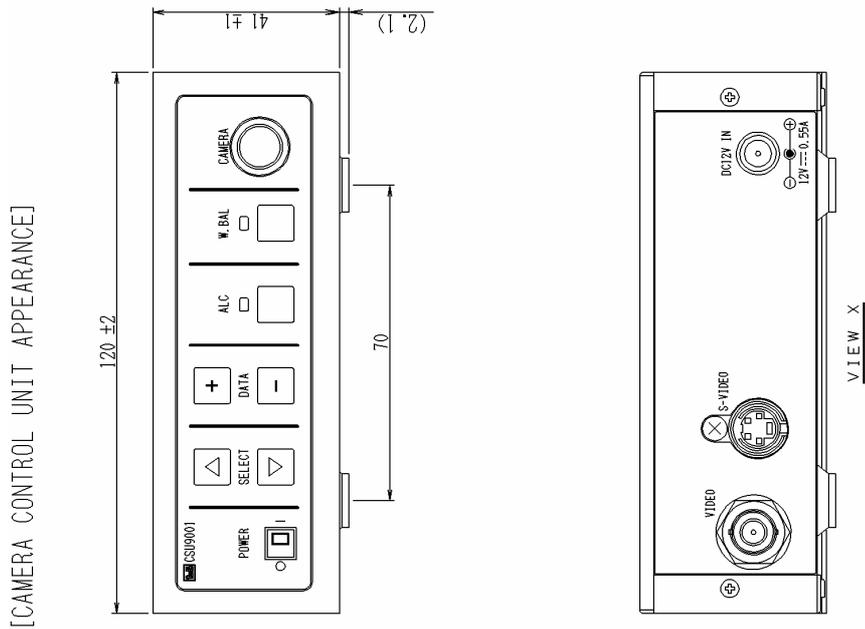
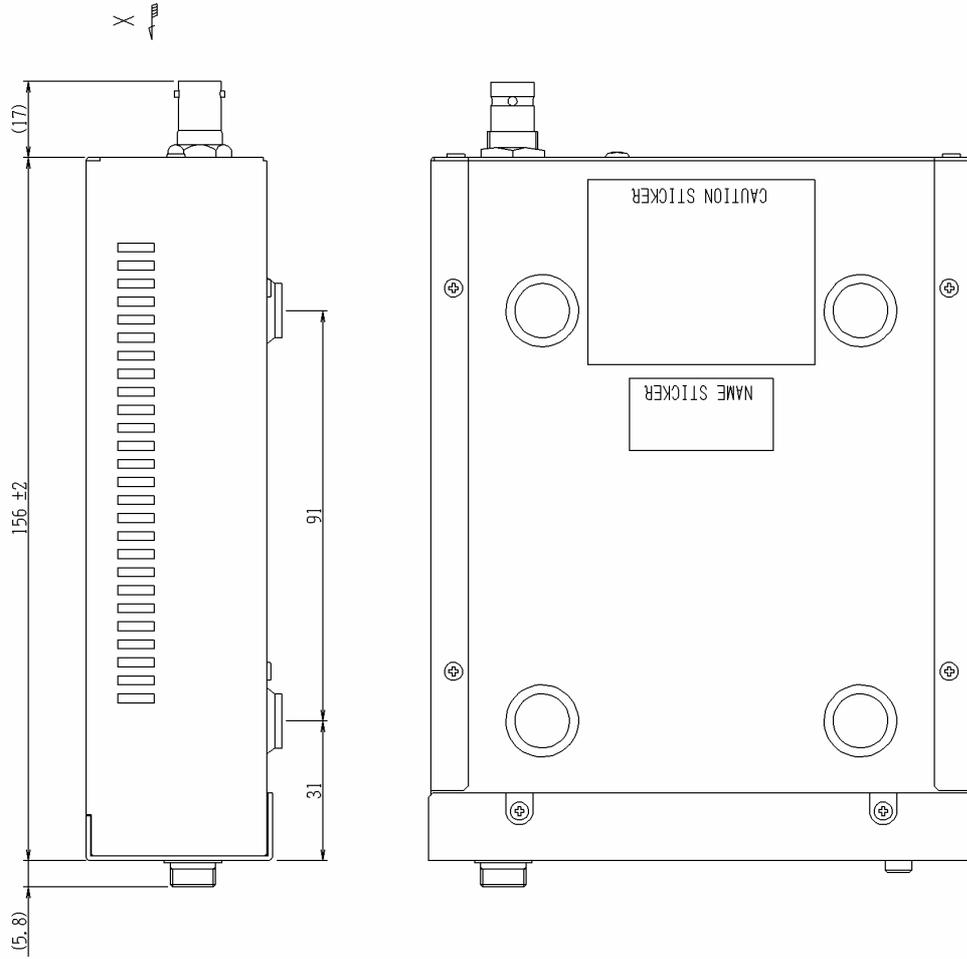
⑤CSH9501-**



A-A Sectional view

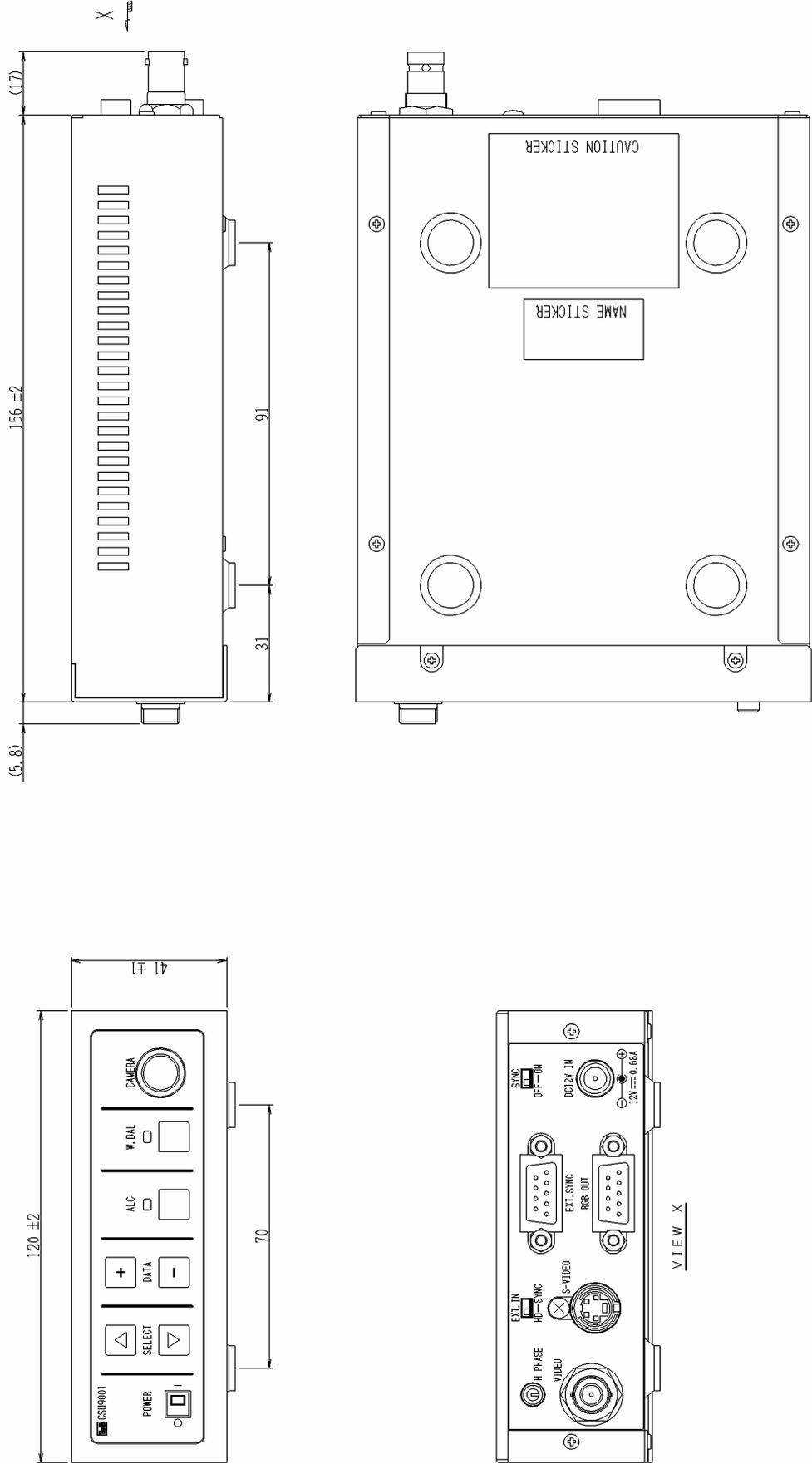
7.2. Camera Controller Dimensions

①CSU9*01(P)



②CSU9*01(P)E

[CAMERA CONTROL UNIT APPEARANCE]





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Distributor

- This product must be classified for disposal according to the laws of each country and municipal laws.
 - Information contained in this document is subject to change without prior notice.
-