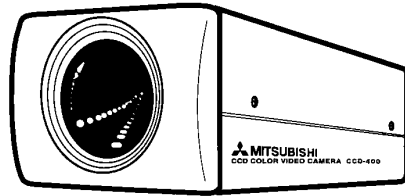




COLOUR VIDEO CAMERA

CCD-400E

CCD-400EW



# OPERATION MANUAL

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This CCD Camera complies with the requirements of the EC Directive 89/336/EEC "EMC Directive" as amended by Directive 93/68/EEC.

The electro-magnetic susceptibility has been chosen at a level that gains proper operation in residential areas, on business and light industrial premises and on small-scale enterprises, inside as well as outside of the buildings. All places of operation are characterised by their connection to the public low voltage power supply system.

## 1. INSTRUCTIONS BEFORE USE

### Power Supply

- Only connect this camera to its exclusive adapter, DA-100E. (Use power supply of DC12V±1, with a ripple voltage less than 500mVp-p.)

### Handling

- Do not take the camera apart.
- Do not spill liquids into the inside of camera.
- Do not touch the lens.

### Utilization and Storage

- Do not store or operate the camera under the following conditions:
  - Extremely hot or cold environment (operational temperature: 0°C - 40°C).
  - High humidity or dusty environment.
  - In inclement weather.
  - Under severe vibrations.
  - In the vicinity of TV or radio.
- Keep this camera away from direct sunlight or bright lights.

### Care and Handling

- Clear dust on the lens with a blower.
  - Wipe off stains on the case with a dry cloth.
- To remove dirt, clean with a non-abrasive detergent and wipe dry.

### CAUTION:

- Some parts of this camera are made of plastic. Wiping it with benzine or thinner, putting a product of rubber or vinyl against it, or spilling volatile liquids on it such as insecticides may cause deterioration of parts and flaking of paint.
- Read the instructions before using a chemical duster.

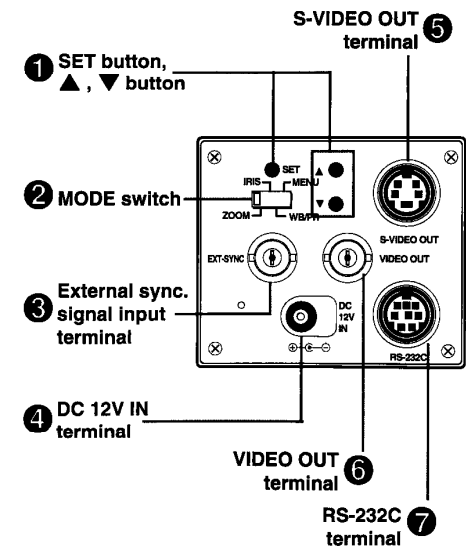
### Interference

- Operation of camera in the vicinity of a TV or radio, motor or transformer having a strong magnetic field may cause distortion of the picture.
- To reduce interference, protect the camera cable from magnetic radiation by putting it through a metal conduit. When using more than one camera systems, connect each camera cable through a metal conduit.

### Camera Malfunction

- If the camera makes an unusual noise, smokes, or emits an unusual odour, immediately unplug the camera and take it to an authorized MITSUBISHI service centre.

## 2. FEATURES AND FUNCTIONS



- 1 SET button, ▲ button, ▼ button
- When MODE switch is set to ZOOM (page 4)
  - Use to adjust zoom and to switch focus between auto and fix.
  - Press ▲ to zoom up and ▼ to zoom back.
  - Press SET to switch focus between auto and fix.

- **When MODE switch is set to IRIS (page 5)**  
Use to switch iris between auto and manual. Use also to set value at manual adjustment.

- **When MODE switch is set to WB/PR (pages 5-6)**  
Use to switch white balance between auto and manual. Use also to select preset number.

- **When MODE switch is set to MENU (pages 6-9)**  
Use to select and set items on the menu screen.

**② MODE switch ZOOM (page 4)**

Use for zooming or switching focus between auto and fix.

**IRIS (page 5)**

Use to switch iris (AUTO/MANUAL) or to make manual adjustment.

**WB/PR (page 5 for WB and pages 9-10 for PR)**

Use to adjust white balance (WB) and select a preset (PR) number.

**MENU (page 6)**

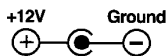
Use to display menu screens on the monitor.

**③ External sync. signal input terminal (BNC type)**

Input terminal for external synchronous signals (VBS or VS).

**④ DC 12V IN terminal (Ø5.5 DC jack) (page 4)**

Use for DC12V±1 power supply. <polarities>



**NOTE:**

- Do not connect the plug other than above. Wrong wiring may cause the set break.
- Use power supply of DC12V±1, ripple voltage less than 500mVp-p.

**⑤ S-VIDEO OUT terminal (page 3)**

Output terminal for separate Y/C video signals.

**⑥ VIDEO OUT terminal (BNC type) (page 3)**

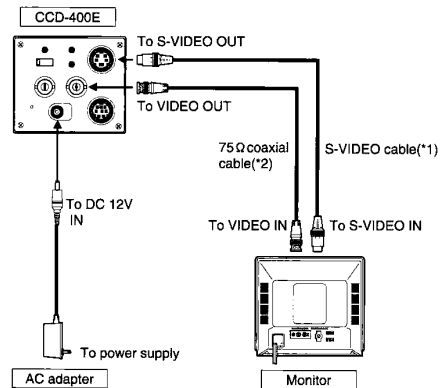
Output terminal for composite PAL video signals.

**⑦ RS-232C terminal (DIN 8 pin) (page 4)**

Input and output terminal for control signals for each function.

**3. CONNECTION**

**Connection with a colour video monitor**

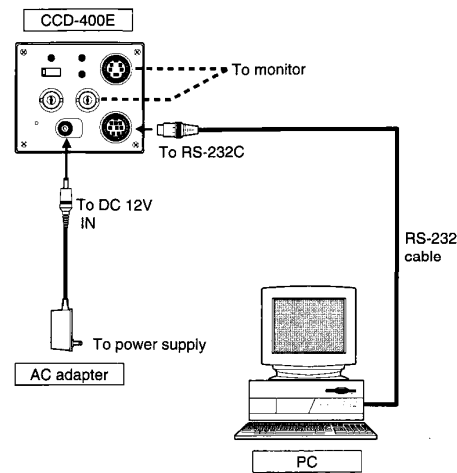


\*1 : Use only when the monitor has an S-VIDEO terminal  
\*2 : Use only when the monitor has no S-VIDEO terminal

**NOTE:**

- See also operation instructions of the connecting equipment.
- **When you wish to hang the camera**
  - The fitting board is set on the bottom side of the camera fixed with 4 screws. Replace the board and fix it on the top side with the same screws.
  - Be sure to use the attached screws or 6mm-long screws otherwise it may cause trouble (the camera may be damaged or may not be fit firmly).

**Connection with an RS-232C equipment**

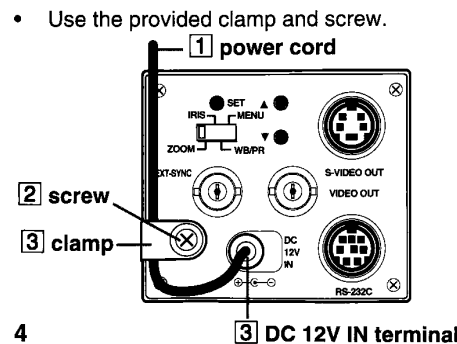


**NOTE:**

- See also operation instructions of the connecting equipments.
- **When you wish to hang the camera**
  - The fitting board is set on the bottom side of the camera fixed with 4 screws. Replace the board and fix it on the top side with the same screws.
  - Be sure to use the attached screws or 6mm-long screws otherwise it may cause trouble (the camera may be damaged or may not be fit firmly).

**Connection with power cord**

Attach the clamp onto the camera with the screw to prevent the power cord plug from becoming disconnected as shown below:



- 1 Put the power cord through the clamp.
- 2 Fix the clamp on the camera's rear panel with the attached screw.
- 3 Plug the power cord in the DC 12V IN terminal.

**NOTE:**

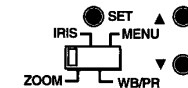
Be sure to use the specified power cord (DA-100E optional).

**4. BASIC SETTINGS**

When you plug in the camera after making connection (p3-4), an image will be displayed on the monitor screen. The focus will be then adjusted to the position last time the set was used.

**NOTE:**

If operating this camera through PC, make sure to connect AC adapter with this camera before turning on the PC.



- 1 Set the mode switch to ZOOM.
- 2 Adjust the view angle by pressing ▲ or ▼ while watching the monitor screen.

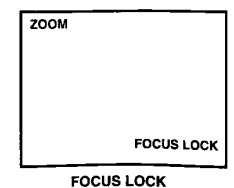
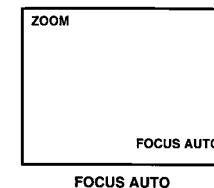
As you hold ▲, the picture will gradually zoom up.

As you hold ▼, the picture will gradually zoom back.

- 3 Press the SET button to display "FOCUS LOCK" to fix the focus (if you wish).

The set condition display will disappear in about 3 seconds. If you wish to check the display, press the SET button again.

If you wish to switch back to auto focus, press the SET button again to display "FOCUS AUTO".



## ■ Initializing

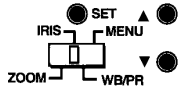
- The settings such as focus, white balance, and shutter speed are retained even if the power is turned off. However, if you find some setting different, re-set each setting.

## 5. IRIS ADJUSTMENT

Iris is automatically adjusted when AUTO is selected. (The default setting is AUTO.)

### ■ Manual adjustment of iris

- Set the MODE switch to IRIS.



- Press ▲ or ▼ to display "MANUAL" and press the SET button.

- Press ▲ or ▼ to change values.

- Press the SET button.

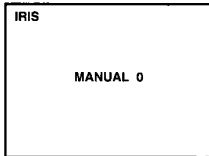
The menu screen will disappear after displaying the setting condition for about 3 seconds.

### ■ Setting back to AUTO

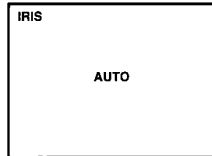
- Set the mode switch to IRIS.

- Press ▲ or ▼ to display "AUTO" and press the SET button.

The menu screen will disappear after displaying the setting condition for about 3 seconds.



IRIS MANUAL



IRIS AUTO

## 6. WHITE BALANCE (WB) ADJUSTMENT

The image may seem blueish or reddish due to light source.

In such case, make white balance adjustment so that white is displayed white and natural tints are precise, depending on the light.

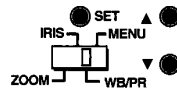
White balance is automatically adjusted in accordance with change of the light if "WHITE BALANCE" is set to "AUTO".

- The default setting is "AUTO".

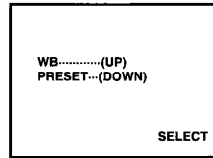
## ■ Selection of white balance

- Set the MODE switch to WB/PR.

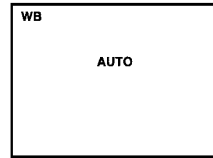
WB/PR selection menu will be displayed on the monitor.



- Press ▲ to display "WB" menu.



WB/PR SELECTION MENU



WB MENU

- Press ▲ or ▼ to set the white balance.

**AUTO** Automatic white balance adjustment regardless of light source.

**INDOOR** Suitable for indoor use under incandescent light.

**FL.LIGHT** Suitable for indoor use under fluorescent light.

**OUTDOOR** Suitable for outdoor use under the sunlight.

**LOCK** White balance is fixed. (page 6)

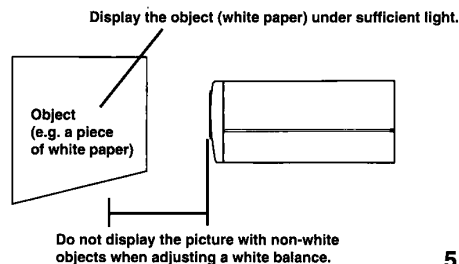
**MANUAL** White balance is set as you wish. (page 6)

- Press the SET button.

The menu screen will disappear after displaying the set conditions for about 3 seconds except MANUAL setting.

### ■ Fixing White Balance

- Place a piece of white paper in front of the camera and display the white paper on all over the monitor.



- Select "LOCK". (See page 5)

- Press the SET button for about 3 seconds to fix white balance.

The "LOCK" setting will function for about 5 seconds, after displayed "LOCK" indicator on the right corner of the screen. When finished, the menu screen will disappear.

### NOTE:

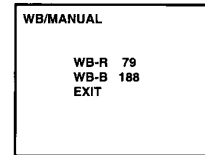
Although the object is not limited to paper, if the color of that is not white or is extremely dark, white balance may not be locked.

### ■ Manual setting (setting as you wish)

- Select "MANUAL" on the WB menu. (page 5)

- Press the SET button to display "WB/MANUAL" on the monitor.

- Press ▲ or ▼ to flash your desired item and press the SET button.



**WB-R** Set the redness as you wish.

**WB-B** Set the blueness as you wish.

- Press ▲ or ▼ to set value and press the SET button.

The flashing will move onto the next item. To set the other item repeat the steps 3 and 4.

- Press ▲ or ▼ to set the flashing to "EXIT" and press the SET button to exit the setting.

The menu screen will disappear after displaying the set conditions for about 3 seconds.

## 7. MENU SETTINGS & FUNCTIONS

### Functions of each menu

The menu to set each function will be displayed on the monitor.

### LENS

Zooming, setting zooming speed, switching focus setting between auto and manual

### BRIGHT

Switching iris setting (AUTO/MANUAL) and setting standard value of iris and gain

### BACK-LIGHT

Backlight control

### SHUTTER

Setting shutter speed

### DETAIL

Adjusting contour of image

### COLOR

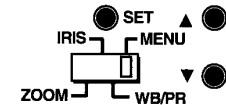
Adjusting white balance, gain of red, blue and tint

### SUB-MENU

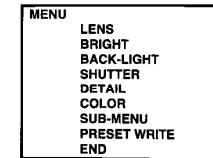
camera ID display, making camera ID, setting auto focus sensitivity, adjusting black level, adjusting H and V phase at external sync. signal and reset all settings to default condition

**PRESET WRITE** Memorizing each setting of zoom, focus, iris, gain, back-light compensation and color in PRESET 1 to 20.

### Operation of menu screens



- Set the MODE switch to MENU. MENU screen will be displayed on the monitor.



- Press the buttons ▲, ▼, or SET to switch the setting of the selected item.

See Menu chart on following pages for operation and functions of each button and item.

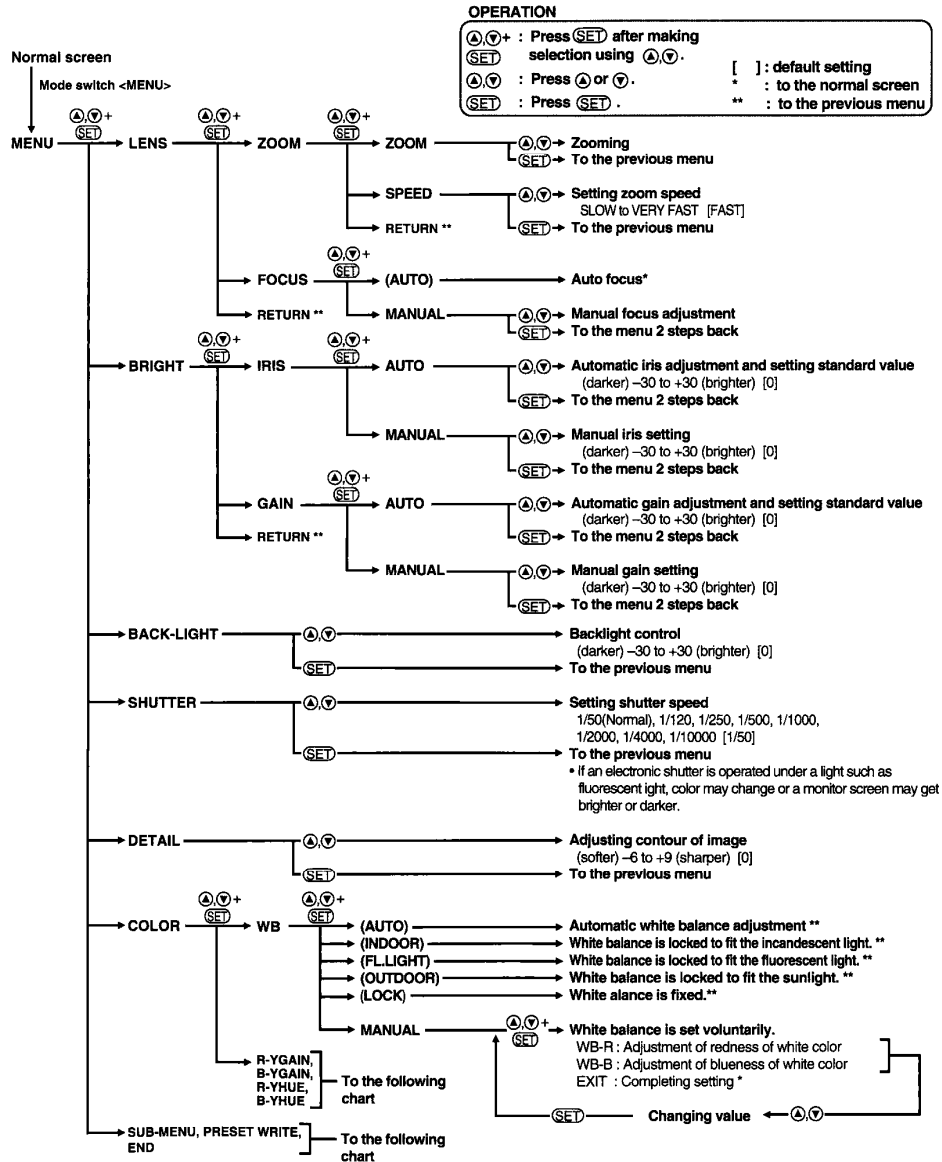
### NOTE:

If no button is pressed for about 30 seconds while displaying the menu screen, the display will return to the normal screen.

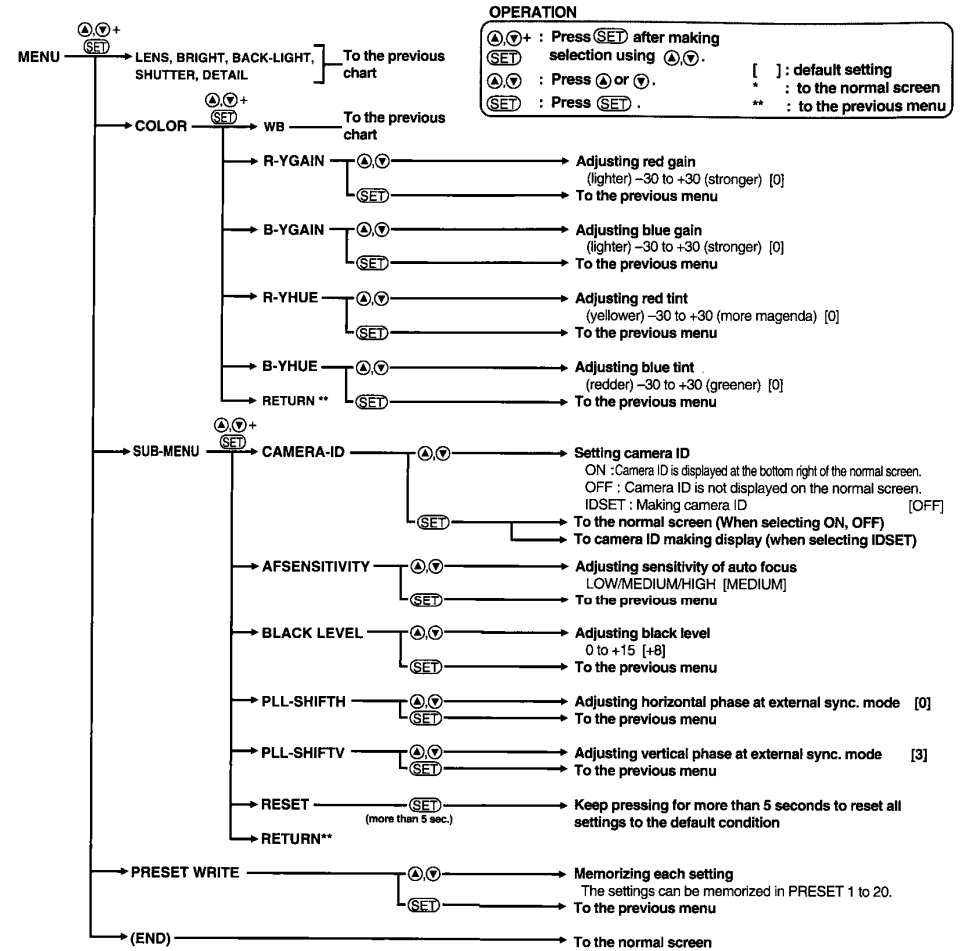
# 7. MENU SETTINGS & FUNCTIONS

## Menu chart

### Chart 1/2 (LENS, BRIGHT, BACK-LIGHT, SHUTTER, DETAIL, COLOR)



### Chart 2/2 (COLOR, SUB-MENU, PRESET WRITE, END)



## Making camera ID

### ■ Displaying the menu to make camera ID

- 1 Set the MODE switch to MENU.

Menu screen will be displayed on the monitor.

- 2 Press ▲ or ▼ to select "SUB-MENU" and press the SET button.

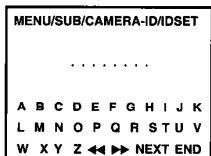
"MENU/SUB-MENU" screen will be displayed.

- 3 Press ▲ or ▼ to select "CAMERA-ID" and press the SET button.

"MENU/SUB/CAMERA-ID" screen will be displayed.

- 4 Press ▲ or ▼ to select "IDSET" and press the SET button.

"MENU/SUB/CAMERA-ID/IDSET" screen will be displayed.



### ■ Inputting camera ID

After displaying "MENU/SUB/CAMERA-ID/IDSET", input the camera ID with the ▲, ▼ or SET buttons. 8 letters can be put at maximum.

- 1 Press ▲ or ▼ to select a letter to be inputted.

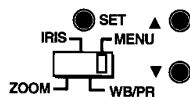
- 2 Press the SET button to input the selected letter.

- There are 3 kinds of character table, alphabet (capital letter), alphabet (small letter) and figures.

When you select "NEXT" with ▲ or ▼ and the SET button, the character table will be switched in order of ALPHABET(capital), alphabet (small), figures (incl. symbols), ALPHABET(capital)....

- To make a blank, select "▶▶" using ▲ or ▼ and press the SET button.
- To delete a letter, select "◀◀" using ▲ or ▼ and press the SET button.

- 3 Select "END" using ▲ or ▼ and press the SET button to exit the setting menu.



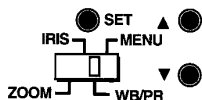
### ■ Displaying camera ID on the screen

When you wish to display camera ID on the screen, select "ON" in the "MENU/SUB/CAMERA-ID" menu.

See page 8.

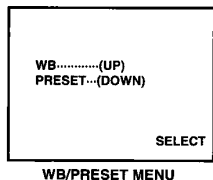
## 8. SELECTING PRESET NO.

To display a screen according to the memorized setting, operate as follows;



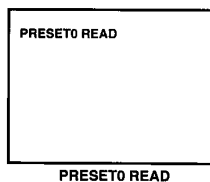
- 1 Set the MODE switch to WB/PR.

- "White balance/Preset" menu will be displayed on the monitor.



- 2 Press ▼ to display "PRESET0 READ".

- PRESET 0 is the present setting.



- 3 Press ▲ or ▼ to select the desired setting (PRESET 1 to 20) and press the SET button.

The condition of the selected PRESET will be displayed.

**FC** (focus) A(AUTO) / L(LOCK)

**BL** (back light) compensation value

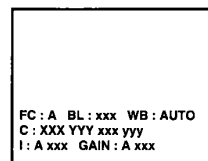
**WB** (white balance)

INDOOR / FL LIGHT /  
OUTDOOR / LOCK /  
MANUAL:xxx yyy  
(values xxx:WB-R, yyy:  
WB-B)

**C** (color) XXX YYY xxx yyy  
( values  
XXX:R GAIN, YYY:B  
GAIN, xxx : R HUE,  
yyy:B HUE)

**I** (iris) A(AUTO) xxx /  
M(manual) xxx  
(xxx:value)

**GAIN** A(AUTO) xxx /  
M(manual) xxx  
(xxx:value)



- 4 Press the SET button.

### NOTE:

If not pressed, PRESET 1 will be automatically selected.

## 9. RS-232C INTERFACE

This camera can be controlled by using PC equipped with the RS-232C connector.

### RS-232C terminal

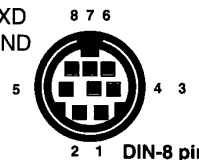
#### ■ Pin no.

Pin No.	Signal line	Meanings	from camera side
1	NC	-	-
2	NC	-	-
3	RXD	Received data	Input
4	NC	-	-
5	GND	Signal ground	-
6	NC	-	-
7	TXD	Transmitted data	Output
8	NC	-	-

#### ■ Data link

Camera DIN-8 pin PC D-SUB 9 pin

3 RXD 2 RXD  
5 GND 3 TXD  
7 TXD 5 GND



### ■ Transmission mode

Transmission rate 9600 bps  
Data bit length 8 bits  
Stop bit length 1 bit  
Parity bit Nil  
Control parameter CR(0DH) or CR+LF (0DH+0AH)

### ■ RS-232C adapter cable (provided)

DIN-8 pin D-SUB 9 pin

1 NC 1 NC  
2 NC 2 RXD  
3 RXD 3 TXD  
4 NC 4 ESR  
5 SG 5 SG  
6 NC 6 DSR  
7 TXD 7 RTS  
8 NC 8 CTS  
9 NC 9 NC

## 9. RS-232C INTERFACE

### RS-232C command & functions

NO	Group	Command	Functions	Status
1	zoom	ZMS┘	stop	RC┘ EX10┘
2		ZMT┘	TELE start	
3		ZMW┘	WIDE start	
4		ZSS┘	speed VERY FAST	
5		ZSH┘	speed FAST	
6		ZSM┘	speed MEDIUM	
7		ZSL┘	speed SLOW	
8	focus	FCS┘	stop	RC┘ EX11┘
9		FCA┘	AUTO	
10		FCN┘	NEAR start	
11		FCF┘	FAR start	
12	WB (white balance)	WBA┘	AUTO	RC┘ EX03┘
13		WBI┘	INDOOR	
14		WBO┘	OUTDOOR	
15		WBF┘	Fluorescent light	
16		WBM┘	MANUAL	
17		WBRU┘	R up	
18		WBRD┘	R down	
19		WBR(**)┘	(**R 0-255	
20		WBBU┘	B up	
21		WBBD┘	B down	
22		WBB(**)┘	(**B 0-255	
23		WBL┘	retrieve LOCK setting	
24	WBK┘	LOCK start		
25	SS (shutter speed)	SSU┘	up (increase)	RC┘ EX05┘
26		SSD┘	down (decrease)	
27		SS0┘	1/50	
28		SS1┘	1/120	
29		SS2┘	1/250	
30		SS3┘	1/500	
31		SS4┘	1/1000	
32		SS5┘	1/2000	
33		SS6┘	1/4000	
34		SS7┘	1/10000	
35	BL (back light)	BLU┘	up (brighter)	RC┘ EX06┘
36		BLD┘	down (darker)	
37		BL(**)┘	BL (**) ± 30	
38	iris	IRA(**)┘	AUTO (**) ± 30	RC┘ EX07┘
39		IRM(**)┘	MANUAL (**) ± 30	
40		IRA┘	AUTO	
41		IRM┘	MANUAL	
42		IRU┘	up (open)	
43		IRD┘	down (stop down)	
44	gain	GNA(**)┘	AUTO (**) ± 30	RC┘ EX08┘
45		GNM(**)┘	MANUAL (**) ± 30	
46		GNA┘	AUTO	
47		GNM┘	MANUAL	
48		GNU┘	up	
49		GND┘	down	

NO	Group	Command	Functions	Status	
50	DETAIL	DTU┘	up (sharper)	RC┘ EX18┘	
51	(aper- ture)	DTD┘	down (softer)		
52		DT(**)┘	APERTURE(**) -6 to +9		
53	color	RG(**)┘	R GAIN (**) ± 30	RC┘ EX0B┘	
54		RGU┘	R GAIN up		
55		RGD┘	R GAIN down		
56		BG(**)┘	B GAIN (**) ± 30		
57		BGU┘	B GAIN up		
58		BGD┘	B GAIN down		
59		RH(**)┘	R HUE (**) ± 30		
60		RHU┘	R HUE up		
61		RHD┘	R HUE down		
62		BH(**)┘	B HUE (**) ± 30		
63		BHU┘	B HUE up		
64		BHD┘	B HUE down		
65	camera ID entry	CH=(***)┘	entry of 8 letters	RC┘ EX14┘	
66	camera	CDD┘	ID display disable	RC┘	
67	ID display	CDE┘	ID display enable	EX0E┘	
68	AF sensitivity	ASU┘	up	RC┘ EX19┘	
69		ASD┘	down		
70		ASH┘	HIGH		
71		ASM┘	MEDIUM		
72		ASL┘	LOW		
73	AWB speed	AWU┘	up	RC┘ EX1A┘	
74		AWD┘	down		
75		AWF┘	FAST		
76		AWM┘	MEDIUM		
77		AWS┘	SLOW		
78		AWV┘	VERY SLOW		
79	BLACK	BK(**)┘	adjust black level (0 to +15)	RC┘ EX25┘	
80	LEVEL	BKU┘	up		
81		BKD┘	down		
82	PLL shift H	PH(**)┘	PLL shift H (**) 0 to 453	RC┘ EX1B┘	
83			PHU┘		up
84			PHD┘		down
85	PLL shift V	PV(**)┘	PLL shift V (**) 0 to 624	RC┘ EX1C┘	
86			PVU┘		up
87			PVD┘		down
88	data display	DS0┘	normal screen	RC┘ EX20┘	
89		DS1┘	FOCUS AUTO/MANUAL		
90		DS2┘	IRIS AUTO/MANUAL		
91		DS3┘	GAIN AUTO/MANUAL		
92		DS4┘	BACK LIGHT		
93		DS5┘	SHUTTER		
94		DS6┘	DETAIL		
95		DS7┘	W.B.		
96		DS8┘	COLOR		
97	DS9┘	SUB MENU			
98	preset	PR(**)┘	Load PRESET (**) 1 to 20	RC┘ EX21┘	
99		PW(**)┘	Enter PRESET data (**) 1 to 20		
100		PC(**)┘	PRESET data clear (**) 1 to 20		

NO	Group	Command	Functions	Status
101	inquiry	ST0┘	ZOOM information	aa,bbb
102		ST1┘	FOCUS information	cc,ddd
103		ST2┘	PRESET number	ee
104		ST3┘	BRIGHT information	ff,gg,hh,ii
105		ST4┘	BACK-LIGHT information	jj
106		ST5┘	SS(shutter speed) information	kk
107		ST6┘	DETAIL information	ll
108		ST7┘	COLOR information	mm,nn,oo,pp
109		ST8┘	WB information	qq, (rr,ss)
110		ST9┘	AF sensitivity information	tt
111		STA┘	AWB SPEED information	uu
112		STB┘	PLL-SHIFT information	vv,www
113		STG┘	back-up 01(off) / 00(on)	
114		STI┘	BRIGHT information	yyy
115	lens control	LD***##┘	ZOOM***FOCUS###position	RC┘ EX22┘
116	MENU preset	MP┘	Switches all MENU settings back to the default condition	RC┘ EX23┘
117	back-up	BUE┘	back-up enable at power off	
118		BUD┘	back-up disable at power off	

#### Details of the status no. 101-114

Status	Meanings
aa	Zoom speed
bbb	ZOOM position (3 figures in hexadecimal) 0 to 78A
cc	FOCUS AUTO (1) / LOCK (0)
ddd	FOCUS position (3 figures in hexadecimal) E0 to 2C8 (H)
ee	PRESET no.
ff	IRIS AUTO (1) / MANUAL (0)
gg	IRIS value
hh	AGC AUTO (1) / MANUAL (0)
ii	AGC value
jj	BACK- LIGHT value
kk	SS (shutter-speed) value
ll	DETAIL value
mm	R GAIN
nn	B GAIN
oo	R HUE
pp	B HUE
qq	WB value
rr	WB manual value
ss	WB manual value
tt	AF sensitivity value
uu	AWB SPPD value
vv	PLL-SHIFT H value
www	PLL-SHIFT V value
yyy	BRIGHT GAIN (0 to 255)

#### Error messages and meanings

ERROR code	Meanings
ERR1	command line undefined
ERR2	data after command out of range
ERR3	overflow occurred in reception buffer
ERR4	wrong serial format found
ERR5	W.B. unlocked
ERR6	data reception invalid (as the focus lens is moving)
ERR7	command reception invalid (ADJUST etc.)

#### NOTE:

- When you send "stop" command such as ZMS┘ or FCS┘, be sure to make adjustments (zoom, focus etc.) first.
- If you turn on the camera before turning on your PC or starting RS-232C driver software, the command may not be received correctly. The first command may be taken as an error. In this case, send the command "┘ (CR or CR + LF)" before sending the command you wish to send.

## 10. SPECIFICATIONS & ACCESSORIES

Specifications	
Model	CCD-400E / CCD-400EW
Image pickup device	1/4" CCD (total 470,000 pixels)
No. of effective pixels	752H x 582V (440,000 pixels)
Signal system	PAL colour system
Scanning system	625 lines; 2:1 interlace
Scanning frequency	15.625 kHz (H), 50 Hz (V)
Sync. system	Internal / External
External sync. signal	VBS or VS Sync. signal 0.3Vp-p±3dB Horizontal period 64µsec ±1%
Video output	VBS 1.0Vp-p/75 Ω (BNC output)
Control terminal	RS-232C DIN 8 pin
Horizontal resolution	430 TV lines (S-video output)
S/N ratio	More than 46dB
Minimum illumination	Min. 1 lux / F1.4 (at GAIN-MAX)
Gain control	AUTO / MANUAL
White balance	AUTO / INDOOR/ FL LIGHT/ OUTDOOR / LOCK / MANUAL
Backlight compensation	Available (-30 to 30)
Color adjustment	R-GAIN / B-GAIN / R-HUE / B-HUE
Electronic shutter	1/50 - 1/10000 (8 steps)
Closest distance	1cm (widest angle) 1m (telephoto end)
Lens	Electrically powered 14-power zoom lens F1.4, f = 3.9 - 54.6mm Zoom speed 2 / 3 / 6 / 10 sec. Focus AUTO / LOCK / MANUAL Iris AUTO/MANUAL
Temperature	Operating 0°C to 40°C Safekeeping -20°C to +60°C
Power supply	DC 12V±1V, Ripple voltage less than 500mVp-p (not supplied with the camera)
Current consumption	DC12V 380mA
External dimensions	66mm(W) x 55mm(H) x 104mm(D) 2.60"(W) x 2.17"(H) x 4.09"(D) (excluding external connectors)
Weight	350g
Accessories	Clamp 1 Screw 1 RS-232C adapter cable 1 Operation Manual 1

- Specifications are subject to change without notice.

#### Options

AC adapter DA-100E

Name of Importers

**Mitsubishi Electric Europe B.V.**

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PRINTED IN JAPAN