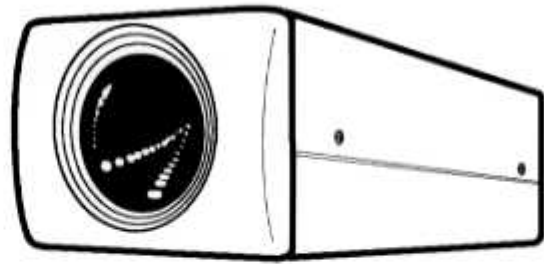




MITSUBISHI
 COLOUR VIDEO CAMERA
 DC-420E



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:

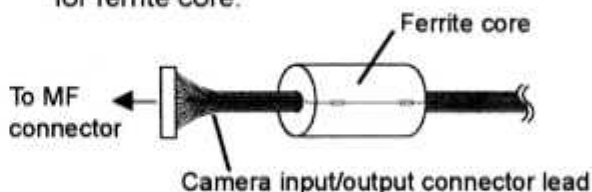
- Some parts of this camera are made of plastic. Wiping it with benzine or thinner, putting a product of rubber or vinyl against it, or spilling volatile liquids on it such as insecticides may cause deterioration of parts and flaking of paint.
Read the instructions before using a chemical duster.

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.

Caution on Installation

- When connecting this camera to other devices, it is necessary to attach a ferrite core as below figure for avoiding interference radiation from an input/output cable.
Use TDK ZCAT2032-0930 or equivalent for ferrite core.



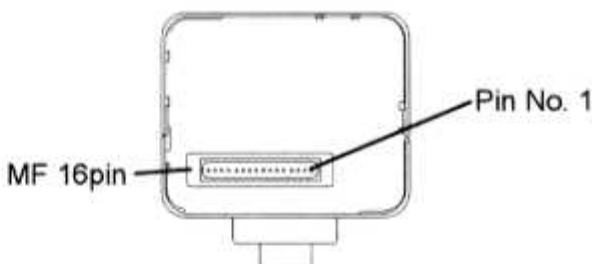
Camera Malfunction

- 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. TERMINAL

Terminal on the rear panel

I/O connector : MF 16pin (JST PH type)



Pin assignment

Table 1

Pin No.	name	Description and function
1	5VDC OUT	5V DC POWER output for switch circuit
2	GND	GND for switch circuit
3	SWIN	function control voltage input, see table 2 for control voltage.
4	KEYIN	mode control voltage input, see table 2 for control voltage
5	MEMIN	grabbing trigger signal input, active in low (less than 0.7VDC).
6	FLASH OUT	output of flashing the strobe light, output low level synchronized grabbing the picture
7	C OUT	C video signal output
8	GND	GND for C OUT
9	Y OUT	Y video signal output
10	GND	GND for Y OUT
11	GND	GND for 12VDC IN
12	GND	GND for 12VDC IN
13	12VDC IN	power supply input
14	12VDC IN	power supply input
15	SD OUT (RS-232C)	serial signal output on RS-232C for function control
16	RD IN (RS-232C)	serial signal input on RS-232C for function control

3. SWITCH CIRCUIT

For switch control, the following circuit is needed. Connect this circuit to Pins No. 1 to 4 of MF connector.

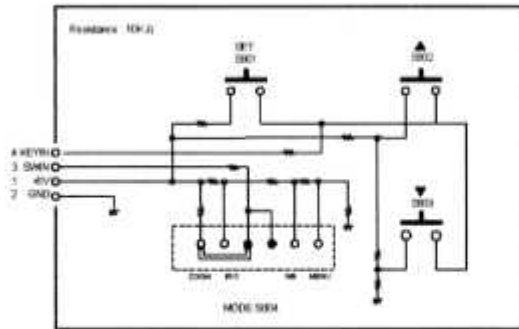


Table 2

Function(SW IN)	SET	▲ UP	▼ down	—
control voltage	4.1±0.05V	2.8±0.05V	1.4±0.05V	—
mode(KEY IN)	ZOOM	IRIS	WB/PR	MENU
control voltage	4.8±0.05V	3.85±0.05V	2.45±0.05V	1.20±0.05V

4. FEATURES AND FUNCTIONS

① SET button, ▲ button, ▼ button

- **When MODE switch is set to ZOOM**
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**
Use to switch iris between auto and manual.
Use also to set value at manual adjustment.
- **When MODE switch is set to WB/PR**
Use to switch white balance between auto and manual. Use also to select preset number.
- **When MODE switch is set to MENU**
Use to select and set items on the menu screen.

② MODE switch

ZOOM

Use for zooming or switching focus between auto and fix.

IRIS

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

WB/PR

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

MENU

Use to display menu screens on the monitor.

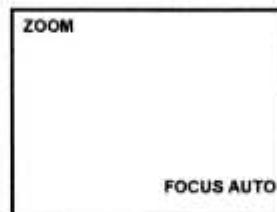
5. BASIC SETTINGS

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

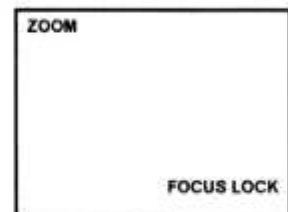
NOTE:

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".



FOCUS AUTO



FOCUS LOCK

■ 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.

6. IRIS ADJUSTMENT

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

Manual adjustment of iris

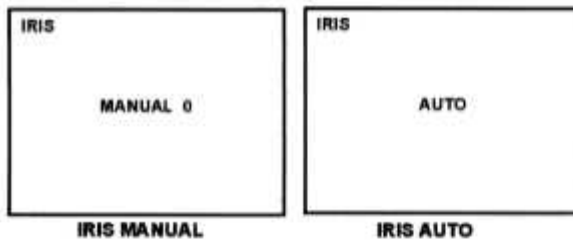
- 1 Set the MODE switch to IRIS.
- 2 Press ▲ or ▼ to display "MANUAL" and press the SET button.
- 3 Press ▲ or ▼ to change values.
- 4 Press the SET button.

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

Setting back to AUTO

- 1 Set the mode switch to IRIS.
- 2 Press ▲ or ▼ to display "AUTO" and press the SET button.

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



7. 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".

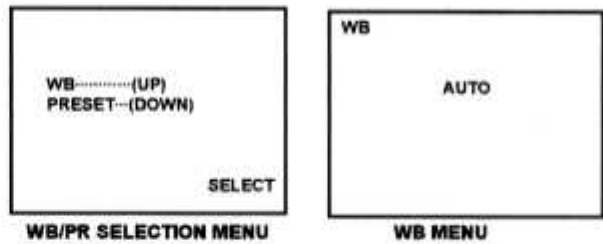
- The default setting is "AUTO".

Selection of white balance

- 1 Set the MODE switch to WB/PR.

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

- 2 Press ▲ to display "WB" menu.



- 3 Press ▲ or ▼ to set the white balance.

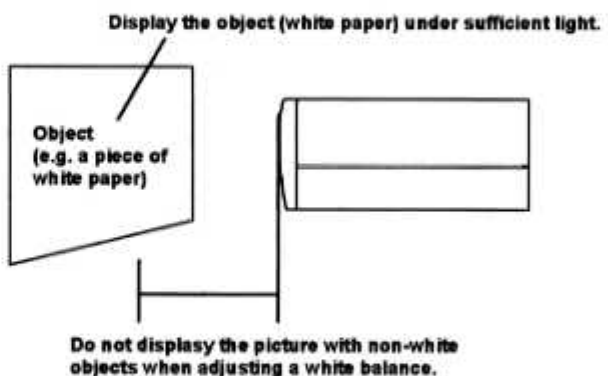
AUTO	Automatic white balance adjustment regardless of light source.
INDOOR	Suitable for indoor use under incandescent light.
FL.LIGHT	Suitable for indoor use under fluorescent light.
OUTDOOR	Suitable for outdoor use under the sunlight.
LOCK	White balance is fixed. (pages 4-5)
MANUAL / STROBE	White balance is set as you wish. (pages 4-5)

- 4 Press the SET button.

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

Fixing White Balance

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



- 2 Select "LOCK". (See page 4)
- 3 Press the SET button for about 3 seconds to fix white balance.

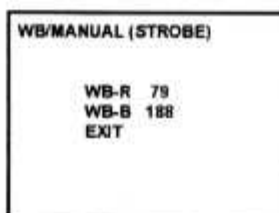
The "LOCK" setting will function for about 5 seconds, after displayed "LOCK" indicator on the right corner of the screen. When finished, the menu screen will disappear.

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)

- 1 Select "MANUAL" on the WB menu. (page 4)
- 2 Press the SET button to display "WB/MANUAL" on the monitor.
- 3 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.

- 4 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.

- 5 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.

8. 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
STROBE	Strobe setting
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

- 1 Set the MODE switch to MENU.
MENU screen will be displayed on the monitor.
- 2 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.



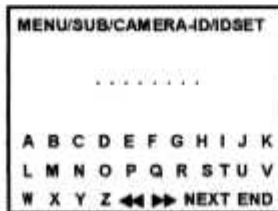
NOTE:

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

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

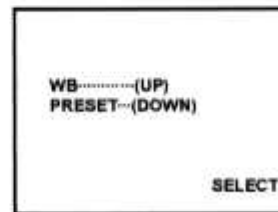
When you wish to display camera ID on the screen, select "ON" in the "MENU/SUB/CAMERA-ID" menu.

See ■ Chart 2/2 on page 8.

Selecting preset No.

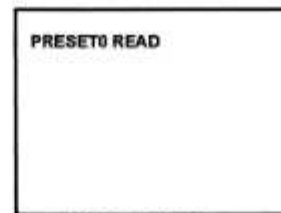
To display a screen according to the memorized setting, operate as follows;

- 1 Set the MODE switch to WB/PR.
 - "White balance/Preset" menu will be displayed on the monitor.



WB/PRESET MENU

- 2 Press ▼ to display "PRESET0 READ".
 - PRESET 0 is the present setting.



PRESET0 READ

- 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)

WB (white balance)

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

Menu chart

Chart 1/2 (LENS, BRIGHT, STROBE, DETAIL, COLOR)

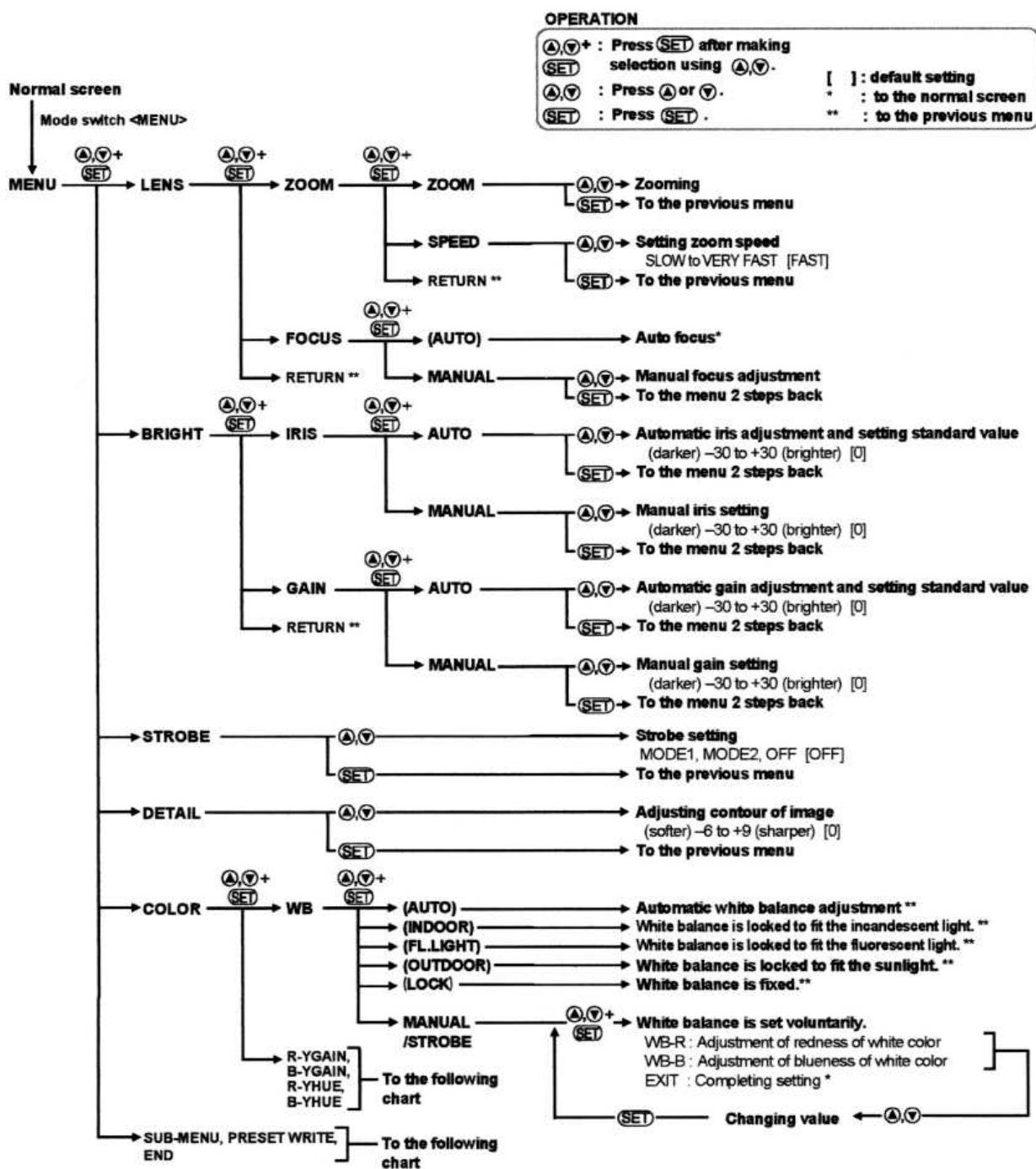
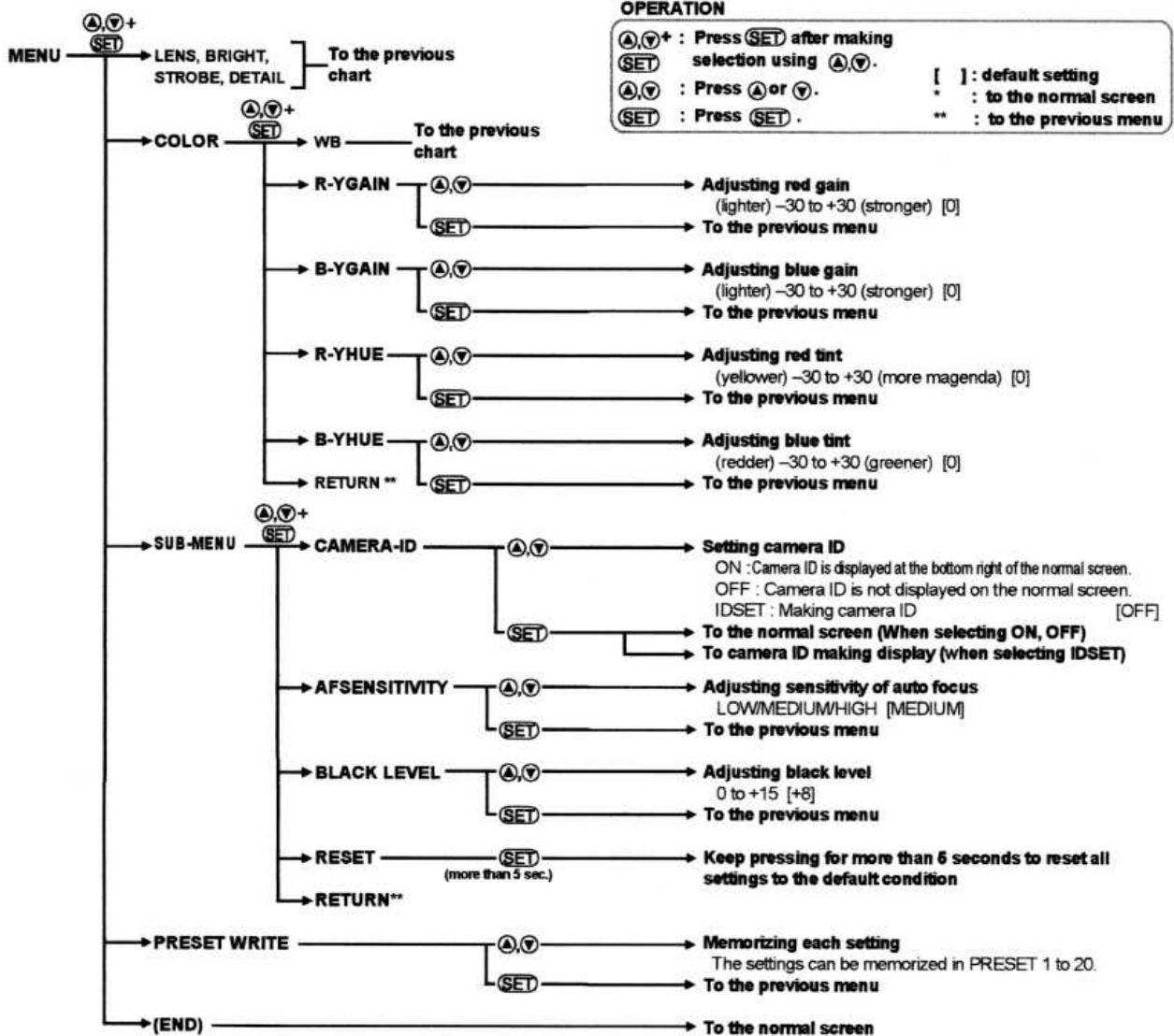


Chart 2/2 (COLOR, SUB-MENU, PRESET WRITE, END)



9.STROBE CONTROL

- 1 Set STROBE mode by using MENU or RS-232C command.
- 2 Connect MEMIN (MF connector #5) to GND.
- 3 Camera captures the picture after 300msec and outputs strobe signal for flashing the strobe light.

■ Setting each functions on STROBE mode

When setting iris, white balance and color adjustment on strobe mode 1, make sure to set the camera to strobe mode 1 (freeze output mode) first.

The set values of the above settings will be memorized for strobe mode 1. The each memorized setting will be reproduced whenever MEM IN signal or the command SBE is inputted.

NOTE:

The preset setting function for iris, white balance and color adjustment (the setting and reproducing of PRESET 1 to 20) does not work on strobe mode 1.

10.RS-232C INTERFACE

■ 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 command & functions

NO	Group	Command	Functions	Status
1	zoom	ZMS↓	stop	RC↓
2		ZMT↓	TELE start	EX10↓
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↓
9		FCA↓	AUTO	EX11↓
10		FCN↓	NEAR start	
11		FCF↓	FAR start	
12	WB (white balance)	WBA↓	AUTO	RC↓
13		WBI↓	INDOOR	EX03↓
14		WBO↓	OUTDOOR	
15		WBF↓	Fluorescent light	
16		WBM↓	MANUAL/STROBE	
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	RC↓
24		WBK↓	LOCK start	EX04↓
25	iris	IRA(**)↓	AUTO (**) ± 30	RC↓
26		IRM(**)↓	MANUAL (**) ± 30	EX07↓
27		IRA↓	AUTO	
28		IRM↓	MANUAL	
29		IRU↓	up (open)	
30		IRD↓	down (stop down)	
31	gain	GNA(**)↓	AUTO (**) ± 30	RC↓
32		GNM(**)↓	MANUAL (**) ± 30	EX08↓
33		GNA↓	AUTO	
34		GNM↓	MANUAL	
35		GNU↓	up	
36		GND↓	down	
37	DETAIL (aper- ture)	DTU↓	up (sharper)	RC↓
38		DTD↓	down (softer)	EX18↓
39		DT(**)↓	APERTURE(**) -6 to +9	
40	color	RG(**)↓	R GAIN (**) ± 30	RC↓
41		RGU↓	R GAIN up	EX0B↓
42		RGD↓	R GAIN down	
43		BG(**)↓	B GAIN (**) ± 30	
44		BGU↓	B GAIN up	
45		BGD↓	B GAIN down	
46		RH(**)↓	R HUE (**) ± 30	
47		RHU↓	R HUE up	
48		RHD↓	R HUE down	
49		BH(**)↓	B HUE (**) ± 30	
50		BHU↓	B HUE up	
51	BHD↓	B HUE down		

NO	Group	Command	Functions	Status
52	camera ID entry	CH=(**).↓	entry of 8 letters	RC.↓ EX14.↓
53	camera ID display	CDD.↓	ID display disable	RC.↓
54		CDE.↓	ID display enable	EX0E.↓
55	AF sensitivity	ASU.↓	up	RC.↓
56		ASD.↓	down	EX19.↓
57		ASH.↓	HIGH	
58		ASM.↓	MEDIUM	
59		ASL.↓	LOW	
60	AWB speed	AWU.↓	up	RC.↓
61		AWD.↓	down	EX1A.↓
62		AWF.↓	FAST	
63		AWM.↓	MEDIUM	
64		AWS.↓	SLOW	
65		AWV.↓	VERY SLOW	
66	BLACK LEVEL	BK(**).↓	adjust black level (0 to +15)	RC.↓
67		BKU.↓	up	EX25.↓
68		BKD.↓	down	
69	data display	DS0.↓	normal screen	RC.↓
70		DS1.↓	FOCUS AUTO/MANUAL	EX20.↓
71		DS2.↓	IRIS AUTO/MANUAL	
72		DS3.↓	GAIN AUTO/MANUAL	
73		DS6.↓	DETAIL	
74		DS7.↓	W.B.	
75		DS8.↓	COLOR	
76		DS9.↓	SUB MENU	
77	preset	PR(**).↓	Load PRESET(**) 1 to 20	RC.↓
78		PW(**).↓	Enter PRESET data(**) 1 to 20	EX21.↓
79		PC(**).↓	PRESET data clear(**) 1 to 20	
80	inquiry	ST0.↓	ZOOM information	aa,bbb
81		ST1.↓	FOCUS information	cc,ddd
82		ST2.↓	PRESET number	ee
83		ST3.↓	BRIGHT information	ff,gg,hh,ii
84		ST6.↓	DETAIL information	ll
85		ST7.↓	COLOR information	mm,nn,oo,pp
86		ST8.↓	WB information	qq, (rr,ss)
87		ST9.↓	AF sensitivity information	tt
88		STA.↓	AWB SPEED information	uu
89		STG.↓	back-up 01(off) / 00(on)	
90		STI.↓	BRIGHT information	yyy
91		STJ.↓	FREEZE information	z
92	lens control	LD***###.↓	ZOOM***FOCUS###position	RC.↓ EX22.↓
93	MENU preset	MP.↓	Switches all MENU settings back to the default condition	RC.↓ EX23.↓
94	back- up	BUE.↓	back-up enable at power off	
95		BUD.↓	back-up disable at power off	
96	strobe	SB1.↓	strobe mode 1	RC.↓
97		SB2.↓	strobe mode 2	EX27.↓
98		SBD.↓	normal mode	
99		SBE.↓	freeze ON	

Details of the status no. 80-91

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
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
yyy	BRIGHT GAIN (0 to 255)
z	FREEZE OFF (0) / ON (1)

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.

11. SPECIFICATIONS & ACCESSORIES

Specifications

Model	DC-420E
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
Video output	Y/C Separate
Horizontal resolution	430 TV lines (S-video output)
S/N ratio	More than 46dB
Gain control	AUTO / MANUAL
White balance	AUTO / INDOOR / FL LIGHT / OUTDOOR / LOCK / MANUAL
Color adjustment	R-GAIN / B-GAIN / R-HUE / B-HUE
Electronic shutter	1/50
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	390g
Accessories	Operation Manual 1

• Specifications are subject to change without notice.

Options

AC adapter	DA-100E
------------	---------

Name of Importers

Mitsubishi Electric Europe B.V.

UK Branch

Travellers Lane, Hatfield, Herts. AL10 8XB, England, U.K.

Phone (1) 707 276100 FAX (1) 707 278755

Italian Branch

Centro Direzionale Colleoni, Palazzo Perseo-Ingresso 2,

Via Paracelso 12, 20041 Agrate Brianza, (Milano) Italy

Phone (039) 60531 FAX (039) 6057694

Benelux Branch

Nijverheidsweg 23 A, 3641 RP. Postbus 222, 3640 AE Mijdrecht

Phone 02972-82461 FAX 02972-83936

Spanish Branch (Barcelona)

Sucursal en españa

Polígono Industrial "Can Magi", Calle Joan Bucallà 2-4,

Apartado de Correos 420, 08190 Sant Cugat del Vallés,

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