WAT-2200Mk-2 & WAT-3200
User's Manual

Rev. 2.00

Watec Co., Ltd.

Revision Record

Rev.	Date	Changes
1.00	2018/12/19	-
1.10	2022/07/13	Added description of the WAT-3200.
2.00	2025/05/30	Correction of RS232 Command List Added commands for W513R.

Table of Contents

1. About this manual

This user manual describes the OSD (On Screen Display) menu of WAT-2200 Mk-2 and WAT-3200(simply called the “camera”), the function setting method by RS232, and the details of each function.

When the settings of the camera is changed according to this manual, check to see that the operation and the effects of the changes made to the camera are acceptable.

The WAT-2200 Mk-2 & WAT-3200 user’s manual is subject to change by design and the specifications of the product without notice.

2. Configuring the camera function

The function of the camera can be set by the RC-02 (remote control) or RS232. Utilize the option RC-02 (remote control) to set function through OSD (On Screen Display) menu. By RS232, through communication by the VISCA/Pelco-D/Pelco-P protocol, it is able to set the camera function through not only the OSD menu same as RC-02 but also without displaying the OSD menu. Utilize the option CB-03 (serial communication cable) for the communication. Connect either the RC-02 or CB-03 to the REMOTE terminal on the rear of the camera. You cannot use both these at the same time.

2.1. RC-02 (Remote Control)

Operate the OSD menu by the RC-02.

Connect the RC-02 to the REMOTE terminal on the rear of the camera. Remote control unit providing access to adjustments, settings the functions on the OSD menu.

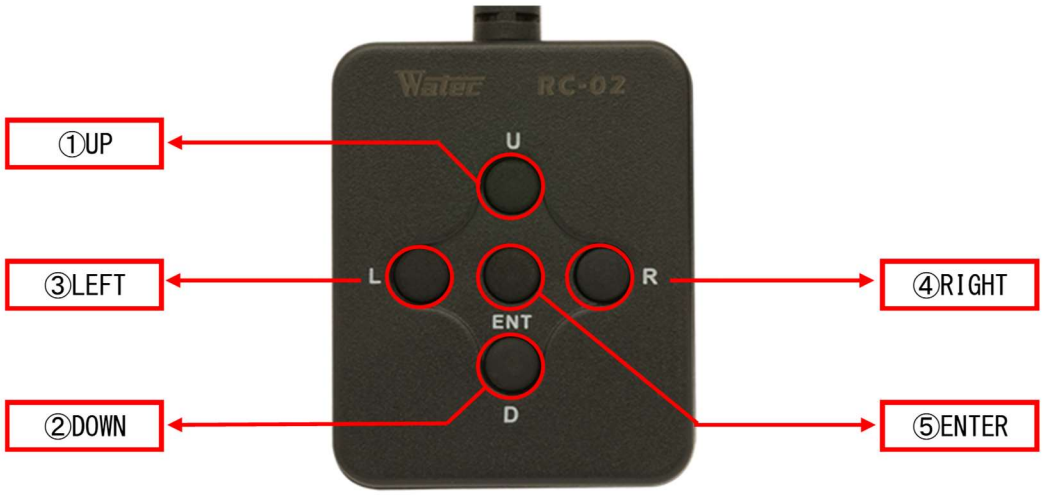


Figure 1. RC-02 (remote control)

1. UP, 2. DOWN	: Cursor control for selecting the OSD menu items.
3. LEFT, 4. RIGHT	: Change the settings or value on the OSD menu.
5. ENTER	: Open the OSD menu. Execute the selected item or function.

2.2. RS232

It is able to operate the OSD menu same as RC-02 by the RS232 communication.
It is also able to change the function settings or acquire the current setting without displaying the OSD menu. See the “5.RS232 Command List” for the corresponding command.

Connect the CB-03 to the REMOTE terminal on the rear of the camera and the control equipment such as a PC.

*CB-03 REMOTE terminal side: mini-din 8pin connector (male)
Control equipment side: D-Sub 9pin connector (female)

Figure 2. CB-03 (Serial Communication Cable)

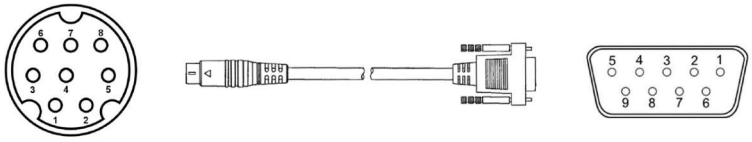


Figure 3. Pin Number of the CB-03 (Internal wiring)

Table 1. Internal connection of the CB-03

Mini-Din 8pin (male)			Internal Connection	D-sub 9pin (female)		
Pin No.	Name	Description		Pin No.	Name	Description
3	TXD (out)	Send from camera	Connect	2	RXD (in)	Receive by control equipment
5	RXD (in)	Receive by camera	Connect	3	TXD (out)	Send from control equipment
4	GND	Ground	Connect	5	GND	Ground
1, 2, 6, 7, 8	NC	Unused (For remote control bouton)	Non-Connect	1, 4, 6, 7, 8, 9	NC	Unused *

*Short the 7pin (RTS) and 8pin (CTS) on the control equipment side as needed. (Disable the hardware flow control)

Table 2. The RS232 Communication Specifications

Communication Speed	9600bps
Data Length	8bits
Parity	None
Stop Bit	1
Flow Control	None

WAT-2200Mk-2 and WAT-3200 is designed for the following camera operation by the VISCA/Pelco-D/Pelco-P protocol.

Table 3. Corresponding Operation to Each Protocol

Protocol	Corresponding Operation
VISCA	Change settings*, Acquire settings*, Restore factory default, Operate OSD menu
Pelco-D	Operate OSD menu, Change settings (flip video)
Pelco-P	Operate OSD menu, Change settings (flip video)

*Not correspond to all of the OSD item. See the “5.RS232 Command List” for the corresponding command.

The camera sends the following response command when it receives the command corresponding to each protocol.

Table 4. Response Command for Each Protocol

Protocol		Response Command
VISCA	Complete changing settings	0x90, 0x41, 0xFF, 0x90, 0x51, 0xFF
	Complete acquiring settings, Return set value	(See "response for inquiry command" on 5.RS232 command list)
	Error (Wrong part on commands)	0x90, 0x60, 0x02, 0xFF
Pelco-D		0xFF, 0x01, 0x00, 0x01
Pelco-P		0xA0, 0x01, 0x00, 0xA1

*Send multiple commands continuously from the control equipment after the camera returned the response command.

2.3. OSD Menu Operations

All of the camera function can be set by the OSD (On Screen Display) menu.
Set the function through the OSD menu operation by the following procedure.

[Open / Close OSD menu]

Press the “ENTER” while the OSD menu is not displayed, or send the "OSD Open"/"OSD On" command of the RS232, then the OSD menu (MAIN MENU) will be opened. To close the OSD menu, move the cursor to the "EXIT" and press “ENTER” (send “ENTER” command).

Figure 4. MAIN MENU is opened

[Shift to Each Setting Menu]

Use the “UP/DOWN” on the RC-02 (“Up/Down” command of the RS232) to move the cursor to select each OSD menu item, and press “ENTER” (send “ENTER” command) to open each function setting menu. In the each function setting menu, to go back to the previous menu, move the cursor to the "RETURN", and press “ENTER”.

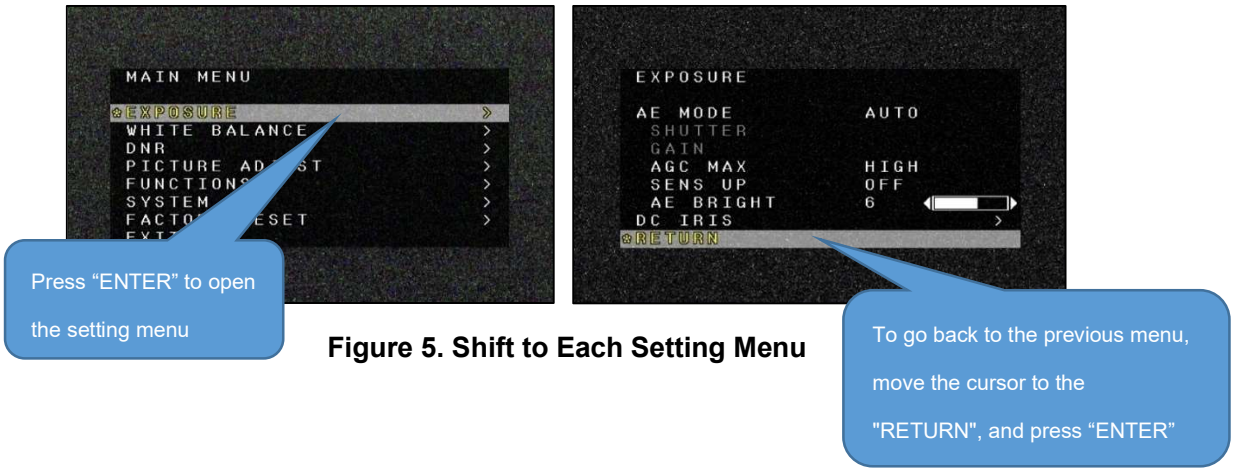


Figure 5. Shift to Each Setting Menu

[Change Settings]

Use the “UP/DOWN” on the RC-02 (“Up/Down” command of the RS232) to move the cursor to select each OSD menu item, and press ”LEFT/RIGHT” (“Left/Right” command of the RS232) to change the setting of the item that the cursor is matched.

Figure 6. Change Settings

Precautions *Save behavior of settings

The set value is saved immediately on this camera as soon as the settings are changed by the OSD. The settings retains even when the power of the camera is turned off. (*Excluding the DZOOM and function not supported to be saved.)

*To retain the DZOOM function, operate the OSD/RS232 (DZOOM SAVE).

*The function not supported to be saved is below. See the “3. Description of Each Function” for the detail of the function.

PICTURE ADJUST	=> DISP. FUNCTION	=> FREEZE
FUNCTIONS	=> WDR	=> FRAME VIEW SEL

3. Functions

Set each function by the OSD menu. Part of the function can be set by the RS232 without displaying OSD menu. See the “5.RS232 Command List”.

3.1. EXPOSURE

3.1.1. AE MODE

Set control method of shutter, slow shutter, gain and DC iris lens.

Default: AUTO

AUTO

Automatically control the shutter speed (including SENS UP), gain and DC iris lens in accordance with the brightness of the subject.

When a bright subject is imaged, lower the brightness to the target value by the shutter speed and DC iris lens.

When a dark subject is imaged, heighten the brightness to the target value by the gain and slow shutter.

The max. and min. of the shutter speed is changed in accordance with the “OUTPUT FORMAT” setting (Table 5). The longer max. shutter speed, the higher sensitivity for the subject in the dark, but the video resolution will be lowered.

See “3.1.7” for the DC iris lens and “3.1.5” for the slow shutter.

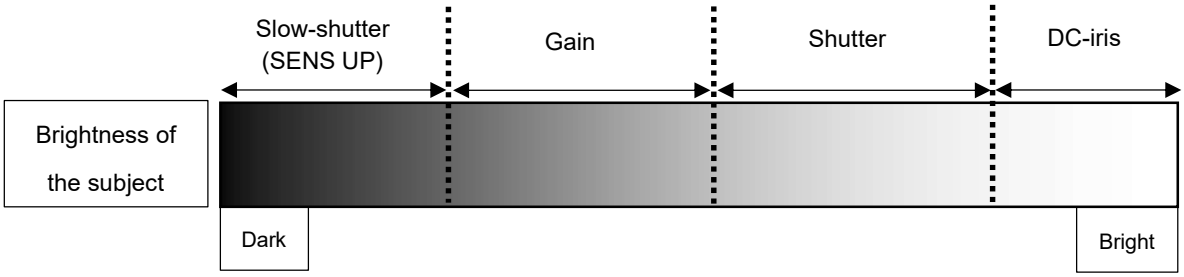


Figure 7. AE = AUTO Behavior (When slow shutter x2 or more, DC IRIS MODE = AUTO)

Table 5. The Max. and Min. the Shutter Speed of Each OUTPUT FORMAT

OUTPUT FORMAT	Max. & Min. of the Shutter Speed (sec.) (AE MODE=AUTO)
1080p60,1080p59,1080i60,1080i59, 720p60,720p59	1/60 - 1/10000
1080p50,1080i50,720p50	1/50 - 1/10000
1080p30,1080p29	1/30 - 1/10000
1080p25,1080p24	1/25 - 1/10000

SHUT FIX

Gain automatically controls the brightness of the subject but the shutter speed is fixed.

MANUAL

The shutter speed (including SENS UP) and gain is fixed.

3.1.2. SHUTTER

Set the shutter speed while the AE MODE is SHUT FIX or MANUAL. The configurable shutter speed is changed in accordance with the “OUTPUT FORMAT” (Table 6).

Table 6. The Configurable Shutter Speed for Each OUTPUT FORMAT

OUTPUT FORMAT	Configurable Shutter Speed (sec.) (AE MODE=SHUT FIX/MANUAL)
1080p60,1080p59,1080i60,1080i59, 720p60,720p59	1/60, 1/120, 1/180, 1/240, 1/300, 1/500, 1/1000, 1/2000, 1/5000, 1/10000
1080p50,1080i50,720p50	1/50, 1/100, 1/150, 1/200, 1/250, 1/500, 1/1000, 1/2000, 1/5000, 1/10000
1080p30,1080p29	1/30, 1/60, 1/120, 1/180, 1/240, 1/300, 1/500, 1/1000, 1/2000, 1/5000, 1/10000
1080p25,1080p24	1/25, 1/50, 1/100, 1/150, 1/200, 1/250, 1/500, 1/1000, 1/2000, 1/5000, 1/10000

3.1.3. GAIN

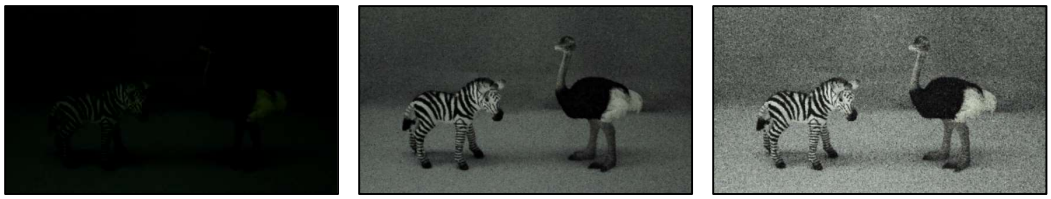
Set the gain while the AE MODE is MANUAL.

The configurable gain is 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65 and 72[dB].

3.1.4. AGC MAX

Set the max. value of gain while the AE MODE is AUTO or SHUT FIX.

Selectable from OFF, LOW, MID and HIGH.



AGC MAX = LOW **AGC MAX = MID** **AGC MAX = HIGH**

Figure 8. AGC MAX

The max. value of gain is 0dB (OFF), 36dB (LOW), 50dB (MID), 72dB (HIGH).

Default: HIGH

3.1.5. SENS UP

Set the long exposure (slow shutter). The sensitivity will be higher due to extending the max. exposure time to 1 frame/field, but the video resolution will be lowered. The slow shutter is set as a multiple of the min. value (the slowest value) of the shutter speed.

The configurable value is OFF, x2, x3, x4, x5, x6, x7, x8, x9, x10, x12 and x15.

Default: OFF

While the “AE MODE” is “AUTO”, the slow shutter (SENS UP) works when it is set as x2 or more. When the subject is dark until gain reaches the max. value, the slow shutter will start to work. While the “AE MODE” is “MANUAL”, the slow shutter will be fixed with the selected setting value of the slow shutter.

3.1.6. AE BRIGHT

Set the target brightness while the AE MODE is AUTO or SHUT FIX.

The higher value is set, the brighter it gets when the AE is converged.

The setting value range is 0-10.

Default: 6

3.1.7. DC IRIS

Open the setting menu by the ENTER operation while the cursor is matched with the DC IRIS. The following settings are configurable in the menu.

Default: MODE = OPEN, PWM OFFSET ADJ = 127, IRIS SPEED = 3

Table 7. DC IRIS

Menu Item	Value	Description
MODE	AUTO	Control the DC iris to the AE BRIGHT value. The DC iris works while the shutter speed reaches the max. value (when the subject is bright).
	OPEN	Fully open the DC iris.
	CLOSE	Fully close the DC iris.
PWM OFFSET ADJ	0 – 255 (127)	Set the easiness of the start moving the DC iris. When the value is large, it starts to move soon. Turn the power off of the camera after changing the setting and power the camera back on.
IRIS SPEED	0 – 5 (3)	Set the speed between the start moving until convergence of the DC iris. When the value is large, it converges quickly.
DEFAULT	-	Restore the DC iris settings to the factory default.

3.2. WHITE BALANCE

3.2.1. WHITE BALANCE MODE (MODE)

Set the WHITE BALANCE control mode.

This setting is not applicable for the WAT-3200.

Default: ATW

Table 8. WHITE BALANCE - MODE

Menu Item	Value	Description
MODE	ATW	Automatically follow WHITE BALANCE (Approx. 2000K-15000K) by matching the color temperature of a subject. The range of color can follow is wider than the INDOOR/OUTDOOR.
	ONE PUSH	Fix WHITE BALANCE at the specific color temperature. Combined use the WHITE BALANCE convergence movement (PUSH). Utilize the WHITE BALANCE convergence movement (PUSH) to complete while imaging such as a white paper.
	INDOOR	WHITE BALANCE automatically follows (Approx. 4600K-7200K). Set as easy to follow indoor light source (fluorescent light, etc.).
	OUTDOOR	WHITE BALANCE automatically follows (Approx. 4600K-10000K). Set as easy to follow outdoor light source (sunlight, etc.).
	MANUAL	Manually set WHITE BALANCE

3.2.2. One Push Trigger (PUSH)

Complete the WHITE BALANCE convergence movement while the WHITE BALANCE mode is ONE PUSH. The B and R gain value after completing PUSH operation retains even when the power of the camera was turned off, or the WHITE BALANCE mode was changed.

When the “3.7. FACTORY RESET” is completed, the B and R gain value after completing PUSH operation will return to default settings.

3.2.3. B-Gain (BLUE)

Set the B and R gain value while the WHITE BALANCE mode is “MANUAL”.

Lager the B gain, it will be bluer. The setting value range is 0-100.

Default: 50

3.2.4. R-Gain (RED)

Set the B and R gain value while the WHITE BALANCE mode is “MANUAL”.

Lager the R gain, it will be redder. The setting value range is 0-100.

Default: 50

3.2.5. White Balance Tracking Speed (SPEED)

Set the follow-speed of WHITE BALANCE while the WHITE BALANCE mode is “ATW, INDOOR or OUTDOOR”. The larger value, the quicker speed of the follow-speed of WHITE BALANCE when the subject color was changed. The setting value range is 0-7.

Default: 6

3.2.6. B-Gain Offset (OFFSET-B)

Set the offset by the B gain when WHITE BALANCE is converged while the WHITE BALANCE mode is “ATW, INDOOR or OUTDOOR”. The larger value, when WHITE BALANCE is converged, it will be bluer. The setting value range is 0-100.

Default: 50

3.2.7. R-Gain Offset (OFFSET-R)

Set the offset by the R gain when WHITE BALANCE is converged while the WHITE BALANCE mode is “ATW, INDOOR or OUTDOOR”. The larger value, when WHITE BALANCE is converged, it will be redder. The setting value range is 0-100.

Default: 50

Figure 9. Change in MODE = ATW and OFFSET-B/R

3.3. NOISE REDUCTION

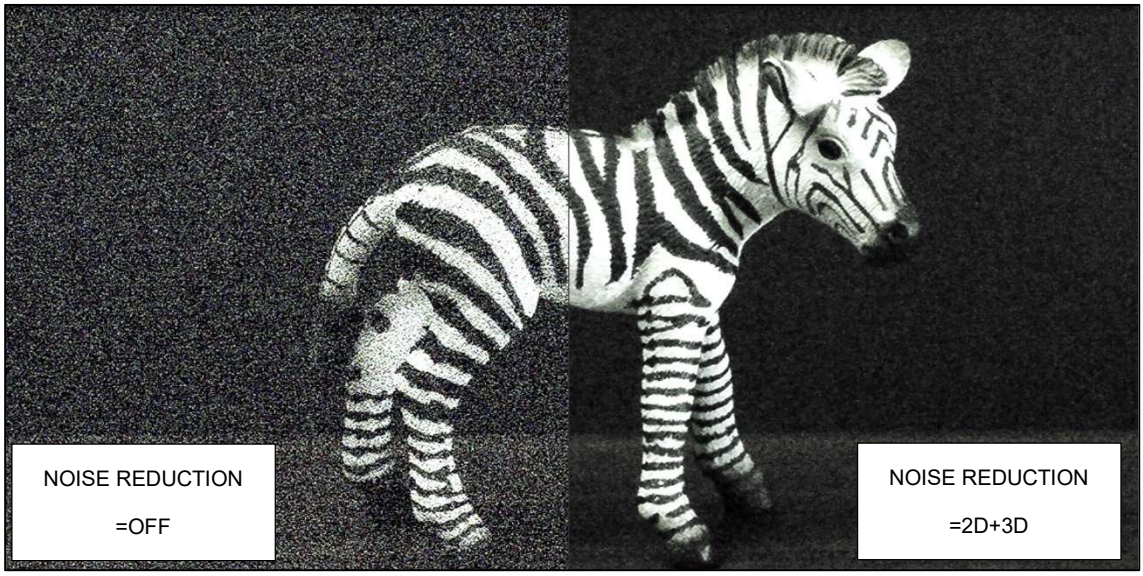


Figure 10. NOISE REDUCTION

3.3.1. Noise Reduction Mode (MODE)

Set the NR (Noise Reduction) control mode.

Default: 2D+3D

Table 9. NOISE REDUCTION - MODE

Menu Item	Value	Description
MODE	OFF	Not operating NR control.
	2D	The 2DNR works. Reduce noise by the edge preserved smoothing. The contour of the subject may be blurred.
	3D	The 3DNR works. Reduce noise by analyzing the differences as the noise between consecutive frames. The after-image may be obvious depends on a subject.
	2D+3D	Control NR by combining 3DNR and 2DNR.

3.3.2. Noise Reduction Level (LEVEL)

Set the strength of NR.

Default: AUTO

Table 10. NOISE REDUCTION - LEVEL

Menu Item	Value	Description
LEVEL	AUTO	Automatically control the strength of NR.
	LOW	Set the strength of NR to LOW. The noise increases when imaging a dark subject comparing with HIGH/MID, but the after-image will be less.
	MID	Set the strength of NR to MID. The noise and after-image is about medium between LOW/HIGH.
	HIGH	Set the strength of NR to HIGH. The noise decreases when imaging a dark subject comparing with LOW/MID, but the after-image will be obvious.

3.4. PICTURE ADJUST

3.4.1. GAMMA CORRECT

Complete the ENTER operation while the GAMMA CORRECT is ON to open the setting menu. Default: GAMMA CORRECT = ON, GAMMA = 0.45, Y LUT EXTEND = UNIFORM

OFF (1.0)

Turn off the “GAMMA CORRECT” (γ≒1.0).

ON

Turn on “GAMMA CORRECT”.

Complete the ENTER operation to open the setting menu.

Table 11. GAMMA CORRECT

Menu Item	Value	Description
GAMMA	OFF-BYPASS, 0.9, 0.8, 0.7, 0.6, 0.55, 0.5, 0.45, 0.4	Set GAMMA CORRECT. γ≒1.0 is set by selecting OFF-BYPASS same as GAMMA CORRECT=OFF.
Y LUT EXTEND	UNIFORM	Uniformly correct the dark and bright part of the subject.
	EXTEND-F2C	Bright correction except on the bright part on the subject.

(GAMMA = OFF-BYPASS, Y LUT EXTEND = UNIFORM)

(GAMMA = 0.45, Y LUT EXTEND = UNIFORM)

(GAMMA = 0.45, Y LUT EXTEND = EXTEND-F2C)

Figure 11. GAMMA / Y LUT EXTEND

3.4.2. CONTRAST

Adjust the contrast difference and color density difference of the image.

The setting value range is 0-20. Default: 11

3.4.3. BRIGHTNESS

Adjust the brightness of the image.

The setting value range is 0-20. Default: 11

3.4.4. SATURATION

Adjust the saturation of the image.

The setting value range is 0-20. Default: 10

3.4.5. HUE

Adjust the hue of the image.

The setting value range is 0-20. Default: 10

3.4.6. EDGE

Adjust the contour emphasizing level.

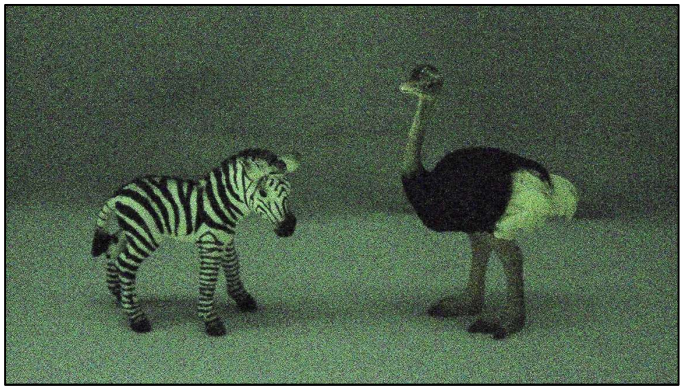
The setting value range is 0-20. Default: 5

3.4.7. AUTO SATURATE

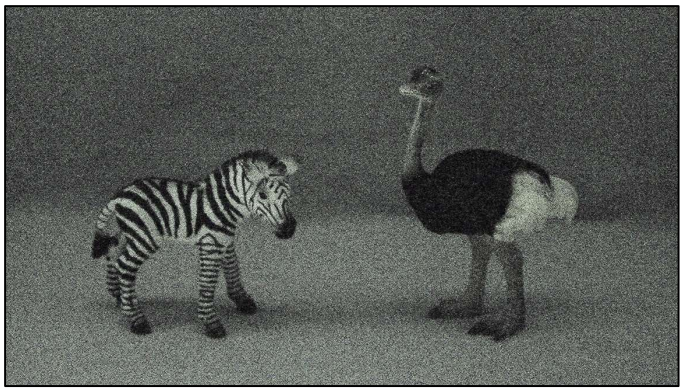
Control the saturation while the illumination of the subject is low. Default: MID

Table 12. AUTO SATURATE

Menu Item	Value	Description
AUTO SATURATE	OFF	Retain the saturation even while the illumination of the subject is low. The chroma noise may be obvious, and the white balance may be shifted from the edge.
	LOW	Set the control level of the saturation while the illumination of the subject is low. *The color of MASK/LINE becomes thin during low illuminance while PRIVACY MASK and/or CROSS LINE is displayed.
	MID	
	HIGH	



AUTO SATURATE = OFF



AUTO SATURATE = MID

Figure 12. AUTO SATURATE (illuminance of the subject = Approx. 0.1lx, AGC = HIGH)

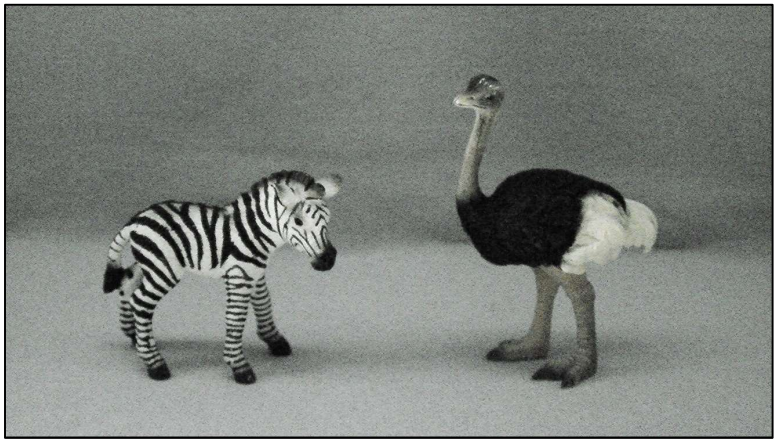
3.4.8. AUTO EDGE

Weaken the contour emphasizing during low illuminance.

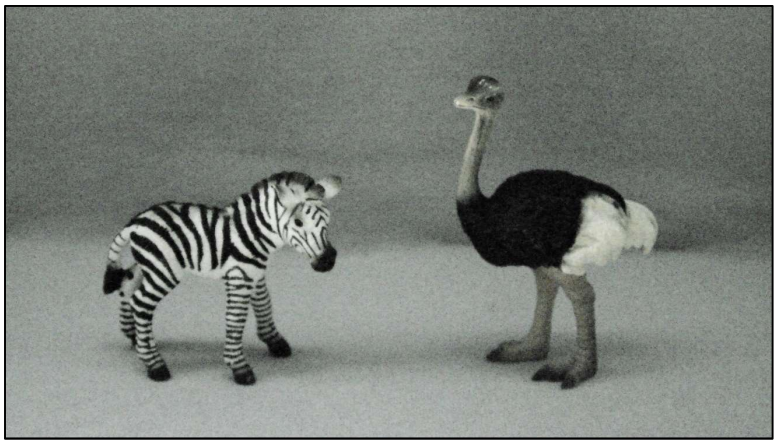
Default: OFF

Table 13. AUTO EDGE

Menu Item	Value	Description
AUTO EDGE	OFF	Retain the saturation even while the illumination of the subject is low.
	ON	Weaken the contour emphasizing during low illuminance. The noise becomes slightly less but the contour of the subject may become blurred.



AUTO EDGE = OFF



AUTO EDGE = ON

Figure 13. AUTO EDGE

3.4.9. DISPLAY FUNCTION

Open the setting menu by the ENTER operation while the cursor is matched with "DISP.FUNCTION". Default: FREEZE = OFF, MIRROR = OFF, IMAGE EFFECT = OFF

Table 14. DISPLAY FUNCTION

Menu Item	Value	Description
FREEZE	OFF	Turn off FREEZE.
	ON	Turn on FREEZE.
MIRROR	OFF	Turn off MIRROR.
	MIRROR	Invert to right and left of the image.
	V-FLIP	Invert to up and down of the image.
	BOTH(H/V)	Invert to up, down, right and left of the image.
IMAGE EFFECT	OFF	Turn off IMAGE EFFECT.
	NEGATIVE	The negative-positive reversal on the contrast and color of the image.
	GREY	Make the image to achromatic color.
	REDDISH-1 - 4	Make the image to red monochrome. Color density range: 1-4
	BLUISH-1 - 4	Make the image to blue monochrome. Color density range: 1-4
	GREENISH-1 - 4	Make the image to green monochrome. Color density range: 1-4

3.4.10. Reset Picture Adjust (DEFAULT)

PICTURE ADJUST: Restore the settings in the menu to factory default.

3.5. FUNCTIONS

3.5.1. Digital Zoom (DZOOM)

Display the partly enlarged image.

Enlarged view by zoom and movable horizontally and vertically by pan and tilt.

Default: OFF

OFF

Turn off the “DZOOM” (1 time).

Note that the PTZ (Pan, Tilt, and Zoom) settings turn back to the original setting when DZOOM was turned OFF without DZOOM SAVE after the setting of the position of Pan/Tilt and ZOOM RATIO.

ON

Turn on the “DZOOM and PAN/TILT”.

The setting which is saved as DZOOM SAVE after the setting of the position of PAN/TILT and ZOOM RATIO will be read.

Cannot use together the “DZOOM” and “DIS”.

Open the setting menu by the ENTER operation.

The following settings are available in the menu.

- ZOOM CONTROL

Set the position of PAN/TILT and zoom magnification.

The setting range of DZOOM RATIO is below.

・x1.00 - x6.00 (Output Format = 1080p/1080i)

・x1.00 - x7.11 (Output Format = 720p)

The setting range of PAN/TILT is 0x00 – 0xF0. The PAN/TILT setting value is not displayed. However, it can be read with the RS232 communication.

(See the “5.RS232 Command List”.)

(DZOOM = OFF) (DZOOM = ON, ZOOM = x3.00, PAN =0x2B, TILT =0x86)

Figure 14. DZOOM

[Setting Method of OSD]

-Set digital ZOOM RATIO: Operate LEFT/RIGHT while the cursor is on RATIO

*Press “ENTER” to move the cursor to the “POSITION”.

Figure 15. ZOOM

- Set the position of PAN/TILT:

Operate UP/DOWN/LEFT/RIGHT while the cursor is on POSITION

*Press “ENTER” to move the cursor to the “RETURN”. Press “ENTER” to return to the previous screen while the cursor is on to the “RETURN”.

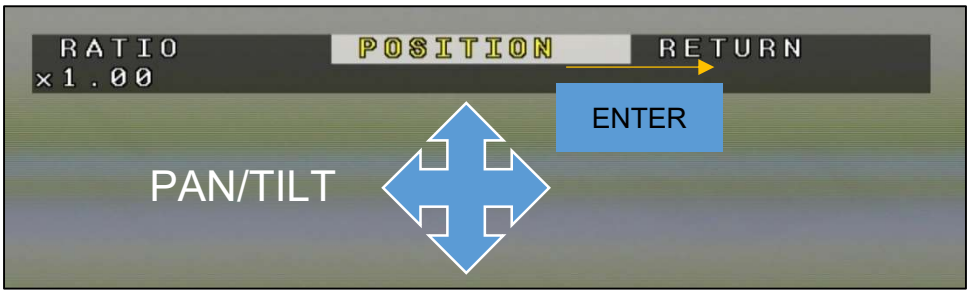


Figure 16. PAN/TILT

[Setting Method of RS232]

(See the “5.RS232 Command List” for the communication commands.)

-Send the command turning DZOOM=ON first.

- Specify the ZOOM RATIO by the ZOOM command.

ZOOM command = 0x81, 0x01, 0x04, 0x46, 0x00, 0x00, 0x0p, 0x0q, 0xFF

*See “Table 15” for the interrelationship between the ZOOM command setting value and ZOOM RATIO.

- Specify the position of PAN/TILT by the PAN, TILT position command.

-The PAN/TILT position moves from the current position by sending PAN-Left, PAN-Right, TILT-Up, TILT-Down commands.

Table 15. RS232 – ZOOM Commands 0xpq and ZOOM RATIO

*Coupling the low-order 4bit of 0x0p/0x0q to describe 0xpq.

0xpq (in ZOOM command)	Zoom ratio	
	Output Format	
	1080p/1080i	720p
0x00 - 0x03	x1.00	x1.00
0x04	x1.01	x1.01
0x05 - 0x08	x1.03	x1.03
0x09 - 0x0C	x1.05	x1.05
0x0D - 0x11	x1.07	x1.07
0x12 - 0x15	x1.09	x1.09
0x16 - 0x19	x1.11	x1.11
0x1A - 0x1D	x1.13	x1.13
0x1E - 0x22	x1.15	x1.15
0x23 - 0x26	x1.17	x1.18
0x27 - 0x2A	x1.20	x1.20
0x2B - 0x2E	x1.22	x1.23
0x2F - 0x33	x1.25	x1.25
0x34 - 0x37	x1.27	x1.28
0x38 - 0x3B	x1.30	x1.31
0x3C - 0x3F	x1.33	x1.34
0x40 - 0x44	x1.36	x1.37
0x45 - 0x48	x1.39	x1.41
0x49 - 0x4C	x1.42	x1.44
0x4D - 0x50	x1.46	x1.48
0x51 - 0x55	x1.50	x1.52
0x56 - 0x59	x1.53	x1.56
0x5A - 0x5D	x1.57	x1.60
0x5E - 0x61	x1.62	x1.65
0x62 - 0x66	x1.66	x1.70
0x67 - 0x6A	x1.71	x1.75
0x6B - 0x6E	x1.76	x1.80
0x6F - 0x73	x1.81	x1.86
0x74 - 0x77	x1.87	x1.92
0x78 - 0x7B	x1.93	x1.99
0x7C - 0x7F	x2.00	x2.06
0x80 - 0x84	x2.06	x2.14
0x85 - 0x88	x2.14	x2.22
0x89 - 0x8C	x2.22	x2.31
0x8D - 0x90	x2.30	x2.40
0x91 - 0x95	x2.40	x2.50
0x96 - 0x99	x2.50	x2.62
0x9A - 0x9D	x2.60	x2.74
0x9E - 0xA1	x2.72	x2.88
0xA2 - 0xA6	x2.85	x3.03
0xA7 - 0xAA	x3.00	x3.20
0xAB - 0xAE	x3.15	x3.38
0xAF - 0xB2	x3.33	x3.59
0xB3 - 0xB7	x3.52	x3.83
0xB8 - 0xBB	x3.75	x4.10
0xBC - 0xBF	x4.00	x4.41
0xC0 - 0xC3	x4.28	x4.77
0xC4 - 0xC8	x4.61	x5.20
0xC9 - 0xCC	x5.00	x5.71
0xCD - 0xD0	x5.45	x6.33
0xD1 - 0xD5	x6.00	x7.11

- PIP (Picture in Picture)

Partly display the image which is DZOOM=OFF on the screen. Default: OFF

The blue-colored box of the displayed part of PIP synchronizes with the range of PTZ.

*When PIP is ON, the CVBS (NTSC/PAL) output does not display correctly and is not a failure.

Figure 17. DZOOM (PIP=ON)

- PIP SIZE

Set the size of PIP display.

Configurable size: 1/4, 1/9, 1/16, 1/25 Default: 1/9

- PIP POSITION

Set the position of PIP.

-PIP position setting: Operate UP/DOWN/LEFT/RIGHT while the cursor is on “POSITION”.

*Press “ENTER” to move the cursor to the “RETURN”. Press “ENTER” to return to the previous screen while the cursor is on to the “RETURN”.

Figure 18. PIP POSITION

- DZOOM SAVE

Save DZOOM setting to the camera.

The setting of the position of PAN/TILT and ZOOM RATIO is while the DZOOM ON (*).

*Excluding the PIP settings. The PIP settings were saved when PIP, PIP SIZE and PIP POSITION were operated.

- DEFAULT

Initialize all of the PAN/TILT, ZOOM RATIO and PIP settings.

Note that the result by DZOOM SAVE will be deleted.

3.5.2. DEFOG

Correct by improving visibility of the image when the contrast becomes low by foggy or poor weather conditions. Default: OFF

OFF

Turn off the “DEFOG”.

ON

Enable the “DEFOG (FIX)”. Open the setting menu by the ENTER operation.

Table 16. DEFOG (ON)

Menu Item	Value	Description
STRENGTH	0 – 16(8)	Set the strength of “DEFOG (FIX)”.

AUTO

Enable the “DEFOG (AUTO)”. Control DEFOG in accordance with the subject situation. Open the setting menu by the ENTER operation.

Table 17. DEFOG (AUTO)

Menu Item	Value	Description
THRESHOLD	0 - 3(0)	Set the threshold of “DEFOG (AUTO)”. 0=correct the most, 3=correct the least
AUTO LEVEL	HIGH	Set the strength of DEFOG (AUTO).
	MID	
	LOW	

3.5.3. DWDR

Correct the contrast of the subject by the histogram equalization. Default: OFF

OFF

Turn off the “DWDR”.

ON

Enable the “DWDR (FIX)”.

Correct the contrast of the subject by the histogram equalization on the bright part.

Open the setting menu by the ENTER operation.

Table 18. DWDR (ON)

Menu Item	Value	Description
STRENGTH	0 – 16(8)	Bright correction on the dark part.
SATURATION	0 – 16(0)	Darken the bright part to make less difference with the dark part.
LOCAL RATIO	0 – 16(0)	Reduce the difference of the medium part of the contrast.

AUTO

Enable the “DWDR (AUTO)”.

Automatically control the DWDR in accordance with the subject situation.

Open the setting menu by the ENTER operation.

Table 19. DWDR (AUTO)

Menu Item	Value	Description
SAT. SYNC	OFF	Turn off the control for lowering the brightness of the bright part.
	ON	Control for lowering the brightness of the bright part.
AUTO LEVEL	HIGH	Set the strength of “DWDR (AUTO)”.
	MID	
	LOW	

3.5.4. MOTION DETECT

Detect the motion in the image.

Default: OFF

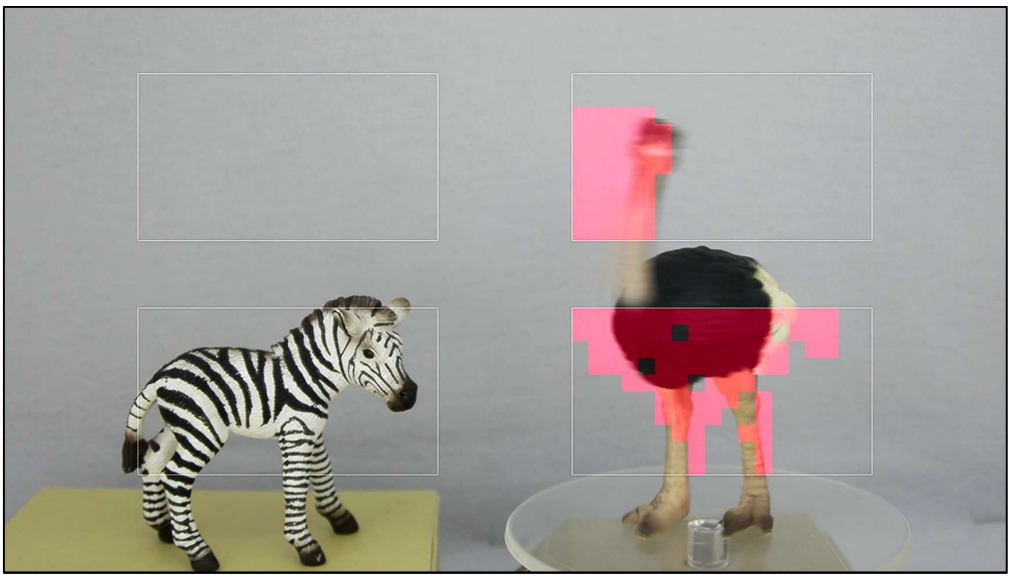


Figure 19. MOTION DETECTION

OFF

Turn off the “MOTION DETECT”.

ON

Turn on the “MOTION DETECT”. The detected part will be displayed in red.

Open the setting menu by the ENTER operation.

- AREA

Set the MOTION DETECT area for the detail setting.

Select from AREA1-4.

- AREA ENABLE

Switch the MOTION DETECT ON/OFF of the selected area.

Default: ON

- AREA DISPLAY

Switch the frame display ON/OFF of the selected area.

- SIZE/POSITION

  Adjust the selected area size and position.

  - MOTION DETECT area position setting: Operate UP/DOWN/LEFT/RIGHT while the cursor is on the “POSITION”.

    *Press “ENTER” to move the cursor to the “SIZE”.

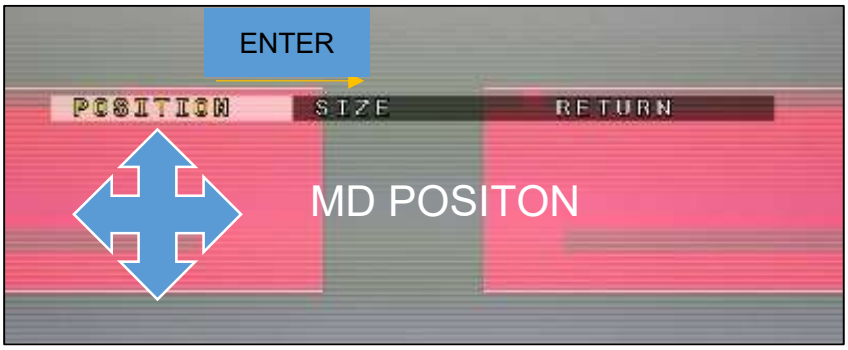


Figure 20. MD POSITION

- MOTION DETECT area size setting: Operate UP/DOWN/LEFT/RIGHT while the cursor is on the “SIZE”.

  *Press “ENTER” to move the cursor to the “RETURN”. Press “ENTER” to return to the previous screen while the cursor is on to the “RETURN”.

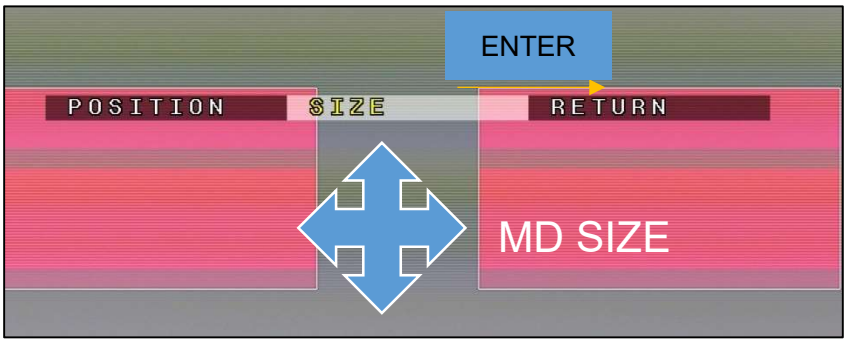


Figure 21. MD SIZE

- SENSITIVITY

  Set the detection sensitivity of the MOTION DETECT.

  The larger setting value, the easier to detect. The setting value is all in common.

  The setting value range is 0-40. Default: 20

- MOTION VIEW

Switch ON/OFF of displaying the MOTION DETECT. Default: ON

- VISCA ALARM

Switch ON/OFF of the VISCA command output of the MOTION DETECT result.

Default: OFF

The MOTION DETECT result will be sent as the response command like below.

Response to the MOTION DETECT result = 0x90, 0x07, 0x04, 0x1B, 0xXX, 0xFF

The XX part shows the detected area. The low-order corresponds to the detected area, and it becomes to 1 when detected.

Example 1: Only when the area1 was detected = 0x90, 0x07, 0x04, 0x1B, 0x01, 0xFF

Example 2: All areas (1-4) were detected= 0x90, 0x07, 0x04, 0x1B, 0x0F, 0xFF

bit of XX part	7	6	5	4	3	2	1	0
Detected area	-	-	-	-	area4	area3	area2	area1

- DEFAULT

Restore the MOTION DETECT setting to the default.

3.5.5. Digital Image Stabilizer (DIS)

Reduce the horizontal and vertical blur and/or vibration of the subject.

The angle of view is changed due to the correction by zooming.

Cannot use together the “DZOOM” and “DIS”.

Default: OFF

OFF

Turn off the “DIS”.

ON

Turn on the “DIS”.

3.5.6. Backlight Compensation (BACKLIGHT)

Make more visible the subject with backlighting, etc.

Default: OFF

OFF

Turn off the “BAKLIGHT”. Control the exposure by the entire image information.

BLC

Match the exposure to the specified area on the image.

The dark part will be more visible when metering only the dark part with backlighting.

Open the setting menu by the ENTER operation.

Table 20. BLC

Menu Item	Value	Description
BLC	OFF	Unable BLC.
	ON	Enable BLC.
SIZE /POSITION	-	Set the BLC area size and position. Size setting: Operate UP/DOWN/LEFT/RIGHT while the cursor is on “SIZE”. Position setting: Operate UP/DOWN/LEFT/RIGHT while the cursor is on “POSITION”.
AREA DISPLAY	OFF	Hide the BLC area.
	ON	Display the BLC area.
DEFAULT	-	Restore the BLC setting to default.

BACKLIGHT = OFF **BACKLIGHT = BLC**

Figure 22. BLC

HSBLC

Match the exposure to the specified area on the entire image except the brightest part. Make more visible the part except the headlight while imaging the subject including high brightness part. Open the setting menu by the ENTER operation.

Table 21. HSBLC

Menu Item	Value	Description
AREA DISPLAY	OFF	Hide the HSBLC area.
	ON	Display the HSBLC area.
SIZE /POSITION	-	Set the HSBLC area size and position. Size setting: Operate UP/DOWN/LEFT/RIGHT while the cursor is on “SIZE”. Position setting: Operate UP/DOWN/LEFT/RIGHT while the cursor is on “POSITION”.
LEVEL	0-20(3)	Set the threshold to recognize the high brightness part.
BLACK MASK	OFF	Does not perform masking on the high brightness part.
	ON	Apply black masks on the high bright part. The pixel of the masked part is excluded from metering area.
DEFAULT	-	Restore the HSBLC setting to the default.

BACKLIGHT = OFF

(BACKLIGHT = HSBLC, BLACK MASK = ON)

(BACKLIGHT = HSBLC, BLACK MASK = OFF)

Figure 23. HSBLC

3.5.7. Pixel Binning (BINNING)

Enhance sensitivity by combining the A/D value of the adjacent pixels.

The resolution of the image will be low.

Default: OFF

OFF

Turn off the “BINNING”.

ON

Turn on the “BINNING”.

(AE MODE = MANUAL, SHUTTER = 1/60s, GAIN = 0dB, BINNING = OFF)

(AE MODE = MANUAL, SHUTTER = 1/60s, GAIN = 0dB, BINNING = ON)

Figure 24. BINNING

3.5.8. DEFECT PIXEL COMPENSATION

Correct inconspicuously the defect pixel.

Default: ON

OFF

Turn off the “DEFECT PIXEL COMPENSATION”.

ON

Turn on the “DEFECT PIXEL COMPENSATION”.

*The subject, which is similar with a defect pixel, may be corrected when it was imaged.
In this case, turn off this setting.

3.5.9. Multiple Exposure-Type WDR (WDR)

Make more visible of the subject with a large contrast.

Synthesize one frame of the WDR image from the two frames of the long exposure and short exposure. The detail setting of the WDR image synthesis from the setting menu.

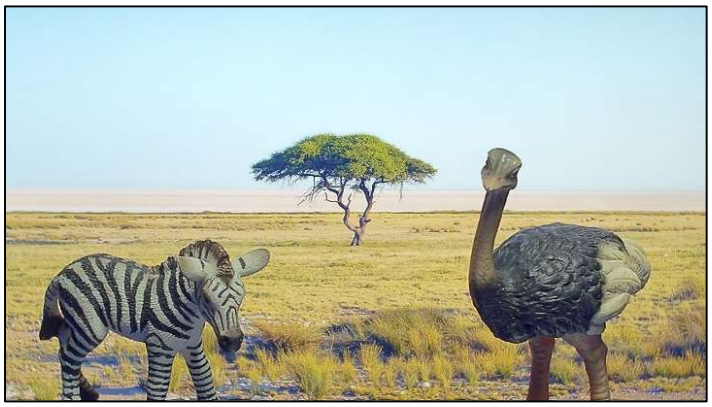
The video resolution when WDR=ON will be lower than when WDR=OFF.

Default: OFF

WDR = OFF

FRAME VIEW SEL = SHORT

FRAME VIEW SEL = LONG



WDR = ON

Figure 25. WDR

OFF

Turn off the “WDR”.

ON

Turn on the “WDR”. Open the setting menu by the ENTER operation.

Table 22. WDR

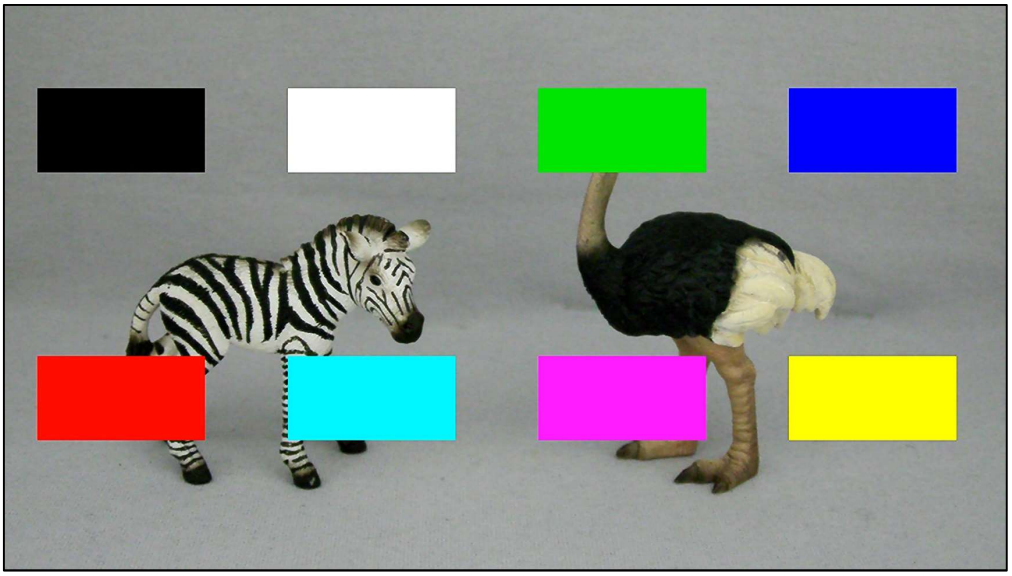
Menu Item	Value	Description
FRAME VIEW SEL	WDR ON	Display the WDR image synthesis.
	LONG	Display only the long exposure image.
	SHORT	Display only the short exposure image.
WDR STRENGTH	0-29(12)	Set the strength of the WDR process.
LOCAL CONTRAST	0-5(2)	Set the correction level of the contrast when the WDR synthesis.
WDR AE MODE	AUTO	Automatically adjust the shutter and gain during the WDR is working. It works more when the contrast of the subject change largely. The time the WDR motion convergence will be longer.
	MANUAL	The shutter and gain value is fixed during the WDR is working. The time the WDR motion convergence will be shorter.
AE BRIGHT	0-19(10)	Set the target value of the brightness when WDR AE MODE=AUTO.
GAIN	0-19(0)	Set gain when WDR AE MODE=MANUAL.
SHUTTER	0-19(19)	Set shutter when WDR AE MODE=MANUAL.
EXPOSURE RATIO	1:32	Set the ratio of the exposure time between short and long time exposure. Set as 1:16 to extend the short time exposure time.
	1:16	
DEFAULT	-	Restore the WDR settings to the default.

3.5.10. PRIVACY MASK

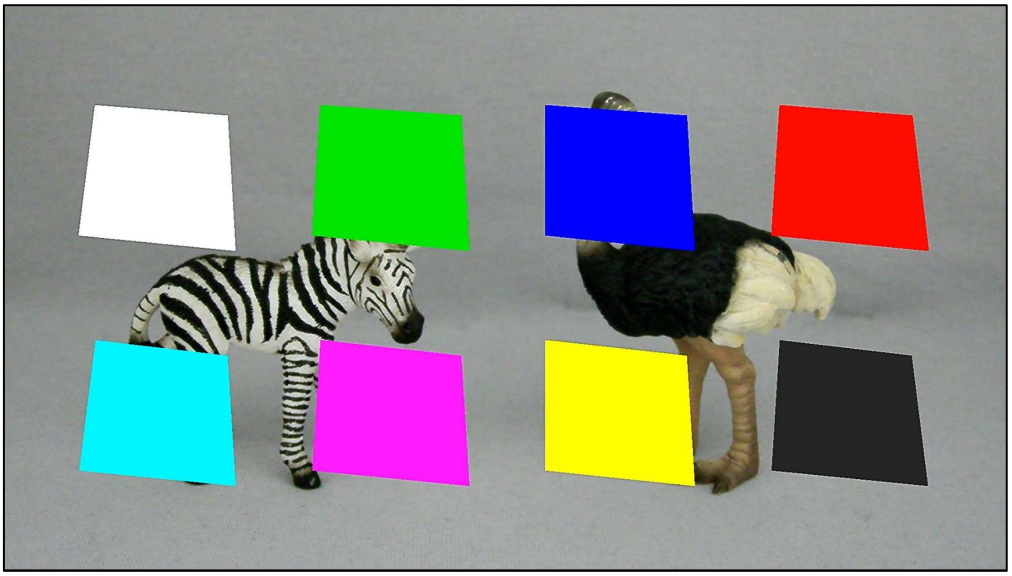
Mask arbitrary area in the image.

8 different size, position and color masks can be displayed.

Cannot use together the “PRIVACY MASK” and “CROSS LINE”.



TYPE = SQUARE



TYPE = POLYGON

Figure 26. PRIVACY MASK

Open the setting menu by the ENTER operation while the cursor is on the “PRIVACY MASK”. The settings in the Table 23 are available in the menu.

Default: MODE = OFF

Table 23. PRIVACY MASK

Menu Item	Value	Description
MODE	OFF	Turn off the “PRIVACY MASK”.
	ON	Turn on the “PRIVACY MASK”.
TYPE	SQUARE	Set the mask with adjustable square size.
	POLYGON	Set the mask adjustable the 4 corner coordinates.
MASK NO.	MASK 1-8	Select the mask No. of the setting to be edited.
DISPLAY	OFF	Hide the mask.
	ON	Display the mask.
COLOR	BLACK,WHITE, GREEN,BLUE, RED,CYAN, MAGENTA, YELLOW, GRAY-1 - 6	Set the mask color.
POLY SELECT	L-TOP, R-TOP, L-BOTTOM, R-BOTTOM	Select the corner to adjust the position when the TYPE=POLYGON is set. L-TOP=Left top , R-TOP=Right top L-BOTTOM=Left bottom, R-BOTTOM=Right bottom
POSITION-X	0-255	[TYPE=SQUARE] Set the horizontal position of the mask. [TYPE=POLYGON] Set the selected corner coordinate (H) with POLY SELECT.
POSITION-Y	0-216	[TYPE=SQUARE] Set the vertical position of the mask. [TYPE=POLYGON] Set the selected corner coordinate (V) with POLY SELECT.
SIZE-X	1-60	[TYPE=SQUARE] Set the horizontal size of the mask.
SIZE-Y	1-33	[TYPE=SQUARE] Set the vertical size of the mask.
DEFAULT	-	Restore the “PRIVACY MASK” setting to the default.

3.5.11. CROSS LINE

Display vertical/horizontal line in the image. 8 lines (4 cross lines) for the total can be displayed with the setting of thickness, position, color and vertical/horizontal of each line. Cannot use together the “PRIVACY MASK” and “CROSS LINE”.

Open the setting menu by the ENTER operation while the cursor is on the “CROSS LINE”. The settings in the Table 24 are available in the menu.

Default: MODE = OFF

Table 24. CROSS LINE

Menu Item	Value	Description
MODE	OFF	Turn off the “CROSS LINE”.
	ON	Turn on the “CROSS LINE”.
LINE NO.	LINE 1-8	Select the line No. of the setting to be edited.
DISPLAY	OFF	Hide the line.
	ON	Display the line.
COLOR	WHITE, GREEN, BLUE, RED, CYAN, MAGENTA, YELLOW, GRAY-1 - 6, BLACK	Set the line color.
DIRECTION	VERTICAL	Make the line direction vertical.
	HORIZONTAL	Make the line direction horizontal.
POSITION	-959 – 959	Set the line position.
WIDTH	2 - 127	Set the line width.
DEFAULT	-	Restore the “CROSS LINE” to the default.

The line 1 and 2 are displayed and line 3 -8 are hidden with the default when MODE = ON. Turn on the “DISPLAY” and select line 3-8 to display 3 or more lines.

Figure 27. CROSS LINE

3.6. SYSTEM

3.6.1. S/W INFO

Display the software information.

Open the software information display menu by the ENTER operation while the cursor is on the “S/W INFO”.

Table 25. S/W INFO

Menu Item	Value	Description
S/W Ver	-	Display the version of the software.
S/W Date	-	Display the release date of the software.

3.6.2. CAM TITLE

Display letters on the right top on the screen. Default: OFF

OFF

Turn off the “CAM TITLE”.

ON

Turn on the “CAM TITLE”. Open the setting menu by the ENTER operation.

Table 26. CAM TITLE

Menu Item	Value	Description
TITLE	A-Z, a-z, !, “, #, $, %, & `, (,), *, +, ', - ., /, 0-9	Set the letter to display. Max. 10 letters. Select letters by LEFT/RIGHT, and choose the next letter by ENTER.
TEXT COLOR	WHITE, BLACK OP, WHITE OP, NO COLOR, BLACK, BLUE, GRAY, YELLOW	Set the letter color

Figure 28. CAM TITLE

3.6.3. MENU COLOR

Set the OSD menu color. Open the software information display menu by the ENTER operation while the cursor is on the “MENU COLOR”.

Default: TEXT COLOR =WHITE, TEXT (H) COLOR = YELLOW,
B/G COLOR = BLACKOP, B/G (H) COLOR = WHITE OP

Table 27. MENU COLOR

Menu Item	Value	Description
TEXT COLOR	WHITE, BLACK OP, WHITE OP, NO COLOR, BLACK, BLUE, GRAY, YELLOW	Set the letter color of the OSD menu.
TEXT(H) COLOR	WHITE, BLACK OP, WHITE OP, NO COLOR, BLACK, BLUE, GRAY, YELLOW	Set the selected letter color of the OSD menu.
B/G COLOR	WHITE, BLACK OP, WHITE OP, NO COLOR, BLACK, BLUE, GRAY, YELLOW	Set the background color of the OSD menu.
B/G(H) COLOR	WHITE, BLACK OP, WHITE OP, NO COLOR, BLACK, BLUE, GRAY, YELLOW	Set the selected background color of the OSD menu.

3.6.4. MENU POSITION

Set the position of the OSD menu. Selectable from below. Default: DEFAULT

DEFAULT

Set the menu position to the center.

TOP-LEFT

Set the menu position to the left top.

TOP-RIGHT

Set the menu position to the right top.

3.6.5. OUTPUT FORMAT

Set the SDI output format from below. Default: 1080i60

1080i60
1080i59
1080i50
1080p60
1080p59
1080p50
1080p30
1080p29
1080p25
1080p24
720p60
720p59
720p50

Select output format, and select “ENTER -> YES” and complete the ENTER operation to switch the output format.

*The 720p60, 720p59, 720p50 are output by compressing the imaged 1920 x 1080 pixel image with the image sensor to 1280 x 720 pixel. It is same angle of view with 1080i/p because it is not cutting-out image.

*The 1080p30, 1080p29, 1080p25, 1080p24 may not displayed due to the connecting monitor does not support the matched vertical synchronous frequency. The specification of the monitor shall be checked before actual usage.

*The 1080i60, 1080i59, 1080i50 are the interlacing format. Whether the monitor and SDI to HDMI converter support the interlacing format or not shall be checked before actual usage.

*The 1080p60, 1080p59, 1080p50 are the 3G-SDI format. Whether the connecting equipment supports the 3G-SDI format or not shall be checked before actual usage.

*Start with the arbitrary Output Format setting by the following operation. Try that when the image is not displayed even when connecting with peripherals. The color bar will be displayed when the camera is started. Press “ENTER” to release the color bar display.

・1080i60 -> Turn on the unit power while pressing and holding down LEFT + RIGHT

・1080p60 ->Turn on the unit power while pressing and holding down LEFT + UP + RIGHT

3.6.6. CVBS FORMAT

Set the CVBS output format. Default: NTSC1

NTSC1

PAL1

Output NTSC/PAL format after compressing horizontally the 1920 x 1080 pixel (aspect ratio 16:9) imaged with an image sensor to aspect ratio 4:3.

The both ends of the viewing angle can be seen even though the image is distorted due to the horizontal compression.

NTSC2

PAL2

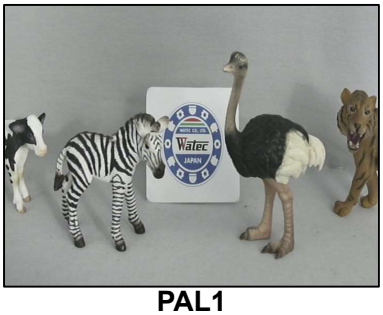
Output NTSC/PAL format after cutting-out excluding the both ends 240 pixel of the 1920 x 1080 pixel imaged with an image sensor to 1440 x 1080 pixel (aspect ratio 4:3).

The image does not be distorted but the ends of the viewing angle will not be displayed. (The 1920 x 1080 pixel before cut-out will be displayed for the SDI.)

(SDI-out, 1920x1080)

NTSC1

NTSC2



PAL1

PAL2

Figure 29. CVBS FORMAT

*When the PIP on the DZOOM function is on, the CVBS side image does not output correctly and it is not a failure.

*Start with the arbitrary CVBS Format setting by the following operation. The color bar will be displayed when the camera is started. Press “ENTER” to release the color bar display.

- NTSC1 -> Turn on the unit power while pressing and holding down RIGHT
- PAL1 -> Turn on the unit power while pressing and holding down LEFT

3.7. FACTORY RESET

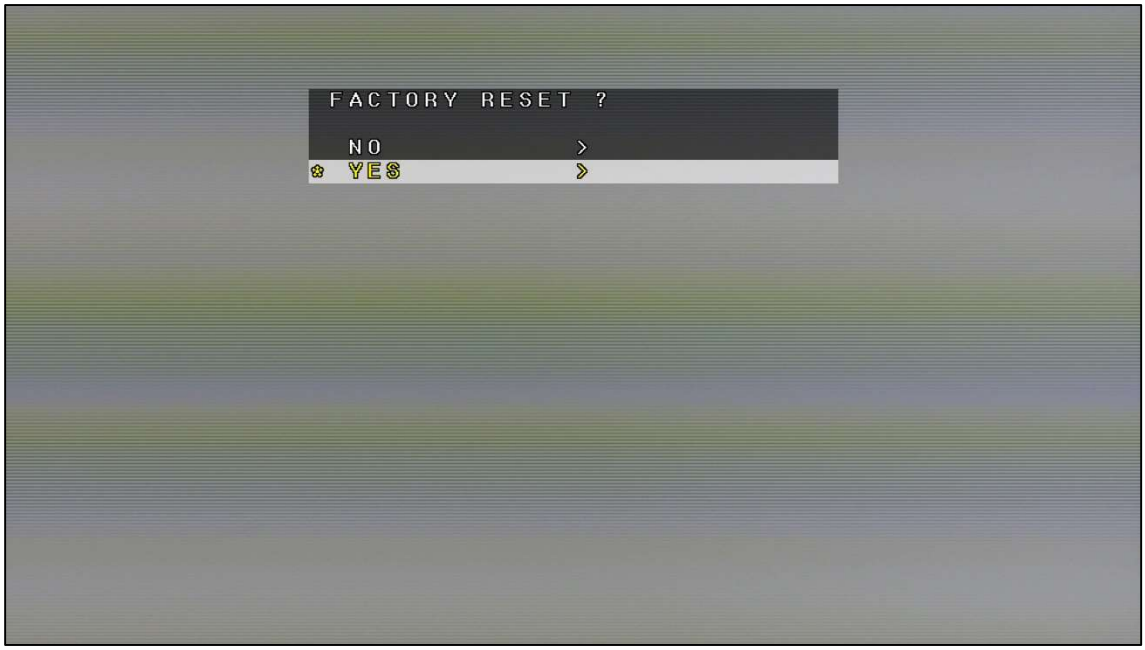


Figure 30. FACTORY RESET

Restore the factory default by completing the ENTER operation while the cursor is on the “YES”, and the camera restart after a specified period.

4. OSD menu tree

Legend:

Represents OSD menu item

Represents the operation by UP, DOWN and ENTER key of the remote control

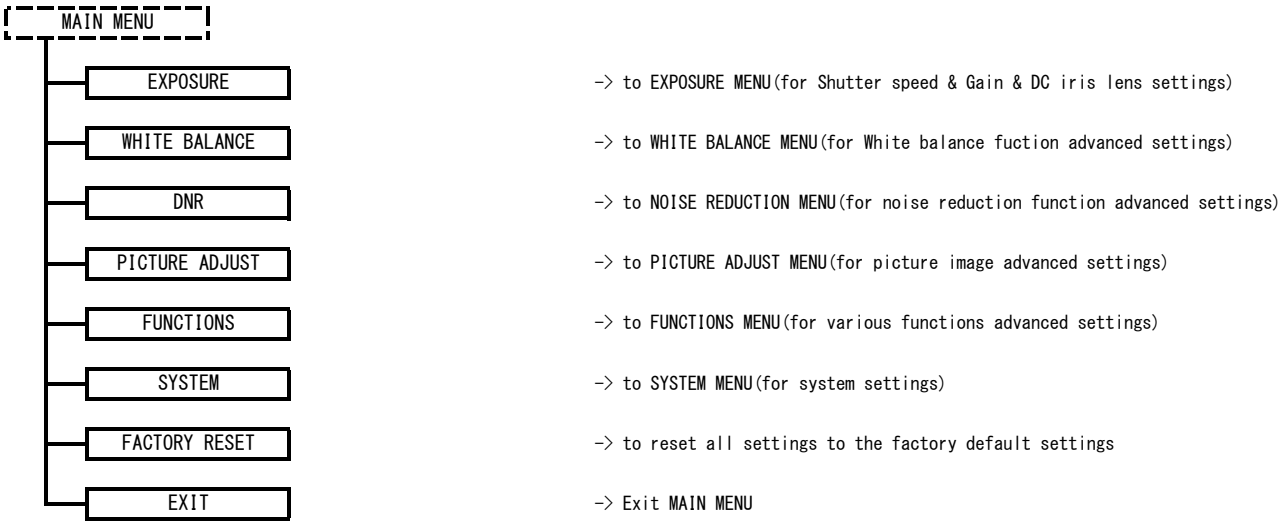
Represents the operation by RIGHT, LEFT and ENTER key of the remote control

Represents a selectable mode and setting value of each menu item

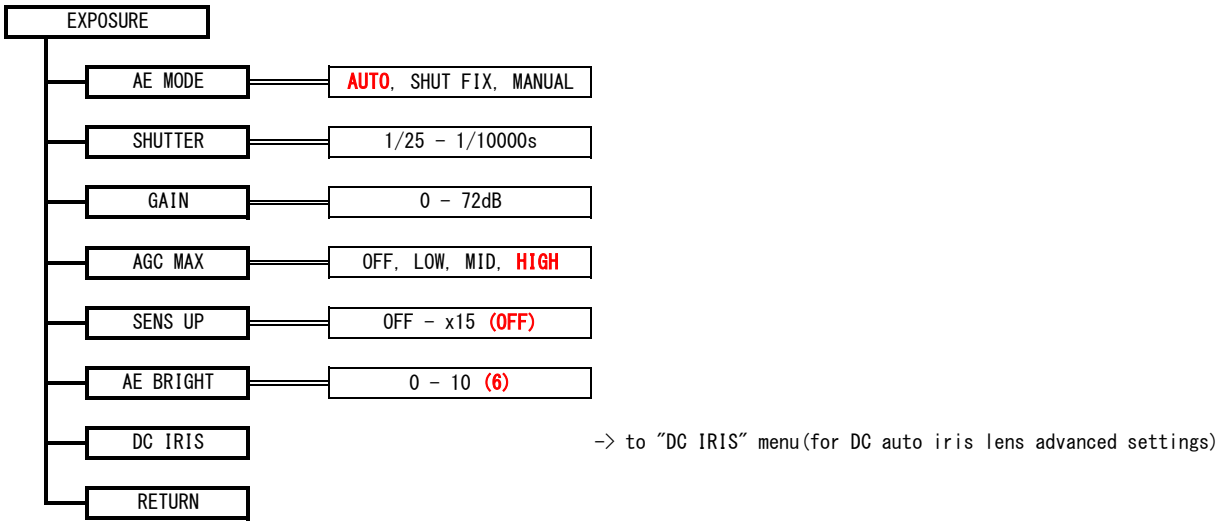
Represents the title on the OSD and not a setting item

Default : in Red

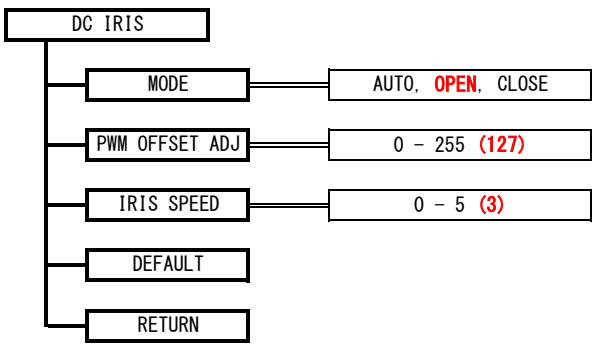
○MAIN MENU



○EXPOSURE

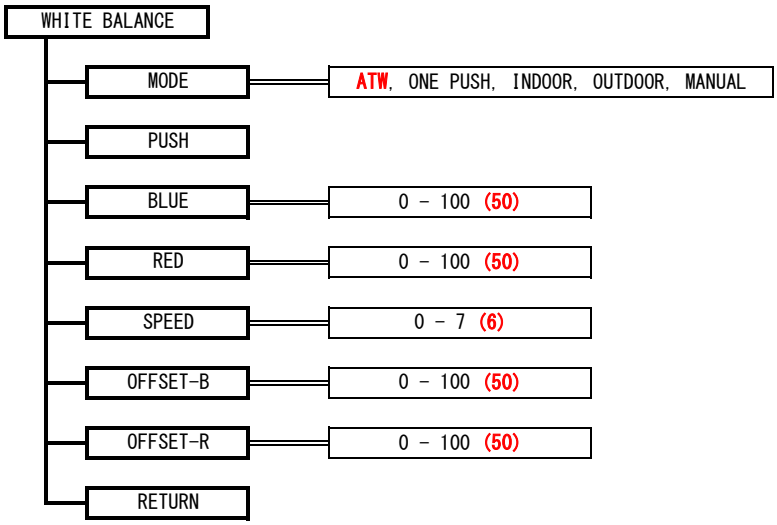


○DC IRIS

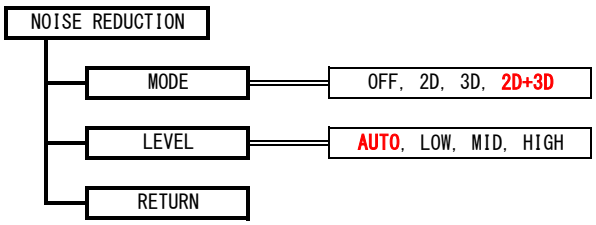


○WHITE BALANCE

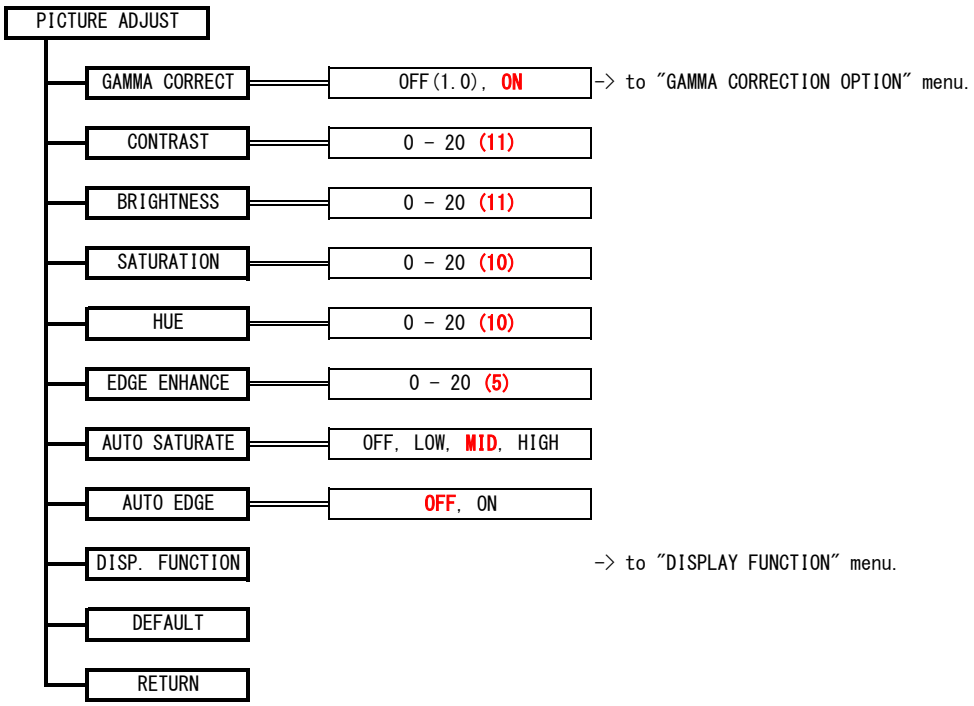
*This setting is not applicable for the WAT-3200.



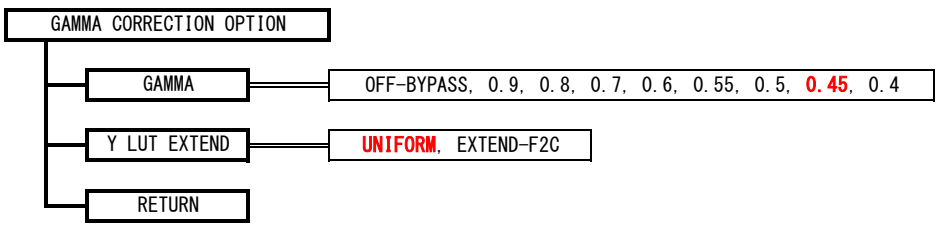
○NOISE REDUCTION



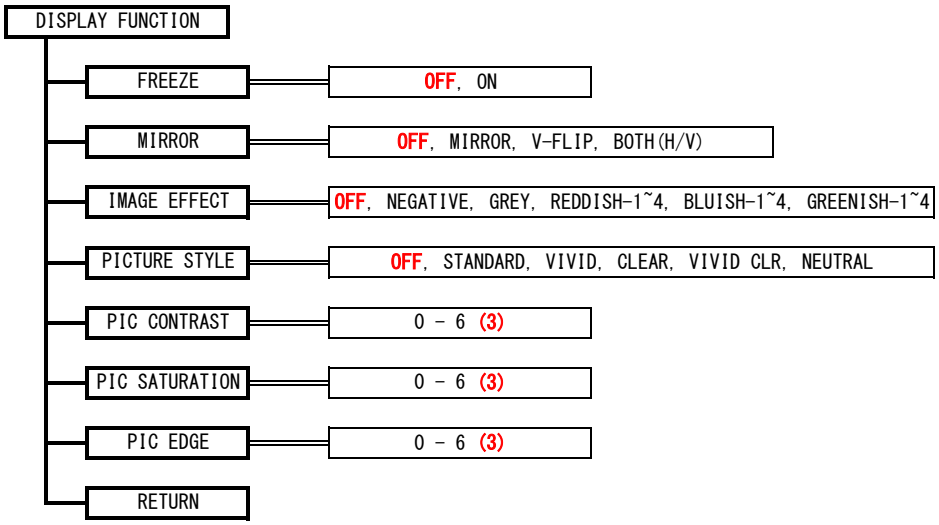
○PICTURE ADJUST



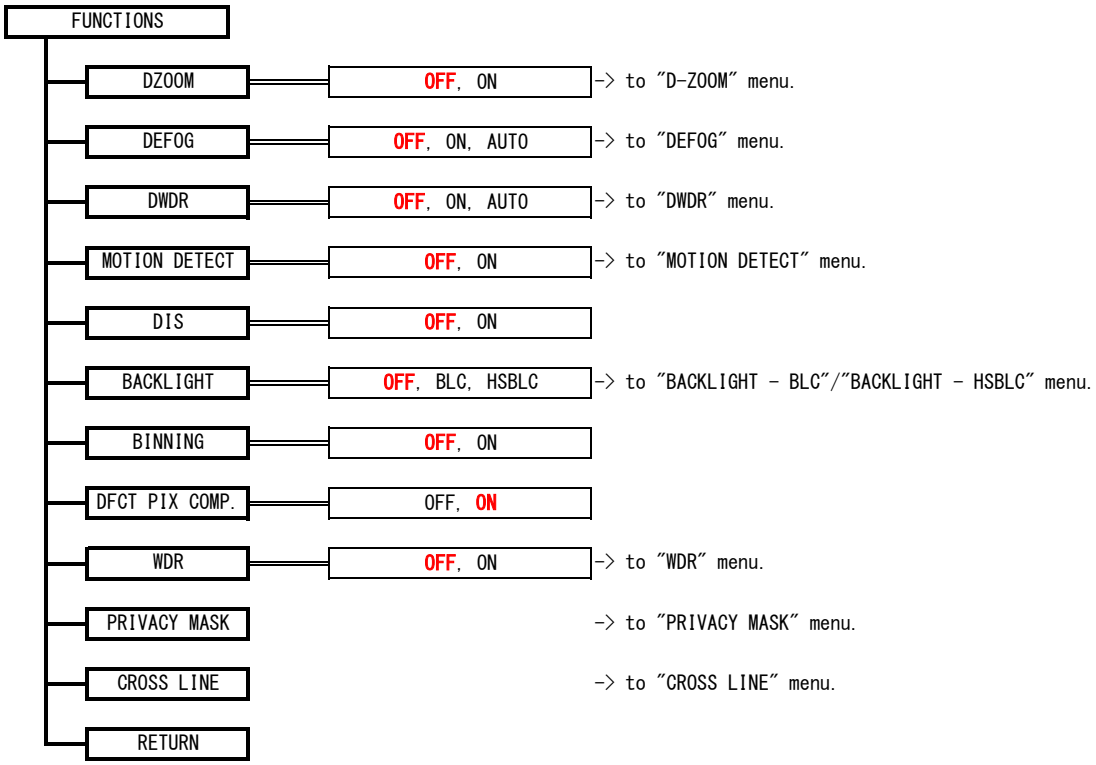
○GAMMA CORRECTION OPTION



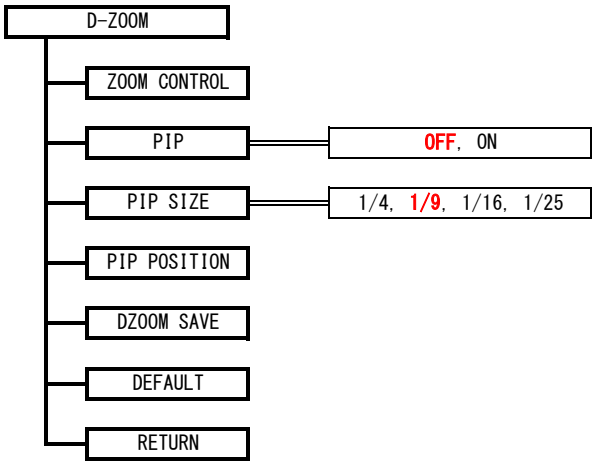
○DISPLAY FUNCTION



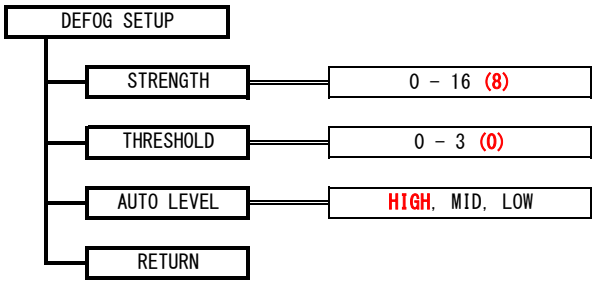
○FUNCTIONS



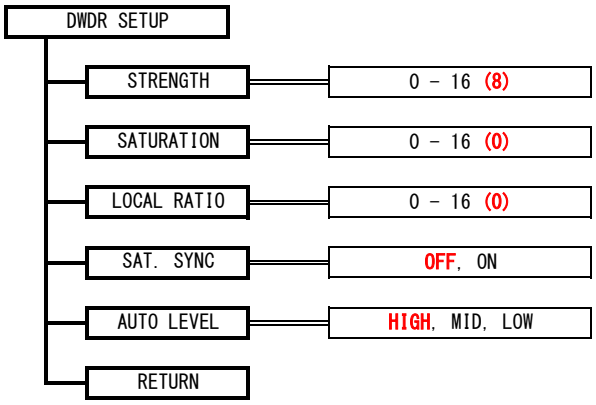
○D-ZOOM



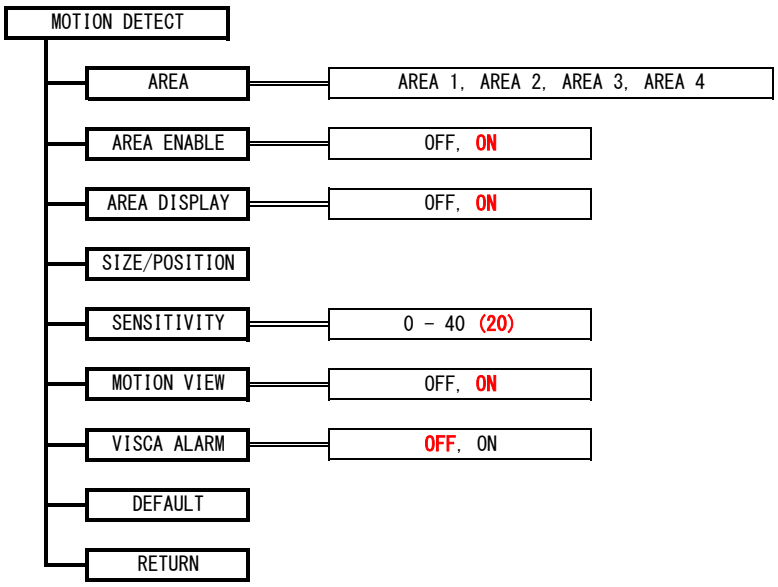
○DEFOG SETUP



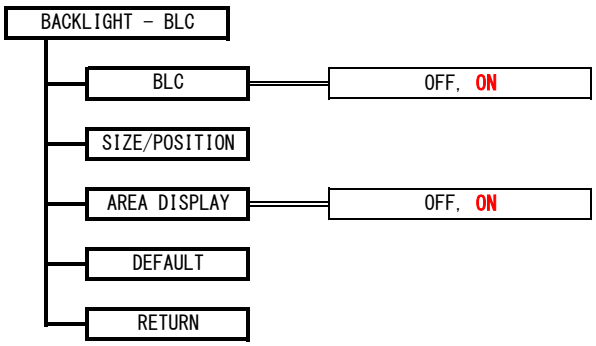
○DWDR SETUP



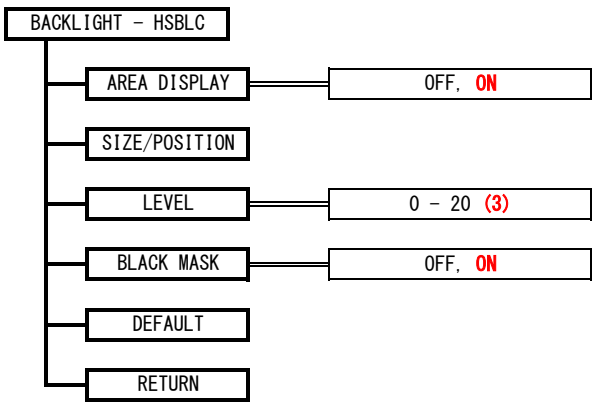
○MOTION DETECT



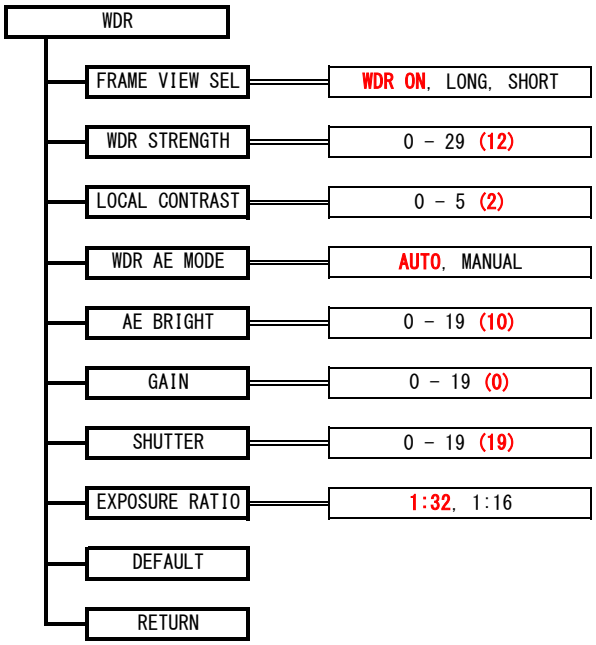
○BACKLIGHT - BLC



○BACKLIGHT - HSBLC

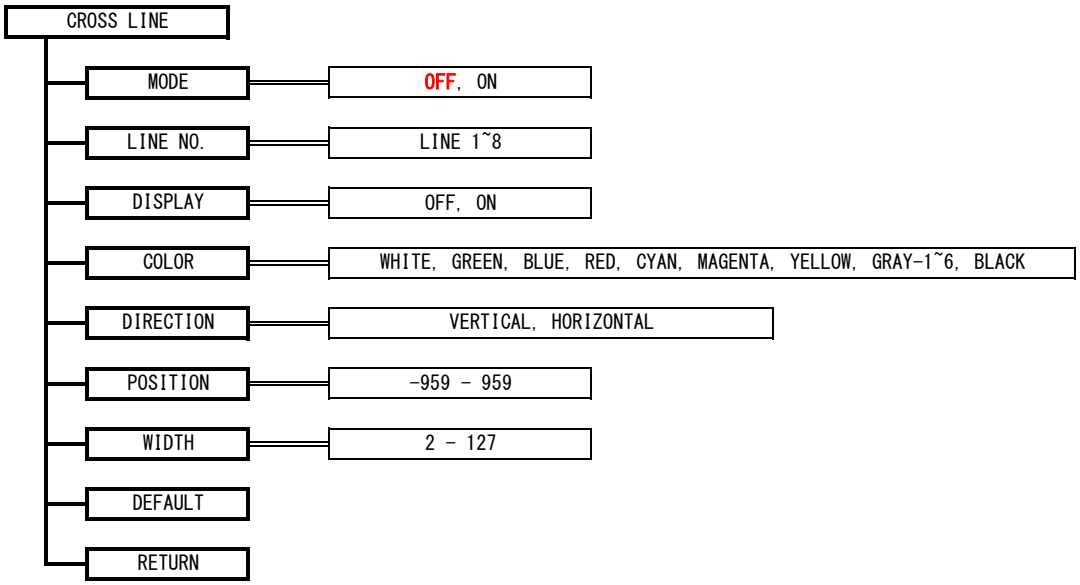


○WDR

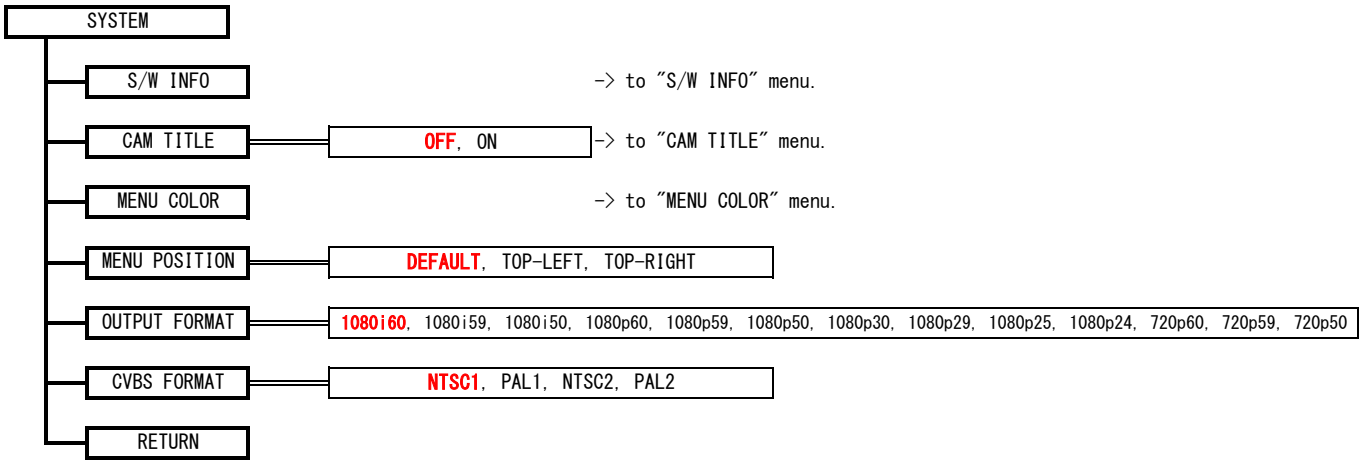

WDR
FRAME VIEW SEL
WDR ON, LONG, SHORT
WDR STRENGTH
0 - 29 (12)
LOCAL CONTRAST
0 - 5 (2)
WDR AE MODE
AUTO, MANUAL
AE BRIGHT
0 - 19 (10)
GAIN
0 - 19 (0)
SHUTTER
0 - 19 (19)
EXPOSURE RATIO
1:32, 1:16
DEFAULT
RETURN

○PRIVACY MASK

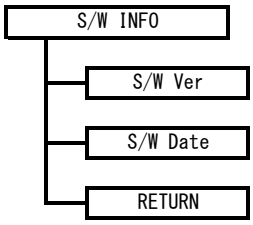
○CROSS LINE



○SYSTEM



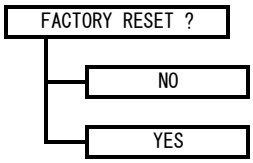
○S/W INFO



○CAM TITLE

○MENU COLOR

○FACTORY RESET



WAT-2200Mk-2 & WAT-3200 (R) visca command-list (1/3)
BaudRate:9600bps, Databits:8, Parity:None, Stopbits:1, Flowcontrol:none

menu1	menu2	menu3	setting/(operation)	set command	inquiry command	response for inquiry command
EXPOSURE	AE MODE		AUTO	0x81, 0x01, 0x04, 0x39, 0x00, 0xFF	0x81, 0x09, 0x04, 0x39, 0xFF	0x90, 0x50, 0x00, 0xFF
			SHUT FIX	0x81, 0x01, 0x04, 0x39, 0x0A, 0xFF		0x90, 0x50, 0x0A, 0xFF
			MANUAL	0x81, 0x01, 0x04, 0x39, 0x03, 0xFF		0x90, 0x50, 0x03, 0xFF
	SHUTTER		(Up)	0x81, 0x01, 0x04, 0x0A, 0x02, 0xFF	0x81, 0x09, 0xA1, 0xE9, 0xFF *1	-
			(Down)	0x81, 0x01, 0x04, 0x0A, 0x03, 0xFF	(command for "W513R")	-
			(Reset)	0x81, 0x01, 0x04, 0x0A, 0x00, 0xFF		-
			1/30s, 1/25s	0x81, 0x01, 0x04, 0x4A, 0x00, 0x00, 0x00, 0x05, 0xFF	0x81, 0x09, 0x04, 0x4A, 0xFF *2	0x90, 0x50, 0x00, 0x00, 0x00, 0x05, 0xFF
			1/60s, 1/50s	0x81, 0x01, 0x04, 0x4A, 0x00, 0x00, 0x00, 0x06, 0xFF	(command for "W513" and "W513R")	0x90, 0x50, 0x00, 0x00, 0x00, 0x06, 0xFF
			1/120s, 1/100s	0x81, 0x01, 0x04, 0x4A, 0x00, 0x00, 0x00, 0x08, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x08, 0xFF
			1/180s, 1/150s	0x81, 0x01, 0x04, 0x4A, 0x00, 0x00, 0x00, 0x0A, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x0A, 0xFF
			1/240s, 1/200s *1	0x81, 0x01, 0x04, 0x4A, 0x00, 0x00, 0x00, 0x0B1, 0xFF		0x90, 0x50, 0x0A, 0x00, 0x0B, 0x01, 0xFF
			1/300s, 1/250s	0x81, 0x01, 0x04, 0x4A, 0x00, 0x00, 0x00, 0x0B, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x0B, 0xFF
			1/500s	0x81, 0x01, 0x04, 0x4A, 0x00, 0x00, 0x00, 0x0D, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x0D, 0xFF
			1/1000s	0x81, 0x01, 0x04, 0x4A, 0x00, 0x00, 0x00, 0x0F, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x0F, 0xFF
			1/2000s	0x81, 0x01, 0x04, 0x4A, 0x00, 0x00, 0x00, 0x11, 0xFF		0x90, 0x50, 0x00, 0x00, 0x01, 0x01, 0xFF
			1/5000s	0x81, 0x01, 0x04, 0x4A, 0x00, 0x00, 0x00, 0x13, 0xFF		0x90, 0x50, 0x00, 0x00, 0x01, 0x03, 0xFF
			1/10000s	0x81, 0x01, 0x04, 0x4A, 0x00, 0x00, 0x00, 0x15, 0xFF		0x90, 0x50, 0x00, 0x00, 0x01, 0x05, 0xFF
	GAIN		(Up)	0x81, 0x01, 0x04, 0x0C, 0x02, 0xFF	0x81, 0x09, 0x04, 0x4C, 0xFF	-
			(Down)	0x81, 0x01, 0x04, 0x0C, 0x03, 0xFF		-
			(Reset)	0x81, 0x01, 0x04, 0x0C, 0x00, 0xFF		-
			0dB	0x81, 0x01, 0x04, 0x4C, 0x00, 0x00, 0x00, 0x01, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x01, 0xFF
			5dB	0x81, 0x01, 0x04, 0x4C, 0x00, 0x00, 0x00, 0x02, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x02, 0xFF
			10dB	0x81, 0x01, 0x04, 0x4C, 0x00, 0x00, 0x00, 0x03, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x03, 0xFF
			15dB	0x81, 0x01, 0x04, 0x4C, 0x00, 0x00, 0x00, 0x04, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x04, 0xFF
			20dB	0x81, 0x01, 0x04, 0x4C, 0x00, 0x00, 0x00, 0x05, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x05, 0xFF
			25dB	0x81, 0x01, 0x04, 0x4C, 0x00, 0x00, 0x00, 0x06, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x06, 0xFF
			30dB	0x81, 0x01, 0x04, 0x4C, 0x00, 0x00, 0x00, 0x07, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x07, 0xFF
			35dB	0x81, 0x01, 0x04, 0x4C, 0x00, 0x00, 0x00, 0x08, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x08, 0xFF
			40dB	0x81, 0x01, 0x04, 0x4C, 0x00, 0x00, 0x00, 0x09, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x09, 0xFF
			45dB	0x81, 0x01, 0x04, 0x4C, 0x00, 0x00, 0x00, 0x0A, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x0A, 0xFF
			50dB	0x81, 0x01, 0x04, 0x4C, 0x00, 0x00, 0x00, 0x0B, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x0B, 0xFF
			55dB	0x81, 0x01, 0x04, 0x4C, 0x00, 0x00, 0x00, 0x0C, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x0C, 0xFF
			60dB	0x81, 0x01, 0x04, 0x4C, 0x00, 0x00, 0x00, 0x0D, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x0D, 0xFF
			65dB	0x81, 0x01, 0x04, 0x4C, 0x00, 0x00, 0x00, 0x0E, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x0E, 0xFF
			72dB	0x81, 0x01, 0x04, 0x4C, 0x00, 0x00, 0x00, 0x0F, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x0F, 0xFF
	AGC MAX		OFF	0x81, 0x01, 0x04, 0x2C, 0x00, 0xFF	0x81, 0x09, 0x04, 0x2C, 0xFF	0x90, 0x50, 0x00, 0xFF
			LOW	0x81, 0x01, 0x04, 0x2C, 0x01, 0xFF		0x90, 0x50, 0x01, 0xFF
			MID	0x81, 0x01, 0x04, 0x2C, 0x02, 0xFF		0x90, 0x50, 0x02, 0xFF
			HIGH	0x81, 0x01, 0x04, 0x2C, 0x03, 0xFF		0x90, 0x50, 0x03, 0xFF
	SENS UP		OFF	0x81, 0x01, 0x04, 0x5A, 0x11, 0xFF	0x81, 0x09, 0xA1, 0x09, 0xFF	0x90, 0x50, 0x00, 0xFF
			x2	0x81, 0x01, 0x04, 0x5A, 0x12, 0xFF		0x90, 0x50, 0x01, 0xFF
			x3 *1	0x81, 0x01, 0xA1, 0x08, 0x12, 0xFF		0x90, 0x50, 0x02, 0xFF
			x4	0x81, 0x01, 0x04, 0x5A, 0x13, 0xFF		0x90, 0x50, 0x03, 0xFF
			x5 *1	0x81, 0x01, 0xA1, 0x08, 0x14, 0xFF		0x90, 0x50, 0x04, 0xFF
			x6	0x81, 0x01, 0x04, 0x5A, 0x14, 0xFF		0x90, 0x50, 0x05, 0xFF
			x7 *1	0x81, 0x01, 0xA1, 0x08, 0x16, 0xFF		0x90, 0x50, 0x06, 0xFF
			x8	0x81, 0x01, 0x04, 0x5A, 0x15, 0xFF		0x90, 0x50, 0x07, 0xFF
			x9 *1	0x81, 0x01, 0xA1, 0x08, 0x18, 0xFF		0x90, 0x50, 0x08, 0xFF
			x10	0x81, 0x01, 0x04, 0x5A, 0x16, 0xFF		0x90, 0x50, 0x09, 0xFF
			x12	0x81, 0x01, 0x04, 0x5A, 0x17, 0xFF		0x90, 0x50, 0x0A, 0xFF
			x15	0x81, 0x01, 0x04, 0x5A, 0x18, 0xFF		0x90, 0x50, 0x0B, 0xFF
	AE BRIGHT		(Up)	0x81, 0x01, 0x04, 0x3E, 0x02, 0xFF, 0x81, 0x01, 0x04, 0x0E, 0x02, 0xFF	0x81, 0x09, 0x04, 0x4E, 0xFF	-
			(Down)	0x81, 0x01, 0x04, 0x3E, 0x02, 0xFF, 0x81, 0x01, 0x04, 0x0E, 0x03, 0xFF		-
			(Reset)	0x81, 0x01, 0x04, 0x3E, 0x02, 0xFF, 0x81, 0x01, 0x04, 0x0E, 0x00, 0xFF		-
			0	0x81, 0x01, 0x04, 0x3E, 0x02, 0xFF, 0x81, 0x01, 0x04, 0x4E, 0x00, 0x00, 0x00, 0x00, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x00, 0xFF
			1	0x81, 0x01, 0x04, 0x3E, 0x02, 0xFF, 0x81, 0x01, 0x04, 0x4E, 0x00, 0x00, 0x00, 0x01, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x01, 0xFF
			2	0x81, 0x01, 0x04, 0x3E, 0x02, 0xFF, 0x81, 0x01, 0x04, 0x4E, 0x00, 0x00, 0x00, 0x02, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x02, 0xFF
			3	0x81, 0x01, 0x04, 0x3E, 0x02, 0xFF, 0x81, 0x01, 0x04, 0x4E, 0x00, 0x00, 0x00, 0x03, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x03, 0xFF
			4	0x81, 0x01, 0x04, 0x3E, 0x02, 0xFF, 0x81, 0x01, 0x04, 0x4E, 0x00, 0x00, 0x00, 0x04, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x04, 0xFF
			5	0x81, 0x01, 0x04, 0x3E, 0x02, 0xFF, 0x81, 0x01, 0x04, 0x4E, 0x00, 0x00, 0x00, 0x05, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x05, 0xFF
			6	0x81, 0x01, 0x04, 0x3E, 0x02, 0xFF, 0x81, 0x01, 0x04, 0x4E, 0x00, 0x00, 0x00, 0x06, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x06, 0xFF
			7	0x81, 0x01, 0x04, 0x3E, 0x02, 0xFF, 0x81, 0x01, 0x04, 0x4E, 0x00, 0x00, 0x00, 0x07, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x07, 0xFF
			8	0x81, 0x01, 0x04, 0x3E, 0x02, 0xFF, 0x81, 0x01, 0x04, 0x4E, 0x00, 0x00, 0x00, 0x08, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x08, 0xFF
			9	0x81, 0x01, 0x04, 0x3E, 0x02, 0xFF, 0x81, 0x01, 0x04, 0x4E, 0x00, 0x00, 0x00, 0x09, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x09, 0xFF
			10	0x81, 0x01, 0x04, 0x3E, 0x02, 0xFF, 0x81, 0x01, 0x04, 0x4E, 0x00, 0x00, 0x00, 0x0A, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x0A, 0xFF
	DC IRIS	MODE	AUTO	0x81, 0x01, 0x04, 0x4B, 0x00, 0x00, 0x0F, 0x00, 0xFF	0x81, 0x09, 0x04, 0x4B, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0F, 0x00, 0xFF
			OPEN	0x81, 0x01, 0x04, 0x4B, 0x00, 0x00, 0x01, 0x01, 0xFF		0x90, 0x50, 0x00, 0x00, 0x01, 0x01, 0xFF
			CLOSE	0x81, 0x01, 0x04, 0x4B, 0x00, 0x00, 0x00, 0x00, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x00, 0xFF
		PWM OFFSET ADJ	0~255 *1	0x81, 0x01, 0x2A, 0x01, 0x0r, 0x0r, 0xFF	0x81, 0x09, 0x2A, 0x01, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0r, 0x0r, 0xFF[rr=0x00~0xFF]
		IRIS SPEED	0~5 *1	0x81, 0x01, 0x2A, 0x02, 0x00, 0x0r, 0xFF	0x81, 0x09, 0x2A, 0x02, 0xFF	0x90, 0x50, 0x00, 0x00, 0x00, 0x0r, 0xFF[r =0x00~0x05]
WHITE BALANCE	MODE		ATW	0x81, 0x01, 0x04, 0x35, 0x00, 0xFF	0x81, 0x09, 0x04, 0x35, 0xFF	0x90, 0x50, 0x00, 0xFF
			ONE PUSH	0x81, 0x01, 0x04, 0x35, 0x03, 0xFF		0x90, 0x50, 0x03, 0xFF
			INDOOR	0x81, 0x01, 0x04, 0x35, 0x01, 0xFF		0x90, 0x50, 0x01, 0xFF
			OUTDOOR	0x81, 0x01, 0x04, 0x35, 0x02, 0xFF		0x90, 0x50, 0x02, 0xFF
			MANUAL	0x81, 0x01, 0x04, 0x35, 0x05, 0xFF		0x90, 0x50, 0x05, 0xFF
			PUSH	0x81, 0x01, 0x04, 0x10, 0x05, 0xFF	-	-
	BLUE		(Reset)	0x81, 0x01, 0x04, 0x04, 0x00, 0xFF	0x81, 0x09, 0x04, 0x44, 0xFF	-
			(Up)	0x81, 0x01, 0x04, 0x04, 0x02, 0xFF		-
			(Down)	0x81, 0x01, 0x04, 0x04, 0x03, 0xFF		-
			(Direct)	0x81, 0x01, 0x04, 0x44, 0x00, 0x00, 0x0p, 0x0q, 0xFF		0x90, 0x50, 0x00, 0x00, 0x0p, 0x0q, 0xFF[pq=0x00~0x64]
	RED		(Reset)	0x81, 0x01, 0x04, 0x03, 0x00, 0xFF	0x81, 0x09, 0x04, 0x43, 0xFF	-
			(Up)	0x81, 0x01, 0x04, 0x03, 0x02, 0xFF		-
			(Down)	0x81, 0x01, 0x04, 0x03, 0x03, 0xFF		-
			(Direct)	0x81, 0x01, 0x04, 0x43, 0x00, 0x00, 0x0p, 0x0q, 0xFF		0x90, 0x50, 0x00, 0x00, 0x0p, 0x0q, 0xFF[pq=0x00~0x64]
	SPEED *1		0~7	0x81, 0x01, 0x2A, 0x03, 0x00, 0x0r, 0xFF	0x81, 0x09, 0x2A, 0x03, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0r, 0xFF[r =0x00~0x07]
	OFFSET B *1		0~100	0x81, 0x01, 0x2A, 0x04, 0x0r, 0x0r, 0xFF	0x81, 0x09, 0x2A, 0x04, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0r, 0x0r, 0xFF[rr=0x00~0x64]
	OFFSET R *1		0~100	0x81, 0x01, 0x2A, 0x05, 0x0r, 0x0r, 0xFF	0x81, 0x09, 0x2A, 0x05, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0r, 0x0r, 0xFF[rr=0x00~0x64]

*1 These commands are available only for cameras with the serial label starting “W513R”.
*2 When SHUTTER is set to 1/240s, 1/200s in the OSD, reading the value with this inquiry command returns the same command (0x90, 0x50, 0x00, 0x00, 0x00, 0x0B, 0xFF) as when set to 1/300s, 1/250s. (Common to “W513” and “W513R.)

WAT-2200Mk-2 & WAT-3200 (R) visca command-list (2/3)
BaudRate:9600bps, Databits:8, Parity:None, Stopbits:1, Flowcontrol:none

menu1	menu2	menu3	setting/(operation)	set command	inquiry command	response for inquiry command
DNR	MODE		OFF	0x81, 0x01, 0x04, 0x53, 0x00, 0xFF	0x81, 0x09, 0x04, 0x53, 0xFF	0x90, 0x50, 0x00, 0xFF
			2D	0x81, 0x01, 0x04, 0x53, 0x01, 0xFF		0x90, 0x50, 0x01, 0xFF
			3D	0x81, 0x01, 0x04, 0x53, 0x02, 0xFF		0x90, 0x50, 0x02, 0xFF
			2D+3D	0x81, 0x01, 0x04, 0x53, 0x03, 0xFF		0x90, 0x50, 0x03, 0xFF
	LEVEL		AUTO	0x81, 0x01, 0x04, 0x53, 0x04, 0xFF	0x81, 0x09, 0x2A, 0x06, 0xFF *	0x90, 0x50, 0x00, 0x00, 0x00, 0x00, 0xFF
			LOW	0x81, 0x01, 0x04, 0x53, 0x05, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x01, 0xFF
			MID	0x81, 0x01, 0x04, 0x53, 0x06, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x02, 0xFF
			HIGH	0x81, 0x01, 0x04, 0x53, 0x07, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x03, 0xFF
PICTURE ADJUST	GAMMA CORRECT		ON	0x81, 0x01, 0x04, 0x5B, 0x01, 0xFF	0x81, 0x09, 0x04, 0x5B, 0xFF	0x90, 0x50, 0x01, 0xFF
			OFF(1.0)	0x81, 0x01, 0x04, 0x5B, 0x00, 0xFF		0x90, 0x50, 0x00, 0xFF
		GAMMA	OFF-BYPASS	0x81, 0x01, 0x04, 0x5B, 0x10, 0xFF	0x81, 0x09, 0x2A, 0x07, 0xFF *	0x90, 0x50, 0x00, 0x00, 0x00, 0x01, 0xFF
			0.4	0x81, 0x01, 0x04, 0x5B, 0x18, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x09, 0xFF
			0.45	0x81, 0x01, 0x04, 0x5B, 0x17, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x00, 0xFF
			0.5	0x81, 0x01, 0x04, 0x5B, 0x16, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x07, 0xFF
			0.55	0x81, 0x01, 0x04, 0x5B, 0x15, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x06, 0xFF
			0.6	0x81, 0x01, 0x04, 0x5B, 0x14, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x05, 0xFF
			0.7	0x81, 0x01, 0x04, 0x5B, 0x13, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x04, 0xFF
			0.8	0x81, 0x01, 0x04, 0x5B, 0x12, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x03, 0xFF
			0.9	0x81, 0x01, 0x04, 0x5B, 0x11, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x02, 0xFF
		Y LUT EXTEND	UNIFORM *	0x81, 0x01, 0x2A, 0x06, 0x00, 0x00, 0xFF	0x81, 0x09, 0x2A, 0x08, 0xFF	0x90, 0x50, 0x00, 0x00, 0x00, 0x00, 0xFF
			EXTEND-F2C *	0x81, 0x01, 0x2A, 0x06, 0x00, 0x01, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x01, 0xFF
	CONTRAST *		0~20	0x81, 0x01, 0x2A, 0x07, 0x0r, 0x0r, 0xFF	0x81, 0x09, 0x2A, 0x09, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0r, 0x0r, 0xFF[rr=0x00~0x14]
	SATURATION		0~20	0x81, 0x01, 0x04, 0x49, 0x00, 0x00, 0x0p, 0x0q, 0xFF	0x81, 0x09, 0x04, 0x49, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0p, 0x0q, 0xFF[pq=0x00~0x14]
	BRIGHTNESS *		0~20	0x81, 0x01, 0x2A, 0x08, 0x0r, 0x0r, 0xFF	0x81, 0x09, 0x2A, 0x0A, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0r, 0x0r, 0xFF[rr=0x00~0x14]
	HUE		0~20	0x81, 0x01, 0x04, 0x4F, 0x00, 0x00, 0x0p, 0x0q, 0xFF	0x81, 0x09, 0x04, 0x4F, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0p, 0x0q, 0xFF[pq=0x00~0x14]
	EDGE ENHANCE		0~20	0x81, 0x01, 0x04, 0x42, 0x00, 0x00, 0x0p, 0x0q, 0xFF	0x81, 0x09, 0x04, 0x42, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0p, 0x0q, 0xFF[pq=0x00~0x14]
	AUTO SATURATE		OFF	0x81, 0x01, 0x04, 0x5F, 0x00, 0xFF	0x81, 0x09, 0x04, 0x5F, 0xFF	0x90, 0x50, 0x00, 0xFF
			LOW	0x81, 0x01, 0x04, 0x5F, 0x01, 0xFF		0x90, 0x50, 0x01, 0xFF
			MID	0x81, 0x01, 0x04, 0x5F, 0x02, 0xFF		0x90, 0x50, 0x02, 0xFF
			HIGH	0x81, 0x01, 0x04, 0x5F, 0x03, 0xFF		0x90, 0x50, 0x03, 0xFF
	AUTO EDGE *		OFF	0x81, 0x01, 0x2A, 0x09, 0x00, 0x0r, 0xFF	0x81, 0x09, 0x2A, 0x0B, 0xFF	0x90, 0x50, 0x00, 0x00, 0x00, 0x00, 0xFF
			ON	0x81, 0x01, 0x2A, 0x09, 0x00, 0x0r, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x01, 0xFF
	DISP.FUNCTION	FREEZE	OFF	0x81, 0x01, 0x04, 0x62, 0x03, 0xFF	0x81, 0x09, 0x04, 0x62, 0xFF	0x90, 0x50, 0x03, 0xFF
			ON	0x81, 0x01, 0x04, 0x62, 0x02, 0xFF		0x90, 0x50, 0x02, 0xFF
		MIRROR	OFF	0x81, 0x01, 0x04, 0x61, 0x03, 0xFF, 0x81, 0x01, 0x04, 0x66, 0x03, 0xFF	0x81, 0x09, 0x04, 0x61, 0xFF, 0x81, 0x09, 0x04, 0x66, 0xFF	0x90, 0x50, 0x03, 0xFF, 0x90, 0x50, 0x03, 0xFF
			MIRROR	0x81, 0x01, 0x04, 0x61, 0x02, 0xFF, 0x81, 0x01, 0x04, 0x66, 0x03, 0xFF		0x90, 0x50, 0x02, 0xFF, 0x90, 0x50, 0x03, 0xFF
			V-FLIP	0x81, 0x01, 0x04, 0x61, 0x03, 0xFF, 0x81, 0x01, 0x04, 0x66, 0x02, 0xFF		0x90, 0x50, 0x03, 0xFF, 0x90, 0x50, 0x02, 0xFF
			BOTH(H/V)	0x81, 0x01, 0x04, 0x61, 0x02, 0xFF, 0x81, 0x01, 0x04, 0x66, 0x02, 0xFF		0x90, 0x50, 0x02, 0xFF, 0x90, 0x50, 0x02, 0xFF
		IMAGE EFFECT	OFF	0x81, 0x01, 0x04, 0x63, 0x00, 0xFF	0x81, 0x09, 0x04, 0x63, 0xFF	0x90, 0x50, 0x00, 0xFF
			NEGATIVE	0x81, 0x01, 0x04, 0x63, 0x02, 0xFF		0x90, 0x50, 0x01, 0xFF
			GREY	0x81, 0x01, 0x04, 0x63, 0x04, 0xFF		0x90, 0x50, 0x02, 0xFF
FUNCTIONS	DEFOG		OFF	0x81, 0x01, 0x04, 0x37, 0x03, 0x00, 0xFF	0x81, 0x09, 0x04, 0x37, 0xFF	0x90, 0x50, 0x03, 0x00, 0xFF
			ON	0x81, 0x01, 0x04, 0x37, 0x02, 0x11, 0xFF		0x90, 0x50, 0x02, 0x02, 0xFF
			AUTO	0x81, 0x01, 0x04, 0x37, 0x02, 0x10, 0xFF		0x90, 0x50, 0x02, 0x00, 0xFF
		STRENGTH *	0~16	0x81, 0x01, 0x2A, 0x0A, 0x0r, 0x0r, 0xFF	0x81, 0x09, 0x2A, 0x0C, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0r, 0x0r, 0xFF[rr=0x00~0x10]
		THRESHOLD *	0~3	0x81, 0x01, 0x2A, 0x0B, 0x00, 0x0r, 0xFF	0x81, 0x09, 0x2A, 0x0D, 0xFF	0x90, 0x50, 0x00, 0x00, 0x00, 0x0r, 0xFF[r =0x00~0x03]
		AUTO LEVEL *	HIGH	0x81, 0x01, 0x2A, 0x0C, 0x00, 0x00, 0xFF	0x81, 0x09, 0x2A, 0x0E, 0xFF	0x90, 0x50, 0x00, 0x00, 0x00, 0x00, 0xFF
			MID	0x81, 0x01, 0x2A, 0x0C, 0x00, 0x01, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x01, 0xFF
			LOW	0x81, 0x01, 0x2A, 0x0C, 0x00, 0x02, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x02, 0xFF
	DWDR *		OFF	0x81, 0x01, 0xA1, 0x07, 0x03, 0x00, 0xFF	0x81, 0x09, 0xA1, 0xE7, 0xFF	0x90, 0x50, 0x03, 0x00, 0xFF
			ON	0x81, 0x01, 0xA1, 0x07, 0x02, 0x11, 0xFF		0x90, 0x50, 0x02, 0x01, 0xFF
			AUTO	0x81, 0x01, 0xA1, 0x07, 0x02, 0x10, 0xFF		0x90, 0x50, 0x02, 0x02, 0xFF
		STRENGTH *	0~16	0x81, 0x01, 0x2A, 0x0D, 0x0r, 0x0r, 0xFF	0x81, 0x09, 0x2A, 0x0F, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0r, 0x0r, 0xFF[rr=0x00~0x10]
		SATURATION *	0~16	0x81, 0x01, 0x2A, 0x0E, 0x0r, 0x0r, 0xFF	0x81, 0x09, 0x2A, 0x10, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0r, 0x0r, 0xFF[rr=0x00~0x10]
		LOCAL RATIO *	0~16	0x81, 0x01, 0x2A, 0x0F, 0x0r, 0x0r, 0xFF	0x81, 0x09, 0x2A, 0x11, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0r, 0x0r, 0xFF[rr=0x00~0x10]
		SAT SYNC *	OFF	0x81, 0x01, 0x2A, 0x10, 0x00, 0x00, 0xFF	0x81, 0x09, 0x2A, 0x12, 0xFF	0x90, 0x50, 0x00, 0x00, 0x00, 0x00, 0xFF
			ON	0x81, 0x01, 0x2A, 0x10, 0x00, 0x01, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x01, 0xFF
		AUTO LEVEL *	HIGH	0x81, 0x01, 0x2A, 0x11, 0x00, 0x00, 0xFF	0x81, 0x09, 0x2A, 0x13, 0xFF	0x90, 0x50, 0x00, 0x00, 0x00, 0x00, 0xFF
			MID	0x81, 0x01, 0x2A, 0x11, 0x00, 0x01, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x01, 0xFF
			LOW	0x81, 0x01, 0x2A, 0x11, 0x00, 0x02, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x02, 0xFF
	MOTION DETECT		OFF	0x81, 0x01, 0x04, 0x1B, 0x03, 0xFF	0x81, 0x09, 0x04, 0x1B, 0xFF	0x90, 0x50, 0x03, 0xFF
			ON,Alarm-OFF	0x81, 0x01, 0x04, 0x1B, 0x04, 0xFF		0x90, 0x50, 0x04, 0xFF
			ON,Alarm-ON	0x81, 0x01, 0x04, 0x1B, 0x02, 0xFF		0x90, 0x50, 0x02, 0xFF
	DIS		OFF	0x81, 0x01, 0x04, 0x34, 0x03, 0xFF	0x81, 0x09, 0x04, 0x34, 0xFF	0x90, 0x50, 0x03, 0xFF
			ON	0x81, 0x01, 0x04, 0x34, 0x02, 0xFF		0x90, 0x50, 0x02, 0xFF
	BACK LIGHT		OFF	0x81, 0x01, 0x04, 0x33, 0x03, 0xFF	0x81, 0x09, 0x04, 0x33, 0xFF	0x90, 0x50, 0x03, 0xFF
			BLC	0x81, 0x01, 0x04, 0x33, 0x02, 0xFF		0x90, 0x50, 0x02, 0xFF
			HSBLC	0x81, 0x01, 0x04, 0x14, 0x02, 0xFF	0x81, 0x09, 0x04, 0x14, 0xFF	0x90, 0x50, 0x02, 0xFF
		BLC *	OFF	0x81, 0x01, 0x2A, 0x12, 0x0o, 0x0w, 0x0w, 0x0h, 0x0h, 0x0x, 0x0x, 0x0y, 0x0y, 0x0p, 0xFF	0x81, 0x09, 0x2A, 0x14, 0xFF	0x90, 0x50, 0x00, 0x00, 0x00, 0x00, 0xFF
			ON	[o=OFF/ON, ww=SIZE-W, hh=SIZE-H, xx=POSITION-X, yy=POSITION-Y, p=AREA DISPLAY]		0x90, 0x50, 0x00, 0x00, 0x00, 0x01, 0xFF
			SIZE		0x81, 0x09, 0x2A, 0x15, 0xFF	0x90, 0x50, 0x0w, 0x0w, 0x0h, 0x0h, 0xFF[ww=0x01~0x2F, hh=0x00~0x21]
			POSITION		0x81, 0x09, 0x2A, 0x16, 0xFF	0x90, 0x50, 0x0x, 0x0x, 0x0y, 0x0y, 0xFF[xx=0x00~0x2E, yy=0x00~0x20]
			AREA DISPLAY		0x81, 0x09, 0x2A, 0x17, 0xFF	0x90, 0x50, 0x00, 0x00, 0x00, 0x0p, 0xFF[p =0x00~0x01]
		HSBLC *	AREA DISPLAY	0x81, 0x01, 0x2A, 0x13, 0x0p, 0x0w, 0x0w, 0x0h, 0x0h, 0x0x, 0x0x, 0x0y, 0x0y, 0xvv, 0x0m, 0xFF	0x81, 0x09, 0x2A, 0x18, 0xFF	0x90, 0x50, 0x00, 0x00, 0x00, 0x0p, 0xFF[p =0x00~0x01]
			SIZE	[p=AREA DISPLAY, ww=SIZE-W, hh=SIZE-H, xx=POSITION-X, yy=POSITION-Y, vv=LEVEL, m=BLACK MASK]	0x81, 0x09, 0x2A, 0x19, 0xFF	0x90, 0x50, 0x0w, 0x0w, 0x0h, 0x0h, 0xFF[ww=0x01~0x2F, hh=0x00~0x21]
			POSITION		0x81, 0x09, 0x2A, 0x1A, 0xFF	0x90, 0x50, 0x0x, 0x0x, 0x0y, 0x0y, 0xFF[xx=0x00~0x2E, yy=0x00~0x20]
			LEVEL		0x81, 0x09, 0x2A, 0x1B, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0v, 0x0v, 0xFF[vv=0x00~0x14]
			BLACK MASK		0x81, 0x09, 0x2A, 0x1C, 0xFF	0x90, 0x50, 0x00, 0x00, 0x00, 0x0m, 0xFF[m =0x00~0x01]

* These commands are available only for cameras with the serial label starting “W513R”.

WAT-2200Mk-2 & WAT-3200 (R) visca command-list (3/3)
BaudRate:9600bps, Databits:8, Parity:None, Stopbits:1, Flowcontrol:none

menu1	menu2	menu3	setting/(operation)	set command	inquiry command	response for inquiry command
FUNCTIONS	WDR		OFF	0x81, 0x01, 0x04, 0x3D, 0x03, 0xFF	0x81, 0x09, 0x04, 0x3D, 0xFF	0x90, 0x50, 0x03, 0xFF
			ON	0x81, 0x01, 0x04, 0x3D, 0x02, 0xFF		0x90, 0x50, 0x02, 0xFF
		FRAME VIEW SEL *	WDR ON	0x81, 0x01, 0x2A, 0x14, 0x00, 0x00, 0xFF	0x81, 0x09, 0x2A, 0x1D, 0xFF	0x90, 0x50, 0x00, 0x00, 0x00, 0x00, 0xFF
			LONG	0x81, 0x01, 0x2A, 0x14, 0x00, 0x01, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x01, 0xFF
			SHORT	0x81, 0x01, 0x2A, 0x14, 0x00, 0x02, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x02, 0xFF
		STRENGTH *	0~29	0x81, 0x01, 0x2A, 0x14, 0x01, 0xrr, 0xFF	0x81, 0x09, 0x2A, 0x1E, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0r, 0x0r, 0xFF[rr=0x00~0x1D]
		LOCAL CONTRAST *	0~5	0x81, 0x01, 0x2A, 0x14, 0x02, 0x0r, 0xFF	0x81, 0x09, 0x2A, 0x1F, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0r, 0x0r, 0xFF[r =0x00~0x03]
		WDR AE MODE *	AUTO	0x81, 0x01, 0x2A, 0x14, 0x03, 0x01, 0xFF	0x81, 0x09, 0x2A, 0x20, 0xFF	0x90, 0x50, 0x00, 0x00, 0x00, 0x01, 0xFF
			MANUAL	0x81, 0x01, 0x2A, 0x14, 0x03, 0x00, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x00, 0xFF
		WDR AE BRIGHT *	0~19	0x81, 0x01, 0x2A, 0x14, 0x04, 0xrr, 0xFF	0x81, 0x09, 0x2A, 0x21, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0r, 0x0r, 0xFF[rr=0x00~0x13]
		GAIN *	0~19	0x81, 0x01, 0x2A, 0x14, 0x05, 0xrr, 0xFF	0x81, 0x09, 0x2A, 0x22, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0r, 0x0r, 0xFF[rr=0x00~0x13]
		SHUTTER *	0~19	0x81, 0x01, 0x2A, 0x14, 0x06, 0xrr, 0xFF	0x81, 0x09, 0x2A, 0x23, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0r, 0x0r, 0xFF[rr=0x00~0x13]
		EXPOSURE RATIO *	1:16	0x81, 0x01, 0x2A, 0x14, 0x07, 0x00, 0xFF	0x81, 0x09, 0x2A, 0x24, 0xFF	0x90, 0x50, 0x00, 0x00, 0x00, 0x00, 0xFF
			1:32	0x81, 0x01, 0x2A, 0x14, 0x07, 0x01, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x01, 0xFF
	DZOOM		OFF	0x81, 0x01, 0x04, 0x06, 0x03, 0xFF	0x81, 0x09, 0x04, 0x06, 0xFF	0x90, 0x50, 0x03, 0xFF
			ON	0x81, 0x01, 0x04, 0x06, 0x02, 0xFF		0x90, 0x50, 0x02, 0xFF
		ZOOM CONTROL	PAN-Left	0x81, 0x01, 0x06, 0x01, 0x00, 0x00, 0x03, 0x01, 0xFF	0x81, 0x09, 0x04, 0x12, 0xFF	0x90, 0x50, 0x0p, 0x0q, 0x0r, 0x0s, 0xFF [pq=PAN=0x00~0xF0] [rs=TILT=0x00~0xF0]
			PAN-Right	0x81, 0x01, 0x06, 0x01, 0x00, 0x00, 0x03, 0x02, 0xFF		
			TILT-Up	0x81, 0x01, 0x06, 0x01, 0x00, 0x00, 0x01, 0x03, 0xFF		
			TILT-Down	0x81, 0x01, 0x06, 0x01, 0x00, 0x00, 0x02, 0x03, 0xFF		
			PAN,TILT position	0x81, 0x01, 0x06, 0x02, 0x00, 0x00, 0x00, 0x00, 0x0m, 0x0n, 0x00, 0x00, 0x0p, 0x0q, 0xFF		
			ZOOM	0x81, 0x01, 0x04, 0x46, 0x00, 0x00, 0x0p, 0x0q, 0xFF	0x81, 0x09, 0x04, 0x46, 0xFF	0x90, 0x50, 0x00, 0x00, 0x0D, 0x05, 0xFF [pq=0x00~0xD5]
			ZOOM(x1)	0x81, 0x01, 0x04, 0x46, 0x00, 0x00, 0x00, 0x00, 0xFF		
			ZOOM(x2)	0x81, 0x01, 0x04, 0x46, 0x00, 0x00, 0x07, 0x0F, 0xFF		
			ZOOM(x3)	0x81, 0x01, 0x04, 0x46, 0x00, 0x00, 0x0A, 0x0A, 0xFF		
			ZOOM(x4)	0x81, 0x01, 0x04, 0x46, 0x00, 0x00, 0x0B, 0x0F, 0xFF		
			ZOOM(x5)	0x81, 0x01, 0x04, 0x46, 0x00, 0x00, 0x0C, 0x0C, 0xFF		
			ZOOM(x6)	0x81, 0x01, 0x04, 0x46, 0x00, 0x00, 0x0D, 0x05, 0xFF		
			DZOOM SAVE	0x81, 0x01, 0xA1, 0x04, 0x00, 0x00, 0x00, 0x01, 0xFF	-	-
SYSTEM	OUTPUT FORMAT		1080i60	0x81, 0x01, 0x04, 0x24, 0x72, 0x00, 0x02, 0xFF	0x81, 0x09, 0x04, 0x24, 0x72, 0xFF	0x90, 0x50, 0x00, 0x02, 0xFF
			1080i59	0x81, 0x01, 0x04, 0x24, 0x72, 0x00, 0x01, 0xFF		0x90, 0x50, 0x00, 0x01, 0xFF
			1080i50	0x81, 0x01, 0x04, 0x24, 0x72, 0x00, 0x04, 0xFF		0x90, 0x50, 0x00, 0x04, 0xFF
			1080p60	0x81, 0x01, 0x04, 0x24, 0x72, 0x01, 0x05, 0xFF		0x90, 0x50, 0x01, 0x05, 0xFF
			1080p59	0x81, 0x01, 0x04, 0x24, 0x72, 0x01, 0x03, 0xFF		0x90, 0x50, 0x01, 0x03, 0xFF
			1080p50	0x81, 0x01, 0x04, 0x24, 0x72, 0x01, 0x04, 0xFF		0x90, 0x50, 0x01, 0x04, 0xFF
			1080p30	0x81, 0x01, 0x04, 0x24, 0x72, 0x00, 0x07, 0xFF		0x90, 0x50, 0x00, 0x07, 0xFF
			1080p29	0x81, 0x01, 0x04, 0x24, 0x72, 0x00, 0x06, 0xFF		0x90, 0x50, 0x00, 0x06, 0xFF
			1080p25	0x81, 0x01, 0x04, 0x24, 0x72, 0x00, 0x08, 0xFF		0x90, 0x50, 0x00, 0x08, 0xFF
			1080p24 *	0x81, 0x01, 0x04, 0x24, 0x72, 0x00, 0x0B, 0xFF		0x90, 0x50, 0x00, 0x0B, 0xFF
			720p60	0x81, 0x01, 0x04, 0x24, 0x72, 0x00, 0x0A, 0xFF		0x90, 0x50, 0x00, 0x0A, 0xFF
			720p59	0x81, 0x01, 0x04, 0x24, 0x72, 0x00, 0x09, 0xFF		0x90, 0x50, 0x00, 0x09, 0xFF
			720p50	0x81, 0x01, 0x04, 0x24, 0x72, 0x00, 0x0C, 0xFF		0x90, 0x50, 0x00, 0x0C, 0xFF
	CVBS FORMAT		NTSC1	0x81, 0x01, 0x04, 0x24, 0x72, 0x00, 0x03, 0xFF	0x81, 0x09, 0xA1, 0x07, 0xFF	0x90, 0x50, 0x00, 0x00, 0x00, 0x00, 0xFF
			PAL1	0x81, 0x01, 0x04, 0x24, 0x72, 0x00, 0x05, 0xFF		0x90, 0x50, 0x00, 0x00, 0x00, 0x01, 0xFF
FACTORY RESET	RESTORE FACTORY SETTINGS			0x81, 0x01, 0xA1, 0x06, 0x00, 0x00, 0x00, 0x01, 0xFF	-	-
(OSD)	(OSD Open)			0x81, 0x01, 0xA1, 0x03, 0x00, 0x00, 0x00, 0x01, 0xFF		
	(OSD Exit)			0x81, 0x01, 0xA1, 0x03, 0x00, 0x00, 0x00, 0x10, 0xFF		
	(OSD Up)			0x81, 0x01, 0xA1, 0x03, 0x00, 0x00, 0x00, 0x11, 0xFF		
	(OSD Down)			0x81, 0x01, 0xA1, 0x03, 0x00, 0x00, 0x00, 0x12, 0xFF		
	(OSD Right)			0x81, 0x01, 0xA1, 0x03, 0x00, 0x00, 0x00, 0x13, 0xFF		
	(OSD Left)			0x81, 0x01, 0xA1, 0x03, 0x00, 0x00, 0x00, 0x14, 0xFF		
	(OSD Enter)			0x81, 0x01, 0xA1, 0x03, 0x00, 0x00, 0x00, 0x15, 0xFF		

* These commands are available only for cameras with the serial label starting “W513R”.

WAT-2200Mk-2 & WAT-3200 pelco command-list
BaudRate:9600bps, Databits:8, Parity:None, Stopbits:1, Flowcontrol:none

type	operation	command	response
pelco-d	flip(H+V) on/off	0xFF, 0x01, 0x00, 0x07, 0x00, 0x21, 0x29	0xFF, 0x01, 0x00, 0x01
	OSDMenu on-off	0xFF, 0x01, 0x00, 0x07, 0x00, 0x5F, 0x67	
	OSDMenu Up	0xFF, 0x01, 0x00, 0x07, 0x00, 0x60, 0x68	
	OSDMenu Down	0xFF, 0x01, 0x00, 0x07, 0x00, 0x61, 0x69	
	OSDMenu Right	0xFF, 0x01, 0x00, 0x07, 0x00, 0x62, 0x6A	
	OSDMenu Left	0xFF, 0x01, 0x00, 0x07, 0x00, 0x63, 0x6B	
	OSDMenu Enter	0xFF, 0x01, 0x00, 0x07, 0x00, 0x64, 0x6C	
pelco-p	flip(H+V) on/off	0xA0, 0x01, 0x00, 0x07, 0x00, 0x21, 0xAF, 0x28	0xA0, 0x01, 0x00, 0xA1
	OSDMenu on-off	0xA0, 0x01, 0x00, 0x07, 0x00, 0x5F, 0xAF, 0x56	
	OSDMenu Up	0xA0, 0x01, 0x00, 0x07, 0x00, 0x60, 0xAF, 0x69	
	OSDMenu Down	0xA0, 0x01, 0x00, 0x07, 0x00, 0x61, 0xAF, 0x68	
	OSDMenu Right	0xA0, 0x01, 0x00, 0x07, 0x00, 0x62, 0xAF, 0x6B	
	OSDMenu Left	0xA0, 0x01, 0x00, 0x07, 0x00, 0x63, 0xAF, 0x6A	
	OSDMenu Enter	0xA0, 0x01, 0x00, 0x07, 0x00, 0x64, 0xAF, 0x6D	