

Color CCD Camera

WAT-2215/2315

Operation Manual

This Operation Manual covers safety, camera functions, installation and the correct operating procedure for the WAT-221S/231S. First, we ask you to read this Operation Manual thoroughly, then install and operate the WAT-221S/231S as advised. In addition, for future reference, we also advise safekeeping of this manual.

Please contact the distributor or dealer from which the WAT-221S/231S was purchased, if you do not understand the installation, operation or safety instructions laid out in this manual. Not understanding the contents of the Operation Manual sufficiently may cause damage to the camera.

Guide to the Safety Symbols

The definitions of the symbols used in this operation manual are:

When you do not adhere to or take notice of the "Danger" sign, it Danger may lead to a serious accident such as death or injury caused by fire or electric shock.

When you do not adhere to or take notice of the "Warning" sign, Warning it may cause severe damage such as a physical injury.

When you do not adhere to or take notice of the "Caution" sign, it Caution may incur injury and cause damage to peripheral objects in the immediate surroundings.

Cautions for Safety

The WAT-221S/231S is designed to be used safely; however, it may lead to a physical accident caused by fire and electric shock if not used correctly. Therefore, please keep and read the "Cautions for safety" for protection against accidents.

- Do not disassemble and/or modify the WAT-221S/231S. Danger • Do not operate the WAT-221S/231S with wet hands.
- Use a stabilized power adaptor designed for DC+12V± Warning 10%, with a current capacity of more than 250mA for the 221S/231S.

The recommended voltage is DC+12V \pm 10%

• Do not expose the WAT-221S/231S to wetness or high moisture conditions.

The WAT-221S/231S is designed and approved for indoor use only. The WAT-221S/231S is not water-resistant or waterproof. If the location of the camera is outdoors or in an outdoor like environment, we recommend that you use an outdoor camera housina.

- Protect the WAT-221S/231S from condensation. Keep the WAT-221S/231S dry at all times during storage and
- operation • Should the camera not work properly, switch off the power immediately. Then check the camera according to the "Problems and Trouble shooting" section.

· Avoid the striking of hard objects or dropping the WAT-Caution 221S/231S.

> The WAT-221S/231S uses high quality electrical parts and precision components.

. Do not connect any power supply directly to the video out terminal of the unit.

Do not connect the WAT-221S/231S with any monitor using a video/power single transmission terminal. The WAT-221S/ 231S is not designed for use with this type of equipment. We also advise you to read the operation manual of the monitor you plan to use before any connections are made.

• Do not install the WAT-221S/231S in a position subject to direct sunlight.

Sunlight shinning directly onto the WAT-221S/231S lens can cause damage to the CCD.

 Select a stable place for installation of the WAT-221S/ 231S.

Use a support of durable strength around an installation position on a ceiling or wall when a camera stand or tripod is used.

• Do not move the WAT-221S/231S with the cables connected.

Before moving the WAT-221S/231S, always remove the video cable and power cable from the rear of the camera first.

 Avoid using the WAT-221S/231S near any strong electromagnetic field.

After installing into main equipment, if the WAT-221S/231S is exposed to electromagnetic waves causing the monitored image to become distorted, we recommend the camera be shielded by appropriate protective casing.

Problems and Trouble Shooting

If any of the following problems occur when using the WAT-221S/ 231S.

- An optimal picture cannot be obtained, after checking that all the cables and connections are correctly in place
- Smoke or any unusual odor emerges from the WAT-221S/231S.
- An object becomes embedded or a quantity of liquid seeps into the camera housing
- More than the recommended voltage or/and amperage has been applied to the WAT-221S/231S by mistake
- Anything unusual occurring to any equipment connected to the WAT-221S/231S.

Disconnect the camera immediately according to the following procedures:

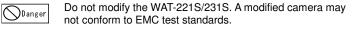
①Switch off the main power supply to the camera.

2 Remove the power and video cables connected to the WAT-221S/231S. ③Contact the distributor or dealer from which the WAT-221S/231S was purchased

About EMC

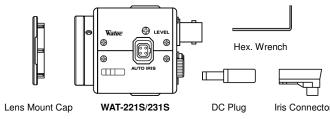
The WAT-221S/231S is in conformity with EMC test standards carried out by authorized organizations in Japan.

NTSC	FCC Part15 class B
PAL	EN61000-6-3/EN50130-4

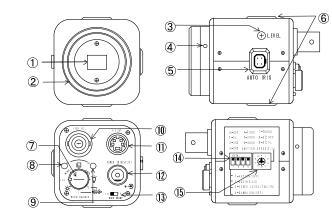


Contents

Using the contents figures below, check to make sure all parts are present before use.



Description of Parts



(1)CCD FRONT FACE

• The light receiving face of the CCD camera

(Dirt, water or oil deposits on the CCD will cause an unclear picture on the monitor. Attach the lens cap to protect the lens and CCD from contamination and damage.)

- **(2)LENS MOUNT**
- Mount for the lens (Thread type)

③IRIS LEVEL VOLUME

- · By controlling the volume, the iris level of a DC iris lens can be adjusted. **④**FOCUSING ADJUSTMENT SCREWS
- There are 3 hex. adjustment screws each placed at intervals of 120° for fine focusing of the lens.

⑤AUTO-IRIS SOCKET

- This socket is for a video or DC auto-iris lens cable connector. (Video/DC: Auto selected by the camera)
- 6 TRIPOD MOUNTING SCREW HOLES
- Mounting holes for stands. The size of these threads are 1/4", 20 threads, 4.5 ± 0.2 mm, which is the same as any standard camera tripod (U1/4").
- **WHITE BALANCE MODE SELECTOR**
- The selector for the white balance mode
- ⑧PUSH BUTTON (R) (MWB mode)
- The button for adjustment of the white balance to increase the red hue of a monitored image using M.W.B mode.
- (9) PUSH BUTTON (B) (MWB mode)
- The button for adjustment of the white balance to increase the blue hue of a monitored image using M.W.B mode.
- **10 VIDEO OUT (BNC)**
- The terminal for composite video signal output
- 1)Y/C OUT
- The terminal for Y/C signal output
- 12POWER IN
- . The terminal designed for the DC-plug of the power adaptor **BACK LIGHT**
- The switch for back light compensation
- **(I)**FUNCTION SWITCHES

 Functional switches for setting AGC, video level and gamma control. (BAE MODE CONTROL

. The switch for the electronic shutter mode control according to the object being monitored.

Power Supply

Use a stabilized power adaptor designed for DC+12V±10%, with a current capacity of more than 250mA.

Use the optional DC plug if the shape or polarity of the DC plug of the power adaptor to be used is not compatible with the camera (See the drawing on the right below).

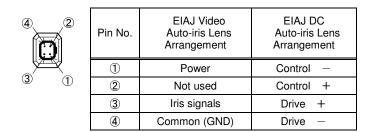


The wiring on the connector must be exact. Be careful no to touch the other terminal while wiring. Protect the wiring portion by using insulation tape after wiring. If the above care and attention is not adhered to, damage to the WAT-221S/231S and power adaptor may occur and may also cause fire.

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Auto-iris Lens

Before connecting the auto-iris lens, please make sure that the pin configuration is correct by checking with the following table. If the configuration of your iris connector is different from the following, the plug and pins will need to be rewired.



Set-up and Operation

- 1) Ensure that the power to the WAT-221S/231S and the peripheral equipment is turned off before making any connections.
- 2) Remove the lens mount cap from the WAT-221S/231S and attach the CS-mount lens. Use the optional C-mount adaptor (34CMA-R) when a C-mount lens is used.
- 3) Connect the iris control cable to (5)AUTO-IRIS SOCKET on the WAT-221S/231S when an auto-iris lens is being used.
- 4) Connect
 (IVIDEO OUT on the WAT-221S/231S with the monitor, using a coaxial cable with 75 Ω impedance, such as an RG-59 or an RG-6/U. If the monitor has an S-terminal, high resolution imaging is possible by connecting with (1)Y/C OUT.

%The ①Y/C OUT can be used together with the ②VIDEO OUT.

*Select a monitor with the same television system as the WAT-221S/ 231S NTSC or PAL. A monitor with more than 500TV lines is recommended

COMMON (GND)



5) Insert the power plug of the power adaptor to ⁽¹⁾POWER IN on the back panel of the WAT-221S/231S. Confirm that the power adaptor is not connected to the power supply before insertion of the power plug into (1) POWER IN.

6) Turn on the power to the WAT-221S/231S, monitor and all other allied equipment. When a picture cannot be obtained on the monitor, or a problem occurs, check and follow the procedure mentioned in the [Problems and Trouble Shooting] section.

7) After following the procedure below and the picture is still out of focus, open the iris fully and loosen $\textcircled{\sc 4}{\sc 4}$ FOCUSING ADJUSTMENT SCREWS with the hex. wrench and move the lens forwards until a clear picture is obtained.

Manual Lens	Adjust the focus and iris to the best position on the lens.
Video Auto-iris Lens Adjust the focus on the lens.	
DC Auto-iris Lens	Adjust the iris level on the camera, then adjust the focus on the lens. See below.

Iris Level Adjustment (for DC auto-iris lenses only) Adjust ③IRIS LEVEL VOLUME placed on the side of the unit until an acceptable light level is attained. No change will occur if a video iris lens or manual iris lens is fitted.



8) Select any required shutter speed by the (BAE MODE CONTROL to one of its 10 positions.

No. M		lode	Shutter Speeds (Sec.)		
INO.	IVI	lode	NTSC	PAL	
0	C	DFF	1/60	1/50	
1		FL	1/100	1/120	
2	E	ES	1/2	250	
3	3 ES 1/500		00		
4 ES 1/1000		000			
5		ES	1/20	000	
6		ES	1/4000		
7		ES	1/10	000	
8		OFF	1/60-1/100000	1/50-1/100000	
9	EI	I: FL	1/100-1/100000	1/120-1/100000	
AE	Mode	Effect			
C	FF	Fixes the shutter speed to NTSC1/60、PAL1/50.		C1/60、PAL1/50.	
F	=L	L Reduces the flickering phenomena occurring on the monitor screen caused by fluorescent or mercury lamps.			
ES Fixes the shutter speed in a range between 1/250- 1/10000. (6 steps)			ige between 1/250-		
-	OFF	betwe	Automatically selects the shutter speed in a range between NTSC1/60-1/100000, PAL1/50-1/100000 according to the lighting conditions.		
EI	ī	Automatically selects the shutter speed in a range			

FL between NTSC1/100-1/100000, PAL1/120-1/100000 according to the lighting conditions.

XIn El mode, intense light may leave a trail on the screen longitude. This smearing is a natural phenomenon and is not due to equipment failure or fault.

9) Select any required white balance mode by ⑦WHITE BALANCE.

Mode	Name	Effect
AUTO	Auto-tracking	Automatically follows and adjusts to the changing color temperature of the illumination.
MWB	Manual	Manual adjustment using ⑧⑨PUSH BUTTON(R)(B) as required.
PWB	Push-lock	Adjusted with ③PUSH BUTTON(B) according to the color temperature of the environment.
	Lock	To lock your manually adjusted color temperature settings.
` `	Sunlight (=6300K)	Color correction to give natural color renditions under incandescent lighting.
	Fluorescent 1 (=4300K)	Color correction to give natural color renditions under reddish fluorescent light.
1 /− 2	Fluorescent 2 (=5100K)	Color correction to give natural color renditions under bluish fluorescent light.
->	Incandescent (=3200K)	Used in sunlight to retain white balance.

10) Set the ⁽¹⁾BACK LIGHT according to your requirements.

Mode	Effective condition		
ON	When the picture of the monitored object is silhouetted due to strong lighting from above or behind.		
OFF	When the illumination differences between the monitored object is narrow.		

*Use an auto-iris lens if back light compensation is required using the following 0-7(OFF/FL/ES) of (SAE MODE CONTROL.

11) Set the ⁽ⁱ⁾FUNCTION SWITCHES according to

your requirements.



Switch	Setting	Effective Condition (Example)	Upon Shipment
1.	ON	 When sensitivity is more important than the SN ratio. When an auto iris lens can not be used for general surveil- lance purposes. 	V
AGC	OFF	 When SN ratio is more important than sensitivity. When adequate lighting is present or a stable lighting condition is available. 	
2.	ON [HI]	When sensitivity is more impor- tant than the SN ratio	\checkmark
AGC	OFF 【LO】	 When SN ratio is important and AGC is also required. 	
3. Video	ON 【100】	 When dark areas on an object with contrasting light and dark area are monitored. 	V
Level	OFF 【75】	 When the standard video output level is required 	
4. Gamma correction	ON	 Applicable to a general surveil- lance monitoring system 	\checkmark
	OFF	 When gamma correction is not required for image processing 	

Options

To purchase these options, please contact the distributor or dealer from which you purchased the WAT-221S/231S.



C-mount Adaptor (34CMA-R)

This lens mount adaptor is used to convert a CS-mount to a C-mount.



Mini Stand (MS50)

A convenient stand for the WAT-221S/231S. With this stand, the camera can be adjusted to any desired angle.



Bracket (B003)

This bracket is effective for a stable installation of the WAT-221S/231S.

Specifications

WAT-221S

Model	WAT-221S (NTSC)	WAT-221S (PAL)
Pick-up Element	1/2 inch interline transfer CCD image sensor	
Unit Cell Size	8.4 μ m(H) × 9.8 μ m(V)	8.6μ m(H) × 8.3μ m(V)
Power Consumption	1.86W (155mA)	

WAT-231S

Model	WAT-231S (NTSC)	WAT-231S (PAL)
Pick-up Element	1/3 inch interline transfer CCD image sensor	
Unit Cell Size	6.35μ m(H) × 7.4 μ m(V)	6.5μ m(H) × 6.25μ m(V)
Power Consumption	1.8W (150mA)	

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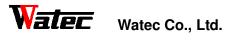
WAT-221S/231	S		
Model		WAT-221S (NTSC) WAT-231S (NTSC)	WAT-221S (PAL) WAT-231S (PAL)
Number of Total Pixels		811(H) × 508(V)	795(H) × 596(V)
Number of Effective Pixels		768(H) × 494(V)	752(H) × 582(V)
Imaging system		Ye, Cy, Mg, and G complementary color mosaic filters on chip	
Sync. Sys	stem	Internal	
Scanning S	ystem	2:1 int	
Video Ou	tput	Composite, Y/C: 1.0 V(
Resolution	n (H)	Composite: More than 450TVL (Center) Y/C: More than 480TVL (Center)	
Minimum Illur	nination	0.1 lx.	F1.2
S/N		More than 50dB (AGC=8dB, ⁄⊱1.0)
	OFF	1/60 sec.	1/50 sec.
	FL	1/100 sec.	1/120 sec.
AE Mode	ES	1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000 sec.	
	EI:OFF	1/60-1/100000 sec. 1/50-1/100000 sec.	
	EI:FL	1/100-1/100000 sec.	1/120-1/100000 sec.
White Balance		ATW, PWB, MWB, 3200K, 4300K, 5100K, 6300K	
AGC	ON	HI: 8-36dB / LO: 8-24dB	
AGC	OFF	80	IB
Gamma Characteristics		γ≒0.45(ON) / ⊭1.0(OFF)	
Video Le	evel	100IRE / 75IRE	
Lens-ir		Video / DC (EIAJ arrangement, Auto-select)	
Back Light Compensation		ON / OFF	
Power Supply		DC+12V±10%	
Operating Temperature		-10 - +40°C	
Operating Humidity		Less than 95% RH (Without condensation)	
Storage Temperature		-30 - +70°C	
Storage Humidity		Less than 95% RH (Without condensation)	
Lens Mount		CS-mount	
Size		44.5(W) × 44(H) × 64(D) (mm)	
Weight		Approx. 160g	

• Design and specifications are subject to change without notice.

• Watec is not responsible for any inconvenience or the attendant damages to the video and monitoring recording equipment caused by misuse, misoperation or improper wiring of our equipment.
If for any reason the WAT-221S/231S does not work properly, or if you

have any questions regarding installation or operation, please contact the distributor or dealer from which it was purchased.

Contact information



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