

Watec® DIGITAL CCD COLOR CAMERA WAT-202D OPERATION MANUAL

INTRODUCTION:

Thank you for choosing our WAT-202D DIGITAL CCD COLOR Camera.

WATEC hopes that both the quality and design satisfy your requirements. Before proceeding to install or operate the WAT-202D, please read and understand thoroughly the contents of this Operation manual.

For future reference we also advise safe keeping of this manual.

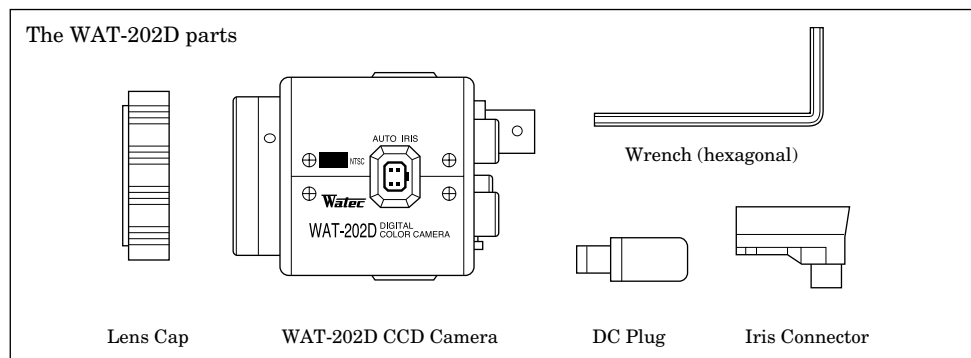
CAUTIONS:

1. Use only the AD901-120/230 or equivalent power adaptor for the WAT-202D. Power supplied without voltage stabilization and/or the voltage range maintained at $\pm 10\%$ 12V. DC. may cause damage.
2. Do not expose the WAT-202D to wetness or high moisture conditions. The WAT-202D is designed and approved for indoor use only. If the location of the camera is outdoors or in an outdoor like environment, we recommend that you use an OUTDOOR CAMERA HOUSING.
3. Avoid the striking of hard objects or dropping the unit.
4. Do not disassemble and/or modify the WAT-202D or any of its component parts or accessories. WATEC can not be held responsible for equipment failure or any damage and/or trouble caused by such action.
5. Do not install the WAT-202D near heat sources, such as radiators or heating air ducts, or in a position subject to direct sunlight, excessive dust, mechanical vibration or shock.
6. When installing the WAT-202D in an industrial or commercial environment (i. e. within equipment housing, near other electronic device, etc.) Make sure to avoid any strong electromagnetic field, otherwise the video output may be distorted and monitor clearness compromised.
7. Do not connect any power supply directly to the VIDEO OUT terminal of the unit. This may cause damage.
8. When a cable operation system, such as video/power multiplex transmission is being used, check the specifications or requirements of your monitor for proper connection with the video signal terminal of the camera.
9. Do not make connections and/or operate the WAT-202D with wet hands.
10. Should the WAT-202D not work properly, switch off the power and then, check that power and video terminals are properly connected.

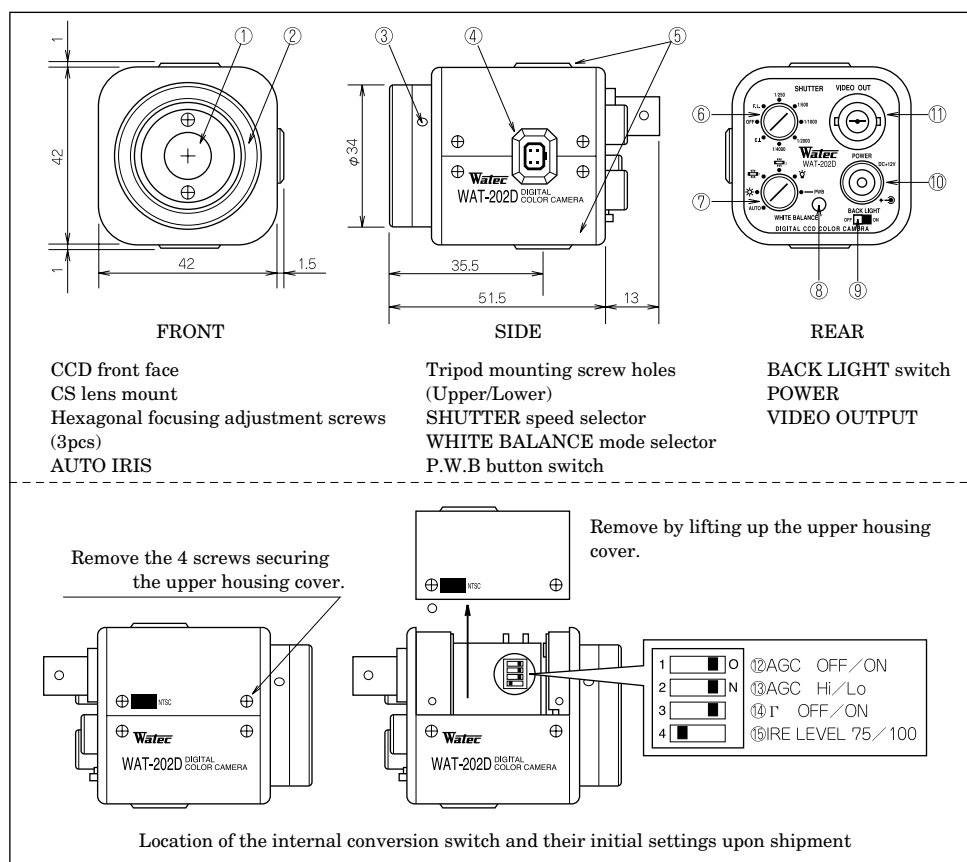
Sunlight shining directly onto the camera lens can cause damage to the CCD.

CONTENT:

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



DESCRIPTION OF PARTS(UNIT:mm):



- CCD front face (light receiving face of the CCD camera)
NOTE: 1. Handle the CCD and lens with special care.
 2. Always attach the lens cap so as to protect the lens and the CCD from contamination and damage.
 3. Dirt, water or oil deposits on either will cause an unclear picture on the monitor, and scratches will become permanent damage.

CS lens mount
 Any standard model C-mount lens can be attached to the WAT-202D, if our optional C-mount ring 34CMA-R is fitted to the unit.

Focusing the WAT-202D when manual adjustment is not effective.
 There are three hexagonal focusing adjustment screws each placed at intervals of 120° around the lens mount ring for the forward and backward motion of the lens mount.

AUTO IRIS
 Female connector for the auto-iris lens.
 See Sec. 2 of the operation manual for a more detailed explanation.

Tripod mounting screw holes (upper and lower)
 Thread size and depth are the same as that for the standard camera tripods.

SHUTTER speed selector with seven different settings with manual or automatic selection
NOTE: Shutter speed is set to OFF upon shipment.
 See Sec. 7 of the operation manual for a more detailed explanation.

| Symbol | Shutter speed (seconds) selection chart |
|--------|--|
| OFF | NTSC:1/60, PAL:1/50 |
| F.L. | NTSC:1/100, PAL:1/120 |
| 1/250 | 1/250 |
| 1/500 | 1/500 |
| 1/1000 | 1/1000 |
| 1/2000 | 1/2000 |
| 1/4000 | 1/4000 |
| E. I. | NTSC:1/60~1/100000 PAL :1/50~1/100000 |

- F. L. : Flicker compensation
 This function is used to reduce the flickering phenomena occurring on the monitor screen caused by fluorescent and mercury lamps. (This function is effective when used with normal commercial power supplies and is effective at 50Hz in NTSC and 60Hz when using PAL.)
 See Sec. 7 + 8.
- E. I. : Shutter speed priority
 This function is to control the shutter speed and adjust the iris automatically according to the light intensity. It is also effective if a fixed iris lens is being used.
 See Sec. 7 + 9.

WHITE BALANCE selector with four different preset modes and AUTO (Auto trace) and P.W.B. (Push-lock White Balance) modes
NOTE: White balance mode is set to AUTO upon shipment.
 See Sec. 8.

| | |
|--------|---|
| AUTO | Auto trace mode · The white balance is automatically adjusted on the monitor screen in various lighting situations. |
| | Daylight mode (Approx. 6300K) : The white balance is adjusted when sunlight is illuminating the monitored area. |
| | Fluorescence lamp mode 1. (Approx. 5100K) : The white balance is adjusted when fluorescent lamps being used emit light close to the blue spectrum. |
| | Fluorescence lamp mode 2. (Approx. 4200K) : The white balance is adjusted when fluorescent lamps being used emit light close to the red spectrum. |
| | Incandescent lamp mode (Approx. 3200K) : The white balance is adjusted when incandescent lighting is illuminating the area. |
| P.W.B. | Push-lock white balance mode: P. W. B. button switch. The white balance is corrected in conditions when the above pre-set modes are ineffective due to extreme color temperature situations. |

+ P.W.B. (Push lock white balance) balance switch
 The following operation is available only when the White Balance Switch is set at P.W.B. mode. Then can be utilized.

BACK LIGHT switch for the Back Light compensation function
NOTE: BACK LIGHT switch is set to OFF upon shipment.

POWER
 The terminal is designed for connection with a DC plug from an appropriate power adaptor.
NOTE: The optional power adaptor AD901-120/230(DC+12V, 250mA) is recommended for use with the WAT-202D. See Sec.3.

VIDEO OUTPUT
 The B.N.C. terminal for video signal output.
NOTE: A 3C2V or 5C2V coaxial cable with 75Ω impedance must be used for connection with the WAT-202D. See Sec.4.

are preset switches. See Sec. 10 of the operation manual for a more detailed explanation.

AGC (Automatic Gain Control) OFF/ON Switch
 When the Switch is shifted to the left, it is in the OFF position and when shifted to the right, AGC is ON. When the AGC is OFF, CCD output signal is amplified at fixed 12dB gain. The AGC is set to ON position upon shipment.

AGC Hi/Lo Selection Switch
 When the Switch is shifted to the left the AGC is in the Hi (high) gain position, when shifted to the right AGC is in the Lo (low) position. The CCD output signal is amplified up to a maximum of 24dB in the Lo gain position and a maximum of 36dB in Hi gain position. AGC Hi/Lo Selection Switch is set to Lo upon shipment.

(GAMMA compensation) OFF/ON Selection Switch
 When the Switch is Shifted to the left, Gamma Compensation is in the OFF position and when shifted to the right, Gamma Compensation is ON. When the Gamma Compensation is ON, Gamma is compensated by the coefficient of about 0.45. The OFF/ON Switch is set to the ON position upon shipment.

IRE LEVEL 75/100 Selection Switch
 When the Switch is shifted to the left, the White level in the colour bar chart is 75 IRE. In the right position, the white level is 100 IRE. The video level is about 1Vp-p on 75 IRE and 1.2Vp-p on 100 IRE. The IRE LEVEL 75/100 Selection Switch is set to 75 IRE upon shipment.

NOTE:
 When changing the above switches, switch off the power and carefully remove the upper housing cover by removing the four screws. Static electricity damage may occur if any electronic parts on the circuit board are touched carelessly. When replacing the Upper Housing Cover, ensure that no dust, foreign objects or particles enter into the camera body.

SETTING UP AND OPERATION OF THE WAT-202D:

NOTE: Ensure that before any connections are made to the WAT-202D the power is switched OFF.

- Remove the lens cap from the WAT-202D and attach the lens.
Use the optional C-mount adaptor 34CMA-R, when the C-mount model lens is used.
NOTE: Confirm the specifications of the lens to be used, when it can not be mounted onto the WAT-202D smoothly.

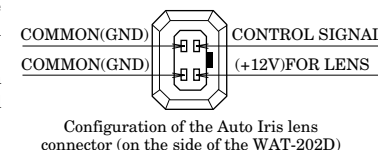
- AUTO IRIS**
Connect the iris control cable to AUTO IRIS on the WAT-202D, when the auto iris lens is used.

IMPORTANT NOTES FOR AUTO IRIS USAGE

: Ensure that the connector mentioned in the operation manual of the AUTO IRIS lens can be applied to the one shown in the diagram on the right and connect it firmly to the connector on the right side of the WAT-202D.

: Insert the pins as shown in the picture on the right. If the pin configuration is different from that shown, use the special adaptor supplied with this unit.

CAUTION: Do not touch the power pin or the signal control pin with the Common (GND) pins on the extra connector for the Auto Iris lens.



Configuration of the Auto Iris lens connector (on the side of the WAT-202D)

- Insert the DC plug of the power adaptor to POWER on the rear panel of the WAT-202D.
The optional WATEC power adaptor AD901-120/230(DC+12V,250mA) is recommended.
NOTE: Ensure that the power adaptor is not connected before insertion of the DC plug into POWER.

IMPORTANT NOTES FOR POWER ADAPTOR USAGE

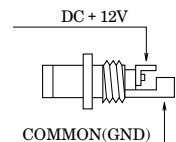
: Use the stabilized power adaptor designed for DC+12V, ±10% with a current capacity of more than 250mA.

: Use the optional DC plug. when the shape or polarity of the DC plug of the DC power adaptor can not be fitted to POWER on the WAT-202D.

: Connect the cables to the DC adaptor using the drawing on the right.

CAUTION: Be careful not to touch any other terminal while wiring.

NOTE: This may cause damage to the WAT-202D and power adaptor or may cause fire if the above care and attention is not adhered to.



4. MONITOR SPECIFICATIONS

Connect VIDEO OUTPUT on the WAT-202D to the monitor, using the coaxial cable with 75Ω impedance, such as 3C2V or 5C2V.

IMPORTANT NOTES ON THE MONITOR SPECIFICATIONS

: Select a monitor with the same transmission mode the WAT-202D, there are two versions, NTSC and PAL.

: A monitor with more than 500TV lines is recommended.

CAUTION: Do not use a monitor which uses a video signal/power multiplex transmission cable.

- Switch on the WAT-202D, monitor and all other allied equipment.
Remove the DC plug of the AD901-120/230, AC adaptor immediately whenever the picture does not appear on the monitor.

6. FOCUSING

Focusing the lens of the WAT-202D is achieved while looking at the monitor screen.

N.B. In cases when the unit can not be focused manually, use the focusing adjustment method set out below.

IMPORTANT NOTES ON FOCUSING

: Attach the required lens on the WAT-202D and loosen the Hexagonal screws. (3pcs)
Be extremely careful not to drop the lens.

: Set the focus ring to the infinitive (∞) position, and while looking at the monitor screen, move the lens forwards or backwards to focus.

: Tighten the Hexagonal focusing adjustment screws (3pcs) when focusing is completed.

7. ELECTRONIC SHUTTER

Select any required shutter speed by the SHUTTER speed selector to one of its 8 positions.

The shutter speed has been set to OFF upon shipment.

NOTE: Be sure to turn the SHUTTER speed selector firmly, otherwise, operation of the WAT-202D may be unstable.

IMPORTANT NOTES ON THE ELECTRONIC SHUTTER

: When a strong spot beam is shone directly onto the lens when SHUTTER speed selector is set at E. I. (Electronic Iris) and /or at a high speed shutter position, smearing may appear on the monitor screen. (This is not abnormal or considered defective in any way).

In addition when using fluorescent or mercury lighting 50Hz or 60Hz the following phenomenon may appear.

| | NTSC 1/60 | PAL 1/50 |
|---|--------------|--------------|
| Frequency of commercial power supply 50Hz | Phenomenon 1 | Phenomenon 2 |
| Frequency of commercial power supply 60Hz | Phenomenon 2 | Phenomenon 1 |

Phenomenon 1 : The higher shutter speed selected, the more conspicuous the flickering will appear on the monitor screen.

Phenomenon 2 : Cyclic change of colour may appear on the monitor screen. The change of colour becomes greater, when a high shutter speed selected.

When the above phenomena is present, operate the camera with the SHUTTER SPEED set to the OFF position. An AUTO IRIS LENS is recommended or replace the illumination device with a high frequency light source.

F. L. (Flickerless) : This function is useful for reducing the flickering phenomenon on the monitor screen caused by such lighting sources as fluorescent or mercury lamps.

N. B. This feature is only effective at 50Hz using NTSC equipment and 60Hz using PAL equipment and when a standard power supply is being utilized.

8. WHITE BALANCE MODE

Select any required white balance mode by the WHITE BALANCE mode selector to one of its 6 positions available. The white balance mode has set to AUTO upon shipment.

IMPORTANT NOTES ON WHITE BALANCE MODE

The auto or P. W. B. mode is effective when the 4 automatic settings (sunlight, fluorescent 1, fluorescent 2, and incandescent) are not suitable for the lighting conditions. The AUTO mode is effective when lighting conditions are constantly changing such as night and day outdoor surveillance.

On occasions, it may be difficult to get optimal White Balance adjustment in low light conditions.

Also when fluorescent and mercury lighting being used is inexpensive and/or not conforming to certain recommended industrial standards.

Adjustment of the white balance when set at P. W. B. is especially effective when white objects are being monitored on the whole screen such as paper or a large area like a wall.

The P. W. B. mode can be used in almost all lighting conditions, however the P. W. B. mode is provided with a function that can cope with changing color temperatures (light conditions) automatically.

In this case the image can be adjusted by pressing and releasing the button at intervals.

- When back light compensation (light that falls on to the back of the object being monitored) is required, set the BACK LIGHT switch to the ON position.

IMPORTANT NOTES ON BACK LIGHT COMPENSATION

The back light compensation function is to reduce the dark image of an object (silhouette) when it is monitored. The back light compensation switch when used in combination with provides the following functions.

| Settings | Back light compensation (internally operated) |
|----------|--|
| E. I. | Shutter speed priority. The back light can be compensated in combination with the AGC function. |
| F. L. | The back light can only be compensated by AGC priority. (The shutter speed is fixed.) |
| OFF | The back light can be compensated by varying the signal of the AUTO IRIS auto priority. connector. Accordingly, the back light compensation works only in combination with the According to the status of the object to be monitored, the AGC and the back light compensation may be operated in the reverse way (even if iris of the lens is open in the back light compensation, the video level is restrained by the AGC operation). In this case, AGC OFF/ON switch must be set to the OFF position. |
| 1/250 | |
| 1/500 | |
| 1/1000 | |
| 1/2000 | |
| 1/4000 | |

10. BUILT IN SWITCHES

Optimal picture quality can be obtained when to built-in switches are changed in accordance with the monitored situation.

N. B. As a general rule these switches do not need to be altered as they are designed for special situations.

If you feel that you need to alter or are unsure of these functions consult your dealer or an expert.

SET UP OF THE BUILT IN SWITCHES

Re-setting of the built-in switches is an optional that should be considered in certain situations.

If the criteria explained below is relevant to the conditions and usage of the WAT-202D, then it is recommended that these adjustments be made.

NOTE : Static electricity damage may occur if any electronic parts on the circuit board are touched carelessly. When replacing the Upper Housing Cover, ensure no dust or foreign bodies are able enter the unit.

| Built-in switches | Set up | Effective situation (Example) |
|-----------------------|--------|---|
| AGC OFF/ON | OFF | When a stronger S/N level is required. When operation of AGC is critical due to computer image-processing. When stronger back light compensation is required in combination with an auto-iris lens. |
| | ON | The auto-iris lens cannot be used for surveillance purposes. Used in low light situations when the S/N is not critical. The AGC OFF/ON switch is set to ON upon shipment. |
| AGC Hi / Lo | Hi | Used in low light situations when the S/N is not critical, for example, surveillance use in low light situations. |
| | Lo | When AGC function is required in conditions when the minimal illumination is not serious. The AGC Hi/Lo is set to Lo upon shipment. |
| OFF / ON | OFF | When Gamma correction function is strongly required for strong in computer image processing, (When Gamma correction is not desired in the camera). |
| | ON | For surveillance purposes when using a standard monitor. The OFF/ON switch is set to ON upon shipment. |
| IRE LEVEL 100 / 75 | 75 | When the standard video output level (1Vp-p) is required. The IRE LEVEL 75/100 switch is set to 75 upon shipment. |
| | 100 | When the contrast and brightness can not be adjusted on the monitor. When dark areas on an object with contrasting light and dark areas is monitored. |

BEFORE REPAIR:

Check the following when the WAT-202D does not work properly:

: Ensure the power and video out cables are connected properly.

: Check to see that the cables are continuous and not damaged.

: Make sure that the WAT-202D and monitor are compatible (NTSC or PAL).

: It is not possible to connect the WAT-202D to a monitor with a power source which will supply a DIRECT CURRENT to the video signal. Review the operation manual of your monitor.

: If you do not use the AD901-120/230 POWER ADAPTOR, check whether your power supply is DC+12V±10% over 250mA. and the power source is of the current polarity.

: When using a MANUAL IRIS LENS : check to see that the iris is properly opened.

: When using an AUTO IRIS LENS : check the connections of the cable and WAT-202D.

: When using an AUTO IRIS LENS : check that the pin connection of the lens cable is same as that of the AUTO IRIS connector of the WAT-202D.

: Ensure that the wiring is correct if the lens power cable have been rewired.

: Check if the indication value is 180mA, when tasted with an amperemeter.

NOTE: After checking the above list and the camera still does work or you think that the unit is faulty then immediately contact the dealer where you purchased the WAT-202D for repairs and advice.

SPECIFICATIONS:

| Model | WAT-202D (NTSC) | WAT-202D (PAL) |
|-------------------------|---|---|
| Pick-up element | 1/3" Interline transfer CCD image sensor | |
| Number of pixels | 811(H) × 508(V) | 795(H) × 596(V) |
| Sensing area | 768(H) × 494(V) | 752(H) × 582(V) |
| Unit cell size | 6.35μm(H) × 7.4μm(V) | 6.5μm(H) × 6.25μm(V) |
| Sync system | Internal | |
| Scanning system | 2 : 1 Interlaced | |
| Video output | 1Vp-p 75ohm (unbalanced) | |
| Horizontal resolution | Composite: mode than 450 TV line (center) Y/C model: mode than 470 TV line (center) | |
| Minimum illumination | 1 lx. F1.2 (AGC High), 4 lx. F1.2 (AGC Low) | |
| S/N Ratio | more than 50dB (AGC OFF, =1) | |
| AE mode | E.I (Electronic Iris) | 1/60 ~ 1/100000 sec |
| | E.S (Electronic Shutter) | OFF (1/60), 1/250, 1/500, 1/1000, 1/2000, 1/4000 sec |
| | F.L (Flicker Less) | 1/100 sec |
| | | 1/60 ~ 1/100000 sec |
| White balance mode | AUTO (Auto trace) | automatically adjust the color temperature of the illumination. |
| | Preset | · Daylight (6300K) · Fluorescence lamp 1 (5100K) · Fluorescence lamp 2 (4300K) · Incandescent lamp (3200K) |
| | P.W.B (Push lock White Balance) | Push button sets the color temperature for using conditions. |
| AGC | · AGC ON: 2 levels (High:max. 36dB Low:max 24dB) selectable · AGC OFF: fix gain 12dB | |
| Characteristic | 0.45 (ON), 1.0 (OFF) selectable | |
| Back light compensation | ON/OFF selectable | |
| Power supply | DC+12V±10% | |
| Current consumption | max. 180mA | |
| Storage temperature | -30 ~ +70 | |
| Operating temperature | -10 ~ +40 | |
| Weight | approx. 160g | |

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

This device may not cause harmful interference, and this device must accept any interference received, including interference that may cause undesired operation.

Important:

The camera mentioned does not comply with this regulation, if it is modified at your disposal.

WATEC is not responsible for any inconvenience or the attendant damages to the video or audio and monitoring recording equipment, caused by misuse, misoperation or improper wiring of our equipment.

If for any reason the WAT-202D 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.

Design and specifications are subject to change without notice.

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