



## Monochrome CCD Camera

# WAT-120N+

## Operation Manual

This Operation Manual covers safety, camera functions, installation and the correct operating procedure for the WAT-120N+. First, we ask you to read this Operation Manual thoroughly, then install and operate the WAT-120N+ as advised. In addition, for future reference, we also advise safekeeping of this manual.

Please contact the distributor or dealer from which the WAT-120N+ 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 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, it may cause severe damage such as a physical injury.

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

### Cautions for Safety

The WAT-120N+ 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-120N+.**  
**Do not operate the WAT-120N+ with wet hands.**

**Use a stabilized power adaptor designed for DC+12V±10%, with a current capacity of more than 250mA for the WAT-120N+.**  
The recommended voltage is DC+12V±10%.  
**Do not expose the WAT-120N+ to wetness or high moisture conditions.**  
The WAT-120N+ is designed and approved for indoor use only. The WAT-120N+ 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 housing.  
**Protect the WAT-120N+ from condensation.**  
Keep the WAT-120N+ 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-120N+.**  
The WAT-120N+ 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-120N+ with any monitor using a video/power single transmission terminal. The WAT-120N+ 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-120N+ in a position subject to direct sunlight.**  
Sunlight shinning directly onto the WAT-120N+ lens can cause damage to the CCD.  
**Select a stable place for installation of the WAT-120N+.**  
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-120N+ with the cables connected.**  
Before moving the WAT-120N+, always remove the video cable and power cable from the rear of the camera first.  
**Avoid using the WAT-120N+ near any strong electromagnetic field.**  
After installing into main equipment, if the WAT-120N+ 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-120N+,

- 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-120N+
- 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-120N+ by mistake
- Anything unusual occurring to any equipment connected to the WAT-120N+

Disconnect the camera immediately according to the following procedures:

- Switch off the main power supply to the camera.
- Remove the power and video cables connected to the WAT-120N+.
- Contact the distributor or dealer from which the WAT-120N+ was purchased.

### About EMC

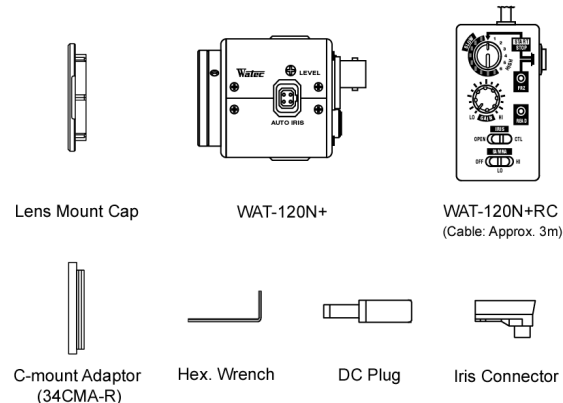
The WAT-120N+ is in conformity with EMC test standards carried out by authorized organizations in Japan.

NTSC FCC Part15 class B  
P A L EN61000-6-3 / EN50130-4

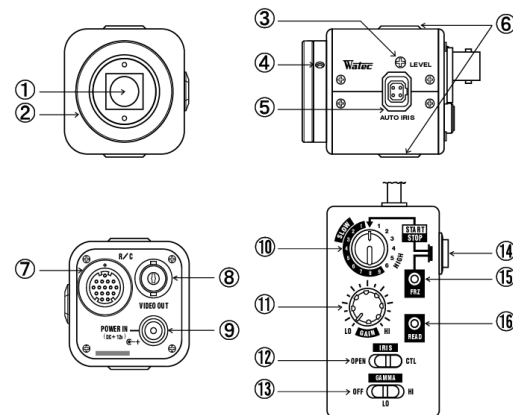
Do not modify the WAT-120N+. A modified camera may not conform to EMC test standards.

### 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 the CCD from contamination and damage.)

#### ② LENS MOUNT

Mount for the lens (CS-mount)

#### ③ IRIS LEVEL VOLUME

By controlling the volume, the iris level of the 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.

#### ⑤ AUTO-IRIS SOCKET

This socket is for the video/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±0.2mm, which is the same as any standard camera tripod (U1/4").

#### ⑦ REMOTE CONTROLLER SOCKET

Socket for the remote controller

#### ⑧ VIDEO OUT (BNC)

The terminal for composite video signal output

#### ⑨ POWER IN

The terminal designed for connection with the DC-plug of the power adaptor

#### ⑩ SHUTTER MODE DIAL

Selecting dial for exposure time

#### ⑪ GAIN DIAL

Controlling dial for the gain amplifier

#### ⑫ IRIS SWITCH

Mode select switch for auto iris function of lens

#### ⑬ GAMMA SWITCH

Mode select switch for gamma correction

#### ⑭ FREEZE/START/STOP BUTTON

Operation button for the freeze mode and the manual shutter mode

#### ⑮ FRZ INDICATOR

The red LED to indicate picture freeze mode

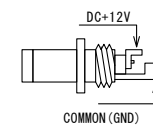
#### ⑯ READ INDICATOR

The green LED indicator for the frame capture timing

### 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-120N+ and power adaptor may occur and also may cause fire.



### 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.

Pin No.	EIAJ Video Auto-iris Lens Arrangement	EIAJ DC Auto-iris Lens Arrangement
①	Power	Control -
②	Not used	Control +
③	Iris signals	Drive +
④	Common (GND)	Drive -

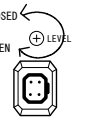
### Set-up and Operation

- Ensure that the power to the WAT-120N+ and the peripheral equipment is turned off before making any connections.
- Remove the lens mount cap from the WAT-120N+ and attach the CS-mount lens. Use the optional C-mount adaptor(34CMA-R) when a C-mount lens is used.
- Connect the iris control cable to ⑤AUTO-IRIS SOCKET on the WAT-120N+ when an auto-iris lens is being used.
- Connect ⑧VIDEO OUT on the WAT-120N+ with the monitor, using a coaxial cable with 75Ω impedance, such as an RG-58/U or an RG-6/U. Select a monitor with the same television system as the WAT-120N+: EIA or CCIR. A monitor with more than 600TV lines is recommended.
- Insert the power plug of the power adaptor to ⑨POWER IN on the back panel of the WAT-120N+. Confirm that the power adaptor is not connected to the power supply before insertion of the power plug into ⑨POWER IN.
- Turn on the power to the WAT-120N+, 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.
- After following the procedure below and the picture is still out of focus, open the iris fully and loosen ④FOCUSING ADJUSTMENT SCREWS with the hex. wrench and move the lens forwards until a clear picture is obtained.

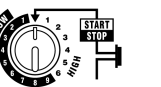
Manual Lens	Adjust the focus and iris to the best position on the lens.
Video Auto-iris Lens	Adjust the focus on the lens.
DC Auto-iris Lens	Adjust the iris level on the camera, then adjust the focus on the lens. See below.

#### 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.



- Select any required shutter speed by the ⑩SHUTTER MODE DIAL and set the exposure time by ⑭FREEZE/START/STOP BUTTON.



Shutter mode	Shutter speed	
0	Manual shutter mode (0 - ∞) To begin exposure: Press ⑭ button once. To end exposure: Press ⑭ button again. ※⑭ button will illuminate during exposure.	
1	HIGH	OFF (1/60:EIA, 1/50:CCIR)
2		1/125
3		1/250
4		1/500
5		1/1000
6		1/2000
1	SLOW	1 FRM
2		2 FRM
3		4 FRM
4		8 FRM
5		16 FRM
6		32 FRM
7		64 FRM
8		128 FRM
9		256 FRM

※The unit is set to 1FRM(EIA: 1/30, CCIR: 1/25) when the remote controller is not connected.

- Set the gain to any required environment by ⑪GAIN DIAL.



VR position	Gain	Amplitude
LO	8dB	Approx. 2.5 times
↓	↓	↓
HI	38dB	Approx. 80 times

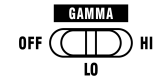
※The unit is set to LO(8dB) when the remote controller is not connected.

- 10) Set the iris mode by ⑫IRIS SWITCH when an auto-iris lens is used.



Mode	Operation
CTL	Auto iris function is controlled automatically according to the objects illuminance.
OPEN	Lens iris is opened fully.

- 11) Select any required gamma by the ⑬GAMMA SWITCH.



Mode	Effect
OFF	Required for image processing such as data storage for PCs and for FA.
LO	Standard setting for using TVs and Monitors. Natural images can be obtained in dark areas.
HI	Dark areas can be lightened and bright areas can be reduced.

※Select LO position for normal use. In a low light environment or dark viewing, HI mode is recommended.

※The unit set to LO mode when the remote controller is not connected.

- 12) A still picture can be obtained by setting the freeze mode of ⑭FREEZE /START/STOP BUTTON. ⑮FRZ INDICATOR is illuminated during freeze mode. To release freeze mode, push the switch again.

※When the camera is switched on, and the camera is set in freeze mode, a normal image can not be obtained. Press the freeze mode button to return be normal.



## Options

To purchase these options, please contact the distributor or dealer from which you purchased the WAT-120N+.



### Mini Stand (MS50)

A convenient stand for the WAT-120+. 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-120N+.

## Specifications

Model	WAT-120N+ (EIA)	WAT-120N+ (CCIR)
Pick-up Element	1/2 inch interline transfer CCD image sensor	
Number of Total Pixels	811(H) × 508(V)	795(H) × 596(V)
Number of Effective Pixels	768(H) × 494(V)	752(H) × 582(V)
Unit Cell Size	8.4 μm(H) × 9.8 μm(V)	8.6 μm(H) × 8.3 μm(V)
Imaging System	Frame accumulation, Field readout	
Sync. System	Internal	
Scanning System	2:1 interlace	
Video Output	Composite video, 1.0 V(p-p) 75 Ω (Unbalanced)	
Resolution	Horizontal	More than 570TVL (Center)
	Vertical	480TVL / 570TVL
Minimum Illumination	0.00002 lx. F1.4	
S/N	More than 52dB (MGC=8dB, γ=1.0)	
Shutter Speed	HI	OFF (EIA:1/60, CCIR:1/50), 1/125, 1/250, 1/500, 1/1000, 1/2000 sec.
	LO	1, 2, 4, 8, 16, 32, 64, 128, 256 frame(s)
	Manual	As required (1frame step)
Gain Control	8-38dB (Manual)	
Gamma Characteristics	γ ≒ 0.35(HI) / γ ≒ 0.45(LO) / γ = 1.0(OFF)	
Lens-iris	Video / DC (EIAJ arrangement, Auto-select)	
Power Supply	DC+12V ± 10%	
Power Consumption	2.16W (180mA)	
Operating Temperature	-10 ~ +40°C (Without condensation)	
Operating Humidity	Less than 95% RH	
Storage Temperature	-30 ~ +70°C (Without condensation)	
Storage Humidity	Less than 95% RH	
Lens Mount	CS-mount	
Size	43.5(W) × 44(H) × 63(L) mm	
Weight	Camera: Approx. 140g / Controller: Approx. 215g	

- 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, mis-operation or improper wiring of our equipment.
- If for any reason the WAT-120N+ 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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