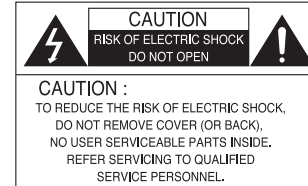

Ultra High Resolution Color Camera

WDAC-4288WD

Instruction Guide





The lightning flash with an arrowhead symbol, within an equilateral triangle is intended to alert the user to the presence of uninsulated dangerous voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

INFORMATION - This equipment has been tested and found to comply with limits for a Class A digital device, pursuant to part 15 of the FCC Rules & CE Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING - Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

CAUTION : To prevent electric shock and risk of fire hazards:

- ◆ Do NOT use power sources other than those specified.
- ◆ Do NOT expose this appliance to rain or moisture.

This installation should be made by a qualified service person and should conform to all local codes.

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Ultra High Resolution

By adopting a 960H Sony CCD, the camera produces clear picture quality with a horizontal resolution of 650 TV lines for color.

Excellent Sensitivity

The highly sensitive diagonal 6mm (1/3") CCD and digital signal processing technology, can clearly distinguish the outline and color of a subject even at extremely low luminance levels - for example, under starlight.

Since surveillance is possible in places where the light is poor, the camera is appropriate for day and night surveillance both indoors or on the outside of buildings.

DNR (Digital Noise Reduction)

The amount of low illuminance noise has been significantly reduced and the signal-to-noise ratio (S/N ratio), as well as horizontal resolution, have been improved resulting in a clear and sharp image even in low light.

Day & Night

The camera identifies whether it is day or night and automatically switches to the appropriate mode, depending on its environment. By day, the camera switches to color mode in order to maintain optimal color. At night, it switches to B/W mode so as to obtain better picture definition.

PRIVACY Function

The PRIVACY function conceals the areas not required to appear on the image.

Motion Detection

Since the camera detects motion without any additional external sensor, you can monitor activity more efficient.

Miscellaneous functions

MIRROR, BRIGHTNESS, CONTRAST and SHARPNESS functions are provided.

Language

The camera OSD Menu control is equipped with seven different languages, these being:

- English, Spanish, Japanese, German, French, Russian, Poland

Wide Dynamic Range (WDR)

The camera delivers clear high quality pictures, even when backlit, by increasing exposure in dark areas while decreasing it in bright areas; a corrected image clear results.

· 120dB maximum dynamic range

VIDEO / DC Drive Lens

The video drive lens and the DC drive lens can be selected by the touch of a switch.

The camera requires periodic inspection.

Contact an authorised technician to carry out the inspection.

Stop using your camera when you find it malfunctioning.

If the camera emits smoke or is unusually hot for a long period, a fire may be caused.

Do not install the camera on a surface that can not support it.

If the camera is installed on an inappropriate surface, it may fall and cause injury.

Do not hold plug with wet hands.

It could cause an electric shock.

Do not dis-assemble the camera.

It may result in an electric shock or other hazards.

Do not use the camera close to a gas or oil leak.

It may result in a fire or other hazards.

■ Precautions

Do not install the camera in extreme temperature conditions.



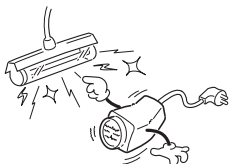
Only use the camera under conditions where temperatures are between -10°C and $+50^{\circ}\text{C}$. Be especially careful to provide ventilation when operating under high temperatures.

Do not install or use the camera in an environment where the humidity is high.



It can cause the image quality to be poor.

Do not install the camera under unstable lighting conditions.



Severe lighting change or flicker can cause the camera to work improperly.

Do not touch the front lens of the camera.



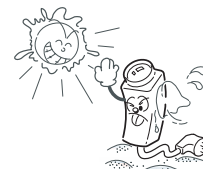
This is one of the most important parts of the camera. Be careful not to leave fingerprints on the lens cover.

Do not drop the camera and protect it from physical shocks.



It can cause malfunctions to occur.

Never keep the camera pointed directly at strong light.



It can damage the CCD.

Do not expose the camera to rain or spill beverage on it.



If it gets wet, wipe it dry immediately. Liquids can contain minerals that corrode the electronic components.

Do not expose the camera to radioactivity.



If exposed to radioactivity the CCD will fail.



Note

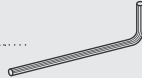
- If the camera is exposed to spotlight or an object reflecting strong light, smear or blooming may occur.
- Please check the power supply satisfies the normal specification before connecting the camera.

■ Components

1. COLOR BOX CAMERA



2. L-WRENCH



3. C-MOUNT ADAPTOR



4. INSTRUCTION GUIDE



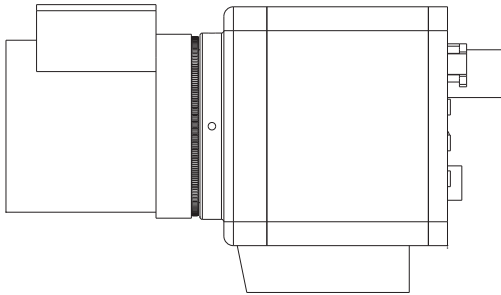
Names and Functions of Parts ■

Front

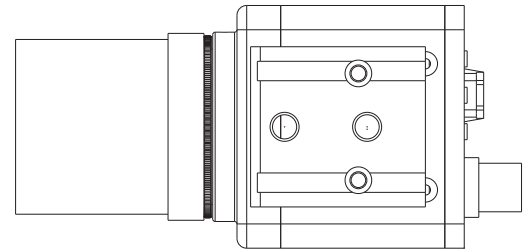


Overview

Side View



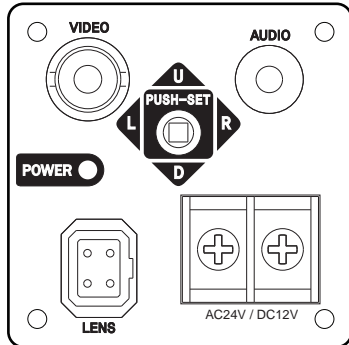
Bottom View



Tripod Mounting Bracket Screw Hole

Used to fix the camera onto a bracket or tripod.
The screw sizes for this hole are as follows:
"1/4-20 thread, 1/8" length

Rear View



Lens

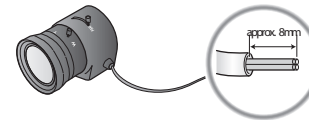
The lens is not supplied with this camera. Purchase a lens suitable for the environment. This camera accepts an auto iris lens, and both C-and CS-mount lenses.

Note

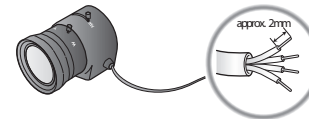
- It is recommended to use the DC type Auto Iris Lens to effectively enjoy the major functions of this camera.
- Keep the lens surface clean, as the picture quality suffers if there is dirt or fingerprints on the Lens.

Using an Auto Iris Lens

1. Strip 8mm of insulation from the end of the Auto Iris Lens cable..



2. Strip 2mm of insulation from each of the cores of the cable.



Installation Procedures

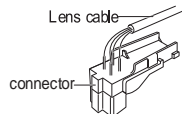
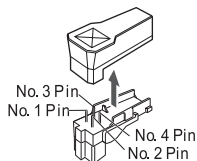
3. Remove the cover of the Auto IRIS Lens connector plug and solder the lens cable to the connector pins of the plug

• For a Video Drive Lens

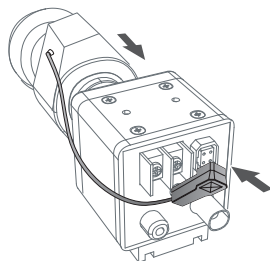
Pin 1: Red (Power)
Pin 2: NC
Pin 3: White (Video Signal)
Pin 4: Black (Ground)

• For a DC Drive Lens

Pin 1: Damping -
Pin 2: Damping +
Pin 3: Drive +
Pin 4: Drive -



4. Fit the cover of the auto iris lens connector plug, remove the protective CCD cover from the front of the camera, and fasten the Auto Iris Lens by turning it clockwise.

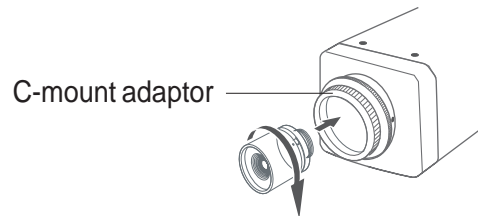


Using a C/CS mount lens

Before installing a lens, identify whether the lens to be installed is a C-Mount or CS-Mount. This camera is set for a CS-Mount Lens by default to install a C-Mount Lens, a simple modification is required.

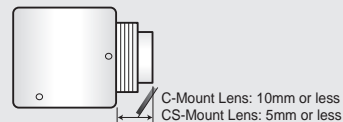
• When using a C-Mount lens

Please take off the lens protection cap and attach the C-Mount lens to the camera by screwing it in clockwise.



Note

• Use a lens threaded as shown in the following figure. If the dimensions of the thread are incorrect the camera could be damaged, or the lens may not get installed firmly enough.



- If the lens is too heavy the camera becomes unbalanced, which may cause problems. Use a lens weighing less than 450g.
- When adjusting the Automatic Level Control (ALC) of an Auto Iris Lens, use Av mode if available. If Pk mode is used the picture brightness may change continuously.

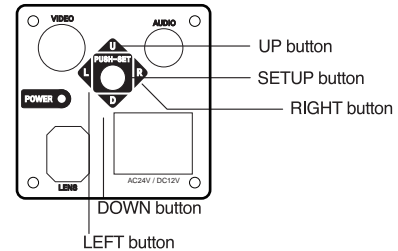
How to Use the Camera

Menu

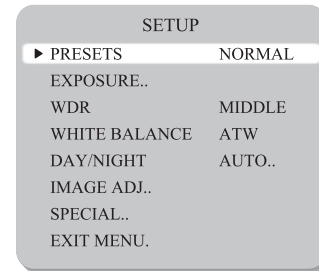
SETUP menu	
PRESETS	· NORMAL · INDOOR · OUTDOOR
EXPOSURE	· LENS · FOCUS · EXPOSURE MODE · AGC · DNR · HIGHLIGHT · COLOR ROLL · SENS-UP
WDR	· MIDDLE · HIGH · USER · LOW
WHITE BALANCE	· ATW · INDOOR · OUTDOOR · AWB · MANUAL
DAY/NIGHT	· AUTO · COLOR · BW · EXTERN
IMAGE ADJ.	· FREEZE · FLIP · SHARPNESS · COLOR GAIN · GAMMA
SPECIAL	· CAMERA ID · VIDEO OUT · DZOOM · MOTION · PRIVACY SETUP · SYNC · RESET · RETURN
EXIT MENU	

Settings

Settings can be made using the 5 buttons on the rear of the camera.



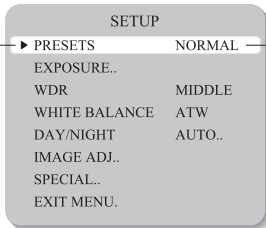
1. Press the SET button
 - Settings can now be made. The SETUP menu is displayed on the monitor.



2. Select a menu item from the list available by using the UP and DOWN buttons.
 - Functions are selected using up and down buttons.
 - The selected position is displayed in blue.

How to Use the Camera

Select the function using the UP or DOWN button,



Change the status using the LEFT or RIGHT button.

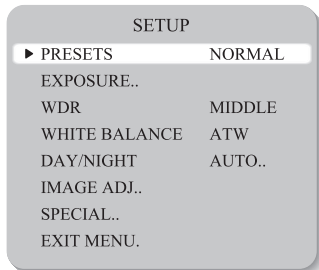
3. Set up a selected item by using the Left and Right buttons.
4. To finish and save the settings, select 'EXIT' and press the SET button.



Note

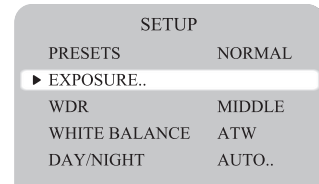
- An item with the .. icon also has sub-menus. To select a sub-menu, press the SET button.

PRESETS

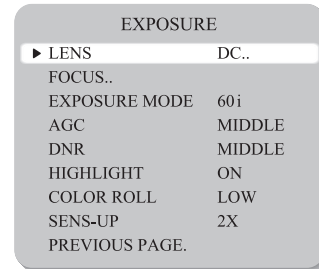


- **NORMAL** : Normal environment.
- **INDOOR** : Indoor environment.
- **OUTDOOR** : Outdoor environment.

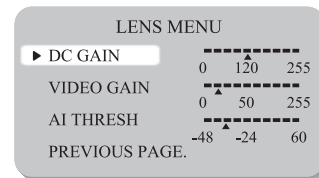
EXPOSURE



When the SETUP menu screen is displayed, select 'EXPOSURE' by using the Up and Down buttons so that the arrow indicates 'EXPOSURE'.

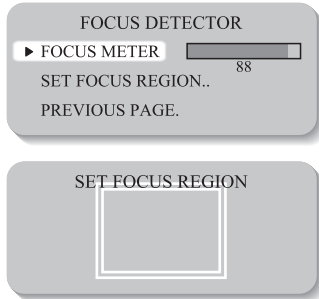


- **LENS** : Using this function, you can control the screen brightness.
 - DC / VIDEO / Manual : Select Lens Type



How to Use the Camera

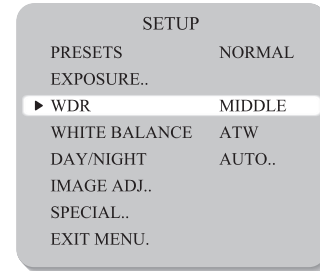
- **FOCUS** : To adjust the DC and VIDEO lens focus



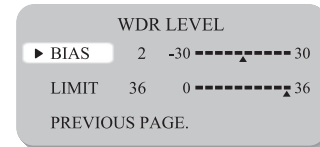
- **EXPOSURE MODE** : To select the number of fields and number of exposure cycles.
 - 60i / 30p selectable
- **AGC (AUTO GAIN CONTROL)** : In the dark situation, the higher the gain level, the brighter the screen but the higher the noise.
 - OFF / LOW / MIDDLE / HIGH selectable
- **DNR (Digital Noise Reduction)** : The level of background noise in low light decreases automatically as the level of gain changes.
 - OFF / LOW / MIDDLE / HIGH selectable
- **HIGHLIGHT** : To optimize the scene when high dynamic range lighting is detected.
 - ON : bright parts of the image are most visible.
 - OFF : dark parts of the image are most visible.
- **COLOR ROLL** : To control a detector that finds color fluorescent roll.
 - OFF / LOW / MIDDLE / HIGH selectable

- **SENS-UP** : When it is night or dark, the camera automatically detects the light level and maintains a clear picture if this mode is activated.
 - 2X, 4X, 8X, 16X, 32X
 - OFF : Deactivates the SENS-UP function.

WDR



- **WDR** : When the image has simultaneous bright and dark areas, the Wide Dynamic Range makes both areas distinct.
 - LOW / MIDDLE / HIGH / USER selectable

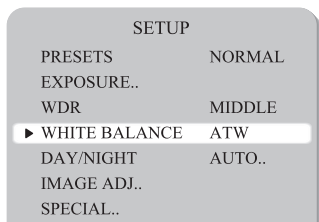


How to Use the Camera

WHITE BALANCE

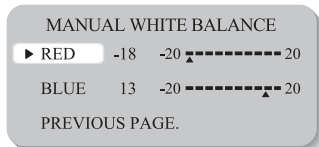
Use the White Balance function to adjust the screen colors.

1. Position the cursor to point to WHITE BAL on the SETUP menu screen, select using the Up and Down buttons.
2. Select the desired mode using the Left and Right buttons.



※Select one of the following 5 modes, as appropriate.

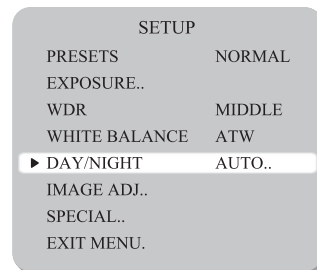
- **ATW** : The ATW mode continuously monitors.
- **INDOOR** : Select when the color temperature is between 4000°K and 8500°K
- **OUTDOOR** : Select when the color temperature is between 2000°K and 11000°K
- **AWB** : To obtain the optimum state under the current luminance levels, direct the camera to point toward a sheet of white paper and press the SET button. If the environment changes, including the light source, the white balance will require re-adjustment.
- **MANUAL** : Select to "fine-tune" the White Balance manually. Set White Balance first using the ATW or AWB mode. Afterwards switch to MANUAL mode, fine-tune the White Balance and then press the SET button.



Note

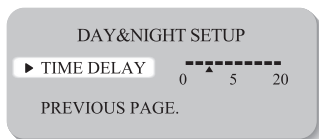
- Under the following conditions White Balance may not work properly. In such cases, select the AWC mode.
 - ① When the color temperature of the subject environment has a very high temperature range (e.g. clear sky, or sunset)
 - ② When the ambient illumination of the subject is low.
 - ③ If the camera is directed toward a fluorescent light, or is installed in a place where illumination changes dramatically, the White Balance operation may become unstable.

DAY/NIGHT

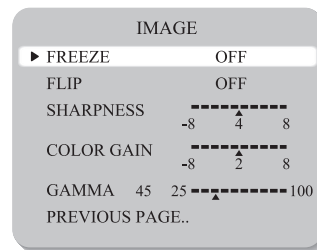


- **AUTO** : This camera has an IR Cut-Filter and automatically changes to the appropriate mode according to lighting levels. To set up the switching time and switching speed for the AUTO mode press the SET button.

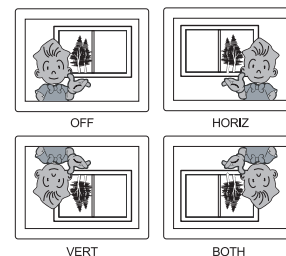
How to Use the Camera



- **COLOR** : The picture is displayed in color.
- **B/W** : The picture is always displayed in black and white.



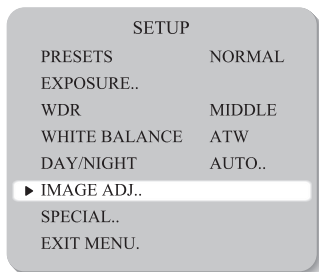
- **FREEZE** : View still pictures.
- OFF / ON selectable
- **FLIP** : OFF / HORIZ / VERT / BOTH selectable



- **SHARPNESS** : The outline of the video image becomes cleaner and more distinctive as the level of SHARPNESS increases. If the level goes up excessively, however, it may affect the video image and generate noise.
- The available range of level is -8 ~ 8
- **COLOR GAIN** : To control the color level in the video.
- The available range of level is -8 ~ 8
- **GAMMA** : Users can change the gamma setting between 25 and 100

IMAGE ADJ.

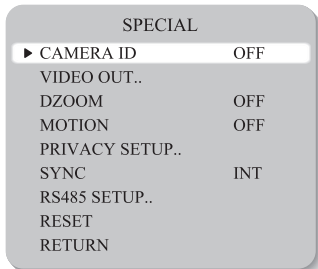
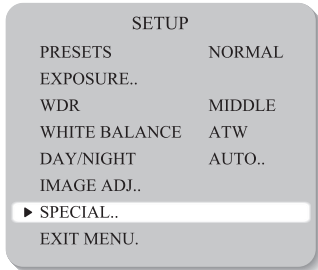
When the SETUP menu screen is displayed, select 'IMAGE ADJ.' using the Up and Down buttons.



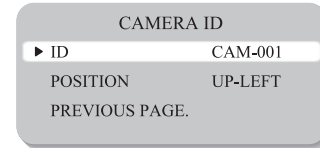
■ How to Use the Camera

SPECIAL

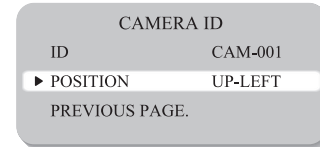
When the SETUP menu screen is displayed, select 'SPECIAL' by using the Up and Down buttons so that the arrow indicates 'SPECIAL'.



- **CAMERA ID** : User can enter a unique name for the respective camera. The maximum length of the ID is ten characters.
 - You can choose the ON and OFF with the selector. If you select ON, the entered camera ID is displayed at the selected position in the video picture (normal operation).
 - Please select the setup button while in ON mode.
 - Select the desired position with the selector.

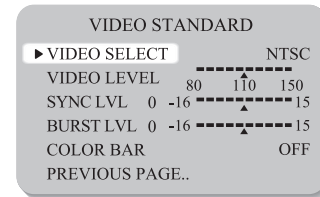


- ① Move the cursor to the letter required by using the Set-Up button.
- ② Select an ID from A,B~Y,Z, a,b~y,z, 0,1~8,9 by using the LEFT and RIGHT buttons.
- ③ Repeat the above steps until the ID is complete.



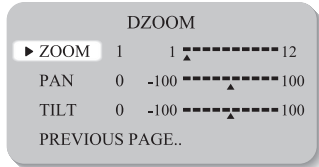
- ① Select the position where the ID is to be displayed by using the LEFT and RIGHT buttons.

- **VIDEO OUT** : Move the cursor to select the video system
 - VIDEO STANDARD : You can control NTSC / PAL, Video level, Sync level, Burst level.

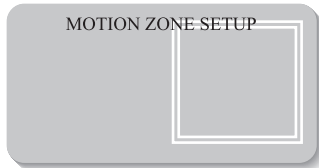
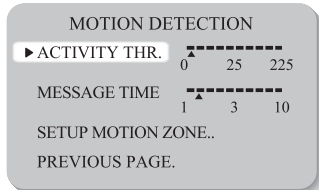


How to Use the Camera

- **DZOOM** : Digital P/T/Z are used to create a zoom lens effect. Zoom Factor (1X to 8X), Pan ($\pm 100\%$, center of image can be moved to left and right edges of screen), Tilt ($\pm 100\%$, center of image can be moved to top and bottom edges of screen)

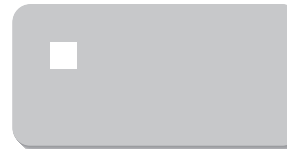
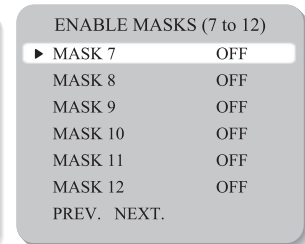
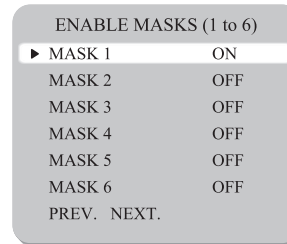
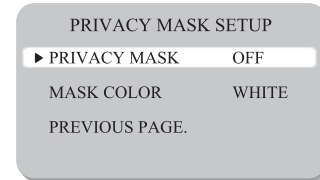


- **MOTION** : This product has a feature that allows you to observe movements of objects in on the screen, hence a single individual can conduct supervision efficiently. The camera detects an object's movement by sensing disparity of outline, and level of brightness and color.



- White : MOTION ZONE Position movement
- Green : MOTION ZONE Size enlargement
- Red : MOTION ZONE Size reduction
- For MOTION ZONE Confirm, long press SET button

- **PRIVACY SETUP** : Hide an area you want to hide on the screen.

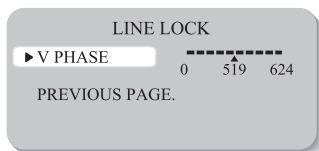


- White : PRIVACY-ZONE Position movement
- Blue : PRIVACY-ZONE Size enlargement or reduction
- For PRIVACY-ZONE Confirm, long press SET button

How to Use the Camera

- **SYNC** : Two synchronization modes are available, INTERNAL and EXTERNAL LINELOCK. In LINE-LOCK mode, it synchronizes the video signal between cameras without a synchronous generator. The line-lock synchronization is only used in areas of 60Hz (NTSC) / 50Hz (PAL).

- INT : Internal synchronization
- LL : External line-lock synchronization
 - If 'LL' is selected, it can be adjusted to the desired phase. Press the SET button.



- Adjust to the desired phase from 0 to 624.

EXIT MENU.

Saves all the setting menus and then exits.

Troubleshooting

If you have trouble operating your camera, refer to the following table. If the guidelines do not enable you to solve the problem, contact an authorized technician.

Problem	Solution
Nothing appears on the screen.	<ul style="list-style-type: none"> • Check the power connections. • Check the VIDEO signal line connection.
The image on the screen is dim.	<ul style="list-style-type: none"> • Make sure the lens is clean. Clean the lens with a soft clean lint free cloth. • Adjust the monitor contrast & brightness controls. • Re-position the camera if necessary.
The image on the screen is dark.	<ul style="list-style-type: none"> • Adjust the contrast control of the monitor. • If you have an intermediate device, set the 75Ω/ Hi-z properly.
The camera is not working properly, and the surface of the camera is hot.	<ul style="list-style-type: none"> • Check that an appropriate power source is connected to the camera.
The DAY/NIGHT menu does not work.	<ul style="list-style-type: none"> • Check that AGC in the EXPOSURE menu is set to 'OFF'.
The SENS-UP function does not work.	<ul style="list-style-type: none"> • Check that AGC in the EXPOSURE menu is not set to 'OFF'. • Check that SHUTTER in the EXPOSURE menu is not set to 'A.FLK' or 'MANUAL'.

■ Troubleshooting

Problem	Solution
The Motion Detection function does not work.	<ul style="list-style-type: none"> Check that MOTION DET in the SPECIAL SETUP is not set to 'OFF'.
Color is not correct.	<ul style="list-style-type: none"> Check the WHITE BAL settings in the SETUP menu.
The screen flickers continually.	<ul style="list-style-type: none"> Check that the camera isn't facing toward a bright light source, such as the sun.

Specifications (AC24V / DC12V) ■

ITEM	NTSC		PAL	
	AC24V / DC12V	DC12V	AC24V / DC12V	DC12V
Power Consumption	170mA(AC24V)/250mA(DC12V)	160mA	170mA(AC24V)/250mA(DC12V)	160mA
Image Sensor	PIXIM 1/3" High Sensitivity Digital Sensor			
Effective Pixels	758(H) x 540(V)			
Dynamic Range	120dB(Max), 102dB(Typical)			
Horizontal Resolution	690TVL Effective			
Min. Illumination	0.1Lux			
Day & Night	Auto / Color / B/W			
White Balance	Auto / AWB / Indoor / Outdoor / Manual			
WB Range	2000°K~11,000°K			
Shutter Speed	up to 1/30, 720 sec			
Sens-up	Auto / Off (Selectable x2 ~ x32)			
Privacy Masking	12 Zones			
AGC	Low / Auto / High / Off			
Image Flip	Horizontal and Vertical			
Camera ID	On / Off			
S/N Ratio	More than 50dB			
Video Output	Composite video output 75 ohm terminated			
OSD	Built-in			
Sync. System	Internal / Line Lock			
Iris Control	DC / VIDEO			
Operating Humidity	30% ~ 90% RH			
Operating Temp.	-10°C to 50°			

■ Specifications (AC230V)

MEMO ■

ITEM	NTSC	PAL
Power Consumption	AC230V MAX. 4.5W	
Image Sensor	PIXIM 1/3" High Sensitivity Digital Sensor	
Effective Pixels	758(H) x 540(V)	
Dynamic Range	120dB(Max), 102dB(Typical)	
Horizontal Resolution	690TVL Effective	
Min. Illumination	0.1Lux	
Day & Night	Auto / Color / B/W	
White Balance	Auto / AWB / Indoor / Outdoor / Manual	
WB Range	2000°K~11,000°K	
Shutter Speed	up to 1/30, 720 sec	
Sens-up	Auto / Off (Selectable x2 ~ x32)	
Privacy Masking	12 Zones	
AGC	Low / Auto / High / Off	
Image Flip	Horizontal and Vertical	
Camera ID	On / Off	
S/N Ratio	More than 50dB	
Video Output	Composite video output 75 ohm terminated	
OSD	Built-in	
Sync. System	Internal / Line Lock	
Iris Control	DC / VIDEO	
Operating Humidity	30% ~ 90% RH	
Operating Temp.	-10°C to 50°	

■ MEMO

Ultra High Resolution Color Camera
