TOA

INSTRUCTION MANUAL

Outdoor Day/Night IR Camera

C-CV454R-3 CU

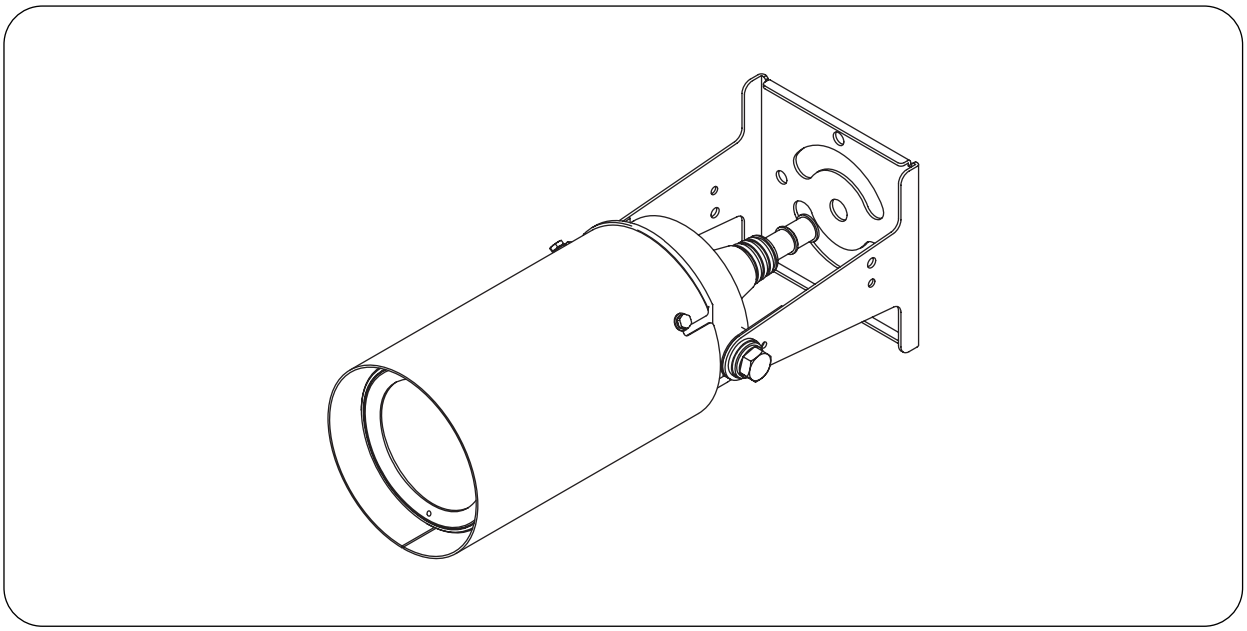


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Thank you for purchasing TOA Outdoor Day/Night IR Camera.
Please carefully follow the instructions in this manual to ensure long, trouble-free use of your equipment.

TOA Corporation

1. SAFETY PRECAUTIONS

- Before installation or use, be sure to carefully read all the instructions in this section for correct and safe operation.
- Make sure to observe the instructions in this manual as the conventions of safety symbols and messages regarded as very important precautions are included.
- We also recommend you keep this instruction manual handy for future reference.

Safety Symbol and Message Conventions

Safety symbols and messages described below are used in this manual to prevent bodily injury and property damage which could result from mishandling. Before operating your product, read this manual first and understand the safety symbols and messages so you are thoroughly aware of the potential safety hazards.

⚠ **WARNING**	Do not leave the unit upside-down where it could be exposed to the rain or elements. Water in the unit may cause shorts that could result in fire or electrical shock.

⚠ **WARNING**	Indicates a potentially hazardous situation which, if mishandled, could result in death or serious personal injury.

- Do not touch the camera with wet hands. Installing or setting the camera with wet hands may result in electrical shock.
- To prevent lightning strikes, install the unit at least five meters away from a lightning rod, and yet within the protective range (angle of 45°) of the lightning conductor. Lightning strikes may cause a fire, electric shock or personal injury.
- Install the unit only in a location that can structurally support the weight of the unit and the mounting bracket. Doing otherwise may result in the unit falling down and causing personal injury and/or property damage.
- Use nuts and bolts that are appropriate for the ceiling's or wall's structure and composition. Failure to do so may cause the unit to fall, resulting in material damage and possible personal injury.
- Tighten each nut and bolt securely. Ensure that the bracket has no loose joints after installation to prevent accidents that could result in personal injury.
- Avoid installing the unit in locations exposed to sea breeze or corrosive gas. The unit or its mounts may be subject to corrosion, that might cause it to fall or result in other accidents.
- Do not insert nor drop metallic objects or flammable materials inside the unit, as this may result in fire or electric shock.
- If any of the following irregularities occurs, immediately turn off the power supply, and inform the shop from where the unit was purchased. Further using the unit may result in fire or electric shock.
  - · If you detect smoke or a strange smell coming from the unit.
  - · If water or any metallic object gets into the unit.
  - · If the unit falls, or the unit case breaks.
  - · If the connection cable is damaged (exposure of the core, disconnection, etc.)
  - · If no tone sounds (When an optional microphone is used.)
  - · If it is malfunctioning (no image appears.)
- Do not mount the unit in locations exposed to constant vibration. The mounting screws and/or bolts may be loosened by excessive vibration, potentially causing the unit to fall, which could result in personal injury.
- To prevent a fire or electric shock, never open nor remove the unit case as there are high voltage components inside the unit. Refer all servicing to your nearest TOA dealer.

⚠ CAUTION Indicates a potentially hazardous situation which, if mishandled, could result in moderate or minor personal injury, and/or property damage.

- Leave the installation of the unit to your TOA dealer because the installation requires expert experience and skills. The unit may fall off if incorrectly installed, resulting in possible personal injury.
- Do not stand or sit on, nor hang down from the unit as this may cause it to fall down or drop, resulting in personal injury and/or property damage.
- Be sure to inspect the unit periodically for safety use. Deterioration of the installed part may cause dropping of the unit, resulting in personal injury and/or property damage. Contact your TOA dealer as to the periodical inspection.
- Avoid touching the unit's sharp metal edge to prevent injury.
- Switch off the power for safety purposes when cleaning or leaving the unit unused for 10 days or more. Doing otherwise may cause a fire or electric shock.

CU version complies with Part 15 of the FCC Rules.

Note
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

Modifications
Any modifications made to this device that are not approved by TOA Corporation may void the authority granted to the user by the FCC to operate this equipment.

2. HANDLING PRECAUTIONS

- Do not direct the camera lens to the sun, strong lighting, or reflected light. If strong light enters the lens, this may cause the CCD's internal color filter to deteriorate, leading to image discoloration.
- Do not give the camera a great shock or vibration to avoid camera damage.
- It is recommended that the camera be always used in locations where the ambient temperature ranges from −10°C to +50°C (14°F to 122°F) and humidity levels of less than 90% to ensure that no condensation is formed.
- To clean, wipe with a dry soft cloth. Never use benzene, thinner or chemically processed towel as the camera's plastic or other parts may be deformed or discolored.
- When dust has settled on the unit's lens, lightly clean using a commercial camera blower or cleaning paper.
- Installing the camera cables in close proximity to fluorescent lamps or other electrical appliances can downgrade the picture quality. In such cases, change the wiring.
- If there is a strong electric or magnetic field near the camera, such as television transmission antennas, motors or transformers, this may distort or roll the monitor picture. In such cases, run the entire wiring route through metal conduit tubing.
- When operating on 12 V DC, use the external power supply rated at 12 V DC and over 1.0 A.

3. GENERAL DESCRIPTION

The C-CV454R-3 is Outdoor-use Day/Night IR cameras equipped with a 1/3" CCD. Owing to a built-in auto iris varifocal lens, the angle of view can also be manually adjusted. Since it is equipped with a Day-Night function, it functions as a color camera (day mode) in bright locations and as a high-sensitivity black and white camera (night mode) in dark locations. Since the camera's built-in infrared LED illuminator lights in night mode, video surveillance is possible even in no light conditions, allowing the camera to be used for around-the-clock surveillance. Noise reduction function enables low noise, clear images to be viewed even under poor lighting conditions. Its dust-proof and waterproof (IP66) construction permits it to be mounted to an outdoor wall or ceiling without using a special device. Angle of the camera unit can be adjusted freely regardless of installation location, allowing a wider area to be viewed.
The power is supplied from 24 V AC or 12 V DC external power source.

4. FEATURES

- **Built-in 3x Varifocal Lens**
  Owing to a built-in auto iris 3x varifocal lens (f= 3 - 9 mm), the angle of view can be adjusted.

- **Adjustment Switch**
  The infrared camera is equipped with an adjustment switch that facilitates the manual adjustment of lens focus. Turning on this switch forcibly makes the depth of field shallow, allowing finer focus adjustment.

- **Day & Night Mode**
  By mechanically inserting and extracting the infrared block filter, the camera can function as a color camera (day mode) in bright locations and as a high-sensitivity black & white camera (night mode) in dark locations. The camera switches from day mode to night mode at a brightness level of approximately 2 lx, while night mode switches to day mode at approximately 10 lx. There is a standby time of approximately 5 seconds before the mode switches in order to prevent malfunctions resulting form momentary changes in brightness (such as headlights).

- **Internal Infrared LED Illuminator**
  The internal infrared illuminator lights in night mode and allows subjects to be viewed even in environments where no lighting equipment is installed. The infrared LED's irradiation distance is as follows:
  Indoor irradiation distance: Approx. 18 m (59.06 ft.)
  Outdoor irradiation distance: Approx. 15 m (49.21 ft.) (High-sensitivity switch OFF)

- **Noise Reduction**
  Since the camera is equipped with noise reduction circuitry, it can pick up images with less noise even in low-light scenes. Also, the camera's reduced noise permits video recording to be more efficiently performed using a digital video recorder.

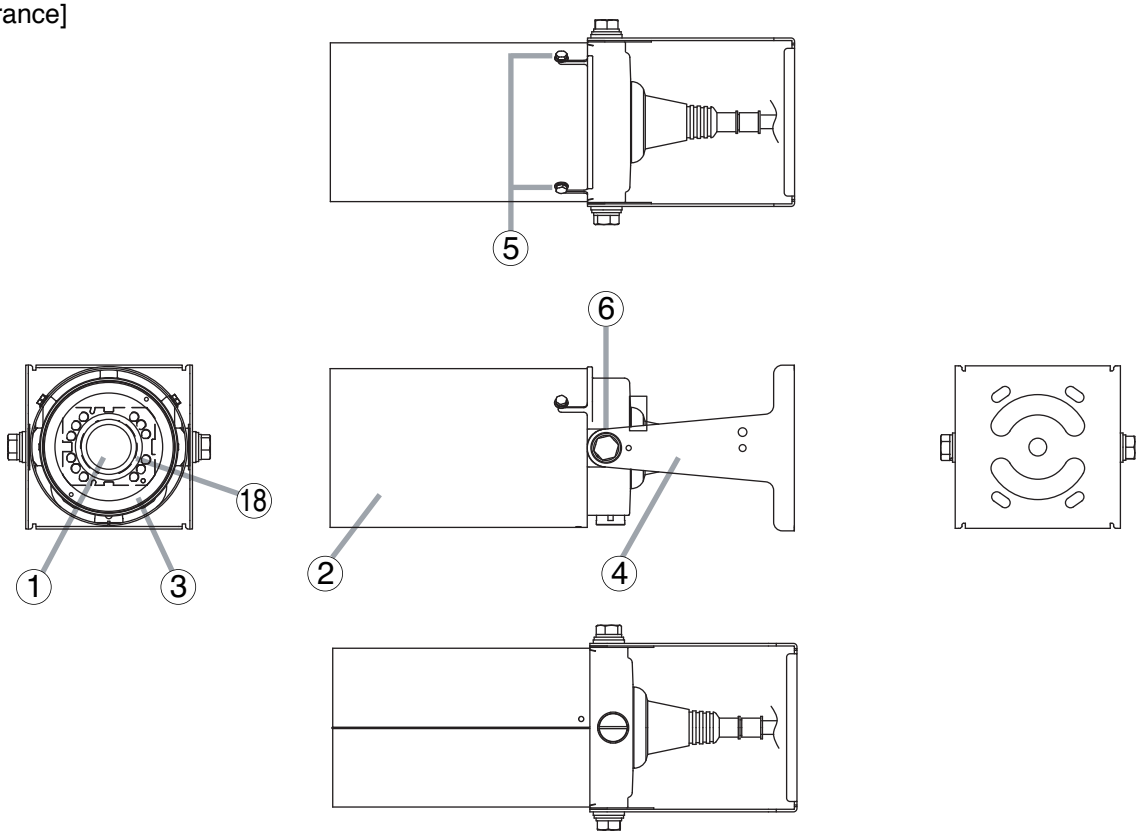
- **Backlight Compensation**
  This function reduces the darkening of subject images due to backlighting.

- **White Balance**
  Selection can be made of either automatic tracking white balance (ATW), which automatically adjusts the camera's white balance as the subject's color temperature changes, or automatic white balance (AWB), which keeps the white balance at the adjusted level.

- **High-Sensitivity Function (Slow-Speed Shutter)**
  The camera's automatic gain control (AGC) operates when images become dark. However, if the image remains dark, the camera's high-sensitivity function works to obtain a brighter image. This is done by extending the light exposure time during which the electrical charge is stored in the image pickup device. (After-image blurs may be produced by quickly moving subjects.)

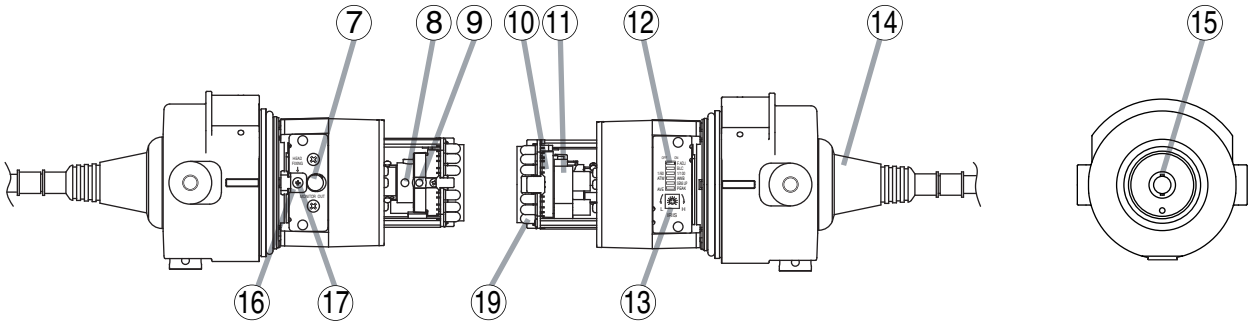
5. NOMENCLATURE

[Appearance]



[View with sunshade, front cover and mounting bracket detached]

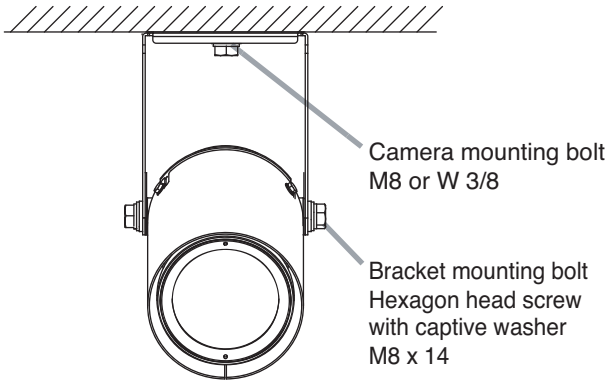
[View with waterproof cap detached]



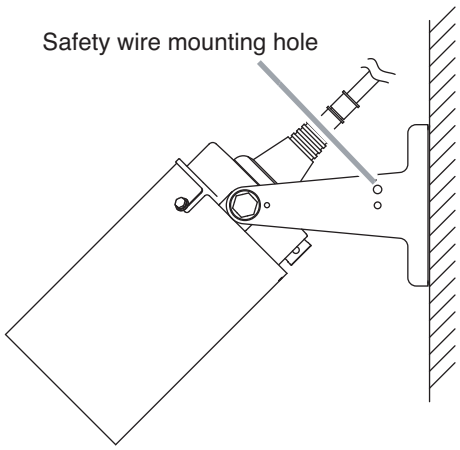
(1) Varifocal lens
(2) Sunshade
(3) Front cover
(4) Mounting bracket (accessory)
(5) Sunshade fixing screws
(6) Bracket mounting bolt (accessory)
(7) Monitor output terminal (RCA pin jack)
(8) Zoom ring fixing screw
(9) Focus ring fixing screw
(10) Focus ring
(11) Zoom ring
(12) Mode setting switch
(13) Iris control
(14) Cable with waterproof cap (accessory)
(15) Video output terminal
(16) Camera head fixing plate
(17) Camera head fixing screw
(18) Shield ring
(19) Infrared LED

6. INSTALLATION AND CONNECTIONS

[Ceiling mounting example]



[Wall mounting example]



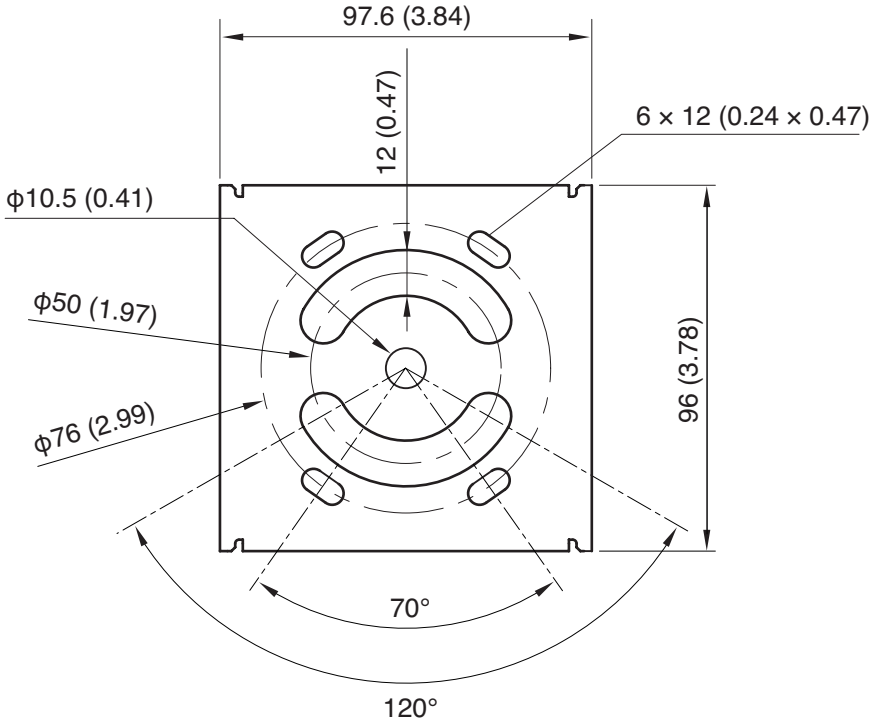
⚠ WARNING

Install the unit only in a location that can structurally support the weight of the unit and the mounting bracket. Doing otherwise may result in the unit falling down and causing personal injury and/or property damage.

Note

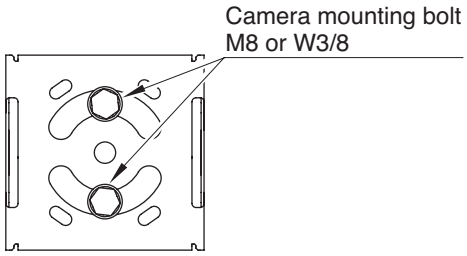
Install a safety wire as needed.
Select the wire considering its length, diameter, and hook strength.

1. Check the mounting bracket's installation location, and determine its mounting direction and position.
   Depending on the installation location, installation options are available as shown in the examples 1 - 3.



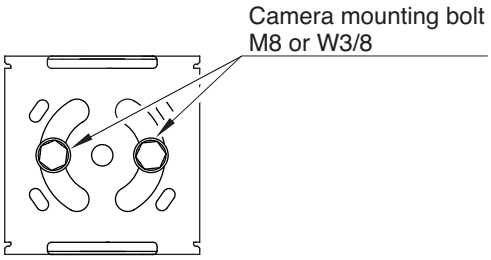
Unit: mm (inch)

[Example 1: Mounting to a ceiling or wall]



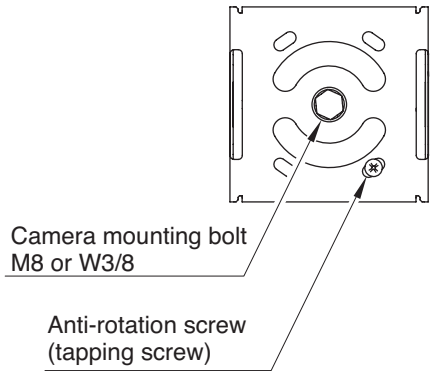
[Example 2: Mounting on a wall]

If angle which Example 1 can not cover is required;



[Example 3: Mounting to a ceiling or wall]

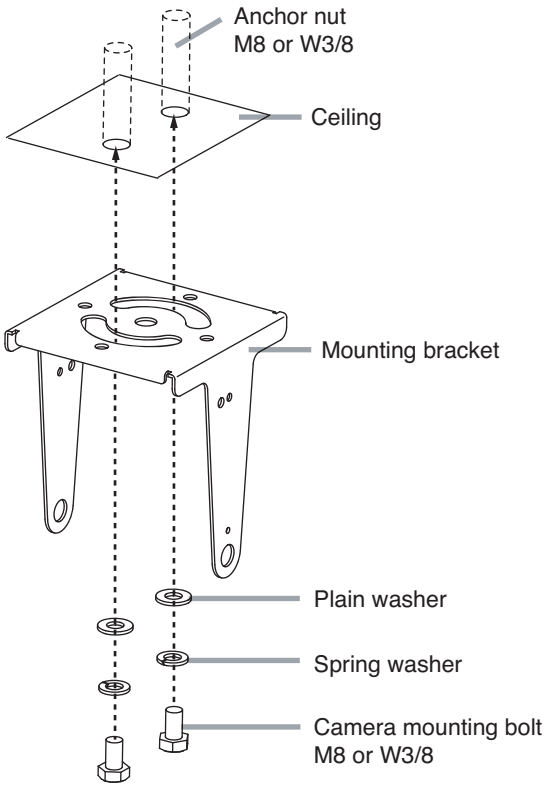
If only fine adjustment of camera angle is required;

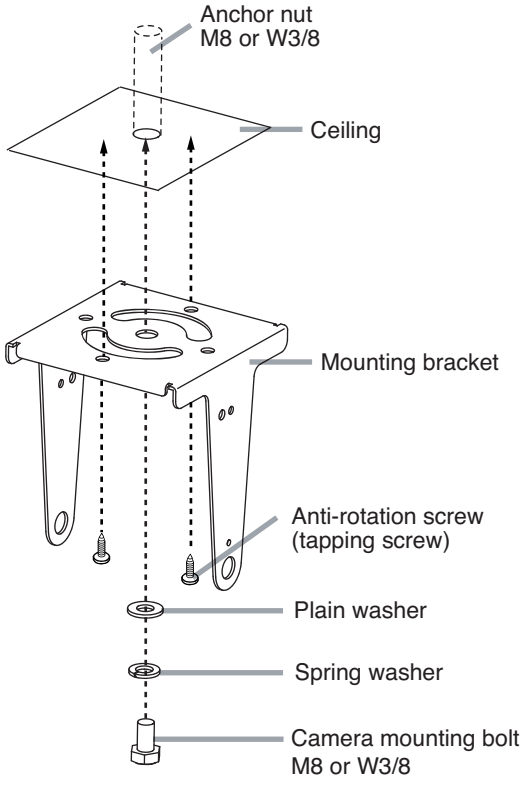


Note

Installing the mounting bracket using only one camera mounting bolt may cause the bracket to rotate or the bolt to come loose. Be sure to secure it with an anti-rotation screw (tapping screw).

2. Install an anchor nut into a ceiling or a wall, then secure the mounting bracket.

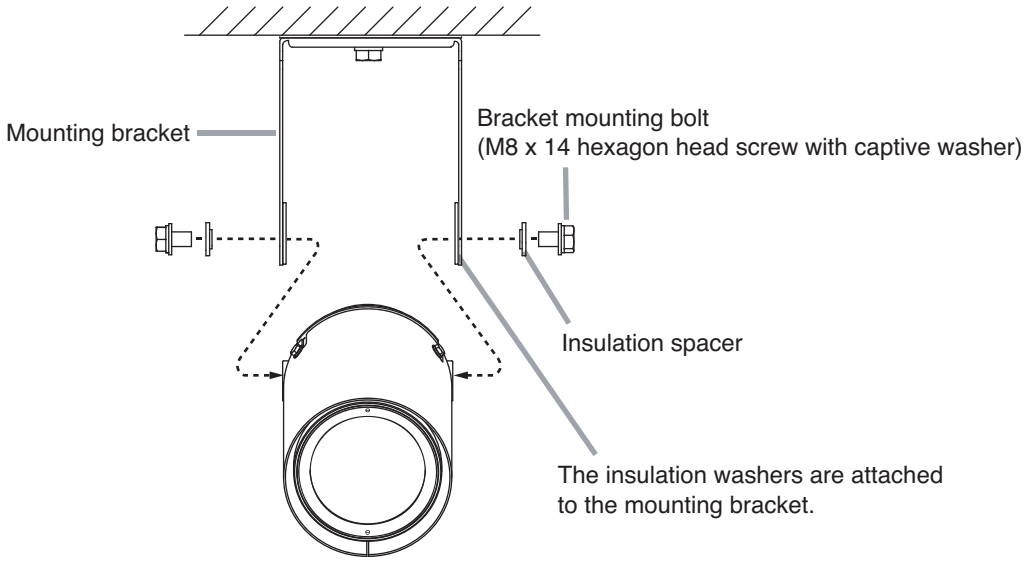




3. Install the camera unit to the mounting bracket using the supplied insulation spacers and Bracket mounting bolt (M8 x 14 hexagon head screw with captive washer).

Note

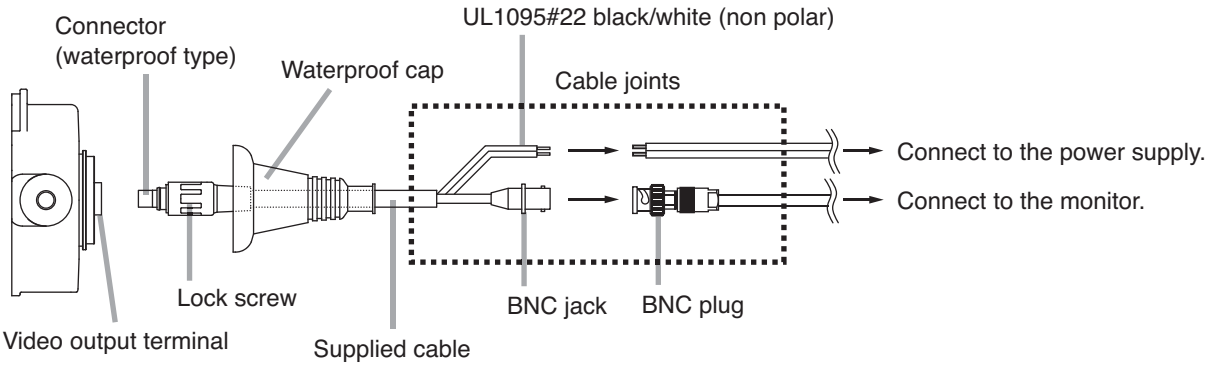
Be sure to position the insulation spacers between the bracket and bolt, as induction voltage or noise may be produced at the joints depending on installation conditions. Also, do not remove the insulation washers attached to the mounting bracket.



4. Connect the connector of the supplied cable with waterproof cap to the camera unit's video output terminal, then tighten the lock screw of the connector.

Notes

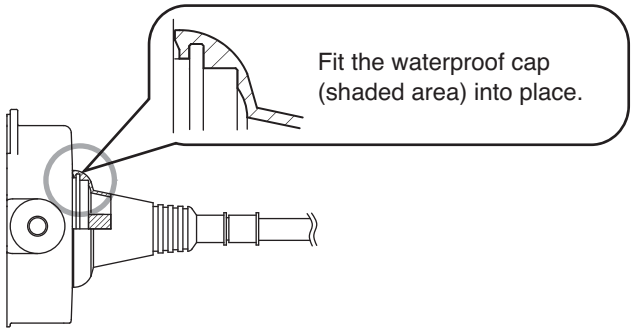
- To meet the waterproof requirements, insert the connector in place until it will not go any further.
- Wrap self-adhesive butyl rubber tape around the coaxial cable joints in order to prevent rain from soaking in.



5. Attach the waterproof cap to the camera unit.

Note

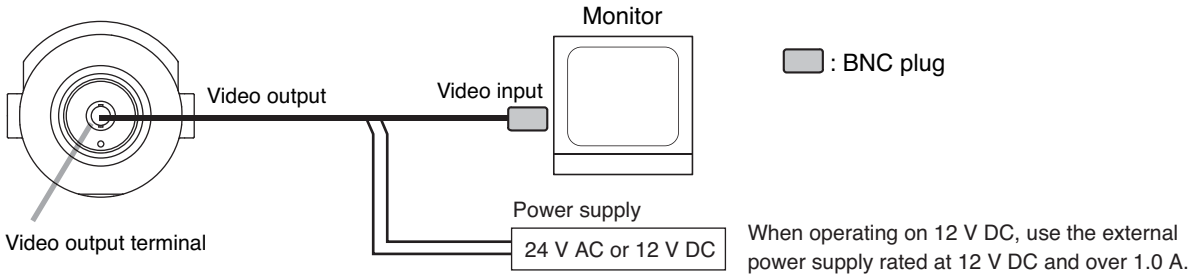
If the waterproof cap is not secured to the mounting surface, water or moisture soaks in, causing the corrosion of the BNC connector. This may cause unit failure. Check to be sure that the waterproof cap is secured as shown below.



6. Connect the camera unit.
   Connect the camera unit to the monitor and the power supply referring to the figure below.

   Note

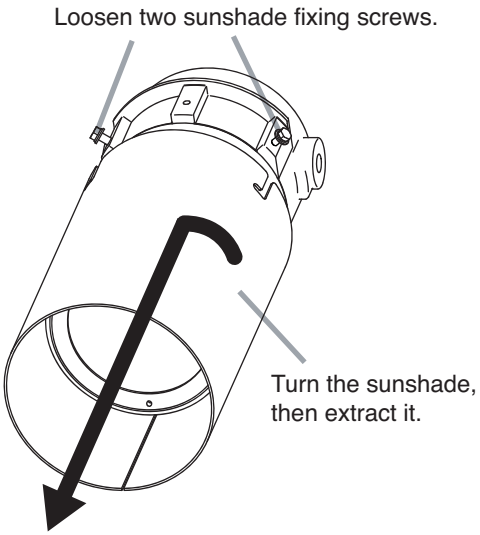
   If the Video output is not terminated at 75 Ω, camera images are not properly displayed. Make sure that the output has been terminated at 75 Ω at the connected monitor or switcher.



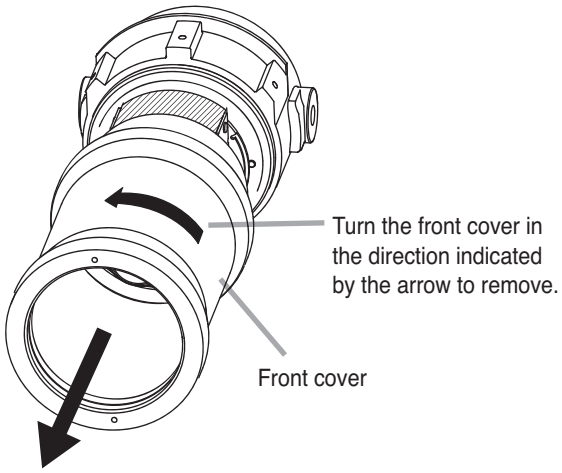
7. ADJUSTMENT

1. After completing camera unit installation and connections, remove both the sunshade and front cover.

[Removing the sunshade]



[Removing the front cover]



2. Connect the camera's monitor output terminal to the monitor.

   Note: The camera will not operate if the monitor output terminal is connected to the camera drive unit.

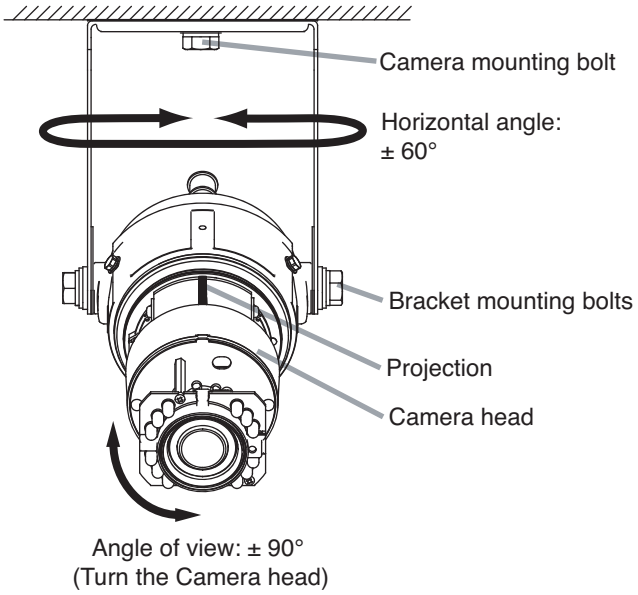
3. Switch on the power supply. The power is supplied to the camera, permitting the camera images to be viewed on the monitor.

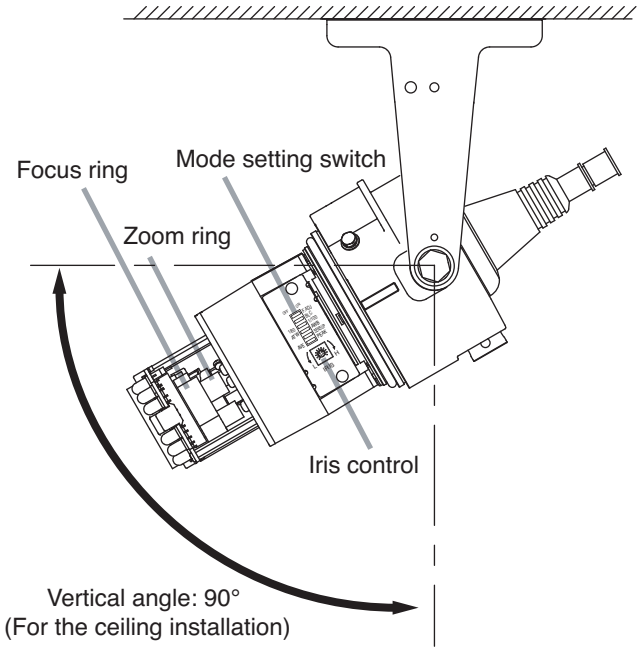
4. Set each mode setting switch to the position that provides the best picture reproduction.
   - If flicker may cause a nuisance, turn the Flickerless switch to ON.
   - If the camera images will be too dark, turn the Backlight compensation switch to ON.

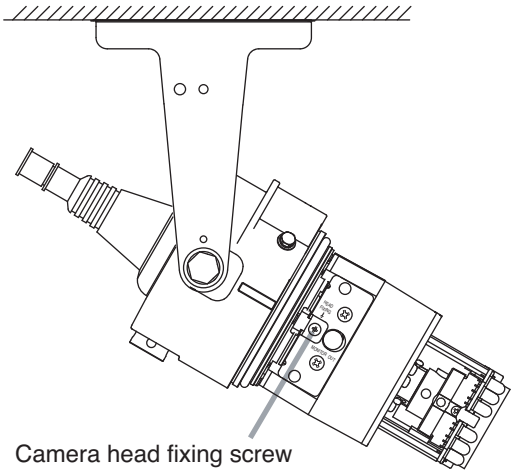
   Note: For the details, refer to p. 12, “About mode setting switch.”

5. Adjust the camera angle.
   - Camera's orientation can be adjusted with the camera mounting and bracket mounting bolts loosen.
   - Adjust the inclination of image so that the projection of the camera faces upward by loosening a camera head fixing screw and turning the camera head. After adjustment completion, retighten the camera head fixing screw.

   Note: Horizontal camera angle cannot be adjusted if the camera unit is installed as shown in [Example 3] on page 7.







6. Adjust the camera's angle of view.
   Adjust the angle of view with the Zoom ring and the focus with the Focus ring for the best possible picture reproduction.

Notes

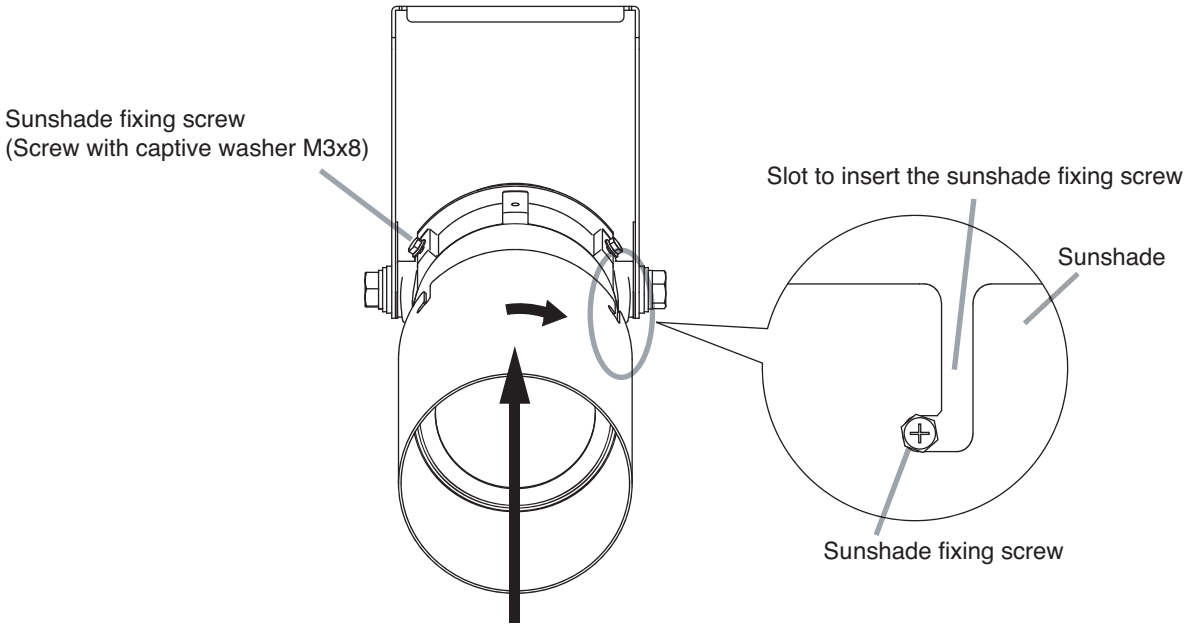
- Since the Iris control (for sensitivity adjustment) is factory-preset to an optimum position for general use, avoid tampering with it in normal conditions. Turning the control unnecessarily could cause reduced picture quality or equipment failure. When the Iris control needs to be readjusted to match a specific subject, first set both the Adjustment switch and the Backlight Compensation switch of the Mode switch to the OFF position, then adjust the control to an optimum level. After adjustment, cover the lens with your hand for several seconds and then release to check the lens for correct iris operation.
- If the focus is adjusted when the subject is bright, the subject may go out of focus when it grows dark. To avoid this, adjust the lens focus after setting the Adjustment switch of the Mode setting switch to the ON position. Be sure to switch it back to the OFF position after completing lens adjustment.
- The camera may experience fluctuations between color and black-and-white modes when used in dark locations with infrared illuminators, incandescent lights, halogen lights or other strong sources of infrared light other than the camera's internal infrared LED illuminator. In such cases, adjust to reduce the amount of infrared light detected by changing the angle of the infrared illuminator, halogen light, incandescent light, etc.
- The camera can also fluctuate between color and black-and-white modes when its distance relative to the subject area is short (approximately 2 meters (6.56 ft) or less). In such cases, install the camera as far away as possible from the subject area.
- When a blue subject occupies most of the screen, difficulty could be experienced in switching from black-and-white to color mode. In such cases, try to change the camera's view angle to reduce the ratio of blue in the screen.
- Turning the Iris control toward the "L" position may cause the camera not to switch to black-and-white mode smoothly.
- When the camera is switched to night mode with its lens set to the widest angle, slight vignetting (i.e. whitish areas) may be produced at the four corners of the image. This is not a defect. However, if this vignetting is an annoyance, adjust the lens to a viewing angle that is set slightly back from the wide angle limit.

7. After completing all the adjustments, disconnect the RCA pin jack connected to the monitor output terminal in Step 2.

8. Tighten both the camera mounting and bracket mounting bolts, then replace the front cover.
   Note: If the front cover is not secured enough, waterproof effect is reduced, causing unit failure.

9. Insert the sunshade from the front side of the camera unit as shown below, then secure it with two sunshade fixing screws.

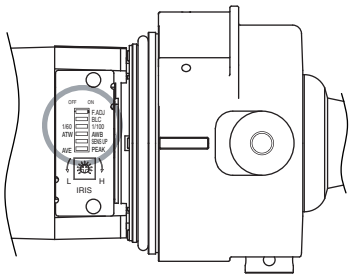
[Ceiling mounting example]

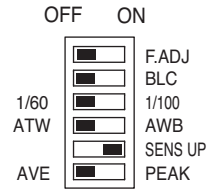


After inserting the sunshade, turn clockwise to fix it in position (as shown), then secure it with the sunshade fixing screws.

8. ABOUT MODE SETTING SWITCH

Set each switch to the position that provides the best picture reproduction.





Mode Setting Switch
(Factory-preset setting)

1: Focus adjustment switch
2: Backlight compensation switch
3: Flickerless switch
4: ATW/AWB selection switch
5: High-sensitivity switch
6: Average/Peak selection switch

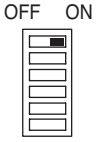
8.1. Focus adjustment switch:

Set to "ON" position when adjusting focus. (This setting provides the same effect as when using an ND filter.)



Standard:

After focus adjustment completion, set the switch to “OFF” position. Normally set to this position.



Adjustment (during adjustment):

Used when adjusting the lens focus. Turning on this switch forcibly makes the depth of field shallow, allowing finer focus adjustment. Set this switch to the OFF position after lens adjustment completion.

Note

When the Focus adjustment switch is set to the "ON" position, the color of the screen may change periodically if the camera is used under fluorescent lighting. Further, the screen may flicker in areas where the electrical frequency is 50Hz.

8.2. Backlight compensation switch:

Set to “ON” position to avoid making the subject too dark when it is backlit.



Standard:

Normally set to this position. Backlight Compensation function does not operate when the switch is set to this position.



Backlight Compensation(when backlit):

This position compensates images from being become too dark when it is backlit. Controls image brightness depending on the brightness of the subject in the center of the screen when set to the backlight compensation position.

8.3. Flickerless switch:

Set this switch to the ON position when annoying screen image flicker is detected.



1/60:

Normally set to this position.



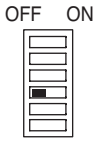
1/100:

Annoying screen flicker may result under fluorescent lighting in areas where power frequency is 50 Hz. In such cases, set the Flickerless switch to "ON" position to permit a flicker-free picture to be viewed.

Note

If the Flickerless switch is set to "ON" position, sensitivity is reduced compared to operation in the OFF position. When using the camera in dark conditions, or where light flicker is not an annoyance, set the switch to "OFF" position.

8.4. ATW/AWB selection switch:
Set the white balance operation.



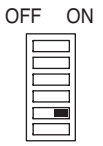
ATW: Normally set to this position. Automatically adjusts the camera white balance when the subject's color temperature changes.



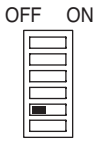
AWB: Set the switch to AWB when a single-color subject occupies most of the screen and the difference between the on-screen color and the actual color is annoying, or when the subject's fluctuating color temperature causes annoying changes in color balance. Setting the switch to AWB allows the subject to be displayed in the set white balance, even if the subject's color temperature changes.

Note
When setting the switch to AWB, switch from ATW to AWB while a white subject (such as printer paper) is fully displayed on the screen. The white balance sets itself approximately 2 seconds after having been switched to AWB. (Be sure to continue to display the white subject for at least 2 seconds after switching.)

8.5. High-Sensitivity Switch:
Set for automatic increases in sensitivity in dark conditions.



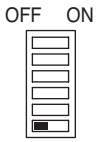
ON: Normally set to this position. High-sensitivity function (slow-speed shutter) increases the sensitivity up to eightfold in dark conditions.



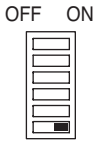
OFF: When after-image blurs of fast moving subjects in dark conditions create an annoyance, set the switch to the OFF position. Also set the switch to OFF when night mode over-exposure of the subject is annoying.

Note
Since the high-sensitivity function is operated by extending the light exposure time during which the electrical charge is stored in the image pickup device, after-image blurs may be produced by quickly moving.

8.6. Average/Peak Selection Switch:
Set this switch when night mode subject over-exposure is annoying.



Average:
Normally set to this position.



Peak: When in night mode, the camera's infrared light could make the over-exposure of nearby subjects annoying. In such cases, set the Average/Peak Selection switch to the Peak position to lighten the over-exposure condition.

9. TROUBLESHOOTING

Symptom	Possible Cause	Remedy
No camera image displayed on the monitor.	Monitor TV's power is not switched ON.	Switch on the main power.
	Cables are not correctly connected.	Connect the cables correctly.
	BNC plugs are not correctly soldered.	Solder BNC plugs correctly.
Camera image is not clear.	Camera lens does not focus properly.	Focus the lens.
	The lens or front cover is dirty.	Remove dirt on the lens or front cover.
	Image black level of the monitor is not correctly adjusted.	Adjust focus correctly.
The color of the camera image changes periodically.	The Focus adjustment switch is set to "ON."	Turn the Focus adjustment switch of the Mode setting switch to "OFF."
The screen flickers even when the Flickerless switch is set to "ON."	The Focus adjustment switch is set to "ON."	Turn the Focus adjustment switch of the Mode setting switch to "OFF."
When in night mode, the LED infrared light mixes with the onscreen display.	The shield ring around the lens is detached or moved from its original position.	Set the shield ring correctly.
	The front cover's acrylic surface is dirty.	Lightly clean using a commercial camera blower or cleaning paper.
After image appears when the subject becomes dark at night.	Check the position of the camera's High-sensitivity switch.	Turn the High-sensitivity to "OFF" if the after image is annoying and distracting.

10. SPECIFICATIONS

Model Number	C-CV454R-3 CU
Power Source	24 V AC, 50/60 Hz or 12 V DC
Power Consumption	4 W (300 mA, Maximum current: 800 mA)
Image Device	1/3 type IT-CCD
Number of Effective Pixels	768 (H) x 494 (V), 380,000 pixels
Scanning System	2:1 interlace
Scanning Frequency	Horizontal: 15.734 kHz, Vertical: 59.94 Hz
Monitor Output	VBS1.0 V(p-p), 75 Ω, RCA pin jack
Video Output	VBS1.0 V(p-p), 75 Ω, Water-resistant connector
Synchronizing System	Internal synchronization
Resolution (at center)	Horizontal: 540 lines (standard), Vertical: 350 lines
S/N Ratio	50 dB
Minimum Illumination (Flickerless: OFF)	0.5 lx (50 IRE, color, High-sensitivity switch OFF), 0.2 lx (20 IRE, color, High-sensitivity switch OFF), 0 lx (night mode)
Threshold Illumination for Mode Switching	Color-to-B/W mode: Approx. 2 lx, B/W-to-color mode: Approx. 10 lx (incandescent lamp)
White Balance Mode	ATW/AWB (switch selector)
Focal Length	f = 3.0 mm - 9.0 mm
Maximum Aperture Ratio	1 : 1.4 - 2.4
Iris	Auto iris
Angle of View	Horizontal: 90.3° - 31.9°, Vertical: 66.4° - 23.9°, diagonal: 115.4° - 39.8°
Infrared LED's Illumination Range	Indoor: Approx. 18 m (59.06 ft) (High-sensitivity switch OFF), Approx. 25 m (82.02 ft) (High-sensitivity switch ON) Outdoor: Approx. 15 m (49.21 ft) (High-sensitivity switch OFF), Approx. 25 m (82.02 ft) (High-sensitivity switch ON)
Functions	Backlight compensation, Flickerless function, Iris control, Max.8 x sensitivity increase (auto/off), Noise reduction (24-hours), Day/Night mode (auto selector), Adjustment switch: ON/OFF (use for focus adjustment)
Water/Dust Protection	IP66
Operating Temperature	−10ºC to + 50ºC (14ºF to 122ºF)
Operating Humidity	90%RH or less (no condensation)
Finish	Front cover, rear cover, and sunshade: Aluminum, light gray, paint Mounting bracket: Stainless steel, light gray, paint
Dimensions	ø92 x 230 (D) mm (ø3.62" x 9.06" (D)) (excluding the mounting bracket)
Weight	1.2 kg (2.65 lb)

The design and specifications are subject to change without notice for improvement.

• **Accessories**

Mounting bracket 1
Cable with waterproof cap (2 m (6.56 ft)) 1
Bracket mounting bolts
(Hexagon head screw with captive washer M8 x 14, stainless steel) 2
Insulating spacer 2

• **Optional products**

Pole mounting bracket: C-BC450PM
Mounting band: YS-60B

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133-22-186-8A