User Manual

Thank you for purchasing our product. If there are any questions, or requests, do not hesitate to contact the dealer.

This manual applies to the models below:

<table>
<thead>
<tr>
<th>Type</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I Camera</td>
<td>DS-2CE16H0T-ITE</td>
</tr>
<tr>
<td>Type II Camera</td>
<td>DS-2CE16H0T-IT1E</td>
</tr>
<tr>
<td></td>
<td>DS-2CE16H0T-IT3E</td>
</tr>
<tr>
<td></td>
<td>DS-2CE16H0T-IT5E</td>
</tr>
</tbody>
</table>

This manual may contain several technical incorrect places or printing errors, and the content is subject to change without notice. The updates will be added to the new version of this manual. We will readily improve or update the products or procedures described in the manual.

0100001080321
Regulatory Information

FCC Information
Please take attention that changes or modification not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

FCC compliance: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC 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.

FCC Conditions
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

EU Conformity Statement
This product and - if applicable - the supplied accessories too are marked with “CE” and comply therefore with the applicable harmonized European standards listed under the Low Voltage Directive 2014/35/EU, the EMC Directive 2014/30/EU, 2012/19/EU (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info.

Industry Canada ICES-003 Compliance
This device meets the CAN ICES-3 (A)/NMB-3(A) standards requirements.

Warning
This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.
Safety Instruction
These instructions are intended to ensure that user can use the product correctly to avoid danger or property loss. The precaution measure is divided into “Warnings” and “Cautions”.

**Warnings**: Serious injury or death may occur if any of the warnings are neglected.

**Cautions**: Injury or equipment damage may occur if any of the cautions are neglected.

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### Warnings

- In the use of the device, you must be in strict compliance with the electrical safety regulations of the nation and region.
- Input voltage should meet both the SELV (Safety Extra Low Voltage) and the Limited Power Source with 12 VDC according to the IEC60950-1 standard. Refer to technical specifications for detailed information.
- Do not connect multiple devices to one power adapter to avoid over-heating or a fire hazard caused by overload.
- Make sure that the plug is firmly connected to the power socket.
- Make sure that the device is firmly fixed if wall mounting or ceiling mounting is adopted.
- If smoke, odor or noise rise from the device, turn off the power at once and unplug the power cord, and then contact the service center.
- Never attempt to disassemble the camera by unprofessional personal.

### Cautions

- Do not drop the camera or subject it to physical shock.
- Do not place the camera in extremely hot, cold (the operating temperature shall be -40°C to 60°C), dusty or damp locations, and do not expose it to high electromagnetic radiation.
- Do not touch sensor modules with fingers.
- If cleaning is necessary, use clean cloth with a bit of ethanol and wipe it gently.
- Do not aim the camera at the sun or extra bright places.
- The sensor may be burned out by a laser beam, so when any laser equipment is in using, make sure that the surface of sensor will not be exposed to the laser beam.
- Do not expose the device to high electromagnetic radiation or extremely hot, cold, dusty or damp environment.
- To avoid heat accumulation, good ventilation is required for the operating environment.
Keep the camera away from liquid while in use for non-water-proof device.
While in delivery, the camera shall be packed in its original packing, or packing of the same texture.

Mark Description

<table>
<thead>
<tr>
<th>Mark</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>Voltage</td>
</tr>
</tbody>
</table>

1 Introduction

1.1 Product Features
The main features are as follows:
- High performance CMOS sensor
- Low illumination, 0.01 Lux@F1.2, AGC ON), 0 Lux with IR
- IR cut filter with auto switch
- OSD menu with configurable parameters
- Auto white balance
- Internal synchronization
- SMART IR mode
- PoC (with -E)
- 3-axis adjustment

Note:
For the models have PoC function, you can connect the video cable of the camera to the PoC device to get the power supply.

1.2 Overview
This manual applies to two types of bullet cameras. The overviews of each type are shown in the figures below.

1.2.1 Overview of Type I Camera

1.2.2 Overview of Type II Camera
2 Installation

Before you start:

- Make sure that the device in the package is in good condition and all the assembly parts are included.
- Make sure that all the related equipment is power-off during the installation.
- Check the specification of the products for the installation environment.
- Check whether the power supply is matched with your power output to avoid the damage.
- Make sure the wall is strong enough to withstand three times the weight of the camera and the bracket.
- If the wall is cement, insert expansion bolts before installing the camera. If the wall is wooden, use self-tapping screws to secure the camera.
- If the product does not function properly, contact your dealer or the nearest service center. Do NOT disassemble the camera for repair or maintenance by yourself.

2.1 Installation of Type I Camera

2.1.1 Ceiling/Wall Mounting without Junction Box

Steps:
1. Paste the drill template (supplied) to the place where you want to install the camera.
2. Drill the screw holes and the cable hole (optional) in the ceiling/wall according to the drill template.

![Drill Template](image)

Note:
Drill the cable hole, when adopting the ceiling outlet to route the cable.
3. Attach the bracket to the ceiling/wall and secure the camera with supplied screws.

![Fix the Camera to the Ceiling](image)

Note:
- The supplied screw package contains self-tapping screws, and expansion bolts.
- For cement wall/ceiling, expansion bolts are required to fix the camera. For wooden wall/ceiling, self-tapping screws are required.
4. Route the cables through the cable hole, or the side opening.
5. Connect the corresponding power cord, and video cable.
6. Power on the camera to check whether the image on the monitor is gotten from the optimum angle. If not, adjust the camera according to the figure below to get an optimum angle.

![Diagram](image)

**Figure 2-3 3-axis Adjustment**

1. Loosen the P screw to adjust the pan position [0° to 360°]. Tighten the screw after completing the adjustment.
2. Loosen the T screw to adjust the tilt position [0° to 180°]. Tighten the screw after completing the adjustment.
3. Loosen the R screw and rotate the camera [0° to 360°]. Tighten the screw after completing the adjustment.

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2.1.2 Ceiling/Wall Mounting with Junction Box

**Before you start:**
You need to purchase a junction box separately.

**Steps:**
1. Paste the drill template on the ceiling/wall.
2. Drill screw holes and the cable hole in the ceiling/wall according to the holes of the drill template.

![Diagram](image)

**Figure 2-4 Drill Template of Junction Box**

3. Take apart the junction box, and align the screw holes of the bullet camera with those on the Junction box' cover.
4. Fix the camera on the junction box’s cover with supplied screws.

![Diagram](image)

**Figure 2-5 Fix the Camera on the Junction Box’s Cover**

5. Attach the junction box body to the ceiling/wall by aligning the screw holes of the junction box.
6. Secure the junction box’s body with supplied screws on the ceiling/wall.

7. Route the cables through the bottom cable hole, or the side cable hole of the junction box.

8. Combine the junction box cover with its body.

9. Repeat the steps 5 and 6 of 2.1.1 Ceiling/Wall Mounting without Junction Box to complete the installation.

2.2 Installation of Type II Camera

2.2.1 Ceiling/Wall Mounting without Junction Box

Steps:
1. Paste the drill template (supplied) to the place where you want to install the camera.
2. Drill the screw holes according to the drill template, and the cable hole (optional) on the ceiling.

Note:
- Drill the cable hole in the center of the drill template, when adopting ceiling outlet to route the cable.
- Route the cables through the cable hole (optional) or the side opening.
- Fix the camera to the ceiling with supplied screws.
Fix the Camera to the Ceiling

Note:
- The supplied screw package contains self-tapping screws, and expansion bolts.
- For cement wall/ceiling, expansion bolts are required to fix the camera. For wooden wall/ceiling, self-tapping screws are required.

5. Connect the corresponding power cord, and video cable.
6. Power on the camera to check whether the image on the monitor is gotten from the optimum angle. If not, adjust the surveillance angle.

2.2.2 Ceiling/Wall Mounting with Junction Box

Before you start:
You need to purchase a junction box separately.

Steps:
1. Paste the drill template on the ceiling/wall.
2. Drill screw holes and the cable hole (optional) in the ceiling/wall according to the holes of the drill template.

Note:
Drill the cable hole, when adopting ceiling outlet to route the cable.
3. Take apart the junction box, and align the screw holes of the bullet camera with those on the Junction box’s cover.
4. Fix the camera on the junction box’s cover with three supplied screws.
5. Secure the junction box’s body with supplied screws on the ceiling/wall.
6. Route the cables through the bottom cable hole, or the side cable hole of the junction box.
7. Combine the junction box cover with its body with supplied screws on the junction box’s cover.

8. Repeat the step 5 and 6 of 2.2.1 Ceiling/Wall Mounting without Junction Box to complete the installation.
3 Menu Description

**Purpose:**
Call the menu by clicking button 📶 on the PTZ Control interface, or call preset No.95.

**Steps:**
1. Connect the camera with the TVI DVR, and the monitor, shown as the figure 3-1.

   ![Figure 3-1 Connection](image)

2. Power on the analog camera, TVI DVR, and the monitor to view the image on the monitor.
3. Click PTZ Control to enter the PTZ Control interface.
4. Call the camera menu by clicking 📶 button, or call preset No. 95.

   ![Figure 3-2 Main Menu Overview](image)

5. Click the direction arrow to control the camera.
   1). Click up/down direction button to select the item.
   2). Click Iris + to confirm the selection.
3). Click left/right direction button to adjust the value of the selected item.

3.1 VIDEO FORMAT
You can set the video format as 5MP@20fps, 4MP@25fps, 4MP@30fps, 2MP@25fps, and 2MP@30fps.

3.2 EXPOSURE
Exposure describes the brightness-related parameters, which can be adjusted by EXPOSURE MODE, and AGC.

<table>
<thead>
<tr>
<th>EXPOSURE MODE</th>
<th>GLOBAL</th>
<th>BACK</th>
<th>EXIT</th>
<th>SAVE &amp; EXIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGC</td>
<td>LOW</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 3-3 EXPOSURE

EXPOSURE MODE
You can set the EXPOSURE MODE as GLOBAL, BLC, and DWDR.
- **GLOBAL**
  GLOBAL refers to the normal exposure mode which performs exposure according to the whole image brightness.
- **BLC (Backlight Compensation)**
  BLC (Backlight Compensation) compensates light for the front object to make it clear, but this may cause the over-exposure of the background, where the light is strong.
- **DWDR (Digital Wide Dynamic Range)**
  The DWDR helps the camera provide clear images even under backlight circumstances. When both very bright and very dark areas simultaneously exist in the image, DWDR balances the brightness level of the whole image to provide clear images with details.

AGC (Automatic Gain Control)
It optimizes the clarity of the image in poor light conditions. The AGC level can be set as HIGH, MEDIUM, or LOW. Select OFF to disable the AGC function.

*Note:* The noise will be amplified, when the AGC is ON.

3.3 DAY/NIGHT
COLOR, BW (Black White), and AUTO are selectable for DAY/NIGHT switch.

**COLOR**
The image is colored in day mode all the time.

**B & W** (Black and White)
The image is black and white all the time, and the IR LIGHT turns on in the poor light conditions. You can turn on/off the IR LIGHT and set the value of SMART IR in this menu.
### 3.4 VIDEO SETTINGS

Move the cursor to **VIDEO SETTING** and click **Iris+** to enter the submenu. **WHITE BALANCE, BRIGHTNESS,**

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<table>
<thead>
<tr>
<th>DAY/NIGHT MODE</th>
<th>B &amp; W</th>
</tr>
</thead>
<tbody>
<tr>
<td>IR LIGHT</td>
<td>ON</td>
</tr>
<tr>
<td>SMART IR</td>
<td>2</td>
</tr>
<tr>
<td>BACK</td>
<td></td>
</tr>
<tr>
<td>EXIT</td>
<td></td>
</tr>
<tr>
<td>SAVE &amp; EXIT</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 3-4 B & W**

- **IR LIGHT**
  You can turn on/off the **IR LIGHT** to meet the requirements of different circumstances.

- **SMART IR**
  The **Smart IR** function is used to adjust the light to its most suitable intensity, and prevent the image from over exposure. The **SMART IR** value can be adjusted from 1 to 3. The higher the value is, the more obvious effects are.

**AUTO**
Automatically switch Color, or BW (Black and White) according to actual scene brightness.

You can turn on/off the **IR LIGHT**, and set the value of **SMART IR** in this menu.

<table>
<thead>
<tr>
<th>DAY/NIGHT</th>
<th>AUTO</th>
</tr>
</thead>
<tbody>
<tr>
<td>IR LIGHT</td>
<td>ON</td>
</tr>
<tr>
<td>SMART IR</td>
<td>2</td>
</tr>
<tr>
<td>D → N THRESHOLD</td>
<td>2</td>
</tr>
<tr>
<td>N → D THRESHOLD</td>
<td>7</td>
</tr>
<tr>
<td>BACK</td>
<td></td>
</tr>
<tr>
<td>EXIT</td>
<td></td>
</tr>
<tr>
<td>SAVE &amp; EXIT</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 3-5 AUTO**

- **IR LIGHT**
  You can turn on/off the **IR LIGHT** to meet the requirements of different circumstances.

- **SMART IR**
  The **Smart IR** function is used to adjust the light to its most suitable intensity, and prevent the image from over exposure. The **SMART IR** value can be adjusted from 1 to 3. The higher the value is, the more obvious effects are.

- **D → N Threshold (Day to Night Threshold)**
  **Day to Night Threshold** is used to control the sensitivity of switching the day mode to the night mode. You can set the value from 1 to 9. The larger the value is, the more sensitive the camera is.

- **N → D Threshold (Night to Day Threshold)**
  **Night to Day Threshold** is used to control the sensitivity of switching the night mode to the day mode. You can set the value from 1 to 9. The larger the value is, the more sensitive the camera is.
CONTRAST, SHARPNESS, SATURATION, DNR, and MIRROR are adjustable.

<table>
<thead>
<tr>
<th>VIDEO SETTINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHITE BALANCE</td>
</tr>
<tr>
<td>BRIGHTNESS</td>
</tr>
<tr>
<td>CONTRAST</td>
</tr>
<tr>
<td>SHARPNESS</td>
</tr>
<tr>
<td>SATURATION</td>
</tr>
<tr>
<td>DNR</td>
</tr>
<tr>
<td>MIRROR</td>
</tr>
<tr>
<td>BACK</td>
</tr>
<tr>
<td>EXIT</td>
</tr>
<tr>
<td>SAVE &amp; EXIT</td>
</tr>
</tbody>
</table>

Figure 3-6 VIDEO SETTINGS

WHITE BALANCE
White balance, the white rendition function of the camera, is to adjust the color temperature according to the environment. It can remove unrealistic color casts in the image. You can set the mode as AUTO, or MANUAL.

- AUTO
Under AUTO mode, white balance is being adjusted automatically according to the color temperature of the scene illumination.

- MANUAL
You can set the R GAIN/B GAIN value from 1 to 255 to adjust the shades of red/blue color of the image.

<table>
<thead>
<tr>
<th>WHITE BALANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODE</td>
</tr>
<tr>
<td>R-GAIN</td>
</tr>
<tr>
<td>B-GAIN</td>
</tr>
<tr>
<td>BACK</td>
</tr>
<tr>
<td>EXIT</td>
</tr>
<tr>
<td>SAVE &amp; EXIT</td>
</tr>
</tbody>
</table>

Figure 3-7 MANUAL MODE

BRIGHTNESS
Brightness refers to the brightness of the image. You can set the brightness value from 1 to 9 to darken or brighten the image. The higher the value is, the brighter the image is.

CONTRAST
This feature enhances the difference in color and light between parts of an image. You can set the CONTRAST value from 1 to 9.

SHARPNESS
Sharpness determines the amount of detail an imaging system can reproduce. You can set the SHARPNESS value from 1 to 9.

SATURATION
Adjust this feature to change the saturation of the color. The value ranges from 1 to 9.
DNR (Digital Noise Reduction)
The DNR function can decrease the noise effect, especially when capturing moving images in poor light conditions and delivering more accurate and sharp image. You can set the DNR value from 1 to 9.

MIRROR
OFF, H, V, and HV are selectable for mirror.
OFF: The mirror function is disabled.
H: The image flips 180° horizontally.
V: The image flips 180° vertically.
HV: The image flips 180° both horizontally and vertically.

3.5 FACTORY DEFAULT
Move the cursor to FACTORY DEFAULT and click Iris+ to reset all the settings to the factory default.

3.6 EXIT
Move the cursor to EXIT and click Iris+ to exit the menu without saving.

3.7 SAVE & EXIT
Move the cursor to SAVE & EXIT and click Iris+ to save the settings, and exit the menu.