Precaution

- Please read this manual carefully before installing the unit.

- Never disassemble the camera. Unauthorized disassembly may cause equipment failure or damage to the unit.

- Please do not install the camera in a place exposed to direct sunlight.

- Do not operate the camera in environments beyond the specified temperature. Refer to Environment Condition on APPENDIX (A): SPECIFICATIONS in this manual.

- Before applying power to the camera, check the power source to ensure that it is within the specifications. Refer to Electrical Characteristics on APPENDIX (A): SPECIFICATIONS.

- CAUTION: RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE MANUFACTURER’S INSTRUCTIONS.
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1. FEATURES

Camera

- 17 $\mu$m uncooled vanadium oxide micro-bolometer
- 320x240 / 640x480 resolutions
- 9, 18, 24, 37, 42, 50 degrees’ field of view (ZNT1-H)
- Weather Proof (IP66)

Video

- H.264 and MJPEG (Motion JPEG)
- Max 9 fps or 30 fps in all available resolutions depending on the camera model
- Text Overlay
- Video Motion Detection supported

Audio

- Two-way audio streaming
- Audio compression: G.711 μLaw

Network

- RTSP/ HTTP protocol supported
- 10/100 Base-T Ethernet

Sensor/Alarm

- 1 Digital Input / 2 Digital Outputs

Integration

- Software Development Kit (SDK)
- ONVIF compliant (Profile S & Profile G)

Additional Features

- microSDHC card embedded (optional)
- RS-485 supported
- DC12V, AC24V, or PoE

VCA (Video Content Analysis)

- VCA Detect (Included as basic)
2. PACKAGE CONTENTS

Please unpack the package carefully and handle the equipment with care. The package contains:

- Camera
  (Below is the sunshield attached image)
- Sunshield
- DC Power Jack Cable
- Tamper Resistant Screws x 8
- Base Mount
- Terminal Blocks
- Stem Bumpers x 2 and 1 Spare
- Cable Gland & Electrical Nut & O-ring
- Silica Gel Packet
- Quick Start Guide
- Screw & Plastic Anchor-3pcs
- Quick Installation Guide
- Installation Template
- Adaptor & AC Plug
- WALL CUSHION
- Torx Wrench

The contents above are subject to change without prior notice.
3. PART NAMES

① Sunshield
It prevents the lens from getting the direct sunlight.

② NTSC / PAL Button
The button switches the video output mode between NTSC and PAL.
Pressing the button will maintain the current video output mode unless pressing once more
to switch to the other mode.

③ Analogue Video Output
Connect a BNC output cable to see video via an analogue monitor.

④ RJ45 Socket
RJ45 LAN connector for 10/100 Base-T Ethernet (PoE supported).

⑤ Reset Button
Pressing this button reboots the camera or initializes the current settings of the camera to
the factory default settings. Refer to 6.3. Reboot and 6.4. Factory Default for the pressing
duration and more information.

⑥ Terminal Connectors for DI/DO
Connecting terminal blocks for digital input (sensor) and digital outputs (alarms)
Refer to 5. CONNECTIONS for more information.

⑦ Terminal Connectors for Audio In/Out
Connecting terminal blocks for audio input (microphone) and audio output (speaker)
Refer to 5.CONNECTIONS for more information.

⑧ Terminal Connector for RS-485
Connecting terminal blocks for RS-485
Refer to 5.CONNECTIONS for more information.

* The model herein and its appearance are subject to change without any prior notice.
⑨ Terminal Connector for Power Adaptor
Connect terminal blocks for power supply
Refer to 5.CONNECTIONS for more information.
4. INSTALLATION

4.1. Installing Cable Gland

1) Detach the back cover by twisting it counter-clockwise.
2) Disassemble the provided cable gland unit. There will be an electrical nut, a rubber sealing ring inserted inside the cable gland, a gland body, and a sealing nut.
3) Pass the electrical nut through the ends of the necessary cables.
4) Pass the cables through the holes both on the back and the bottom of the camera by referring to the image above.
5) Pass the provided O-ring and gland body through the ends of the cables that are on the backside of the camera.
6) Insert the cables into the rubber sealing ring at the point where about 4.5 inches (11.5 cm) of the cable ends remains to connect to the corresponding connectors on the back panel later.
7) Push the rubber sealing ring through the claw of the gland body.
8) Insert the sealing nut into the thread of the gland body, and tighten it by turning the nut on the thread. The rubber sealing ring will be tightened to fill the gap between the rubber sealing ring and the cables.
9) Push the gland unit through the hole on the back of the camera so that the other end of the thread on the gland unit will be inserted into the hole for gland near the bottom of the camera body.
10) Fix the gland unit to the hole by inserting the electrical nut and tightening it on the thread of the gland unit.

When you insert a video out cable together with other cables such as RJ45, DIDO, and audio cables, a thin type of the BNC cable is recommended as the standard BNC cable is too thick to be inserted together with the other cables into the rubber sealing ring.

Use the detachable cable with a separate BNC connector to pass the hole of the sealing nut. Otherwise, use the female type head of the BNC cable to pass the hole of the sealing nut.
4.2. Connecting Cable(s)

Connect the required cables to the corresponding connectors on the back panel of the camera body. Refer to 5. CONNECTIONS for more information about each connector.

4.3. Installing Base Mount

1) Insert the provided 8 tamper resistant screws to the corresponding screw holes on the base mount by referring to the image above.
2) Tighten them with a Phillips head #2 screwdriver to fix the base mount to the camera.
4.4. Closing the Back Cover

1) Insert the provided silica gel packet inside the back panel.
2) Close the back panel of the camera by twisting the back cover clockwise on the camera’s back panel.
3) Insert the two tamper resistant screws into the holes on the back cover, and tighten them with a Phillips #2 screwdriver to fix the back cover to the camera unit.

4.5. Installing the Sunshield

1) Insert the two provided stem bumpers to the holes at the bottom of the sunshield.
2) Place the sunshield on top of the camera body, and snap the sunshield to the base mount.

4.6. Adjusting Image Focus

The camera is pre-focused at factory to suit each FOV. However, in case you need to adjust the focus for optimal image quality at your installation site, you can manually set the focus by rotating the lens with hand.

The lens may be a little difficult to turn due to the O-ring behind the lens. Try to turn the lens counter-clockwise first to move the lens away from the base. Once the lens moves, start turning it in either direction for focusing by grabbing the barrel of the lens with one hand and grabbing the base unit with the other hand.
4.7. Installing with Bracket

The compatible accessories to mount this camera are as follows.

Model Names & Combinations

- WB-1W – Wall Mount Bracket
- JB-1W – Ceiling Mount Bracket
- PMA2 – Pole Mount Adaptor
- WB-1W + PMA2

Refer to the corresponding accessory model’s installation guide for the instructions.

Note

Some models, may or may not be required depending on the installation environment.
5. CONNECTIONS

**DIDO (Sensor/Alarm) Connection**

Two Alarms (DO1 | DO2)

The camera provides two digital outputs (alarms). The default status of each is respectively normally open (N.O) and normally closed (N.C) so that you can opt to use one accordingly.

Only the relay type is supported.

- **Digital Output 1**
  - Relay Rating: Max 30VDC 1A
  - Normally Open (N.O) at power off

- **Digital Output 2**
  - Relay Rating: Max 30VDC 1A
  - Normally Closed (N.C) at power off

---

**Caution**

Do not exceed the maximum relay rating.
One Sensor (DI)

The camera provides one digital input (sensor). Sensor (DI) can be connected to either a voltage type sensor or a relay type sensor as the following figures. Settings can be done through the camera’s webpage.

- **Input voltage range**: 0VDC minimum to 5VDC maximum, Max 50mA
- **Relay Rating**: Max 30VDC 1A

---

**Caution**

Do not exceed the maximum input voltage or relay rate.

---

Audio Connection

The camera provides a mono audio input and output. Due to low audio output power, an amplified speaker is recommended for enhanced sound (Refrain from connecting a headphone or an earphone directly to the camera).

- **Microphone In**: Max 2Vp-p, 20KΩ (90dB)
- **Headphone Out**: 60mW, 16Ω (95dB)
3 RS-485 Connection
The RS-485 serial port consists of TRX+(RX+) and TRX-(RX-) like the following image.

![RS-485 Application](image)

4 Power Connection
The camera can be powered by either 12VDC, 24VAC, or PoE. If the camera is powered via PoE, you do not need to connect the power adaptor. For more information about PoE, refer to “Appendix (C). Power over Ethernet” for more information.

To operate your camera by using 12VDC, make sure the polarity is correct before connecting the power cable. Incorrect connection may cause damage to the device.

![Power Connection](image)

5 RJ45 Connection
This is a RJ45 LAN connector for 10/100 Base-T Ethernet. Use the Ethernet cable (RJ45) to connect the device to a hub or a router in the network. Refer to “Appendix (C). Power over Ethernet” for more information.

6 Analogue Video Output Connection
Use a 75-ohm video coaxial cable to connect to a monitor’s analog video input.
The factory default for analogue video output is NTSC. Press once to set the video to PAL, and press again to set the video to NTSC.
6. CONFIGURATION

6.1. Set up network environment

The default IP address of the device is 192.168.XXX.XXX. Users can identify the IP address of the device from converting the MAC address's hexadecimal numbers, which is attached to the device. Be sure that the device and PC are on a same network before running the installation.

IP address: 192.168.xxx.xxx
Subnet mask: 255.255.0.0

6.1.1. Generic IP Environment

In case of generic private network environment where IP address 192.168.XXX.XXX are used, users may view the live streaming images on a web page using the device’s default IP address:

1. Convert the device’s MAC address to the IP address. Refer to the Hexadecimal-Decimal Conversion Chart at the end of the manual.
   (The MAC address of the device is attached on the side or bottom of the device.)

   MAC address = 00-13-23-01-14-B1 → IP address = 192.168.20.177
   Convert the last two sets of hexadecimal numbers to decimal numbers.

2. Start the Microsoft® Internet Explorer web browser and enter the address of the device.

3. Web streaming and device configurations are supported through ActiveX program. When the ActiveX installation window appears, authorize and install the ActiveX.
6.1.2. Custom IP Environment

IPAdminTool is a management tool, which automatically scans all of the network products for users to perform administrative tasks, which includes network configurations, firmware update, device reboot, and device organizations.

To modify the device’s default IP address for customized network area;

1. Find the device from the IPAdminTool’s list and highlight the device’s name.

2. Right-click the mouse and select IP Address; IP Setup window appears.
   * There are two options that are for a single device or for multiple devices respectively. For one device, click “Single”.

3. On the New Information table in the Single IP Change window, modify the last two digits of the device’s IP address. Make sure to input the correct ID and PW of the device (default: root / pass).

4. Click Apply to complete the modification.
6.2. View video on web page

Type the proper IP address to view the live streaming images through a web browser. The default username and password is \textbf{root/pass}.

6.2.1. ActiveX Installation

1. When the browser asks to install the AxUMF software, click \textbf{install} to proceed.

2. When Setup installation pop-up window appears, click \textbf{install} to proceed with rest of installations.

\begin{center}
\textbf{Note}
\end{center}

Depending on system OS and Internet Explorer version, installation experience may differ from one another. Figures described above are from Windows 7, Internet Explorer 9 environment.
6.2.2. View video using IPAdminTool

IPAdminTool automatically searches all activated network encoders and IP cameras and shows the product name, IP address, MAC address and etc.

1. From the IPAdminTool’s product list, select the device by highlighting it.

2. Right-click the mouse, and select Web view. Then, the system’s default web browser opens the device’s address.

Caution!

Whether directly accessing the streaming video by typing IP address on a web page or taking steps through IPAdminTool, the ActiveX is needed to be installed for the Microsoft® Internet Explorer to have the complete configuration privileges.
6.3. Reboot

On the Device
Perform the following procedure to reset your device.
1. Press the reset button for 2 seconds when the device is powered on.
2. Wait for the system to reboot.

Caution
Do not press the reset button for more than 2 seconds. Otherwise, the camera may be switched to its factory default settings.

On the Webpage
Reboot the device via the camera’s webpage:
1. Go to Setup > Maintenance > Reboot.
2. Click the Reboot button to reboot the device.
3. Wait for the device to complete booting.

6.4. Factory Default

Resetting the device back to the factory default will initialize all parameters including the IP address back to the factory defaults.

On the Device
1. Press the reset button for 10 seconds by making sure that booting is complete on the device.
2. Wait for the system to reboot.
Then, all the parameters of the device will be initialized.

On the webpage
Reset the current settings to the factory default values via the camera’s webpage:
1. Go to Setup > Maintenance > Reset All Settings.
2. Select the items that you want to preserve from the initialization among network settings, user account information, and time zone setting.
3. Click Reset All Settings.

The factory default settings can be inferred with the following information:

| IP address: | 192.168.xx.yy |
| Network mask: | 255.255.0.0 |
| Gateway: | 192.168.0.1 |
| User ID: | root |
| Password: | pass |
6.5. Safe Mode

What is Safe Mode?
There may be certain occasions that your camera repeatedly fails to boot. Then, your camera may enter safe mode to be recovered from the occasions.

What may have caused Safe Mode?
Here below are the main typical causes.
* The power supply is continually unplugged certain times in the middle of system booting.
* The firmware files required for system booting are damaged.
* There are conflicts in the system settings.

How to recover your system from Safe Mode

The messages above will appear on the webpage when your device has been rebooted in safe mode. Then, you should follow the instructions on the webpage according to each step.

There is another method to update firmware, which is using IPAdminTool. Please refer to ‘IPAdminTool User’s Manual.pdf’ for the detailed procedure.

If your device is still in safe mode after trying to update firmware, please contact your local agency to get further assistance.
## APPENDIX (A): SPECIFICATIONS

### Summary

<table>
<thead>
<tr>
<th>Camera Module</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Array Size</td>
<td>ZNT1-HET14G/ZNT1-HBT14G: 320x240</td>
</tr>
<tr>
<td></td>
<td>ZNT1-HAT24G/ZNT1-HBT24G: 640x480</td>
</tr>
<tr>
<td>Detection Type</td>
<td>Uncooled Vanadium Oxide Microbolometer</td>
</tr>
<tr>
<td>Sensor pixel size</td>
<td>17um</td>
</tr>
<tr>
<td>Spectral Response</td>
<td>8-14 μm</td>
</tr>
<tr>
<td>Lens</td>
<td>ZNT1-HET14G/ZNT1-HBT14G: 9°, 24°, 42°</td>
</tr>
<tr>
<td></td>
<td>ZNT1-HAT24G/ZNT1-HBT24G: 18°, 37°, 50°</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>Less than 50mK</td>
</tr>
<tr>
<td>Scanning System</td>
<td>Progressive Scan</td>
</tr>
</tbody>
</table>

### Video

<table>
<thead>
<tr>
<th>Compression Format</th>
<th>H.264 Baseline, Main, High profile (MPEG-4 Part 10/ AVC), MJPEG (Motion JPEG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Streams</td>
<td>Dual Stream, Configurable</td>
</tr>
<tr>
<td>Resolution</td>
<td>ZNT1-HET14G / ZNT1-HBT14G 320x240 (QVGA) 160x120 (QQVGA)</td>
</tr>
<tr>
<td></td>
<td>ZNT1-HAT24G / ZNT1-HBT24G 640x480 (VGA) 320x240 (QVGA) 160x120 (QQVGA)</td>
</tr>
<tr>
<td>Frame Rate</td>
<td>Configurable up to 30 FPS or 9 FPS</td>
</tr>
<tr>
<td>Motion Detection</td>
<td>Built-in</td>
</tr>
<tr>
<td>Burnt-in Text (Digital)</td>
<td>Time stamp and text caption overlay</td>
</tr>
<tr>
<td>Analogue Output</td>
<td>NTSC/PAL</td>
</tr>
</tbody>
</table>

### Audio

| Input/output | 1/1 channel |
| Compression Format | G.711 |

### Function

| Digital Input/output | 1/2 channels |
| RS-485               | Supported |
| Network              | 10/100 Base-T |
| Power over Ethernet (PoE) | Supported |
| Protocol             | QoS Layer 3 DiffServ, TCP/IP, UDP/IP, HTTP, HTTPS, RTSP, RTCP, RTP/UDP, RTP/TCP, mDNS, UPnP™, SMTP, DHCP, DNS, DynDNS, NTP, SNMPv2c/v3(MIB-II), IGMP, ICMP, SSLv2/v3, TLS, SRTP, RTMP |
| Storage              | 1 x microSDHC card embedded (optional) |
**Electrical Characteristics**

<table>
<thead>
<tr>
<th>Power Source</th>
<th>DC 12V (CLASS 2, LPS)/ AC 24V / PoE IEEE802.3af (Class 0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Consumption</td>
<td>Max 10W@12VDC</td>
</tr>
<tr>
<td>Audio Input</td>
<td>MIC in, Max2Vp-p, 20KΩ (90dB)</td>
</tr>
<tr>
<td>Audio Output</td>
<td>Line out, 60mW, 16Ω (95dB)</td>
</tr>
<tr>
<td>D/I</td>
<td>Max 50mA@5VDC, TTL level 1.5V threshold</td>
</tr>
<tr>
<td>D/O 1, D/O 2</td>
<td>Max 1A@30VDC</td>
</tr>
</tbody>
</table>

**Environment Condition**

<table>
<thead>
<tr>
<th>Operating Temperature</th>
<th>[DC12V/PoE] -40°C ~ 60°C (-40°F ~ 140°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Humidity</td>
<td>Up to 85% RH</td>
</tr>
</tbody>
</table>

**Mechanical Condition**

<table>
<thead>
<tr>
<th>Material</th>
<th>Poly-carbonate, Aluminum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension</td>
<td>3.7” x 3.9” x11.5” (95 x 98 x 293 mm)</td>
</tr>
<tr>
<td>Weight (Approx.)</td>
<td>1.2kg (2.65lb)</td>
</tr>
</tbody>
</table>
**APPENDIX (B): DETECTION RANGE**

*The detection range is of the maximum values. (Unit: meter)*

### ZNT1-HET14G / ZNT1-HBT14G

<table>
<thead>
<tr>
<th>Lens</th>
<th>Object</th>
<th>Identification</th>
<th>Recognition</th>
<th>VCA Event</th>
<th>Detection</th>
</tr>
</thead>
<tbody>
<tr>
<td>9°</td>
<td>Person</td>
<td>220</td>
<td>285</td>
<td>340</td>
<td>1,450</td>
</tr>
<tr>
<td></td>
<td>Vehicle</td>
<td>560</td>
<td>725</td>
<td>770</td>
<td>3,390</td>
</tr>
<tr>
<td>24°</td>
<td>Person</td>
<td>75</td>
<td>100</td>
<td>130</td>
<td>555</td>
</tr>
<tr>
<td></td>
<td>Vehicle</td>
<td>205</td>
<td>265</td>
<td>300</td>
<td>1,375</td>
</tr>
<tr>
<td>42°</td>
<td>Person</td>
<td>45</td>
<td>60</td>
<td>70</td>
<td>330</td>
</tr>
<tr>
<td></td>
<td>Vehicle</td>
<td>120</td>
<td>160</td>
<td>170</td>
<td>840</td>
</tr>
</tbody>
</table>

### ZNT1-HAT24G / ZNT1-HBT24G

<table>
<thead>
<tr>
<th>Lens</th>
<th>Object</th>
<th>Identification</th>
<th>Recognition</th>
<th>VCA Event</th>
<th>Detection</th>
</tr>
</thead>
<tbody>
<tr>
<td>18°</td>
<td>Person</td>
<td>220</td>
<td>285</td>
<td>340</td>
<td>1,450</td>
</tr>
<tr>
<td></td>
<td>Vehicle</td>
<td>560</td>
<td>725</td>
<td>770</td>
<td>3,390</td>
</tr>
<tr>
<td>37°</td>
<td>Person</td>
<td>105</td>
<td>140</td>
<td>160</td>
<td>745</td>
</tr>
<tr>
<td></td>
<td>Vehicle</td>
<td>280</td>
<td>365</td>
<td>360</td>
<td>1,825</td>
</tr>
<tr>
<td>50°</td>
<td>Person</td>
<td>60</td>
<td>100</td>
<td>110</td>
<td>550</td>
</tr>
<tr>
<td></td>
<td>Vehicle</td>
<td>200</td>
<td>260</td>
<td>270</td>
<td>1,260</td>
</tr>
</tbody>
</table>
APPENDIX (C): POWER OVER ETHERNET

The Power over Ethernet (PoE) is designed to extract power from a conventional twisted pair Category 5 Ethernet cable, conforming to the IEEE 802.3af Power-over-Ethernet (PoE) standard. IEEE 802.3af allows for two power options for Category 5 cables. The IEEE 802.3af-2003 standard allows up to 15.4 W of power the device. However, 12.95W is the available power, as some power gets lost in the cable. The updated IEEE 802.3at-2009 (PoE+) standard allows up to 25.5 W (Max 34.2 W) of power the device.

PoE has advantages over conventional power in such places where AC powers cannot be reached or is expensive to wire.

### Power Comparison

<table>
<thead>
<tr>
<th>Property</th>
<th>802.3af</th>
<th>802.3at</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available Power</td>
<td>12.95 W</td>
<td>25.50 W</td>
</tr>
<tr>
<td>Max. Power by PSE</td>
<td>15.40 W</td>
<td>34.20 W</td>
</tr>
<tr>
<td>Max. Current</td>
<td>350 mA</td>
<td>600 mA</td>
</tr>
<tr>
<td>Supported Cable</td>
<td>Category 3 or higher</td>
<td>Category 5 or higher</td>
</tr>
</tbody>
</table>

For proper activation of PoE, the Category 5 cable must be shorter than 100m and conform the PoE standard.

**With non-Power Sourcing Equipment (non-PSE)**

When it is connected with non-PSE, the power adaptor should be connected.

**With power adaptor**

Connecting both PSE and power adaptor does not do any harm to the product. Disconnecting PSE or power adaptor from device does not reboot the device as long as either one is connected to the device.
APPENDIX (D): DIMENSIONS

[Unit: mm]
### APPENDIX (E): HEXADECIMAL-DECIMAL CONVERSION TABLE

Refer to the following table when you convert the MAC address of your device to IP address.

<table>
<thead>
<tr>
<th>Hex</th>
<th>Dec</th>
<th>Hex</th>
<th>Dec</th>
<th>Hex</th>
<th>Dec</th>
<th>Hex</th>
<th>Dec</th>
<th>Hex</th>
<th>Dec</th>
<th>Hex</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>25</td>
<td>37</td>
<td>4A</td>
<td>74</td>
<td>6F</td>
<td>111</td>
<td>94</td>
<td>148</td>
<td>B9</td>
<td>185</td>
</tr>
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# REVISION HISTORY

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