

# UPC

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*User's manual*



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We are very grateful for using our product, please read the manual carefully before using the camera. It will provide the correct illustration for you to install and use.

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If you have a problem, which is not mentioned in the manual during the process of using the camera, please contact us or your authorized agent.

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# 1 Reading this first

## 1.1 Safety precautions

### 1.1.1 Warning

- 1、 Before using the camera, please ensure that you read and understand the safety precautions described below. Always ensure that the IR camera operate correctly.
- 2、 The safety precautions noted on the following pages are intended to instruct you in the safe and correct operation of the IR camera and its accessories to prevent injuries or damage to yourself, other persons and equipment.
- 3、 Use only the recommended power accessories. Use of power sources not expressly recommended for this IR camera may lead to overheating, distortion of the IR camera, fire, electrical shock or other hazards.
- 4、 Do not attempt to disassemble or alter any part of the equipment that is not expressly described this guide
- 5、 The power matched with IR camera should satisfy manual criterion. Please contact our agent or us if you are not sure about the installing power.
- 6、 Stop operating immediately if it emits smoke or noxious fumes .Failure to do so may result in fire or electrical shock. Immediately turn the IR camera's power off, remove the IR camera battery or unplug the power cord from the power outlet. Confirm that smoke and fume emissions have ceased.
- 7、 Stop operating immediately if it dropped or the casing damaged.

Failure to do so may result in fire or electrical shock. Immediately turn the IR camera's power off, remove the IR camera battery or unplug the power cord from the power outlet.

- 8、 Do not use substances containing alcohol, benzene, thinners or other flammable substances to clean or main the IR camera. The use of these substances may lead to fire.
- 9、 Do not handle the power cord if your hands are wet Handling it with wet hands may lead to electrical shock. When unplugging the cord, ensure that you hold the solid portion of the plug. Pulling on the flexible portion of the cord may damage or expose the wire and insulation, creating the potential for fires and electrical shocks.
- 10、 Do not install camera to the unstable wall and support arm, or it could lead to injury of people and camera.
- 11、 Please contact us immediately if you meet situations as follows:
  - a. The power or control line damaged.
  - b. Using the wrong voltage and type of power.
  - c. Cause damage when dropping the camera.
  - d. The camera occurs functional problems.
  - e. The camera still working wrong after operating properly as user manual.

|  |
|--|
| <p><b>Warning:</b> Do not aim the IR camera directly into the sun or at other intense heat source, which could damage the detector of the IR camera.</p> |
|--|

### 1. 1. 2 Caution

- 1、 Please avoid strong vibration, heavy pressure and soaking. Or it would damage the camera.
- 2、 If you want to change the location of the installed camera, please make sure turn off the power before start.
- 3、 Please install camera in a well-ventilated circumstance.
- 4、 If the camera work abnormally, please contact us, do not disassemble or alter camera in any ways. Manufacturer has no responsibility for

- the problem that caused by the unauthorized alter or maintain.
- 5、 When installing in outside, please take effective actions to prevent camera from water, humidity and dust.

## 1. 2 Prevent malfunction

Avoid damaging the detector of the IR camera, please read contents carefully as follows:

### 1、 **Avoid Condensation Related Problems**

Moving the IR camera rapidly between hot and cold temperatures may cause condensation (water droplets) on its external and internal surfaces.

You can avoid this by placing the IR camera in the plastic case (bundle) and letting it adjust to temperature changes slowly before removing it from the case.

### 2、 **If Condensation Forms Inside the IR Camera**

Stop using the camera immediately if you detect condensation. Continue to use may damage the IR camera. Wait until moisture evaporates completely before resuming use.

### 3、 **Storage For a Long Time**

Please put the camera into a shady and dry condition when without operating for a long time.

## 1. 3 Maintenance and Support

For more maintenance and other after-sale service, please refer to the random guarantee card.

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## 2 Preface

Thermal imaging detection technology has been imperative means to guarantee the safety of industrial production in developed countries. It is used mainly in many fields such as electrical system, metallurgy, petrochemical industry, machinery, coal, transportation, firefight, security, etc. During continuous production task in company, we can apply thermal imaging detection technology to detect device located in danger so that avoid stopping procedure of manufacturing and design. Comparing with the traditional detection method, it is no doubt that the technology has turned a new leaf in the history of detection industries.

Thermal imaging technology used widely in all kinds of industries as follows:

- Detection of electric devices and power transmission line
- Detection of hidden fire in fire fight work
- Rescue and command in fire spot
- Heat leakage and heat analysis of heat channel or heat insulation.
- Heat malfunction locating in an operating train.
- Heat analysis in electronic industry.
- Security surveillance at night in security department.

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## 3 Introduction

SATIR Universal Purpose Core (UPC) is an uncooled long wave thermal imager core which is highly modular design for thermal product OEMs or integration with their existing products/systems. With the multiple optional solutions, image processing and the standard video output, UPC can be easily integrated in the existing surveillance & security cameras or CCTV systems, robots, UAVs and vehicles.

SATIR UPC is composed of three parts: the main camera, control box and optional lenses. It provides high-quality infrared thermal image signal, analog video output and selectable lens matched with different field of view. It is also simple to installing and operating.



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# 4 Module introduction

## 4. 1、 Main camera

It turns the thermal radiation into visual infrared images, and realizes relevant function. Its internal structure is consisted of UFPA detector and processing main board. The system is designed with a housing which meets IP40 (optional to IP54) encapsulation standards.

## 4. 2、 Optional lenses

It collects radiation coming from target and focuses that on the detector. According to different field of view, lenses can be classified as two types: telephoto lens and wide-angle lens. The former can focus long distance and has a narrow FOV, while the later has a wide FOV but only focus shorter.

## 4. 3、 Control box

The control box is the connection between UPC and external device. Its function is to divide multifunctional port of UPC into each single output: power input, video output, COM port (RS232), meanwhile it also can control the menu settings in UPC.

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# 5 Structure and Function

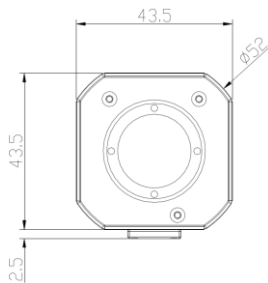
## 5.1 Main structure

Inside: detector, Main board, other component,  
Outside: housing, Connection port, control box.

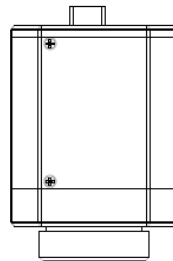
### 5.1.1 Detector type

UFPA, uncooled microbolometer, Spectral range: 8~14um,  
resolution 160\*120, 25um, NETD:80mk@30°C  
resolution 384\*288, 25um, NETD:50mk@30°C  
resolution 640\*480, 17um, NETD:60mk@30°C

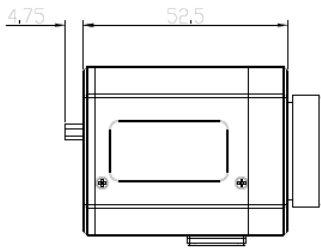
### 5.1.2 Housing



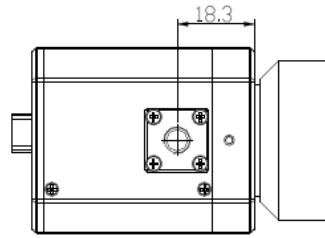
Front view



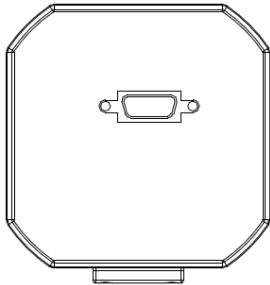
Vertical view



Side view



Button view



Back-end view

Connector:

Multifunctional port

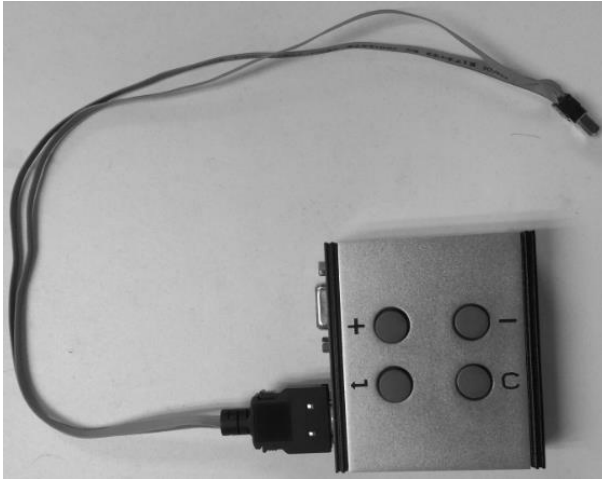
### 5. 1. 3 Power system

DC 8-12V

### 5. 1. 4 Video out

Analog video output

## 5. 1. 5 Control box



### Keypad definition:

1. Enter: pop out the menu, and save modified settings.
2. C/A: If no menu, click it to calibrate camera; if under menu, go back to previous menu level without saving.
3. Down: moving menu items/value down.
4. Right: moving menu items/value right.
5. Enter + C/A: turn the Down/Right definition to Up/Left.
6. After modified all settings, go to the version menu, and click Enter key to save all settings in UPC that will keep all settings after reboot UPC.
7. After setting Center/tracking spot, click Enter the save setting, and the click Enter again to pop out the spot.

## 5. 1. 6 Combination control port

RS232, transfer and control commands

|               |         |
|---------------|---------|
| Interface     |         |
| Port          | RS232   |
| Baud rate     | 9600bps |
| Start bit     | 1bit    |
| Date bit(hex) | 8 bit   |
| Stop bit      | 1 bit   |
| Parity bit    | N/A     |

Manual control commands:

|       |                      |
|-------|----------------------|
| On    | FF 01 00 03 00 5F 63 |
| Off   | FF 01 00 03 00 5E 62 |
| Up    | FF 01 00 08 00 04 0D |
| Down  | FF 01 00 10 00 04 15 |
| Left  | FF 01 00 04 00 04 09 |
| Right | FF 01 00 02 00 04 07 |
| Enter | FF 01 02 00 00 00 03 |
| Esc   | FF 01 04 00 00 00 05 |

## 5. 2 Function parameters

### 5. 2. 1 Structure and Appearance

Each module should install stable and has no loose movement. The surface of housing should be clean and bright without scratches.

### 5. 2. 2 Video format

PAL or NTSC video

### 5. 2. 3 Communication

Control signal transmission

### 5. 2. 4 Image quality

The image should not involve abnormal phenomenon as follows:

Image shadows, Horizontal stripe interruption, Oblique stripe interruption, Dispersive focusing, etc.

### 5. 2. 5 Consumption and Startup time

Under normal condition:  $\leq 3W$     Startup time:  $\leq 5s$

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# 6 Menu option

As a new generation of infrared core product, SATIR UPC possesses kinds of pseudo-color modes on the base of temperature measuring function, and contains many characteristics of temperature measuring and surveillance & security products. It has two types of menu option: temperature measurement menu; Non-temperature measurement menu.

## 6.1 Menu interface

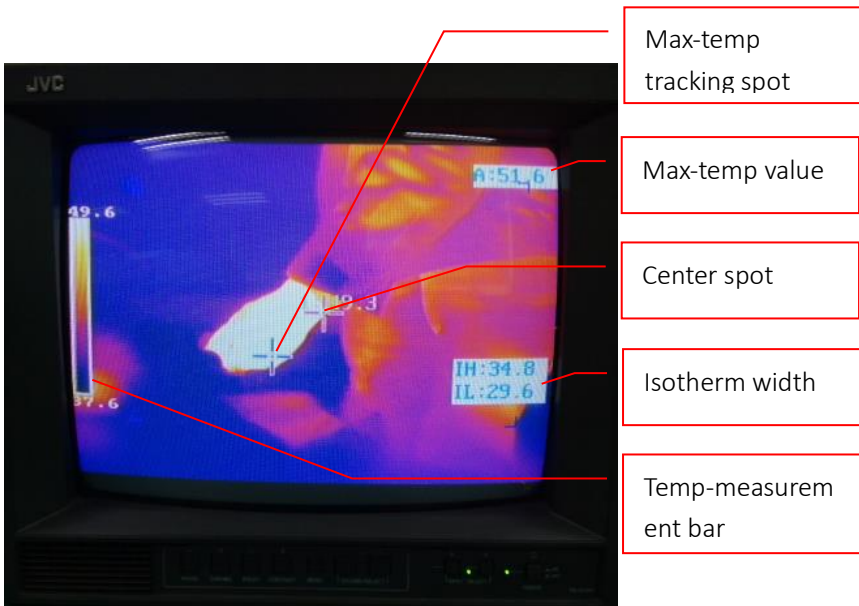
- Temp-measurement menu interface:

Max/Min temp tracking spot: Tracking the max/min temp spot on full screen and showing a cross cursor on the spot as a marker. The value of max/min temperature present in the top right corner of screen. It allows only one max/min temperature tracking spot;

Center spot: Measuring the temperature of center spot on entire screen and showing a cross cursor on it. The value of max/min temperature present in the top right corner of screen. It allows no more than one center spot;

Isotherm: Realizing the isotherm analysis on full screen, it contains three factors: the high temperature, low temperature and isotherm width. Users can use some color (Green/Red/Black/White) to indicate a temperature range that belongs to the setting width from the low temp to high temp. It allows no more than one isotherm analysis;

As shown in below picture:



Menu model as shown in below picture (other menu options are similar to this model, more details presented in following menu excels):



- Non-temp measurement menu interface  
It just contains image ongly, not includes analysis functions of temp-measurement menu. As shown in follows (menu model are similar



to temp-measurement menu):



## 6. 2 Temp measurement menu

Analysis option:

| Analysis            | Image   | Setup         | System information |
|---------------------|---------|---------------|--------------------|
| Center Spot         | Off     | On/Off        |                    |
| Tracking Spot       | Off     | Max/Min/Off   |                    |
| Isotherm            | Off     | On/Off        |                    |
| Emissivity          | 1       | 0.01~1        |                    |
| Distance            | 1 m     | 1~500m        |                    |
| Ambient Temperature | 25°C    | - 60 ~ 5000°C |                    |
| Humidity            | 50%     | 0 ~ 100%      |                    |
| Reflect Temperature | 25°C    | - 60 ~ 5000°C |                    |
| Illustration:       | Default | Contents      |                    |

Image option:

| Analysis       | Image          | Setup  | System information |
|----------------|----------------|--|--------------------|
| Palette        | Iron           | Iron/Rainbow/Feather/White hot/Black hot/Iron Inverted |                    |
| AGC            | Level and Span | Level and Span/ Level/ Span/Off                        |                    |
| Continuous AGC | Off            | Off/Level and Span/ Level                              |                    |
| Shutter Period | Normal         | Off/Short/Normal                                       |                    |
| DDE            | 0              | 0~15   |                    |
| Level          | 25.2 °C        | -40°C ~ 270°C/180°C ~ 620°C                            |                    |
| Span           | 8.0 °C         | 1°C ~ 270°C/4°C ~ 400°C                                |                    |
| Range          | -20°C~+250°C   | -20°C~+250°C/+200°C~+600°C                             |                    |
| Zoom           | x1             | x1/2/4   |                    |
| Illustration:  | Default        | Contents   |                    |

Setup option:

| Analysis            | Image   | Setup                 | System information |
|---------------------|---------|-----------------------|--------------------|
| Language            | English | Chinese/English       |                    |
| Video Output        | PAL     | PAL/NTSC              |                    |
| Temperature Unit    | °C      | °C/°F                 |                    |
| Distance Unit       | Meter   | Meter/Feet            |                    |
| Alert               | Off     | On/Off                |                    |
| Alert Temperature   | 30°C    | 30°C                  |                    |
| Correct Temperature | 0°C     | 0°C                   |                    |
| Isotherm Width      | 5°C     | 5°C                   |                    |
| Isotherm Color      | Green   | Green/Red/Black/White |                    |
| Illustration:       | Default | Contents              |                    |

System information:

| Analysis      | Image      | Setup      | System information |
|---------------|------------|------------|--------------------|
| Serial Number | UPC XXXXXX |            |                    |
| Produced On   | YYYY.MM.DD | 2015.06.01 |                    |
| Version       | 1.0.0      | 1.0.0      |                    |

### 6.3 Non-temp measurement menu

Image option:

| Image          | Setup                   | System information                                     |
|----------------|-------------------------|--|
| Palette        | Iron                    | Iron/Rainbow/Feather/White hot/Black hot/Iron Inverted |
| AGC            | Brightness and Contrast | Brightness and Contrast/<br>Brightness/ Contrast/Off   |
| Continuous AGC | Off                     | Off/Brightness and Contrast/<br>Brightness             |
| Shutter Period | Normal                  | Off/Short/Normal                                       |
| DDE            | 0                       | 0~15   |
| Brightness     | 6                       | 0~15   |
| Contrast       | 5                       | 0~15   |
| Zoom           | x1                      | x1/2/4   |
| Illustration:  | Default                 | Contents   |

Setup option:

| Image         | Setup   | System information |
|---------------|---------|--------------------|
| Language      | English | Chinese/English    |
| Video Output  | PAL     | PAL/NTSC           |
| Illustration: | Default | Contents           |

System information option:

| Image         | Setup      | System information |
|---------------|------------|--------------------|
| Serial Number | UPC XXXXXX |                    |
| Produced On   | YYYY.MM.DD | 2015.06.01         |
| Version       | 1.0.0      | 1.0.0              |

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# 7 Installation

## 7.1 Requirements for installer

1. Read and understand the manual completely.
2. Possess basic knowledge and operate skills in the field of electronic layout and electronic connection.
3. Possess certification of CCTV installation and maintenance. And the installer must own relevant qualification (working aloft).
4. Installer must possess basic knowledge and skills of CCTV components.

## 7.2 Tool

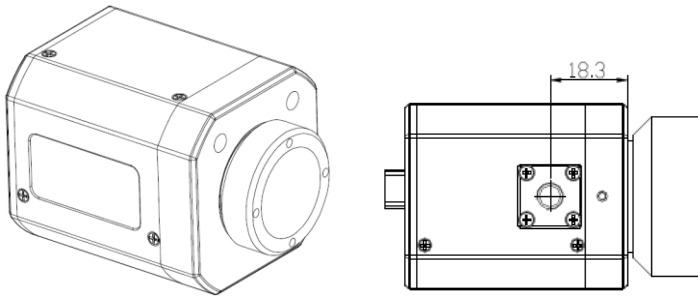
Straight/cross screwdriver

## 7.3 Start installation

Two main parts: 1. Main camera, 2. Lens

### 7.3.1 Main camera

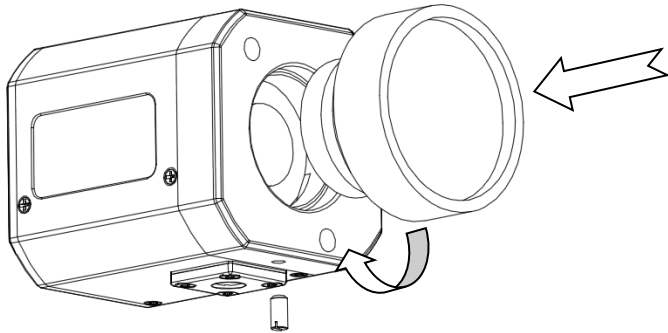
See below pictures: use universal screw to mount the camera



Main camera

### 7. 3. 2 Lens installation

See the below picture, point the lens direct to the camera. Plug in, and turn in clockwise direction. Focus to target, and lock the lens with the screw.



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# 8 Operating environment

## 8.1 Storage temperature

-40°C to +70°C (-40°F to +158°F)

## 8.2 Operating temperature

-15°C to +50°C (5°F to 122°F)

## 8.3 Working humidity

≤95%, uncondensed

## 8.4 Encapsulation standard

IP40

---

## 9 Manufacturer Details

### **Manufacturer Information**

**SATIR Europe (Ireland) Co. Ltd**

**Marley's Business Park**

**Marley's Lane**

**Drogheda**

**Co. Louth**

**Ireland**

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## SATIR UPC specifications:

| Type   | UPC80  | UPC160            | UPC384           | UPC640            |
|--|--|-------------------|------------------|-------------------|
| <b>Imaging performance</b>                         |  |                   |                  |                   |
| FOV/Minimum Focus distance                         | 51.6°x38.7° /0.3m  | 38.2°x28.6° /0.3m | 16.3°x12.2°/0.3m | 48° x36°/0.3 m    |
| Thermal Sensitivity(NET D)                         | 100mK@30°C, #F1.0  | 60mK@30°C , #F1.0 | 50mK@30°C, #F1.0 | 50mK@ 30°C, #F1.0 |
| Detector type                                      | Focal Plane Array (FPA), uncooled microbolometer               |                   |                  |                   |
| Resolution   | 80 x80   | 160 x 120         | 384 x 288        | 640 x 480         |
| Spectral range                                     | 8-14um   |                   |                  |                   |
| Focus mechanism                                    | Fixed lens   |                   |                  |                   |
| I.F.O.V  | 9.5mrad  | 2.4mrad           | 0.89mrad         | 1.3 mrad          |
| <b>Measurement [3]</b>                             |  |                   |                  |                   |
| Temperature Range                                  | -20°C~+250 °C (-4°F ~+ 482°F), up to 600 °C /1112°F (optional) |                   |                  |                   |
| Accuracy   | ±2°C Or ±2% Of Reading   |                   |                  |                   |
| Measurement tools                                  | Center spot, auto hot/cold spot, isotherm                      |                   |                  |                   |
| Temperature Alarms                                 | Yes  |                   |                  |                   |
| Set-up Controls                                    | Language/ Palettes/Units                                       |                   |                  |                   |
| Measurement Corrections                            | Ambient Temperature/ Emissivity Correction/ Distance/ Humidity |                   |                  |                   |
| <b>Environmental</b>                               |  |                   |                  |                   |
| Operating  | -15°C to +50°C (5°F to+ 122°F)                                 |                   |                  |                   |
| Storage  | -40°C to +70°C (-40°F to +158°F)                               |                   |                  |                   |
| Humidity   | 95% relative humidity, non-condensing                          |                   |                  |                   |
| Encapsulation                                      | IP40   |                   |                  |                   |
| <b>Physical Characteristics [Camera body only]</b> |  |                   |                  |                   |
| Weight   | 145g   |                   |                  |                   |
| Dimensions   | 43.5mm*45.5mm*52.3mm   |                   |                  |                   |

| <b>Interfaces</b>                             |   |                                    |  |  |
|---|---|------------------------------------|--|--|
| Power input                                   | DC 8-12V output to camera                               |                                    |  |  |
| Video output                                  | Output the composite video in NTSC@60Hz/PAL@50Hz format |                                    |  |  |
| RS232   | Controlling and setting                                 |                                    |  |  |
| <b>Optional Parts</b>                         |   |                                    |  |  |
| Optional Lens [2]                             | 3mm:<br>51.6° x38.7°<br>Customized                      | 6mm:<br>38.2° x28.6°<br>Customized | 6.8mm:<br>46.6°x34.9°<br>10mm: 30°x22°<br>19mm: 16°x12°<br>35mm: 9°x7°<br>Customized | 9mm:<br>73° x<br>53.5°<br>13mm:<br>48° x36°<br>25mm:<br>24° x<br>18°<br>Customized |
| <b>DRI Range [Human size: 1.7m x 0.6m][1]</b> |   |                                    |  |  |
| Detection                                     | 275m  |                                    |  |  |
| Recognition                                   | 70m   |                                    |  |  |
| Identification                                | 46m   |                                    |  |  |

Note:

[1] Data base on the 384\*288 camera with 19mm standard lens.

[2] Different lenses will cause different size and weight of whole camera.

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