

AFFO Series Operating Manual

V1.0

InfiRay Technologies Co., Ltd.

Specifications

Model	AP13
Detector Specifications	
Type	Uncooled Vox
Resolution	256×192
Pixel size, μm	12
NETD, mk	≤ 40
Frame Rate, Hz	25
Optical Specifications	
Objective Lens, mm	13
FOV	13.5°×10.1°
Optical Magnification, ×	1.2-2.4
Digital Zoom, ×	1×, 2×
Diopter	-3~+1
Detection Range, m (Target size: 1.7m×0.5m, P(n)=99%)	670
Display Specifications	
Type	LCOS
Resolution	720×540
Battery Power Supply	
Battery type/Capacity/Output voltage	Built-in lithium ion battery/4.4Ah/3.6V
Operating time (22 °C), h*	≤ 5h
External Power Supply	5V (Type C)
Physical Specifications	
Ingress Protection Rating	IP67
Memory Capacity, GB	32
APP	Support
Operating Temperature, °C	-10~+50
Weight (g)	<340
Dimension, mm	165×60×60

*Actual operation time depends on the density of Wi-Fi use and the built-in video recorder;

*Improvements may be made to the design and software of this product to enhance its features without prior notice to the customer;

I. Package Contents

- AFFO Handheld Thermal Imager
- Neck strap
- Portable bag
- Type-C data cable
- Micro HDMI video output data cable
- Power adapter
- Lens cleaning cloth
- User manual

II. Description:

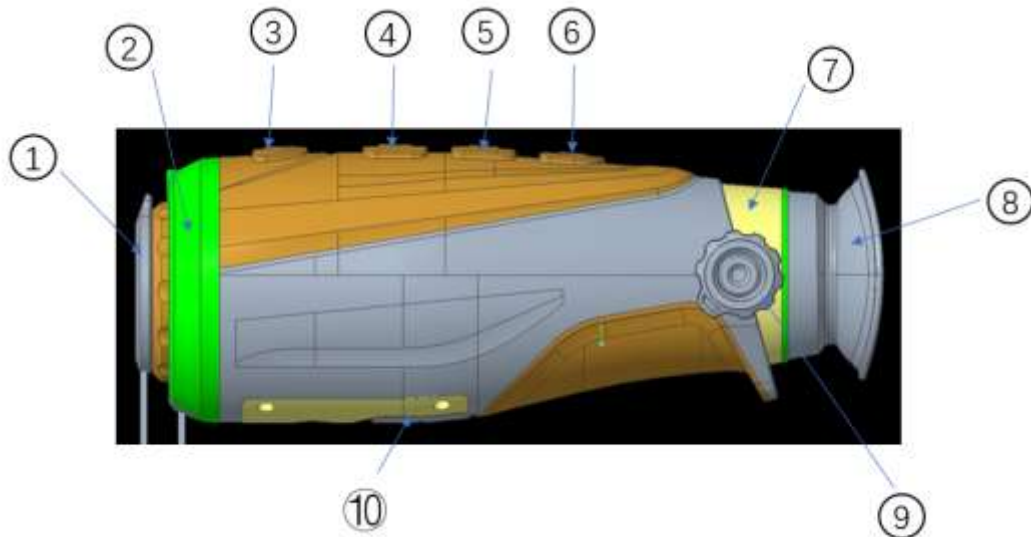
The AFFO series infrared thermal imager is for outdoor use. It can be used in the day or night, or in harsh weather (such as rain, snow, fog, and haze) without being affected by strong light. It requires no external light source. Even targets hidden behind obstacles (such as branches, grass, and shrubs) can be observed. The AFFO series thermal imager is light and easy to carry, small in size, suitable for single-hand operations, comfortable in use, and rich in functions. It can be widely used for hunting, searching, and locating in various outdoor conditions.

III. Distinguishing Features

- 12 μ m self-developed detector;
- High image quality;
- Lightweight and compact;
- Stadiametric rangefinding;
- Long detection distance;
- Built-in memory card, supporting photo taking and video recording
- Built-in Wi-Fi module, supporting app connection
- Defective pixel calibration;


IV. Units and Controls

1. Lens cover, 2. Front cover, 3. Power button, 4. Up button, 5. M button (menu button), 6. Down button, 7. Bottom casing, 8. Eye cup, 9. Focusing knob, 10. Type-C interface rubber cap



V. Button Operations

The following table lists buttons from top to bottom:

Button	Device Status/ Current Operating Mode	Press	Press and Hold
Power button 	Powered off	—	Power on the device
	Home screen	Enter the standby mode (the display is powered off, and the main chip enters the standby mode)	Shut down the device
	Standby	Wake up the device	—
	Menu screen	Return to the home screen	—
	Defective pixel calibration screen	Add/delete defective pixels	
↑ button	Home screen	Switch image modes	Turn on/off the laser

			pointer
	Menu screen	Scroll up the menu	——
	Powered off	——	Press and hold this button to turn on the LED indicator; Release the button to turn off the LED indicator
Menu button (M button)	Home screen	Enable digital zoom	Enter the menu
	Menu screen	Switch on and off/Enter the next-level options/Select a function parameter in sequence	Confirm the option/Save and go back to the previous level
↓ button	Home screen	Take a photo	Turn on the video recording
	Menu screen	Scroll down the menu	——
	Recording screen	Take a photo	End the recording and save the video
↑ button + M button	Home screen	——	Turn on/off stadiametric rangefinding
↑ button + ↓ button	Home screen	——	Turn on/off hotspot tracking
M button + ↓ button	Home screen	——	Calibration
↑ button + M button + ↓ button	Home screen	——	Switching the status of the laser pointer function

VI. Powering On

When the thermal imager is turned off, press and hold the **Power** button for 2s to turn on the

thermal imager. When an infrared image is displayed in the eyepiece, the thermal imager enters the operating status, and the indicator is on.

WARNING! The lens of the device must not be pointed at any sources of intense radiation energy, such as laser-emitting devices or the sun. This may damage the electronic components in the device. Damage caused by failure to comply with the operating guidelines is not covered under warranty.

VII. Powering Off

Press and hold the **Power** button. The shutdown countdown screen will appear. When the countdown counts from 3 to 0, the device shuts down. Then, you can release the **Power** button. The current status will be automatically saved after shutdown. **When the device is powering off and saving data, do not disconnect it from the power source. Otherwise, the data cannot be saved.**

VIII. Standby

When the device is powered on, press the **Power** button to enter the standby status. Press the **Power** button again to wake up the device. Then the thermal imager enters the operating status.

IX. Turning On/Off the LED Indicator

The AFFO series is equipped with the LED indicator. You can quickly turn on the LED indicator. When the device is powered off, press the ↑ button to turn on the LED indicator, and release the ↑ button to turn off the LED indicator (the LED indicator cannot be turned on when the device is turned on).

X. Switching the Image Mode

Setting the image mode: Press the ↑ button to open the image palette mode, which is white-hot, black-hot, palette, red-hot, and sky bird in sequence. The icon on the top status bar is updated in real-time.

XI. Diopter Adjustment

The diopter adjustment knob is used to adjust the eyepiece diopter for users with different degrees of myopia.

XII. Laser Locating

On the home screen, press and hold the \uparrow button to turn on the laser pointer. After the laser pointer is turned on, a laser pointer icon is displayed. Press and hold the \uparrow button again to disable the laser locating function.



XIII. Digital Zoom

On the home screen, press the **M** button to cyclically enable the digital zoom of $1\times$ and $2\times$. The zoom status is updated in the status bar on the top in real time.

XIV. Photo Taking/Recording

Photo taking: On the home screen, press the \downarrow button to take a photo. When the photo taking icon flashes for one time, the photo is taken. (When the memory is about to full, **!** will be displayed)

Recording: On the home screen, press and hold the \downarrow button to start recording. The recording time is displayed. Press and hold the \downarrow button again to exit and save the video. (When the device is recording videos, press the \downarrow button to take a photo)



XV. Stadiametric Rangefinding

On the home screen, press and hold the ↑ button + **M** button simultaneously to enter the stadiametric rangefinding mode;

Target box-selecting range adjustment: Press the ↑/↓ button to **enlarge/shrink** the range of the cursor for 2px. The upper and lower cursors each move for 1px. Press and hold the ↑/↓ button to enlarge/shrink the range of the cursor for 10px. The upper and lower cursors each move for 5px. The three reference distance values on the right change with the range of the cursor.



XVI. Hotspot Tracking

On the home screen, press and hold the ↑ button + ↓ button simultaneously to enter the hotspot tracking mode. A prompt box is displayed on the screen, to track the target with the highest temperature on the screen.



XVII. Calibration Mode

On the home screen, press and hold the **M** button + ↓ button for calibration (the calibration mode is consistent with that selected in the menu: A for automatic shutter, M for manual shutter, and B for background calibration). If you select the background calibration mode, a text prompt is

displayed in the central area of the screen. (cover lens during calibration)



XVIII. Video Output

On the main menu, turn on the video output function. The video output icon is displayed on the always-visible status bar on the top. Use a Micro HDMI video output data cable so that the video can be played on an external display.

XIX. Menu Settings

Press and hold the **M** button to enter the menu screen (disabled by default). The options from top to bottom are as follows:

1. Ultra-clear: On/Off
2. Wi-Fi: On/Off
3. Video output: On/Off
4. PIP: On/Off (this function is unavailable on the AP13)
5. Shutter correction: A for automatic shutter/ M for manual shutter/B for background calibration (A by default)
6. Screen brightness: 1 to 5 (3 by default)



Use the ↑ button and ↓ button to switch up and down among functions. Functions 1 to 4 are options where you can press the **M** button to turn on/off the corresponding function and save the settings instantly; For functions 5 to 6, you can press the **M** button to cyclically select a specific option under the function and press and hold the **M** button to save and confirm the settings. Then you can continue using the ↑ button and ↓ button to switch up and down among functions.



The functions on the second page of the menu from top to bottom are as follows:

1. Laser calibration
2. Defective pixel calibration
3. Date setup
4. Time setup
5. Language
6. Factory reset
7. Device information

Use the ↑ button and ↓ button to switch up and down among functions and press the **M** button to enter the next level. Use the ↑ button and ↓ button to select an option and press the **M** button for confirmation. The up and right directions indicate positivity, and the down and left directions

indicate negativity.

XX. Laser Calibration

Laser cross calibration: Point the cursor to the laser calibration function on the second page of the menu, and press the **M** button to enter the laser calibration page: the X axis and Y axis are displayed, the center cursor returns to the central area of the screen, and the default cursor returns to that of factory settings. (If the laser pointer is hidden, this function is also hidden. By default, this function is hidden)



- Use the ↑ button and ↓ button to switch among the four options, and press the **M** button to select an option. When the device is in the calibration mode, press the ↑ button and ↓ button to move 1px a time, and press and hold the ↑ button and ↓ button to move 10px at a time.
- If the X axis or Y axis is selected for calibration, the selected icon flashes continuously. Then: use the ↑ button to move the cursor to the right direction, and use the ↓ button to move the cursor to the left direction (X axis); Use the ↑ button to move the cursor to the up direction, and use the ↓ button to move the cursor to the down direction (Y axis). Then press the **M** button again to stop the flashing.
- When the arrow points to centre/default, press the **M** button. The cursor returns to the original position of centre/default.



(The Default position is configured upon delivery, and the arrow points to the Default position. Press and hold the \uparrow button + \downarrow button for activation to adjust the Default position: Adjust the position in the X axis and Y axis. After determining the small cross position, press the M button to save the settings.)

XXI. Defective Pixel Calibration



Point the cursor to the defective pixel calibration function on the second page of the menu, and press the M button to enter the page for defective pixel calibration (as shown in the following figure): In the mean time, PIP is enabled on the lower-left corner of the image, and the displayed area of the PIP image changes with the cursor position (this function is unavailable on the AP13).



Press the \uparrow/\downarrow button to switch between the X axis/Y axis, and press the M button to select an option. The icon continuously flashes. Press the \uparrow/\downarrow button to move the cursor displayed on the screen. Use the \uparrow/\downarrow button to move the cursor to left/right (X axis), or up/down (Y axis).

Press the M button again to stop the flashing and switch between the X axis/Y axis for adjustment.

On the lower area, the number of defective pixels is displayed. Point the cursor to the

position requiring defective pixel calibration, and press the  button to add a defective pixel. In the PIP image, **Add** is displayed (this function is unavailable in the AP13); In the same position, press the  button again to delete the defective pixel. In the PIP image, **Del** is displayed. Hover the point near the PIP image. The X axis and Y axis and the number of defective pixels of the PIP image are moved to the upper-left corner (this function is unavailable in the AP13).



Press and hold the **M** button. A prompt is displayed for you to save this operation. **Factory resetting can delete all added defective pixels.**



XXII. Date Setup

Point the cursor to the date setup function on the second page of the menu, and press the **M** button to enter the configuration page. The arrow indicates that the current option is configurable. Use the \uparrow button and \downarrow button to configure the correct date, press the **M** button to switch among year/month/day, and press and hold the **M** button to save and exit from the date setup.



XXIII. Time Setup

Point the cursor to the time setup function on the second page of the menu. The 24-hour system is used, and the time is displayed in the format of hour/minute. Press the **M** button to configure the time, use the \uparrow button and \downarrow button to configure the correct hour/minute, press the **M** button to switch between hour/minute, and press and hold the **M** button to save and exit from the time configuration. (The time on the home screen changes accordingly.)



XXIV. Language Selection

Point the cursor to the language selection function on the second page of the menu, press the **M** button to enter the configuration page. Use the \uparrow button and \downarrow button to switch between languages, and press the **M** button for confirmation. After the selected option flashes for one time, the option is saved and the screen goes back to the previous level.



XXV. Factory Reset

Point the cursor to the factory reset function on the second page of the menu, and press the **M** button to enter the configuration page. Use the **↑** button and **↓** button to select between yes and no, and press the **M** button for confirmation.



XXVI. Device Information

Point the cursor to the device information function on the second page of the menu. The device name, hardware version number, software version number, SN, PN, and so on are displayed.



XXVII. Charging

When the device is charging, the LED indicator is red if the device is not fully charged yet; the LED indicator turns green when the device is fully charged; (the LED indicator is covered by the Type-C interface rubber cap, and is on only in the charging status. When the power level is low,

a battery icon will show the low-battery status on the display.)

Note: The battery should be fully charged before first use.

XXVIII. Precautions

1. The rated voltage of the product is 5V. Please charge the device promptly when the battery is low so that the service life of the thermal imager will not reduce due to battery over-discharge;
2. Using this product in a high-temperature environment for a long time is not recommended. A too high temperature will cause the thermal imager to enter the high-temperature protection status and shut down automatically;
3. The recommended temperature for using this product is -10° to $+50^{\circ}$. A temperature exceeding this range will affect the service life of the product;
4. Before using this product in an environment with water, ensure that the Type-C interface rubber cap on the bottom of the thermal imager is tightly covered;
5. Do not aim the thermal imager at radiation sources such as the sunlight and laser in any circumstance, to avoid irreversible damage to the thermal imager;
6. In the calibration mode, the thermal imager will reduce the automatic shutter correction frequency. If the image is degraded, cover the lens cover for manual background calibration;
7. If the thermal imager is not used for a long time, recharge the device every 2 months at least, and store the device in a dry and ventilated environment.
8. When you configure the thermal imager with a laser pointer, do not aim the laser pointer at human eyes.
9. The laser and cursor functions are subject to the laws in different countries or regions;
10. Do not charge the device in an environment with a temperature over 40°C .