AT1280

Online Temperature

Measurement Thermal Camera

User Manual V1.0.4

IRay Technology Co., Ltd.

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Introduction to IRay Technology

IRay Technology Co., Ltd. concentrates on developing infrared thermal imaging technologies and manufacturing relevant products, with completely independent intellectual property rights. IRay is committed to providing global customers with professional and competitive infrared thermal imaging products and solutions. The main products include IRFPA detectors, thermal imaging modules, and terminal thermal imaging products.

With R&D personnel accounts for 48% of all employees, 787 intellectual property projects in terms of IRay have been authorized and accepted: 629 patented technologies authorized and accepted in China (including those for integrated circuit chips, MEMS sensors design and manufacture, Matrix III image algorithms and intelligent precise temperature measurement algorithms, etc.); 18 patented technologies authorized and accepted overseas; 101 software copyrights; and 39 integrated circuit layout designs.（Up to August, 2021）

IRay products have been applied in various fields, including epidemic prevention and control, industrial thermography, security and fire control, night vision observation, automatic driving, Internet of Things, AI, and machine vision.
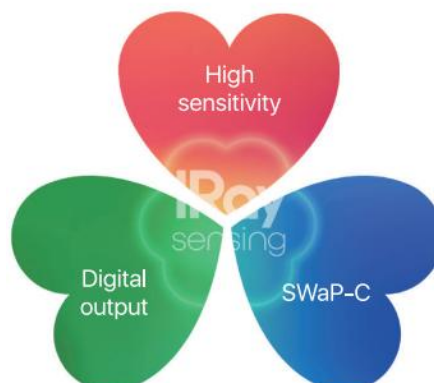
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1. Legal Disclaimer

1.1 Legal Disclaimer

The thermal cameras manufactured by IRAY TECHNOLOGY are warranted for a period of two-year and the accessories are warranted for a period of three-month form the delivery date of the original purchase, provided such products have been under normal storage, use and maintenance.

This warranty extends only to the original purchaser and is not transferable. It is not applicable to any product which has be subjected to misuse, neglect, accident or abnormal conditions of operation.

In the case of a defect in a product covered by this warranty the product must not be further used or maintained in order to prevent additional damage. The purchaser shall promptly report any defect to IRAY TECHNOLOGY or this warranty will not apply.

IRAY TECHNOLOGY will, at its option, repair or replace any such defective product free of charge if, upon inspection, the product or accessories prove to be defective, the user can contact with after-sales service department of IRAY TECHNOLOGY within the said warranty period.

1.2 Copyright

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This manual is used as a guide. The photos, graphics, diagrams and illustrations provided in the manual are only used to explain, which may be different from the specific product. The real product shall prevail. We try our best to make sure the contents in this manual are accurate. We do not provide any representations or warranties in this manual.

IRAY TECHNOLOGY reserve the right to update the manual. If you need the latest version of this manual, please contact us. It is recommended that you use this manual with the guidance of professionals.

1.3 Quality Assurance

The Quality Management System under which these products are developed and manufactured has been certified in accordance with the ISO9001 standard.

We reserve the right to make changes and improvements on any of the products without prior notice.

2.Safety Information

⚠ WARNING
1.Make sure you read all applicable Material Safety Data Sheets (SDS) and warning labels on containers before you use a liquid. The liquids can be dangerous. Injury to persons can occur.
2.It is prohibited to use the product in a high temperature above 85 °C or in a low temperature below-45 °C.
3.It is forbidden to disassemble or refit the thermal camera at will.

⚠ CAUTION
1.No matter there is a lens cover or not, do not point the infrared thermal camera towards strong light or equipment with laser radiation. This will affect the accuracy of the thermal camera and even damage the detector in the thermal camera.
2.Do not use the product under conditions that doesn't match the environmental requirements. For specific use environment requirements, see the product parameter table.
3.Do not apply solvents or equivalent liquids to the camera, the cables, or other items.
4.Be careful when you clean the infrared lenses. The lens has an anti-reflective coating which is easily damaged. Damage to the infrared lens can occur with too much force or cleaning with rough objects such as tissues.

3.Notice to user

3.1 Calibration

IRAY TECHNOLOGY recommends that you verify your calibration yearly in order to ensure accuracy. You can verify the calibration through IRAY TECHNOLOGY or third-party organizations.

3.2 Accuracy

For very accurate results, we recommended that you wait 30 minutes after you have started the camera before measuring a temperature.

3.3 Video Teaching

You can search for mount and use videos from our website.

3.4 Documentation Updates

Our manuals are updated several times per year, and we also issue product-critical notifications of changes on a regular basis. Please visit our website to access the latest manuals and notifications.

4.Customer Help

4.1 FAQ

You can find answers to FAQ about this model on the service support page of our official website.

4.2 Download

You can download the following contents from our website: www.infiray.com

Product Documentation
Client Software
Video Teaching Courses

5.Product Introduction

Main Features	Compact
	Support PoE
	The second generation auto-focus algorithm
	Simultaneous output of temperature data and image data
	Infrared detector of MP array
	Several optional lenses

Typical Applications	Power detection
	Industrial detection
	Process Control
	Machine vision scientific research
	Quality Inspection
	Status Monitoring
	Fire Warning

6.Product Figure and Explanation
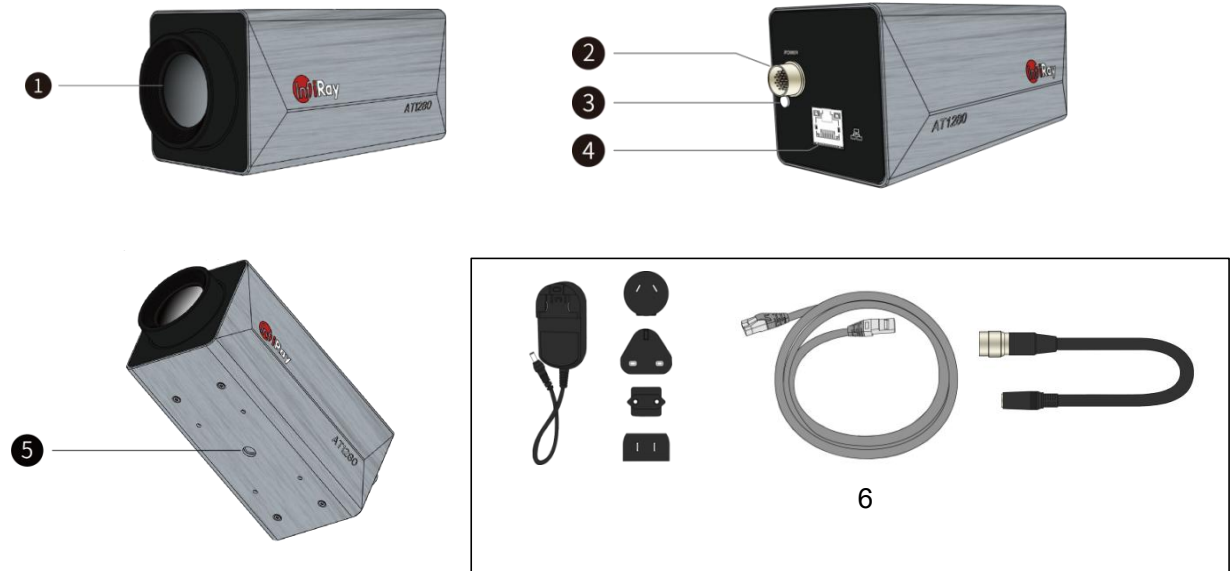
No.	Explanation
1	Infrared lens
2	Power interface
3	LED light
4	Ethernet/Network cable interface
5	Tripod connection
6	Accessories from left to right: Power adapter, gigabit network cable, power cable

Table 6.1 Explanation of Product Appearance

7.Product Application Scenarios
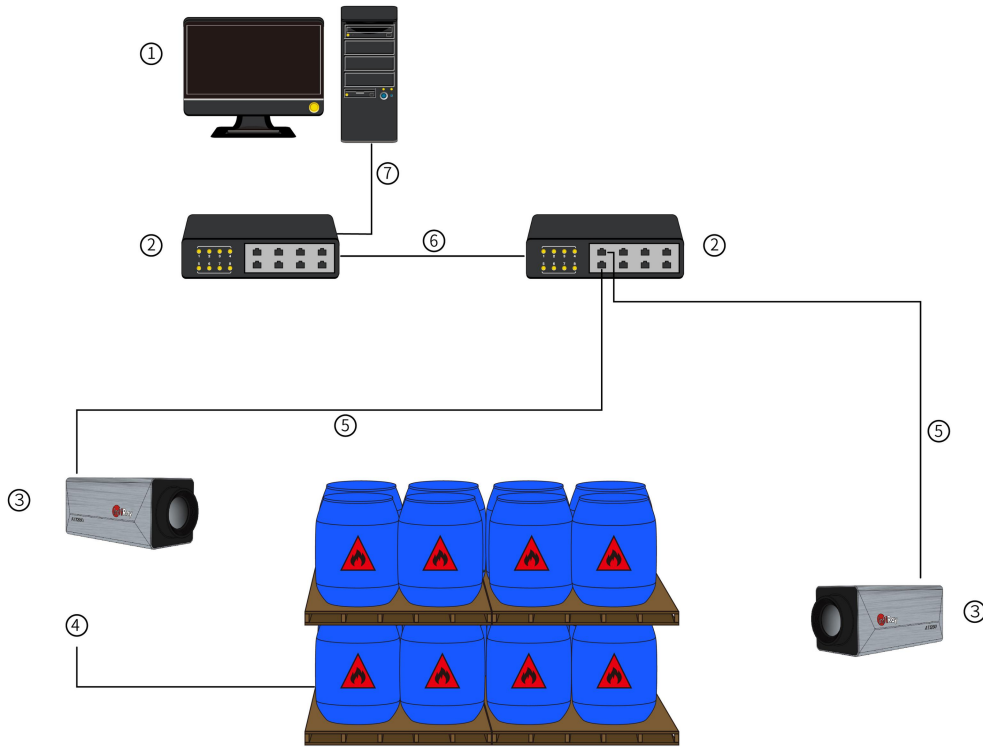
No.	Descriptions
1	PC/Display
2	Exchanger
3	Thermal camera
4	The detected object
5.6.7	Cables

8. Product Models Reference

AT1280	4	X
Model	Lens	Reserved
AT1280	4: 19mm	X
AT1280	5: 35mm	X

Table 8.1 Product Models List

You can refer to the below table for the detailed description of the reserved position.

D/F	Chinese/English
S/N	Standard/no logo
P	P：support GigE Vision protocols
X	Reserved for the customized product

Table 8.2 Detailed Info for the Reserved Position

For example: AT12804DSPX stands for AT1280 with 19mm lens, Chinese, standard.

9.Lens Parameters

Resolution	Focal Length	FOV（H×V）	IFOV
1280×1024	19mm	44°×35.8°	0.63mrad
1280×1024	35mm	25.1°×20.1°	0.34mrad

Table 9.1 AT1280 Lens Parameters

10.Quick Start Guide

|	**Please follow the steps:**
1.	Install IRT_TAS_AT, the software may be updated, the actual version shall prevail. The computer configuration for installing the software is recommended to meet the following conditions:
	1.) i5-9500T and above CPU
	2.)8G and above memory
	3.)64-bit Win10 system
	4.) Main board H370 chip set
	5.) Support Gigabit network.
	6.)The screen resolution is recommended to be 1920×1080
	7.) Video Memory 128MB
	8.) Network card RTL8168/8111/8112 Gigabit Ethernet Controller
2.	Follow the installation instructions in Chapter 11.1.2 to connect the thermal camera, power supply, and a computer. You can also connect to the Ethernet cable through the PoE power supply module.
3.	Follow the instructions in *IRT_TAS_AT_User Manual* to set the computer IP, change the IP to 192.168.1.×××.(Do not choose 123 or 29 to avoid connection failure for the same IP with the camera).
4.	Run IRS_TAS_AT as an administrator, enter the correct user name and password, and click Login.
5.	Continue to follow the procedures in the software instructions. If the camera is successfully connected and the image is normal, then the software can be used for thermal imaging control and temperature analysis.
6.	The client software TAS is applicable for the thermal camera, which can realize other functions needed. The client software TAS can realize the below functions: ● Image capture and video recording ● Thermographic analysis/secondary analysis ● Export recorded infrared data ● Set the parameters and alarm information ● Update firmware to acquire the new functions

11.Product and Accessories List

Product and Accessories
AT online temperature measuring thermal camera
Network cable
Power cable
Power adapter

**Table 11.1 Product and Accessories List**

12.Mechanical Installation

The thermal camera can be mounted to the desired position through the mounting hole at the bottom.

⚠ **WARNING**

Do not use too long screws. That will damage the thermal camera.
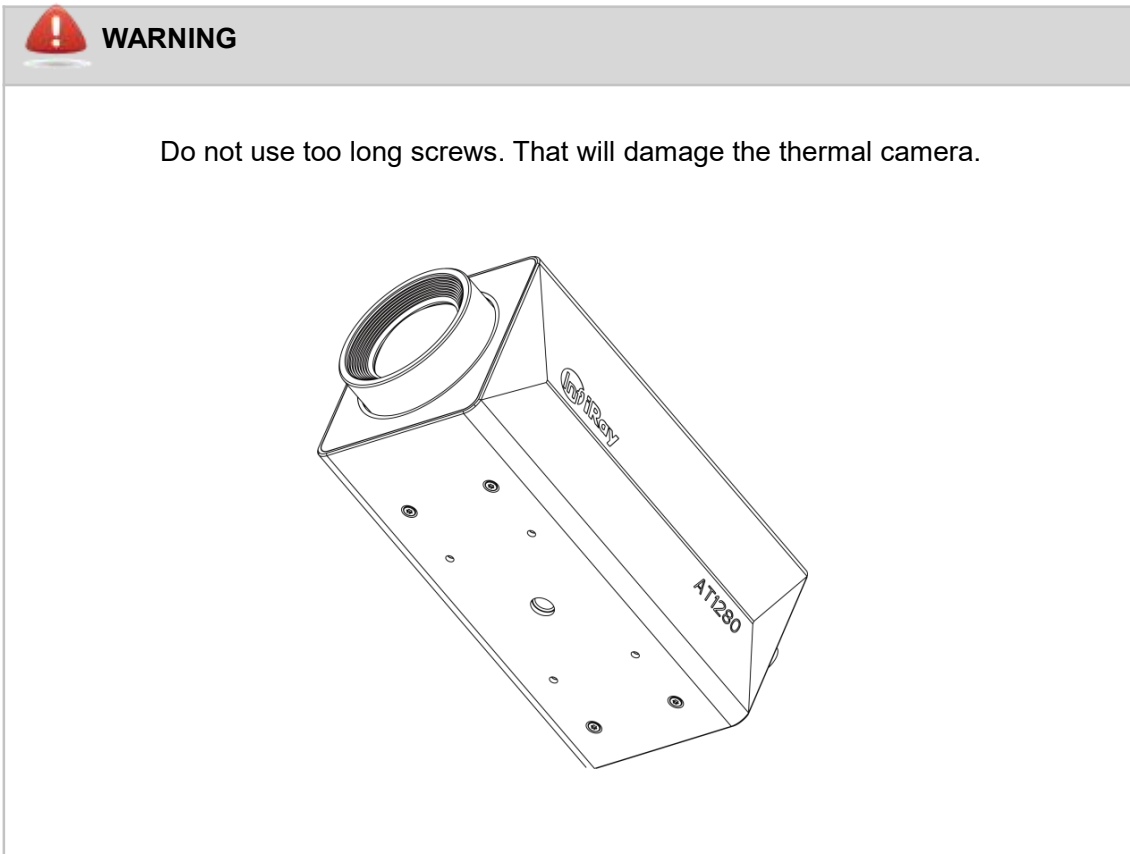
The temperature rise will occur during normal operation. If the thermal camera is   used under poor heat dissipation conditions, the temperature rise may be too high, which will affect the temperature measurement performance. In order to ensure the normal use of the thermal camera, it is recommended to be used under good heat dissipation conditions.

12.1 Camera Mounting

12.1.1 Illustrations
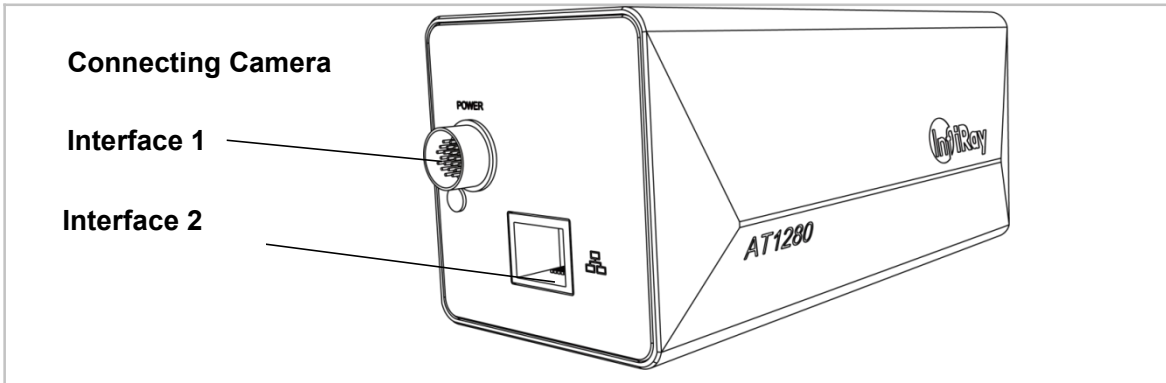
12.1.2 Explanations

1.Fix the thermal camera at the desired location according to the specific use method. The recommended location is in a sheltered area with a relatively stable thermal state.

2.Connect the power cable to the power adapter and interface 1 respectively, power on the thermal camera, and connect the two ends of the network cable to interface 2 and the PC Gigabit Ethernet port respectively.

3.Wait 30 minutes after you have stated the camera, then the temperature can be measured and analyzed by the client software of the computer.

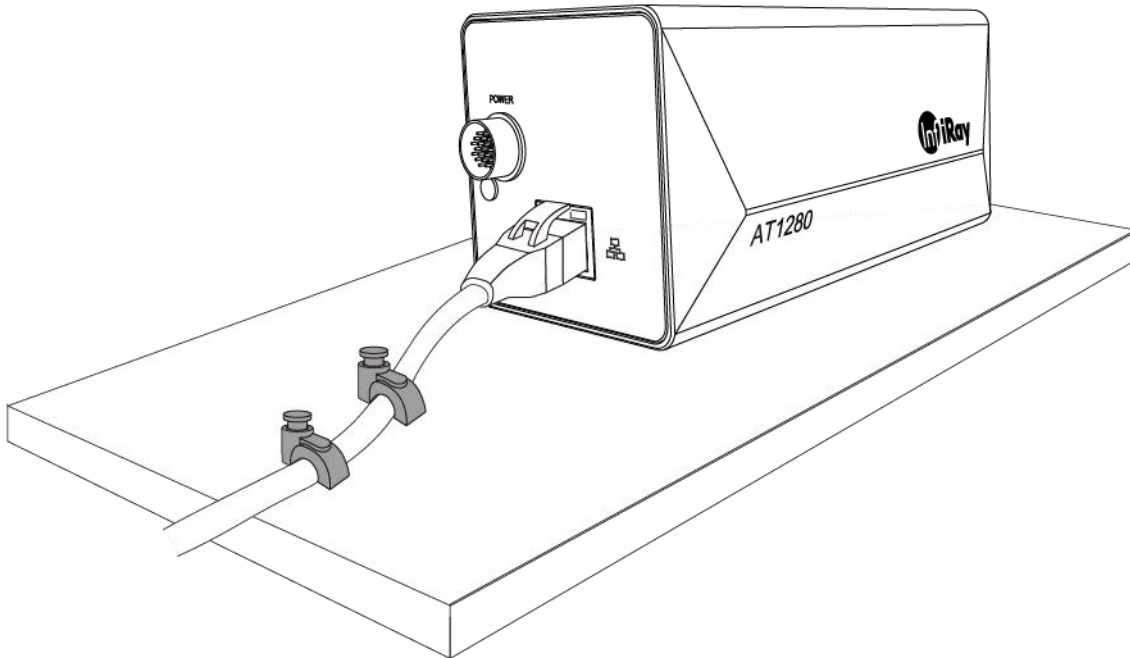### 12.1.3 Cable strain relief

In installations where the camera is subject to vibrations or shocks the power cord may need an external strain relief arrangement to avoid power port failure.

The following pictures show two examples on how cable strain relief of the power cord can be solved.
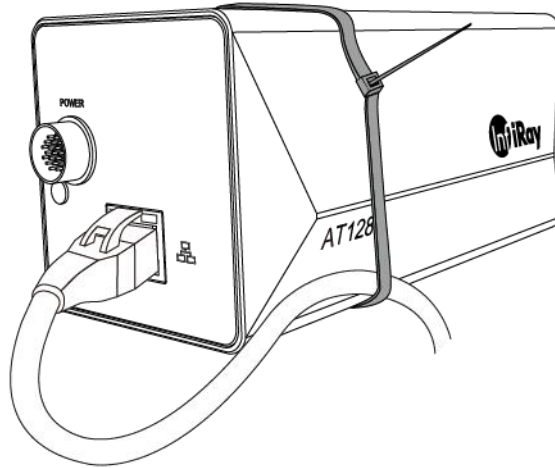
Example 1 Cable strain relief with zip ties

Example 2 cable strain relief with cable clamps

13.Technical Data

13.1 AT1280

Imaging and Optical Data	
Resolution	1280×1024
Thermal Sensitivity/NETD	≤50mK @25℃, F#1.0
Image Frequency	15Hz
Focus	Support Auto-focus

Detector Data	
Detector Type	VOx, Uncooled FPA detector
Spectral Range	8～14µm
Pixel	12µm

Temperature Measurement	
Object Temperature Range	-20℃～150℃ 0℃～550℃
Accuracy	±2℃ or ±2%
Measurement Tools	Any fixed point Full screen max./min. temperature capture Center spot Line/Area analysis tool Manually choose temperature width

Ethernet	
Ethernet	Control and imaging
Ethernet Type	Gigabit
Ethernet Standard	IEEE 802.3
Ethernet Connector Type	RJ45
Ethernet Image Stream	GigE Vision
Ethernet Power Supply	PoE power supply supported
Ethernet Protocol	TCP,UDP,ICMP,DHCP

Image Adjustment	
Brightness and Contrast Adjustment	Manual / Auto 0(defaulted) / Auto 1
Polarity	Black hot/white hot
Palette	18 palettes are available
Image Flip	Left and right / up and down / diagonal
ROI	Support

| Environmental Data	
Operating Temperature Range	-20℃～60℃
Storage Temperature Range	-40℃～85℃
Humidity (operating & storage)	5%～75%RH(no condensation)
EMC	With EMC design
Shock	30g,11ms, all axial
Vibration	4.3g, random vibration, all axial

Power System	
Typical power consumption@25℃	≤4.5W
Connector type for external power supply	DC
Voltage	6-16VDC

Physical Data	
Weight	725g
Thermal Camera（L×W×H）	70mm×63mm × 143mm
Housing Material	Aluminum

Shipping Information	
Packing Type	Carton
Weight with Package	1.6kgs
Packaging Size	233mm×228mm×154mm
List of Contents	Thermal camera Power adapter Power cable Gigabit cable
Country of Origin	China

Table 13.1.1 AT1280 Performance Parameters

14.Mechanical Drawings
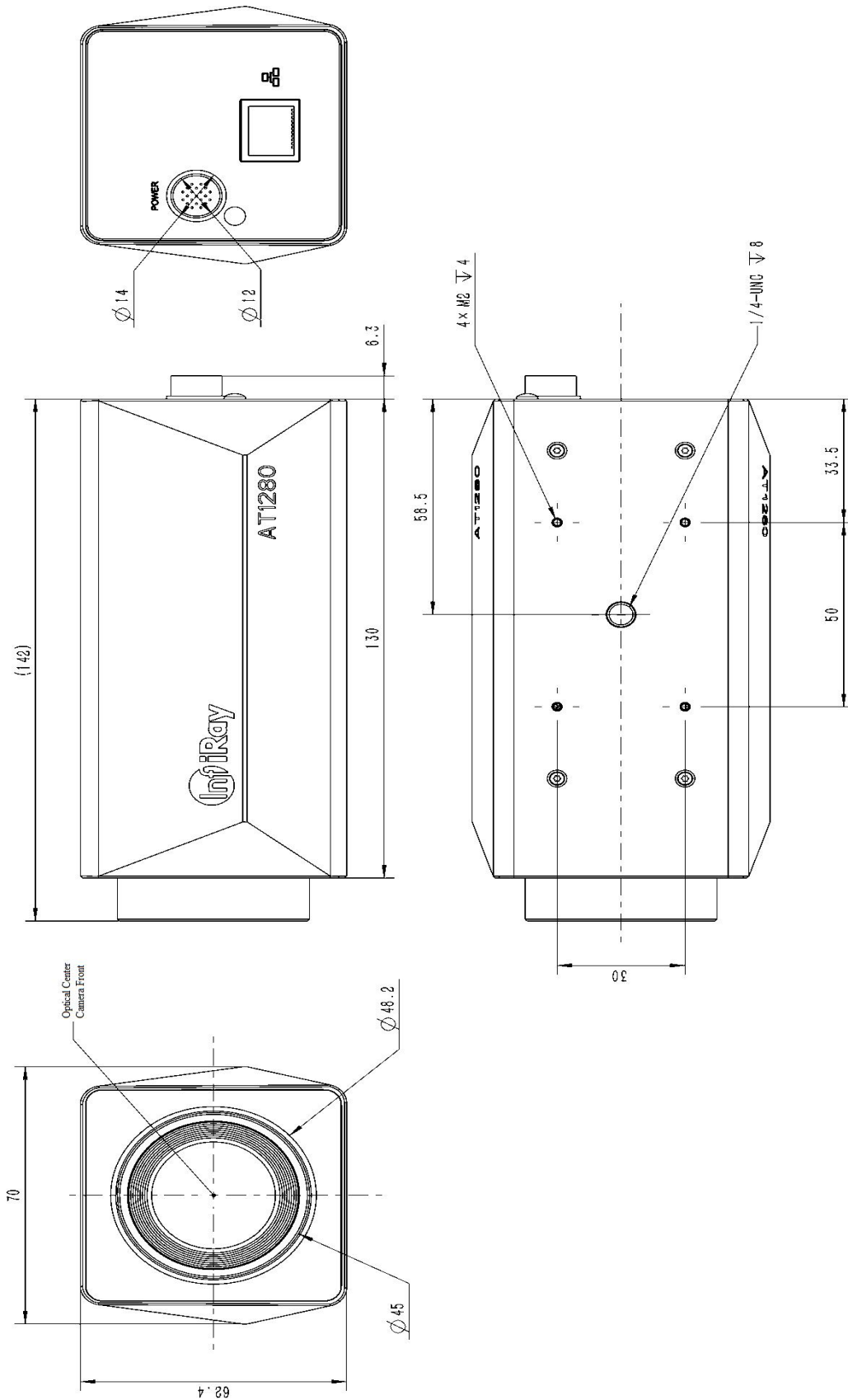
15.Common Troubleshooting

Troubles	Possible Cause	Solutions
Images are blurred	Objective lens focal length does not match	Click auto focus in the software after aiming the thermal camera at the target
	No image calibration for a long time	Click the shutter correction button in the software
Camera can't be started	The supply voltage exceeds the normal working supply voltage range	Check whether the power supply voltage is between 6 and 16V
	The power connector is loose	Check whether the power cable is connected
Inaccurate temperature measurement	The stabilization time for thermal camera is too short.	Keep the thermal camera stable for more than 10 minutes.
	Focus is not good.	Align the target for automatic focus calibration.
The client cannot open, the error shows no mfc300.dll	VC environment is not installed	Install Microsoft Visual Studio
Network parameters can be recognized, but can't be connected.	Network IP address setting is not correct.	Change the network configuration back to automatic acquisition.
Image is stuck.	Power cable or network cable connection is loose.	After checking the power supply and network cable connection, restart the software.
Video is not continuous.	Jumbo frame is not opened	Check the computer configuration again.

Table 15.1 Product Common Troubleshooting

16.Cleaning Thermal Camera

16.1 Cleaning Camera Housing, Cables and Other Items

Camera Housing, Cables and Other Items	
Liquids	One of the following liquids can be used. 1.Warm water 2.A Weak detergent solution
Cleaning Tools	A soft cloth
Cleaning Procedure	Please follow this procedure: 1.Soak a soft cloth in the liquid. 2.Twist the cloth to remove excess liquid. 3.Clean the camera parts with the cloth.

16.2 Cleaning Infrared Lens

Cleaning Infrared Lens	
Liquids	One of the following liquids can be used. 1. Commercial lens cleaning liquid with more than 30% is opropyl alcohol. 2. 96% ethyl alcohol(C_2H_5OH).
Cleaning Tools	Dustless cloth, cotton wool
Cleaning Procedure	Please follow this procedure (Take dustless cloth as an example). 1.Soak the dustless cloth in the liquid. 2.Gently wipe the lens with the dustless cloth

⚠ CAUTION
The dustless cloth or cotton wool should be used one time only.

17.Terms and Definitions

Terms	Definition
FPA (Focal Plane Array)	A type of infrared detector
IFOV (Instantaneous Field of View)	A resolution measure method of infrared thermal camera (that is, the field of view of a pixel)
FOV (Field of View)	The angle of view that the infrared camera can see HFOV is the horizontal angle of FOV，VFOV is the vertical angle of FOV.
NETD (Noise Equivalent Temperature Difference)	A measure of image anti-interference level of infrared thermal camera.

Appendix A Emissivity of Common Materials

Material	Temperature（℃）	Emissivity
Water	0～100	0.95～0.98
Soil(dry)	20	0.92
Soil(wet)	20	0.95
Woods	17	0.962
Sand	20	0.9
Sandstone	19	0.909～0.935
PVC plastic	70	0.93
Asphalt	20	0.967
Paint	70	0.92～0.94
Wallpaper	20	0.85～0.90
Cloth	20	0.98
Concrete	20	0.92
Pavement surface	5	0.974
Smooth porcelain	20	0.92
Ceramic tile	17	0.94
Gypsum	17	0.86
Bricks	35	0.94
Hard rubber	0～100	0.89
Charcoal	20～400	0.95～0.97
Granite(rough)	20	0.879
Cold rolled steel	70	0.09
Oxidized steel	50	0.88
Copper	20	0.07
Oxidized copper	50	0.6～0.7

Worth comes from Service

Technical Support Hotline：

400-883-0800

24h Hotline:

400-998-3088

Customized Services