



TG60/TG80 Series

SF₆ GAS SEE LASER IMAGER

User Manual

Please read carefully before first use

To Our Customer

Dear Customer:

Thank you for choosing TG Series SF6 Gas See Laser Imager!

Please read this user manual carefully before first use. Also please keep in a safe place for reference in the future.

Please operate with the recommended instructions in user manual.

We reserve the right to change this user manual without further notice.



WARNING

**DANGER! INVISIBLE LASER RADIATION!
AVOID EYE OR SKIN EXPOSURE TO DIRECT OR
SCATTERED RADIATION!
DO NOT USE WHEN RAINING!
DO NOT OPEN OR EXCHANGE PARTS!
REPAIR ONLY CAN BE CONDUCTED BY STUFF!**

NOTICE

- Directing device to strong light source (such as sun light) is prohibited under any condition, including after power down. This will cause malfunction or even critical damage to the device.
- Avoid shock and impact during operation or transport.
- Typical storage place is cool, dry, ventilated, and without strong electrical or magnetic field.
- Avoid oil or any chemical liquid on Infrared lens surface. Close lens lid after operation.
- Power off device before remove SD card, and insert SD card before power on device.

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Disclaimer

Limited Warranty

Each ULIRvision product is warranted to be free from defects in material and workmanship under normal use and service. This warranty extends only to the original buyer or end-user customer of an ULIRvision authorized reseller, and does not apply to fuses, disposable batteries, or to any product which, in ULIRvision's opinion, has been misused, altered, neglected, contaminated, or damaged by accident or abnormal conditions of operation or handling. ULIRvision warrants that product will operate substantially in accordance with its functional specifications. ULIRvision does not warrant that product will be error free or operate without interruption.

ULIRvision's warranty obligation is limited, at ULIRvision's option, to refund of the purchased price, free of charge repair, or replacement of a defective product which is returned to an ULIRvision authorized service center within the warranty period.

Quality Assurance

The development and production of this product is qualified per ISO9001 standard.

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1. Product Summary

TG Series Gas See Laser Imager is the new generation SF6 gas laser imager developed by Zhejiang ULIRvision Technology. It is specialized and customized for power industry. TG Series is packed with advanced features, such as clear Infrared thermal image, accurate gas leaking detection, automatic laser strength adjustment, light weight, bundle report software, and easy to use interface.

TG Series Gas See Laser Imager supports Infrared thermal output, visible light output, and picture-in-picture output. These video output can be recorded to SD card and later transfer to PC for field report. TG Series supports both video recording and image saving. TG Series also offers two user modes: normal mode for standard filed environment, and enhanced mode for room environment or field without clear background.

Crisp thermal image, accurate gas leaking detection, clear user interface, reliable product quality, and affordable cost makes TG Series Gas See Laser Imager the new standard in SF6 gas detection industry!

1.1 Standard Item List

TG Series Gas See Laser Imager comes with the following standard items and accessories:

Item Name	Quantity
TG Series Laser Imager	1
Light Tripod	1
Holder Head	1
Device Holder	1
View Finder	1
External Power Cable	1
Li-ion Battery Pack	1
Li-ion Battery Charger	1
SD Card Reader	1
2GB SD Card	1
User Manual	1
Warranty Card	1
Certificate of Qualification	1
Software CD	1

2. Battery and Charger

It is strongly recommended to operate only with the included battery and charger. Use any other brand charger or Li-Ion battery may cause fire or critical damage.

2.1 Using Li-ion Battery Pack

TG series requires AC 85-264V 50/60Hz power input. When operation filed lacks such power source, user can switch to included Li-ion battery pack for remote operation. Connect device with Li-ion battery pack, turn on power on battery pack, wait until red light is off, and operate device normally. After operation, make sure to turn off power on battery pack.

2.2 Charging Li-ion Battery Pack

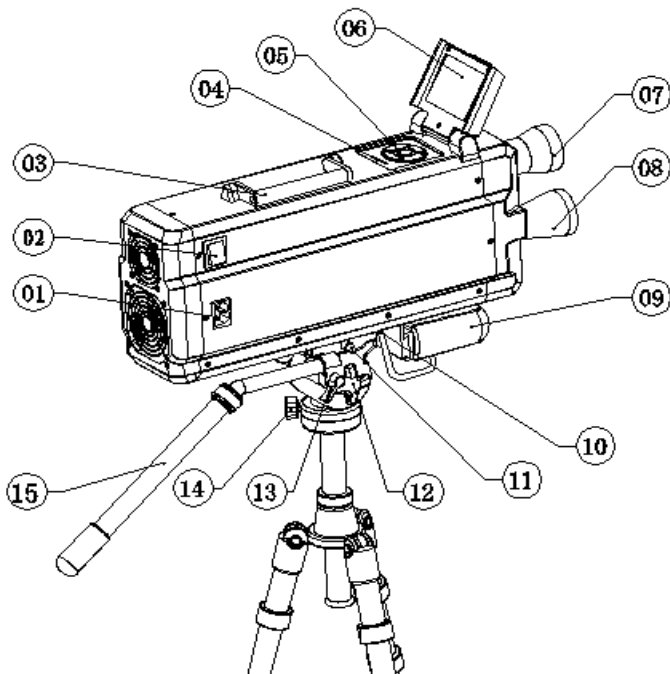
- 1) Connect Li-ion Battery Pack to charger, and connect charger to external AC input.
- 2) Wait until green light on batter pack is on to finish charging.
Note: it normally takes about 10 hours to fully charge one Li-ion battery pack.

2.3 Notes for Using Battery Charger

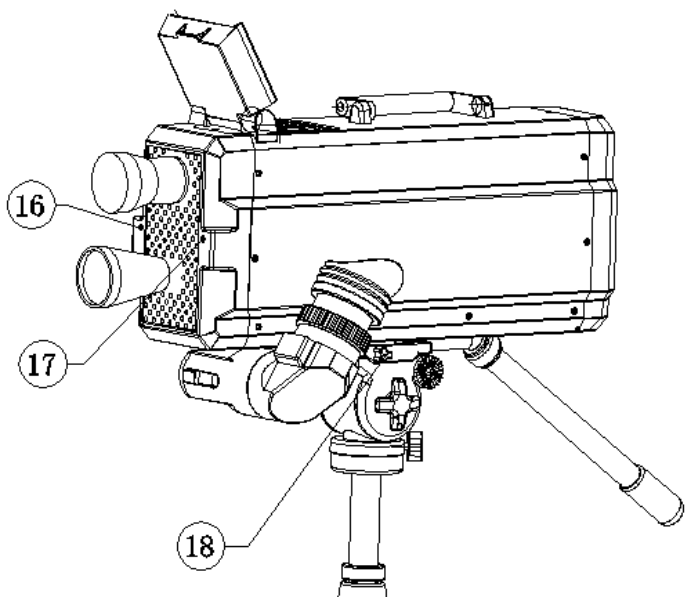
- 1) Charging can only be conducted in a cool, dry, room environment, not under direct sunlight or during rain.
- 2) Do not short-circuit the battery. Do not place battery with metal material such as key chain. These may cause short-circuit during transportation.
- 3) Do not place battery in high temperature environment ($\geq 60^{\circ}\text{C}$) or in fire. This may cause fire or explosion.
- 4) Do not try to modify or open the battery or the charger.
- 5) Li-Ion battery has no memory effect, thus unlike Ni-Cd battery, charging can be conducted at any time.
- 6) It is recommended to remove battery from charger when charging is completed.

3. Main Device and Panel Summary

3.1 Main Device



- | | | |
|---------------------------------|------------------------|-------------------|
| (1) External Power | (2) On/Off Switch | (3) Device Holder |
| (4) SD Card Slot | (5) Main Panel | (6) LCD Screen |
| (7) Infrared Lens | (8) Laser Lens | (9) View Finder |
| (10) View Finder Slot | (11) Device Holder | |
| (12) Holder Position Adjust Key | (13) Holder Handle Key | |
| (14) Holder Angle Adjust Key | (15) Holder Handle | |

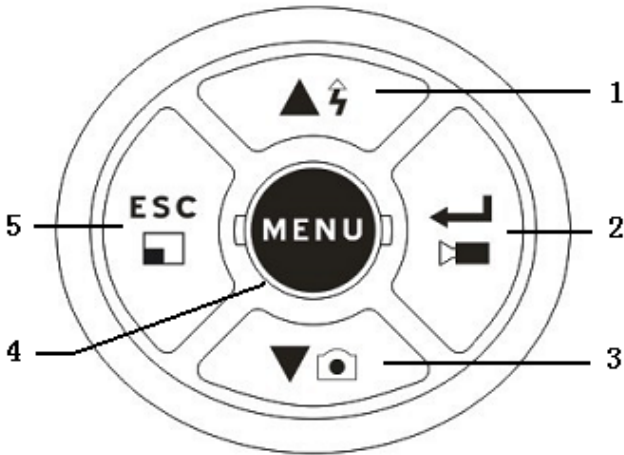


(16) 2.0 Mega-pixel Visible Light Camera

(17) Laser

(18) Device Holder

3.2 Panel Summary



1 Up Button (▲), Laser Button (⚡)

In main menu, functions as up button.

In viewing mode, press to turn on/off laser.

2 Confirm Button (←), Video Button (📹)

In main menu, functions as confirm button.

In viewing mode, press to start video recording.

3 Down Button (▼), Image Button (📷)

In main menu, functions as down button.

In viewing mode, press to save current image.

4 Menu Button (MENU)

Press to enter main menu.

5 ESC Button (ESC), View Switch Button (📺)

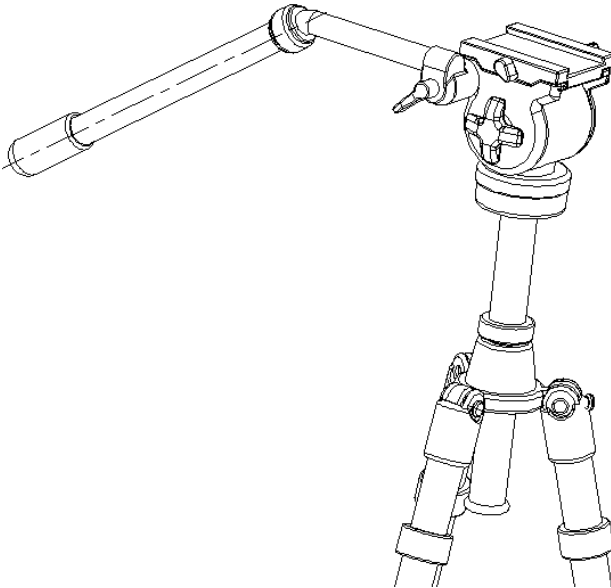
In main menu, Press to cancel or exit menu.

In viewing mode, press to switch between Infrared image, visible light image, and picture-in-picture viewing.

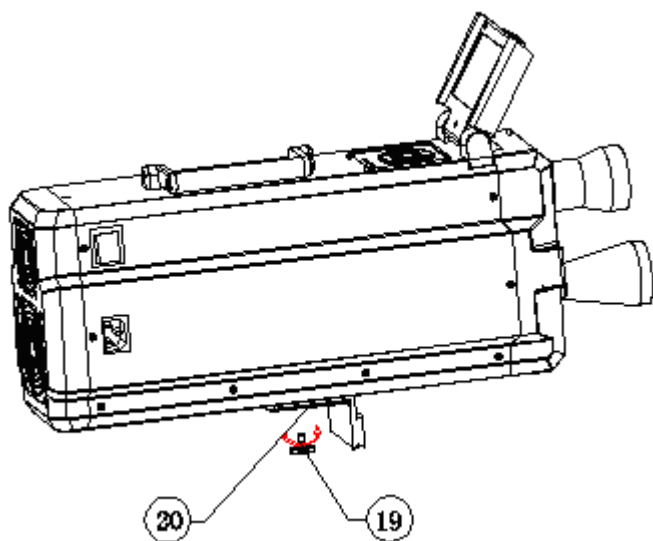
4. Installing Device

First remove Tripod from transport case, and then install holder head. Next install Device holder on TG serial Laser Imager. Next secure device with holder head on Tripod. Finally connect view finder, and turn on power.

4.1 Tripod and Holder Head



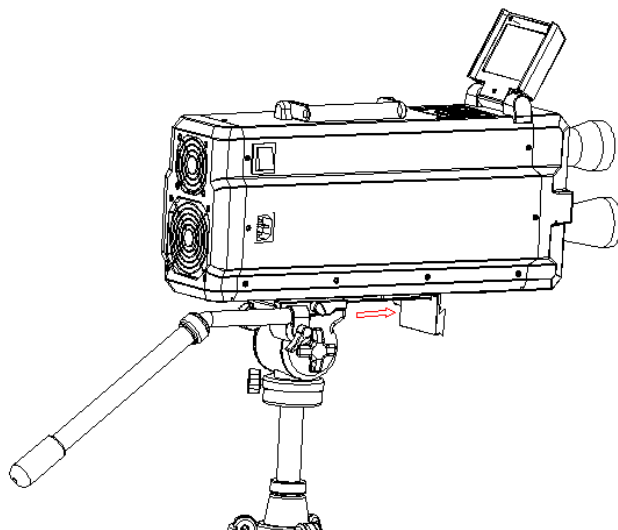
4.2 Device Holder



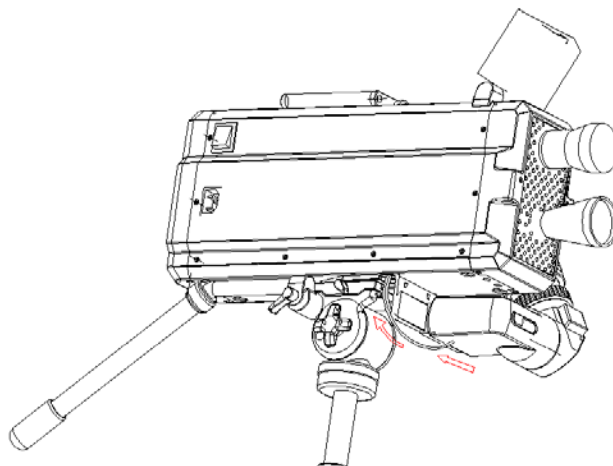
(19) Device Holder Screw

(20) Device Holder

4.3 Install Device on Tripod



4.4 Connect View Finder



5. Device Operation

It is recommended to insert SD card before turn on device.

Connect Device with AC power or Li-ion battery pack, turn on device and after initial warning screen, wait about 30 seconds to enter view mode. The main display is shown time and date, as well as laser strength bar.

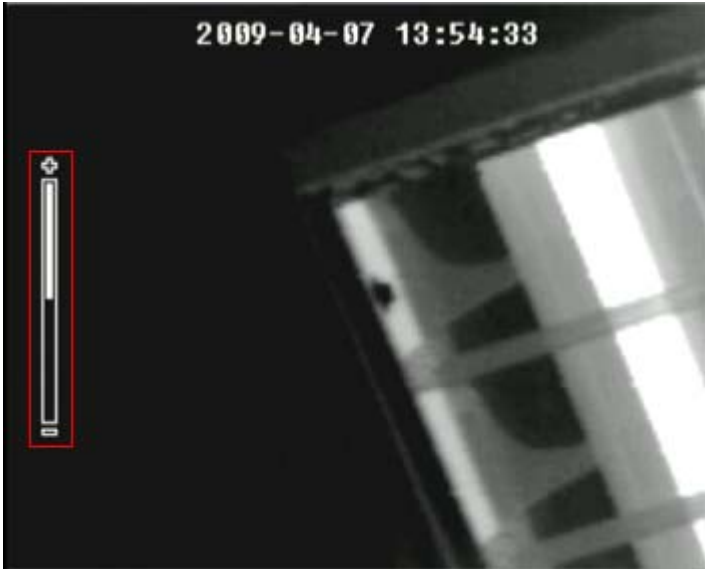


Screen Display

Note: Left bar is Laser strength indicator bar, and on top is current time and date.

5.1 Turn On/Off Laser

Press Laser Button (⚡) to turn on laser. The laser strength indicator bar on the left indicates laser output strength. Laser strength is calculated automatically based on field environment. Press Laser Button (⚡) again to turn off laser.



Laser Strength Indicator Bar

5.2 Save Image

Press Image Button (📷) to save current display image. After successfully save image, press ESC Button to exit. Saved image file is stored under pic folder in SD card. File name format is U_YYYYMMDD_HHMMSS.jpg. For example, image saved at 13:29:19 April 3rd, 2009 is U_20090403_132919.jpg.

Use Image option in main menu to view saved image file.



Save Image

Note: Do not remove SD card from device within 1 minute after save image or record video.

5.3 Record Video

Press Video Button (▶) to start recording video. The time display on the upper-right screen indicates the length of recording. Press ESC Button to exit recording. Saved video recording file is stored under video directory in SD card. Video file name format is U_YYYYMMDD_HHMMSS.264. For example, For example, video recorded at 13:28:26 April 3rd, 2009 is saved as U_20090403_132826.264.


Use Video option in main menu to playback saved video file.

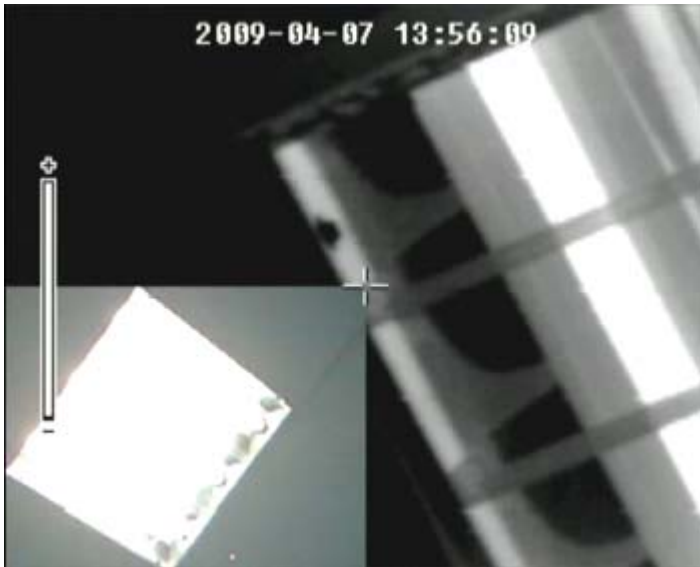


Record Video

Note: Do not remove SD card from device within 1 minute after save image or record video.

5.4 Switch Display

Press View Switch Button () to switch between Infrared thermal image, visible light image, or picture-in-picture display.



Picture-in-picture Display

5.5 Main Menu

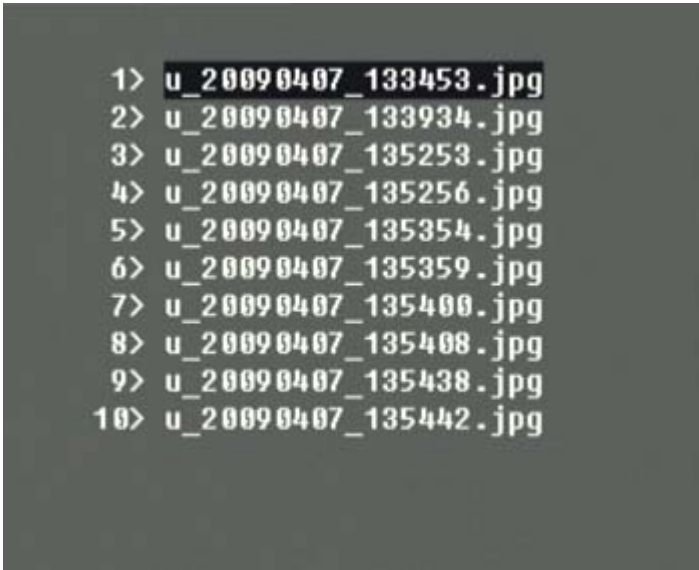
Press MENU Button to enter main menu, then use Up Button (▲) or Down Button (▼) to select menu item. Press Confirm Button (↵) to enter sub-menu. Press ESC Button to exit menu.



Main Menu

5.6 View Image

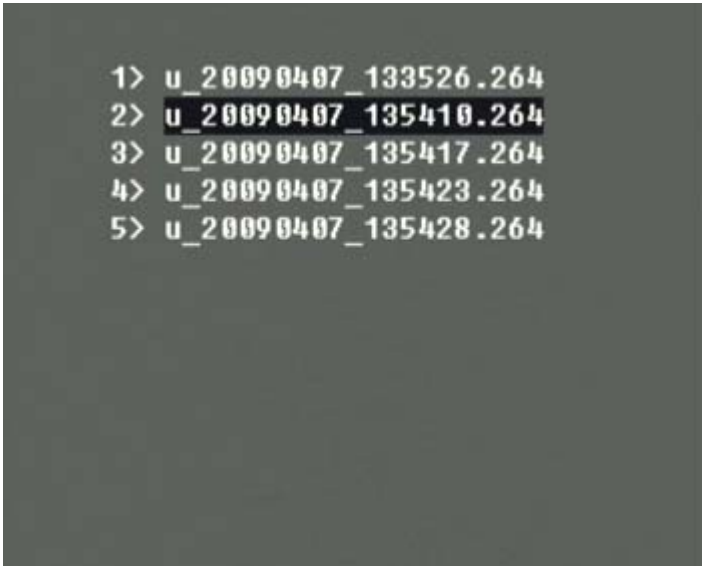
Press Confirm Button (←) to select Image in main menu, and displays a list of saved images. Use Up Button (▲) or Down Button (▼) to select file, and press Confirm Button (←) to view image. Press ESC Button to exit.



Saved Image List

5.7 Playback Video

Press Confirm Button (←) to select Video in main menu, and displays a list of recorded video. Use Up Button (▲) or Down Button (▼) to select file, and press Confirm Button (←) to playback video. Press ESC Button to exit.



Recorded Video List

5.8 Setup Time and Date

Press Confirm Button (←) to select System in main menu, and select Time & Date sub-menu. Use Up Button (▲) or Down Button (▼) to select item, and press Confirm Button (←) to change value. Press ESC Button to exit.



Time & Date Sub-menu

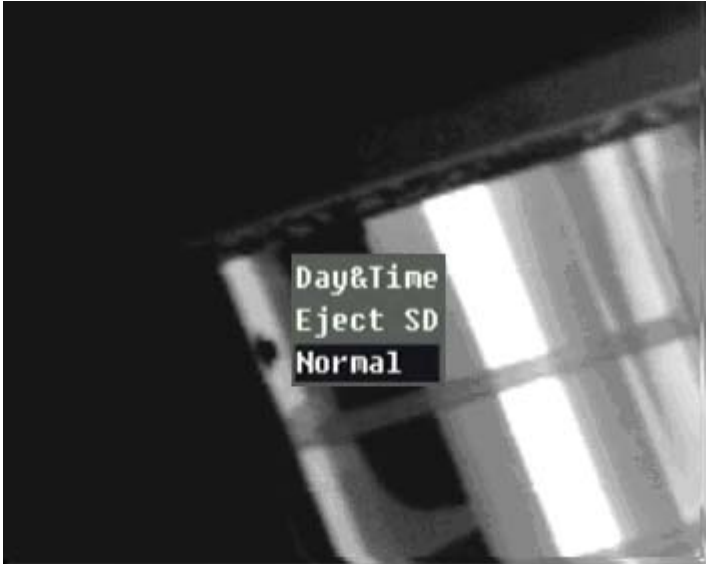
Press Confirm Button (←) to select item to change. Use Up Button (▲) or Down Button (▼) to adjust value. Press Confirm Button (←) to save changes, and Press ESC Button to exit.



Setup Date

5.9 Switch Normal/Enhanced Mode

Press Confirm Button (←) to select System in main menu, and switch between Normal/Enhanced mode. Device displays Normal in Normal mode, and vice versa. Press ESC Button to exit.

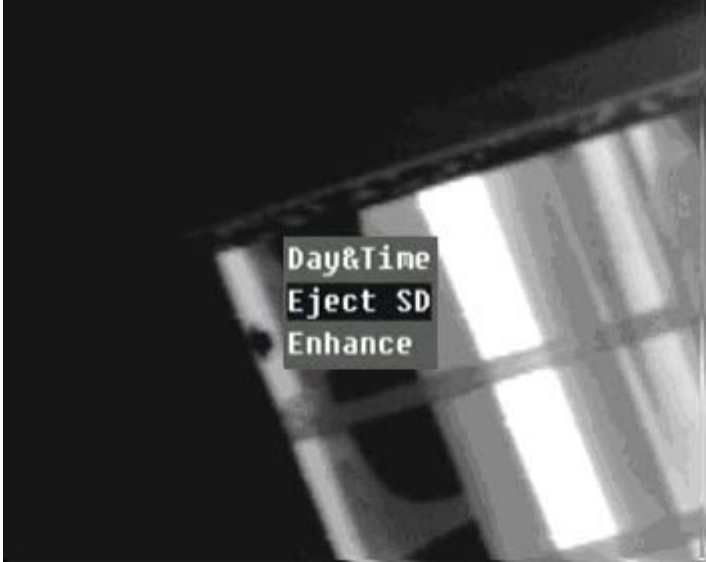


Normal Mode

Note: Enhance mode is better for room environment or filed environment with unclear background. In Enhance mode, laser output strength is enforced to increase SF6 gas leak detection efficiency and accuracy.

5.10 SD Card Operation

In System sub-menu, press Confirm Button (←) to safely Init/Eject SD card. However, it is recommended to insert or remove SD card after power down device.

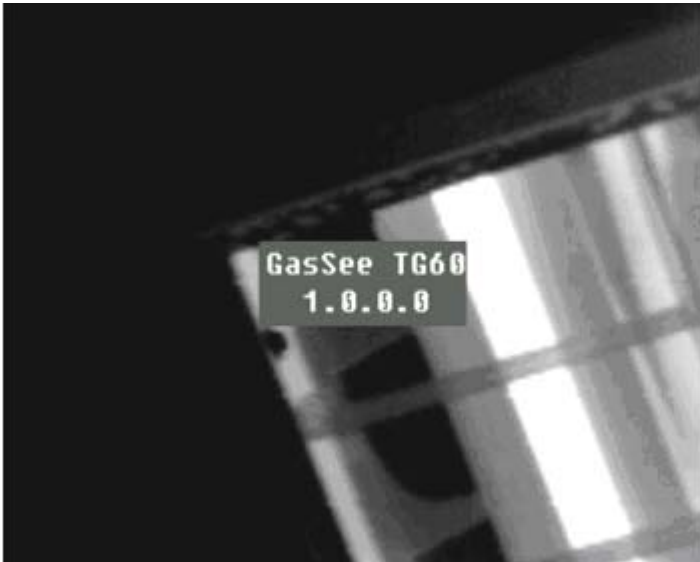


Eject SD Card

Note: After eject SD card, there is no storage media, thus it is not possible to save image or record Video. Insert SD card and select Init SD to initialize SD card and after initialization, device can save image or record video normally.

5.11 Device Version

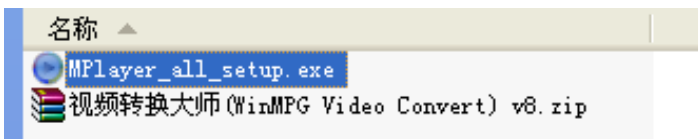
In main menu, select Version to view current device version, and press ESC Button to exit. Device version may be updated without notice.



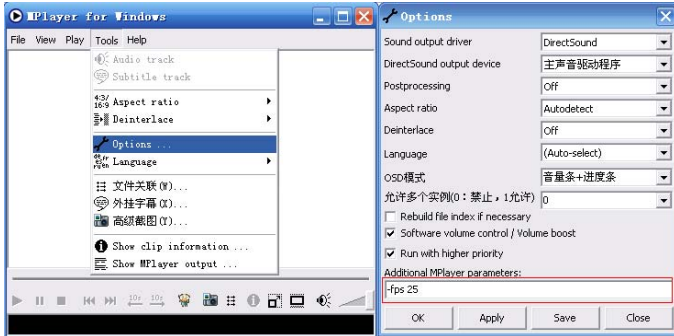
Device Version

5.12 Video Playback Software-Mplayer

For best video quality, video is recorded in H.264 format. To playback recorded video on PC, user must install Mplayer software, which is included in bundle software CD. Double click Mplayer_full_setup.exe to install.



After installation, run Mplayer and select Tools -> Options to setup parameters. As the following screen-shot, set "Additional MPlayer parameters" to "-fps 25".

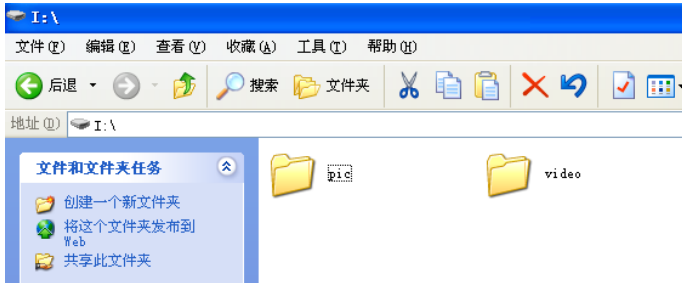


Select File -> Open to open recorded video file and playback.



5.13 SD Card Format

TG Series SF6 Gas See Laser Imager must insert SD card to work correctly, and SD card must has pic and video folder in root directory. Image files are saved in pic folder, and video files are saved in video folder.



Note: Do not delete pic or video folder in root directory. If format SD card, it is required to create these two folders before insert to device.

6. Technical Specification

Detection Range		0.5 ~ 50 meters
IR View Angle		6.4° x 4.8°
Visible Light Camera		2.0 Mega-pixel
Display		LCD, View Finder
LCD Screen		3.5" TFT LCD (640 x 480)
View Finder		> 400 lines
Target Gas		SF6 Gas
Detection Sensitivity		<= 0.001 scc/sec
Image Type		JPG
Video Type		H.264
Storage Media		SD (2G)
Laser Switch		Manual
Laser Strength		Automatic
Laser Protection		Automatic
Device Power		AC 85-264V 50/60Hz
Operating Condition	Temperature	-20°C ~ +55°C
	Humidity	5~90% (non condensing)
Mechanical	Device	525×180×110mm
	Li-ion Battery	252×184×86mm
Device Weight		7.7kg
Li-ion Battery Weight		2.8kg

7. Technical Support

For common mistakes and issues during operation, please refer the following form. If issue cannot be resolved, please contact our technical support department.

Problem	Possible Solution
Cannot save image or record video	<ul style="list-style-type: none">● SD card is full → Change SD card● SD may be corrupted → Format SD card● SD has no pic or video folder → Create folders
Li-ion battery pack is making alarm sound	<ul style="list-style-type: none">● Battery power is low → Power down device and charge battery.