DEK120SCA (Ex) Explosion-proof Radiometric Thermal Imager / Camera

Installation and operation manual | Source edition as supplied

Changzhou Derke Electromechanical Equipment Co., Ltd.

English translation of DEK120SCAEX.pdf. Source ratings, historical standards and source conflicts are retained. This translation does not update the product specification or issue a new certificate.

Source notes

The source gives several pan/tilt speed, angle and material entries in different tables; they are retained separately rather than merged. The source is a historical software/manual edition. Original software screenshots remain in their original UI language; English steps and a UI glossary are provided. The printed software product key is omitted. Confirm actual ordered hardware, explosion marking and supported software with DEK.

Safety information

Read this manual carefully before installation and use. Install only in an environment meeting the manual requirements and on a secure support. Before energizing, check that the supply matches the equipment nameplate. Do not open the explosion-proof chamber in high humidity: trapped moisture may corrode components and impair image quality. Connect cables as specified. Disconnect power before maintenance or repair. Protect flameproof joint surfaces during disassembly and assembly. Collect circuit boards, electronic components, plastics and lubricants during maintenance or disposal; do not discard them indiscriminately. Transfer them to the relevant environmental disposal service.

Technical parameters from the source

Parameter	Value
Input voltage	220 VAC
Input range	+/-10 (unit omitted in source)
Operating current	<1 A
Power consumption	85 W
Electrical connection	Composite cable for power and RJ45
Communication	ONVIF 2.0; configurable baud rate, default 2400 bps; configurable protocol, default PELCO-D
Material	304 or 316L stainless steel
Ingress protection	IP68, 1.2 m for 30 min
Pan / tilt range	360° / +/-90°
Pan / tilt speed	Approximately 0.1-30°/s in both axes
Net / shipping weight	30 / 33 kg
Overall dimensions	498 x 310 x 377.5 mm (L x W x H)
Mounting	Fixed bracket, base or pole
Atmospheric pressure	86-106 kPa
Ambient temperature	-40°C to +60°C
Relative humidity	95% RH at +25°C; inequality symbol unclear in source
Thermal models	DEK120SCA2 / DEK120SCA1
Detector	Uncooled focal-plane microbolometer
Pixels (SCA2 / SCA1)	640 x 480 / 384 x 288
Pixel pitch	17 micrometers
Spectral range	7.5-14 micrometers
Thermal sensitivity (SCA2 / SCA1)	<0.05°C at 30°C / <0.04°C at 30°C
Lens options	19/25/35/50/75 mm athermal lenses; 15/25/35/50/75 mm motorized lenses
Focal length / aperture	25 mm / F=1
Field of view	24° x 18°
Frame rate	50 Hz
Focus	Motorized, autofocus supported
Clear imaging range	0.3 m to infinity

Parameter	Value
Measurement range	-20°C to +150°C standard; +180°C to +600°C optional
Measurement accuracy	+/-2°C or +/-2%, whichever is greater
Display enhancement	Automatic stretch; DDE digital detail enhancement
Emissivity/background correction	Automatic correction from entered emissivity/background temperature; emissivity adjustable 0.01-1
Filter/window transmission correction	Automatic from entered transmission
Atmospheric transmission correction	Automatic from meteorological parameters, with temperature correction
Highest-temperature tracking	Real-time hot-point location and temperature
Palettes	Gray, color, iron-red
Electronic zoom	2x / 4x
Visible resolution / pixels	1920 x 1080 / 2 MP
Visible compression	H.265 / MPEG4 / MJPEG
Visible noise reduction	3D digital noise reduction
Visible imaging device	HIKVISION
Visible iris / lens	Automatic iris / fixed focus
Visible minimum illumination	Color 0.01 lux at F1.2 AGC ON; B/W 0.001 lux at F1.2 AGC ON
Additional pan range in visible table	0-360° continuous
Additional tilt range in visible table	-75° to +40°, up to -90° to +40°
Additional pan / tilt speed	0.01-60°/s / 0.01-30°/s
Additional control protocol	PELCO-D or PELCO-P
Additional baud rates	2400 / 4800 / 9600 / 19200 bps
Additional communication	RS485
Monitoring mode	Panoramic scanning supported
Additional construction entry	Aluminum alloy
Housing thermostatic fan / heater	Yes / yes
Additional ingress entry	IP68

1. Overview

DEK120SCA (Ex) is an explosion-proof intelligent infrared radiometric thermal imager/camera for flammable/explosive gas and combustible-dust environments. The source states that the equipment is designed to GB3836.1-2010 (general requirements), GB3836.2-2010 (flameproof enclosure type d) and GB12476.1-2010 (enclosure and surface-temperature protection for combustible dust). Intended applications include chemical plants, petroleum facilities and grain stores. These are source-document statements, not a new certification.

2. Model and explosion marking

DEK = company code; 120 = camera 1 code; SCA = camera 2 code; Ex = explosion protection. The cover states Exd IIC T6 / Ex tD A21 Ta T6 IP68, while section 2.2 states Exd IIC T6 Gb / Ex tD A21 IP68 T80°C. DO NOT OPEN WHILE ENERGIZED. Wait five minutes after disconnecting power before opening.

2. Electrical safety

Under standard test atmospheric conditions, insulation resistance between supply terminals and enclosure shall be at least 100 megohms when measured at 500 VDC. The source specifies a 50 Hz, 2000 V withstand test for one minute without breakdown or flashover.

3. Installation checks

Before installation check: (a) explosion-proof certificate number is present; (b) the protection marking is suitable for the explosive gas mixture; (c) all explosion-proof parts are free from cracks and defects affecting protection; (d) internal and external grounding is reliable. Do not use the equipment if these requirements are not met. Observe the FORWARD mark on the base, or the cable-exit-to-rear orientation. Especially for wall mounting, FORWARD must face open space away from the wall or obstructions.

3. Structure and mounting dimensions

Figure 3-1.2 legend: 1 wiper; 2 left housing (camera); 3 PTZ body; 4 external cable; 5 sunshield; 6 viewing window; 7 right housing (IR illuminator, as labeled in source); 8 grounding mark; 9 base. Allow adequate space for equipment and accessories. Confirm base and support dimensions against the source drawings, in mm. The unit weighs 30 kg; the support must bear at least twice the total unit weight, 60 kg. Do not attempt to open the PTZ yourself; electric shock and explosion risks exist. Contact the company if opening is necessary.

3. Pole installation

Before installing a pole, cast a concrete foundation with good-quality embedded bolts. Allow a suitable cable opening at the foundation center if required. Install the pole and secure the bolts. Pole height and thickness depend on coverage, wind speed and slope; design for the site or consult the supplier. Draw the reserved cable through the pole opening and fit the junction-box base plate above the cable opening. Face the factory-marked midpoint of horizontal pan travel toward the main observation area and fasten the camera with bolts. Protect camera-to-junction-box wiring with explosion-proof flexible conduit, or use armored cable. Protect junction-box-to-control-room wiring with metal conduit, or lay armored cable directly.

3. Bracket installation

Face the factory-marked midpoint of pan travel toward the main observation area. Check mounting-hole locations against the source base drawing. Protect camera-to-control-box wiring with explosion-proof flexible conduit, or use armored cable. Protect the junction-box-to-control-room run with metal conduit, or use armored cable directly. The source bracket drawing is DEK-B5.

3. Cable preparation

Flexible conduit: unscrew the compression nut at the base and prepare the threaded fitting supplied with the flexible conduit. Tighten the threaded fitting first, then tighten the flexible conduit. Armored cable: strip the outer sheath to the required length to expose the steel armor, retain the necessary armor length and trim the excess. Fit an explosion-proof cable gland according to its Installation and Use instructions. Secure the gland-equipped armored cable directly to the appropriate explosion-proof equipment.

4. System and cable connection

The factory composite cable exits through the base and is at least 1.2 m long. Route it into the junction box and connect it to the system bus. Video may feed a monitor, DVR, picture processor or matrix. If several devices receive one video signal, use a video distributor with gain as required. Controllers must match communication interface and protocol. Some matrix systems need a protocol adapter, and some DVRs need an RS232-RS485 converter. Normally an RS485 bus permits one master; for multiple masters use a supplier-recommended arrangement with control permissions. Brown: 220 VAC; blue: 220 VAC; yellow: protective earth G. Communication: RJ45. Factory defaults: address 1, baud rate 2400, protocol PELCO-D. Check the actual product nameplate and cable identification before connection.

5. Preset operation

The source provides the following call/set commands. Availability depends on the board or camera. Unless stated otherwise, factory default is OFF. Call and Set are different commands.

49 Call: PTZ switch self-test (all boards).

50 Call: restart system; Set: factory reset (all boards).

51 Call: start patrol (all boards).

52 Call: slow limit scan; Set: left limit (all boards).

53 Call: fast limit scan; Set: right limit (all boards).

54/55 Call: slow/fast full-circle scan (all boards).

56 Call: pattern scan (some boards).

57 Call/Set: proportional speed reduction ON/OFF (high-speed boards).

58 Call/Set: automatic flip ON/OFF (high-speed boards).

59 reserved.

60 Call: camera menu, requires camera support.

61 Call: idle action to guard preset; Set: idle time 60 s.

62 Call: idle limit scan; Set: idle time 180 s.

63 Call: idle patrol; Set: idle time 240 s.

64 Call/Set: idle action OFF; factory DEFAULT.

86 Call: power-on guard preset; Set: patrol dwell 8 s.

87 Call: power-on limit scan; Set: patrol dwell 15 s.

88 Call: power-on patrol; Set: patrol dwell 60 s.

89 Call: power-on remembered action; factory DEFAULT.

90-93 reserved.

94 Call/Set: wiper ON/OFF, wiper boards only.

95 Call: PTZ menu, OSD boards only.

96 reserved.

5. Dual-command configuration

Special presets are 65-85. Address configuration: call 80, then within 15 seconds call subpreset 1-254 to set software address 1-254; other values reserved. Set 80, then within 15 seconds call subpreset 1 to use the DIP-switch address; other values reserved. PTZ system configuration: call 65, then within 15 seconds call 84 for low joystick speed limit (20), 85 for medium (30), or 86 for high (64); other values reserved.

6.1 Control software installation

Extract the DEK901&DEK902 program and run IRSERVER.exe. The source requires a genuine Simplified Chinese Windows XP, Windows 7, Windows 8 or Windows 10 system. This records the historical software environment described in the supplied manual; compatibility with current systems is not established by this translation.

6.2.1-6.2.2 Server configuration

Open IRSERVER.exe (Figure 6-1). Select Configuration (Figure 6-2), then enter server name, installation location, server address (the local PC IP address), server port, responsible person name and mobile phone (Figure 6-3; example values only). After adding the server, select Modify and confirm the dialog (Figure 6-4).

6.2.3 Device and channel configuration

For DEK901/DEK902 instruments, select the thermal imager, infrared encoder, visible-light encoder and infrared camera checkboxes as appropriate for the model. Add the encoder types required: IR encoder (Figure 6-5), visible encoder (Figure 6-6), IR camera (Figure 6-7). Automatic Search can find thermal devices, change their IP addresses and add them (Figure 6-8).

6.2.4-6.2.5 Channel creation and preview

Enter the channel name, installation location and installation address (Figure 6-9), then select Add. Restart the program for the added information to take effect (Figure 6-10). Reopen IRSERVER.exe, select the server at upper left, choose Preview, expand the added devices and drag visible and IR channels into the preview panes (Figure 6-11).

6.2.6 Visible preview

Check that video remains smooth while moving the thermal imager. Right-click to stop preview (Figure 6-12). Use zoom/focal-length buttons for magnification, focus buttons for sharpness and iris controls to open/close the iris (Figure 6-13).

6.2.7 Infrared preview

Check that the IR image remains smooth while moving the imager. Right-click the image to adjust IR functions (Figure 6-14).

6.2.8 Presets

Select preset 1, use the direction controls to move to the desired position, select Edit and enter a preset name (Figure 6-15). Confirm; the program reports successful saving (Figure 6-16).

6.2.9 Patrol plans and alarms

Select Patrol Setup and a patrol plan (Figure 6-17), then Edit to name the patrol route (Figure 6-18). Add patrol points and associate them with previously saved presets. Exit and select Start Patrol. Movement time, snapshot count, snapshot interval and self-test may be configured; schedules are available only for specified thermal-imager models. Figure 6-19 shows function-area controls. Alarm settings include alarm state, alarm-window popup and alarm sound (Figure 6-20).

6.2.10 Panorama and temperature objects

Select Panorama to automatically generate a picture of the monitored area; the source estimates about 30 minutes (Figure 6-21). Positions/angles within the panorama can then be selected. Double-click the required position to move the imager there. Use the upper-right preset-setting button to add points, lines or rectangles, or select Clear / Clear All (Figure 6-22). Enter preset name, object distance and thermal focal length, then save. For a first measurement object, use Method 1 Settings and enter actual object properties (Figure 6-23). Method 2 enables quick addition of objects sharing properties already established by Method 1. Temperature-difference alarm settings compare objects and trigger when their difference reaches the configured threshold (Figure 6-24). The source states panorama movement of 360° horizontally and 72° vertically, with automatic calibration after one horizontal track before the next track.

6.2.11 Real-time curves

Open Real-time Curve 1, 2, 3 or 4. Select equipment and add it to monitoring for curve analysis. The source permits selection of 1-7 days and analysis by point, day, week or month (Figure 6-25). Click and drag the curve left/right for analysis.

6.2.12 Equipment information

Displays monitored-equipment name, type, material, distance, alarm temperature, first inspection time, latest inspection time and latest temperature (Figure 6-26).

6.2.13 Historical analysis

Choose equipment name and start/end dates, then Search to display the historical curve. Click curve points to read their temperatures. Select alarm color, alarm level or a custom temperature (Figure 6-27; the source caption is duplicated as 6-26). Select Report to edit reports.

6.2.14 Logs

Choose alarm, system or operation logs. System subtypes include normal and abnormal logs. Set start/end times and select Find (Figure 6-28).

6.2.15 Users and permissions

Configuration adds users and manages permissions (Figure 6-29). Select Add User and edit user type, username, password and allowed permissions (Figure 6-30).

6.2.16 Report editing

Analyze abnormal equipment alarms in reports. Choose a blank template for custom editing or an automatic report; set appearance, fonts and output format (Figure 6-31).

7. Historical database installation procedure

The source describes DTLite4356-0091 virtual-drive software and the SQLFULL_CHS SQL Server 2008 image. Mount the image using DAEMON Tools. Open SQL Server Installation Center, choose Installation, then New SQL Server stand-alone installation or add features. Enter an authorized product key; the product key printed in the source is intentionally not reproduced in this English web edition. Continue to Feature Selection, select all and specify the shared-feature directory. In Instance Configuration choose Default Instance. In Server Configuration the source selects one account for all SQL Server services. In Database Engine Configuration choose Mixed Mode, enter a password and Add Current User; also Add Current User in Analysis Services Configuration. Continue through the default Next steps to finish. In Start > Configuration Tools > SQL Server Configuration Manager, check that SQL Server (MSSQLSERVER) and SQL Server Browser are started. Under SQL Server Network Configuration > Protocols for MSSQLSERVER enable Named Pipes and TCP/IP. In TCP/IP Properties the source enables Listen All and Enabled, then sets IPAll TCP Port to 1433. Under SQL Native Client 10.0 Configuration > Client Protocols > TCP/IP Properties, set default port 1433 and Enabled Yes. The source then instructs closing or configuring the PC firewall so port 1433 is not blocked, and using Windows authentication to select Security > Logins > the created login > Properties > Server Roles > sysadmin. This paragraph faithfully records legacy source steps; it does not establish a current secure deployment configuration. Have the software supplier confirm the supported database, licensing and required access before deployment.

Explosion-proof construction

The enclosure is designed so an internal explosion does not ignite the surrounding explosive mixture. Protection depends on enclosure strength, flameproof-joint gaps and lengths, and maximum surface temperature. After welding and finish machining, the source specifies a GB3836.2 hydrostatic test at 2 MPa for 10-12 seconds, with no leakage, structural damage or deformation. Maximum enclosure surface temperature during normal operation is 80°C. The tempered-glass window shall withstand impact and thermal-shock tests. Enclosure protection is IP68. A compression-nut cable-entry device clamps the cable firmly without loosening.

Troubleshooting

No image: check that power is connected and supplied correctly; check for poor video-signal cable contact. Intermittent image: check the video-signal cable connections.

Transport and storage

The packaged product may be transported by any method provided it is protected from direct rain and snow. The source permits storage for more than one year at 0°C to +40°C and relative humidity not exceeding 90%.

Warranty

The source promises replacement within six months and a one-year warranty. Free repair is provided during the warranty period, but material and labor charges may apply to damage caused by operation contrary to the manual, unauthorized disassembly, lightning or unavoidable natural disasters. Any separate written service commitment or agreement between the company and user takes precedence.

Company statement

The company reserves interpretation rights concerning changes to product design and specifications without prior notice. Copyright belongs to Changzhou Derke Electromechanical Equipment Co., Ltd.; no organization or individual may reproduce or copy any part or all of the manual without permission. Source contact: +86 519 88059627; fax +86 519 88059629; website www.dekcn.com.

Reference illustrations

Original dimension drawings and interface screenshots are retained for reference. Original-language labels may remain inside these images; the English operating text and legends explain them. Dimensions are copied from the supplied source, not redrawn or recalculated.

UI glossary: Configuration; Add; Modify; Confirm; Search; Preview; Preset; Patrol; Panorama; Real-time Curve; Historical Analysis; Logs; User Permissions; Report. The step numbers above correspond to the source software screenshots.

Figure 1. Source page 4, illustration 1.

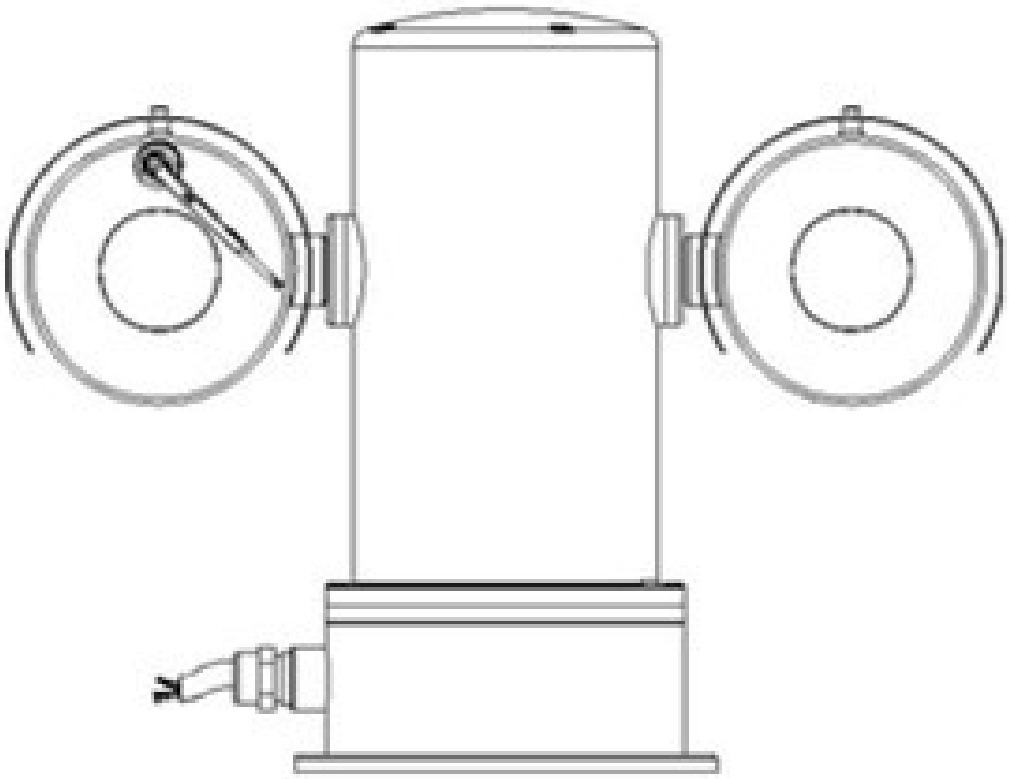


Figure 2. Source page 7, illustration 1.

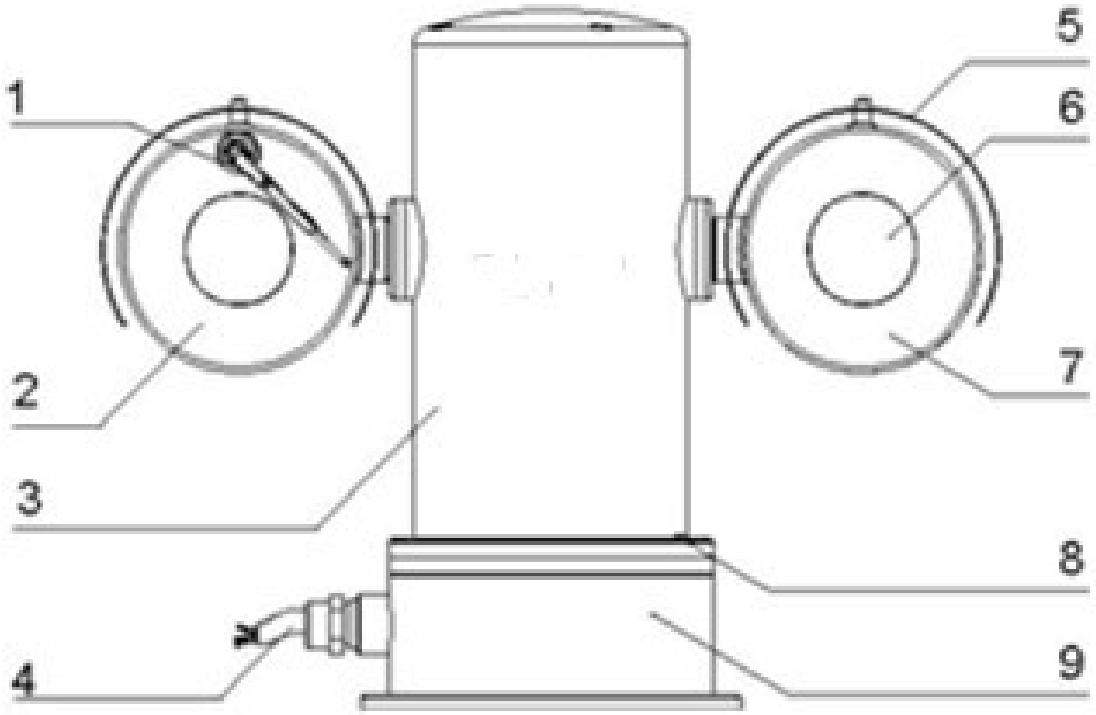


Figure 3. Source page 7, illustration 2.

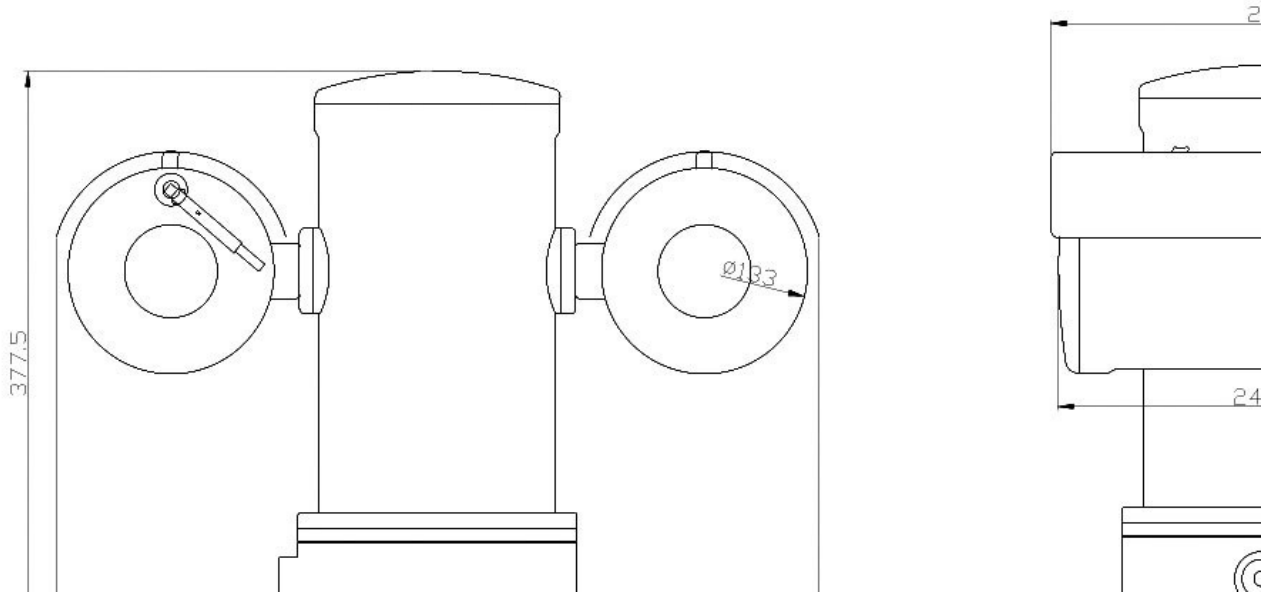


Figure 4. Source page 8, illustration 1.

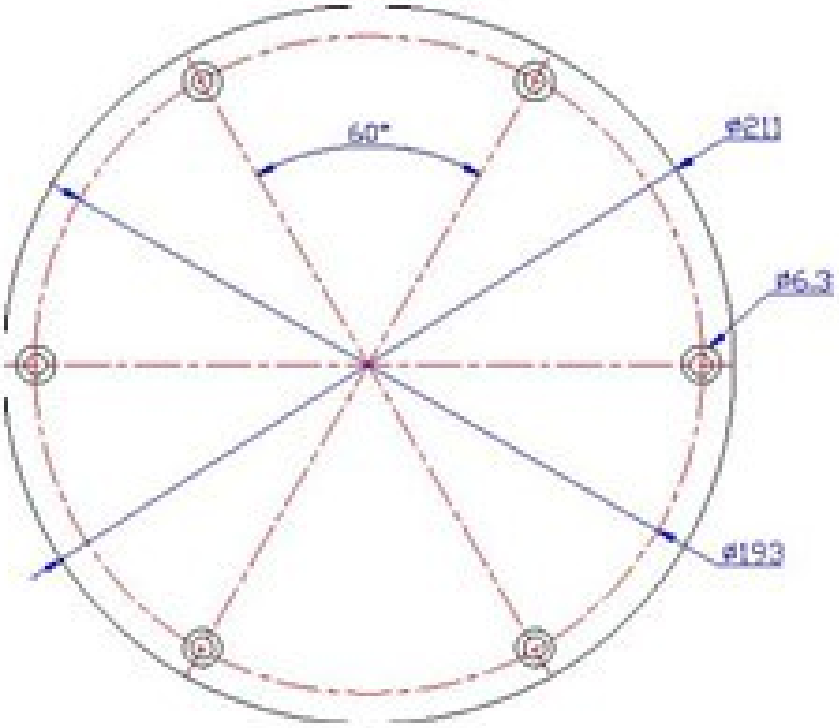


Figure 5. Source page 8, illustration 2.

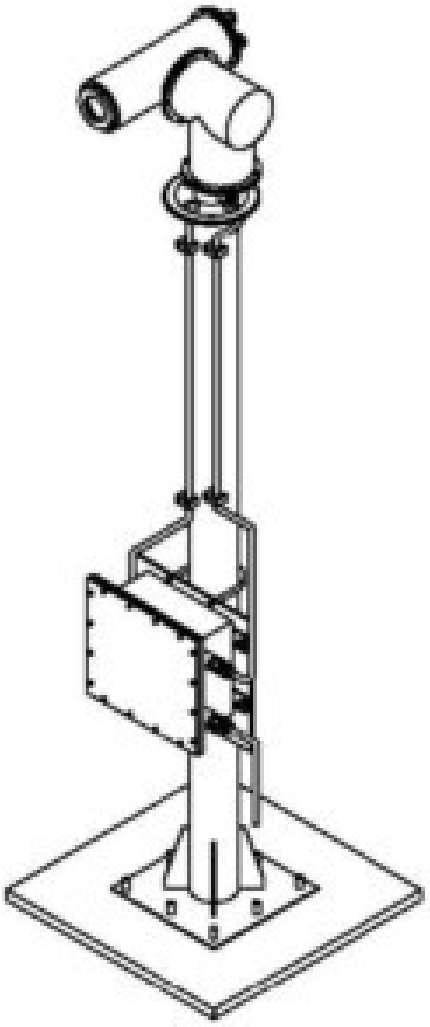


Figure 6. Source page 9, illustration 1.

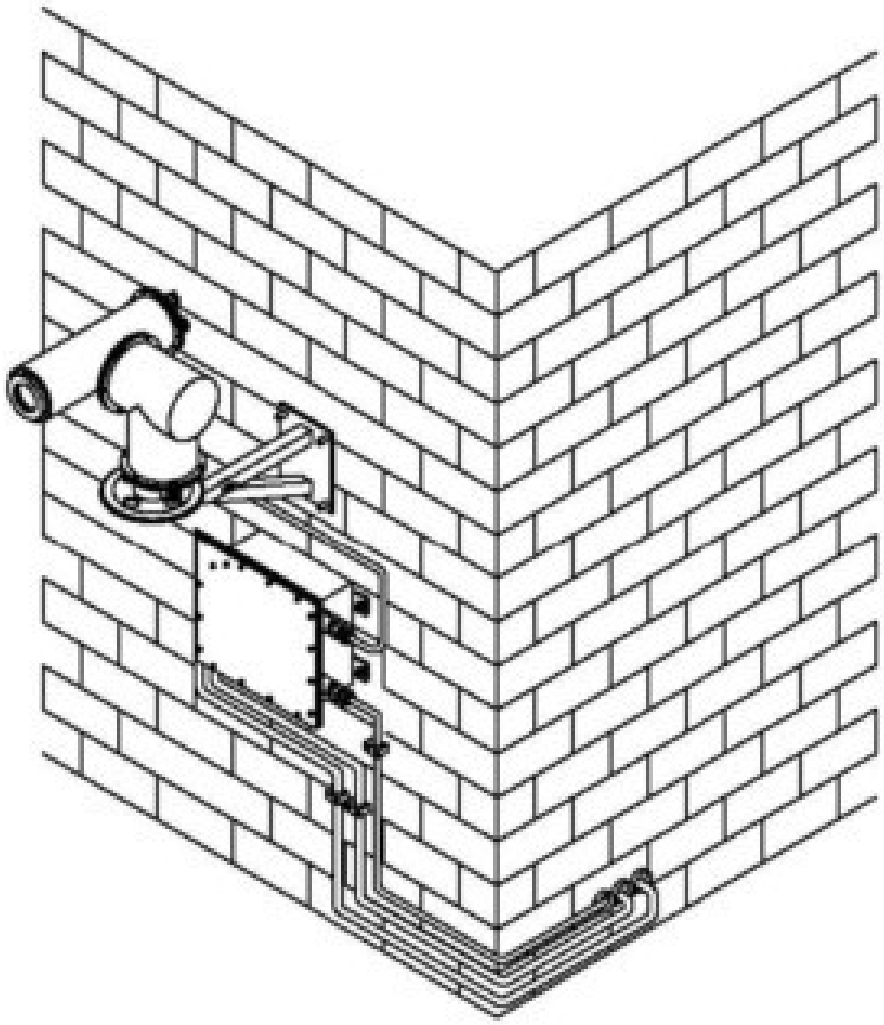


Figure 7. Source page 9, illustration 4.

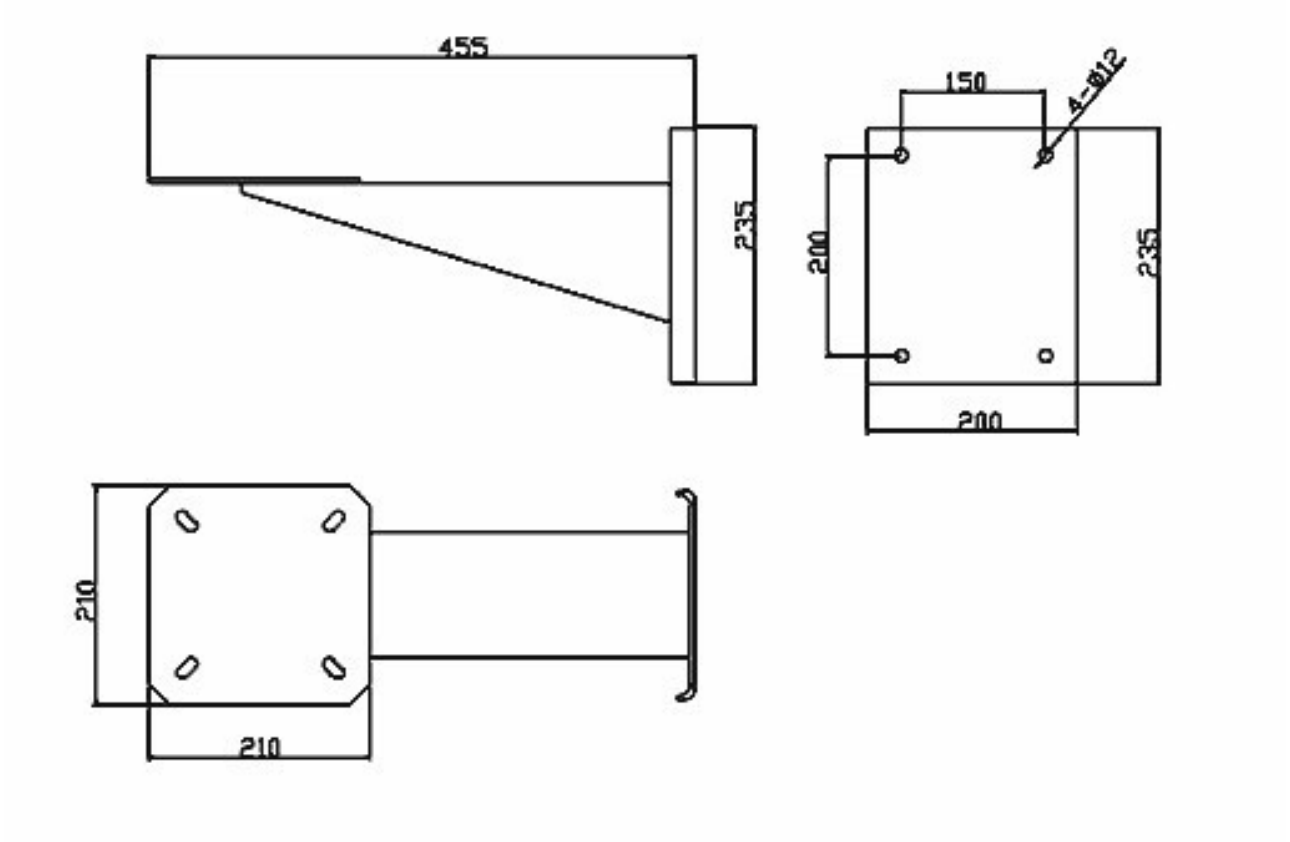


Figure 8. Source page 10, illustration 2.

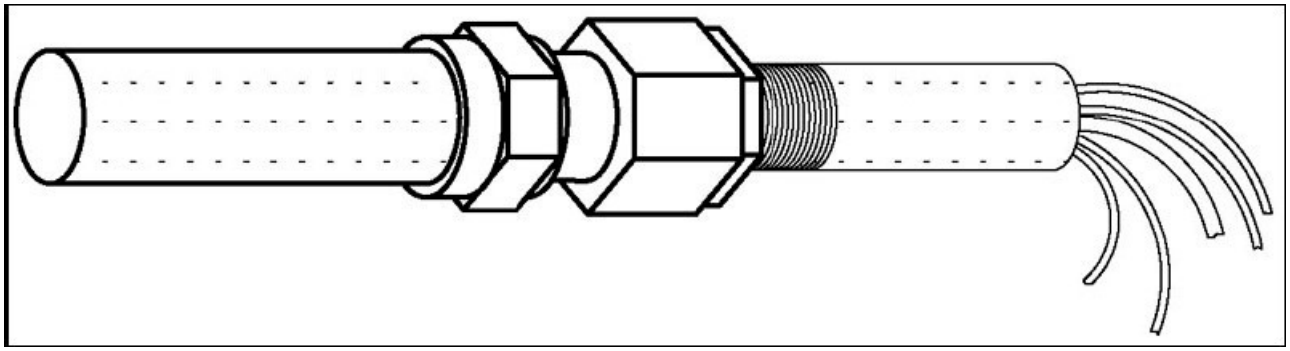


Figure 9. Source page 12, illustration 1.

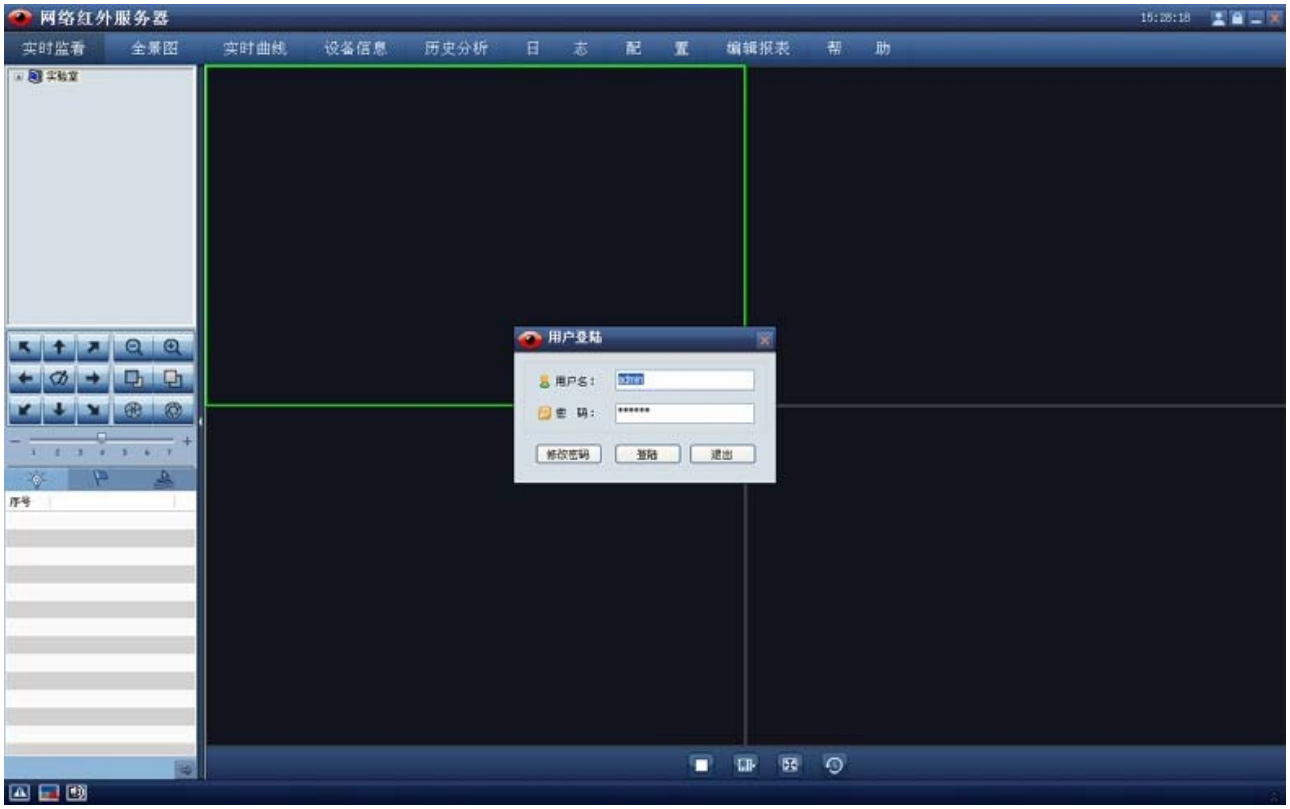


Figure 10. Source page 13, illustration 1.



Figure 11. Source page 13, illustration 3.



Figure 12. Source page 14, illustration 1.



Figure 13. Source page 14, illustration 2.



Figure 14. Source page 15, illustration 1.



Figure 15. Source page 15, illustration 2.



Figure 16. Source page 16, illustration 2.

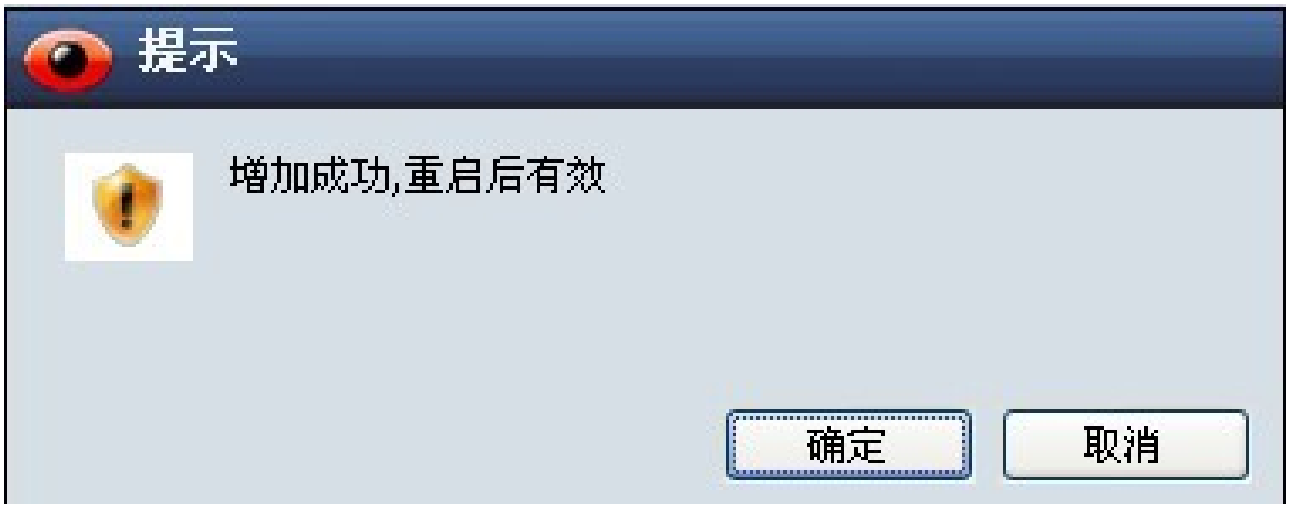


Figure 17. Source page 16, illustration 3.



Figure 18. Source page 17, illustration 1.



Figure 19. Source page 17, illustration 2.

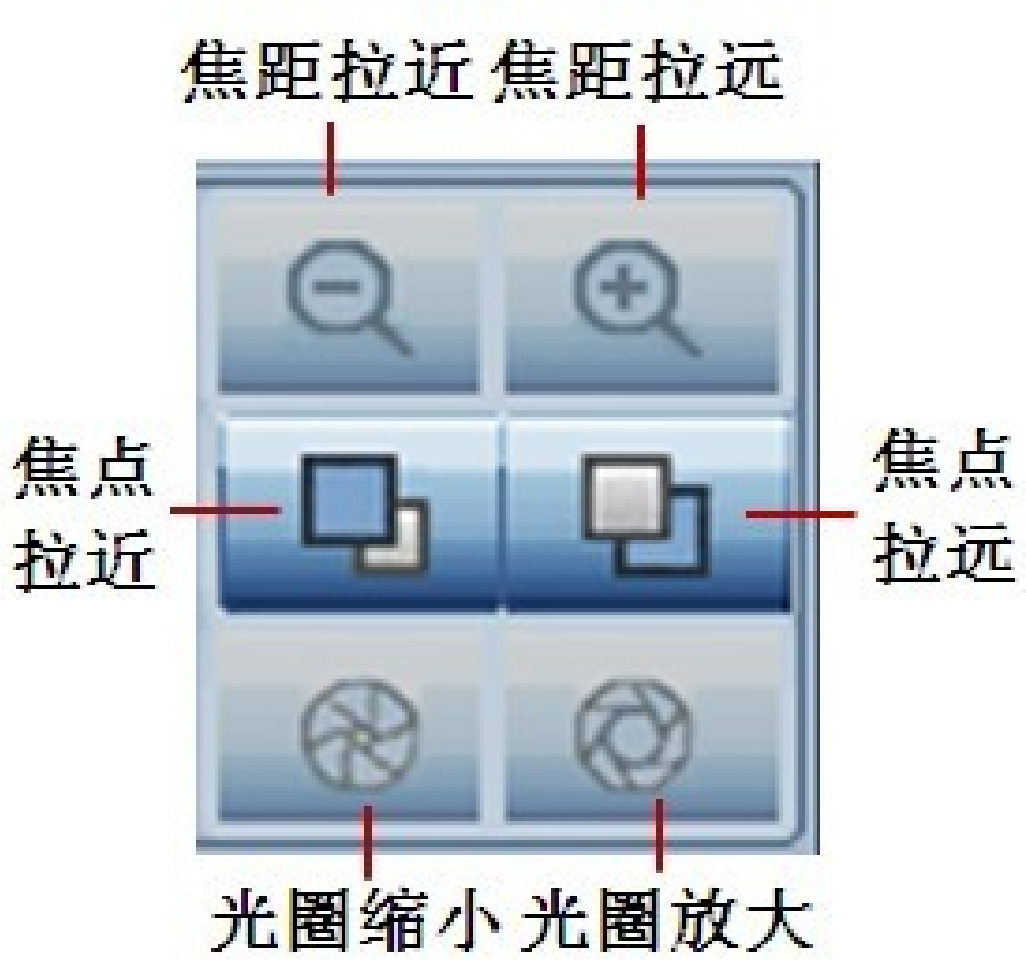


Figure 20. Source page 18, illustration 1.

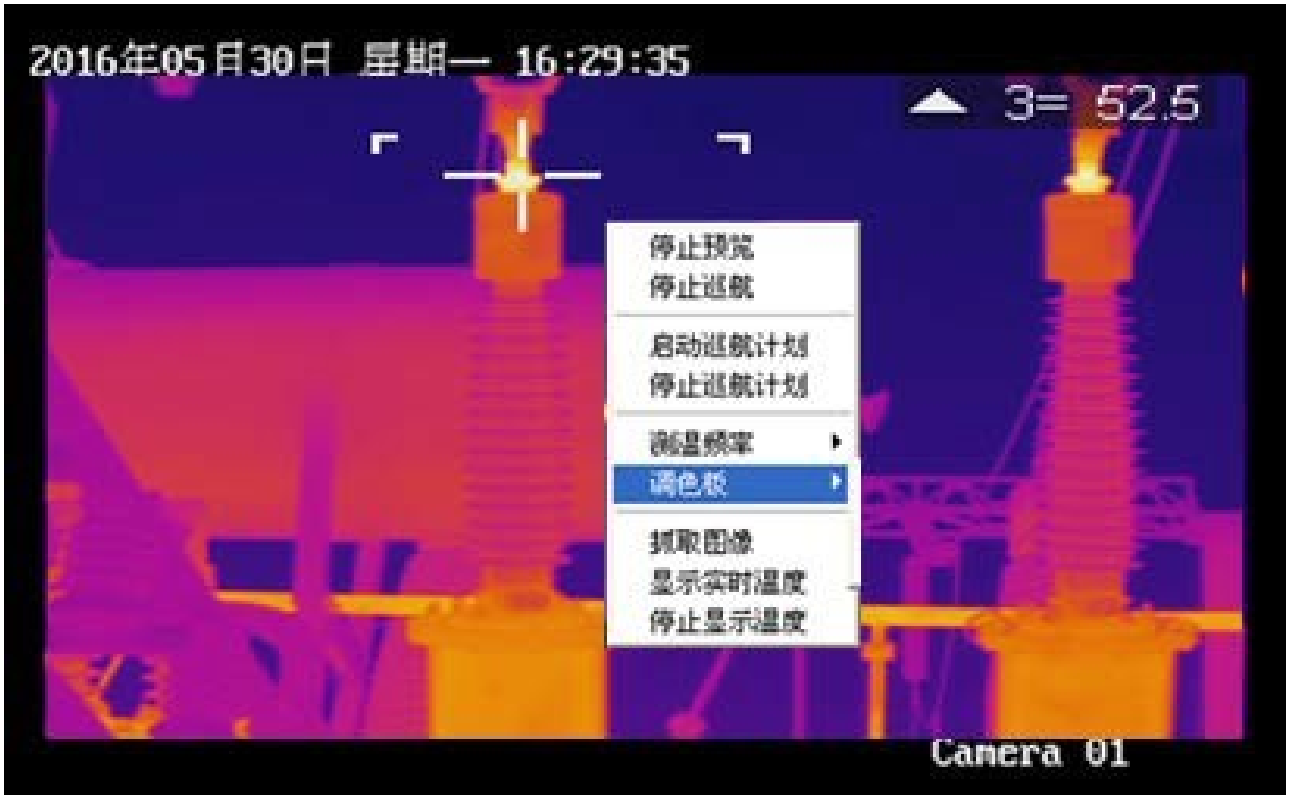


Figure 21. Source page 18, illustration 2.



Figure 22. Source page 18, illustration 3.



Figure 23. Source page 19, illustration 1.

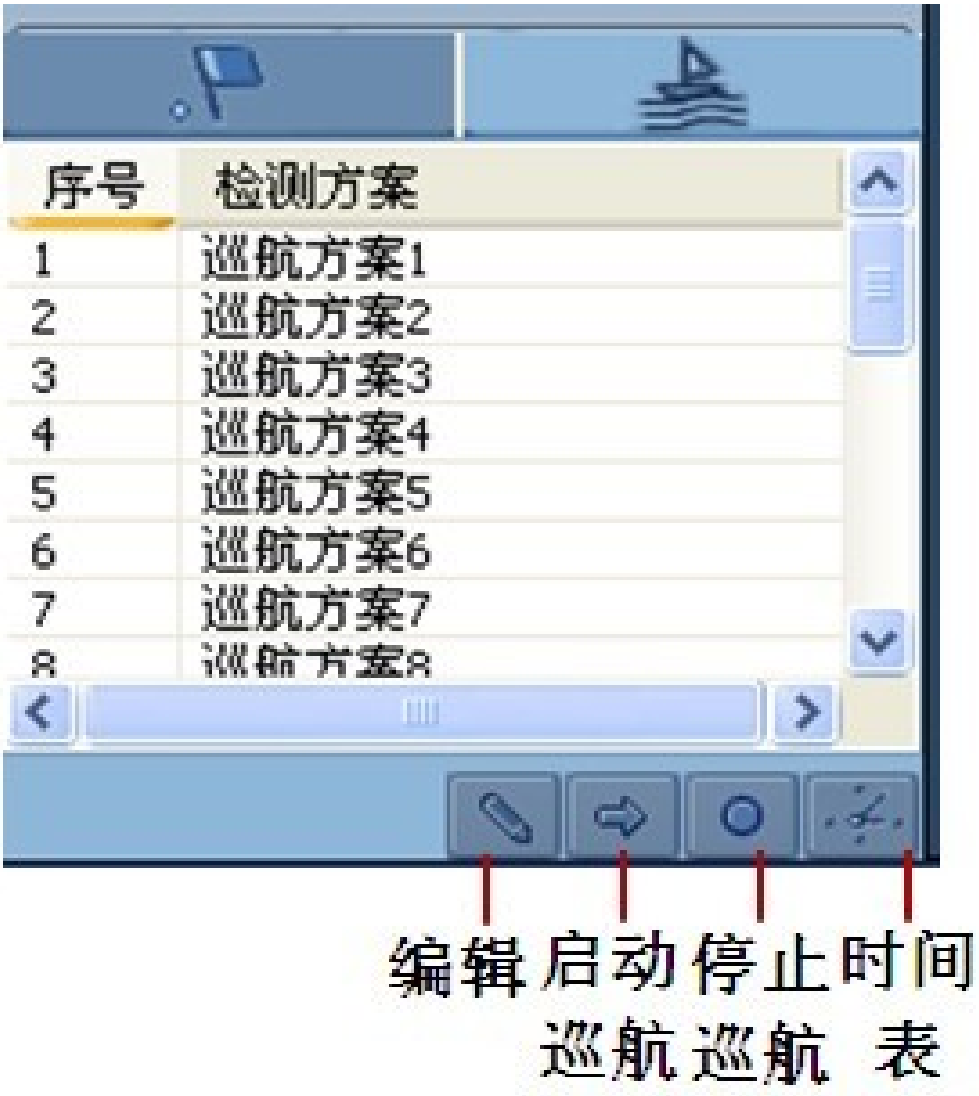


Figure 24. Source page 19, illustration 2.



Figure 25. Source page 20, illustration 1.



Figure 26. Source page 20, illustration 2.



Figure 27. Source page 21, illustration 1.

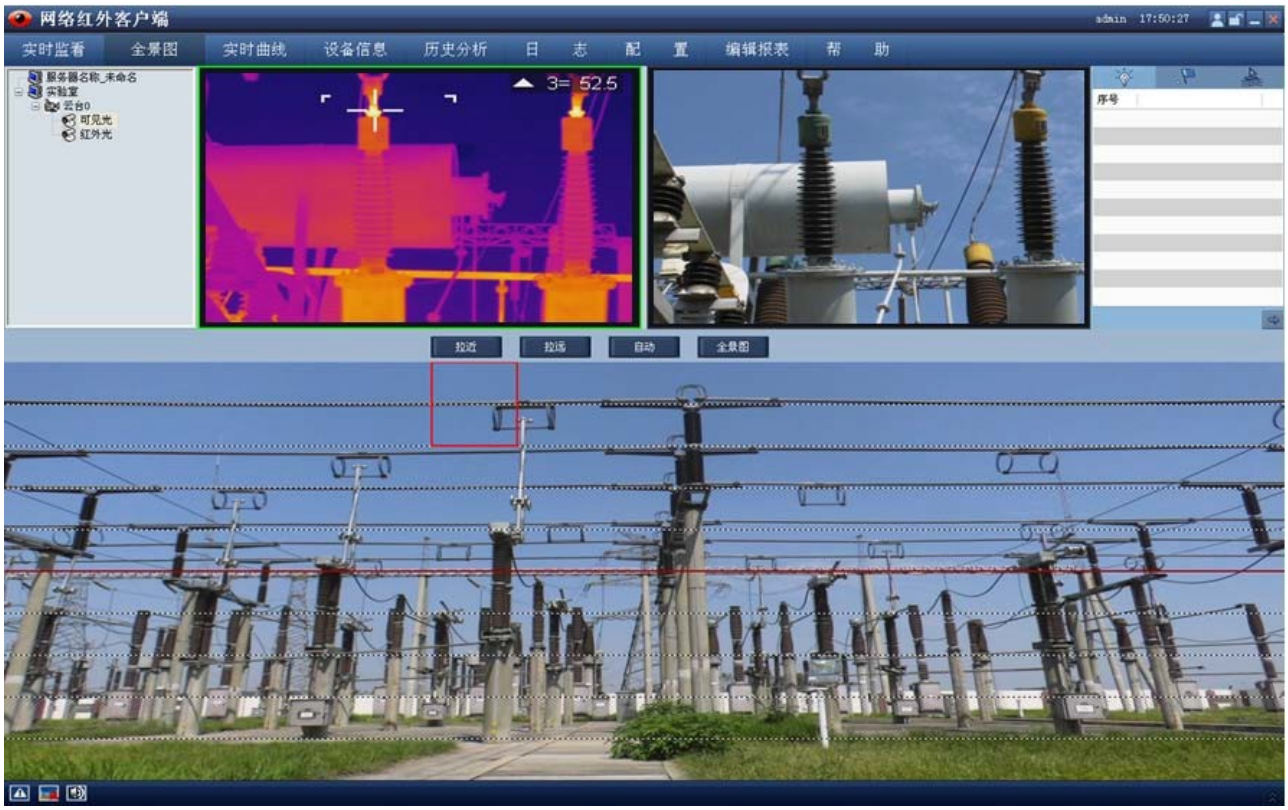


Figure 28. Source page 21, illustration 3.

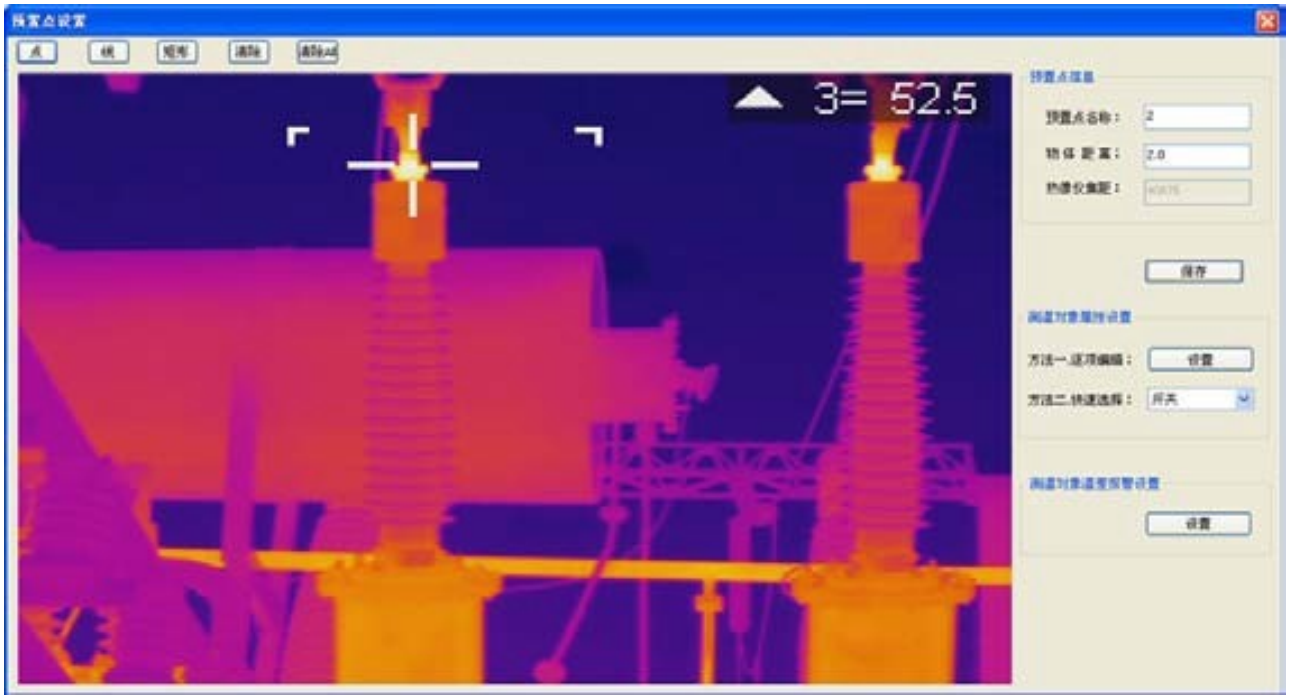


Figure 29. Source page 22, illustration 1.

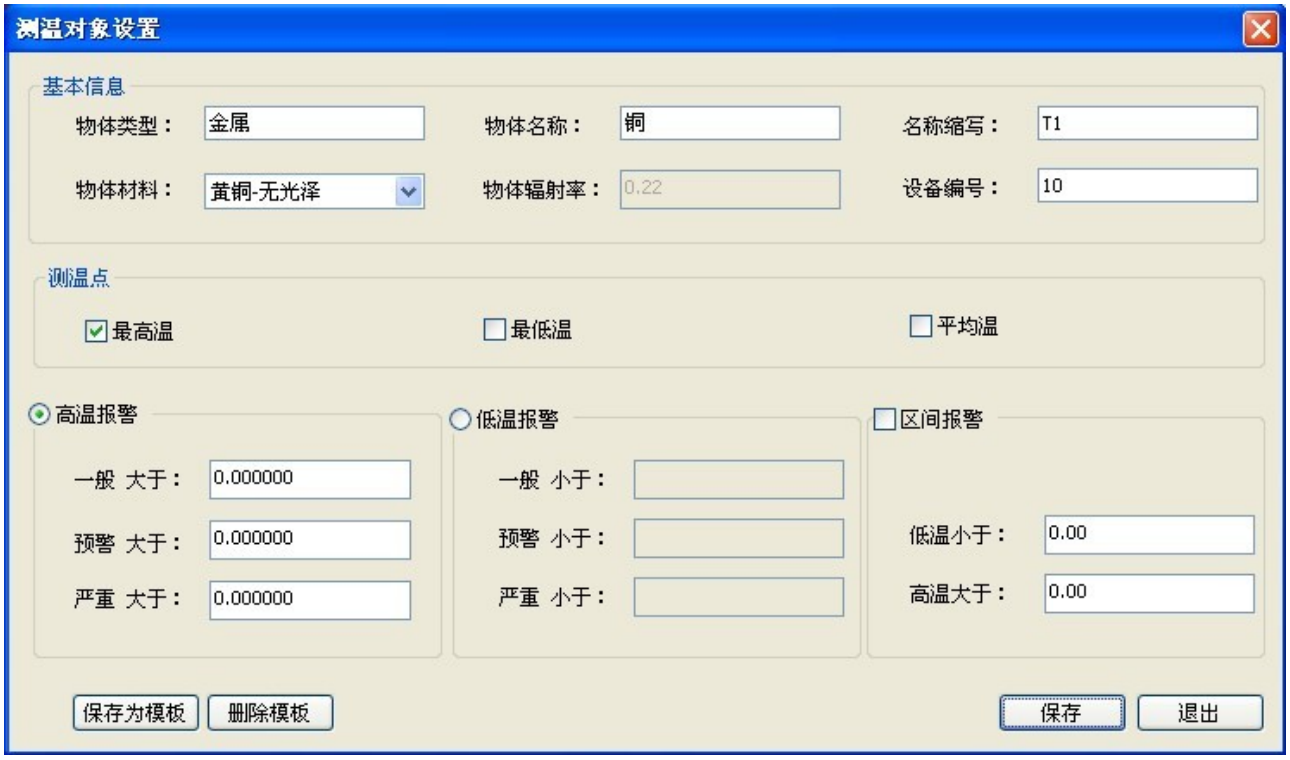


Figure 30. Source page 22, illustration 2.



Figure 31. Source page 23, illustration 1.

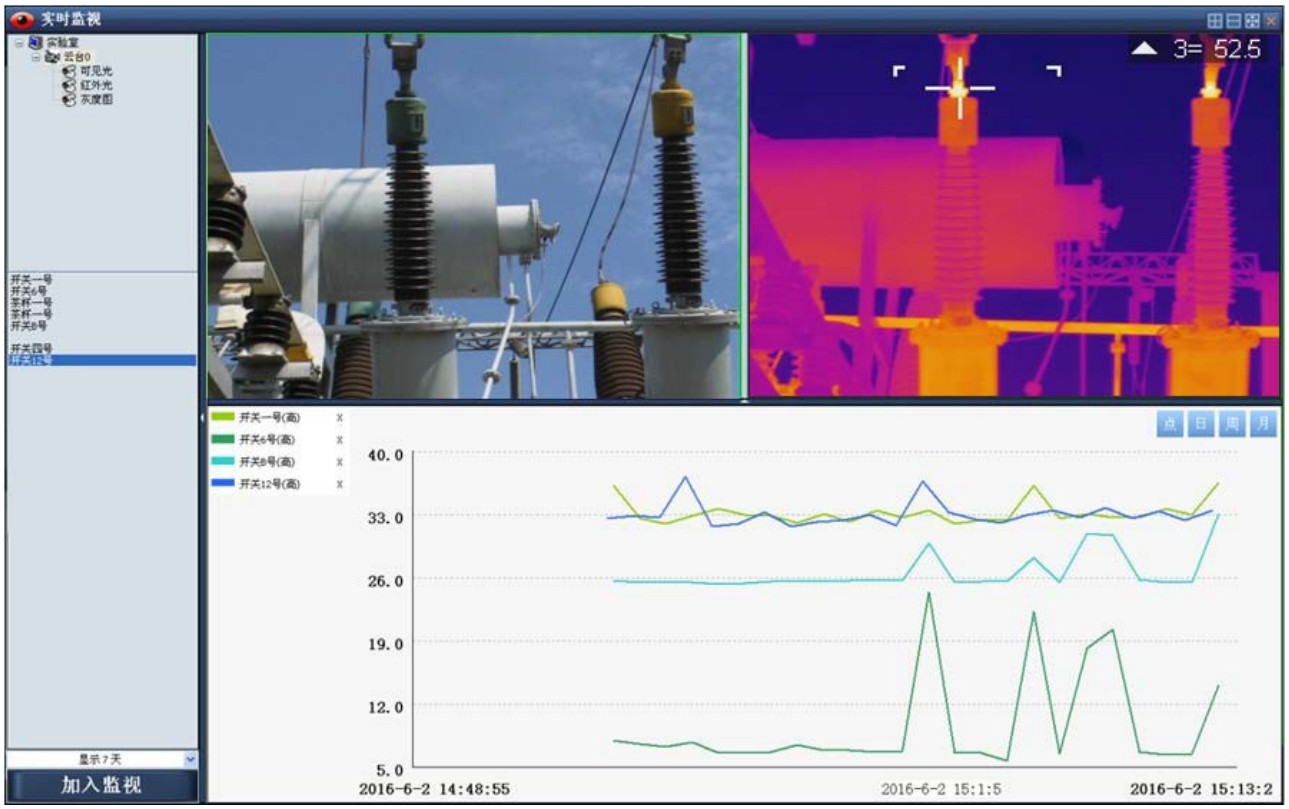


Figure 32. Source page 24, illustration 1.



Figure 33. Source page 25, illustration 1.

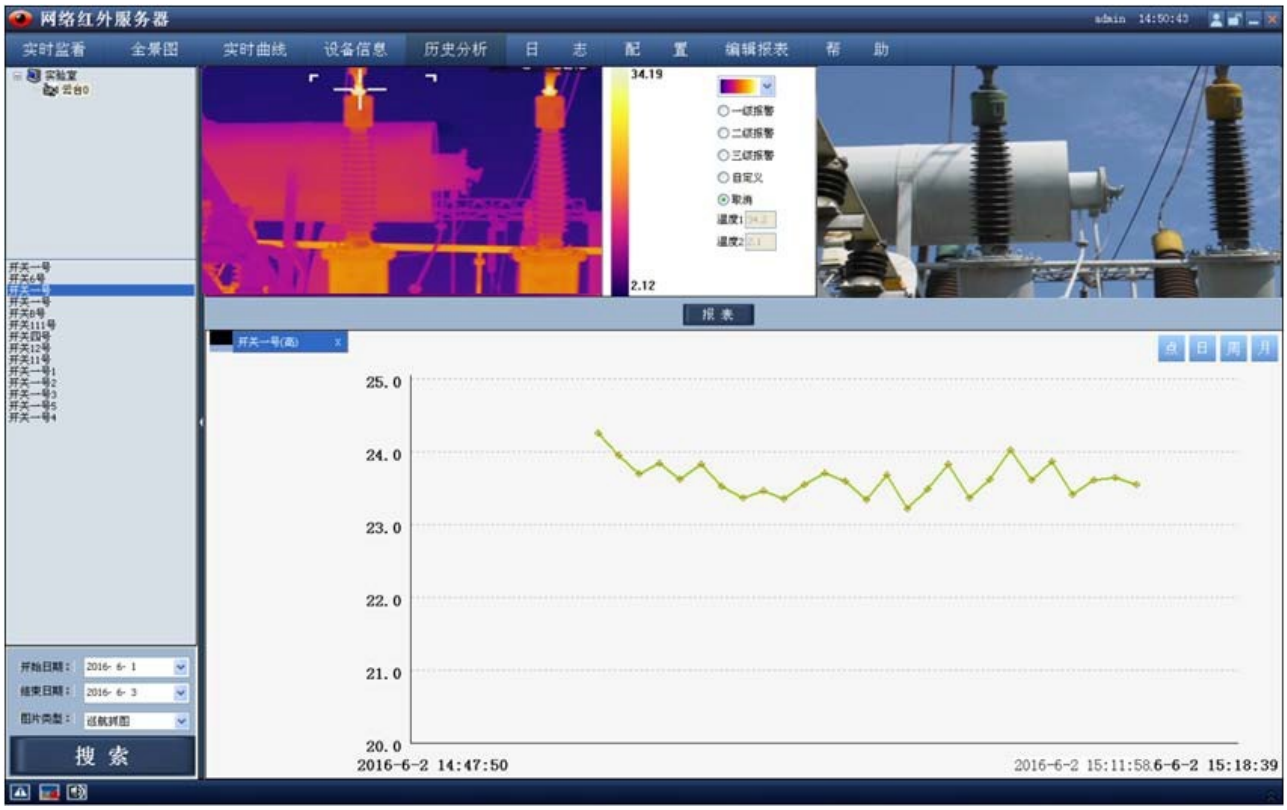


Figure 34. Source page 26, illustration 1.



Figure 35. Source page 27, illustration 1.

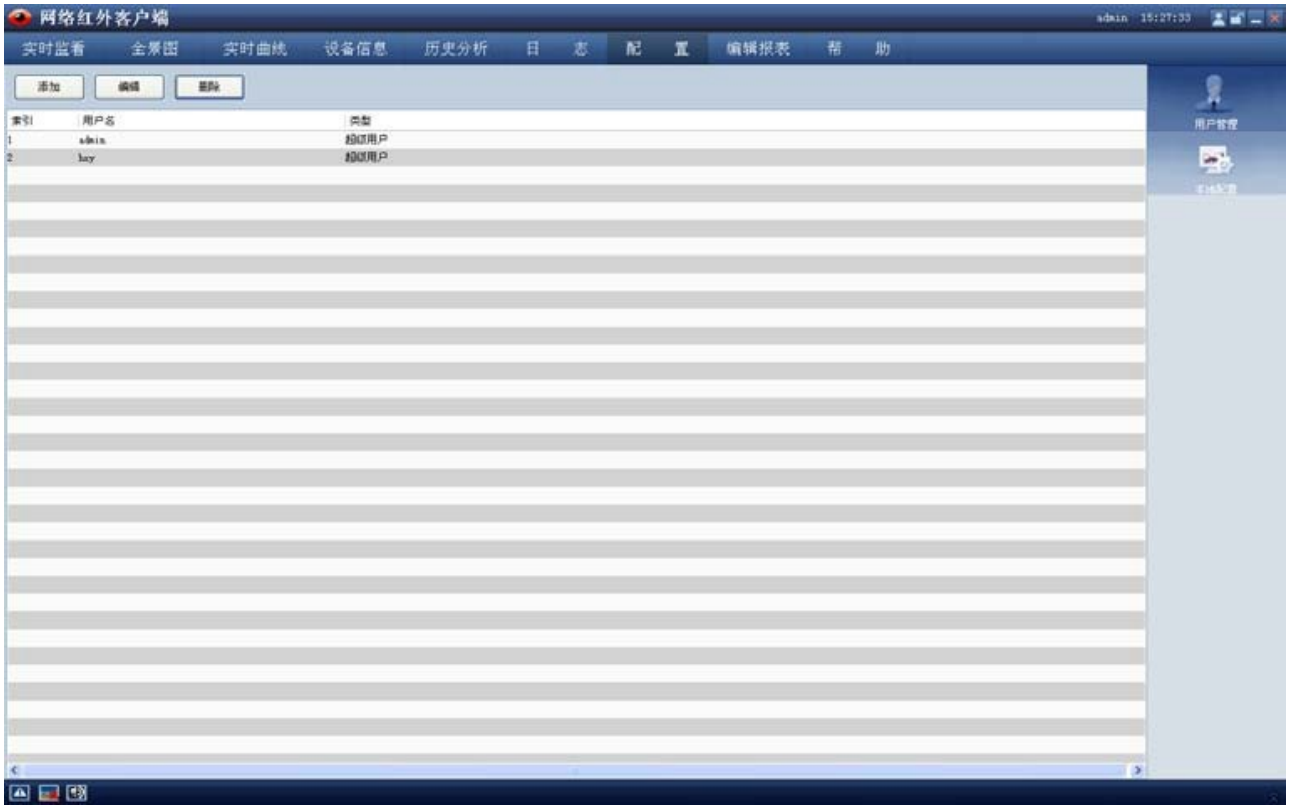


Figure 36. Source page 27, illustration 2.



Figure 37. Source page 28, illustration 1.

