PROGRAM APPARATUS COMPLEX
CCTV SYSTEM
DEL-150(V)

Operation Manual

PLA150.512.105.000RE

Rev. 01

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1. GENERAL OVERVIEW

1.1. Description

The Program Apparatus Complex **CCTV System DEL-150(V)** (hereto is "**CCTV System**" or "**System**") is hardware and software that is designed for:

- Video recording at drilling facilities, well workover, including in explosive zones;
- Video registration at other industrial facilities;
- Real-time surveillance using Monitors that are available for connection by Ethernet, VGA, HDMI;
- Data compression by online recording on the hard disk, which ensures stable synchronization of the signal;
- File backup via the SATA interface;
- Data playback with possibility to play both one recording channel and several channels simultaneously. In addition, there is a digital zoom function for the selected area of the image;
- Remote operations including:
    - Real-time surveillance;
    - Viewing of the data archive;
    - PTZ cameras control;
    - Recording of a video stream;
    - Administration of system settings;

1.2. System Components

The CCTV System includes the following components based on the Customer's requirements:

- Video Recorder;
- Video Cameras;
- Monitors;
- Remote Controls;
- Commutation boxes;
- HDMI Converter;
- Wi-Fi Bridges;
- GSM Antenna;
- Power Supplies;
- Cabling.

1.3. Technical Characteristics of the System's Components

1.3.1. Video Recorder

The Video Recorder is a device for recording video from network IP Video Cameras. The image broadcast by the cameras is displayed by the Video Recorder (DEL-150V3-MDT4 model) on its internal screen and recorded to the Removable Memory Drive. The Video Recorder has the ability to connect to a computer local area network and to the Internet. In this case, it is possible to view the video and control the Video Recorder remotely over the network using the VMS video surveillance program.

Also, when the Video Recorder is connected to the Internet, it becomes possible to view the image on

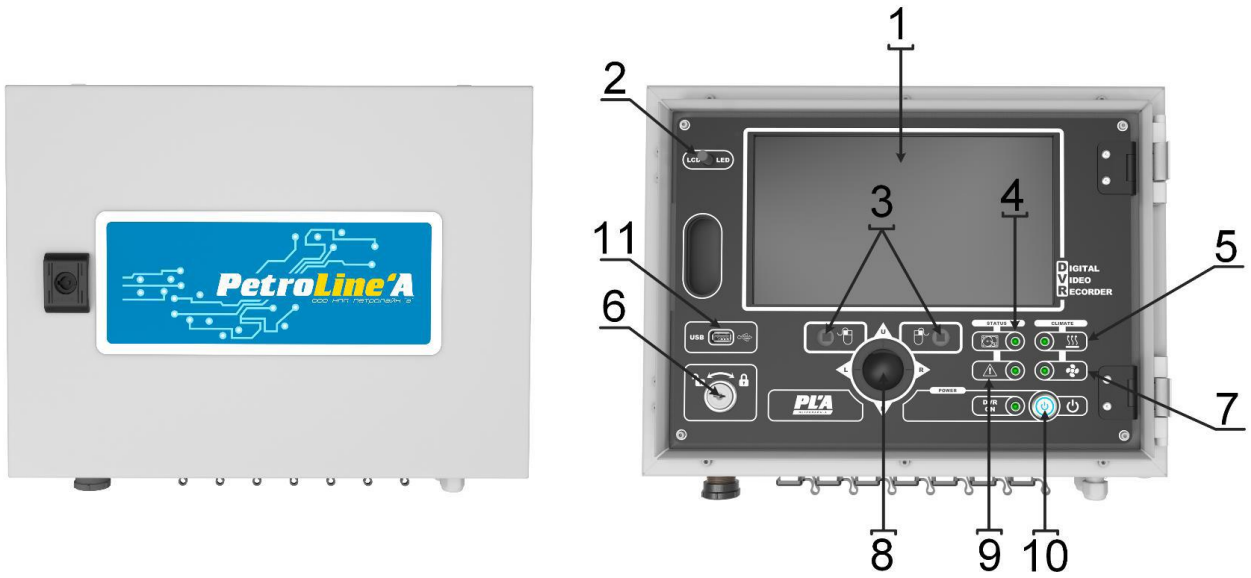
mobile devices (smartphones and tablets).

The Video Recorder is designed specifically for security and is a video surveillance device running on the LINUX operating system. It uses a modern video compression format, which provides high-quality images and high-speed operation.

The Video Recorder can be used individually or as part of a multi-component security system.

The Video Recorder has the following configurations:

- Video Recorder DEL-150V3-MDT4



1. Internal screen;
2. Limit switch;
3. Functional buttons;
4. Removable memory drive operation LED;
5. Heater LED;
6. Lock;
7. Cooling LED;
8. Trackball;
9. Error LED;
10. Power button;
11. USB-port for periphery connection

Figure 1. The DEL-150V3-MDT4 Video Recorder overview

Table 1. The DEL-150V3-MDT4 Video Recorder technical characteristics

Name of parameter	Value
Qty of plugs for Video Cameras connection, max.	4
Qty of Video Cameras supported, max.	32
Removable memory drive	HDD/SSD 2.5" up to 2 pcs.
Internal screen size, inch	10
Power supply, VDC	24
Ingress protection	IP54
Power consumption with heater on, max., Wt	240

Power consumption with heater off, max., Wt	100
Temperature range in the environment of operation, °C	-40…+50
Dimensions, mm	300 x 400 x 150
Weight, max., kg	12

The Video Recorder's plugs panel contains connectors for equipment connection according to their marking.

- Video Recorder DEL-150V3-M0

Figure 2. The DEL-150V3-M0 Video Recorder overview

Table 2. The DEL-150V3-M0 Video Recorder technical characteristics

Name of parameter	Value
Qty of RJ-45 plugs	1
Qty of Video Cameras supported, max.	32
Removable memory drive	HDD/SSD 2.5"
Power supply, VDC	12
Power consumption max., Wt	20
Temperature range in the environment of operation, °C	0…+50
Enclosure material	plastic
Dimensions, mm	200 x 135 x 75
Weight, max., kg	2

The DEL-150V3-M0 Video Recorder is intended for indoor usage only. Its plugs panel contains connectors for equipment connection according to their marking (see Fig. 3)

1. Power supply;
2. USB-port for periphery connection;
3. LAN-port for the network connection;
4. HDMI-port for Monitor connection by HDMI;
5. VGA-port for Monitor connection by VGA;
7. AUX – linear asynchronous-serial audio input

Figure 3. The DEL-150V3-M0 Video Recorder's plugs panel

1.3.2. Video Camera

The Video Camera has the following configurations:

- IP-Video Camera

Figure 4. The IP-Video Camera overview

Table 3. The IP-Video Camera technical characteristics

Name of parameter	Value
Camera	
Matrix	1/2.8'' Progressive Scan CMOS
Resolution, MP	2 (by default) or 4 (by order)
Photosensitivity, lx	Color: 0.005 (at F1.6, AGC on) B/W: 0 (IR on)
Day & night	Mechanic IR-filter
Movement range (manual), °	360 pan 90 tilt 360 roll
Lens	
FOV, °	2.8 mm: 107 (horizontal), 57 (vertical), 127 (diagonal) 4 mm: 87 (horizontal), 46 (vertical), 104 (diagonal) 6 mm: 54 (horizontal), 29 (vertical), 63 (diagonal)
Aperture	F1.6
IR lightning	
Distance, m	40
Wavelength, nm	850
Video	
Resolution, max., MP	1920 x 1080 (1280 x 720 by default)
Main stream	25 fps (1920 x 1080, 1280 x 720) by order 15 fps (1280 x 720) by default
Sub-stream	25 fps (1920 x 1080, 1280 x 720) by order 15 fps (640 x 360) by default
Video compression	Main stream: H.265 / H.264 / H.264+ (by default) / H.265+ Sub-stream: H.265 / H.264 (by default) / MJPEG

Video bit rate range, kbps	32…8192 Main stream: 2048 (by default) Sub-stream: 1024 (by default)
Network	
Simultaneous real-time viewing	up to 6 channels
Web Browser	Plug-in is required: IE 10, IE 11 Plug-in is not required: Chrome 57.0+, Firefox 52.0+ Local services: Chrome 57.0+, Firefox 52.0+
Interface	
Communication interface	1 RJ45, self-adaptive 10M/100M Ethernet port
On-board storage	support microSD up to 256 GB
Hardware reset	Yes
General	
Web-client language	Multi-language
Storage conditions	Temperature: -30°C…+60°C, Humidity: ≤ 95%
Operating conditions	Temperature: -40°C…+60°C, Humidity: ≤ 95%
Power supply range, VDC	9…15, PoE (802.3 af, 36…57 VDC), class 3
Power consumption, Wt, max.	6 at 12 VDC, 0.5 A 7 at PoE (802.3 af, 36…57 VDC), 0.2…0.13 A
Material	Aluminum enclosure, plastic IR cap
Ingress protection	IP67
Dimensions, mm	Ø70 x 162
Weight, max., kg	0.49

The IP-Video Camera is connected to the Video Recorder by the Communication Cable YT-RJ45/RJ45 (socket) (see Fig. 5):

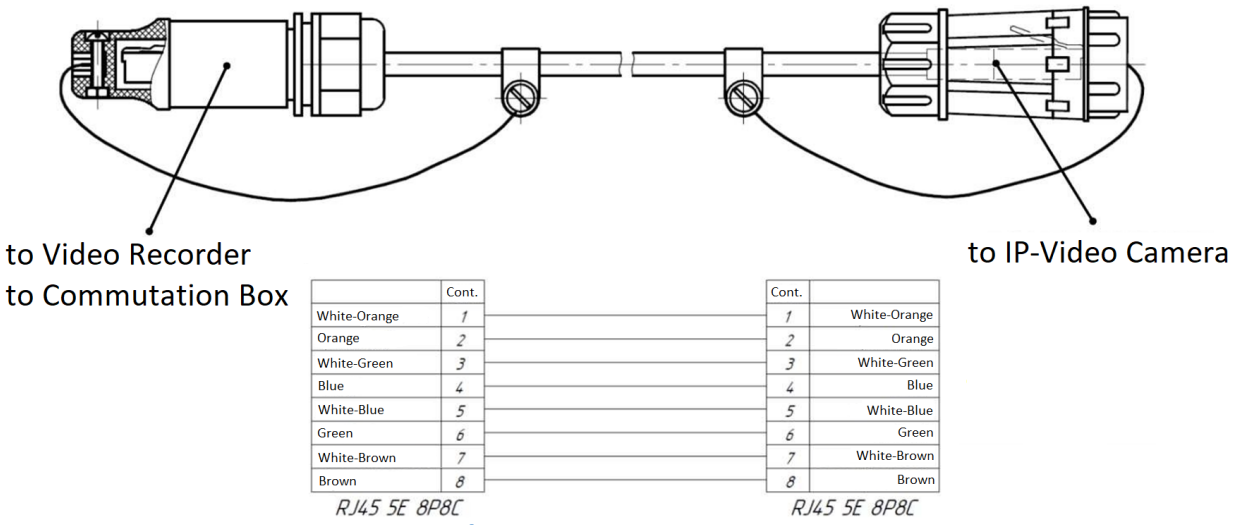


Figure 5. The Communication Cable YT-RJ45/RJ45 (socket)

- Explosion-Proof Fixed Video Camera VOV-150

The VOV-150 Explosion-Proof Fixed Video Camera (hereto the "**VOV-150 EX Video Camera**") is designed to work in explosive zones. It consists of a cylindrical body that closes on both sides with lids. The enclosure and lids are made of stainless steel. The enclosure has one explosion-proof compartment,

protects the equipment from environmental influences, the protection degree corresponds to IP66. Explosion-proof of Video Camera is provided by the explosion-proof enclosure, which withstands the explosion pressure inside it and eliminates the explosion transmission into the surrounding explosive environment. An observation window made of tempered glass is installed on the front lid.

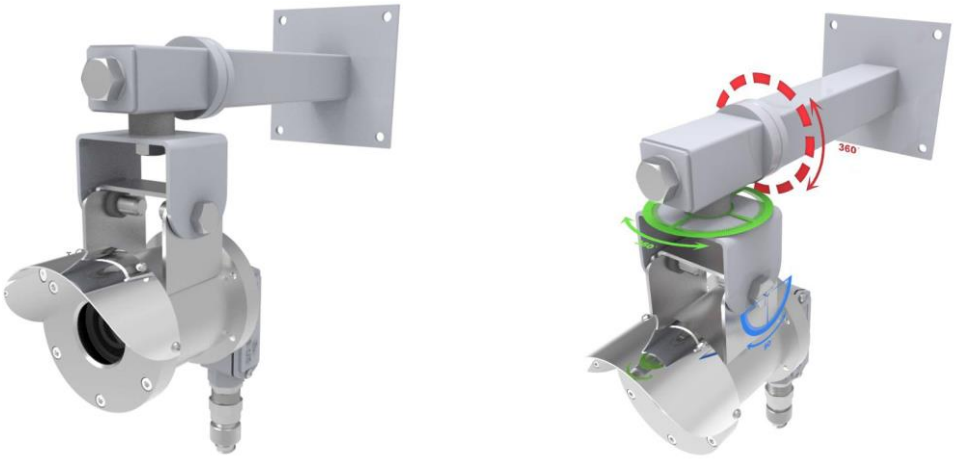


Figure 6. The VOV-150 EX Video Camera and its movement ranges

Table 4. The VOV-150 EX Video Camera technical characteristics

Name of parameter	Value
Camera	
Matrix	1/2.8'' Progressive Scan CMOS
Resolution, MP	2 (by default) or 4 (by order)
Photosensitivity, lx	Color: 0.005 (at F1.6, AGC on) B/W: 0 (IR on)
Day & night	Mechanic IR-filter
Movement range (manual), °	360 pan 90 tilt 360 roll
Lens	
FOV, °	2.8 mm: 107 (horizontal), 57 (vertical), 127 (diagonal) 4 mm: 87 (horizontal), 46 (vertical), 104 (diagonal) 6 mm: 54 (horizontal), 29 (vertical), 63 (diagonal)
Aperture	F1.6
IR lightning	
Distance, m	40
Wavelength, nm	850
Video	
Resolution, max., MP	1920 x 1080 (1280 x 720 by default)
Main stream	25 fps (1920 x 1080, 1280 x 720) by order 15 fps (1280 x 720) by default

Sub-stream	25 fps (1920 x 1080, 1280 x 720) by order 15 fps (640 x 360) by default
Video compression	Main stream: H.265 / H.264 / H.264+ (by default) / H.265+ Sub-stream: H.265 / H.264 (by default) / MJPEG
Video bit rate range, kbps	32…8192 Main stream: 2048 (by default) Sub-stream: 1024 (by default)
Network	
Simultaneous real-time viewing	up to 6 channels
Web Browser	Plug-in is required: IE 10, IE 11 Plug-in is not required: Chrome 57.0+, Firefox 52.0+ Local services: Chrome 57.0+, Firefox 52.0+
Interface	
Communication interface	1 RJ45, self-adaptive 10M/100M Ethernet port
On-board storage	support microSD up to 256 GB
Hardware reset	Yes
General	
Web-client language	Multi-language
Temperature range in the environment of operation, °C	-60…+60
Power supply, VDC	48
Power consumption, Wt	8 at 0.16 A
Material	Stainless steel
Ex marking, TR CU 012/2011	1ExdbIICT6GbX
Ex marking, ATEX	II2GExdbIICT6Gb
Ingress protection	IP66
Dimensions, mm	Ø104 x 111
Weight, max., kg	2.5

The VOV-150 EX Video Camera is connected to the Video Recorder by the Communication Cable YT-RJ45 (see Fig. 7):

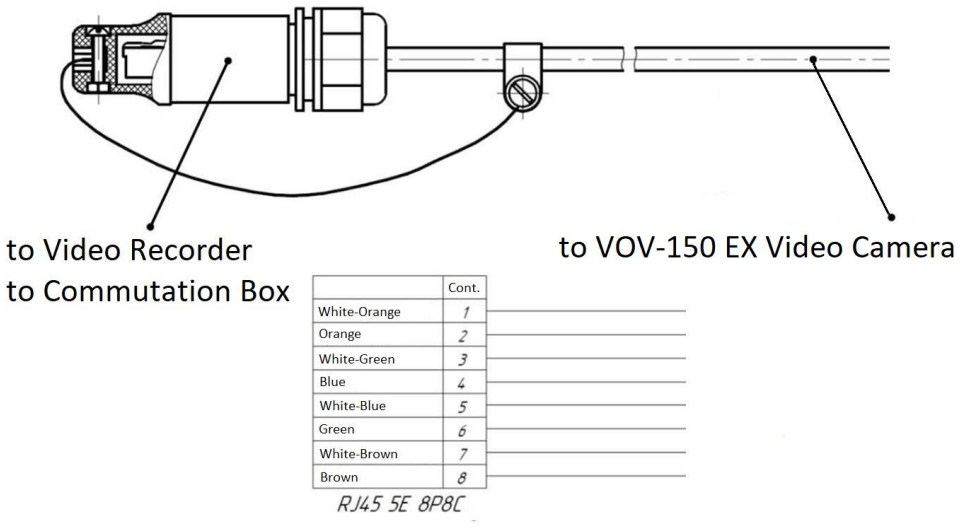


Figure 7. The Communication Cable YT-RJ45

Connection of the Communication Cable to the VOV-150 EX Video Camera is carried out in the following order (see Fig. 8):

1. Removing the lid of the explosion-proof terminal box (Item 1) by screwing off 2 screws;
2. Connection the cable to the terminal (Item 2) according to the diagram.

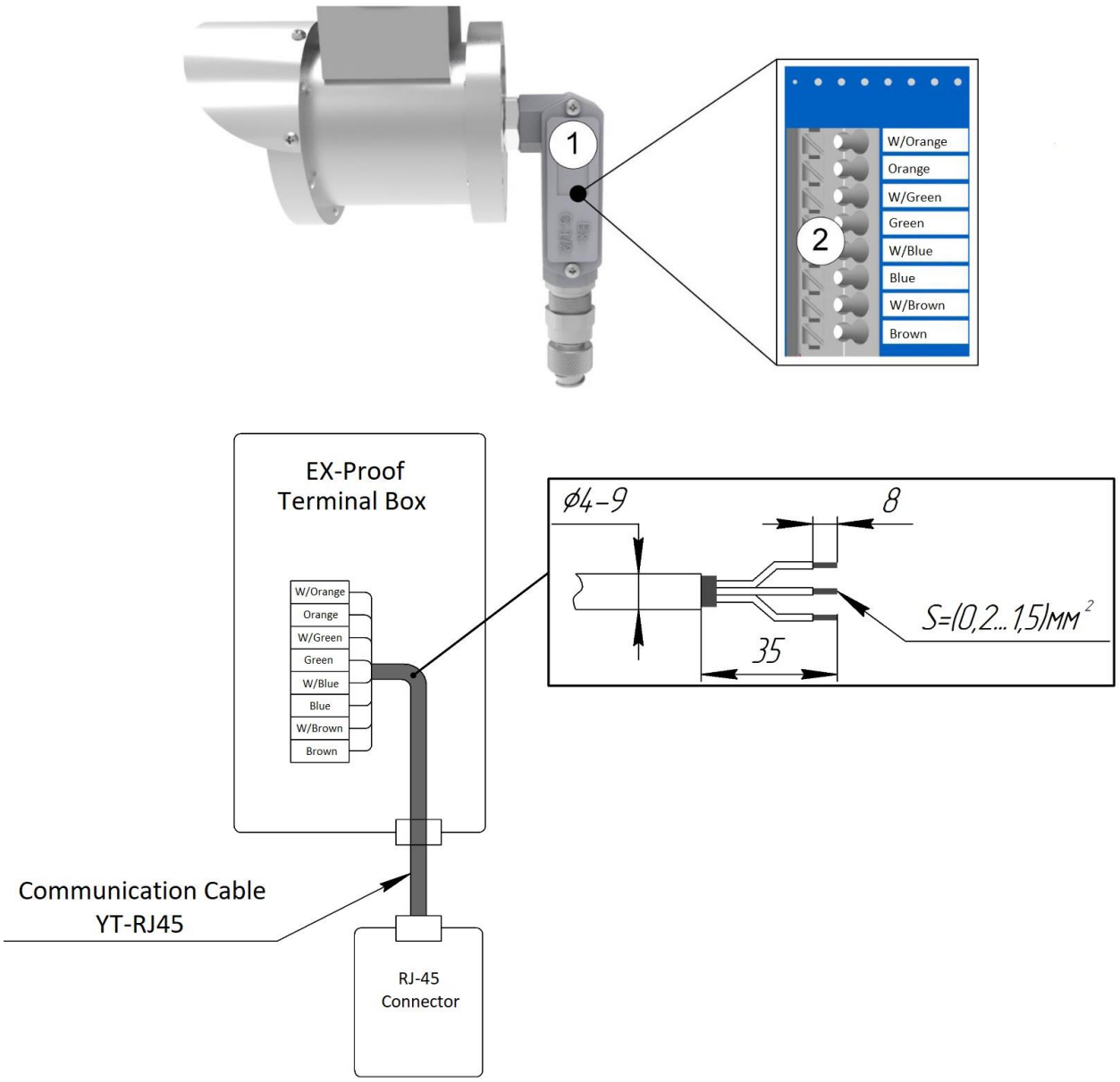


Figure 8. Connection of the VOV-150 EX Video Camera

- Explosion-Proof Dome Video Camera VOV-150(PTZ)

The VOV-150(PTZ) Explosion-Proof Dome Video Camera (hereto the "**VOV-150(PTZ) EX Video Camera**") is designed to work in explosive zones. It's a dome type and is made of stainless steel. The VOV-150(PTZ) EX Video Camera is equipped for use in areas where professional anti-corrosion protection is a must, which protects the equipment from environmental influences, the protection degree corresponds to IP66. The VOV-150(PTZ) EX Video Camera has TVS 6000V lightning protection, surge protection and voltage transient protection.

Figure 9. The VOV-150(PTZ) EX Video Camera

Table 5. The VOV-150(PTZ) EX Video Camera technical characteristics

Name of parameter	Value
Camera	
Matrix	1/2.8'' Progressive Scan CMOS
Resolution, MP	4
Photosensitivity, lx	Color: 0.005 (at F1.5, AGC on) B/W: 0.001 (at F1.5, AGC on), 0 (IR on)
Day & night	Mechanic IR-filter
Digital zoom	16 x
Optical zoom	4 x
Lens	
Focal length range, mm	2.8…12
Zoom speed, s	2
FOV range, °	96.7…31.6 (horizontal) 51.1…17.7 (vertical) 115.1…36.3 (diagonal)
Aperture	F1.5
PTZ	
Movement range (pan), °	0…355
Movement range (tilt), °	0…90
Pan speed range, °/s	0.1…100, configurable, 100 by default
Tilt speed range, °/s	0.1…100, configurable, 100 by default
Proportional zoom	yes
Video	
Resolution, max., MP	2560 x 1440
Main stream	50 Hz: 25 fps (2560 × 1440, 1920 × 1080, 1280 × 960, 1280 × 720) 60 Hz: 30 fps (2560 × 1440, 1920 × 1080, 1280 × 960, 1280 × 720)
Sub-stream	50 Hz: 25 fps (704 x 576, 640 x 480, 352 x 288) 60 Hz: 30 fps (704 x 480, 640 x 480, 352 x 240)

Compression	
Video	H.264 / H.264+ / H.265 / H.265+ / MJPEG
Audio	G.711alaw / G.711ulaw / G.722.1 / G.726 / MP2L2 / PCM / AAC
Network	
Network storage	NAS (NFS, SMB/ CIFS), ANR
Protocols	IPv4/IPv6, HTTP, HTTPS, 802.1x, Qos, FTP, SMTP, UPnP, SNMP, DNS, DDNS, NTP, RTSP, RTCP, RTP, TCP/IP, UDP, IGMP, ICMP, DHCP, PPPoE, Bonjour
Simultaneous real-time viewing	up to 20 channels
User/Host	Up to 32 users. 3 levels: Administrator, Operator and User
Web Browser	IE11, Chrome 57.0+, Firefox 52.0+, Safari 11+
Interface	
Communication interface	1 RJ45, auto 10M/100M Ethernet port
On-board storage	support microSD / microSDHC / microSDXC cards, up to 256 GB
General	
Temperature range in the environment of operation, °C	-60…+60
Power supply range, VDC	12, PoE (802.3 af)
Power consumption, max., Wt	11.2
Material	Stainless steel
Ex marking, TR CU 012/2011	1ExdbIICT6GbX
Ex marking, ATEX	II2GExdbIICT6Gb
Ingress protection	IP66
Dimensions, mm	Ø150 x 183
Weight, max., kg	4.2

The VOV-150(PTZ) EX Video Camera is connected to the Video Recorder by the Communication Cable YT-RJ45/RJ45 (see Fig. 10):

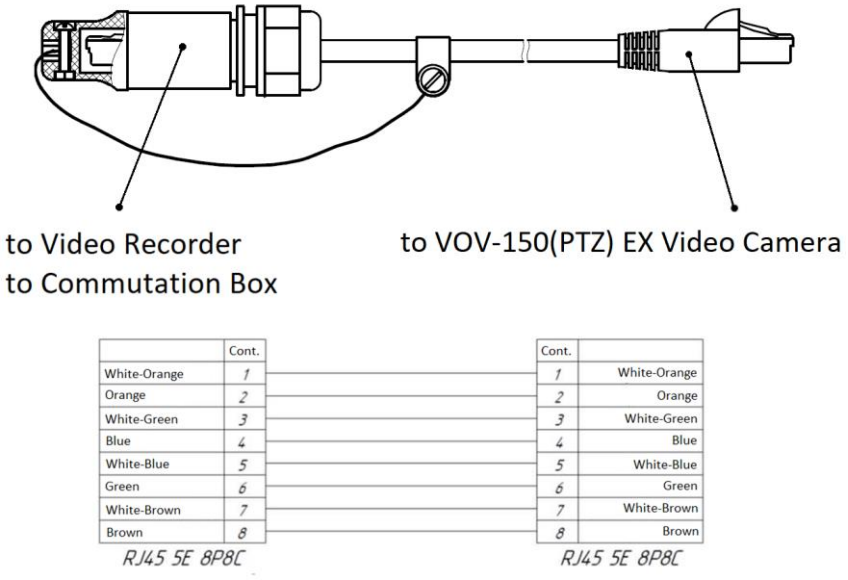


Figure 10. The Communication Cable YT-RJ45/RJ45

1.3.3. Commutation Box

The Commutation Box is used for connecting additional Video Cameras to the CCTV System. Communication with the Video Recorder is carried out via a Wi-Fi Bridges or using a network Ethernet cable.

The Commutation Box has the following configurations:

- Commutation Box SHK

Figure 11. The SHK Commutation Box overview

Table 6. The SHK Commutation Box technical characteristics

Name of parameter	Value
Qty of plugs for Video Cameras connection, max.	4
Power supply range, VDC	18…36
Ingress protection	IP54
Temperature range in the environment of operation, °C	-40…+50
Dimensions, mm	360 x 260 x 130
Weight, max., kg	4.5

The Wi-Fi Power Supply ON/OFF switch located on the front panel must be ON when Wi-Fi Bridge is used for connection. In case of running the network Ethernet cable for communication with the Video Recorder, it must be OFF.

The plugs panel of the SHK Commutation Box is depicted on Fig. 12.

1. Power supply;
2, 3, 4, 5. Video Cameras connection plugs;
6. Monitor connection plug;
7. Wi-Fi Bridge connection plug

Figure 12. The SHK Commutation Box's plugs panel

- Commutation Box SHK-8

The SHK-8 Commutation Box has the same application and characteristics as the previous one SHK excepting quantity of the Video Cameras connected. It supports up to 8 pcs. Video Cameras (see Fig. 13).

Figure 13. The SHK-8 Commutation Box overview

Table 7. The SHK-8 Commutation Box technical characteristics

Name of parameter	Value
Qty of plugs for Video Cameras connection, max.	8
Power supply range, VDC	18…75
Ingress protection	IP54
Temperature range in the environment of operation, °C	-40…+50
Dimensions, mm	362 x 250 x 130
Weight, max., kg	4.5

- Commutation Box SHK-Ex

The SHK-Ex Commutation Box is designed to work in explosive zones and has a polymer-epoxy staining with antistatic properties, friction intrinsically safe, resistant to environments and ionizing radiation.

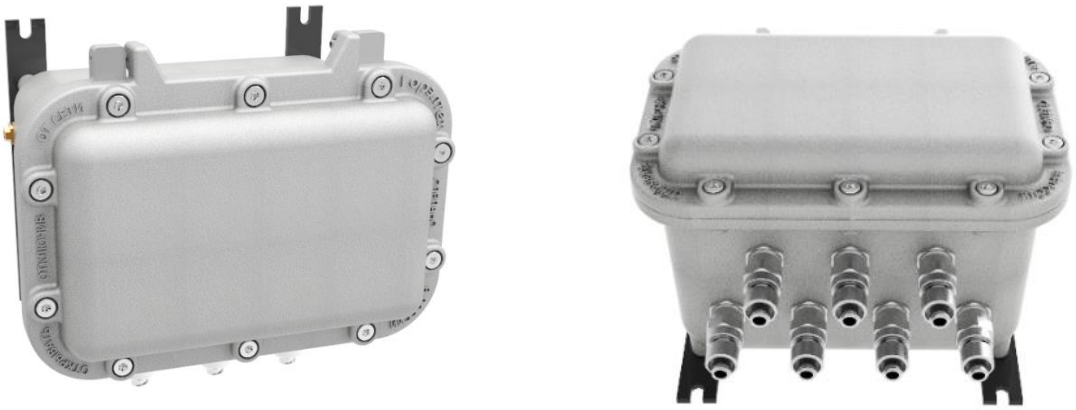
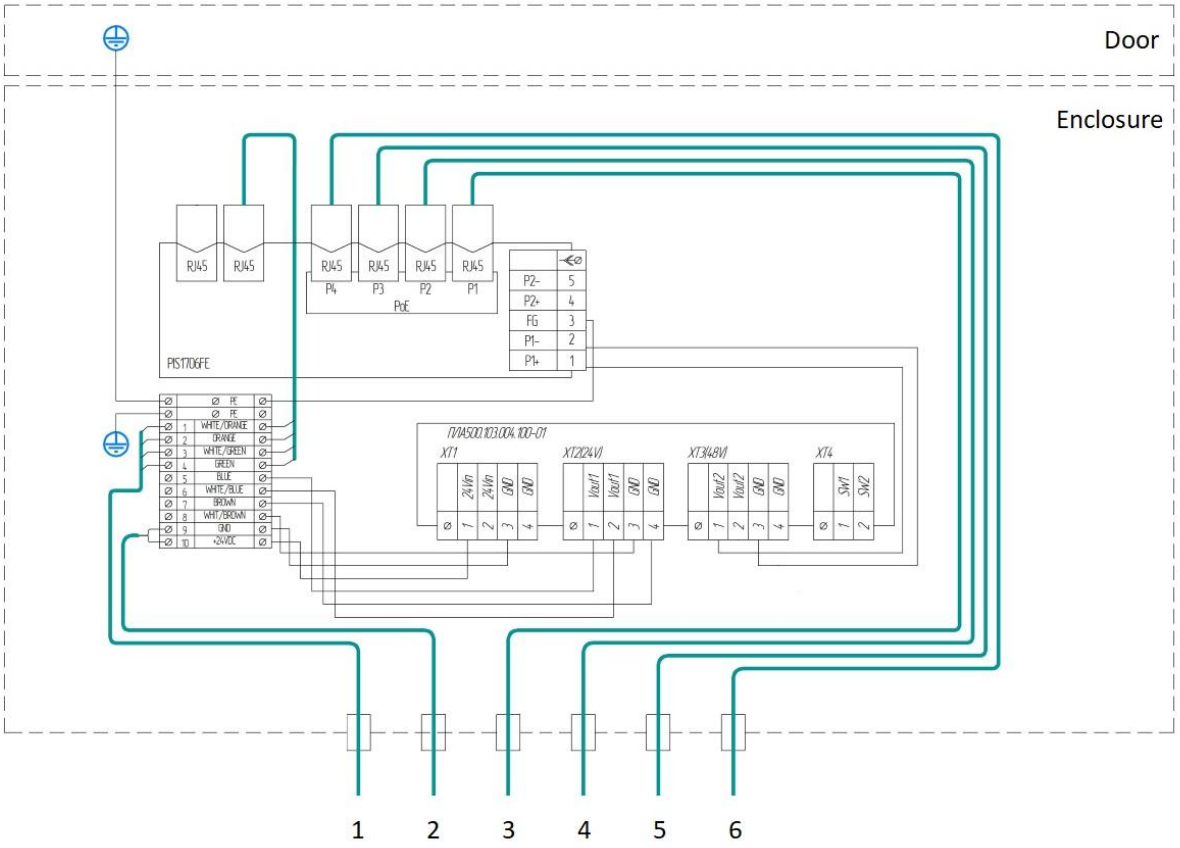


Figure 14. The SHK-Ex Commutation Box overview

Table 8. The SHK-Ex Commutation Box technical characteristics

Name of parameter	Value
Qty of Video Cameras connection, max.	4
Power supply range, VDC	18…36
Ingress protection	IP66
Temperature range in the environment of operation, °C	-40…+50
Ex marking, TR CU 012/2011	1ExdbIIB+H2T4Gb
Ex marking, ATEX	II2GExdbIIB+H2T4Gb
Dimensions, mm	370 x 310 x 220
Weight, max., kg	15

Electrical connections drawing is referenced on Fig. 15.



1. Ethernet connection to PC;
2. Power supply;
3, 4, 5, 6. Video Cameras connection glands

Figure 15. The SHK-Ex Commutation Box electrical connections drawing

- Commutation Box SHK-8-Ex

The SHK-8-Ex Commutation Box is designed to work in explosive zones and has the same application and characteristics as the previous one SHK-Ex excepting quantity of the Video Cameras connected. It supports up to 8 pcs. Video Cameras (see Fig. 16).

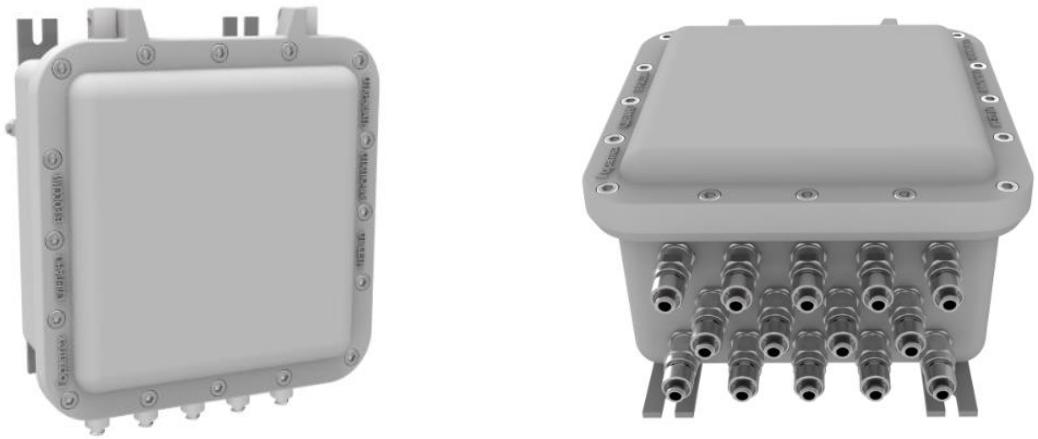
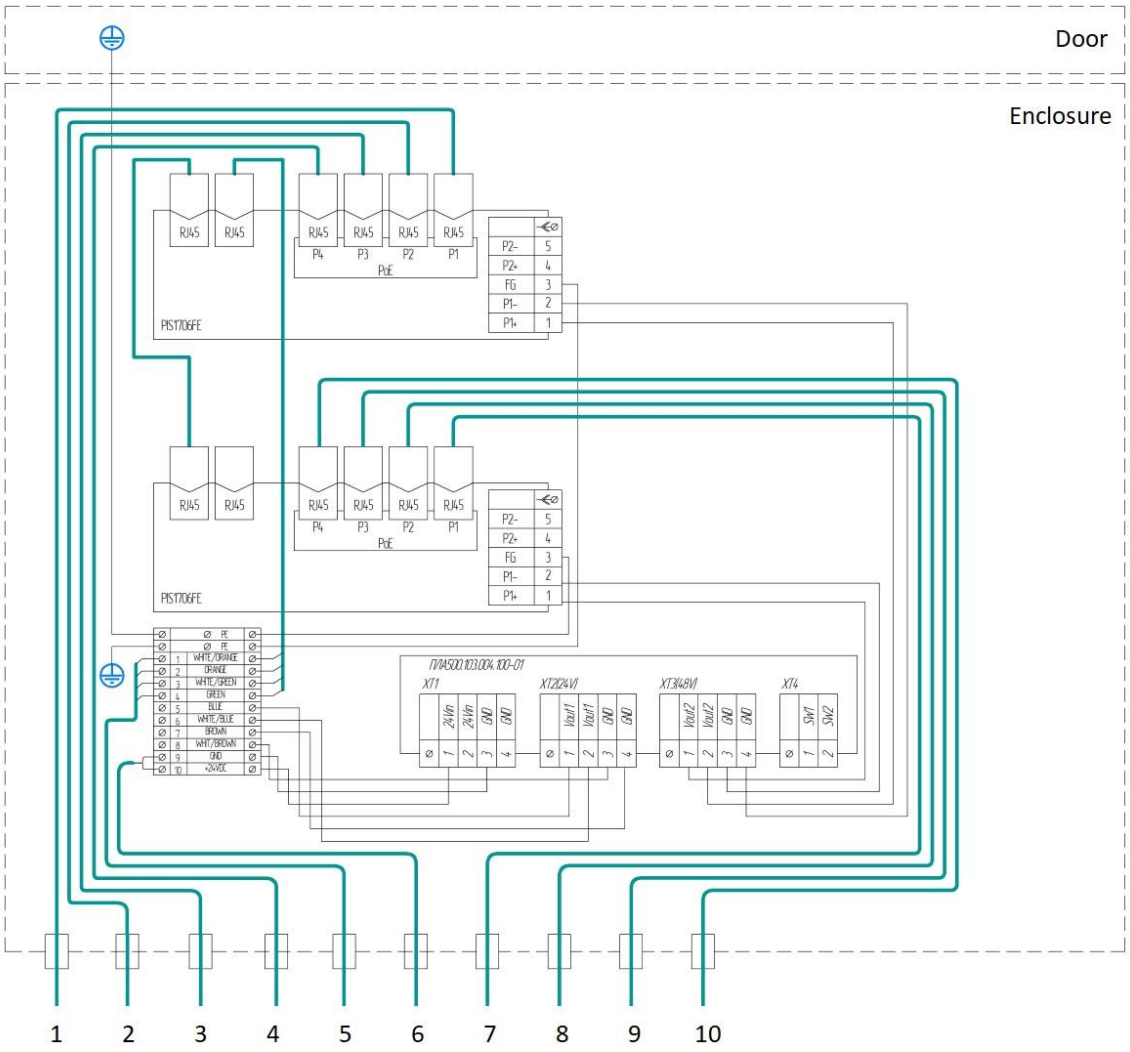


Figure 16. The SHK-8-Ex Commutation Box overview

Table 9. The SHK-8-Ex Commutation Box technical characteristics

Name of parameter	Value
Qty of Video Cameras connection, max.	8
Power supply range, VDC	18…75
Ingress protection	IP66
Temperature range in the environment of operation, °C	-40…+50
Ex marking, TR CU 012/2011	1ExdbIIB+H2T4Gb
Ex marking, ATEX	II2GExdbIIB+H2T4Gb
Dimensions, mm	402 x 338 x 221
Weight, max., kg	25

Electrical connections drawing is referenced on Fig. 17.



1, 2, 3, 4, 7, 8, 9, 10. Video Cameras connection glands;
5. Ethernet connection to PC;
6. Power supply.

Figure 17. The SHK-8-Ex Commutation Box electrical connections drawing

- Commutation Box SHK-1

The SHK-1 Commutation Box is intended to connect 1 pc. of the Video Camera that is located remotely from the Video Recorder. Connection between this type of the Commutation Box and the Video Recorder is carried out via a Wi-Fi Bridge.

Figure 18. The SHK-1 Commutation Box overview

Table 10. The SHK-1 Commutation Box technical characteristics

Name of parameter	Value
Qty of plugs for Video Cameras connection, max.	1
Power supply range, VDC	18…36
Ingress protection	IP54
Temperature range in the environment of operation, °C	-40…+50
Dimensions, mm	197 x 167 x 58
Weight, max., kg	0.6

1.3.4. Wi-Fi Bridge

The Wi-Fi Bridge is intended to replace cable lines, for example, between the Video Recorder and the Commutation Boxes.

The Wi-Fi Bridges of the kit work in pairs, one of them acts as a “Master” (access point), and the second as a slave device “Slave”.

1. Lid bolts;
2. Lid;
3. Enclosure;
4. Mounting plate;
5. Signal strength and LAN1 connection indicator;
6. Plate bolts.

Figure 19. Wi-Fi Bridge

Table 11. The Wi-Fi Bridge technical characteristics

Name of parameter	Value
Operation Frequency, GHz	2.4
Max. distance for stable wireless communication, m	3000
Power supply, VDC	24, PoE
Ingress protection	IP65
Temperature range in the environment of operation, °C	-40…+50
Dimensions, mm	80 x 56 x 225
Weight, max., kg	0.5

2. OPERATION

2.1. System configuration examples

The examples of the CCTV System's configurations are depicted on Fig. 20 and Fig. 21. Generally, any configuration is based on the Customer's requirements considering distinct application.

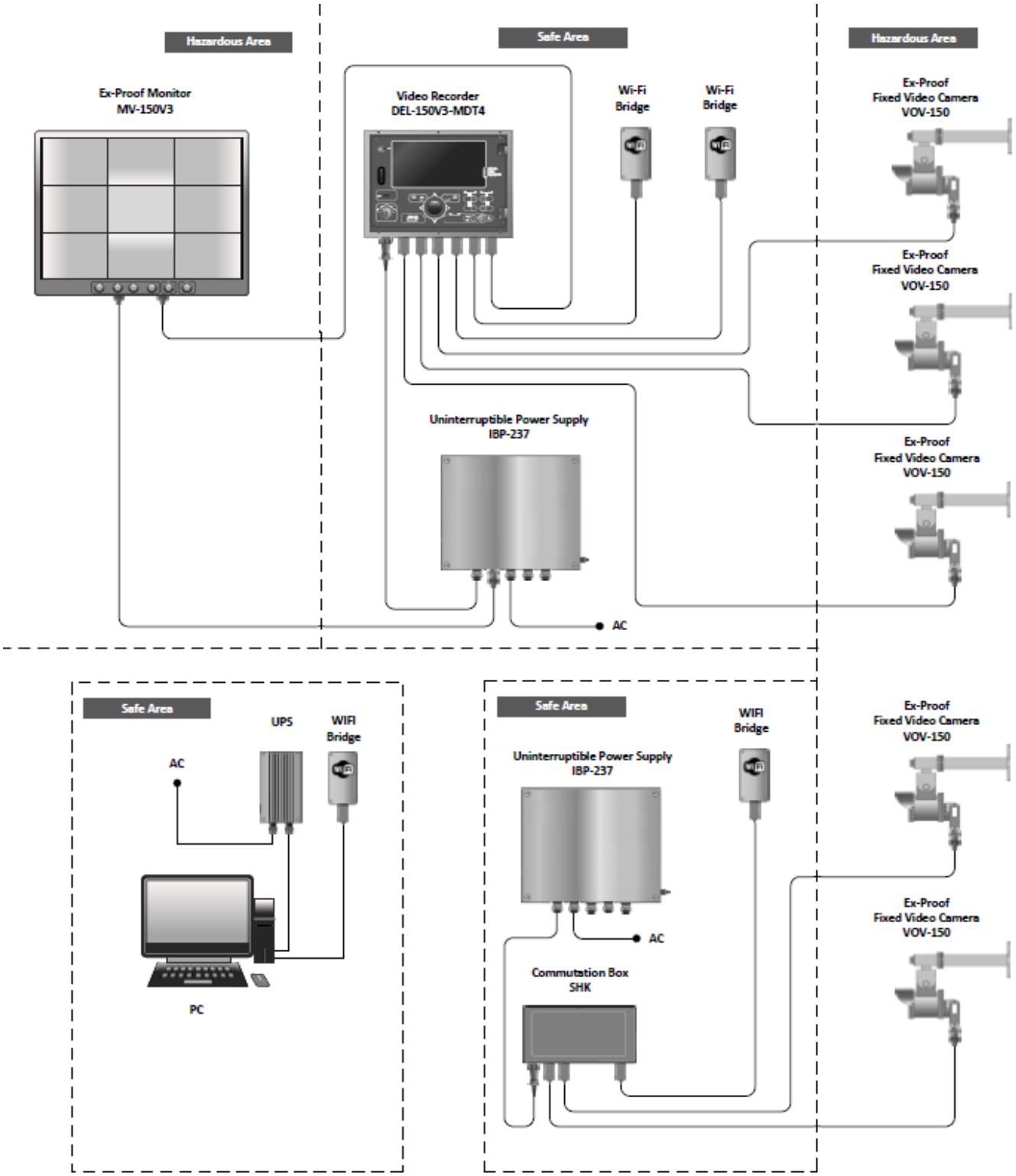


Figure 20. Example of the CCTV System configuration

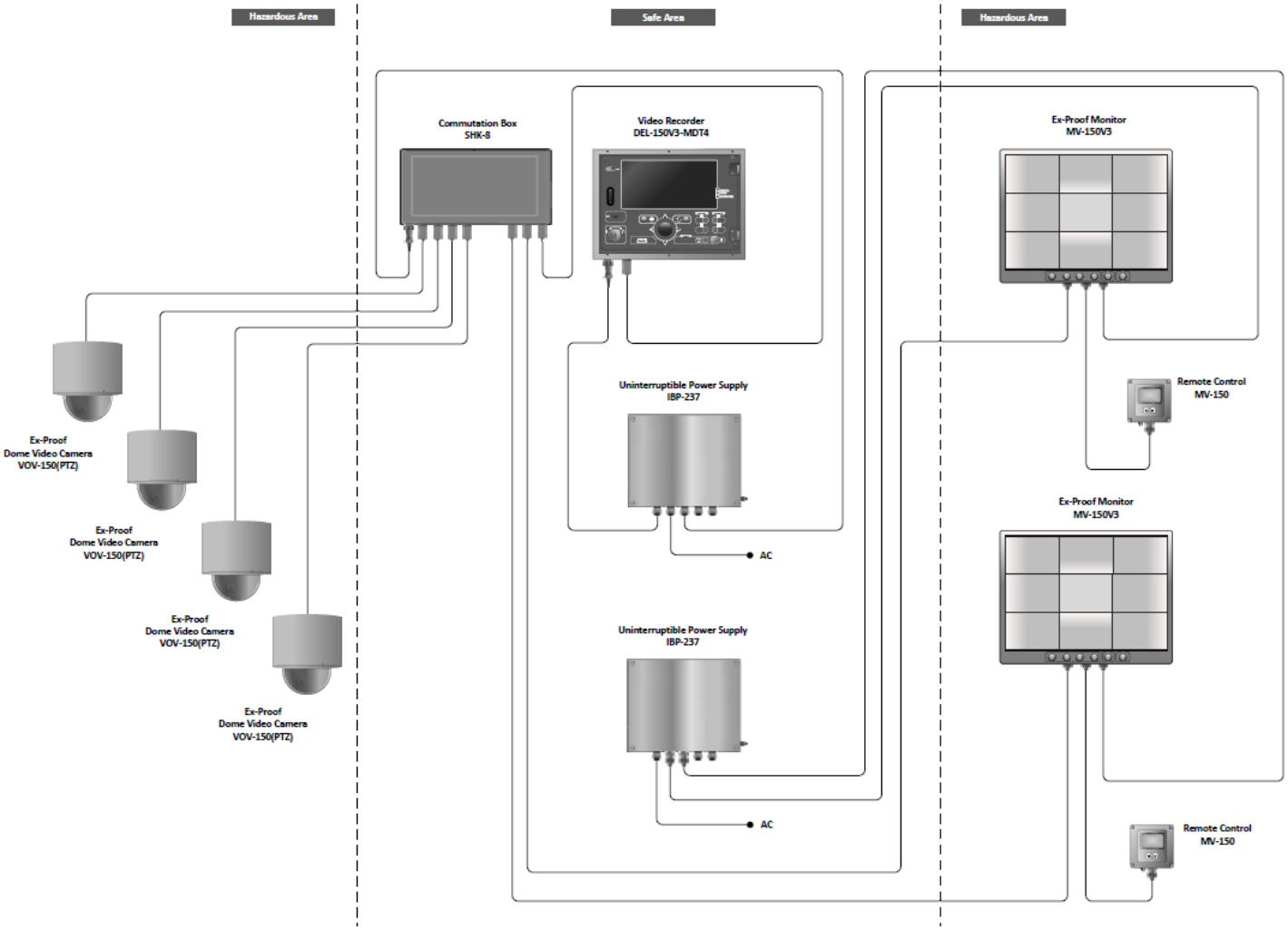


Figure 21. Example of the CCTV System configuration

2.2. Starting of the DEL-150V3-MDT4 Video Recorder

When power is ON, the climate system (if available) puts the Video Recorder into operation. If the temperature inside enclosure is less than +5 °C, the heater turns on and brings the temperature to +5 °C, after which the Video Recorder is turned on (the backlight of the power button lights up (see Fig. 1, Item 10).

When the Video Cameras are connected, the appearance of an image from a Video Camera on the Video Recorder's display (see Fig. 1, Item 1) indicates the connection. It is possible to view the current video data of connected cameras on the display, with the capability of manually switching the image from the necessary Video Camera using the trackball and functional buttons located on the front panel of the Video Recorder (see Fig. 1, Item 8 and Item 3) or using a computer mouse connected to the USB-port (see Fig. 1, Item 11).

After loading the Video Recorder, an image will appear on its display of the connected channels in multi-channel mode. By double-clicking the left mouse button, you can switch between channel images. By default, the system date, time, and channel name are shown in each window. To open the context menu, right-click the mouse (see Fig. 22).

Authorization is required then using account details (see Fig. 23)

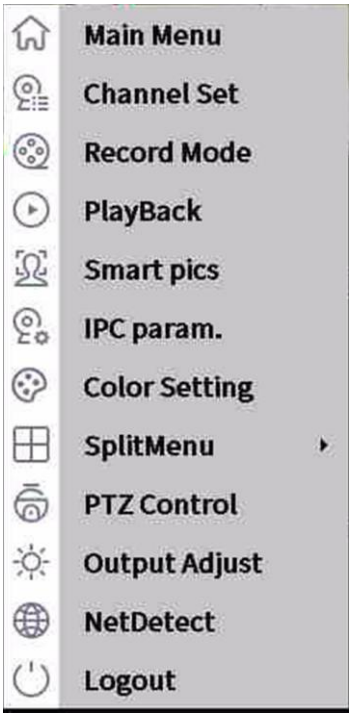


Figure 22. Context menu

Figure 23. Authorization page

NOTIFICATION. In case of entering the password incorrectly 3 times, an alarm will be triggered and the account will be blocked. After restarting or after 30 minutes, the account will be automatically unblocked

To change the number of cameras displayed, select the "SplitMenu" and the required layout. Examples of a screen layouts are shown on Fig. 24.

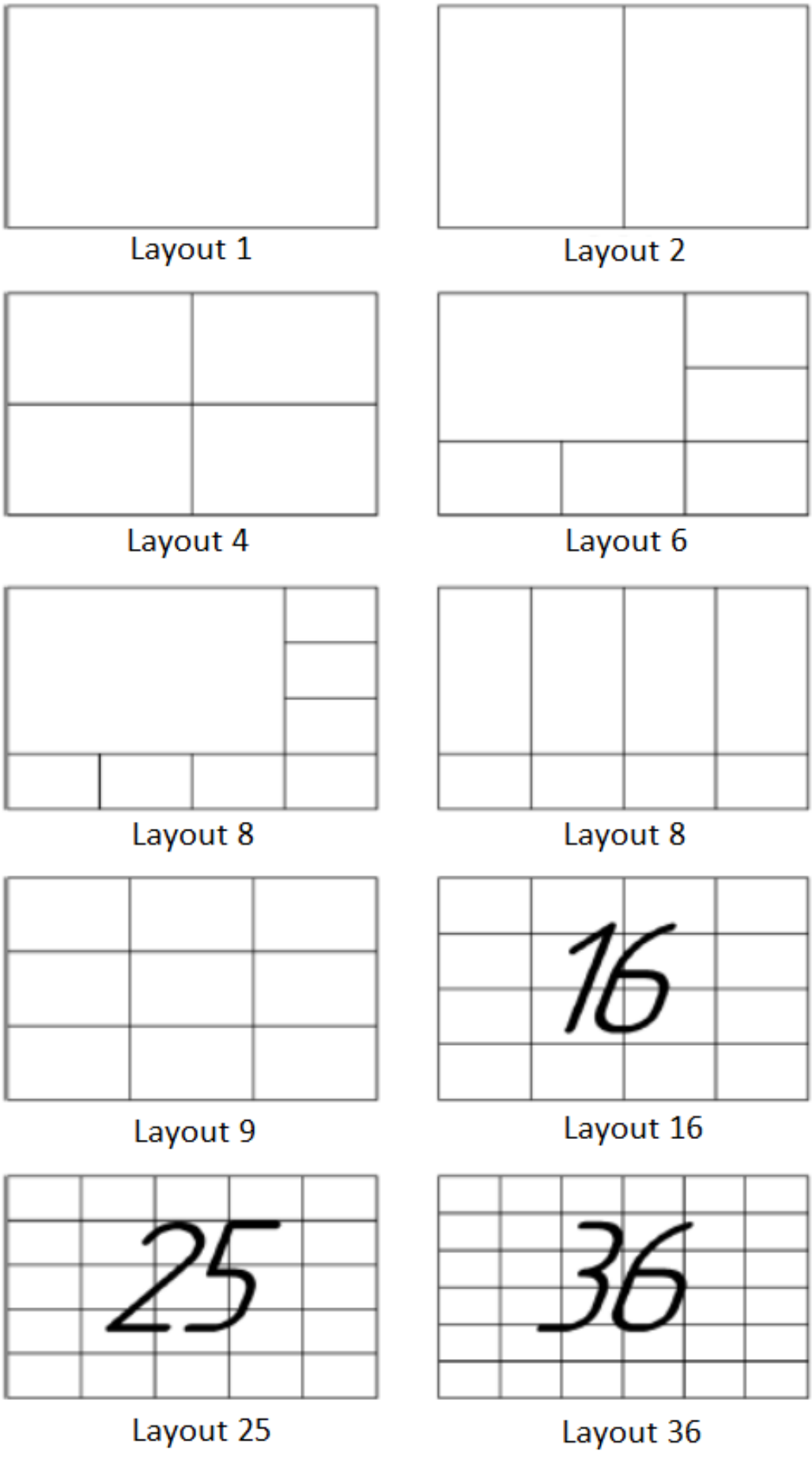


Figure 24. Screen layouts examples

2.2.1. The PTZ Video Camera Setup

To control the PTZ Video Camera, select the channel with the connected PTZ Video Camera, right-click mouse and click on the "PTZ Control" item in the context menu. The functions of this menu include PTZ Video Camera motion control, rotation speed, zoom, focus, aperture, PTZ settings, movement at preset points, tour following mode, frame following mode, etc. (see Fig. 25).

NOTIFICATION. PTZ functions depend on the distinct PTZ Video Camera model

Figure 25. PTZ Video Camera control panel

The available functions of PTZ Video Camera control panel are:

- **"Speed"** – camera movement speed from 1 to 8;
- **"Hide"** – hiding of the current screen;
- **"Zoom"** – focal length adjustment;
- **"Preset" / "Start"** – preset points control;
-  – camera position control. 8 positions are available;
- **"Advanced"** – locations of the PTZ Video Cameras;
- **"PTZ Trace"** – camera position control using a mouse. In full-screen mode, click the left mouse button to control the movement of the PTZ Video Camera and scroll with the mouse wheel to adjust the zoom;
- **"Page Switch"** – switching-over the menu pages.

Special functions description is provided below:

1. Preset points.

The "Preset" is a predefined position of an image. When the preset is called, the PZT Video Camera automatically moves to the preset position.

The following order is required to setup preset points:

- Step 1: press the direction buttons  to select the required camera position. Use the "+" / "-"

of “Zoom” to adjust focal length;

- Step 2: enter the preset point number and press the “+” to record in the “Preset” section (see Fig. 26);

Figure 26. Preset point setup

- Step 3: To select a preset point, enter the preset point number, then press “Start”. The camera will move to the specified point. To delete a preset: enter the preset number, press “-”.

2. Focus and iris control in manual mode.

Click “Advanced” on the PTZ Video Camera control panel (see Fig. 25). Press “+” / “-” in order to adjust focus and “+” / “-” to adjust iris respectively (see Fig. 27).

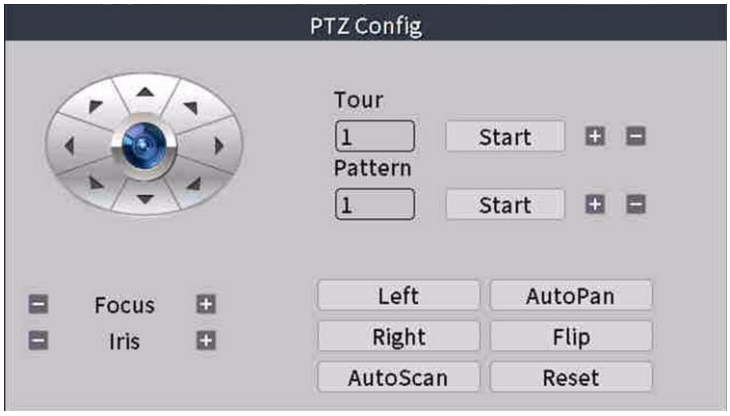


Figure 27. Focus and iris control in manual mode

3. Tour.

The preset points can be connected to the tour that the PTZ Video Camera will follow.

The following order is required to setup this function:

- Step 1: click “Advanced” on the PTZ Video Camera control panel;

- Step 2: click “+” in the “Tour” section (see Fig. 28);

- Step 3: select the preset point number (if necessary, press “Start” to move the camera to this point) in the “Preset” section (see Fig. 29). Specify the stop time at this preset point in the “MD Interval” section. Next, click the “Add Preset” to record the preset point in the tour. Repeat Step 3 until all the preset points are programmed in the required order. Right-click to exit the menu;

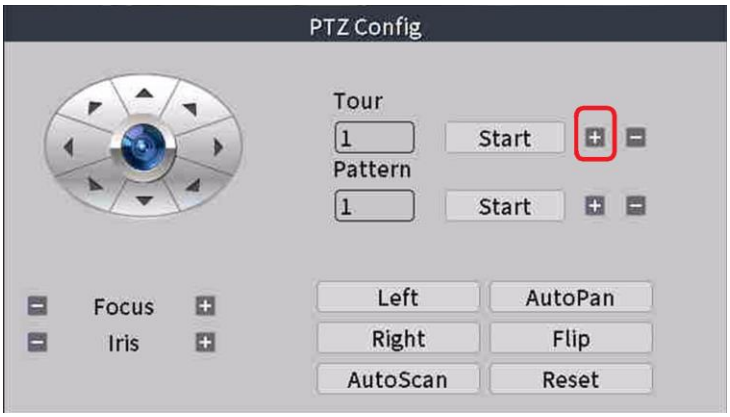


Figure 28. Tour setup

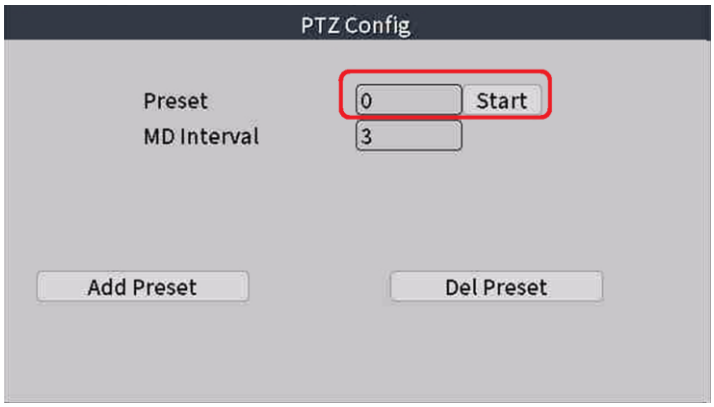


Figure 29. Preset point setup for the “Tour” function

- Step 4: click “Start” in the “Tour” section (see Fig. 28) to call the function. The PTZ Video Camera will start moving in accordance with the specified tour. To stop it, press “Stop”.

4. Pattern.

The “Pattern” is a memorized series of zoom, focus and iris. The PTZ Video Camera can work using predefined pattern.

NOTIFICATION. The operation of this function depends on the distinct model of the PTZ Video Camera

The following order is required to setup the pattern function:

- Step 1: click “Advanced” on the PTZ Video Camera control panel (see Fig. 25);

- Step 2: click “+” in the “Pattern” section (see Fig. 30);
- Step 3: click  , “+” / “-” of “Zoom”, “Focus” and “Iris” for the pattern configuration (see Fig. 31);
- Step 4: click “OK” to complete pattern configuration;

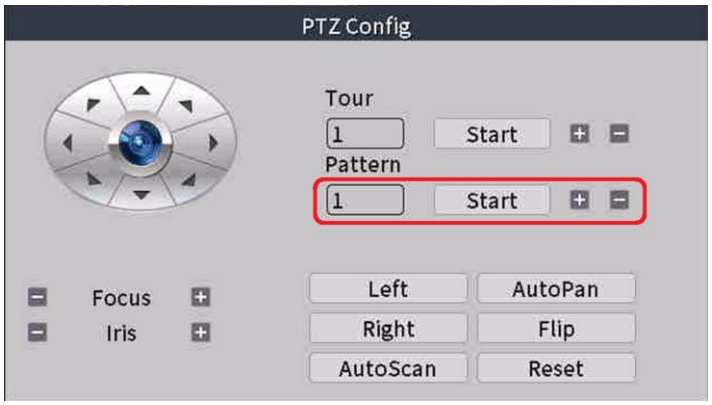


Figure 30. Pattern setup

Figure 31. Pattern configuration

NOTIFICATION. Quantity of the patterns available depends on the distinct model of the PTZ Video Camera

- Step 5: choose the required pattern number (see Fig. 30) and press “Start”. A PTZ Video Camera will commence working according to the chosen pattern. Click “Stop” to cancel the pattern function following. Click “+” to edit pattern or “-” to delete.

5. Frame.

NOTIFICATION. The operation of this function depends on the distinct model of the PTZ Video Camera

The following order is required to setup the frame function:

- Step 1: adjustment of the frame edges.
    - Click “Advanced” on the PTZ Video Camera control panel;
    - Press the direction buttons  to adjust PTZ Video Camera’s left edge of the frame. Click “Left” then to record (see Fig. 32);

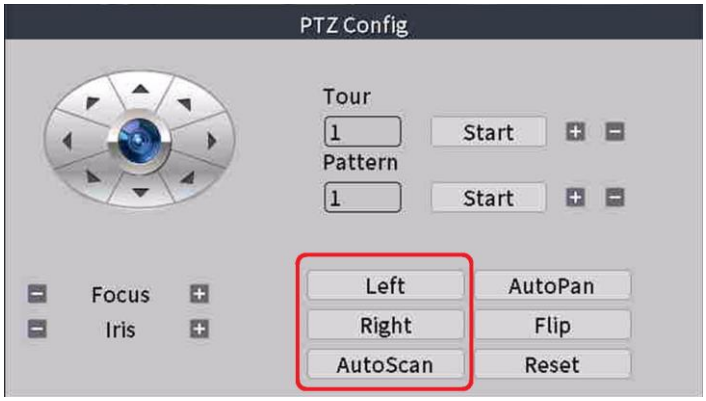


Figure 32. Frame setup

    - Press the direction buttons  to adjust PTZ Video Camera’s right edge of the frame. Click “Right” then to record;

- Step 2: click “AutoScan” to run frame routing and the PTZ Video Camera will be working according to predefined edges of the frame. Click “Stop” to stop the function following.

6. AutoPan.

NOTIFICATION. The operation of this function depends on the distinct model of the PTZ Video Camera

Click “AutoPan” (see Fig. 32) to rotate the PZT Video Camera in horizontal plane. Click “Stop” to stop the function following.

7. Flip.

NOTIFICATION. The operation of this function depends on the distinct model of the PTZ Video Camera

Click “Flip” (see Fig. 32) to turn the PZT Video Camera on 180º in horizontal plane.

8. Reset.

NOTIFICATION. The operation of this function depends on the distinct model of the PTZ Video Camera

Click “Reset” (see Fig. 32) to reload the PZT Video Camera. All changes will return back to by default settings.

9. Data Backup.

It is possible to copy video files or part of a video recording to external USB drives. A USB drive is connected to the connector Item 11 of the Video Recorder (see Fig. 1). Before starting of copying, determine the start and end time of the video fragment. Insert the drive into the USB port of the Video Recorder then. Next, go to the Main Menu ► Settings ►Backup. The backup interface page is shown on Fig. 33.

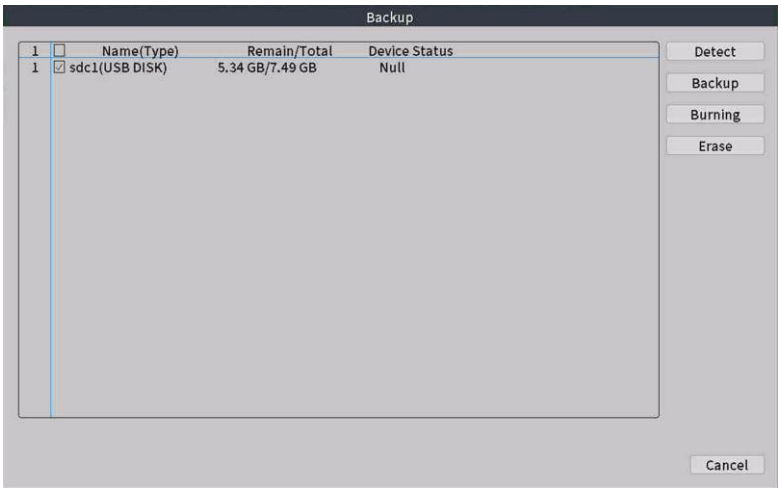


Figure 33. Backup interface page

The available functions of archiving interface page are:

- **Detect** – searching for external USB devices connected to the Video Recorder, such as an external hard drive or flash drive;
- **Backup –** going to backup menu to write files to a USB drive;
- **Burning** – immediate synchronous recording of live video of the selected channel;
- **Erase** – cleaning (formatting) the specified USB drive.

Before starting of backup, make sure that an external drive is connected. Select the USB drive to copy the files. If necessary, click “Detect” to get a list of connected drives. Next, click “Backup” to go to the backup menu (see Fig. 34).

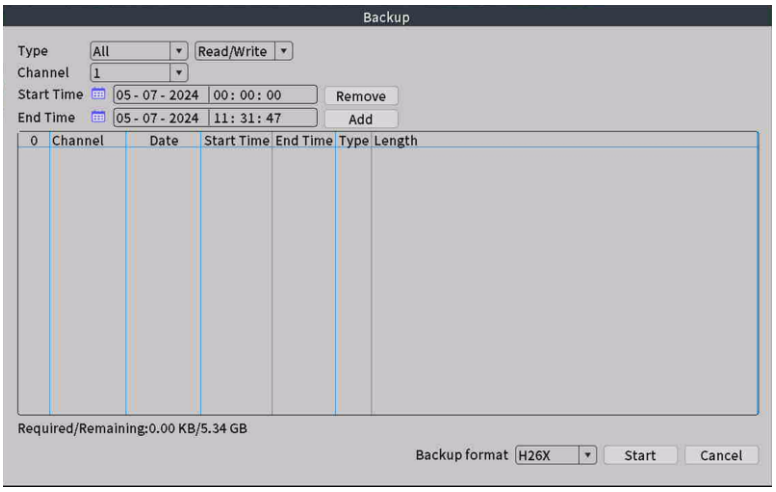


Figure 34. Backup menu

The available functions of the archive menu page are:

- **Remove** – clearing of the file selection window;
- **Add** – output of the content of archive to select files for recording;
- **Start / Stop** – start / stop of files recording;
- **Cancel** – cancel of backup and return to the previous page;
- **Backup format** – choosing of the video file compression format H26X (H.264 / H.265), AVI (for H.264 archive only) or MP4.

To start files copying specify the recording type, channel number, start date/time, and end date/time of the recording. Next, click “Add”. The system will find the video files in the archive and add them to the list according to the specified requirements. Select the files you want to record from the list. In the “Backup format” section choose the standard for writing the file. Next, click “Start” to start recording the file. Wait until the files are written to the USB drive. Click “Stop” if finish of recording is required. Exit the backup menu and disconnect the USB drive from the Video Recorder.

2.3. Cloud Service Utilization

XMEye VMS is a remote video surveillance software that combines all connected Video Cameras into one interface. To watch the video, add a device (the Video Recorder) to the VMS software in the following order:

- Step 1: run the VMS software, go to Device Manager (see Fig. 35);

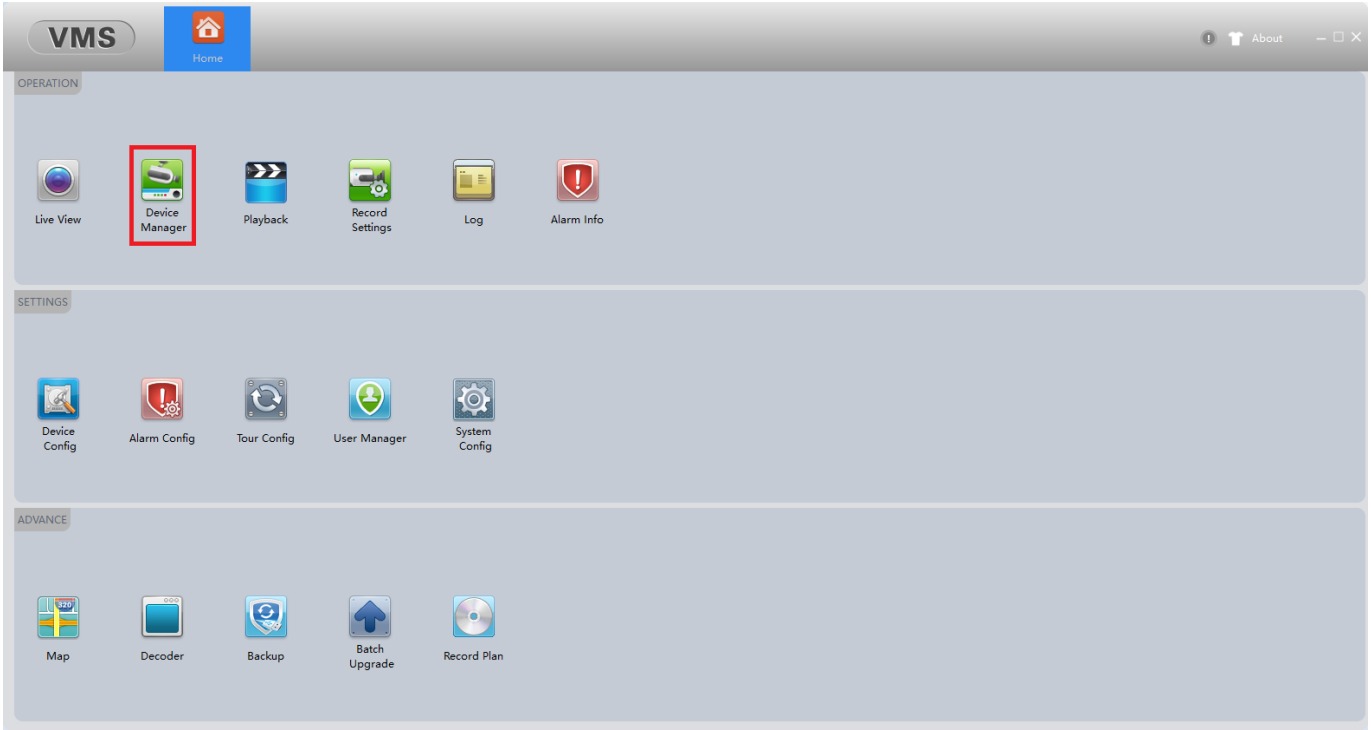


Figure 35. VMS software interface (Main menu)

- Step 2: click “Cloud Add” (see Fig. 36);

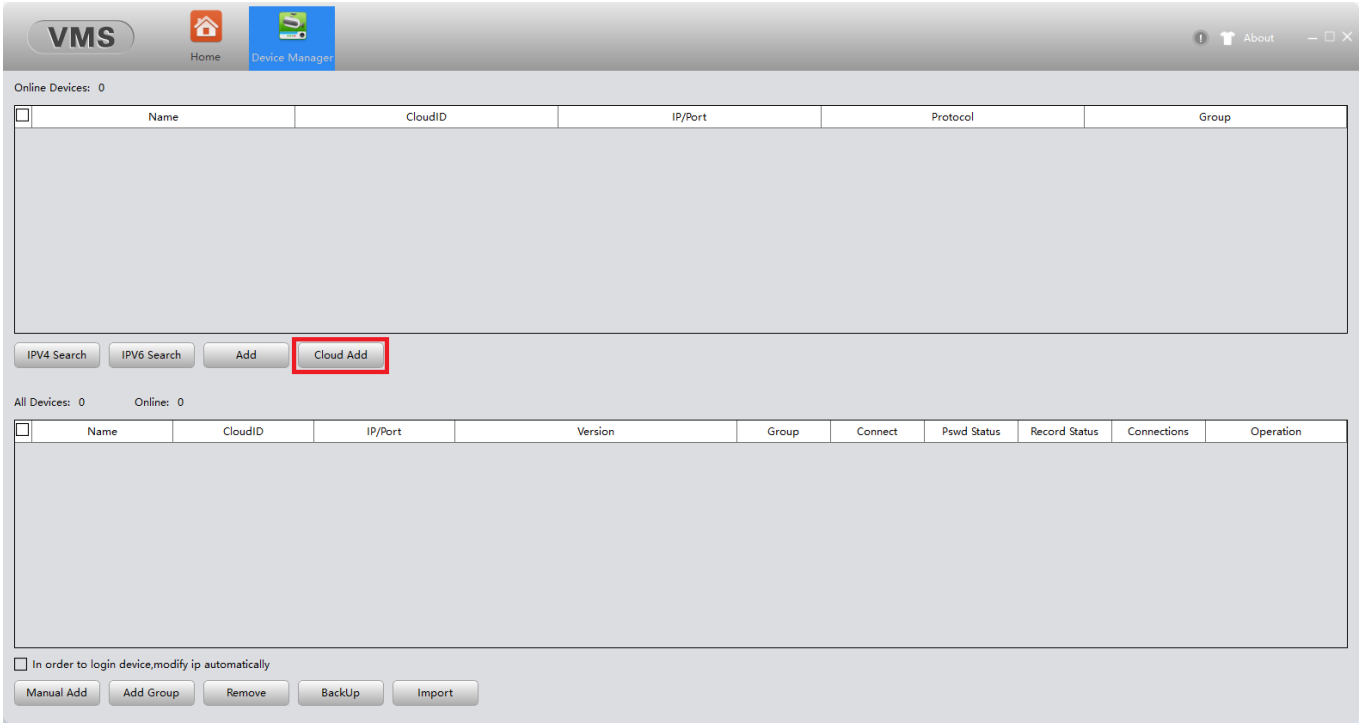


Figure 36. VMS software interface (Device Manager menu)

- Step 3: select the CloudID in the "Login Type" section, enter the "Device Name" (any name), the Video Recorder serial number ("CloudID" section), "User Name" and "Password" (see Fig. 37);

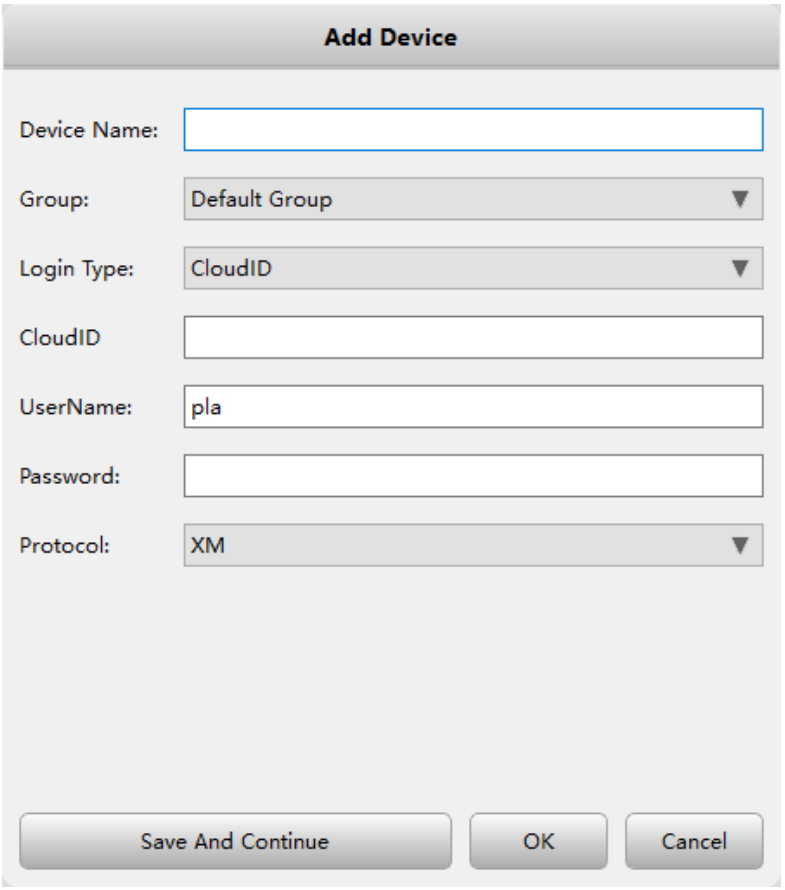


Figure 37. VMS software interface (Cloud Add menu)

Information about the Video Recorder serial number can be found in its menu: Main Menu ► Control ►Version (see Fig.38).

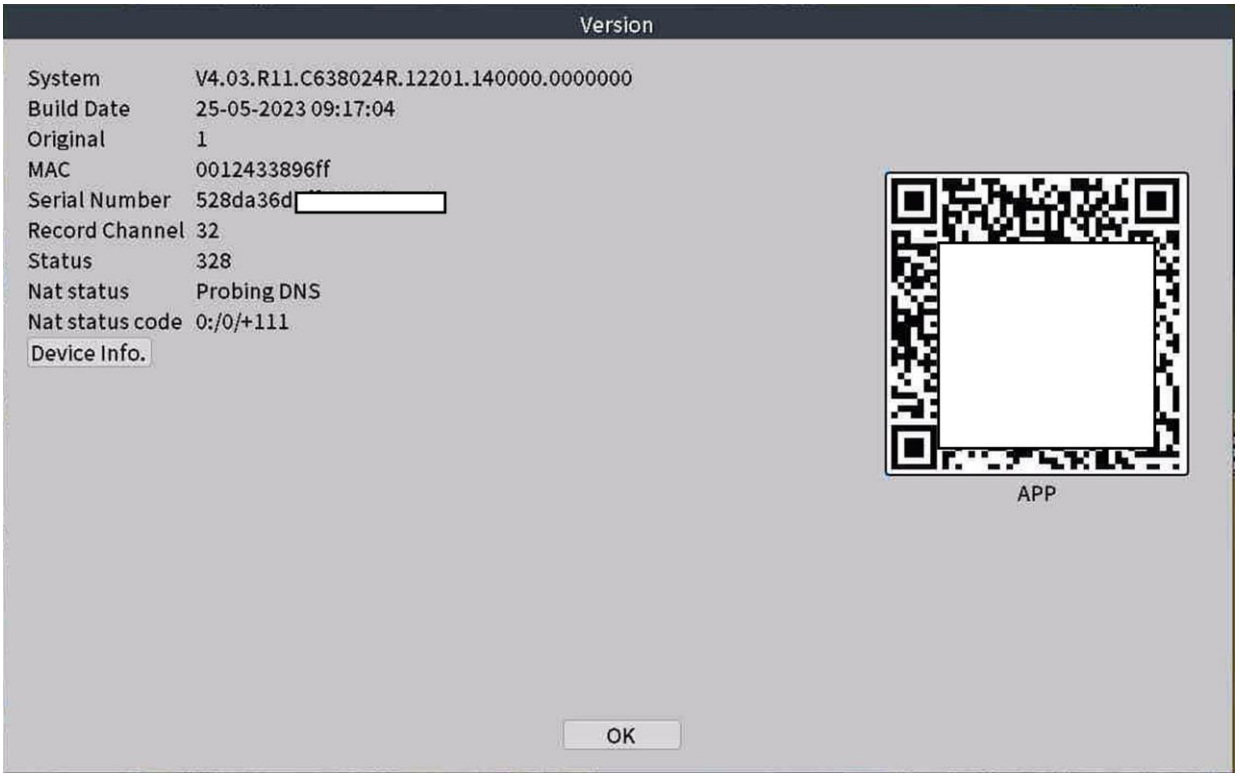


Figure 38. The Video Recorder data menu

The device will be added to the VMS software as soon as all data are filled out (see Fig.39).

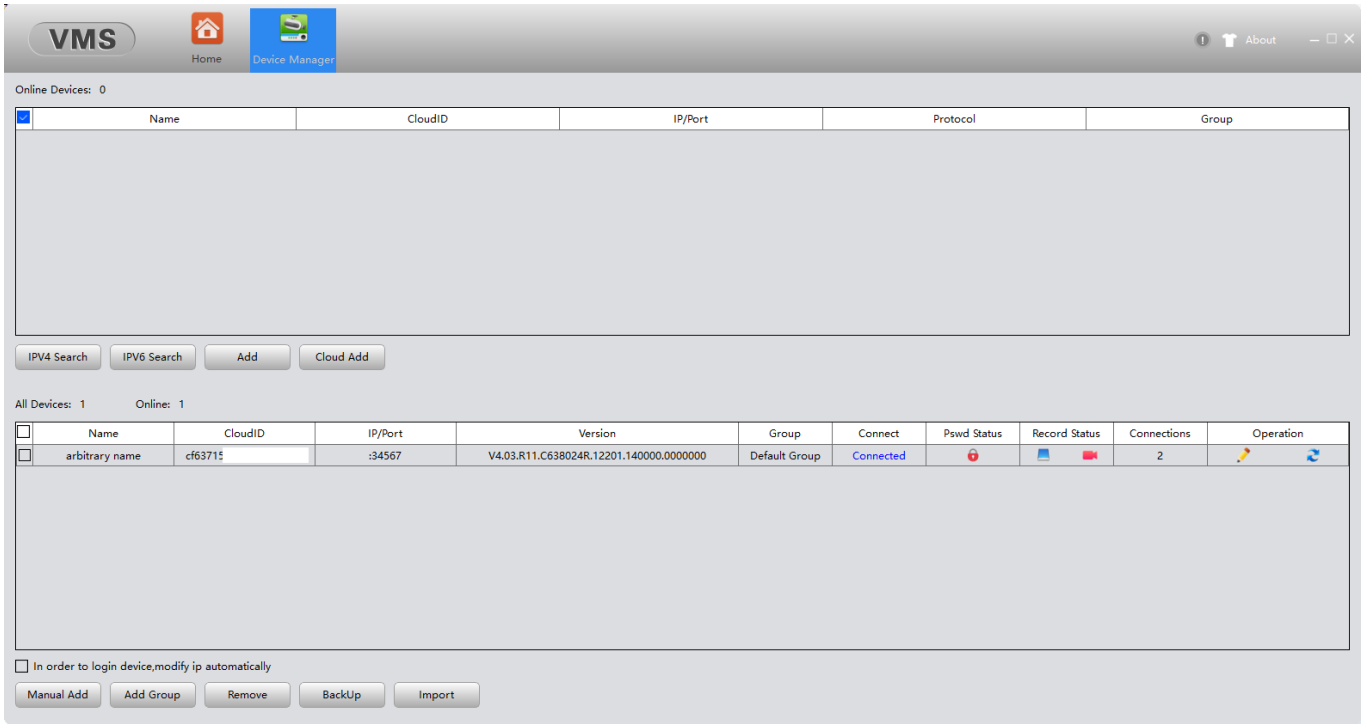


Figure 39. VMS software interface (Device Manager menu. The device has been added)

- Step 4: click “Live View” on the Home page (see Fig. 40);

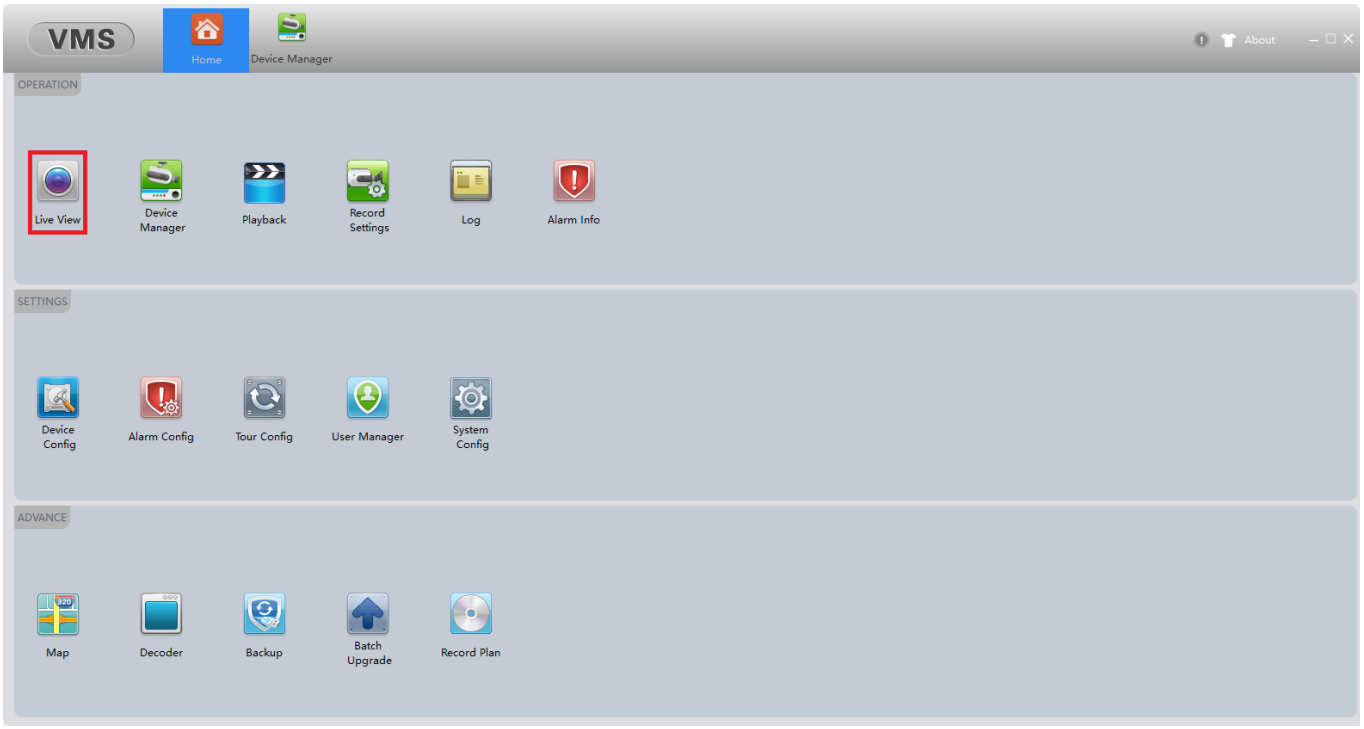


Figure 40. VMS software interface (Home page menu)

- Step 5: Double-click on the camera to display the video stream from the camera in the selected window (see Fig. 41);

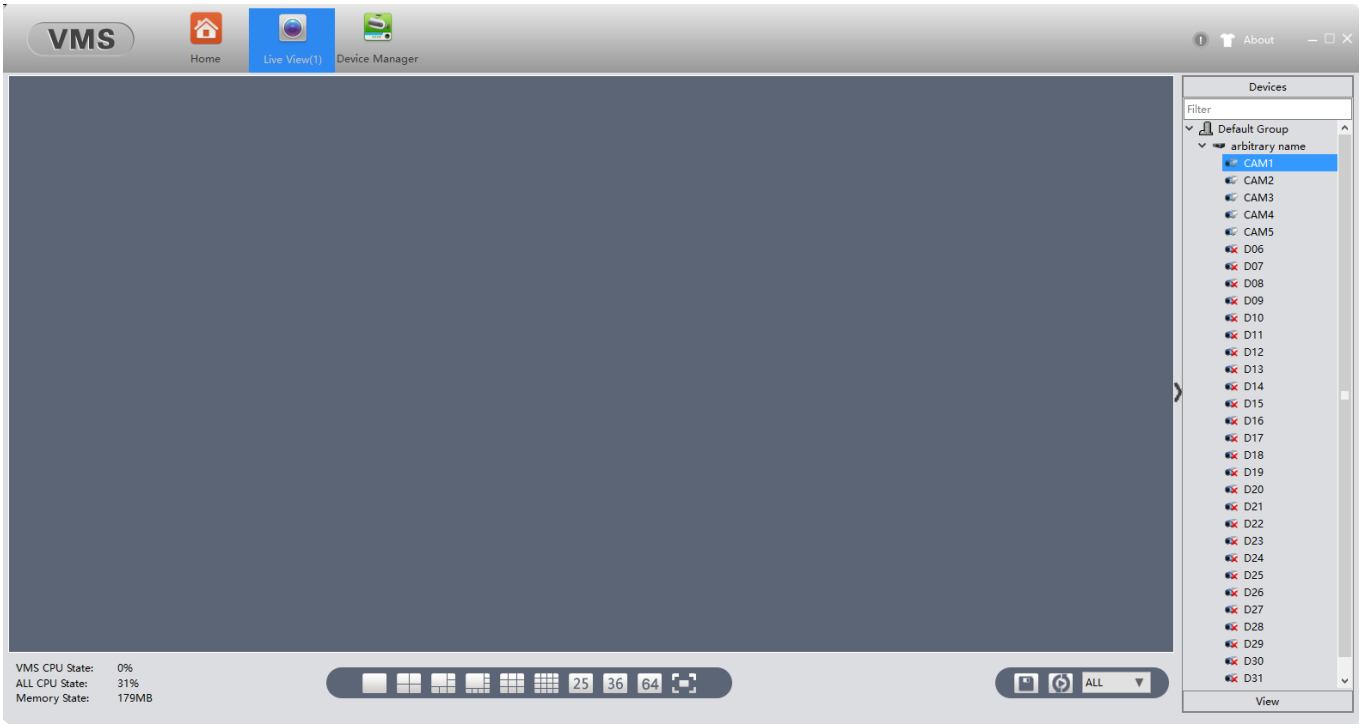


Figure 41. VMS software interface (Live View menu)

2.4. XMEye Application Installation on Android and iOS Platforms

The application is available on the following resources:

- Android or iOS app store;
- Website www.xmeye.net (for Android platform only).

To start the application, click on the XMEye icon. Log in to account. The created account on http://xmeye.net can be used. To create a new account, click “Sign Up”, enter required email address. A response code will be provided then. Enter it in the “Code” section (see Fig. 42).

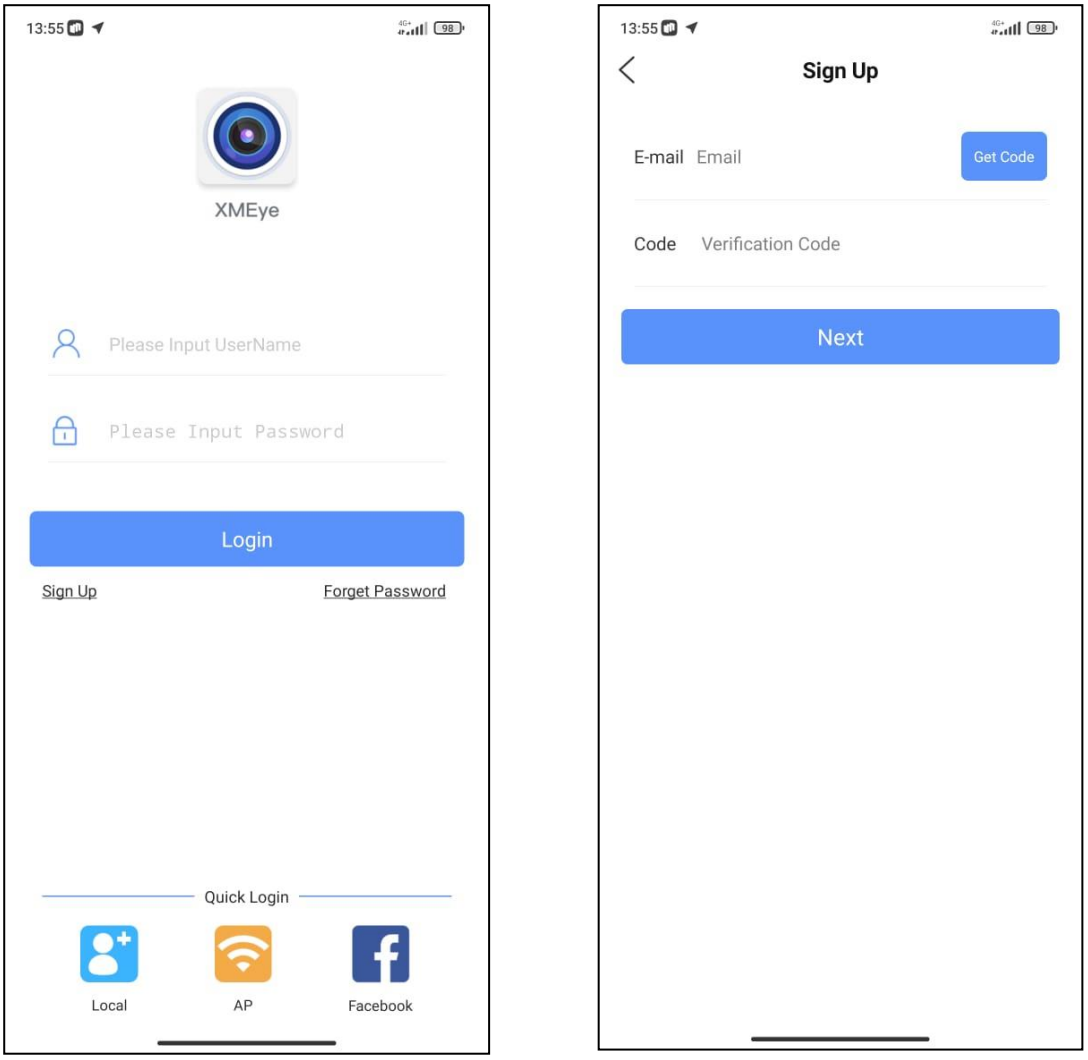


Figure 42. XMEye application log in

Next, click “+” in the upper right corner in the “Add Device” page and specify the device name and enter the device serial number in the “Add Video Recorder” page that is opened afterwards (see Fig. 43). Click “OK” then. The required device will be added in the list.

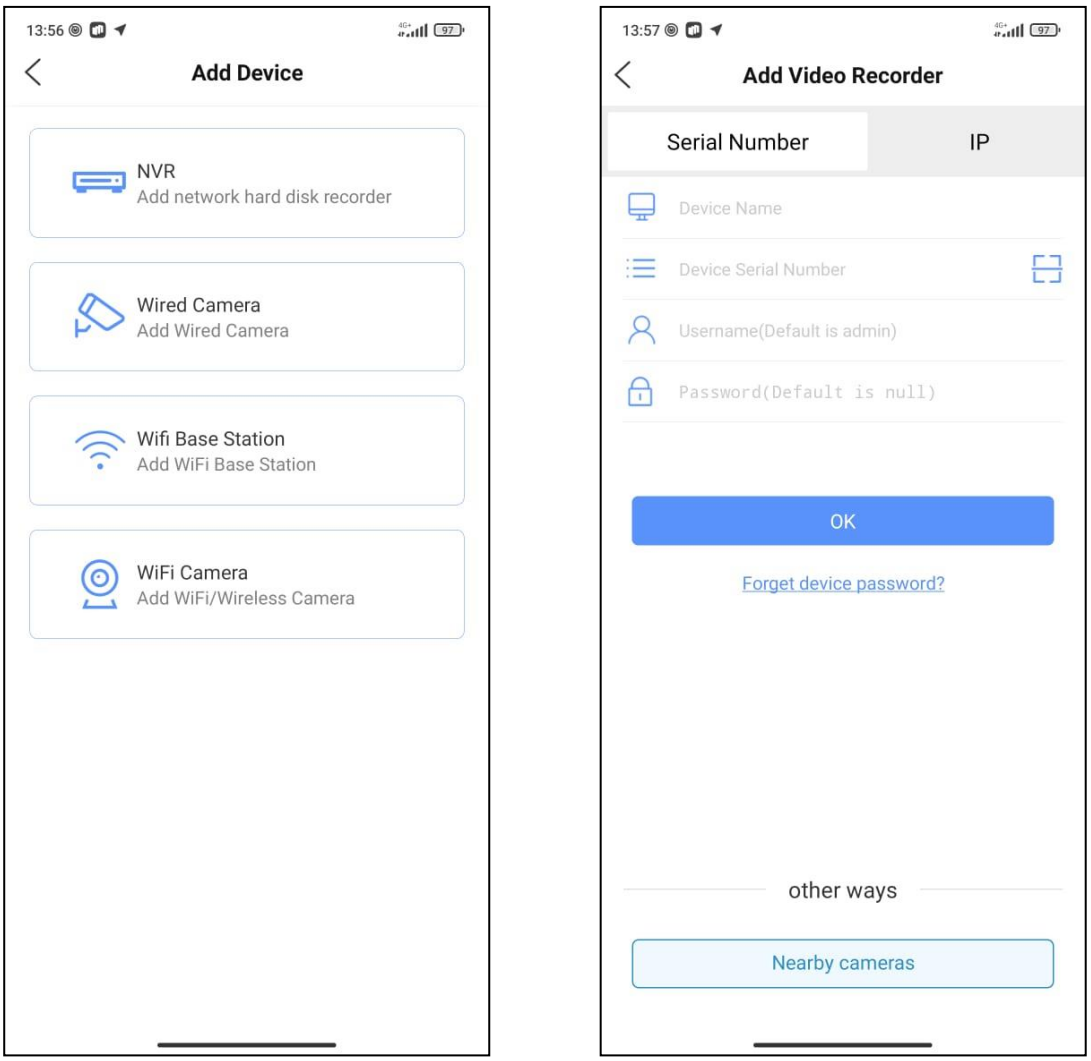


Figure 43. XMEye application Add device page

2.5. Data Recording and Storage by the Video Recorder

Video data is recorded on the removable memory drive such as HDD/SSD hard drive 2.5”. The removable memory drive is used to transfer data to a personal computer (to create an archive database).

Recording to the memory drive is performed in cycles – these are small videos of 5 minutes each. Such videos are stored in the memory and when the maximum size is reached, the old (by date) videos are overwritten with the new ones, that is, a cycle occurs.

Replacement of the removable memory drive of the DEL-150V3-MDT4 Video Recorder is performed in the following order (see Fig. 44):

1. Turn OFF the Video Recorder by pressing button Item 1;
2. Open the door by unlocking Item 2;
3. Detach a cable flat from the hard drive;
4. Pull out hard drive Item 3 carefully.

Installation of the removable memory drive is carried out in reverse order.

Figure 44. Replacement of the removable memory drive of the DEL-150V3-MDT4 Video Recorder

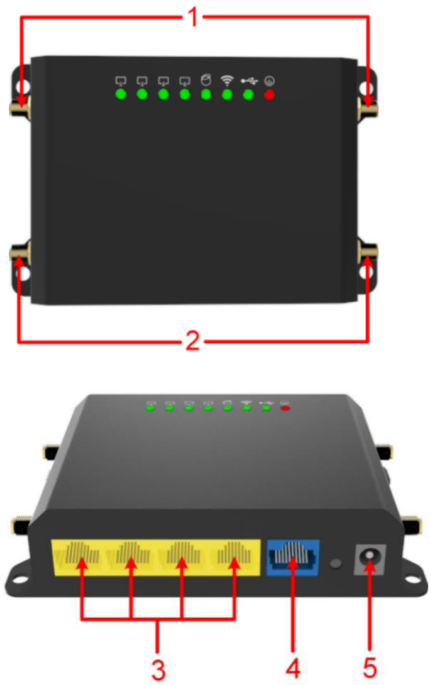
NOTIFICATION. Replacement of the removable memory drive of the DEL-150V3-M0 Video Recorder is performed in the same order.

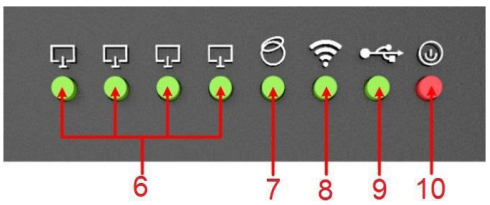
ATTENTION!!! Keep the mentioned order during the removable memory drive replacement strictly in order to avoid loosing the arhive data!

2.6. 3G-Router Setup

The 3G-Router is used for data transmission in the coverage area of GSM networks and is located inside the Video Recorder.

Description of the plugs panel and indicators of the 3G-Router is shown on Fig. 45.





1. SMA plugs for GSM Antenna connection;
2. RP-SMA plugs for Wi-Fi Antenna connection;
3. LAN ports;
4. WAN port;
5. Power supply;
6. LAN connection LED;
7. WAN connection LED;
8. Wi-Fi operation LED;
9. 3G operation LED;
10. Power supply LED

Figure 45. The 3G-Router's plugs panel and indicators

A SIM card is required to be installed in the 3G-Router firstly. To install the SIM card, turn OFF power supply of the Video Recorder, open the door and insert the card into the slot located on the right side of the router (see Fig. 46).

Figure 46. SIM card installation in the 3G-Router

It is necessary to match only the access point name of the mobile operator (Access Point Name) for the 3G-Router operation in the GSM network. The router's Web interface is used for editing. Running of the Web interface is performed in the following order:

1. Connect computer to the Video Recorder in the “PC” connector using a network Ethernet cable;

2. In the network computers settings set the IP address for example: 192.168.0.222…192.168.7.222. The gateway and DNS can be omitted. To do that right-click on “LAN connections” ► “Properties” ► “Internet Protocol version 4 (TCP/IPv4) and insert the IP address under the section “Use the following IP address”;

3. Open the browser and enter the IP address of the Video Recorder 192.168.0.172:8080 (by default) in the address bar of the browser;

4. Log in with the username (**root)** and password (**plarouteradmin**).

To change the external IP address of the Video Recorder, follow these steps:

1. Follow the steps 1…4 above;

2. Open “Network” ► “Interfaces” (see Fig. 47);

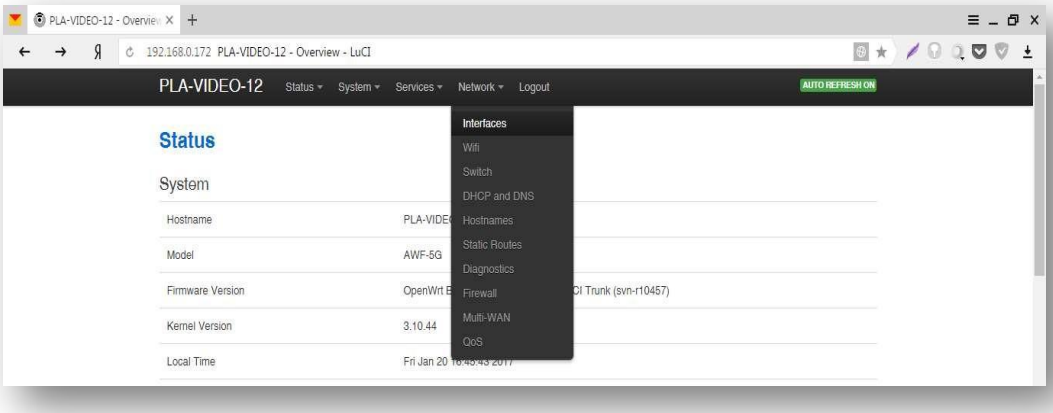


Figure 47. 3G-Router setup

3. Go to “WAN” tab and change IPv4 address (the IP address of the Video Recorder), IPv4 netmask and IPv4 gateway (see Fig. 48). Click “Save&Apply” then.

ATTENTION!!! The static IP address can be used only!

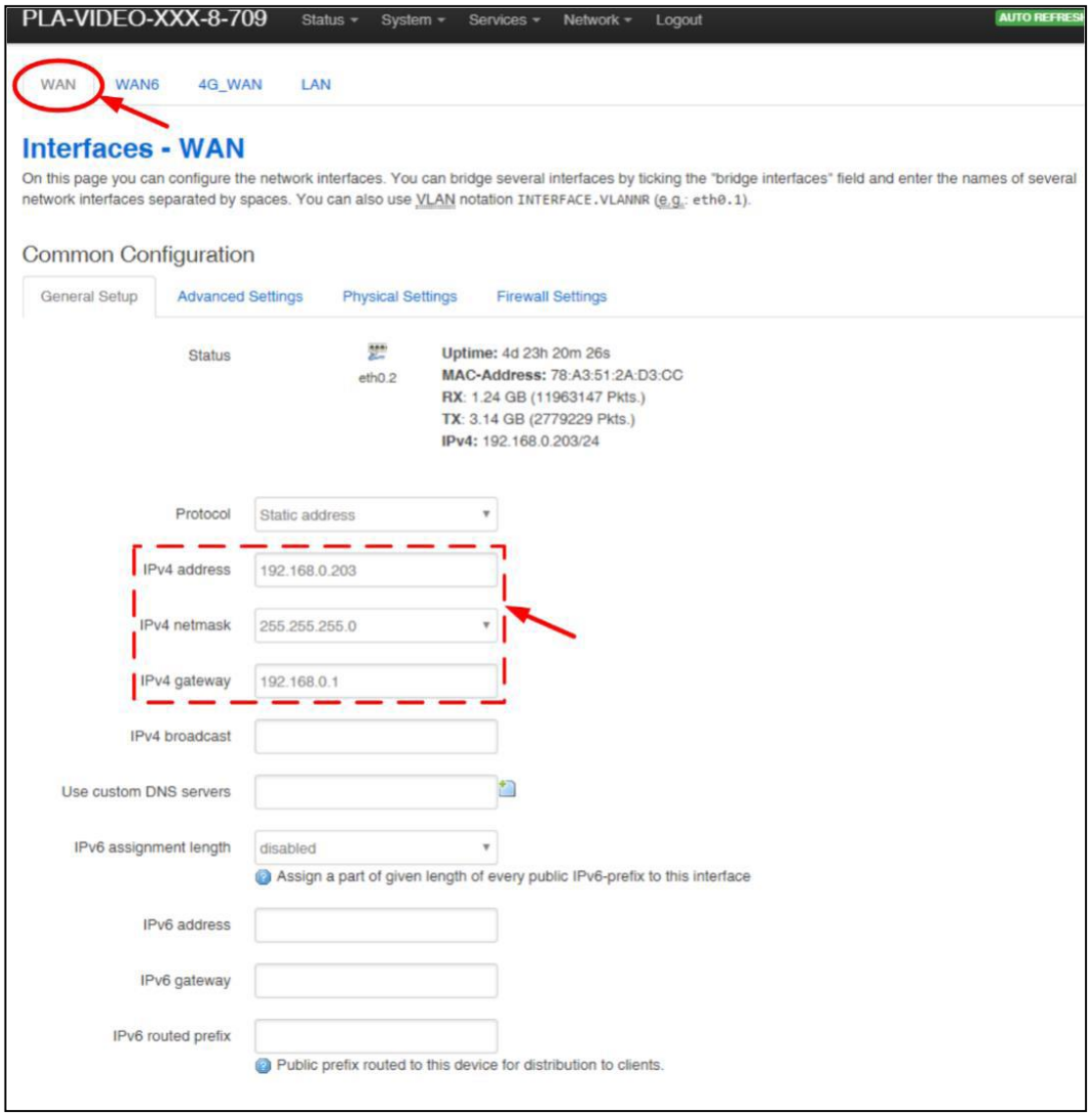
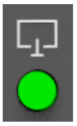


Figure 48. 3G-Router setup

As soon as setup of the 3G-Router is completed upon installation of SIM card, check the router functionality according to its LED lightning (see Table 12).

Table 12. The 3G-Router's LEDs status

LED	Status*	Description
LAN connection LED 	Green	A device is connected to the port, but there is no data exchange
	Flash green	A device is connected to the port and data is exchanged
WAN connection LED 	No light	No connection to the port
Wi-Fi operation LED 	Green	Access point is active
	Flash green	Data transmission via Wi-Fi
3G operation LED 	Green	Connected to GSM network
	Flash green	GSM network searching
	No light	Faulty router
Power supply LED 	Red	Power ON
	No light	Power OFF

* – the color of the LEDs may vary

3. MAINTENANCE

3.1. General Instructions

Technical maintenance is divided into:

- Daily maintenance;
- Periodic maintenance performed after the equipment has been used for a certain time, and after moving (before installation).

3.1.1. Daily maintenance procedure

- Cleaning of the Video Cameras enclosure and lens from contamination;
- Contamination removal from the surface of the Video Recorder, Commutation Boxes and etc. equipment;
- Checking of connections reliability;
- Functional monitoring of display elements;
- Recording in the System's equipment passports of all deviations, failures, completed works.

3.1.2. Periodic maintenance procedure

- Checking of the safety of seals (if available);
- Checking of presence and strength of the mounting components;
- Cleaning of connectors and terminals from contamination;
- Checking for the absence of visible mechanical damages;
- Replacement and (or) repair of damaged cable products;
- Replacement of damaged connectors;
- Checking of the Video Cameras installation;
- Functional monitoring of display elements;
- Recording in the System's equipment passports of all deviations, failures, completed works.

NOTIFICATION. Absence of maintenance records in the System's equipment passports (section "Maintenance Records") ENTAILS VIOLATION OF THE OPERATION RULES, and the Manufacturer has the right to withdraw from warranty obligations

4. WARRANTY OBLIGATIONS

The warranty period is 12 months from the date of receipt of the System's equipment by the Customer, unless otherwise provided by the Agreement concluded between the Customer and the Manufacturer.

A full description of the warranty obligations is described in the System's equipment passports.

5. STORAGE

The System’s equipment requires careful handling, storage in dry, clean rooms with a constant temperature from -50°C to +50°C and a relative humidity of no more than 80%.

The long-term storage requires conservation, according to the requirements of the equipment conservation instructions. The equipment arriving at the warehouses in the Manufacturer's containers are not unpacked, laid on flat pallets and stacked or in the cells of the racks.

Factory-sealed devices are not allowed to be opened in warehouses. Small devices and devices arriving in individual packaging are stored in box pallets with installation in a stack.

Devices and components without individual packaging should be stored in shelving cells no more than 3 rows in height with the use of cushioning materials between them.

Small devices and products arriving without packaging can be stored in small-cell racks and cabinets, while devices or products of the same type should be stored in one cell.

NOTIFICATION. Absence of storage records in the System’s equipment passports (section “Storage Records”) ENTAILS VIOLATION OF THE OPERATION RULES, and the Manufacturer has the right to withdraw from warranty obligations

6. TRANSPORTATION

Transportation of the System's equipment is allowed by all types of closed transport. The System's components in a package for transportation allows the impact of transport shaking with an acceleration of 30 m/s2 with a frequency of 100 beats per minute or 1500 beats with that acceleration.

7. DISPOSAL

The System’s equipment is disposed of in accordance with the requirements and norms applicable in the oil and gas industry.

APPENDIX A. EQUIPMENT OVERALL DIMENSIONS

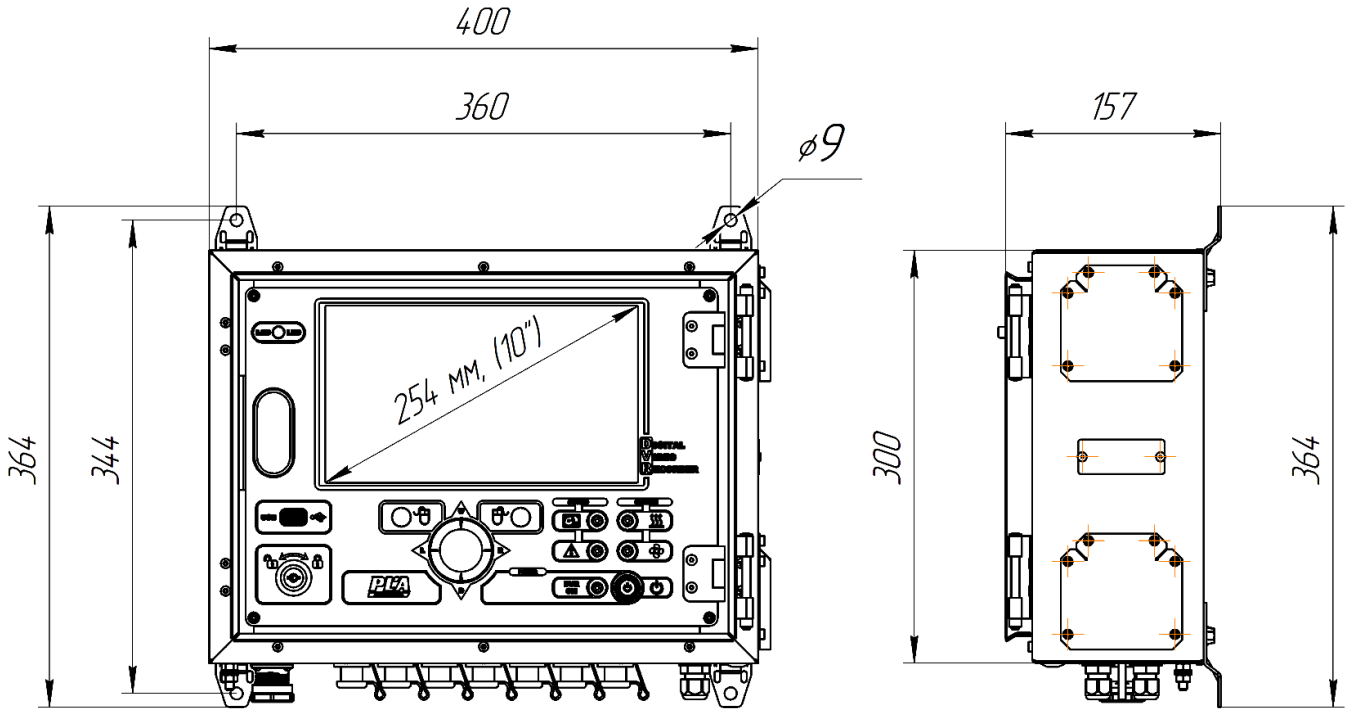


Figure 49. Overall dimensions of the DEL-150V3-MDT4 Video Recorder

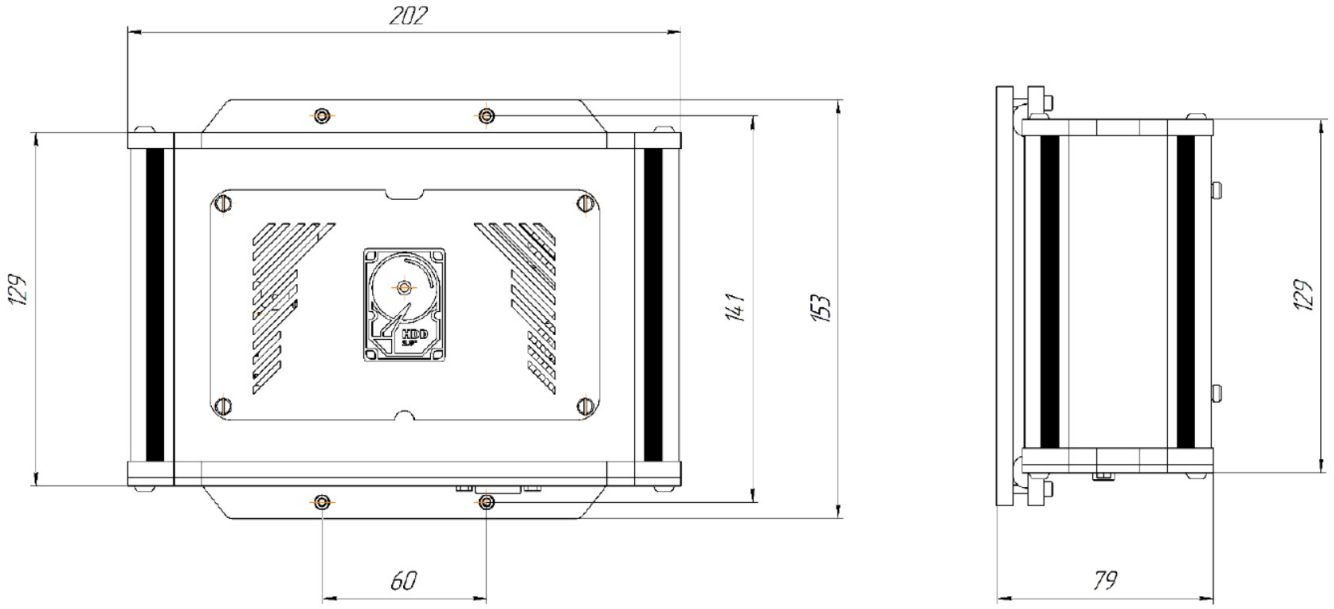


Figure 50. Overall dimensions of the DEL-150V3-M0 Video Recorder

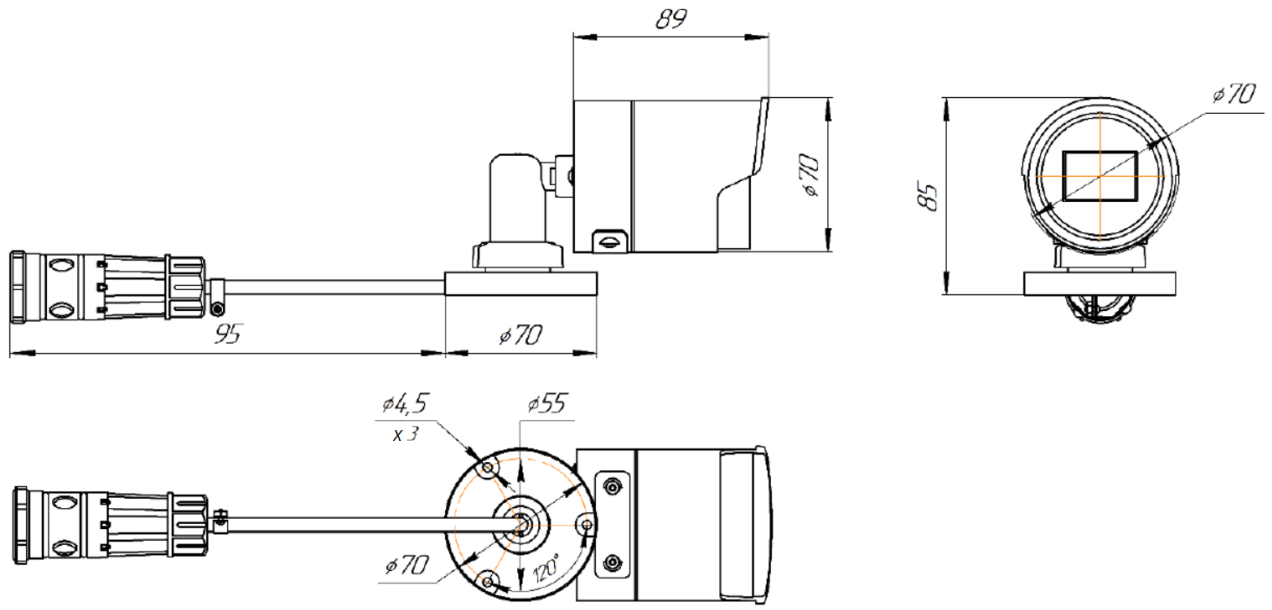


Figure 51. Overall dimensions of the IP-Video Camera

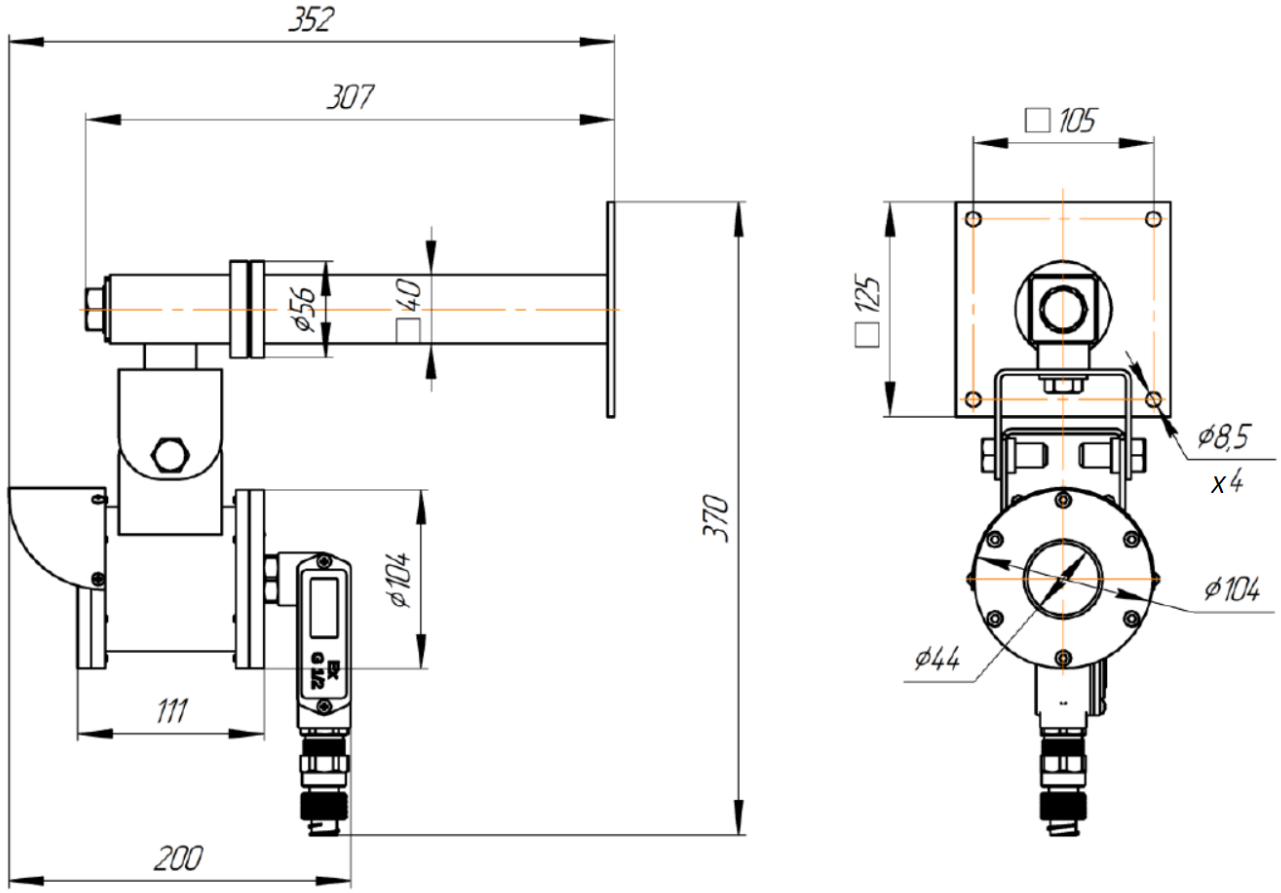


Figure 52. Overall dimensions of the VOV-150 EX Video Camera

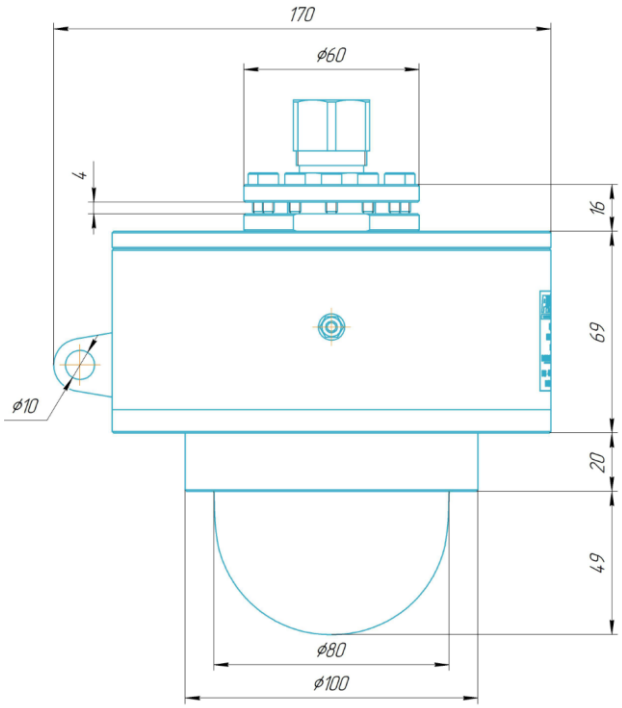


Figure 53. Overall dimensions of the VOV-150(PTZ) EX Video Camera

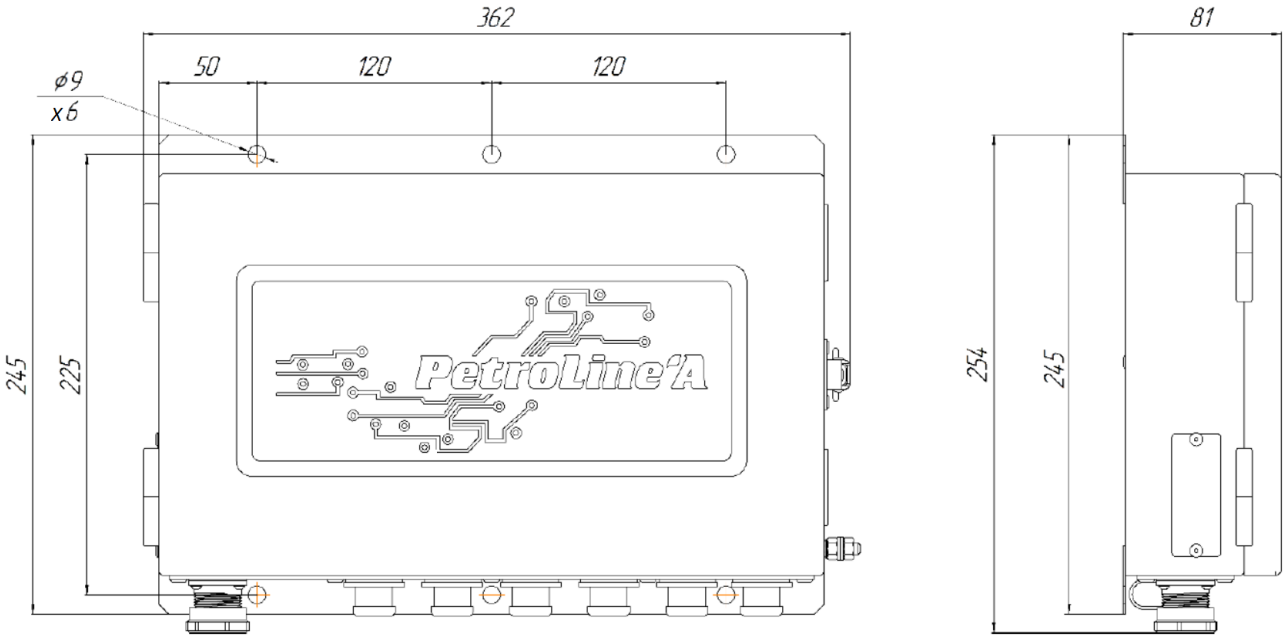


Figure 54. Overall dimensions of the SHK Commutation Box

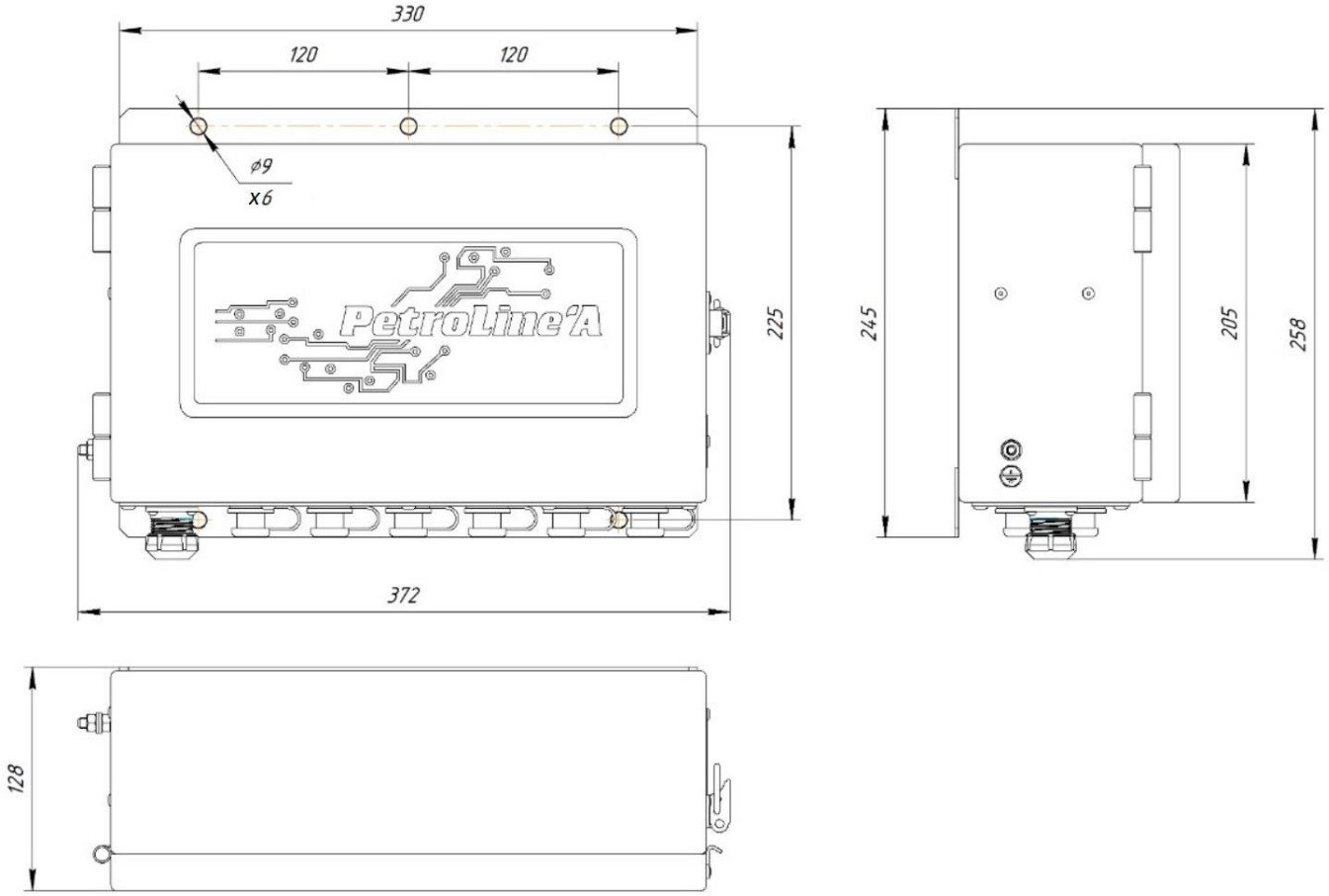


Figure 55. Overall dimensions of the SHK-8 Commutation Box

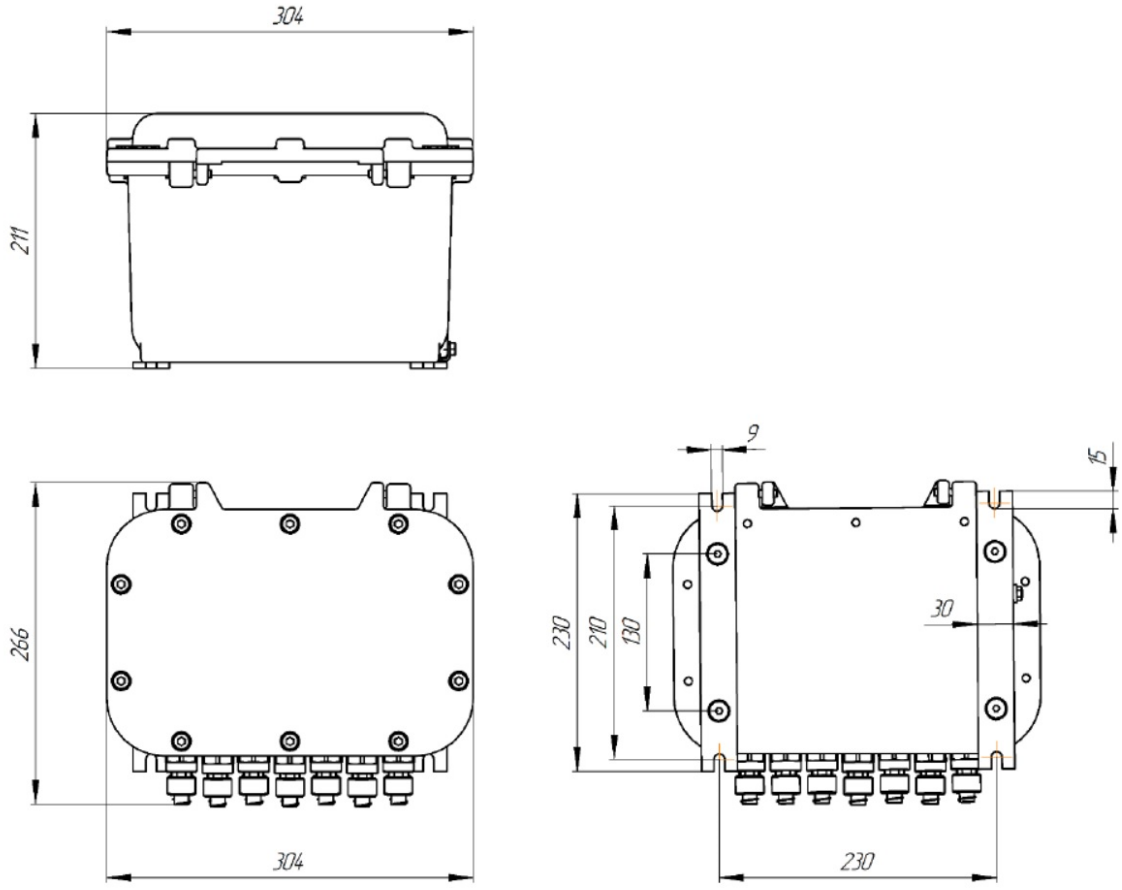


Figure 56. Overall dimensions of the SHK-Ex Commutation Box

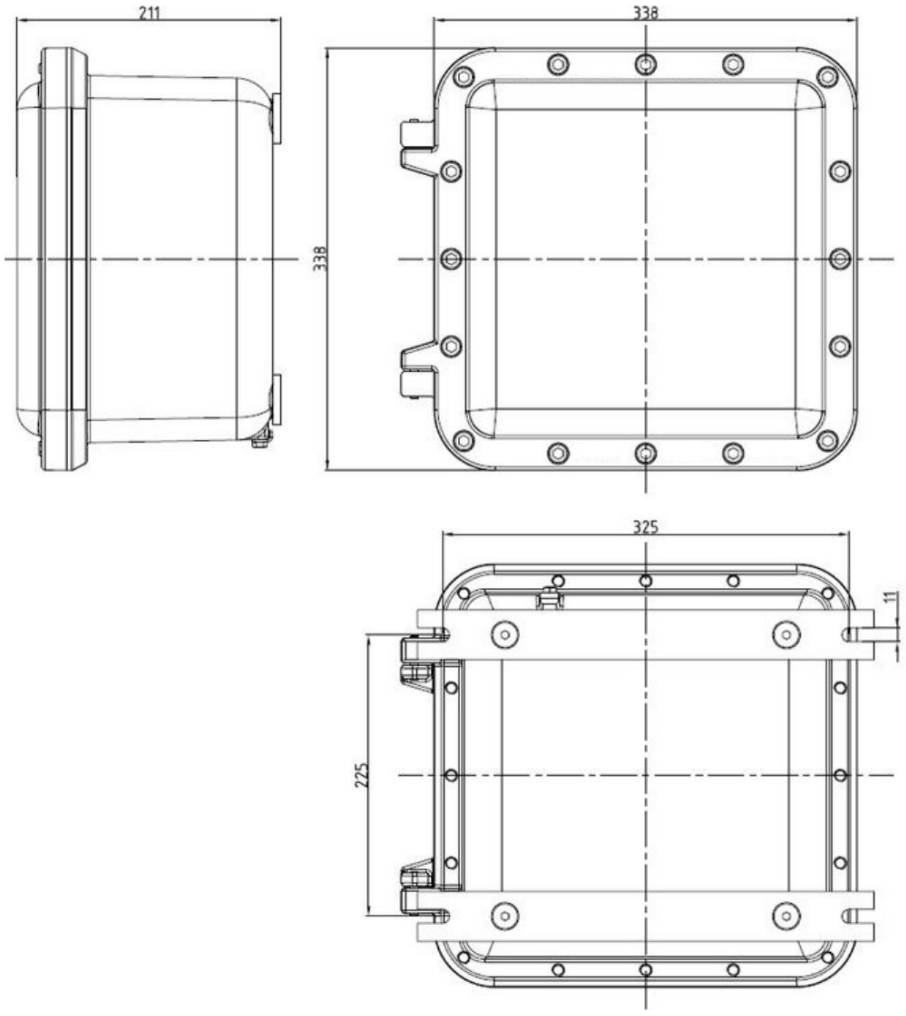


Figure 57. Overall dimensions of the SHK-8-Ex Commutation Box

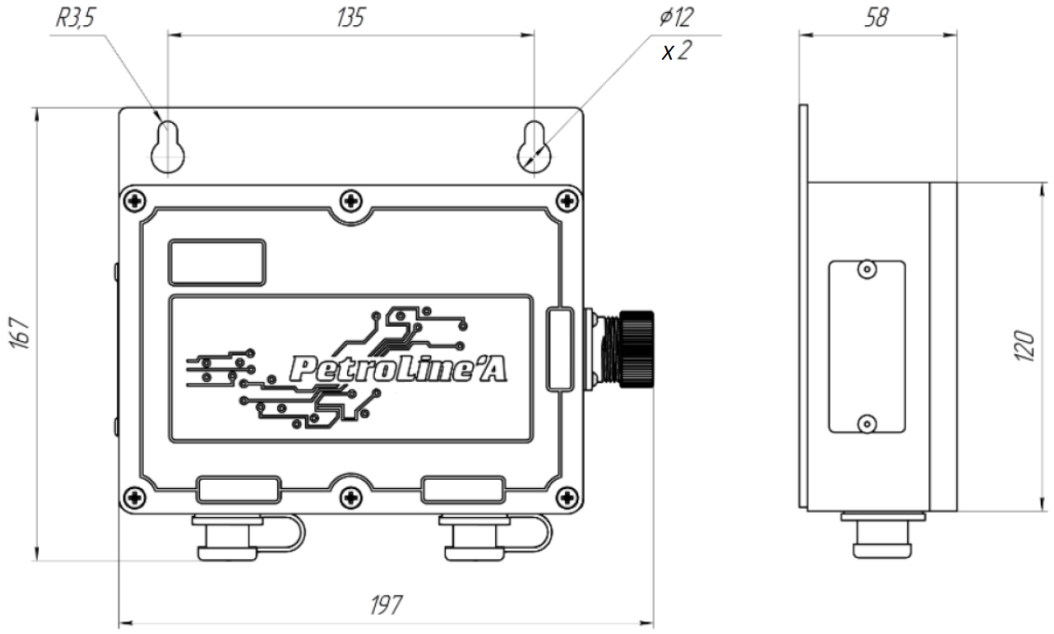


Figure 58. Overall dimensions of the SHK-1 Commutation Box

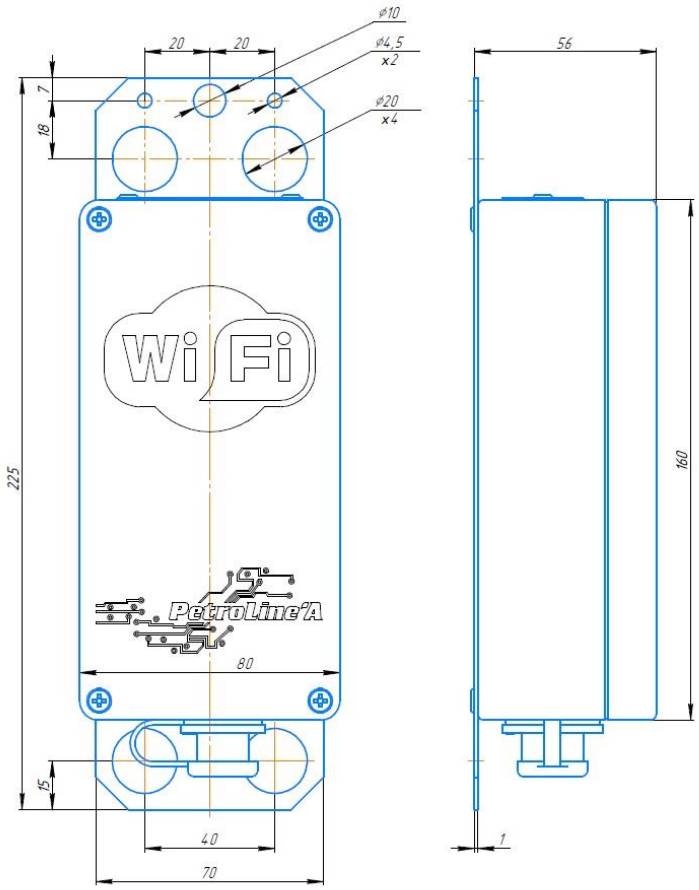


Figure 59. Overall dimensions of the Wi-Fi Bridge