

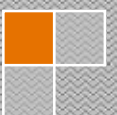
2023



# CCTV System DEL-150V

Operation Manual

PLA150.512.105.000RE



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## **1. DESCRIPTION AND OPERATION**

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### **1.1. DEL-150V2 Description and operation**

#### **1.1.1 Application**

CCTV system is designed:

- for video recording at drilling facilities, well workover, including in explosive zones using Ex VOV-150 video cameras
- for video registration at other industrial facilities;
- together with the DEL-150/DEL-150E Monitoring system;

The system provides:

- recording video archive on a removable memory drive;
- connection to 9 IP video cameras;
- real-time video data transmission over Ethernet, GSM, Wi-Fi networks;
- video data synchronization with DEL-150 telemetry;

#### **1.1.2 Device components**

- video recorder;
- video camera;
- commutation box;
- explosion proof video camera VOV-150;
- SHK-1 commutation box;
- SHK-Ex commutation box;
- SHK-1-Ex commutation box;
- HDMI converter;
- Wi-Fi bridge;
- removable media (SATA2.5' (9 mm) hard drive);
- GSM antenna (SMA connector);
- power cable;
- communication cables;
- power supply unit (BP-137/BP-237/BP-237-2).



Figure 1. Video recorder DEL-150V2



Figure 2. Video recorder DEL-150V2-M0



Figure 3. IP-video camera



Figure 4. Commutation box



Figure 5. Explosion proof CCTV camera VOV-150



Figure 6. Commutation box (SHK-1)

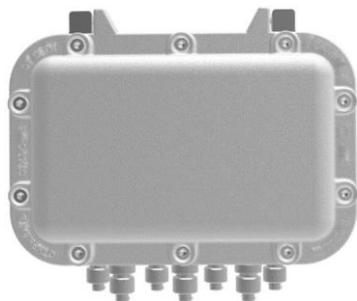


Figure 7. Commutation box (SHK -Ex)



Figure 8. Commutation box (SHK -1-Ex)



Figure 9. HDMI Converter



Figure 10. Wi-Fi Bridge

### 1.13 Technical characteristics

Video recorder has different configurations which is reflected in the device marking.

Video recorder marking:

**ДЕЛ-150В2-МДТ4**

возможность подключения 4-х камер;  
 наличие термоконтроля;  
 основная аббревиатура прибора.

- DEL-150V2-MDT4 recorder unit



Figure 11. Video recorder

Table 1 – Technical characteristics

|                                  |              |
|----------------------------------|--------------|
| Number of connected video camera | 4            |
| Removable memory drive           | HDD/SSD 2.5" |
| Diagonal                         | 7"           |
| Supply voltage, V                | 24 DC        |

|  |             |
|--|-------------|
| Protection degree                              | IP54        |
| Ambient temperature range, °C                  | -40...+50   |
| Ambient temperature range without heating, °C  | +5...+50    |
| Dimensions, mm                                 | 300x400x150 |
| Power consumption (heated) no more, W          | 240         |
| Power consumption (without heating) no more, W | 100         |
| Weight, kg                                     | 12          |
| Service life, years                            | 4           |

There are 4 connectors for connecting cameras on the video recorder connector panel. In total, no more than 9 cameras can be connected to the recorder (by connecting the SHK).



Figure 12. Connector panel

- DEL-150V2-M0 recorder unit



Figure 13. Video recorder DEL-150V2-M0

Table 2. DEL-150V2-M0 Technical characteristics

|                                 |              |
|---------------------------------|--------------|
| Supply voltage, V               | 12 DC        |
| Power consumption, W, no more   | 20           |
| Number of network ports (RJ-45) | 1            |
| Ambient temperature range, °C   | 0...+50      |
| Removable memory drive          | HDD/SSD 2.5" |
| Enclosure material              | plastic      |
| Dimensions, mm                  | 200x165x75   |
| Weight, kg                      | 2            |

Video recorder DEL-150V2-M0 (hereinafter referred to as "DEL-150V2-M0") performs the functions of recording a video archive on a removable memory drive (hard disk) from video cameras. DEL-150V2M 0 is designed to work only indoors. Structurally, the video recorder is made in a plastic case. LEDs are located on the front panel, showing the connection status and external storage, as well as the on and off switch button of the video cameras displayed on the monitor (see Figure No. 14). The necessary connectors for connecting external devices and power are placed on the back panel (see figure No. 15).



Figure 14. DEL-150V2-M0 video recorder (front view)

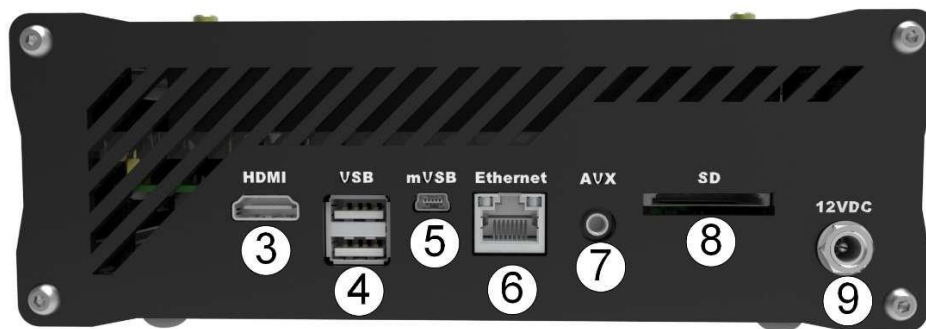


Figure 15. DEL-150V2-M0 video recorder(back view)

1. Power button; 2. MODE – switching the cameras displayed on the monitor (HDMI output); 3. Connector for the monitor via the HDMI interface; 4-5. USB/mUSB - serial interface for connecting peripheral devices; 6. Ethernet – local area connection;
7. AUX – linear asynchronous-serial audio input (not involved); 8. SD – SD card slot (not involved); 9. 12VDC - power connection;

- IP-video camera (weatherproof):



Figure 16. IP-video camera

Table 3 - IP-video camera technical characteristics

| <b>Camera</b>                  |  |
|--------------------------------|--|
| Matrix                         | 1/2.8" Progressive Scan CMOS   |
| Resolution                     | 2Mp*, 4 Mp**   |
| Sensitivity                    | Color: 0.005lux@(F1.6,AGC on.), 0 lux with IR  |
| Day/night mode                 | Mechanic IR  |
| Angling                        | Rotation: 0° - 360°; tilt: 0° - 90°;   |
| <b>Lens</b>                    |  |
| Lens object of view            | 2.8 mm: horizontal: 107°, vertical: 57°, diagonal: 127°<br>4 mm: horizontal: 87°, vertical: 46°, diagonal: 104°<br>6 mm: horizontal: 54°, vertical: 29°, diagonal: 63° |
| Aperture                       | F1.6   |
| <b>Illumination</b>            |  |
| IR illumination                | Up to 40 m   |
| Wave length                    | 850 nm   |
| <b>Video</b>                   |  |
| Resolution, max                | 1920×1080 (1280×720)*  |
| Main stream                    | 25 fps: 1920×1080, 1280×720 / (15 fps: 1280×720)*  |
| Additional stream              | 25 fps: 1920×1080, 1280×720 / (15 fps: 640×360)*   |
| Video compression              | Main stream: H.265/H.264/H.264+*/H.265+<br>Additional stream: H.265/H.264*/MJPEG   |
| Video bitrate                  | from 32 Kb/s to 8 Mbps<br>(for main stream: 2048 Kb/s)*<br>(for additional stream: Kb/s)*  |
| Simultaneous real-time viewing | Up to 6 channels   |





- Explosion-proof CCTV camera VOV-150:

The explosion-proof camera VOV-150 is designed to work as part of CCTV systems. Scope of application – explosive zones of Class 1 and 2 of premises and outdoor installations, in which mixtures may form, classified as subgroups IIA, IIB, IIC according to GOST IEC 60079-10-1-2013, to the requirements of GOST IEC 60079-14-2011 and industry safety regulations governing the use of this electrical equipment in explosive zones.

The explosion-proof camera VOV-150 is a cylindrical body that closes on both sides with lids. The enclosure and lids are made of 08X18N10T stainless steel. The enclosure has one explosion-proof compartment, protects the equipment from environmental influences, the protection degree corresponds to IP66 according to GOST 14254-2015. Explosion-proof 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. There is a warning sign on the lid: "WARNING! Open non explosive zone!" An observation window made of tempered glass is installed on the front lid.

For cable entry, a cable of the KNVM1M series manufactured by GORELTECH LLC is used, which has a valid certificate of compliance with TR TS 012/2011, which does not violate the type of the product explosion protection as a whole and the IP protection degree, as well as the connecting thread, size and type of inserted cable.



**Figure 18. Explosion proof CCTV camera VOV-150**

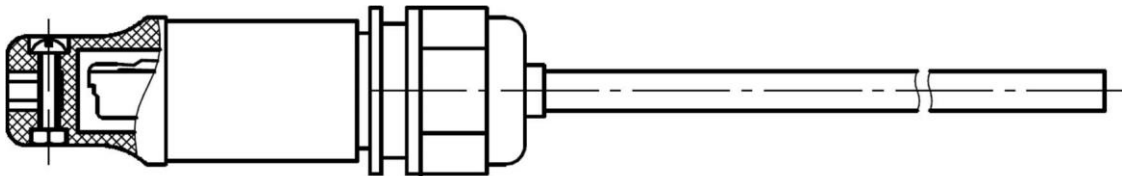
Table 4. Technical characteristics video camera VOV-150

| Camera     |                              |
|------------|------------------------------|
| Matrix     | 1/2.8" Progressive Scan CMOS |
| Resolution | 2Mp*, 4 Mp**                 |

|                                |  |
|--------------------------------|--|
| Sensitivity                    | Color: 0.005lux@(F1.6,AGC on.), 0 lux with IR  |
| Day/night mode                 | Mechanic IR  |
| Angling                        | Rotation: 0° - 360°; tilt: 0° - 90°;   |
| <b>Lens</b>                    |  |
| Lens object of view            | 2.8 mm: horizontal: 107°, vertical: 57°, diagonal: 127°<br>4 mm: horizontal: 87°, vertical: 46°, diagonal: 104°<br>6 mm: horizontal: 54°, vertical: 29°, diagonal: 63°   |
| Aperture                       | F1.6   |
| <b>Video</b>                   |  |
| Max resolution                 | 1920×1080** (1280×720)*  |
| Main stream                    | 25 fps: 1920×1080, 1280×720 / (15 fps: 1280×720)*  |
| Additional stream              | 25 fps: 1920×1080, 1280×720 / (15 fps: 640×360)*   |
| Video compression              | Main stream: H.265/H.264/H.264+*/H.265+<br>Additional stream: H.265/H.264*/MJPEG   |
| Video bitrate                  | from 32 Kb/s to 8 Mbps<br>(for main stream: 2048 Kb/s)*<br>(for additional stream: 1024 Kb/s)*   |
| Simultaneous real-time viewing | Up to 6 channels   |
| Web interface                  | Requires a plugin for real-time viewing: IE10, IE11<br>No plugin required for real-time viewing: Chrome 57.0+, Firefox 52.0+<br>Local services: Chrome 57.0+, Firefox 52.0+  |
| <b>Interface</b>               |  |
| Network interface              | 1 RJ45 auto 10/100M port Ethernet  |
| Local storage                  | Built-in microSD card slot, up to 256 GB   |
| Hardware Reset                 | Yes  |
| <b>Main</b>                    |  |
| Web client language            | English, Russian, Estonian, Bulgarian, Hungarian, Greek, German, Italian, Czech, Slovak, French, Polish, Dutch, Portuguese, Spanish, Romanian, Danish, Swedish, Norwegian, Finnish, Croatian, Slovenian, Serbian, Turkish, Korean, Chinese (Traditional), Thai, Vietnamese, Japanese, Latvian, Lithuanian, Brazilian Portuguese, Ukrainian |
| Ambient temperature            | from -60 °C...+60 °C   |

|                    |                 |
|--------------------|-----------------|
| Power supply       | 48V             |
| Power consumption  | 8W              |
| Current, Max       | 0,16A           |
| Material           | metal           |
| Ex-marking EAC     | 1ExdbIICT6GbX   |
| Ex-marking ATEX    | II2GExdbIICT6Gb |
| Ingress protection | IP66            |
| Service life       | 10 years        |
| Dimensions         | 104×111 mm      |
| Weight             | 2,5 kg.         |

*\*default, \*\*on request*



|                        | Конт. |
|------------------------|-------|
| <i>бело-оранжевый</i>  | 1     |
| <i>оранжевый</i>       | 2     |
| <i>бело-зелёный</i>    | 3     |
| <i>синий</i>           | 4     |
| <i>бело-синий</i>      | 5     |
| <i>зелёный</i>         | 6     |
| <i>бело-коричневый</i> | 7     |
| <i>коричневый</i>      | 8     |

*RJ45 5E 8P8C*

**Figure 19. Communication cable YT-RJ/RJ45 to connect the VOV-150 camera**

To connect the communication cable to the explosion-proof VOV-150 video camera, it is necessary:

- remove the lid of the explosion-proof box compartment (1) (see Figure No. 20) by screwing off 2 screws, using a screwdriver of size PH1;
- connect the network communication cable to the port (2) (see Figure No. 20), according to the diagram (see Figure No. 21).

The crimped cable diameter in the cable entry should be in the range from 4 to 9 mm. Specifications for port (2): rigid wire cutset - 0.2 mm<sup>2</sup>...1.5 mm<sup>2</sup>, flexible wire cutset- 0.2 mm<sup>2</sup>...1.5 mm<sup>2</sup>, cutset of a flexible conductor with a cable tip, without a plastic sleeve - 0.25 mm<sup>2</sup>...1 mm<sup>2</sup>, the strip part length: 8 mm. (see Figure No. 21)

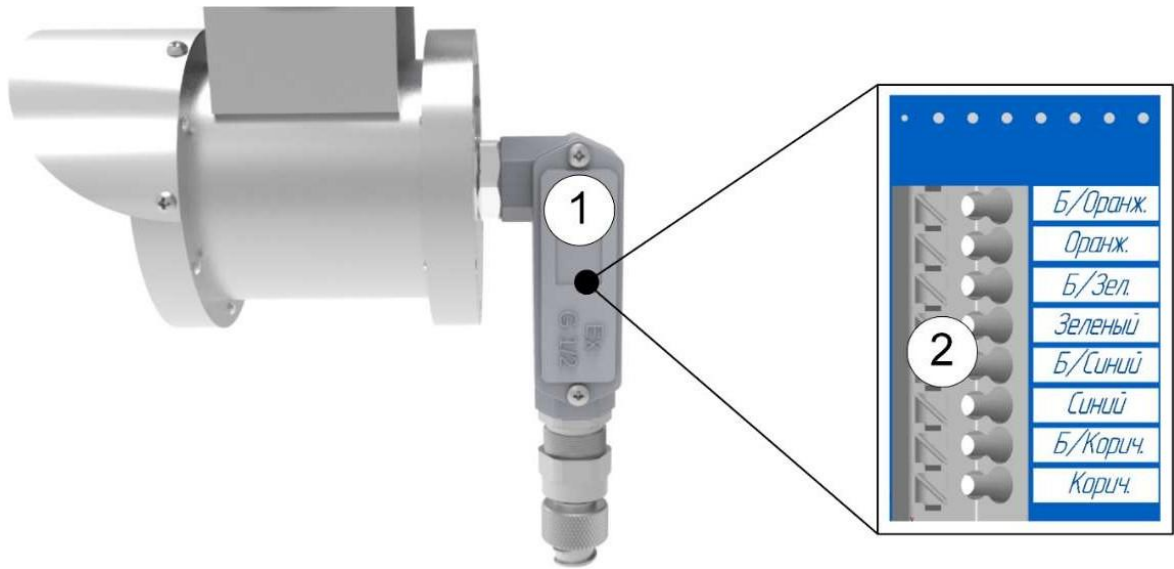


Figure 20. Ex-proof box compartment

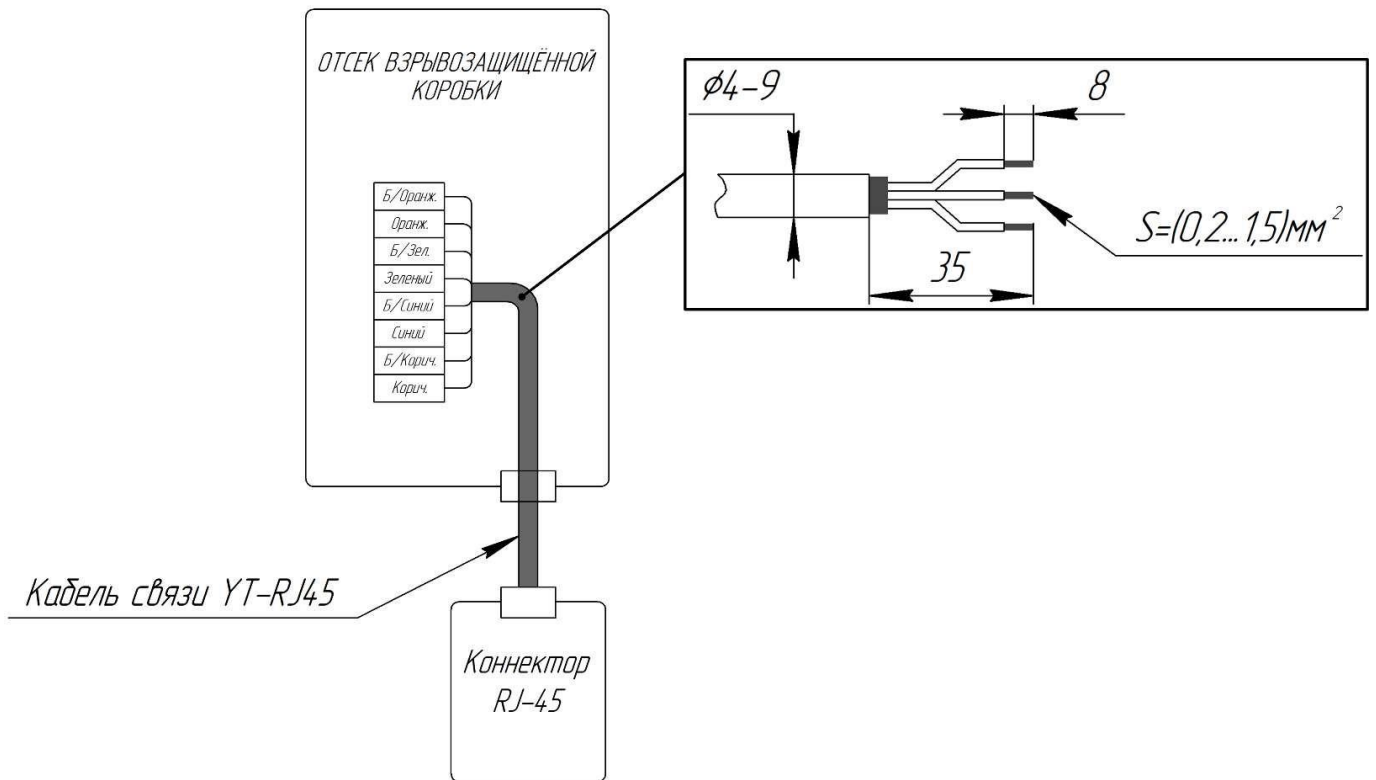


Figure 21. Connection diagram of the ex-proof VOV-150 video camera

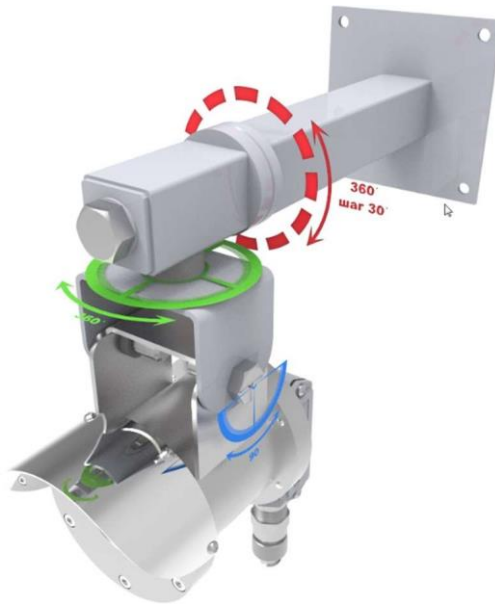


Figure 22. Rotation and tilt angle

- Commutation box (SHK):

Commutation box is intended for connection of remote CCTV Cameras to the DEL-150V2 System. Communication with the video recorder is carried out by a Wi-Fi bridge or using a network cable (Ethernet). There is a connector for communication with the DEL-150 control module on the connector panel. No more than 4 cameras can be connected to the commutation box.



Figure 23. Commutation box.

- \* - power on when connecting a Wi-Fi bridge
- power off when connecting the communication box to the video recorder (or PC) by a network cable (Ethernet)

Table 5 – Technical characteristics and communication box parameters

|  |             |
|--|-------------|
| Number of connected IP CCTV cameras, ea. | 4           |
| Ingress protection                       | IP54        |
| Supply voltage, V                        | =18...36    |
| Ambient temperature range, °C            | -40...+50   |
| Dimensions, mm                           | 360x260x130 |
| Weight, kg, no more                      | 4,5         |



1 –power connection port; 2,3,4,5 –port for connecting video cameras /MV-150; 6 – port for connecting DEL-150E/MV-150/video cameras; 7 – port for connecting a Wi-Fi bridge or PC

Figure 24. Box commutation panel

- Commutation box (SHK-Ex)

The EX commutation box (hereinafter referred to as SHK-Ex) (see Figure No. 25) is designed to connect IP video cameras and DEL-150 E (up to 4 devices in total). The commutation box complies with the ex- protection marking 1ExdbIIB+H2T5Gb and IP66 ingress protection. It is used in ex zones "1", "2". The box has a polymer-epoxy staining with antistatic properties, friction intrinsically safe, resistant to environments and ionizing radiation. The electrical diagram of the SHK-Ex connections is shown in Figure No. 26. **ATEX certification marking is II2GExdbIIB+H2Gb.**

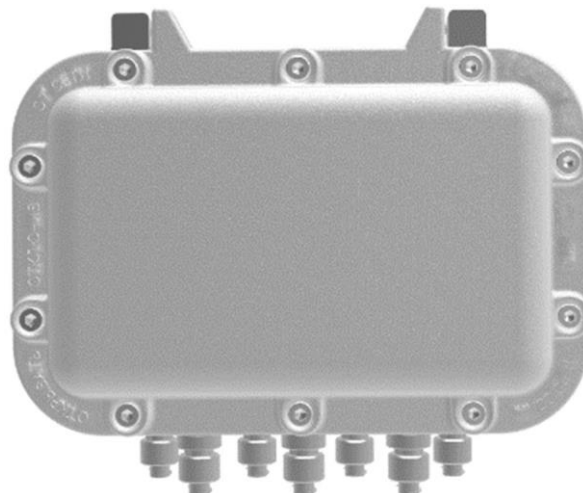


Figure 25. Commutation box SHK-Ex

## Схема электрическая соединений ШК-Ex

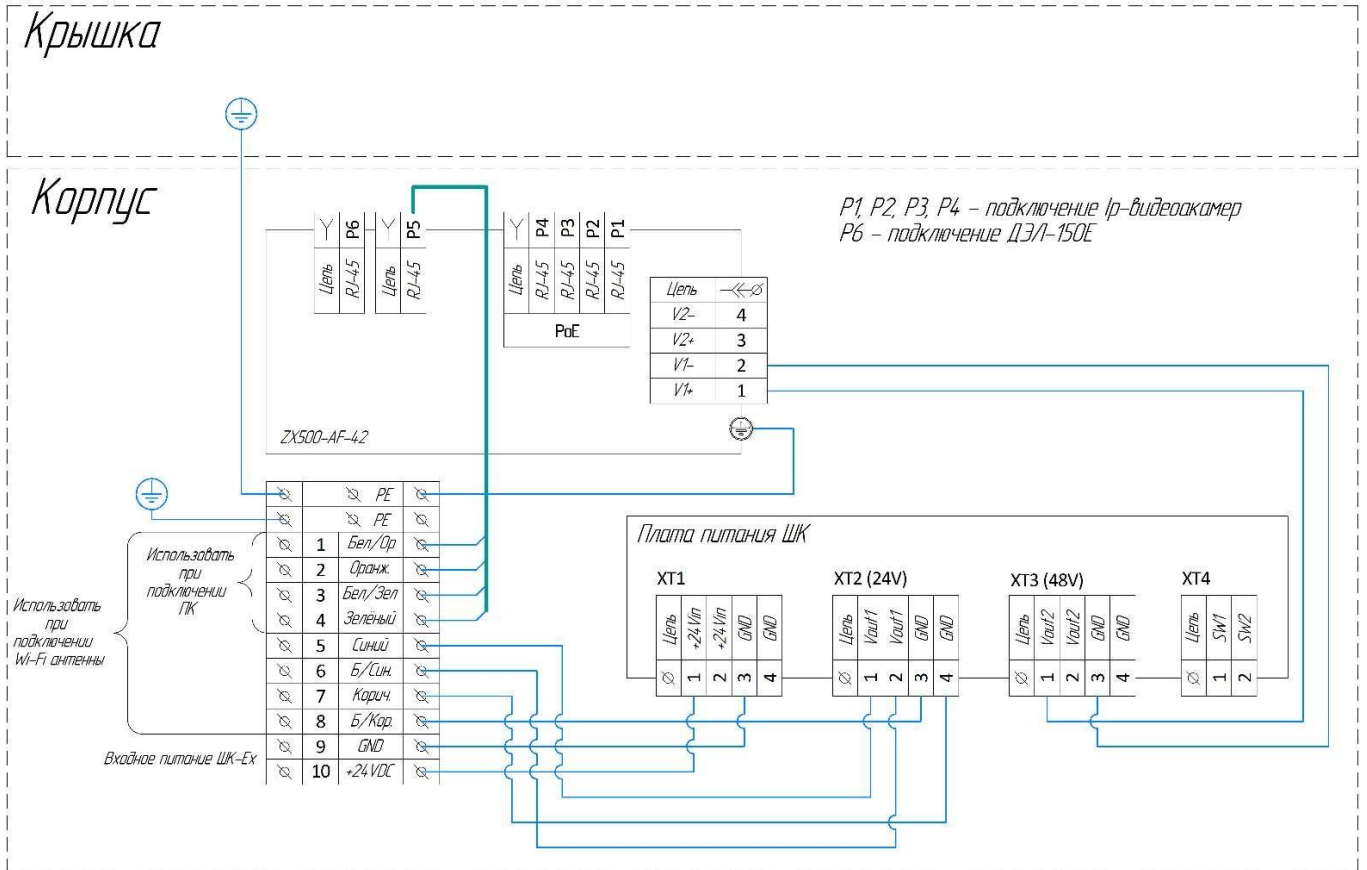


Figure 26. Electrical diagram of the SHK-Ex connections

- Commutation box-1 (SHK-1):

The SHK-1 box (see Figure No. 27) is used to connect one IP camera located at a remote distance from the video recorder. Communication with the video recorder is carried out by a Wi-Fi bridge.



Figure 27. Commutation box-1 (SHK-1)



Table 6 – Technical characteristics SHK-1

|  |            |
|--|------------|
| Number of connected IP CCTV cameras, ea. | 1          |
| Ingress protection                       | IP54       |
| Supply voltage, V                        | =18...36   |
| Ambient temperature range, °C            | -40...+50  |
| Dimensions, mm                           | 197x167x58 |
| Weight, kg                               | 0,6        |

HDMI Converter (see Figure No. 28) is an intermediate device between the monitor/TV and the video recorder DEL-150V2 and serves to display video information from IP cameras to the monitor via the HDMI interface. Communication with the video recorder DEL- 150 V 2 is carried out by an Ethernet network cable or a Wi-Fi bridge. HDMI Converter is connected to the video recorder DEL-150V2 in the port for connecting cameras or in the port "DEL-150E" (see Figure No. 12).

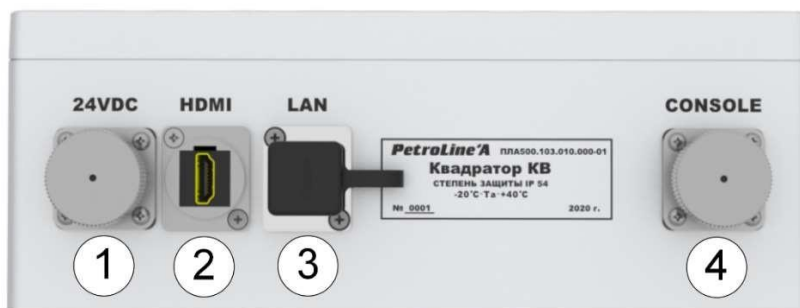


View 1

1 – Power on/off for the "LAN" port\*; 2 – Switching display modes; 3 – Power on/off the HDMI converter

\* - power on when connecting a Wi-Fi bridge

- power off when connecting the HDMI converter to the video recorder by a network cable (Ethernet)



View 2

Figure 28. HDMI converter

1 –power connection port; 2 – port for connecting the monitor via the HDMI interface; 3 – port for connecting video recorder DEL–150V to the internal network (LAN); 4 - port for connecting the remote panel;

Table 7 - Technical characteristics HDMI interface

|                                      |               |
|--------------------------------------|---------------|
| Number of connected monitors, ea.    | 1             |
| Max number of displayed windows, ea. | up to 9       |
| Ingress protection                   | IP65          |
| Supply voltage, V                    | =15...36      |
| Ambient temperature range, °C        | from 0 to +50 |
| Dimensions, mm                       | 240x160x93    |
| Weight, kg                           | 1             |

## 2. STRUCTURE AND FUNCTIONING

---

Video cameras are connected to the recorder by communication cables (see Figure No. 17,19) or using a Wi-Fi bridge through commutation boxes. Options for connecting video cameras and placing system elements on the object may be different. Some examples of connections are shown in Figure No. 29,30.

## 2.1. Block- diagrams of the system

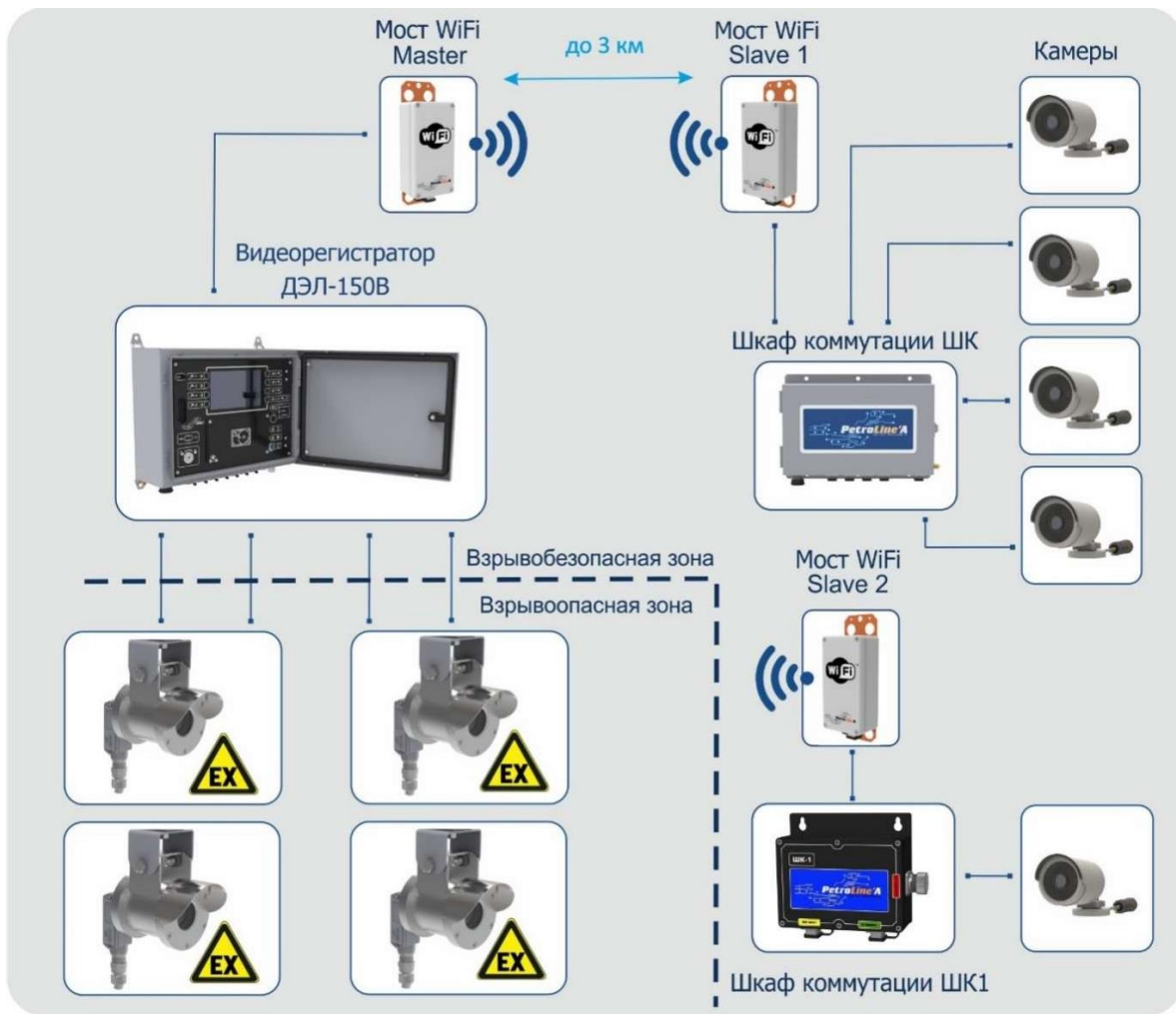


Figure 29. Example №1 DEL-150V2 diagram connection



Figure 30. Example №2 DEL-150V2 diagram connection

## 2.2. Video recorder

The video recorder is made in a metal case, with an internal door on which the display (if available) and controls are placed (see Figure No. 31). The overall drawing of the video recorder is specified in Appendix No. 2.

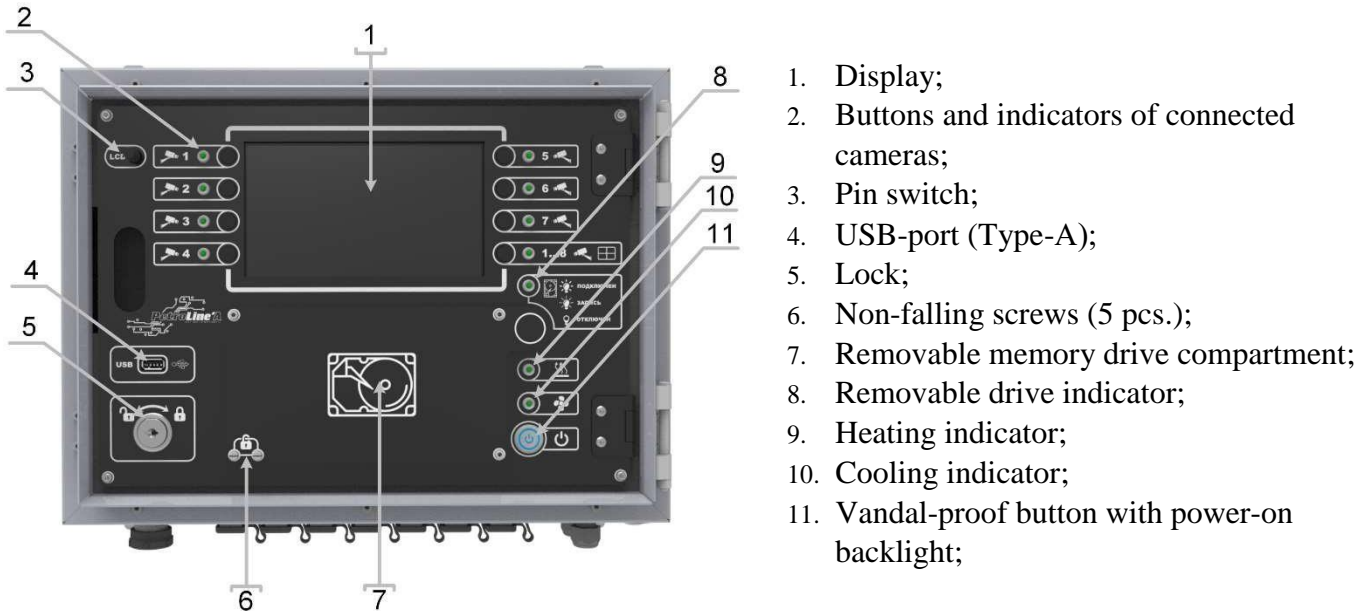


Figure 31. Video recorder (the outer door is not shown)

## 2.3. Video recorder operation

When power is supplied, the climate system (if available) puts the recorder into operation (provided that the temperature inside the recorder is less than  $+5^{\circ}\text{C}$ , the heating turns on and brings the temperature to  $+5^{\circ}\text{C}$ ), after which the video recorder is turned on, the power indicator signals this (the backlight of the power button lights up (see Figure No. 31, item 11).

The video recorder works with IP cameras. In the switched-on mode, the connection of cameras is indicated by the light of the corresponding indicators on the recorder front panel (see Figure No. 31, item 2).

If the video recorder is equipped with a built-in display, then on this display you can view the current video data of the connected cameras, with the possibility of manually switching the image from the necessary video camera. The number of simultaneously displayed images from cameras on the display screen is 1; 4; 6; 9. Using the button, switch the modes.



Screen form is shown in Table No. 8.

Table 8. Screen form example

|              |  |  |  |
|--------------|--|--|--|
| KAM-"X"      |  |  |  |
| <i>Bud 1</i> |  |  |  |

|              |       |
|--------------|-------|
| KAM-1        | KAM-2 |
| KAM-3        | KAM-4 |
| <i>Bud 2</i> |       |

|              |       |       |       |
|--------------|-------|-------|-------|
| KAM-1        | KAM-2 |       |       |
| KAM-3        | KAM-4 | KAM-5 | KAM-6 |
| <i>Bud 3</i> |       |       |       |

|              |       |       |
|--------------|-------|-------|
| KAM-1        | KAM-2 | KAM-3 |
| KAM-4        | KAM-5 | KAM-6 |
| KAM-7        | KAM-8 | KAM-9 |
| <i>Bud 4</i> |       |       |

#### 2.4. Recording and data storage

Video data is recorded on the removable memory drive. The removable drive can be a HDD/SSD hard drive (2.5" form factor, NTFS file system). The removable memory drive is used to transfer data to a personal computer (to create an archive database).

The video recorder is equipped with a slot for installing an SD card with a capacity of more than 16 GB. This slot is located on the controller board (see Figure No. 32). After installing the SD card, it becomes possible to record video data to the internal memory module, during the absence of the removable drive. Recording to removable/internal drive is performed in cycles – these are small videos of 5 minutes each. Such videos are "stored" in the removable / internal drive and when the maximum size is reached, the old (by date) videos begin to be overwritten with new ones, and that is, a cycle occurs.

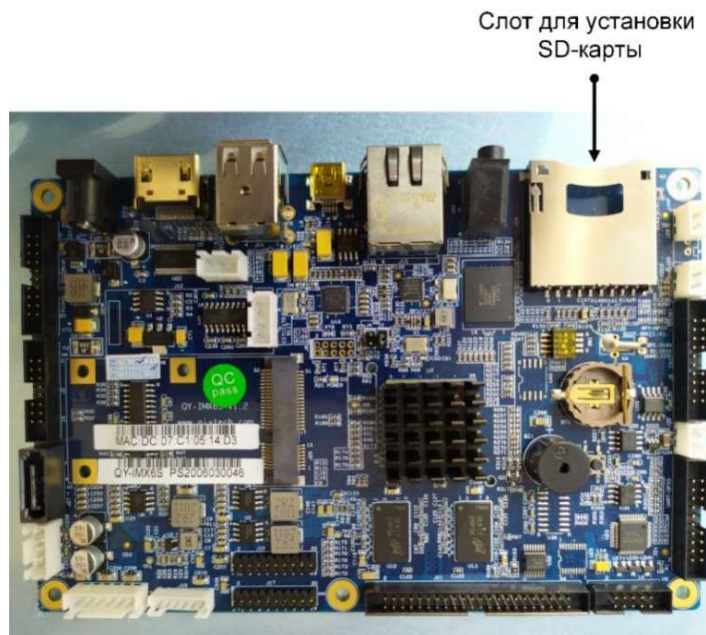

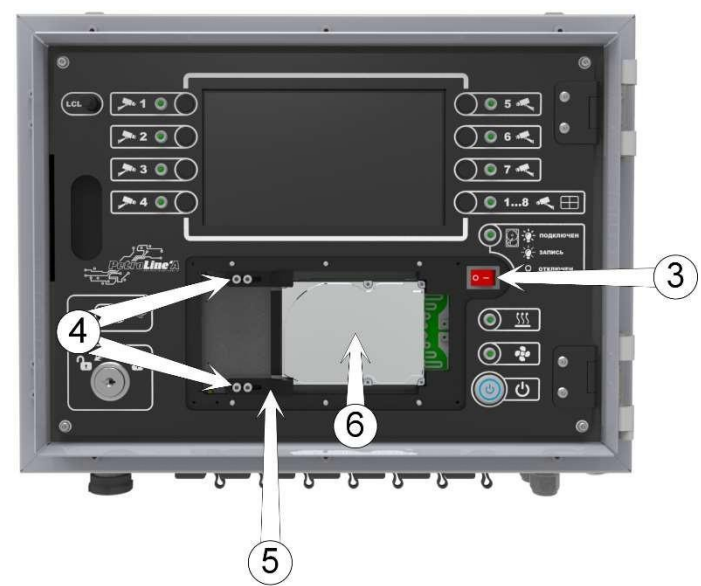


Figure 32. Controller board

## 2.5. Removable drive change

To replace the removable drive, you must:

|  |  |
|--|--|
|  | <ol style="list-style-type: none"><li>1. Unscrew the non-falling screws (1). Remove the hard disk compartment lid(2);</li><li>2. Turn off the power to the removable drive using the key switch (3);</li><li>3. Loosen the hard disk mounting screws(4);</li><li>4. Slide the holders (5);</li><li>5. Carefully remove the hard drive (6), by disconnecting the</li></ol>  <p>!!! Installing the hard drive, repeat the steps in reverse order!!!</p> |
|--|--|



*Similarly, the removable drive of the video recorder DEL-150V2-M0 is changed*

**ATTENTION!!! IF THE SEQUENCE OF ACTIONS IS NOT FOLLOWED WHEN REPLACING THE REMOVABLE DRIVE, THE VIDEO ARCHIVE MAY BE LOST!!!**

## 2.6. Video recorder operation as part of the DEL-150/DEL-150E

In this mode, the system synchronizes the internal time of the video recorder with the current time of DEL-150/DEL-150E, which allows you to synchronize telemetry data with the video archive. It also becomes possible to remotely view the current video data on-line. To organize the archive and view the on-line broadcast, the "Drilling and well workover monitoring" program is used. In this program there is a possibility to choose the interval for updating the current video data. The shorter the update period, the larger the amount of data consumed. Approximately in standby mode (there is no video data viewing) the data volume is 2 MB per hour. The software is available for download on the manufacturer's website at the link <https://www.pla.ru/service/programmnoe-obespechenie/>

An example of on-line viewing is shown in Figure No. 33

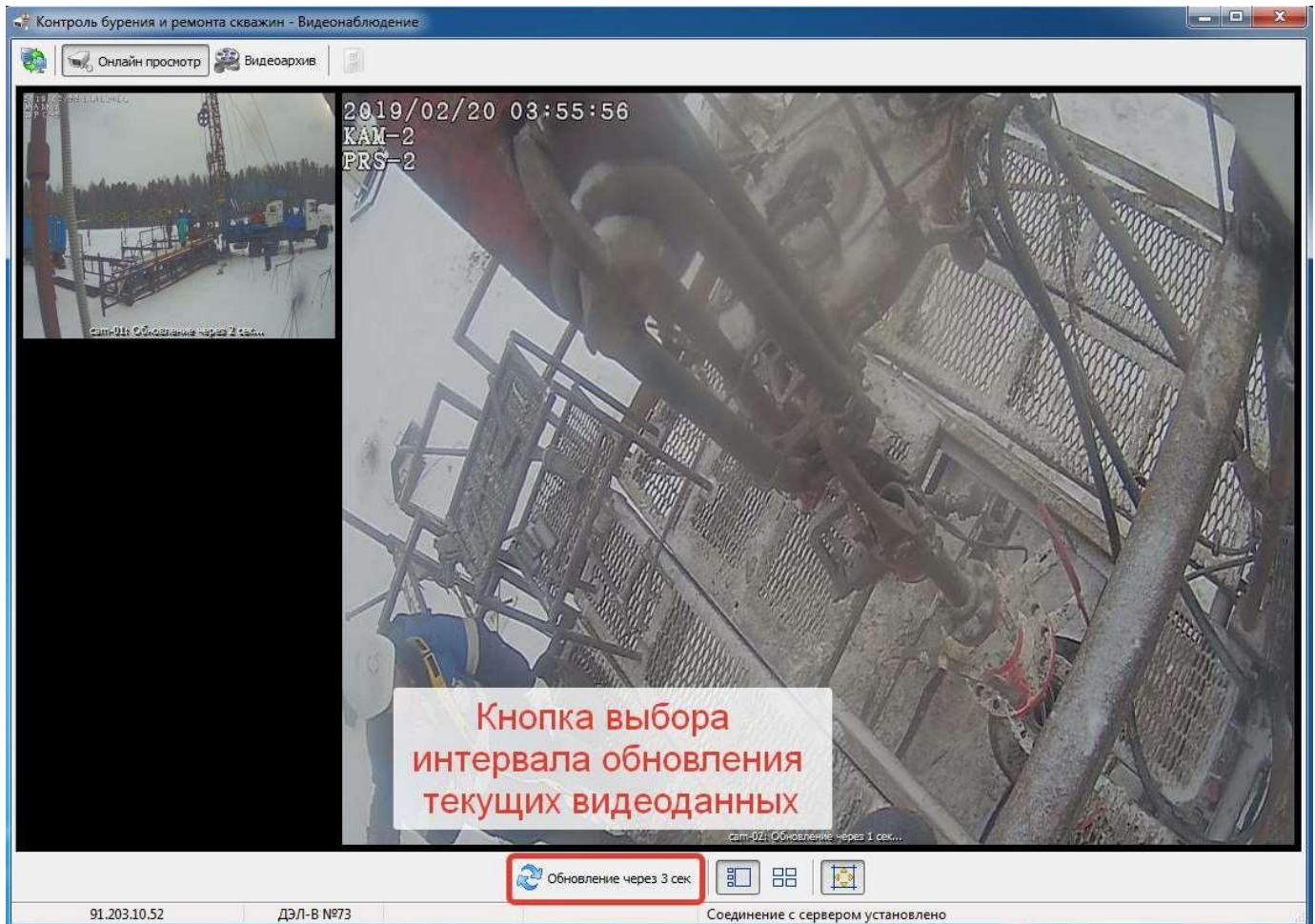


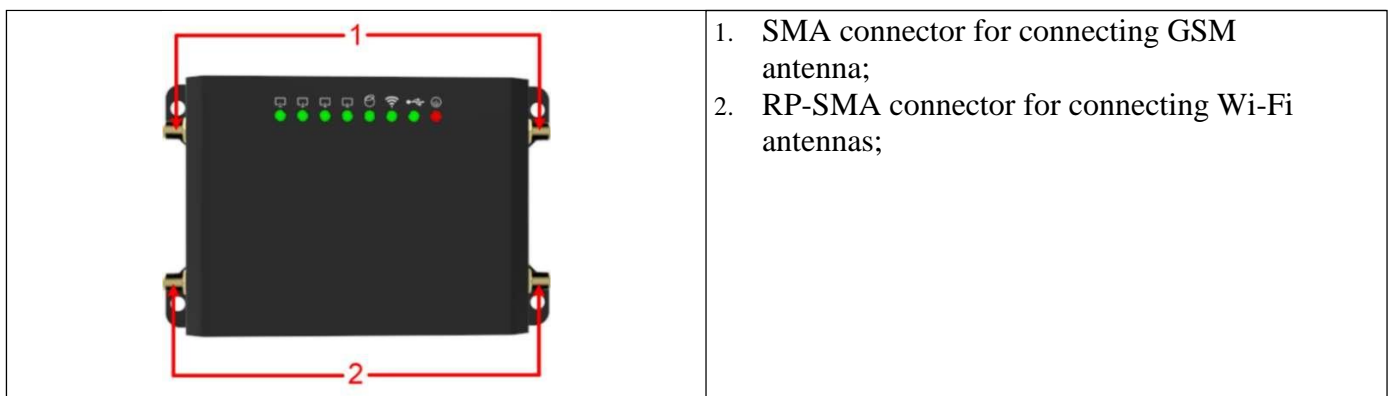
Figure 33. On-line viewing

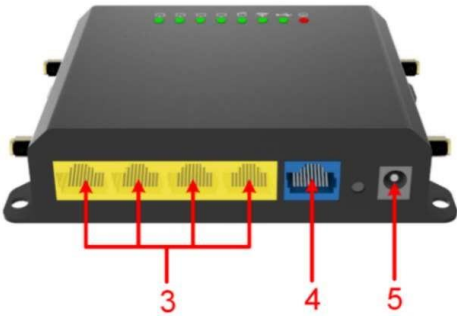
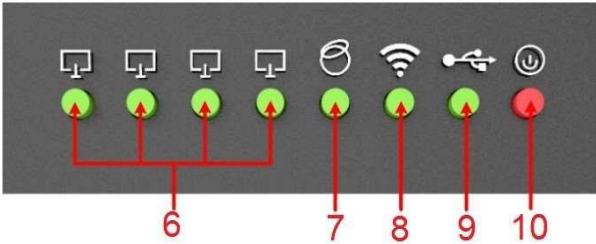
### 3. COMMUNICATION DEVICES

#### 3.1. 3G-router

For data transmission in the coverage area of GSM networks, a 3G router is provided as standard.

#### 3.2. 3G-router structure



|   |  |
|---|--|
|  | <ol style="list-style-type: none"> <li>3. LAN ports;</li> <li>4. WAN port;</li> <li>5. Socket for connecting the power adapter;</li> </ol>   |
|  | <ol style="list-style-type: none"> <li>6. LAN connection indicator;</li> <li>7. WAN connection indicator;</li> <li>8. Wi-Fi indicator;</li> <li>9. 3G router indicator;</li> <li>10. Power indicator.</li> </ol> |

### 3.3. SIM-card installation

The SIM card is installed in a 3G router, which is located inside the video recorder (behind the inner door). To install the SIM card, turn off the power, open the inner door and insert the card into the slot located on the right side of the router, as shown in (see Figure No. 34).



Figure 34. SIM-card installation

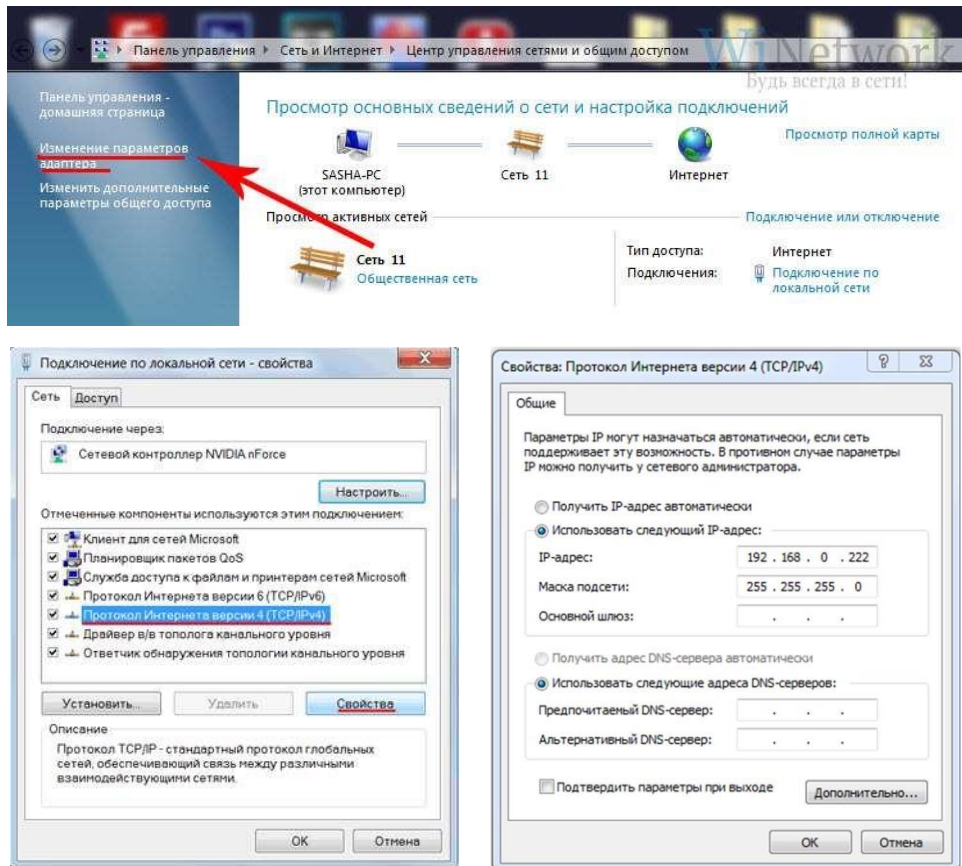
### 3.4. 3G-router setting

For the 3G- router operation in the GSM network, it is necessary to match only the access point name of the mobile operator (Access Point Name). The 3G router's Web interface is used for editing. Procedure:

- a. Connect the computer to the video recorder in the "PC" connector using a network (Ethernet) cable;



- b. In the network PC settings, we set the IP address for example: 192.168.0.222/192.168.7.222. The gateway and DNS can be omitted. Right-click on the item "LAN connection", then "Properties", then to the menu item "Internet Protocol version "TCP/IPv4" and select the following items "Use the following IP address"

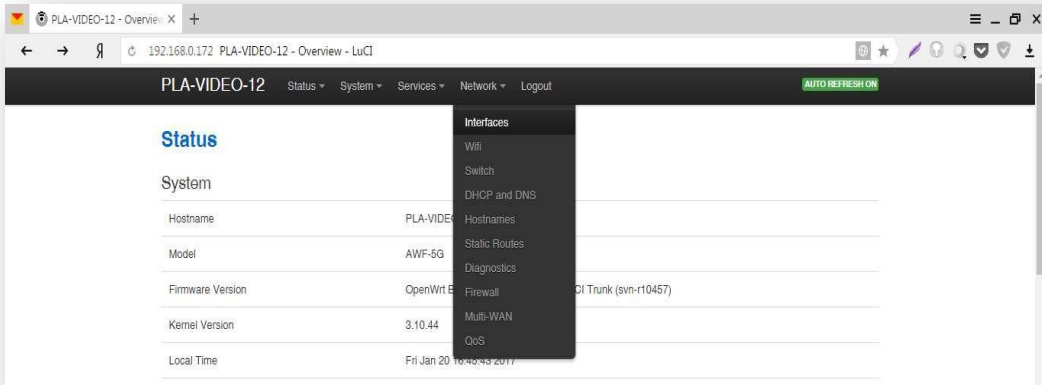


- c. Next, open the browser and enter the IP address of the video recorder 192.168.0.172:8080 (by default) in the address bar of the browser.
- d. In the window that appears, enter the data for authorization, click the "Login" button:  
 Username: **root**  
 Password: **plarouteradmin**

### 3.5. Setting the external IP address of Video recorder DEL-150V2

To change the external IP address of the video recorder, follow these steps:

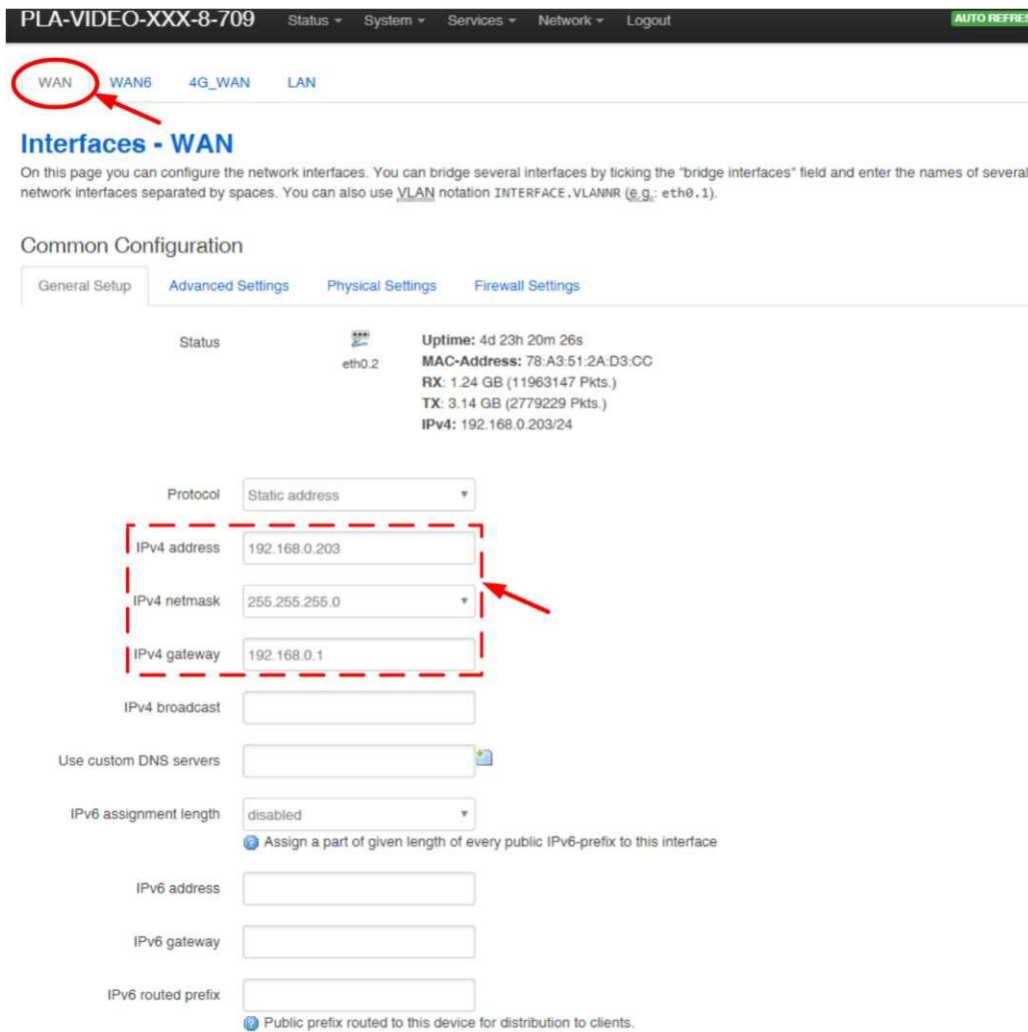
- Follow the steps "a-d" in section 3.4 of this manual
- Go to the Network->Interfaces tab



- Then go to the "WAN" parameter and change IPv4 address (video recorder IP address), IPv4 netmask (subnet mask), IPv4 gateway (gateway). We save the settings by pressing the "Save&Apply" button








### **ATTENTION!!! USE ONLY A STATIC IP ADDRESS**



### 3.6. 3G-router operation

After installing the Sim card and setting the 3G router, you need to check the router operation. The indicators are located on the device. The description of the indicators are shown in Table No. 9.

Table 9 – Description of 3G-router operation

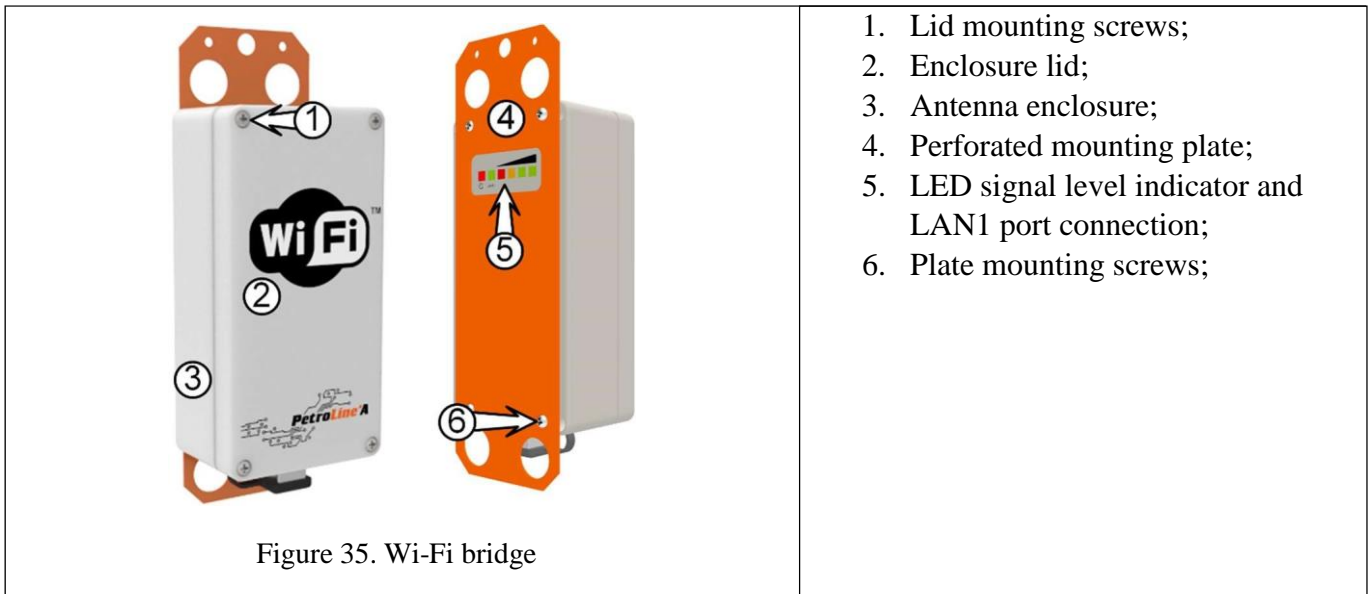
| Indicator  | Status        | Meaning  |
|--|---------------|--|
| Индикатор подключений по LAN-порту-<br><br>Индикатор подключений по WAN-порту-<br> | Green *       | A device is connected to the port, but there is no data exchange |
|  | Flash green*  | A device is connected to the port and data is exchanged          |
|  | No light      | no connection to the port  |
| Индикатора работы Wi-Fi -<br>   | Green *       | active access point  |
|  | Flash green * | Data transmission via Wi-Fi                                      |
| Индикатор работы 3G -<br>   | Green *       | Connected to GSM network   |
|  | Flash green * | GSM Network Search   |
|  | No light      | faulty router  |
| Индикатор питания -<br>   | Red           | Power on   |
|  | No light      | Power off  |

\*- The color of the LEDs may vary

### 3.7. Wi-Fi bridge

Designed to replace cable lines, for example: between the recorder and the commutation box, between the recorder and the control module DEL-150. The antennas are configured at the manufacturer in the transparent bridge mode.

### 3.8. Wi-Fi bridge structure



### 3.9. Wi-Fi bridge description and operation

The antennas work in pairs, one of them acts as a "Master" (access point), and the second as a slave "Slave". Multiple "Slave" antennas can be connected to one "Master" antenna. Instructions for setting up antennas are described in the Wi-Fi antenna operation manual.

## 4. WEB-INTERFACE

---

### 4.1. Video recorder DEL-150 V2 setting

The web interface is designed for video recorder settings. The diagram of the network environment of the video recorder DEL-150V2 is shown in Appendix No. 1.

There are 3 options for logging into the Web interface:

#### Variant №1.

- Connect the PC to the video recorder using an Ethernet cable in the "PC" connector
- The PC and the video recorder must be on the same subnet, to do this, follow the steps "a-b" in section 3.4 of this manual.
- Launch the browser and type the video recorder address in the address bar:

<http://192.168.0.172> – default address

#### Variant №2.

- Connect the PC to the video recorder using an Ethernet cable in the connector for video cameras or "DEL-150E".
- The PC and the video recorder must be in the same subnet, to do this, follow the steps "a-b" in section 3.4 of this manual.
- Launch the browser and type the video recorder address in the address bar:

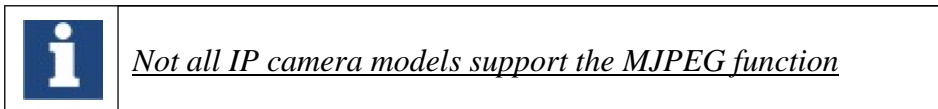
<http://192.168.7.20> – default address

Variant №3.

- Connect to the video recorder using WI-FI (built-in router). By default, the name of the network is PLAY-VIDEO-XXX-INT, (where XXXX is the serial number of the video recorder). Password: **plawifiap**
- Launch the browser and type the video recorder address in the address bar:

<http://192.168.7.20> – default address

For IP cameras to work, it is necessary to specify the URL link RTSP\* stream (main and additional) in the Web interface of the video recorder (see Figure No. 35). The main RTSP stream is recorded on a drive. To display video data, the main or additional RTSP stream is used, depending on the settings and configuration of the converter. There are individual RTSP links for each IP camera manufacturer (you can check this information at the video module manufacturer). An example of RTSP links for a camera manufactured by HikVision is described in the table No. 10 of this manual. MJPEG\*\* is used for remote frame-by-frame data transmission.



\*RTSP – real-time streaming protocol

\*\*MJPEG - frame-by-frame video compression method, the main feature of which is the compression of each individual frame of the video stream using the JPEG image compression algorithm

Table 10. RTSP-stream for HikVision cameras

| CAM № | LAN (internal network)                               | WAN (external network)                                  | Note       |
|-------|--|---|------------|
| CAM 1 | rtsp://192.168.7.30:554/ISAPI/Streaming/Channels/101 | rtsp://192.168.0.172:17103/ISAPI/Streaming/Channels/101 | main       |
|       | rtsp://192.168.7.30:554/ISAPI/Streaming/Channels/102 | rtsp://192.168.0.172:17103/ISAPI/Streaming/Channels/102 | additional |
| CAM 2 | rtsp://192.168.7.31:554/ISAPI/Streaming/Channels/101 | rtsp://192.168.0.172:17113/ISAPI/Streaming/Channels/101 | main       |
|       | rtsp://192.168.7.31:554/ISAPI/Streaming/Channels/102 | rtsp://192.168.0.172:17113/ISAPI/Streaming/Channels/102 | additional |
| CAM 3 | rtsp://192.168.7.32:554/ISAPI/Streaming/Channels/101 | rtsp://192.168.0.172:17123/ISAPI/Streaming/Channels/101 | main       |
|       | rtsp://192.168.7.32:554/ISAPI/Streaming/Channels/102 | rtsp://192.168.0.172:17123/ISAPI/Streaming/Channels/102 | additional |
| CAM 4 | rtsp://192.168.7.33:554/ISAPI/Streaming/Channels/101 | rtsp://192.168.0.172:17133/ISAPI/Streaming/Channels/101 | main       |
|       | rtsp://192.168.7.33:554/ISAPI/Streaming/Channels/102 | rtsp://192.168.0.172:17133/ISAPI/Streaming/Channels/102 | additional |
| CAM 5 | rtsp://192.168.7.34:554/ISAPI/Streaming/Channels/101 | rtsp://192.168.0.172:17143/ISAPI/Streaming/Channels/101 | main       |
|       | rtsp://192.168.7.34:554/ISAPI/Streaming/Channels/102 | rtsp://192.168.0.172:17143/ISAPI/Streaming/Channels/102 | additional |

|          |  |   |            |
|----------|--|---|------------|
| CAM<br>6 | rtsp://192.168.7.35:554/ISAPI/Streaming/Channels/101 | rtsp://192.168.0.172:17153/ISAPI/Streaming/Channels/101 | main       |
|          | rtsp://192.168.7.35:554/ISAPI/Streaming/Channels/102 | rtsp://192.168.0.172:17153/ISAPI/Streaming/Channels/102 | additional |
| CAM<br>7 | rtsp://192.168.7.36:554/ISAPI/Streaming/Channels/101 | rtsp://192.168.0.172:17163/ISAPI/Streaming/Channels/101 | main       |
|          | rtsp://192.168.7.36:554/ISAPI/Streaming/Channels/102 | rtsp://192.168.0.172:17163/ISAPI/Streaming/Channels/102 | additional |
| CAM<br>8 | rtsp://192.168.7.37:554/ISAPI/Streaming/Channels/101 | rtsp://192.168.0.172:17173/ISAPI/Streaming/Channels/101 | main       |
|          | rtsp://192.168.7.37:554/ISAPI/Streaming/Channels/102 | rtsp://192.168.0.172:17173/ISAPI/Streaming/Channels/102 | additional |

## 4.2. Web-interface description

The following data is used to log in to the Web interface:

Login: **admin**

Password: **pladvradmin**

The screenshot shows a login form with the following elements:

- User name:** A text input field containing the value "admin". To its right is the placeholder text "Enter your user name".
- Password:** A text input field with masked characters (dots). To its right is the placeholder text "Enter your password".
- Remember me:** A checkbox that is currently unchecked. To its right is the text "Keeps login for 2 weeks".
- Login button:** A blue button with the text "Login" in white.

Figure 36. Login window

The window displays 5 tabs:

- **Status** (open at the start);
- **Bindings:**
- **Squarer:**
- **Camera:**
- **System.**

The **Status** tab displays the following:

**System;**

**Recorder;**

**Bindings;**

**DEL;**

**Cams;**

DEL-150(DVR)   Status   Bindings   Squarer   Camera   System ▾   admin   Logout

### Status

#### System

|                |  |
|----------------|--|
| System Version | Plintuzz 1.0 (buildroot-2017.08-sk-imx6) |
| Kernel Version | 4.1.15                                   |
| CPU Temp       | 41°                                      |
| Local Time     | 2019/02/21 09:35:16                      |
| Uptime         | 0d 18h 25m 13s                           |

#### Recorder

|                       |                        |
|-----------------------|------------------------|
| Version               | 1.3                    |
| Serial                | 64                     |
| File saving processes | 0                      |
| File saving errors    | 0                      |
| Storage name          | SD_0x70451923_1        |
| Storage capacity      | 9.2 GB / 59.5 GB (84%) |

#### Bindings

|              |           |
|--------------|-----------|
| DEL serial   | 10998     |
| Drilling rig | 0         |
| Section      | 0         |
| Crew         | САБАНОВА  |
| Oilfield     | НАБЕРЕЖНЫ |
| Well cluster | НОВЫЙ     |
| Oil well     | 195       |

#### DEL

|             |            |
|-------------|------------|
| Last synced | 1m 26s ago |
| Serial      | 10998      |
| Version     | 1082       |

#### Cams

|        |   |
|--------|---|
| cam-01 | recording: error<br>displaying: stopped |
| cam-02 | recording: ok<br>displaying: ok         |

Figure 37. Web interface main window

The **System** tab displays:

- SystemVersion;**
- KernelVersion;**
- CPUTemp;**
- LocalTime;**
- Uptime;**

The **Recorder** tab displays:

- Version;**
- Serial;**
- Filesavingprocesses;**
- File saving errors;**
- Storagename;**
- Storagecapacity;**

The **Bindings** tab displays:

- DELserial;**
- Drillingrig;**
- Section;**
- Crew;**
- Oilfield;**
- Wellcluster;**
- Oilwell;**



*Attention!!! Syncing with DEL-150 or DEL-150 E, the data is recorded automatically. If there is no synchronization, the data is entered manually.*

DEL-150(DVR)   Status   Bindings   Squarer   Camera   System ▾   admin   Logout

Bindings

Bindings

|               |  |
|---------------|--|
| DEL serial:   | <input type="text" value="10998"/>     |
| Driling rig:  | <input type="text" value="0"/>         |
| Section:      | <input type="text" value="0"/>         |
| Crew:         | <input type="text" value="САБАНОВА"/>  |
| Oilfield:     | <input type="text" value="НАБЕРЕЖНЫ"/> |
| Well cluster: | <input type="text" value="НОВЫЙ"/>     |
| Oil well:     | <input type="text" value="195"/>       |

The **DEL** tab displays:

- Lastsynced;**
- Serial;**
- Version.**

The **CAMS** tab displays the list of connected cameras and their status:

**Cam-01**



**Recording: error**  
**Recording: ok**  
**Displaying: stopped**

### 4.3. Camera setting

You can add and set up cameras if it is required. There are individual settings for each video camera models.

The **Camera** tab displays:

- **Add;**
- **Save&Apply;**
- **Revert;**



Figure 38. Camera tab.

The drop-down panels contain the camera settings. The setting example for a HikVision camera (see Figure № 39).

DEL-150(DVR)   Status   Bindings   Squarer   Camera   System ▾   **admin**   Logout

**Cams settings**

▼ cam-01

**enabled:**

**external:**

**rtsp-h264-0:**

**rtsp-h264-1:**

**mjpeg:**

**sjpeg:**

**user:**

**password:**

Figure 39. Settings for a HikVision IP camera

In the drop-down panels **cam-XX** you can find the following fields:

- **enabled;**
- **external;**
- **rtsp-h264-0** – URL-link to the main RTSP camera stream;
- **rtsp-h264-1** – URL-link to the additional RTSP camera stream;
- **mjpeg** – URL-link to the MJPEG-camera stream;
- **sjpeg** - URL-link to a single camera frame;
- **user** ;
- **password;**

and buttons:

- **Ok;**
- **Rename;**
- **Remove**

To save the changes, click the Save&Apply button

The **System** tab displays:

**Time;**

- **DEL;**
- **Tucanserver;**

The field **Time** contains:

- **Timezone;**
- **Date;**

DEL-150(DVR) Status Camera Squarer System-

System

Time

Time zone: GMT+3

Date: 2018-01-30

Time: « January 2018 »

| Mon | Tue | Wed | Thu | Fri | Sat | Sun |
|-----|-----|-----|-----|-----|-----|-----|
| 25  | 26  | 27  | 28  | 29  | 30  | 31  |
| 1   | 2   | 3   | 4   | 5   | 6   | 7   |
| 8   | 9   | 10  | 11  | 12  | 13  | 14  |
| 15  | 16  | 17  | 18  | 19  | 20  | 21  |
| 22  | 23  | 24  | 25  | 26  | 27  | 28  |
| 29  | 30  | 31  | 1   | 2   | 3   | 4   |

DEL

Hostname:

Port: 17999

DEL-150(DVR) Status Camera Squarer System-

System

Time

Time zone: GMT+3

Date: 2018-01-30

Time: 11:11:27

11 11 27

- **Apply;**
- **Refresh;**
- **Synsenabled;**
- **Syncwith:**
  - **DEL-150 ;**
  - **ntpserver;**
- **Hostname;**
- **Interval,sec;**
- **Revert**

The field **DEL** contains:

- **Hostname;**
- **Port ;**
- **Interval, sec;**
- **Revert.**

DEL-150(DVR)   Status   Bindings   Squarer   Camera   System ▾   admin   Logout

System

**Time**

Time zone: GMT+3 ▾

Date: 2018-11-22 📅

Time: 11:37:19 ⌚

Apply   Refresh

Sync enabled:

Sync with: DEL-150 ▾

Hostname: pool.ntp.org

Interval,min: 120

Revert

**DEL**

Hostname: 192.168.7.60

Port: 17999

Interval,sec: 300

Sync bindings:

Revert

**Tucan server**

enabled:

Hostname: tcn-test.pla.ru

Port: 17996

Revert

Save&Apply   Revert

Figure 40. System tab

The field **Tucanserver** contains:

- **Enabled;**
- **Hostname;**
- **Port;**
- **Revert;**

In the System/Password, it is possible to change the authorization password to log in to the WEB interface:

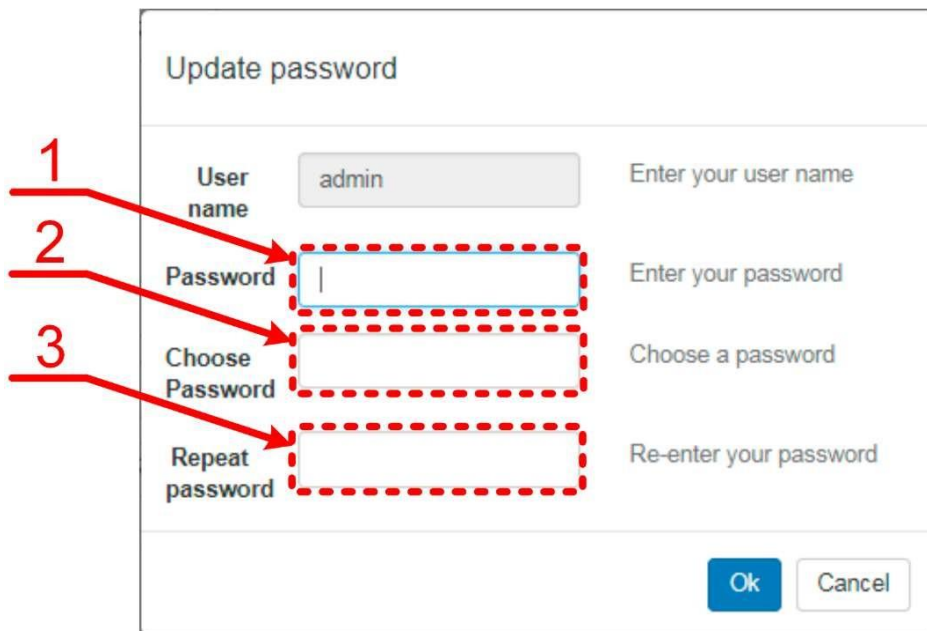
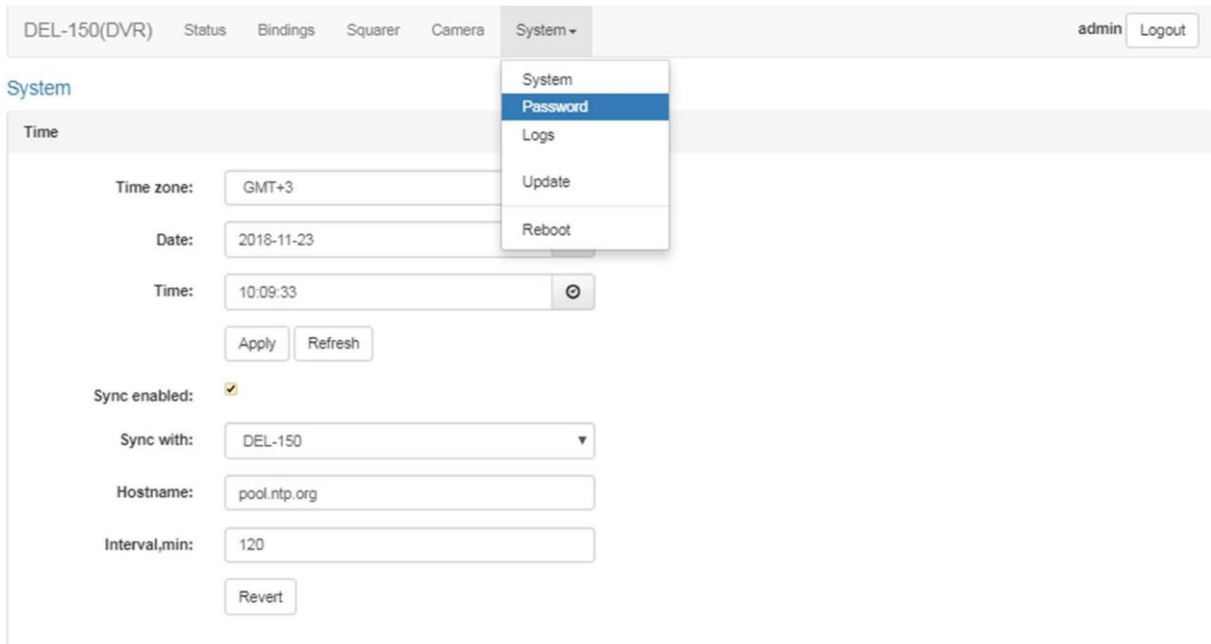


Figure 41. Password change

Video cameras are supplied with certain settings (resolution, frame rate, format and stream number, IP address, etc.). The system determines the camera number by IP address. The organization of the network environment of the video recorder DEL-150V2 is specified in Appendix No. 1 of this manual.

## 5. MAINTENANCE

---

### 5.1. Maintenance

#### 511 . General instructions

Maintenance is divided into:

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

Maintenance of the DEL-150V is performed by personnel who are responsible for Complex operability.

#### 512 . Safety measures

Operating the Complex, it is necessary to be guided by:

- Chapter 3.4 "Electrical installations in explosive zones";
- current rules of electrical installations;
- this operation manual and other regulatory documents in force at the enterprise.

#### 513 . Daily maintenance procedure

- cleaning the camera enclosure and lens from dust, dirt, moisture
- dirt and dust removal from the surface of the video recorder
- detachable connections check
- functional monitoring of display elements
- registration in the form recommended by the manufacturer (or the forms accepted at the enterprise) of all recorded deviations, failures, completed works

#### 514 . Periodic maintenance procedure

- checking the reliability of detachable connections
- checking the reliability of the equipment installation
- checking the equipment technical condition and cable products
- checking the quality of wire attachment on connectors and terminal blocks
- checking the correct installation of the video camera
- functional monitoring of display elements


Periodic maintenance of the DEL-150V is performed by personnel who are responsible for Complex operability and it is carried out as necessary, but at least once a month.

In order to carry out a complete and qualified diagnosis, it is recommended to do the annual maintenance at certified service centers.



Absence of maintenance records in the passport (section "Maintenance Records") ENTAILS VIOLATION OF THE OPERATION RULES, and the manufacturer has the right to withdraw from warranty obligations.

## 515 . Possible problems and recommendations for its elimination

| Failure  | Possible reasons   | Remedy   |
|--|--|--|
| «NO SIGNAL»<br>on the display  | <ul style="list-style-type: none"> <li>• The communication cable is damaged</li> <li>• Invalid RTSP link for the video camera in the settings</li> <li>• The video camera is faulty</li> </ul> | <ul style="list-style-type: none"> <li>• Replace the communication cable</li> <li>• Check the RTSP link in the recorder settings according to the table No. 10 of this manual (when using Hikvision video cameras). When using video cameras from other manufacturers, the RTSP stream link must be used appropriate.</li> <li>• Replace the video camera</li> </ul> |
| Missing image (black screen)   | <ul style="list-style-type: none"> <li>• Incorrect camera settings</li> <li>• Limit switch malfunction</li> <li>• Motherboard malfunction</li> </ul>   | <ul style="list-style-type: none"> <li>• Check the camera settings</li> <li>• Check the limit switch connection (see Figure No. 31)</li> </ul>   |
| The video recorder does not record (hanging on the symbols  ) | <ul style="list-style-type: none"> <li>• Motherboard malfunction</li> </ul>  | <ul style="list-style-type: none"> <li>• Contact the service center or the manufacturer</li> </ul>   |
| The monitor flickers (blinks, ripples)   | <ul style="list-style-type: none"> <li>• Incorrect camera settings</li> </ul>  | <ul style="list-style-type: none"> <li>• In the camera Web interface, check the setting: "maximum bitrate" - the number of bits used for data transmission/processing per unit of time). By default, set the value to 2048</li> </ul>  |
| Permanent restart of the recorder  | <ul style="list-style-type: none"> <li>• Motherboard malfunction</li> <li>• Malfunction of the backup power supply</li> </ul>  | <ul style="list-style-type: none"> <li>• Contact the service center or the manufacturer</li> </ul>   |
| No indication of the removable drive   | <ul style="list-style-type: none"> <li>• There is no removable drive</li> <li>• the power button of the removable drive is disabled (see section 2.5 of this manual)</li> </ul>                | <ul style="list-style-type: none"> <li>• Check for removable drive</li> <li>• turn on the power button of the removable drive</li> </ul>   |

|                            |  |   |
|----------------------------|--|---|
|                            | <ul style="list-style-type: none"> <li>• A hard disk partition has not been created</li> </ul>   | <ul style="list-style-type: none"> <li>• Create a primary hard disk partition</li> </ul>  |
| No data transmission (GSM) | <ul style="list-style-type: none"> <li>• Damage of the GSM antenna</li> <li>• No Sim card</li> <li>• Mobile network is unavailable</li> <li>• Incorrect logger settings</li> <li>• Router malfunction</li> </ul> | <ul style="list-style-type: none"> <li>• Check GSM antennas for technical damage</li> <li>• Check for a Sim card</li> <li>• Check the GSM network availability (see the table No. 9 of this manual)</li> <li>• Check the recorder settings</li> <li>• Replace the router</li> </ul> |

**Attention!!!** If it's impossible to eliminate failure, contact the service center or the manufacturer

## 6. WARRANTY OBLIGATIONS

---

The average video recorder service life is 4 years.

Warranty service – 12 months from the sale date.

Warranty obligations do not apply to devices that have mechanical damage and seal violations.

The manufacturer guarantees that the system meets the requirements set out in the operation manual, if the consumer complies with the conditions, operation rules and maintenance.

If a malfunction or incompleteness is detected during the warranty period, the consumer must submit a claim to the company at:

RPE Petroline-A LLC:

Address: 53A Lermontova St., Naberezhnye Chelny,

Republic of Tatarstan, Russian Federation, 423801

Postal address: P.O. Box 23, 423801

Phone/Fax: +7 (8552) 535-535, 71-74-61

[main@pla.ru](mailto:main@pla.ru), [www.pla.ru](http://www.pla.ru)

A claim for the product is not presented:

- if warranty period is expired
- in violation case by the consumer of operation rules, storage, transportation

## 7. STORAGE

---

The storage must comply with the conditions 1 (L) according to GOST 15150-69 in the absence of a corrosive environment.



## **8. TRANSPORTATION**

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8.1 The packed complex can be transported by any covered type of transport.

8.2 Transportation by rail should be carried out by covered train in accordance with the "Rules of Cargo Transportation", the Ministry of Transport of the Russian Federation. The placement and fastening of cargo should be carried out in accordance with the norms and requirements of the current "Technical conditions for loading and fastening cargo" of the Ministry of Transport of the Russian Federation.

8.3 Transportation by road must be carried out in accordance with the "Rules of Cargo transportation by road" approved by the Ministry of Motor Transport of the Russian Federation.

8.4 Transportation by air must be carried out in accordance with the "Manual on Cargo Transportation on Domestic Air Lines" approved by the Ministry of Civil Aviation of the Russian Federation.

8.5 Transportation by river transport is carried out in accordance with the Rules of Cargo Transportation approved by the Ministry of River Fleet of the Russian Federation.

8.6 Conditions of transportation of the Complex in terms of the impact of mechanical factors L according to GOST 23216-78, in terms of the impact of climatic factors 5 (OJ 4) according to GOST 15150-69.

## **9. DISPOSAL**

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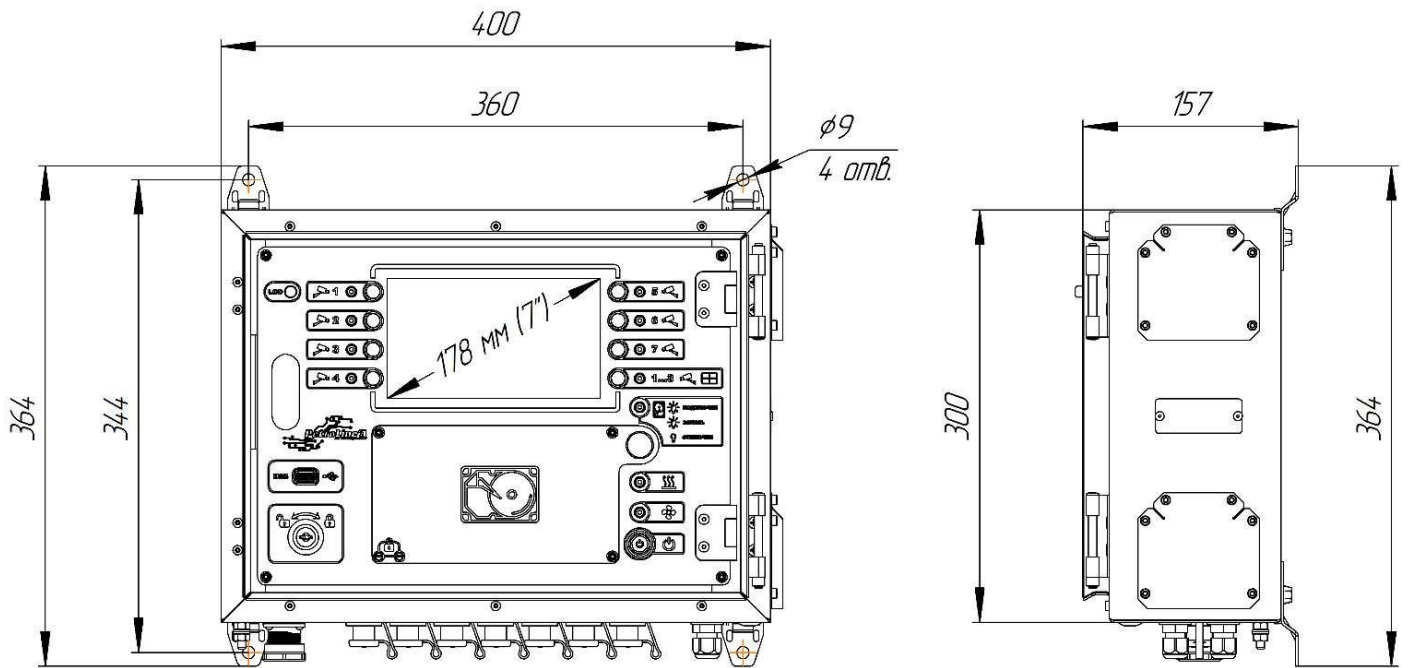
9.1 The components of the Complex do not contain components that pose a danger to life, human health and the environment after the end of their service life.

9.2 Disposal methods and measures comply with the requirements for general industrial electronic products.

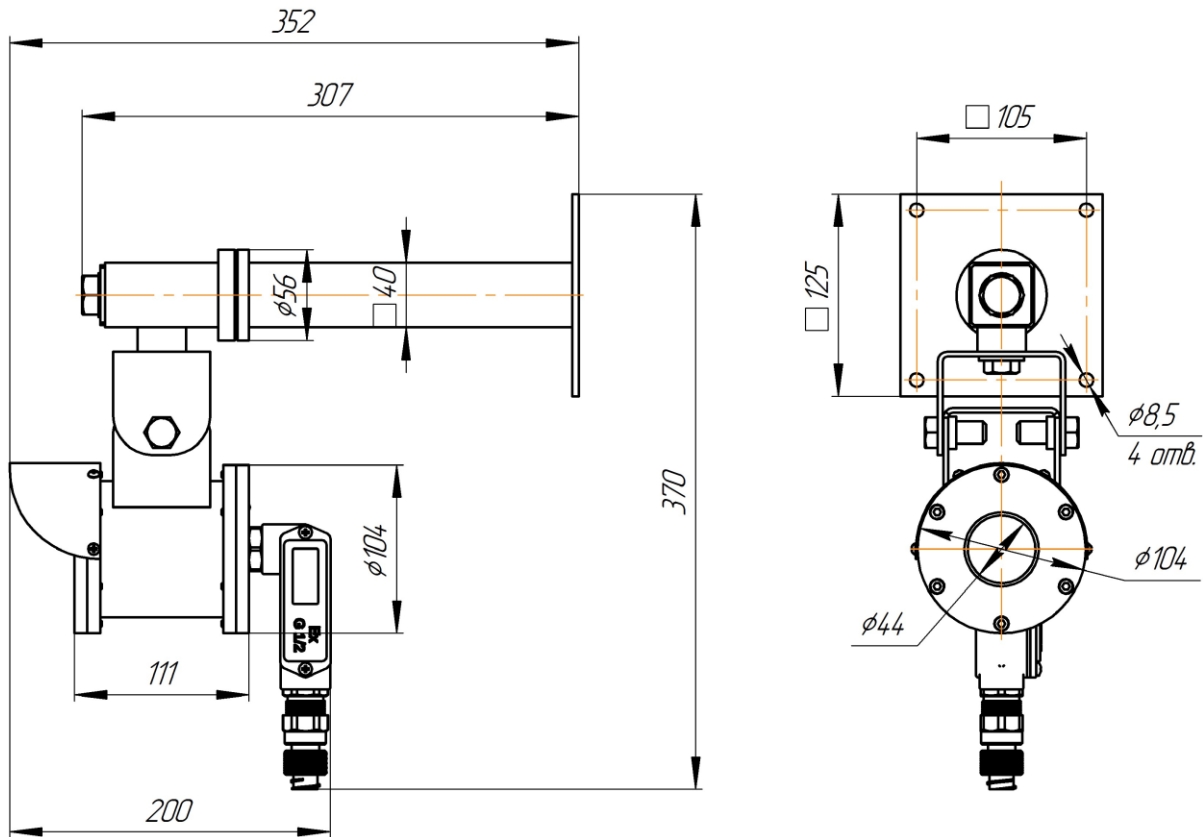
9.3 The recycling complex is dismantled and divided into its component parts in accordance with the requirements of local recycling enterprises.



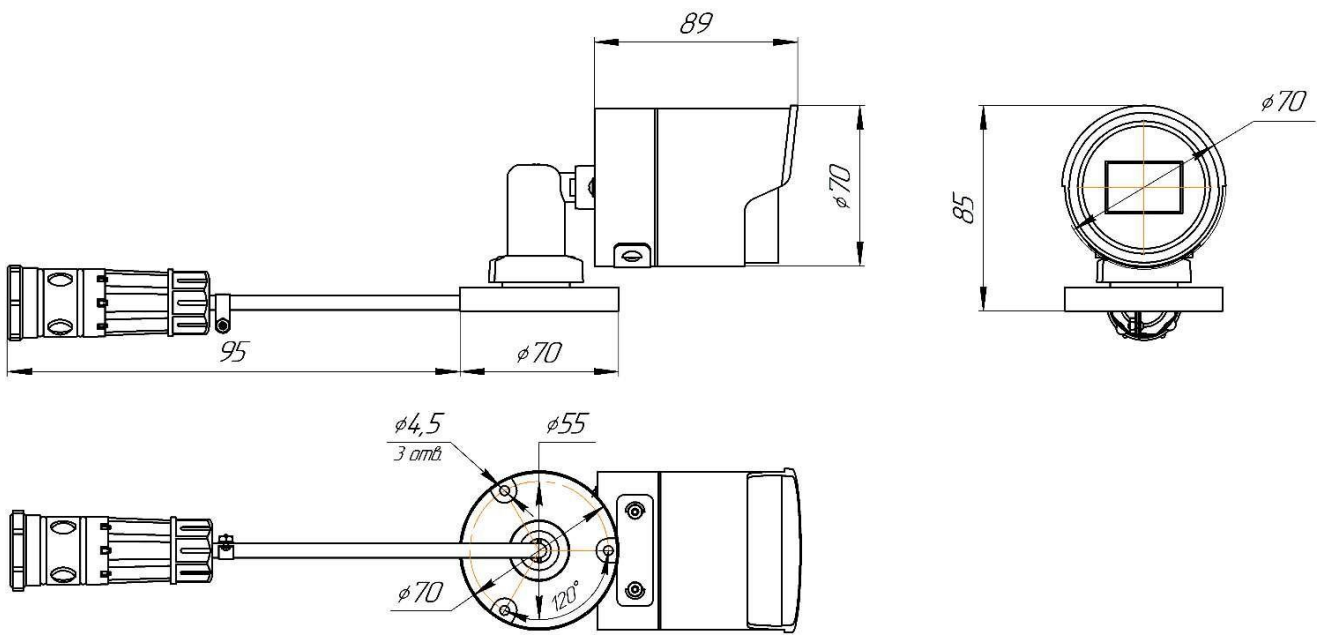
**APPENDIX 2. Overall drawing of video recorder DEL-150V2**



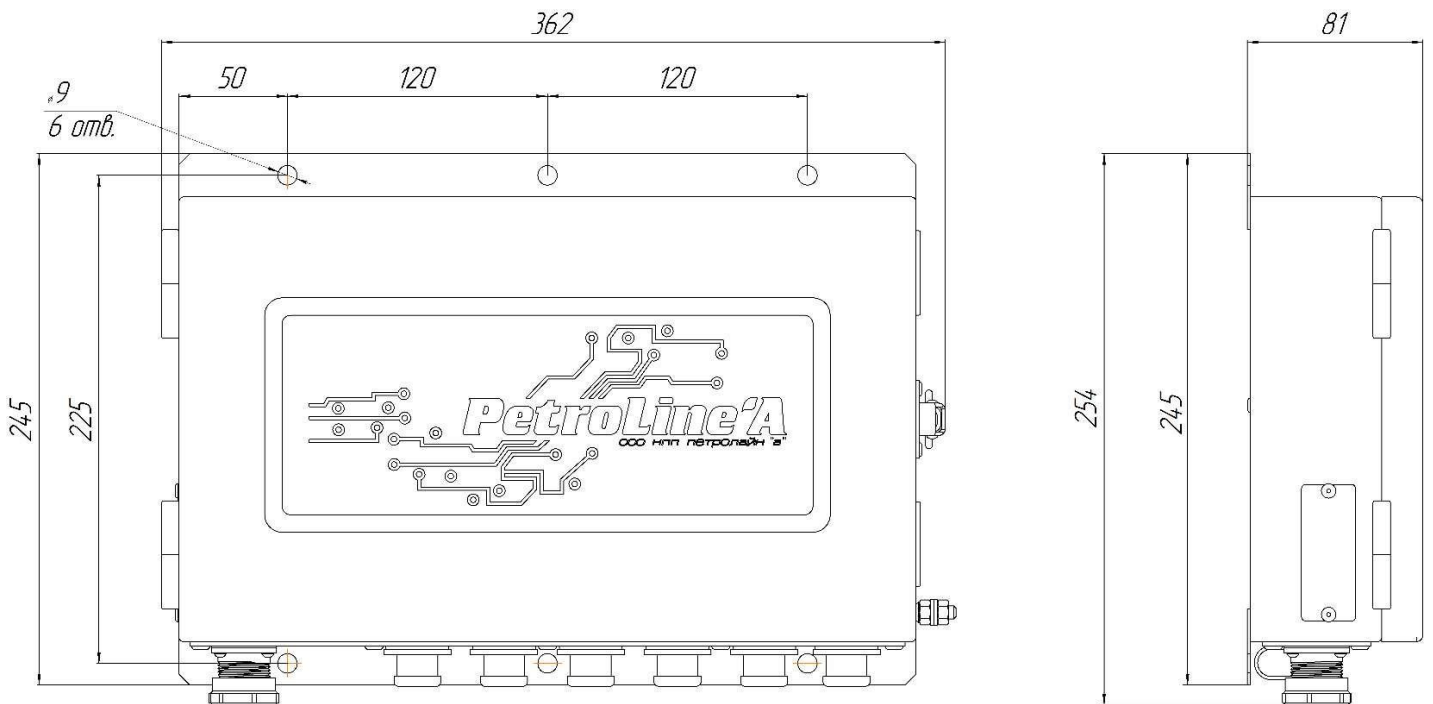
**APPENDIX 3. Overall drawing of ex-camera VOV-150-VK**



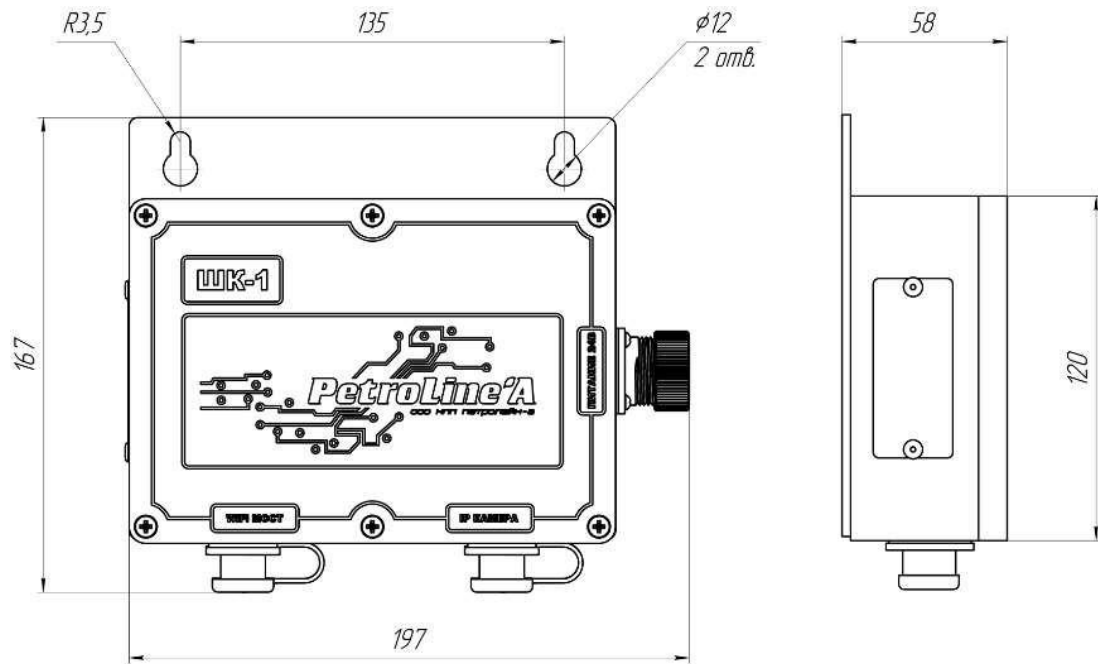
**APPENDIX 4. Overall drawing of IP-camera**



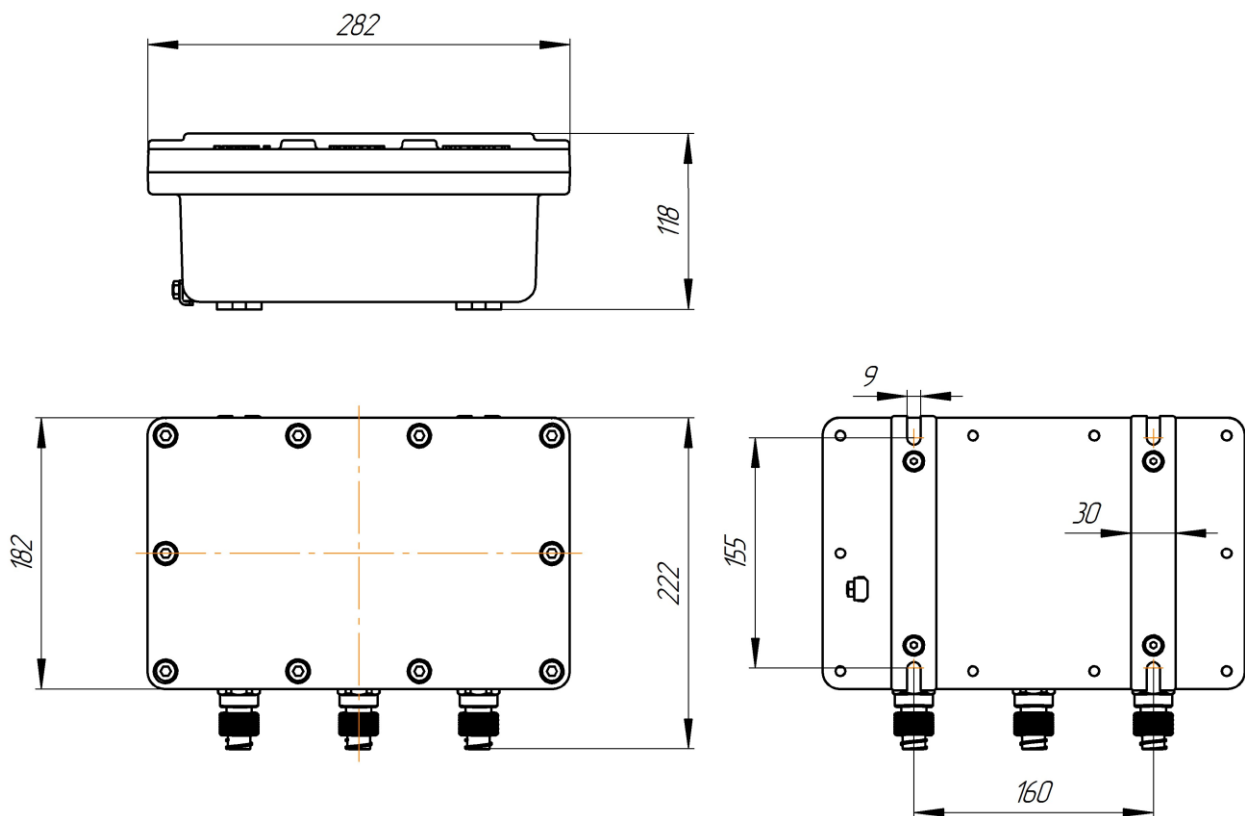
**APPENDIX 5. Overall drawing of commutation box**



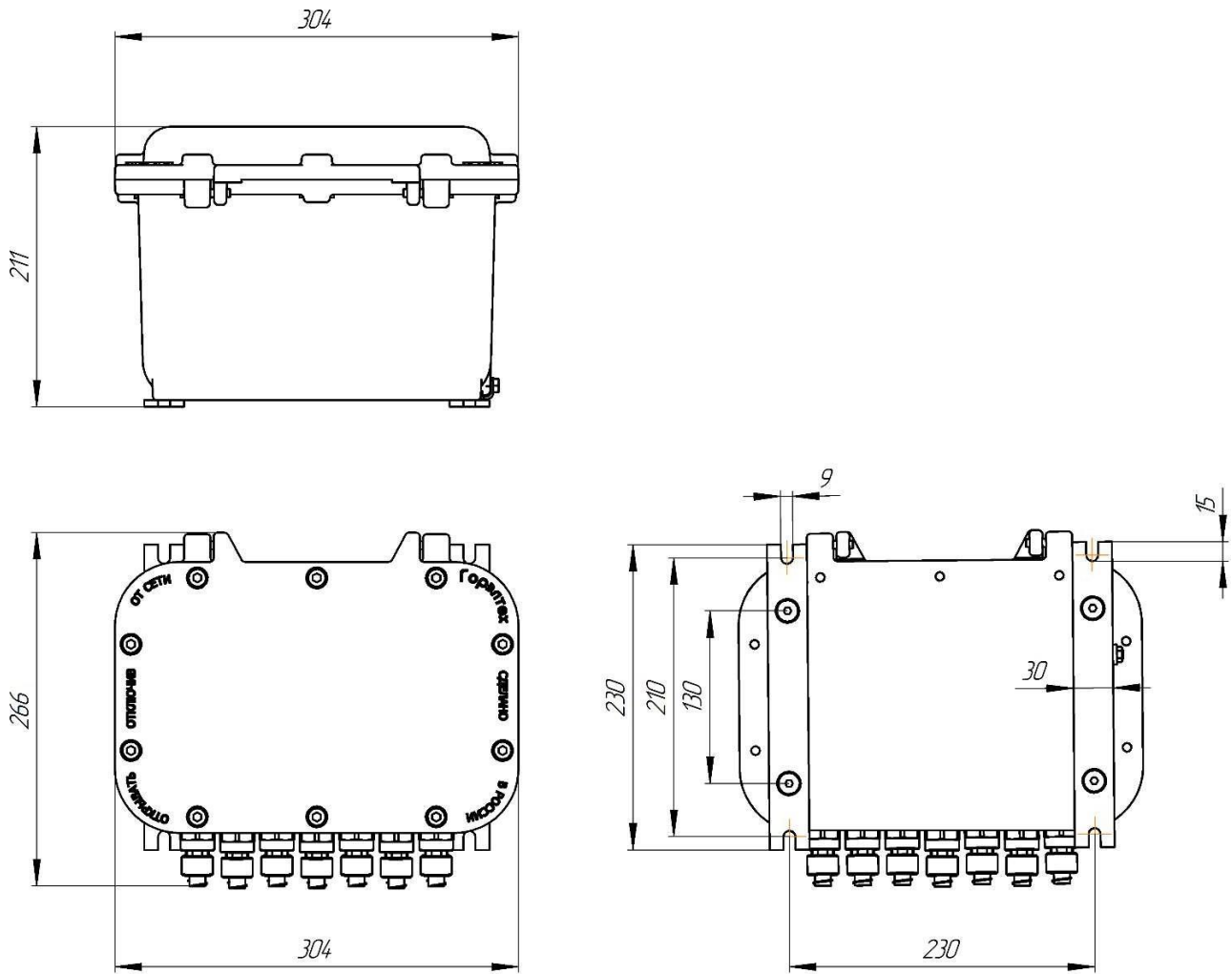
**APPENDIX 6. Overall drawing of commutation box-1**



**APPENDIX 7. Overall drawing of commutation box-1-EX**



**APPENDIX 8. Overall drawing of commutation box-EX**



**APPENDIX 9. Overall drawing of video recorder DEL-150V2-M0**

