ARMACORP SPIN-2 Optic Electron Detection Device Instruction Manual

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ARMACORP SPIN-2 Optic Electron Detection Device

Product Information

Description and Principle of Operation
The Optic-electron Device SPIN-2 is designed for the detection of covert electro-optical surveillance systems and for evaluating the technical condition of instruments. It can be used to search and visualize the location of electro-optical surveillance systems in various lighting conditions, whether outdoors or indoors.

Area of Application
The device is suitable for use in moderate climate conditions, under a shed, or on-premises.

Technical Parameters

- Distance of ESS detection (with the base lens 75 mm):
  - Minimal: 2 m
  - Maximal: 50 m
- The receiver of the reflected signal is a highly sensitive video camera:
  - Size of receiver: 752×582 pixels
  - Minimal illumination: 0.0003 lx (F1,4)
- Detector cell's lens:
  - Focal distance: 75 mm
  - Receiving channel field of view
  - Focus control range: 2 m …
  - Signal-to-noise ratio, at least: 46 dB
  - Output signal format: CCIR
- Backlight illumination:
  - Wavelength of laser
  - Power of laser radiation in continuous mode: not less than 0.2W
- Eyepiece and built-in display:

    - Turning range of ocular
    - Microdisplay type and resolution: AMLCD 0.44, 640×480 pixels
- Power supply:
    - 4 rechargeable Li-ion batteries of type 18650
    - Power consumption, up to: 11W
    - Time of continuous work without battery replacement/charge at normal climatic conditions, not less than 6 hours
- Overall dimensions, not more than:
    - Device Delivered set in standard package-case
    - Weight, not more than:
        - Instrument with battery, up to
        - Delivered set in standard package case
- Climatic conditions of the instrument operation:
    - Operating temperatures range
    - Operating temperatures range during transportation
    - Relative humidity at plus 25, up to
    - Absence of influence of atmospheric precipitation
- Functional capabilities:
    - Laser radiation power adjustment
    - Sharpness adjustment of receiving TV camera
    - Continuous/pulse laser illumination mode
    - Backlight illumination brightness adjustment
    - Indication of battery charge level
    - Automatic device shutdown when the battery is discharged
    - Activation time up to 5 s
    - Protection class from dust and water IP65

Product Usage Instructions

Operational Restrictions

There are no specific operational restrictions mentioned in the user manual.

Preparation for Use

Prior to using the Optic-electron Device SPIN-2, ensure that the Li-ion rechargeable batteries of type 18650 are fully charged. The device comes with four rechargeable batteries, delivered uncharged. Insert the charged batteries into the device.

Running the Instrument

To run the instrument, follow these steps:

1. Turn on the device using the power button.
2. Adjust the laser radiation power and sharpness of the receiving TV camera as needed.
3. Select the desired laser illumination mode (continuous or pulse).
4. Adjust the brightness of the backlight illumination.

5. Monitor the battery charge level indicated on the device.
6. When the battery is discharged, the device will automatically shut down.
7. The activation time of the device is up to 5 seconds.

Safety Precautions
When using the Optic-electron Device SPIN-2, it is important to follow these safety precautions:

- Do not expose the device to extreme temperatures or atmospheric precipitation.
- Handle the device with care to prevent damage.
- Ensure that the device is protected from dust and water (IP65 protection class).

For technical maintenance and repair works, transportation and storage guidelines, as well as guarantees, please refer to the user manual.

The Operating manual is intended for the correct and safe operation of the device SPIN-2 (further in the text “device” or “instrument”) designed for the detection of covert electro-optical surveillance systems and for evaluation of the Instrument technical condition with the goal of making the decision whether it should be sent for repair. Special training of personnel is not required for product servicing.

DESCRIPTION AND PRINCIPLE OF OPERATION

Area of application
The Device is designed for the search and visualization of location electro-optical surveillance systems (ESS). It operates in various lighting conditions in moderate climates on open air, under a shed or in the premises.

Technical parameters

Distance of ESS detection (with the base lens 75 mm):		
Minimal		2 m
Maximal		50 m
The receiver of the reflected signal is a highly sensitive video camera:		
Size of receiver		752×582 pixels
Minimal illumination		0.0003 lx (F1,4)
Detector cell' lens:		
Focal distance		75 mm
Receiving channel field of view		(5,0 ± 0,2º)x(3,8 ± 0,2º)
Focus control range		2 m … ∞
Signal-to-noise ratio, at least		46 dB
Output signal format		CCIR
Backlight illumination:		
Wavelength of laser		810 ± 5 nm
Power of laser radiation in continuous mode		not less than 0,2W
Eyepiece and built-in display:		
Turning range of ocular		±4 diopters
Microisplay type and resolution		AMLCD 0,44″, 640×480 pixels
Power supply:		
4 rechargeable Li-ion batteries		of type 18650
Power consumption, up to		11W

Time of continuous work without battery replacement/ charge at normal climatic conditions, not less than	6 hours
Overall dimensions, not more than:	
Device	(217±5)x(144±5)x(75±5) mm
Delivered set in standard package case	470x370x180mm
Weight, not more than:	
Instrument with battery, up to	(1,5±0,1) kg
Delivered set in standard package case	5.5 kg
Climatic conditions of the instrument operation	
Operating temperatures range	-30°C…+40°C
Operating temperatures range during transportation	-40°C…+60°C
Relative humidity at plus 25°C, up to	95%
Absence of influence of atmospheric precipitation	

Functional capabilities:

- laser radiation power adjustment;
- sharpness adjustment of the receiving TV camera;
- continues/pulse laser illumination mode;
- backlight illumination brightness adjustment;
- indication of battery charge level;
- automatic device shutdown when the battery is discharged;
- activation time up to 5 s;
- protection class from dust and water IP65.

Delivery set
The delivery set is in accordance with the Table 1.

Table 1		
Description of goods	**Q-ty**	**Comment**
Device SPIN-2	1	
Li-ion rechargeable battery of type18650	4	
Container for batteries	1	
Charging unit	1	
Mains adapter for charging unit	1	
Video cable	1	
Cleaning tissue	1	
Package-case	1	
Operating manual	1	

warning
Buttery delivered uncharged.

Principal of operation

1. SPIN-2 controls are shown in Figure 1.

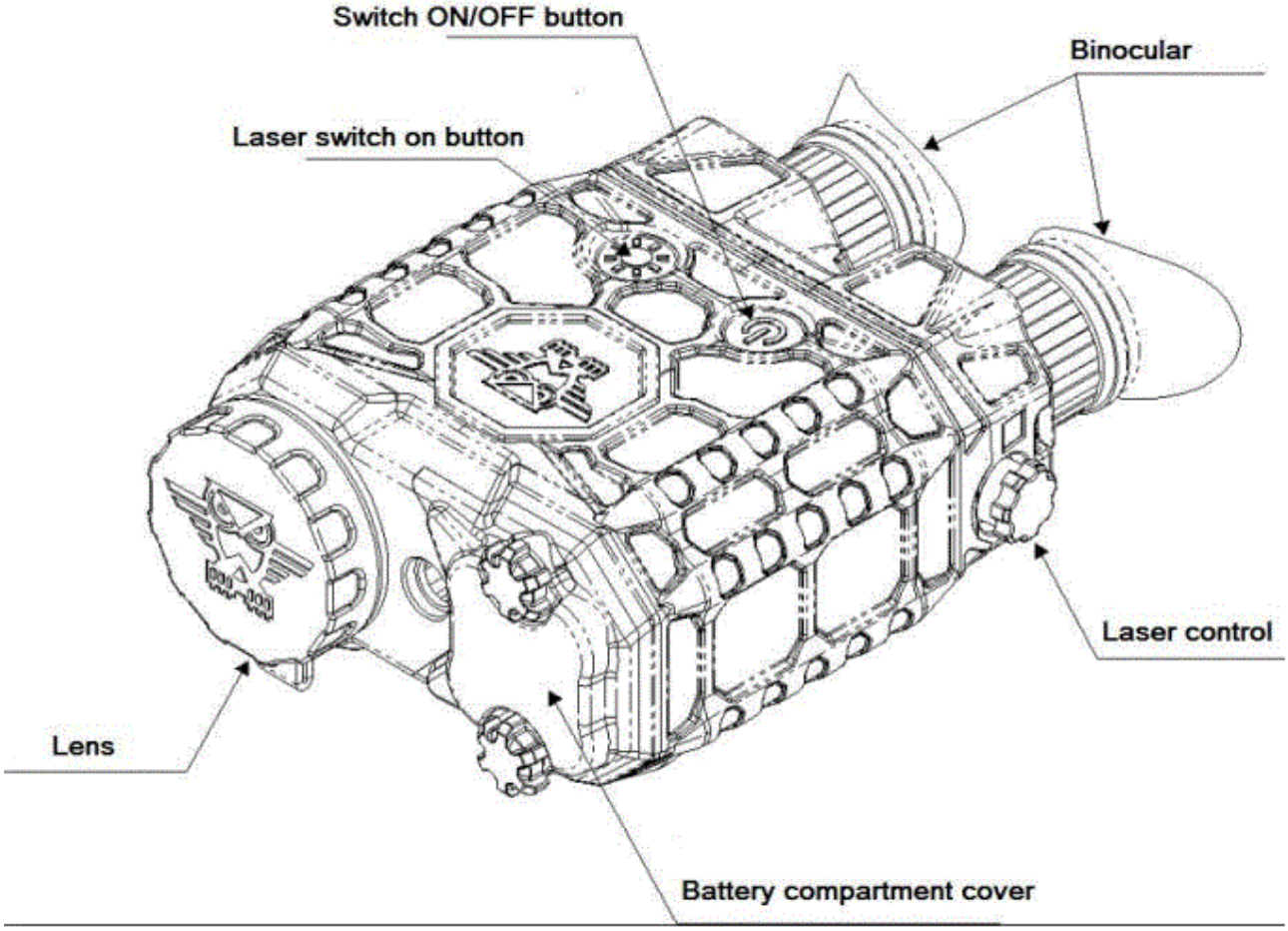

Fig. 1. Control keys of SPIN-2

2. The principle of operation is based on the cat's eye (retroreflection) phenomena, i.e. on the ability of optical

objects to reflect the transmitted radiation in the opposite direction at an angle close to the angle of sight. As the source of transmitted radiation used is the semi-conducting laser IR diode (transmitting channel). The reflected signal is registered by a sensitive CCD matrix video camera. The transmitting channel forms the laser beam in the form of a vertically located rectangular scanning field. When required and depending on the distance to the observed object the power of scanning field illumination can be changed to get the best image contrast. Image details sharpness focusing is performed by adjusting of video camera lens.

3. Modes management of the device is carried out by two buttons, which are shown in Figure 2, and laser control to change laser radiation power

Switch ON/OFF button

Laser switch on button

Fig.2

4. The visualization of observed objects is performed through built-in pseudo binoculars. Available on the instrument housing standard video signal output (CCIR format) is used for connection to an external monitor, video recorder, or PC (the last one should be equipped with the video input PCB) to enhance the quality of the obtained image
5. At the bottom part of the instrument' casing the 1/4″ thread hole is provided allowing mounting the instrument on a tripod by means of a screw.
6. The level of battery charge is indicated in the right top corner of the image (Fig. 3). When the battery is flat the instrument is automatically switched off. To switch the laser illumination on press and keep pressing the corresponding control button. When using the instrument the observer looks through its binoculars trying to detect the searched object (ESS) and as a result of a successful search to visualize on a monitor screen or in a viewfinder the places of location of intensive glowing dots (flares) upon less bright scanning field background. In cases when outside the scanning field such glowing dots (flares) disappear they can be interpreted as potential ESS. If flares do not disappear when laser illumination is switched off they are not considered as potential ESS.
7. An example of an image obtained by moving it on the wall from a distance of 15 m is shown in Figure 3.

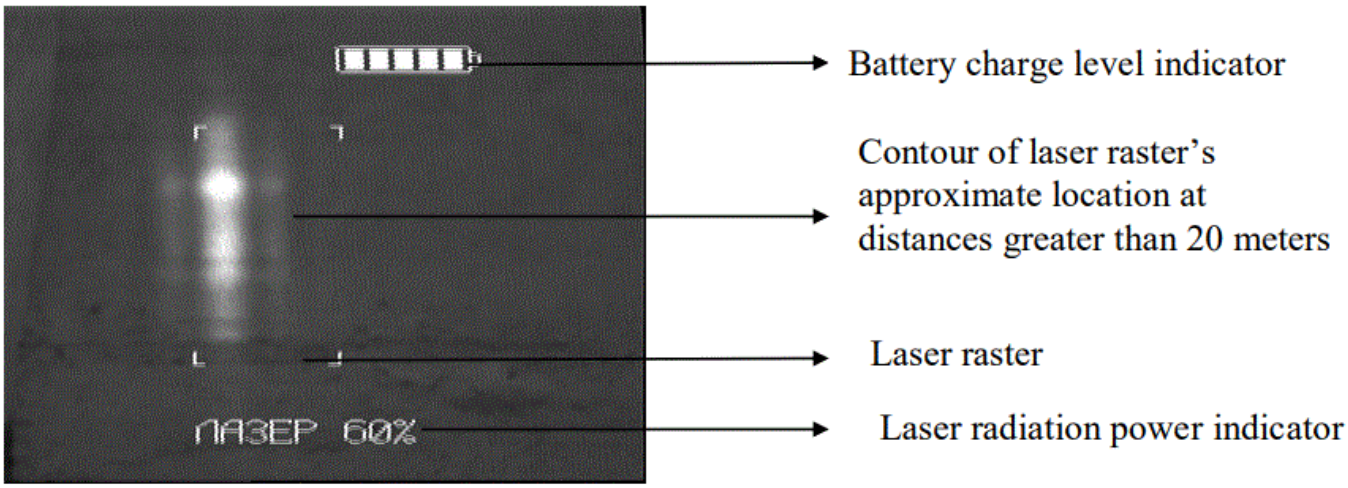

Fig.3. Example of image obtained with help of SPIN-2

Marking.

The marking provided on the instrument housing contains the following information:

- Short name of the manufacturer;
- Name of the instrument;
- Unique factory number;

Packaging

- The instrument SPIN-2, battery, charging unit, mains adapter for charging unit, video cable and operating manual are put in standard packing (robust, shock- and moisture-proof plastic package-case).
- Optionally standard plastic package cases can be packed in the transportation packing (plywood box).

RUNNING THE INSTRUMENT

Operational restrictions

- Before the battery is to be inserted into the correspondent instrument compartment it is necessary to make sure that the Instrument is switched off.
- IT IS NOT ALLOWED TO RUN INSTRUMENT WITH OPENED COVER OF THE BATTERY COMPARTMENT and to unseal the Instrument (to break the integrity of a guarantee seal)!
- It is not recommended to use for Instrument power supply the power supply sources different from the source that is in the delivered set as this may cause fail of the Instrument.
- It is not recommended to use a type of charging unit for a standard battery different from the one in the delivered set as this may lead to battery incomplete charging or failure.
- It is not allowed to close the battery terminals as this may cause its failure.
- Do not store the battery at a temperature exceeding 60ºC, for example, in the car left in the sun.
- To maintain stated battery capacity in case of work at low temperatures it is recommended to store it in a warm place, for example in a pocket, and to insert it into the Instrument just before use. 2.1.8. It is recommended to

perform the battery charging at the ambient temperature from plus 10º to plus 30ºC.
- It is not allowed to switch on the charging unit under rain or at high humidity.
- During the Instrument operation or transportation, it is not allowed to touch by hand or in any other manner to make dirty outlets of the lens and laser filter as this may have a negative influence and significantly worse operation of the Instrument. If outlets of lens and laser filter became dirty it is required thoroughly to clean these outlets with specially provided tissue before continuing to use the instrument.

Preparation for use

To prepare the Instrument for use it is required to fulfill the following steps:

- Take the Instrument and battery out of the standard package;
- Unscrew the cover of the battery compartment;
- Remove the battery compartment cover;
- If the battery is uncharged – charge it;

  To charge the battery it is required to fulfill the following steps:
  - Connect the charging unit to the mains;
  - Insert the battery into the charging unit;
  - Charge the battery. The battery charge level is indicated in the process of charging on the screen of the charging unit;
- Insert the battery in the instrument;
- Close the battery compartment cover and tighten it with a screw;
- Switch on the Instrument.

  To charge the lithium-ion battery it is necessary to remember the following:
- It is not required to discharge the battery prior to its charging as the presence of residual charge does not have an effect on its rating;
- The recommended ambient temperature for the charging process is from plus 10º to plus 30ºC;
- Battery charging shall be performed on a flat surface in the absence of vibration;
- During charging the charging unit can heat up a little. This is normal;
- If a fully charged battery is inserted in the charging unit then a value 100% will be present on the charging unit display

Running the Instrument
Security measures:

- It is prohibited to direct the laser toward people, animals, and vehicles (especially aircraft). The laser beam can blind the driver or pilot of the aircraft and cause a crash.
- Probing infrared semiconductor laser of class IV laser danger installed in the device. Infrared radiation is not visible to the naked eye.
- The impact of laser radiation on the eye can cause temporary or permanent vision disorders, and also skin injuries. Even diffuse reflected laser radiation is dangerous for eyes and skin at a distance of less than 10 cm.
- Information on whether the laser is turned on is displayed in the form of figures showing the percentage of maximum radiation power.
- To eliminate the harmful laser radiation exposure, it is not recommended to:

- watch the laser radiation along the optical axis;
- to turn on the laser, if in the observable sector at a distance less than 50 meters, there are shiny objects, as well as at a distance less than 50 meters in any direction from the operator, including outside the monitored area, there are people.

It is required to fulfill the following steps to run the Instrument:

- Switch on the instrument by pressing and keep pressed for approx. 2 seconds button “ON\OFF”;
- Orient the instrument lens in the direction of the examined area;
- When required – carry out diopter adjustment of binoculars to fit the operator’s vision, this is done by rotation of corresponding control keys. The image of the battery level sign in binoculars shall be razor-sharp;
- Depending on the illumination level and required focusing depth adjust the position of the lens diaphragm by means of rotation of the corresponding ring (during night time it is recommended fully to open the diaphragm); get a maximal sharp image in binocular;
- Be aware of the absence of any people within the field of view of the Instrument, after that press and keep pressing the «LAZER» button that switches it on.
- When necessary rotate the handle of the laser power adjustment and regulate it depending on the distance from observed objects. The indication of the laser power value (in percent) is displayed on the bottom part of the image. Usually at a distance of 10m, the power shall be minimal (10%) while at distances above 40m it shall be maximal (99 %). At the same time, it is required to obtain optimal contrast of the image within the scanning field. The interior elements within the scanning field also should be well observable. It is necessary to take into account that in conditions of high-illumination level or at considerable distances the keyline of the laser scanning field may be invisible but this is acceptable and practically does not have any effect on the ESS detection probability. The laser illumination spot (pattern) can be seen (via binocular) if the Instrument on a uniform surface (like a wall or screen) located at a distance of 20 – 50m;
- Keep the push button «LASER» pressed and perform scanning of the area of interest. All glowing dots seen within the scanning field limits, i.e. occurring within the area illuminated by a laser, are considered as reflecting surfaces of optical and electrooptical surveillance systems. At the same time when the laser is switched off or the scanning field illuminated by the laser is moved away from the initial observation position, these dots shall disappear and this is the criteria for separating detected ESS from ghost flares

The Instrument switch-off is performed in reverse to switch on order.
Operation in extreme situations:
Warning! When the instrument is switched on it is necessary to keep away eyes of the operator or any other person from the laser illumination beam.

- In case of fire, switch off the device and take measures to fight the fire.
- If the device is used in emergency operating conditions (high temperature, humidity, vibration, etc.) measures should be taken to reduce the effects of accidental factors on the product.

TECHNICAL MAINTENANCE AND REPAIR WORKS

- The Instrument maintenance does not require special training.
- In cases when an output window of the Instrument and/or the viewfinder lens are dirty they should be cleaned with a clean tissue (cloth) made from the natural or microfibrous suede intended for rubbing of optical details

(for example glasses).

- The current repairs are performed in accordance with Table 2.

Table 2

Description of failure effects and damages	**Possible reasons**	**Actions to be taken to eliminate the failure**
When the instrument is switched on there is no image in viewfinder,	There is no contact between spring contacts and battery contacts. The battery is flat. The battery failed.	Clean the contacts of the battery and battery compartment from dirt and oxides bend the spring contacts and try to insert the battery once again. Charge the battery. Replace the battery.
When operating the instrument disturbing flashings, flares and stains are continuously present.	The output window of the instrument is dirty.	Clean the output window with clean tissue made of natural or microfiber suede.
Battery graphical symbol displayed on the charging unit screen starts blinking and it dimly glows.	The battery is wrongly inserted in the charging unit. There is no reliable contact with the charging unit.	To insert the battery in the charging unit in a right manner to provide reliable contact.

Note: If measures taken to eliminate the problems listed in the table with the aim of restoring the serviceability of the instrument failed, it is necessary to pass over the Instrument for repair to the specialized repair division of the manufacturer.

TRANSPORTATION AND STORAGE

- The Instrument should be transported in a special transportation container by any type of cargo and passenger transportation means at ambient temperature from minus 30C to plus 50C and relative humidity up to 95% at ambient temperature plus 25C. The direct influence of atmospheric precipitation is not allowed.
- After transportation and prior to use, the Instrument prior to use should be kept in normal climatic conditions not less than 12 hours.
- During transportation, it is recommended to remove the battery from the instrument.
- The Instrument should be stored in a standard package stacked on racks in capital capital-heated storehouse at air temperature from plus 5C to plus 40C and relative humidity up to 80 % at temperature plus 25C. In a premise for storage should not be conducting dust and vapors of acids and alkalis, and also gases causing corrosion and destroying insulation.
- In case of storage, the battery should be removed from the instrument and stored separately in the corresponding slot of the standard package case.
- Before long-term storage of the battery in the idle state once a year it should be totally charged and totally

discharged after. Such charge/discharge operations should be repeated once a year for the preservation of the operability of the battery.

MANUFACTURER'S WARRANTY

- The manufacturer guarantees the compliance of a product to requirements of specification within 12 months from the date of it put in operation, but no more than 18 months from the date of goods shipment (with taking into account storage and transportation time) if the conditions of use, storage and transportation stipulated in the present Operating manual are met.
- The guaranteed storage term is 6 (six) months.
- Service lifetime (with replacement of the battery when required) is – 5 years.
- The warranty obligations cover electrical or mechanical defects of basic items caused by bad workmanship or faulty material within the period stated in clause 5.1.
- Such warranty shall not include batteries or other products to which a specific manufacturer's warranty applies.

Documents / Resources

	**ARMACORP SPIN-2 Optic Electron Detection Device** [pdf] Instruction Manual SPIN-2 Optic Electron Detection Device, SPIN-2, Optic Electron Detection Device, Electron Detection Device, Detection Device, Device

Manuals+,