



Certified Quality
Management System

HARDWARE AND SOFTWARE SYSTEM FOR FORENSIC
EXAMINATION OF FIREARMS AND AMMUNITION SERIAL
NUMBERS REGULA 7517.

MAGNETO-OPTICAL DEVICE REGULA 7517A

USER'S GUIDE



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ABBREVIATIONS

MCAS	— magnetic copying accessories set
MOI	— magneto-optical image
MOV	— magneto-optical visualization
MOV USB device	— USB device for magneto-optical visualization
OMB	— optic-mechanical block
MT	— magnetic tape
SPRK	— spare parts and repair kit
CMS	— combination magnetic scanner

INTRODUCTION

The User's Guide is the main operational document to the magneto-optical device Regula 7517A (hereinafter referred to as the "device"). The device is a part of the hardware and software system for forensic examination of firearms and ammunition serial numbers Regula 7517. As a part of the system the device is used together with the eddy-current magnetographing device Regula 7517B and magnetizing equipment Regula 7517C.

The User's Guide contains information concerning device and its components design, principles of operation and specifications. The Guide also provides instructions on the correct and safe use of the device (intended use, maintenance, routine repairs, storage and transportation) and on its technical condition evaluation when deciding whether it is necessary to send the system for repairs.

Description of the device software is given in a separate document.

Personnel operating the device are required to:

- have higher or specialized technical education,
- pass special training and get clearance to perform expert examination in the field of trace evidence,
- be an OS Windows user,
- study techniques of authenticity verification of firearms and ammunition serial numbers and the User's Guide,
- pass practical training on the use of equipment supplied,
- pass training on safety measures observed when working with the system.

ATTENTION!

USB devices do not have dangerous voltage as they are powered by a secondary power supply source — a PC USB-bus with nominal voltage 5 V. However, the mains power source and PC peripherals (supplied optionally) can have life hazardous nominal voltage ~ 220 V 50 Hz. To avoid electric shock personnel are obliged to strictly observe the safety measures. The device is classified as Class I Equipment (IEC 60950-1) with regard to protection against electric shock.

The magnetic copying accessory set contains inflammable liquid (alcohol).

To ensure device proper operation it is strongly recommended not to change software settings. The system should be operated, maintained, repaired, stored and transported in conformity with paragraphs 2-6 of this User's Guide. Violation of these requirements will result in the loss of the manufacturer's warranty.

1 DESCRIPTION AND OPERATION

1.1 Device Description and Operation

1.1.1 Device Function

The device is intended for forensic examination of firearms and ammunition serial numbers with the following purposes:

- serial numbers authenticity verification,
- recovery of initial numbers in case of any damages in their relief (corrosion, scale, wear, etc.),
- recovery of initial numbers in case of their removal,
- general trace evidence examinations and non-destructive testing of relief and stresses in the surface layer of metal objects.

Regula 7517A is a set of hardware and software products enabling visualization (video imaging) of relief and structural inhomogeneity of metal surface with magnetic properties (traces of mechanical processing, inclusion of non-ferromagnetic materials, surface flaws of welding seams), without removing the lacquer-and-paint coating (if applicable) by methods of magneto-optical visualization. A PC is used for capturing, collecting, processing, transferring and displaying information.

Area of application

The device is intended for use by forensic laboratories, law enforcement agencies, judicial authorities, customs and insurance companies. Regula 7517A can be used for express inspection (e.g. at customs or by highway patrol), as well as for advanced forensic examination of firearms serial numbers in laboratory conditions due to the fact that the device provides high-quality results, visual evidence and uses non-destructive magneto-optical methods. In case any changes in serial numbers are detected, further investigations can be carried out using a special set of peripheral hardware tools (supplied optionally).

Storage and operation conditions

The system is to be used indoors.

Climatic conditions:

air temperature	+10 °C ... +35 °C
relative air humidity	up to 80 % at temperature of +25 °C
atmospheric pressure	from 84 to 107 KPa (from 630 to 800 mm mercury)

Operating temperature on the data carrier surface during magnetic copying: -20 °C...+50 °C.

Operating temperature on the surface of the combination magnetic scanner during magnetic copying: -20 °C...+50 °C.

Climatic conditions of storage (see paragraph 5).

Climatic conditions of transportation (see paragraph 6).

Avoid hitting and vibrations during device transportation and operation.

1.1.2 Technical Specifications

Device technical specifications are given in the description of its components (see paragraphs 1.2.1–1.2.3).

In working conditions device nonstop operation with maintained performance lasts for up to 8 hours.

Warm-up time — maximum 3 min.

Power supply

Autonomous power supply	PC battery
Mains power supply	External PC power supply source, converting AC voltage of 110–240 V, frequency 50–60 Hz into DC voltage of PC power supply. External PC power supply source, converting DC voltage of the vehicle on-board system (nominal value — 12/24/48 V) into DC voltage of PC power supply.

Power consumption

USB device for magneto-optical visualization	not more than 2,5 W
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Reliability

Time to failure	not less than 10 000 hours
Mean lifetime	not more than 5 years
Operation warranty period	12 months from the date the device is delivered to the customer
Storage warranty period	12 months

Dimensions

In transportation packaging	not more than 350×280×220 mm
In working position (open case)	not more than 240×110×110 mm

Weight in transportation packaging

Gross weight	not more than 4 kg
Net weight	not more than 3,2 kg

1.1.3 Delivery Set

The device delivery set is given in Table 1.

Table 1

Components	Quantity	Packing	Figure №	Marking
USB device for magneto-optical visualization	1	box	3	Regula 7517A serial #, year of production
USB cable to connect to the PC	1			
**Laptop 12"	1			
**External PC power supply source	1			
Magnetic copying accessories set		box	8–10	
Combination magnetic scanner-demagnetizer with the set of changeable concentrators:	1	case	8	
rotary 15 mm	1	case		
rotary 21 mm	1	bag		
flat 11 mm	1	case		
Compact magnetic scanner 11 mm	1	bag		
Magnetic tape cartridges	2	case	6	
Magnetic tape reserve (magnetic tape strip, 250 mm)	10	case		
Magnetic clamps for magnetic tape	2	case		
Container for alcohol (10 g)	1	bag	7d	
Brush	1	bag	—	
Marker	1	bag	—	
Case for accessories	1	box	1b	
Bag for accessories	1	box	1b	
**Peripheral examination tools Regula 7516		body-case		Regula 7516
Software		CD folder	—	—
**PC drivers and utilities	+/-	CD 1		
**OS Windows XP	+/-	CD 2		
**MS Office	+/-	CD 3		
Special software for managing USB devices, for capturing, processing and stitching images				
NUCA (EYER)	1	CD 4		
Driver for the USB device for magneto-optical visualization	1	CD 4		
Software settings files	1	CD 4		
Graphic files (.cdr, dwg) of paper cartridges for threading plastic magnetic tape	2	CD 4		
Operational documents			—	—
Passport	1			
Regula 7517A user's guide	1			
**User's guide to eddy-current scanners Regula 7515	+/-			
** User's guide to peripheral examination tools Regula 7516	+/-			
User's guide to NUCA (EYER) software	1			
**PC user's guide	+/-			
Warranty card	1			
Spare parts and repair kit			—	—
Magnetic tape cutter + metal magnetic tape reserve (10 m roll)	1	bag		
1" plastic magnetic tape reserve (10 m roll)	1	bag		
½" plastic magnetic tape reserve (5 m roll)	1	bag		
Paper cartridges intended for threading ½" plastic magnetic tape	1	bag		

Table 1 (continued)

Components	Quantity	Packing	Figure №	Marking
Test-object	1	bag	1b, 2	—
Sleeve gaskets of the combination magnetic scanner	2	bag	—	
Polyethylene bag	1	box	—	
Transportation packaging	1	—	—	Regula 7517A serial #, year of production

** — supplied optionally.

1.1.4 Configuration and Operation

Regula 7517A is a set of hardware components and software products. The device allows examining objects using different methods.

Examination starts with magnetic copying (making a magnetogram = magnetic copy) of the ferromagnetic object surface. The magnetic copying accessories set (**MCAS**) contains various kinds of magnetic scanners which locally magnetize the object, excite its magnetic stray fields and copy them to the intermediate flexible magnetic carrier (magnetic tape) without removing the lacquer-and-paint coating. **The eddy-current scanner** (supplied optionally) is used for investigating internal stresses in ferromagnetic objects and for examining the surface of aluminum objects.

The magnetogram is loaded into the **USB device for magneto-optical visualization (MOV USB device)** where information about object's surface layer is scanned. The MOV USB device combines two functional components: optic-mechanical block and block of electronics.

The optic-mechanical block (OMB) contains a magneto-optical visualizer which converts magnetic stray fields of a magnetic copy into an image and a special tape drive mechanism which moves the magnetic copy relative to the visualizer.

A magnetic copy is loaded into the tape drive where it is automatically detected and introduced into the tape drive tract. Then it is scanned step-by-step by a sensor designed on the basis of a magneto-optical crystal. Magneto-optical visualization of magnetograms of the examined object is based on Faraday magneto-optical effect which occurs in crystalline films of Bi-containing ferrite garnets.

Light distribution obtained as a result of visualization is received by the sensitive element of the video camera and is converted into a digital TV signal which is further processed and examined with the help of PC software.

Step-by-step input of images into a PC allows making automatic panoramic stitching of a digital image from several sub-shots.

The block of electronics manages OMB resources (electric drive, inductor, illuminator, video camera and indicators).

The **PC** operates the MOV USB device via special software. The PC displays newly obtained and stored examination data which are processed, examined and documented.

Peripherals (supplied optionally) extend examination possibilities of the device by applying additional methods and means of investigation.

The device operates together with the following peripherals:

- USB device for optical input,
- magnetic powder visualization device,
- eddy-current probe,
- electrochemical etching device.

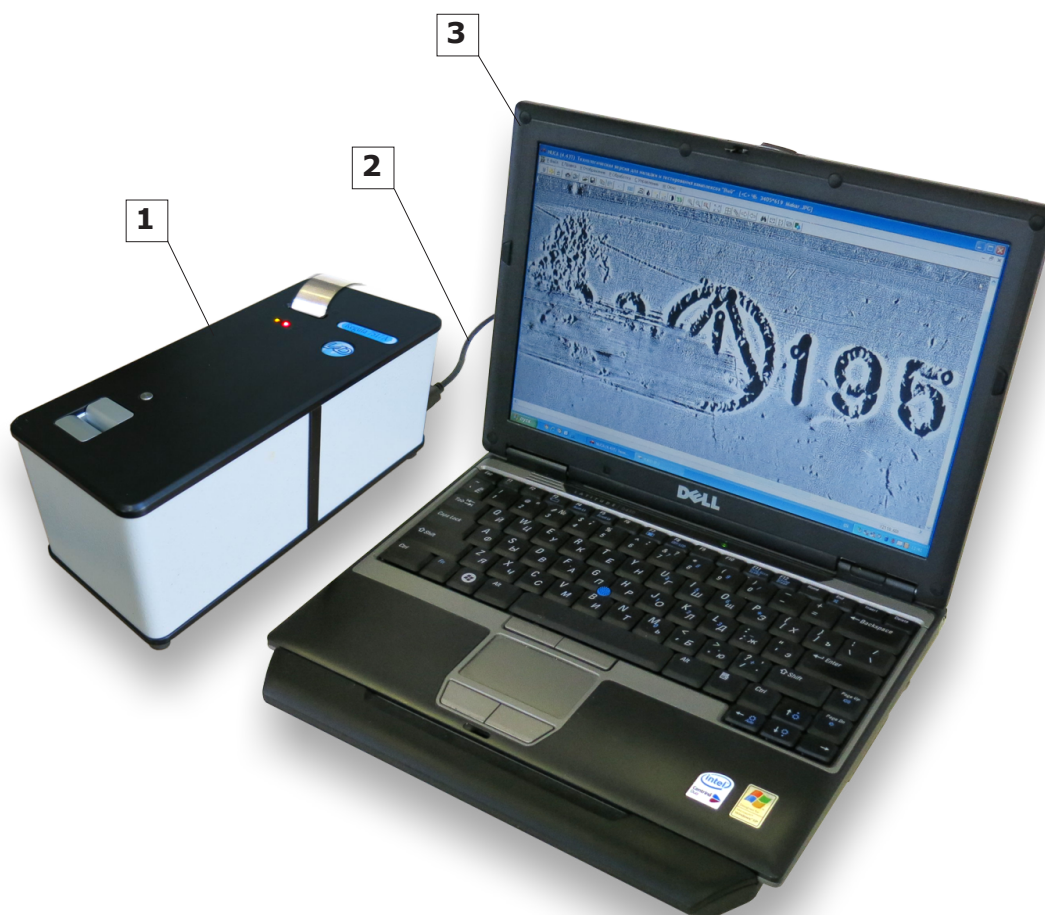
Basic functions of NUCA (EYER) **software**:

- operating USB devices,
- input and processing of images,
- automatic program correction and panoramic stitching of MOV frames,
- image scaling and rotation,
- comparison of images,
- measurements of linear and angular sizes,
- saving and printing of image files as illustrations to the photo charts.

A set of **operational documents** contains data on design, principles of operation, properties of the device and its components. It also contains instructions on correct and safe device operation and evaluation of its technical condition when deciding whether it is necessary to send it for repairs.

The device is designed as a compact unit for desktop use. The general view of the device is given in Figure 1.

Figure 1



1 — MOV USB device, 2 — USB-cable, 3 — PC (laptop).

1.1.5 Means of Measurement, Tools and Accessories

The device belongs to indicating (not measuring) equipment. Therefore control of device operation is carried out using test-objects, simulating several known methods of number alteration (cold calking, sealing with fusible metals, dot welding and pressing-in fragments). See paragraph 2.2.1.2 for the details of the device operational check-up using the test-object.

Test-object specifications

The test-object (see Figure 2) imitates an examined object. It is a plate (unkilled sheet steel) with the thickness of 0,8–0,9 mm bearing "291634" original number applied by mechanic pressing (cold stamping). The original number details: manual stamping with the use of "font No.6" stamping set and a hammer on a massive anvil. The depth of digit relief is about 0,3–0,4 mm.

Three digits of the original number were modified: "9" to "0", "6" to "9" and "4" to "5". Thus, the altered number appears as "201935" (altered digits are underlined).

Digit "9" of the original number was altered manually using **cold calking** of one element (crosspiece) of digit "9" with the help of bench tools. Then digit "0" was stamped over the remaining contour of digit "9".

Figure 2



Photo of the test-object examined surface

Alterations of digit "6". The original number fragment bearing digit "6" was dismantled (cut out), rotated by 180°, **pressed in** (so that digit "6" transformed into digit "9") and then was fixed in the plate frame by **spot welding**.

Digit "4" of the original number was modified by means of **sealing the digit relief with soft metal (tin)** and then stamping a new digit "5" over the built-up area.

After the original digits were altered, the following operations were performed on the test-object: grinding, spackling, dressing, priming, two-layer spray-on painting with aerosol motor enamel using the technique of cold drying in accordance with the repaired coating type.

1.1.6 Marking

Device marking is performed in the form of a label on the rear side of the PC panel. The marking label provides the following information:

- manufacturer's name and/or trade mark,
- manufacturer's model identification,
- device serial number in compliance with the numbering system of the manufacturer,
- date of manufacturing (year and month),
- rated voltage, V,
- rated current, A,
- nominal frequency, Hz,
- national certification mark.

Device sealing is made with the help of destructible security labels applied on the OMB body and on the device chassis. Damage to the security label causes a loss of warranty.

The SPRK is labeled on the repair kit's bag.

1.1.7 Packaging

The device is transported and stored in a special cardboard box of the delivery set. Device components are arranged in conformity with Table 1.

1.2 Description and Operation of Device Components

1.2.1 USB Device for Magneto-Optical Visualization (MOV USB Device)

Functions

- Magneto-optical visualization of a physical copy from MT.
- Transforming a visualized image into a digital TV signal.
- Changing frames due to step-by-step movement of MT in the tape drive mechanism with further automatic stitching.
- Indicating current system status.

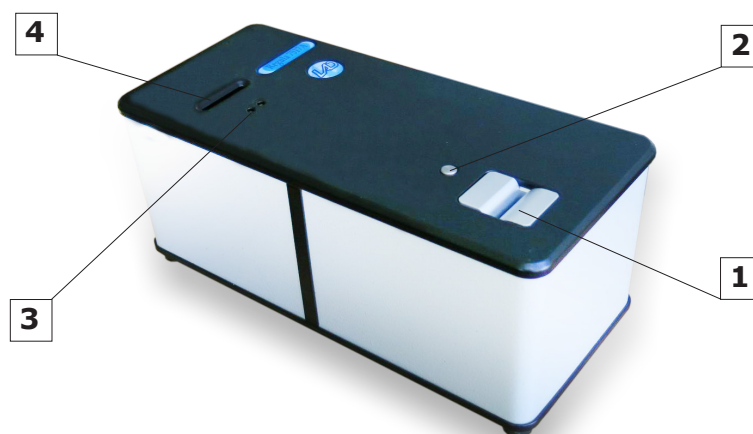
Technical Specifications

Material of the examined object	ferromagnetic	
MT width	25,4 and 12,6 mm	
MT maximum length	unlimited	
MT examined width	not less than 20 mm	
Physical size of an image dot (frame format 1280×1024)	16 μm	
Acceptable thickness of nonmagnetic coating (see Figures 7–8):	for detailed examination (spatial resolution 80 μm)	not more than 0,1 mm
	for general research (spatial resolution 400 μm)	not more than 0,5 mm
Acceptable thickness of the removed surface layer of metal	not more than 1,0 mm	
Approximate time of input of a magnetic copy of the number platform	15 sec	
OS	Windows XP or later	
Format of image files	BMP, PCX, GIF, JPG	
PC monitor size	>12"	
Approximate size of an image file of the number platform (75 % JPG, 640×512)	1,8 Mb	
Operation time:	in autonomous mode (depends on a PC type), usually	not more than 3 hours
	when powered by AC mains	not less than 8 hours
Consumed electric capacity on the USB bus	not more than 2,5 W	

Design

The MOV USB device is designed as a desktop unit. It is sealed and covered with protective casing.





Figure 3



1 — tape drive (place to insert MT),
2 — pressing roller block (for manual extraction of MT),

3 — status indicators of the MOV USB device,
4 — bunker (place to extract MT).

State indicators of the MOV USB device:

-  — “device is passive” (special software is not operating with the device),
-  — “device is active” (special software is operating with the device),
-  — “MT in the bunker” (insertion or extraction of MT),
-  — “MT in the tract” (stitching is in process).

Algorithm of MOV USB device operation

- Switching the PC on, loading the OS, initializing software. Automatic check-up of the state / pre-installation of OMB equipment.
- MT is manually inserted into the OMB buffer. Then MT is captured by the magnetic tape drive and moved to MOV working zone.
- Step-by-step movement of MT is followed by panoramic stitching of MOV images.
- The quality of stitching and its informative value is controlled.
- MT extraction: direct or reverse rotation depending on the length of the inserted MT strip. Manual extraction of MT from the OMB buffer. The device switches to a stand-by mode.
- The equipment automatically switches to a stand-by mode when the “Stop” mode lasts longer than ≈ 5 minutes. The stand-by mode is switched off as soon as a new command is received.

1.2.2 Magnetic Copying Accessories Set (MCAS)

Functions

- Creating a physical copy (recording information to intermediate flexible magnetic carrier — magnetic tape) of magnetic stray fields distribution over the object surface. The copy reflects relief and structural inhomogeneity of the material. Permanent magnets of the combination magnetic scanner (CMS) concentrators serve as sources of magnetic stray fields excitation.
- Demagnetizing magnetic tapes for further use.
- Arranging, marking, storing and carrying the operating reserve of MT and recorded magnetic copies.
- Service functions while performing magnetic copying.

Technical Specifications

Dimensions of physical copies:	length	unlimited. Recommended length — 250 mm
	width	11 mm (CMS flat concentrator and compact magnetic scanner)
	width	15 mm (CMS rotary concentrator)
	width	21 mm (CMS rotary concentrator)
MT cartridge capacity	not more than 10 strips (250 mm long)	
MCAS case dimensions	120×80×40 mm	
Weight of the loaded MCAS case	0,4 kg	
CMS dimensions	105×30×30 mm	
CMS weight	not more than 0,2 kg	

Design

The MCAS case is designed as a leather waist carrier pouch intended for carrying accessories for magnetic copying.

The combination magnetic scanner-demagnetizer (CMS) is intended for magnetization of an examined object and magnetic biasing of magnetic tape while performing a magnetogram. It is also used for demagnetizing magnetic copies for their further reuse. The CMS is equipped with three replaceable concentrators on permanent magnets for use on different surfaces of objects with various properties:

- flat concentrator (effective width of 11 mm),
- rotary concentrator № 1 (effective width of 15 mm),
- rotary concentrator № 2 (effective width of 21 mm).

The CMS flat concentrator is designed for copying relief surfaces with unevenness not exceeding 0,5 mm at the base width of 11 mm. The CMS flat concentrator has the strongest magnetic flow compared to the other scanners. Thus, it is mainly used for examining structural inhomogeneity of metal surfaces.

Rotary concentrators of the CMS are designed as the system of floating disks for magnetic copying of more complex relief surfaces with unevenness not exceeding 1 mm at the base width of 20 mm. The CMS rotary concentrators form surface magnetic flow. Therefore they are mainly used for examination of relief inhomogeneity of metal surfaces (front side of the number platform, defective welded seams). They have the highest penetrating ability through lacquer-and-paint coating. Stronger magnetization is provided by the concentrator with a smaller effective width. That is why the use of 15 mm concentrator is more preferable for detailed examination. The use of 21 mm concentrator is more preferable for increasing the examined area.

The compact magnetic scanner is equipped with a flat concentrator on permanent magnets with effective width of 11 mm. Due to the minimal size the scanner can be used on difficult surfaces: grooves, joints or abutment of examined object elements. Magnetizing properties of this scanner occupy an intermediate position among the CMS concentrators. The compact magnetic scanner is equipped with a spring clip which can be fixed in one of two positions. The operator can choose a suitable position relative to the direction of scanning.

The most effective device for advanced examination of metal structure of objects is **the eddy-current scanner** (supplied optionally). Its specifications are given in the user's guide to eddy-current magnetographing device Regula 7517B.

Magnetic tape cartridges are used for storing operating reserve of MT. The cartridges are marked: 1) the cartridge for MT that has recorded information is marked with a red marker, 2) the cartridge for demagnetized MT is marked with a green marker. Cartridges can be either attached to magnetic clamps (Figure 6) or kept separately.

Magnetic clamps are used to fix a MT strip on the examined area during magnetic copying.

Use a container with operating reserve of alcohol and a brush when preparing the object surface for magnetic copying. Use a marker for marking magnetic copies.

Some accessories for magnetic copying and **SPRK** are kept in the accessories bag:

- CMS rotary concentrator (21 mm),
- compact magnetic scanner (11 mm) (Figure 10, pos. 1),
- container for alcohol (10 g),
- marker,
- brush,
- MT cutter with technological reserve of MT — 10 m roll (Figure 5),
- test-object (Figure 2),
- CMS sleeve gaskets.

1.2.3 Personal Computer (PC)

Function

The PC with special software manages various USB-devices of Regula 7517A (MOV, optical input), displays operative and stored information, provides conditions for its processing, examination and documenting.

Technical specifications

The device can operate with a desktop PC or with a laptop.

For NUCA (EYER) software operation the following PC specifications are required:

- IBM-compatible PC,
- CPU — Celeron 2 GHz, Intel Pentium IV or higher,
- OS — Windows XP (SP2 or higher), Windows 2000 (SP2 or higher),
- available USB 2.0 port with high speed support,
- RAM — 512 Mb or higher,
- video adapter supporting 1280x1024, 24-bit color mode,
- MS DirectX v.9.0b or higher.

1.2.4

Software

NUCA (EYER) is intended for input and processing of magneto-optical images of examined surface relief and structure.

The software performs the following functions:

- operating Regula 7517A components,
- input of images from the scanners,
- automatic panoramic stitching of images of serial numbers,
- processing the obtained images,
- comparing the obtained images with specimens,
- recording image files of different formats,
- documenting examination results.

Detailed description of NUCA (EYER) software is given in the corresponding user's guide.

1.2.5

Spare Parts and Repair Kit (SPRK)

Function

SPRK is intended for routine maintenance and repairs of the device, for renewing operating reserve of consumables and for servicing during examination.

Full set and its application:

- cutter used for cutting MT from stock to fill up operative MCAS reserve,
- test-object used for device operation control,
- metal MT reserve (10 m roll) in the bunker of the cutter,
- 1" plastic MT reserve (10 m roll),
- ½" plastic MT reserve (5 m roll),
- paper cartridges intended for threading ½" plastic MT (11 pieces),
- spare CMS gaskets (2 pieces).

2 INTENDED USE

2.1 Device Intended Use

2.1.1 Safety measures and operating limitations

IT IS STRICTLY PROHIBITED TO:

- use ungrounded mains sockets,
- use faulty mains sockets and power supply sources,
- use power supply sources different from the ones described in paragraph 1.1.2,
- switch on the device with visible damage of protective isolation, of cables conductors and of power supply cords,
- switch on the device when protective shrouds are removed.

To avoid a fire hazard, the personnel must observe fire safety measures.

- Do not use the device near open fire. Do not allow smoking at working place.
- Examination is to be carried out on the working platform equipped with firefighting appliances.

Operating limitations

- It is prohibited to use the device under rain. In case water or condensate appear on the device components case, device operation must be stopped and can be renewed only after drying.
- The device should not be exposed to hitting and strong vibrations during operation and transportation.
- Observe specified electric parameters for power supply sources in conformity with paragraph 1.1.2.
- Place the device and its cables far from sources of strong magnetic and electrostatic fields.
- Consider operating limitations for the components of the device in conformity with paragraph 2.2.

Failure to observe operating limitations given in paragraphs 2.1.1 and restrictions on the use of device components 2.2.1.1, 2.2.2.1 will result in the loss of the manufacturer's warranties.

2.1.2 Preparing the device for operation

Step-by step preparation of the device for operation:

- Take the device out from the package (box) and place its hardware on the working surface.
- loosen the plastic straps (Figure 12, pos. 2). To unlock the straps, use a small screwdriver. Then remove the transportation batten (Figure 12, pos. 1). Keep the straps and the batten for further device transportation.
- Inspect the device components visually.
- Check the device components and prepare them for operation in accordance with paragraphs 2.2.1–2.2.3.
- Prepare the PC and its peripherals for operation in accordance with the corresponding technical description.

In case the User has purchased a PC on his own (see the requirements listed in paragraph 1.2.4), the following operations should be performed to connect the device to the PC correctly:

- Install the OS and the necessary programs in conformity with their technical description.
- Install the software (NUCA (EYER), Autodocs) and their drivers following the instructions given in the installation guide.
- Connect the MOV USB device to the PC using the USB cable (Figure 1).

2.2

Intended Use of Device Components

2.2.1

MOV USB device

2.2.1.1 Restrictions on the use

- It is possible to examine ferromagnetic materials only (iron, steel, cast iron). Nonferromagnetic materials (aluminum) are examined with the corresponding scanner of the eddy-current magnetographing device Regula 7517B.
- Do not use damaged MT (having breaks with sharp edges, strongly crumpled), MT with bent on edges or dirty MT (see paragraphs 2.2.2.2 and 3.2). Failure to observe these requirements may result in discrepancies during MT stitching and MT jamming in the MOV USB device.
- Avoid large abrasive particles (dust, sand, scale, etc.), oils, preservatives and other objects (coins, paper clips, etc.) getting into the OMB tape drive.
- Do not interfere with MT movement in the OMB tape drive tract. Do not try to extract an MT strip manually when it is automatically moving in the OMB tract.
- Do not reinstall the OS and drivers for the device components.
- Do not change settings of the special software. If it is necessary to reinstall the software, follow the instructions given in the corresponding software User's Guide.
- Do not change the arrangement of USB cables connecting the device components and PC slots. The change in cables arrangement may require drivers reinstallation.

Do not use MT strips shorter than 150 mm. Otherwise there won't be a possibility of manual tape removal in case of tape jamming in the tape drive. This situation may require qualified service.

2.2.1.2 Preparing for use

Switching on the MOV USB device

- Connect the PC to an external power supply source. The device can be powered by the internal (autonomous) PC battery. In this case power supply cables are not connected.
- Switch on the PC. Start the OS and launch NUCA (EYER) software. As soon as the MOV USB device is successfully connected, the yellow LED (Figure 3, pos. 3) comes on. The device is ready to operate.

Operation control

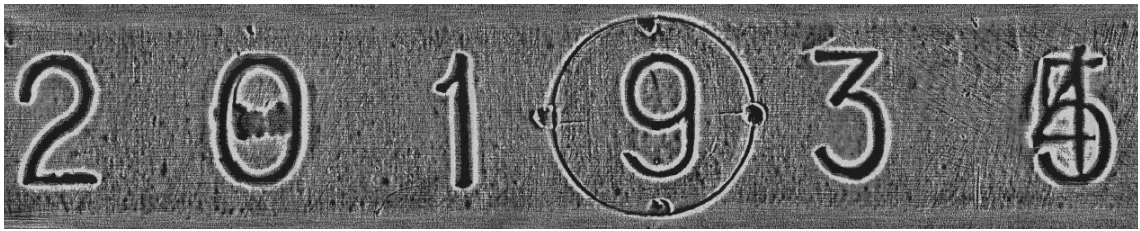
- Take out test-object #1 intended for testing the MOV USB-device (see paragraph 1.1.5) from the SPRK. Carry out magnetic copying of the test-object in conformity with paragraph 2.2.2.3.
- Perform magnetic copy stitching in the PC in conformity with paragraph 2.2.1.3.
- Compare the results of obtained magnetic copy stitching with the template shown in Figure 4. In case of positive results, operation of the unit is considered normal. Criteria of comparing the obtained magnetic copy stitching results with the templates are as follows:
 - Compare the quality of displaying the original metal surface (surface texture shall be visible).
 - Compare the quality of displaying original number digits alterations (traces of mechanical processing on the 2nd, 4th and 6th digit positions, as well as traces of spot welding and contours of pressing-in fragments on the 4th digit position shall be visible).
 - Compare the quality of displaying residual digits of the original number that were altered (fragments of the original number digits shall be visible on the 2nd and 6th digit positions).
- In case of malfunction at any stage of operation control, see paragraphs 3 and 4.

Switching off the MOV USB device

To switch the device off, do the following:

- Exit NUCA (EYER). The yellow LED (Figure 3, pos. 3) goes off and the device enters sleep mode. Exit the OS and switch off the PC.
- Unplug the PC (if it was connected to the mains).

Figure 4



Magneto-optical visualization of the test object surface through the layer with thickness of 0,1 mm. Spatial resolution is around 80 µm.

2.2.1.3 MOV USB device intended use

The MOV USB device performs the following operations:

- magnetic copy stitching,
- extracting a used magnetic copy,
- processing and analyzing magnetic copy stitching,
- documenting examination results.

Magnetic copy stitching:

- Ensure that no magnetic tape is present in the OMB tape drive tract — neither the red LED “MT in the buffer” (Figure 3, pos. 3), nor the green LED “MT in the tract” (Figure 3, pos. 3) is on. Otherwise, first remove the previous magnetic copy.
- **For plastic MT. Put the MT with its working surface** (of brown colour) facing down (facing the MOV USB device). It should be noted that when using ½” MT, it is inserted into a paper cartridge beforehand. Then put the ½” MT with its working surface (of brown colour) facing down while the paper cartridge is located on top of MT.
- Straighten MT holding it by its edges and insert it into the tape drive (Figure 3, pos. 1). Move MT into the tape drive to a depth of 30 mm (until blocked). The red LED (Figure 3, pos. 3) lights up confirming the state “MT in the buffer” and the electric motor starts to capture the tape. Move the tape further inside the tape drive tract until it is captured by the drive shaft of the OMB. The green LED (Figure 3, pos. 3) lights up confirming the state “MT in the tract”. **Release the MT strip and it will move forward automatically.**
- Wait for approximately 5 seconds to load the potentially informative sector of the magnetic copy into MOV zone. Start the stitching process by corresponding software command. The stitching process is confirmed by the green LED blinking (Figure 3, pos. 3) with the meaning “MT in the tract”. The first visualization sub-frame appears on the PC screen.
- Control the quality of stitching visually. When signs of low quality of magnetic copying are observed (due to MT non-contact with the examined surface, MT or scanner warp during copying, etc.), it is possible to stop the stitching process by clicking “Eject MT”. As soon as MT is returned to the buffer, extract it, demagnetize, and make another magnetic copy in conformity with paragraph 2.2.2.3.
- If magnetic copy quality is satisfactory, stitching can be continued until the end of the informative MT area and then stopped by clicking “Eject MT”, or you can wait until **OMB** stops in automatic mode (“MT end” LED comes on).

Extraction of the used magnetic copy

- As soon as the command “Eject MT” is executed by the **OMB**, used MT automatically returns to the buffer — to the tape drive or to the bunker (to the closest location). The green LED “MT in the tract” fades and the red LED “MT in the buffer” comes on indicating that MT stopped moving. **Do not remove an MT strip from the tape drive until it stops completely and the LED “MT in the tract” is off!**
- Take MT by its edges and remove it from the buffer. The red LED “MT in the buffer” is to go out. Then the used magnetic copy is to be demagnetized for reuse and placed into the **CMS** case or it should be stored for further use.

Processing and analyzing magnetic copy stitching

- Rotate the stitched copy to match the original, using manipulation functions: image rotation and mirror imaging.
- Evaluate the quality of stitching visually. If the quality is satisfactory, save the initial file and start processing and analyzing. If the quality is unsatisfactory, repeat magnetic copy stitching or make a new magnetic copy.
- Process the stitched image using software functions. In general the following functions give the most effective results: threshold processing with the possibility of brightness levels band spreading, image differentiation and spatial filtering.
- Analyze magnetic copy stitching:
 - Visually determine if there are any signs of number alterations. The main signs of alterations examined are the following: traces of mechanical processing taking the form of traces or nicks (Figure 4: 2nd, 4th and 6th digit positions); original number fragments (Figure 4: 2nd and 6th digit positions); non-ferromagnetic materials fragments (Figure 4: 4th digit position); welded seams and borders of pressing in (Figure 4: 4th digit position).
 - Additional signs of number alterations examined are the following: deviation of form and arrangement of digits in the number; different intensity (clearness) of the number digits contour; non-uniformity or absence of the object surface texture processing. It should be taken into account that the last two features can result from a poor quality copying (magnetic tape does not fit closely to the surface).
 - Compare the images of the digits with the specimen numbers of this model of firearms or with digits repeated in the examined number.
 - Measure geometric dimensions of the images of the digits and analyze their position. The software allows measuring linear and angular image dimensions.
- Analyze examination results.

Documenting examination results

- Save the initial file of magneto-optical visualization of the number platform. It is also possible to save processed images.
- The magnetic copy can be saved as material evidence.
- Print the obtained images.

2.2.2 Magnetic Copying Accessories Set

2.2.2.1 Operating limitations

- Only ferromagnetic materials (iron, steel, cast iron) can be examined. For nonferromagnetic materials (aluminum) the corresponding eddy-current scanner must be used (supplied optionally).
- The thickness of examined lacquer-and-paint coating shall not exceed 0,5 mm. The thickness of an examined rust or scale layer shall not exceed 0,3 mm.
- Examined surface unevenness shall not exceed 0,5 mm at the basic width of 11 mm when using the **CMS** flat concentrator.
- Examined surface unevenness shall not exceed 1 mm at the basic width of 20 mm when using the **CMS** rotary concentrator.
- Protect the CMS concentrators from blows and falls to avoid damaging magnets and loss of magnetic properties.
- Damaged rubber protective sleeve gaskets of the **CMS** rotary concentrator should not be used during device operation.
- Do not use MT strips shorter than 150 mm (see paragraph 2.2.1.1).

2.2.2.2 Preparing the MCAS for operation

Set inspection:

- Check availability and proper arrangement of the set components.
- Make sure that there is MT and ethyl alcohol in reserve.
- Check MT surface integrity and cleanliness (see "The Order of Refilling").
- Visually control the integrity of the rubber sleeve gasket of the CMS rotary concentrator. If necessary, replace the worn out sleeve gasket with a new one (see paragraph 4.2).

The order of refilling

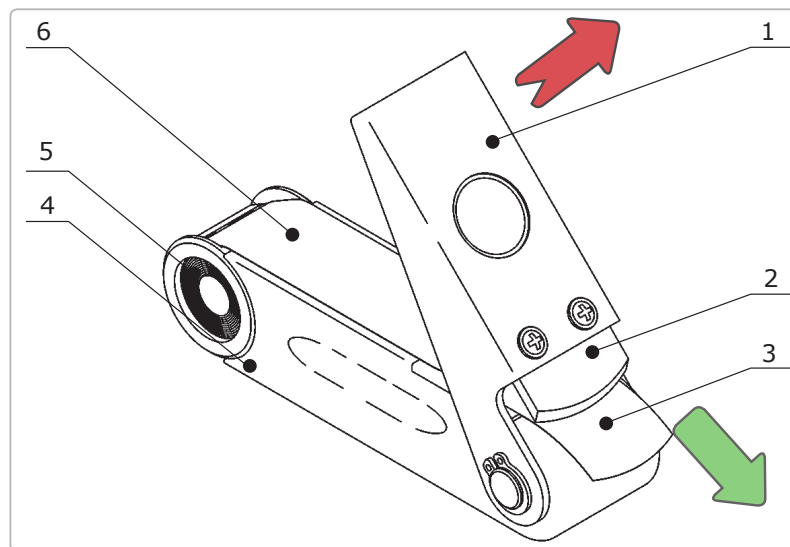
Consumables: MT, ethyl alcohol.

To fill up the operating reserve of MT, do the following: take MT from the SPRK, cut it into strips of necessary length and enclose them into the cartridge intended for storing MT (Fig. 6, pos. 1).

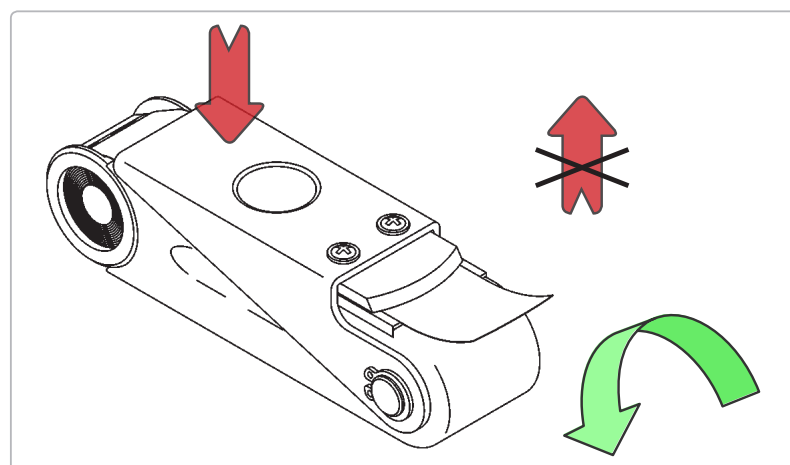
To cut metal MT, use the cutter from the SPRK and do the following:

- Set the cutter lever (Figure 5, pos. 1) in the upper position, letting the tape freely pass through the slot as shown in Figure 5a.
- Push the MT strip in the area marked as 6 (see Figure 5a) to move the MT strip (Figure 5, pos. 3) through the slot beyond the edge of the blade (Figure 5, pos. 2).
- Take the MT by its edge (Figure 5, pos. 3) and pull it out for a required length, relative to the blade edge (Figure 5, pos. 2). The cutter body (Figure 5, pos. 4) can be used for measuring the approximate length of the MT strip. A full loop of the tape around the body is equal to the operating MT strip length – 250 mm.
- Lower the cutter lever (Figure 5, pos. 1) and slightly press it down to fix the tape as shown in Figure 5b.

Figure 5



a) MT extraction from the bunker for cutting



b) Cutting MT with the cutter

- 1 – lever,
- 2 – blade,
- 3 – MT,

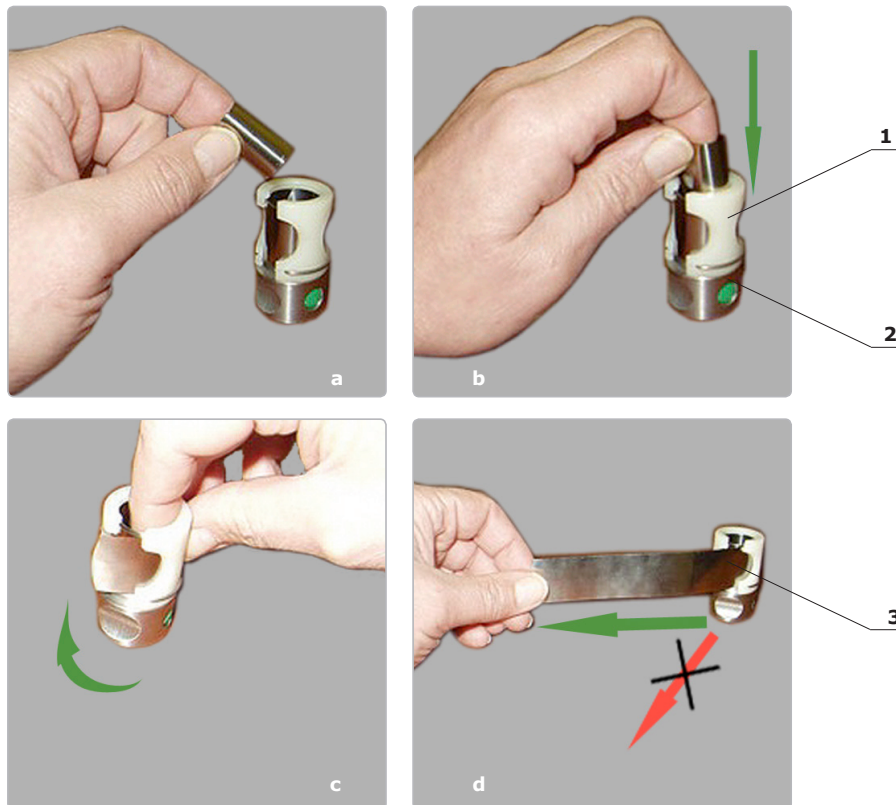
- 4 – body,
- 5 – bunker with MT reserve,
- 6 – area for pushing MT.

- Tear the tape along the blade edge (Figure 5, pos. 2). When tearing, it is better to “twist” the tape but not pull it up (Figure 5b). When tearing the MT avoid fins forming on strip edges.
- Put the obtained MT strip with its concave edge under the blade of the cutter and tear another edge similarly.
- Stack the ready-made MT strips into the cartridge for storing MT (Fig. 6, pos. 1). which is marked with green marker (demagnetized MT).

Cut plastic MT using paper scissors. When cutting, it is recommended to trim MT edges so that they are rounded in shape.

Cut paper cartridges for 1/2" plastic MT from printed stencils using paper scissors. Cut along the lines.

Figure 6



1 — cartridge for storing MT, 2 — magnetic clamp, 3 — MT.

Inserting MT strips into the cartridge and extracting them

To insert MT strips into the cartridge, do the following. Roll up the MT strip into a curl $\approx \text{Ø}20$ mm (for example, it can be rolled around your finger as shown in Figure 6a). Then push it inside the cartridge (Figure 6b). Each subsequent roll is inserted inside the previous one.

To extract MT strips from the cartridge, do the following. Turn the roll of MT strips inside the cartridge so that the butt end of the upper curl of the tape would appear opposite to the cut of the cartridge (Figure 6c). Then pull the MT strip by its edge in the tangent direction towards the cartridge circumference (Figure 6d).

Correct the defects of MT strips or replace the damaged strips during routine inspection of the accessories.

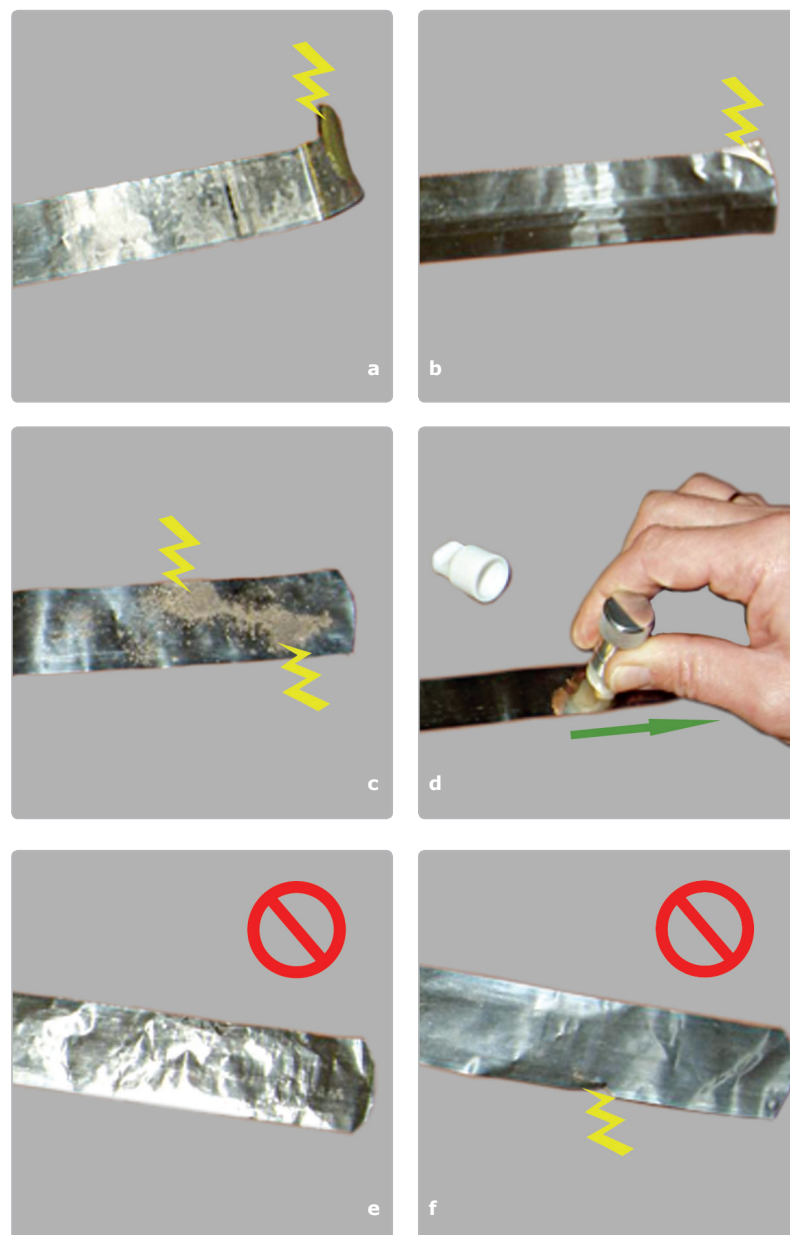
If the ends of the MT strip (20–30 mm from the strip ends) have transverse bends with the radius of curvature less than 20 mm (Figure 7a), straighten them. To straighten the tape, roll the tape into a tight tube of inverse curvature or slightly stretch it on an angular edge (for example, on the table edge). The same is applied to the bent MT strip corners (Figure 7b). In case the tape edges are failing to straighten up, cut them with the cutter from the SPRK.

Another kind of MT defect to be eliminated (Figure 7c) is dirty MT surface (greasy film, water, solvents, chemical solutions, particles of dust/rust/ metal, etc.). MT surface should be cleaned with alcohol using a special container from the SPRK (Figure 7d).

MT with considerable bends (breaks) (Figure 7e), breaks of edges (Figure 7f) and punctures cannot be mended. Such tapes should not be used in case it is impossible to remove the damaged fragment with the SPRK cutter.

As a result of being damaged and worn out, plastic MT loses particles of the working layer. Consequently the quality of copying worsens and the MOV USB device becomes dirty. If the defects of MT working layer are visible, the MT is to be withdrawn from use.

Figure 7



Non-observance of the recommended form of MT strip edges can result in stitching discrepancies and MT jamming in the MOV USB device. Use of polluted and damaged MT leads to device malfunction.

To renew ethyl alcohol operating reserve, take the container for alcohol from the box (Figure 7d), remove the cap, unscrew the head and pour about 5 ml of ethyl alcohol. Screw the head of the container and put the cap back on its place.

2.2.2.3 MCAS intended use

The MCAS can be used after the requirements of paragraph 2.2.1 are fulfilled and the steps described in paragraph 2.2.2.2 are completed.

Magnetic copying of an object using MCAS consists of the following steps:

- preparing the examined surface,
- selecting MT type,
- preparing (demagnetizing) MT,
- magnetic copying.

Selecting the MT type

The User is to select the MT type (metal or plastic) and width (1" or ½"). The following recommendations should be taken into consideration.

- Plastic MT is considerably less expensive than metal MT. As technical properties of both MT types are almost the same, plastic MT can be used in the majority of cases.
- It is recommended NOT TO USE plastic MT in the conditions which worsen the quality of magnetic copying and shorten MT lifetime, e.g. on very rough surfaces (severe corrosion, premilling), on hot surfaces (when surface temperature exceeds +50 °C), on surfaces with sticky stains that cannot be removed.
- It is recommended TO USE plastic MT in the conditions which improve the quality of magnetic copying, e.g. for examining the relief and structure of aluminum objects, for examining weak internal stresses in ferromagnetic objects, for magnetic copying in narrow openings and in grooves where the only way to avoid MT damage is to use ½" plastic MT.

Preparing the examined surface

- Provide easy access to the examined surface: take off jackets, side plates, detachable equipment.
- Clean the examined surface from foreign particles (such as dust, dirt, sand, tar, etc.), as well as from lubricant films. If necessary, clean it with ethyl alcohol, then dry or remove moisture. Dirty MT slightly worsens the quality of magnetic copying, but it leads to untimely magnetic tape wear. The particles adhered to the tape damage the magneto-optical crystal and foul the tape-drive mechanism.

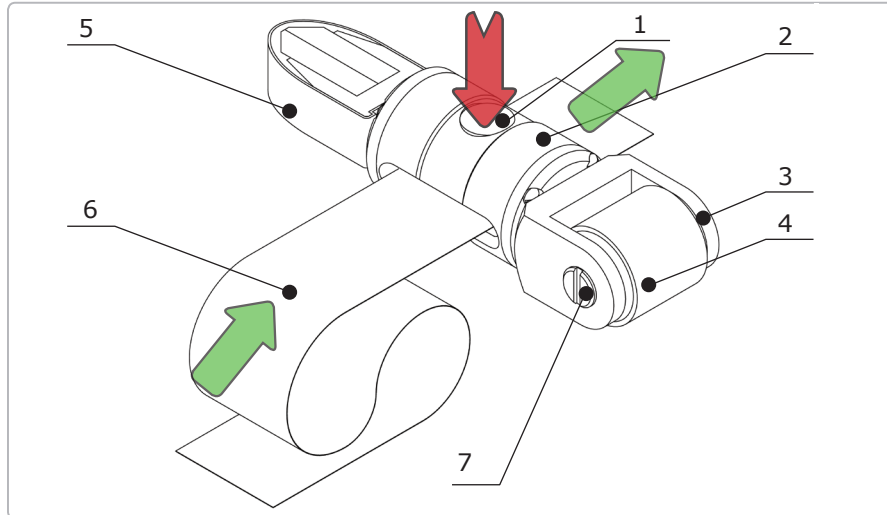
ATTENTION! DO NOT REMOVE RUST FROM THE SURFACE!

Rust layer, especially on the heavily corroded surfaces, often is the only remaining carrier of information about original numbers.

Preparing (Demagnetizing) MT

- Take the CMS out of the MCAS compartment.
- Select a used (after visualization) MT strip.
- Press and hold the demagnetizer drive button (Figure 8, pos. 1). Insert the end of the MT strip (Figure 8, pos. 6) into the demagnetizer slot and slightly push it forward until its end appears on the opposite side.
- Release the demagnetizer drive button (Figure 8, pos. 1), take the threaded end of the MT strip and pull it through the demagnetizer.
- Use the demagnetized MT for carrying out a new magnetic copy or place it into the cartridge for demagnetized MT (marked with green marker) (Figure 6a, b).

Figure 8



- 1 — demagnetizer drive button,
- 2 — frame handle,
- 3 — rotary concentrator holder,
- 4 — rotary concentrator,

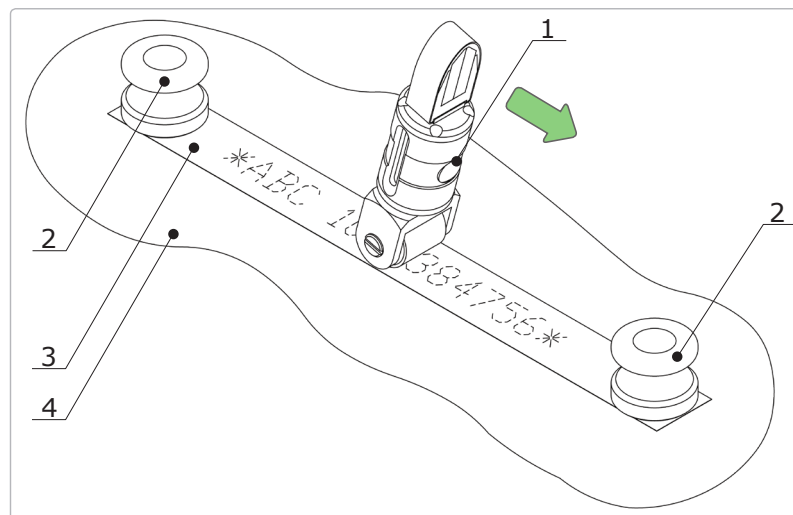
- 5 — flat concentrator,
- 6 — MT strip,
- 7 — rotary concentrator screw.

Demagnetizing MT using the CMS

Magnetic copying

- Fix one end of the demagnetized MT strip with a magnetic clamp (Figure 9, pos. 2).
- Put the MT strip upon the prepared number platform and fix the MT end on the examined surface using a magnetic clamp (avoid warps and shifts relative to the examined number). **For plastic MT: put the MT with its working surface (of brown colour) facing down** (facing the examined surface).

Figure 9



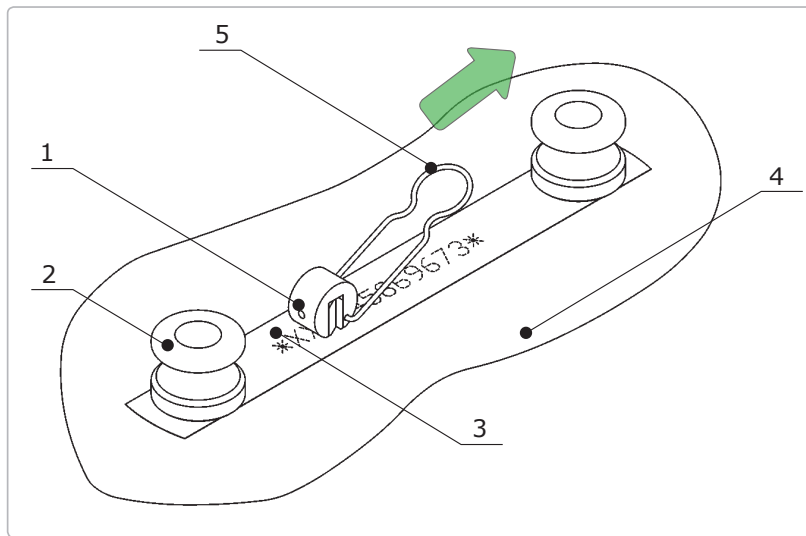
- 1 — CMS.
- 2 — magnetic clamp,

- 3 — MT strip,
- 4 — examined surface.

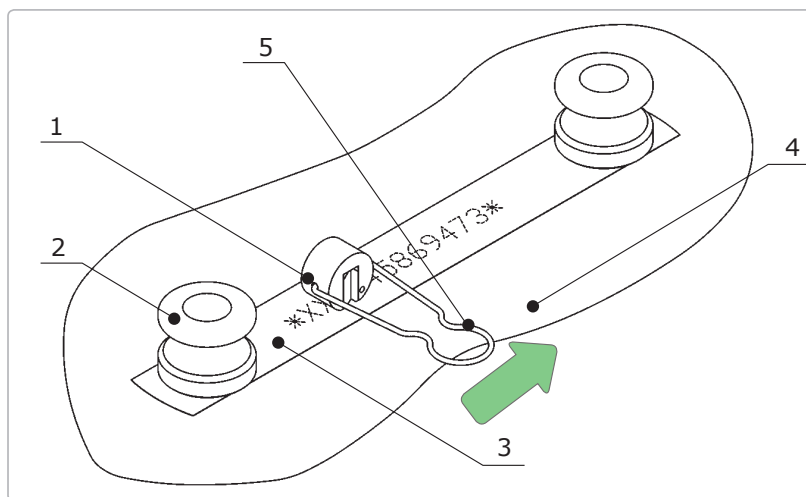
Making a magnetic copy of a number platform using the CMS with the rotary concentrator

- Similarly fix the other end of the MT with a magnetic clamp (see Figure 9–10). MT can also be fixed on the examined surface manually — without using magnetic clamps.

Figure 10



a) Making a magnetic copy of a number platform using the compact magnetic scanner with the spring clip positioned along the number platform



b) Making a magnetic copy of a number platform using the compact magnetic scanner with the spring clip positioned across the number platform

- | | |
|-------------------------------|-----------------------|
| 1 — compact magnetic scanner, | 4 — examined surface, |
| 2 — magnetic clamp, | 5 — spring clip. |
| 3 — MT strip, | |

- Select the CMS concentrator according to the properties of the examined object.
- Make a magnetic copy. Lower the concentrator of the magnetic scanner unto the fixed MT strip and, slightly pressing it down, move it from the beginning to the end of the examined area (see Figure 9). The operator should visually and tacitly control the perpendicularity of the flat scanner in relation to the examined surface in order to receive a magnetic copy of good quality. Rotary and compact scanners move along the examined surface keeping a stable position due to magnetic attraction. In case copying conditions were not fulfilled (because of MT shift, lack of contact of the scanner), all operations should be repeated starting from MT demagnetization.

- Remove the MT strip with the examined object copy and disconnect the magnetic clamps. Avoid contact of magnetic clamps and the scanner with the MT surface. Otherwise, the MT can be partially demagnetized or “unnecessary” magnetization elements (blemishes or strips unrelated to the examined object) may appear.
- Put the magnetic copy into the corresponding cartridge for storing MT (see Figures 6a, b). The one for storing MT with recorded data is marked with red marker. If necessary, use the marker for applying a comment on the MT strip.
- If it is impossible to carry out prompt examination of the magnetic copy (e.g. there is no USB MOV device), it is recommended to carry out 1–2 additional magnetic copies. It minimizes the probability of obtaining a magnetic copy of low quality.

3 MAINTENANCE OF THE DEVICE COMPONENTS

3.1 MOV USB Device

Daily maintenance of the MOV USB device involves the following procedures:

- external inspection (visually check the integrity of controls and indicators; check the USB cable isolation and connectors),
- checking the PC battery charge via the OS or with the help of NUCA (EYER) software in the menu "Operation / Device operation / Power sources",
- cleaning the front panel and controls from dust and oily films with soft tissue or a wad wetted in ethyl alcohol (rate of alcohol application — 5 g).

Device routine maintenance for the MOV USB device is carried out when the surfaces of the tape drive become dirty (stitching quality worsens — images appear double). When the surface of MT strips is properly cleaned, there is no need to clean the tape drive tract and the bunker with MT reserve.

To clean the **tape drive tract of the MOV USB device** do the following:

- Cut a paper strip (width — 24–25 mm, length — 280–300 mm) from a clean writing paper sheet (density — 80 g/m²). This paper strip is used as a cleaning tape.
- Wet a half of the paper strip with 10–20 drops of the ethyl alcohol (0,1–0,2 g). Do not use other solvents!
- Insert the wetted end of the paper strip in the tape drive of the MOV USB device. Pass the cleaning tape 2–3 times through the tape drive in the mode of magnetic copy stitching, as described in paragraph 2.2.1.3. During stitching the cleaning tape can stop (this occurs because of the tape drive leading surfaces dampening and it is not a sign of the device malfunction). Improper dosage of ethyl alcohol or unsuitable paper density may cause cleaning tape jamming in the tract. In this case extract the cleaning tape manually, as described in paragraph 4.2. It is recommended not to reuse cleaning tapes.
- After extracting the cleaning tape, wait for at least 3 minutes until the tape drive surfaces get dry before starting device operation. Rate of one-time ethyl alcohol application — 0,5 g.

Maintenance of the MOV USB device when preparing it for storage and during the storage period:

- arrange all the components of the MOV USB device and place them into the shipping package,
- recharge the PC battery at least once a month,
- during recharging (at least once a month) it is recommended to perform magnetic copy stitching 5–10 times in PC in conformity with paragraph 2.2.1.3 — necessary for preventive maintenance of the OMB parts.

3.2 Magnetic Copying Accessories Set

Daily maintenance of the MCAS involves the following procedures:

- External inspection (check the integrity of bodies and threaded connections of the MCAS components visually).
- Make sure that the MT surface is clean and not damaged. Remove damaged tapes (cut through breaks with sharp edges, strongly crumpled), straighten up the bent edges of tapes, clean dirty tapes (see paragraph 2.2.2.2).
- Control the reserve of consumables (magnetic tape and ethyl alcohol). Refill the reserve if necessary (see paragraph 2.2.2.2).
- Check the integrity and quality of the protection rubber sleeve gasket visually. If necessary, replace the worn-out sleeve gasket (see paragraph 4.2).
- Clean the working surfaces of the magnetic scanners concentrators from dust, metal particles and greasy films using a dry tissue or a wad wetted in ethyl alcohol.
- Clean the MCAS body and threaded connections from dust and greasy films using a dry tissue or with a wad wetted in ethyl alcohol.
- Clean MT surfaces using ethyl alcohol from a special container (see paragraph 2.2.2.2). It is required to demagnetize the MT strips after cleaning. This operation is to be carried out whenever the surface becomes dirty. Approximate rate of ethyl alcohol application — 25 g.

MCAS maintenance when putting it in storage: arrange and pack the MCAS components into the shipping package.

4 ROUTINE REPAIRS

4.1 General Instructions

The list of possible problems and troubleshooting is given in Table 2.

Table 2

Device	Problem	Cause	Troubleshooting
MOV USB device	When connecting the device to the USB port of the PC, the power indicator does not come on.	The USB connector has not been successfully connected.	Check the power cable connection: unplug it and then plug it in again.
		The controller or the power cable is out of order.	Service center repairs.
	Spontaneous MT stopping in the OMB tape drive tract.	The tape drive is clogged with foreign objects.	Clean the tape drive as described in paragraph 4.2.
		MT got stuck in the tape drive because MT is crumpled or damaged.	Straighten or replace the MT strip.
	Stitching quality worsens — images appear double.	MT sliding because of the tape drive clogging.	Clean the tape drive mechanism as described in paragraph 3.1.
The device does not respond to the executive commands.	Software error.	Restart the software. If necessary, restart the OS.	
MCAS	The rubber sleeve gasket of the CMS rotary concentrator is damaged.	Natural wear-and-tear.	Replace the rubber sleeve gasket as described in paragraph 4.2.
	No precision when viewing the stitched image	Improper preparation of the examined surface or a thick lacquer-and-paint coating.	Improve preparation of the examined surface, measure the thickness of lacquer-and-paint coating.
	When examining the stitched image, there are image fragments irrelevant to the examined object.	MT is not completely demagnetized.	Demagnetize the MT strip and carry out a new magnetic copy.
	When examining the stitched image, there are longitudinal tracks irrelevant to the examined object.	Adhesion of magnetic particles to the scanner surface or scratches on the MT surface.	Clean the scanner as described in paragraph 3.2, demagnetize or replace the MT and carry out a new magnetic copy.

4.2 Repair Instructions

Cleaning the OMB tape drive tract if clogged

Cleaning is carried out when the tract is clogged up with foreign objects which interfere with MT movement.

The same is applied to the MT extraction, when it was jammed during the automatic injection or reverse motion. Such jamming is possible when the user does not observe the recommended edge form of the magnetic tape strip (see paragraph 2.2.2.2).

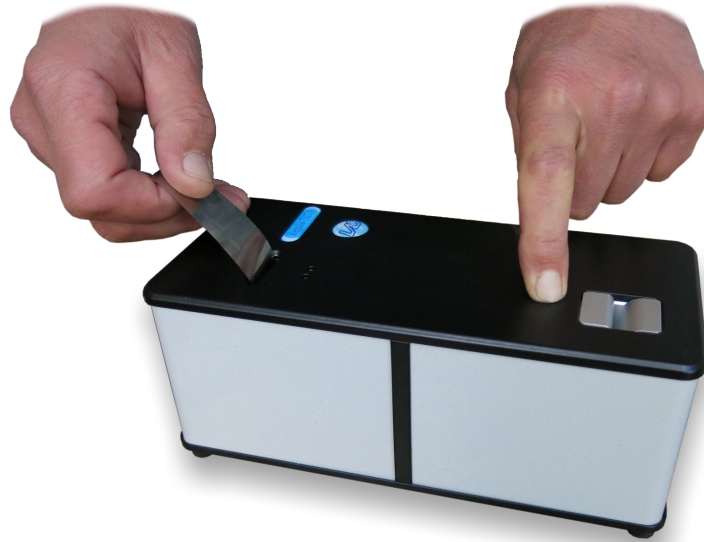
To clean the OMB tape drive tract, do the following:

- Turn the front side of the MOV USB device, when in the working position, to the operator (see Figure 3).
- Release the MT pressing roller by pressing the button of the pressing roller block (Figure 3, pos. 2)
- Still holding the button of the pressing roller block, take the protruding end of the MT strip and extract the jammed piece (Figure 11). If two ends of the MT stick out, it can be extracted in any direction. In case the length of the tape is less than 200 mm or the MT strip has rolled in the tape drive, none of

the MT edges will stick out. Thus, the User won't be able to extract the MT strip manually without assistance. It is advised to apply to the service center.

- If the foreign object is still in the tract (after extracting the MT strip), the user may try to take it out using a strip of cartridge paper or thin cardboard (holding the button of the pressing roller block). It is strictly prohibited to use metal instruments for extracting foreign objects from the tract!
- If the described methods are ineffective, it is recommended to apply to the authorized service center.

Figure 11



Manual extraction of the MT strip from the OMB tract

Replacement of the rubber sleeve gasket of the CMS rotary concentrator.

- Unscrew 2 screws (Figure 8, pos. 7) of the rotor axle attachment and pull out the rotary concentrator from the rotary concentrator holder (Figure 8, pos. 3).
- Remove the used rubber sleeve gasket and replace it with an auxiliary one from the SPRK.
- Assemble the unit in the reverse order.

5 STORAGE

The device is to be stored in manufacturer's packaging.

Climatic storage conditions:

air temperature	from +5 °C to +40 °C
relative air humidity	up to 80 % at the temperature of +15 °C
atmospheric pressure	100 +/- 4 KPa (750 +/- 30 mm Hg)

When preparing the device for storage, it is recommended to perform maintenance works as described in paragraph 3.2.

Devices can be stored in stacks — up to 5 items.

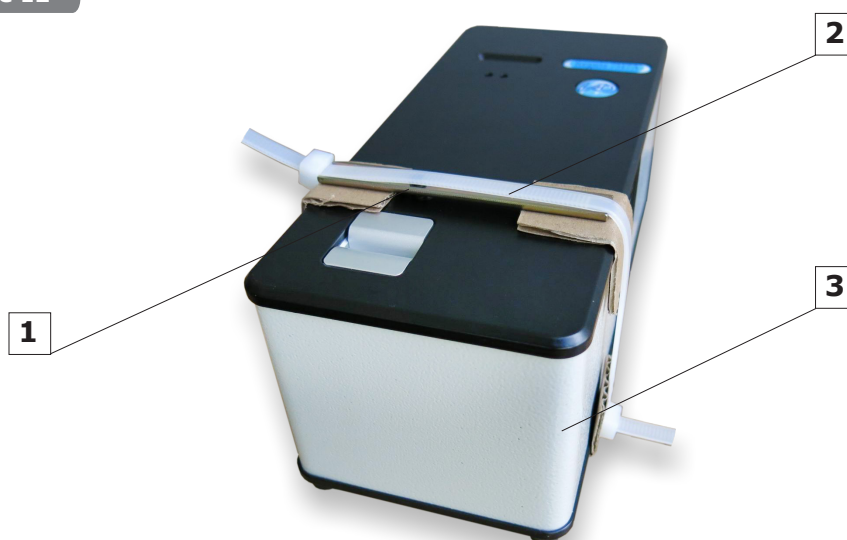
6 TRANSPORTATION

The device is to be transported in the industrial packaging of the manufacturer (provided in the delivery set). When preparing the device for shipping (impact load involved), install the transportation batten (Figure 12, pos. 1) so that its screw is set against the button of the pressing roller block (Figure 3, pos. 2). The button should be recessed by the screw for about 1 mm. Then put pieces of cardboard on the arrises and tighten plastic straps (Figure 12, pos. 2).

The device is to be stored in climatic conditions given in paragraph 5. Protect the device from hitting and vibrations.

The device contains magnetized material packed in accordance with the requirements of ICAO Doc 9284 AN/905. The device is allowed for transportation by passenger aircraft.

Figure 12



1 — transportation batten; 2 — plastic strap; 3 — MOV USB device.

Device position during transportation

7 RECYCLING

Recycling of the device shall be carried out in conformity with the rules adopted at the Manufacturer's enterprise.

8 MANUFACTURER'S WARRANTY

The warranty period makes 24 months from the date of sale provided that all terms of the given User's Guide are observed. Do not remove any seals set by the manufacturer during the whole warranty period.

Storage period makes ___ months from the date of manufacturing.

Mean lifetime makes 5 years.

9

ACCEPTANCE CERTIFICATE

(to be completed by the manufacturer)

Hardware and software system for forensic examination of firearms and ammunition serial numbers Regula 7517. Magneto-optical device Regula 7517A

Nº _____ is produced and accepted in accordance with obligatory requirements
(serial number)

of state standards, current technical documentation and considered serviceable.

Date of production

Seal

Manufacturer: REGULA Ltd.

Address for mailing claims with regard to the quality of the device:

1 Volokha Street, Office 314, Minsk

220036, Republic of Belarus

Phone: +375 17 2862825

Fax: +375 17 2136897

e-mail: support@regulaforensics.com

http://www.regulaforensics.com

10

SALE CERTIFICATE

(to be completed by the seller)

Hardware and software system for forensic examination of firearms and ammunition serial numbers Regula 7517. Magneto-optical device Regula 7517A

Nº _____
(serial number)

Is sold to:

Seller's name _____

Seal:

Date of sale _____



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Phone: +375 17 2862825 Fax: +375 17 2136897
e-mail: mail@regula.by <http://www.regulaforensics.com>