Workstation for forensic examination of firearms and ammunition identification numbers Regula 7517

The device is intended for authenticity verification, detection of firearms and ammunition identification number falsification and restoration of original identification numbers.

Regula 7517 is designed as a compact complex for desktop use. The workstation consists of a magneto-optical device Regula 7517A, an eddy-current magnetographing device Regula 7517B and magnetizing equipment Regula 7517C.

Regula 7517 is optionally supplied with a portable PC for collecting, storing, processing, transferring and displaying information; peripherals Regula 7516.

Functionality

1. **Magneto-optical device Regula 7517A:**
    a. **USB device for magneto-optical visualization**, which is constructed as a separate module. The USB device is used for:
        - step-by-step scanning of magnetic tape with the recorded data and obtaining a panoramic image of firearms and ammunition identification numbers
        - converting a magneto-optical image into a digital video signal
        - indicating the status of device systems
    b. **Magnetic copying accessories set**, which includes a combination magnetic scanner-demagnetizer with the set of replaceable concentrators, magnetic tape clamps, magnetic tape cartridges, etc. The accessories set is used for:
        - creating a physical copy of magnetic stray fields distribution over the object surface using magnetic tape. The copy reflects relief and structural inhomogeneity of the material
        - demagnetizing magnetic tapes for further use
        - arranging, marking, storing and carrying extra magnetic tape and recorded magnetic copies
        - service functions while performing magnetic copying
2. **Eddy-current magnetographing device Regula 7517B**. The device consists of a controller constructed in metal body and scanners used for non-destructive examination of the structure of electroconductive non-ferromagnetic and ferromagnetic materials.
3. **Magnetizing equipment Regula 7517C** which is constructed as a magnetizing desk with brackets, planks, etc. The magnetizing equipment is intended for producing magnetic stray fields in thick-walled ferromagnetic objects and their registration during the examination process.
4. **NUCA software**. The software is used for loading and processing images of identification numbers:
    - comparing image fragments
    - measuring linear and angle dimensions
    - saving and printing obtained images

Special features

- Restoration of fully destroyed original firearms and ammunition identification numbers on ferromagnetic materials
- Surface examination of nonferromagnetic materials in order to get information and/or to prove the fact of original identification number falsification
- Detection of welded joint defects in ferromagnetic materials and aluminium alloys

Principles of operation

1. After being demagnetized, magnetic tape is placed on the examined surface and fixed.
2. One of the scanners selected according to the type of examined material (included in the delivery set of magneto-optical device Regula 7517A or eddy-current magnetographing device Regula 7517B) is connected to the controller. The scanner is moved along the examined surface.
3. Magnetizing equipment Regula 7517C is used together with the scanners mentioned above for investigating internal stresses in thick-walled ferromagnetic objects.
4. The controller forms voltage pulses with preset parameters and feeds them to the scanner.
5. Pulse current flowing in the scanner conductor forms around it an alternating magnetic field which induces eddy currents in electroconductive material of the examined object.
6. The eddy current trajectories and the corresponding magnetic stray fields show the lines of electric resistance

formed on the basis of the size, form and location of defects on the examined object.
7. Obtained magnetograms of magnetic stray fields are visualized by USB device for magneto-optical visualization which is included in magneto-optical device Regula 7517A.
8. The visualized image is converted into a digital video signal.
9. **NUCA software** processes the images of firearms and ammunition identification numbers.

Application

- Court expertise
- Forensic departments
- Law-enforcement agencies
- Border control services

Delivery set

- Magneto-optical device Regula 7517A
- Eddy-current magnetographing device Regula 7517B
- Magnetizing equipment Regula 7517C
- **NUCA software**
- Magnetic tape, 10 m
- Optionally
    - portable PC (selected at customer's request)
    - peripherals Regula 7516

Magneto-optical device Regula 7517A

USB device for magneto-optical visualization

- Examined object material — ferromagnetic
- Magnetic tape width, mm — 25.4 and 12.6
- Image file format — .BMP, .GIF, .JPG, .PCX
- Dimensions (length×width×height), mm — 240×110×110
- Weight, kg, max — 3.2
- Connection interface — USB port
- Power consumption, W — 2.5

Magnetic copying accessories set

- Magnetic tape length, mm — 250
- Dimensions (length×width×height), mm — 120×80×40
- Weight, kg, max — 0.4

Eddy-current magnetographing device Regula 7517B

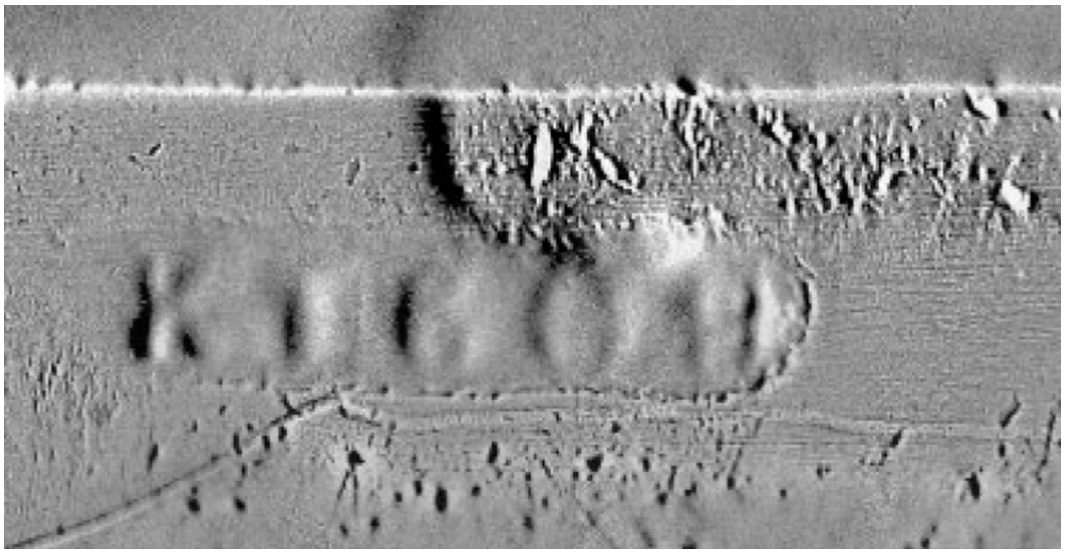
- Dynamic scanners scanning speed, m/s — 0.05
- Effective magnetographing width, mm, not more than:
  - static scanners — 17
  - dynamic scanners — 20
- Magnetographing current, A, not more than:
  - static scanners — 1500
  - dynamic scanners — 150
- Nonflatness of examined surface, mm, not more than:
  - static scanners — 2
  - dynamic scanners — 0.5
- Dimensions (length×width×height), mm:
  - static scanners — 30×45×75
  - dynamic scanners — 28×30×35
  - controller — 160×100×30
  - power adapter — 100×80×30
- Weight, kg, not more than — 3.5
- Controller power supply, V/A — 12/1

Magnetizing equipment Regula 7517C

- Type of permanent magnets — Fe-Nd-B alloy
- Pole distance, mm:
  - magnetizing desk — 0–330
  - magnetizing bracket — 0–270
  - magnetizing plank — 20–40
- Pull out force (when the pole distance is maximum), N:
  - magnetizing desk — 120
  - magnetizing bracket — 40
  - magnetizing plank — 60
- Magnetic field strength in the middle of a 40 mm air gap (tangential component), A/cm:
  - magnetizing desk — 200
  - magnetizing bracket — 180
  - magnetizing plank — 190
- Dimensions (length×width×height), mm:
  - in a plastic case — 460×370×180
  - in the operating mode — 380×200×120
- Weight, kg:
  - in a plastic case — 7,8
  - in the operating mode — 4,5

Object photo — the Mosin rifle with corroded marking

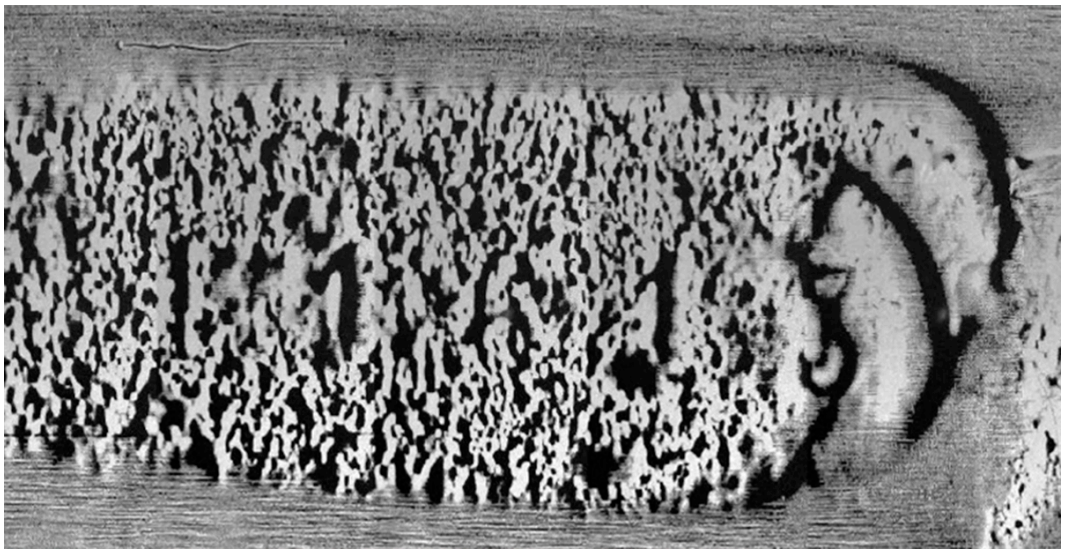
Object photo — the MCM pistol with the removed number



Magneto-optical image of the area with the number — «K1609» marks are visible

Object photo — the Mosin rifle with corroded marking

Photo of the number platform — elements of the number are not recognized



Magneto-optical image of the number platform — The image is more informative than the optical one (“Д?1613” signs can be recognized)