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Saint-Petersburg, Russia

AC/DC ELECTROMAGNET

EMA-200

Operation manual
EMA-200 OM



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This Operation Manual (OM) together with the data sheet contains information on the intended use, operating principle, technical specifications, design and operation of portable electromagnet EMA-200 (hereinafter referred to as the “electromagnet”), rules for its operation, transportation and storage.

The electromagnet shall be used by qualified specialists who have passed certification at level I, II or III in the field of magnetic particle inspection in accordance with the current rules for personnel certification and who have familiarized themselves with this OM.

1. DEVICE INTENDED USE

The electromagnet is intended for use in magnetic particle inspection as per ISO 9934-1, 9934-2, 9934-3 (GOST R 56512-2015) of products made of ferromagnetic materials in order to detect surface and subsurface defects in the base material and welded joints of the control objects.

The electromagnet is designed for magnetization of products of various shapes and individual areas of products, including welds, during magnetic particle inspection with an AC or DC magnetic field.

In the AC mode, the electromagnet can be used to demagnetize control objects by gradually removing the switched-on electromagnet from the control object.

The electromagnet meets the requirements established in ISO 9934-3 (GOST R 53700-2009, Part 3).

The electromagnet can be used for magnetic particle inspection of products in the power generation, railway, aviation, automotive and other industries.

2. TECHNICAL SPECIFICATIONS

For electromagnet technical specifications, see Table 1.

Table 1

Parameters	Values
Average pole span	142 mm
Max pole span	242 mm
Min pole span	42 mm
Pole cross section, min.	26 × 25 mm
Operating magnetic field	AC/DC
Operating current:	
Alternating	2.5 A
Direct	0.25 A
Releasing force, min.:	
AC	10 kg
DC	30 kg
Power supply (AC network)	230 V, 50 Hz
Duty cycle	50 %
Maximum duty cycle	6 s
Protection degree	IP 54
Overall dimensions	229 × 275 × 61 mm
Weight, max.	3.8 kg
Detachable power cable	3 m in length, waterproof connector
Operating conditions	Ambient air temperature - 30... + 55 °C
Service life	5 years
Warranty period	24 months

3. DEVICE DELIVERY SET

The device delivery set shall comply with Table 2.

Table 2

Name	Quantity, pcs	Note
Electromagnet EMA-200	1	
Power cable	1	3 m in length
Operation manual	1	With data sheet
Case for carrying and storage	1	

4. ELECTROMAGNET DESIGN

Electromagnet can create AC or DC magnetic field.

A special switch for selecting the operating mode is located at the end of the device housing: "OFF", "AC", "DC".

Electromagnet shall be operated from 230 V, 50 Hz power supply mains. Electromagnet shall be connected using a detachable electric cable through a connector at the end of the housing (Figure 1).

The device appearance may differ slightly from the pictures shown (Figures 1-3) in this Operation Manual.



Fig. 1

The power button ("START") is located on the electromagnet handle (Figure 2).

When the "START" button is pressed, a control signal is sent to the relay (located inside the device housing), which, in turn, supplies current to the electromagnet winding.

To control objects of various shapes and sizes, the electromagnet is equipped with a yoke (magnetic conductor) with adjustable poles (Figure 3).



Fig. 2



Fig. 3

5. MARKING AND SEALING

5.1 There is a nameplate on the electromagnet housing containing the following information:

- Manufacturer's name;
- electromagnet name;
- electromagnet serial number.

5.2 There is a plate next to the power connector containing the following information:

- power supply parameters;
- peak current;
- electrical protection degree (IP).

5.3 Inscriptions, signs and images on the plates shall be made in a way that ensures their integrity during storage and operation of the product.

6. PACKAGING

For transportation and storage, the electromagnet and its components shall be placed in a case.

7. OPERATION

7.1 Safety Precautions

7.1.1 When operating the electromagnet, it is necessary to comply with the applicable requirements of the "Rules for Technical Operation of Electrical Installations and Safety Rules for Operation of Electrical Installations by the Consumer" approved by Gosenergoadzor (State Power Supply Inspectorate).

7.1.2 When operating the electromagnet, it is necessary to comply with the safety requirements established during magnetic particle inspection.

7.1.3 It is prohibited to use the electromagnet for other purposes.

7.1.4 It is prohibited to use a faulty and/or damaged electromagnet and/or power cable.

7.1.5 It is prohibited to manually open the electromagnet housing.

7.1.6 Electromagnet repairs shall be performed only by qualified personnel.

7.1.7 Mains outlets shall have a PE grounding contact.

7.2 Electromagnet Handling Operations

7.2.1 Electromagnet preparation for operation

To prepare electromagnet for operation, it is necessary to:

- Inspect the electromagnet and the power cable for damage;
- Configure adjustable poles of the electromagnet for installation in the control zone;
- Connect the power cable to the connector on the device housing;
- Connect the power cable to the supply mains outlet.

7.2.2 Electromagnet handling operations

For electromagnet handling, it is necessary to:

- Using the switch, select the operating mode: "AC" or "DC";
- Place electromagnet with its poles in the control zone on the product;
- Press and hold the "START" button to create a magnetic field in the product.

ATTENTION! Follow the duty cycle parameters and the electromagnet maximum duty duration! Failure to comply with these parameters may result in overheating and untimely failure of the electromagnet!

7.2.3 Demagnetization after inspection

Set the operating mode selection switch to "AC" position.

While holding the "START" button, slowly remove the electromagnet from the product surface. The control zone will be demagnetized by a decreasing AC magnetic field.

7.2.4 Electromagnet switching off:

- Disconnect the power cable from the supply mains outlet;
- Disconnect the power cable from the connector on the electromagnet housing;
- Clean the electromagnet from residual magnetic suspension and place it in a case.

ATTENTION! Do not leave the electromagnet connected to the power supply mains!

8. MAINTENANCE

8.1 Technical condition of electromagnets shall be checked to ensure their operability throughout the entire period of operation at least once a year as follows:

- electromagnet shall be subject to visual inspection for signs of damage;
- serviceability of controls, power cable, and condition of connectors shall be checked.

8.2 The device shall be handed over to the Manufacturer for troubleshooting.

9. TRANSPORTATION AND STORAGE

9.1 Transportation of the electromagnet shall be carried out in transport packaging by rail and motor road transport in compliance with the "Rules for Transportation of Goods" applicable to the specified modes of transport.

9.2 In terms of resistance to climatic factors, electromagnets in transport packaging belong to UHL design of category 3.1 as per GOST 15150-69 or other similar standard.

9.3 In terms of resistance to single mechanical impacts, electromagnets in transport packaging comply with GOST 12997-84 or other similar standard.

9.4 Electromagnets shall be stored in a case in a closed heated room with an air temperature of 25 ± 10 °C, relative humidity from 45 to 80% and atmospheric pressure from 630 to 800 mm Hg.

10. DISPOSAL

Upon completion of the service life, the electromagnet shall be disposed of in accordance with the applicable equipment disposal rules.

11. MANUFACTURER'S WARRANTY

11.1 The Manufacturer shall guarantee that the electromagnet complies with technical specifications given in this operation manual with the data sheet throughout the warranty period.

The electromagnet warranty period shall be **24 months from the date of sale, but not more than 30 months from the date of manufacture**, subject to compliance with the requirements of this manual with the data sheet, for operation, maintenance, transportation and storage.

11.2 Warranty and post-warranty repairs shall be carried out at the Manufacturer's enterprise.

11.3 If any faults are detected during the warranty period, the consumer shall draw up a report on the need for troubleshooting of the electromagnet. The electromagnet and one copy of the report shall be sent to the Manufacturer or to the Manufacturer's representative (Supplier).

11.4 Electromagnets that have damage related to violation of the requirements for operation, precautions during operation, maintenance, transportation and storage; mechanical damage (except for traces caused by normal operation); traces of other impacts leading to the electromagnet failure shall not be subject to warranty repair.

11.5 Electromagnets with broken safety seals (labels) on the housing, as well as electromagnets that have traces of opening and/or attempts at self-repair shall not be subject to warranty repair.

11.6 The warranty shall not cover natural wear of the electromagnet parts caused by intensive use.

11.7 Warranty repair of the device shall be carried out upon presentation of this operation manual with the data sheet for the electromagnet.

12. ACCEPTANCE CERTIFICATE

EMA-200 electromagnet set, serial number _____, complies with the technical specifications of this Operation Manual and shall be deemed fit for operation.

Date of manufacture:

Person responsible for acceptance:

< ___ > _____ 20__.

_____ / _____

L.S.

Date of sale*:

Supplier: _____

< ___ > _____ 20__.

_____ / _____

L.S.

*The field "**Date of sale**" shall be filled in by the Supplier of the electromagnet. If this field is not filled in, the warranty period shall be counted from the **date of manufacture** of the device.

13. REPAIR DETAILS OF ELECTROMAGNET EMA-200

Date	List of works	Signature

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