Octane Number Meter
‘OCTANOMETER’
PE-7300

Passport and Operation manual

Version 1.5EN dated 20.08.2015

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CONTENTS

1. INTRODUCTION

1.1. This passport and operating manual certify technical specifications of Octane number meter "Octanometer" PE-7300 (further mentioned as octanometer or instrument) guaranteed by the manufacturer.

1.2. The document contains the basic technical specifications of the octanometer and operation instructions. Please become familiar with this document for undisturbed operation.

1.3. The manufacturer makes the warranty service and repair of octanometer.

2. FUNCTION

2.1. Octanometer is intended for determination of Research Octane Number (RON) and Motor Octane Number (MON) of automobile petrol and cetane number of diesel fuels during the operational check over field and laboratory conditions.

Range of application:

- testing laboratories of the petroleum refineries and petroleum storage depots for the control of stability of technological processes;
- agencies carrying out petroleum products quality audit for conformity to requirements of national standards;
- research laboratories.

3. THE COMMON DATA ABOUT THE INSTRUMENT

3.1. The principle of operation of the Octanometer is based on comparison of dielectric properties of petrol (diesel fuel) with a reference values stored in computer database taking into account the temperature correction.

3.2. The Octanometer can be connected to a personal computer via USB interface for further data processing.

4. TECHNICAL SPECIFICATIONS

4.1. Types of controllable fuel ..... Automobile petrol and Diesel fuel

4.2. Octane number range .....66÷98

4.3. Cetane number range .....30÷70

4.4. Measurement error:

- octane number, no more ..... ±1.0
- cetane number, no more ..... ±1.0

4.5. Measurement time, no more than, sec 10

4.6. Power supply:

- battery..... model 6F22, voltage 9V
- adapter..... DC 12V/25mA

4.7. Continuous running time, hours 10

4.8. Operating conditions:

- ambient temperature, ^{o}C..... -10 ÷ +35
- relative humidity, %@35°C..... 95
- atmospheric pressure, mm Hg ..... 630÷800

4.9. Overall dimensions:

- electronic block, WxLxH, mm, no more than 76x210x23
- sensor, DiaxH, mm, no more than 48x110

4.10. Total weight, kg, no more than..... 1.2

including:

- electronic block, kg, no more than 0.8
- sensor, kg, no more than 0.3

4.11. Mean Time Between Failures, not less than, hours 1000

5. DELIVERY SET

Electronic block .....1 piece
Sensor .....1 piece
Power adapter .....1 piece
Beaker 100 ml.....1 piece
Case .....1 piece
Magnet .....1 piece
Passport .....1 piece

Additional items for instrument with USB connection feature are listed in the paragraph 8.

6. STRUCTURE AND THE PRINCIPLE OF OPERATION

6.1. Appearance of the electronic block is shown on Figure 1.

6.2. The principle of operation of octanometer is based on measurement of permittivity of hydrocarbons.

6.3. The sensor of the device is equivalent to capacitor where the petrol is used as a dielectric. Since the sensor as a capacitor is used as the time-setting element for pulse generator, so generation frequency is strictly depend on filled gasoline permittivity. The microprocessor unit compares the frequency value corrected with regard to a temperature with values stored in a database and find out corresponding octane number. The database of the instrument contains the information on petrol according to GOST R 51313-99.

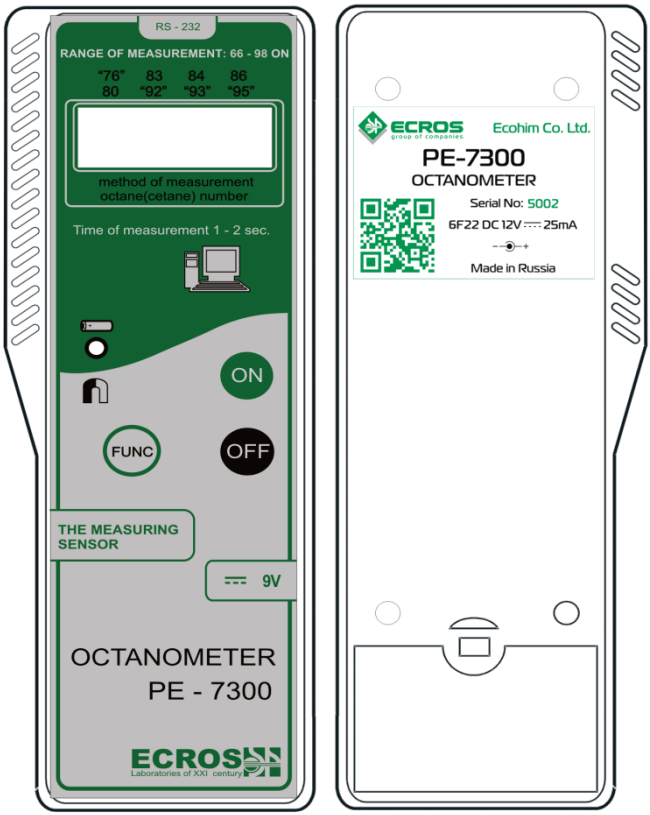

Figure 1 - Appearance of instrument

7. PROVISIONING AND OPERATION PROCEDURE

7.1. PROVISIONING

7.1.1. Open a cover of the battery compartment at the back side of the instrument, connect the battery and close the cover (do this before the first run only).

7.1.2. Connect the power adapter if necessary.

7.1.3. Do not fill the sensor with a fuel. Power up the instrument with 'ON' button.

7.1.4. Ensure the operating capacity of the instrument: display readings should be '**RESEARCH MET ON=0.0**'.

7.1.5. At the first run perform the correction removal according to paragraph 7.3.8.

7.2. OPERATING

7.2.1. Remove the sensors cover, collect 75-100 ml of tested petrol to the beaker and slowly fill the sensor full to the brim.

7.2.2. Read out the displayed value of octane number.

7.2.3. To change the measuring mode to MON press 'FUNC' button. The display will change to '**MOTOR MET ON=X.X**' with corresponding octane number.

7.2.4. To switch to the cetane number determination press 'FUNC' button one more time. '**AKI. ON=0.0**' will be displayed. After that press 'ON' button until '**MENU 2. CETANE**' display appears. Then press 'FUNC' button – '**CETANE NUM. ON=X.X**' will be displayed.

7.2.5. In order to save measured value into the memory press 'ON' button until '**MENU 4. SAVE**' display appears, then press 'FUNC' button – '**Is kept Under X**' display appears and then turns back to measured value.

7.2.6. The instrument can store in the memory up to 10 measured values, further savings will replace older stored data. To clear the memory press 'FUNC' button until '**MENU 5. CLEAR**' display appears and press 'FUNC' button – '**The meanings are removed**' display appears and then turns back to measured value.

7.2.7. Empty the sensor and remove the rest of diesel fuel or gasoline of

unknown formulation by repeated rinsing with lead-free gasoline.

7.2.8. Always fill the sensor with petroleum products only. On completion of work close the sensors cover and put the instrument into the case.

7.3. DATA CORRECTION

Manual correction

PERFORMING THE CORRECTION

7.3.1. Data correction procedure for each mode (MON, RON and cetane number) is similar, but has to be performed separately for each mode.

7.3.2. Turn on the instrument, fill the sensor with a known fuel and switch to the desired mode. Wait for readings stabilization.

7.3.3. Bring the magnet closely to the place marked with symbol at the front panel to 0.5-1 second until '**Correction**' display appears.

7.3.4. Choose '**Correction 2. Octane**' display pressing 'ON' button and then press 'ON' button to enter correction coefficient editing procedure.

7.3.5. Set a necessary coefficient using 'ON' and "FUNC' buttons. The 'ON' button press increases a value for 1/10 of octane number. The 'FUNC' button press decreases a value for 1/10 of octane number.

7.3.6. To save the performed correction bring the magnet closely to the place marked with symbol at the front panel to 0.5-1 second until initial data display turns back.

7.3.7. If correction coefficient is not zero, the additional 'K' symbol will display meaning corrected data.

REMOVING THE CORRECTION

7.3.8. Turn on the instrument.

7.3.9. Bring the magnet closely to the place marked with symbol at the front panel to 0.5-1 second until '**Correction 2. Octane**' display appears.

7.3.10. Set correction coefficient to zero (see paragraph 7.3.5).

7.3.11. Bring the magnet closely to the place marked with symbol at the front panel to 0.5-1 second until initial data display turns back.

7.3.12. Turn off the instrument with 'OFF' button.

Computer correction

7.3.13. The computer correction is carrying out using two standard samples of fuel with known octane numbers. It is desirable to use standard samples with a maximal difference between their octane numbers. You should remember that the correction is calculated for each method separately and is kept in memory of device as well as in computers memory.

7.3.14. Attention! The proper work of instrument with PC connection is only possible using the power adapter supply.

7.3.15. Connect supplied cable with DB9 m connector to the 'RS-232' connector at the top part of instrument and with USB A connector to the proper PC port.

7.3.16. Run previously installed 'PE-7300 USB' software at the PC to calculate and write down correction coefficient into the instruments memory. The detailed procedure is descripted in the software manual.

8. CONNECTION TO THE PC AND SOFTWARE FEATURES

Delivery set:

CD with software ..... 1 pcs;
DB9 m - USB A cable ..... 1 pcs.

Software allows:

1. Process measured data received from measuring unit.
2. Store and print out measuring results.
3. Automatically calculate up to 24 points computer correction table using two measured values of octane number.
4. Record calculated correction table to the measuring unit (up to 8 user tables per method), change and delete tables.

PC Connection

1. Attention! The proper work of instrument with PC connection is only possible using the power adapter supply.
2. Connect supplied cable with DB9 m connector to the 'RS-232' connector at the top part of instrument and with USB A connector to the proper PC port.

9. SOFTWARE INSTALLATION

9.1.1. Run setup.exe located at the root directory of CD and follow step-by-step instructions.

9.1.2. Run application using ‘PE-7300 USB’ shortcut at the desktop or in the ‘PE7300’ program group.

10. TROUBLESHOOTING

Cause	Solution
The instrument doesn’t turn on.	Checkup the battery, replace if necessary.
The LED at the face panel of the electronic block shines.	The battery doesn’t provide enough current. Replace the battery.

11. MANUFACTORING INFORMATION

PE-7300 ‘Octanometer’

serial number:

date of production:

is manufactured and checked according to TU 4215-026-23050963-2003, technical documentation and national standards of Russian Federation.