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BLASTING OHMMETER

OSH – 1

BLASTING OHMMETER TESTER

OSH – 1T

OPERATING MANUAL

IO 1120

CONTENTS

1 DESTINATION

Blasting ohmmeter type OSH-1 is designed for precise measurement of the resistance of blasting lines, blasting circuits and single electric detonators. Measurements may also be carried out in mine faces, close to loaded explosion material in blast holes. The device has two measurement ranges, 00.00Ω to 99.99Ω and 100.0Ω to 1999.9Ω and, therefore, may measure any blasting network with electric detonators.

The switching-on and change of measurement range is done automatically. Blasting ohmmeter type OSH-1 has category M2 and can be used in all mines susceptible to methane /coal dust. In case of appearing firedamp, ohmmeter must not be used.

2 SPECIAL WORKING CONDITIONS

Blasting ohmmeter type OSH-1 can be used after meeting the following conditions:

a) The place of use of the ohmmeter must be safe, in case of appearing firedamp /coal dust, ohmmeter must not be used.

b) The device can be used only by trained blasting technician. The training program includes reading following instruction.

c) The device only purpose is resistance measurement of blasting lines, blasting circuits and single electric detonators. The measurements can be done in mine faces when detonators are inside the bullets of explosives, placed inside blasting holes. Measurements should be done in accordance to instructions approved by the relevant departments.

d) It is forbidden to use the device for purposes other than measuring blasting circuits resistance, especially the measurements of electrical circuits.

e) The device must be used only in the etui.

f) Each time, before giving the ohmmeter to the blasting technician the device must be checked with the OSH-1T tester. The OSH-1T tester must be used only in places witch are NOT susceptible to firedamp/coal dust, and away from electrical detonators.

   The checking procedure is described later in this manual.

g) Only Zinc – Carbon batteries described below may be used in the ohmmeter:

Type:	*Manufacturer:*	*Name:*
6F22R 9V	PANASONIC	SPECIAL POWER
1604S 6F22 9V	GP BATTERY	SUPERCELL, SUPER HEAVY DUTY
6F22 9V	PHILIPS	LONGLIFE
E-BLOCK 6F22 9V	VARTA	LONGLIFE

h) At least once a year ohmmeter should be checked in detail (periodic inspection), but if ohmmeter is used in methane fields – inspection must be done at least once per 6 months. The results of inspection should be noted.

3 CONSTRUCTION

Ohmmeter OSH-1 has a casing made from high quality ABS plastic. The casing consists of 2 parts. There are the A/D converter, the auto-range system and the LCD screen in the top part of the casing. In the bottom part of the casing there are measure terminals and circuits that provide intrinsically-safety and safety of use. The elements of bottom part are encapsulated with silicone. There is an information plate on the bottom side of the device. The device does not have a power switch or button changing measure range. Turning on the device and changing the range is automatic. Ohmmeter shall be used in provided leather etui. It protects the device from mechanical damage.

4 WORKING DESCRIPTION

The ohmmeter is turned off when the measure terminals are unconnected or open-circuit. The device turns on when a resistor of less than 30 kΩ is connected to the terminals. Depending on the connected resistance, ohmmeter automatically selects the appropriate range from 00.00Ω to 99.99 Ω or from 100.0Ω to 1999.9Ω . While measuring there may appear an information about low batteries on the screen: „LOW BATTERY". In that case the measurement should be ended and the batteries should be replaced. Battery replacement is not permitted in the blasting zone, and in zone endangered by methane and/or coal dust.

5 TECHNICAL DATA SHEET

-	Measure ranges:	00.00 ÷ 99.99 Ω and 100.0 ÷ 1999.9 Ω auto-range
-	Measurement accuracy:	±2%
-	Max. measure current:	≤ 1 mA
-	Max. emergency current :	≤ 5 mA
-	Digital readout:	LCD display 4 and 1/2 digits,
-	Power supply:	Zinc-carbon battery 9V type 6F22
-	Power autonomy:	minimum 48h of continuous measurement,
-	Working temperature range:	from -10°C to +40°C
-	Casing internal protection:	IP-65
-	Dimensions:	152 x 83 x 33,5 mm
-	Weight:	0,4 kg
-	Scope:	for classes of detonators: I, II, III, IV by EN 13763-1 and 0.2, 0.45, 2, 4 A
-	Explosion-proof mark	Ex I M2 IP65 CE
-	Type test certificate	KDB 05 ATEX 093 KDB 05 EXP-D 01
-	The device meets the requirements of the standards:	PN EN 60079-0: 2009 PN EN 60079-0: 2009

6 HANDLING OHMMETER

Each time before giving ohmmeter OSH-1 to blasting technician, the device must be checked:

- ***Check the etui and housing.***
  Check if the etui and housing have any mechanical damages, cracks and distortions. In particular, pay attention to signs that may indicate an attempt to interfere with the construction of an ohmmeter.

- ***Check the insulation of measuring terminals.***
  When the measuring terminals are open, the ohmmeter should be turned off, also the display should be turned off. Otherwise, clean and dry the space between the measuring terminals. This applies to the housing and the etui.

- ***Check the battery condition.***
  To check battery condition it is necessary to make short-circuit between of measuring terminals for at least ten seconds. After this period of time ohmmeter should show a value of no more than 00,01 Ω, and message "LOW BATTERY" should not appear on display. Otherwise, replace the battery.
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- ***Check the measuring current of the ohmmeter.***
  To check the measuring current it is necessary to use OSH-1T tester. Checking should be performed in the following order:
  1. With the open terminals of tester switch-on the "AUTOTEST" switch. The measuring tip should lean from "0" position to the marked area. Otherwise, the OSH-1T tester battery should be replaced. If replacing battery within the tester does not help and the "AUTOTEST" still does not work it means that the tester is damaged.
  2. The cables of the tester should be connected to ohmmeter terminals. The cable with red tip connect to right terminal of ohmmeter (view from side of proper using). The ohmmeter should turn-on and display the resistance 1Ω±0,1Ω
  3. Turn-on and shortly after - turn off the "AUTOTEST" switch. During that time observe the measuring tip. The tip should lean smoothly from zero to the end of the scale, and then fall to zero. Measuring tip should move smoothly in all range of scale. Otherwise it means that the tester is damaged.
  4. Turn-on the "POMIAR" switch. The measuring tip should lean from "0" position to marked area.

  If all of above points are positive then it is considered that the ohmmeter and the tester are properly working, and the ohmmeter measuring current has a safe value.

7 PERFORMING MEASUREMENTS

Connect the unisolated wires of measured blasting circuit or detonator to the measure terminals of ohmmeter. If there is no result on display, it means that the circuit is broken or the resistance of the circuit is greater than 30 kΩ. If screen displays „1 - - - . -„ it means that the value of measured resistance is out of range – greater than 1999.9 Ω. Value of measured resistance from

0 to 1999 kΩ is automatically matched to the appropriate range 00.00 ÷ 99.99 Ω or 100.0 ÷ 1999.9 Ω. The result of measurement should be compared with the calculated or estimated resistance of blasting circuit, its fragment (branch) or detonator.

During measurement, if the display shows text: „LOW BATTERY", you should end the measurement due to battery discharge below the acceptable limit.

After work, the ohmmeter should be returned to the issuing person.

8 OPERATING NOTES

- The ohmmeter cannot be stored with discharged battery.
- Do not connect any voltage sources or circuits and devices other than blasting circuits to the measure terminals, because it may cause damage..
- Ohmmeter OSH-1 must be used in provided etui.
- Ohmmeter OSH-1 with damaged housing or etui cannot be used.
- Ohmmeter OSH-1 and his etui should be kept clean.
- The space between measure terminals cannot be wet or humid due to the possibility of battery discharge.
- Ohmmeter can be used in ambient temperature from –10°C to +40°C, However, long keeping at a temperature below 0° C and above 30° C reduces its battery life.
- The Ohmmeter Tester OSH-1T can be used only in safety zone, not endangered by explosion of methane and/or coal dust.

9 STORAGE AND TRANSPORT

Ohmmeter OSH-1 should be transported in a manner that protects it from direct exposure to the weather and against mechanical shocks and vibrations. In transport or while moving pay attention to measuring terminals, if they are not shorted by metal objects.

Ohmmeter OSH-1 should be stored in its etui, in dry, after thorough cleaning of the housing and measuring terminals. The ambient temperature should be between +5°C do +30°C. The atmosphere must be free from aggressive, corrosive substances. During longer storage time, the battery should be removed.

WARNING !

In the case of worn out the product should be removed from service. Disposal of waste equipment should be carried out in accordance with the standards adopted in the territory of the consumer related electronic equipment.

10 ACCESSORIES

The Ohmmeter OSH-1 is supplied with etui and the following documents:

- Operating Manual
- Declaration of conformity EU
- Factory certificate

11 CONCLUDING REMARKS

– The Ohmmeter OSH-1 and OSH-1T tester are carefully tested by the manufacturer HASO S.C. or by GIG KD Barbara.

– Repairs must be performed by manufacturer HASO S.C. or delegated unit only.

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The content of this manual has been agreed with the GIG KD „Barbara" in Mikołów.