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**CAPACITIVE BLASTING MACHINE TESTER**  
***HZKT-100***

**USER MANUAL**

**IO 10370**

ED: 00/17/WS/ENG



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## 1 PURPOSE

Capacitive blasting machine tester is device designed for testing HZK-100 and HZK-100M capacitive blasting machines.

Tester is portable device, powered with replaceable batteries. After connecting to the blasting machine, the tester reads model, operating mode and serial number of blasting machine. The test involves checking the voltage, duration and energy of detonation pulse. Additionally condition of the blasting machine battery is checked.

## 2 TECHNICAL DATA

### Technical data of HZKT-100 tester:

Power	6F22 replaceable battery (carbon-zinc or alkaline)
Operating temperature range	from -20 °C to + 40°C
Relative humidity range	from 0% do 99% without condensation
External dimensions (without wire)	120 x 65 x 22mm
Weight	about 300 g
Ingress Protection Rating	IP54
Blasting machine nominal voltage	Un = 700V
Internal resistance	200 Ω ± 5%
Explosion-proof mark	⊕ I -/M2 Ex ia I Mb
EC-Type Examination Certificate	TEST 17 ATEX 0029X
EXP certificate	KDB 17 EXP-D 164

### Blasting line parameters:

<b>Z1-Z2</b>	Um = 800 V, Un = 700 V
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## 3 ACCEPTABLE WORKING CONDITIONS

### **3.1 Use restriction for potentially explosive rooms and zones**

Capacitive blasting machine tester HZKT-100 may be used in underground mines in all excavation areas with possibility of methane and/or coal dust explosion hazard. The condition is that the concentration of methane does not exceed the value specified in the separate safety regulations. HZK-100 may be also used in open-pit mining and borehole mining

The tester as M2 class device must be switched off after exceeding the appropriate threshold of methane concentration at the site of use. This applies above all to explosives

warehouses, areas which are used for detonation or any other places where there is explosion hazard of methane and/or coal dust.

#### 4 CONDITIONS OF USE

- The tester with visible damage must be withdrawn from exploitation
- The tester may be used only for testing measuring/firing circuit of the HZK-100 and HZK-100M blasting machine, manufactured by HASO S.C.
- The tester should be used by authorized and trained personnel only.
- The tester should only be used only in place for issuing blasting equipment
- The tester must be transported in leather holder
- Device should be protected against direct contact or closing in to source of extensive heat or high power wires or powerful magnetic and electric fields
- The battery may be replaced only in area without methane and/or coal dust explosion hazard.
- Only the following types of batteries can be used in the tester:
  - PANASONIC 6LR61 9V (alkaline)
  - PANASONIC 6F22 9V (carbon-zinc)
  - PHILIPS 6F22 9V (carbon-zinc)

#### 5 DEVICE CONSTRUCTION

Capacitor blasting machine tester HZKT-100 is shown in Figure 5.1.



Figure 5.1 Capacitive blasting machine tester HZKT-100

In the front of housing there is a four-button membrane keyboard and graphic LCD display. At the back of the device, there is plastic battery cover, secured with screw for replacing 9V battery (type 6F22 or 6LR61 only).

## 6 VERSIONS

Capacitive blasting machine tester HZKT-100 is available in one version, regardless of the type of HZK-100x blasting machine which will be tested.

## 7 HANDLING

### 7.1 Button functions

The HZKT-100 tester has four buttons ESC, UP, DOWN, OK. The buttons are shown in Figure 7.1

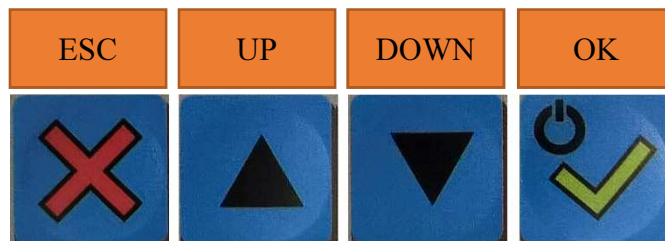


Figure 7.1 HZKT-100 tester buttons

### 7.2 Turning on/off the device

To turn on the device, press and hold OK button for about 1 second. During this time, the start screen is displayed, as shown below.



Figure 7.2 Start screen of HZKT-100 tester

The following information is displayed on the start screen:

- Serial number (SN)
- Firmware version (FW)

To turn off the device, press the OK button for about 3 seconds and then confirm with the same button. In addition, to save the battery, the tester will turn off automatically after 3 min of idle state.

If the battery level at the moment of starting the device is too low to ensure proper operation of the device, the message "REPLACE THE BATTERY" will be displayed instead of the start screen.

### 7.3 Time and date setting

When the device is turned on for the first time or when the device has been stored without a battery, the user must enter the current date and time.

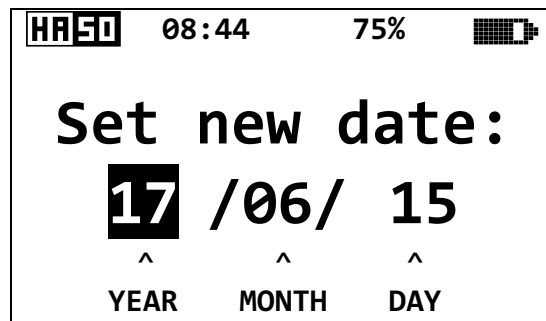


Figure 7.3 Date setting screen

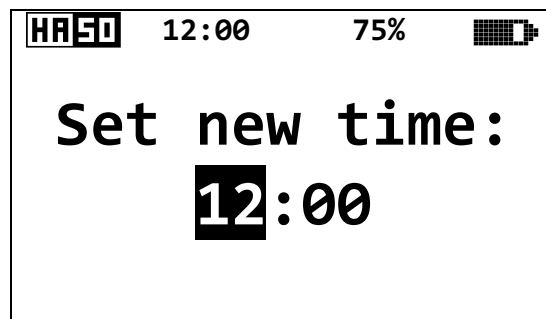


Figure 7.4 Time setting screen

The highlighted field is active. The value in active field can be changed with UP and DOWN buttons. The transition to the next position or screen is done by pressing OK. After entering all the settings, the device will show the main screen.

The next time the device turns on, the time and date setting screen will not appear. Instead, the device will immediately display the main screen. If there is a need to set a different date and time, this can be done from the settings menu.

### 7.4 Main screen

After turning on the device (with date and time set) the display will show the following message:



Figure 7.5 Message screen showing before the blasting machine is connected



When blasting machine is connected the main screen will be displayed:

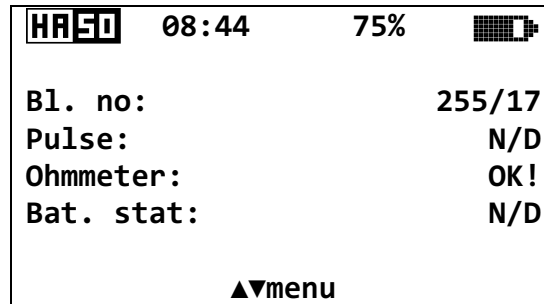


Figure 7.6 Main screen after connecting with blasting machine

Screen fields description:

- „Blaster no” – serial number of connected blasting machine,
- „Blast pulse” – blasting pulse status (N/D, OK or FAIL!),
- „Ohmmeter” – status of blasting machine’s ohmmeter (N/D, OK or FAIL!),
- „Bat. stat” – status of blasting machine’s battery (N/D, OK or FAIL!),
- „12:00” – time,
- „75%” – status of tester’s battery status
- “N/D” – no data

"Blast pulse" and "Bat. stat" are updated after the test of the blasting pulse. The remaining fields are updated after the blasting machine is connected and turned on.

## 7.5 Blasting pulse testing

The pulse test consists in measuring the energy and duration of the firing pulse.

When the tester is ready, at the bottom of the main screen you will see blinking message which says that that the tester is waiting for a blasting pulse. The pulse waiting screen is shown in the figure below:

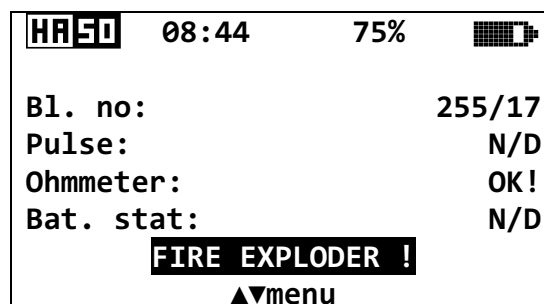


Figure 7.7 Main screen – waiting for blasting pulse

### ATTENTION !

When performing blasting machine testing, output voltage of blasting machine must be taken into consideration (see HZK-100x user manual - IO10360). Discharge into HZKT-100 testing circuit must be done when output voltage of blasting machine will be equal 700V (± 4V)!

**ATTENTION !**

After reading the serial number of the exploder and checking the ohmmeter, the tester switches off the communication, and waits for the blasting pulse. If there is need for termination of test and checking device with different serial number, the blasting machine must be disconnected. After disconnecting go to menu and select "New test".

After detection and measurement of the blasting pulse, on the screen there will be information about finished test:

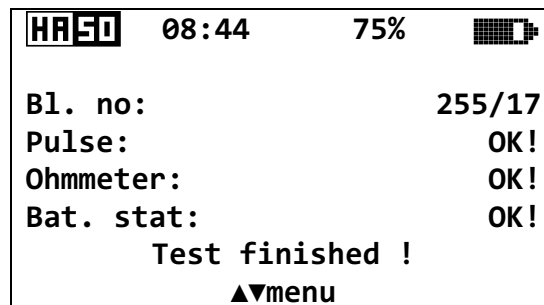


Figure 7.8 Main screen – pulse test is finished

If in all of fields (Blast pulse, Ohmmeter, Battery status) appears "OK!" message, this means that the blasting machine is working properly and can be used safely. The exploder may be disconnected and after that the OK button should be pressed. It will cause reset of previously connected blasting machine data and waiting for connection of new blasting machine will start.

When one of the fields shows "FAIL!" It means that blasting machine has not passed the test. In this case blasting machine cannot be used and must be returned to service. When measured blasting pulse does not meet the requirements for duration or energy, additional information will appear on the display:

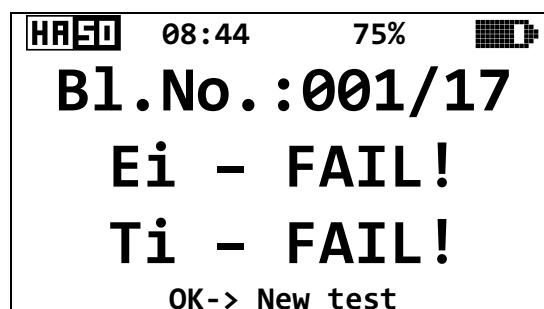


Figure 7.9 Information about blasting pulse error

There can be two kinds of blasting pulse errors:

- "Ei – FAIL" – incorrect pulse energy
- "Ti – FAIL" – incorrect pulse time

When the exploder does not pass the test, the test history menu can be checked to see what caused the test failure (see chapter 7.6.2)

**ATTENTION!**

**If the "FAIL!" information is displayed at any of the tested positions, the tested blasting machine should be sent for repair!**

## 7.6 Main menu

To access the menu press the UP or DOWN button from the main screen (Figure 7.6). The main menu has 3 items:

- „Clr. blast. data” - clearing current information about blasting machine
- „Test history” - history of recent tests
- „Settings” - device settings

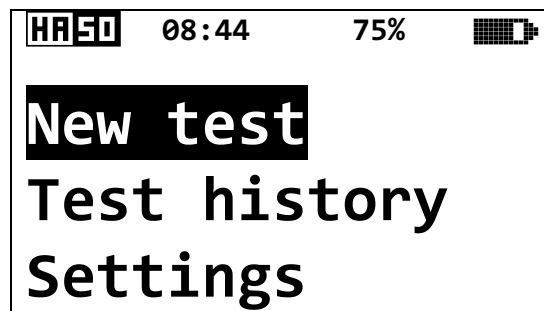


Figure 7.10 Main menu.

To navigate through the menu the buttons shown in Figure 7.1 are used. The item marked in the negative ("white letters" on the "black" background) is an active element. The active element can be changed with UP and DOWN arrow buttons. OK button is used to confirm selection, and the ESC button may be used to exit submenu. The main menu screen example is shown in Figure 7.10.

### 7.6.1 New test

When the test is completed and the exploder is disconnected, the tester displays the data of the last tested device. Before starting test of another blasting machine, press OK when main screen is displayed, or select "New test" from the menu and confirm selection with OK button.

The data of the currently tested blasting machine is stored while the tester is turned on. Switching off the device will have the same effect as selecting "new test". After selecting "new test" option, result of the last test can be viewed in "test history" menu.

### 7.6.2 History of blasting machine's tests

This menu contains the test reports of last 12 tests of HZK-100x blasting machines. The history is divided to four pages, 3 records per page. Example history screen is shown below:

<b>Test history 1/4</b>		
<b>1:</b>	<b>17/06/15</b>	<b>12:01</b>
	<b>001/17</b>	<b>E:TE</b>
<b>2:</b>	<b>17/06/15</b>	<b>08:01</b>
	<b>005/17</b>	<b>OK!</b>
<b>3:</b>	<b>17/06/15</b>	<b>15:45</b>
	<b>011/17</b>	<b>OK!</b>

Figure 7.11 History of tests. Page 1/4.

Screen fields description:

- 1 - number of record
- 17/06/15 - date of test Y/M/D
- 12:01 - time of test
- 001/17 - serial number of tested blasting machine
- OK! - result of test - passed
- E:0,2,0 - result of test – failed, after colon there is error code

Error code examples:

- E: TEB
  - E: E
- , where:
- T – means incorrect pulse time
  - E – means incorrect pulse energy
  - B – means worn out battery

### 7.6.3 Settings

The settings menu has 3 items:

- "Set date"
- "Set time"
- "Set language"

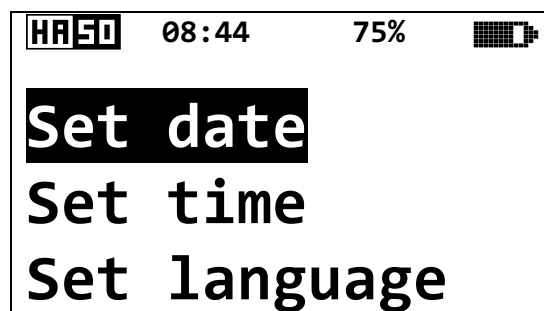


Figure 7.12 Settings submenu.

Description of how to set the date and time is in chapter 7.3.

In the "Set Language" submenu, there are two available options:

- "English"
- "Polish".

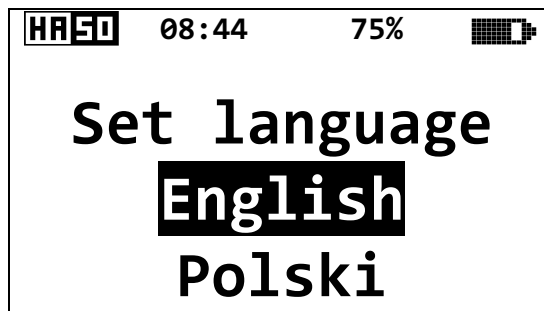


Figure 7.133 Settings submenu.

### 7.7 Additional informations about device errors

In case, when the user changes the tested blasting machine while waiting for the firing pulse, the HZKT-100 tester will detect the error:

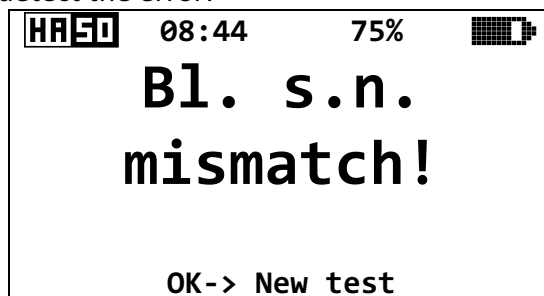


Figure 7.144 Settings submenu.

Also, errors corresponding to physical damage of the device may occur. In such case, screen similar to shown on fig. 7.12 may show up.

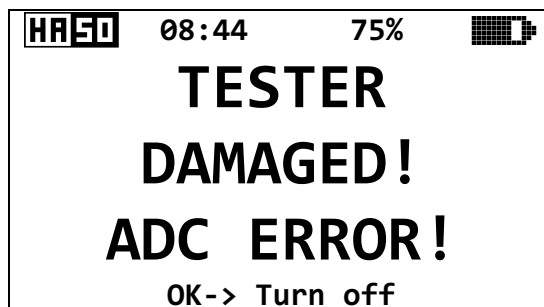


Figure 7.15 Settings submenu.

If this kind of a screen will show up, the device must be sent for repair.

## 8 PREPARING THE DEVICE FOR BLASTING MACHINE TESTING

- 1) The tester's cable (with special connector) should be connected to the blasting machine as shown in Figure 8.1.



Figure 8.1 Connection of HZKT-100 tester to HZK-100 blasting machine

- 2) If the HZK-100M version is used, MPS-1 methane detector must be connected to blasting machine. It will enable generation of blasting pulse. The method of connecting the methane detector is described in the user manual of the HZK-100 blasting machine.
- 3) Turn on the HZKT-100. When the main screen (shown in Figure 7.5) appears, turn on the HZK-100. Wait a few seconds for tester to read the data such as serial number, firmware version, etc, from the blasting machine.
- 4) After reading the data from HZK-100 the testing procedure described in chapter 7.5, may be carried.

## 9 MAINTENANCE

Mainly, the maintenance is to remove dirt from device housing and maintain good condition of cable with connector.

## 10 PERIODICAL INSPECTIONS

Periodical inspections must be carried out by a manufacturer, appraiser or user on the terms of the appraiser every 12 months or if used in methane fields every 6 months. Every working copy of the device should be inspected.

Periodic inspection consists of functional checking and visual inspection of the device.

### **10.1 Items subject to periodic replacement**

If there is need the battery can be replaced. The list of approved batteries is shown in chapter 4 of this manual. The battery may be replaced only in area without methane and/or coal dust explosion hazard.

### **10.2 Visual inspection**

Periodical inspections are necessary. The result of the check is positive if:

- the measuring cable for connecting the blasting machine is not damaged
- the housing has all screws (Torx screws and one sealed screw)
- the battery door has hexagonal screw,
- the housing and all components on housing are not damaged
- nameplate is readable and not damaged

## **11 EQUIPMENT**

The equipment of tester consist of:

- HZKT-100 Capacitive blasting machine tester
- 9V battery
- The proof of usability
- User manual
- Declaration of conformity EC

## **12 ORDERING INFORMATION**

The tester is offered under the name:

**HZKT-100 Capacitive blasting machine tester**

## **13 REPAIRS**

Repairs must be carried out only by the manufacturer's service point or units authorized by the manufacturer.

### **13.1 Spare parts and additional equipment**

The manufacturer supplies the following spare parts and accessories:

- 9V battery

## **14 STORAGE & TRANSPORT**

The tester of the blasting machine should be stored in the supplied packaging to protect it from mechanical damage and dirt.

The device may be stored in enclosed rooms with temperature between +5°C and +40°C and relative humidity not exceeding 85%. The atmosphere must be free of aggressive, corrosive substances.

Delivery should be carried out using enclosed means of transport. The package of the device must be labeled as 'fragile content'. Permissible transport temperature range is from  $-20^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$ . During transport, the device should be turned off.



**ATTENTION!**

**The product must be disposed of in accordance with the Waste Electrical and Electronic Equipment Regulation in force in the country concerned.**