

Thomas Instruments

Blaster's Digital Ohmmeter

#### 1. GENERAL

The Blaster's Digital Ohmmeter (BDOM) is the state of the art achievement of solid state technology. A LCD gives precise digital readout directly in ohms in 1-ohm steps, in a range of 1-2000 ohms. Accuracy is 1% of reading +/- 2 ohms. A 9-volt alkaline battery, powers the instrument. The battery is shock mounted in a compartment to prevent it from shaking or vibrating loose.

#### 2. SAFETY FEATURES

This instrument is approved by the United States Department of Labor, Mine Safety and Health Administration (MSHA), as being intrinsically safe.

The circuit has redundant current limiting loops to prevent current in excess of 5 milliamperes appearing across the terminals in a short circuit configuration.

#### 3. HOW TO PREVENT MISFIRES

This instrument is designed especially to prevent misfires of electric blasting circuits. Avoid improper blasting cap layout by:

- a) Using circuits consisting of series or series-parallel circuit.
- b) Calculate the resistance of each series.
- c) Balance each series to within + or - 2 ohms. This assures constant and equal current through each branch circuit. Walk carefully, counting caps and inspecting as you go,
- d) Do not use more caps than recommended by the blasting machine manufacturer.
- e) Do not exceed the firing source capacity as recommended by the blasting machine manufacturer.
- f) Keep the bare wire splices out of wet areas,
- g) Use only caps from the same manufacturer in a given blasting circuit.
- h) Always check the firing lead with the BDOM to assure there are no breaks and the insulation is good.
- i) Use adequate firing lead line gauge wire for the power source used. Keep the resistance low. (3 ohms or less as lead line resistance consumes power.)
- j) Make connections in accordance with standard manufacturers procedures. The twist wire loop is considered an excellent connection. When cutting and stripping wire do not nick the wire, as this may cause a break at any time.
- k) Check the blasting machine prior to use. Weak batteries may cause excessive firing delay or misfires.

#### 4. CIRCUIT TESTING

Prior to testing a firing circuit, the BDOM should be tested for operation. This is accomplished by placing a conductor across the terminals. Three zeros should appear on the liquid crystal display. If the zeros are not present, this is an indication the unit is defective. Return it to Thomas Instruments for calibration and repair. When the conductor is removed from the terminals the number 1 should be shown on the LCD. The LCD will be blank when the battery has been removed or discharged completely.

Circuit continuity and resistance of individual Electric Blasting Caps (EBC) should be checked before wiring them into the blasting circuit. This is done by removing the EBC shunt and connecting the leads to the terminals on the BDOM. The resistance value will be shown on the LCD.

The instrument, when connected to a firing circuit, will read the total resistance of all components in the circuit, i.e. leading line, EBC's and leg wire resistance. From this reading, the total given resistance of any given circuit can be determined quickly, accurately. A poor connection or open circuit may be located by connecting the BDOM to the lead line termination end. One person holds the instrument, making certain the connection is secure and monitors the LCD readout. A second person walks the shot, inspecting visually and physically, by moving the connections gently to detect loose connections or breaks. A loose or defective wire will give immediate fluctuation of the LCD readout. Normal readout will not be over 2000 ohms. If the reading is over this value of resistance, recheck the circuit to determine this cause.

#### 5. TYPICAL CAUSES OF DEFECTIVE BLASTING CIRCUITS

- (a) Poor connections.
- (b) Broken wires\*.
- (c) Series/parallel circuits connected in series, rather than series/parallel.
- (d) Unbalanced series in a series-parallel circuit.
- (e) Exceeding the blasting machine capacity rating.

\*A crack in the leading wire inside the insulation, usually at the ends which are flexed each time they are hooked to the circuit or the blasting control.

#### 6. CALCULATING BLASTING CAP CIRCUITS

Blasting cap circuits may be calculated by multiplying the resistance of a given cap by the number of caps in a series, i.e. 50 caps x 2.76 ohms=138 ohms. if two series circuits of 50 caps are wired in parallel, the total resistance will be approximately 1/2 to 69 ohms; if 3 series/parallel circuits, the resistance will be approximately 1/3; etc. Take into consideration, the minor variations in resistances per series due to different lengths of blasting cap leg wires, or uneven blasting cap holes per shot. Attempts to keep the series balanced cannot be over emphasized. Remembering current supplied to each branch circuit must nearly be equal to prevent some caps from not receiving enough firing current while another branch receives more than necessary.

More information may be obtained by referring to the Atlas handbook of electric blasting or the International Society of Explosives Engineers (I.S.E.E.) Blaster's Handbook.

#### 7. CHANGING BATTERY

Always change the battery away from the blasting circuit.

To change the battery in the BDOM, simply remove screw(s) from back plate, remove old battery and install new 9-volt alkaline battery, re-install back plate. Note: Thomas Instruments does not recommend the use of rechargeable batteries. The BDOM should be tested prior to each use. (Refer to CIRCUIT TESTING SECTION)

#### 8. WARRANTY

Thomas Instruments warrants its products to be free from manufacturer's defects for a period of one year from the date of purchase. This warranty covers all parts and labor except for abuse or neglect.

Thomas Instruments does not make any warranty of any kind, express or implied, other than the BDOM shall be of merchantable quality. The properties, characteristics, and methods discussed are based on research and experience and are believed to be accurate; however, Thomas Instruments does not warrant the suitability or applicability of the BDOM, and the purchaser should make their own tests for their particular purpose.

The information herein is subject to change without notification. Any errors or omissions in data or its interpretations are not the responsibility of Thomas Instruments, Inc. This equipment should be maintained and operated by technically qualified personnel.

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