MICKO 1 *Dual*



User and Maintenance Guide

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Introduction

All documentation of ***MICKO 1 Dual*** is part of the product and should therefore be preserved and properly used.

NTX ® has done every effort to ensure that the information contained herein is complete and accurate, but editorial or technical errors cannot be excluded. Risks assessment for blasting machine's use in specific contexts is responsibility of the users.

1. Features

MICKO 1 Dual box (code EQP.002.0006) includes:

- N.1 Blasting Machine MICKO 1 DUAL (ABS ergonomic case)
- N.4 Rechargeable Batteries NiMH 1.2 V >= 2000 mAh
- N.1 Battery charger (100-240V AC input @ 50-60Hz, 9V DC output)
- N.1 Carrying bag
- N.1 User's and maintenance guide
- N. 1 WARNINGS sheet

2. Before first use

	• ***MICKO 1 Dual*** must be used only by qualified personnel. • Before using ***MICKO 1 Dual*** read all the information contained herein and make some dry blast. • ***MICKO 1 Dual*** repairings must be performed only by NTX authorized personnel. • Modifications of any kind are forbidden and put the blasting machine out of warranty. • Parameters on the label and features should be checked according to each national legislation and regulation in any case Nitrex advice a conformity check at least once every year (in Italy DPR 128/59 requires a six-month check). • Before using ***MICKO 1 Dual***, verify that NTX revision certificate does not exceed one year.
	• **ATTENTION**! ***MICKO 1 Dual*** could generate dangerous high voltages, that might cause electric-shock or death. Ensure that the electric fire line is disconnected before turning on the machine.
	• Prohibition to open and / or modify the product.
	• Strictly forbidden to copy and / or distribute parts of this manual without the written authorization of NTX ®

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3. Packaging and disposal



- Packaging protects the equipment during transport. The original packaging should be conserved and used whenever it is necessary to transport the blasting machine.
- The product may contain lead. Take appropriate precautions to avoid direct contact and follow the legal requirements for the treatment and disposal.
- The product that is no longer usable or repairable, shall be disposed following the legal procedure.
- ***MICKO 1 Dual*** uses alcaline or rechargeable Ni-MH batteries (AA type capacity >= 2000 mAh); do not dispose exhausted batteries in the environment and do not throw them into fire, as they may cause explosions.
- Using alcaline batteries, do not use the battery charger, do not recharge.

4. Technical assistance and revision service

NTX recommends the customer to periodically control the blasting machine, according to local laws. In every case, NTX suggests to send the blasting machine to an authorized revision laboratory at least every 12 months.

For any needs of revision and certificate of compliance, repairs, training, or just for information please contact an authorized distributors or directly:

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5. General Description

MICKO 1 Dual is a new dual blasting machine based on a last generation multi-core controller. It delivers more than 40 Joules at 450 Volts to fire electric detonators circuits, in alternative, the same machine, fires one shocktube / nonelectric detonator.

All the functions of ***MICKO 1 Dual*** are controlled by a multi-core controller powered by battery AA type or Ni-MH rechargeable batteries.

The charge of the internal capacitor is generated by a power circuit based on MOSFETs, regulated by a PWM waveform. The flow of the out current occurs through a power SCR. The safety discharge of the capacitor is made by a TRIAC.

Two screwed clamps 'EL' allow the connection of the rheophores of the electric detonators.

A 'ST' shocktube clamp is in placed for nonelectric detonators firings.

The innovative ST clamp and the feature of the discharge circuit grant a reliable and long life usage.

Shelf life of single electrode for ST blast is about 200 firings plus additional 200 firings after the electrode registration.

It is recommended to have a spare electrode for ST blast.

MICKO 1 Dual uses several protection circuits increasing its reliability and safety:

- An independent watchdog timer, in case of failure of the multi-core controller, discharge and inhibit the charge of the internal blast capacitor.
- The charge of the internal capacitor is continuously monitored by means of an ADC and no overcharge is allowed. This feature allows the blasting machine to be ready for FIRE for a long time once charged, ready for an immediate FIRE ACTION with no more charging actions.
- To fire a blast (both the EL and ST) it is necessary to complete the charge of the internal blast capacitor and press SIMULTANEOUSLY both CHARGE AND FIRE buttons
- Release of the CHARGE button, activates a specific circuit for the fast discharge on an internal capacitor, driving the blasting machine in a safe status for spontaneous ignitions.
- After firing (with both EL and ST system) an acoustic tone (of about 2 seconds) is generated, indicating the completion of the discharge of the circuit.
- The status of the batteries is continuously monitored: light on BATTERY LOW led indicates that the battery is almost empty. Even under conditions of low charge (about 20% of the total charge) ***MICKO 1 Dual*** is able to fire the blast if it detects the sufficient voltage in the firing capacitor (but this will require much longer charging time of the capacitor). After the battery led lights up ***MICKO 1 Dual*** can fire maximum 5 shots.
- ***MICKO 1 Dual*** turns automatically off when the charge of battery is insufficient to guarantee a safe shot.
- ***MICKO 1 Dual*** has a connector to recharge the batteries. It is placed in the back, inside the battery compartment. The use of chargers 10VDC stabilized (delivered together with the instrument) is recommended. Charging time is minimum 2 hours, during this time the fire impulse is inhibited.

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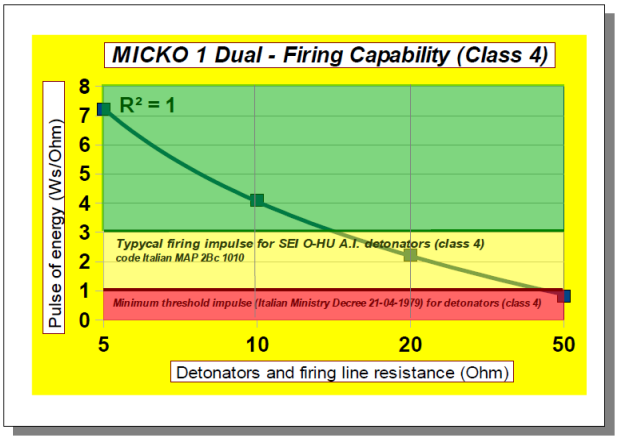
6. Technical Characteristics

Technical Characteristics		
Manufacturer	**NITREX S.r.l. - Lonato del Garda - ITALY**	
Detonator firing capability	**Single detonator** Total resistance firing line* and detonator (K safety =2)**	**Multiple detonators** Total resistance firing line* and detonators (K safety = 3)**
Class 4	**<=8 Ω**	**<=5,4 Ω (*4 detonators****)**
Class 3 - VA	**<=100 Ω**	**<=68 Ω (15 *detonators******)**
Class 2	**<=225 Ω**	**<=150 Ω (*84 detonators*****)**
Class 1	**<=375 Ω**	**<=250 Ω (*107 detonators*******)**
Firing capacitor voltage	450 Vcc	
EL blast energy	40 Joule (Ws)	
ST blast energy	Until 0.6 Joule (Ws)	
Internal safety resistance	1 Ω	
Weight	**Approx 550 g** *(with batteries)*	
Power supply	4 AA type 1.2 Vdc rechargeable Ni-MH batteries or 4 AA type 1.5 Vdc alkaline batteries (recommended capacity ≥ 2000 mAh)	
Power supply voltage	From 4.5 to 8 Vdc	
Batteries recharge voltage	From 9 to 10 Vdc (internal steady current controlled)	
Operating temperature	From -10°C to + 55°C : ***EN 60068-2-1:2007-04*** EN 60068-2-2:2007-09 Humidity 90% without condensing	
Storage temperature	**From -20°C to + 70°C** *(excluded batteries)*	
Conformity	**CE – EMC** : ***EN61000-6-2, EN61000-6-3***	
Authorization and classification	***Germany: BAM-ZM-458*** ***Italy: M.S.E. 3eA 2006***	

* Firing line copper 100 meters cross section 2 square millimeters

** For class 4 detonators K safety is calculated on firing impulse, for class 1,2 detonators K safety is calculated on firing current

*** Detonators with copper rheophores 6 meters lenght, 3 J/Ω firing pulse and 0.84 Ohm total circuit resistance (10% increasead for resistance connection)
**** Detonators with copper rheophores 6 meters lenght, 16 mJ/Ω firing pulse and di 1.78 Ohm total circuit resistance (10% increasead for resistance connection)
***** Detonators with copper rheophores 6 meters lenght, 5.5 mJ/Ω firing pulse and 2.33 Ohm total circuit resistance (10% increasead for resistance connection)
****** Detonators with resistance of 1,07 Ohm and 140 mJ/Ω firing pulse.



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7. Operative instructions

NOT PERMITTED IN GASSY ENVIRONMENTS

MICKO 1 Dual **Operation for correct usage**

PRELIMINARY CONDITIONS

Before connecting ***MICKO 1 Dual*** to the firing line or to the shock tube, ensure that all the safety conditions are respected, such as to assess the firing circuit resistance, the respect of the safety distance, the acoustic alert before fire, etc. Ensure that the detonators are within the shelf life given by the producer. These procedures are to be followed for each blast.

TURNING ON

Before switching on the blasting machine, ensure that the firing line is not connected to the blasting machine.

Hold down the button  to switch it on, after 4 seconds the blasting machine will run a self-diagnostic test. During this phase the LED in the front of panel will blink in sequence. After the self-diagnostic test, ***MICKO 1 Dual*** emits a short acoustic tone, indicating the end of the self-diagnostic test. Automatically ***MICKO 1 Dual*** placed itself on the "Shock tube" firing mode, signaled by the blinking red central light corresponding to the shock tube mode button. 

In case the red service lamp remain lit, DO NOT use the blasting machine and contact an authorized service center.

FIRING MODE

Press the button  to change between ST and EL mode and vice versa, as indicated by relative led.

To prevent the blasting machine to be snatched from hands at firing, ensure that the shock tube or firing line are secured to a fixed point close to the blasting location (i.e. in case of demolitions).

ST Mode *(Shock tube detonators)*	**EL Mode** *(Electric detonators)*
Do a sharp cross cut on the shock tube. Loosen the ST (central) brass screw. Firmly insert the shock tube inside the relative clamp.	Check the resistance of the firing line circuit (electric line and electric detonators) using an ohmmeter/tester. Loosen the EL terminal screws. Connect the firing line to the red and black clamps and tight well the screws.

CHARGING

Hold ***MICKO 1 Dual*** with both hands. Press and hold on the CHARGE button  with left thumb. The LEDs on the selected mode (EL or ST) will begin to blink red, indicating the charging. When the charge is completed, the LEDs start to blink green.

(Note: The LED indicator LOW BATTERY indicates that the batteries are running low. Even under low battery conditions MICKO 1 Dual is able to fire if it detects a sufficient voltage on the capacitor. MICKO 1 Dual turns power off when the batteries voltage is insufficient to ensure a safe shot. In this case remove the firing line or shock tube from their clamps, replace the batteries, and repeat the procedure from PRELIMINARY CONDITIONS.)

FIRE

To perform the shot, while holding the CHARGE button  , press FIRE button  with right thumb.

After the blast, ***MICKO 1 Dual*** emits an audible tone for 2 seconds indicating the completion of the discharge of the circuit.

TURNING OFF

MICKO 1 Dual turns down by itself after 3 minutes of non-use, emitting an audible tone for 2 seconds. Otherwise hold down the button  , after 4 seconds the blasting machine will turn off, emitting an audible tone for 2 seconds.

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8. Maintenance and precautionary measures

In order to maintain the full functionality and efficiency of your ***MICKO 1 Dual***, you have to follow some precautionary measures.



- Remove the batteries before long inactivity periods.
- Keep ***MICKO 1 Dual*** in a safe and dry place, keep out of reach of children.
- All electric and electronic parameters and discharging diagrams of your ***MICKO 1 Dual*** are filed by the constructor and supplied with the device. To request a copy of the diagrams or the audit certificate, please contact NTX workshop, indicating your S/N and enclosing a valid purchase document.
- Releasing the CHARGE button during charging, before pressing the FIRE button, will instantly discharge the capacitor to prevent accidental shots.
- NTX recommends the customer to periodically control the blasting machines, according to local laws. In every case, NTX suggests to send the blasting machine to an authorized revision laboratory at least every 12 months.
- For your safety, NTX ® recommends to keep a new (or charged) set of spare batteries and a new shock tube electrode with your ***MICKO 1 Dual*** kit.
- Clean ***MICKO 1 Dual*** using only a dump cloth. DO NOT use solvents or detergents.
- To ensure the maximum batteries life, ***MICKO 1 Dual*** should be stored at a temperature not below 0°C / 32°F.
- The use of ***MICKO 1 Dual*** is possible at temperatures down to -10°C / 14°F. For use of ST (Shock tube) at temperature lower than 0°C / 32°F, be careful to minimize the risk of condensation in the shock tube.

CAUTIONS WHEN USING SHOCK TUBE DETONATORS



- When using shock tube detonators at temperatures below 0°C / 32°F, you should be careful to minimize condensation risks inside the shock tube. For the shock tube activation at these low temperatures, it is convenient to leave it whole with its seal and shot it with an electric detonator.
- It is always recommended to use shock tubes within their shelf life and correctly stored in a dry place. On old shock tubes or if the tube had been stored in a place with high humidity, the explosive powder inside may have a reduced sensitivity, or partially detached from the internal walls, and less sensible to the ignition spark. To reduce the possibility of a misfire, it is recommended to cut the last meter (3 ft) of the shock tube, and then follow the shot procedure.
- The needles that generate the activation spark are subjected to wearing out. In this case it is possible, by the user or by an authorized lab, to replace the electrode, and fully restore the functionality. NTX recommends to send the electrode for maintenance to an authorized center after 200 sots and to replace the electrode after 400 shots.

9. Prohibitions



- DO NOT use expired, oxidized, or not properly preserved batteries.
- DO NOT shoot ST (Shock Tube) without connecting the shock tube line. If improperly used, the electrode will be damaged, and other internal electronic damages can also occur.
- DO NOT bump the unit. ***MICKO 1 Dual*** is resistant but violent bumps can damage or break the case. NEVER USE the unit if is damaged. Please contact an authorized service center.
- DO NOT partially or totally dip ***MICKO 1 Dual*** in water or other liquids. In case of immersion DO NOT turn the machine on. Remove the batteries, dry the unit especially around the electric con-

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tacts, shock tube housing, batteries housing. When completely dried, please contact the nearest authorized assistance center.

- DO NOT leave ***MICKO 1 Dual*** in too hot or too cold places. These conditions affect batteries state.
- DO NOT tighten the ST or EL clamps too much. This may damage the insulation, and may expose the operator to ELECTRIC SHOCK risk. In case of damaged electric connections immediately contact an authorized service center.
- DO NOT use ***MICKO 1 Dual*** as an hammer or as a lever.
- DO NOT use ***MICKO 1 Dual*** as energy source for other devices.
- DO NOT use ***MICKO 1 Dual*** in case of real or supposed damage status. In this case immediately contact an authorized assistance center.

10. Warranty

NTX guarantees repair or replacement of the products that present defects or malfunctioning, within the warranty limitation as follows.

The warranty does not include:

- Deterioration of the product due to its use.
- Defects caused by use of unsuitable or damaged batteries
- Defects caused by opening, or attempting to open, modification or repairing of the product lead by personnel not authorized, or if the serial number has been intentionally tampered.
- Damages caused by wrong or improper use
- Damaged caused by exposition of the product to intense humidity, steam, chemicals, dipping in liquids, product usage in extreme environmental or thermal conditions, corrosion, oxidation, spilling of liquids or foods.
- Damages, defects or failures caused by wrong storage, negligence, wrong use or abuse of the product.

No NTX seller, agent or employee is licensed to make any modification, extension or addition to the present warranty. The usage of the product by not qualified personnel makes the warranty invalid and is expressly forbidden.

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Notes

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