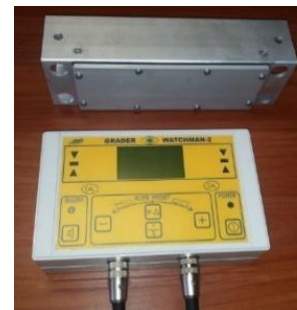


# Englo LLC

## Mining Product Overview



We develop, design and manufacture quality products since 1991

# Contents

- Blasting Machines and Line Testers ..... 3
  - Blasting Machines with Hand Generators ..... 3
  - Battery Powered Blasting Machines ..... 4
  - Blasting Machine Testers ..... 5
  - Digital Line Testers ..... 5
- Digital Inclinometers ..... 6
  - Grader and Bulldozer Slope Meters ..... 6
- Water Level Meters ..... 7
- Metal Detectors ..... 8
- Dosimeters and Radiation Detectors ..... 9
  - Handheld Dosimeters ..... 9
  - Handheld Radiation Detectors ..... 10
  - Vehicle mounted radiation measuring system ..... 12
- Digital Distance Measuring Devices ..... 12
- Material and Cable Length Measuring Devices ..... 13

# Blasting Machines and Line Testers

Englo develops, designs and manufactures a wide range of blasting machines and digital line testers for use in mining, military, civil and road construction and other applications.

Many Englo blasting machines come with built-in line testers that eliminate the need for a stand-alone ohmmeter, but stand-alone line testers are available as well.

Both integrated and separate line testers verify the detonator line resistance to identify short circuits, breaks in the blasting line or circuits with excessive resistance prior to the blast. This technology virtually eliminates misfires caused by detonator wiring problems, which is one of the leading causes of blast related injuries. For safety reasons, the line tester current is limited to 1mA.

Most of the products include output pulse tail cutting to limit the impulse to 4ms and quench the remaining capacitor charge. These safety features are necessary to eliminate potential secondary explosions of the flammable dust generated during the blast.

The blasting machines are portable, compact and lightweight, and can easily be operated by a single person.

The blasting machines can include hand generators or can be battery powered.

All Englo blasting machines are rated IP65 under the international IEC 60529 standard and are splash and dust proof.

## Blasting Machines with Hand Generators

By using hand generators the operator does not have to consider the quality and shelf life of a battery.

The blasting machines with hand generators support various firing voltages and come with various feature sets.

**As a new feature there is the digital ohmmeter used in ERNA-5.**

**PONGO: Push-Button Blasting Machine**

- Low energy blasting machine
- Push-button immediate firing impulse generation
- Supports blasting of up to two Class 1 detonators in series, with up to 120m total line length
- Ultra-lightweight

**ERNA-3: Hand Cranked Blasting Machine With Line Continuity Tester**

- Medium energy blasting machine
- Built-in line tester with two color LED

**BART-1: Hand Cranked Blasting Machine With Line Continuity Tester**

- Medium energy blasting machine
- Built-in line tester with two color LED
- Short 4ms output pulse
- Certified according to EN 13763-26

**ERNA-4: Hand Cranked Blasting Machine With Line Tester**

- Medium energy blasting machine
- Built-in line tester with selectable Class 1, 2 or 3 line resistance settings
- 3 two color LEDs for line resistance
- Short 4ms output pulse

**ERNA-5: Hand Cranked Blasting Machine With Digital Ohmmeter**

- Medium energy blasting machine
- Built-in ohmmeter with digital 0-999  $\Omega$  reader
- Short 4ms output pulse

**BART-2 and BART-2AS: Hand Cranked High Energy Blasting Machine**

- High-energy blasting machine
- Mechanical safety block engaged during connecting and loading the line
- Plastic details manufactured from antistatic plastics to avoid static electrical charge accumulation (BART-2AS)
- Removable crank handle
- Certified according to EN 13763-26

Product	Weight (kg)	Voltage (V)	Energy (J)	Line ( $\Omega$ )	Size (mm)
<b>PONGO</b>	0.15	11.5	0.03	11	$\varnothing$ 32, L= 95
<b>ERNA-3</b>	0.8	440	6.6	380	142 x 125 x 45
<b>ERNA-4</b>		560	12.8	500	
<b>ERNA-5</b>		560	12.8	500	
<b>BART-1</b>	1.3	900	9.3	700	200 x 143 x 55
<b>BART-2</b>	1.4	1250	88.0	1000	
<b>BART-2AS</b>	1.4	1250	88.0	1000	

**Battery Powered Blasting Machines**

Englo battery powered blasting machines are compact and ultra-lightweight and come with built-in line testers.

#### **GUERILLA: Blasting Machine With Line Continuity Tester**

- Lightweight
- Medium energy blasting machine
- Built-in line tester with two color LED
- Battery level indicator LED

#### **MARS-3: Blasting Machine With Digital Line Tester**

- Built-in line tester with digital 0-999  $\Omega$  reader
- Capacity level indicator LED
- Short 4ms output pulse

#### **MARS-2: Blasting Machine with Digital Line Tester**

- Lightweight
- Medium energy blasting machine
- Built-in line tester with digital 0-1999  $\Omega$  reader
- Battery level indicator LED
- Short 4ms output pulse

Product	Weight (kg)	Voltage (V)	Energy (J)	Line ( $\Omega$ )	Size (mm)
<b>GUERILLA</b>	0.3	250	2.1	150	170 x 82 x 34
<b>MARS-2</b>	0.5	440	6.6	380	200 x 100 x 50
<b>MARS-3</b>	0,34	500	8,5	450/180/36	170 x 88 x 33

## **Blasting Machine Testers**

The blasting machine tester VIGOR is designed for testing the impulse energy of Englo's blasting machines. The tester can be used in both indoor and outdoor conditions.

VIGOR can be customized for the specific blasting machine or blasting machine family that is being tested.

VIGOR doesn't need any batteries and is ready for immediate operation.

Product	Weight (kg)	Power supply	Protection level of tester case	Operating temperature ( $^{\circ}\text{C}$ )	Size (mm)
<b>VIGOR</b>	0.26	No batteries needed	IP67	-15 to +50, at 100 % relative humidity	170 x 88 x 33

## **Digital Line Testers**

Englo digital line testers can be used in conjunction with the blasting machines that do not already include a built-in line tester. The line testers are designed for safe testing of electric detonator lines or sections and the connecting cables.

The line tester accurately measures the line resistance over the full range between 0 to 1999  $\Omega$  and includes an LCD screen that displays the readout. Momentary and also continuous measurement modes are available.

The continuous mode is initiated releasing the TEST button after 10 seconds and it lasts indefinitely. This is useful in situations where the detonator line can be affected for some time prior to the actual blasting moment, such as intentional covering of blasting charges.

For safety reasons, the line tester current is limited to 1mA. The products are battery powered.

Englo digital line testers are rated IP65 under the international IEC 60529 standard and are splash and dust proof.

**OOM-4: Digital Line Tester**

- Highly accurate
- Full-range numeric line resistance measurement with display
- Continuous and button-based measurement modes

Product	Weight (kg)	Range ( $\Omega$ )	Resolution (%)	Max line resistance current (mA)	Size (mm)
OOM-4	0.23	0-1999	+/-0.5	1	140 x 69 x 34

## Digital Inclinometers

Englo’s product portfolio includes a number of different surface slope measuring devices or digital inclinometers to measure the slope or angle of roads, floors, pipes and other objects or surfaces with inclination.

The inclinometers are compact and easy to use. Handheld products, and products mounted to graders and bulldozers are available.

Englo’s digital inclinometers are rated IP65 under the international IEC 60529 standard and are splash and dust proof.

### Grader and Bulldozer Slope Meters

Englo offers products for a wide range of graders and bulldozers to regulate and control surface slope.

The devices come with two separate units – slope sensor with signal precision amplifier and slope measuring and control unit – that are connected by a flexible cable. The slope sensor unit is connected to the grader blade or bulldozer bucket and the slope measuring and control unit is attached to the window of the cabin, allowing the operator to view the measurement results and alarms directly from the cabin.

The products allow the operator to keep the blade or bucket slope at a desired angle with the aid of sound and light signals. Additionally, the devices allow the operator to measure slope of an existing surface by lowering the blade of the grader or the bucket of the bulldozer to the desired surface location and then taking the measurement.

Englo’s grader and bulldozer slope meters are rated IP65 under the international IEC 60529 standard and are splash and dust proof. The sensor units are rated IP68.

**GRADER WATCHMAN-2: Grader Slope Meter**

- Wide slope measuring range
- Alarms and signals to help keep the blade slope at desired angle
- Measurement with display
- Measurement results and alarms can be viewed directly from the cabin during operation
- Can be used during construction or to measure slope of existing surfaces

**DOZER WATCHMAN: Bulldozer Slope Meter**

- Wide slope measuring range
- Alarms and signals to help keep the bucket slope at desired angle
- Measurement with display
- Measurement results and alarms can be viewed directly from the cabin during operation
- Can be used during construction or to measure slope of existing surfaces

Product	Operating Angle (°)	Digital Display Max Angle (°)	Accuracy (°)	Sensitivity to longitudinal slope	Impact Resistance (g)
<b>GRADER WATCHMAN-2</b>	+/- 30	+/- 10	+/-0.1	0.1% slope to 45°	10,000
<b>DOZER WATCHMAN</b>	+/- 30	+/- 10	+/-0.1	0.1% slope to 45°	10,000

## Water Level Meters

Englo provides portable groundwater level meters to determine the groundwater level in bores and wells.

The water level meters are compact, lightweight and easy to use. The body of the device includes the electronics. The body is fastened to a measuring tape with a connector. A 30m measuring tape is included with the product but any measuring tape or cable can be used. Once the sensor reaches the water level, it sounds a signal to notify the user.

The groundwater level measuring devices are rated IP65 under the international IEC 60529 standard and are splash and dust proof.

### SOND-2M: Groundwater Level Meter

- Compact
- Measures any groundwater level depth (for >30m a different measuring tape is needed)
- Audible notification signal

Product	Weight (g)	Measurement Unit (cm)	Measurement Accuracy (cm)	Dimensions (mm)
SOND-2M	151	1	+/-1	32 x 235

## Metal Detectors

Englo develops, designs and manufactures lightweight handheld metal detectors.

These detectors can be used as metal detectors for accurate search of people and hand luggage control in the airports, ports and other public institutions. They can also be used for precise positioning of cables, wires and pipes in walls and concrete, or to search for metal objects lost in sand and other materials. Different types of metals can be detected.

All Englo's metal detectors are rated IP65 under the international IEC 60529 standard and are splash and dust proof.

### MINION-1 and MINION-2: All-Purpose Handheld Metal Detector

- Handheld
- Highly accurate
- Lightweight
- 3 sensitivity ranges with automatic adjust
- LED, vibration or sound-based detection indicator
- LED-based battery charge indicator

### METO-7: Ground Search Handheld Metal Detector

- Handheld
- 3 sensitivity ranges with range regulator
- LED, vibration or sound-based detection indicator
- Coil to cover larger surface area
- Short or long handle

Product	Weight (g)	Detection distance for 3g gold ring (cm)	Detection distance for 8x8cm metal plate (cm)	Metals Detected	Size (mm)
MINION-1 MINION-2	319 300	9.5	19	Magnetic and non-magnetic	375 x 55 x 30
METO-7	720	8	31	Magnetic and non-magnetic	∅ 250 coil diameter



# Dosimeters and Radiation Detectors

Englo develops, designs and manufactures a wide range of digital dosimeters and radiation detectors that can be used to detect alpha ( $\alpha$ ) and beta ( $\beta$ ) particles, gamma ( $\gamma$ ) rays and X-rays and radon (Rn).

Even though  $\gamma$  rays can be most prevalent in the contaminated environment, as they have tremendous penetrating power and would require several inches of dense material (like lead) to shield them,  $\alpha$  and  $\beta$  particles can be equally, or even more, harmful to the human body, especially when inhaled or taken in with food and water. Therefore, depending on the situation and source of the radioactivity, the capability to measure all three types of radiation is important and lifesaving.

Englo radiation detectors can also detect radon (Rn). Rn is gaseous under normal conditions and can easily be inhaled. It is often the single largest contributor to an individual's background radiation dose.

Englo's dosimeters and radiation detectors can be used in professional applications for survey and monitoring, including construction, mining, military, oil and gas exploration, nuclear sites and hospital radiology departments, and they are also ideal for personal use to determine whether there are hazardous materials in cellars, walls, or anywhere in the surrounding environment.

Englo's products are easy to use and are they are highly radiation sensitive. Depending on the product, different types of radiation can be monitored and detected. Clip-on and handheld devices, or systems that can be mounted to doorframes, indoor/outdoor walls or vehicles are available.

The versatility of the product portfolio makes them suitable for different customer requirements. For instance, Englo's products were widely used in Japan after the 2011 Fukushima nuclear disaster, but they can also be used by civilians or professionals to determine levels of radioactivity in user's everyday or work environment.

## Handheld Dosimeters

Englo's handheld personal dosimeters include a clip to fasten the device to the user's clothing and allow the measurement to be taken over a longer period of time, for instance for a duration of the time spent in a potentially hazardous environment.

The dose equivalent (dose) and dose equivalent rate (dose rate) with corresponding time and date are displayed on the device's LCD display. A silent and/or audible alarm alerts the user if the radiation dose or rate exceeds the programmable threshold level. An additional alarm indicates if the device battery is running low.

The measurement data is stored in the device memory and can later be transferred to a computer via Bluetooth interface.

### **NOVA-3b: Personal Gamma, X-Ray Radiation Dosimeter and Radiation Detector**

- Handheld or clip-on
- Lightweight
- Monitors and detects  $\gamma$  or X-Ray dose equivalent and dose equivalent rate
- Audible alarm with adjustable radiation dose and level threshold
- Stores data separately for individual users
- Data displayed as easy to read graphs
- Bluetooth interface

Product	Weight (g)	Type of Radiation	Max Dose ( $\mu\text{Sv}$ )	Dose Accuracy ( $\mu\text{Sv}$ )	Max Dose Rate ( $\mu\text{Sv/h}$ )	Dose Rate Accuracy ( $\mu\text{Sv/h}$ )	Size (mm)
<b>NOVA-3b</b>	105	$\gamma$	9,999,999	1	99,999.9	0.1	195 x 58 x 18

### **Handheld Radiation Detectors**

Englo's handheld radiation detectors are lightweight and easy to use. They are good companions when visiting areas with possible threat of radiation. The devices are very sensitive and can detect even small sources of radiation.

Visual and audible alarms alert the user immediately if the radiation dose rate exceeds the programmable threshold level. Each detected event is accompanied by a beep sound; a full alarm is sound for higher radiation levels. An LCD display is programmed to display the dose equivalent rate or number of radiation pulses in CPM.

The handheld radiation detectors have a precision mode for longer and more accurate measurement per location.

For some devices the collected data is stored in the device memory and can later be transferred to a computer via USB interface.

Both personal and professional devices are available.

**RADON-3: Handheld Alpha, Beta, Gamma, X-Ray Radiation Detector**

- Highly accurate
- Lightweight
- Measures and detects  $\alpha$ ,  $\beta$ ,  $\gamma$  and X-ray radiation
- LCD displays alarms and dose equivalent rate ( $\mu\text{Sv/h}$ ) or pulse frequency (CPM)
- Audible beeps for radiation detection events with full alarm for  $>10 \mu\text{Sv/h}$  dose equivalent rate
- Precision measurement mode
- Setup and control by a single button

**RADON-4: Handheld Alpha, Beta, Gamma, X-Ray Radiation and Radon Detector**

- Highly accurate
- Lightweight
- Measures and detects  $\alpha$ ,  $\beta$ ,  $\gamma$  and X-Ray radiation and Rn
- LCD displays alarms and equivalent dose rate ( $\mu\text{Sv/h}$ ) or number of pulse frequency (CPM)
- Audible beeps for radiation detection events with full alarm for  $>10 \mu\text{Sv/h}$  dose equivalent rate
- Precision measurement mode
- Setup and control by a single button

**PAKRI-E and PAKRI-EM: Professional Handheld Alpha, Beta, Gamma, X-Ray Radiation and Radon Detector**

- Highly accurate
- Very fast radiation detection time
- Measures and detects  $\alpha$ ,  $\beta$ ,  $\gamma$  and X-Ray radiation and Rn
- Large active area helps determine source of  $\alpha$  and  $\beta$  radiation
- LCD displays alarms and equivalent dose rate ( $\mu\text{Sv/h}$ ) or pulse frequency (CPM)
- Audible beeps for radiation detection events with full alarm for  $>10 \mu\text{Sv/h}$  dose equivalent rate
- Precision measurement mode
- Data can be stored (PAKRI-EM only)
- USB interface (PAKRI-EM)

Product	Weight (g)	Type of Radiation	Max Dose Rate ( $\mu\text{Sv/h}$ )	Dose Rate Resolution ( $\mu\text{Sv/h}$ )	Size (mm)
<b>RADON-3</b>	122	$\alpha$ , $\beta$ , $\gamma$ , X-ray	999	0.01	96 x 60 x 26
<b>RADON-4</b>	122	$\alpha$ , $\beta$ , $\gamma$ , Rn, X-ray	999	0.01	96 x 60 x 26
<b>PAKRI-E PAKRI-EM</b>	1,060	$\alpha$ , $\beta$ , $\gamma$ , Rn, X-ray	99.99	0.01	240 x 128 x 80

## Vehicle mounted radiation measuring system

SPECTATOR-2 is a vehicle mounted measuring system for measuring the radiation level in areas with radioactive contamination and mapping the surveyed areas. The SPECTATOR-2 measuring system is placed in a special case.

The SPECTATOR-2 measuring system can be installed on a passenger car, SUV or minibus. The system consists of a sensitive radiation sensor and a control unit located in the cabin. The radiation sensor is attached to the front part of the vehicle using a bracket, the control unit is attached to the windshield of the vehicle with a suction cup from the inside.

During measurement, radiation level is shown on the control unit display. Results are also saved to device memory. If the dose rate value exceeds the alarm level, an audible and visual alarm is triggered.

The measurement data is read to the computer via a USB cable. The computer software included with the device allows to prepare measurement reports, view graphs of measurement results and show measurement results on a map.

### SPECTATOR-2: Vehicle mounted radiation measuring system

- Compact, easy to set up and use
- Measures both gamma and beta radiation
- Real-time calculation and display of measurement results on LCD display
- GPS unit to determine and store measurement location
- Different measurement modes: dose rate ( $\mu\text{Sv/h}$ ) and pulses per second (CPS)
- Selectable averaging modes: fast (4 s), slow (16 s) average and precision (continuous average) mode
- Visual and audible dose rate alarm, alarm level can be changed

Product	Type of Radiation	Measurement range	Memory capacity (recording once per second)	Speed of the car when measuring
SPECTATOR-2	$\beta, \gamma$	0,05 – 100 $\mu\text{Sv/h}$ 1 – 1800 CPS	at least 240 hours	Maximum 60 km/h recommended

## Digital Distance Measuring Devices

Englo develops, designs and manufactures various high precision digital distance measuring devices that are perfect for use in civil and road construction, land surveys and many other personal and professional applications.

The distance measuring instruments include handheld distance measuring wheels or surveyor's wheels and bicycle-mounted distance measuring devices. The products are easy to use and provide quick and accurate results.

The distance meters can be used to measure the total covered distance and view length of individual segments by including both odometer and segment length readings. Rectangular area can be calculated

by a simple push of a button. When the user has exceeded the intended target endpoint, and wants to remove part of the recently covered distance from the measurements, he or she simply has to walk the digital distance measuring device backwards, and the reversed distance will be subtracted from the original results.

The measurement results can be viewed on the LCD screen of the product’s electronic unit. The measurement data is stored in the device memory and can later be transferred to a computer via Bluetooth interface.

The electronic unit of the distance meters is very energy efficient and one battery will generally last the user through a whole season, which reduces need for regular maintenance of the device. To further save energy, the electronic unit will automatically turn off after the device has not been used for a certain amount of time.

Englo’s digital distance measuring devices are rated IP65 under the international IEC 60529 standard and are splash and dust proof, and as such can be used in rainy weather or go through puddles.

**MR-3MT and MR-4MT: Digital Measuring Wheel**

- Handheld with wheel
- Lightweight
- Segment length and odometer readings
- Area calculation for rectangular surfaces
- Correction for exceeded target measurement endpoints
- Energy efficient
- Electronic unit with LCD screen
- Computer connection via Bluetooth

**BR-1: Bicycle-Mounted Digital Distance Measuring Device**

- Bicycle-mounted
- Lightweight
- Segment length and odometer readings
- Area calculation for rectangular surfaces
- Correction for exceeded target measurement endpoints
- Energy efficient
- Electronic unit with LCD screen
- Computer connection via Bluetooth

Product	Weight (kg)	Wheel Diameter (cm)	Measuring Unit (cm)	Accuracy (%)	Max Distance or Area (m)	Max Speed (km/h)	Height (cm)
MR-3MT	2.2	54	5	+/-1	19,999	10	760 – 1135
MR-4MT	2	34	5	+/-1	19,999	10	690 – 1035
BR-1	n/a	–	5	n/a	19,999	50	n/a

## Material and Cable Length Measuring Devices

Englo product portfolio includes high precision mechanical material and cable length measuring devices for the measurement of length of cable, rubber and plastic pipes or fabric and ribbons. These devices are highly accurate and greatly speed up the measurement process.

The material and cable length meters are handheld or stationary that can be mounted to tables or other support structures. Stationary digital length measuring system KMS-1 also includes a work desk and coil winder to measure out the required length of cable or wire and loop it for easy handling or shipment.

The length meters include both segment and odometer reading, and can be used to measure the material total length and/or view length of individual segments. When the user has exceeded the intended material length endpoint, and wants to remove part of the recently measured length from the measurements, he or she simply has to pull the measured material through the digital length measuring device backwards, and the reversed length will be subtracted from the original results.

The measurement results can be viewed on the product’s digital mechanical display.

Englo’s digital length measuring devices are rated IP65 under the international IEC 60529 standard. MS-2, MS-5 and KMS-1 include type certificates.

**MS-1: Digital Material Length Measuring Module**

- Fabric and ribbon length meter
- Highly accurate and lightweight
- Correction for exceeded target measurement endpoints
- Narrow wheel with rubber coating or wide riffled surface aluminum wheel

**MS-2: Handheld Digital Cable Length Meter**

- Wire and cable length meter
- Highly accurate and lightweight
- Correction for exceeded target measurement endpoints
- Lever for reset to zero
- Type certificate # SI 14-01-003 MID

**MS-5: Stationary Digital Cable Length Meter**

- Fastened to table or support leg
- Wire and cable length meter
- Correction for exceeded target measurement endpoints
- Lever for reset to zero
- Type certificate # SI 14-01-004 MID

**KMS-1: Stationary Digital Cable Length Measuring Device with Work Desk and Coil Winder**

- Comes with a working table, coil winder and MS-5
- Wire and cable length meter
- Correction for exceeded target measurement endpoints
- Lever for reset to zero
- MS-5 type certificate # SI 14-01-004 MID

Product	Weight (g)	Measuring unit (cm)	Counter Accuracy (%)	Max Distance Range (m)	Max Measuring Speed (m/min)
MS-1	153	1	+/-1	999.99	60
MS-2	673	1	+/-1	999.99	60
MS-5	689	1	+/-1	999.99	60
KMS-1	n/a	1	+/-1	999.99	60



Akadeemia tee 21/1, Tallinn 12618, Estonia \* phone + 372 670 2444

Englo reserves the rights to make changes to, or discontinue any products described in this document without further notice.