



Electronic Initiation System

Making electronic initiation more accessible

A practical step into electronic initiation, helping mining operations transition from non-electric systems to greater blast control, safety and performance with confidence.



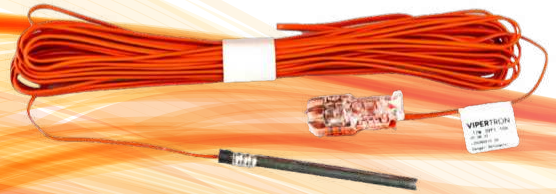
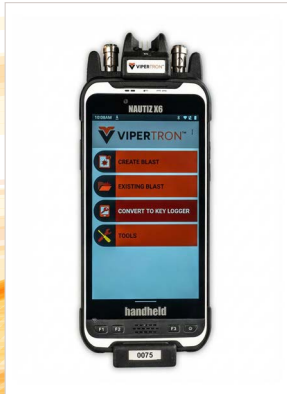
bme
BLASTING SOLUTIONS

Engineered for the next step in blasting

Mining operations are under pressure to improve productivity, safety and cost control while managing skills constraints and operational complexity. For many mines, the shift from traditional non-electric initiation to electronic initiation has been recognised as valuable – but often perceived as costly, disruptive or difficult to implement.

VIPERTRON® has been developed by BME to address this gap. It brings the core benefits of electronic initiation into a more accessible, intuitive and practical system, supporting mines that want greater timing accuracy, improved blast consistency and better control over blast outcomes.

Designed as a bridge for operations familiar with shock-tube and traditional initiation practices, VIPERTRON® supports a smoother transition to electronic initiation through straightforward system logic, intuitive workflows and reduced operational disruption.



A practical bridge to electronic initiation

VIPERTRON® is designed for operations seeking a reliable and cost-effective electronic initiation option, particularly those currently using non-electric systems.

It gives mines an opportunity to upgrade their initiation technology while preserving familiar bench practices and operational workflows. This makes it especially relevant for operations that want to improve blasting outcomes without introducing unnecessary complexity or destabilising established practices.

VIPERTRON® helps make the move to electronic initiation more achievable – delivering dependable functionality, operational value and improved blast confidence in a system designed around practical mine-site realities.



Core Benefits

1. Accessible electronic initiation

VIPERTRON® has been developed to make electronic initiation more accessible across the mining sector, helping mines move beyond the limitations of traditional non-electric systems.

2. Improved timing accuracy and blast control

With exceptional timing accuracy and programmable delays, VIPERTRON® supports more controlled burden relief, rock movement and fragmentation – helping mines achieve more consistent blast execution.

3. Built-in diagnostics and system integrity checks

VIPERTRON® incorporates diagnostics and system integrity testing before blasting, helping reduce the likelihood of misfires and improving confidence in blast execution.

4. Practical adoption for existing operations

The system has been designed around intuitive workflows and straightforward system logic, supporting mines that want to transition from traditional initiation methods with minimal additional training requirements.

5. Cost-conscious design

By focusing on the functionality that matters most to mining operations, VIPERTRON® has been designed to lower adoption barriers while retaining the technical benefits of electronic initiation.

Technical Feature Highlights

VIPERTRON® supports:

- Programmable delays for burden-relief-based blast design.
- Greater timing precision than traditional shock-tube systems.
- Comprehensive diagnostics and system integrity testing before blasting.
- Dual communication channels and high immunity characteristics for demanding mining environments.
- Up to 500 holes per blast and downline lengths of 25 m, according to the internal positioning guide.

Designed for mines ready to take the next step

VIPERTRON® is well suited to mining operations that:

- Currently use non-electric initiation systems.
- Want to improve blast consistency, fragmentation and vibration control.
- Need an electronic initiation system that is practical to adopt and aligned with familiar bench practices.
- Want the benefits of electronic initiation without unnecessary operational complexity.

VIPERTRON®

**SAFE
EASY TO USE
RELIABLE
EFFECTIVE RESULTS**

Description

VIPERTRON® is the ideal choice for current shock tube users / quarry and small mines seeking reliable, cost-effective electronic blasting solutions.

The VIPERTRON® electronic initiation system passes ARP 1717-1: The South African National Standard for the design and approval of EDD initiation systems for mining and civil applications.

Designed to meet the needs of clients who require high-quality performance but are budget-sensitive, VIPERTRON® combines user-friendly operation with the key benefits of electronic detonators which are precision, flexibility, and enhanced safety. The VIPERTRON® system allows new users to transition seamlessly into electronic blasting while maximising productivity and control.

VIPERTRON® is purpose-built to help clients convert from non-electric initiation to a modern electronic system with minimal disruption. It delivers the flexibility, timing precision, and traceability of electronics while keeping the field workflow simple for crews experienced with shock tube and conventional tie-ins. The system is suited to surface and underground mining, quarrying, and construction blasting.

The VIPERTRON® electronic initiation system is comprised of three components:

- VIPERTRON® Electronic Delay Detonator (EDD)
- VIPERTRON® Logger
- VIPERTRON® Blast Box

Application

VIPERTRON® is an electronic initiation platform designed around three goals: make the switch from non-electrics easy, improve blast outcomes immediately, and raise safety & quality assurance standards by default. The system combines rugged hardware with straightforward menus and an operator-led workflow, so blast prep feels familiar.

VIPERTRON® BLAST BOX



System Usage

All VIPERTRON® Blast Boxes are the same. Each VIPERTRON® Blast Box is configurable to a Combiner, Blaster Box or a Controller Box to accomplish its required function. Blast Box operation is simple, with double rotary switches for switching a box on, placing it in standby mode, and opening communications channels to fire the blast. Wireless communication is achieved through three selectable open-band frequency channels. Other frequency channels can be configured based on the country's requirements.

3.1 Blaster Box

VIPERTRON® Blast Box configured as Blaster Boxes is placed at each blast site and connected to the surface wire on the harness port. No power is supplied to the detonators until the system is armed from the Controller Box at blast time. Each Blaster Box can fire up to 500 detonators.

3.2 Controller Box

Only one Blast Box may be configured as a Controller Box per blast. The Controller Box requires the presence of a Key Logger to authorize arming and firing of the system. On arming of the system with the Controller Box, each Blaster Box then powers up its detonators, and testing routines automatically start and continue until firing time. Detonators respond by-exception, allowing quick testing time and immediate warnings to the operator through the color screen on the Controller Box and the Key Logger.

3.3 Combiner Box

A Blasting Box may be configured as a Combiner Box. The Combiner Box configuration is useful in quarry and construction blasting where the harness line-in from the blast can be directly connected (hard-wired) into the Combiner Box at the safe firing point. The Combiner Box

requires the presence of a Key Logger to authorize arming and firing of the system. On arming the system with the Combiner Box, the detonators are powered up, and testing routines automatically start and continue until firing time. Detonators respond by-exception, allowing quick test time and immediate warnings to the operator through the color screen on the Combiner Box and the Key Logger.

Testing

Final testing of the VIPERTRON® Electronic Delay Detonators and the harness lines are performed using the VIPERTRON® Logger before the harness line is connected to the Blast Box. After the VIPERTRON® detonators and the harness lines have cleared testing by the VIPERTRON® Logger, the harness line is connected to the Blast Box. The VIPERTRON® Blaster Box is switched on, and the unit performs a self-test. Once the self-test is completed the Blasting Box is switched into stand-by mode to open the communications channel – the detonators remain unpowered in stand-by mode.

Antennas

Two types of VIPERTRON® system specific antennas are available. The short-range antenna can be used for line-of-sight distances up to 1500 m. Depending on frequency allocation, the long-range ET Plate antenna can be used for line-of-sight distances between 1500 m and 5000 m.



Short-Range Antenna



Long-Range ET Plate Antenna

TECHNICAL DATA

Physical

Blast Box Housing	Hard Orange Plastic Case
User Interface	Color LCD with Variable Intensity
Screen Resolution	2000 x 1500 pixels
Battery	15V Li-Ion Rechargeable
Communication Ports	• BNC Port • Charge Port • USB Port • Harness Connector

Functional

Maximum Detonators Per Logger	500
Maximum Detonators Per Box	500
Maximum Blasters Per Controller	1
Maximum Detonators Per Blast	500
Minimum Detonators Per Blast	1
Controls	• Two Rotary Switches • Turn right to fire Blast in Controller/Combiner mode
Communication Ports	• BNC Port • Charge Port • USB Port • Harness Wire
Wireless Communication	5000m (Line of Sight)
Modem Frequency	158, 433, 868 or 915 MHz
Resistance to Electrostatic Discharge	• Electrostatic Discharge Immunity (+8 kV Contact, +-15 kV air) • Electrical Fast Transient / Burst Immunity (+-2 kV)
Operating Temperature	-30°C and +60°C
Storage Temperature	-40°C and +70°C

Disclaimer

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VIPERTRON® LOGGER



Logger Usage

All VIPERTRON® Loggers are the same. VIPERTRON® Loggers are robust, hand-held devices for the logging and testing of VIPERTRON® Electronic Detonators. These mobile devices are manufactured by Handheld and have a VIPERTRON® developed POD that docks onto the device. The POD contains the detonator communication circuit, and this enables the logging and programming of VIPERTRON® Electronic Detonators. The VIPERTRON® Logger can read and write to the detonator's non-volatile memory, test a single detonator, test multiple detonators and transfer the logged blast files to the VIPERTRON® Blast Box.

VIPERTRON® Loggers are easy and convenient to handle. They operate on the Android operating system which facilitates the upload of history files, current logging activity, reporting applications and web pages.

To operate VIPERTRON® Blasting Boxes (in Blaster mode) at firing time, one VIPERTRON® Logger is configured and designated as the Key Logger. The Key Logger generates a one-time pin to configure the VIPERTRON® Blasting Boxes (in Blaster mode). As a security measure, any VIPERTRON® Blasting Boxes (in Blaster mode) that has not been configured for a blast and bound through the one-time pin on the Key Logger will not function for that blast. At the safe firing point, the Key Logger and the one-time pin is also required to arm the VIPERTRON® Blasting Box (in Controller mode). Upon blast completion, all VIPERTRON® Loggers and Blast Boxes return to a neutral un-configured state, ready for use on the following Blast.

TECHNICAL DATA

Physical

Logging Device	Handheld NX6
User Interface	Color Touch Screen with variable intensity Buttons for use in extreme weather
Screen Resolution	5.25 inches; 1280x720 pixels
Operating System	Android 14
Battery	3.7V Li-Ion Rechargeable
POD Maximum Output	9V, 70mA (Intrinsic Safety)
Logger Mass	0.480 kg

Functional

Logger Functions	• Read and Log Detonator ID's • Program Fire Time (0-10s in 1ms Intervals) • Test Functionality (500 Detonators) • All Communication via attached POD
Testing Functions	• Line Current Consumption • Programmed or Not Programmed • Detonator Voltage • Testing for Missing Detonators • Testing for Intruders
Communication to Blast Box	• Bluetooth • Wired, Serial
Maximum Detonators Per Log File	500
Maximum Blasters Per Line Test	500
Maximum Detonators Per Blast	500
Resistance to Electrostatic	• Electrostatic Discharge Immunity (±8kV Contact, ±15kV Air) • Electrical Fast Transient and Burst Immunity (±2kV)
Operating Temperature	-30°C to +60°C
Storage Temperature	-40°C to +70°C

Disclaimer

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VIPERTRON®

Electronic Delay Detonator

Shipping Name	Detonator Assemblies Electronic Delay Detonators, programmable for blasting
Trade Name	VIPERTRON®
Product Name	VIPERTRON® Electronic Delay Detonator
Recommended Use	Electronic initiation system for explosive charge
Synonyms	EDD; Electronic Delay Detonator
Chemical Formula	Not applicable
Emergency telephone number	(+27) 11 706 3398



Composition/information on ingredients

Recommended Use: Electronic Initiation System for explosive charges.

Composition: Article composed of aluminium or copper alloy shell, wiring, connector and internal energetic materials

Energetic components: DDNP (primary charge), PETN/RDX (base charge)

Appearance: Copper or Aluminium shells closed at one end and connected to a length of yellow insulated copper wire which is terminated by a white, yellow or green connector at the other end.

The wire is arranged in a tubular spool configuration with the Copper or Aluminium shell and connector housed in the cavity of the spool. The spool is held together in a clear shrink wrap.

The electronic detonator assemblies consist of 3 parts that are interconnected: a Copper or Aluminium shell, a spool of wire and a connector.

Enclosed within the copper or aluminium alloy shell are a printed circuit board, a fuse head, a primary charge, and a base charge. The primary charge and base charge consist of DDNP and PETN/RDX respectively. Refer to product data information for the specific configuration.

Substance/preparation

Chemical name Metal and plastic composition articles	CAS No	% > 60	GHS Classification Not applicable
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First-aid measures

The construction of the items prevents any chemical contamination.

General: Treat symptomatically, detonator assemblies are explosive

Ingestion: Remove object, obtain medical attention. Physicians are to be made aware of the risk of detonation. Unlikely, but seek medical attention if it occurs.

Eye contact: In cases of eye injury or contamination, it is a sensible precaution to seek medical advice. Seek medical attention if exposed to fumes

Skin: Not applicable unless injury due to detonation. Obtain medical attention immediately.

Inhalation: If exposed to fumes from detonation, in a poorly ventilated area, remove the victim from exposure and loosen clothing. Allow the patient to assume a most comfortable position and keep warm. Keep at rest until fully recovered. Seek medical advice if the effects persist. Remove from exposure and monitor for symptoms.

Hearing: In the event of detonation in the vicinity, check the hearing system by a specialist.

Notes to physician: Treat symptomatically. Detonator assemblies are explosive – handle with care.

Fire-fighting measures

Specific hazards: Explosives material. Avoid all ignition sources.

Explosive hazard: Evacuate the area immediately and DO NOT attempt to fight a fire involving explosives.

Firefighting: Explosive. Severe detonation hazard when exposed to heat. In case of fire where the actual product is not involved, carefully remove the product to a safe distance, otherwise evacuate the area immediately and allow it to burn. On burning may emit toxic fumes. Firefighters

Accidental release measures

Personal Precautions: Avoid exposure to shock, friction, heat and ignition sources and anything that could cause a spark. Keep away from open flames or sources of heat. Shut off all potential sources of ignition

Environmental Precautions: Shut off all ignition sources. Collect and seal in properly labelled containers for collection. In the case of a transport accident notify the Police, Explosives Inspectors and BME (Tel No. - +27 11 709 8888). Explosives should not be abandoned at any location for any reason. It is important to notify the authorities in case of a transport accident. Collect only the intact articles, do not dismantle.

Handling and storage

Handling: No smoking or open fire is allowed in the vicinity. Heat or flame may cause detonation. Handle with care, preferably by hand. Avoid impact or friction.

Storage: Store in clean, dry licensed explosive magazine suitably licensed for Class 1.1 explosives, safe from electric and magnetic risks in compliance with rules of compatibility of storage of product in original packaging. Do not store directly on the ground. Do not store with explosives or flammable products. Recommended storage temperature range -5°C to +30°C. Do not subject materials to impact sparking or any type of heat. Keep away from electromagnetic fields, heat sources or static discharge.

Exposure controls/personal protection

National occupational exposure limits: No occupational exposure limits have been assigned for this specific material.

Engineering Measures: When test firing, ensure adequate ventilation, when exposed to fumes, to maintain air concentration below Exposure Standard. Natural ventilation should be adequate under normal use conditions.

Personal protective equipment: Hearing protection is recommended during controlled firing or test shots of the product. Eye protection using safety goggles are strongly advised when working with the product. Always wash hands before smoking, eating, drinking or using the toilet. A respirator is not required under normal and intended conditions of product use.

Physical and chemical properties

Appearance, form and colour: Copper or Aluminium shells closed at one end and connected to a length of yellow insulated copper wire which is terminated by a white, yellow or green connector at the other end. The wire is arranged in a tubular spool configuration with the Copper or Aluminium shell and connector housed in the cavity of the spool. The spool is held together in a clear shrink wrap.

Solubility: Insoluble in water.

Odour: Odourless

Thermal Decomposition: Explosion in the event of a rise in temperature/elevated temperatures.

Hazardous Decomposition: CO, CO₂, oxides of nitrogen.

Toxicological information

No adverse health effects if the product is handled per the Safety Data Sheet and the product label.

General: Exposure to fumes may cause skin irritation, long term exposure to lead residue may affect the blood and kidneys.

Ingestion: May cause irritation to the gastrointestinal tract. Keep under observation for possible lead poisoning. Long term exposure to low concentrations of lead may result in altered haemoglobin breakdown, kidney damage, anaemia and central and peripheral nervous system damage.

Eye contact: Fumes from detonation or fire may cause eye irritation

Skin contact: Only applicable in cases of detonation. Treat for shock, stop bleeding if applicable and obtain medical attention.

Inhalation: N/A

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Stability and reactivity

Stability:

- Stable under the recommended storage conditions.
- Detonation risk can occur from shock, impact, friction and excessive heating.
- Possible transmission of the explosion to all other detonators in the package.

Ecological information

Avoid contaminating waterways.

Disposal considerations

Disposal must be done through licensed explosives destruction services. Do not discard into the environment or general waste streams.

For small quantities: Follow destruction methods duly authorised by relevant authorities and internal Management procedures. Not to be thrown in sewers, natural environment or in refuse discharge. The operation of destroying pyrotechnical products by shooting or incineration must be carried out in a specially designated area by qualified personnel with the necessary safety measures in place. The procedures and instructions for the destruction of pyrotechnical products as well as the means of protecting personnel are to be defined by a safety study which fixes in particular maximum loadings according to the environment and the personnel to be protected. Explosive matters not to be mixed with priming devices at the time of the destruction of the latter.

For Large quantities: Should be returned to BME or be disposed of in conjunction with relevant authorities.

Waste Classification: Hazardous Waste.

Transport information

- **UN No:** UN 0511
- **Class/Division:** 1.1
- **Compatibility Group:** B
- **Classification Code:** 1.1B
- **Proper Shipping Name:** DETONATORS, ELECTRONIC programmable for blasting (When packed in special approved packaging and appropriately marked):
- **UN No:** UN 0513
- **Class/Division:** 1.4
- **Compatibility Group:** S
- **Classification Code:** 1.4S
- **Proper Shipping Name:** DETONATORS, ELECTRONIC programmable for blasting
- **UN No:** UN 0512
- **Class/Division:** 1.4
- **Compatibility Group:** B
- **Classification Code:** 1.4B
- **Proper Shipping Name:** DETONATORS, ELECTRONIC programmable for blasting

Regulatory Information

Based on the information available, this material is not hazardous, when it is based on adherence to safe working procedures.

The Explosives Act and the associated regulations apply.

Classified under SANS 10234 (GHS) as an explosive.

Note the explosive hazards classification, the transport hazard class and that it is in accordance with GHS requirements.

Other information

Product Name: VIPERTRON®, Electronic Detonators for blasting

This SDS summarizes, at the date of issue, our best knowledge of the health and safety hazard information of the product, and in particular how to safely handle the product in the workplace. As BME cannot control the use and handling of the product each user must review the MSDS in the context of how the user intends to handle and use the product in the workplace. This SDS was compiled as per the GHS classification system.

Hazards identification

Based on available information, this material is not classified as hazardous according to the health criteria of international authorities.

Classified as Dangerous Goods, under the UN Code for the Transport of Explosives by Road and Rail.

Class:

- 1.1B Explosive. When shipped or handled as UN0511 (Mass explosion hazard if it is initiated).
- 1.4S Explosive. When packed in approved 1.4S packaging, when shipped or handled as UN0513. (Very limited explosion hazard and it is designed so that the accidental functioning is confined to the packaging. It presents no significant blast hazard as it is packed and designed to mitigate explosive effects and engineered to cause minimal external impact).
- 1.4B Explosive when shipped or handled as UN0512. (No mass explosion hazard localized and limited explosive risk. Minor explosive hazard).

Poisons Schedule: None allocated

Additional Hazards: Toxic or irritant fumes: May be emitted on burning or detonation (e.g. Carbon Monoxide, Carbon Dioxide, Nitrogen Oxide, etc.). Avoid inhalation and ensure evacuation during a fire.

Hearing hazard: from detonation. Use hearing protection during controlled firing.

Shock sensitivity: Articles are electro-sensitive. Avoid electromagnetic fields, static discharge and mechanical impact. Store and handle as per the licensed magazine requirements stated in the SDS.

GHS Classification: Explosives (Divisions 1.1B and 1.4S (when packed in approved 1.4S packaging) and 1.4B), physical hazards- Explosives

Signal Words: Danger and Warning

Hazard Pictogram: GHS01



Hazard Statements: H201, H203, H204

- **H201:** Explosive, mass explosion hazard. Indicates a substance capable of a mass explosion as it can explode virtually instantaneously across the entire mass
- **H203:** Explosive, fire, blast or projection hazard. Indicates the material may explode, causing fire, blast or projectile hazards
- **H204:** Fire or projection hazard. Indicates the substance presents a fire hazard and/or may project fragments when involved in an incident

Precautionary Statements: P210, P250, P241, P280, P370+P380, P372, P373, P401, P501

- **P210:** Keep away from heat/sparks/open flames/hot surfaces- No smoking. This is a prevention statement requiring the avoidance of ignition sources.
- **P250:** Do not subject to grinding/shock/friction. This indicates that the product must not be exposed to mechanical stimuli that may trigger an explosion.
- **P241:** Use explosion proof electrical/ventilating/equipment. This requires the use of certified explosion proof equipment.
- **P280:** Wear protective gloves/protective clothing/eye protection/face protection. Indicates the need for appropriate PPE to prevent contact or injury.
- **P370+P380:** In the case of fire or incidents involving fire, immediately evacuate the area. This indicates the need to move people away from the hazard zone, typically when fire or explosion risks exist.
- **P372:** Explosion risk in case of fire. This statement is used for explosive or highly reactive substances to warn that fire may trigger an explosion, and special precautions are required.
- **P373:** Do not fight fire when fire reaches explosives. This indicates that firefighting is unsafe once explosives are involved.
- **P401:** Storage instructions must be carefully and strictly followed for this product.
- **P501:** Dispose of the product contents in accordance with regulations. This indicates that proper disposal via the approved waste systems is required.

References

History

Date of printing: 24-02-2026

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Date of previous issue: 23-02-2024

Recommended by: A Posthumus – Product Development Manager

Authorized by: DH Voogt – General Manager – Production and Logistics

Remarks:

This SDS summarises, at the date of issue, our best knowledge of health and safety hazard information of the product, and in particular how to safely handle the product in the workplace. As BME cannot control the use and handling of the product, each user must review the SDS in the context of how the user intends to handle and use the product in the workplace.

References:

- GHS "purple book": Globally Harmonized System of classification and labelling of chemicals.
- UNITAR GHS Companion Guide (United Nations Institute for Training and Research).
- APEC Implementation Guide (Asia-Pacific Economic Co-operation).
- EU CLP (European Union).
- OSHA Hazcom (Occupational Health and Safety Act Hazardous Communications).
- GHS country specific regulations.

Making electronic initiation the industry norm

With VIPERTRON®, BME is helping to make electronic initiation more widely accessible to mines of different sizes and operational profiles. The system supports safer, more consistent and more efficient blasting outcomes while helping operations take a practical step forward in their initiation technology.

As part of BME's broader commitment to innovation, VIPERTRON® reflects the drive to deliver solutions that support commercial performance, industry improvement and a more sustainable mining future.

**Contact us about how VIPERTRON®
can support your transition to accessible
electronic initiation: info@bme.co.za**

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