

eDev™ Electronic Tunnelling System

Description

The eDev™ system is specifically designed for tunnelling; providing the accuracy and flexibility of electronic timing at a reasonable price with rapid and easy operations at the tunnel face. The system consists of programmable electronic detonators and hardware to identify, test, program and fire the detonators (Scanner, Network Tester and Blast Box). The system is supported by sophisticated software to design tunnel rounds and download the timing design for implementation at the face.



The eDev™ detonator fits into all conventional boosters or can be used to initiate explosive cartridges. Each detonator has a unique identity code (ID) written into its memory during manufacture. This ID is represented in the form a barcode printed on a flag-tag attached to the wire near the connector. A hand held laser scanner is used to read this barcode and a firing time is assigned to this detonator ID in the scanner memory, using one of several convenient scanning modes.

Basic Operation

The preparation for blasting with eDev™ is made easier and quicker with the use of eDev's™ exclusive SHOTPlus-T software. The round is designed using SHOTPlus-T and the timings downloaded into the scanner using either detailed hole-by-hole timing or eDev's™ unique "timing by numbers" which enables blasting crews to load the eDev™ detonators in much the same way and time as they currently do with pyrotechnic detonators.

The detonators will usually be scanned as they are charged into the holes, but scanning can be done at any convenient time. After the blast has been charged and stemmed, each detonator is connected, via its insulation-displacement connector, to the harness wire at the face. Once all detonators are connected, the resulting wiring network can be tested for full integrity with the inherently safe, hand held Network Tester.

To fire the blast, the blast area must be cleared. Then at a place of safety the Blast Box is connected to the detonator network with the use of a firing cable. All detonator ID's and assigned times that are stored in the Scanner's memory are down-loaded to the Blast Box through a Bluetooth wireless connection. Each detonator is then powered up and programmed with its firing time according to its ID. The Blast Box will report back the details of any detonators that are not communicating properly. Once all detonators have been programmed and all detonators have confirmed their presence, the blast can then be fired – with the confidence that all detonators will initiate, and in the right sequence.



Scanner



Blast Box

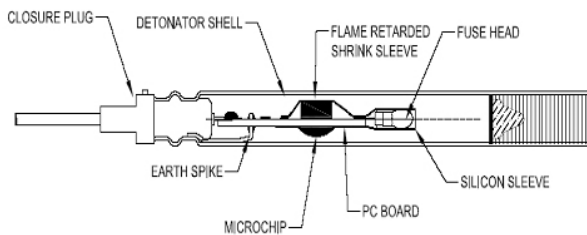
Network Tester



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Safety

The eDev™ System is designed with the principal of 'Inherent Safety'. Barcode Scanning enables each detonator's unique identity to be attained without any electrical current being introduced into the detonator. The hand held Network Tester is also inherently safe and does not have enough current or enough voltage to fire the fusehead even under fault conditions.



The only time there is sufficient current or voltage applied to the blast circuit to fire the detonators is from the Blast Box at a point of safety with the blast area cleared.

eDev™ Detonators have protection structures in the electronic circuitry, which give a high level of resistance to stray currents, over voltage, static electricity and electromagnetic radiation.

Care should be taken as with all detonators not to cause initiation by intense impact, friction or heat.

Training

This Technical Data Sheet is for information only. The eDev™ System should only be used by personnel who have been properly trained to use this system.

Detonators	Fully programmable from 0 to 10 000 ms in 1ms increments. Precision (standard deviation) of 0.1% of programmed delay.
Scanner	Non-volatile memory for det ID's and delay times. Interfaces with SHOTPlus-T software.
Network Tester	Inherently safe hand-held testing device. Tests for continuity, short circuits, and leakage.
Blast Box	Capacity to fire the biggest tunnel rounds. 2-way communication with eDev™ detonators.
Harness wire	Harness wire supplied by Orica is recommended

eDev™ System Specification

eDev™ Detonator Properties

Legwire:	Conductor is copper-clad steel
Form, Insulation:	Duplex, polypropylene insulation
Wire Tensile Strength:	25 kg load
Base Charge	PETN
Primary Charge:	Lead Azide
Delay Time Range	Minimum = 0 ms Maximum = 10 000 ms

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Benefits

The new "time by numbers" feature allows blasters to operate in a familiar way with the great convenience of all detonators being the same. eDev™ offers the users significant reduction in inventory logistics and costs.

Electronic timing has been shown to drastically reduce vibration in tunnels, allowing as much as twice the mass of explosive per delay or per hole. This can lead to great increases in advance per round.

Advance per round is also improved simply due to (a) better accuracy (b) a wider choice of delay schemes, and (c) guaranteed in-sequence firing.

In some circumstances overbreak control – limiting the amount of material to be hauled and / or limiting the amount of concrete lining needed, can be the most significant benefit.

Application

The eDev™ system is designed to provide accurate and flexible timing sequencing for tunnelling, with rapid and easy operations at the tunnel face. The eDev™ detonator will directly initiate detonator sensitive packaged explosives and Pentex™ or other cast boosters.

eDev™ detonators should normally be 'reverse primed', with the detonator base pointing toward the blast hole collar. Excessive force should not be applied to the detonator or legwire. Care should be taken during loading and hook-up to prevent dirt, water, and product from entering the connector as this may cause leakage and communication errors.

eDev™ Scanners, Network Testers and Blast Boxes are designed to be robust under normal operating circumstances, however, care should be taken not to subject this equipment to any undue rough handling or impact.

Storage and Handling

eDev™ detonators should be stored in a licensed detonator magazine or underground storage box. Stacks of cases should be no more than 2 metres (6.6 ft) high. eDev™ Scanners, Network Testers and Blast Boxes should be kept in an environment that is not subject to excessive temperatures or humidity. Normal storage precautions applying to electronic equipment will maximise the useful life of the control equipment.

eDev™ Detonator Packaging

eDev™ detonators are classified 1.1B or 1.4S, which may be air freighted. All detonator wires are wound in a figure eight configuration.

Detonators packed as 1.4S have a plaster and cardboard attenuator over the explosive end to prevent mass detonation.

Wire Length (m)	1.1B packaging Units per case	1.4S packaging Units per case
2	To be advised	
3		
4		
5		
6	120	70
8	To be advised	



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Equipment Servicing

eDev™ Scanners and Blast Boxes are powered by rechargeable batteries. Mains chargers for these are supplied. The batteries must be charged regularly as they are critical to the effective functioning of the eDev™ System. The Network Tester uses replaceable batteries. Except for these batteries, eDev™ Scanners, Network Testers and Blast Boxes contain no field-serviceable parts. All faulty equipment must be labeled and returned to Orica.

Hazardous Materials Shipping Descriptions

eDev™ 1.1B

DETONATORS, ELECTRIC for blasting

UN Number 0030

UN Class 1.1B

eDev™ 1.4S

DETONATORS, ELECTRIC for blasting

UN Number 0456

UN Class 1.4S

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