

i-kon™ Digital Energy Control® System

System Description

The i-kon™ Digital Energy Control® System consists of programmable digital Detonators and control equipment (i-kon™ Logger and Blaster). The Logger is used during hook-up to assign the delay sequence and perform testing functions. The Logger reads and stores the unique Detonator Identification Number (Det ID) and required delay the time. Blaster is used to conduct final system tests, blast programming and firing.



i-kon™ Logger

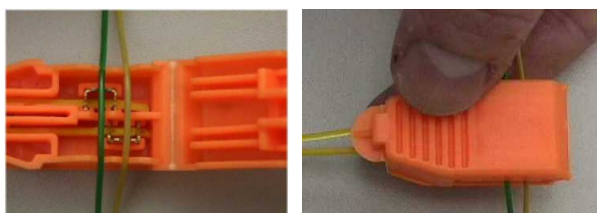
i-kon™ Detonators are fully programmable and have on board digital timing circuits and energy storage enabling them to function independently once the fire signal has been sent. A connecting harness of twin copper wire is used to hook-up the Detonators. The harness is connected to a Logger to enable delay assignment and testing during hook up.



Cut-away view of an i-kon™ Detonator

As each Detonator is connected, the i-kon™ Logger checks Detonator functionality, reads the Det ID and then writes along with the delay time to its memory. The user is able to edit the assigned delay times stored in the Logger upon review of the delay list. The Logger has various modes to simplify the logging process including SHOTPlus-i®, Auto and Manual modes to suit differing applications. Up to 200 Detonators can be logged to a single Logger in delay increments of 1 millisecond (ms) from 0 to 15,000 ms. Any delay can be assigned to any Detonator, regardless of order on harness.

Hinged connector



Once hook-up is complete, or at any time during logging, the system may be fully tested by using the Logger test menu. This causes the Logger to communicate with every detonator individually and determine its' status. If errors are detected the Logger will display these in a meaningful way along with comprehensive help information.

Current leakage is continuously monitored during logging and can be measured using the 'Measure Leakage' facility.

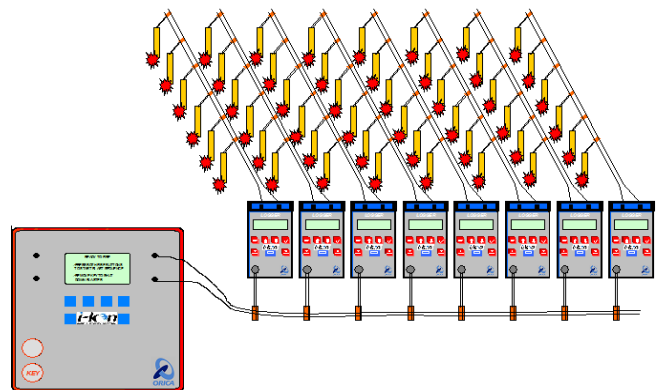
To fire the blast, the Loggers are placed at a safe position from the blast and connected to the Blaster via a firing line. The Blaster communicates with the Detonators via the Loggers. Blasters are protected by a firing key to prevent use by unauthorised personnel.

There are four different types of i-kon™ Blasters available. The Blaster400 can fire up to 400 Detonators on 2 Loggers.



i-kon™ Blaster 400

The Blaster2400s can fire up to 2400 Detonators on 12 Loggers individually and 4800 Detonators on 24 Loggers synchronized. The Surface Remote Blasting System (SURBS) can fire up to 2400 Detonators on 12 Loggers. The Centralised Electronic Blasting System (CEBS) a remote firing system for underground can fire 2400 Detonators on 12 Loggers.



Safety

The i-kon™ Digital Energy Control System complies with the Orica principle of 'Inherent Safety' for electronic blasting systems. This means the i-kon™ Logger, used at the blasthole, is unable to fire Detonators even if the Logger develops faults. This is ensured because Loggers are unable to produce more than 6 volts r.m.s and the proven, tested No-Fire voltage of every Detonator being above 8.7 volts. In addition, the Logger does not contain any circuitry or programming capable of generating program, arm and fire signals.



i-kon™ Digital Energy Control® System

i-kon™ Detonators have protection structures in the electronic circuitry, which give a high level of protection against stray currents, over voltage, static and electromagnetic induction.

i-kon™ Detonators are supplied in Class 1.4B packaging and have UN Number 0255. The unique i-kon™ Det ID is printed on the flag tag and allows full production traceability for detonators. i-kon™ Detonators have a special copper/zinc alloy shell to provide a high level of shock protection. Like all detonators, the i-kon™ Detonator contains sensitive explosives. Care should be taken not to cause initiation by intense impact, friction or heat.



i-kon™ Detonator tag showing ID

i-kon™ System Specification

i-kon™ Detonators	Fully programmable from 0 to 15,000 milliseconds. Accuracy: 0 – 1300 ms: ± 0.13 ms 1301 – 15000 ms : ± 0.01%
Harness	0.6mm twin twist copper on 200m or 500m coils.
i-kon™ Logger	Inherently Safe, hand-held logging and testing device. Includes system memory. Maximum of 200 i-kon™ Detonators per Logger.
Firing Cable	Dependent upon cable characteristics. Consult Orica for specific recommendations.
i-kon™ Blaster	Hand held device able to provide the voltage and digital signalling required to fire i-kon™ Detonators. Available in various versions: capable of firing up to 400, 2400 or 4800 i-kon™ Detonators.

i-kon™ Detonator Properties

Downline wire:	Standard	0.6mm Steel
	RX	0.6mm Steel
Wire tensile strength:	Standard	30 kgf/200N
	RX	30 kgf/250N
Standard Lengths:	Standard	6,15,20,30,40, 60m
	RX	15,20,30,40m
Insulation:	Standard	PP
	RX	TPU
Base charge:	All	750 mg Pentolite
Priming charge:	All	90 mg Lead Azide
Connector:	All	Hinged, greased

Application

The i-kon™ Digital Energy Control System is designed to provide accurate, flexible and reliable sequencing of both surface and underground blasts. The i-kon™ Detonator will

directly initiate detonator sensitive packaged explosives and Pentex™ boosters.

Priming and subsequent operations must be carried out in a manner that will ensure that the lead wires and i-kon™ Detonator are not damaged. The i-kon™ Detonator should always be secured inside a suitable primer that fully encloses the Detonator shell to protect it from damage during charging. Exposed Detonators should not be placed inside blastholes or charging hoses. i-kon™ Detonators should normally be "reverse-primed", with the Detonator base pointing towards the blasthole collar.

The lead wire is extremely robust, however if the insulation is cut or split, moisture may cause earth leakage problems causing testing and communication errors with the i-kon™ System, therefore care must be taken when handling and loading the product.

Excessive force should not be applied to the lead wires under any circumstances. If a primer becomes stuck when attempting to retrieve or reposition it, a replacement unit should be used.

The i-kon™ RX Detonator is recommended for use in surface mining applications where high bulk explosives loading rates, mechanical charging or abrasive stemming materials are likely to be encountered. " The i-kon RX detonator is provided with a much tougher, more robust outer insulation than the standard i-kon wire, giving the RX unit superior performance in severe, abrasive mining conditions".

Care should be taken during loading and hook up to prevent dirt and water entering the hinged connector. The connector contains silicon grease for water proofness. A special connector is provided to join harness wire. Joins in the harness wire should be made secure and kept free from moisture.

To assist deployment of the i-kon™ System at the face or on the bench a specially designed sling bag has been provided. The sling bag is designed to deploy the draw-from-centre harness wire. Care should be taken to ensure that the i-kon™ Loggers and Blasters are kept dry and free from dust and grease.

The i-kon™ Blaster may only be connected to the firing line at a point of safety. i-kon™ Loggers and Blasters contain sensitive electronic circuits and are designed to be robust under normal operating conditions. However, care should be taken to prevent this equipment being subject to mechanical damage through rough handling or impact.

i-kon™ Digital Energy Control® System

Packaging

i-kon™ Detonators are packed into cardboard cases. All units are presented coiled on plastic spools apart from the 6m products, which is presented in a folded format. The case dimensions are 0.4 x 0.3 x 0.3 m. Loggers and Blasters400's are provided in nylon carry cases and Blaster2400s, SURBS and CEBS are provided in a Pelican Case to protect equipment during transport and storage.

Packaging Details

Packaging Details for Standard i-kon™		
Lead Length (m)	Units per Case	Gross Weight (kg)
6	120	8.2
15	90	15.5
20	90	18.7
30	72	20.3
40	45	16.4
60	30	15.5
Packaging Details for i-kon™ RX		
Lead Length (m)	Units per Case	Gross Weight (kg)
15	90	19.2
20	72	19.2
30	45	17.0
40	45	21.1

Storage and Handling

i-kon™ Detonators should be stored in a cool, dry licensed detonator magazine. Stacks of cases should be no more than 2 metres high. i-kon™ Loggers and Blasters should be stored in a protective case in a location not subject to high temperatures or humidity. Normal storage precautions applying to electronic equipment will maximise the useful life of the control equipment.

Training

This Technical Data Sheet is for information only. Personnel who have been trained and assessed as competent to use this system should only use the i-kon™ Digital Energy Control® System.

User Servicing

i-kon™ Loggers and Blasters are powered by rechargeable batteries. Mains chargers are supplied. A 12V car charger is provided for i-kon™ Loggers and Blaster400 only. The batteries must be charged regularly as they are critical to the effective functioning of the i-kon™ Digital Energy Control® System. i-kon™ Loggers and Blasters contain no other serviceable parts and must be returned to Orica for replacement. Faulty equipment should be tagged out and returned to Orica.

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