



a Unipart Rail Company

# Optonator Remote Warning Device



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Design • Develop • Integrate • Investigate

Whilst utilising innovative and powerful technology, Park Signalling's Optonator system has been specifically designed for simple yet effective use as a track worker alarm system. It is intended for "less complex" track worker applications. The features were initially designed in response to the circumstances of the Tebay incident, caused by a runaway wagon that was inside the formal protection. In addition, Optonator is ideally suited for use where track worker tasks require quick "in and out" access.

It is simply and quickly deployed and removed. The equipment can be easily transported to the worksite.

The Signaller would provide the primary protection prohibiting train movements and Optonator, which is easily carried to the work site, rapidly provides the secondary protection against any "run-away" vehicle approaching.

### Key features

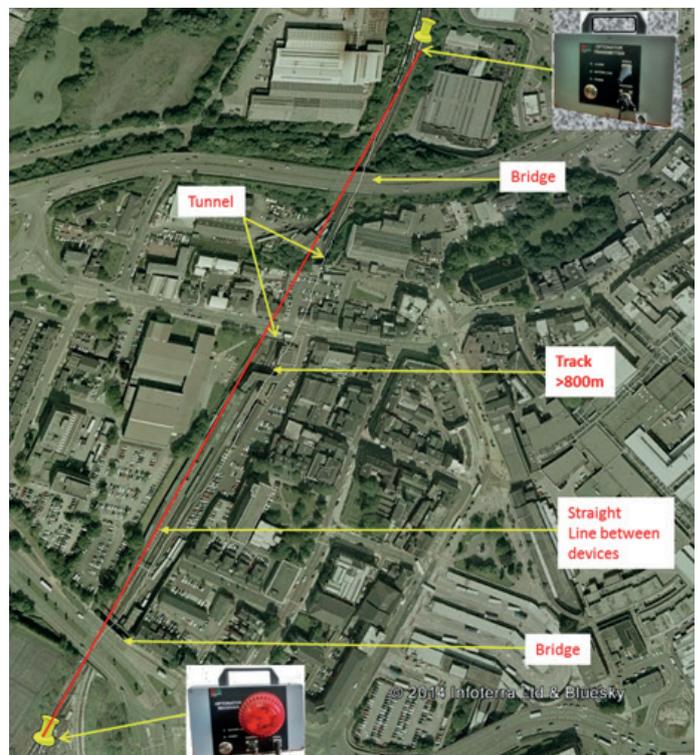
The system comprises 2 units; a Transmitter and a Receiver. The Transmitter is located at the boundary of the worksite to be protected. The Receiver is located at the worksite.

- The Transmitter comprises the following key components:

- Lightweight rugged fiberglass-reinforced polycarbonate enclosure with carrying handle; 240x150mm and <3Kg.
- Internally: fiber optic transmit and receive circuits, general circuits, radio transmitter plus antenna and batteries. Externally: battery charger connector, on/off pushbutton and indicators.

- The Receiver comprises the following key components:

- Lightweight rugged fiberglass-reinforced polycarbonate enclosure with carrying handle; 240x150mm and <3Kg.
- Internally: general circuitry, batteries, radio receiver plus antenna. Externally: aerial, battery charger connector, on/off pushbutton and indicators and integrated siren and flasher unit.



Trialling: 800m track length, which included the effects of a tunnel, 2 bridges, across station platform and vehicle stabling, a curved track structure, and in a town centre environment with various interference.

### Charger / power supplies:

Option 1: Is used for recharging the internal batteries and/or operating from the mains supply (100-240Vac).

Option 2: Is used for recharging the internal batteries and/or operating from a 12/24Vdc supply.

### Battery power:

- Fully charged batteries will operate the transmitter and receiver devices in monitoring mode for > 24 hours.

### Battery status and indication:

- Optonator receiver unit (worksite) is provided with a battery level indicator which provides 60 minutes visual warning of the battery power becoming depleted. Also, an audible and visual warning is provided at least 30 minutes before the battery is depleted.

- Optonator transmitter (worksite boundary) is provided with a battery level indicator which provides 60 minutes warning of the battery power becoming depleted.

- Communication between devices is achieved by standard wireless. The signal between devices uses coded license-free frequencies for secure communications. If the signal between devices is lost or corrupted, the unit will provide an alarm warning that the connection has been compromised.

### Radio Specification:

- 869.525MHz/500mW.

- Flexible usage: pre-configured matched transmitter/receiver pair or complex networks via ELPRO I/O and/or Gateway products.

- Peer-to-peer communications with exception reporting, self-checking of messages via CRC, update time and secure data encryption.

- Multi-hop repeatability via ELPRO multi-I/O & Gateways products.

- Antenna: Internally mounted dipole 4dBi.

- Range: In a live trial at Bury station on the ELR, Optonator was tested and proved effective over 800m track length, which included the effects of a tunnel, 2 bridges, across station platform and vehicle stabling, a curved track structure, and in a town centre environment.

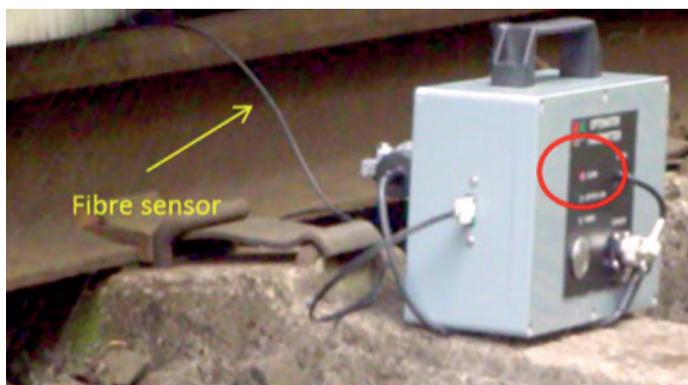
### Monitoring and alarm triggering:

- Track vehicle detection is achieved by looping a plastic coated fibre optic cable around the rail.

- When the fibre is intact and the "light circuit" maintained, Optonator is in an active sensing mode confirmed by an audible regular "heartbeat" indication each 5 seconds at the receiver (worksite).

- When the fibre is broken and/or distorted, breaking the "light circuit", the alarm will activate.

- An edge-triggered method is adopted to detect the disturbed fibre, preventing the possible effect of normal light that may shine in to a broken fibre.



Optonator Transmitter - just before and just after the leading wheel enters the Track Worker Safety zone.

Note: Alarm indicator is off, then on after wheel contact

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