





# VORTOK REARGUARD SECONDARY WARNING SYSTEM

## Installation & Operating Manual



Approval	Name	Signature	Date
Edited by	Craig Mulvay		28/01/2015
Approved by	Neil Perry		28/01/2015

Release No.	Date	Revision Description
1	25/06/2012	First Issue
2	16/01/2014	Second issue
3	04/12/2014	Third Issue
4	10/12/2014	Fourth Issue
5	16/01/2015	Description of charging procedure amended following document review by J. Harris.
6	28/01/2015	Ammended to meet changes advised by Network Rail staff member T. Qureshi

## **Content**

1. Health and Safety Requirements for Product Deployment
2. Levels of Competence
3. Pre-User Visual Inspection Regimes
4. Operational Deployment
  - 4.1 Component Parts
  - 4.2 Installation at Work Site
  - 4.3 Testing and Commissioning the Secondary Warning Unit
5. Alarm Events
6. Charging the Battery
  - 6.1 Charging Profiles
7. Override (OVRD) Function
8. Sounder and LED indicator sequence.
9. Product Support

## **1. Health and Safety Requirements for Product Deployment**

- a) Always wear correct PPE when installing or removing Rearguard.
- b) The Rearguard must never be installed unless within a possession/suitable line block as per the safe system of work.
- c) Be aware of Sharps, Slips, Trips and Falls when deploying Rearguard.
- d) Ensure Rearguard cabling is away from walking routes to avoid creating a tripping hazard.
- e) Be aware of sharp rail when installing/removing the Trigger Unit.
- f) Unit weights:

I.	Alarm Unit with Trigger inside	9.1kg
II.	Alarm Unit	5.7kg
III.	Trigger Unit	3.4kg
IV.	Cable Reel 100m	5.0kg
V.	Bracing Strut	0.9kg

- g) Be aware of passing traffic and any machine movements on, or adjacent to your worksite when setting up Rearguard.
- h) The Alarm Unit sounders will produce 120db, there is a risk of hearing damage if exposed to a prolonged alarming tone.

## **2. Levels of Competence**

Operators/Installers of Rearguard must have attended a Vortok Rearguard training session.

## **3. Pre-User Visual Inspection Regimes**

Before deployment, always check:

- a) All cables for signs of damage, abrasion or cutting. Ensure there are no exposed conductors along the cable length or at the plug ends.
- b) Check plugs are not damaged/deformed and are tight with no signs of water ingress.
- c) Visually inspect the Alarm Box casings for signs of damage or deformation. Check the padlocking points, hinges, light beacons and switches are not damaged, perforated or defective.

- d) Visually check the treadle mechanism for signs of damage/deformation. Check that the spring loaded mechanism operates correctly and that the micro-switch is not damaged. Ensure that the treadle arm operates correctly and shows no signs of bending or deformation.

#### **4. Operation and Deployment**

Prior to use, the equipment should be checked and tested to ensure it is fit for purpose, and that it is not visibly damaged. Check the battery level indicator is at least at 75% charged, (2 green LEDs illuminated). The test can be carried out off site and must include the use of at least one cable reel.

##### **4.1 Component Parts**

The complete equipment set consists of;

- a) 1 x Alarm Unit.
- b) 1 x Trigger Unit.
- c) 2 x 100m Cable Reels.
- d) 1 x Bracing Rod.



**COMPLETE REARGUARD EQUIPMENT SET**

The Trigger Unit is stowed within the Alarm Unit.



#### **4.2 Installation in Worksite**

- a) Position the alarm box on the sleeper shoulder outside of the 4ft on the lower side of the gradient from the Trigger Unit.
- b) The Alarm Unit must be placed within 25m maximum of the workgroup, this distance may need to be reduced if there is excessive background noise.
- c) A power isolation switch is provided on the inside of the the lid of the Alarm Unit. The switch must be set to the on position and then the box lid closed and sealed before operation.
- d) When the power switch is set to on, the battery condition lights on the top of the lid will illuminate for a period of 30 seconds indicating the battery power available.
- e) The Alarm Box lid must be locked with a unique padlock. The key must be held by the COSS work safe leader. Please note that the padlock is not supplied with the unit and it is the responsibility of the user to provide a unique padlock.
- f) The cables have links across 2 pins and this provides power to thye Alarm Unit upon connection
- g) Plug the free end of the cable into the Alarm Unit. The connection of the plug will apply power to the Alarm Unit, and the power indicator and battery condition LEDs will then illuminate and the sounder will warble. Note, if the reel cable is plugged in during the first 30 seconds of switching the Alarm Unit on, the warble will sound after 30 second battery charge check has occurred.
- h) Collect the Cable Reels, the Trigger Unit, and the Bracing Rod, and walk up the gradient towards the predetermined position for the treadle.





**POWER ISOLATION SWITCH**

**Note: There is no external ON/OFF switch to arm the unit. This prevents inadvertent switch off.**



**FRONT PANEL**



**DISPLAY PANEL**

- i) Walk at a slow pace and the cable will unreel along the track. Keep laying out the cable along the track until the end of the first reel is reached. One fully extended

cable is 100m. Ensuring that the cable is not tangled or fouled on any infrastructure components which may cause damage.

- J) Connect the second cable to the first and continue to lay out the cable as before. When the cable is fully extended, position the drum adjacent to the track. This will ensure that the 200m safety distance is reached.

**Note: 100m of cable will provide 5 seconds of protection at 40mph. In order to provide maximum escape time upon alarm activation, it is paramount that two cable reels are connected to achieve 200m of cable in total.**

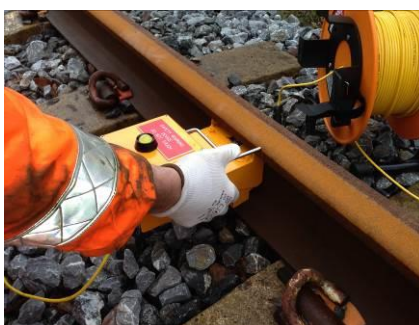
- k) Locate the Trigger Unit onto the rail web within the 4ft, making sure that it is correctly located in a position free from rolling marks or welds. Ensure that the sprung foot of the assembly is compressed, whilst rotating the upper profile to a position under the rail head.
- l) Check that in the installed position that the rail head micro switch is fully depressed.
- m) Check that the treadle arm is correctly positioned adjacent to the top of the rail head (but not in contact). The limpet magnets will hold the device in position.



**OFFER THE TRIGGER UNIT  
UP TO THE RAIL FOOT**



**ENSURE MICRO SWITCH  
DEPRESSED**



**ENSURE TREADLE ARM  
CLEARS RAIL HEAD**



**BRACING BAR INSTALLED**

- n) Insert the probe end of the Bracing Rod into the spring pocket of the Trigger Unit. Compress the spring and brace the rubber foot of the rod against the opposite rail web. This positively locates the trigger unit against the rail with a constant force.



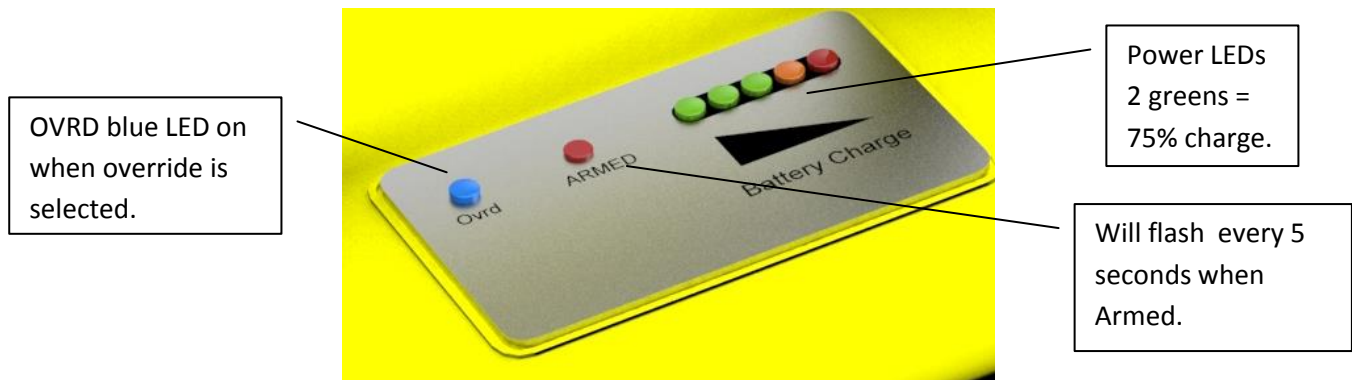
### INSTALLING BRACING BAR

- m) Pass the fly lead from the trigger unit **under** the rail and connect it to the socket on cable reel. Note, to avoid accidental arming of the Rearguard Unit, ensure the trigger is connected to the cable reel in a single operation. Positive connection of the plug on the Trigger Unit will be shown by the LED on the top cover flashing once every 0.5 seconds. This means that the Trigger Unit has been installed correctly.
- o) Ensure the cable drum is stowed safely and according to the Rulebook requirement, and ensure no additional significant tripping hazards are created by the cables and its drum.
- p) At the Alarm Unit, the strobes will flash.

#### 4.3 **Testing and arming the Secondary Warning Unit**

- a) Test the Trigger Unit by manually operating the treadle arm with one full depression. **This will initiate the arming sequence.**
- b) Arming will consist of 3-1 second pulses from the sounders on the Alarm Unit; the LED on the Trigger Unit will change from flashing every 0.5 seconds to flashing every 1 second confirming that the system is active.
- c) When this operation is completed the installers may return to the worksite. The strobes will stop flashing; the red armed LED on the top will be on and the yellow LED on the front will flash every 5 seconds. An audible comfort tone will pulse every 5 seconds indicating that the device is active.





## 5. **Alarm Events**

An alarm condition will consist of continuous full operation of the sounders for 15 seconds, and continuous flashing of the xenon light units. It can only be cancelled by the disconnection of the cable from the Alarm Unit.

### **If the alarm sounds the following actions should be taken:**

- 1) All personnel are to immediately move to a position of safety.  
  
The COSS must contact and inform other working parties of the encroaching runaway or if it is a false alarm. If a false alarm has occurred the rearguard should be inspected and tested to ascertain the cause prior to allowing staff back onto the worksite.
- 2) If a true alarm condition has occurred the COSS must follow Network Rail incident reporting procedures.
- 3) All alarm incidents must be reported as a near miss following Network Rail policy and reporting systems.

## 6.0 **Charging the Battery**

- a) There are 2 charging options available for the batteries which are contained within the Alarm Box. Both of which are stored in the Alarm Box container. They are;
  - i. Mains charger
  - ii. In car charger
- b) Plug the charger lead into the charger socket on the underside of the Alarm Unit lid, and then connect the charger to the power supply. Charging time is dependent on the current charge state of the batteries (minimum of 4 hours). The charging lights will cascade upward during charge and provide an approximate indication of charge with 2 to 3 green LEDs included in the cascade indicates a full charge. However, a more accurate display of battery charge is achieved by disconnecting the charger and switching the isolator switch to the on position and observing the battery indicator lights.



**CHARGER SOCKET**

#### **6.1 Charging profiles**

- a) The equipment is accompanied by an intelligent battery charger. The battery will fast charge over a period of 7 hours, when it will convert to trickle charge mode. The total charging time to maximum capacity is 10 hours. The total life of the battery in storage is at least 5 years.
- b) Although total discharge may be recovered, it is recommended that the battery be maintained in storage by regular charging every 3 months.
- c) The life of the battery in service when the Alarm Unit is in an armed condition is 10 hours, assuming the unit has recently been charged for more than 4 hours. See section 4 for pre-use battery check guidance.

#### **7.0 Maintenance Vehicle Access**

If there is a requirement for a maintenance vehicle to pass over the Trigger Unit and enter the worksite, the equipment may be overridden using a key, held by the COSS. The key is inserted into a key switch and turned to override (OVRD). The key will be retained in the lock when OVRD is selected. This will allow a vehicle to pass over the treadle without activation of the alarm. When the switch is in this position the red Armed LED will go out and the blue OVRD LED will illuminate and the strobes will flash.

**Note: Deactivation of the system using this method will negate the protective effect of the device.** To rearm the system, the key should be turned to ACTV, and the system will return to the armed condition.



**ACTIVE/OVERRIDE SWITCH**

## **8.0 Sounder and LED indicator sequence**

### **a) Applying power to the unit**

Upon switching on the isolator switch. The sounder will chirp for one second. The battery condition lights will be illuminated for 30 seconds.

### **b) Setting up Alarm Unit**

At cable plug in. Alarm sounders warble for 1 second. Battery condition lights are on.

### **c) Fitting Trigger Unit**

At cable plug in, the LED on the top of the Trigger Unit flashes once every 0.5 seconds.

At the Alarm unit the Xenon lights flash once every 0.5 seconds.

### **d) Arming**

Initial setting operation of the treadle arm on the Trigger Unit – 3 pulses from sounders on Alarm Unit, accompanied by flashing xenon's indicating arming. Armed red LED on Alarm Unit display panel is on. Internal sounder pulses comfort tone every 5 seconds. LED on Trigger Unit flashes every 1 second. The LED on the front panel flashes every 5 seconds in unison with the comfort tone.

### **e) Override**

When override is selected the Armed LED on the Alarm Unit display panel is off. Internal sounder pulses comfort tone twice every 5 seconds and the LED on the front flashes in unison. The LED on Trigger Unit flashes once every 1 second. The blue override LED on the display panel is on.

### **f) Alarm**

Xenon's continuously flash, and the sounders warble for 15 seconds then turn off. The Armed LED on the display panel is off.

### **g) Alarm Cancellation**

To cancel alarm, power down the Alarm Unit by disconnecting the cable from the plug on the front of the Alarm Unit or by opening the alarm box top cover and setting the isolator switch to off.

## 9.0 **Product Support**

Supplier:

VORTOK INTERNATIONAL

Innovation House  
3 Western Wood Way  
Langage Science Park  
Plymouth – PL7 5BG  
Devon – UK

TELEPHONE: +44 (0) 1752 349200  
TELEFAX: +44 (0) 1752 338855  
e-mail: [sales@vortok.co.uk](mailto:sales@vortok.co.uk)  
[www.vortok.co.uk](http://www.vortok.co.uk)



VORTOK International, Innovation House, 3 Western Wood Way, Langage Science Park,  
Plymouth, Devon, PL3 5AJ

**T:** +44 (0) 1752 349200, **F:** +44 (0) 1752 338855 e mail: [sales@vortok.co.uk](mailto:sales@vortok.co.uk)

Vortok International is the trading name of the Multiclip Company Ltd. The Multiclip Company Ltd is a member of the PANDROL Group companies. Vortok is a registered trademark

