



ZoneSafe™ System

User Manual



Avonwood Developments Limited
Knoll Technology Centre, Stapehill Road
Wimborne, Dorset, BH21 7ND
Tel: +44 (0) 1202 868000 Fax: +44 (0) 1202 868001
Email: sales@avonwood.co.uk
www.avonwood.co.uk

Document Name

ZoneSafe™ System User Manual

Document Number

A176283

Original Issue Date

24/09/2014

Record of Changes

Issue No.	Date of Issue	Detail of Change

Information in this document is subject to change without notice.

You do not have permission to reproduce, publish or share any part of this document either electronically or printed in part or full without prior written consent from Avonwood Developments Ltd.

Contents

1	Introduction	5
2	How the System Works	5
3	System Components	6
3.1	Control Unit	6
3.2	Wakeup Antenna Units	6
3.3	Transponder	6
3.4	Driver Transponder	7
3.5	Manager Software	7
3.6	Transponder Test Unit	7
3.7	LED Test Transponder	7
3.8	Fixing Kits	7
4	Hardware Installation	8
5	Example Installation	9
6	Connections	10
7	System Specification	11
7.1	Control Unit	11
7.2	Wakeup Antenna Unit	11
7.3	Transponder	12
7.4	Transponder Test Unit	12
8	WEEE Directive	13
9	FCC Compliance Information	14
10	Disclaimer	15
11	Appendix A – Transponder Test Unit Operation Guide	16
		17

This page is intentionally blank

1 Introduction

ZoneSafe™ is a proximity warning system that produces an invisible detection zone around any machine or area it is fitted to. The system detects transponders worn by personnel or fitted to other objects that are within its proximity and provides an audible/visual warning.

ZoneSafe™ systems are supplied as audible and/or visual warning systems, which provide an aid to safety only. ZoneSafe™ should not be used to replace proper job site organisation, safeguards, operator training and the application of relevant vision standards that addresses safety and the safety of people on job sites.

2 How the System Works

ZoneSafe™ is based on proven radio frequency technology. The driver of the vehicle places an Authorized driver transponder in to the control unit. Completing this ensures the drivers transponder does not set off the detection alarm. If no Authorized Driver Transponder is placed in the Control Unit a constant alarm will sound.

The system produces a user configurable detection zone around a machine or area between 3m to 9m which interacts with transponders worn by personnel or other hazards. When a ZoneSafe™ transponder is within the proximity of, or enters the detection zone of a ZoneSafe™ enabled object, a visual and/or audible indication is provided to the machine operator.

The ZoneSafe™ system comprises a control unit with display, antenna units and transponders. Each installed system has its own unique identification code, as do each of the transponders used with the system. The Control Unit can optionally contain an LCD which can indicate the location of the detected transponder in the zone

The system's main control unit has a real time clock and built in memory for storing an audit trail of up to 7000 proximity detection events and system configuration settings. Event logs and system settings can be viewed for each control unit using the ZoneSafe™ software or ZoneSafe Android APP

ZoneSafe™ Manager software provides an easy to use interface for downloading, viewing, analysing and exporting event data.

NOTE: The ZoneSafe™ proximity warning system is supplied as an audible and/or visual alert system only. It is not a protective device, it does not initiate or perform safety related functions and it does not provide control to reduce risk but and audible/visual alert to the operator of the risk.

NOTE: Detection accuracy will depend on environmental and installation factors

3 System Components

The ZoneSafe™ system comprises the following standard components and accessories (part numbers in Installation and Operation Manual):

Standard Components

1. ZoneSafe™ Control Unit
2. ZoneSafe™ Wakeup Antenna Unit(s)
3. ZoneSafe™ Driver Transponders
4. ZoneSafe™ Transponders

Accessories

5. ZoneSafe™ Transponder Test Unit
6. ZoneSafe™ LED Test Transponder
7. ZoneSafe™ Fixing Kits
8. ZoneSafe™ Software
9. Discovery Readers

3.1 Control Unit

The ZoneSafe™ Control Unit contains the main electronics of the system and requires a 24V DC supply (other voltages available on request). All of the other system devices are connected to and are controlled by the control unit. The control unit contains a real-time clock (with battery backup) for time and date information, internal memory to store event data and a Bluetooth interface for communication. A relay is available for the addition of external sounders or beacons for alerting personnel in the detection zone.

Warning indicators and unit features include:

- Alarm Buzzer/Light
 - Pulsing - Transponder in Zone
 - Constant - No Driver Transponder, No ignition or system fault
- Mute Button
 - Alarm mute for one transponder when pressed



3.2 Wakeup Antenna Units

The ZoneSafe™ Wakeup Antenna Units generate the detection zone around an object. Antennas should be fitted at appropriate locations to provide the optimum detection zone required. Wakeup antenna units are linked together with the first unit connected to the system control unit.

The number of antennas required depends on the size of the detection zone and the size of the machine or area they are fitted to. The size of the generated detection zone from each antenna is adjustable from approximately 3m to 9m.

3.3 Transponder

All ZoneSafe™ Transponders are worn by all personnel or fitted to other hazards. When a transponder enters a detection zone a visual and/or audible indication is provided to warn the machine operator.

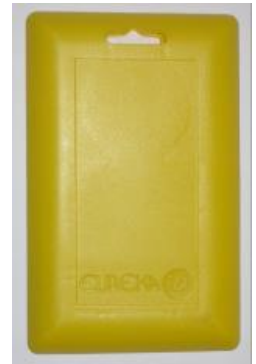
Each transponder is factory configured with a unique ID and can be used on any ZoneSafe™ enabled job site. Transponders within the proximity of a detection zone will be logged by the control unit. The data logged from the transponder includes its unique ID, date/time and battery status.



NOTE: It is essential that all personnel on the job site must wear a transponder.

3.4 Driver Transponder

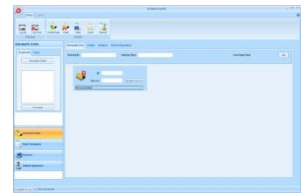
A ZoneSafe™ Driver Transponder is required for the driver of the vehicle. The Transponder is placed into the Control Unit and allows for correct system operation. When the vehicle is in operation and a Driver Transponder is not present the alarm will emit a constant tone. With correct installation the system will emit a constant tone if the transponder is left in the Control Unit when the ignition is switched off.



3.5 Manager Software

The ZoneSafe™ Manager Software is an easy to use administration tool for configuring devices and managing event data. For full details of how to use the software please refer to the software manual, which covers the following topics:

- Installing the software
- Visual overview & key features of the interface
- Using the software



3.6 Transponder Test Unit

The ZoneSafe™ Transponder Test Unit provides an easy way to test the status of each ZoneSafe™ transponder worn by all personnel before entering the job site. The unit reads a transponder and displays the status of the battery, using indicator LEDs. Daily use of the transponder test unit ensures transponder batteries are always in a serviceable condition.

Indicator LED's include:

- Tag Read
- Battery OK
- Low Battery



3.7 LED Test Transponder

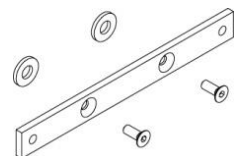
The ZoneSafe™ LED Test Transponder is an easy to use tool for visually checking the detection zone. The test transponder uses an illuminated LED to indicate the detection zone, helping with initial set up, system checking and maintenance.

3.8 Fixing Kits

Optional fixing kits are available, which provide flexibility with system installation.

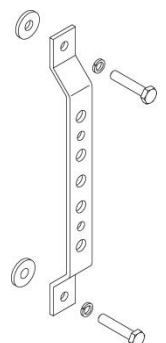
3.8.1 Flat Fixing Kit

The flat fixing kit enables the wakeup units or transponder test unit to be mounted flat on to a flat surface from the front. The kit includes 2 stainless steel bars, 4 off M6 countersunk hex head screws and 4 off neoprene spacers. Refer to section 4.3 figure 6.



3.8.2 Raised Fixing Kit

The raised fixing kit enables the wakeup units or transponder test unit to be mounted with access between the back of the unit and the fixing surface. The kit includes 2 stainless steel bars, 4 off M6 bolts and 4 off washers. Refer to section 4.4 figure 7.



4 Hardware Installation

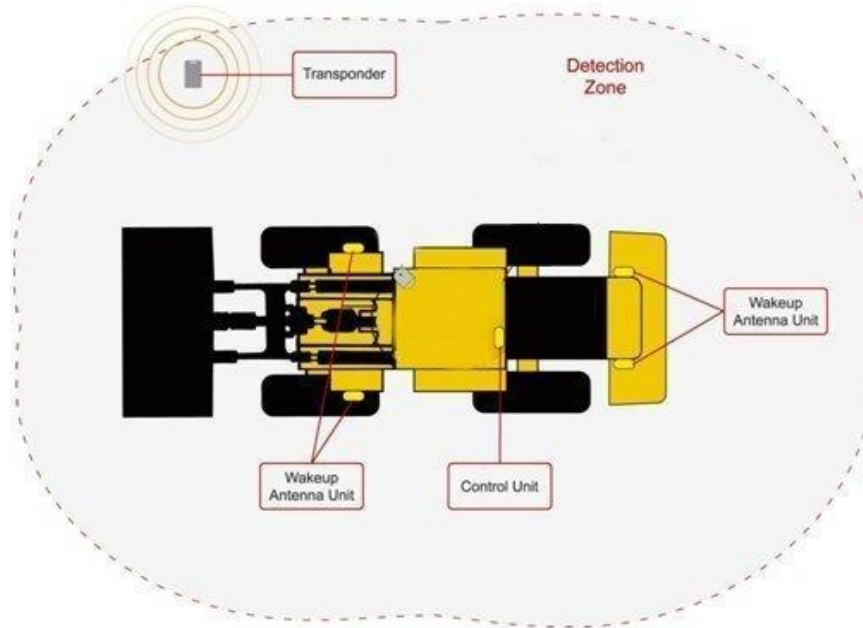
Before installation please refer to the Installation and Operating manual, which covers the following topics:

- Requirements
- Installation Considerations
- Control Unit
- Wakeup Antennas
- Transponders

NOTE: It is recommended that the installation of ZoneSafe™ is carried out by a fully authorised ZoneSafe™ installation engineer.

5 Example Installation

The figure below illustrates a typical earth moving machinery installation. This example uses four wakeup antennas, two either side of the vehicle, to provide a well defined detection zone. The control unit is installed in the vehicles cab. The transponder shown could be attached to an object or worn by a worker and is shown activated in the detection zone.



6 Connections

For more information please refer to the Installation and Operating manual, which covers the following topics:

- Control Unit Connections
- Wakeup Antenna Unit Connections
- Switch Settings: Control Unit and Wakeup Units
- Hardware Setup & Test
- Wakeup Unit Covers
- Normal System Operation Sequence

7 System Specification

7.1 Control Unit

ZoneSafe™ Control Unit		
Electrical	Voltage	24V DC nom (18-30V)
	Current Consumption	800mA max
	Memory	7000 Events
Mechanical	Dimensions (inc glands)	235mm x 90mm x 73.5mm
	Connectors	IP68 ABS Glands
	Relays (for additional sounders/beacons)	1 x DPCO Rated Current 2A
Communications	Wireless	Bluetooth
Environment	Ingress Protection	IP65
	Temperature	- 10°C to + 55°C



7.2 Wakeup Antenna Unit

ZoneSafe™ Wakeup Antenna Unit		
Electrical	Voltage	24V DC nom (18-30V)
	Current Consumption	500mA max
Mechanical	Dimensions (inc glands)	285mm x 150mm x 102mm
	Material	Anodised Aluminium Base. Polystyrene Weather Resistant HIPS Cover
	Weight	1125 grams
	Connectors	IP68 ABS Glands
	Mounting	Integrated M6 Blind Nuts Optional Mounting Kit
Communications	Wired	RS485
Environment	Ingress Protection	IP67
	Temperature	- 10°C to + 55°C
Radio	TX Frequency	125kHz
	RX Frequency	868-960MHz
	Range	TX: adjustable 3-9m approx RX: 50m typ



7.3 Transponder

ZoneSafe™ Transponder (all)		
Electrical	Voltage	3V (Lithium Coin Cell)
	Life	typ 2million reads or 2years
Mechanical	Dimension	85mm x 54mm x 7mm
	Material	ABS (Grey)
	Weight	22.5 grams
Environment	Ingress Protection	IP67
	Temperature	- 10°C to + 55°C
Radio	RX Frequency	125kHz
	TX Frequency	868-960MHz
	Modulation	GFSK
	Output Power	<10dBm
	Range	RX: typ 9m (Wakeup) TX: typ 50m (Transmit)
	Read Time	Less Than 250ms



7.4 Transponder Test Unit

ZoneSafe™ Transponder Test Unit		
Electrical	Voltage	24V DC nom (18-30V)
	Current Consumption	500mA max
Mechanical	Dimensions (inc. glands)	285mm x 150mm x 102 mm
	Material	Anodised Aluminium Base. Polystyrene Weather Resistant HIPS Cover
	Weight	965 grams
	Connectors	IP68 ABS Glands
	LEDs	Tag Read Battery OK Low Battery
	Relays	2 x Guided Contacts DPDT Rated Current 8A
	Mounting	Integrated M8 Blind Nuts Optional Mounting Kit
Communications	Wired	Ethernet
Environment	Ingress Protection	IP67
	Temperature	- 10°C to + 55°C
Radio	TX Frequency	125kHz
	RX Frequency	See Frequency Table
	Range	TX: typ 1.5m RX: typ 50m



8 WEEE Directive

The Waste Electrical and Electronic Equipment Directive (WEEE Directive) was introduced into UK law in January 2007 by the Waste Electronic and Electrical Equipment Regulations 2006.

This product shall not be treated as household waste. It must be treated in accordance with the Waste Electronic and Electrical Equipment Regulations 2006.

Avonwood Developments Limited is a WEEE registered producer WEE/EFO483SX.



9 FCC Compliance Information

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications to ZoneSafe™ systems not expressly approved by Avonwood Developments Limited may void the user's authority to operate the equipment.

10 Disclaimer

The ZoneSafe™ proximity warning systems manufactured by Avonwood Developments Limited are supplied as an audible and/or visual alert system only. The ZoneSafe™ proximity warning system is not a protective device, it does not initiate or perform safety related functions and it does not provide control to reduce risk but and audible/visual alert to the operator of the risk.

ZoneSafe™ should not be used to replace proper job site organisation, safeguards, operator training

Fig 1: WEEE Symbol

and the application of relevant vision standards that addresses safety and the safety of people on job sites.

Due to the nature of radio frequency, wireless communications and possible interference, data can never be guaranteed. Data can be corrupted, have errors or be totally lost. Avonwood Developments Limited ZoneSafe™ systems should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death or loss of property. Avonwood Developments Limited accepts no responsibility for damages of any kind resulting from errors in data transmitted or received using Avonwood's ZoneSafe™ systems, or for the failure of the Avonwood's ZoneSafe™ systems to transmit or receive such data.

Avonwood Developments Limited accepts no liability for any and all direct, indirect, special, general, incidental, consequential, punitive or exemplary damages including, but not limited to, loss of profits or revenue or anticipated profits or revenue arising out of the use or inability to use any Avonwood Developments Limited products.

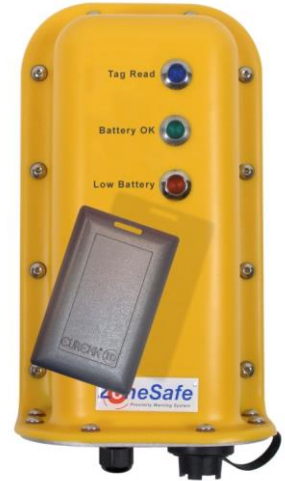
Information in this document is subject to change without notice.

11 Appendix A – Transponder Test Unit Operation Guide



Test YOUR ZoneSafe™ Personnel Safety Transponder Before Entering Work Site.

- 1) Hold your transponder in front of the test unit.
- 1) Wait for LED's to illuminate.
- 1) Check transponder status as indicated:
 - **Blue** - Transponder Read
 - **Green** - Battery OK
 - **Red** - Low Battery



If 'Tag Read' & 'Battery OK' are illuminated, it is **OK** to proceed.

If 'Low Battery' is illuminated, **Report it to your supervisor immediately.**

Test YOUR Transponder Daily

Avonwood Developments Limited

Knoll Technology Centre, Stapehill Road
Wimborne, Dorset, BH21 7ND

Tel: +44 (0) 1202 868000 Fax: +44 (0) 1202 868001

Email: sales@avonwood.co.uk

www.avonwood.co.uk

