Safe Training Systems Ltd

Safe-Series

Portal Monitor Simulators

Safe Training Systems Ltd
Registered Office
Holly House, Maidenhead Road, Wokingham, Berkshire, UK, RG40 5RR

Tel: 01344 483563
Fax 01344 485175
Web: www.radiationsimulation.com
Email: sales@safetrainingsystems.com

User Manual
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1.0 Customer Care

Safe Training Systems have had over 20 years of experience in the development, manufacture and maintenance of simulated instruments. Our aim is to manufacture instruments to a high standard using high quality materials and electronic components. All units produced are assembled to strict guidelines and are then passed through functional and visual checks before being signed off by quality control.

However accidents do happen and very occasionally faults may occur in instruments in the field, this manual describes basic maintenance which can be done by the operator.

Where a fault occurs – or an instrument is damaged in operation which cannot be rectified please return the unit –suitably packaged- to STS who will assess the instrument and provide a quote for repair if outside of warranty.

Instruments within warranty (12 months from date of delivery) will be repaired free of charge provided that the failure is not as a result of misuse or physical damage.

Any repairs should be sent to:

Instrument Repairs
Safe Training Systems Ltd
Holly House
Maidenhead Road
Wokingham
UK
RG40 5RR

2.0 Warning Notices

2.1 Control of Simulators

STS aims to make simulators that are indistinguishable from real instruments, so that the person being instructed experiences the best possible training. A consequence of this is that there is a possibility that the simulator could be mistaken for a real instrument, and then used for a real monitoring task, when, obviously, no readings would result.

To guard against this danger, simulators must be effectively managed so that they cannot be used for real monitoring, while at the same time their benefit as a precise simulator of a real instrument is not diminished.

2.1.1 This equipment is not suitable to be operated whilst on board an aircraft.

2.1.2 This equipment may not operate in the close proximity of high energy emissions, eg RADAR installations.

2.1.3 This equipment is not intended to be used in or close to Life Support appliances, devices or systems where malfunction of the STS product can reasonably be expected to result in a personal injury.

2.1.4 This equipment is not designed to be intrinsically safe and should not be used in potentially explosive atmospheres.

3.0 Safety Notices

These units use a low powered radiofrequency device running from batteries generating 3.3 Volts and as such should pose no risk to health.

Instruments should be kept clean and not exposed to excessive moisture, very high humidity or rain. The instruments are not IP rated and as such any failure occurring through water ingress is not covered under the warranty.
Please note the following safety advice:

a) Remove batteries before taking this unit on board an aircraft.

b) Remove batteries before returning this unit for repair.

c) Remove batteries before storage for any extended period(in excess of 4 weeks).

4.0 Operational Characteristics

4.1 Initial Setup of Network

The Safe-Series operates similar to a wifi network and as such has a Master Control Device. In order for the units to function correctly the Master instrument must be switched on first, then any other instruments or simulated radiation sources. Once initially set up the devices will remember the configuration set and use this until such time as the setup is changed. Only the Survey-Safe, Safe-FH40, Safe-EPD or the Dosi-Safe can be configured to be a Master instrument, this is done in the instruments on screen menu options.

4.2 Inverse Square

The **Safe-Series** has been designed to provide as realistic as possible response to the Inverse Square Law. Radiofrequency is by its nature governed by the principle of 1/D2 so the simulators start from a position of strength. It is however impossible to actually recreate the full characteristics of gamma radiation and so there are other factors which will influence the instruments response. These include reflections, materials used in casings and materials in the local environment where the instrument is being used. These factors will all have some effect on the accuracy of the inverse square representation, the instruments software does compensate for some of this loss through reflections and the end result is very close to the expected relationship.

4.3 Attenuation

Attenuation by Materials
The wavelength selected for use in the **Safe-Series** was chosen because it provides the best simulation of ionising radiation attenuation. At this wavelength, most common building materials provide approximately the same attenuation for ionising radiation (Cs 137) as does the simulator, using its radiofrequency signal.

In particular, wood, glass, brick, concrete and plasterboard all have appropriate attenuation characteristics.
Metals of any thickness totally attenuate the radiation field although due to reflected signal it is possible for some of the signal to leak out of containers which are not fully sealed.
For training purposes it is suggested that sources are placed in plastic, wood or card containers if the source is to be concealed. That said the source can be successfully hidden in vehicles without any issues.

4.4 Field Pattern

The **Safe-PocketSource** has been specifically designed to generate as near an isotropic field as is possible. The use of advanced antennae design and sophisticated software enables a field to be generated in three different axis and thus forms a virtually complete sphere or radiated signal. Some factors may cause imperfections in the field pattern such as large metal objects which cause significant reflection of the signal, or other objects between

the detector and the signal generator. These are however minor imperfections and should not greatly affect the received signal on the Portal Monitor.

4.5 Polar Response

The **Safe-Series** instruments have also been specifically designed to eliminate loss of signal seen when the instrument is pointed away from the source. The unique system of Antennae in the instrument allows for the instrument to face in any direction and still receive the signal generated by the **Safe-PocketSource**. As with real instruments there is some minor loss when the instrument is pointing 180 degrees away from the source but unlike other systems the signal is not lost altogether.

5.0 Portal Detector

5.1 Technical Data

Instrument Name	**STS Portal Detector**		
	Description The STS Portal simulator is a simulated radiation survey meter designed to aid the tuition of workers in the nuclear industry in safe practices and in understanding the nature and mechanics of ionising radiation . The instrument operates using an STS radio frequency detection head which detects the presence of a simulated radiation field, generated by the Safe-PocketSource, with the resultant reading activating a LED beacon and sounder.		
Dimensions (mm)	55H	85W	40D
Weight (KG)	0.25KG		
Construction	Moulded Plastic Case		
Controls	10 stage rotary switch		
Control Keys	n/a		
Power	Mains powered from Portal Controller at 5V		
Detector	STS radio frequency Detector		
Audio Output	n/a		
Alarm Levels	0-9 0 being the most sensitive		
Alarm LED	n/a		
Operating & Storage Temperature	Operating temp 0 to +30C	Storage temp 0C to +40C	
Warm up time	10 seconds from switch on to ready.		
Available Sources	Safe-Pocket Source	(variable activity level)	
Additional Information	The STS Portal Detector is not designed to be intrinsically safe and therefore should not be used in hazardous environments. The units are not waterproof and contain delicate and sensitive electronics which may be caused to fail if exposed to moisture. Units should be stored in a clean and dry environment, batteries should be removed if storing for more than 4 weeks. Instrument response will be affected by environmental conditions such as the presence of large reflective surfaces, substantial metal structures and variable wall thicknesses.		

5.2 Operational Controls

Available settings via Rotary Switch

0-9 Alarm levels with 0 being the most sensitive (ie will trigger alarm from a greater range and in a quicker time) through to 9 being the least sensitive. – the setting is changed with a small flat bladed screwdriver.

5.3 Maintenance

The Portal Detector does not contain any user serviceable parts and as such no repair or adjustment should be attempted as this will both invalidate the warranty and lead to potential damage of the circuit.

The unit is powered by a 5Volt supply from the Portal Controller box no batteries are required.

6.0 Portal Controller

6.1 Technical data

Instrument Name	**STS**	**Portal Controller**	
	The STS Portal simulator is a simulated radiation survey meter designed to aid the tuition of workers in the nuclear industry in safe practices and in understanding the nature and mechanics of ionising radiation . The instrument operates using an STS radio frequency detection head which detects the presence of a simulated radiation field, generated by the Safe-PocketSource, with the resultant reading activating a LED beacon and sounder.		
Dimensions (mm)	75H	66W	32D
Weight (KG)	0.15KG		
Construction	Moulded Plastic Case		
Controls	n/a		
Buttons	Lit on/off switch		
Power	Supplied by 12V power pack from mains 240V supply via input jack.		
Audio Output	Yes on alarm activation		
BEACON	LED Amber alarm beacon directly wired into controller		
Portal Detector	Direct wiring from controller to portal detector.		
Operating & Storage Temperature	Operating temp 0 to +30C	Storage temp 0C to +40C	
Warm up time	10 seconds		
Available Sources	Safe-PocketSource		
Additional Information	The STS Portal Controller is not designed to be intrinsically safe and therefore should not be used in hazardous environments. The units are not waterproof and contain delicate and sensitive electronics which may be caused to fail if exposed to moisture. Units should be stored in a clean and dry environment, batteries should be removed if storing for more than 4 weeks. Instrument response will be affected by environmental conditions such as the presence of large reflective surfaces, substantial metal		

	structures and variable wall thicknesses.

6.2 Operational Controls

PLEASE NOTE THE CONNECTIONS TO THE PORTAL CONTROLLER BOX ARE HARD WIRED – THE METAL CONNECTORS ARE CABLE GLANDS WHICH SHOULD NOT BE UNDONE.

Power Jack – only the supplied power pack should be used. The power pack should be set to supply 12V from a 240V mains supply.


Jack socket for power supply


On/off button -lit when on.

Cable to Portal Detector

Speaker and cable to Beacon

Alarm Beacon

6.3 Maintenance

The **Portal Controller** does not contain any user serviceable parts and as such no repair or adjustment should be attempted as this will both invalidate the warranty and lead to potential damage of the circuit.

7.0 Safe-PocketSource

7.1 Technical Data

Instrument Name	**STS**	**Safe-MiniSource (variable)**	
	Description The STS Safe-MiniSource (variable) is a simulated radiation source for use with the Survey-Safe, Safe-EPD & Dosi-Safe range of instruments. The Safe-MiniSource (variable) is a variable activity source with a near isotropic field pattern, its small size makes it easily hidden for carrying out training such as lost source recovery.		
Dimensions (mm)	104H	65W	24D
Weight (KG)	0.20KG		
Construction	Moulded Plastic Case		
Controls	Membrane with on/off key and LED	10 position rotary switch	
Power Level	10 variable levels settable from rotary switch		
Battery	2 x AAA 1.5V cells	THIS UNIT CANNOT BE MAINS RECHARGED	Battery life 10 hrs+
Emitter	STS radio frequency Detector	3 pole emitter for 360 degree Isotropic field	
Low Battery LED	Green on	Red – Low Battery	
Operating & Storage Temperature	Operating temp 0 to +30C	Storage temp 0C to +40C	
Warm up time	10 seconds from switch on to ready.		
Available Meters	Survey-Safe	Dosi-Safe	Safe-EPD
Additional Information	The STS Safe-PocketSource is not designed to be intrinsically safe and therefore should not be used in hazardous environments. The units are not waterproof and contain delicate		

	and sensitive electronics which may be caused to fail if exposed to moisture. Units should be stored in a clean and dry environment, batteries should be removed if storing for more than 4 weeks. Instrument response will be affected by environmental conditions such as the presence of large reflective surfaces, substantial metal structures and variable wall thicknesses.

7.2 Operational Controls

LED is lit green when battery is good and turns red when batteries are low.

Battery Access door

The Safe-PocketSource is designed to be simple to use and as such has only a power on/off (press and hold to turn off) button and a LED and a variable dial. The LED shows Green to show the source is switched on and working and that the battery level is ok. The LED will turn Red when the battery life is low and will extinguish once the batteries are exhausted. To change the activity level use a small flat blade screw driver to rotate the dial to the desired setting.

7.3 Maintenance

The Safe-PocketSource does not contain any user serviceable parts and as such no repair or adjustment should be attempted as this will both invalidate the warranty and lead to potential damage of the circuit.

The batteries are accessed through the panel on the rear of the instrument -this clips in – (it is a little difficult sometimes to get the door on!) The Safe-pocketSource uses 2 alkaline AAA cells, professional or long life cells are recommended for best performance. Batteries should be removed when not in use for prolonged periods and partially discharged cells should never be mixed with new cells.

8.0 Warranty Information

All STS products are guaranteed for a period of 12 months from the date of supply. This guarantee cover workmanship and component failure only and does not cover accidental damage, damage through misuse or neglect.