Safe Training Systems Ltd

Safe-Series

Simulators

Safe Training Systems Ltd
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User Manual Revised May 2023

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16.0 Warranty Information

1.0 Customer Care

Safe Training Systems have had over 26 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
Unit 33 Space Business Centre
Molly Millars Lane
Wokingham
Berkshire
RG41 2PQ
UK
+44 (0) 1189 799591

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 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-MiniSource** 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 Survey Meter or Dosimeter.

4.5 Polar Response

The **Survey-Safe** and **Dosi-Safe** 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-MiniSource**. 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 Survey-Safe Meter

5.1 Technical Data

STS Survey-Safe				
	The STS Survey-Safe 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-MiniSource, with the resultant reading displayed on the LCD Display of the instrument. The Survey-Safe may be used in conjunction with the Dosi-Safe dosimeter simulator to provide a more in-depth training experience.			
Dimensions (mm)	180H		110W	35D
Weight (KG)	0.25KG			
Construction	Moulded Plastic Case			
Controls	Single piece membrane keypad		4 function keys	Gloved operable buttons
Control Keys	On/Off	Menu	Backlight on/off & menu scroll	Audio on/off and menu scroll
Display Type	Digital		65 x 35mm LCD	Black & White
Backlight	Yes		On/off from keypad	
Battery	2 x AA 1.5V cells		Not mains rechargeable	Battery life 20 hrs+
Detector	STS radio frequency Detector			
Audio Output	Yes – Selectable on/off		Rate and Alarm	
Alarm Thresholds	YES		Set in menu	
Alarm LED	Red Alarm LED			
Histogram	Rate over Time graph displays last 10 readings trend			
Background	Level set in user menu			
Operating & Storage Temperature	Operating temp 0 to +30C		Storage temp 0C to +40C	
Warm up time	10 seconds from switch on to ready.		Network OK icon displayed	
Available Sources	Safe-MiniSource		Available in a range of activity levels	
Additional Information	The STS Survey-Safe 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.			

Factory Default Settings

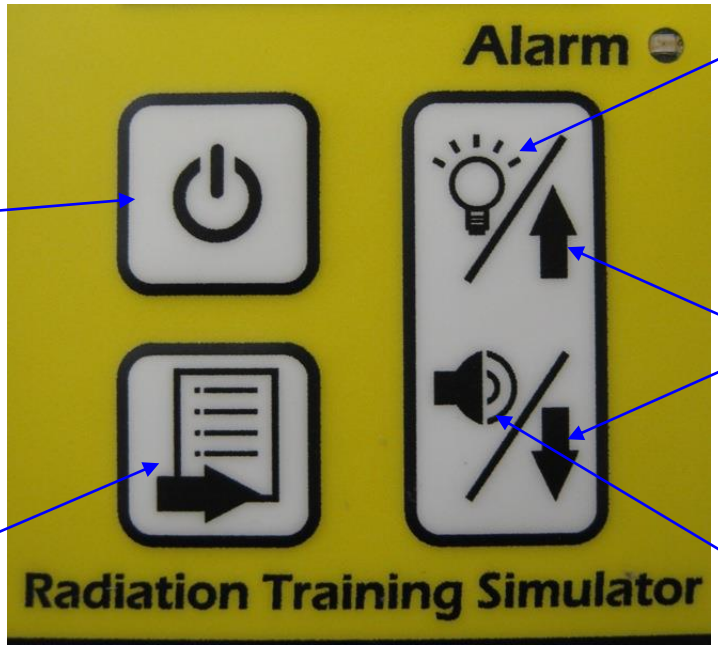
Background:
3: 150 nSv/hr
Rate Alarm:
3: 1 mSv/hr

Available settings via Menu

Background:
1: 0 nSv/hr
2: 50 nSv/hr
3:150 nSv/hr
4: 500 nSv/hr

Rate Alarm:
1: 50 uSv/hr
2: 500 uSv/hr
3: 1 mSv/hr
4: 10 mSv/hr

5.2 Operational Controls



Backlight on/off

ON / OFF Press and hold to turn off

Menu up/down -Press together to LOCK or UNLOCK

Menu & Item Select/Set

Audio on/off

The Home Screen displays Rate with Auto scaling units, a 10 reading Historical Graph and information Icons

LOCK Status

Battery Status

Audio Status

Backlight Status

Rate reading with auto-scaling units

Histogram

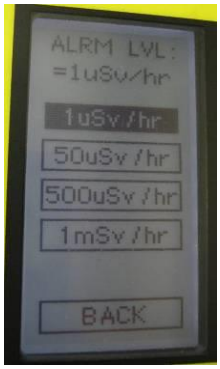
To enter the menu must be unlocked. options. The curr status is shown in the upper left corner of the home screen.

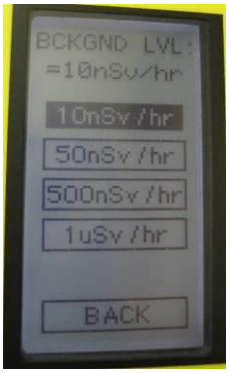
To unlock or lock the instrument, press both UP and DOWN  simultaneously. The Lock Status icon will change to show the new Lock status.

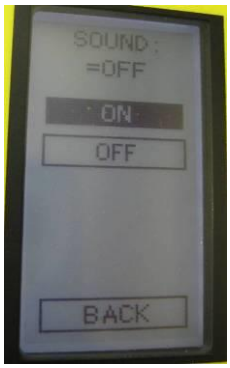
Press the Menu Button once  , with the instrument unlocked, to Access the user menu.

Use the Up and down arrows  to scroll and the select button to choose.

By Selecting each menu item the following information is displayed, to move back to the menu scroll down to the BACK button and press select 



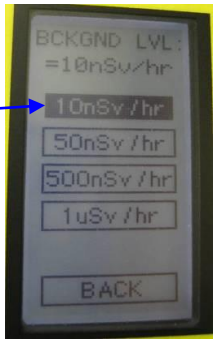




To Change the settings of  a menu item use the following steps. First Enter the main menu

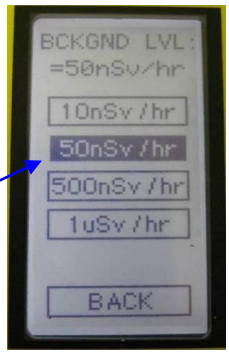
Select the desired item from the list by scrolling down  and pressing select  in this case the background Level.

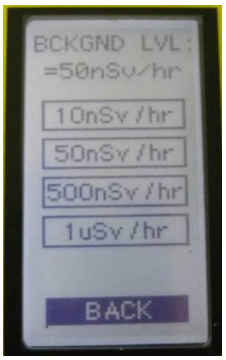
The initial screen displays the current value selected at the top of the screen, in this case =10nSv/hr



To change the value scroll down  to the desired value and press select 

The top of the screen now displays the new value set, in this case =50nSv/hr, to exit back to the menu scroll down to BACK and press Select, this returns you to the main menu. To start taking readings exit the main menu in the same way to return to the home screen.





Here is a breakdown on each of the menu options:

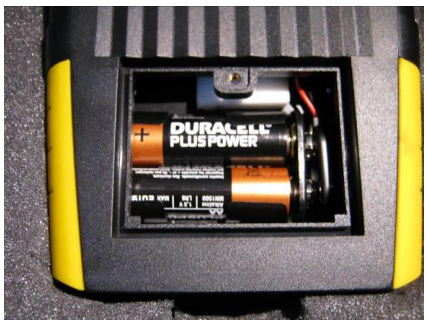
- Background – This determines the dose rate level when there is no source present. This is used to create an environment with a constant dose rate level.
- Alarm – This Alarm determines the dose rate level to which any great increase in dose rate will trigger an audio alarm. This alarm will have a frequency of 1 tone every second.
- Sound – This determines the initial audio state of the device upon turning on.
- BCKL – This determines the initial LCD backlight state of the device upon turning on.
- Network – This determines the network type of this instrument. There are two states: Master and Slave. The Master instrument will control the addition of any new instruments into the Radiation simulation network. There must always be one Master instrument switched on to control this network. The Slave units do not have this controlling function, but will join any radiation simulation networks upon turning on. (This radiation network technology is common to all SAFE-Series instruments.)

The Network Status of the instrument is shown upon boot up as shown:

5.3 Maintenance

The Survey-Safe 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. The Survey-Safe uses 2 alkaline AA 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.



6.0 Radeye G10 Simulator

6.1 Technical Data

STS Safe-RadEye G-10				
	The STS Safe-RadEye G-10 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 system built into a real RadEye which detects the presence of a simulated radiation field, generated by the Safe-MiniSource, with the resultant reading displayed on the LCD Display of the instrument. The Safe-RadEye G-10 may be used in conjunction with the Dosi-Safe or Safe-EPD dosimeter simulators to provide an even more immersive training experience.			
Dimensions (mm)	96H		61W	31D
Weight (KG)	0.16KG			
Construction	Moulded Plastic Case			
Controls	Single piece membrane keypad		4 function keys	Gloved operable buttons
Control Keys	On (scroll)	Menu(off)	info (scroll)	Audio (scroll)
Display Type	Digital		32 x 20 LCD	Black & White
Backlight	Yes		On/off from keypad	
Battery	2 x AAA 1.5V Alkaline cells			Battery life 7 hrs+
Detector	STS radio frequency Detector			
Measurement range	0.5uSv to 100mSv display range on instrument			
Functionality	All RadEye functions are retained in the simulator, this is a real RadEye with an additional STS circuit.			
Background	Level set at production not user changeable			
Operating & Storage Temperature	Operating temp 0 to +40C		Storage temp 0C to +40C	
Warm up time	10 seconds from switch on to ready.			
Available Sources	Safe-MiniSource, Safe-MiniSource Variable, Safe-Pocket Source		Available in a range of activity levels	
Additional Information	The STS Safe-RadEye G-10 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

The Safe-RadEye G10 operates exactly as a real G10 does, all of the menu functionality and displays are available and function as with the real instrument. The only difference to the real unit is that the RadEye is being fed a pulse generated by the STS electronics and not from a GM tube (which has been removed) as in the real instrument.
Please see the Thermo RadEye manual for operation instructions.

Starting an exercise

To ensure that good network connection is made the G10 instruments should be turned on before the source(s) are activated.

Background

The instrument has an inherent background of between 0 and 0.1µSv, this is set and cannot be changed by the operator.

6.3 Maintenance

The Safe-RadEye G10 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 access cover on the rear of the instrument. The Safe-RadEye 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.

7.0 FH40 GL10

7.1 Technical Data

STS Safe-FH40G				
	The STS Safe-FH40G 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-MiniSource, with the resultant reading displayed on the LCD Display of the instrument. The Safe-FH40G may be used in conjunction with the Dosi-Safe or Safe-EPD dosimeter simulators to provide a more in depth training experience.			
Dimensions (mm)	180H		110W	35D
Weight (KG)	0.25KG			
Construction	Moulded Plastic Case			
Controls	4 Button key pad		4 function keys	Gloved operable buttons
Control Keys	On/Off Press & Hold OFF	Menu	Backlight on/off & menu scroll	Audio on/off and menu scroll
Display Type	Digital		65 x 35mm LCD	Black & White
Backlight	Yes		On/off from keypad	
Battery	2 x AA 1.5V cells		THIS UNIT CANNOT BE MAINS RECHARGED	Battery life 7 hrs+
Detector	STS radio frequency Detector			
Audio Output	Yes – Selectable on/off		Rate and Alarm	
Alarm Thresholds	YES		Set in menu	
Scale	Scale automatically displayed for each range			
Background	Level set in user menu			
Operating & Storage Temperature	Operating temp 0 to +30C		Storage temp 0C to +40C	
Warm up time	10 seconds from switch on to ready.		Network OK icon displayed	
Available Sources	Safe-MiniSource, Safe-MiniSource Variable		Available in a range of activity levels	
Additional Information	The STS Safe-FH40G 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

Reading

Status Icons

Auto scale
Units

Readings
Bar Graph

Menu Keypad

Backlight
on/off

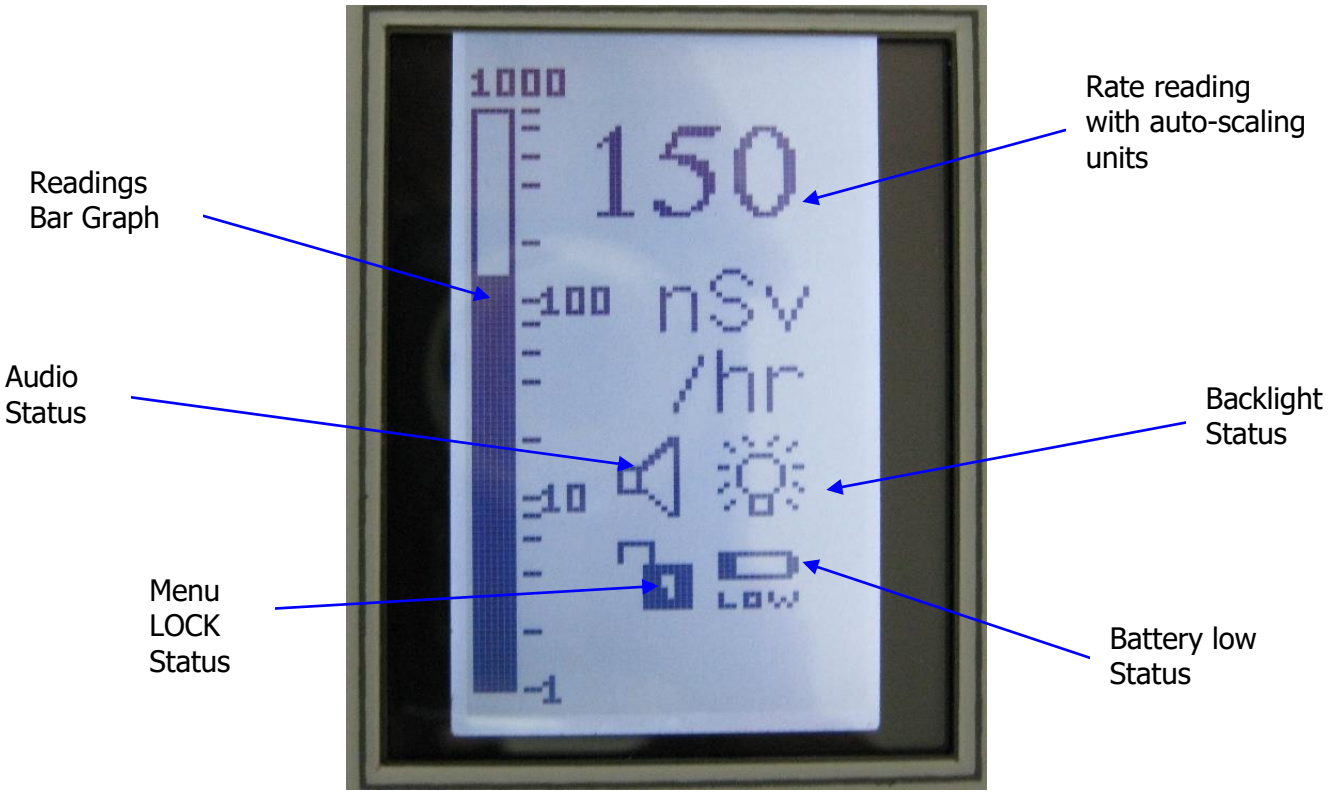
ON / OFF
Press and
hold to
turn off

Menu
up/down -Press
together to LOCK
or UNLOCK

Menu & Item
Select/Set

Audio
on/off

The Home Screen displays Rate with Auto scaling units, a reading Graph and information Icons



Starting an exercise

To ensure that good network connection is made the FH40 instruments should be turned on before the source(s) are activated.

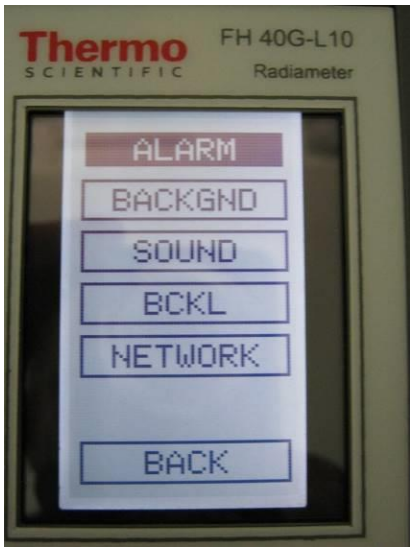
Setting up Alarm and Background levels

To enter the menu options, the device must be unlocked. The current lock status is shown in the bottom left corner of the home screen.

To unlock or lock the instrument, press both UP and DOWN simultaneously. The Lock Status icon will change to show the new Lock status.

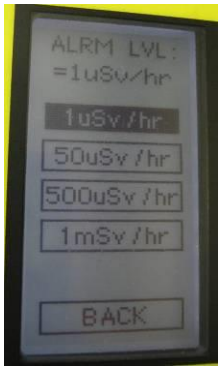
Press the Menu Button once  , with the instrument unlocked, to Access the user menu.

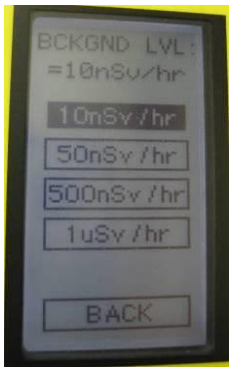
Use the Up and down arrows  to scroll and the select button to choose.

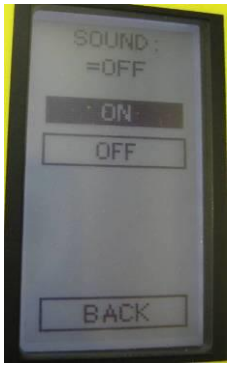


By Selecting each menu item the following information is displayed, to move back to the menu scroll down to the BACK button and press select 

To Change the settings of a menu item use the following steps. First Enter the main menu 



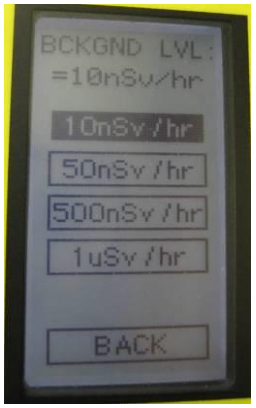




Select the desired item from the list by scrolling down  and pressing select  in this case the background Level.

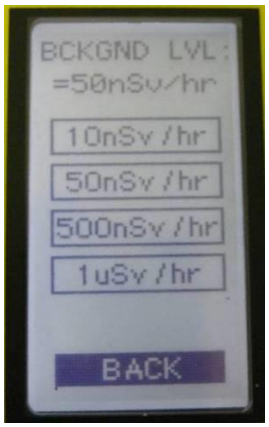
The initial screen displays the current value selected at the top of the screen, in this case =10nSv/hr

To change the value scroll down  to the desired value and press select 

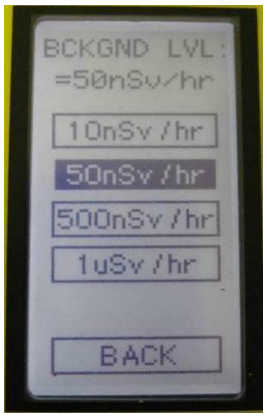


The top of the screen now displays the new value set , in this case =50nSv/hr, to exit back to the menu scroll down to BACK and press Select, this returns you to the main menu. To start taking readings exit the main menu in the same way to return to the home screen.

Here is a breakdown on each of the menu options:



- Background – This determines the dose rate level when there is no source present. This is used to create an environment with a constant dose rate level.
- Alarm – This Alarm determines the dose rate level to which any great increase in dose rate will trigger an audio alarm. This alarm will have a frequency of 1 tone every second.
- Sound – This determines the initial audio state of the device upon turning on.
- BCKL – This determines the initial LCD backlight state of the device upon turning on.
- Network – This determines the network type of this instrument. There are two states: Master and Slave. The Master instrument will control the addition of any new instruments into the Radiation simulation network. There must always be one Master instrument switched on to control this network. The Slave units do not have this controlling function, but will join any radiation simulation networks upon turning on.
  (This radiation network technology is common to all SAFE-Series instruments.)



The Network Status of the instrument is shown upon boot up as shown:

Network Status

7.3 Maintenance

The Safe-FH40 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 cap on the base of the instrument. The Safe-FH40 uses 2 alkaline AA 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 Safe -EPD

8.1 Technical Data

STS Safe-Series Field Survey Instruments

STS Safe-EPD Dosimeter			
	The STS Safe-EPD simulator is a simulated generic Electronic Personal Dosimeter designed to aid the tuition of workers in the nuclear industry in safe practices and in understanding the accumulation of dose over time but without exposure to radiation. The instrument operates using an STS radio frequency detection head which detects the presence of a simulated radiation field with the resultant reading displayed on the LCD Display. The instrument will work simultaneously with the Survey-Safe to provide a complete training experience. Set-able alarm levels, background and chirp rates allow the user to create their own specific training environment.		
Dimensions (mm)	75H	66W	32D
Weight (KG)	0.15KG		
Construction	Moulded Plastic Case		
Controls	Surface mounted pushbuttons	Suitable for gloved use	
Buttons	Side - On/Off	Front –Menu Scroll	Pin Hole – Setup access
Display Type	Digital	2 Line 16 character	
Backlight	Yes		
Battery	2 x AAA 1.5V cells		Battery life 10 hrs+
Detector	STS radio frequency Detector		
Audio Output	Yes	Alarm and chirp rate	
Alarm Thresholds	Yes (1 Rate & 2 Dose Alarm levels)	Set in Admin menu	
LED	Red Led	Chirp and alarm response	
Functionality	Dose display	Rate Display	
Background	Level set in user menu		
Operating & Storage Temperature	Operating temp 0 to +30C	Storage temp 0C to +40C	
Warm up time	10 seconds		
Available Sources	Safe-MiniSource		
Additional Information	The STS Safe-EPD 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.		

Factory Default Settings

Background:
3: 150 nSv/hr
Rate Alarm:
2: 100 uSv/hr
Chirp Dose:
3: 500 nSv
Dose Threshold 1:
2: 500 uSv
Dose Threshold 2:
2: 10 mSv

Available settings via Menu

Background:
1: 0 nSv/hr
2: 50 nSv/hr
3:150 nSv/hr
4: 500 nSv/hr

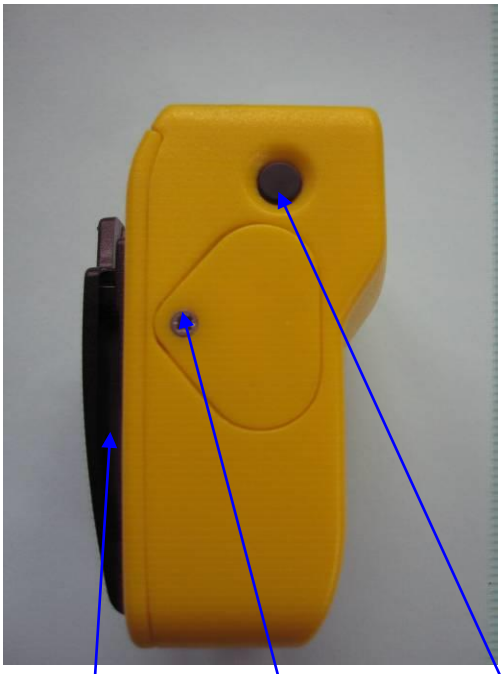
Rate Alarm:
1: 20 uSv/hr
2: 100 uSv/hr
3: 500 uSv/hr
4: 1 mSv/hr

Chirp Dose:
1: 0 nSv
2: 150 nSv
3: 500 nSv
4: 1 uSv

Dose Threshold 1:
1: 100 uSv
2: 500 uSv
3: 1 mSv
4: 5 mSv

Dose Threshold 2:
1: 5 mSv
2: 10 mSv
3: 20 mSv
4: 100 mSv

8.2 Operational Controls



Scroll through Menu
Acknowledge Alarm

Menu Option
Select

Pocket/Belt
Clip

Battery Access

On/ Off
Press and
hold to
turn off

To turn the unit on briefly press the on button. To turn the unit off press and hold the on button for 2 seconds.

USER accessible Menu:

Dose Display:

Battery Level
Percentage

Rate Alarm Triggered:
R – Rate Alarm

Dose Alarm Triggered:
D1 - Dose Alarm
D2 - Final Dose Alarm

Rate Display:

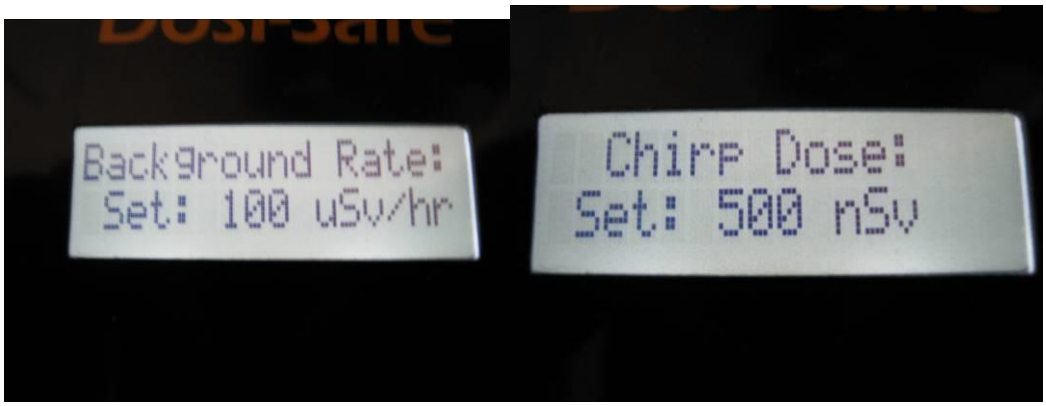
To view the user selectable menu items use the scroll key  to move through the Home menu, the Home menu will loop through DOSE, RATE, and Admin Menu screens.

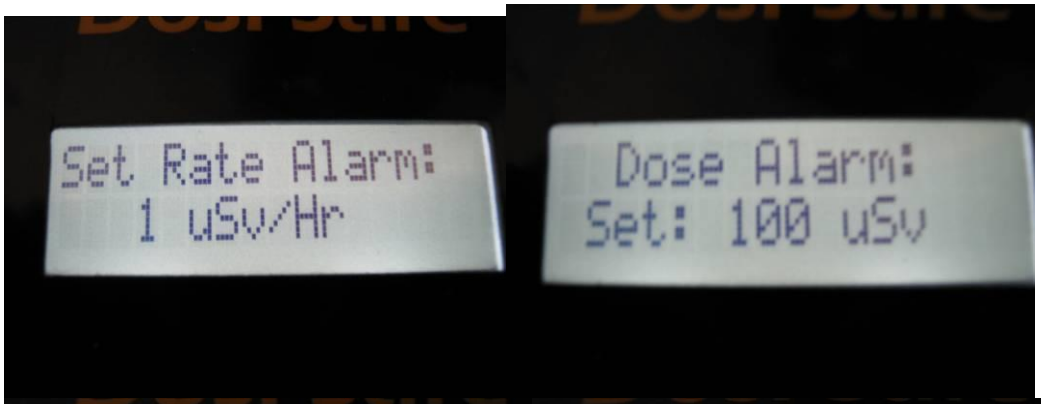
ADMINISTRATOR accessible Menu:

To enter the Admin menu, press  until the screen shows Administrator Menu.

Use a paper clip to activate the Admin Menu through the access hole

In the Administration Menu there will be various setting available for selection:


Background Rate:
Set: 100 uSv/hr
Chirp Dose:
Set: 500 nSv


Set Rate Alarm:
1 uSv/Hr
Dose Alarm:
Set: 100 uSv


Final Dose Alarm
Set: 5 mSv
Sound:
Set: ON


Network:
Set: Slave
Exit
Options

For all the menu items it is possible to select a value from four preset levels. To do this first scroll  to the desired menu option and then enter the option by pressing the paper clip . you can then scroll through the various available levels using the  . To set the desired level press the paper clip.

To exit the options menu, press paper clip at the Exit Menu screen (if you leave the dosimeter for a period of time(15s) it will revert back to the user menu default).

In this case it is the Rate Alarm level, currently the level is set at 1uSv/Hr

To change the level Press the paper clip the display will then display Set Alarm Level: as below

To choose from a preset level use the scroll button  to choose the new desired level, in this case 50uSv/Hr

To save this new value press paper clip- the screen will now update to show Alarm Level: Set : in this case at 50uSv/Hr as below.

Here is a breakdown on each of the menu options:

- Background Rate – This determines the dose rate level when there is no source present. This is used to create an environment with a constant dose rate level.
- Rate Alarm – This Alarm determines the dose rate level to which any great increase in dose rate will trigger an audio alarm. This alarm will have a frequency of 1 tone every second.
- Chirp Dose – An audible beep every time set dose is accumulated.
- Dose Alarm: The first dose alarm. The instrument will alarm once the accumulated dose reaches this threshold.
- Final Dose Alarm: The final dose alarm. The instrument will alarm once the accumulated dose reaches this threshold.
- Sound – This determines the initial audio state of the device upon turning on.
- Network – This determines the network type of this instrument. There are two states: Master and Slave. The Master instrument will control the addition of any new instruments into the Radiation simulation network. There must always be one Master instrument switched on to control this network. The Slave units do not have this controlling function, but will join any radiation simulation networks upon turning on. (This radiation network technology is common to all SAFE-Series instruments.) After initial configuration, the devices will remember the set up and use this the next time they are turned on until such time as the set up is manually changed.

The Network Status of the instrument is shown upon boot up as shown:

Audible Alarms:

The Dosimeter has 3 audible alarms.

Chirp Dose – The Dosimeter will give one single short beep for each incremental amount of dose received ie Set at 50nSv will beep at the first 50, then after a further 50 etc.

Rate Alarm – The Dosimeter will give an intermittent alarm beep when the rate alarm threshold is exceeded. This Alarm will have an audible intermittent sound until acknowledged by pressing the  button.

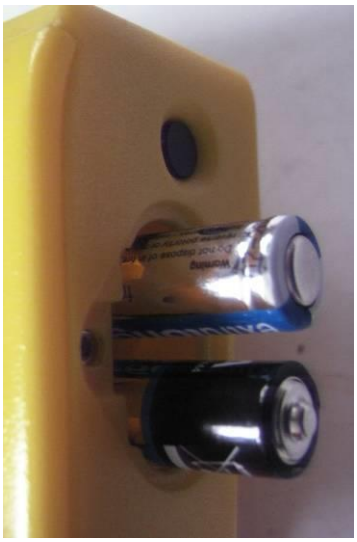
Dose Alarm – The Dosimeter will give a continuous broken beep when the dose alarm threshold is exceeded. This Alarm will continue until acknowledged by pressing the  button.

Final Dose Alarm – The Dosimeter will give a continuous beep when the final dose alarm threshold is exceeded. This Alarm will continue until acknowledged by pressing the  button.

8.3 Maintenance

The Safe-EPD 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 side of the instrument. The Safe-EPD 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.
ENSURE CELLS ARE CORRECTLY FITTED – Observe the polarity markings on the case, the + sign indicates that the cell should be placed with the positive terminal facing the battery door aperture.



9.0 *Dosi-Safe* Dosimeter

9.1 Technical data

STS Dosi-Safe Dosimeter			
	The STS Dosi-Safe simulator is a simulated generic Electronic Personal Dosimeter designed to aid the tuition of workers in the nuclear industry in safe practices and in understanding the accumulation of dose over time but without exposure to radiation. The instrument operates using an STS radio frequency detection head which detects the presence of a simulated radiation field with the resultant reading displayed on the LCD Display. The instrument will work simultaneously with the Survey-Safe to provide a complete training experience. Set-able alarm levels, background and chirp rates allow the user to create their own specific training environment.		
Dimensions (mm)	120H	65W	23D
Weight (KG)	0.15KG		
Construction	Moulded Plastic Case		
Controls	Surface mounted pushbuttons	Suitable for gloved use	
Buttons	On/Off	Menu	Select
Display Type	Digital	2 Line 16 character LCD	
Backlight	Yes		
Battery	2 x AA 1.5V cells	THIS UNIT CANNOT BE MAINS RECHARGED	Battery life 20 hrs+
Detector	STS radio frequency Detector		
Audio Output	Yes	Alarm and chirp rate	
Alarm Thresholds	Yes (rate and Dose alarms)	Set in user menu	
LED	Red Led	Chirp and alarm response	
Functionality	Dose display	Rate Display	
Background	Level set in user menu		
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-MiniSource		
Additional Information	The STS Dosi-Safe 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.		

Factory Default Settings

Background:
3: 150 nSv/hr
Rate Alarm:
2: 100 uSv/hr
Chirp Dose:
3: 500 nSv
Dose Threshold 1:
2: 500 uSv
Dose Threshold 2:
2: 10 mSv

Available settings via Menu

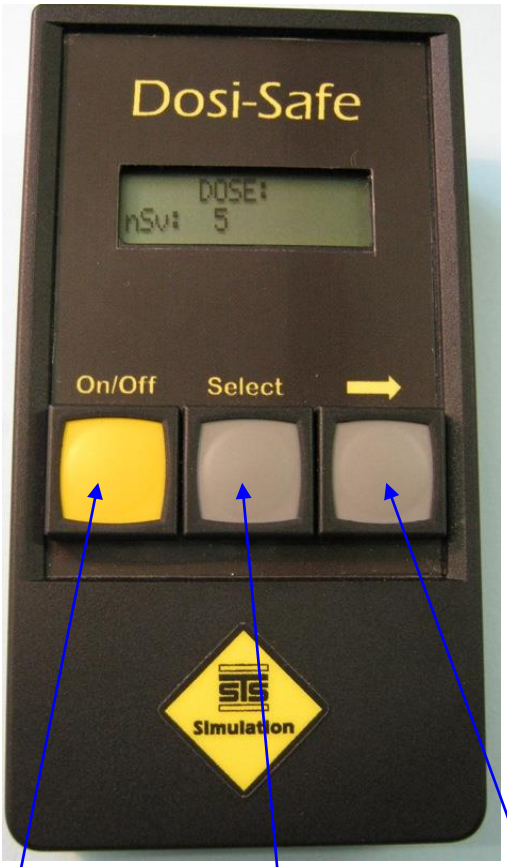
Background:
1: 0 nSv/hr
2: 50 nSv/hr
3:150 nSv/hr
4: 500 nSv/hr

Rate Alarm:
1: 20 uSv/hr
2: 100 uSv/hr
3: 500 uSv/hr
4: 1 mSv/hr

Chirp Dose:
1: 0 nSv
2: 150 nSv
3: 500 nSv
4: 1 uSv

Dose Threshold 1:
1: 100 uSv
2: 500 uSv
3: 1 mSv
4: 5 mSv
Dose Threshold 2:
1: 5 mSv
2: 10 mSv
3: 20 mSv
4: 100 mSv

9.2 Operational Controls



On/ Off
Press and
hold to
turn off

Menu Option Select
and Backlight
Acknowledge Alarm

Scroll through
Menu

Pocket/Belt
Clip

Dose Display:

Battery Level
Percentage

Rate Alarm Triggered:
R – Rate Alarm

Dose Alarm Triggered:
D1 - Dose Alarm
D2 - Final Dose Alarm

Rate Display:

Audio

To view the user selectable menu items use the scroll key  to move through the Home menu, the Home menu will loop through DOSE, RATE, and Options screens.

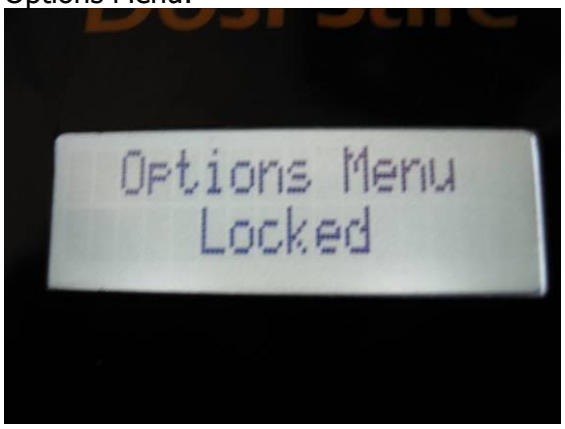
The Backlight can be turned on by Pressing the Select button 

when at the DOSE/RATE screen.

To enter the options menu, press SELECT 

. The instrument must be unlocked to enter this menu.

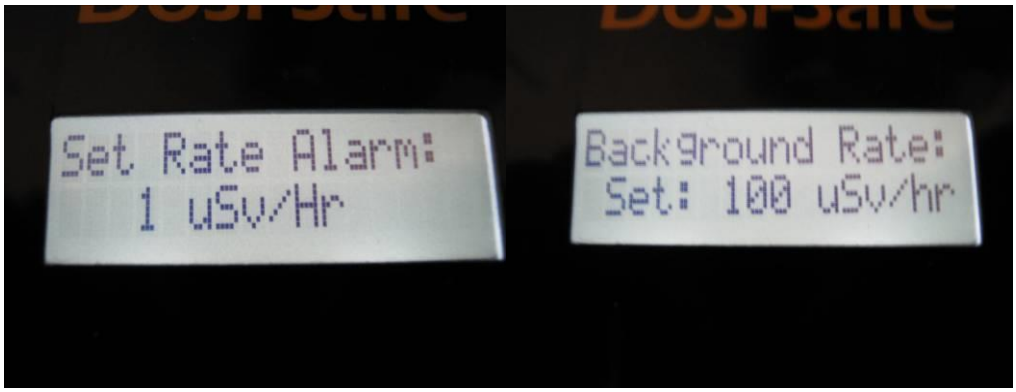
Options Menu:

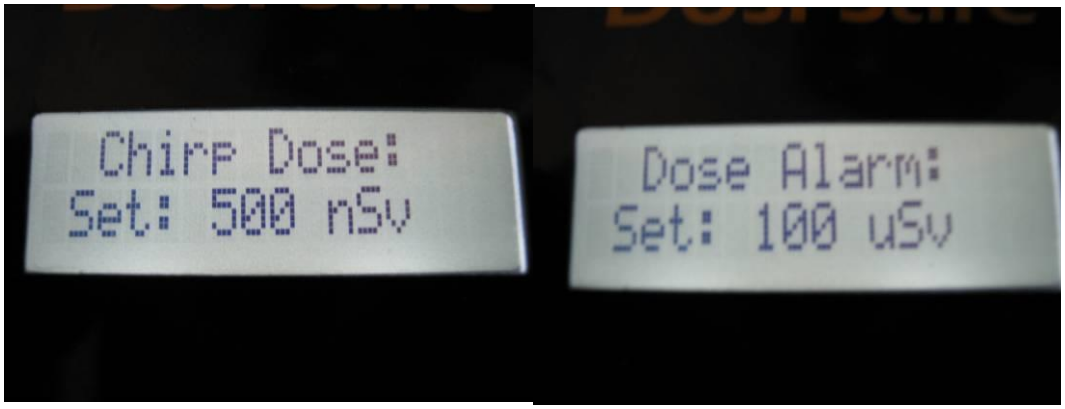


At the Options menu homescreen press SELECT 

and RIGHT  simultaneously to Lock or Unlock the instrument. The Lock status will be show on this screen. :

Once in the options menu, there will be various setting available for selection:





For all the menu items it is possible to select a value from four preset levels. To do this first scroll  to the desired menu option and then press the select 

button to enter the item.

To exit the options menu, press SELECT 

, at Exit Options.

In this case it is the Rate Alarm level, currently the level is set at 1uSv/Hr

To change the level Press the Select Button 

the display will then display Set Alarm Level: as below

To choose from a preset level use the scroll button  to choose the new desired level, in this case 50uSv/Hr

To save this new value press the Select button 

the screen will now update to show Alarm Level: Set : in this case at 50uSv/Hr as below.

Here is a breakdown on each of the menu options:

- Background Rate – This determines the dose rate level when there is no source present. This is used to create an environment with a constant dose rate level.
- Rate Alarm – This Alarm determines the dose rate level to which any great increase in dose rate will trigger an audio alarm. This alarm will have a frequency of 1 tone every second.
- Chirp Dose – An audible beep every time set dose is accumulated.
- Dose Alarm: The first dose alarm. The instrument will alarm once the accumulated dose reaches this threshold.
- Final Dose Alarm: The final dose alarm. The instrument will alarm once the accumulated dose reaches this threshold.
- Sound – This determines the initial audio state of the device upon turning on.
- Network – This determines the network type of this instrument. There are two states: Master and Slave. The Master instrument will control the addition of any new instruments into the Radiation simulation network. There must always be one Master instrument switched on to control this network. The Slave units do not have this controlling function, but will join any radiation simulation networks upon turning on. (This radiation network technology is common to all SAFE-Series instruments.) After initial configuration, the devices will remember the set up and use this the next time they are turned on until such time as the set up is manually changed.

The Network Status of the instrument is shown upon boot up as shown:

Audible Alarms:

The Dosimeter has 3 audible alarms.

Chirp Dose – The Dosimeter will give one single short beep for each incremental amount of dose received ie Set at 50nSv will beep at the first 50, then after a further 50 etc.

Rate Alarm – The Dosimeter will give an intermittent alarm beep when the rate alarm threshold is exceeded. This Alarm will have an audible intermittent sound until acknowledged by pressing the 

button.

Dose Alarm – The Dosimeter will give a continuous broken beep when the dose alarm threshold is exceeded. This Alarm will continue until acknowledged by pressing the 

button.

Final Dose Alarm – The Dosimeter will give a continuous beep when the final dose alarm threshold is exceeded. This Alarm will continue until acknowledged by pressing the 

button.

9.3 Maintenance

The Dosi-Safe 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. The Dosi-Safe uses 2 alkaline AA 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.

10.0 *Safe-MiniSource* Remote Control (Variable)

10.1 Technical Data

STS Safe-MiniSource (RC variable)			
	The STS Safe-MiniSource (RC variable) is a simulated radiation source for use with the Survey-Safe, Safe-EPD & Dosi-Safe range of instruments. The Safe-MiniSource (RC 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)	80H	60W	40D
Weight (KG)	0.20KG		
Construction	Moulded Plastic Case		
Field Range	Approx. 10m		
Control Keys	On/Off	Hold for off	
Remote Control -key fob	8 selectable levels	868MHz frequency	100m range
Backlight	N/a		
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	
Isotope Activity	Variable activity from 2.5uSv to 5mSv/hr at 1M range		
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-MiniSource 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.		

10.2 Operational Controls

The Safe-MiniSource is designed to be simple to use and as such has a power on/off (press and hold to turn off) button and a LED. 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 the remote control keyfob to select the desired setting. On the reverse of the fob is a label which shows the activity setting that relates to the 1-8 numbers.

The button on the key fob should pressed for 1second to register the change of each setting the source LED will flash to show that the setting has been changed.

When the unit is turned off the activity level is set back to the lowest level of 1μSv.

10.3 Maintenance

The Safe-MiniSource 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 by removing the 4 screws ion the corners. The Safe-MiniSource 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.

Factory Default Settings

Levels:
1 = 2.5uSv/hr
2 = 5uSv/hr
3 = 25uSv/hr

4 = 50uSv/hr
5 = 250uSv/hr
6 = 0.5mSv/hr
7 = 2.5mSv/hr
8 = 5mSv/hr

11.0 Safe-MiniSource (Variable)

11.1 Technical Data

STS Safe-MiniSource (variable)			
	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)	80H	60W	40D
Weight (KG)	0.20KG		
Construction	Moulded Plastic Case		
Controls	1 surface mounted push button	Gloved operable button	
Control Keys	On/Off	Variable dial	
Display Type	None		
Backlight	N/a		
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	
Isotope Activity	Variable activity from 0.5uSv to 25mSv/hr at 1M range		
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-MiniSource 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.		

Factory Default Settings

Levels:
0 = 0.5uSv/hr
1 = 2.5uSv/hr
2 = 5uSv/hr
3 = 25uSv/hr
4 = 50uSv/hr
5 = 250uSv/hr
6 = 0.5mSv/hr
7 = 2.5mSv/hr
8 = 5mSv/hr
9 = 25mSv/hr

11.2 Operational Controls

The Safe-MiniSource 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.

11.3 Maintenance

The Safe-MiniSource 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 by removing the 4 screws ion the corners. The Safe-MiniSource 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.

12.0 Safe-PocketSource

12.1 Technical Data

STS Safe-MiniSource (variable)			
	The STS Safe-Pocket Source (variable) is a simulated radiation source for use with the Survey-Safe, Safe-EPD & Dosi-Safe range of instruments. The Safe-Pocket Source (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.		

12.2 Operational Controls

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

Access door to batteries

The Safe-PocketSource is designed to be simple to use and as such has only a power on/off button- (Press for On & Press and hold to turn off) 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.

12.3 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.

13.0 Portal Detector

13.1 Technical Data

STS Portal Detector			
	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.		

13.2

13.3 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.

13.4 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.

14.0 Portal Controller

14.1 Technical data

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.		

14.2 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

Cable to Portal Detector

Alarm beacon

On/off button -lit when on.

Speaker and cable to Beacon

14.3 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.

15.0 Safe-6150AD Simulator

15.1 Technical Data

STS Safe-6150AD				
	The STS Safe-6150AD 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-MiniSource, with the resultant reading displayed on the LCD Display of the instrument. The Safe-6150AD may be used in conjunction with the Dosi-Safe or Safe-EPD dosimeter simulators to provide a more in-depth training experience.			
Dimensions (mm)	180H		110W	35D
Weight (KG)	0.25KG			
Construction	Moulded Plastic Case			
Controls	4 function keys		Gloved operable buttons	
Control Keys	On/Off	Menu	Backlight on/off & menu scroll	Audio on/off and menu scroll
Display Type	Digital		65 x 35mm LCD	Black & White
Backlight	Yes		On/off from keypad	
Battery	2 x AA 1.5V cells		THIS UNIT CANNOT BE MAINS RECHARGED	Battery life 7 hrs+
Detector	STS radio frequency Detector			
Audio Output	Yes – Selectable on/off		Rate and Alarm	
Alarm Thresholds	YES		Set in menu	
Background	Level set in user menu			
Operating & Storage Temperature	Operating temp 0 to +30C		Storage temp 0C to +40C	
Warm up time	10 seconds from switch on to ready.		Network OK icon displayed	
Available Sources	Safe-MiniSource variable, safe-Pocket Source		Available in a range of activity levels	
Additional Information	The STS Safe-6150AD 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.			

15.2 Operator Controls

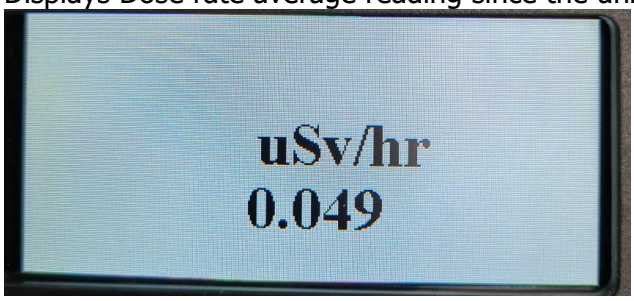
The Available operator buttons are displayed on the rear of the case.

To enter the menu select the up arrow – to change the adjustable alarm thresholds enter the required menu and then use the Audio button to scroll through the available options.

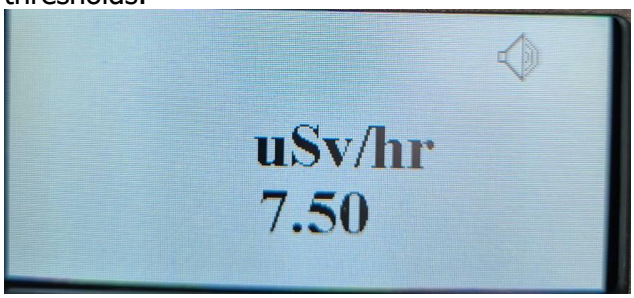
The unit is pre-programmed with a fixed 0.05uSv background.
The unit has an autoscaling display that will automatically change from uSv to mSv when the counts go over 100 uSv. The maximum count rate displayed is 10mSv

Menu Information

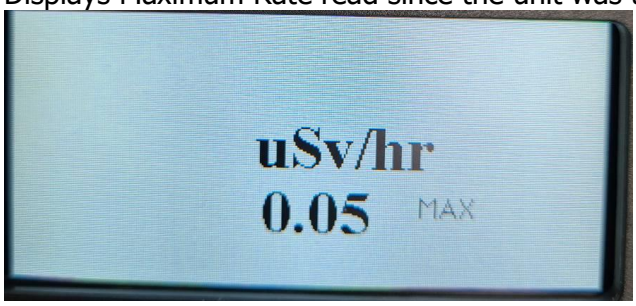
Screen 1.
Displays Dose rate average reading since the unit was turned on.



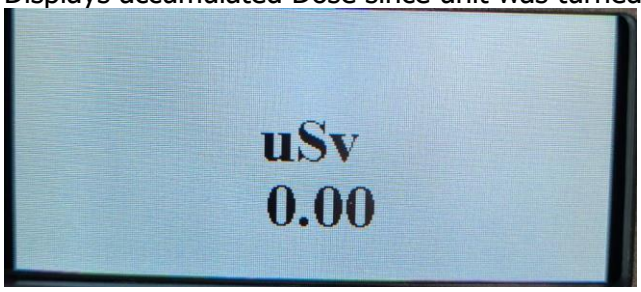
Screen 2.
Displays Rate Alarm Set level, use Audio button to scroll through and select available thresholds.



Screen 3.
Displays Maximum Rate read since the unit was turned on.

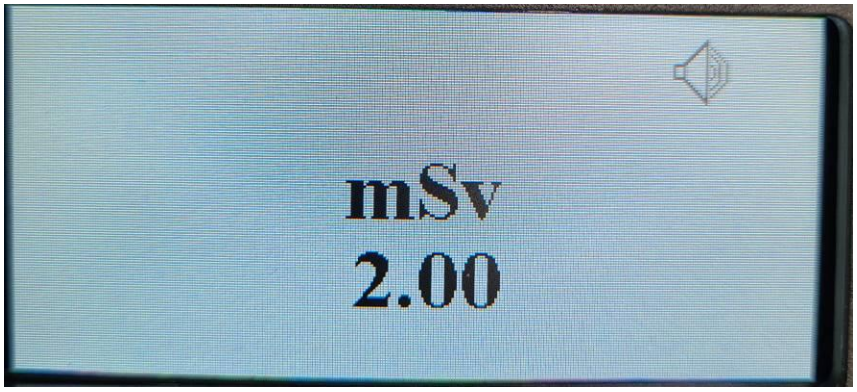


Screen 4.
Displays accumulated Dose since unit was turned on.

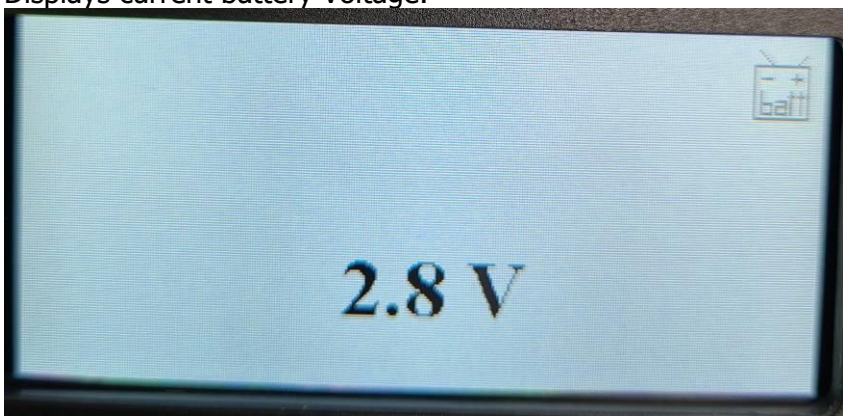


Screen 5.

Displays Dose alarm set level, use audio button to scroll through and select available dose alarm levels



Screen 6.
Displays current battery Voltage.



15.3 Maintenance

The Safe-6150AD 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 cap rear of the instrument. The Safe-6150AD uses 2 alkaline AA 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.

16.0 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.

17.0 CE/UKCA

EU Declaration of Conformity

This declaration of conformity is issued under the sole responsibility of the manufacturer:

Safe Training Systems Ltd
Unit 33 Space Business Centre
Molly Millars lane
Wokingham
RG41 2PQ

Product: STS Instruments Simulated "Safe Series" instruments
Survey Safe, Dosi-Safe, Safe-EPD, Safe-FH40,Safe MiniSources, Safe-PocketSource, Safe RadEye G10/GF10, Safe-6150AD, Safe- portal monitor.

Equipment type: Battery Operated Training Simulator
The STS Safe Series Simulated survey Monitors as described in the Full Manual is in conformity with the relevant Union Harmonisation Legislation:

	reference	Codes	Date Passed
Radiated Emissions	CISPR 11:2015 + A1:2016 + A2:2020	EN 55011:2016 + A1:2017 + A2:2021	25/09/2023
Radiated Spurious Emissions	ETSI EN 300 328 V2.2.2 Clause 5.4.9	ETSI EN 300 328 V2.2.2	25/09/2023
Electrostatic Discharge	EN 61000-4-2:2009 IEC 61000-4-2:2008	IEC 61326-1:2021 Basic Immunity Requirement (Table 1) ETSI EN 301 489-1 V2.2.3 ETSI EN 301 489-3 V2.3.2	25/09/2023
Radiated RF Immunity	EN IEC 61000-4-3:2020		25/09/2023
Power Frequency Magnetic Field	EN 61000-4-8:2010 IEC 61000-4-8:2009		25/09/2023

Signed for and on behalf of:

J Ward

Name: Jim Ward
Position: Operations Director
Company: Safe Training Systems Ltd
Date: 31/01/2024