FNIRSi 菲尼瑞斯

GC-01

核辐射检测仪使用手册

NUCLEAR RADIATION DETECTOR USER MANUAL

目录

CATALOG

用户须知

●请详细读完本使用说明书以及操作指示，并且要确实遵守文中的规定，如此才能够发挥探测仪的最佳功能。

●请妥善保存本使用手册

●不要在易燃、易爆的环境中使用仪器。

●仪器　更换的废旧电池和报废的仪器不可与生活垃圾一同处理，请按国家或者当地的相关法律规定处理。

●当仪器出现任何质量问题或者对使用仪器有疑问时，可联系“菲尼瑞斯-FNIRSI”在线客服或厂家，我们将在第一时间为您解决。

一、产品概述

本产品采用的是盖革-米勒计数器，一种探测电离辐射(β粒子、γ射线和x射线)强度的计数仪。用充气管或小房间做探头，当向探头施加的电压达到一定的范围时，射线在管内每电离产生一对离子，就能放大产生一个相同大小的电脉冲，并被连接的电子设备记录，由此测量的单位时间内射线的数量。报警阈值测量率可任意选择。

二、产品特点

●检测x射线γ射线及β射线。

●灵敏度高，可工作环境多样。

●中、英双语操作界面,操作简单,使用方便。

●掉电数据保存。

●液晶显示,并有汉字显示功能,状态显示目了然。

●灯光/震动/声音3种组合报警方式选择。

●实时时钟显示。

●产品可预置剂量率和累计剂量报警阈值。

三、产品参数

产品参数	核辐射检测仪
尺寸	120x78x27mm
探测射线种类	γ射线、x射线、β射线
探测器	能量补偿GM管（盖革计数管）
剂量当前率	0.00-10000μSv/h（10mSv/h）
积累剂量当量	0.00μSv-500.0mSv
能量范围	48keV-1.5Mev≤±30%（对137Cs-）
语言	中文+英文，任意切换
灵敏度	80CPM/μSv（对于Co-60）
剂量单位	μSv/h、μGy/h、mR/h、cps、cpm任意切换
电池容量	1100mAh
报警方式	灯光、震动、声音

四、按键说明

- ●左键/返回键：从下级菜单返回上级菜单。
- ●右键/设置键：进入设置菜单/进入下级菜单。
- ●开关机键/OK键：开关机/确认。
- ●上键：上下切换选项。
- ●下键：上下切换选项。

五、操作方法

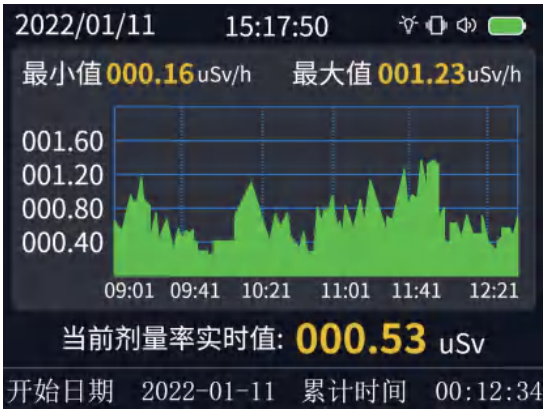
1、开关机

短按开关机键即可开机，长按开关机键关机。

2、监测界面

开机后自动进入此页面，监测参数：

- 实时检测量，左上角板块显示
- 平均值/最大值
- 当前剂量报警值
- 累计剂量报警值
- 累计储存剂量率



按左右键切换到，波形检测页面如下：

- 波形监测
- 当前剂量率实时值
- 最大值
- 最小值

3、设置

长按右键/设置键进入设置菜单。在设置页面长按左键/返回键可返回到监测页面。按上下键切换设置选项。

设置选项：

- 单位设置
- 报警设置
- 系统时钟
- 报警方式
- 显示设置

3.1单位设置

按右键进入下级设置
五种测量单位：

- μSv/h
- μGy/h
- mR/h
- CPS
- CPM

3.2报警设置

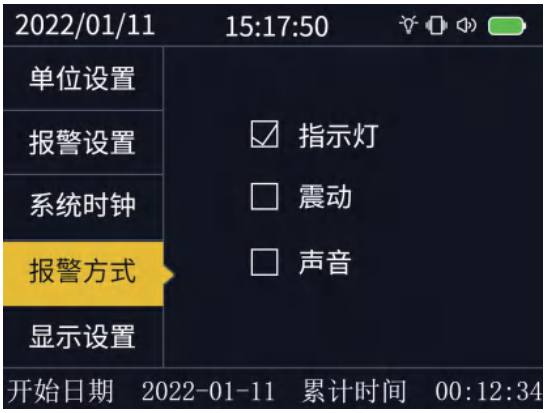
长按右键/设置键进入设置菜单。按上下键切换设置选项。按右键进入下级设置可设置或改变以下选项的值：

- 当前剂量报警值
- 累积剂量报警值
- 累计剂量清零

3.3系统时钟

长按右键/设置键进入设置菜单。按上下键切换设置选项。按右键进入下级设置设置日期和时间。

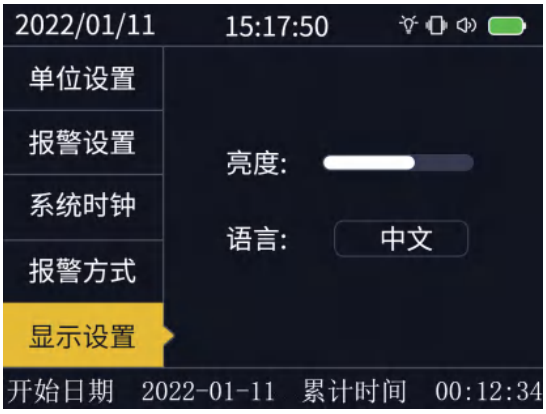
3.4报警方式



长按右键/设置键进入设置菜单。按上下键切换设置选项。按右键进入下级设置。打开或关闭:

- 指示灯
- 震动
- 声音

3.5显示设置



长按右键/设置键进入设置菜单。按上下键切换设置选项。按右键进入下级设置:

- 屏幕亮度调节
- 中英文切换

六、有关放射性单位换算知识

（一）国际标准(我国执行此标准)1990年

1、放射性工作人员:20mSv/年(10μSv/小时)

2、一般公众人员:1mSv/年(0.52μSv/小时)

（二）单位换算等知识

1μSv/h=100μR/h 1nc/kg.h=4μR/h

1μR=1γ(原核工业找矿习惯用的单位)

放射性活度:

1Ci=1000mCi

1mCi=1000μci

1Ci=3.7×10^{10}Bq =37GBq

1mCi=3.7×10^{7}Bq =37MBq

1μCi=3.7×10^{4}Bq=37KBq

1Bq=2.703×10-11Ci=27.03pci

计量当量:

1Sv=10^{3}mSv=10^{6}μSv

1Sv=100rem 100μrem=1μSv

氡单位:

1Bq/L=0.27em=0.27×10-10Ci/L

照射量:

1R=10^{3}mR=10^{6}μR

1R=2.58×10-4c/kg

吸收计量:

1Gy=10^{3}mGy=10^{6}μGy

1Gy=100rad 100μrad=1μGy

其他:

1Sv相当1Gy 1克镭=0.97Ci ≈1Ci

（三）放射性同位素衰变值的计算

A=A0eλ-t t=T1/2；

A0已知源强A是经过时间后的多少根据放射性衰变计算表查表计算。

（四）放射源与距离的关系：

放射源强度与距离的平方乘反比。

X=A.r/R2A:点状源的放射性活度;R:与源的距离;r:照射量率常数

注:Ra—226 (t 1608年) r=0.825伦.米2/小时.居里

Cs—137 (t 29.9年) r= 0.33伦.米2/小时.居里

Co—60 (t　5.23年) r=1.32伦.米2/小时.居里

根据放射性衰变计算表查表计算放射性屏蔽：

不同物质的减少一半和减少到1/10值(cm)

放射源	铅笔		铁		混凝土	
	减半	1/10	减半	1/10	减半	1/10
铯-137	0.65	2.2	1.6	5.4	4.9	16.3
铱-192	0.55	1.9	1.3	4.3	4.3	14.0
钴-60	1.10	4.0	2.0	6.7	6.3	20.3

七、注意事项

核辐射检测仪属于精密的仪器，请注意保护，以下建议将有利于仪器的维护和延长使用寿命。

1、存放及使用过程中应尽量保持干燥，过大的湿度会造成仪器的故障和损坏。

2、不要猛烈或粗暴的使用仪器，防止跌落、敲击和剧烈震动仪器，否则会使仪器出现不同程度的损坏。

3、电量显示过低时，处于欠压状态，应及时充电。严重欠压时仪器出现不能开关机、花屏等异常现象。

※如仪器不能正常工作，与我公司售后联系，或直接返回我公司进行维修。

八、仪表维护

●请在使用前保持干燥并用柔软的布擦干净仪器表面的污垢，不可使用清洁剂或溶剂。

●请以符合环保要求的方式回收和利用坏的仪器、附件及包装材料。

●长时间不使用时请及时关机。

●请勿私自拆卸或更换元器件避免发生故障。

●不使用时请放在干燥的地方储存。

九、生产信息

产品名称：核辐射检测仪

品牌/型号：菲尼瑞斯/GC-01

服务电话：0755-83242477

生产商：深圳市菲尼瑞斯科技有限公司

网址：www.fnirsi.cn

地址：广东省深圳市龙华区大浪街道伟达工业园C栋西边8楼

执行标准：GB/T 9588-2008

Notice to user

●Please read this instruction manual and operation instructions carefully,Follow the instructions in the manual,In order to make the detector function fully.

●Please keep this manual

●Dont use this equipment in a flammable and explosive environment.

●Replaced used batteries and discarded instruments cannot be disposed of with household waste.Please handle according to relevant national or local laws.

●When there are any quality problems with the instrument or questions about using the instrument.You can contact "FNIRSI" online customer service or the manufacturer.We will solve it for you as soon as possible.

1. Product Description

This product uses a Geiger-Miller counter.Counter for detecting the intensity of ionizing radiation (beta particles, gamma rays and x-rays).Use a gas tube or a small chamber as a probe.When the voltage applied to the probe reaches a certain range.Each time the ray is ionized in the tube to produce a pair of ions, it can be amplified to produce an electric pulse of the same size.And recorded by the connected electronic device.The number of rays per unit time thus measured.The alarm threshold measurement rate can be arbitrarily selected.

2.Key features

●Detect x ray, γ rays and β rays.

●High sensitivity, can be used in various environments.

●Data is saved during shutdown.

●High-definition LCD display.The status display is clear at a glance.

●Light/Vibration/Sound 3 combined alarm modes to choose.

●Real-time clock display.

●The product can preset dose rate and cumulative dose alarm threshold.

3.Product parameters

Product name	Nuclear radiation detector
Size	120x78x27mm
Types of detection rays	γ rays, x rays, β rays
Detector	Energy Compensation GM Tube (Geiger Counter Meter)
dose equivalent rate	0.00-10000μSv/h (10mSv/h)
Cumulative dose equivalent	0.00μSv-500.0mSv
Energy range	48keV-1.5Mev≤±30% (for 137Cs-)
Language	Chinese/English switch
Sensitivity	80CPM/μSv (For Co-60)
Dosage unit	μSv/h,μGy/h,mR/h,cps,cpm Switch
Battery capacity	1100mAh lithium battery
Alarm method	light, vibration, sound

4.The button description

- Left/Back key: Return to the upper menu from the lower menu
- Right key/setting key: Enter the setting menu/enter the lower menu
- Power on/off key/OK key: Switch on/Off/Confirm
- Up key: Switch options up and down
- Down key: Switch options up and down

5. How to operate

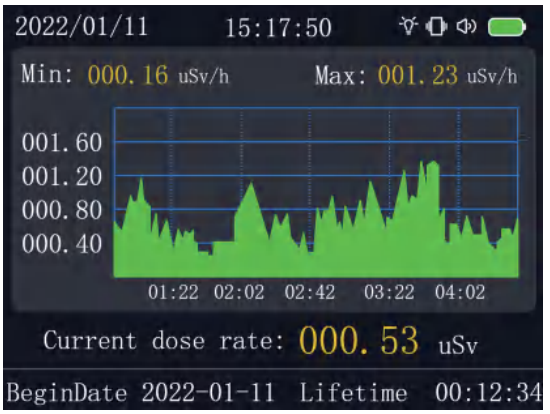
①Power on/off

Short press the power button to turn it on.Long press the power button to shut down.

②Monitoring interface

Automatically enter this page after booting, and monitor parameters:

- Real-time detection amount, displayed in the upper left panel
- Average value/Maximum value
- Current dose alarm value
- Cumulative dose alarm value
- Cumulative stored dose rate



Press the left and right keys to switch to the waveform detection page as follows:

- Waveform monitoring
- Current dose rate real-time value
- Maximum value
- Minimum

③ Settings

Long press the right key/setting key to enter the setting menu.Long press the left button/back button on the setting page to return to the monitoring page.Press the up and down keys to switch the setting options.

Setting Options:

- Unit settings
- Alarm settings
- System clock
- Alarm mode
- Display settings

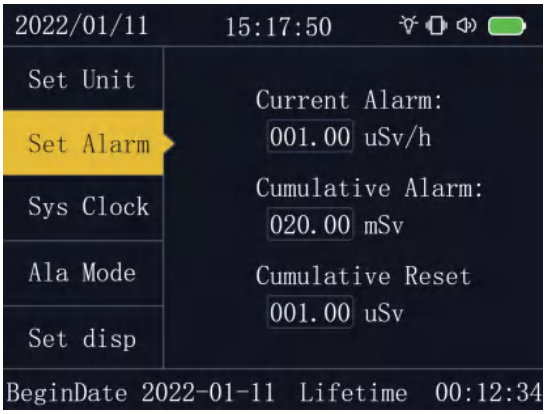
3.1 Unit setting

Press the right button to enter the lower level to set five measurement units:

- μSv/h
- μGy/h
- mR/h
- CPS
- CPM

3.2 Alarm settings

Long press the right key/setting key to enter the setting menu.Press the up and down keys to switch the setting options.Press the right button to enter the lower settings to set or change the values of the following options:

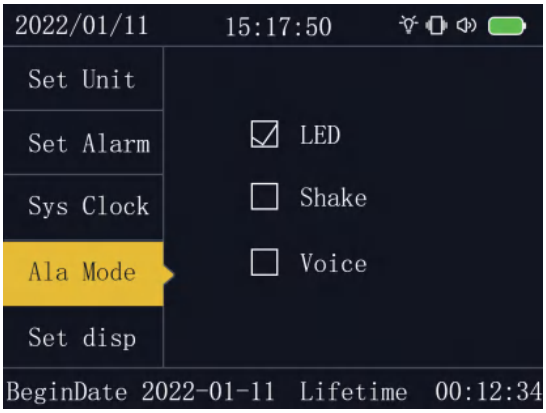


- Current dose alarm value
- Cumulative dose alarm value
- The accumulated dose is reset to zero

3.3 System Clock

Long press the right key/setting key to enter the setting menu.Press the up and down keys to switch the setting options.Press the right button to enter the lower level settings to set the date and time.

3.4 Alarm mode



Long press the right key/setting key to enter the setting menu.Press the up and down keys to switch the setting options.Press the right button to enter the lower level settings.On or off:

- Indicator
- Vibration
- Sound

3.5 Display Settings

Long press the right key/setting key to enter the setting menu.Press the up and down keys to switch the setting options.Press the right button to enter the lower settings:

- Screen brightness adjustment
- Switch between Chinese/English

6. Conversion of radioactive units

①International Standards (1990)

Radioactive staff: 20mSv/year (10μSv/hour)

General public: 1mSv/year (0.52μSv/hour)

②Unit conversion

1μSv/h=100μR/h 1nc/kg.h=4μR/h

1μR=1γ(The unit used for prospecting in the pronuclear industry)

Radioactivity:

1Ci=1000mCi

1mCi=1000μci

1Ci=3.7×10^{10}Bq =37GBq

1mCi=3.7×10^{7}Bq =37MBq

1μCi=3.7×10^{4}Bq=37KBq

1Bq=2.703×10-11Ci=27.03pci

Exposure:

1R=10^{3}mR=10^{6}μR

1R=2.58×10-4c/kg

Absorption metering:

1Gy=10^{3}mGy=10^{6}μGy

1Gy=100rad 100μrad=1μGy

Metering equivalent:

1Sv=10^{3}mSv=10^{6}μSv

1Sv=100rem 100μrem=1μSv

Radon unit:

1Bq/L=0.27em=0.27×10-10Ci/L

Other:

1Sv is equivalent to 1Gy 1g radium=0.97Ci≈1Ci

③Calculation of radioisotope decay values

A=A0eλ-t t=T1/2 ;
A0 The known source strength A is how much time has elapsed,According to the radioactive decay calculation table look-up table calculation.

④The relationship between radioactive source and distance

The intensity of the radioactive source is inversely proportional to the square of the distance.
X=A.r/R2A: The activity of the point source;R: Distance from source;
r: Exposure rate constant

Note: Ra-226 (t 1608) r=0.825 ren. m2/hour. Curie
Cs—137 (t 29.9 years) r= 0.33 ren. m2/hour. Curie
Co—60 (t 5.23 years) r=1.32 ren. m2/hour. Curie

According to the radioactive decay calculation table, look up the table to calculate the radioactive shielding:

Halved and reduced to 1/10 value (cm) for different substances

Radioactive source	Pencil		Iron		Concrete	
	Halving	1/10	Halving	1/10	Halving	1/10
Cesium-137	0.65	2.2	1.6	5.4	4.9	16.3
Iridium-192	0.55	1.9	1.3	4.3	4.3	14.0
Cobalt-60	1.10	4.0	2.0	6.7	6.3	20.3

7.NOTE

Nuclear radiation detectors are sophisticated instruments.Please be careful.The following recommendations will facilitate instrument maintenance and prolong life.

①Keep as dry as possible during storage and use.Excessive humidity can cause malfunction and damage to the instrument.
②Please dont use the instrument violently or rudely, prevent dropping, knocking and violent vibration of the instrument.Otherwise, the instrument will be damaged.
③ When the power display is too low, it is in an undervoltage state and should be charged in time.In case of serious undervoltage, the instrument can not be turned on and off, and abnormal phenomena such as blurred screen occur.

※If the instrument cannot work normally, please contact our company after sales. We will solve the problem.

8. Instrument maintenance

●Please keep it dry and wipe off the dirt on the surface of the instrument with a soft cloth before use.Dont use detergents or solvents
●Please recycle and use damaged instruments, accessories and packaging materials in an environmentally friendly manner.
●Please shut down in time when not in use for a long time
●Dont disassemble or replace components without permission to avoid failure.
●Please store in a dry place when not in use.

9.Production information

Product Name: Nuclear Radiation Detector
Brand/Model: FNIRSI/GC-01
Service phone: 0755-83242477
Manufacturer: Shenzhen FRI NI RUI SI Technology Co., Ltd.
URL:www.fnirsi.cn
Factory address: 8th Floor, West of Building C, Weida Industrial Park, Dalang Street, Longhua District, Shenzhen City, Guangdong Province

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