AION -A7

User Manual

Digital Geiger Counter
(GM Tube Version)

AION-A7

Customer Support :
E-mail : simonlim@hescorp.co.kr

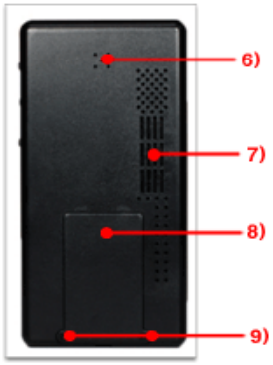
REV : 2012-0705-001

CONTENTS

1 Specification

ITEM	DESCRIPTION
LCD Display	4 Digit numbers
Reference Icons	4 levels of reference icon
Audio	On / Off switch
Detector	GM-tube with Ne^{+} Halogen (SBM20)
Radiation Detected	Beta, Gamma and X-rays
Countable Pulse Resolution& Range	6 CPM , 3500 CPS
Measurement mode	uSv , Bq , Bq/g
Equivalent dose rate measurement range of gamma radiation(CPM)	0.6 ~ 500 uSv/h
Tolerance, γ(gamma) radiation equivalent	±25%
Permission error limits of gamma radiation Equivalent	±25%
Measuring range, γ(gamma) radiation energy	0.0595 ~ 3.0Mev
Tolerance, Cs-137 radiation equivalent Dose rate	±15%
Permission error limits of Cs-137 radiation Equivalent	±15%
Operating temperature	From -1℃ to +50℃
Humidity	up to 95% at 35 degree
Cs-137 Source radioactive aggregate specific activity	0.025 ~ 22.20Bq/g
Battery life	Continuous measuring time : 1080min. Standby time : 12months.
Battery (9V Alkaline Battery)	not exceeding 27x18x48mm
Dimensions, Nor more than	60x26x122mm
Weight, not more than	200g

2 Part Name



1) Display
2) Run button (Gold / Silver center button)
3) Power on / off button
4) Speaker on / off slide switch
5) Mode button
6) Speaker hole
7) Beta window
8) Battery cover
9) Screw hole

3 Preparation before power-on

Battery Cover

A) Open battery cover. Use 9V alkaline battery for long operation time.

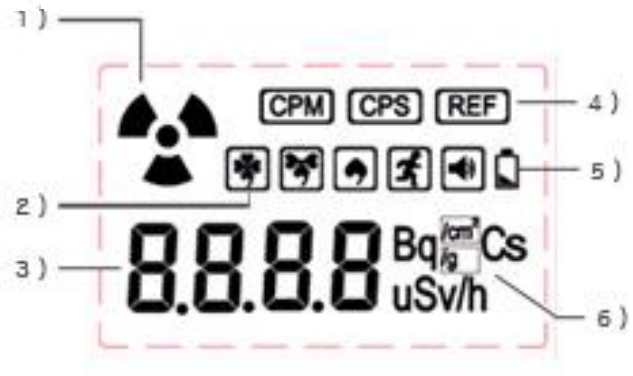
B) Connect battery to power cable of "AION-A7".

C) Let power cable locate on top side of "AION-A7".

D) Fix the battery cover by screw which is in the box.

E) Press the power button for 1 sec. System will turn on.

LCD display	
	1. This icon spins on detecting radiation. Before operation or after measurement done, this icon stays still. 2. This icon means radiation level. There are 4 radiation levels. (It works only in CPM mode.) 3. This 4 digit numbers displayradiation value. 4. Mode icon(CPM, Bq, Bq/g) 5. Battery warning. Need to replace battery. 6. This icon identifies unit of measurement.



4 Operation

4-1 Power button	
To power on, press this button over 1 sec. To power off, press this button again.	
	When pressed to power on, LCD blinks and "AION-A7" will initialize. When initialization is done, preparation for CPM mode detection is finished. When run button(gold color) pressed, Measurement in CPM mode will be operated for 1 minute.

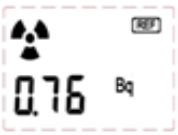
4-2 Mode button	
To change measurement mode, press this button. There are 3 modes of measurement, CPM, Bq , Bq/g.	
4.2.1 CPM Mode	Measures radiation dose equivalent for 1 minute. Used for measuring external radiation exposure in air, ground, material. **SI unit: uSv / h**
4.2.2 Bq Mode	Measures Background radiation energy level. Displays Bq unit which is converted from uSv unit.
4.2.3 Bq/g Mode	To run Bq/g mode, Bq mode should be finished. It takes about 15 minutes to get data in Bq/g mode. Locate "AION-A7" on target material such as fish, rice and so on. Displays radiation energy level of target material. When measurement done, data would be saved and automatically stops operation. (AION-A7 detects β(Beta) particles together. If you measure natural radiation things such as salt. It will show higher radiation energy level.)

• Location of power button and Mode button

4.2.1 CPM Mode	
	When run button (gold color) pressed, AION-A7 detects radiation dose equivalent for 1 minute and displays measured data. When radiation detected, icon spins and speaker beeps. When mode button pressed during measuring process, process would be cancelled. When run button pressed during measuring process, process would be restarted. **Measuring range: 0.06uSv ~ 500uSv / h**

• Reference Icons show levels of radiation dose equivalent rate .

Value Table of Reference Icons		
		**Green Zone** - Natural background radiation level Cobalt-60: 0.01 ~ 0.3uSv/h Cs-137: 0.01 ~ 0.6uSv/h
		Low level radio activation - Low level of radioactive material Cs-137: 0.3 ~ 1.0uSv/h
		Daily human limit rate - Maximum 10uSv of Cs-137
		Do not stay here: - Over 100uSv * When over 500uSv, use CPS mode

4.2.2 Bq Mode	
	In **Bq** mode "AION-A7" detects energy value of natural background radiation. User should run this mode before measuring Bq/g mode. When the value of radiation dose equivalent goes over 0.15uSv, lead shield case is needed to get accurate value. When "AION-A7" is used at home and radiation dose equivalent is over 0.2uSv, measuring should be run in plastic or glass case. The value of natural background radiation in seashore or forest is usually lower than urban area.

4.2.3 Bq/g Mode	

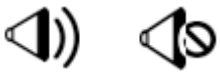
Notice: Before running Bq/g mode. Get natural background radiation value by running Bq mode. Value in Bq/g mode means radiation energy value from target material such as rice, meat, fish and so on. Radiation dose value which is acquired by detecting γ(gamma) and β(beta) particle would be automatically converted to Bq/g value.

<Example>

Put "AION-A7"in glass or plastic case. Then run Bq mode. It has auto power off function. Then put target material such as rice or fish in case with AION-A7 together. And run Bq/g mode.If it show 0.040Bq/g value, it means 40Bq/Kg (1000g x 0.040Bq/g = 40Bq/Kg).

<Notice>

When value of natural background radiation goes over 0.1uSv, tolerance is 25Bq/Kg.
If accuracy of value is needed, measure in lead shield box.
If it detect same of natural background radiation level.
It will show 0.025Bq/g value as follow Japan's ministry of Health, Labour and Welfare.
For more information :
www.mhlw.go.jp/english/

4-3 On/off switch for sound	
	On right side of "AION-A7" is slide switch. When switch on, speaker icon appears in LCD. When switch off, icon disappears and there would be no sound.

4-4 Battery Warning icon / Auto power off	
	When battery low, this icon appears. Needs to replace battery. "**AION - A7"** has auto power off function. In CPM mode and Bq mode 90 seconds after detection finished, power would be off automatically. And in CPS mode, same does in 10minutes. When power off automatically, only measured data in Bq , Bq/g mode would be saved. **<Notice> When battery low, tolerance of measured data would be bigger than normal condition.**

USE AND HANDLING

* Do not allow liquid, small particles or other foreign objects to get into the system or accessories.
* Do not expose the system to direct sunlight, high temperature or high humidity.
* Do not expose the system to dust, smoke or steam.
* The warranty period of the dosimeter shall terminate and be of no further effect 12 months after the date of putting it into operation.
* Free of charge repair or replacement during the warranty period of the dosimeter use in performed by the factory-manufacturer
-the customer encloses a sales receipt for warranty service.
- the customer encloses the broken dosimeter.
•If the production default is eliminated, The warranty period is prolonged for the time length when The dosimeter was not used because of undetected faults.

Warranty is not valid in case of :
* Any mechanical damages.
* Damages under force
* Any liquid remains
* The housing opened, repaired or replaced the third parties
* Lost serial number or changed
* power-off the system for longer using.
* The device shall be stored in the manufacturer package, in warehouses,
* Do not attempt repairs yourself. Unauthorized repairs, attempted repairs, or modification will void your warranty. Additionally, there is a risk of exposure to electrical shock or other hazards.

JQA

総数２頁の１頁
証明書番号 150-15588

校 正 証 明 書

依 頼 者 HESCO
住 所 10B-4L, NAMCHON INDUSTRIAL COMPLEX, #623-3, NAMCHON-DONG, NAMDONG-GU, INCHEON, KOREA

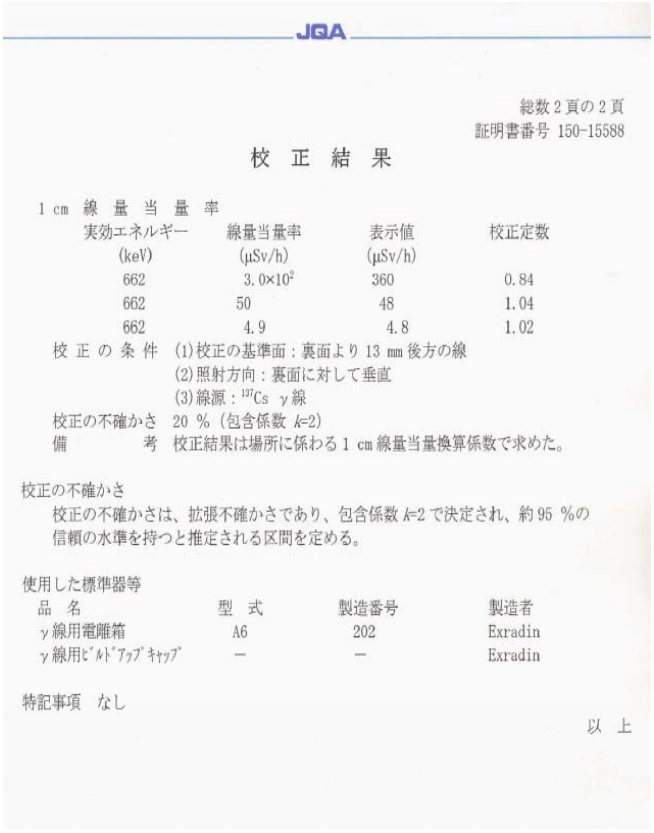
品 名 Digital Geiger Counter
型 式 AION-A7
製造番号 2K2M0100010
製 造 者 HESCO

校正項目 1 cm線量当量率
校正方法 JQA校正要領書による(文書番号E314366)
環境条件 温度23 ℃±1 ℃, 湿度65 %以下
校正年月日 2012年2月9日

校正結果は次頁以降のとおりであることを証明します。

2012年2月10日

東京都世田谷区砧一丁目21番25号
一般財団法人 日本品質保証機構
計量計測センター
所長 中本 文男



JQA

総数２頁の２頁
証明書番号 150-15588

校 正 結 果

1 cm 線 量 当 量 率

実効エネルギー (keV)	線量当量率 (μSv/h)	表示値 (μSv/h)	校正定数
662	3.0×10^{2}	360	0.84
662	50	48	1.04
662	4.9	4.8	1.02

校正の条件 (1)校正の基準面：裏面より 13 mm 後方の線
(2)照射方向：裏面に対して垂直
(3)線源：^{137}Cs γ線
校正の不確かさ 20 %（包含係数 k=2）
備 考 校正結果は場所に係わる 1 cm 線量当量換算係数で求めた。

校正の不確かさ
校正の不確かさは、拡張不確かさであり、包含係数 k=2 で決定され、約 95 %の信頼の水準を持つと推定される区間を定める。

使用した標準器等

品名	型式	製造番号	製造者
γ線用電離箱	A6	202	Exradin
γ線用ﾋﾞﾙﾄﾞｱｯﾌﾟｷｬｯﾌﾟ	−	−	Exradin

特記事項 なし

以 上