

OPERATING INSTRUCTIONS ALPHAiX 3000

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OPERATING INSTRUCTIONS

ALPHA iX 3000

1. General

The ALPHA iX 3000 is a microprocessor-controlled radiation measuring instrument and also a programmable computer with storage facilities. Measurements can, of course, also be carried out without having to program the unit in advance. The principal basic functions:

- a) Switch on the unit
Briefly depress the RUN/STOP key
(Audible signal and AiX 3000 in the display)
- b) Start measurement
Depress the RUN/STOP key for the second time (Display of the battery voltage after approx. 2 sec. followed by display of the measuring method)
- c) Abort measurement
Depress the RUN/STOP key for approx. 3 sec. STOP appears on the LCD – measurement is aborted – can be re-started by RUN/STOP
- d) Changing the measuring method
3 different measuring methods can be set by depressing the SET key:
 - Single impulse measurement
-> display: IMPULSE
 - Minute average measurement
-> display: IMP/m
 - Microsievert per second
-> display: $\mu\text{Sv/h}$The selection is made after switching on or after STOP (abortion of measurement)
- e) Switch off the unit
Simultaneously depress the RUN/STOP + SET key

You now already know the most important things. Please note that the response to a key operation may be slightly delayed – power savings circuit – i.e. do not depress the key too hard but long enough to obtain a response – which can take 2 seconds.



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2. Instructions for the three measuring methods

The 3 different measuring methods offer the chance to select the proper measuring method for each testing purpose. Single impulse determination corresponds to the customary contamination measuring method used till now and has therefore been retained. The values according to IMP/s and $\mu\text{Sv/h}$ are converted and stored in this measuring method.

2.1. Display IMPULSE

Single impulse count with direct display on LCD and an audible signal is given with every impulse, which can be switched off by the SOUND key. The measured value remains in the display after the measuring time. The RUN/STOP key must be depressed to start a new measurement.

2.2. Display Imp/m

With this method the counted impulses are immediately converted to one minute. The display of the one minute mean value is the most important comparative value in radiation measurement – e.g. the background counts.

The results are displayed only after the measuring time or a better measuring interval. The measurements are automatically started again after the measuring interval and the measured value of the last measuring interval remains in the display until the new measured value from the following measuring interval is available and loaded to the display. The last 40 measured values are stored, the oldest value under No. 1 and the last measured value No. 40. Measured value No. 1 is automatically deleted by measured value No. 41 and the other measured values are shifted so that measured value No. 41 is stored as No. 40.

With this measuring method a shorter measuring interval should be chosen. The mean value per minute from all stored measured values can later be retrieved again by the STORE key. This display has an oblique and a zero (/0) after the measured value.

If, for example, 968 impulses are counted in 10 minutes the value 96.8/m appears in the display after 10 minutes. If a one minute measuring interval is selected, 10 individual values are displayed and stored after every minute. Depression of the STORE key after 10 minutes, however, also gives the value 96.8/0.

Long measuring intervals are selected if long measuring times have to be covered. For a 24 hour interval a measuring value can be stored every day for 40 days – for an unattended measuring station, for example.

No audible signals are given – only when the adjustable alarm limit is exceeded.

2.3. Display $\mu\text{Sv/h}$

This display is intended for dose rate measurements expressed in Sv (sievert). This involves measurement of GAMMA radiation only, so ALPHA and BETA radiation must be shielded – i.e. the protective cover must be left on the counter tube during measurement.

The measured value of intense radiation is displayed in seconds, weak radiation may take a few minutes. As in the measurement of the one minute mean value, the measurements are also continued in this measuring method and each last measured value is loaded in the display and stored after the measuring interval. The last measured values are also automatically stored and here too the mean value of the stored measured values can be retrieved with the STORE key.

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3. Programming the Measuring Time/Measuring Interval

The ALPHAiX allows setting of various measuring times in the IMPULSE mode or measuring intervals for display in IMP/m but not in $\mu\text{Sv/h}$. As already mentioned, the new measuring intervals in the $\mu\text{Sv/h}$ and IMP/m measuring method are automatically started after the pre-selected measuring time and the measured value of the completed measuring interval is stored. In other words, it concerns indefinite measurement series.

This is not possible in the IMPULSE mode. The unit stops after the set measuring time showing the total number of impulses counted during the measuring time in the display. The unit must be re-started manually (RUN key), which re-sets the display to zero.

For the IMPULSE mode a longer measuring time is usually selected than for the measuring methods ($\mu\text{Sv/h}$ & IMP/m) which involve automatic storage of the measured values. To allow retrieval of intermediate results in the IMPULSE mode the count can be stopped without interrupting it.

The display stops if the RUN/STOP + PERIOD keys are depressed simultaneously in the IMPULSE mode. The dots in the display disappear and only a flashing dot indicates that the measurement is continuing in the background. The display is reactivated by depressing the RUN/STOP and PERIOD keys again, i.e. the impulses counted during that time are loaded to the display and the measurement is continued with the current values.

Simultaneous depression of the SET + PERIOD keys and the \uparrow/\downarrow keys means 8 different measuring times/intervals can be set:

IMPULSE mode:	10 sec.	Imp/m + $\mu\text{Sv/h}$	/	10 sec
	1 min			1 min
	10 min			10 min
	60 min			60 min
	100 min			100 min
	6 hours			6 hours
	12 hours			12 hours
	indefinite			24 hours

The difference in the last stage follows from the fact that the measuring methods IMP/m + $\mu\text{SV/h}$ run indefinitely anyway. The current flashing measuring time appears on depression of the SET + PERIOD keys. The required measuring time can be set with the \uparrow/\downarrow keys. After the required setting the SET key must be depressed until the date display appears. A new series of measurements can then be started.

The \uparrow/\downarrow keys are identical to the TIME + SOUND keys and are generally used to program the ALPHAiX. Programming is always completed with the SET key – i.e. it must be depressed until the date display appears and can be switched over.

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4. Other Commands for Controlling the ALPHAix 3000

PERIOD key

The PERIOD key is used to program the measuring intervals. The currently set measuring time appears if PERIOD is pressed immediately after switching on. This measuring time display flashes if the SET key is depressed at the same time. The measuring time setting can be changed with the \uparrow/\downarrow keys in this phase. After the required measuring time is set, the SET key is depressed again until the time is displayed. The measuring range selection mode is then exited and other functions can be used.

If the PERIOD key is depressed during a measurement

- the measuring time already elapsed is displayed first
- on the 2nd press the total measuring time previously set is displayed
- on the 3rd press the unit returns to display the current measuring value.

The measured value is always shown in the display at the end of a series of measurements.

No total measuring time display is given when measuring $\mu\text{Sv/h}$ because the measuring time is a variable in this measuring method – i.e. sometimes shorter, sometimes longer depending on the impulse density.

STORE key

Display of the average (mean value) from all stored (max. 43) measured values (/0). This value (total measuring time should be at least 100 minutes) can be used as background rate if no other radiation exposure is present.

After depression of STORE, pages of the stored values can be turned with the \uparrow/\downarrow keys, starting with the display of the date, time, background counts setting and measuring time.

Reading the memory is, however, only possible if no measurement series is in progress – i.e. the measurement series must first be interrupted with STOP or the memory must be made accessible with STORE immediately after switching on.

The measured values are numbered consecutively with the oldest value as No. 1 and the latest measured value as No. 40.

SOUND key

The SOUND key allows to switch on/off the audible impulse signal in the IMPULSE mode. With this key the alarm can also be switched off.

Simultaneous depression of the SOUND and SET key permits setting of the zero rate, ie. adjusting – with \uparrow/\downarrow keys – the background count.

For dose rate measurements in μSv it is important to first program the correct zero rate. A zero rate of 20 IMP/m is set as a factory default – which corresponds to the zero rate for the counter tube type A.

The zero rate for counter tube type B is	8 IMP/m
The zero rate for counter tube type FSZ is	17 IMP/m
The zero rate for counter tube type G is	28 IMP/m

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Programming the correct zero rate is mandatory whenever switching counter tube types.

Pressing SET again in this programming mode permits setting the warning signal (ALARM). By default it is set to 10 times the background count.

The ↑/↓ keys allow setting the ALARM value up to a maximum of 250. If the ALARM value is set to 0, no alarm signal will sound.

Settings are completed by pressing SET again and until the time is displayed.

TIME key

Date and time can be set by first pressing both the TIME and SET key simultaneously, then the ↑/↓ keys, followed by SET.

Press once set DAY, MONTH, YEAR with the ↑/↓ keys followed by SET, then

Press again set HOUR, MINUTE, SECOND with the ↑/↓ keys followed by SET and the time will be displayed.

Thereafter the unit can be switched off or activated by pressing START

Default setting

SET + ↑ + ↓

These three keys are depressed simultaneously for the default setting.

- Default:
- IMPULSE mode
 - 10 minutes measuring time
 - 20 minutes zero rate
 - ALARM set to 10 times background count

5. Replacing the Counter Tubes

The ALPHAiX 3000 is a basic unit to which various probes (Geiger-Müller counter tubes) can be attached. To replace the counter tube the unit must be switched off or the tube must be attached before switching on. The unit must be left for approx. 1/2 min. before the counter tube is removed.

Misoperation may result in program failures and control keys failing to respond. In this case the battery terminals must be disconnected and reconnected – see item VI. It is the same as a “RESET” of a computer when the program has crashed and nothing works anymore.

6. Replacing the Battery

To replace the battery, remove the housing cover at the back of the ALPHAiX which is fixed with 2 screws. The 9 V compound battery is fixed to a battery clip and can easily be removed and replaced. Due to high voltage the unit must be switched off for approximately 1 minute before opening.

The ALPHAiX 3000 operates up to a minimum voltage of 7 V. If the voltage is too low the message BATT appears in the display. It is advisable to replace the battery at a voltage of less than 8 V. The battery should show a voltage of at least 9 V before making long journeys with the ALPHAiX

Depending on quality, a battery can usually last several weeks of continuous operation.

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7. Guarantee

We guarantee the ALPHAiX for 12 months. The prerequisite, however, is the professional handling which is customary for electronic measuring instruments and computers. Intervention in the unit renders the guarantee null and void. Repairs are carried out only by the manufacturer.

This also applies to the various slip-on probes (Geiger-Müller radiation detection tubes). For end window counter tubes care must be taken that the end window diaphragms are not contacted even by water or steam. Diaphragm damage results in total loss of the probe.

For transport and long journeys we recommend the impact-resistant plastic suitcase offered in our scope of available products.

8. EDP measurement and analysis program

The current ALPHAiX version contains an RS-232 interface for transferring data to a PC. All measured data including those stored in the ALPHAiX 3000 (up to 40 values) can thus be transferred.

Scope of delivery for the electronic data processing (EDP) and analysis program includes a Windows program diskette/CD, instructions for use and a connection cable for the PCs COM1/COM2 port.

9. Available Counter Tube Types

Five different counter tubes for connection to the ALPHAiX 3000 are available:

Counter tube type A

for measuring Alpha, Beta and Gamma radiation. This counter tube is especially suited for educational facilities (chemistry and physics classes)

Counter tube type G

for measuring Alpha, Beta and Gamma radiation. This counter tube is especially suited for laboratories. Its bigger window makes it five times more sensitive than the type A counter tube.

Counter tube type B

an immersion tube for measuring Beta and Gamma radiation. Besides surface measurements this tube is especially suited for measurements in bulk materials and liquids.

Counter tube type FSZ

an immersion tube for measuring Beta and Gamma radiation. This version is bigger than tube type B. Its braided one meter connecting wire is attached permanently and waterproof. Measurements in liquids and to a depth of up to one meter are thus possible. It is the most sensitive counter tube by far.

Counter tube type D

for measuring Gamma radiation. Preferred for dose measurements. This counter tube is application specific and available on request. Specify the length of the braided connection wire for this made to order product!

Separate operating instructions are available for the counter tubes A, B, G and FSZ.