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Geiger-Müller-Counter | 13609-99

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Operating instructions
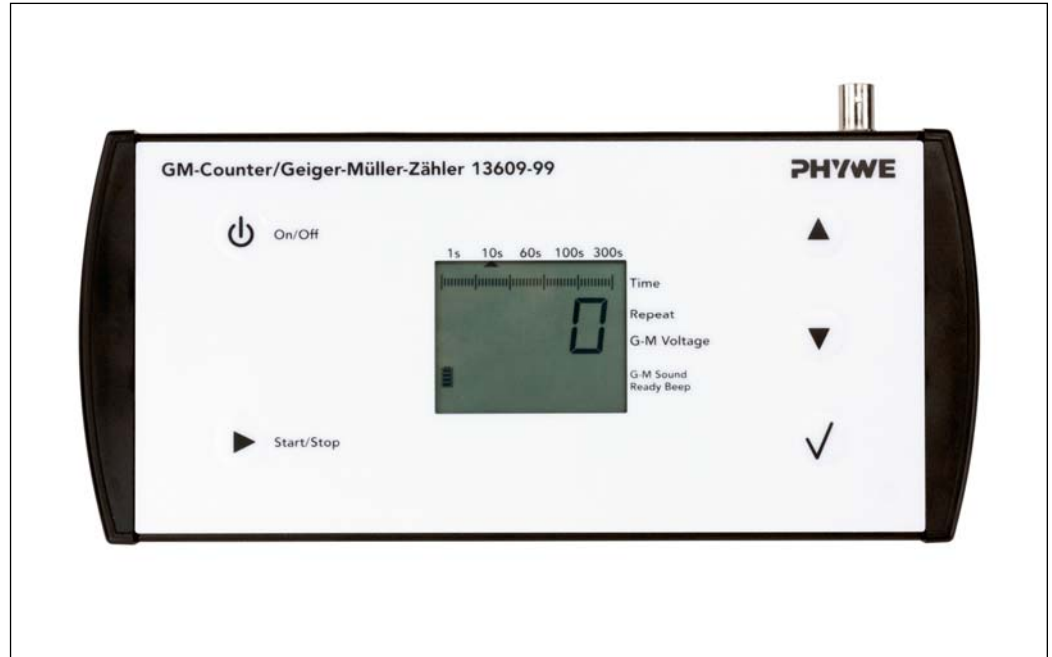
CE The unit complies with the corresponding EC guidelines.

Fig. 1: 13609-99 Geiger-Müller-Counter

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1   SAFETY PRECAUTIONS

⚠ **Caution!**

- Carefully read these operating instructions completely before operating this instrument. This is necessary to avoid damage to it, as well as for user-safety.
- Only use the instrument for the purpose for which it was designed.
- Check that your mains supply voltage corresponds to that given on the type plate fixed to the instrument.
- Install the instrument so that the on/off switch and the mains connecting plug are easily accessible.
- Do not cover the ventilation slots.
- Take care that no liquids or objects enter in through the ventilation slots.
- Only use the instrument in dry rooms in which there is no risk of explosion.
- Do not start up this instrument in case of visible signs of damage to it or to the line cord.

2   PURPOSE AND CHARACTERISTICS

The device is used in conjunction with a Geiger-Müller counter tube to be connected as a measuring and display device for radioactive radiation.

3 FUNCTIONAL AND OPERATING ELEMENTS

Overview

- 5 fixed counting periods (Time = 1, 10, 60, 100 or 300 seconds) - plus manual start and stop.
- Optional Repeat Mode – repeat measurements without interruption. The main display shows every completed measurement result, while the current count is displayed in an auxiliary display.
- GM tube voltage can be adjusted between 400 and 700 V, while still reading the counts.
- GM Sound gives a click from a loudspeaker for each pulse recorded.
- Ready Beep signals end of measurement period - especially handy in repeat mode.
- Very flexible regarding the GM tubes used.
- May be controlled from a PC. Digital pulse output. (Special cables required – option.

4 HANDLING

Quick Guide

- **Connect**: The counter accepts tubes with BNC connectors or with ¼" Jack. Connect only **one** tube.
- **Power On**: Press ⏻ to turn on and off.
  Right after the counter is switched on it is ready for single measurements with a measurement time of 10 s.
- **Navigation:** Find the parameter you want to set using the buttons ▲ and ▼ . The parameter is marked with a flashing arrow in the display: *Time, Repeat, GM Voltage, GM Sound, Ready Beep*.
- **Setting**: Press ✓ to select the current parameter. Then set the parameter with ▲ and ▼ .
- **Accept**: Press ✓ to accept the new value.
- **Measurement**: Start a measurement by pressing ▶ .
  This also resets the display.
  The measurement stops when the selected time expires. If an infinite period is chosen – or if you just want to stop prematurely – press ▶ again to stop.

Connections

Connect either a GM tube (BNC connector) or a GM sensor with integrated electronics (¼" Jack). An ordinary GM tube is the natural choice, but if you have a GM sensor, it may also be used.

The counter's GM voltage adjustment has only effect for the BNC input. A GM sensor with ¼" Jack has its own high voltage supply.

Pulse Out delivers an approximately 50 µs long 5 V pulse when the counter detects a GM pulse. The communication port requires a special USB cable (not incl.) and an associated driver.
See section **Communication with a Computer**.

The power supply input may be connected to a DC adapter (option) if you want to save the batteries.

Time

Set the counting period by using the buttons ▲ and ▼ , until the arrow next to *Time* flashes.

Press ✓ and set the time with ▲ and ▼ . An arrow at the top of the display shows the time to be selected when pressing ✓ .

Pressing ▲ when at 300 s or ▼ when at 1 s, the arrow disappears - this means manual start/stop.

The current counting period is **not** changed before the final ✓ press. Any ongoing counting continues in the background.

If possible, an ongoing measurement will continue after pressing ✓ until the **new** period expires. This will fail when you choose a time that has already expired. If the measurement in this way is invalid, the display will be reset.

When a measurement with fixed time is under way, the horizontal bar next to *Time* will show the amount of time that has elapsed. The bar stays at its maximum after the measurement completes. In repeat mode, however, the bar is reset immediately as the next measurement begins.

Until a valid measurement is available, a small hourglass is shown on the display. This applies when a single measurement is started, and during the first measurement period in repeat mode.

GM tube (BNC) GM tube (Jack) Pulse Out Communication Power Supply
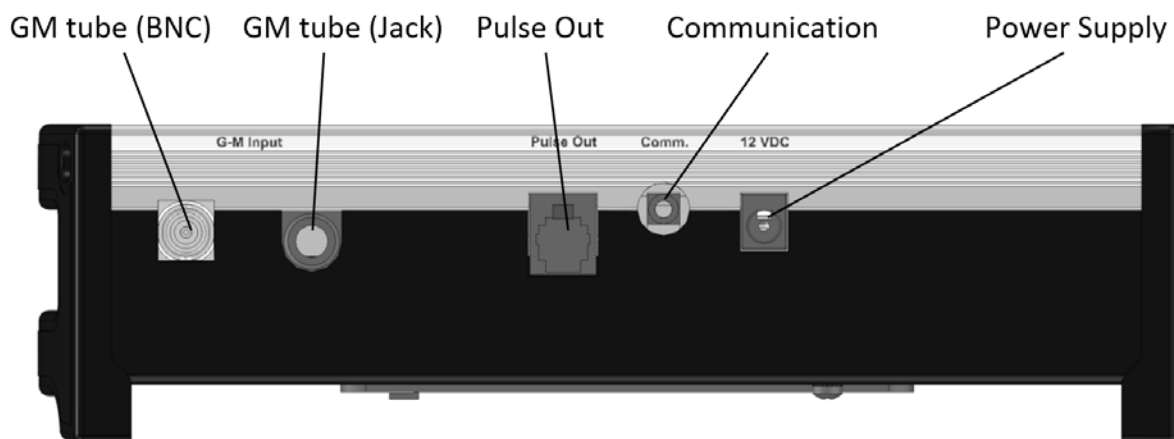
GM voltage

The voltage to the GM tube is set by using the buttons ▲ and ▼ , until the arrow next to *GM Voltage* flashes. Press ✓ and set the voltage with ▲ and ▼ . The voltage change immediately – not at the final ✓ press.

The voltage is shown in the main display and can be adjusted in the range from 300 to 700 V.

When counting simultaneously with adjusting the voltage, the counts are displayed in the auxiliary display. This is handy if you want to measure the GM tube characteristics. Set the counter to single measurements to read the results easier.

There is a certain, short reaction time when the voltage increases – and one a little longer when the voltage is lowered. If you wish to systematically study the effect of changing voltage, it is most practical to start at a low voltage and increase it in small steps.

As mentioned earlier, this setting only applies for tubes connected to the BNC input.

Cancel

You can exit navigation mode by "travelling too far": Press ▲ when *Time* is selected – or press ▼ when *Ready Beep* is selected. Pressing ✓ twice gives the same result - you choose to set a parameter, and accept the old, unchanged value.

If you have changed a parameter, there is no "escape button". However, apart from the GM-voltage, everything can be reset by turning off and on again. The GM voltage should be set at 500 V when using PHYWE GM tubes.

Battery Saver Function

The unit turns off automatically after an hour - but only if it is inactive.

Communication with a computer

Communication requires a cable with built-in adapter. The adapter has an associated driver that must be installed on your computer. Find information about downloading this driver on the packaging for the adapter or on our website. The adapter is recognized as a *virtual serial port*. Communication parameters can be set in Windows' Control Panel.

Communication protocol

Commands to the unit consist of one letter, eventually followed by a number.
The possible responses from the device depend on the command.

Communication examples

If the GM-counter is to be used for automatic logging of data on a PC, you can choose whether to receive data when each counting period expires (streamed mode) or to poll GM-counter for data with a given interval (polling mode).

The following is an example of how communication takes place in two modes:

Polling mode

'e0' → do not send counts automatically
'o0' → Enable single mode
's1' → Start counting
Wait an appropriate time (until the counting period has ended)
'w' → poll finished count
The GM-counter sends the count.

Alternatively you may in polling mode choose to activate repeat mode, thus removing the need to start counting ('s1') before each counting period.

Streaming mode

'e1' → Send counts automatically
'o1' → Enable repeat mode
's1' → Start counting
Now the GM-counter will send the finished counts after each counting period.

Send results or not

When used alone, it returns status. When used with parameter 0-1, the status will change according to the following:
'e0' → counts not automatically sent
'e1' → counts sent automatically when each count period has finished

F: Counting time

When used alone, it returns the actual counting time in seconds. When used with parameter 0-5, counting period is changed according to the parameter:
'f0' → Infinitely
'f1' → 1s
'f2' → 10s
'f3' → 60s
'f4' → 100s
'f5' → 300s
Other counting periods are invalid. Display icons are updated accordingly.

GM voltage

When used alone, it returns the current GM voltage in volts. When used with parameter 400-700, the GM voltage is modified according to the parameter. Example:
'j520' → GM voltage set to 520V

Single / Repeat Mode

When used alone, it returns status. When used with parameter 0-1, mode is changed accordingly:
'o0' → Single
'o1' → Repeat

Start / Stop counting

When used alone, it returns the status. 0 means stopped. When used with parameter 0-1, counting is started or stopped:
's0' → Stop counting. (No function if counting is stopped)
's1' → Start counting. (No function if counting is in progress)

Speaker on / off

Used alone, the command returns the current speaker status. Used with a parameter, the speaker will be connected or disconnected according to this table:

'U0' → GM sound off - Ready Beep off
'U1' → GM sound on - Ready Beep off
'U2' → GM sound off - Ready Beep on
'U3' → GM sound on - Ready Beep on

Version number returned

'GM counter. Firmware version xxxxxxxx '

Read finished counts

Reads a register that holds a copy of the primary register. The value is copied each time a count period expires. The register is erased when it is read. If the register is empty when this command is received, a value of "-1" is returned.

To ensure that all values are transferred to the PC, this register should be read on intervals not longer than the counting time.

5   NOTES ON OPERATION

This instrument is only to be put into operation under specialist supervision in a controlled electromagnetic environment in research, educational and training facilities (schools, universities, institutes and laboratories).

This means that in such an environment, no mobile phones etc. are to be used in the immediate vicinity. The individual connecting leads are each not to be longer than 2 m.

The instrument can be so influenced by electrostatic charges and other electromagnetic phenomena that it no longer functions within the given technical specifications. The following measures reduce or do away with disturbances:

Avoid fitted carpets; ensure potential equalization; carry out experiments on a conductive, earthed surface, use screened cables, do not operate high-frequency emitters (radios, mobile phones) in the immediate vicinity.

6   TECHNICAL DATA

GM-voltage	300…700 V
Measuring period	1, 10, 60, 100 und 300 seconds
Power supply	6 x 1.5 V AA battery
Dimensions (mm)	230 x 105 x 50
Weight	0.9 kg

7   LIST OF EQUIPMENT

The following counter tubes can be used in conjunction with the Geiger-Müller counter:

Geiger-Mueller Counter tube, type A	09025-11
Geiger-Mueller Counter tube, type B	09005-00
Geiger-Mueller Counter tube, 45 mm	09007-00

8   ACCESSORIES

Power supply 12 VDC/2.5 A	11262-99

9   WASTE DISPOSAL

The packaging consists predominately of environmentally compatible materials that can be passed on for disposal by the local recycling service.

Should you no longer require this product, do not dispose of it with the household refuse. Please return it to the address below for proper waste disposal.

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