

PERSONAL COMBINED RADIATION DETECTOR/DOSIMETER

PM1703MO-1

OPERATION MANUAL

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1 DELIVERY OPTIONS

Consult the following table to find out which modes and features are enabled in your Personal Combined Radiation Detector/Dosimeter.

Enabled features are marked by a checked box.

Features and operation modes	On <input checked="" type="checkbox"/>/off <input type="checkbox"/>
Search mode (indication " $\mu\text{R/h}$ ")	<input checked="" type="checkbox"/>
Measurement mode (indication $\mu\text{Sv/h}$)	<input type="checkbox"/>
Measurement mode (indication $\mu\text{R/h}$)	<input checked="" type="checkbox"/>
Dose mode (indication μR)	<input checked="" type="checkbox"/>
Auto calibration	<input checked="" type="checkbox"/>
Possibility to adjust DER thresholds for other search and measurement modes	<input type="checkbox"/>
Possibility to change values of the coefficient n (γ)	<input checked="" type="checkbox"/>
Possibility to enable/disable alarm types	<input checked="" type="checkbox"/>
Audio alarm	<input checked="" type="checkbox"/>
Vibration alarm	<input checked="" type="checkbox"/>

2 BEFORE YOU BEGIN

Thank you for purchasing a Polimaster Personal Combined Radiation Detector/Dosimeter PM1703MO-1. Before operating this unit, please review this guide thoroughly and retain it for future reference.

The Personal Combined Radiation Detector/Dosimeter is designed to detect, search, and locate gamma-emitting radioactive sources. The instrument is easily operated requiring only an understanding of the basic parameters and settings for proper operation.

The instrument is intended for everyday and/or emergency use by firefighters, military, police, etc. It is designed for use in any area where radiation dose and dose rate are required to be measured, where exceeding the default dose and dose rate values requires an alarm. In addition, the instrument provides accumulated information about the accumulated dose and system analysis of the gathered dosimetric information.

3 PRECAUTIONS

1 Keep the instrument at least 4 inches from radio emitting sources, such as cell phones, to avoid false positives.

2 Avoid severe mechanical shocks and submerging the instrument into water.

4 GENERAL DESCRIPTION

The PM1703MO-1 belongs to Polimaster's new generation of highly sensitive, small and power-saving personal gamma combined radiation detectors/dosimeter. When ON the Detector continuously monitors the environment for radiation and alerts the user with a visual, audio and/or vibrating alarm if a radiation source is detected or a radiation threshold is exceeded.

All operations history is stored in the instrument's permanent memory, protecting the data even when the battery is removed. The stored data can also be transferred from the PM1703MO-1 to a personal computer via its infrared interface.

The instrument is recommended for detecting and locating radiation sources in both indoor and outdoor environments.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation



4.1 Display and control buttons

The instrument is equipped with two control buttons located on its top panel:

- **MODE** button — (switching on the instrument; switching between operation modes; background level calibration; changing the instrument parameters in setup mode);

- **LIGHT** button — (switching on the backlight; switching on the indication of the battery power level; enabling IR communications with a PC; changing the instrument parameters in setup mode).

The LCD screen may display any of the following information:

- **gamma Dose Equivalent Rate (DER)** in $\mu\text{R/h}$;
- **Dose Equivalent (DE)** in μR ;
- **n coefficient**: number of mean square deviations for the gamma threshold (also called “alarm multiplier”);
- **Messages** "tSt", "CAL", "OL", "oFF", "bAt", "ot", etc.;
- **“” audio alarm sign** (if audio alarm is enabled);
- **“” vibration alarm sign** (if vibration alarm is enabled);
- **Blinking “h” (history) symbol** (in the Search and DER measurement modes) - indicates that there has been an alarm activation and information about it hasn't been uploaded to a computer;
- **Blinking “S” (search) symbol** – indicates that the Search mode is currently on;
- **Critical battery discharge**: displayed when the battery voltage drops below 1.15 V.

An analogue bar in the lower area of the LCD display indicates the time left until self-tests or background calibration are completed.

In the Search mode, DER measurement mode and DE indication mode the analogue scale segments represent the dynamics of radiation environment change. The bar represents a relative excess of the measured value over the set alarm threshold.

4.2 Specifications

Detectors	CsI (Tl) scintillator Geiger-Muller tube
Sensitivity (for ^{137}Cs)	1 cps/ $(\mu\text{R/h})$ (100 cps/ $(\mu\text{Sv/h})$)
Sensitivity (for ^{241}Am)	0.7 cps/ $(\mu\text{R/h})$ (70 cps/ $(\mu\text{Sv/h})$)
Energy Range (measurement mode)	60 keV – 1.33 MeV Meets the ANSI N42.33 -2005 (6.3.1) requirements
Energy Range (search mode)	60 keV – 3.0 MeV
DER measurement Range DER indication Range	10 $\mu\text{R/h}$ – 999 R/h 1 $\mu\text{R/h}$ – 999 R/h
Maximum permissible intrinsic relative error of DER measurement in measurement range	$\pm(20+ K/H)$ %, where H - DER value, mR/h; K – coefficient 0.5 mR/h
DE measurement range DE indication range	10 μR – 999 R 0 μR – 999 R
Maximum permissible intrinsic relative error of DE measurement in measurement range	± 20 %
Response time (time to alarm) at dose rate increase by 50 $\mu\text{R/h}$ for 0.5 s produced by ^{137}Cs, ^{241}Am, ^{60}Co at the radiation background 20 $\mu\text{R/h}$, not more	2 s Meets the ANSI N42.32 -2006 (6.3.1) requirements

Response time (time to alarm) at dose rate increase up to 50 μR/h for 5.0\pm1 s produced by ^{137}Cs, ^{241}Am, ^{60}Co at the radiation background 20 μR/h, not more	2 s Meets the ANSI N42.32 -2006 (6.5.1, 6.5.2) requirements
Rate of false alarms in the mode of gamma radiation registration at the stable radiation background (10-20 μR/h)	mean time to false alarm > 10 h, Meets the ANSI N42.32 -2006 (6.2.1, 6.2.2) requirements
Response time of display indication to new exposure rate with a relative error of indication of \pm20 % at dose rate increase or decrease (from 20 μR/h to 120 μR/h; from 120 μR/h to 20 μR/h), not more	4 s Meets the ANSI N42.33 -2005 (6.4.1, 6.4.2) requirements
Over-range response: the overload is indicated at the double maximum range and remains in the maximum of the range	Meets the ANSI N42.33 -2005 (6.6.1) requirements
Calibration by background level	- automatic – in case the unit switching on, change of n factors - autocalibration when the background level is changed - user initiated as needed by pressing a button
Communication with PC via IR channel	- Reading of data from storage, - Setting of device working parameters
Power Requirements	One Rechargeable Ni-MH (Nickel Metal Hydride) Battery 1.2 V, 2100 mA/h, size AA (R6)
Battery Lifetime	up to 1.000 hours
PC Communications	IR interface
Data Collection	2.000 data points
Environmental: - Temperature range (LCD indication)	- 22 to +122 °F (-30 to +50 °C) 5 to +122 °F (-15 to +50 °C)
Humidity	up to 95 % at +95 °F (+35 °C)
Water Tightness	IP65
Drop Test	30" (0.7 m) onto concrete surface
Dimensions	2 $\frac{13}{16}$ X 1 $\frac{1}{4}$ X 3 $\frac{7}{16}$ "
Weight, including battery	7.05 oz. (200 g.)

4.3 Battery installation

The instrument is powered by a rechargeable battery NiMH (Nickel Metal Hydride Rechargeable battery 1.2 V min 2000 mA/h) AA size supplied with the instrument.

The PM1703MO-1 is packaged without a rechargeable battery installed. To install the battery, open the cover located on the right end of the unit with a coin or screwdriver. Once opened, insert a single rechargeable AA battery loading the positive (+) end first. Reinstall the cover and tighten it. If the rechargeable battery is properly installed, the LCD screen will display all segments.

When the battery voltage drops below 1.15 V, the instrument LCD will indicate a blinking battery sign and signals will be produced (audio, light and/or vibration). This means that the battery must be recharged or replaced.

However, the instrument can work up to 8 hours after the appearance of the “critical battery discharged” warning (at a normal background radiation level).

By pressing the MODE button the user can switch off the “critical battery discharged” warning for 30 minutes. At the same time the alarm thresholds will be turned on.

To check the battery power level in any operation mode, press and hold more than 5 seconds the LIGHT button, “bat” message and remaining battery power in relative units on the analogue scale will be displayed.



Notice - The manufacturer is not responsible for any malfunctions caused by incorrect battery use.

4.3.1 Battery charger



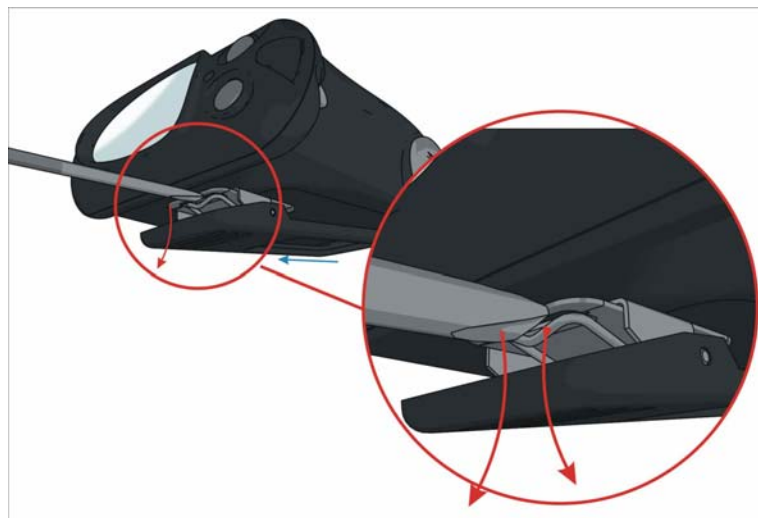
The battery can be recharged using the supplied charger, which is combined with the instrument holder.

To recharge the battery, install the instrument in the stationary holder (Charging the instrument battery) and insert the charger plug into a standard automobile cigarette lighter socket (12 vdc).

The charger also can be permanently installed to the automobiles electrical system: this should be performed by a qualified technician.

4.4 Clip installation/removal

The PM1703MO-1 comes with a clip which may be used to fasten the instrument to a waist belt or pocket. The clip may be easily removed from the instrument by using a screwdriver or similar tool as shown:



Clip installation/removal

4.5 Charging the instrument battery

The battery charger is combined with the instrument holder and is designed for installation on the dash panel of an automobile or any other horizontal surface. To protect the instrument from sun thermal effect, the charger can be equipped with optional protective screen.

- Install the holder on the automobile's dash panel and fasten it with four screws (included in the delivery package);
- Move the instrument clip down by pressing on in;
- Install the instrument to the holder and ensure that the clip claw is firmly fixed in the holder;



- If the charger is properly installed in vehicle power supply, the green LED will be activated on the charger's back side;
- If the instrument is properly installed in the holder, the battery sign will be activated until the battery completely charges.

4.6 Alarm thresholds

PM1703MO-1 can produce warning signals when the following threshold values are exceeded:

- Search (one threshold level, see section 5.5);
- Dose rate (two threshold levels);
- Dose (one threshold level).

When background radiation level reaches the specified threshold level, the instrument immediately produces a warning signal, notifying the user about a dangerous radiation level.

The audio, vibration and visual signals are different for each of the three thresholds.

Exceeding the threshold values is also indicated by an analogue scale on the LCD.

Use the **PM1703MO-1 Data Processing Software** to change instrument threshold values.

When several thresholds are exceeded simultaneously, the **Dose** threshold has the highest priority, then the **Dose rate** threshold, and finally the searching "Alarms" threshold.

4.6.1 Dose rate alarm thresholds

The value range of Dose rate thresholds I and II correspond to the instrument dose rate measurement range (10 μ R/h - 999 R/h).

The following threshold values are manufacturer preset:

First dose rate threshold - 5,000 μ R/h.

Alarms - the instrument produces a light (red LED), audio and/or vibration signals and LCD is activated. The signals are single, of the same tone, constant and periodic with the same interval and duration of 1 s.

Analogue scale —filling the first five segments up to “ Δ ” segment represents the preset threshold value.

For example:



Second dose rate threshold - 999 R/h.

Alarms - the instrument produces a light (red LED), audio and/or vibration signals and LCD is activated. The signals are of the same tone, alternating single and double ones with a constant 1 second interval between them.

Analogue scale - filling the scale up to “ ∇ ” segment represents the preset threshold value. If the radiation background rises, the scale can be filled to the end.

For example:



4.6.2 Dose alarm threshold

The value range of the Dose threshold corresponds to the instrument dose indication range (10 μ R – 999 R).

The manufacturer preset dose threshold is 999 R.

Alarms — the instrument produces a light (red LED), audio and/or vibration signals and LCD is activated. Exceeding this threshold produces triple signals of the same tone, constant and periodic with the same interval and duration of 1 c.

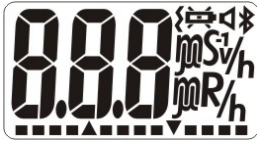
Analogue scale — filling the scale to the end. The preset threshold value corresponds to the last segment of the scale.

For example:



5 OPERATION

5.1 Turning the unit ON/OFF



Once the battery has been installed, the PM1703MO-1 will turn ON automatically. However, when turning ON the instrument from the OFF Mode, it is necessary to press the Mode button. All display segments and alarms will be activated for 1 second and the unit will then perform its self-test procedures.


To turn the unit OFF, press and hold the LIGHT button for 6-7 seconds until the LCD screen displays the flashing "OFF" message. Confirm switching instrument off by pressing the MODE button.



5.2 Going through self-tests and background calibration

During self-tests procedures the display first shows message with firmware version [P-X.X],



Message «bAt» and Flashing message «» and remaining battery power in relative units on the analogue scale is displayed.



Then the message "tSt" is displayed and the unit will perform its self-test procedures.



After the self-tests are completed the instrument goes to the background calibration. Message "CAL" (calibration) is activated on the display during this process, the instrument measures radiation background and calculates threshold values using the specified values of the **n** coefficients.



When self-tests and background calibration are finished, the PM1703MO-1 is ready for operation.

5.3 Operation Modes

In order to meet the demands of every user, Polimaster customizes PM1703MO-1 according to the user's requirements. Please refer to the **Delivery options page to learn about the particular instrument's operation modes.**

- Search Mode;
- Dose Rate Measurement Mode;
- Dose Indication mode.

Use the MODE button to switch between modes.

5.3.1 Search Mode

The Search mode is used for the detection and localization of sources of gamma radiation. In this mode, depending on the factory pre-set settings of your instrument, the LCD display will look as follows:



The instrument LCD window displays the current dose rate value in $\mu\text{R/h}$, mR/h and an “S” symbol is blinking (SEARCH). Indication of the measured dose rate value does not exceed one digit after the decimal separator. Switching the scale and unit is performed automatically.

In the Search mode the instrument detects and localizes sources of gamma radiation in the DER range of $1 \mu\text{R/h}$ - 10mR/h .

The instrument automatically compares the average count rate with the threshold value (the value based on the background radiation measured during calibration and the **n** coefficient set by the user).

In this mode, the instrument is capable of searching for and locating radioactive sources. When a radioactive source is detected (the point at which the calculated alarm threshold is exceeded), the instrument will produce a visual and audio and/or vibrating alarm. As the PM1703MO-1 moves closer to the radiation source, the frequency of audio or vibrating signals increases, thus enabling the user to determine the direction toward the source location.

When the alarm signal frequency reaches the maximum value, it is recommended to run the background calibration procedure (see section 5.4). During this process it is important to keep the instrument in the same place if possible. Once the background calibration is completed, the user may then continue to search for the radiation source. This procedure may be repeated as many times as necessary until the gamma radiation source is located.

If the value of the dose rate exceeds the instrument's upper measuring limit for radiation (10R/h), the overload message on the LCD screen will display “-OL-”.

5.3.2 DER (Dose Equivalent Rate) Measurement Mode

If your instrument is programmed to support DER measurement the LCD screen will look as follows when the unit is in it:



The instrument LCD displays the current dose rate value in $\mu\text{R/h}$, mR/h , R/h . The dose rate measurement range is $10 \mu\text{R/h} - 999 \text{R/h}$.

If the value of the dose rate exceeds the instrument's upper measuring limit for radiation (999R/h), the LCD screen will display the overload message “-OL-”.

5.3.3 DE (Dose Equivalent) Indication mode

In the Dose indication mode the instrument LCD displays the value of the accumulated dose in μR , mR , or R . The indication range is $0\mu\text{R} - 99 \text{R/h}$.



At the same time the analogue scale is filled. The number of displayed scale segments corresponds to the accumulated dose relative to the preset dose threshold level.

If the value of the accumulated dose exceeds the instrument's upper indication limit (999R), the LCD screen will display the overload message “-OL-”.

To reset the accumulated dose value and start a new accumulation it is necessary to connect the instrument to a PC and use the **PM1703MO-1 Data Processing Software**.

The Dose Indication Mode is displayed on the LCD screen for 8 seconds, after that the instrument automatically switches to the Search Mode.

5.4 Getting a new background

The PM1703MO-1 is able to perform its calibration automatically. This feature provides more convenient instrument usage and decreases the probability of false alarms when the radiation background is changed slowly and there are no alarm signals.

The instrument is highly sensitive to a radiation level change. It can give alarm signals if, for example, it is moved from the outside where the radiation background is normally low to a building where there are materials including natural radioactive isotopes, which produce a higher natural radiation background. These materials mostly include: concrete and similar materials containing sand, natural stone (especially granite), ceramic tile, glass, etc.

In case the alarm is actuated automatic calibration is not performed, therefore it is recommended that the user re-calibrate the instrument manually to accommodate the changed background. You can also change the n-coefficient to alter the sensitivity threshold.

When the background radiation decreases (when the instrument is moved from a higher level of background radiation to a lower one) the instrument will be re-calibrated automatically (if auto-calibration is enabled). This increases the instrument's sensitivity and is very useful.

To update the background radiation levels and recalculate the thresholds, press and hold down the Mode button until the message "CAL" appears in the display window. The unit is now acquiring new background. In total, this process requires 60 seconds. When the LCD screen display returns to the normal numeric display, the unit has modified its background radiation levels to the new environment and is ready for normal operation.

5.5 Alarms

Alarm levels in the Search Mode are derived from the ambient background. When the instrument runs through background calibration, it acquires a background reading and calculates the alarm levels automatically based on the value of **n coefficient** set by the user.

The value of n coefficient may be set in the range of 1.0 to 9.9 through every 0.1. The smaller is the value of n coefficient, the more sensitive is the instrument to changes in background radiation, and however this also increases the rate of false alarms (false positives). The larger is the value of n coefficient, the less sensitive unit becomes to minor changes in radiation background and responds only to large radiation field variations (intensive radiation sources nearby) and probability of false alarms decreases.

5.5.1 False Alarms

All radiation detection systems experience false alarms. The number of false alarms depends on many factors including changes in the ambient background radiation level as well as changes to the system setup. Under normal conditions, if there are no mechanical impacts and the manufacturer's settings are used, the user should expect a maximum of one false alarm per ten hours of operation.

Occasionally, the instrument will "chirp" signaling to the user that the unit is still functioning. Such alarms are irregular and can, therefore, be easily distinguished from true alarm signals produced by the gamma radiation sources.

5.6 Exceeding instruments temperature operation range

When the temperature inside the instrument exceeds the upper limit, the message "ot" will be displayed. The instrument functionality will be restored after its temperature will come back to the normal operation range.

6 INSTRUMENT SETTINGS

6.1 Adjusting instrument settings

Using the unit front panel buttons it is possible to adjust several parameters of the instrument. The number and combination of settings enabled for editing in your particular instrument depends on factory pre-sets and may vary in each instrument. See below the complete list of settings that may be enabled for editing in the instrument:

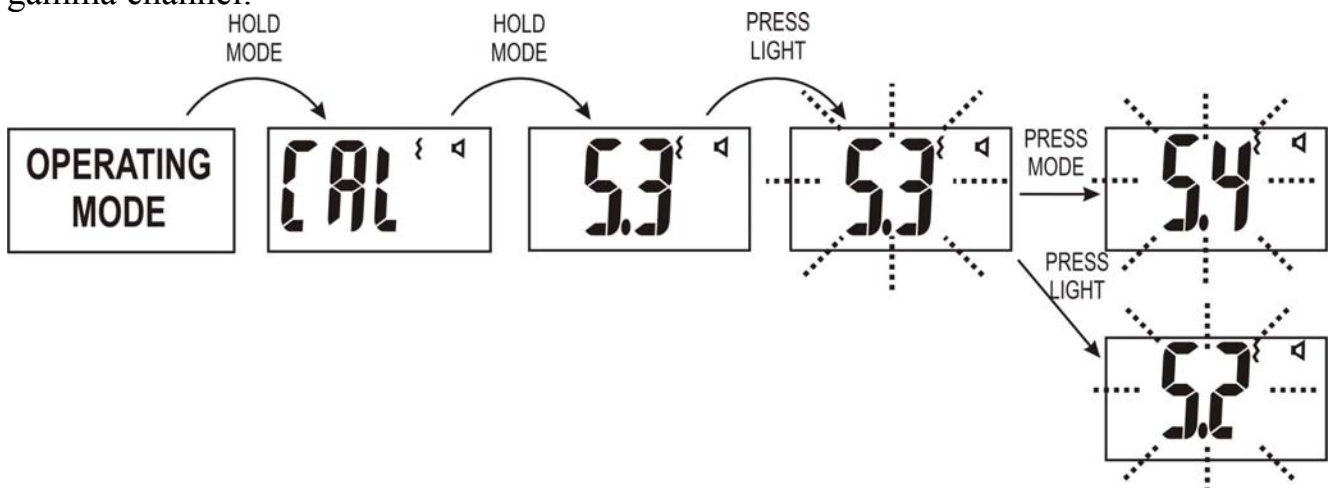
- **n coefficient, gamma** may be setup in the range of 1.0 to 9.9 with increment of 0.1. The manufacturer's recommended value is 5.3;
- Enable or disable the **Audio alarm** on reaching the alarm threshold;
- Enable or disable the **Vibration alarm** on reaching the alarm threshold.

To enter the Setup Menu, press and hold down the Mode button. The "CAL" message will be displayed first. Continue to hold the Mode button down until the screen displays the first setting that can be adjusted. The first setting displayed on the LCD may be the alarm threshold value of n coefficient for the gamma channel:



6.1.1 n coefficient of the gamma channel

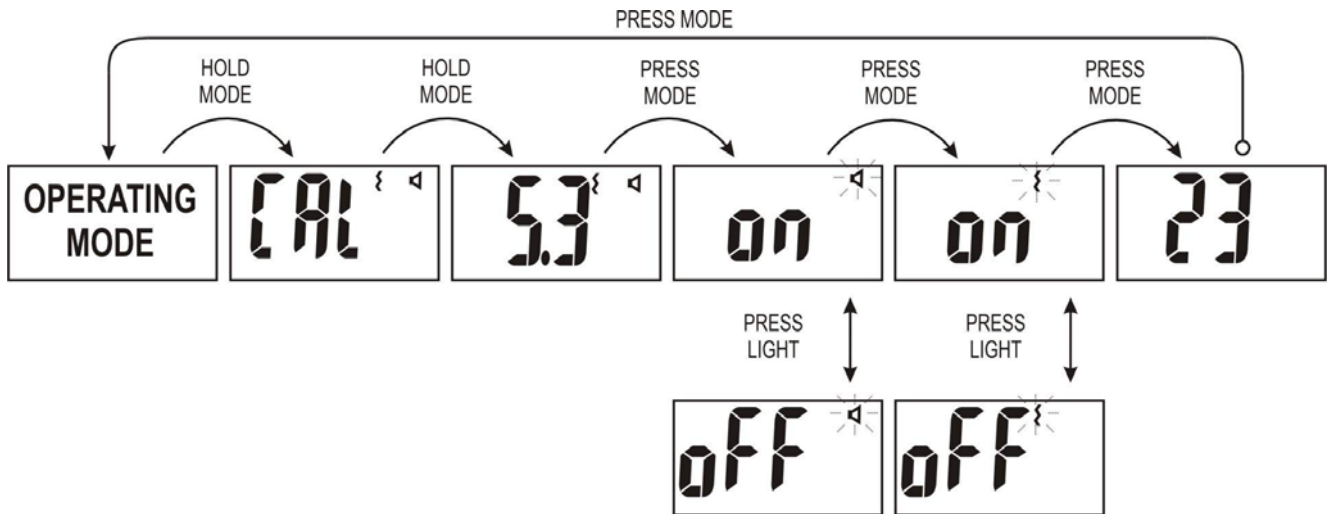
To adjust it, make sure the instrument is in any of the operation modes, then press the Mode button and hold it for more than 5 seconds, "CAL" message will be displayed first. Continue to hold the Mode button down until the instrument enters the settings adjustment menu. You will immediately be able to adjust the N coefficient of the gamma channel:



To change the **n** coefficient value you have to press the Light button within four seconds after entering the menu, and then press Mode button to increase the coefficient value, or Light button to decrease it. If you don't press the Light button within four seconds after entering this menu, the instrument will automatically return to the last operation mode. Six seconds after the last adjustment of the coefficient value the instrument calibration will be performed automatically.

6.1.2 Enabling/disabling the audio and vibration alarms

To adjust it, make sure the instrument is in any of the operation modes, then press the Mode button and hold it for more than 5 seconds, “CAL” message will be displayed first. Continue to hold the Mode button down until the instrument enters the settings adjustment menu. Depending on the settings allowed for editing in your particular instrument, you will have to press the Mode button one or several times until you see the On (or Off) и a blinking loudspeaker sign:



When the LCD displays **On** (or **Off**) you can use the Light button to change the setting, i.e. switch on or off the audio alarm. Then press the Mode button to do the same for the vibration alarm: when the LCD displays **On** (or **Off**) and blinking vibration sign you can use the Light button to change this setting as well.

Then press the Mode button and LCD displays the temperature inside the instrument.

Note: Don't use the built-in temperature use for environmental temperature measurement.

If you don't press any button within four six seconds the instrument calibration will be performed automatically.

7 COMMUNICATION WITH COMPUTER

The PM1703MO-1 is equipped with infrared data exchange capabilities. PM1703MO1 Data Processing Software must be installed on your personal computer in order to be able to communicate with the instrument.

This communication allows the user to set advanced instrument parameters, download event data stored in the instrument memory to the database and perform other operations. Please see the “PM1703MO1 Data Processing Software Guide” for more information.

Whenever information about exceeding a threshold value is stored in the instrument memory, the LCD screen indicates it by a blinking “h” (HISTORY) sign. This sign disappears after the information is read from the instrument memory by the PM1703MO-1 Data Processing Software.

To initialize the infrared communication, place the instrument 3 to 4 inches away from the infrared adapter and press the Light button. When the PM1703MO-1 enters the Data Communication Mode the message “IR” is displayed on the LCD screen.



As soon as the instrument’s operation history is transferred it is deleted from the instrument memory and the instrument is turned off automatically.

8 TROUBLESHOOTING

In the field, troubleshooting is limited to replacing the battery. Most of the yet encountered problems have been reported to be because of low battery or poor battery quality. To operate this instrument, use only fresh, high-quality alkaline batteries. The PM1703MO-1 requires very little energy which means that while troubleshooting the unit should be allowed to stand without the battery for 1-2 minutes to allow the internal circuits to discharge. Discharging the remaining battery power is especially important if the user is experiencing problems with the unit.

9 LIMITED WARRANTY

Polimaster warrants to the purchaser (the "Purchaser") that the Product, including component parts, is free from material defects in material and workmanship, under normal use and service for a period of one year (the "Warranty Period") *provided, however*, that the foregoing warranties are expressly contingent (and shall otherwise be void) upon use of the Products in accordance with specifications and without misuse, abuse, or abnormal use, accident, damage, alteration, or modification thereto or improper or unauthorized repairs or improper maintenance. Non-substantial variations of performance from the documentation do not establish a warranty right.

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EXCLUSIVE REMEDY. Other than termination of this Agreement due to Polimaster's breach, as Purchaser's exclusive remedy for any defect or nonconformity in the Product, Purchaser shall obtain from Polimaster repair or replacement of the Products containing such defect or nonconformity ("Affected Products"). In furtherance of such undertaking, if Purchaser reasonably believes that any Product contains a defect or nonconformity for which Polimaster is responsible, Purchaser shall inform Polimaster of the nature of such defect or nonconformity in reasonable detail and shall request authorization from Polimaster to return the Affected Products to Polimaster for repair or replacement. All Products so returned shall be shipped prepaid or otherwise delivered to Polimaster's facility or authorized service center. If Polimaster fails to repair or replace the Affected Products within a reasonable time after Purchaser has so returned them to Polimaster, Purchaser shall be entitled to repayment or credit of the original price of the defective or nonconforming Product as its exclusive further remedy.

EXCLUSIONS OF DAMAGES AND LIABILITY. PURCHASER ASSUMES THE ENTIRE COST OF ANY DAMAGE RESULTING FROM THE USE OF THE PRODUCT AND THE INFORMATION CONTAINED IN, GATHERED OR COMPILED BY THE PRODUCT, AND THE INTERACTION (OR FAILURE TO INTERACT PROPERLY) WITH ANY OTHER HARDWARE OR SOFTWARE WHETHER PROVIDED BY POLIMASTER OR A THIRD PARTY. TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT WILL POLIMASTER OR ITS SUPPLIERS OR LICENSORS BE LIABLE FOR ANY DAMAGES WHATSOEVER (INCLUDING, WITHOUT LIMITATION, ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL OR INDIRECT DAMAGES, DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, LOSS OF BUSINESS INFORMATION, LOSS OF DATA, LOSS OF GOODWILL, WORK STOPPAGE, HARDWARE OR SOFTWARE DISRUPTION, IMPAIRMENT OR FAILURE, REPAIR COSTS, TIME VALUE OR OTHER PECUNIARY LOSS) ARISING OUT OF THE USE OR INABILITY TO USE THE PRODUCT, OR THE INCOMPATIBILITY OF THE PRODUCT WITH ANY OTHER PRODUCT, HARDWARE, SOFTWARE OR USAGE, EVEN IF SUCH PARTIES HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Limitation on Liability. Notwithstanding any provision to the contrary herein and with the exception of the claims of intellectual property rights infringements and the payments obligations hereunder, the liability of Polimaster for any claim whatsoever related to the Products or this Agreement, including any cause of action sounding in contract, tort, or strict liability, shall not exceed the greater of Ten Thousand (\$10,000.00) Dollars or the total amount of payments theretofore paid by Purchaser during the previous six month period to Polimaster in connection with the Products relating to such liability. THIS LIMITATION OF LIABILITY SHALL NOT APPLY TO LIABILITY FOR DEATH OR PERSONAL INJURY TO THE EXTENT THAT APPLICABLE LAW PROHIBITS SUCH LIMITATION. FURTHERMORE, BECAUSE SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, THE ABOVE LIMITATION, IF APPLICABLE, MAY NOT APPLY TO PURCHASER.

Applicability. The limitations and exclusions contained herein shall apply notwithstanding any failure of essential purpose of any limited remedy.