
DMC-2000 Series Electronic Dosimeter

Quick User's Guide

for Stand-Alone/Autonomous Operation



synOdys Group

5000 Highlands Pkwy Suite 150 Smyrna, GA. 30082
www.mgpi.com

Revision History

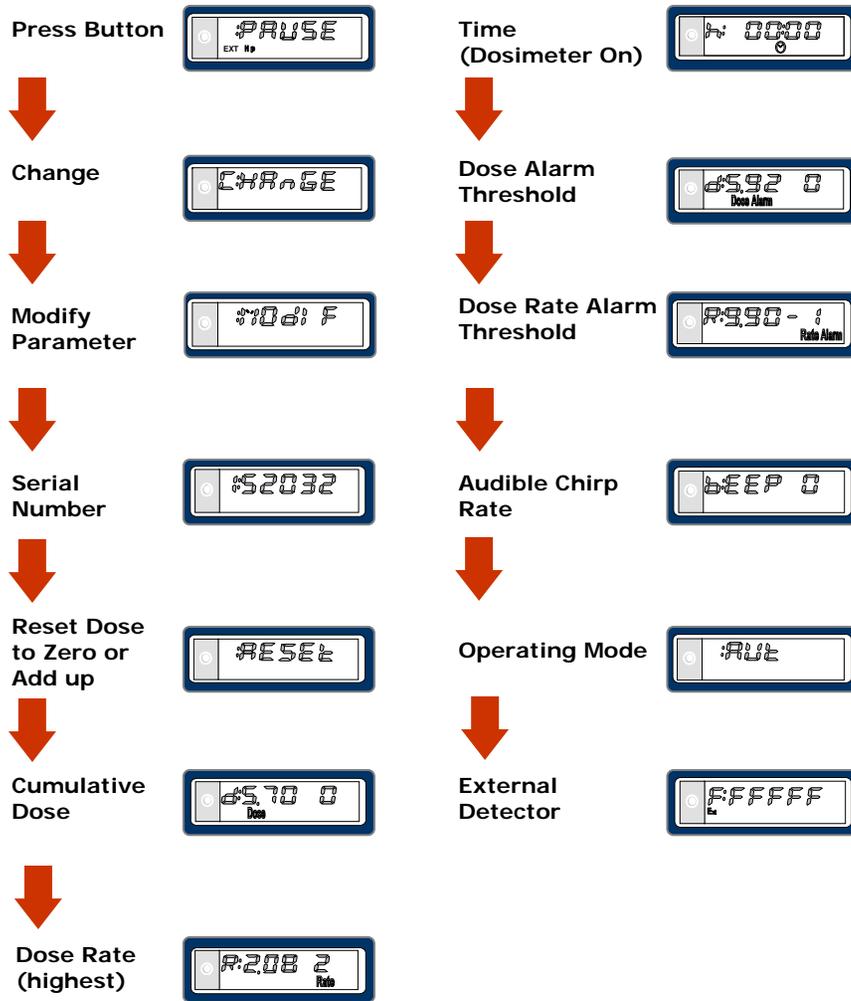
Revision #	Date	Revised Pages	Comments
0	11/2003	N/A	Original issue

Table of Contents

<u>Topic</u>	<u>Page</u>
Displayed Parameters in the PAUSE Mode	4
Activating the DMC-2000	5
Active Information Display	5
Deactivating the DMC-2000	5
Modifying Parameters	6
Display Messages/Troubleshooting	8
Technical Characteristics:	11
- Nuclear	11
- Electrical	12
- Mechanical	13
Notes	14

About this guide: *this mini-guide is a compact manual designed to provide quick reference for autonomous operation of the DMC 2000 electronic dosimeter. For more comprehensive information, refer to the DMC-2000S, X, XB Users Manual, document number 115170.*

Displayed Parameters in PAUSE Mode



Note: The display message "PAUSE" may be replaced by a user programmable display (Serial number, Name, OFF, etc...)

Activating the DMC-2000 (from PAUSE to ACTIVE Mode)

1. Press Button Once
2. Display changes to **CHANGE**, wait
3. Display changes to **ENTER**
- Press Button Once
4. Display changes to **IN**
- Beep, LED Flash
5. Dosimeter Active



Active Information Display

1. Display Dose - mrem
2. Press Button Once
3. Display changes to Rate - mrem/h
4. Press Button Once
5. Display changes to Dose - mrem



Deactivating the DMC-2000 (from ACTIVE to PAUSE Mode)

1. Press and hold Button for 8-10 seconds
- Display changes to **CHANGE**
- Continue to hold button
2. Display changes to **GO OUT**
- Release Button,
- Display changes to **OUT**
- Beep, LED Flash
3. Dosimeter Deactivated (Pause)



Modifying Parameters

This section used to manually modify parameters for:

- Dose Alarm, Dose Warning
- Dose Rate Alarm, Dose Rate Warning
- Keep or Clear previous Cumulative Dose on Entry
- Fast Entry

1. Start from **PAUSE** mode

- Press button once



2. Display changes to **CHANGE**

- Press button once



3. Display changes to **MODIF**

- Wait a moment for display to change



4. When **ENTER** is displayed, press

button to access modification mode



5. Press button – **Serial Number** is displayed



6. Press button – **RESET** is display

with a flashing "P"



At this point, the flashing "P" indicates that the dosimeter parameters can be modified.

The following section provides guidance for changing specific parameters. The process is three-fold:

- Toggling the display to a specific *parameter* Flashing **P**
- Selecting the *digit* to be modified Flashing **D**
- Changing the digit *increment* Flashing **I**

NOTE: Switching between parameters and digits takes practice. You may encounter the display returning to PAUSE during a moment of inactivity. Follow the steps in this section to return to modifying the parameters

Modifying Parameters – cont.

To change **Dose Reset** (re-zeroes dose when dosimeter is deactivated) to **Dose Total** (accumulates dose total each time dosimeter is turned on):

From the flashing "P" on the **RESET** display:



Hold the button until the "P" changes to "I".



When the "I" flashes, press button once to change to **total**. Press and hold button to change **I** to **P** to continue parameter changes.



Continuously press button to cycle to the desired parameter to modify while the "P" flashes.

P – Select Parameter



Press the button continuously to select the desired parameter to be modified. When the selected parameter is displayed...

Hold button down until "P" changes to "D":

D – Select the digit of each number



When the "D" flashes, press the button until the desired digit is highlighted.

Hold button down until "D" changes to "I":

I – Change the Increment of the Digit



Press the button to change the digit increment.

When completed, hold the button and the display will change from **I** to **D**, allowing the user to select another digit to be changed. Repeat process. When completed, release the button and the dosimeter will return to **PAUSE** after approximately 10 seconds.

DMC 2000 Display Messages: Troubleshoot & Corrective Actions

Display	Cause	Corrective Action
 Low Battery (On)	<p>If the dosimeter is in the ON or Measurement mode, the message "BA LOX" alternates on the display with the normal message (with X = number of remaining battery life hours, between 0 and 9).</p>	<ul style="list-style-type: none"> • Change the battery within 9 hours (maximum) if possible • Verify that protective insulator is installed under the battery. • Contact MGPI for verification of device parameters SEE NOTE #2 BELOW
 Low Battery (Off)	<p>If the dosimeter is in the OFF or PAUSE mode, the message "BA LO" alternates on the display with the normal message. This message is displayed for 72 hours, then the dosimeter automatically switches to a reduced consumption mode, during which all functions cease.</p> <p>Non-authorized battery type installed allowing battery to short between negative and positive sides of housing.</p>	<ul style="list-style-type: none"> • Change the battery within 72 hours if possible <i>Caution: Allowing the battery to completely drain may cause the microprocessor to lock resulting in a blank display and red LED to be constantly ON when installing a NEW battery.</i> • Contact MGPI for verification of device parameters SEE NOTE #2 BELOW
 Defective Battery	<p>Battery totally discharged or battery removed</p> <p>The ground contact may have come detached from the battery cover retaining ring.</p>	<ul style="list-style-type: none"> • Change the battery • Check battery ground contact wire • Check for Possible case short • Resolder ground contact to if detached or contact MGPI
 Defective History	<p>Problem in the integrity of the historical data. This can occur after the battery has been handled (removed or changed).</p> <p>Missing bit/pointer in the histogram</p>	<ul style="list-style-type: none"> • Activate the dosimeter with histogram initialization (Start New Histogram). This is done with Dosimass, Assign Tab • Use Dosimass Entry / Exit Function – this writes a new histogram header file. Note: can not be corrected in Autonomous Mode SEE NOTE #2 BELOW

Display	Cause	Corrective Action
 Defective Calibration	Problem in the integrity of dosimeter calibration data	<ul style="list-style-type: none"> Loss of cal factor data stored in e2prom. Re-calibrate the dosimeter Contact MGPI for verification of device parameters SEE NOTE #2 BELOW
 Defective Detector	<p>Physical, internal problem related to the dosimeter's detection circuit.</p> <p>Missing or incorrect parameters related to the detection algorithm.</p>	<ul style="list-style-type: none"> Contact MGPI for verification of device parameters If parameters are verified correct – Dosimeter beyond repair, failed Optical Diode Test or Background test. Contact MGPI SEE NOTE #2 BELOW
 Defective E2PROM	Problem accessing data saved in E2PROM memory	<ul style="list-style-type: none"> Remove the battery, let the dosimeter storage capacitor discharge for 72 hours, and then reinstall the battery. Source check – if error remains, dosimeter is beyond repair.
 Defective initialization	Dosimeter data integrity problem with internal system parameters or calibration parameter corruption	<ul style="list-style-type: none"> Re-initialize the dosimeter. Contact MGPI for verification of device parameters SEE NOTE #2 BELOW
 Defective External Detector	External detector calibration value missing or corrupted.	<ul style="list-style-type: none"> Access the Calibration tab in Dosimass and change the external detector dead time up or down one value. This forces a write to the necessary status message clearing the fault. SEE NOTE #2 BELOW
 Defective Integrated Circuit	Fault in the component used for the pulse counting	<ul style="list-style-type: none"> Dosimeter beyond repair. Contact MGPI

Display	Cause	Corrective Action
 <p>Blank Display – Red LED ON</p>	<p>Red LED "ON" with no display – (sometimes noted when installing a NEW battery) - Microprocessor is hung between pause and run on a low battery condition – typically resulting from allowing the dosimeter battery to drain completely.</p> <p>Non-authorized battery installed causing battery to short out to ground</p>	<ul style="list-style-type: none"> • Remove battery, inspect battery compartment for damage (broken or damaged ground contact, terminals, insulator). • Remove the battery, dosimeter storage capacitor (C-60) discharge for 72 hours, and then reinstall an authorized (new) battery

Notes:

1. Replacement of battery requires an MGPI Battery Tool and Authorized Battery replacement types: Renata CR2450N or Toshiba CR2450.
2. Correcting errors or modifying system values require: LDM-101, 2000, 210 or 220 dosimeter readers and Dosimass configuration software. Changes to parameters should be performed in accordance with recommendations from MGPI.
3. References to calibrations or physical repairs, such as soldering should be performed in accordance with recommendations from MGPI.

The information contained in this troubleshooting section is designed to assist the user in identification a causes related to specific display messages or symptoms which may appear on the DMC-2000 electronic dosimeter. This guide is not intended to replace the need for device service, however, some of the corrective actions may resolve simple problems not requiring service or repair.

Please contact MGP Instruments representatives for further information.

Technical Characteristics: Nuclear

**Additional Technical Characteristics can
be found in the DMC-2000 S, X, & XB
Operating Manual*

- ➔ Detected activity : gamma and X ray (*beta for XB Model*)
- ➔ Compliance to Standards : IEC1283 - ANSI 42-20A, ANSI 13.27
- ➔ Energy Range

	<i>DMC 2000S</i>	<i>DMC 2000X</i>	<i>DMC 2000XB</i>
▪ Normal range	50 KeV to 6 MeV	20 KeV to 6MeV	α : 20 KeV to 6 MeV β Emean > 60 keV (Emax : 0.22MeV to 2.3 MeV)
- ➔ Measured value : Hp(10) Hp(10) Hp(10), Hp(07)
- ➔ Measurement range
 - dose Hp(10) : 1 μ Sv to 10 Sv (0.1 mrem to 1000 rem)
 - dose rate Hp(10) : background noise to 10 Sv/h (background to 1000 rem/h)
- ➔ Display unit : mrem or mSv or cGy
- ➔ Display range
 - dose H(p10) : 1 μ Sv to 10 Sv (0.1 mrem to 1000 rem)
 - dose rate Hp(10) : 10 μ Sv/h to 10 Sv/h (1 mrem/h to 100 rem/h)
 - linearity
 - Hp(10) \leq 1 Sv/h : $\leq \pm 10$ %
 - 1 Sv/h < Hp(10) \leq 10 Sv/h : $\leq \pm 25$ %
- ➔ Accuracy
 - Cs137 = 0,2 mSv/h (20 mR/h) : $\leq \pm 5$ %
 - references : TLD, film or calibrated dosimeter
- ➔ Response time (cf. CEI 1283) : < 5 seconds
- ➔ Operating temperature : - 10° C to 50° C (14 F to 122 F)
- ➔ Storage temperature : - 30° C to 71° C (- 22 F to + 159 F)
- ➔ Relative humidity : ≤ 90 %
- ➔ Maximum dose range : ≥ 100 Sv (10 000 rem)
- ➔ Saturation : No saturation up to 50 Sv/h (5 000 rem/h)

Technical Characteristics: Electrical

- ➔ Power supply
 - Lithium battery "wristwatch type" :Renata CR2450N
 - Autonomy (normal occupational utilization) :≅ 12 months for 8 hours in controlled area /day
- ➔ Warnings
 - Audible alarms :≥ 85 dBA at 30 cm (1 foot)
 - Visual flashing alarm :red LED
- ➔ Alarm threshold
 - dose alarm :x 1
 - dose pre-alert :x 1
 - dose rate alarm :x 1
 - dose rate pre-alert :x 1
 - time alarm :x 1
- ➔ Thresholds range
 - Dose and dose rate :full measurement range
 - time : 1 to 100 h
- ➔ Safety
 - "heart beat" function : display of a blinking colon
 - self-test (in standby and in active mode) Including the detector : every 10 min
 - self-test program Watchdog circuit
 - battery self-test :periodic
 - Display of battery life :Shows the battery life 9 hours before battery is depleted
 - Alarm (a few seconds) :when no battery or sudden dead battery
- ➔ Memorization accessible with reader LDM 2000
 - Dated & timed history
 - Memory intervals : 700 events of dose history.
 - History events :1mn, 10mn, 1h, 24 h
 - Miscellaneous events :30 types of events
 - (alarm, pre alert, RWP, ID, faults) ALL
 - Geographical area counters :10
- ➔ External accessories
 - Connector type :ISO (Smart card type)
- ➔ Electromagnetic interference's IEMC)
 - Conform to European regulations) :CEM - 89/336/CEE et 92/31/CEE

Technical Characteristics: Mechanical

- ➔ Case
 - Clip :High resistance, moulded, metallized, PVC
:Pager type clip, removable
- ➔ Dimensions :84 x 48 x 9 x 17,5 mm (3.3" x 1.9" x 0.7")
- ➔ Weight (with battery) :< 56 gr. (2 oz)
- ➔ Waterproofing :IP 42 or IP52 (splash proof)
Immersion proof at 1 meter (option)
- ➔ Mechanical resistance
 - Drop test :1.5 meters / 5 feet (onto concrete)
 - vibrations 10 Hz to 33 Hz :2 g
15mn/axis



MGP Instruments, Inc.

5000 Highlands Parkway, Suite 150, Smyrna, GA. 30082

(P) 770-432-2744 (F) 770-432-9179 Email: sales@mgpi.com

Web Site: <http://www.mgpi.com>

This document shall not be modified or reproduced without permission from
MGP Instruments, Inc.