

MIRION
Connect **21**
Annual Users' Conference



DMC 3000 & Modules





Modular Response to Different Environments



DMC 3000
Gamma, X, Hp(10)
15 keV to 7 MeV



DMC 3000 Tx
Gamma, X, Hp(10)
15 keV to 7 MeV
+ WRM Telemetry



DMC 3000 B
Gamma, X, Hp(10)
15 keV to 7 MeV
+ Beta Hp(0,07)
0,22 MeV to 2,3 MeV



DMC 3000 N
Gamma, X, Hp(10)
15 keV to 7 MeV
+ Neutron, Hp(10)
0,025eV to 15 MeV



DMC 3000 Ntx
Gamma, X, Hp(10)
15 keV to 7 MeV
+ Neutron, Hp(10)
0,025eV to 15 MeV
+ WRM Telemetry



DMC 3000 LTx
+ WRM Telemetry
UWB Location





The Modular Approach

- Choosing a different path for the DMC 3000, a modular approach to electronic dosimetry :
- One DMC 3000 dosimeter for the several modules
- Easy Plug and Play
- Same DMC 3000 operating characteristics with expanded capabilities
- Calibration and parameters within the modules



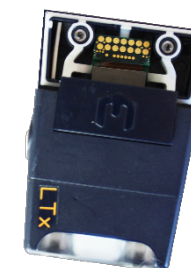
DMC 3000



Telemetry module



Neutron module



LTx module



Beta module





DMC 3000 | Telemetry Module



- Transmits radiological information in preconfigured intervals to WRM2 Telemetry receivers (AWM)
- 900 MHz and 2.4 GHz Options
- Battery Type: AAA (LR03 1.5v) – independent from dosimeter battery
- External Power: 1.5V-3.6V through battery adapter
- Failure of secondary functions (example Tx) will NEVER disable dosimeter counting





DMC 3000 N (H_p 10 Neutron)

- Extension module *powered by the DMC3000 battery*
- Module can be moved from one DMC 3000 to another (*calibration data stored internally*)
- Capability to manage *the total dose* Gamma + Neutron
- Meets or exceeds applicable IEC and ANSI standards
- EMI resistance meets MIL-STD 461 (200V/m up to 5GHz)
- Neutron energy range: 0,025eV to 15 MeV
- Optical test of the Neutron detector
- Waterproof **IP67 protection** (1 meter, 1 hour)
- Battery life over 8 months (8 hours in run, 5 days a week)
- Size (length with DMC 3000) : 131 mm x 60 mm x 21 mm



Nuclear
Power



Homeland
Security
& Defense

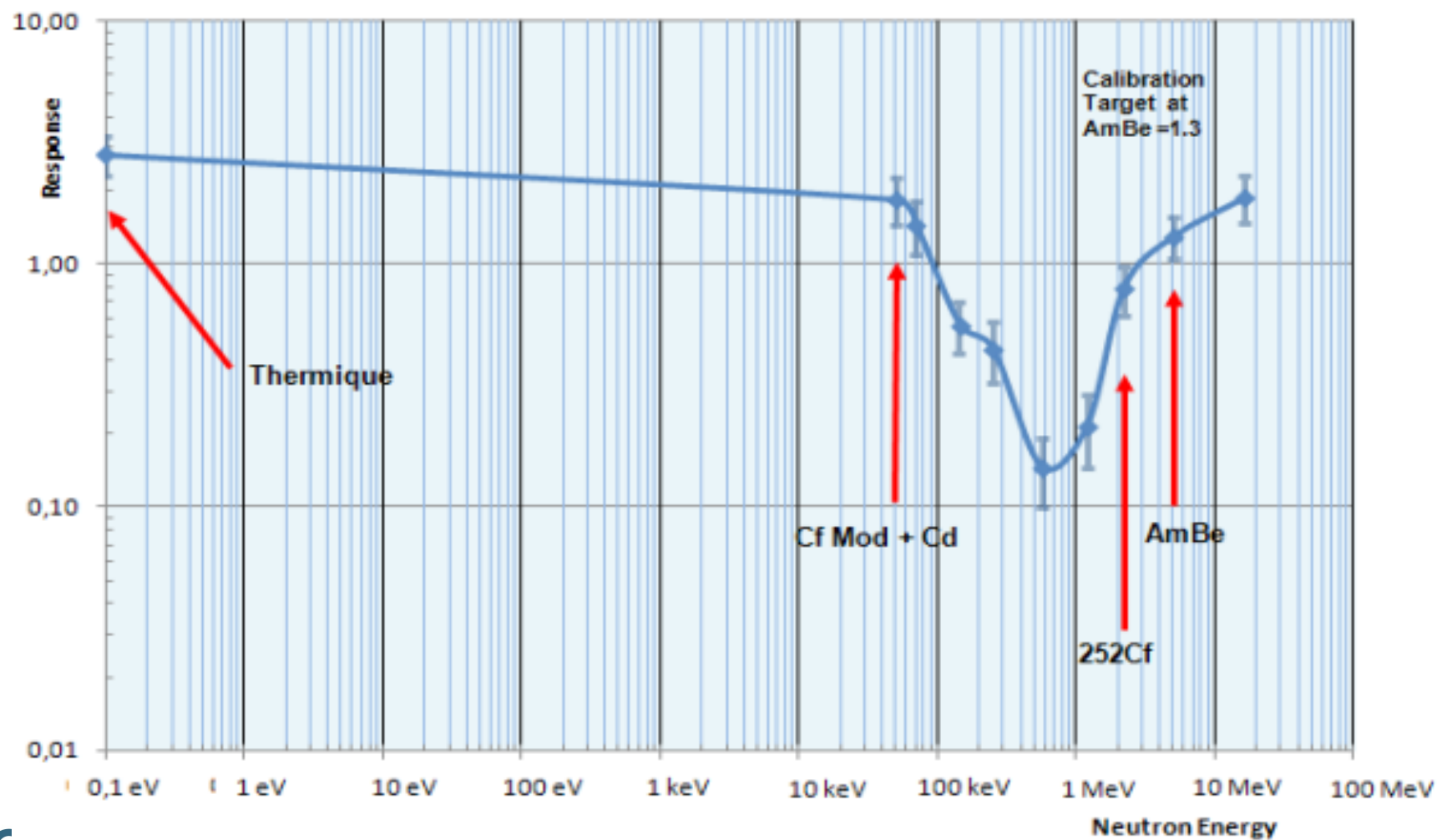


Labs and
Education





Neutron Typical Energy Response





DMC 3000 B (*Hp* 0.07 Beta)

- Replaces DMC 2000 XB
- Extension module *powered by the DMC 3000* battery
- Module can be moved from one DMC 3000 to another (calibration data stored internally)
- Meets or exceeds applicable IEC and ANSI standards
- EMI resistance meets MIL-STD 461 (200V/m up to 5GHz)
- *Wide range* beta radiation measurement with superior *Hp(0,07)* energy response
- X and gamma energy range: 15 keV to 7 MeV
- Beta $E_{\text{mean}} > 60 \text{ keV}$, ie $E_{\text{max}} : 0.22 \text{ MeV to } 2.3 \text{ MeV}$
- Large Silicon detectors *with optical test* for all the detectors
- Hardened Beta window: 3 layers of Mylar + a metal grid
- Battery life over 8 months (8 hours in run, 5 days a week)
- Size (length with DMC 3000): 122 mm x 60 mm x 21 mm



Nuclear
Power



Healthcare



Homeland
Security
& Defense



Labs and
Education

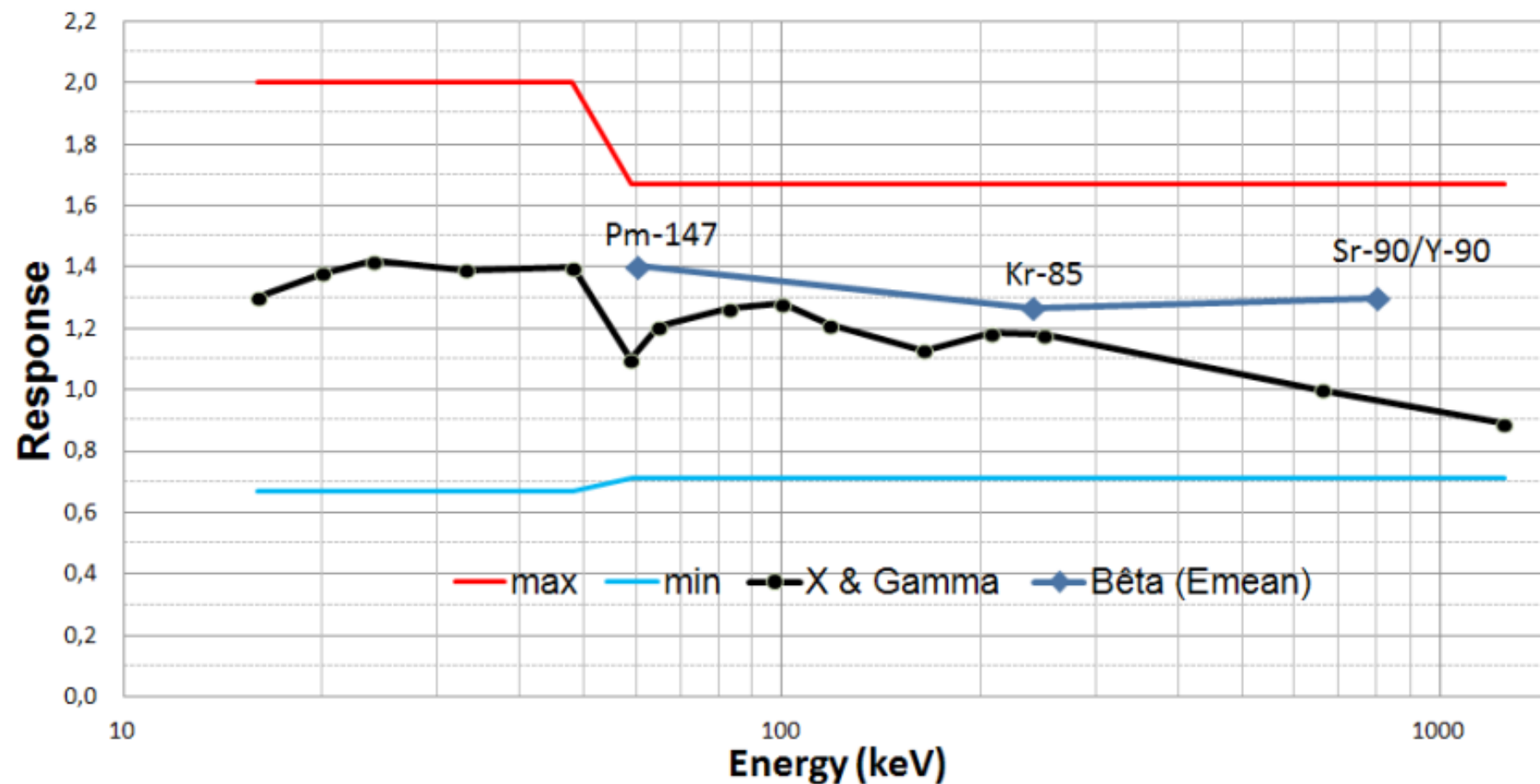




Hp 0.07 Typical Energy Response



2 Photo Diodes





LTx Module





- Before using a detection module...



How to Connect a N, LTx or Beta Module ?

- DMC 3000 in pause
- DMC 3000 need G3 protocol with Firmware > V7
-> press « + » to display firmware version or by DMCUser
- DMC 3000 requires a connector



Firmware version on the DMC 3000 display



connector properly attached

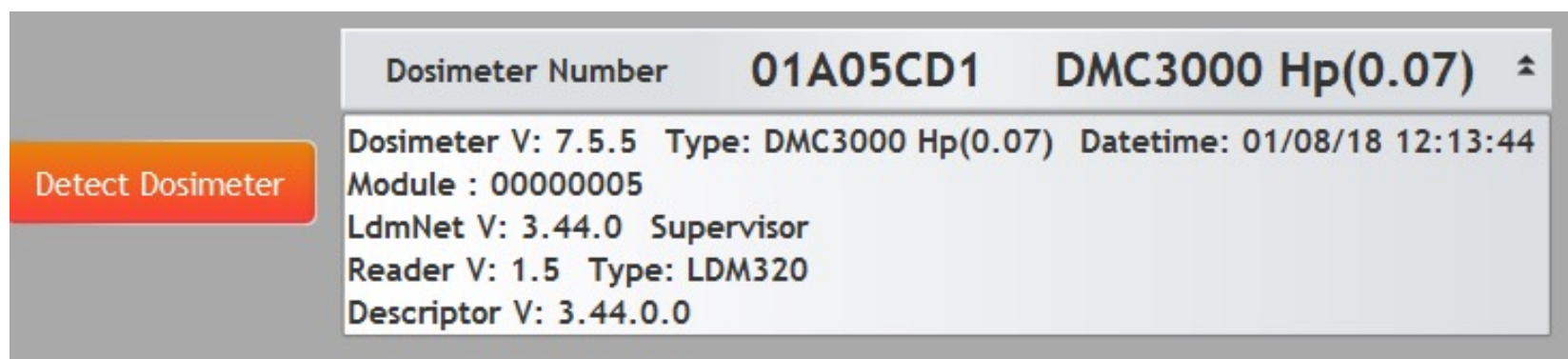
Module Connected





DMC User Software | Update

NEVER connect or Disconnect the Module in RUN – Use the DMC User: Detach Module Function :





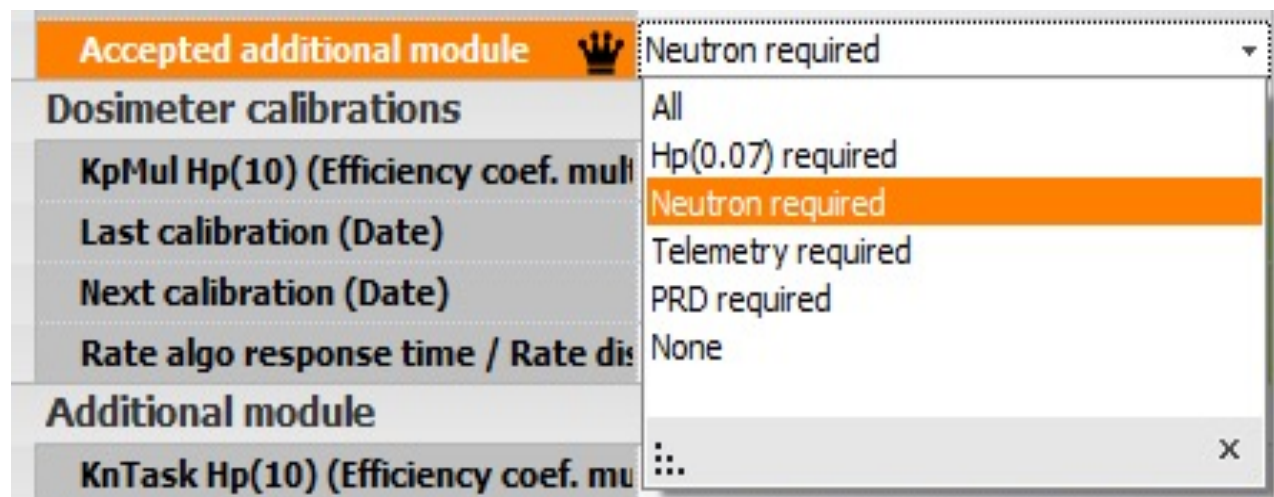
DMC User

Modules in DMC User

- Module Type is automatically detected

Can restrict to REQUIRE a Module

- Selection to accept “any” or only the module restricted





Secondary Channel Histogram

Detect Dosimeter

Dosimeter Number **01968525** DMC3000 Hp(0.07) ▾

Data Parameters Batch In / Out **Historical** DM Editor Batch Configuration Lists Customizer Views Manager

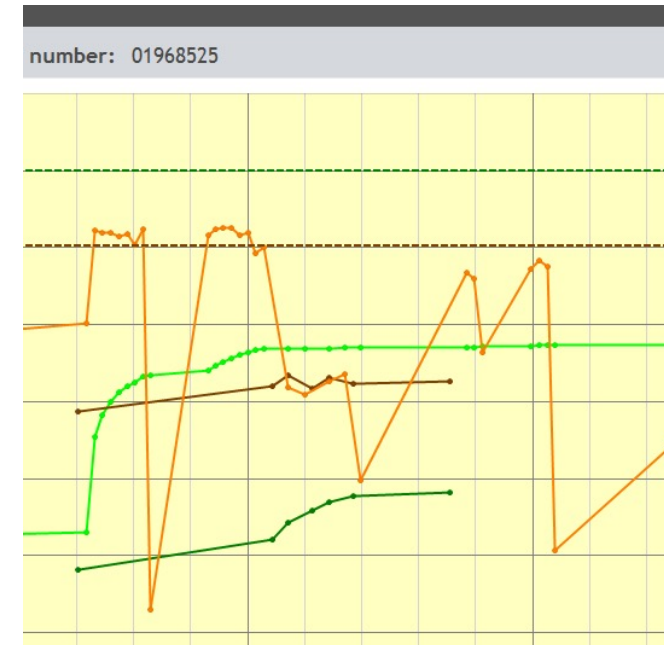
+ - ☐ Append history Get current Get previous Get all

Text **Graph**

Source: Read dosimeter Dosimeter number: 01968525

▾

ID ▾	Datetime ▲	Record	Type	Origin	Primary dose ...	Primary rate (...)	Secondary dos...	Secondary rate...
25	11 Jul 2016 15:...	Measures			0.4	16.8	49.7	15.3
24	11 Jul 2016 15:...	Measures						
22	11 Jul 2016 15:...	Measures						
23	11 Jul 2016 15:...	Measures					49.8	18.8
20	11 Jul 2016 15:...	Measures						
21	11 Jul 2016 15:...	Measures			0.5	13.9		
18	11 Jul 2016 15:...	Measures						
19	11 Jul 2016 15:...	Measures					49.9	0.8
17	11 Jul 2016 15:...	Measures			0.6	15.2		
16	11 Jul 2016 15:...	Measures						
15	11 Jul 2016 15:...	Measures					50.6	366.3
14	11 Jul 2016 15:...	Measures						
13	11 Jul 2016 15:...	Measures					51.6	304.6
12	11 Jul 2016 15:...	Measures						
11	11 Jul 2016 15:...	Measures					52.1	35.1
10	11 Jul 2016 15:...	Measures					52.3	408.1
9	11 Jul 2016 15:...	Measures					53.6	516
8	11 Jul 2016 15:...	Measures					54.7	442.8
7	11 Jul 2016 15:...	Measures					55.1	0.1
6	11 Jul 2016 15:...	Measures					55.4	677.8
5	11 Jul 2016 15:...	Measures						
4	11 Jul 2016 15:...	Measures						
3	11 Jul 2016 15:...	Measures						
2	11 Jul 2016 15:...	Measures						
1	11 Jul 2016 15:...	Measures						



Hands-on Exercise



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Connect the Module

How to Connect the Water-tight Module

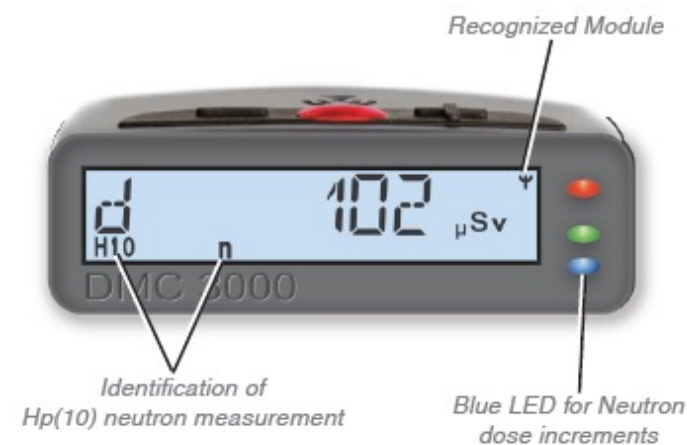
1. Remove Battery cover, Confirm connector installed
2. Completely loosen the 2 screws on the flange of the neutron Module.
3. Make sure the flange is lowered.
4. Place the module at a 45° angle to the base of the dosimeter and rotate it into position (6).
5. Apply pressure to the flange on both sides (7).
6. Hand tighten the four module screws





N Module

- Place DMC 3000 with Module in run mode
- Auto test of the Module
- “-” button displays dose and dose rate (Gamma, Neutron, HP07 depending of the module)
- “+” Button displays present settings
- Blue LED indicates counts received





NPP Transmitter Lessons learned

Transmitter Battery Life:

- To provide the longest life possible with the little AAA battery, we change the transmit time from 4 second to 8 seconds when the transmitter goes into low battery to allow the battery “rest” time.
- We normally expect at least >36 hours of transmit time. 24 hours Green/Green and typ >24 hours Yellow/Green.
- Need to train workers to turn in the dosimeter to RP when they see Yellow/Green on their Transmitter.

Transmitter Battery Usage:

- Don't preload batteries in the transmitters before the outage. transmitter can uses a small amount of power while sitting in the rack with the dosimeter is in Pause.
- Use a Good AAA Alkaline (not Rayovac). Do not use Lithium or NiMH as they have both have other issues.
- Indication of Battery life (Green/Green or Yellow/Green flashes).





NPP Transmitter Lessons learned

Mod Def – Because the DMC-3000 is designed to be modular, if something happens where it loses communication with the transmitter (or any module) it goes to a Mod Def error.

If the device is in Pause, it Will Not Turn On!

To clear Mod Def do these steps in order until it is cleared:

- If the transmitter battery is used, replace with a fresh battery. If the battery is new, just remove the battery cap and reinstall it (do not over-torque).
- or
- Verify the dosimeter is off and remove the transmitter module then remove the dosimeter battery. Replace the dosimeter battery, let the dosimeter reset and then replace the module.
- Or
- Remove and replace the interface board (ensure side with Battery Side is towards the battery) and wipe off the pins and the transmitter pads with an alcohol swap to clean any residue.





To summarize

- Extended possibilities of DMC3000 with modules
- Need FW V7 (G3) to accept modules except for Tx module
- Don't forget the connection board !
- Automatic adaptation to the connected module
- Clear a MOD DEF by DMCUser or by removing the battery





DMC 3000 Modules | Questions ?

