Service Bulletin

Revised version:
Added instructions for warranty replacement of batteries.

Perform battery tests for batteries in DX-D 100 mobile X-ray unit

	Timing		Category		Scope
◉	**Next service as agreed with customer**	○	**Apply at all sites**	◉	**Problem Record: HQ_1204130004 PRB2000350**
		◉	**Apply at affected sites as listed below**		
		○	**Optional to improve functionality of product**		

Task Tracking

After completion of your task the following entry in your Service Report is required: **44442216** *

* Insert the document number into the field "Comment" (SMS form).

Purpose of this document:

- It describes an easy to handle method to test the battery capacity of DX-D 100 batteries.
- It describes the prerequisites and the instructions for this method.
- It describes how to proceed in case of a warranty replacement of batteries

Affected serial number(s) / batch:
All DX-D 100 mobile X-ray units where an insufficient battery capacity is recognized.

The signatures on the approval page indicate the solutions described in this Service Bulletin have been reviewed and are NOT reportable because no actions are taken to reduce a "Risk to Health" according to our risk assessment process.

List of contents

1 Introduction/purpose

Symptom

The battery capacity of DX-D 100 is not sufficient (HQ_1204130004, PRB2000350).

This can apply to:

- Batteries supplying the X-ray generator
- Batteries supplying the motor for moving the device

Cause

One or more broken batteries in the battery trays.
This will affect the performance of the complete system.

Solution

Determine the Ampere Hours (AH) remaining in each battery and detect broken batteries. Perform a battery test with the battery tester *Auto Meter RC-300* as described in section 3.

This test is a fast working alternative to the battery test procedure described in the DX-D 100 Mobile X-Ray Unit Service Manual.

NOTE:
The replacement of batteries in case of warranty requires a special procedure, which is described in chapter 5.

2 Prerequisites

IMPORTANT:

- Before performing the described test procedure, the DX-D 100 mobile X-ray unit must have been connected to the mains for at least 10 hours to ensure a complete battery charging.
- For the test procedure a fully charged battery, known as in good condition, is needed as a reference for the measurements.

SPARE PARTS:

Replacement batteries can be ordered by using the following spare part numbers:

- 9 Ah FIAMM batteries: SC+A520398-03
- 15 Ah CSB EVH batteries: SC+A521051-01

IMPORTANT:

The spare parts delivery comprises a set of two batteries.

Do always exchange broken batteries in pairs such as they are assembled together in the tray.

TOOLS:

Auto Meter RC-300:
hand-held battery load tester

Obtain this equipment locally:
http://test.autometer.com

Figure 1

REFERENCED DOCUMENTS:

- DX-D 100 Mobile X-Ray Unit User Manual, Document ID 41065152
- DX-D 100 Mobile X-Ray Unit Service Manual, Document ID 41600560
- *Auto Meter RC-300* User Manual, Internet Link
- DX-D 100/DX-D 100 Wireless - Video - SB100/114 - Method for identifying faulty batteries ,Document ID 67595252

3 Instructions

REQUIRED TIME:
Approximately 2 hours for battery tests, excluding a possible replacement of batteries

3.1 Safety directions

DANGER:
Use protective gloves and eyewear to prevent electric shock when handling batteries to lower the risk of electric shock during service tasks.

In case of battery casing rupture, electrolyte loss or any other exposure to the electrolyte, rinse with water. In case of contact with eyes, rinse for at least 15 minutes and immediately consult a doctor.

IMPORTANT:
Strictly observe all safety directions described in the Service Manual of the DX-D 100 Mobile X-Ray Unit.

3.2 Battery test procedure

3.2.1 Calibrate *Auto Meter RC-300* to a fully charged battery (reference battery)

NOTE:
Be aware that the values shown in the figures below are only examples.

(1) Get a fully charged battery:

- 12 V / 15 Ah for testing the generator battery trays (type CSB EVH 12150 F2)*
- 12 V / 9 Ah for testing the motor battery tray (type FIAMM FGH 20902)*

* or equivalent type released by the manufacturer

(2) Switch on *Auto Meter RC-300*.
Press **`Y/Enter`** for Menu.

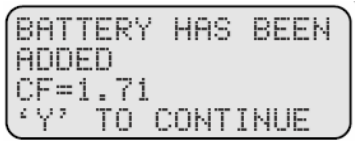
(3) From the main menu select **Setup**.

(4) Add the reference battery to the database:
- Press **Y/Enter** to add the battery.
- Select a number for this battery, e.g. **BAT01** and Press **Y/Enter** to continue.

(5) Set the Ah to 15 (Ah), or 9 (Ah) respectively and press **Y/Enter** to continue

(6) Connect the leads of *Auto Meter RC-300* to the reference battery:
- Black clamp to minus (-)
- Red clamp to plus (+)

Auto Meter RC-300 now tests the reference battery.
After test has finished, it will display:
- *Battery has been added*
- The value of the correction factor associated with
the battery number in the database*(CF)*



(7) Press **Y/Enter** to continue.

Finally some default settings for *Auto Meter RC-300* can be set:

(8) Set the approximate temperature of the battery (in Celsius or Fahrenheit) using the + and - keys.
Press **Y/Enter** to continue.

(9) Set the **Default AH**:
Press **Y/Enter** to accept the value 15 Ah as default

(10) Set the **`Battery Cutoff`** value:

- *Good* default value: 75 % (recommended)
- *Bad* default value: 65 % (recommended)

Marginal Battery will be displayed for values between the above settings.

Example for Good Battery Cutoff

Result *Auto Meter RC-300* has set the parameters of this battery as a reference for successive tests.

NOTE:
It is not necessary to perform this calibration procedure each time when a battery is checked. It is sufficient to calibrate the Auto Meter RC-300 from time to time with a fully charged reference battery.

3.2.2 Perform battery tests

NOTE:
A description of the battery test procedure is also available as Service video, refer to chapter 2, Prerequisites.

The DX-D 100 has following battery equipment which has to be tested:

- At 15 Ah: 5 trays with 6 batteries each for the X-ray generator
- At 9 Ah: 1 tray with 8 batteries for moving the mobile X-ray unit

(1) Switch off DX-D 100 and disconnect from the mains.

DANGER:
Carefully handle all internal parts of the equipment, especially parts located under covers.
Dangerous DC voltage is present in the unit even when unplugged from the AC line.

(2) Remove the front cover of the DX-D 100 to get access to the battery trays.
Refer to *DX-D 100 Mobile X-Ray Unit Service Manual*.

(3) Take out the first of the battery trays and place it stable.
Mind that the trays are heavy.

(4) Switch on the *Auto Meter RC-300*.
Press **`Y/Enter`** for Menu.

(5) Select *Battery Test* by pressing **`Y/Enter`**.

```
>BATTERY TEST
 REVIEW PRINT
 VOLTMETER
 SETUP
```

IMPORTANT:
Make sure that *Auto Meter RC-300* is connected to ONLY ONE BATTERY.
Auto Meter RC-300 has been designed for usage with 12 Volts. It will be damaged if connected to the pair of batteries in serial or to the complete battery tray.

(6) Connect the leads to the first battery in the battery tray:

- Black clamp to minus (-)
- Red clamp to plus (+)

NOTE:
If the clamps are reversed the **`Reversed Connection`** screen will flash.

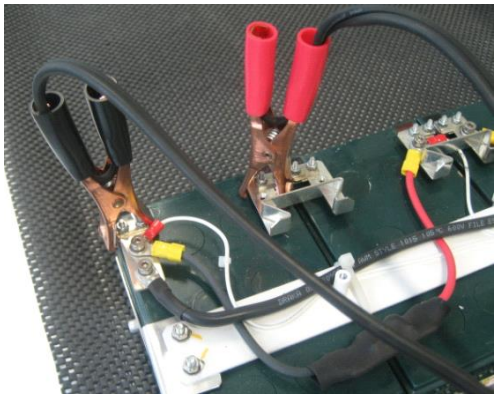


Figure 2

(7) Next select *Database*.

```
>SELECT RATING
<AH>DATABASE
USE +/-
'Y' TO SELECT
```

(8) Select the reference battery from the database.
Click **`Y`** to begin the test.

```
>SELECT BATTERY
BAT01 12V 28.0AH
12.72V
'Y' TO BEGIN
```

(9) Wait for the test result.

```
TESTING BATTERY
PLEASE WAIT…
```

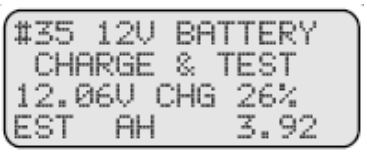
(10) Repeat the procedure for each battery in the tray.

(11) Perform the battery tests for all other battery trays of the DX-D 100.

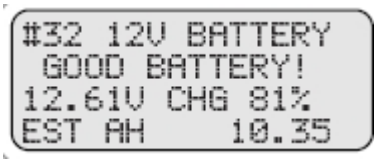
3.2.3 Evaluate test results

The following test results are possible:

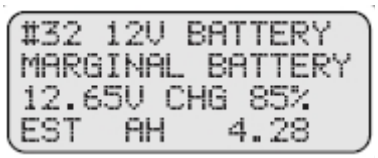
Battery did not have a sufficient charge (26%) for a complete load test.
Battery needs to be charged and retested.



Good battery:
Capacity of the battery is good:
> 75%
Estimated AH = 10.35 in the example



Marginal battery:
Capacity of the battery is marginal:
< 75%
Estimated AH = 4.28 in the example



Bad battery:
Capacity of the battery is bad:
< 65%
Estimated AH = 3.29 in the example

The battery should be replaced.

3.2.4 Order replacement batteries

(1) Determine the required quantity of replacement batteries:
Batteries with a measured charging status of less than 65 % should be replaced.

(2) Order replacement batteries in the required quantity as described in chapter 2.

NOTE:
The replacement of batteries in case of warranty requires a special procedure, which is described in chapter 5.

3.3 Disposal of broken batteries

Dispose of broken batteries according to the local regulations.

3.4 Information label for charging batteries on delivery package and spare part

NOTE:

In order to prevent permanent damage of the batteries, a label is attached on the DX-D 100 delivery package. It describes that the batteries of the mobile X-ray unit have to be charged every two months, when the equipment is not in use.

A similar label is attached to batteries sent as spare parts, informing that those batteries have to be charged every four months. See Figure below.

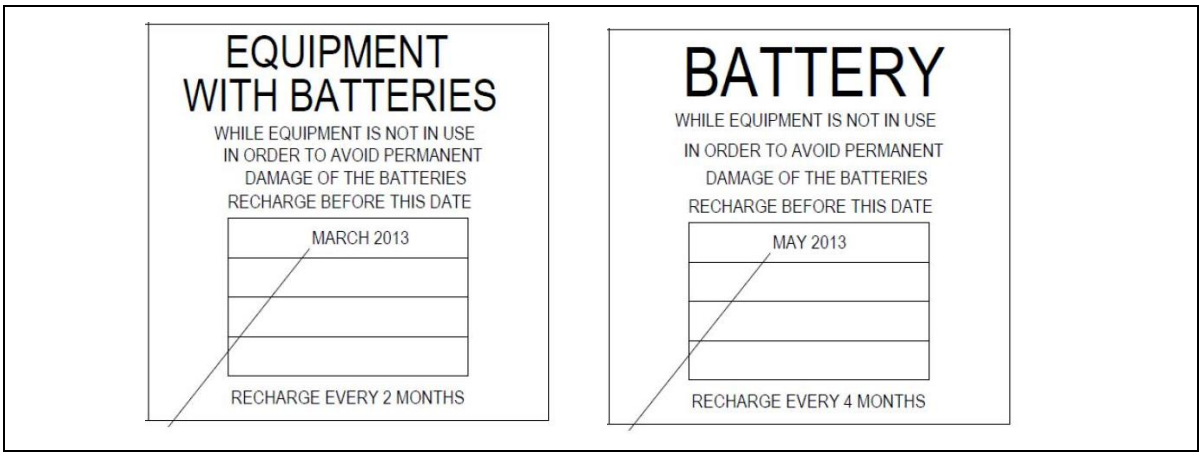


Figure 3

4 Verification

Not applicable

5 Procedure in case of warranty replacement of batteries

In case of a warranty claim, the battery manufacturer requests additional information/steps:

- The serial numbers of the defective batteries
- The measurement results of the batteries in all trays
- Returning of the defective batteries (only applicable if supplier refuses a warranty replacement without returning the defective batteries to them)

Proceed as follows:

(1) Record and fill the attached pdf-form with the following data values after a complete system charge of 10 hours:

- Internal resistance or charge capacity
- Voltage values

Use a RC 300 meter for this purpose.

(2) Send the completed pdf-form to:
MLucas@sedecal.com **and** Hector.Martinez@sedecal.com
And in copy (cc) to: mark.schuermans@agfa.com

(3) After the battery manufacturer has evaluated the pdf-form, you will be informed if the affected batteries have to be sent back or not.

6 Keywords

DX-D 100, battery test, discharged, Auto Meter 300, broken,

7 Version history

Version	Change	Date
1.0	Initial version. This Service Bulletin had a predecessor “Service *Information* Bulletin - Perform battery tests for batteries in DX-D 100 mobile X-ray unit” (same Document Node ID), which was unpublished 2014-04-09 from the Agfa Healthcare (Medimg) Library.	05-2014
2.0	Version 2 Added PRB2000350 Added procedure of warranty replacement of batteries	08-2020

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