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HISTORY

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A	29-Apr-2021	Initial	Thomas Wiedebusch
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REVIEWS

Rev	Date	Reviewer	Department

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ABBREVIATIONS

Builder Operator	Operator of the "FW-Update Builder" assembling the "FW-Update Safe"
DLL	Dynamic Link Library
EMEA	Identifier used for European, Middle East and Africa
FW	Firmware, hardware depending software
FW-Package	A combination of applications which work together and have to be installed as set
FW-Update	Firmware update
FW-Update Builder	Builder of the "FW-Update Safe", tool to select all needed components and to encrypt the "FW-Update Safe"
FW-Update Loader	Software for decryption of the "FW-Update Safe" and hast for the "FW-Update Software"
FW-Update Process	The process of installing the firmware
FW-Update Safe	Encrypted container of all components needed for the "FW-Update Process" during offline operation
FW-Update SW	Software executing the "FW-Update Process"
Genesis	Legacy Name of Cordonel
HW	Hardware
NA	Identifier used for North America
NFC	Near Field Communication, a tag which can be read by a SW on direct contact with the HW
Offline Operation	Without connection to the Xylem-Network
Online Operation	Directly or via VPN connected to the Xylem-Network
PCB ID	Printed Circuit Bord Identifier, unique identification number of the Cordonel HW
SW	Software
Update Opertor	Operator executing the „FW-Update Process"
VPN	Virtual Private Network

Table 1.1 Abbreviations

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1. Introduction

A general introduction of the “FW-Update package” is referenced by [FWU_PK].

1.1 Content

This document gives a brief overview of the “FW-Update Loader”. The software is the loader for the “FW-Update Safe”. Decrypt the safe and start the “FW-Update Software”.

2. Prerequisites

2.1 Hardware Requirements

PC with MS-Windows™ 10 Operating system.

2.2 Software Requirements

Microsoft™ .NET framework 4.7.2.

3. Installation

An installation is not required, just copy the software including all sub-directories to a preferred location.

4. Security

The software is not protected by any license, as the user needs to be registered and therefore the “Builder Operator” can only generate “FW-Update Safes” for validated users. The “FW-Update Safe” has an expiration date and locks for unwanted usage.

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5. Operating Instructions

To operate the “FW-Update Loader” an “Update Operator” registration is required.

5.1 Folders Of Interest

Five folders on the PC will be mentioned to the Update Operator:

1. The personal folder *C:\[User Name]\Downloads\FwUpdateSafe*
   This folder contains all downloaded “FW-Update Safes”. If the update operator receives a safe via e-mail or gets it on a memory device (e.g. USB-stick), he should store it to this location as the “FW-Update Loader” will search exclusively on this location for assigned safes.
2. The personal folder *C:\[User Name]\Downloads\FwUpdateSafesDownloaded*
   This folder contains empty files with the name of the already downloaded “FW-Update Safes”. The extension of these files is *exclude*. If a repeated download of a “FW-Update Safe” should be initiated, erase the according file in this folder.
3. The public folder *C:\GensesiLog\FwUpdateUnreported*
   Here all unreported files will be stored by the “FW-Update SW”. The file names are a composite of the PCB ID, the customer name and the FW update order number and position (e.g. 182100041_Sensus GmbH Hannover_1234567890-10.applist and 182100041_Sensus GmbH Hannover_1234567890-10.report). Always two files per PCB ID are logged, the application list and the report of the update process. Every user can inspect this folder even if a colleague has performed the update.
4. The global folder *C:\GensesiLog\FwUpdateReported*
   Backup of all files after reporting and deletion from the unreported folder.
5. The public folder *C:\GensesiLog\[FW Update Date]\FwUpdateLoader*
   These folders contain a lot of files used for debug purposes. If any problem occurs, the update operator may inspect these files or deliver it to the developers for failure analysis. Every user can inspect this folder even if a colleague has performed the update.

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5.2 Update Operator Registration – Online Operation

For the registration process, a data base connection is required. Therefore the PC has to be connected directly or via VPN to the Xylem network.

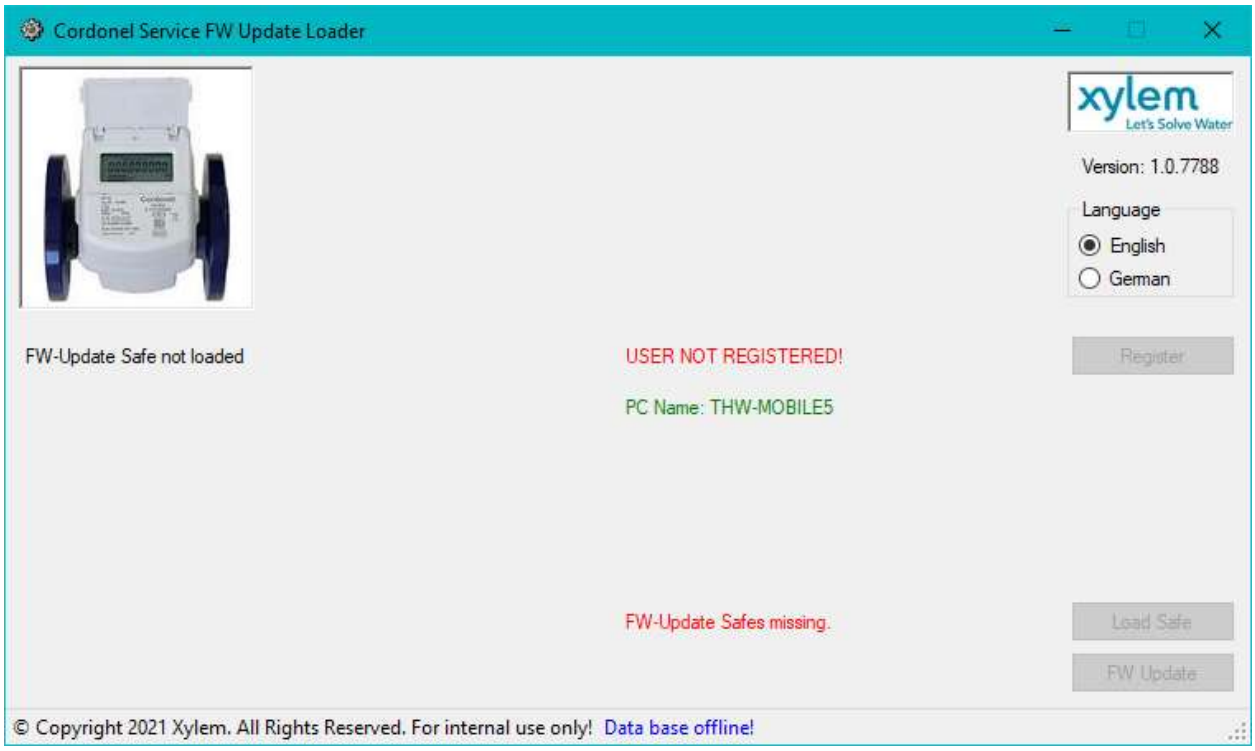


Figure 5.1 FW-Update Loader – User not registered – Data Base Offline

If the data base is offline, a registration cannot be performed, as the Update Operator information have to be stored to the data base.

The “FW-Update Loader” is automatically trying to establish a data base connection. This will be cyclically done every 30 seconds.

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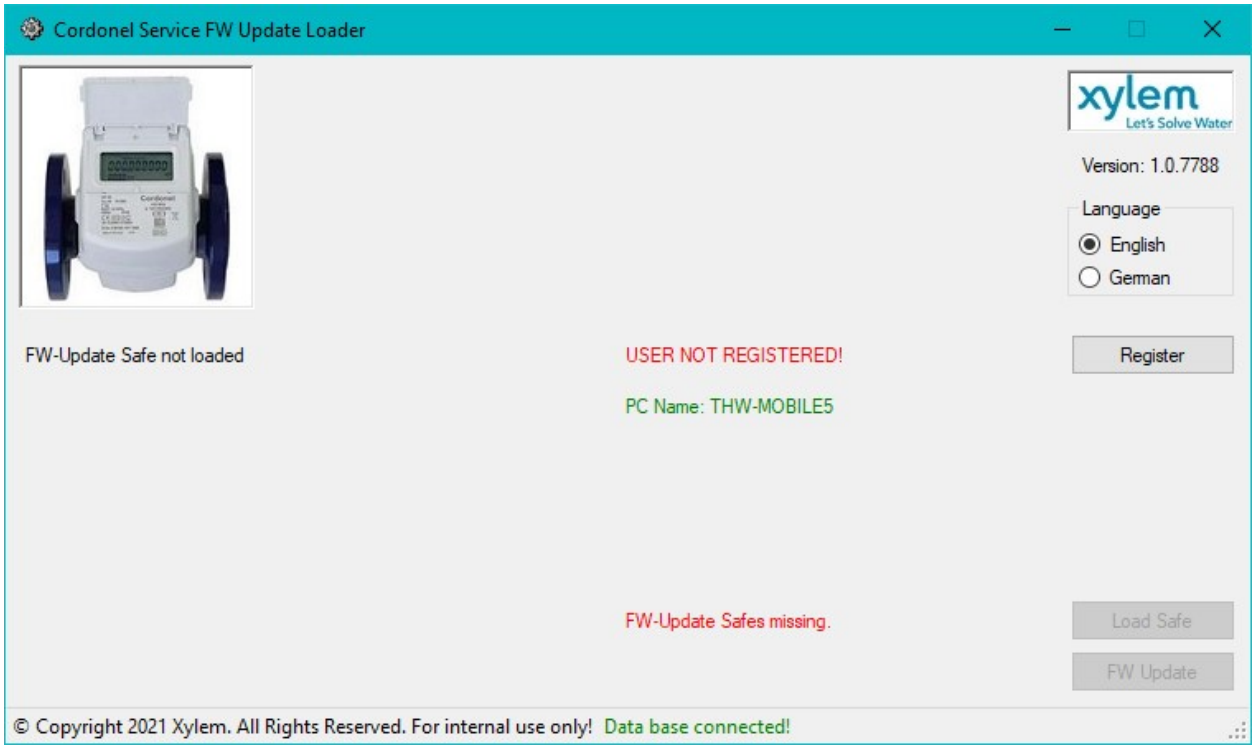


Figure 5.2 FW-Update Loader – User not registered – Data Base Online

The data base connection can be observed on the status bar. Here the data base is connected. Clicking [Regsiter] for “Update Operator” registration.

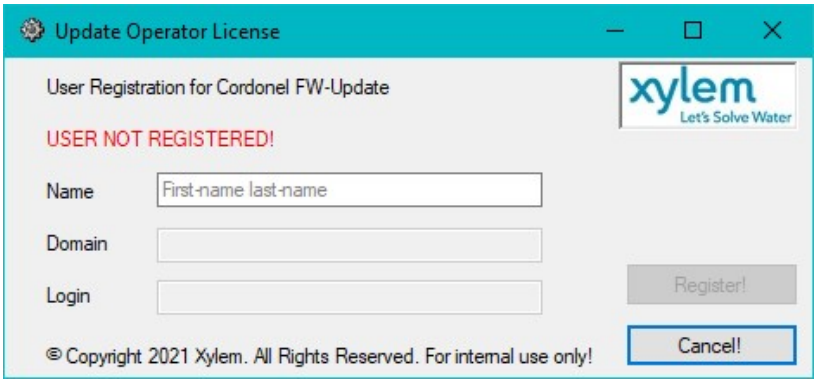


Figure 5.3 FW-Update Operator License Window – User Unknown

The regsitration can only be performed once per user. Input your correct full name (first middle last). This name will be stored to the data base. With this full name the “Builder Operator” can identify the “Update Operator” and assign safes.

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Figure 5.4 FW-Update Operator License Window

After the registration the “Update Operator” can wait for the “FW-Update Safes” assigned to him and his machine.

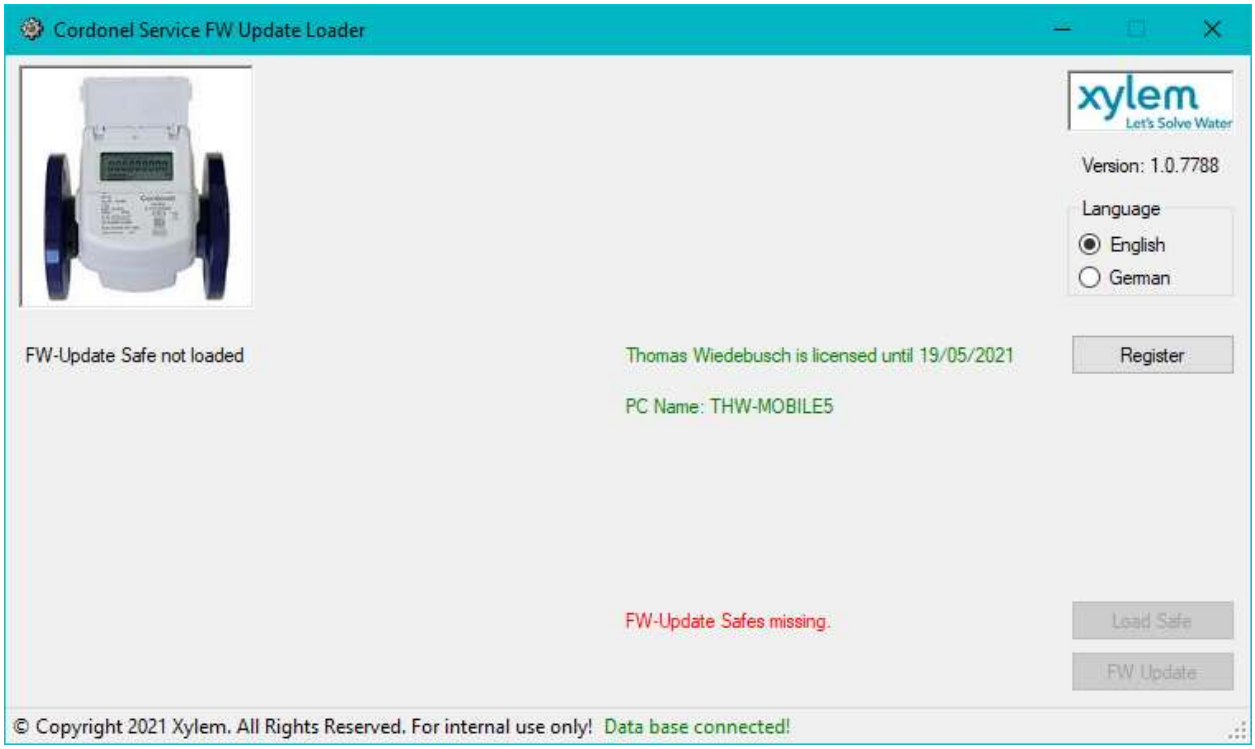


Figure 5.5 FW-Update Loader – User registered

5.3 Download Safes - Online Operation

As soon as the “FW-Update Loader” detects a network connection, it starts automatically to download all safes assigned to the update operator. Files which are previously downloaded will be logged in the

C:\[User Name]\Downloads\FwUpdateSafesDownloaded *.exclude

to avoid a repeated download. All “FW-Update Safes” are going to be stored in the

C:\[User Name]\Downloads\FwUpdateSafe.safe.*

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5.4 FW Update Loader – Offline Operation

During the field operations, the "FW-Update Loader" will be started in offline operation. The user registration will be checked with the local information stored on the PC.



Figure 5.6 FW-Update Loader – User registered – Safes Available

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5.5 Loading Safes – Offline Operation

Load the safe with the [Load Safe] button and select the customer and order number.

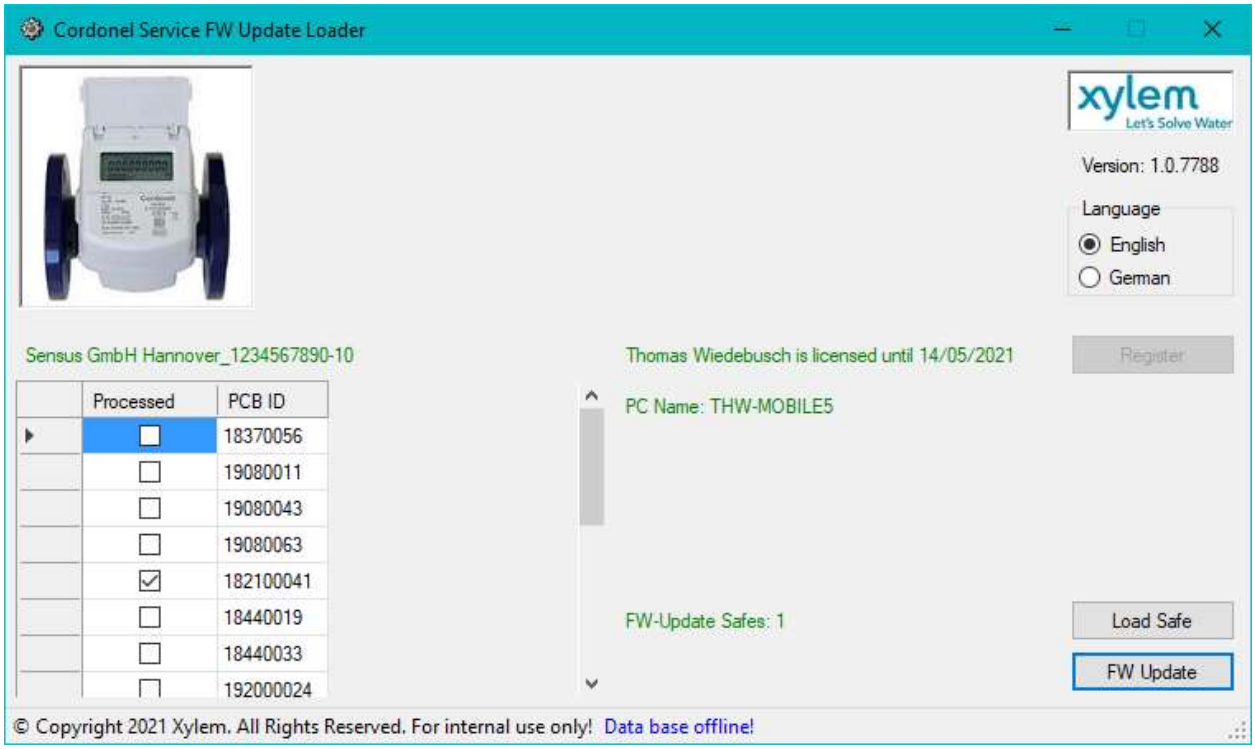


Figure 5.7 FW-Update Loader – Safe Loaded

After loading the safe, all PCB IDs are going to be listed. These PCB IDs are the unique identifiers for a Cordonel™. All processed PCB IDs will be marked as soon as the first connection to the Cordonel has been established.

IMPORTANT NOTICE:

Currently the "FW-Update Loader" cannot detect, if the FW update has be processed and succeeded. This decision will be left to the update operator. The flagged "Processed" field is just a reminder.

IMPORTANT NOTICE:

If all Cordonels have been updated, erase and shredder the according "FW-Update Safe" here "*Sensus GmbH Hannover_1234567890-10.safe* in the *C:\[User name]\Downloads\FwUpdateSafe* folder! This will be a tremendous security improvement as this cannot be compromised by hacking.

5.6 Starting the FW-Update – Offline Operation

After loading of a "FW-Update Safe", the FW update procedure can be started pressing the [FW Update] button. This will load the "FW-Update SW", start it and deliver all information needed for the FW update to this software.

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5.7 Reporting – Online Operation

During the update two files are going to be created by the “FW-Update SW”. These are stored in the public folder as

C:\GensesiLog\FwUpdateUnreported.applist and *.report*

If the data base connection is detected, these files will automatically uploaded. After upload these are going to be moved to the backup folder

C:\GensesiLog\FwUpdateReported

It can be seen on the “FW-Update Loader” screen if any reports need to be uploaded.

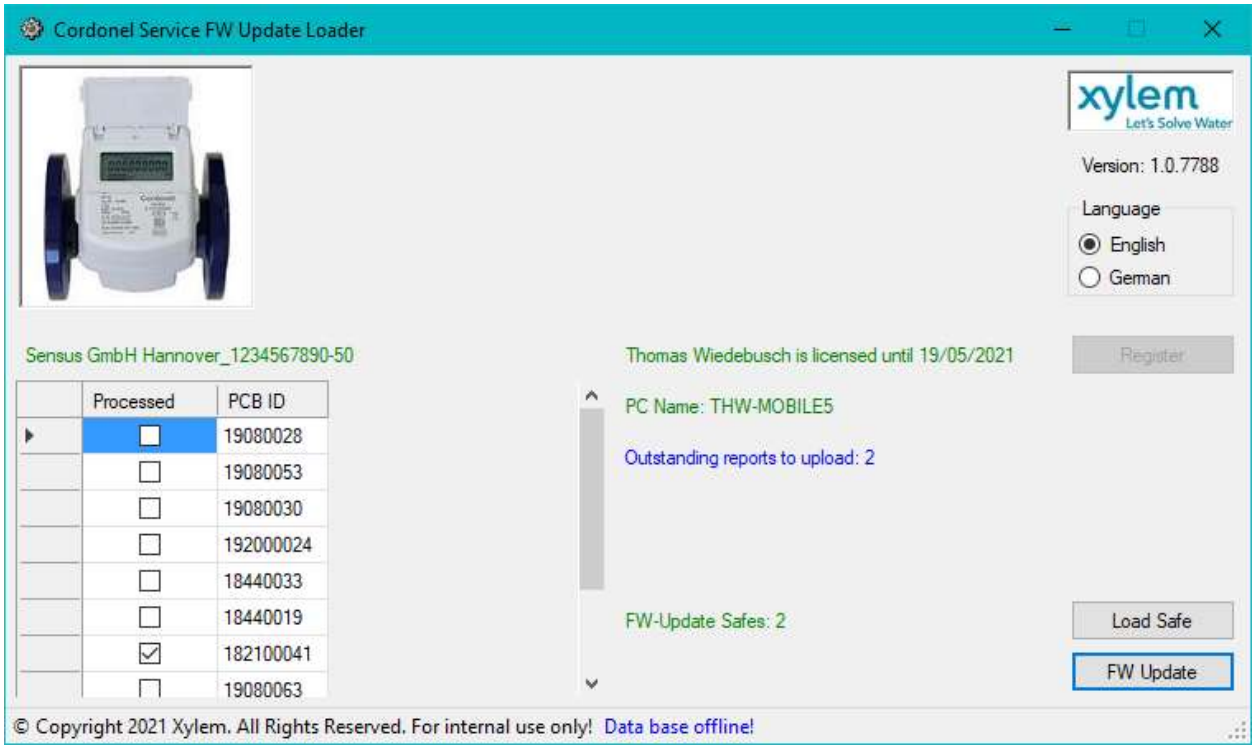


Figure 5.8 FW-Update Loader – Outstanding Reports

The **.applist* file (Json-Format) is describing the last detected applications installed to the Cordonel, the **.report* file (plain text file) is logging all information collected during the update for later analysis of the process. This contains at least all installed application before and after the update, all registers read before and after and each process step. Additional the results of the update capability check can be inspected.

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6. Changing PC for Identical User

If an user changes his PC, the “FW-Update Loader” registration has to be executed on this specific machine. It is essential, that any assigned “FW-Update Safes” are erased before the new PC registration!

6.1 Registration on new PC – Online Operation

The following procedure has to be carried out:

1. Start the “FwUpdateLoader.exe” while connected to the data base,
2. The “FW-Update Loader” will download all previously assigned “FW-Update Safes” for this user, but due to the hardware change, these cannot be decoded anymore!
3. Wait at least until the “Data base connected” shows up in the status line of the program,
4. Wait another 60s,
5. If any “FW-Update Safe: X” will be shown:



Figure 6.1 FW-Update Loader – FW-Update Safes have to be erased for new PC registration

Erase all safes in the
C:\[User Name]\Downloads\FwUpdateSafe.safe*
until “FW-Update Safes missing” will be displayed on the “FW-Update Loader” main screen:

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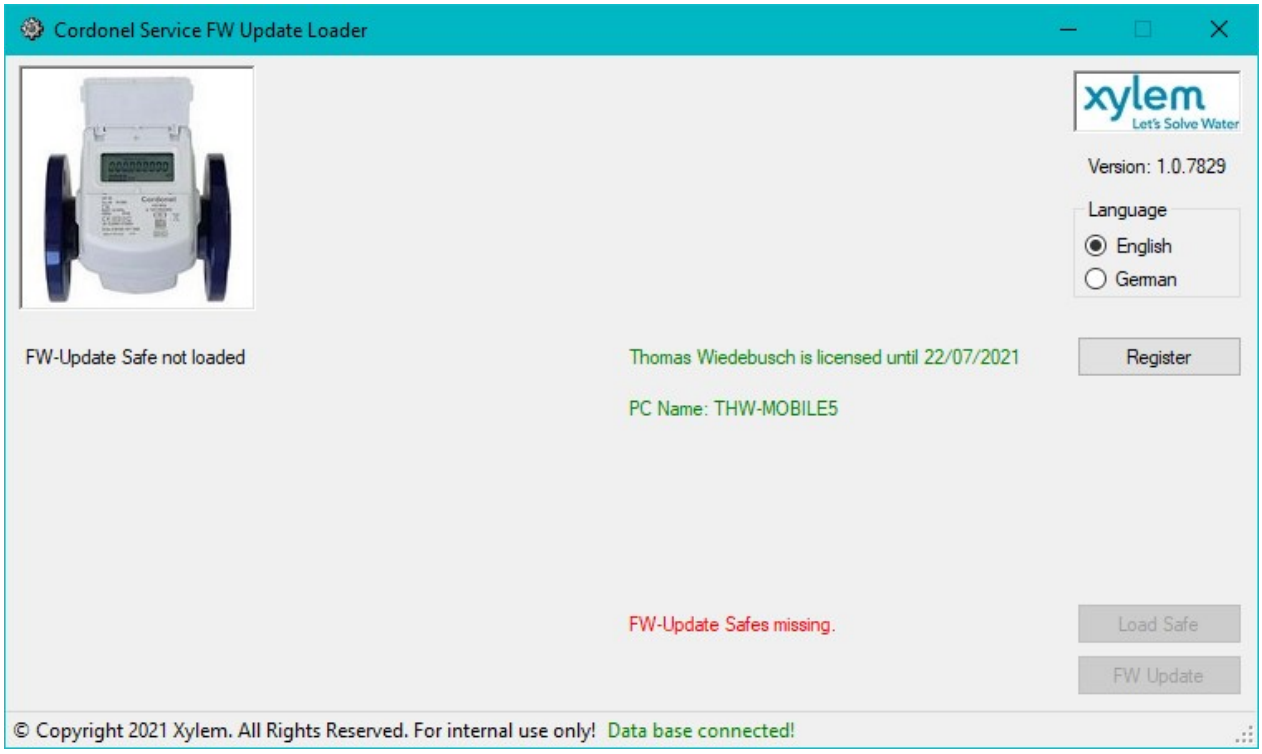


Figure 6.2 FW-Update Loader – Ready for new PC registration

6. Then click the [Register] to execute the registration for this new PC.

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7. Trouble Shooting

7.1 Cordonel Detection Failed

If a Cordonel cannot be detected by the “FW-Update SW”, a NFC tool can be used to read the Cordonel PCB ID and compare this with the “FW-Update Safe” content. The PCB ID can be found in the FI tag (e.g. 182100041), the installed FW version in the PV tag (e.g. 1.0.6B meaning 10.6B)

```
NFC:
Record 0 – UTF-8 (en): text/plain
FI: 182100041
PV: 1.0.6B
```

Listing 7.1 NFC Tag

NFC tool can be found in the android application store.

8. Contacts

Name	Function	Mail

Table 8.1 Contacts

9. References

[FWU_MRD] **Cordonel Service FW-Update Process MRD**; *Published: SENSUS GmbH*; Author: Thomas Wiedebusch; Edition: September 2020 - Revision B

[FWU_BLD] **Quick Reference Cordonel Service FW-Update Builder**; *Published: SENSUS GmbH*; Author: Thomas Wiedebusch; Edition: April 2021 - Revision A

[FWU_SW] **Quick Reference Cordonel Service FW-Update Software**; *Published: SENSUS GmbH*; Author: Thomas Wiedebusch; Edition: April 2021 - Revision A

[FWU_PK] **Quick Reference Cordonel Service FW-Update Packet**; *Published: SENSUS GmbH*; Author: Thomas Wiedebusch; Edition: April 2021 - Revision A

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