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B	27-Oct-2021	FW Update SW and configuration files are taken from DB	Thomas Wiedebusch
C	03-Mar-2022	Mentioned the Safe Upload	Thomas Wiedebusch
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E	23-Nov-2023	Factory Reset with recovery registers	Thomas Wiedebusch
F	13-Jun-2024	Power Correction	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"
DB	Data Base
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 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 host 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
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 Builder”. The software serves as an user interface to collect all data needed to update a series of Cordonels in the field. It is going to verify the selected update packages. If the combination passes all verification steps or the user acknowledges the “FW-Packages” as a valid package to install to specific device, the “FW-Update Safe” can be build.

The “FW-Update Safe” will be encrypted using the selected Update-Operator information.

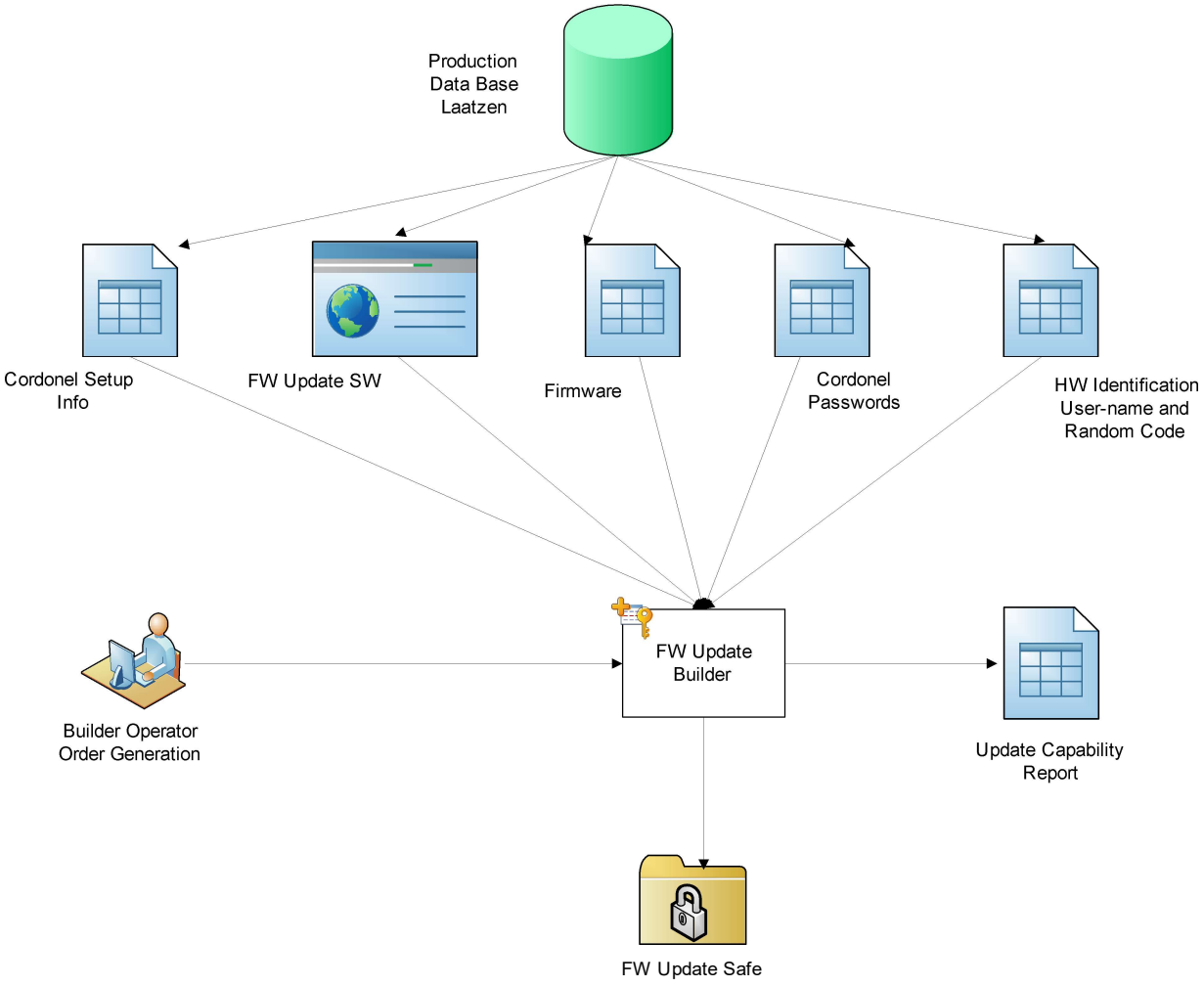


Figure 1.1 FW-Update Builder Operation

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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 protected by a license for a specific version and licensed to a specific user. This license can be used on unlimited amount of PCs.

Key Values:

- License control by the Laatzen production data base – exit SW immediately if not licensed,
- User registration and activation control in DB, user specified by domain, log-in name and full name,
- Lock user control if user is not activated, only menu items are active, Builder operator cannot access the data base contents, neither read nor write,
- Using Web-Interfaces to access the DB contents.

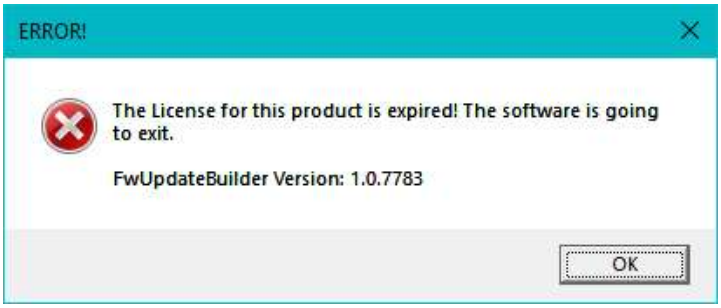


Figure 4.1 Message Window – Expired License

To check the “Builder Operator” validation select from the main menu:

Help->Info

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Figure 4.2 Registration Window – Account Active

If the "Builder Operator" is not registered, only the Domain and Login fields will show a value. These have to be send to the administrator of the production data base. The full name has to be reported. As soon as the data base administrator has added this account, all information is going to be displayed here.

5. Confidence Notice

The Builder Operator can assign wrong "FW-Update Packages" to a Cordonel due to the lack of information nowadays. But finally, there is nothing which can be made wrong at all, as the "FW-Update Software" takes the responsibility for the late update capability check.

Even if the update cannot be performed, the Cordonel™ will remain fully functional.

But assigning an un-installable "FW-Update Package" may put a lot of stress to the Update Operator, as he cannot perform the update at all. Unfortunately, he can check the update capability only at the time of connection to the Cordonel.

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6. Operating Instructions

To operate the “FW-Update Builder” at least the customer name, the customer specific Cordonel serial number and eventually the name of the required “FW-Package” are demanded. The software is almost intuitive to use. Behind the user views, a lot of checks and validation will protect against wrong selections.

6.1 Order-Position and Validation Date

The start screen shows in red all needed information before a “FW-Update Safe” can be created. Input an order number and position for the FW-Update order and select the validation date. Beyond the validation date, the “FW-Update Safe” will be useless.

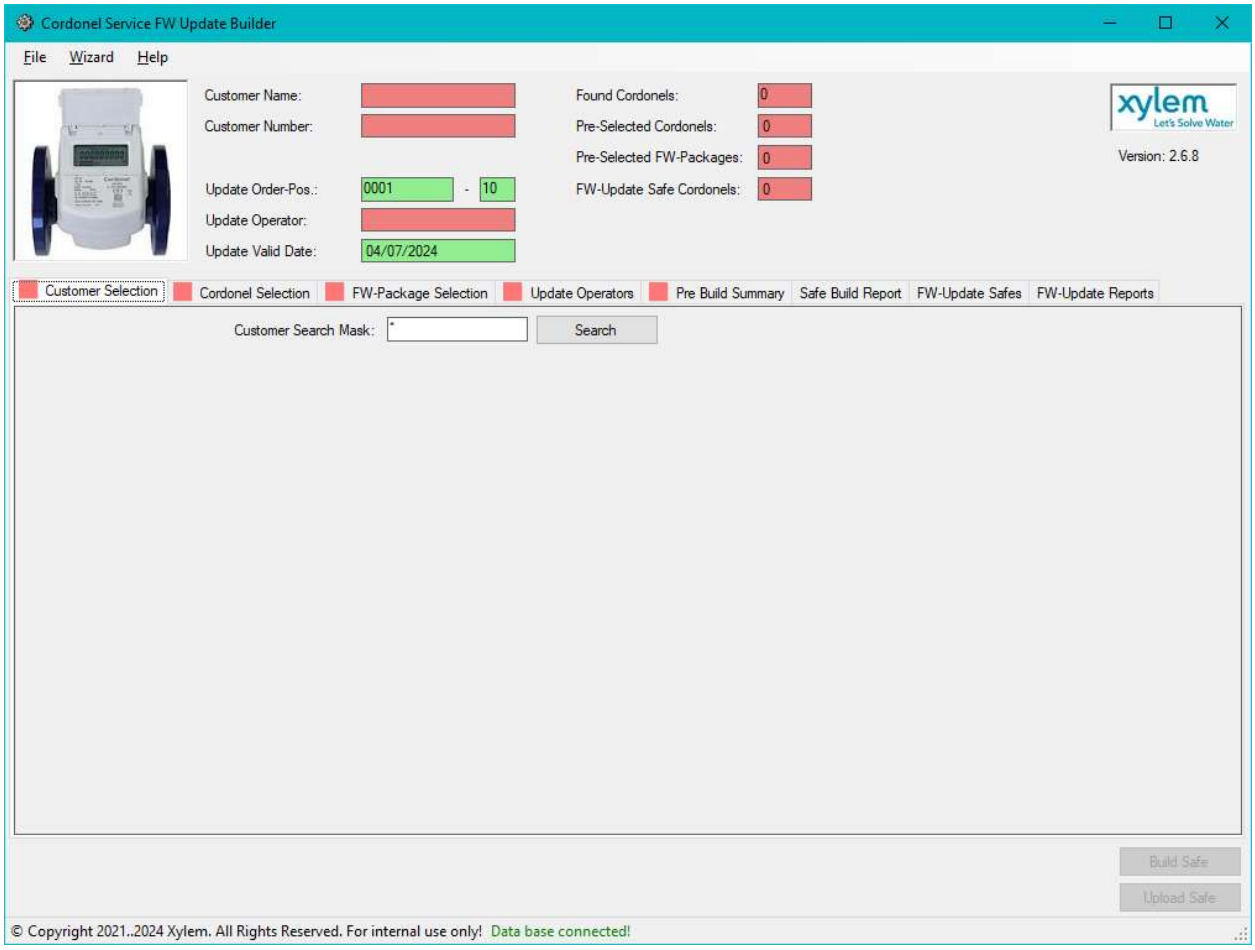


Figure 6.1 FW-Update Order-Position

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IMPORTANT NOTICE:

The order number displayed here is a default number which can be overwritten by the Builder Operator!

A safe has to have a unique name before uploading it to the data base. The need of several safes can be accomplished with an identical order number just increasing the position number. Before the upload, the safe can be overwritten as often as required until it fulfils the builder operator demands.

Only the latest created safe can be uploaded to the data base. Do not forget to upload this safe after generation!

Clicking on the validation date will open a “Date Time Picker”. This date states the last day, on which the generated “FW-Update Safe” can be used. Beyond this day (midnight) the “FW-Update Software” will exit itself.

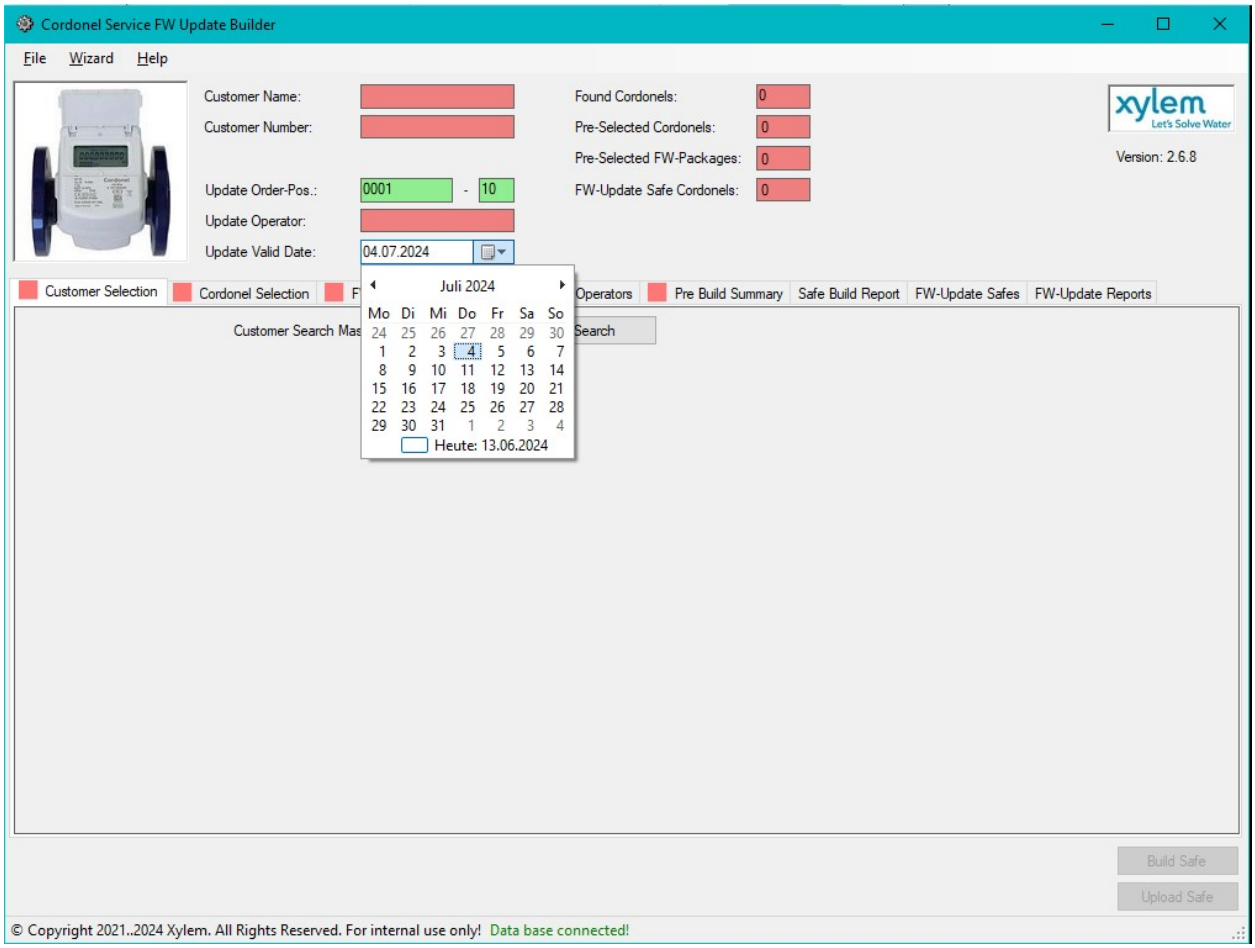


Figure 6.2 FW-Update Validation Date

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6.2 Customer Selection

Select the Customer:

- This is the base for all further operations as the a “FW-Update Safe” is always for one customer,
- Changing the customer will remove all Cordonels from the selections, as these are strongly connected to each other.

A search mask can be used like “*SEN*” to preselect a customer subset, the star behind the search-string is mandatory:

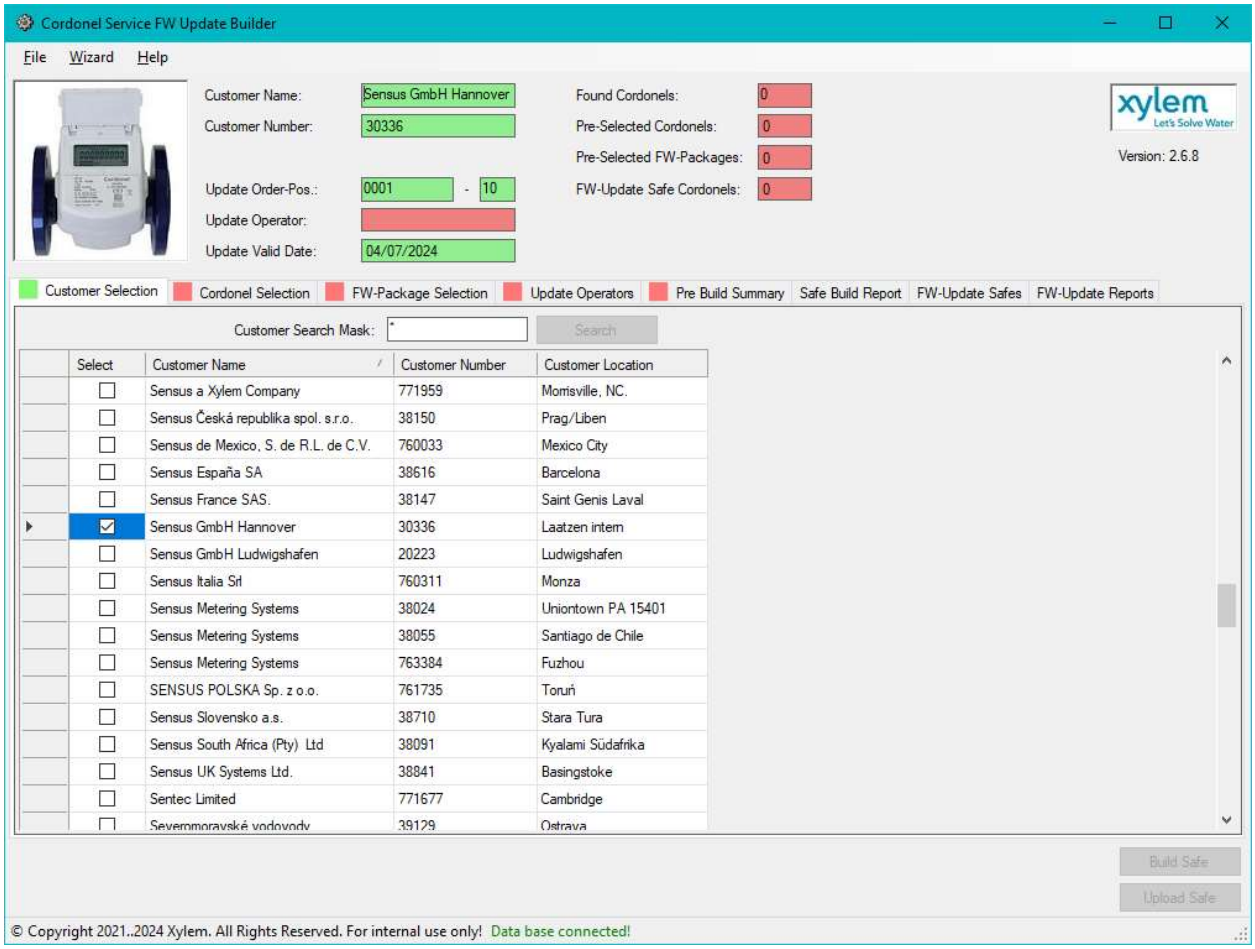


Figure 6.3 Customer Selection

6.4 Cordonel Selection

Select all Cordonels for the “FW-Update Safe”. A suggested range is one to twenty devices, as it might be better to generate a second or third “FW-Update Safe”.

Take the drop down list to select the original production number and position and then click [Search].

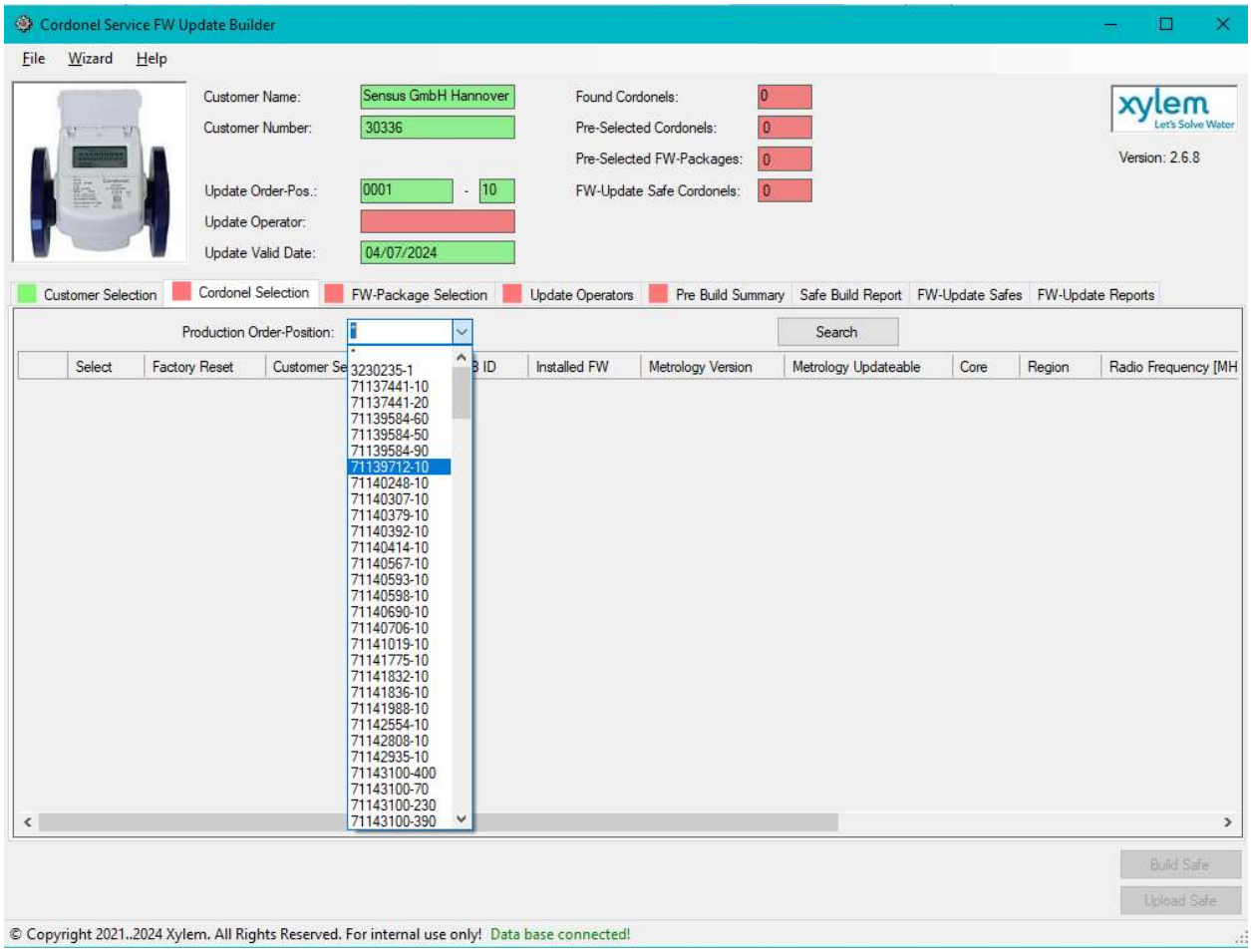


Figure 6.4 Cordonel Order Selection

It is supported to search and assign Cordonels from different “Production Orders-Positions”. The number of Cordonels, which can be selected, is theoretically unlimited but as with every selected Cordonel the “FW-Update Safe” will grow, it is not a good solution to add to many. A recommendation is to select that many Cordonels and put it to a safe as can be updated in one working day. It is possible to generate an unlimited number of safes. These have to be assigned either to a different FW-Update Order-Position or can be used with the identical order, just changing the Position (e.g 1234567890-10, 1234567890-20, 1234567890-30 a.s.o.).

ATTENTION: Identical Update Order-Position numbers will overwrite the safe generated before this one. Only the last generated safe will be downloaded by the “FW-Update Loader” but only if meanwhile the elder has not been downloaded.

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ATTENTION:

The “Factory Reset” selection will add all factory settings for this Cordonel to reset it to the “End Of Line” process values before shipment! Be aware that previously adjusted settings by the customer will be overwritten.

If it is needed to re-program a new Sensus radio encryption key coming out of the data base Laatzen or restore all settings to their initial values this checkbox has to be selected.

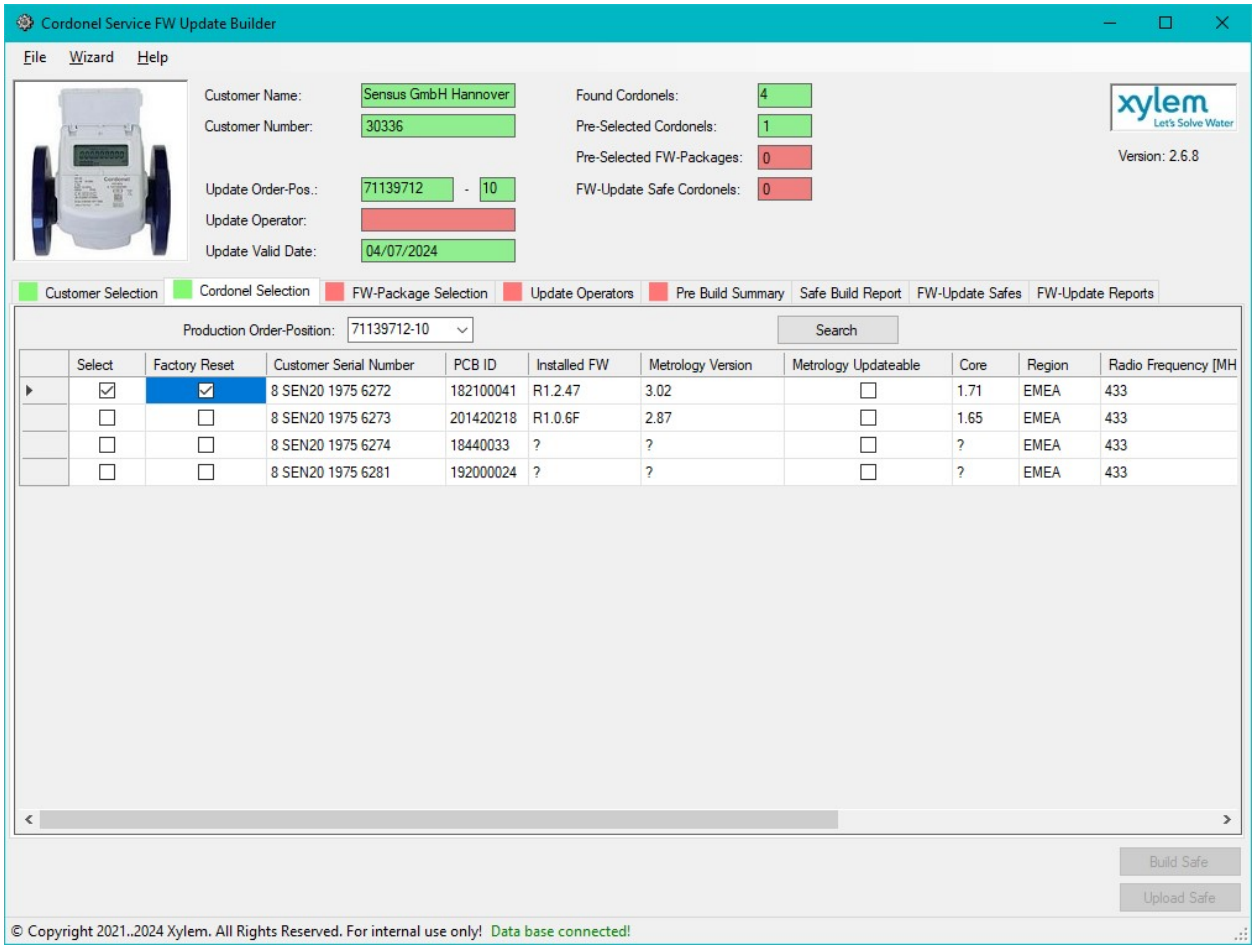


Figure 6.5 Cordonel Selection with Factory RESET

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6.5 FW-Package Selection

The FW package has to be pre-selected, before it can be assigned to a specific device. The search masks will be filled with the information of the selected Cordonels to simplify the pre-selection of valid update packages.

Due to the lack of information nowadays, this has to be selected with the maximum rigor. Nevertheless, if it cannot be installed, an late update capability check in the “FW-Update SW” will avoid an accidentally installation to an unsupported device.

Again search masks can be used to find a specific package.

Important:

- The region (NA or EMEA),
- The radio frequency (433 MHz, 868 MHz or not available on NA versions),
- The Metrology version
- The Size (diameter of the flow tube),
- The Core revision.

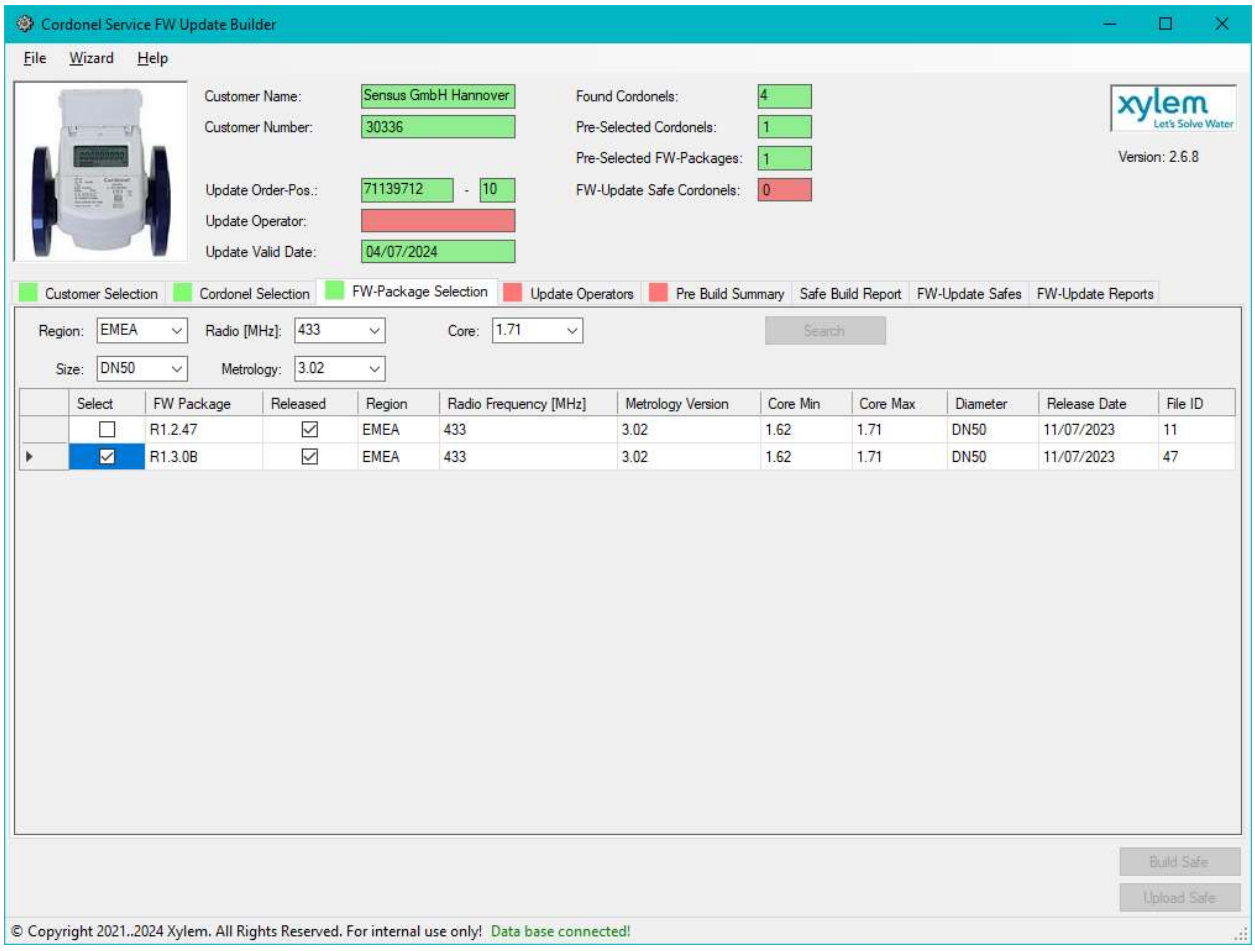


Figure 6.6 FW-Package Selection

The package filter masks will be pre-set during the Cordonel selection to display compatible versions. This filter can be manually changed.

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6.6 Power Correction

If a FW for EMEA below R1.3.x is installed, the update selection to EMEA FW version starting with R1.3.00 will add all information needed to correct an overestimated power consunption of the Cordonel. In FW versions R1.3.00 and higher, this overestimation is corrected. If these power correction values are going to be added, this will be displayed in the “Safe Build Report”.

6.7 Update Operator

A registered update operator has to be assigned. The “FW-Update Safe” will be encrypted with the information of the update operator and his PC. The “FW-Update Safe” can be decoded explicitly by this operator on his registered PC. Therefore only one update operator can be selected for one safe.

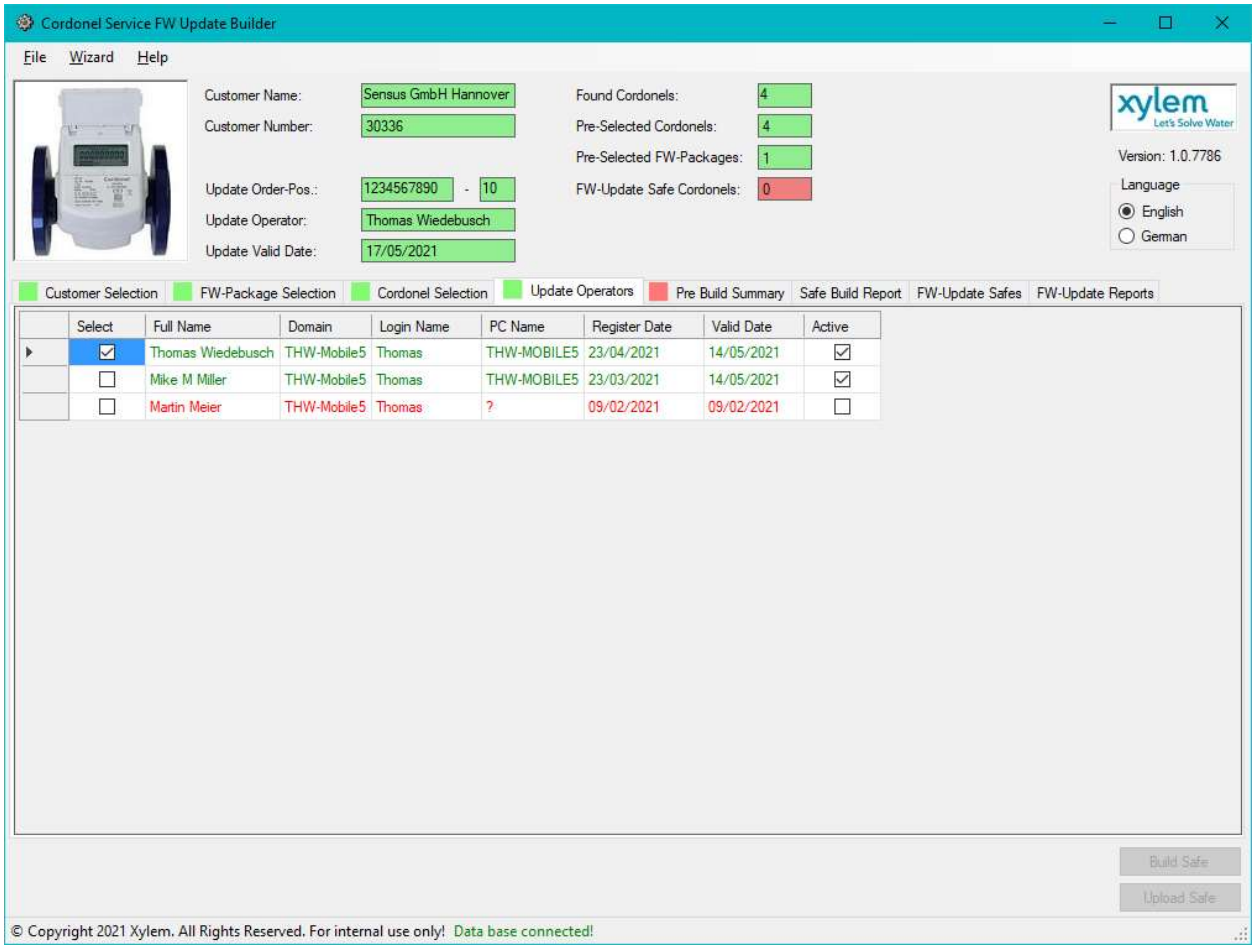


Figure 6.7 Update Operator

REMINDER:

The “Update Order-Pos.” needs to be adjusted to the maintenance order the TSC needs to track this work item. Per default this is pre-set to the “Production Order-Pos.” of the first selected Cordonel.

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6.8 Update Capability Check – Manual Verification

The final step before the FW-Update Safe can be build, indicated by an overall “green” and the enabled [Build Safe] button, is the update capability check at the “Pre Build Summary” page.

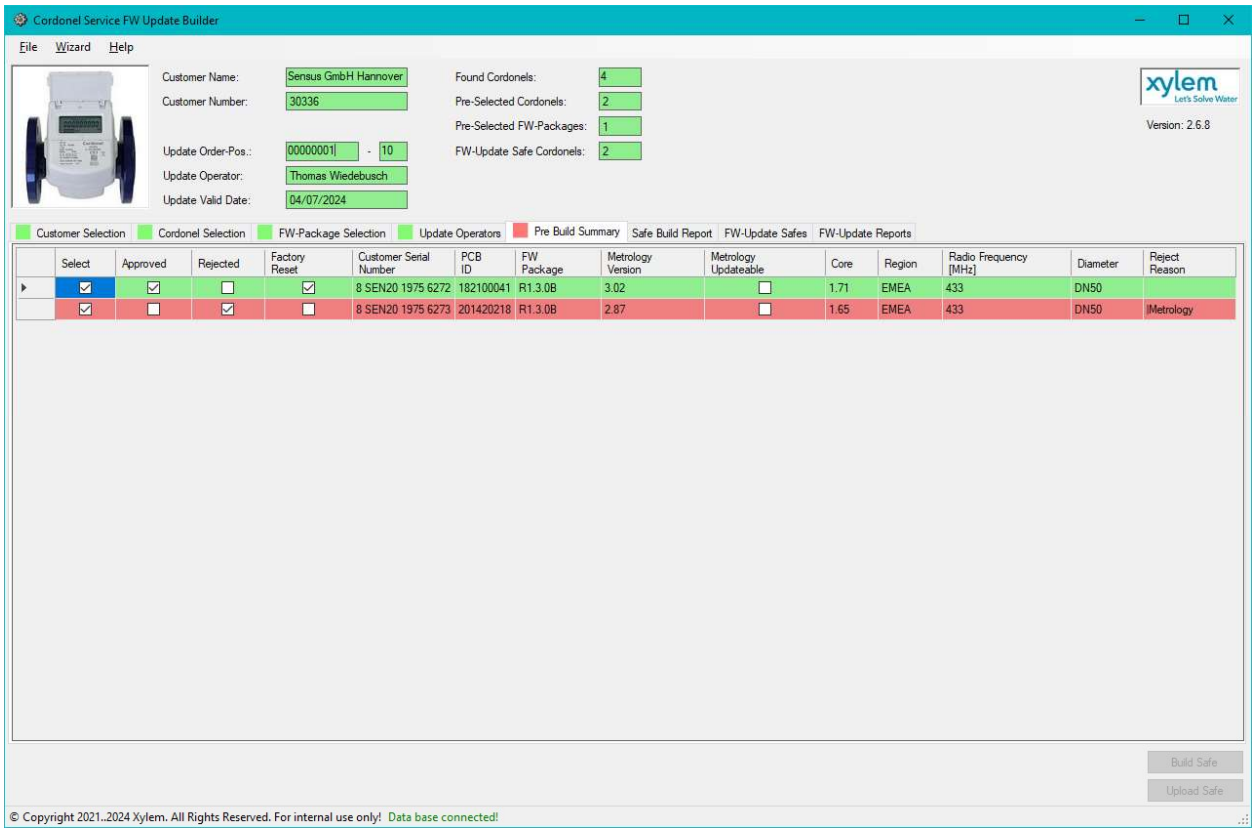


Figure 6.8 Pre Build Summary – Update Capability Verification

The update capability verification will automatically accept the “FW-Package” if the “Region”, the “Radio Frequency”, the “Meter Size”, the “Core Revision” and the “Metrology Version” passes the checks.

If not, the “Reject Reason” states the failed checks and the builder operator can accept the “FW-Package” with a manual approval on his own responsibility.

Green lines are acknowledged, red lines are rejected and have to be unselected to grey the line out and remove this device from the safe.

IMPORTANT NOTICE:

Manual approval should be exclusively done with the knowledge, that this “FW-Package” can be installed. The assignment of a wrong “FW-Package” to a specific Cordonel will not harm the device, as at least the “FW-Update Software” will perform a strong update capability check. But an un-installable “FW-Package” will cause a lot of inconvenience to the update operator in the field, as the update will be denied after connecting to the Cordonel.

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Ready to [Build Safe] as all information needed has been filled. The green lines are showing the Cordonels which will be put into the safe.

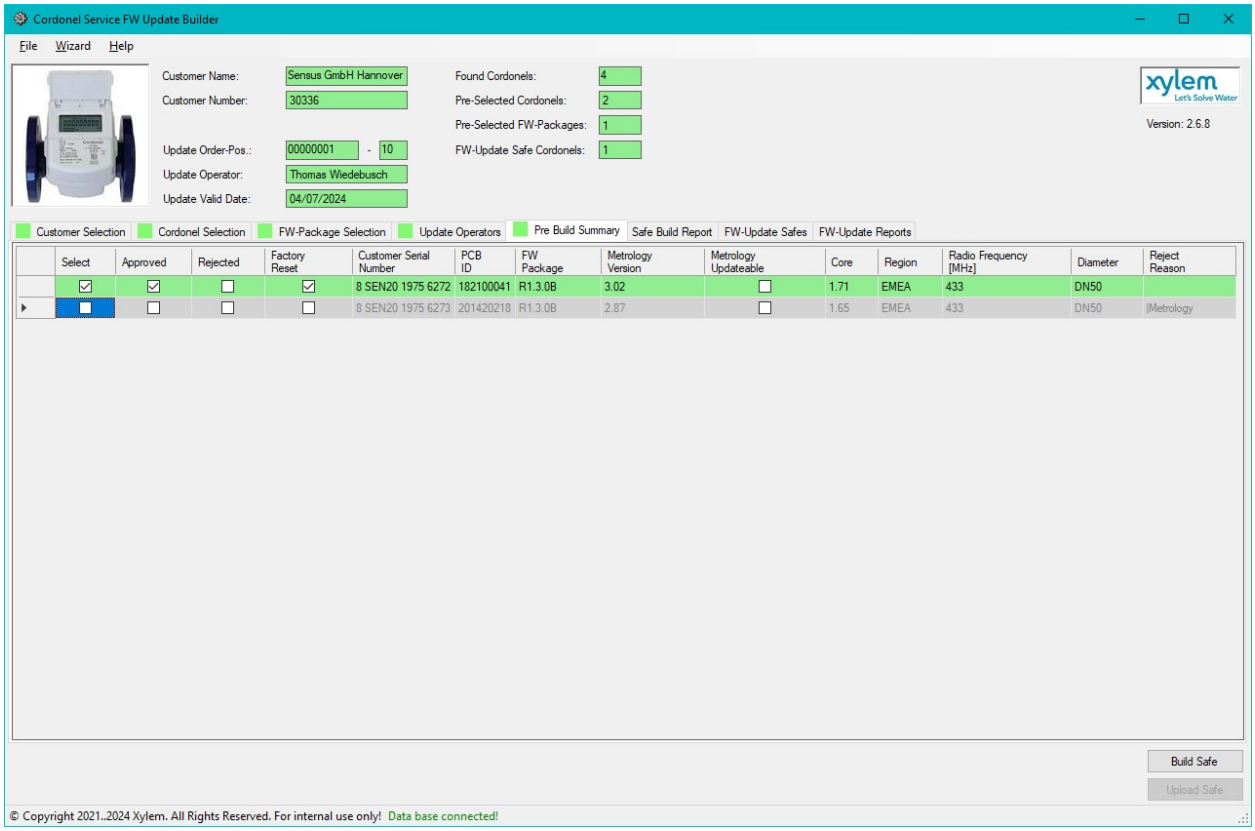


Figure 6.9 Pre Build Summary – Verification Completed

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6.9 Build Update Safe

Finally the update safe build operation will take place by pressing the [Build Safe] button.

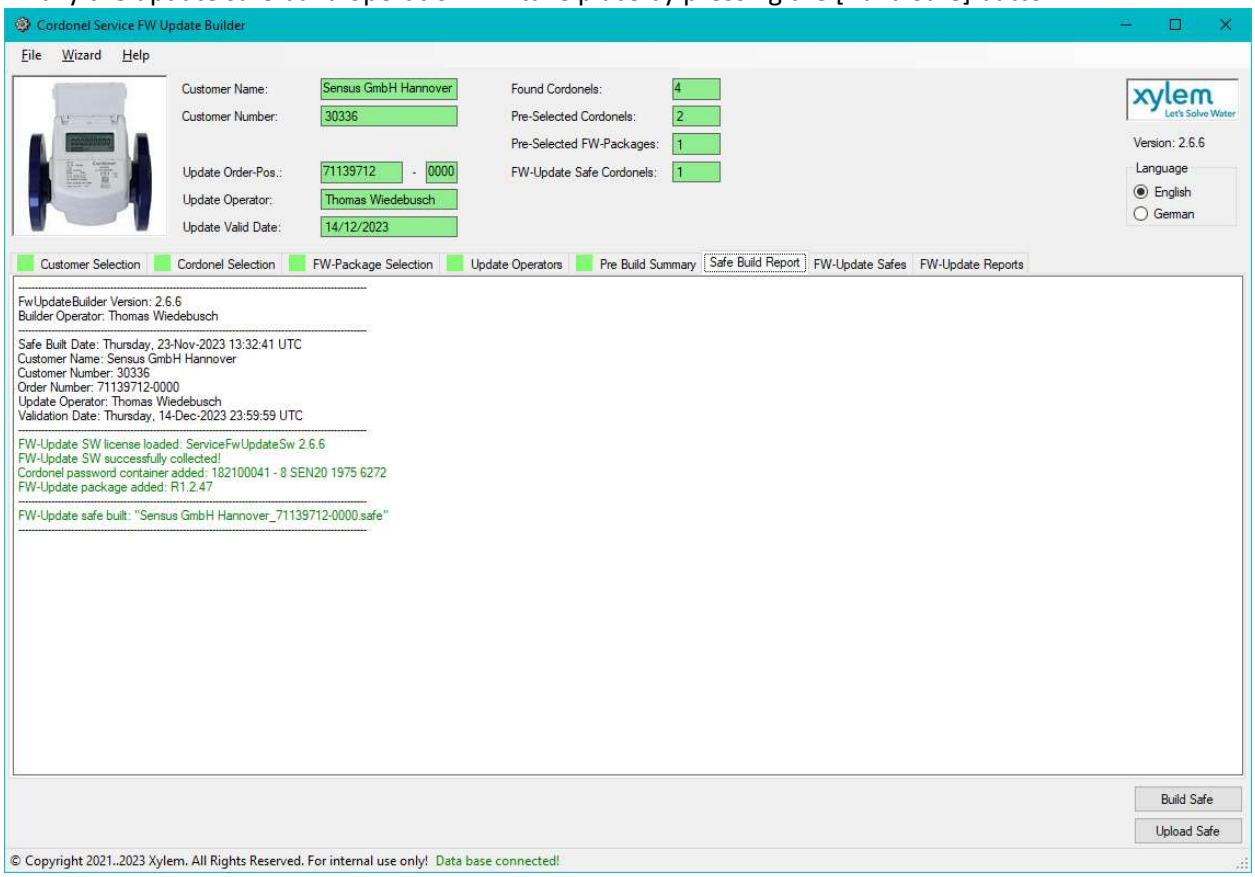


Figure 6.10 Build FW-Update Safe – Success

The message window will show all information and shall be copied by the builder operator for his report.

All Cordonels displayed in green with the message of the “Cordonel password container added” will be contained in the safe. Be aware, a missing “FW-Update package” will disable the update capability for this Cordonel. Any error, which needs a user interaction, will be displayed in red! A “FW-Package” being used for a few Cordonels will only be attached once.

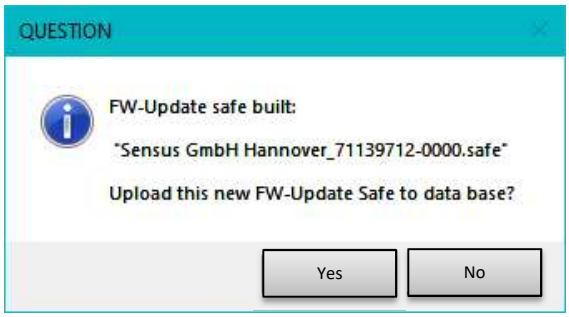


Figure 6.11 Build FW-Update Safe Success Message

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If at least one Cordonel is approved and all information for an update are collected, a safe is going to be build. If some Cordonels cannot be attached, this is displayed in red. A rebuild can be initiated or the critical device can be removed from the list (in Pre Build Summary) to keep the “Safe Build Report” error free. A newly generated “FW-Update Safe” with an identical name is going to overwrite the actual safe.

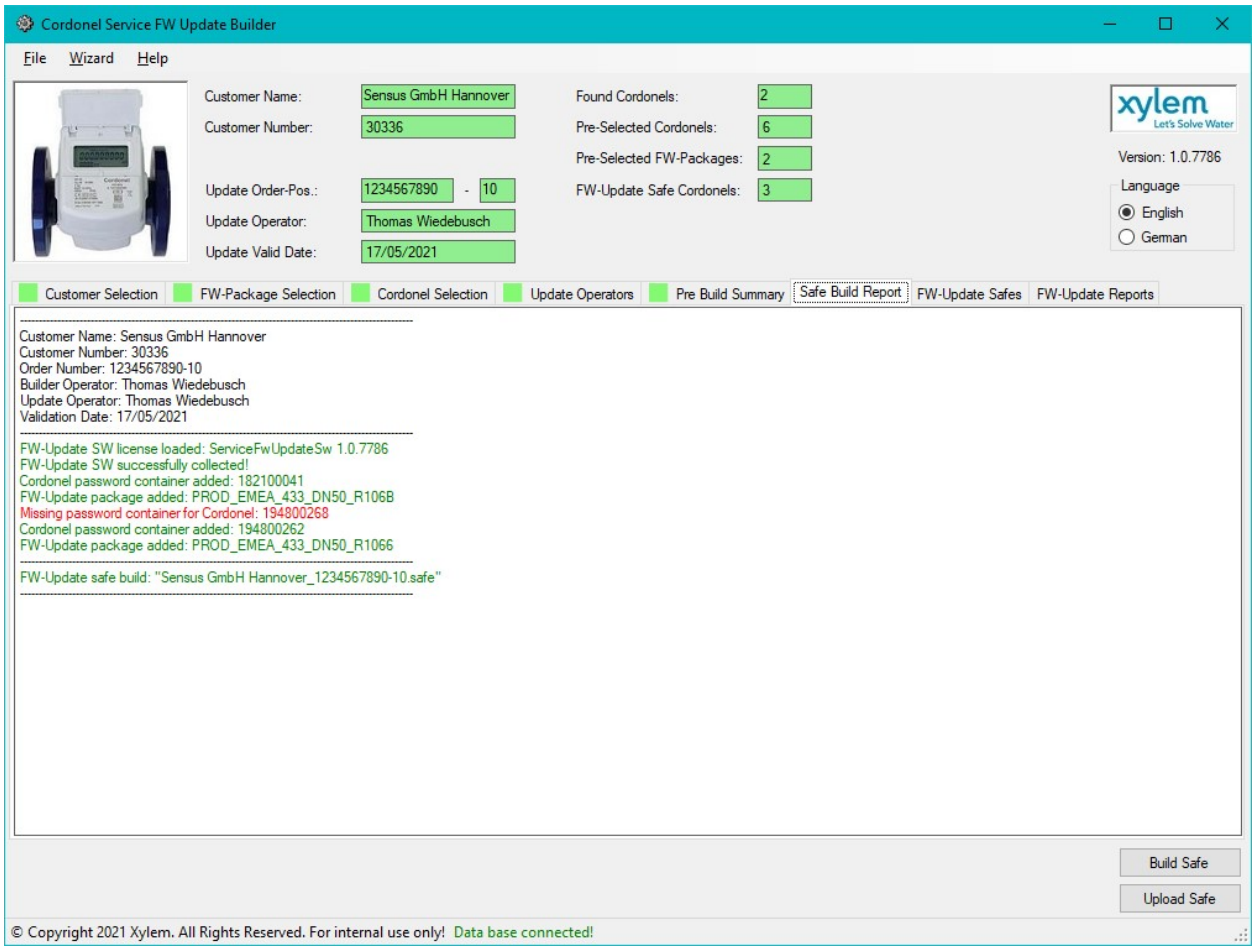


Figure 6.12 Build FW-Update Safe – Success – One Cordonel Missing

This safe can still be delivered to the Update Operator and used to update the attached Cordonels. All generated “FW-Update Safes” are stored in the

C:\[User name]\Downloads\FwUpdateSafe folder.

IMPORTANT NOTICE:

If this safe fulfils your expectations do not forget to press [Yes] button on the “QUESTION” window or the [Upload Safe] button before generating a new safe! Exclusively the last generated safe can be uploaded to the data base directly after the build process! If this is not done, the safes are only locally stored on the PC where the builder is running. Alternatively all safes can be delivered via SharePoint storage or other channels (USB-stick).

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6.10 Upload Safe

IMPORTANT NOTICE:

A safe has to have a unique name before uploading it to the data base. The need of several safes can be accomplished with an identical order number just increasing the position number. Before the upload, the safe can be overwritten as often as required until it fulfils the builder operator demands.

Only the latest created safe can be uploaded to the data base. Do not forget to upload this safe after generation!

REMINDER:

The Builder operator should copy the content of the “Safe Build Report” with [Ctrl] + [A] and [Ctrl] + [C] as commonly usual in all applications and put it to the TSC report to remind what he did and which devices have been added with which settings.

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7. Trouble Shooting

7.1 Data Base Not Connected

The “FW-Update Builder” needs a data base connection for license and operational issues. If it this connection cannot be established, the user interface is locked for further operation.

The missing data base connection can be observed in the status bar at the bottom of the main screen. A connection retry will be executed cyclically every 6 seconds.

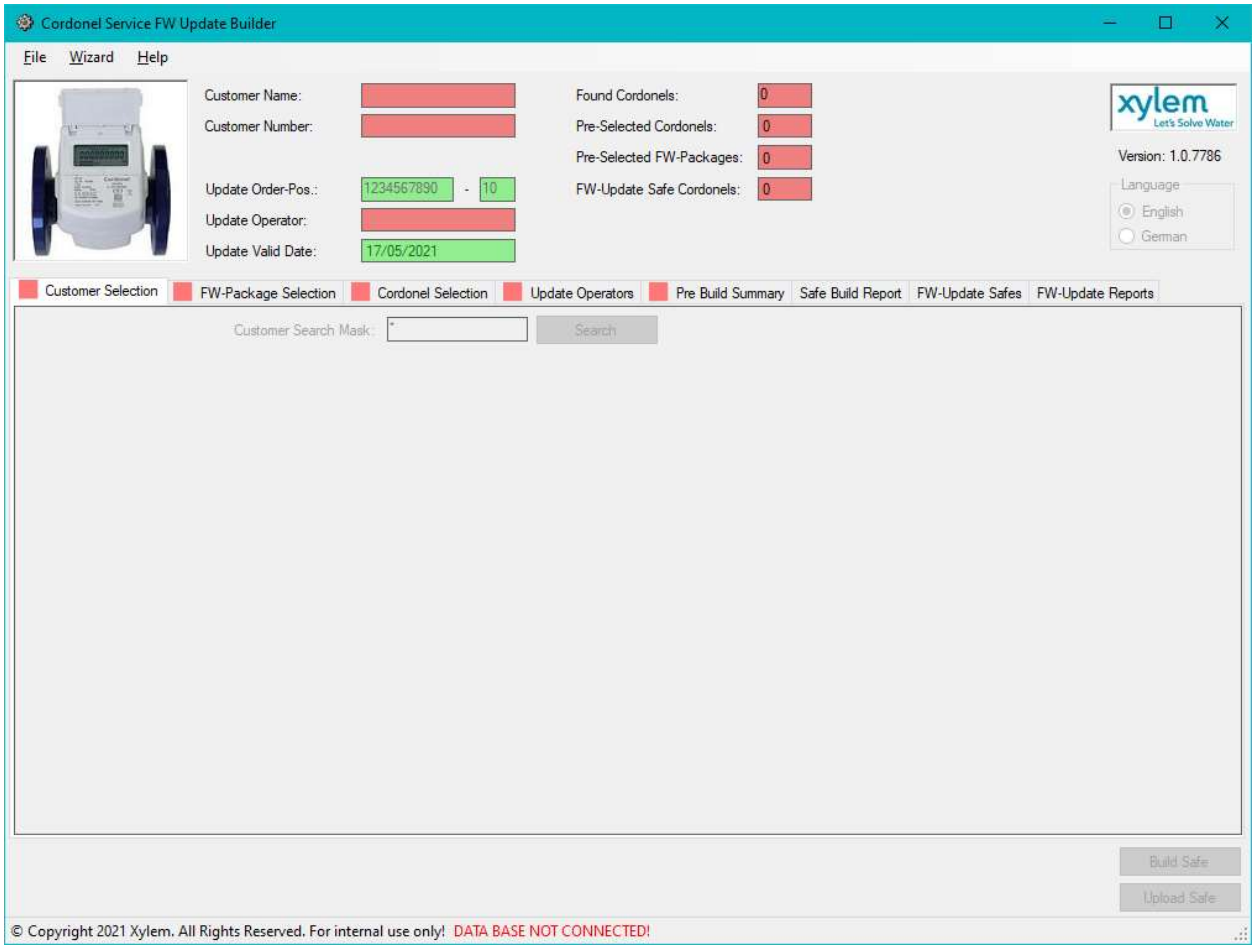


Figure 7.1 Data Base Not Connected

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7.2 Build Update Safe - Failure

If the “FW-Update Safe” cannot be build, messages are going to show the reason for that.

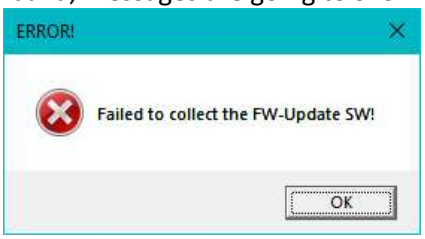


Figure 7.2 Build FW-Update Safe – SW Collection Failure Message

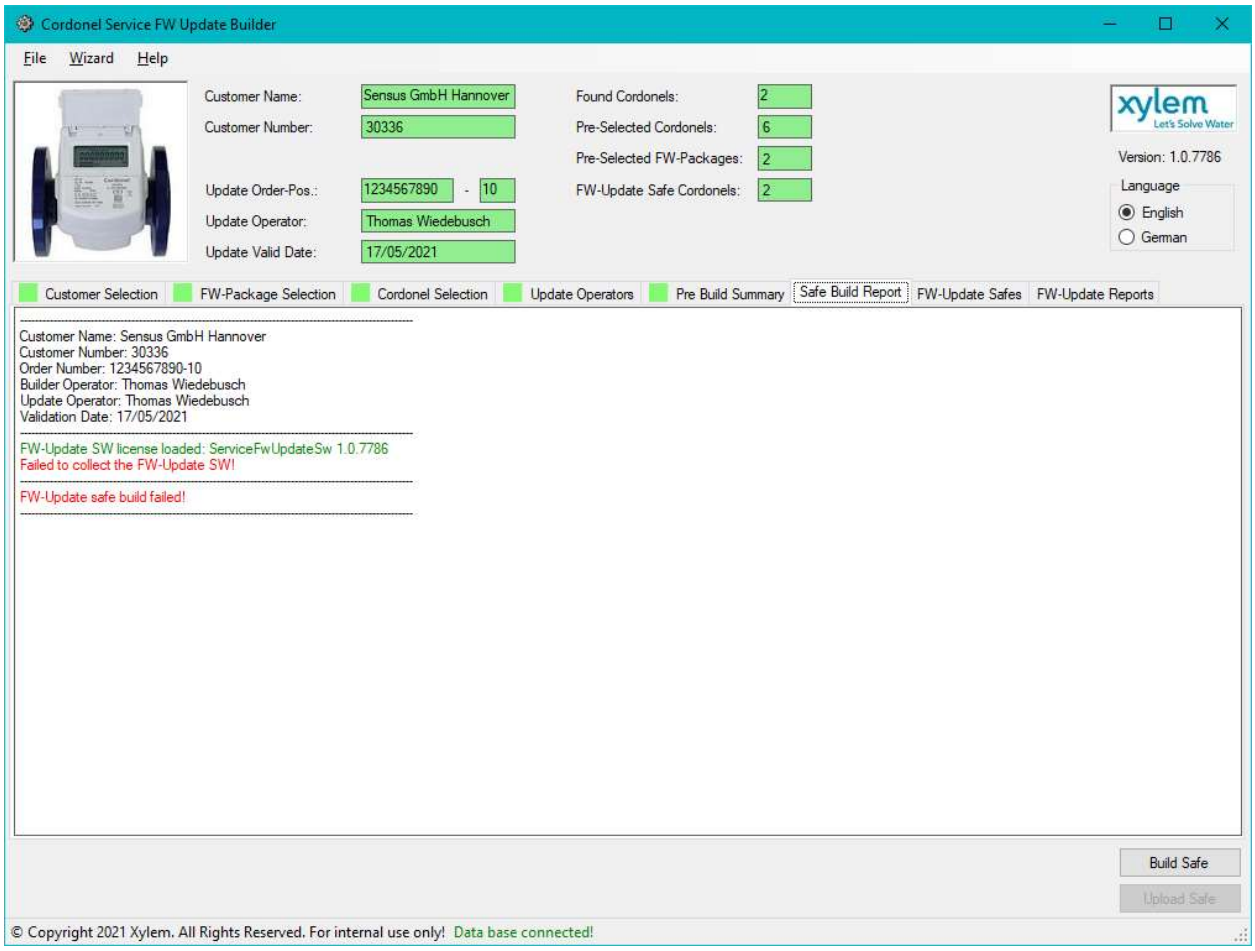


Figure 7.3 Build FW-Update Safe - Failure

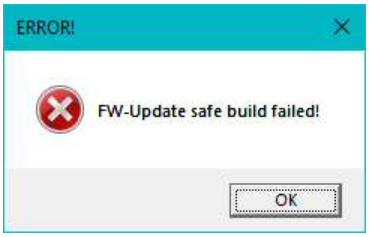


Figure 7.4 Build FW-Update Safe – Failure Message

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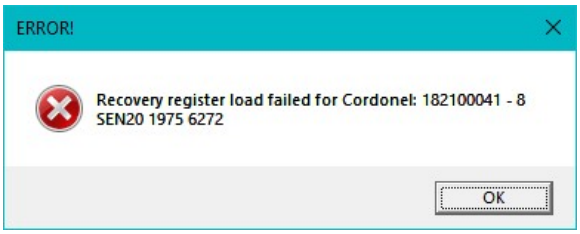


Figure 7.5 Build FW-Update Safe – Failure Message Recovery Registers Cannot Be Added

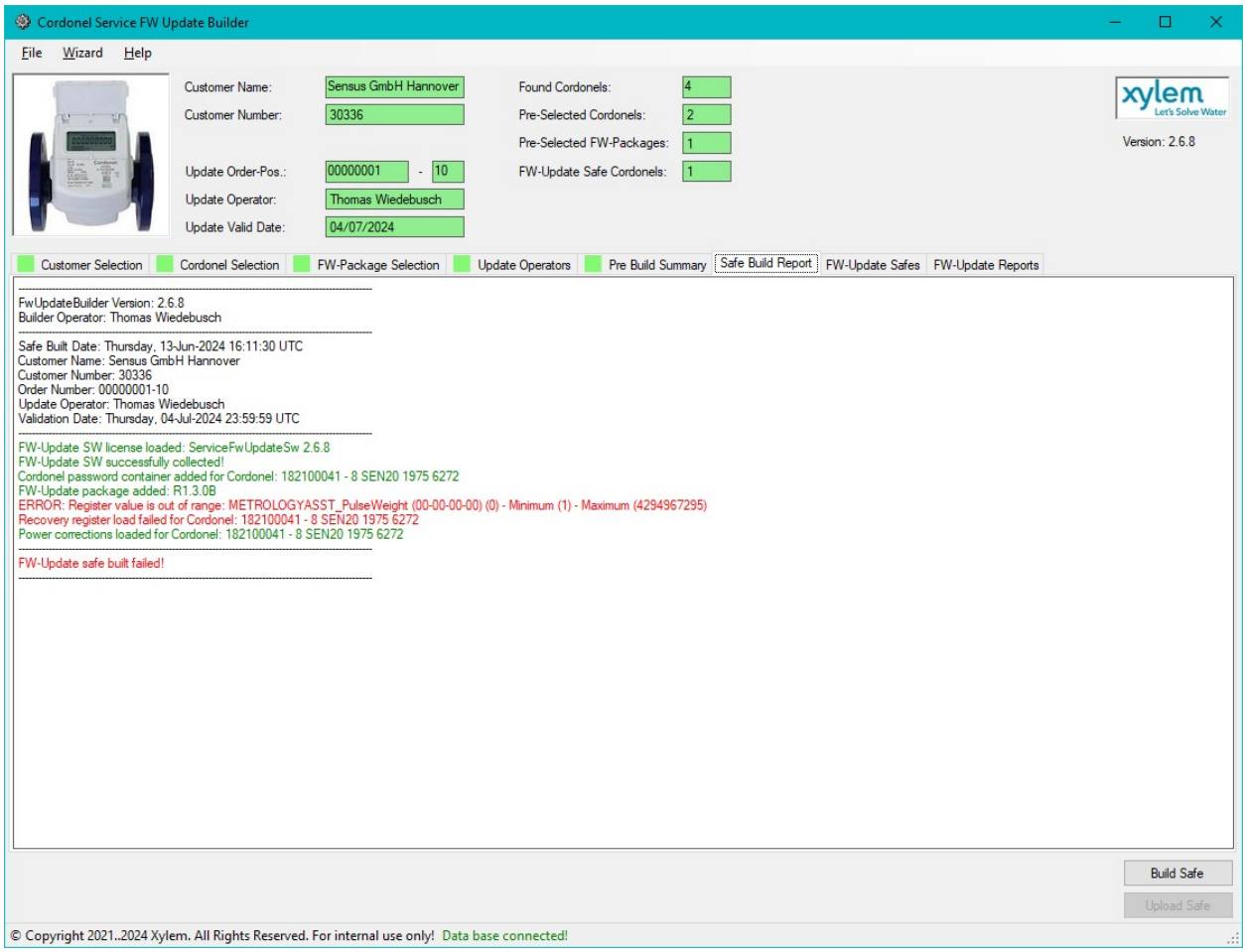


Figure 7.6 Build FW-Update Safe – DB Content is Wrong

The information window shows the content which cannot be added to the safe. In this case the DB needs to be corrected by the production team.

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8. Contacts

Name	Funktion	Contact
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Roland Drabesch	Lead - Software development	roland.drabesch@xylem.com +49 5102 743 225

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_SW] **Quick Reference Cordonel Service FW-Update Software**; *Published: SENSUS GmbH*; Author: Thomas Wiedebusch; Edition: Mar 2023 - Revision B

[FWU_LDR] **Quick Reference Cordonel Service FW-Update Loader**; *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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