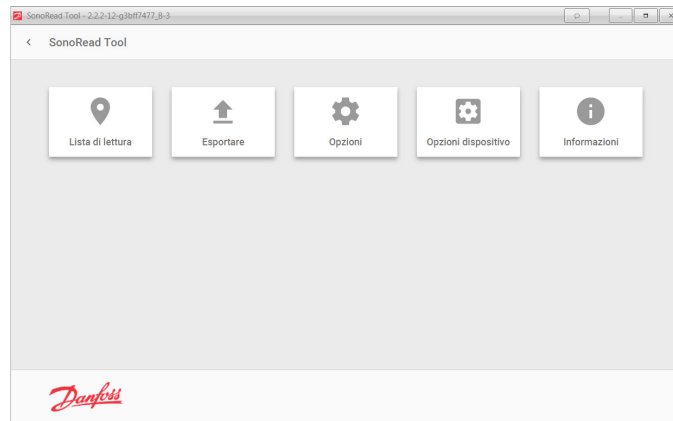


## Operating Guide

# SonoRead Tool Software



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## 1. Introduction

**SonoRead Tool** software permits remote reading of the data from Danfoss SonoHCA radio devices. For this purpose, the SonoRead Tool software works with the SonoRead 868 radio modems.

The list of devices to read is saved in a road file in XML format. The road files can be created or modified directly using the SonoRead Tool software.

This software runs on computer or tablet with Windows OS.

This document gives important information about the installation and use of the SonoRead Tool software.

### 1.1 Main characteristics

A road file contains a list of tasks organized in groups of subgroups. The SonoRead Tool software can only work on a single road file at a time, but several can be stored with easy transition from one road file to another.

The data produced by performing the task (read) are inserted in the road file. The file is updated when the task is completed. The road file is automatically saved whenever its content is changed.

Tasks can be performed individually or in groups.

The road files – in xml format – can be read and changed using a simple text editor. Most databases include export and import functions in xml format.

In addition, a road can be created or changed using the SonoRead Tool software. A task or a group can be added, changed, deleted or reinitialised.

The SonoRead Tool software can be translated into other languages. For further information about the translation tools, please contact Danfoss directly.

The SonoRead Tool software works with the radio modem SonoRead 868.

SonoRead Tool software connects to the modems using Bluetooth.

### 1.2 References

[1]**Open Metering System Technical Report 03, XML-Key Exchange**, Issue 1.0.2 / 2015-10, available at:  
<http://oms-group.org/en/download4all/technical-reports/>

## 2. Installation procedure

The **SonoRead Tool** software can be obtained by contacting your local representative.

### 2.1 Minimum requirements

The following equipment is needed to run the SonoRead Tool software:

- PC computer or tactile tablet with: Windows 7 32/64 bits operating system
- 2 GB memory
- Screen resolution: 1024x768 pixels
- Bluetooth connection if used with SonoRead 868

It is advisable to have:

- A SonoRead 868 radio modem to perform tests
- Internet access to update the software

#### **Remark for Windows 10 users:**

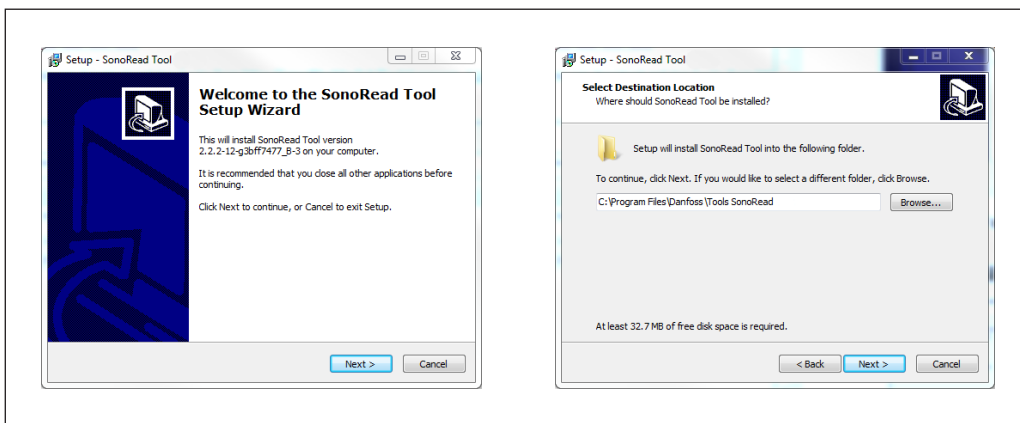
*The generic COM ports provided by the integrated driver of Windows 10 aren't always working. It can be necessary to install the manufacturer Bluetooth drivers to create a COM port which work with the SonoRead Tool!*

## 2.2 Installation of the SonoRead Tool software

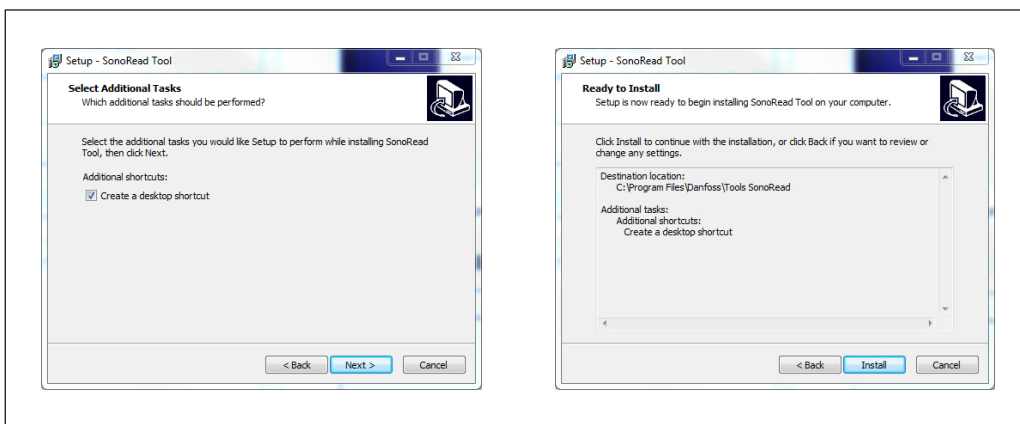
The **SonoRead Tool\_<version>.exe** file launches the installation of the **SonoRead Tool** software.

Procedure to install the application:

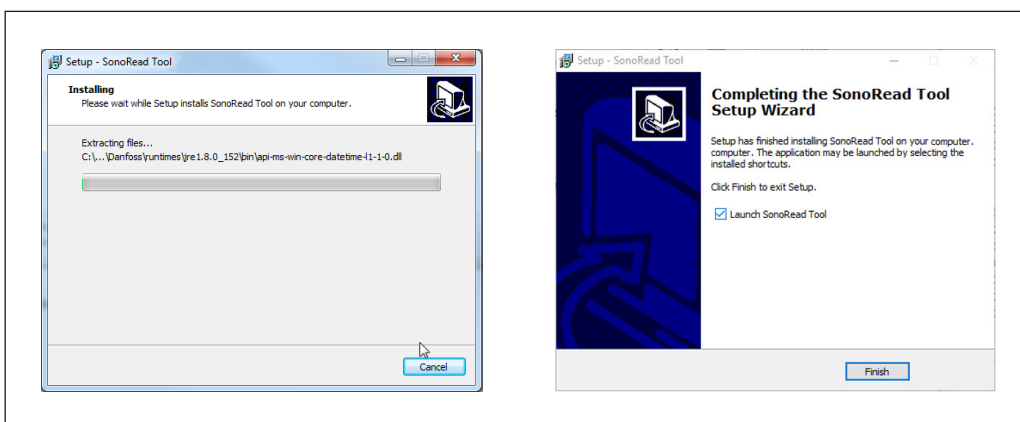
- Double click on the **Setup.exe** icon to launch the installation program.
- The installation help window "Setup – SonoRead Tool" will now appear.
- Define the installation path and validate with the **Next** button.
- If the installation directory does not exist, press the **Yes** button to create it.



- Installation of a shortcut on the desktop.
- Press the **Install** button to start the program installation procedure.



- The files are now being installed on the PC computer or tactile tablet.
- A window will show you when the installation has been completed.



When you click on the **Finish** button, the SonoRead Tool software will be launched automatically.

## 2.3 SonoRead Tool update

An automatic check for updates done at the start-up can be configured using the **Settings** tool.

You can also check for updates manually in: **About → Check for updates**.

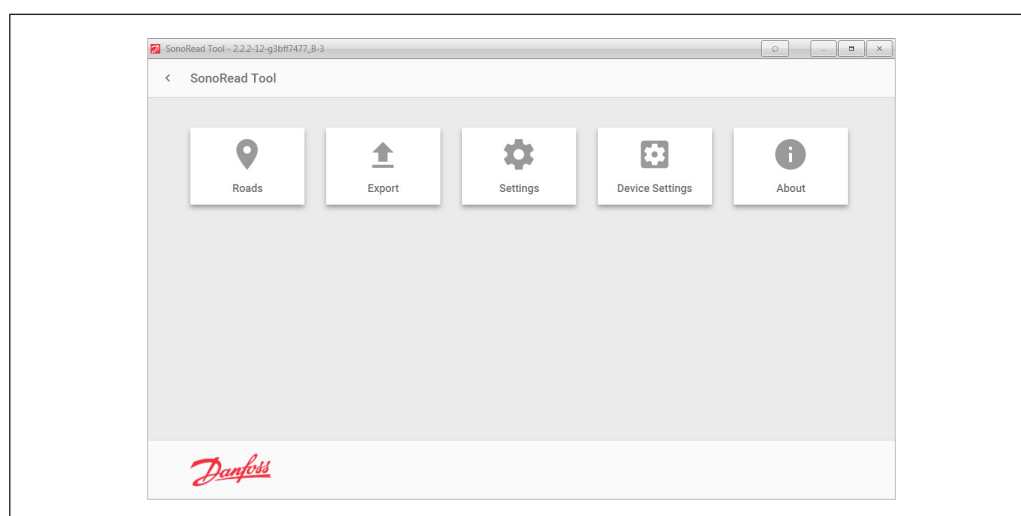
When the installation file for a new release has been downloaded, simply follow the installation procedure described above. There is no need to uninstall the old release. When the **SonoRead Tool** software is uninstalled, the data (roads, user preference) will be kept in the respective directories.

## 3. Software structure

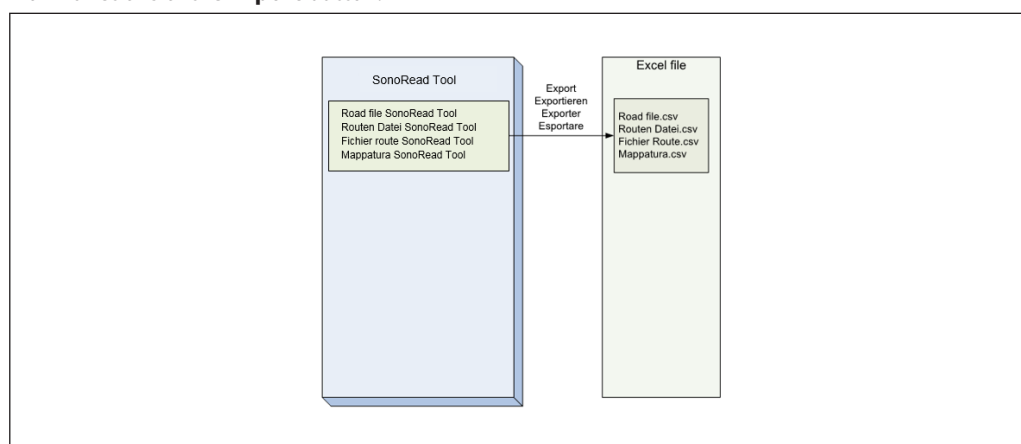
Launch the software with the **SonoRead Tool** shortcut created during installation.

### 3.1 Main screen

The **main menu** of the SonoRead Tool software enables one of the available tools to be chosen. Select the tool by clicking on the appropriate button in the main window.



Main functions of the **Export** button:



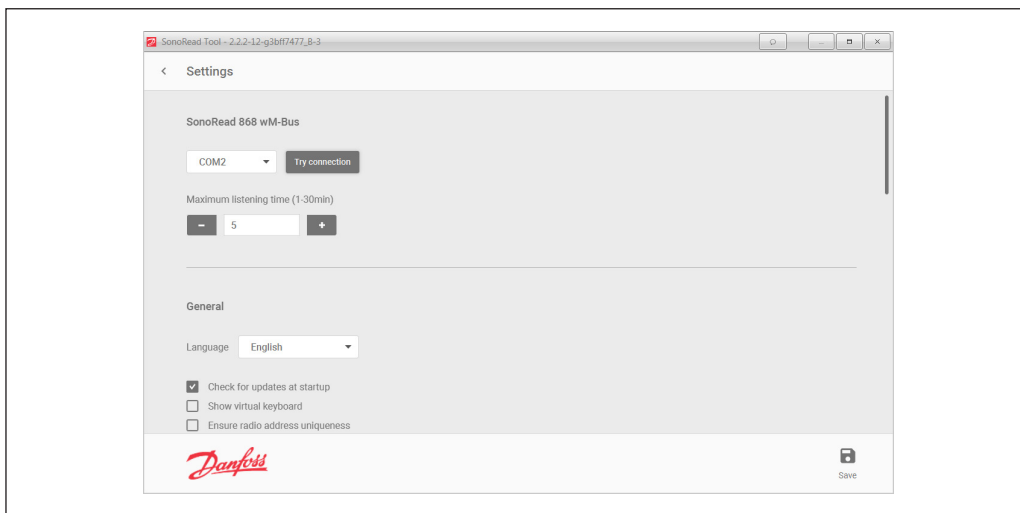
### 3.2 Settings tool

The **Settings** tool defines the SonoRead Tool user parameters. Settings are grouped into the following sections:

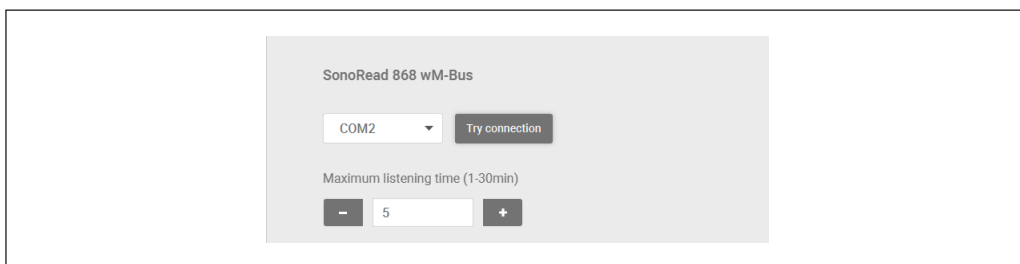
1. **SonoRead 868** settings
2. **General** settings
3. **AES key** settings
4. **License** settings

To save the changes please use the **Save** [1] button.

To return to the main software menu, click on the **Back** [2] button.

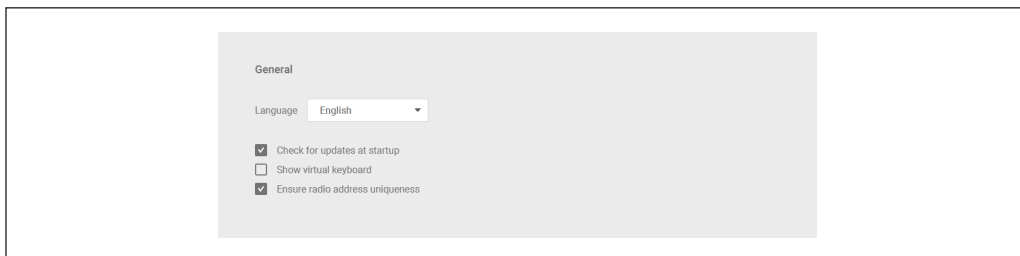


#### 3.2.1 SonoRead 868 wM-Bus



- **COM port**  
Define the communication port to which the SonoRead 868 radio modem will be connected. Select the COM port to be used and press the Try connection button.  
If successful: "Connection succeeded!", if the connection failed: "Unable to connect!"
- **Maximum listening time**  
Defines the maximum time in minutes the SonoRead Tool waits messages from the wM-Bus devices that are scheduled to be read. The time must be between 1 and 30 minutes.

#### 3.2.2 General



- **Language**  
Enables the display language to be chosen. A restart of the SonoRead Tool is mandatory for full support of the selected language.
- **Check for update at start-up**
- **Show virtual keyboard**  
Check/uncheck the box.
- **Ensure radio address uniqueness**  
When adding or editing a task, the SonoRead Tool will check that the entered radio address and task type (read/parametrization) combination is not already present in the current road.

### 3.2.3 AES Key

This section configures the encryption key settings. There are two main ways to handle the encryption keys:

#### 1. Global encryption keys

With global encryption keys, groups of installed devices share the same encryption key (e.g. different key based on the device type). SonoRead Tool supports three global keys and if defined, they are all tried when encrypted data is received from a device.

#### 2. Individual encryption keys

With individual keys each device can have its own. This mode is activated when the encryption key database is enabled in settings. When a device is read out, the possible individual keys are tried first before the global AES keys. Each parametrize task which programs the encryption key to the device will also add the key's information into the database. In addition, SonoRead Tool supports import and export of the individual encryption keys using the OMS Key Exchange format [1]. It is possible to import new encryption keys into the database with a OMS Key Exchange format file. You can also export all the keys from the database into an OMS Key Exchange file.

With AES key settings you can define the default encryption keys that will be used to decrypt any data received from a device. In addition, you can enable the encryption key database to allow individual keys for each device as well as import and export of these files.

- **AES Key 1 (default)**
- **AES Key 2**
- **AES Key 3**  
AES 128 encryption key values. If a Danfoss product (e.g. SonoHCA) uses an AES encryption key, fill up one of the fields with the value of the key to visualize data. All the keys will be tried to decrypt the encrypted data.  
AES Key 1 will be used as the default key when a new parametrization task is added to a road.
- **Use Encryption key database**  
Check/uncheck the box to enable/disable internal encryption key database. Each device has its own individual encryption key when the database is enabled.
- **Database location**  
Shows the location of the internal encryption key database. You can select another location with the Browse button. If the selected

location is a directory with an existing database, it will be opened. If the selected directory is empty then a new database will be created. If multiple users share a common database then, all users need to be able to write to the selected location.

- **Status**  
Displays the status of the encryption key database. When in use it should read "Database opened normally".
- **Default import/export key encryption key**  
In the export and import files all encryption keys are wrapped together, this field defines the default value of the key encryption key.
- **Import**  
Pressing this button starts the import of a OMS Key Exchange file into the database, see chapter 3.2.4.1 for details.
- **Export**  
Pressing this button starts the export of all keys in the database into an OMS Key Exchange file, see chapter 3.2.4.2 for details.

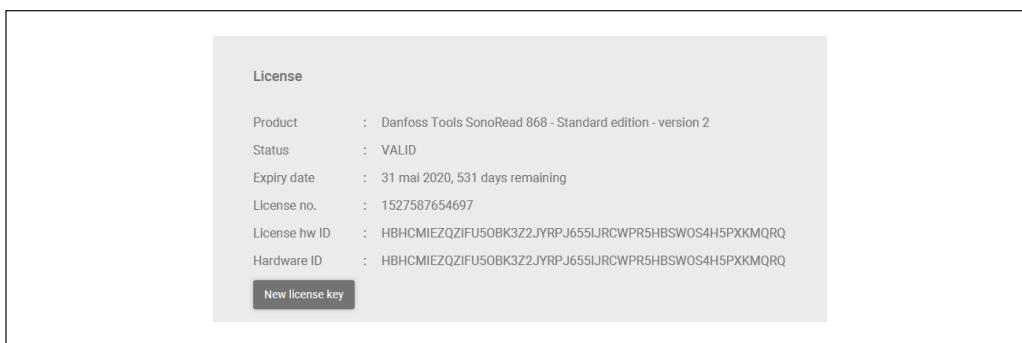
#### 3.2.3.1 Importing an OMS Key Exchange file

- Press the **Import** button
- A file selection dialog will open; select the OMS Key Exchange file you would like to import. **If the signature validation fails for the selected file a confirmation dialog will be shown.**
- A new dialog will open; give the key encryption key that was used to create the file and press Import button on the dialog.
- Once the import is complete, a message dialog is opened with information about how many devices and keys have been imported. Pressing OK on the dialog completes the import process.

#### 3.2.3.2 Exporting to an OMS Key Exchange file

- Press the **Export** button
- A file selection dialog will open; select the directory and file name for the OMS Key Exchange file.
- A new dialog will open; give the key encryption key to be used and press the Export button.
- Once the export is complete a message dialog will be opened with information about how many devices and keys have been exported. Pressing OK on the dialog completes the export process.

### 3.2.4 License



This section shows information about the installed license and allows installation of new license key.

- **Product**  
Displays product, edition and version information contained in the currently installed license.
- **Status**  
Status of the installed license, it should normally be **VALID**.
- **Expire date**  
Expire date of the current license and count of the remaining days from the current date.

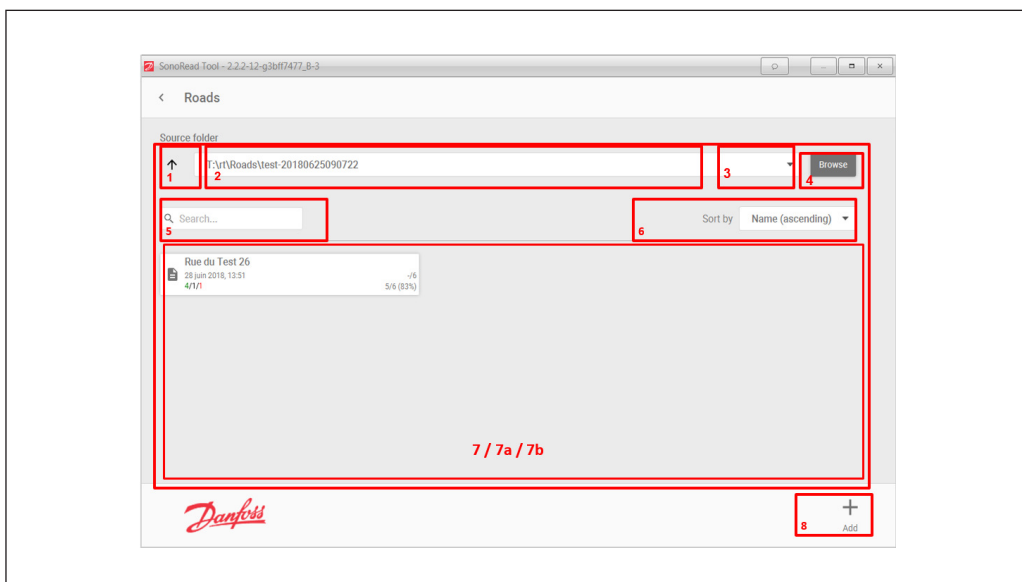
- **License no.**  
License number of the installed license.
- **License hw ID**  
Unique hardware ID stored in the license.
- **Hardware ID**  
Unique hardware ID of the PC/Tablet running the application.
- **New license key**  
Pressing this button starts the activation process for a new license key.

## 3.3 Roads tool

### 3.3.1 Roads overview (start page)

SonoRead Tool can manage several roads at the same time. When starting the tool "Roads", an

overview of all roads available under a specified folder is given.



There are different functions for managing the roads:

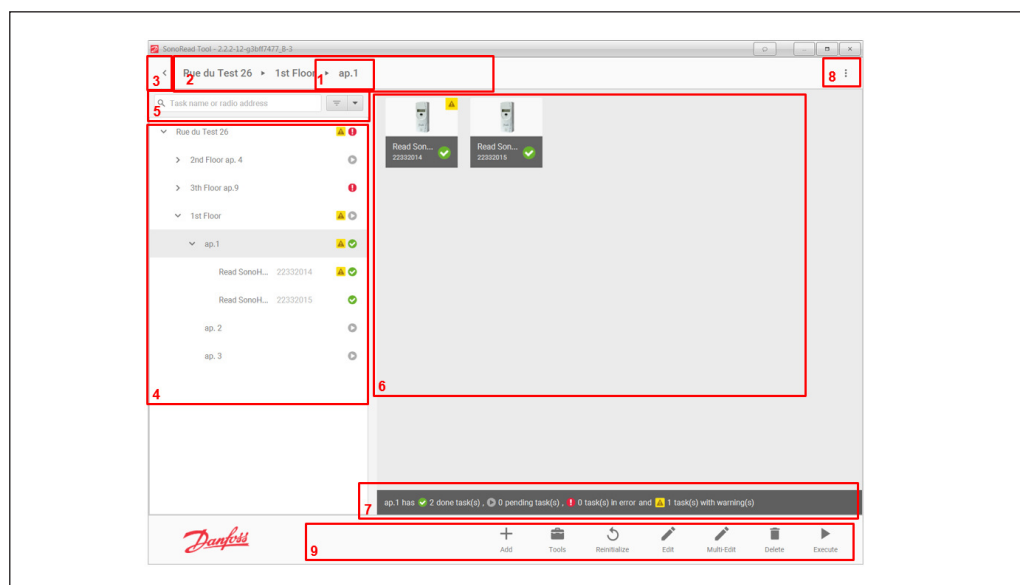
1. **One level up**  
Navigates one level up in the folder structure.
2. **Present location**  
Shows the path to the actual position.
3. **Last locations**  
Shows the last used folder locations.
4. **Browse button**  
To navigate through the folder structure.
5. **Search Field**  
For searching a road within the actual folder.

6. **Sorting Field**  
Classifies the Roads after changing the name or date.
7. **Roads and subfolders in Folder**  
This area shows subfolders [7a] and all or filtered roads [7b] in the actual folder.
8. **Add a new Road**  
This button allows to add a road in the actual folder [2].

See also chapter 4.1 for best practices how to organize the road files.

### 3.3.2 Managing a chosen Road

When a road is chosen in the Roads overview, a new view opens and shows the different possibilities for managing a Road.



#### 1. Present location

Indicate the name of the element which is currently being displayed (**known as "context"**).

#### 2. Full location

Shows the parent elements of the context.

#### 3. Back button

Return to the road selection page.

#### 4. Tree View

Represents the road structure in tree form.

#### 5. Search Field

Input a search string to find one or more elements in the Road.

#### 6. "Tile" view

Displays the content of the context (tasks and/or groups)

Colour/icon symbols:

❗ : element error

⏸ : element not performed

✅ : element performed

#### 7. Group summary

Provide information about the state of the tasks in the selected group.

#### 8. View Options

Selects which information and warning should be displayed.

#### 9. Control bar

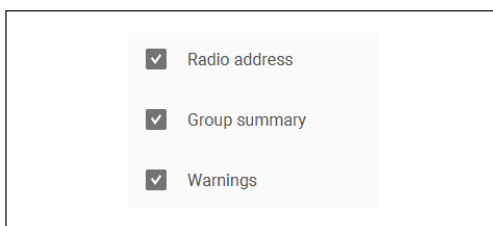
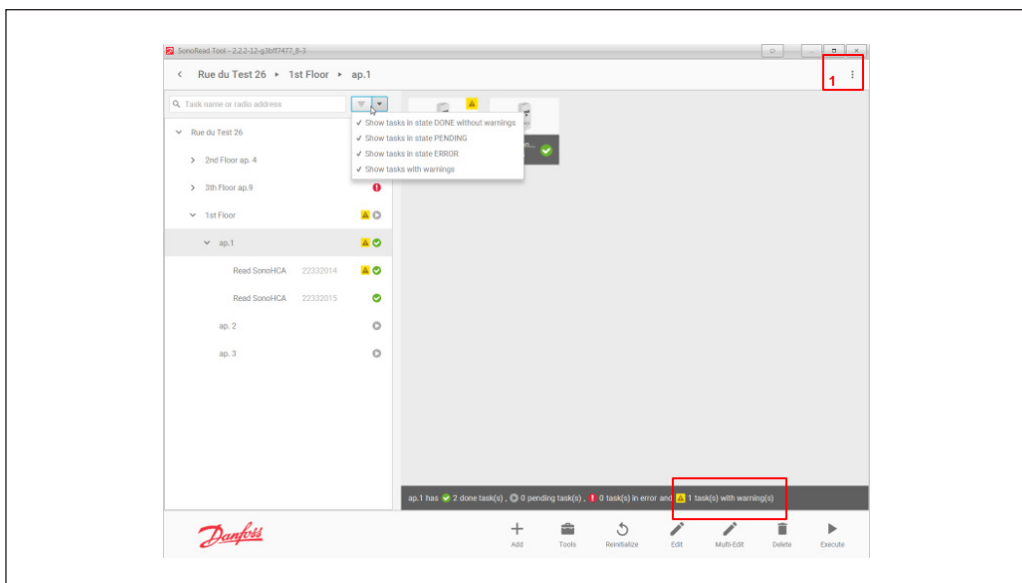
Contain the actions available in the context.



### 3.3.3 Searching and filtering tasks in the road navigator

Tasks in a Road can be searched and filtered by DONE, PENDING, ERROR and Warnings. Optionally, the Radio Address, Group Summary

and Warning icon can be displayed. For changing the view, use the menu View Options [1] in the top right corner of the road navigator.

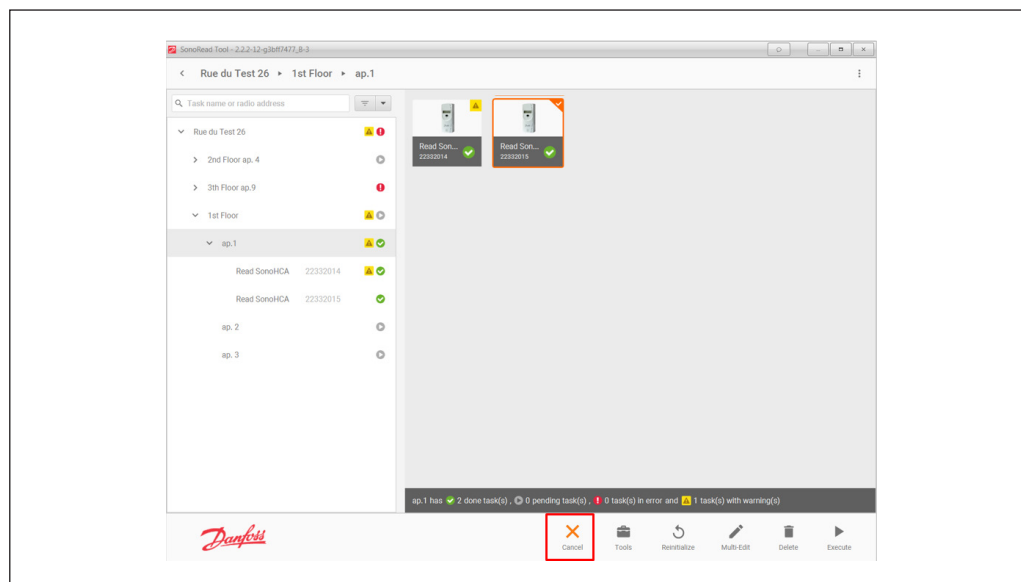


**View Options:** In this pop-up window (button is placed at the top right corner [1]) you can choose which information and warnings should be displayed in the tree view and in the group summary.

### 3.3.4 Selecting multiple items

In the **Tile view**, you can enter a multiselection mode by pressing **Ctrl** and clicking one of the tiles or by holding the left mouse button down on top of a tile for more than one second. On touch screens, multiselection mode is activated by touching one tile for more than one second. Once multiselection mode is activated, you

can add or remove tiles to/from the selection by clicking/tapping them. Selected tiles are marked with a bold border and a check mark on upper right corner. When the multiselection mode is active the control bar has an additional **"Cancel"** button, pressing this button ends the multiselection mode.



### 3.3.5 Create a new Road

**Remark:**

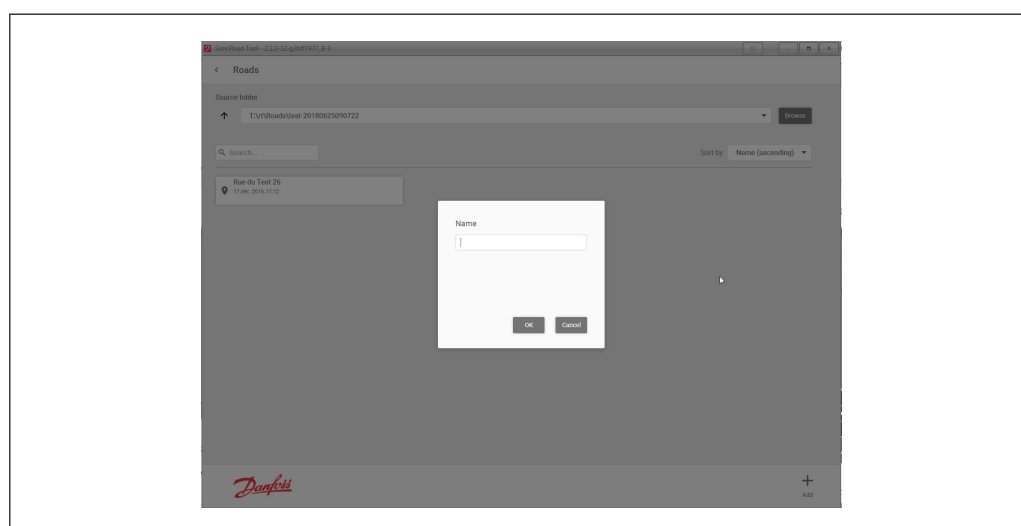
We advise you to create two separate road files in every case (one file containing the parameterization tasks and the other with the reading tasks). See also chapter 6.1 for best practices on how to organize the road files.

Road storage location:

- Click the **Browse** button to select a new location for the road files.

Select the **Road** tool and click on the **Add** button.

Define the name of the new Road file and press OK to validate:



### 3.3.6 Add a group or a task (device) to the road

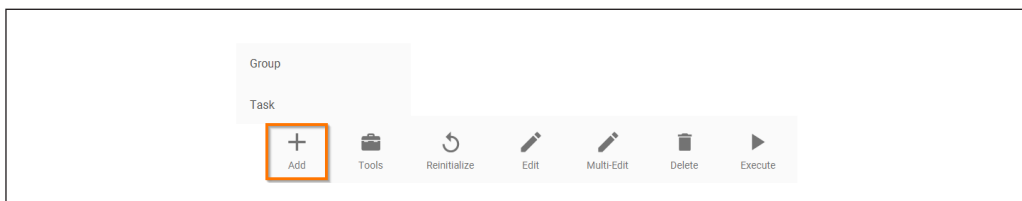
**Remark:**

Each device has its own tasks which can be chosen from the **available tasks** list.

To add a task (read a device) to a road file, you must select the road file and go to the desired location in the road file.

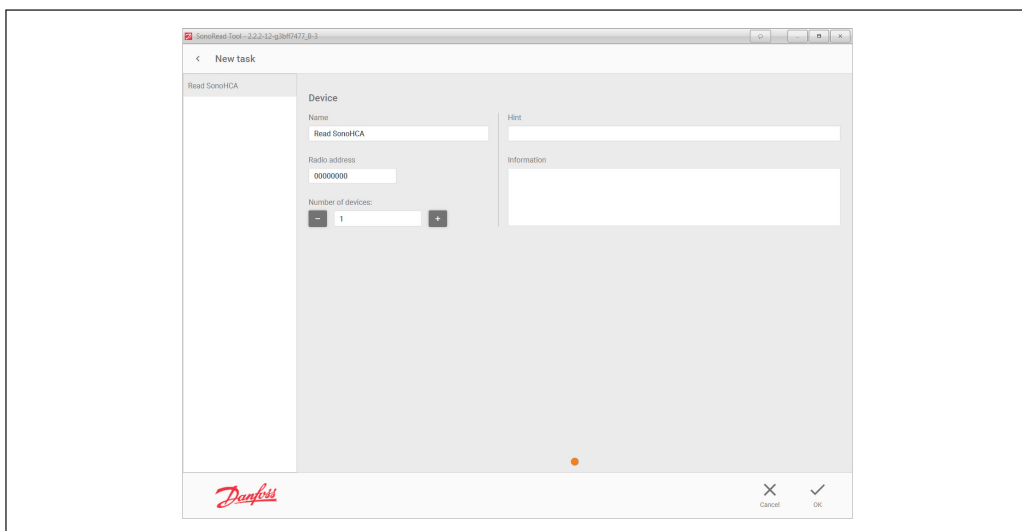
Click on the Add button to create:

- A new group, click on the Group button.
- A new task, click on the Task button.



The new group/task will be added to the selected group. To add a task to a group, just select it before adding a new task.

The list of products as a function of the selected task (reading) will be displayed in the available tasks list window on the left-hand side.



Select a device from the list. A new window will appear. This window will enable certain values of the selected device to be initialised.

Here is an example for the SonoHCA device:

- **Name**  
The title of the task can be changed.
- **Radio address**  
Enter the radio address corresponding to the device. The radio address is the same as the serial number of the device.  
By scanning the QR code of the product or its bar code with a bar code reader, the scanned serial number will immediately be copied into the "Radio Address" field.

- **Device number**  
If the number is 1, one task will be added. If the number is incremented, the amount of tasks will be added (for instance Read SonoHCA), the radio address will also be incremented consecutively in the road structure.

From now on, the device will be present in the road structure.

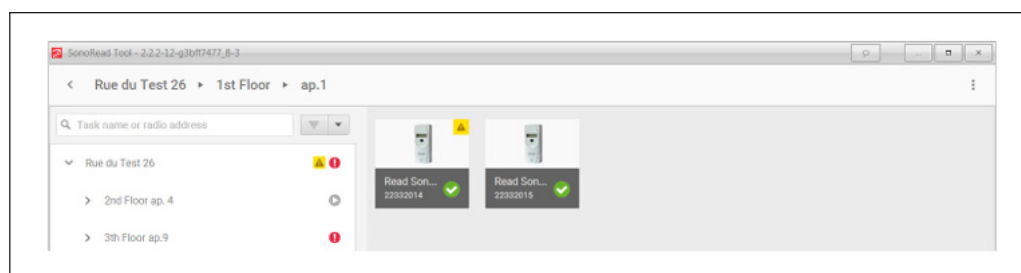
### 3.3.7 Display the state of a task

A reading task may be in 3 different states:

- ✔: Task successfully performed. Symbolised by a green check mark.
- ❗: Task performed with an error. Symbolised by a red exclamation mark.
- ▶: Task not yet performed. Symbolised by a grey play symbol.

To display the properties of a task just click on the desired task.

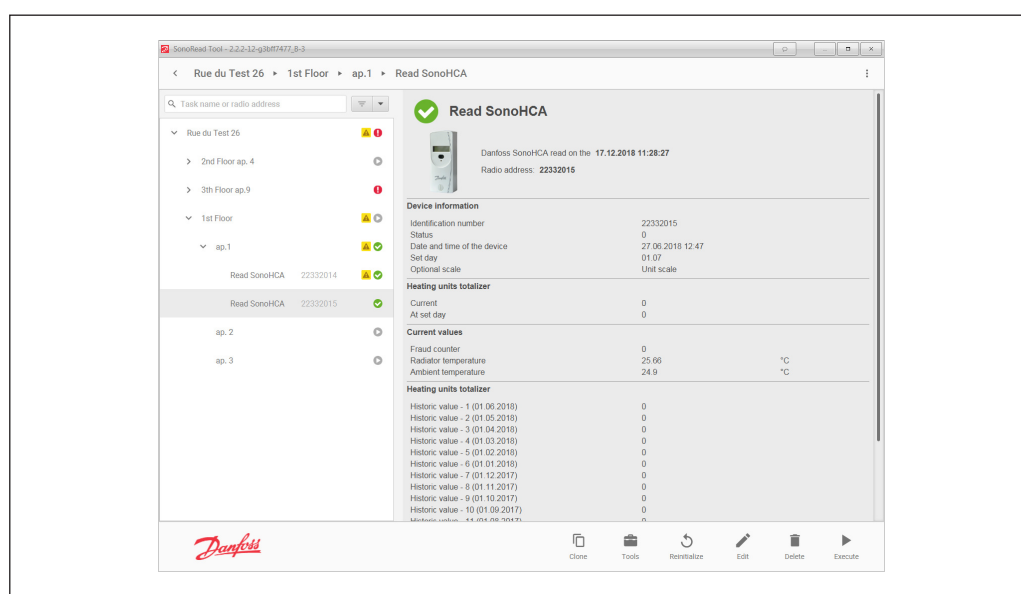
### 3.3.7 Display the state of a task (continuous)



The task properties are displayed in a new screen.

Task successfully performed with a warning.

Data available for the device which has been read. A warning for the device is shown in the top.



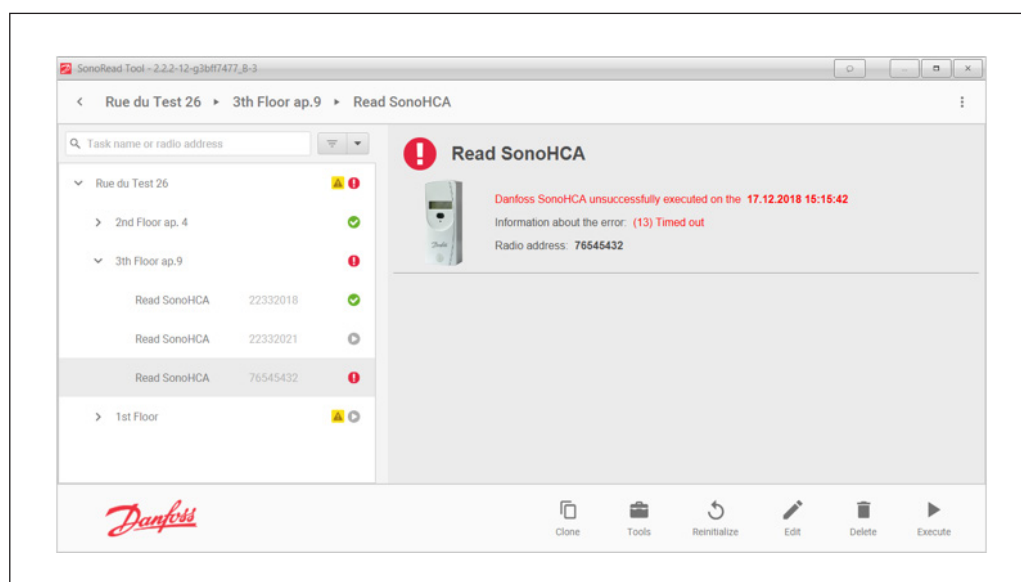
Task performed with an error.

Data not available for the device read.

#### Remark:

The type of error is displayed in red.

See Chapter 3.3.11 List of error messages



### 3.3.7 Display the state of a task (continuous)

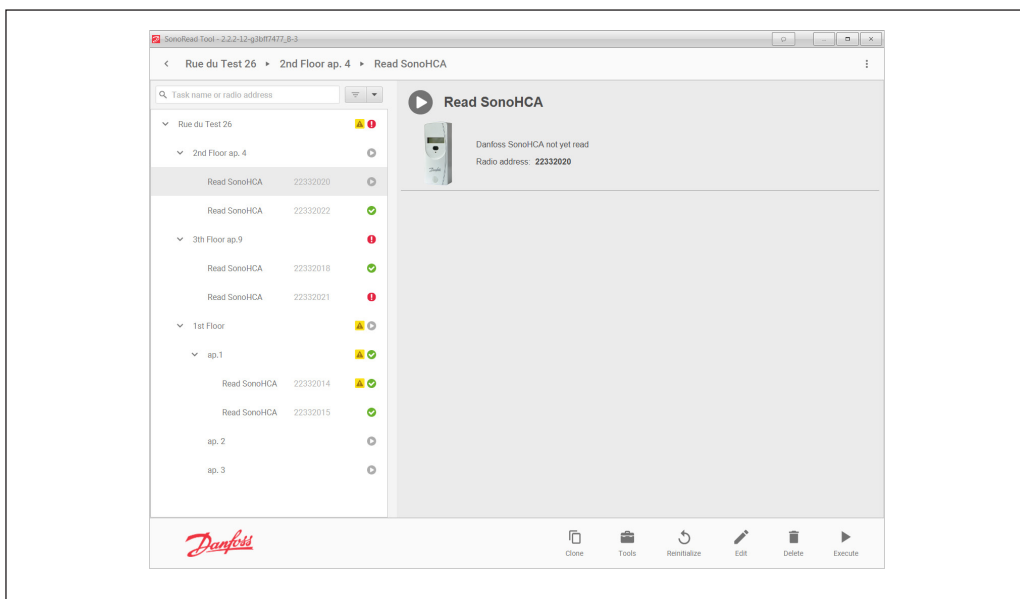
Task not yet performed.

The data for the device read are not yet available.

**Remark:**

The tree view of the road structure shows the state of the tasks:

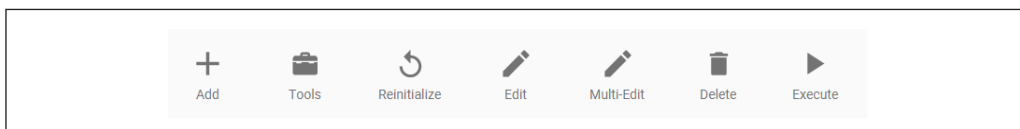
- ❗ Groups containing at least one task performed with an error have an exclamation mark.
- ✅ Groups which only contain tasks successfully performed have a green check mark.
- ⏮ Groups which have not yet been performed have a grey play symbol.



### 3.3.8 Change an existing road file

Go to the desired location and select the desired road file.

The following control bar enables the road file to be changed:

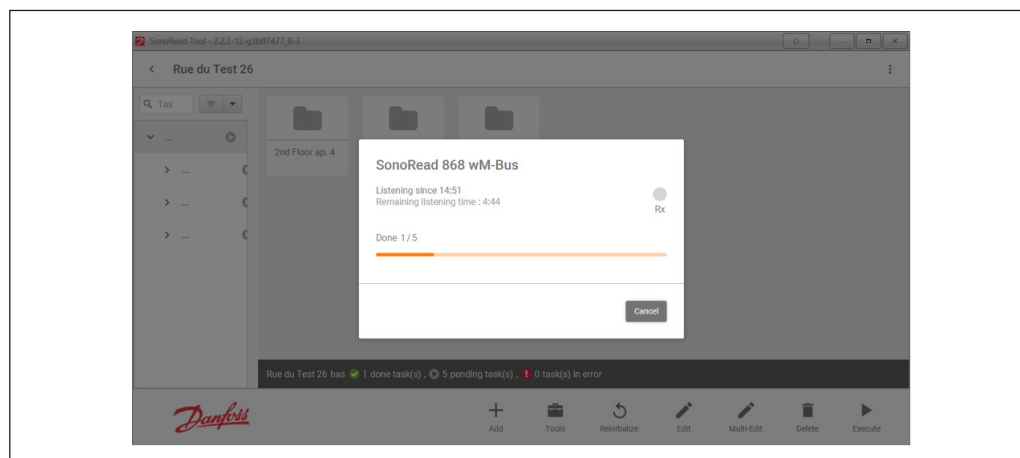


- **Add**  
Enables a new group or task to be added.
- **Tools**  
This contains a menu with copy/paste. Copying of a task or a group is possible. You can also paste the copied element(s) either into the same road or to another road.  
  
**Hint:** Copy/paste function depends on the setting of "Ensure radio addresses uniqueness" in the General Settings (see chapter 3.2.3). If it's enabled, it will prevent pasting a copied element within the same road.
- **Reinitialize**  
A task successfully performed cannot be performed again.  
To perform this task again, it must first be reinitialized by clicking on the **Reinitialize** button. That action erases the data from the previously read XML file.
- **Edit**  
If the task to be edited contains data from a reading, the data will be erased.  
Editing a group enables the group name and the information field to be changed.  
Editing a task enables the task name, radio address, the data to be read and the information field to be changed, depending on the device type.
- **Delete**  
Delete the selected group/task.
- **Execute**  
Select a group or a task and click on the **Execute** button.  
To execute all tasks not yet completed in a particular group, just select the desired group before pressing the **Execute** key.

### 3.3.9 Execute a task

A pop-up window indicates the progress of the current execution. This window disappears as soon as the current execution has been completed.

The LED in the SonoRead 868 radio modems indicates the state of the reading task.



The window of the SonoRead Tool software contains the following information:

- Done: X / Y      error(s): Z  
X: tasks performed successfully.  
Y: total tasks to be performed.  
Z: tasks performed with an error.

Remaining listening time: time remaining to receive messages from wM-Bus devices.

**Remark:**  
To stop the reading process, press the **Cancel** button.

### 3.3.10 Warnings

The warnings inform the user of problems experienced with the radio devices during a radio reading.

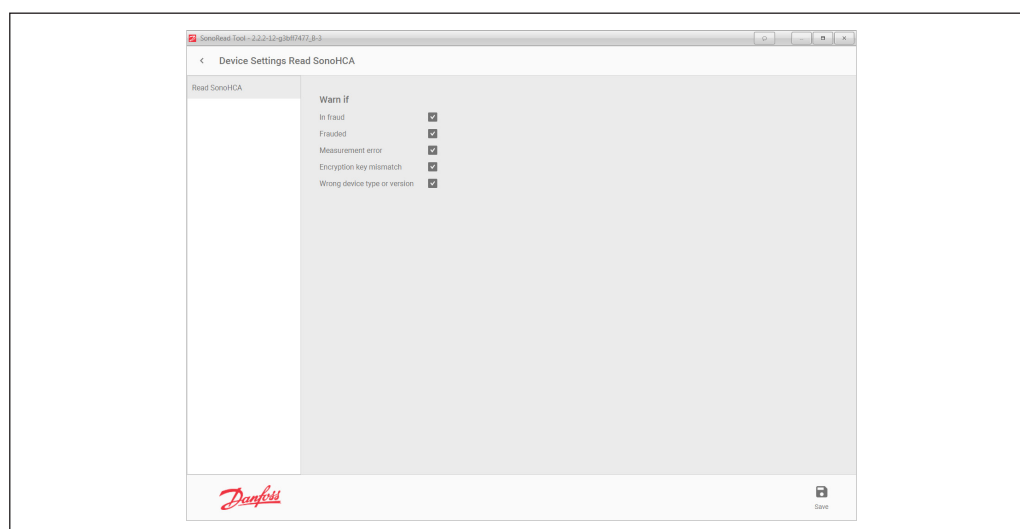
If an error has occurred and this corresponds to the type of warning chosen, a warning message will be automatically displayed on the road navigator or in the radio device properties.

#### 3.3.10.1 Select or deselect warnings to be verified

Several types of warnings can be activated or deactivated for every Read task.

To define the warnings activated, please use the Device Settings tool and check or uncheck the available warning items for every Read task.

Only the checked warnings will be displayed on the road navigator in the event of an error.



The warning messages of all the devices are verified after each reading.

The warnings correspond to an interpretation of the Error states of the devices read.

The type of warning is displayed when the property of a task is shown.

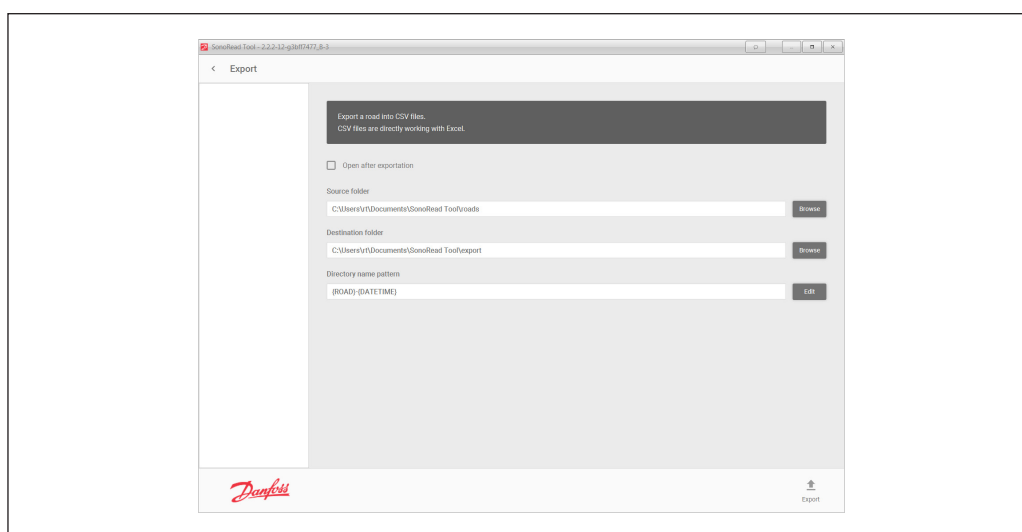
### 3.3.11 List of error messages

List of error messages which may appear when a task is displayed:

- **Codec error:** value of an M-bus field could not be decoded.
- **Radio communication error:** contact between the device and radio modem cannot be established.
- **Cannot contact radio modem SonoRead 868:**
  - SonoRead 868 is not switched on.
- Wrong COM port.
- The Bluetooth communication is disturbed by a WIFI signal, switch off the WIFI function of the PC computer or tactile tablet.
- **Operation not supported:** parameter writing is not supported on the device.
- **Internal error:** indicates any other internal error of the application (consult the log for further information).

## 3.4 Export tool

The **Export** tool enables to convert a xml road file into a CSV type file.



### 3.4.1 Export characteristics

The **Export** tool extracts from the xml file (road file) the values of each device read by the SonoRead Tool software. The **Export** tool will generate various files with the extension ".csv" which can then be used by clients to establish a billing or verification system.

For each column, a heading will be added automatically to obtain a more detailed description of the displayed value.

**The language** of the column heading will correspond to the language used by the SonoRead Tool software.

The generated CSV file will be opened automatically by the "Microsoft Office Excel" software.

During the exportation process, the

SonoRead Tool will create a new folder with the corresponding name pattern defined in **Directory name pattern**. You can only enter standard authorised directory characters, plus the following special tags:

- {ROAD} Name of the exported road.
- {DATETIME} Current date and time in format yyyyymmddHHMMSS.
- {DATE} Current date in format yyyyymmdd.
- {TIME} Current time in format HHMMSS.

For example the export of a road named "TestRoad" on 15th June 2017 at 12:45:22 with pattern "{ROAD}-{DATE}-{TIME} test" will create new directory with name "TestRoad-20170615-124522 test".

**Remark:**

A new pattern can only be saved if it contains either {TIME} or {DATETIME} tag in it. Default pattern is {ROAD}-{DATETIME}.

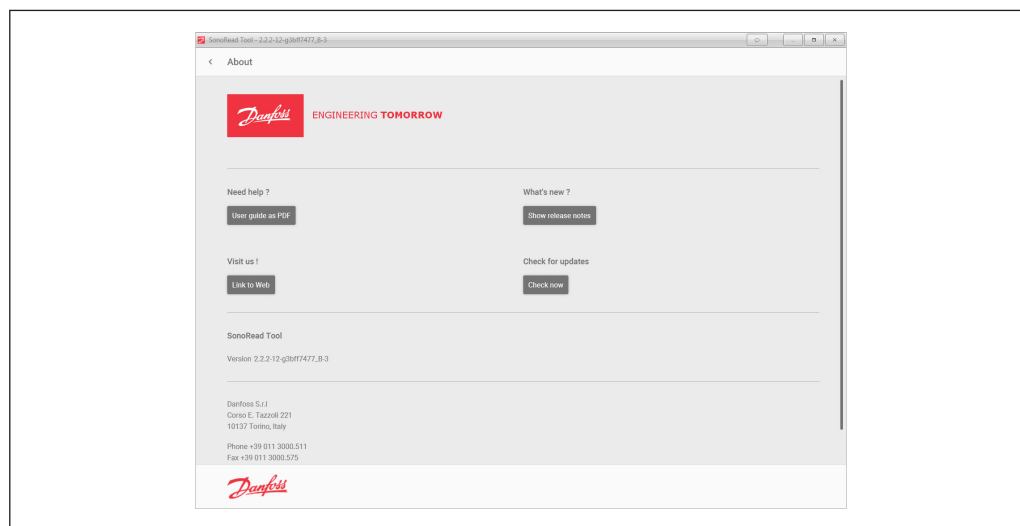
### 3.4.2 Exporting a road file

- Select the road file to be exported in the list on the left side.
- Choose the checkbox "Open/Do not open the csv file after exporting".
- Choose the Export destination.  
**The csv file will be saved in a sub-file timestamped at the indicated location.**
- To start exporting, press the **Export** button and wait a few seconds

### 3.5 About tool

The **About** tool enables:

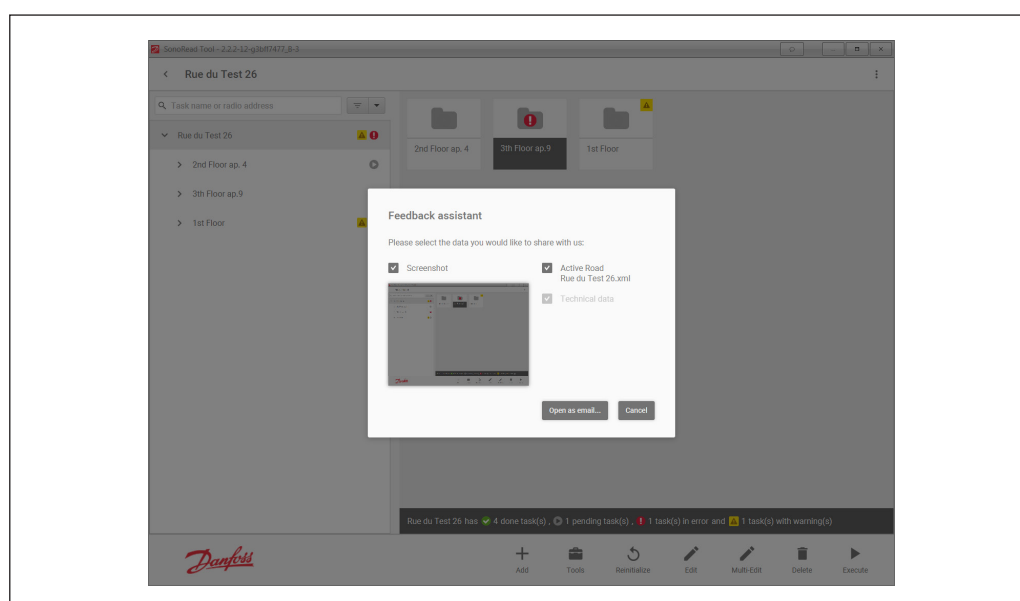
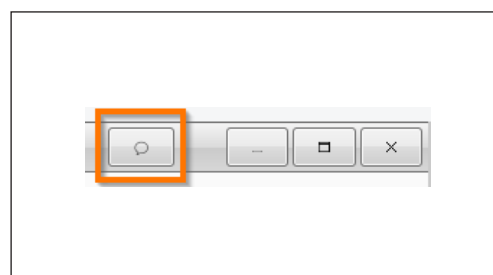
- **Need help?**  
The user guide document can be opened.  
The user guide is available in the « \doc » subfolder of the application folder.
- **What's new**  
The software change log will be displayed.
- **Visit us**  
The Danfoss IT website will be opened.
- **Check for updates**  
A check for updates will be done. It is necessary to be connected to the Internet.



### 3.6 Feedback assistant

The feedback assistant helps us to get feedback regarding the SonoRead Tool software. It will generate a preformatted e-mail message with that needed technical data that will be sent to your local distributor. To use the assistant, press the **Feedback** assistant button in the SonoRead Tool window title bar.

This will open the "Feedback assistant" dialog where you can select if a screenshot should be included with the technical data.



**Remark:**

You can use the feedback assistant even if the SonoRead Tool device does not have e-mail or internet access. In this case, please copy the generated zip file e.g. to a USB-stick and send it to your local distributor. Some Screenshots are also very helpful.

By pressing **Open as e-mail...** button, your default Mail application will be opened with a preformatted e-mail message. A File Explorer

window will popup, please fill in the required fields and attach the generated zip file with the to your e-mail.

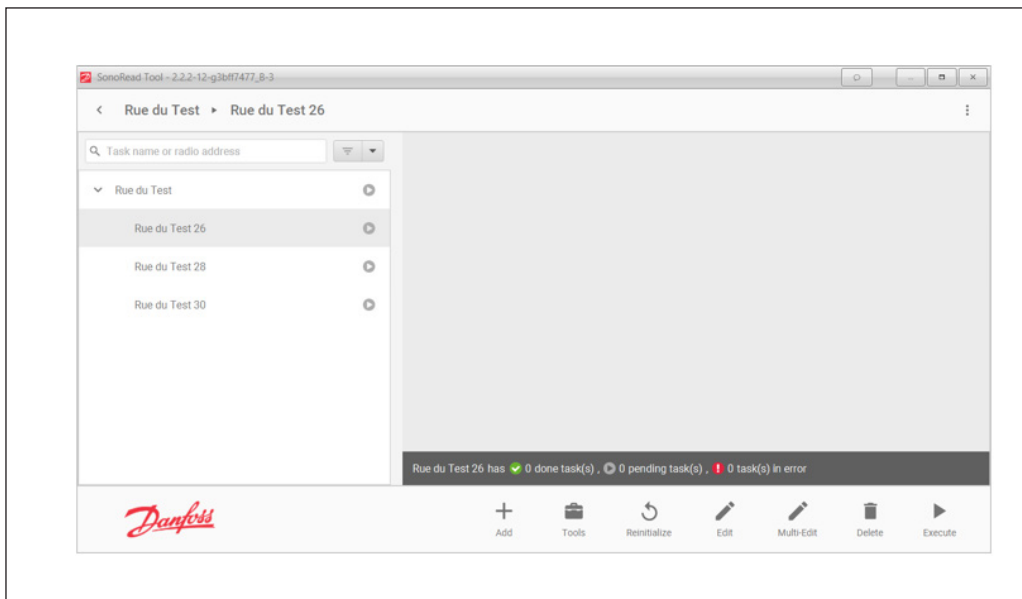


## 4. Best Practice

### 4.1 How to organize a road

For walk by applications, it makes sense to create a road for one or more buildings when doing repeated readouts. If there are bigger buildings with a lot of apartments and devices, it can

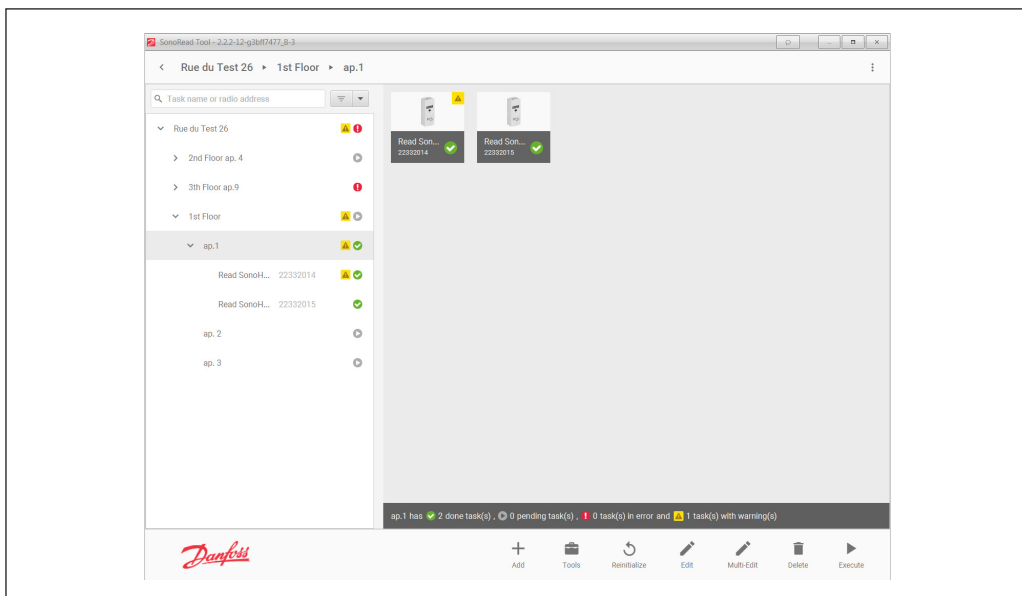
make sense to create a readout road only for one building. Typical application: there's one or more heat cost allocators in each flat.



#### 4.1.1 Organizing Groups

With the SonoRead Tool, it is possible to create multiple groups under one road. You can structure a road in groups and subgroups to have a better overview. For example, you create a group for each floor of a building. If there is more than one device per apartment, you can

also create a subgroup for each flat. If you have bad reception of the radio signal, you could execute every group separately. For example, each floor of a high home when walking up or down the floors.



## 4.2 Recommended ways to edit the road

### 4.2.1 Copy content of a road to another road

If you need to copy all the groups and tasks in one road (Road-A) into another road (Road-B) use the following steps:

- Open Road-A in the SonoRead Tool
- Make sure the top level of the road is selected
- Press **Tools** in the command bar and select **copy** from the opened menu
- Close the road Road-A

- Open Road-B in the SonoRead Tool
- Select the group where you want to put the content of Road-A
- Press **Tools** in the command bar and select **paste** from the opened menu

Content of the Road-A is now part of Road-B

### 4.2.2 Combine two roads into a new road

If you need to combine the content of two roads (Road-A and Road-B) into a new road (Road-C) use the following steps:

- Open Road-A in the SonoRead Tool
- Make sure the top level of the road is selected
- Press **Tools** in the command bar and select **copy** from the opened menu
- Close the road Road-A
- Create Road-C in the SonoRead Tool with the structure you need
- Select the group into where you want to put the content of Road-A
- Press **Tools** in the command bar and select **paste** from the opened menu

- Close the road Road-C
- Open Road-B in the SonoRead Tool
- Make sure the top level of the road is selected
- Press **Tools** in the command bar and select **copy** from the opened menu
- Close the road Road-B
- Open Road-C in the SonoRead Tool
- Select the group into where you want to put the content of Road-B
- Press **Tools** in the command bar and select **paste** from the opened menu

Content of the Road-A and Road-B are now part of Road-B

### 4.2.3 Move part of a road to another road

If you need to move parts of groups and tasks from a road (Road-A), into another one (Road-B), use the following steps:

- Open Road-A in the SonoRead Tool
- Select the groups and tasks you need to move, you can use the multi-select function
- Press **Tools** in the command bar and select **copy** from the opened menu
- Close the road Road-A
- Open Road-B in the SonoRead Tool
- Select the group into where you want to put the content copied from Road-A

- Press **Tools** in the command bar and select **paste** from the opened menu
- Close the road Road-B
- Open Road-A in the SonoRead Tool
- Select the same groups and tasks that were selected in the second step
- Press Delete in the command bar
- Press Yes in the opened confirmation dialog
- Close the road Road-A

Content from the Road-A is now moved to Road-B

## 5. Troubleshooting procedure

This procedure describes the troubleshooting method and sequence to perform when there are communication problems with the SonoRead Tool.

Please refer to chapter **List of error messages**. During the troubleshooting procedure, please use the last software version of SonoRead Tool.

### 5.1 Procedure to follow

Please proceed as follows:

General Check:

1. Check that the radio modem SonoRead 868 is switched on.
2. Check that the radio address of the device is introduced correctly.
3. Check that the radio modem SonoRead 868 is charged and that accumulators are working properly.  
Replace with new batteries if necessary.
4. Read another device or another device type.

Check Bluetooth connection:

5. Check that the Bluetooth interface of your PC or tactile tablet is switched on.
6. Check that the COM port number defined for Bluetooth connection is correct ("Options" tool).
7. Check the windows configuration panel to know which COM port is assigned to the Bluetooth inter-face.
8. Check communication between SonoRead Tool and radio modem SonoRead 868 using "Try connection" in "Options" tool.

If successful: "Connection successful!"; if failure: "Unable to connect!"

If the problem could not be resolved, please write the SN (\_\_\_\_\_), SW version (\_\_\_\_\_) and HW version (\_\_\_\_\_) and provide them to your local distributor.

Other checks:

9. The Bluetooth communication is disturbed by a WIFI signal, switch off the WIFI function of the PC computer or tactile tablet.  
Try a new readout to check if it is working correctly
10. Switch off all of your equipment (PC / tactile tablet and radio modem) and switch them on again.
11. Use another radio modem SonoRead 868 if available.

#### Technical support:

For technical support, please contact your local Danfoss agent.



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