SMARTWELD APPLICATION

Application for process monitoring and documentation of THERMIT® welds

SOFTWARE MANUAL ·· Page 2

RAIL JOINING   RAIL SERVICES   MEASUREMENT   TOOLS & MACHINES   EQUIPMENT

MEMBER OF **GOLDSCHMIDT** THERMIT GROUP

Revision overview

Revision	Date	Notes, affected sections/chapter	Edited by
1.0	31/03/2017	Document created	C. Heinz
1.1	03/08/2017	Add chapter 3.3.3	C. Heinz
1.2	13/08/2018	Add chapter 6.1 and 6.2, editing error messages in chapter 6.4	C. Heinz
1.3	22/02/2019	Updating screenshots and editing chapter 5.3	J. Schulz
1.4	07/06/2019	Add chapter 5.2.5; editing chapters 5.2.1, 5.2.6, 5.3	J. Schulz

1 For your information

1.1 About this software manual

This software manual is part of the SMARTWELD application and includes all the information required for proper use. It also includes information for the installation and user interface for the operation of the SMARTWELD application. In order to reduce the size of the documentation, the software manual refrains from referring to persons and professional titles in both genders. If, for example, an operator is mentioned in this document, this naturally also includes the female equivalent of the operator.

> **NOTE** In addition to this software manual, the operating manuals of the respective devices which are connected to the SMARTWELD application must be read and the safety and warning instructions observed.

1.2 Using the software manual

The information in this software manual is binding. Before using the SMARTWELD application, each user must have read and understood the software manual in full. The instructions and regulations included in the software manual must be observed at all times.

1.3 Product identification version number

The SMARTWELD application has a version number which serves to identify the product. Refer to this number in correspondence with the manufacturer or the customer service department. The current version number is listed in the **Settings** menu.

1.4 About the SMARTWELD application

The SMARTWELD application serves to monitor the process and document THERMIT® welds. Right from the start, the SMARTWELD application supports the full input of all welding parameters and accompanies the welder from the preheating stage up to the trimming process. The intuitive menu navigation and marking of incorrectly inputted information help to improve the quality of the welds and reduce the risk of welding errors.

The general process sequence is divided into the following four points:

1. Input of welding parameters (operator, THERMIT® weld portion, rail type, track section),
2. Execution of preheating (device connection, pressure setting, preheating),
3. Execution of weld (ignition, welding, trimming)
4. Display and export of documentation (possibly only at the end of the work shift).

1.5 License terms

The license terms and the legal information of the SMARTWELD application must be observed.

1.6 Liability

The user is liable for the non-observance of the software manual. The warranty will be invalidated for damages to the SMARTWELD RECORD, SMARTWELD JET or accessories or for malfunctions which are due to the non-observance of the software manual or misuse by the user.

1.7   Copyright protection

This software manual is protected by the copyright of the Elektro-Thermit GmbH & Co. KG. A reproduction of the whole or part of the document and/or transfer to a third party is only permitted with the prior approval in writing of the company Elektro-Thermit GmbH & Co. KG.

1.8   Symbols in this software manual

When using the software manual observe the symbols which are used. Non-observance of the symbols can result in environmental damage and damage to property.

The following symbols are used in this software manual:

Symbol	Meaning
NOTE	Non-observance can result in damage to machines or the environment.
NOTE	General note with helpful tips and extra information.
	Read the safety instructions before using the SMARTWELD application. Non-observance can result in injuries to persons and damage to property.

Table 1: Symbols

2 Safety instructions

This chapter lists all points necessary for safety. Read this chapter thoroughly before you start the SMARTWELD application and observe the instructions before use.

2.1 General causes of risk

2.1.1 Risk of injury in the working environment

The operation of the SMARTWELD application is made in the working environment of a construction site where possibly welding and other work is being carried out in the immediate vicinity. There is an increased risk of injury, for example, through:

- Being run over by a construction site vehicle
- Being swept away by a construction site vehicle or other moving machine
- Slipping on slippery, wet or oily surfaces
- Stumbling over obstacles
- Falling over sharp or pointed objects
- Burning on hot surfaces and naked flames
- Hearing damage or loss through machine noise.

Observe the following precautionary measures:

- Observe all of the construction site regulations.
- Only work with sufficient lighting.
- Remain cautious and observant at all times.
- Wear the protective equipment prescribed in the operating manual of the SMARTWELD RECORD or SMARTWELD JET at all times.

2.1.2 Risk of injury through falling

Use of the SMARTWELD application restricts field of view. There is the risk of injury through stumbling and falling. Possibly there are sharp or pointed objects on the ground. Observe the following precautionary measures:

- Keep an eye on the working environment at all times
- Remain in one position when using the SMARTWELD application and do not walk around
- Lay hoses and cables in such a way as to avoid stumbling.

2.1.3 Damage to property or materials

The input or choice of incorrect process parameters can result in a faulty weld. Observe the following precautionary measures:

- Input the welding parameters strictly in accordance with the work instruction
- Observe possible error messages in the case of incorrect or missing inputted information.

3   Installation and updates

This chapter explains all the information necessary for the installation, updates and de-installation of the SMARTWELD application.

3.1   System requirements

The following system requirements apply for the installation of the SMARTWELD application on your smartphone or tablet:
- Android operating system from version 5.0 ("Lollipop"),
- Bluetooth functionality from version 4.0 ("Bluetooth low energy"),
- At least 10 MB of free memory,
- The latest version of the GOLDSCHMIDT DIGITAL APP.

3.2   Installation

┌─────────┐
│ NOTE   │   Before the installation, ensure that your smartphone/tablet is connected to the internet.
└─────────┘

The GOLDSCHMIDT DIGITAL APP gives you access to all the digital applications of the Goldschmidt Thermit Group. The following steps describe the installation of the SMARTWELD application. Depending on the model and version of your smartphone, it may be possible to skip some individual steps.

3.2.1   Registration in the Google Play Store

1. Open the Google Play Store app.
2. If you already have a Google account, sign in with your ID. Create a Google account if you do not already have one. Follow the instructions on the screen.

3.2.2   Installation of the GOLDSCHMIDT DIGITAL APP

1. Open the Google Play Store app.
2. Use the search function to search for GOLDSCHMIDT DIGITAL APP and select the app from the search results. Alternatively you can use this link (GOLDSCHMIDT DIGITAL APP in the Play Store) or scan the QR code on the right.
3. Tap on the "INSTALL" button and if necessary accept the access rights. The GOLDSCHMIDT DIGITAL APP will be automatically downloaded and installed. When the process is finished, "OPEN" is displayed.

3.2.3   Installation of the SMARTWELD application

1. Open the GOLDSCHMIDT DIGITAL APP.
2. Tap on the SMARTWELD application icon. This can be found under "Apps available in the store".
3. In the detailed view tap on the Google Play button to navigate to the SMARTWELD application in the Google Play Store.
4. Tap on the "INSTALL" button and if necessary accept the access rights. The SMARTWELD application will be automatically downloaded and installed.

3.3 Updates

NOTE Check at least once per month to see if new updates are available for the SMARTWELD application or its databases. This will ensure that the process parameters used for all the welding processes are always up to date. If regular updates are not carried out, this can result in the use of work instructions which are no longer applicable and falsify the documentation process.

NOTE Before each update, ensure that your smartphone/tablet is connected to the internet.

3.3.1 Update SMARTWELD application

1. Open the Google Play Store App.
2. Select the menu item "My apps and games".
3. If an update is available for the SMARTWELD application, the application will be listed under the "Updates" heading. Tap to select the application.
4. Tap the "UPDATE" button and if necessary accept further access rights.
   The update of the SMARTWELD application is automatically downloaded and installed. A message is displayed when the process is complete.

3.3.2 Update parameters for all welding processes

In order to update the process parameters for all welding processes in the SMARTWELD application, follow the instructions for a manual update.

1. Open the menu in the SMARTWELD application and tap on **Settings**.
2. Tap in the area **Weld data** on **Perform database update** in order to carry out a database update. A check is made to see if a database update is required and if necessary it is carried out.

3.3.3 Update the SMARTWELD JET preheating programs

Follow the instructions to update the welding processing parameters for SMARTWELD JET preheating programs.

1. Open the menu in the SMARTWELD application and tap the **Settings** menu.
2. In the **Weld data** area tap on **Perform program update for SMARTWELD JET**. A device connection via Bluetooth is made and then the updated preheating programs are automatically transferred to the SMARTWELD JET. As soon as the process is completed, tap on the button to close the window.

3.4 De-installation

1. Open the Google Play Store app.
2. Select the menu item "My apps and games".
3. Tap on the SMARTWELD application to select it.
4. Tap on the "UNINSTALL" button and confirm with "OK". The SMARTWELD application will be automatically de-installed.

4   User interface

This chapter presents the most important elements of the user interface, the menu structure and its functions and explains the content with a short description of the process sequence.

4.1   Toolbar

The toolbar at the top of the screen can be used to show the menu, receive information about the current screen and have access to further context-related functions.

Figure 1: Toolbar

	Symbol	Function
1	Menu	The menu is displayed or hidden.
2	Add welder	Opens the input mask to add the data for a new welder.
3	Paper clip	The export assistance is opened (PDF or CSV).
4	Thermometer	Bluetooth connection is created with rail thermometer (optional accessory).
5	Question mark	The software manual is opened.
6	Goldschmidt logo	Shows if there is a Bluetooth connection (white = not connected| red = connected). If there is a connection, information can be retrieved from the device.

Table 2: Toolbar

4.2   Menu structure

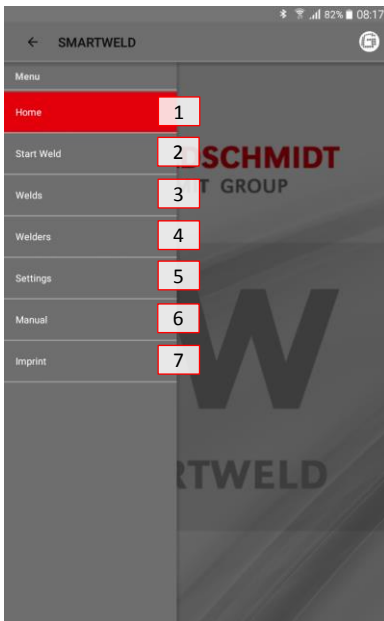Use the menu to navigate to the content of the SMARTWELD application.

Figure 2: Menu

	Menu item	Function
1	**Home**	Shows the start screen.
2	**Start Weld**	Starts a new guided weld.
3	**Welds**	Shows all the stored preheating and welding processes.
4	**Welders**	Shows all the stored welder names.
5	**Settings**	Opens the settings (e.g. Bluetooth connection).
6	**Manual**	Opens the software manual of the SMARTWELD application.
7	**Imprint**	Shows the publisher, imprint and refers to the privacy statement.

Table 3: Menu

5   Operation

This chapter includes all information which is necessary for the proper use of the SMARTWELD application such as the instructions for the start of the SMARTWELD application, the execution of preheating and welding and issue of the documentation.

NOTE   When using the SMARTWELD application also observe the warnings and safety instructions of the connected devices.

5.1   Start the SMARTWELD application

Start the SMARTWELD application to:
- Carry out a new weld
- Export stored documentation
- Display the software manual
- Make basic settings

1. Open the GOLDSCHMIDT DIGITAL APP.

2. Tap the icon of the SMARTWELD application to start the application. You can find it under "Apps downloaded".

3. The start screen of the SMARTWELD application opens and the menu is displayed.

5.2   Carry out new weld

In this section the user is guided step by step to carry out a new weld (**Start Weld**). After identification of the welder and input of all relevant welding parameters, the preheating and welding process is made and finally the documentation is issued.

1. Open the menu and tap on the menu item **Start weld** to start a new guided weld.

5.2.1   Input the welding parameters

The input of the welding parameters includes the identification of the welder, the scan of the THERMIT® weld portion and the input of the rail type, of materials and the environment and rail section parameters.

NOTE   Observe possible error messages with the input of the welding parameters. The SMARTWELD application warns the user if the inputted parameters are invalid (parameters are marked in red). Although it is possible to continue with the incorrect parameter information, this can lead to environmental damage and damage to property.

Identify the welder
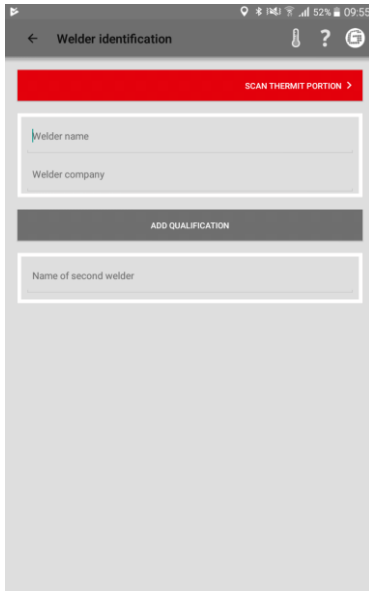
1. Enter your name in the input field or select a name from the dropdown.

2. Enter the company name of the welder in the input field.

   Option: Tap on **ADD QUALIFICATION** to add further personal qualifications.

   Option: Add the name of the second welder or select a name from the dropdown.

3. Tap on **SCAN THERMIT PORTION** to continue.

**Scan the THERMIT® weld portion**
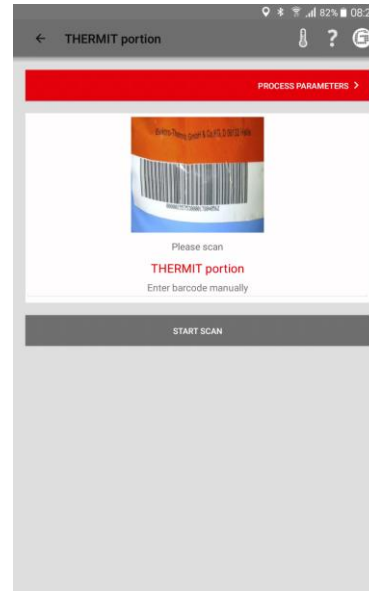
4. Tap on **START SCAN** and use the camera on your smartphone/tablet to scan the THERMIT® weld portion.

   Option: Enter the barcode manually in the line above if scanning is not possible.

5. Tap on **PROCESS PARAMETERS** to continue.

Input rail type and materials

Input environmental and rail section parameters
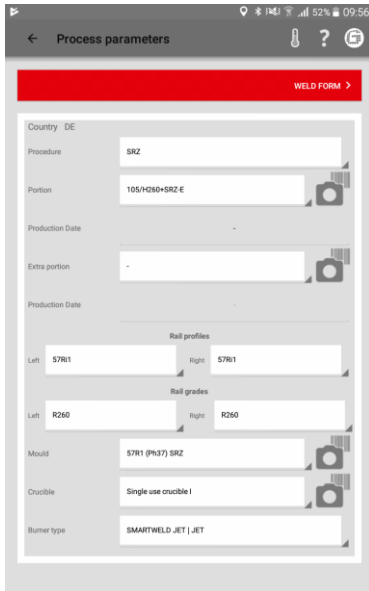
6. Enter all the rail and welding parameters in the input fields.

   Option: Tap on the camera symbol to scan further barcodes such as the mould, additional THERMIT® weld portion, crucible, etc.

7. Tap on **WELD FORM** to continue.
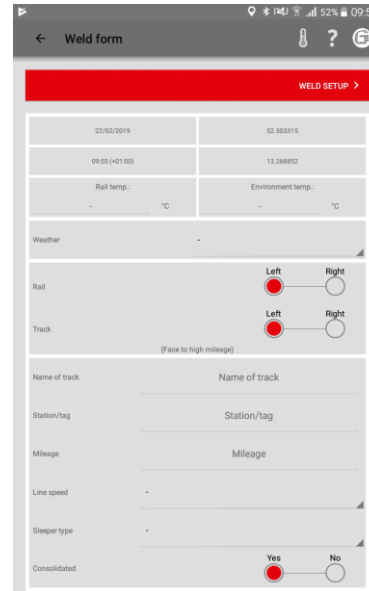
8. Enter the environmental and rail section parameters in the input fields.

9. Tap on **WELD SETUP** to continue with the preheating.

5.2.2 Carry out preheating with SMARTWELD RECORD

The execution of the preheating with SMARTWELD RECORD includes connection of the device via Bluetooth, setting of the pressure specifications and the preheating including recording of the data.

## Connect device via Bluetooth and view the pressure specifications

1. Check the inputted welding parameters and observe the recommended pressure specifications.

2. Switch SMARTWELD RECORD on by shortly pressing the switch.

3. Tap on **CONNECT TO SMARTWELD RECORD** to connect the device via Bluetooth.

   Option: Tap on **MANUAL ENTRY** to manually set the preheating (see Chapter 5.2.4 "Carry out preheating manually" on page 17).
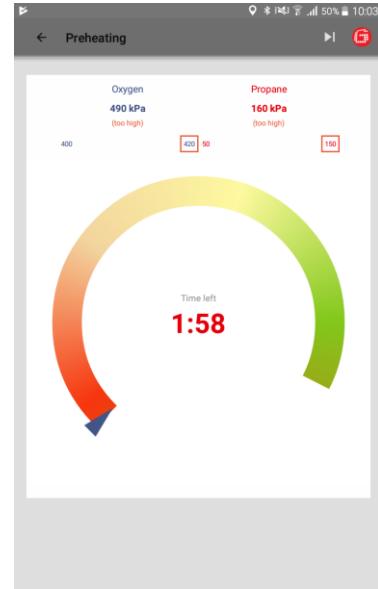
   The SMARTWELD application receives a signal from SMARTWELD RECORD and automatically goes to the next step.

Adjust the pressure and start the preheating
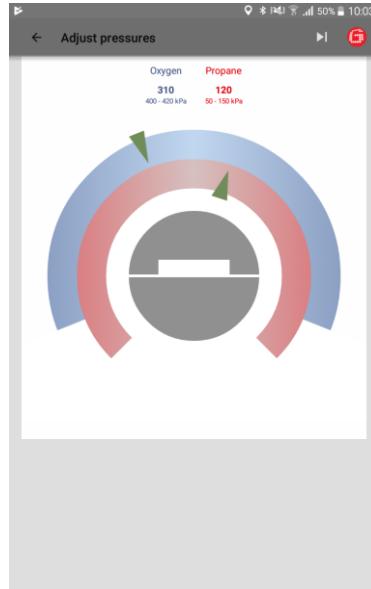
The pressure of both gases and the required range are numerically displayed by the diagram. When the gas pressure valves on the SMARTWELD RECORD are closed, the display shows the pressure on the respective bottle.

4. Adjust the outlet pressure on the pressure regulator to correspond to the pressure specifications for the respective THERMIT® welding process. The green triangles assist with the adjustment. When the pressure is in the required range, the middle display turns to green.

5. On the SMARTWELD RECORD firstly partly open the oxygen valve and then the combustible gas valve and ignite the gas mix. Check the flow pressure and if necessary adjust the pressure on the pressure regulator of the bottle.

6. Start the preheating by shortly pressing the button on the device. The application goes on automatically to the next step.

Carry out the preheating

The diagram shows the remaining preheating times. During the preheating the SMARTWELD application records the pressure of both gases every second. If the flow pressure of a gas during the preheating changes greatly, the user is warned by a vibration of the smartphone/tablet and red markings on the respective limiting value.
The recording only ends when the preheating is finished.

7. End the preheating when the countdown is finished by shortly pressing the switch on the device. The SMARTWELD application receives a signal and automatically goes on to the welding process.

5.2.3   Carry out preheating with SMARTWELD JET

The execution of the preheating with SMARTWELD JET involves connecting the device via Bluetooth, setting the time and air flow specifications and the preheating and welding including the recording of the data.

Connect device via Bluetooth and view the specifications	**Configure the preheating**	**Carry out the preheating**

Connect device via Bluetooth and view the specifications

1. Check the inputted welding parameters and observe the time and air flow specifications.

2. Switch the SMARTWELD JET on.

3. Tap on **CONNECT TO SMARTWELD JET** to connect to the device via Bluetooth.

4. *Option*: Tap on **MANUAL ENTRY** to set the preheating manually (see Chapter 5.2.4 "Carry out preheating manually" on page 17).

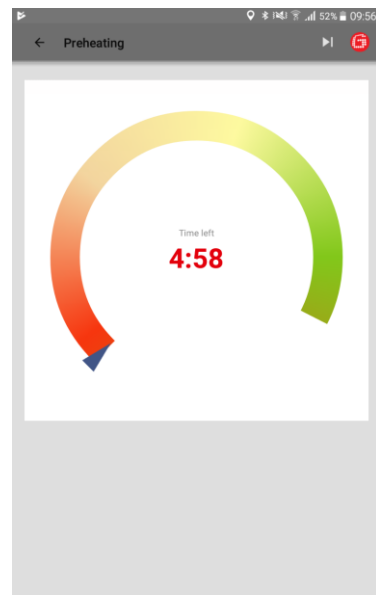   The SMARTWELD application receives a signal and automatically goes on to the next step.

Configure the preheating
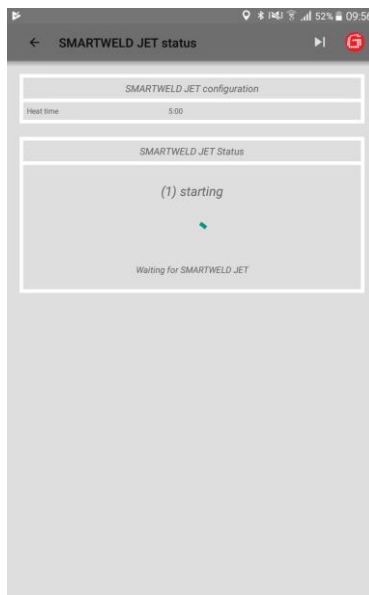
The SMARTWELD application configures the SMARTWELD JET and waits for it to start.

If the SMARTWELD JET indicates an error, the error code is displayed together with a description and help text.

Carry out the preheating

The diagram shows the remaining preheating time.

After preheating, the SMARTWELD JET switches off automatically.

The SMARTWELD application receives a signal and automatically goes on to the welding process.

5.2.4 Carry out preheating manually

NOTE The manual execution of the preheating is exclusively an emergency solution if the device or connection does not work.

The manual execution of the preheating via the SMARTWELD application includes the setting of the preheating parameters and the preheating with the SMARTWELD RECORD or the SMARTWELD JET.

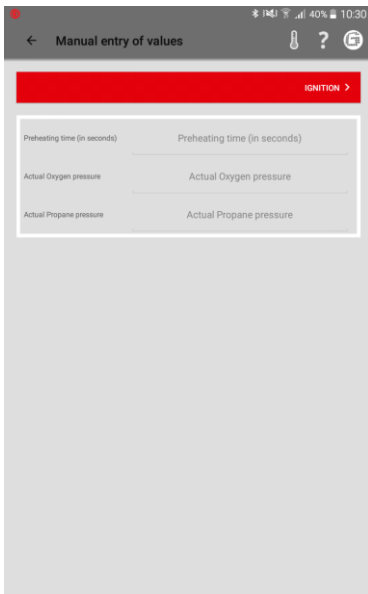| Manual preheating with the SMARTWELD RECORD	Manual preheating with the SMARTWELD JET
1. Manually enter the preheating time and the current gas pressures into the input fields.	1. Select the preheating program or manually enter the values for time and air flow.
2. Tap on **IGNITION** to prepare the ignition of the THERMIT® weld portion.	2. Tap on **IGNITION** to prepare the ignition of the THERMIT® weld portion.

5.2.5   Carry out preheating with a conventional torch

The manual execution of the preheating with a conventional torch includes the setting of the preheating parameters.
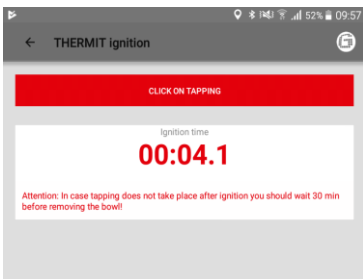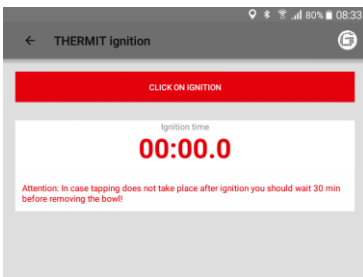
Manual preheating with a conventional torch

1. Manually enter the preheating time and the current gas pressures into the input fields.

2. Tap on **IGNITION** to prepare the ignition of the THERMIT® weld portion.
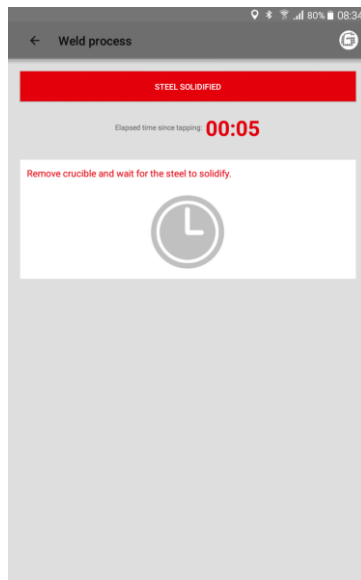
5.2.6 Carry out the welding process

After the preheating is finished, the SMARTWELD application serves as a stopwatch for measuring time and guides the welder through the complete welding process. This includes the THERMT® ignition, the welding and the subsequent trimming.

| Ignite the THERMIT® weld portion	Carry out the welding process	Remove the slag pans
1. Tap on **CLICK ON IGNITION** when the THERMIT® weld portion was ignited. The stopwatch starts. 2. Tap on **CLICK ON TAPPING** when the liquid THERMIT® steel starts to flow into the mould.	3. Remove the crucible and confirm the process by tapping the button.	4. Remove the slag pans and confirm the process by tapping the button.

Remove the mould shoes
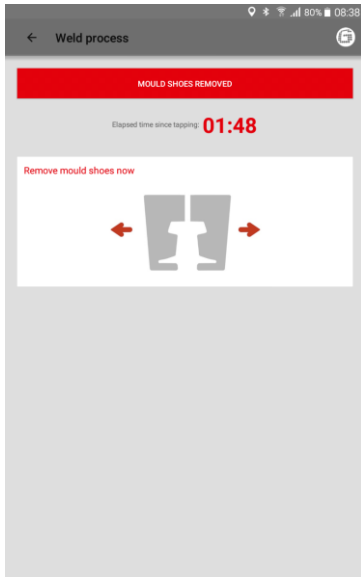
5. Remove the mould shoes and confirm the process by tapping the button.
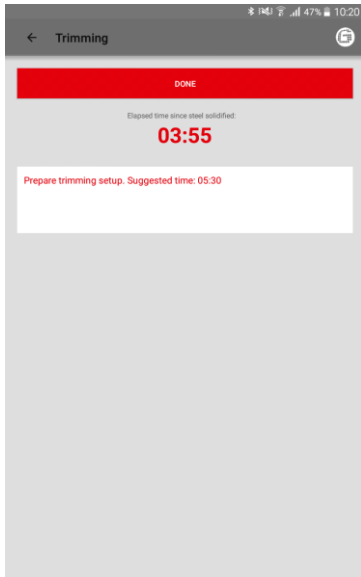
Remove the lower mould parts
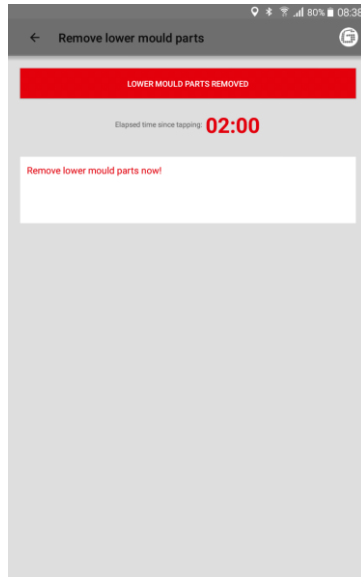
6. Remove the lower mould parts and confirm the process by tapping the button.

Remove the mould head
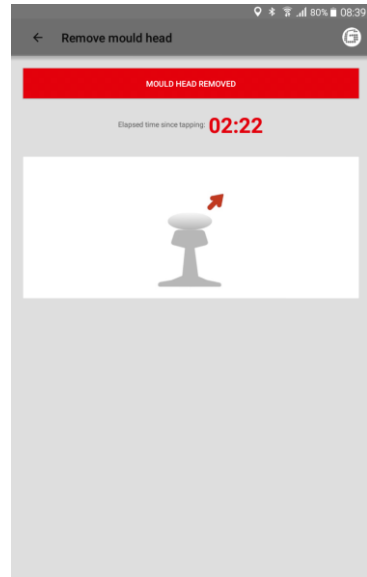
7. Remove the mould head and confirm the process by tapping the button.

Carry out the trimming

Carry out grinding

Remove support wedges

8. Prepare the trimming. The hint tells the recommended waiting time. After the waiting time has ended by tapping on the **DONE** button the SMARTWELD application automatically goes on to the next step.

9. Tap on **TRIMMING DONE** when the welding seam has been trimmed. The SMARTWELD application automatically goes on to the next step.
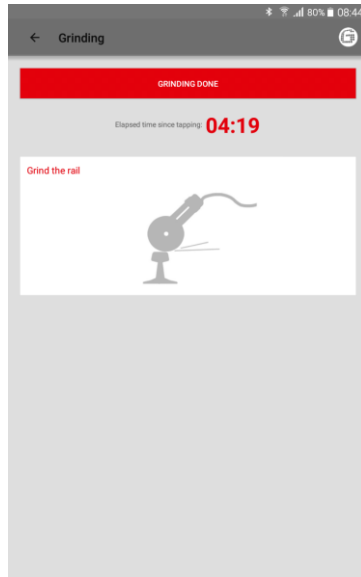
10. Carry out the welding process and confirm the grinding by tapping the button.
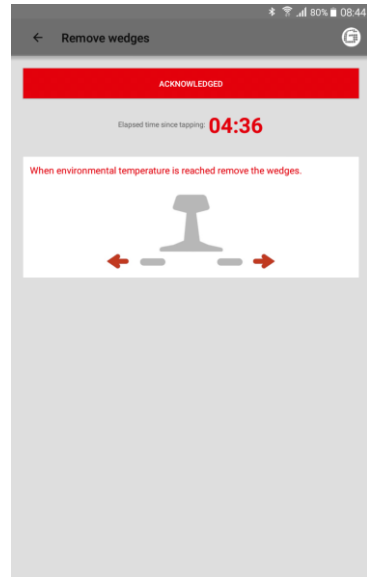
11. Remove the support wedges and confirm the process by tapping the button.

Documentation of the welding process

Finish the welding process
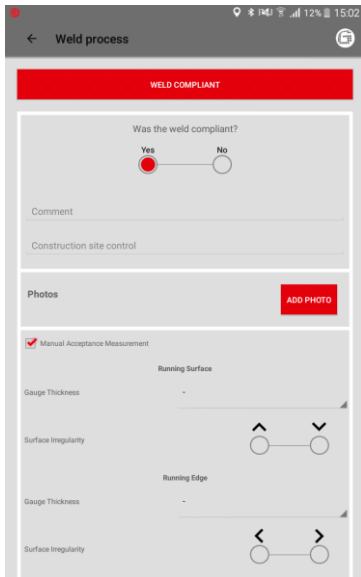
12. Document whether the weld has been compliant. You can add more comments for the welding process in the input field.

13. Up to 4 photos can be added for documentation by tapping on **ADD PHOTO**.

14. A manual acceptance measurement can be added by ticking the checkbox.
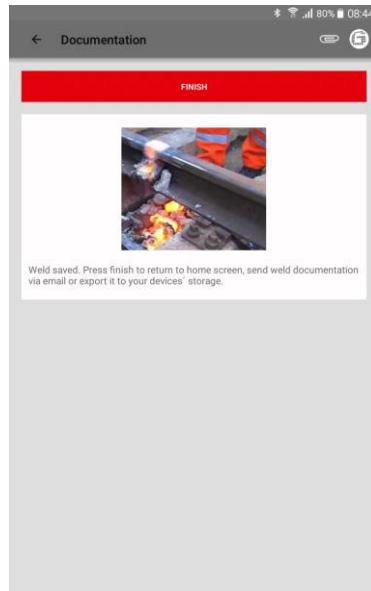
15. Tap on **FINISH** to end the welding process and save the complete documentation.

After this the operator can start with the next weld.

5.3 View and export the documentation

It is possible to view, partly edit and export the documented raw data of the preheating and welding processes.

View saved preheating and welding processes	View and edit details	Export raw data /record

View saved preheating and welding processes

1. In the menu, tap on **WELDS** to view all the saved preheating and welding processes in a list.

2. Select an entry to view the details.

   Option: Tap and hold to select one or more welds in order to delete or export do DARI.
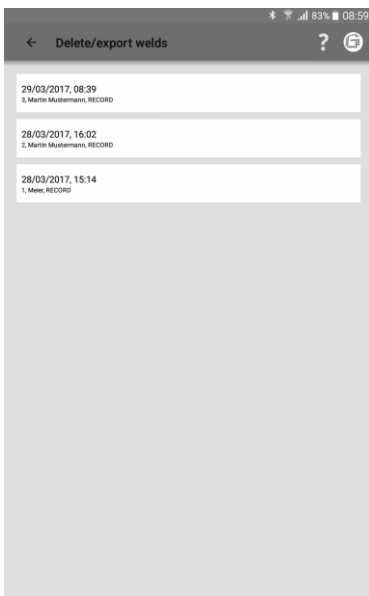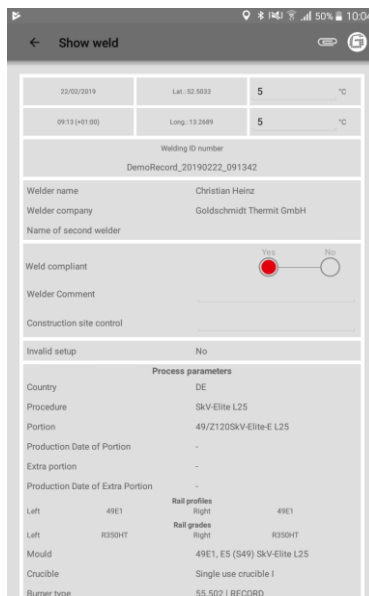
View and edit details

It is possible to view the details for the preheating and welding processes and to partly edit the details. A red exclamation mark indicates invalid parameters.

3. Tap on individual environmental and rail section parameters in order to edit the details.

Export raw data /record
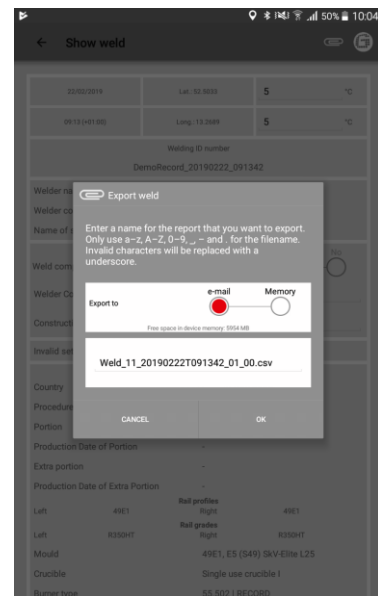
The export of the raw data is possible as a CSV file. The welding data record can be exported as a PDF file. Both options can be carried out after each other in order to export both types of file.

4. Tap on the paper clip in the toolbar and select the desired export option.

5. Select whether the export file should be sent by e-mail or saved to your smartphone/tablet.

   When saving to your smartphone/tablet, the folder "goldschmidt-thermit" will be created. All of the export files will be placed in this folder.

6. Change the filename as required and tap on **OK** to execute the export.

DARI
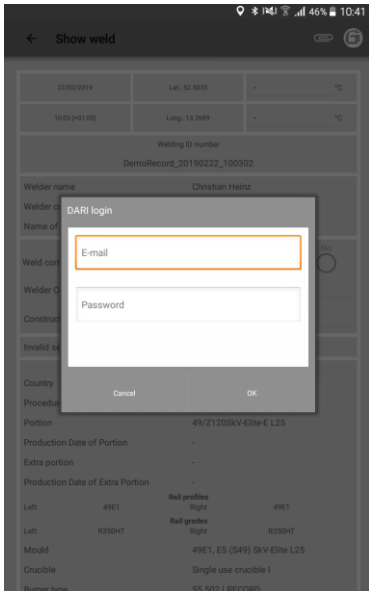
7. Tap on the paper clip in the toolbar and select Export to DARI.

8. Enter your DARI login information. If you confirm the process by tapping the OK button the weld will be uploaded to DARI automatically.

Bulk export/deletion

The welds can be exported in bulk as DARI-upload.

9. Tap on one weld until the toolbar in the top appears. Tapping on other welds now automatically selects them.

10. Use the paperclip icon to start the bulk export.

11. By tapping on the paper bin icon all selected welds will be deleted.

End the process by tapping on the checkmark icon.

5.4   Settings

Select the settings of the SMARTWELD application to select country-specific welding data, update a database and create a Bluetooth connection with a device.

> **NOTE**   Please observe that the Bluetooth function must be switched on in your smartphone/tablet to be able to connect to a device.

Select weld data and carry out database update	Search for Bluetooth devices	Create Bluetooth connection

Select weld data and carry out database update
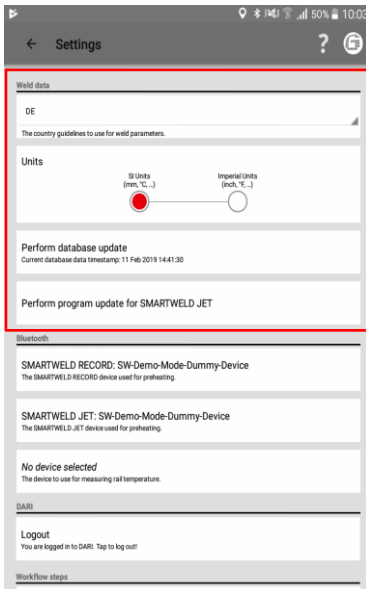
1. In the **Weld data** area, tap on the first selection field and select the country code of the deployment country to ensure that only approved welding parameters and material combinations are available.

2. Then select either metric or imperial units.

3. Database update (see chapter 3.3.2 "Updates" on page 9).

4. Carry out a program update for the SMARTWELD JET (see chapter 3.3.3 on page 9).

Search for Bluetooth devices

You can make parallel connections with 2 devices. The last connected devices are saved. You only have to reset the Bluetooth connection if you work with a different smartphone/tablet or device.
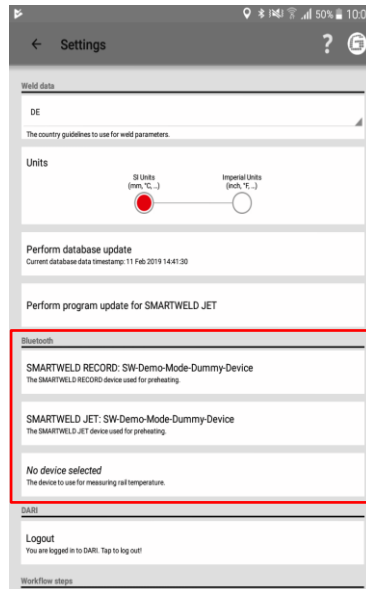
5. In the **Bluetooth** area, tap on the first or second line to show all of the available SMARTWELD preheating devices.

6. In the **Bluetooth** area, tap on the third line to show all of the available SMARTWELD thermometers.

Create Bluetooth connection
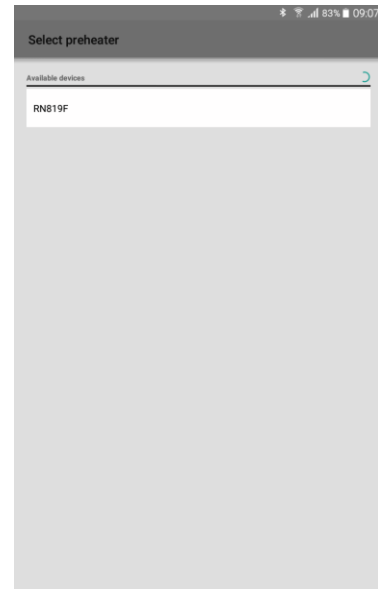
7. In the list, tap on the desired device to create a Bluetooth connection.

When the connection is created, the device will be listed in the Bluetooth settings and the Goldschmidt logo in the toolbar turns red. Tap on the Goldschmidt logo to retrieve information about the connected device.

6 Troubleshooting

This chapter describes all the possible error messages, causes and recommended remedies which are possible in connection with using the SMARTWELD application.

NOTE   Errors are indicated by an error message in the SMARTWELD application. For practical reasons, in the following "SMARTWELD" has been abbreviated to "SW".

6.1 Scanning barcodes

The correct scanning of barcodes requires a fully functional camera lens. Particularly scratches on the mask of the lens or other damages can provide that barcodes can't be read anymore and errors are being deployed. Also damages on the barcode itself can conduct that the barcode can't be read.

6.2 Selection of the country settings

According to the country specific welding processes, the country needs to be selected in the menu **Settings** before starting a weld.

6.3 SMARTWELD RECORD error messages

Error	Cause	Measures
The SW RECORD cannot connect to the SW application and is not shown in the list of available devices.	The Bluetooth function of the smartphone/tablet has been deactivated.	Switch on the Bluetooth function of the smartphone/tablet.
	The SW RECORD is not switched on.	Switch on the SW RECORD.
	The SW RECORD is too far away from the smartphone/tablet.	Ensure the distance between the SW RECORD and your smartphone/tablet is not more than 30 metres.
	The connection between the SW RECORD and your smartphone/tablet is restricted by shielding.	Avoid barriers (e.g. metal) to ensure the signal path is unhindered.
	There are too many Bluetooth devices nearby which may interfere with the signal.	Deactivate the Bluetooth function of other mobile devices nearby or move away from sources of interference.
The SW RECORD cannot connect to the SW application, but is shown in the list of available devices.	The SW RECORD has not yet been connected to the SW APP with the current smartphone/tablet.	Select SW RECORD in the list of available Bluetooth devices.
	The SW RECORD has already been connected to a different smartphone/tablet.	The SW RECORD can only simultaneously connect to a single smartphone/tablet. Disconnect all other connections to be able to connect your smartphone/tablet.
The connection between SW RECORD and the SW application breaks down.	The SW RECORD is too far away from your smartphone/tablet.	Ensure the distance between the SW RECORD and your smartphone/tablet is not more than 30 metres.

SMARTWELD APPLICATION SOFTWARE MANUAL

Error	Cause	Measures
	The connection between the SW RECORD and your smartphone/tablet is restricted by shielding.	Avoid barriers (e.g. metal) to ensure the signal path is unhindered.
	The batteries of the SW RECORD are discharged.	Charge the batteries of the SW RECORD.
It is not possible to start the measurement with the SW RECORD.	The SW RECORD is not connected properly.	Shut down the SW application completely and then re-start the application. Switch the SW RECORD off and then on again. Connect the SW RECORD to the SW application.
	The SW RECORD is operating outside the permitted ambient temperature.	The permitted ambient temperature of the SW RECORD is in the range of -20 to +50 degrees centigrade. The SW RECORD will not function outside this range.

Table 4: SMARTWELD RECORD error messages

6.4 SMARTWELD JET error messages

Error	Cause	Measures
Error 1	The gas pressure is insufficient.	Check the gas supply. Repeat the connection set-up.
Error 2	The air pressure has not been realised.	Check the air cleaner mat. Repeat the connection set-up.
Error 3	Firing error	Activate RESET and repeat the start-up process.
Error 4	Firing error	Contact customer service.
Error 5 up to and including Error 9, Error A	Exceedance of the limiting value because the deposed limiting values in SMARTWELD APP and/or SMARTWELD JET are not current.	Check if the newest version of the application is installed and if needed update SMARTWELD JET throughout Google Play Store.
Error 5	Engine speed exceeded the limiting value.	Contact customer service. The welding process can continue. The error is noted in the record.
Error 6	Engine speed fell short of the minimum value.	Contact customer service. The welding process can continue. The error is noted in the record.
Error 7	Engine output exceeded the limiting value.	Contact customer service. The welding process can continue. The error is noted in the record.

Error	Cause	Measures
Error 8	Engine output fell short of the minimum value.	Contact customer service. The welding process can continue. The error is noted in the record.
Error 9	Engine voltage exceeded the limiting value.	Contact customer service. The welding process can continue. The error is noted in the record.
Error A	Engine voltage fell short of the minimum value.	Contact customer service. The welding process can continue. The error is noted in the record.
Error P	Ground fault	Check the connection from N and PE. Repeat the connection set-up.
The SW JET cannot connect to the SW application and is not shown in the list of available devices.	The Bluetooth function of the smartphone/tablet has been deactivated.	Switch on the Bluetooth function of the smartphone/tablet.
	The SW JET is not switched on.	Switch on the SW JET.
	The SW JET is too far away from the smartphone/tablet.	Ensure the distance between the SW JET and your smartphone/tablet is not more than 30 metres.
	The connection between the SW JET and the smartphone/tablet is restricted by shielding.	Avoid barriers (e.g. metal) to ensure the signal path is unhindered.
	There are too many Bluetooth devices nearby which may interfere with the signal.	Deactivate the Bluetooth function of other mobile devices nearby or move away from sources of interference.
The SW JET cannot connect to the SW application, but is shown in the list of available devices.	The SW JET has not yet been connected to the SW APP with the current smartphone/tablet.	Select SW JET in the list of available Bluetooth devices.
	The SW JET has already been connected to a different smartphone/tablet.	The SW JET can only simultaneously connect to a single smartphone/tablet. Disconnect all other connections to be able to connect your smartphone/tablet.
The connection between SW JET and the SW application breaks down.	The SW JET is too far away from the smartphone/tablet	Ensure the distance between the SW JET and your smartphone/tablet is not more than 30 metres.
	The connection between the SW JET and your smartphone/tablet is restricted by shielding.	Avoid barriers (e.g. metal) to ensure the signal path is unhindered.
	The SW JET was switched off.	Switch on the SW JET.
It is not possible to start a measurement with the SW JET.	The SW JET is not connected properly.	Connect the SW JET to the SW application.

Error	Cause	Measures
	The SW JET is operating outside the permitted ambient temperature.	The permitted ambient temperature of the SW JET is in the range of 0 to 40 degrees centigrade. The SW JET will not function outside this range.

Table 5: SMARTWELD JET error messages