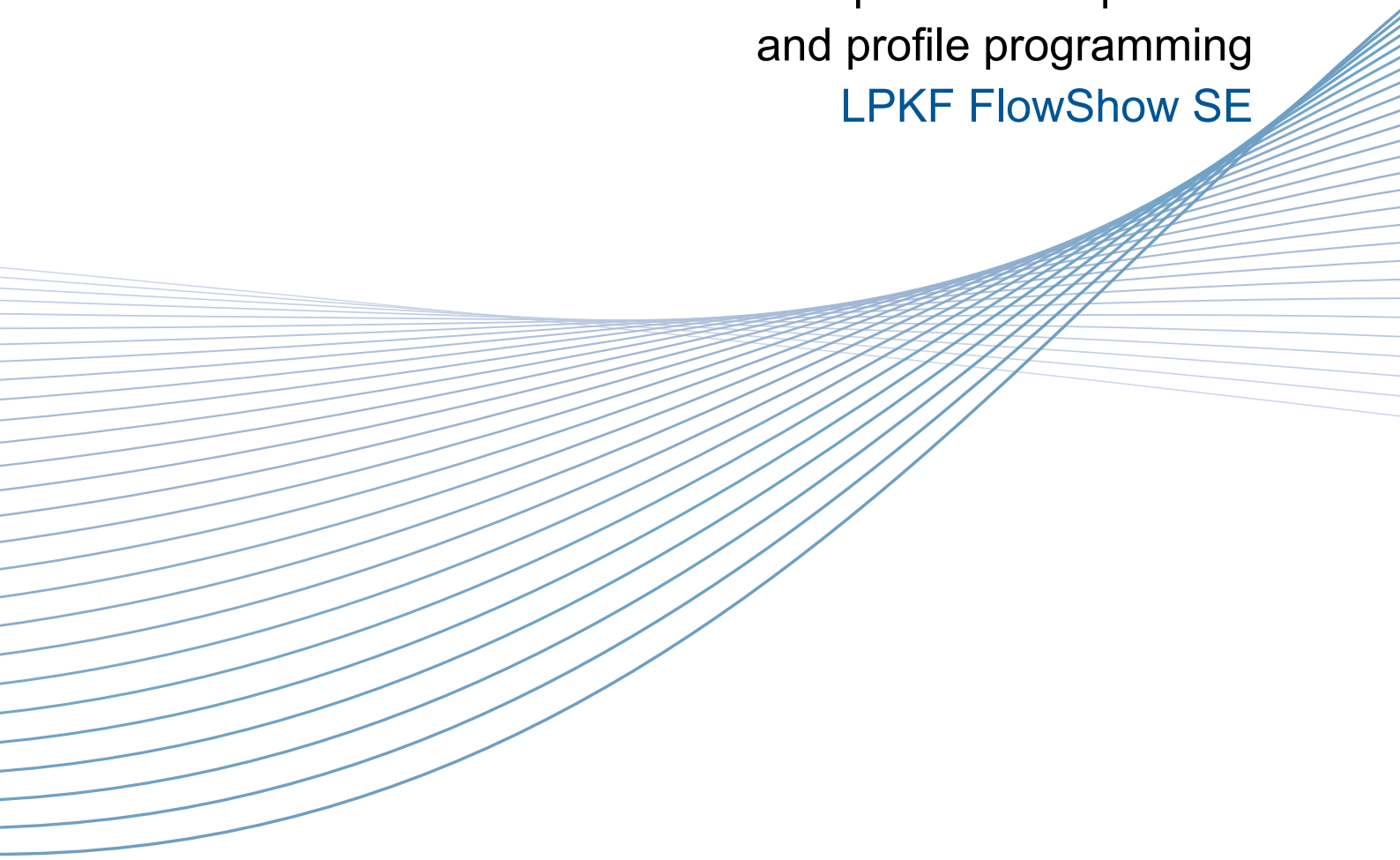
USER MANUAL

Tool for temperature acquisition
and profile programming
LPKF FlowShow SE



LPKF
Laser & Electronics

1 INTRODUCTION

Company name:	LPKF Laser & Elektronika d.o.o.
Abbreviated name:	LPKF d.o.o.
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E-mail:	support@lpkf.si, sales@lpkf.si

Trade-mark:

1.1 FlowShow SE

The LPKF FlowShow SE software is an excellent accessory, which simplifies the handling of ProtoFlow S and ProtoFlow E reflow ovens and it is scope of delivery already.

It can be used together with some older models of the ProtoFlow ovens (all ProtoFlow ovens with white painted housing) and with all ProtoFlow E with USB connection module as well.

LPKF FlowShow SE works as stand-alone MS Windows® program.

It enables:

- Convenient profile programming with profile assistant
- Real time display of temperature profile and process status
- Start of soldering process via PC interface
- User selectable displayed sensors during process
- Programmed profile reference
- Export of recorded charts to .bmp, .csv or .xls for process documentation
- Clear profile manipulation, transfer and backup
- Optimize of the oven
- Update of the Firmware
- Multilingual UI support

1.2 What it offeres?

- Stand alone Microsoft Windows® application
- Same software for ProtoFlow S and E series
- Automatic recognition of the device and serial number
- Support for multiple UI languages
- Redesigned GUI with new icons
- Autostart function
- More shown parameters of connected device (serial number, device type, process status...) which are presented in real-time
- Selectable sensors to be shown/hidden on the chart
- Reference Preheat and Reflow temperature lines
- Window-zooming of the chart
- More options for chart manipulation (export to csv, xls, bmp, print...)
- Profiling assistant - reference chart drawing from the current profile (better visualization and reduced faults in parameter programming)
- Improved database of profiles
- The currently written profile is selected as current oven profile
- Reflow ramp optimization which enables the profile parameters to be set more precisely
- Access to user manual and technical documents through FlowShow SE program
- Email registration of connected device adds more functions for registered users and gives an access to whitepapers and new firmware and software updates
- Possibility of 30 days trial period without registration

1.3 Warnings

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Copying and distributing these instructions in their entirety or in part is only permitted by LPKF approval in writing.

Note: Data can be altered without prior notice.

Original Instructions

LPKF is not liable for any damage occurring due to improper use of these instructions.

The owner of the LPKF device is obligated to:

- Ensure that the device is used only for its intended purpose.
- Ensure that the device is used only under the specified operating conditions.
- Regularly check safety, and control devices.
- Ensure that only authorised and qualified personnel operate the device.
- Ensure that all operators of the device have ready access to these instructions.
- Ensure that the device always has safety labels in place.

Remove the packaging and check the general state of the equipment, and check the contents against the enclosed packing list.

In the event of any damage immediately inform the transport agent!

Please note: unauthorised repairs or modifications to the equipment will void the warranty!

In case of problems, please immediately contact us, giving the serial number of the machine!

For proper functioning of the FlowShow SE software for Windows® administrator rights are required.

Privacy disclamer upon registration:

Your personal data will be exclusively used for communication with you related to your use of the LPKF ProtoFlow S/E according to your indicated preferences. You might be contacted from our marketing department with product survey and in such case, you would have chance to unsubscribe from our further mailings. Collected data will not be sold or passed to 3rd parties.

Upon written request, LPKF or its retailers will inform you by letter, what personal data is stored by us as defined by local law. If such data is incorrect, we will correct that information at your request. Please refer to local Brand site services for further instructions.

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2.1 Symbols etc. used in this manual

Text in *italics* emphasises the importance of the information.

Symbols that you will notice in some chapters have the following meaning:

Danger!
The symbol is used to highlight danger to life or health.

Caution!
The symbol warns of circumstances that could threaten the safety and health of the device operator or cause a serious device defect.

Good advice and instruction
“Rapido” warns us of possible faults, and recommends simple and effective solutions.

2.1.1 Registered trademarks

The LPKF logo and all LPKF product brand names are registered trademarks of LPKF Laser & Electronics AG and LPKF Laser & Elektronika d.o.o.

Microsoft and Windows® are worldwide registered trademarks of the Microsoft Corporation.

All other trademarks are property of their respective owners.

3 INSTRUCTIONS FOR USE

3.1 General

FlowShow SE is generally made for ProtoFlow S and for ProtoFlow E ovens with integrated USB connection. But it can also be used with some older models of the ProtoFlow ovens (all ProtoFlow ovens with white painted housing) and for old ProtoFlow E ovens with USB connection module.

System requirements:
Following system requirements must be met for installing FlowShow SE successfully:

Component	Minimum requirement
CPU	Pentium 1 GHz
RAM	512 MB
Disk space	10 MB
Screen resolution	1024 x 768 px
USB port	1.1, 2.0 *or* 3.0
Software	Windows® 7 *or* Windows® XP Professional SP3 *or* Windows® Vista .NET Framework 4.0 Administrator rights

Installation procedure:
1. Turn ON the PC
2. Insert the installation CD into CD/DVD drive or unzip the file containing the installation files
3. Install the FlowShow SE program (see chapter 3.2)
4. Turn ON the oven and connect it to the PC using the USB cable supplied
5. Install ProtoFlow USB driver (see chapter 3.3)
6. Run the program FlowShow SE (see chapter 3.4)
7. Update the Firmware if necessary (see chapter 3.7)
8. Switch OFF the oven
9. Oven and FlowShow SE are ready for use.

New Firmware version is required:
- ProtoFlow E: 2.10 or newer
- ProtoFlow S: 3.10 or newer

To verify your current firmware version restart your ProtoFlow oven and check the screen message on the display.

To update the Firmware new FlowShow SE can be used.

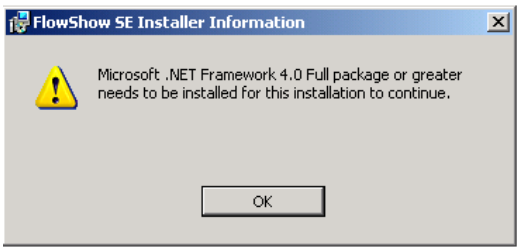
3.2 Installing the LPKF FlowShow SE

For proper functioning of the FlowShow SE software Windows® requires administrator rights.

Insert the installation CD or unzip the file containing intallation files and run the Setup.exe program from the root folder.

Installation requires .NET Framework 4.0.

To install Framework from the CD, run the dotNetFx40_Full_x86_x64.exe file, located in the Framework folder.



When Framework is successfully installed, run the Setup.exe again and installing of the FlowShow SE software continues and finishes automatically.

Depending the computer configuration, installation of framework might take up to 30 minutes.

3.3 ProtoFlow USB driver installation instructions

Connect the PC and ProtoFlow with the USB cable supplied (2x type A female).

Turn ON the oven.

Follow the procedure according to your system's OS:

Windows® XP:

To install the appropriate USB driver in Windows XP, follow this procedure:

1.

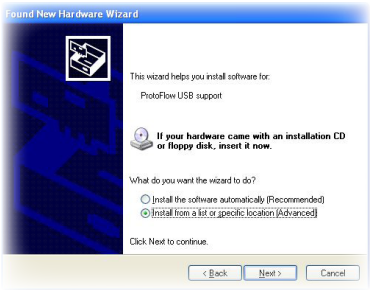
PC should announce **Found new hardware - ProtoFlow USB support.**

2.

Wait until the next page appears (select **No, not this time** and confirm with **Next**).

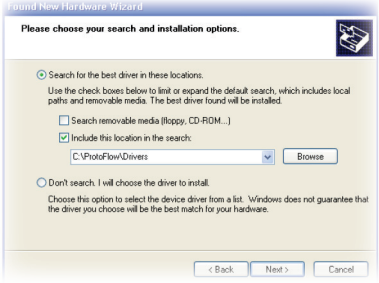
3.

Select **Install from a list or specific location** and confirm with **Next.**



4.

Specify the path to the installation directory and confirm with **Next.**



5.

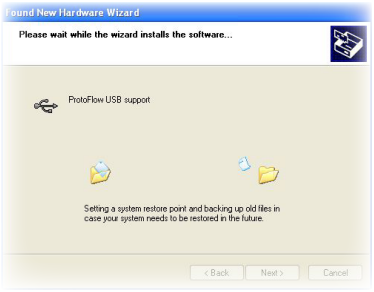
The following page is shown for a moment (wait).

6.

Select **Continue Anyway,** when the following page appears.

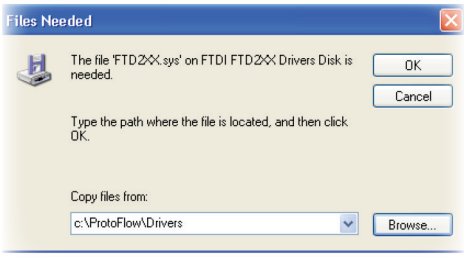
7.

Installation in process should be followed by the next page.



8.

In case the path to the **.SYS** file is not correct, change the path and confirm.



9.

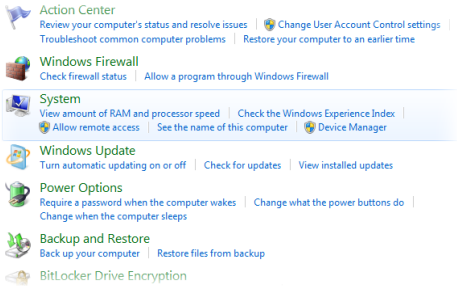
Wait until the following page appears and confirm with **Finish**. Done.

Windows® Vista and Windows® 7:

Windows® Vista and Windows® 7 should automatically install the appropriate driver. In the event installation is not successful, follow this procedure:

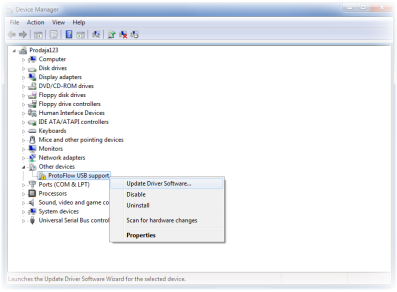
1.

Go to **Start → Control Panel → System and Security → System → Device Manager**



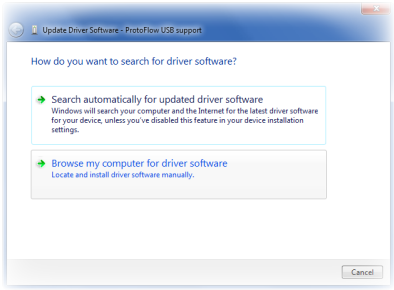
2.

Click to expand **Other devices** and right click **ProtoFlow USB support**. Select **Update Driver Software...**



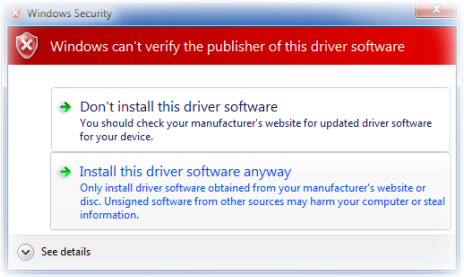
3.

Click **Browse my computer for driver software** and specify the path to the folder that includes Setup.exe for FlowShow SE. Check **Include subfolders**, and click **Next**.



4.

Click **Install this driver software anyway**. Wait until driver is installed and click **Close**. Done.



3.4 Starting the program

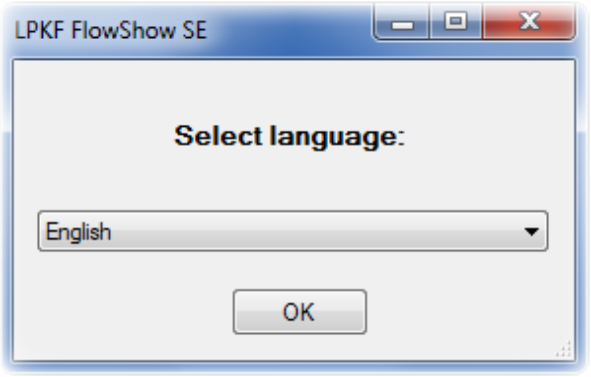
Go to **Start** → **All Programs** → **LPKF Laser & Electronics** → **FlowShow SE** and click the **FlowShow SE** icon or click the icon on the desktop.

LANGUAGE SETTINGS

Program FlowShow SE is a multilingual program.

Default language is **English**.

This setting can be changed at any time using Language function from Admin tab.



If your language is not on the list, you can select “custom” language. Please ask your local distributor for details.

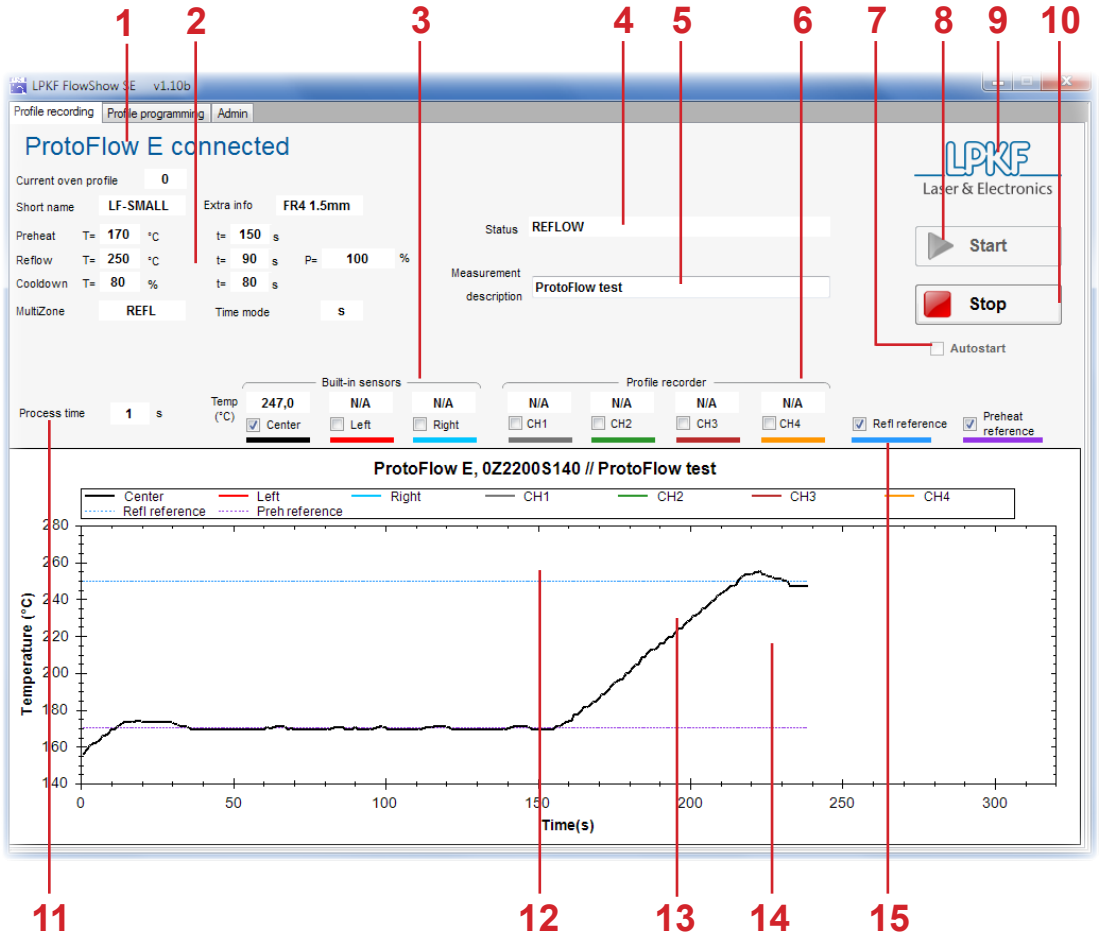
USING THE PROGRAM

Program consists of 3 main screens, organized by tabs:

- Profile recording (see 3.5)
- Profile programming (see 3.6)
- Admin (see 3.7)

3.5 Tab 1 - Profile recording

Profile recording is a screen where the entire current process in the oven can be followed. The current profile setting, current status of the oven, start and stop of the recording, following temperatures of built-in and additional sensors, displaying profile in the graph and exporting the data recorded can be seen on this screen.



1	Device connection status	2	Current profile parameters
3	Built-in sensor temperatures	4	Oven status messages
5	Description of current measurment (used in chart export)	6	Temperatures of additional freely mounted sensors - Profile recorder (option) (N/A when Profile recorder is not available)
7	Check box for automatic start of the oven or recording	8	Start profile recording and oven
9	LPKF home page (click to open)	10	Stop profile recording
11	Remaining time until the end of the current phase	12	Reflow temperature reference
13	Real-time oven temperatures	14	Preheat temperature reference
15	Show/Hide reference line		

No.	Description
1	Connected; oven is successfully connected with PC Not connected; • oven is not switched ON • USB cable is not connected to oven/PC • USB driver on the PC is not correct
2	Profile parameters from the oven. When the oven is connected, the current oven profile parameters are automatically downloaded
3	Display of the current temperatures of the built-in sensors. ProtoFlow E shows only one sensor - CENTER
4	Different status messages are shown: • WARMUP, PREHEAT, STEP1, STEP2, REFLOW, COOLDOWN, RECORDING FINISHED, START THE OVEN'S PROFILE OR ENABLE AUTOSTART FIRST; oven profile phases and recording status • Warnings related to device connection failure
5	Free entry text. Default text is "ProtoFlow test".
6	Display of the current temperatures at freely mounted additional sensors from Profile recorder (option). N/A means that the oven is not equipped with a Profile recorder *This function is not available for ProtoFlow E!!!*
7	Check the box to start the oven automatically by pressing the START button or start the profile recording automatically when the process is started on the oven. This function requires registration (see chapter Registration)
8	Manual Start of profile recording and automatic start of the oven if Autostart box is selected.
9	Link to the LPKF web site
10	Manual Stop of the profile recording *This function does not stop the oven's current profile, it has to be stopped manually.*
11	Remaining time until the end of the current phase
12	Reference line of the Reflow temperature
13	Real time temperature chart of selected sensors. Separate lines can be hidden/shown.
14	Reference line of the Preheat temperature
15	Check box to show/hide the display of reference lines

START

To start the profile recording, first start the process on the oven and press the Start button in FlowShow SE.

Optionally, when FlowShow SE has been registered, Autostart of recording can be enabled.

Autostart enables an automatic start of profile recording, when the profile on the oven has been started, or an automatic start of the current profile on the oven when the Start button in FlowShow SE has been pressed.

The Autostart function requires registration.

STOP

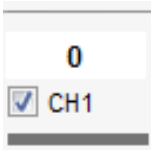
Recording can be stopped automatically when the cooldown phase is finished, or stop it manually by pressing the Stop button.

After stop, FlowShow SE offers to save the recorded data: export it to CSV, draw an Excel chart or skip exporting. When recording is not stopped manually, the export option is offered at the end of the recording.

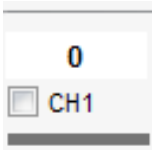
Pressing the Stop button doesn't stop the process on the oven. It has to be stopped manually on the oven.

CHART VIEW

A different view of the chart is possible. To switch on/off the display of separate sensors and reference temperatures, alternation of the check boxes beside the names is required.

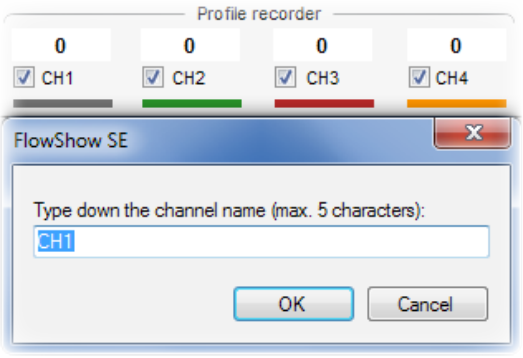


Visible



Hidden

Names of the additional sensors from the Profile recorder can be renamed by double-clicking the name field. Up to 5 characters are allowed.



Changing the display or names of the sensors is only possible at the active sensors.
N/A means “sensor – Profile recorder not available”.
ProtoFlow E shows one sensor – CENTER only.

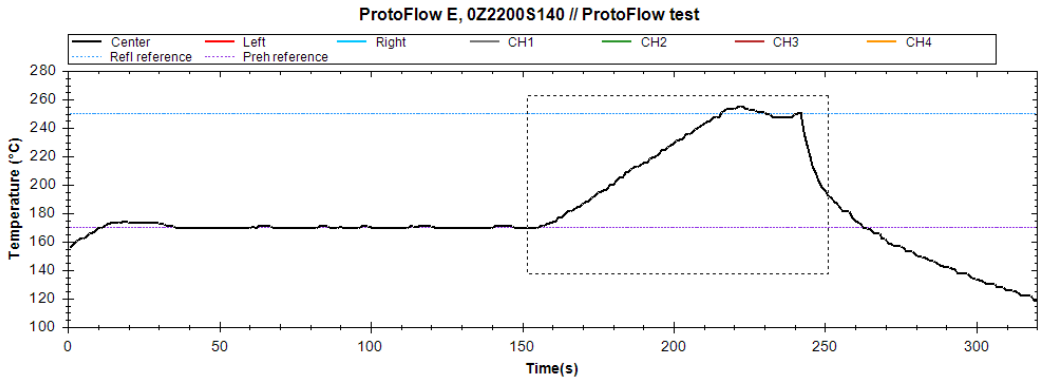
CHART HANDLING

When a profile has been recorded, the chart can be window-zoomed, exported as CSV, XLS chart, BMP image, or printed. The special functions are available by right-clicking the mouse.

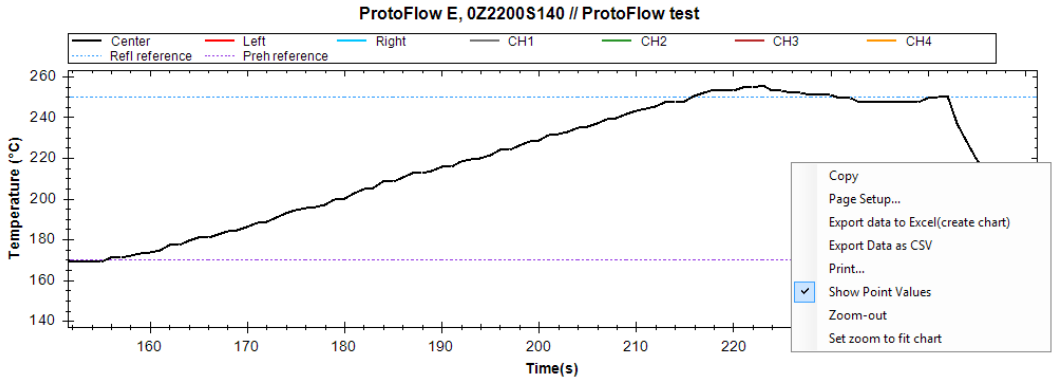
ZOOM

For detailed checking and reviewing of the graph, a zoom function is available.

- To zoom in: Click and drag the mouse over the layout in order to define the part of chart to be zoomed.



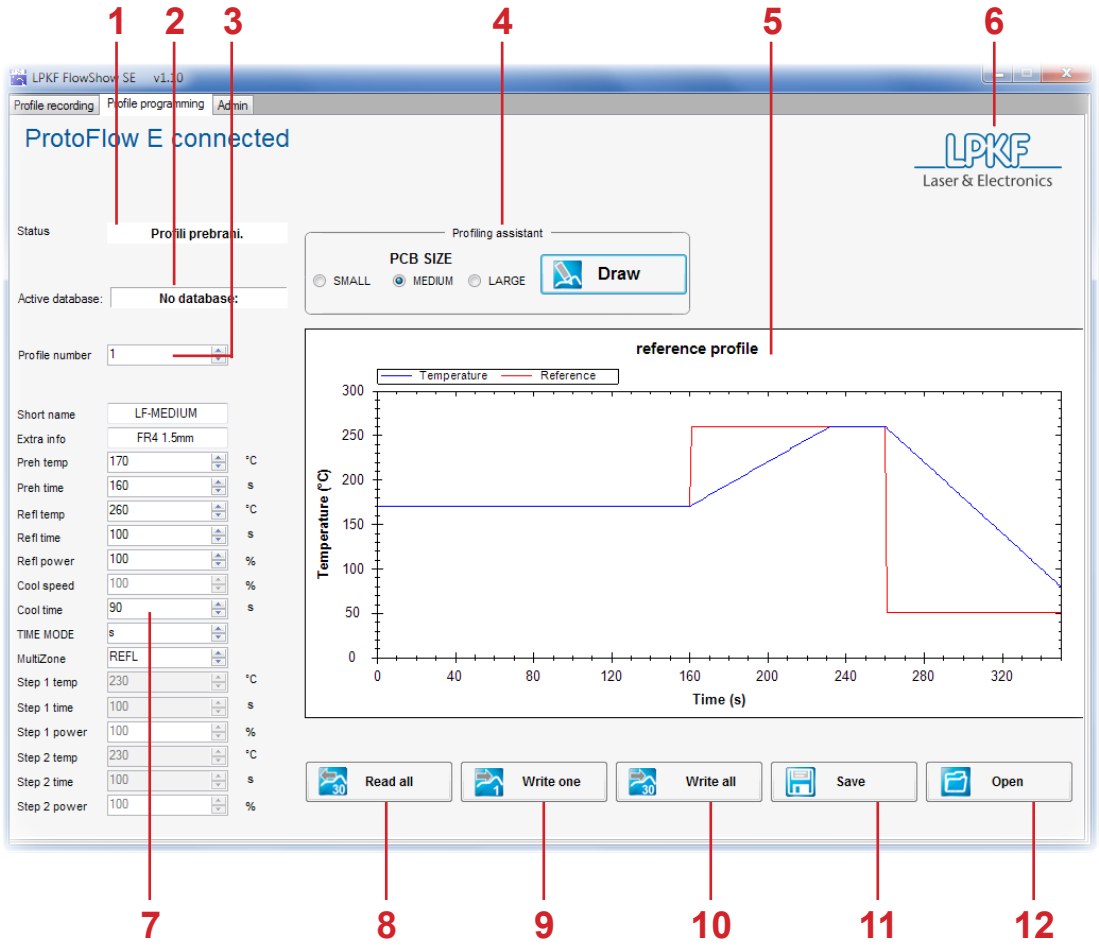
- To zoom out (1 level); click the right mouse button, select the “Zoom-out”.
- To fit chart (overview); click the right mouse button, select the “Set zoom to fit chart”.



A right mouse button click on the graph provides other functions as well:

- Copy the graph to clipboard
- Page setup
- Export data to Excel chart
- Export data as CSV
- Print
- Show point values

3.6 Tab 2 - Profile programming



1	Oven status messages	2	Name of the latest read/loaded database
3	Profile number from oven profile number	4	Profiling assistant
5	Theoretical profile created from parameters entered	6	LPKF home page
7	Profile parameters	8	Read entire database from oven
9	Write selected profile to oven	10	Write entire database to oven
11	Save current read/loaded database	12	Open saved database

No.	Description
1	The current status of the oven is shown.
2	The name of latest read/loaded database is shown. Possible status: database from oven, database from disk...
3	The number of oven profile parameters that can be shown and modified in profile parameters table. The number of profile can be selected by scrolling the menu. A maximum 30 profiles can be stored in the oven database.
4	Profiling assistant is a useful tool for optimizing profile parameters (see explanation below)
5	A theoretical profile created from the profile parameters entered (reference) and temp/ time profile expected (temperature) in the oven regarding the ramp rate.
6	Automatic connection to the LPKF web site
7	Profile parameters, which can be modified. The set parameters are shown as reference in the “reference profile” chart. Adjusting of parameters is necessary to obtain the correct profile (see explanation bellow).
8	All 30 profiles can be transferred from the currently connected oven. The current oven profile is also updated in the Profile recording tab.
9	Write the currently shown profile in the database to the selected profile in the oven. The profile will be set as the current profile of the oven.
10	All 30 profiles in the selected database can be written back to the oven.
11	Save all 30 database profiles to a selected file location on computer (.fsp extension).
12	Open the database from the selected location in the computer (.fsp extension).

PROFILING ASSISTANT

Profiling assistant is a useful tool for profile parameter optimization, before the profile is sent to the oven and tested.

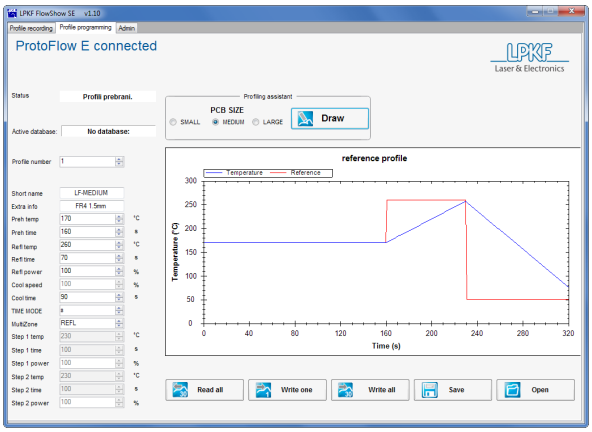
To use Profiling assistant select the PCB size which is most frequently linked with your PCB and press the DRAW button.

To select the adequate PCB size, move the mouse cursor to a name, SMALL, NORMAL or LARGE, to obtain more information of the PCB size.

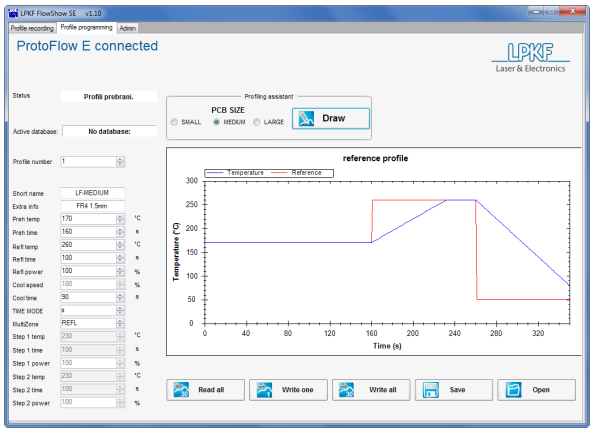
Profile assistant calculates the set parameters and oven specific ramp rate. The calculation, a theoretical profile for selected PCB, is shown in the chart as “temperature”. Calculation uses the default ramp rate.

Result of the calculation can be seen on the next page.

To make profile calculations more accurate, ramp optimization can be achieved by using the specific ramp rate of the connected oven. To obtain this ramp, the oven can be optimized. The Optimze function is available in the Admin tab. More details can be found in the chapter 7.4.7 “Tab 3 – Admin, Optimize description”.



Wrong set Reflow time; time is 60 s - too short



Correct set Reflow time; time is 90s - excellent

PROFILE PARAMETERS

Profile parameters can be inserted/modified with the same restrictions as on the oven, and must be identical. All parameters except Short name and Extra info can be modified by using the scroll menu, or can be written. The set parameters are shown in the “reference profile” chart as “reference”.

To check if the inserted value is appropriate for your oven and if it can achieve the desired process, press the “Draw” button after inserting a new value.

FlowShow SE does not allow a comma (,) to be used in profile names. Profiles previously including a comma in their names will be automatically renamed with a dot (.) and written to the oven.

The maximum value of a separate parameter is the same as on the oven. When the inserted value is too high, the system will write the maximum value automatically. For more details about maximum values of separate parameters see the ProtoFlow User manual.

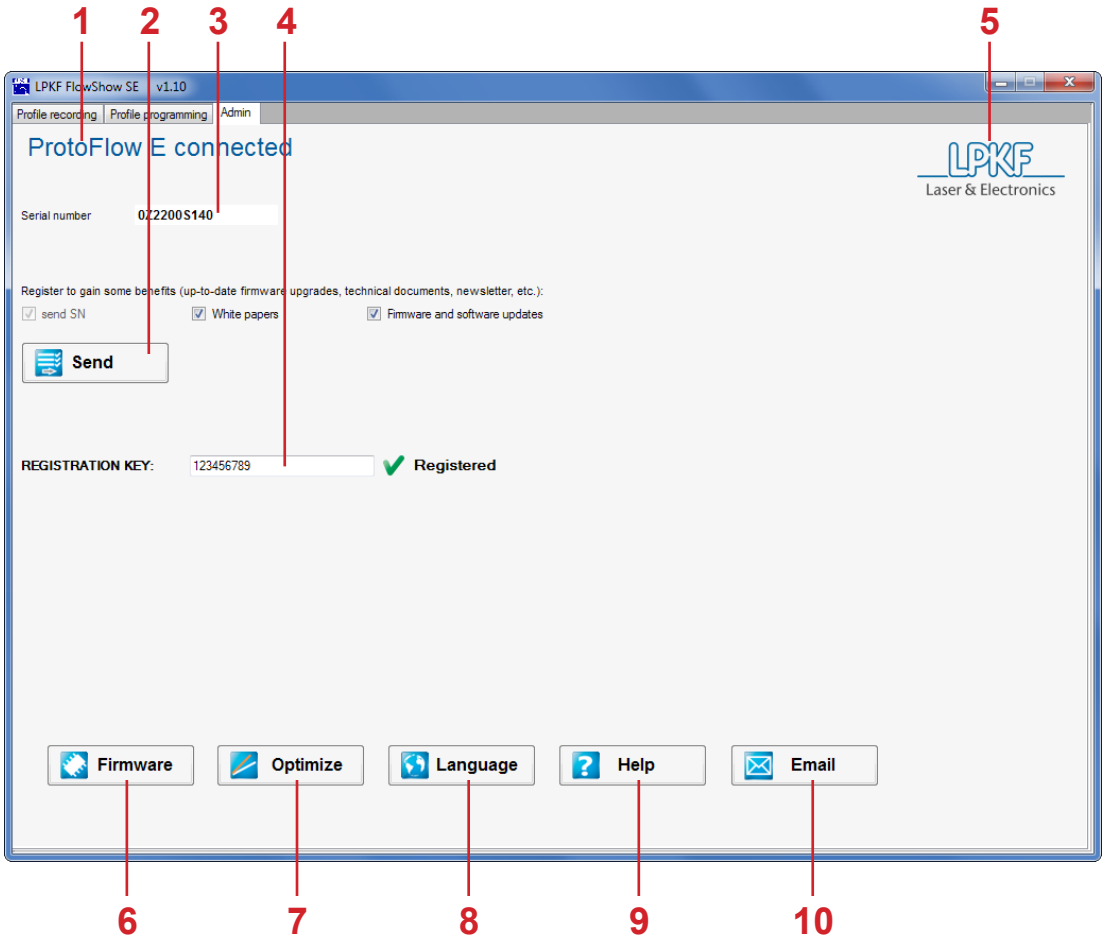
READ, WRITE, SAVE, OPEN

The read, write, save, open functions allow oven profiles to be sent to the FlowShow SE program, after modification they can be sent back to the oven, stored in the computer and opened again at any time.

PROGRAMMING PROCEDURE

- Read all profiles from the oven (press the “Read all” button)
- Adjust the current and all other profile parameters, if necessary (use Profiling assistant for help)
- Write the profile (profiles) to the oven and/or computer database.

3.7 Tab 3 - Admin



1	Device connection status	2	Send serial number of oven and other details to LPKF for registration
3	Serial number of currently connected oven	4	Registration key field
5	LPKF home page	6	Upload firmware to oven
7	Optimize reflow ramp-up rate (requires registration)	8	Change UI language
9	Open user manual	10	Send email to LPKF support

No.	Description
1	The current status of the oven is shown.
2	Default email client creates a new email which contains the registration data. The registration field allows the user to send the registration request by email. They can select options they should receive after registration. The serial number and sender e-mail are generated automatically.
3	The serial number of the currently connected oven.
4	The registration key field allows insertion of the registration key or licence number, which is sent to the sender by LPKF. The registration key or the licence number brings some additional benefits. (for more details see the Registration & Licence paragraph)
5	Automatic connection to the LPKF web site.
6	The button allows the user to upgrade the firmware on the oven.
7	OPTIMIZE button automatically starts the OPTIMIZE oven profile and measures the ramps in the reflow phase. The measured data is used to calculate ramps in PROFILE ASSISTANT chart drawing.
8	Change the user interface language. Select desired language from the drop-down menu.
9	The HELP button opens the User manual in pdf format. A PDF reader is required.
10	Send email to LPKF support team

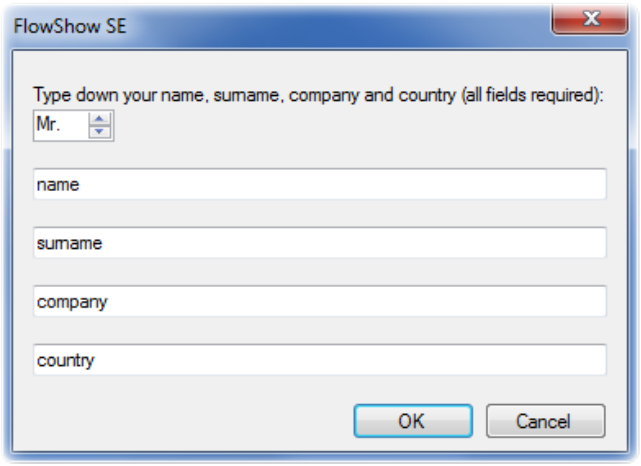
REGISTRATION & LICENCE

This chapter is various depend on the oven types.

Registration (Only for ProtoFlow S)

Free registration brings some benefits, like autostart, ramp optimization, whitepapers and firmware updates.

To register follow these steps:
- connect the oven
- wait until the serial number has been read
- select check the desired options (whitepapers, firmware and program updates)
- press SEND
- Fill the registration form (all fields are required)



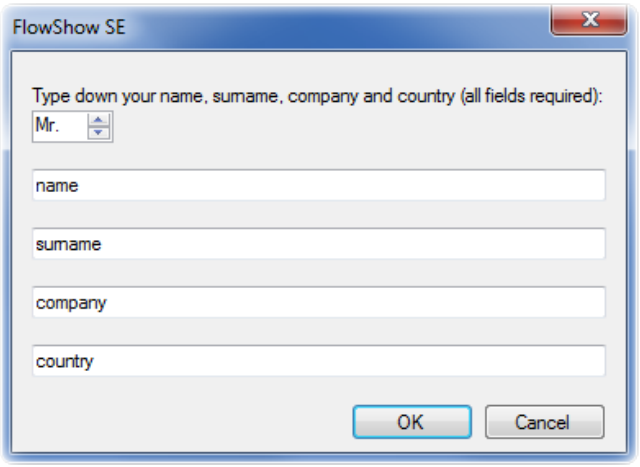
The default email client creates a new email containing the registration data.
A feedback email will contain the registration key.

Enter the received key in the registration field (note 4). A green checkmark will be shown when the registration is successful.

Registartion & Licence (Only for ProtoFlow E)

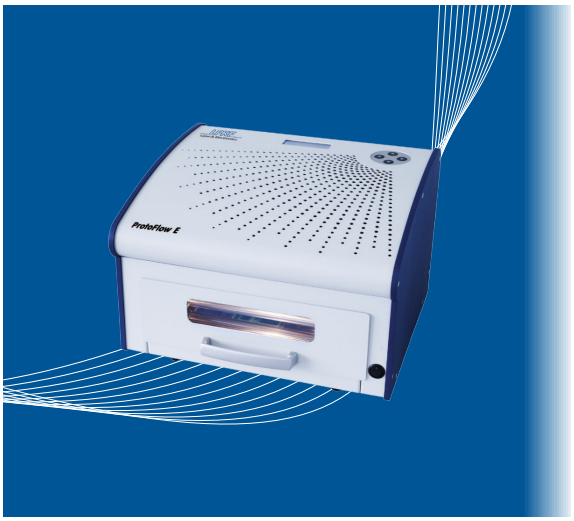
Free registration brings some benefits, like whitepapers and firmware updates.

To register follow these steps:
- connect the oven
- wait until the serial number has been read
- select check the desired options (whitepapers, firmware and program updates)
- press SEND
- fill the registration form (all fields are required)



The default email client creates a new email containing the registration data.

Licence brings full functionality like autostart, ramp optimization, profile managing etc. (Tab 1 and Tab 2). Licence is payable.



LPKF FlowShow SE

Oven's S/N:
0Z2200S140

Licence key:
2319221

How to activate your FlowShow SE:
Type your licence key into Registration field, found in Tab - Admin. A green checkmark will be shown when the registration is successful.

If you have any trouble, please contact LPKF technical support:
support@lpkf.si

LPKF Laser & Electronics

Enter the received licence key in the registration field (note 4). A green checkmark will be shown when the registration is successful.

NOTE:
Registration & licence free 30 days trial is available. To activate, type TRIAL in registration field.

In the event the computer is not connected to the internet or an email client is not installed, email for the registration can be sent by another computer to support@lpkf.si with these contents:

ProtoFlow model (S or E): Serial Number, Receive whitepapers : YES or NO, Receive firmware and software updates : = YES or NO, Salutation: Mr., Name: name, Surname: surname, Company: company, Country: country

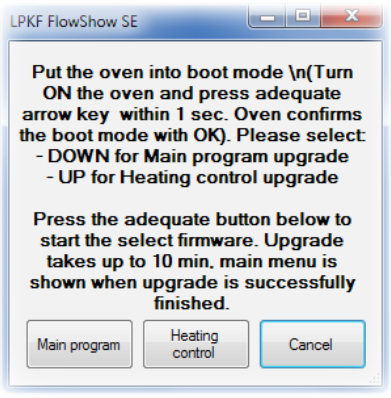
Example:

ProtoFlow S: 0Z2000N001, Receive whitepapers : YES, Receive firmware and software updates : YES, Salutation: Mr., Name: Darko, Surname: Molicnik, Company: LPKF d.o.o., Country: Slovenia

Disclaimer: see chapter 1.3 - Warnings.

FIRMWARE UPDATE

Firmware updating will bring improvements or new features into the oven.
To upgrade follow this procedure:



To upgrade oven firmware:
- press the Firmware button
- turn ON the oven
- press the desired button on the oven within 1s to enter the boot mode

  ⇩ DOWN for Main program upgrade

  ⇧ UP for Heating control upgrade

- Click the right firmware upgrade button and select the .HEX file to be upgraded (i.e. ProtoFlowS_main program V3.10.hex).

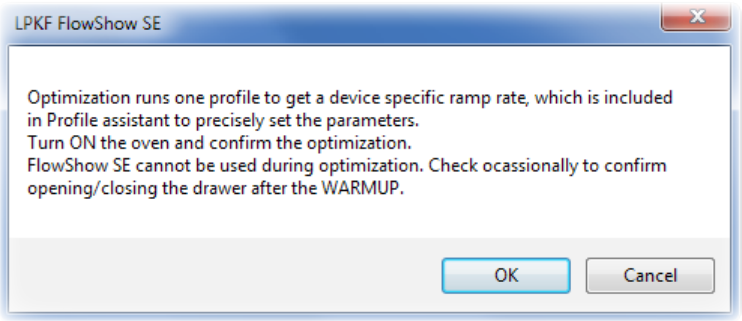
FlowShow SE and ProtoFlow oven cannot be used during this time.
Firmware upgrade takes up to 10 minutes.
Do not cancel the procedure.

OPTIMIZE

This function requires registration

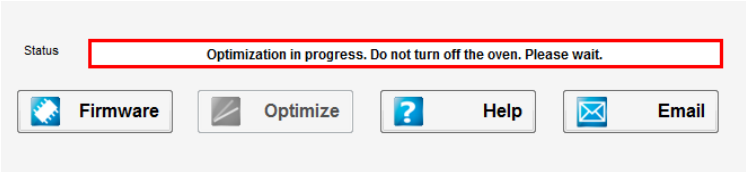
Optimization runs one profile to measure a specific ramp-up rate on the connected oven. Profile assistant includes the measured ramp-up rate when calculating profiles and helps you to precisely set profile parameters.

To start optimization:
- turn ON the oven,
- open the “Admin” tab,
- press the “Optimze” button,
- read the instructions carefully.



Confirm optimization. Backup of the profiles will be done automatically.

The “Optimization in progress. Please wait” window is flashing. Wait for the profile to be completed.

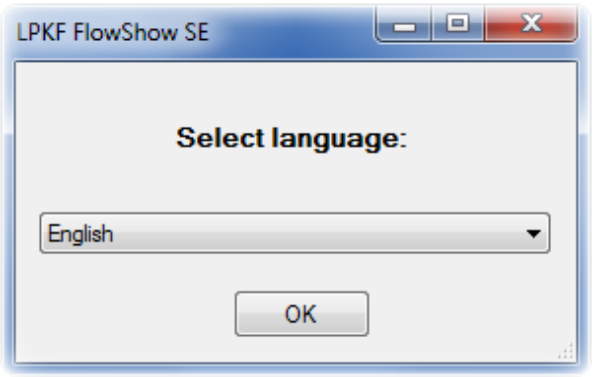


Check occasionally to confirm opening/closing of the drawer after the warmup phase.

Other FlowShow SE functions cannot be used during optimization

LANGUAGE

Language of the user interface can be changed anytime using Language option. Select the desired language from the dropdown menu and confirm with OK.



HELP

The FlowShow SE program is supported by help files.
Help files bring you:

- Opening of user manuals
- “How to” documents
- Different whitepapers with new information about FlowShow SE, processes, ovens, other devices.

Click the button to open the default folder with the user manual, whitepapers, and select the appropriate manual.

To open the document, a PDF Reader is required.

EMAIL

For any complains, problems, questions, suggestions, an email in the default email client can be created. The LPKF Slovenia support team will be automatically contacted.

4 TROUBLESHOOTING

In some cases you can correct a fault in device operation yourself following the guidelines stated below. In the event that you do not succeed do not continue with any repairs, but immediately contact an authorised serviceman/distributor of LPKF devices.

Fault/Defect	Cause	Procedure
Installation is interrupted because NET Framework is not installed.	.NET Framework 4.0 or newer has to be installed first.	Manual installation is required. Find Framework folder on the enclosed CD and run *dotNetFx40_Full_x86_x64.exe*
The device is not recognized.	USB drivers are not installed.	Install or reinstall adequate USB drivers
	There is no USB connection between computer and the device.	- Check connection - Check USB cable
	The device is not turned ON.	- Turn ON the device - Check other faults described in the device user manuals
Parameters of the current profile is not the same as on the oven.	Device works with the firmware version, compatible only with the previous version of FlowShow.	Upgrade to the latest version of the Firmware is required.
Program does not function properly after UI language has been changed.	Windows OS	For changes to take effect, program has to be closed and reopened manually.
Registration key is not remember at exit	Only 64-bit Windows 7	FlowShow SE program must run as administrator.
The virtual COM port is not installed correctly.	Only 64-bit Windows 7	This driver is not important. Oven needs just DLL driver. You can skip this installation.