LEINE LINDE

Programmable Speed Switch Monitor

FOR 800 SERIES, 1000 SERIES AND GATEWAY

MANUAL / USERS GUIDE

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LEINE LINDE

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1 Introduction

1.1 About Programmable Speed Switch Monitor

Leine Linde's Programmable Speed Switch Monitor is a speed detection system that can be integrated in an encoder or a gateway together with a separate input from an incremental encoder. It features four different relay switches which can be manually programmed for optional switching speeds. One of the relays can be set to detect any functional errors in the Speed Switch unit.

The Speed Switch unit is programmed with the help of the PRSS Monitor software. Connection for programming is made via a cable with USB to Type A mini b-plug.

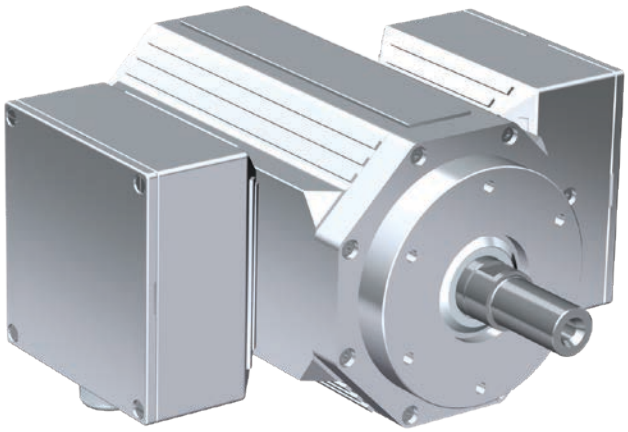
The relays may be connected to maximum 30 Vdc and 2 A.

1.2 About 800 series

The 800 is an extreme robust encoder series which comes in various mechanical solutions, hollow shaft or solid shaft.

With the programmable speed switch integrated into the encoder and accessed by a mini-USB through an opening in the rear cover, it is easy configurable when installed or before installation.

1.3 About 1000 series



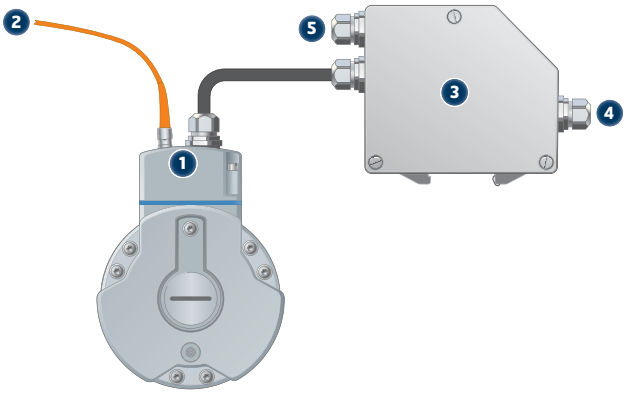
The 1000-series is designed to meet exceptional requirements in real heavy duty application.

With sturdy bearings and enclosure the 1000-series encoders achieve extraordinary durability towards mechanical stress, shock and vibrations as well as dusty environments with high temperatures.

1.4 About encoder gateway

The advantages of the gateway concept is that it allows the use of small and very robust incremental encoders, which make the encoder gateway solution suitable in applications where there are space or mechanic limitations.

The programmable speed switch encoder gateway is compatible with 6 channels HTL or HCHTL encoders within the 500, 700 and 800 series (except for FSI 800) but is typically combined with an encoder with two separate outputs, one for feedback to the motor drive system, and the other connected to the gateway itself to control wether speed reaches the critical levels.



1. Dual encoder with two galvanically insulated outputs.
2. Incremental signal for drive system
3. CRG Speed Switch
4. Relay output for speed switch or function alarm
5. Power supply

1.5 Technical and commercial support

Leine Linde is represented by subsidiaries in many countries around the world. In addition, there are many services agencies and distributors located worldwide ready to reply to commercial enquires or technical support.

For more contact information, please visit our web site or contact Leine Linde in Strängnäs, Sweden.

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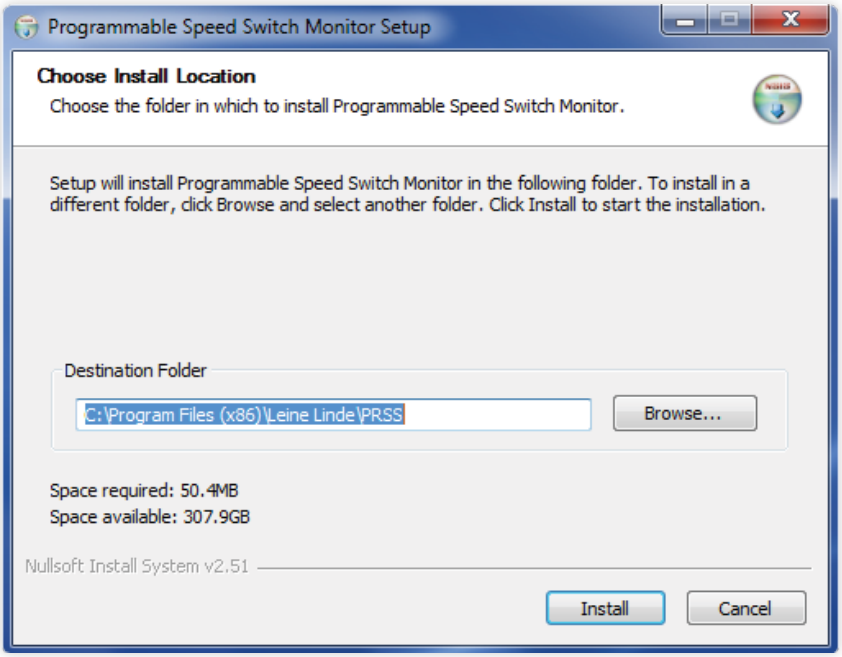
2 Installing the software

2.1 Download and install the software

System requirements: Windows Vista, XP, 7, 8 or 10.

Download the programmable Speed Switch PC-software from the website: www.leinelinde.com.



Follow the instructions given to install the PC-software.

To be able to identify the encoder on the PC-software an FTDI driver might need to be installed. This can be found in the Leine Linde folder: Program Files (x86)/Leine Linde/PRSS (CDM21216_Setup).

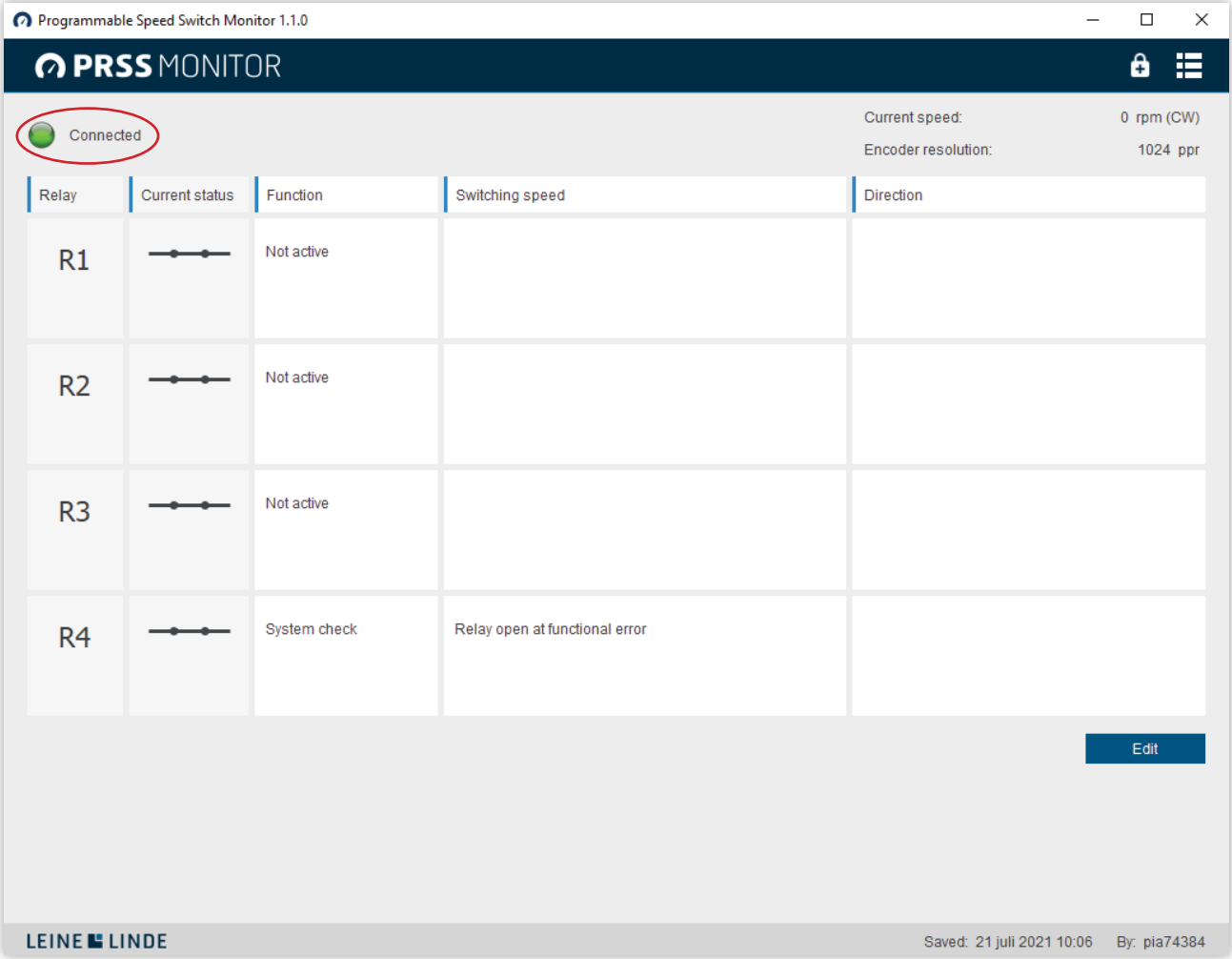
3 Functional description

A description of each available feature in the Speed Switch unit is made in this chapter. The title of each section in the text below refers to a graphical element in the PC software.

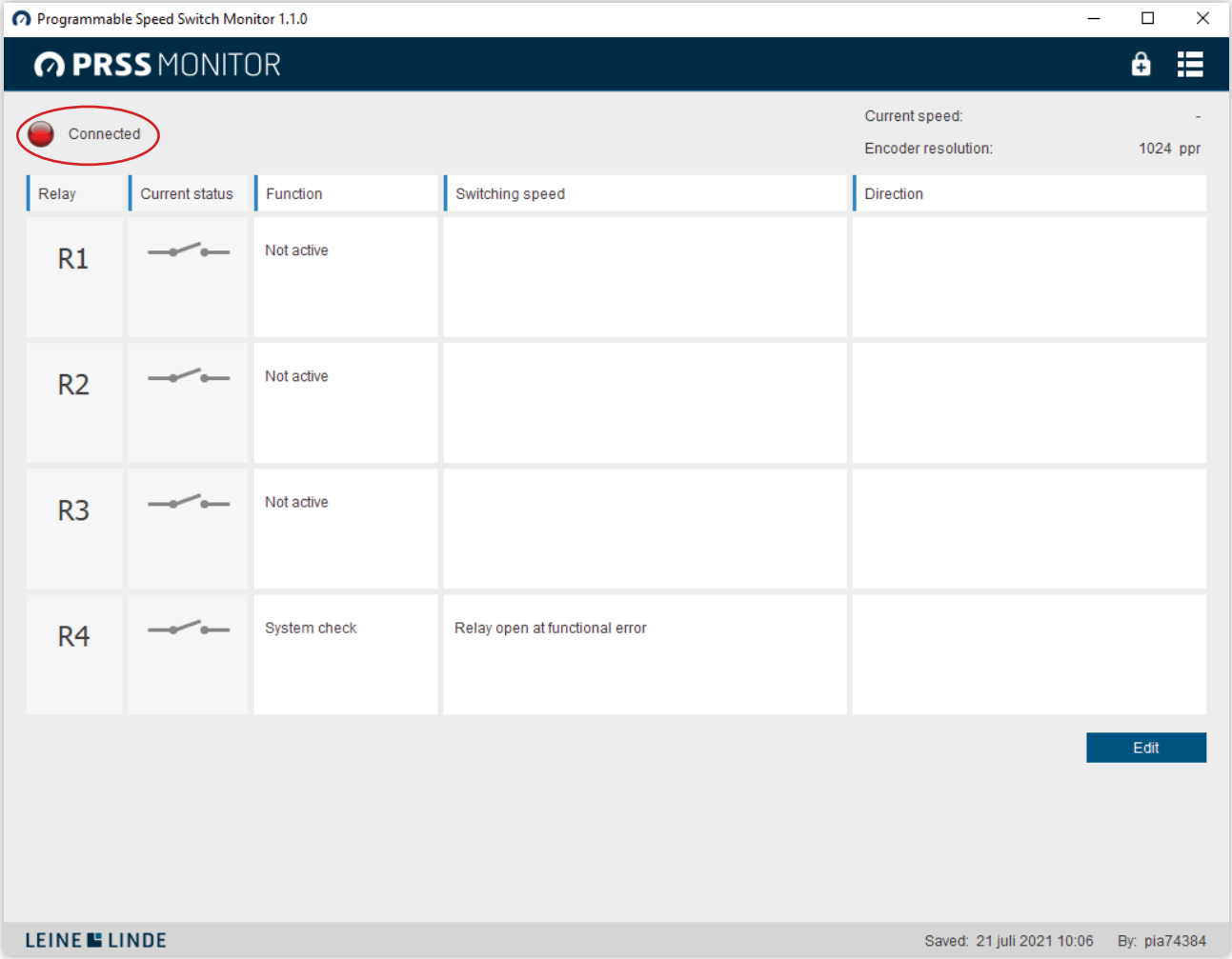
3.1 Digital LED

In the top left corner of the PC software a digital LED indicates the status of the Speed Switch unit. A green LED indicates that the Speed Switch unit is powered and fully operational. A red LED indicates an error or that only the programming mode is active. If the LED is grey, the unit is not connected to the PC or no serial port has been chosen.

For the Speed Switch function to be operational (green LED) the unit needs to be powered via an external power source of 9-30 Vdc.



For using the device in programming mode (red LED) only, it is enough to power the unit via the USB connection. Note that in the programming mode the unit is not able to detect the current speed or operate the switches.

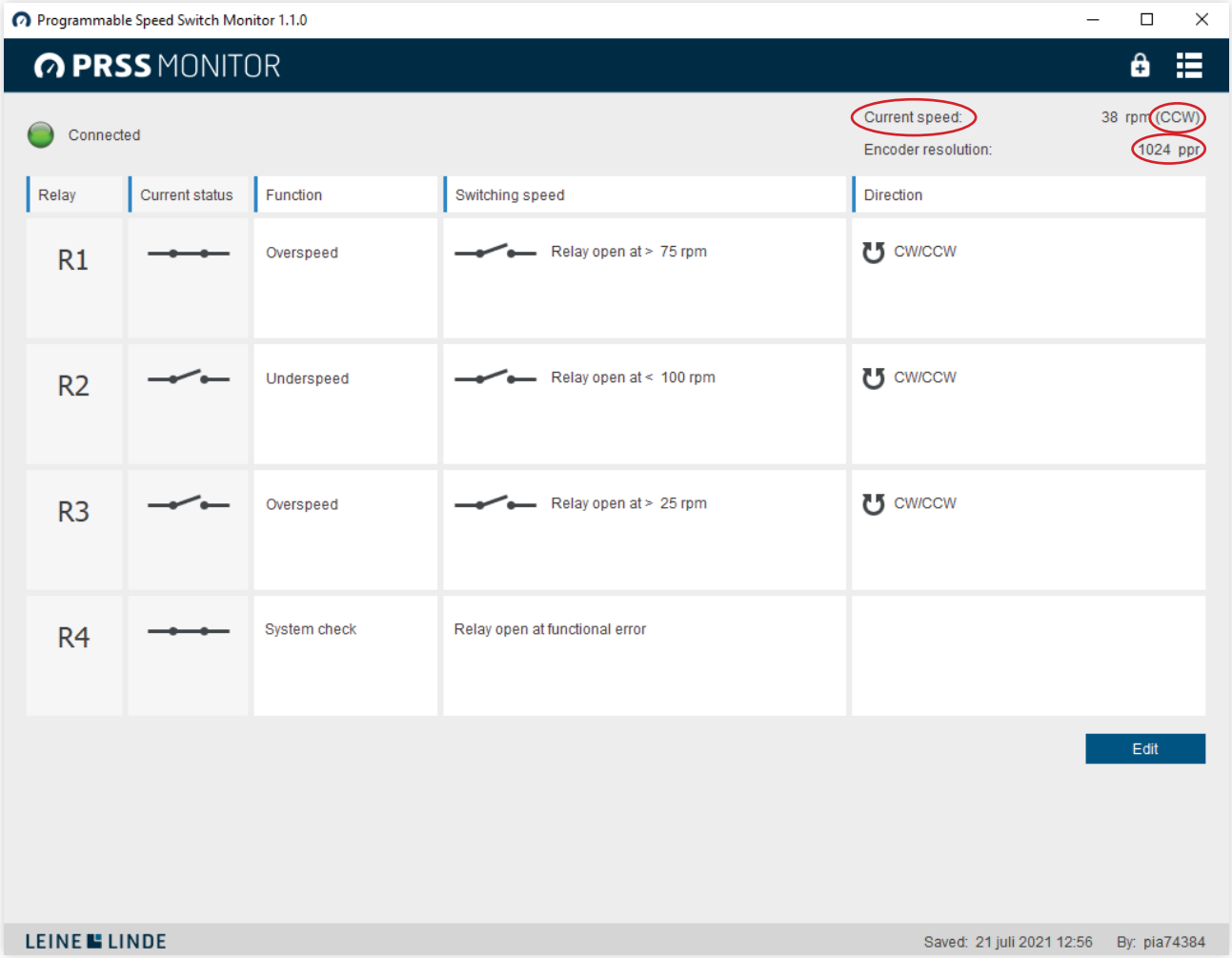


A red LED may also indicate that a functional error is detected in the speed switch unit. If R4 is set to alarm mode the relay will open and an error description will be given on the R4 row.

3.2 Current speed

The value in the top right corner indicates the current speed and direction of rotation of the shaft. This can be used as a help to test settings when configuring the unit. The shaft speed is expressed in revolutions per minute (rpm) and the direction of rotation as clockwise (CW) or counter-clockwise (CCW) seen from encoder shaft end.

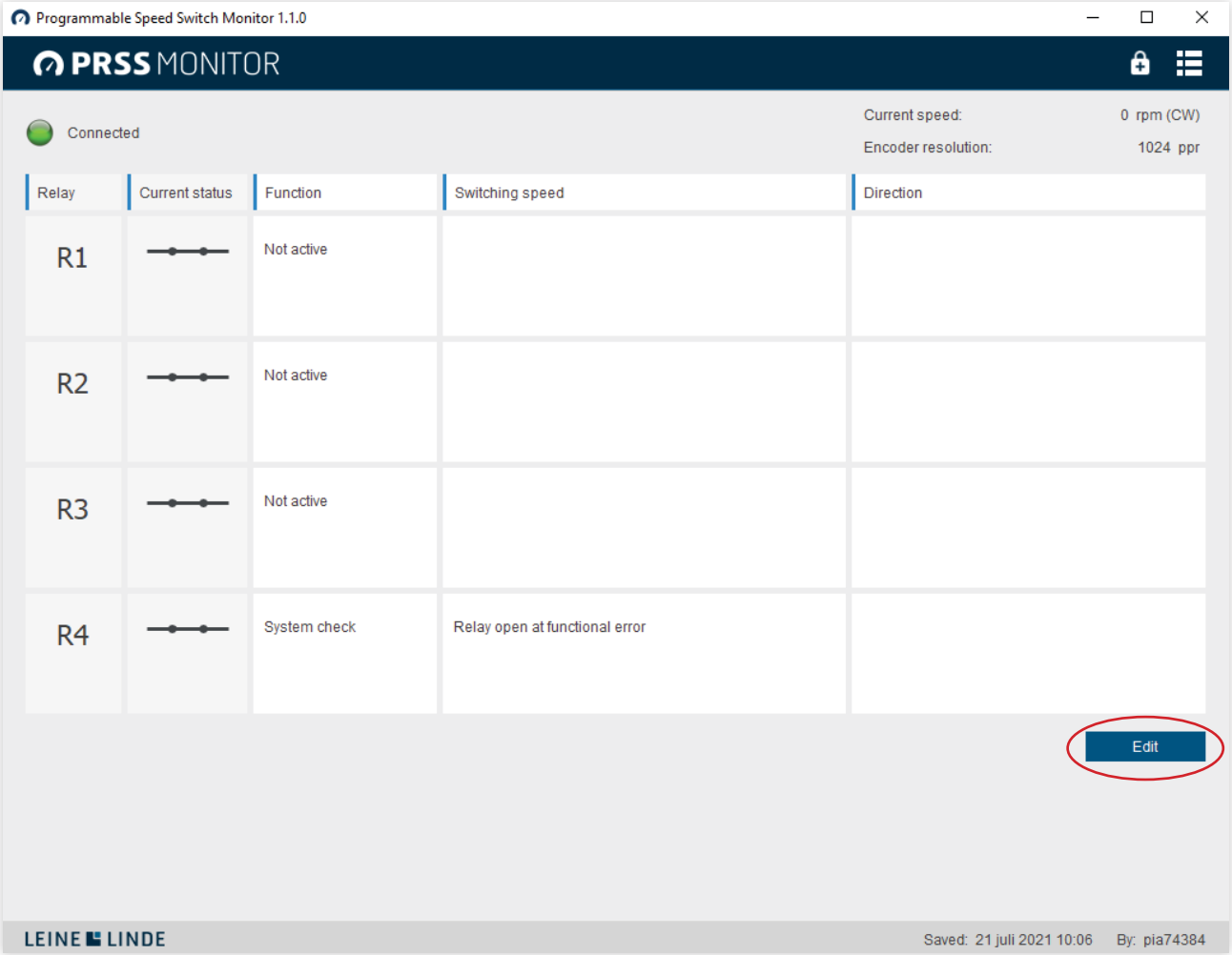
The encoder resolution is shown below the current speed. In case of use of a separate Speed Switch gateway, this field is empty by default. Enter the encoder resolution value by using edit mode (see chapter 3.8-3.9).



3.3 Relays

The Speed Switch unit has four output relays R1-R4, each configurable with its own separate settings. By clicking Edit the switching speed can be manually programmed to switch state at a desired rotational speed and direction of rotation.

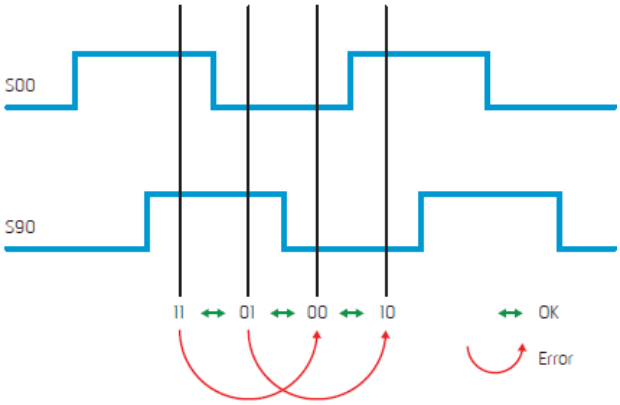
The relay R4 is by default set to alarm mode and will then open in case of functional error. To use R4 as relay for switching speed, fill in the desired values and settings and press save. To again use the R4 as alarm relay, press deactivate button and press save.



Relay 4 in alarm mode will detect if the relays don't open or close as they should, or if there should be a state transition fault (internal error).

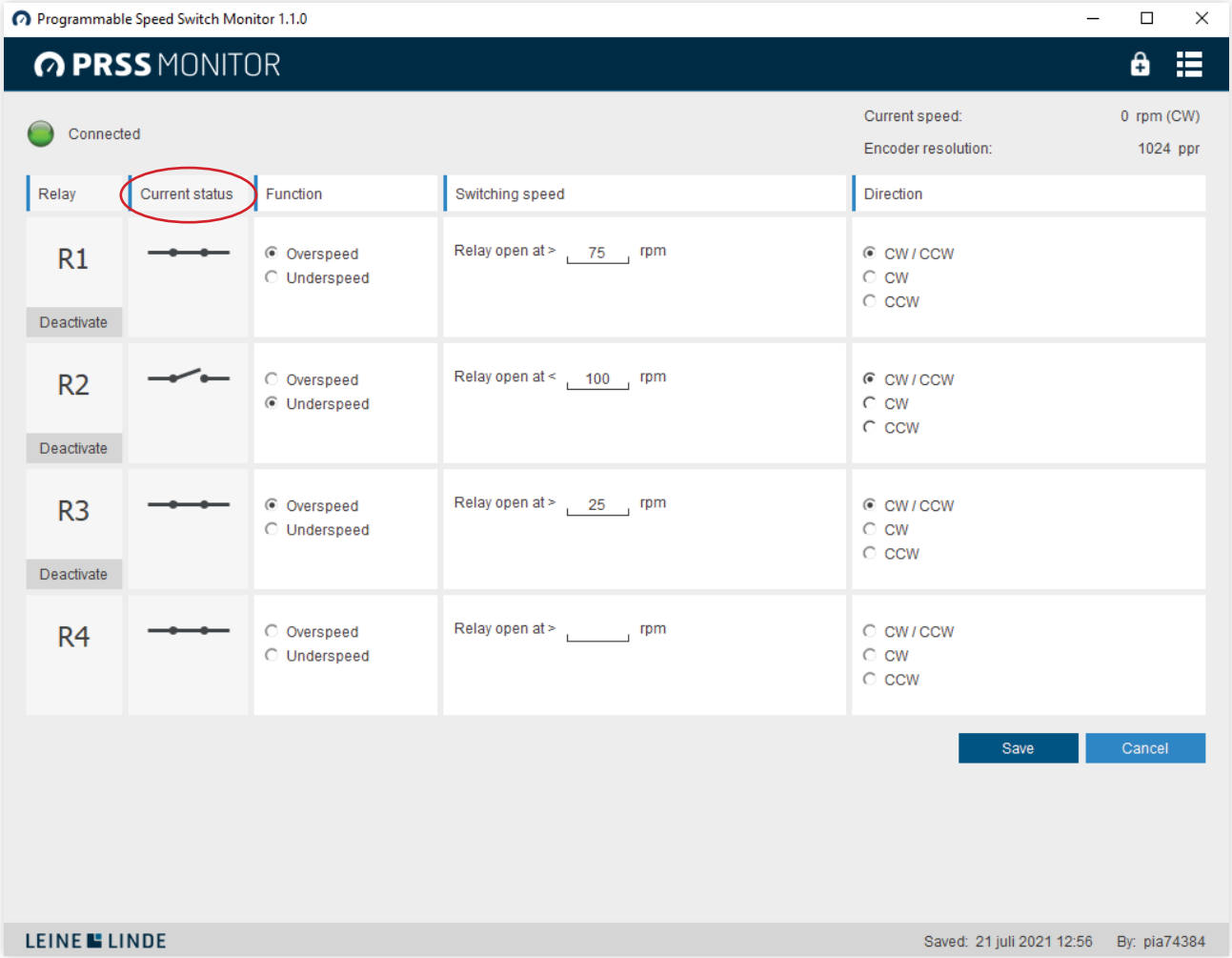
State transition fault
The change of state at channel S00 and S90+ is normally changed in accordance with the green arrows (see image). The alarm relay is activated if the state is change in accordance with the red arrows.

Cause: This fault can occur if the encoder is rotated too fast, if the optics is damaged or if the bearings are worn out.



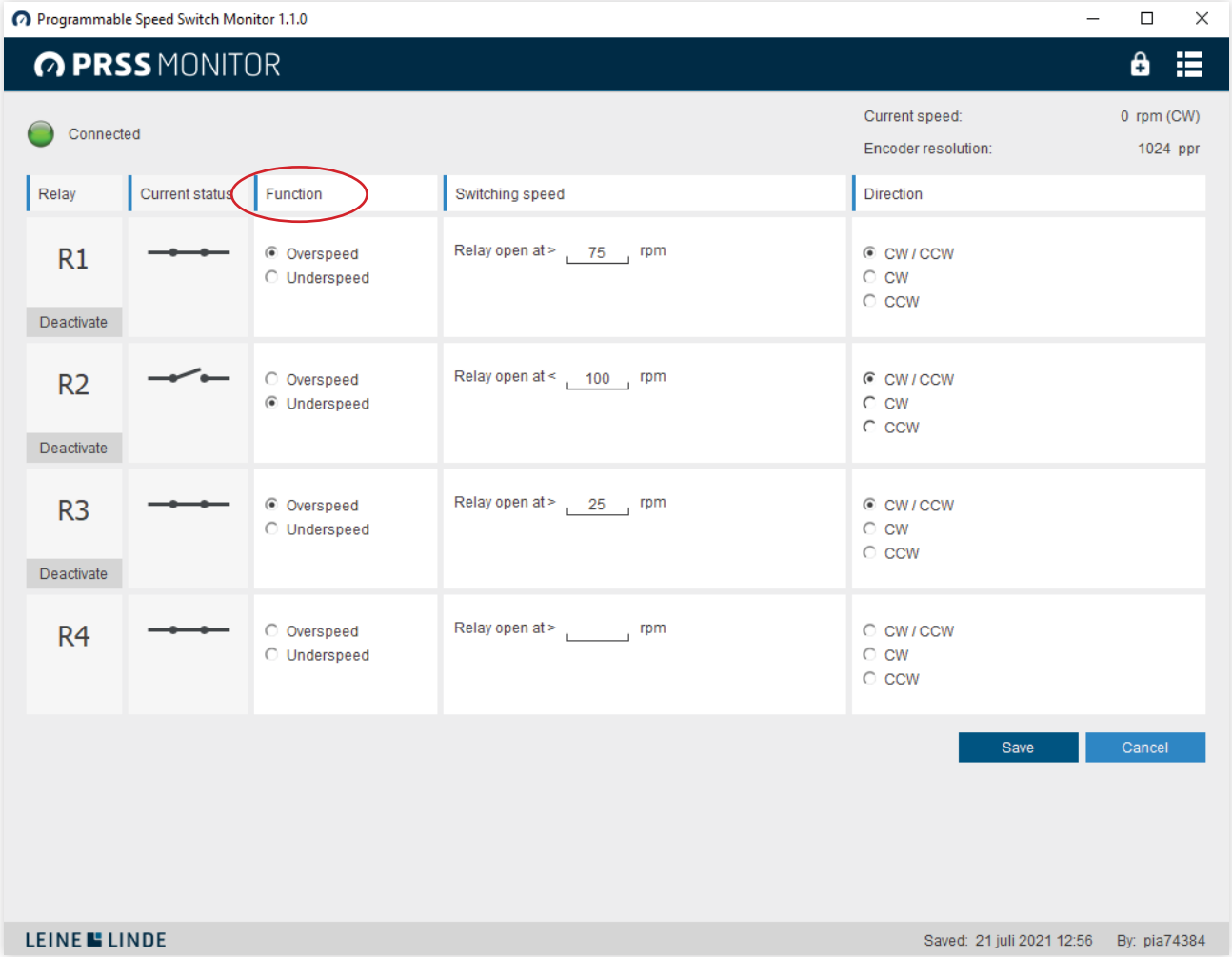
3.4 Current status

The Current status column shows the current state, open or closed, for each of the four relays. The symbols will switch state when the relays do, and can therefore be used for verification of the settings.



3.5 Function

Relays R1-R4 can be configured with overspeed or underspeed function.



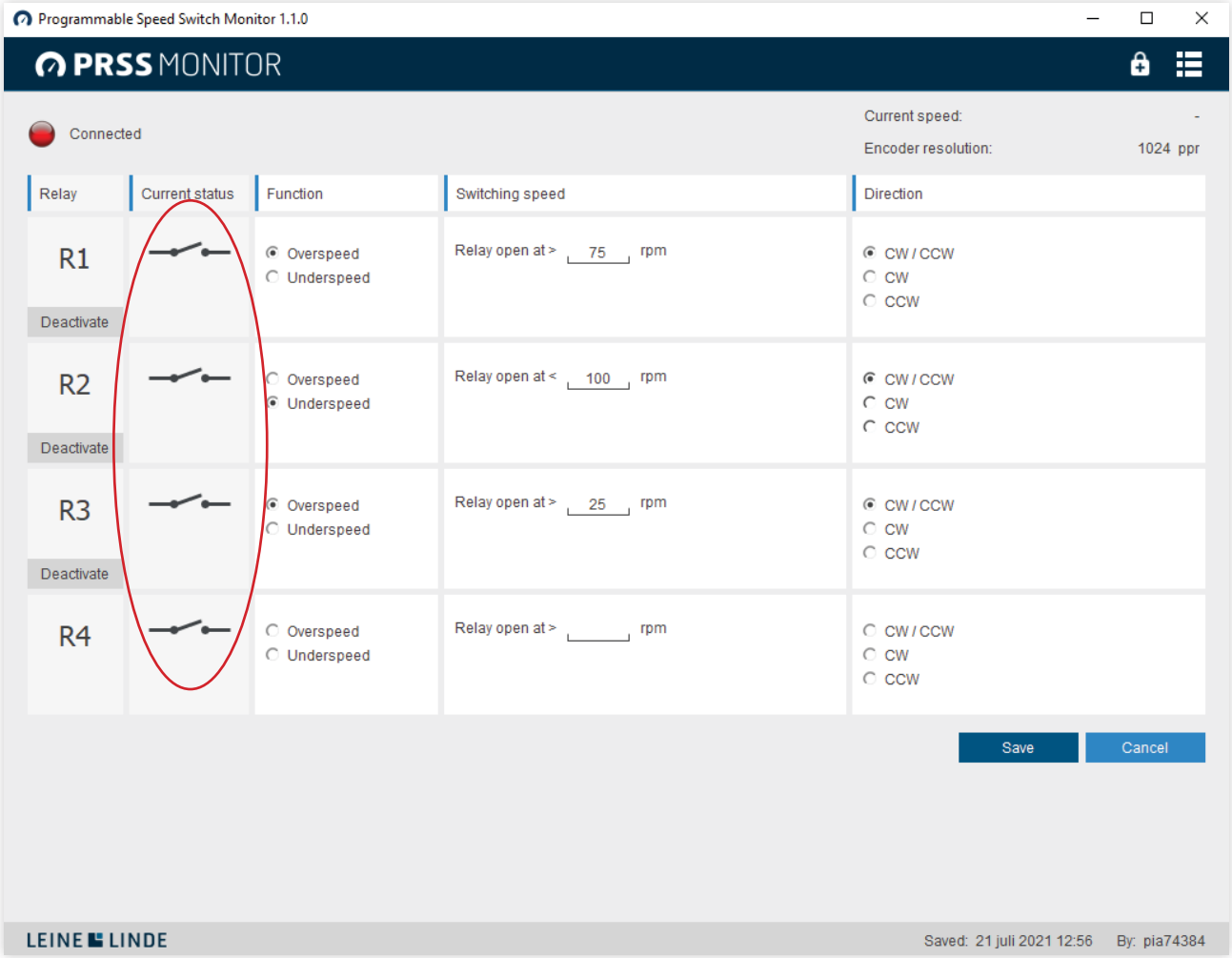
The overspeed option means the relay will be closed at low speeds and open at high. It switches at rising speed and switches back when the speed is decreased to a level -10% below the switching speed.

The underspeed option means the relay will be closed at high speeds and open at low. It switches at falling speed and switches back when the speed is increased to a level +10% above the switching speed.

Relay R4 can alternatively be set into alarm mode (default) and will then monitor the function of the Speed Switch unit. It is normally closed and will open if a functional error is detected. An error description will be given on the R4 row.

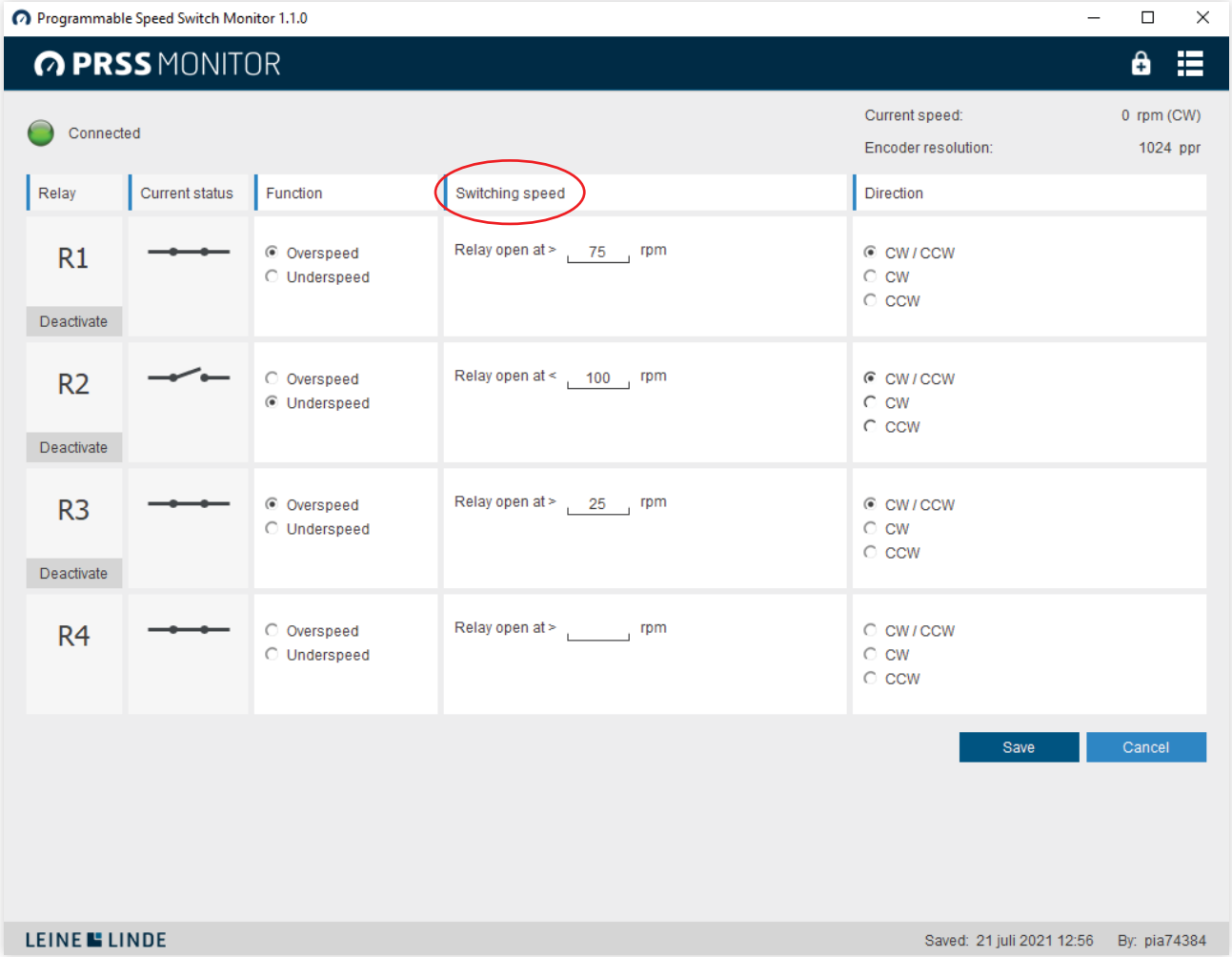
Error descriptions
R1 - do not open
R1 - do not close
R2 - do not open
R2 - do not close
R3 - do not open
R3 - do not close
Internal error

If the Speed Switch unit is not powered, the relays stay open, independently of the settings. Therefore, if the relays do not close when expected to, the power source is a possible fault cause.



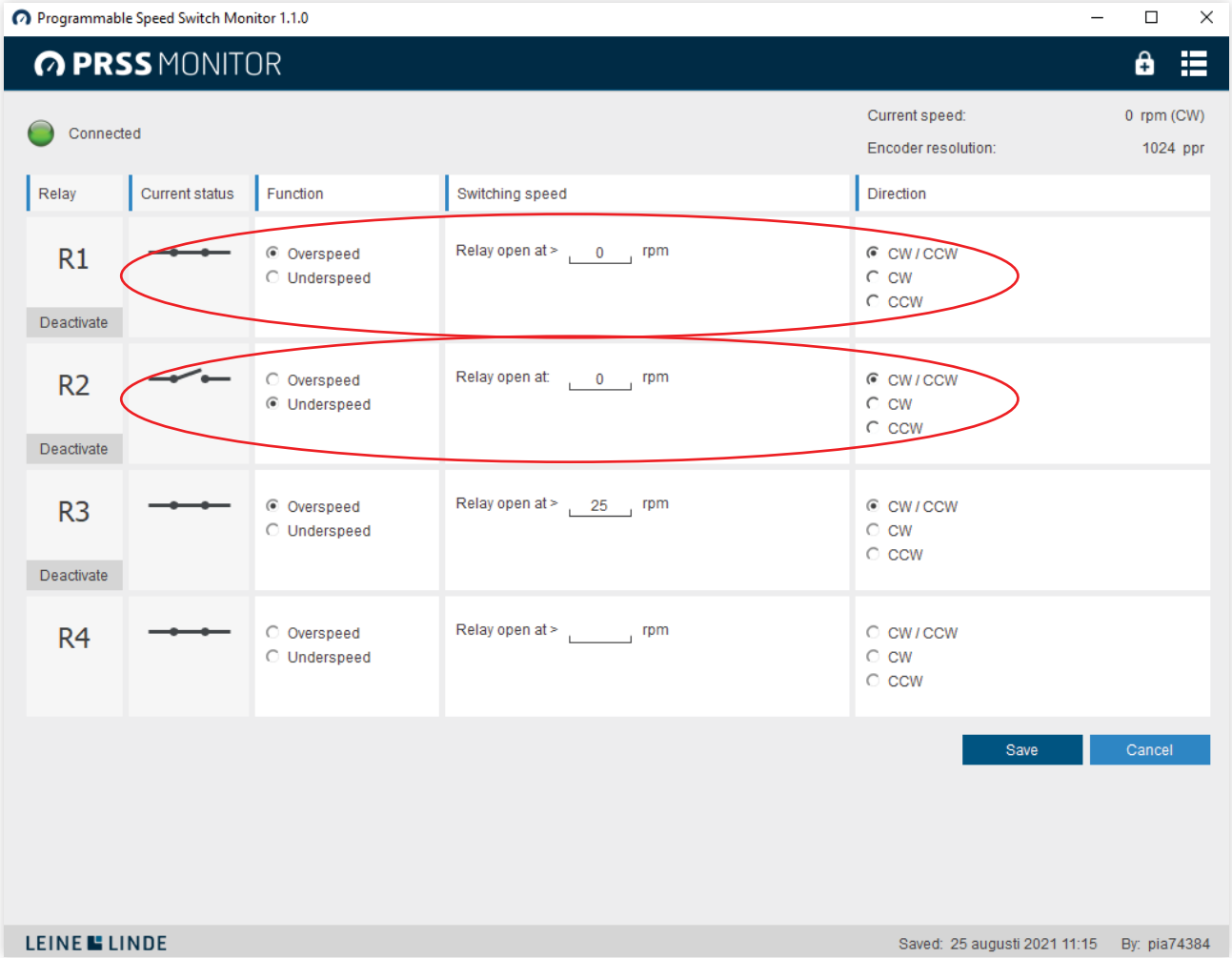
3.6 Switching speed

In the Switching speed boxes, the desired switching levels are configured. Any integer between 0 and 6000 rpm can be set. When using the overspeed setting, the relay will open when the current speed rises above the selected level (>). When using the underspeed setting, the relay will open when it falls below (<).



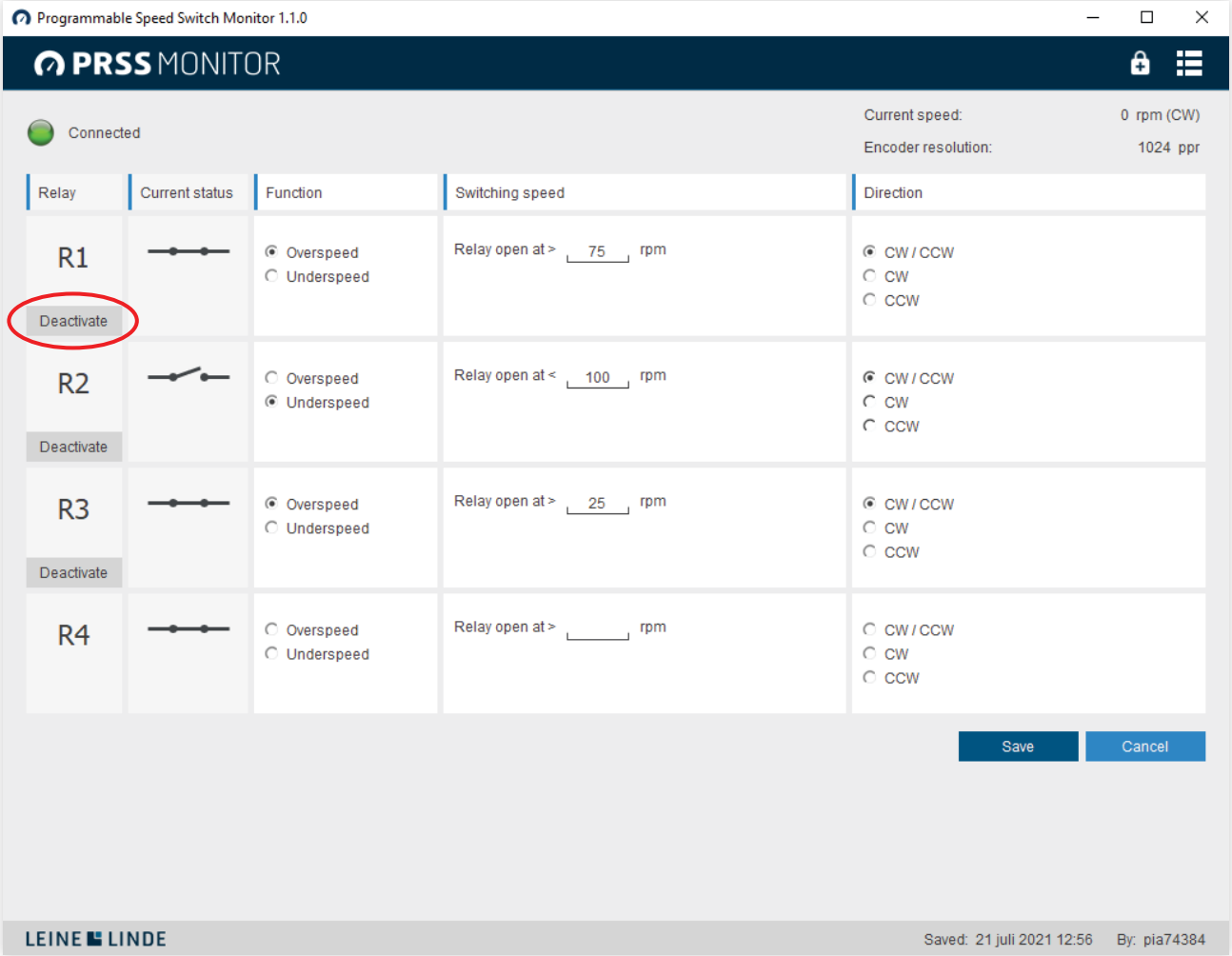
To be able to ignore very short speed peaks the averaging interval time can be set to a value 50 – 1000 ms, see chapter 3.11.

If the switching speed is set to 0 rpm, a standstill indication is created. The relay will be closed at 0 rpm and open at movement (if combined with the overspeed setting), or closed at movement and open at standstill 0 rpm (if combined with the underspeed setting).



Note: The switching speed function is not active until the user has set the values and saved the changes.

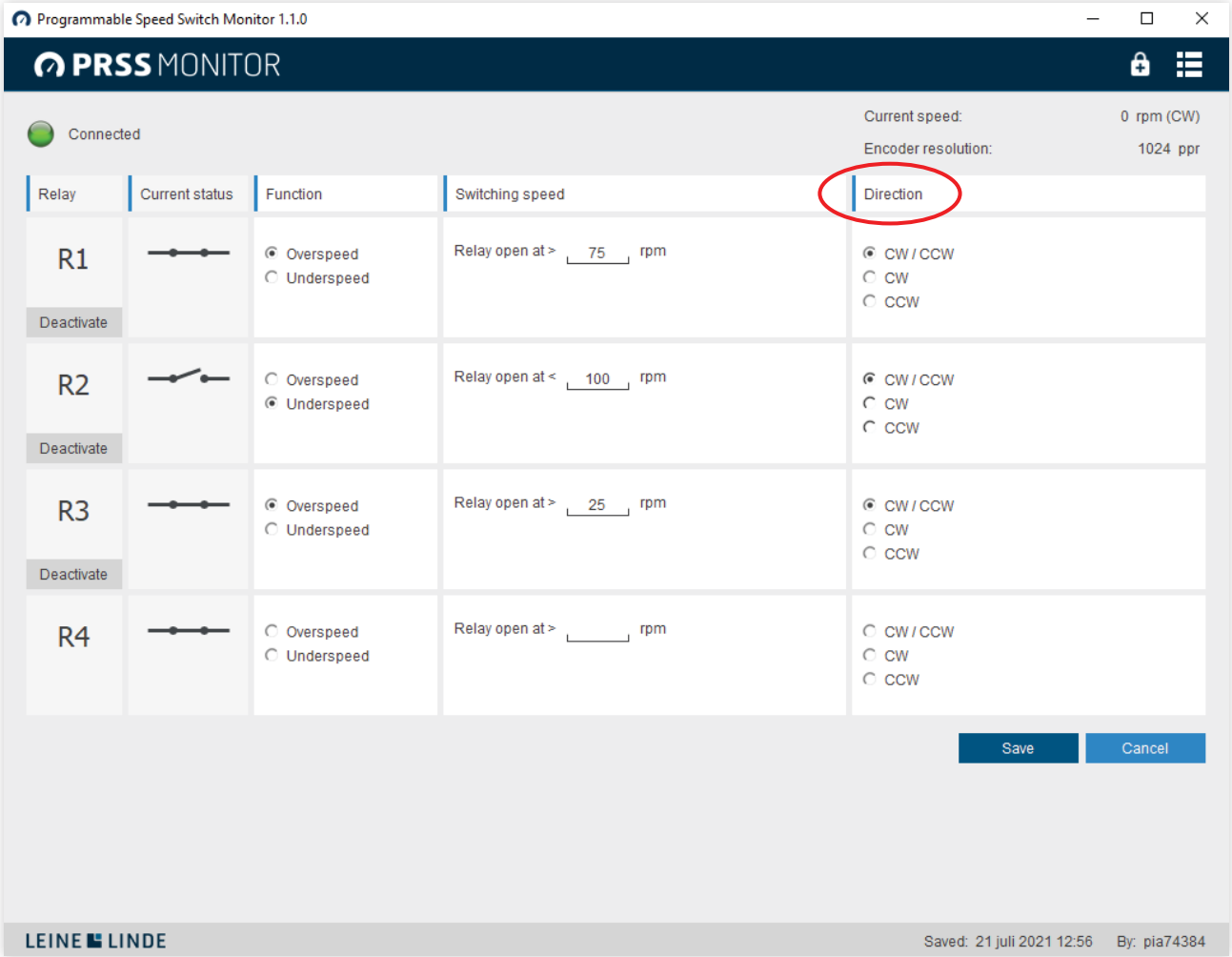
To deactivate a relay, click deactivate button.



3.7 Direction

The Direction option configures how the switching speed should be activated, as seen from the shaft end. With option CW/CCW switching speed is activated independently of the shaft rotation direction. With option CW it is activated only at clockwise rotation, and with option CCW only at counter-clockwise rotation.

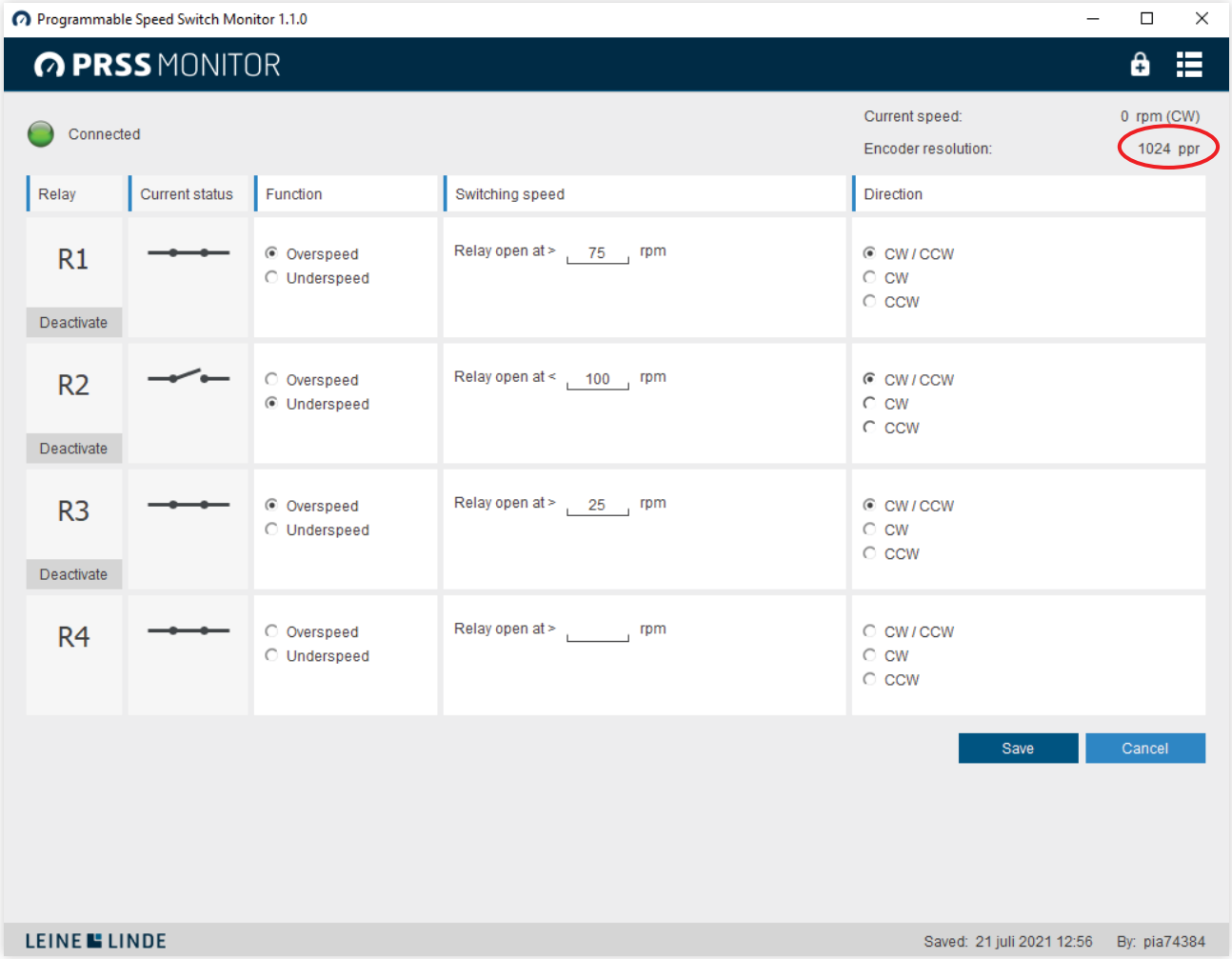
When choosing underspeed, the direction is automatically always set to both directions.



Note: The switching speed function is not active until the user has set the direction and saved the changes.

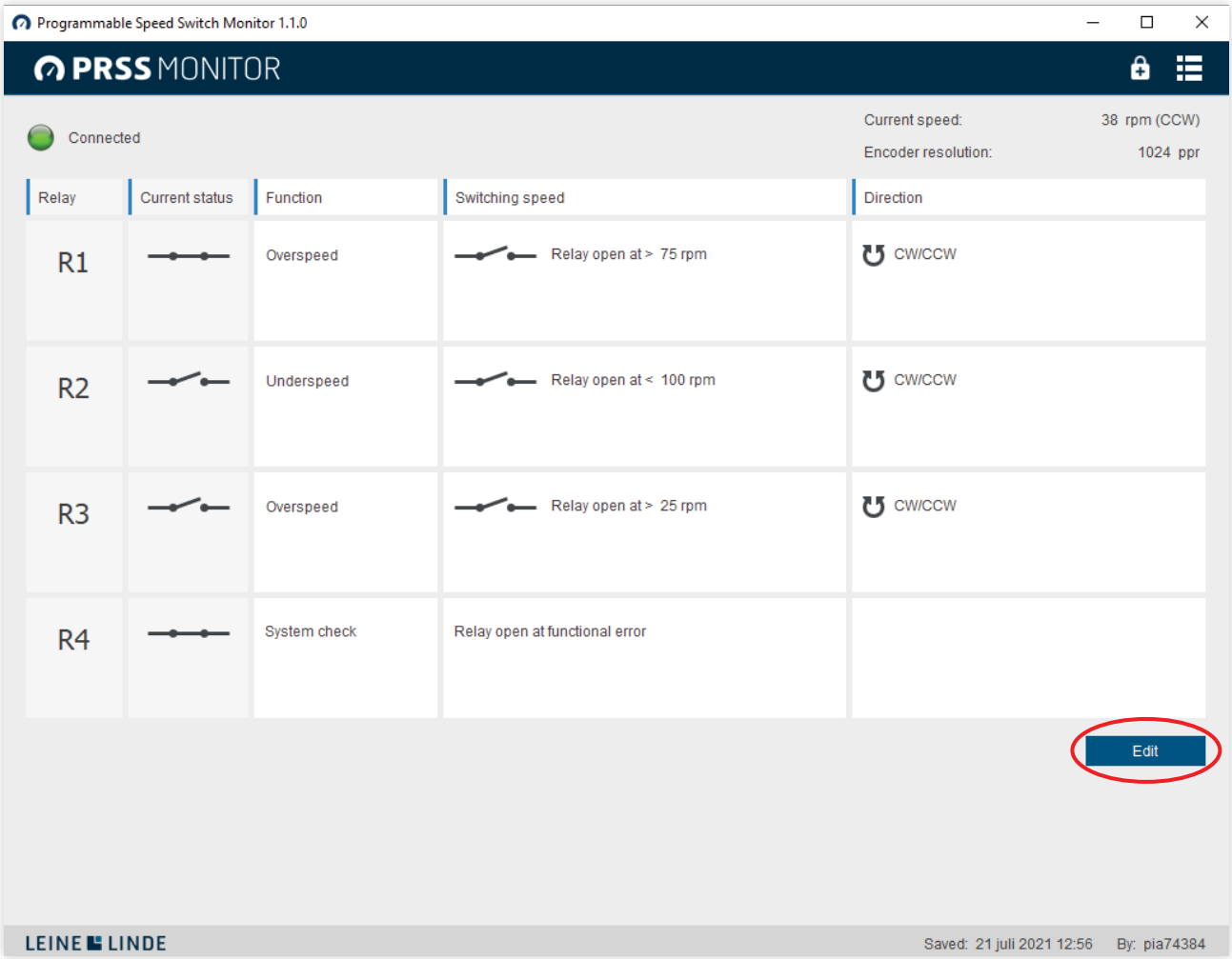
3.8 Resolution

When programming an encoder with integrated Speed Switch, the resolution is automatically shown in the resolution field. When programming a gateway, the resolution of the encoder in use must be entered in this field.



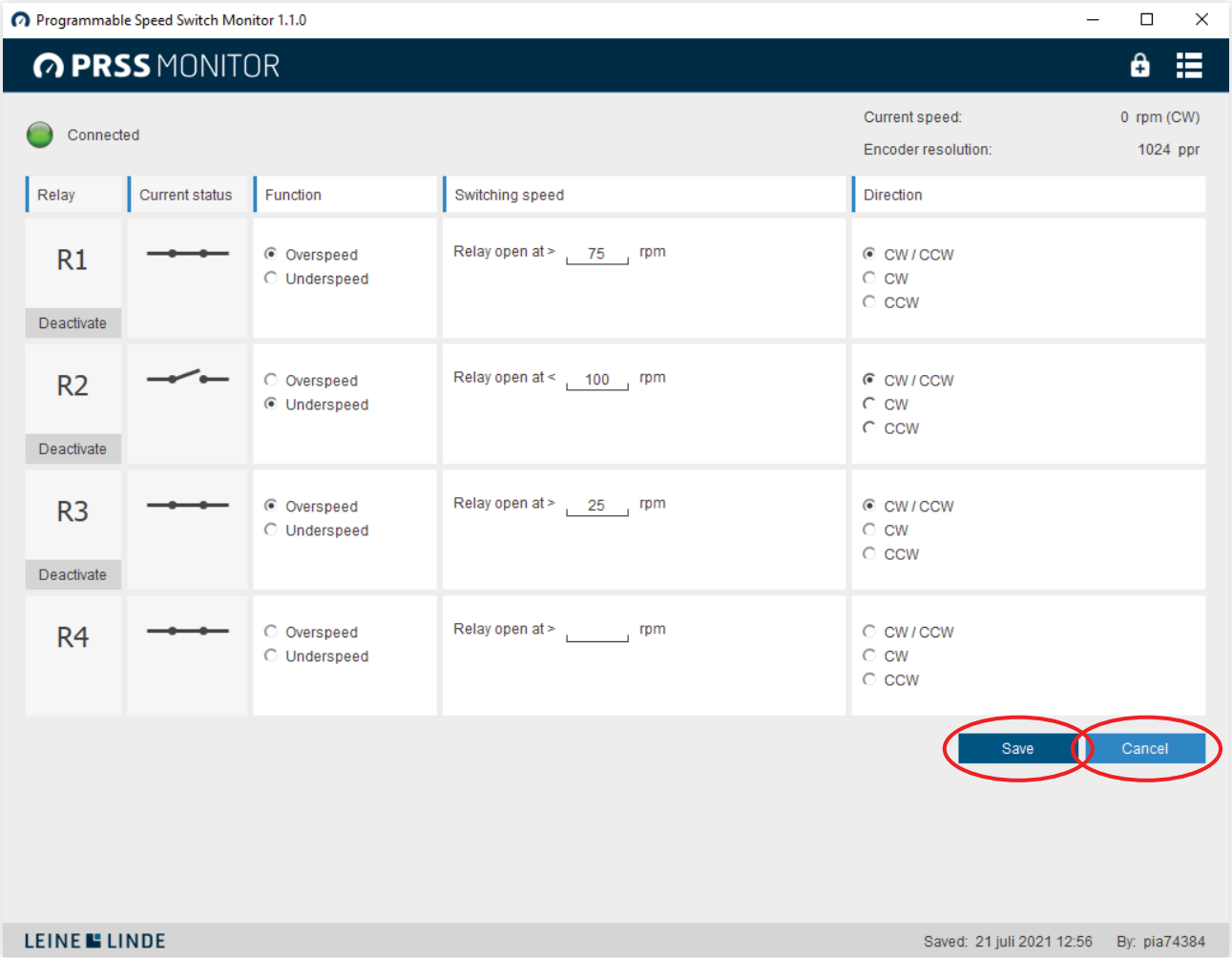
3.9 Edit, Save, Cancel

The starting view of the program provides an overview of the active settings. To configure the settings click Edit to enter the programming mode.



After editing, click Save in order to activate the changes and exit the programming mode. Click Cancel to exit the programming mode without saving changes.

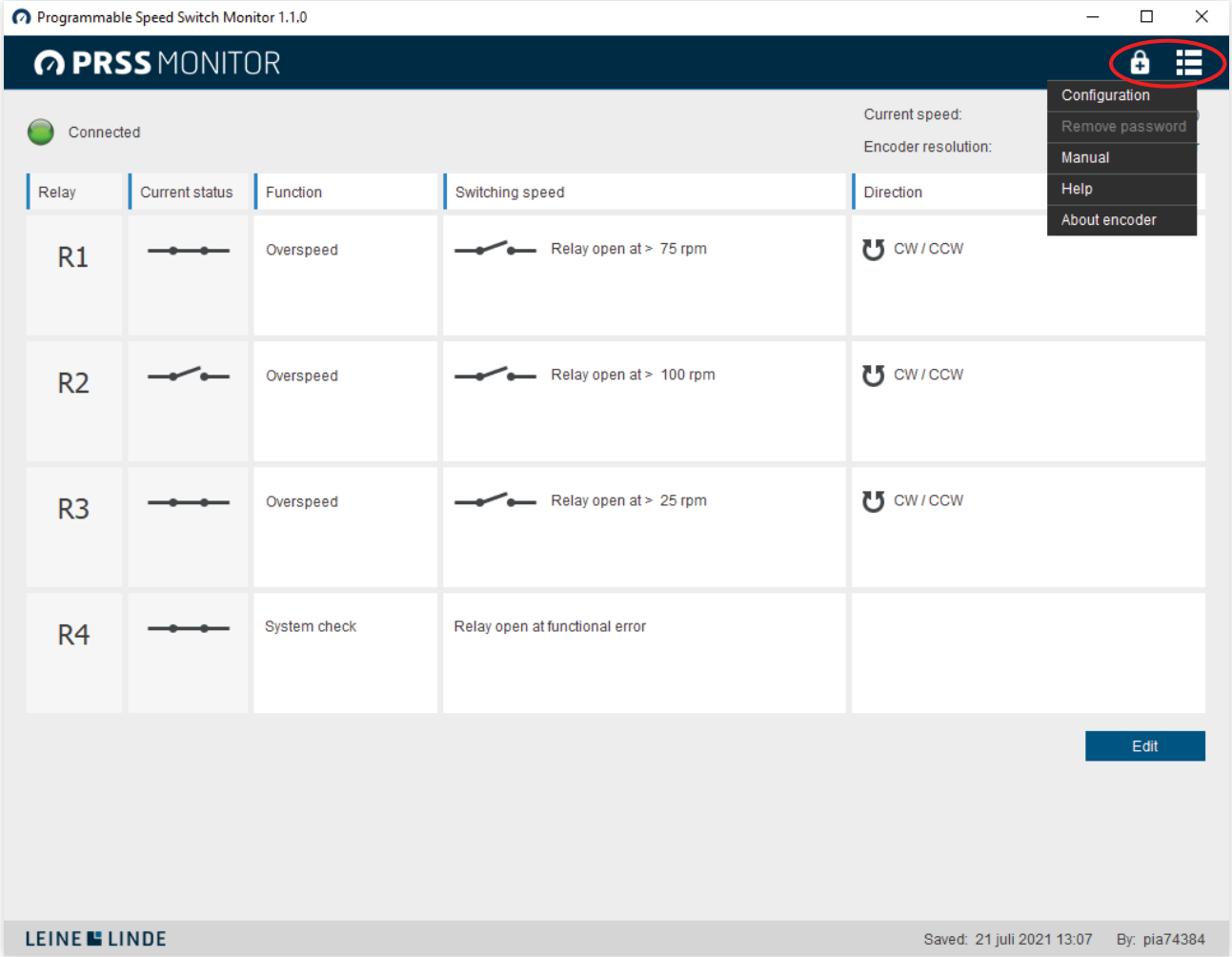
In the bottom right corner, the date and time for when the file was last saved is shown, as well as by which user (the computer user login) it was saved.



3.10 Tool menu

In the top right corner there is a tool menu. Click the icon and you will have five choices:

- Configuration
- Remove password
- Manual
- Help
- About encoder

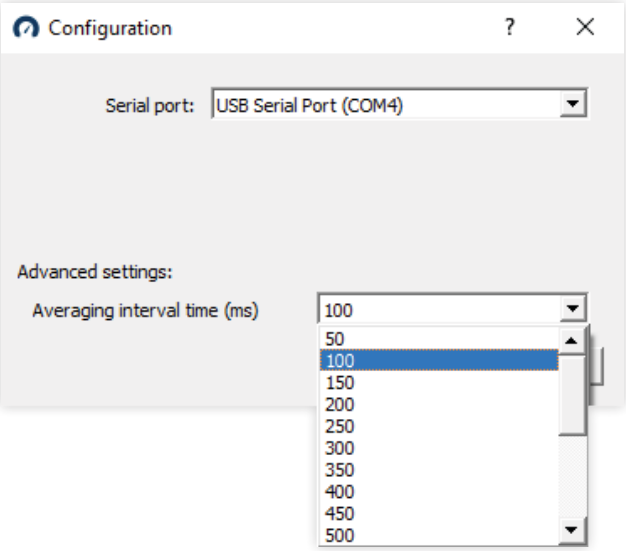


3.11 Configuration

Click Configuration to change the preferred USB port of the computer.

The list is only showing ports where there supposedly is an encoder connected. Other ports are filtered away from the list.

Averaging interval time may be set to avoid very short speed peaks. The value can be set 50 – 1000 ms in steps of 50 ms. Default setting is 100 ms.

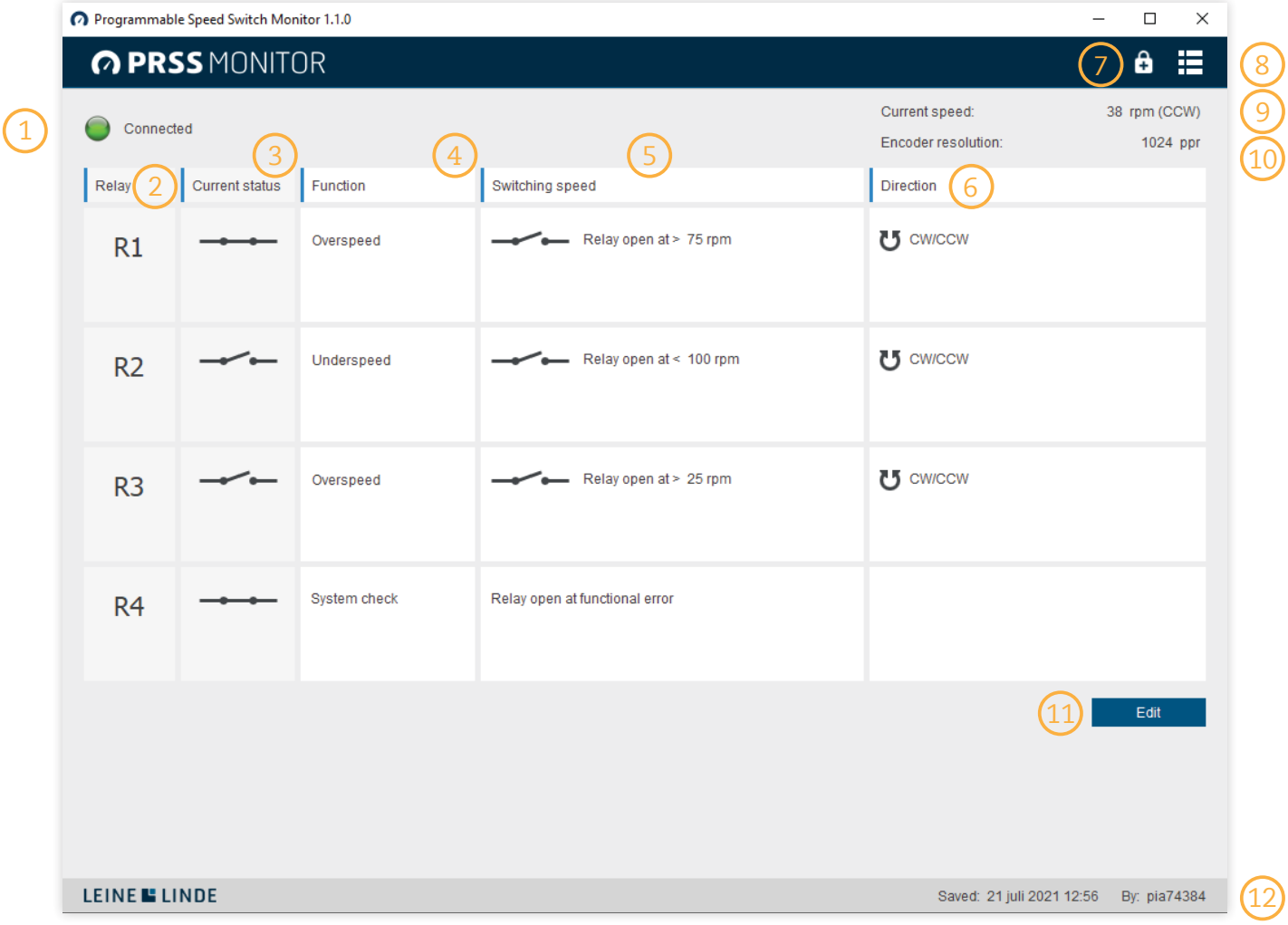


3.12 Remove password

See chapter 4.2.

3.13 Help

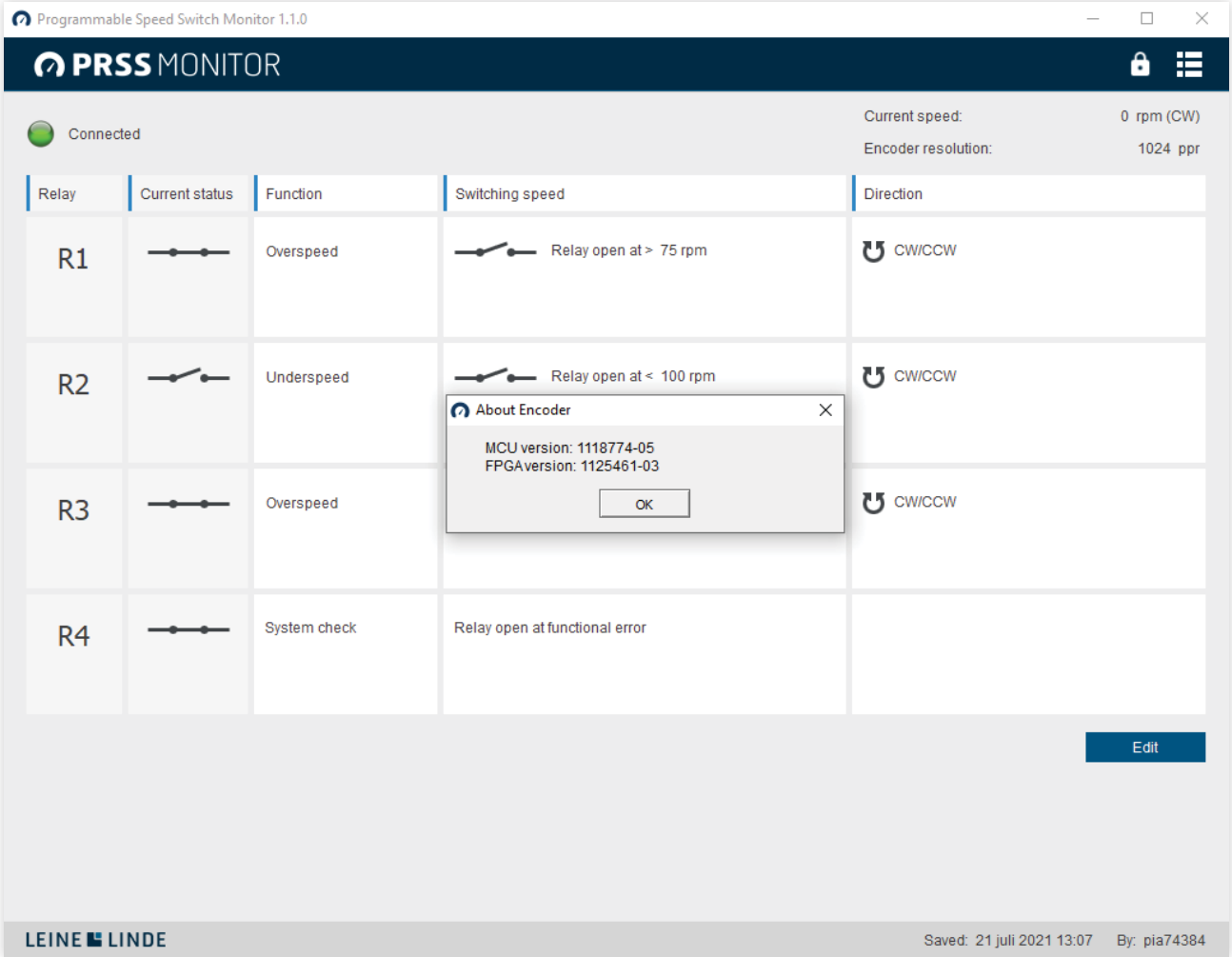
Click Help to get a quick help guide.



1. Green led - Unit powered and fully operational.
   Red led - Error or programming mode.
   Grey led - Serial port missing and/or USB cable not connected to computer.
2. An overview of the relays.
3. Current status of the relay, open or closed.
4. The function of the relay, overspeed, under-speed or system check.
5. The speed limit that is set to switch the status of the relay
6. The direction, along with the speed limit, that will switch the status of the relay. Clockwise rotation (CW), counter clockwise rotation (CCW) or both (CW/CCW).
7. Set password, lock/unlock unit
8. Tool menu. Access to Set serial port, Manual and Help.
9. The current speed and rotation direction.
10. The resolution of the encoder.
11. Click Edit to enter the programming mode.
12. The information in the footer shows when the configuration was last saved and by whom.

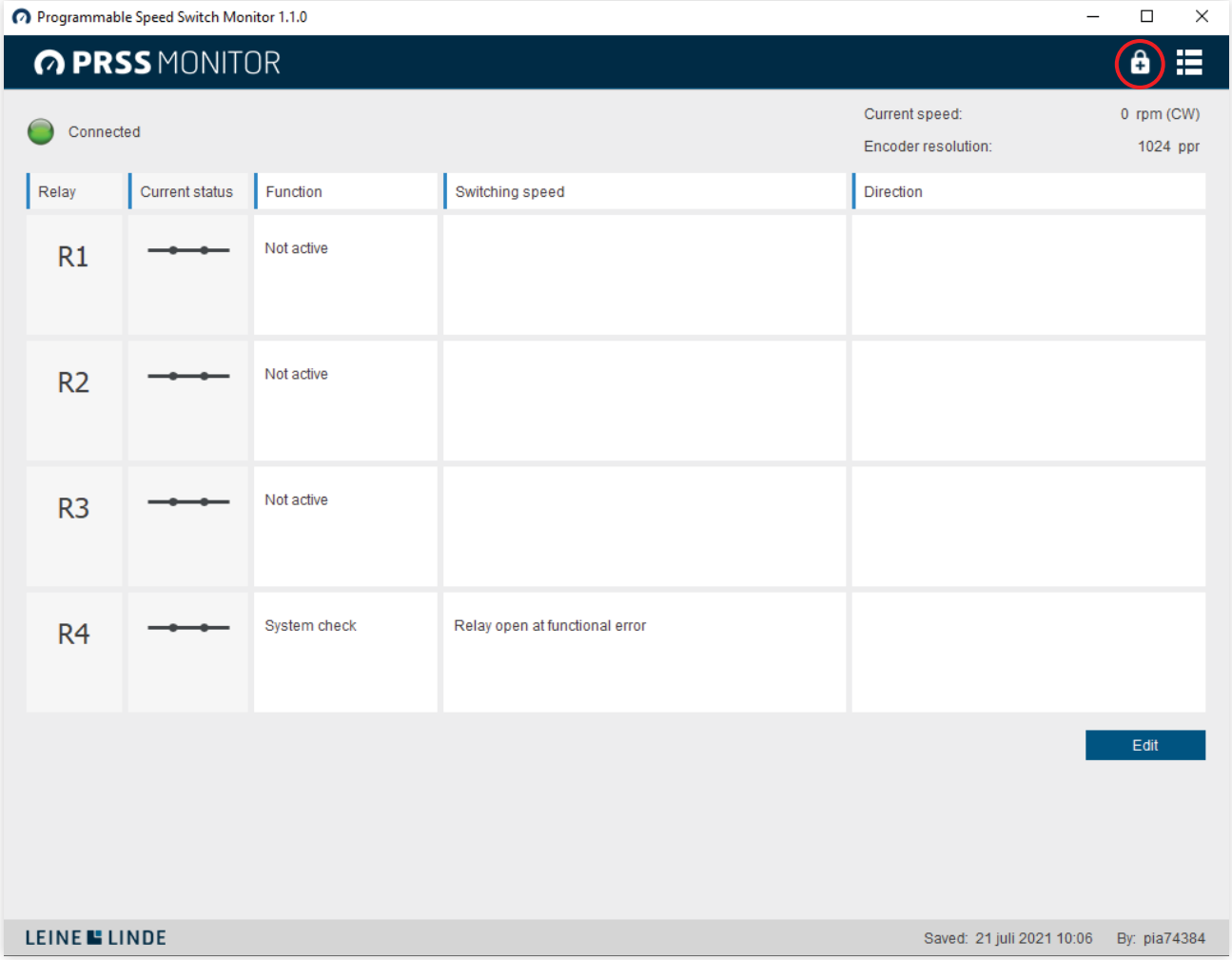
3.14 About encoder

Click About encoder to see present firmware in encoder

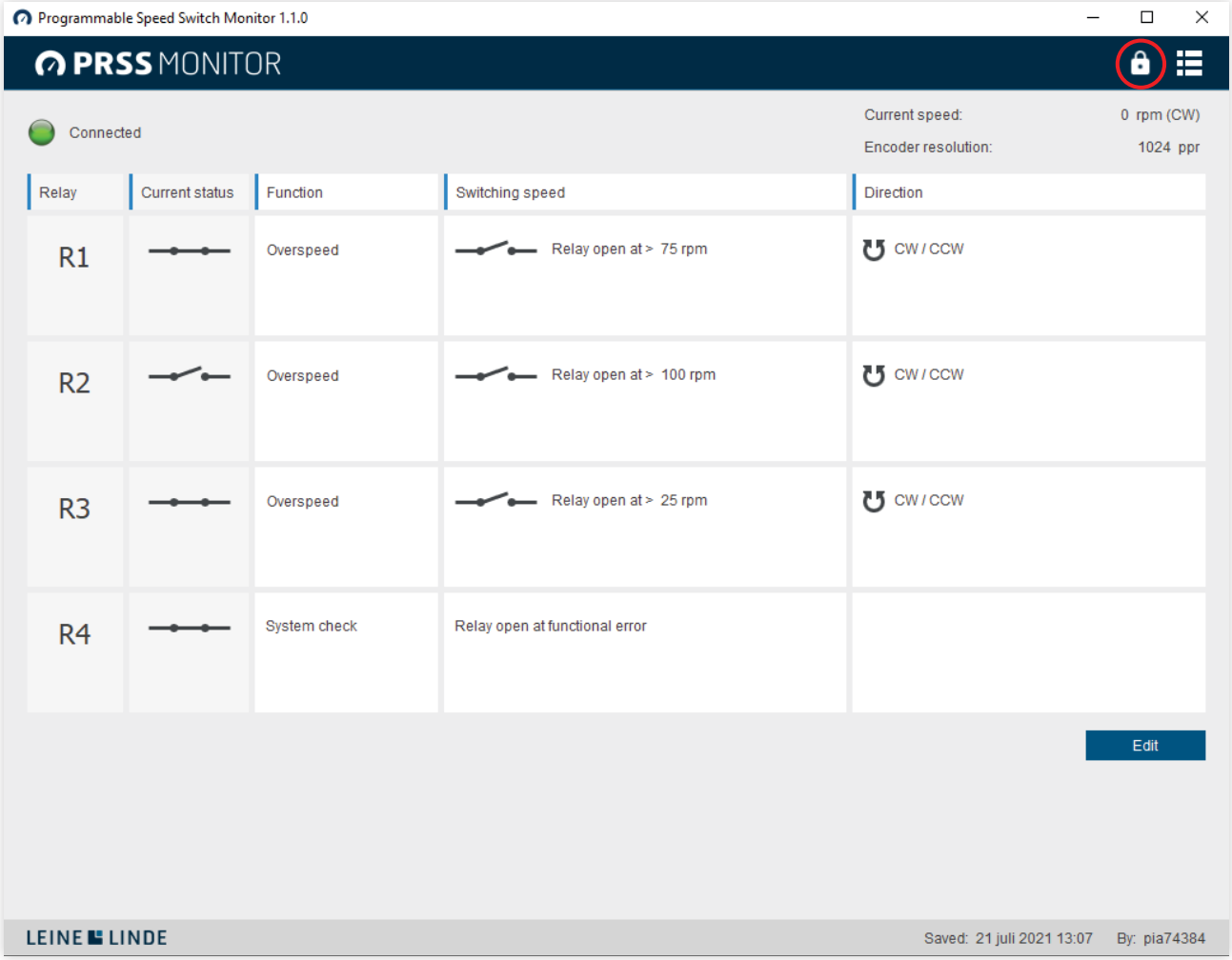


4 Password protection

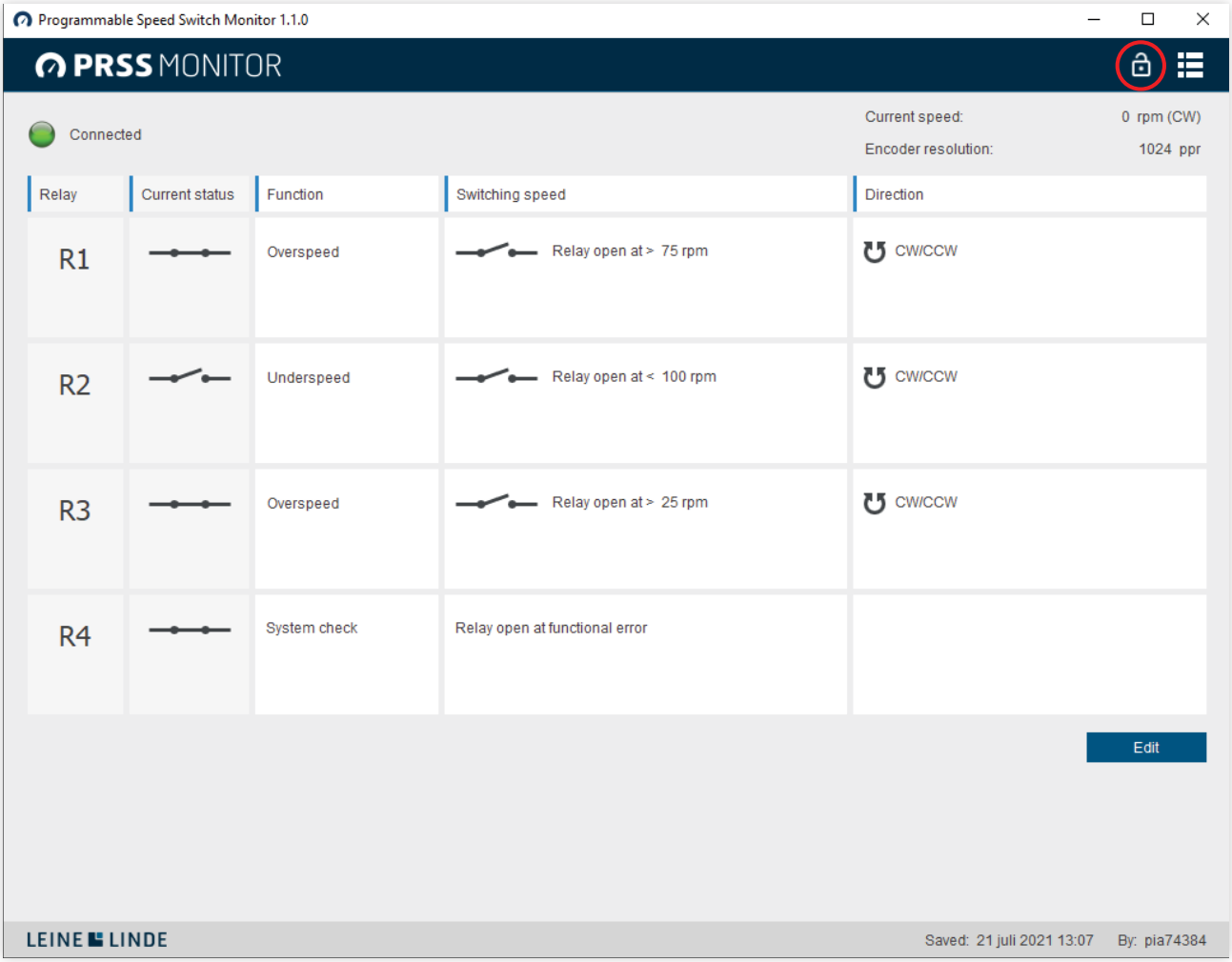
The speed switch units are delivered in an unlocked, unprotected state. It is possible to set and change configuration of relays without the password. The lock symbol shows the state of the unit



Unprotected: No password has been set to protect re-configuration of the unit. The lock symbol has a + in it.



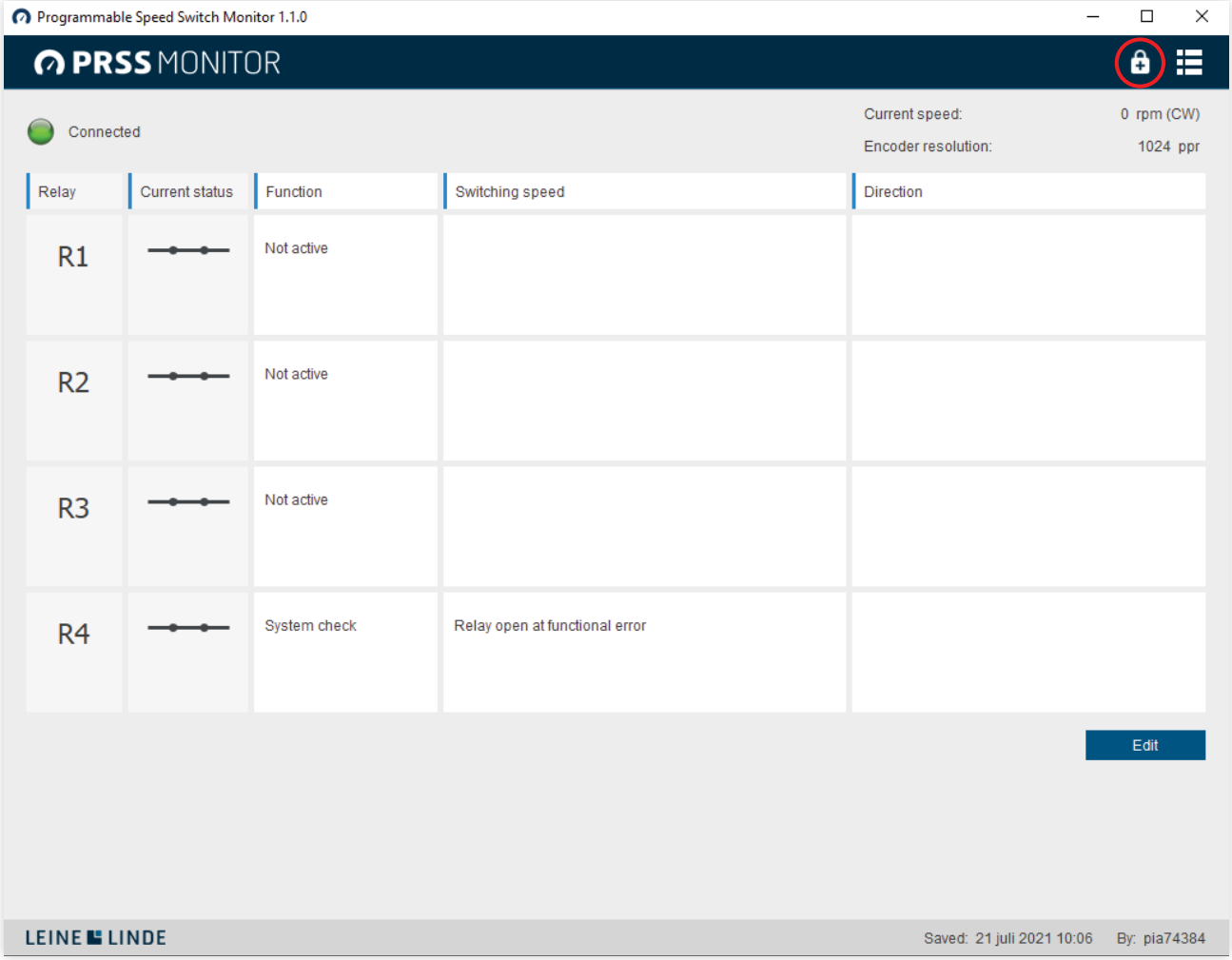
Protected: A password has been set to the unit, a password is required to unlock the unit. By knowing the password it is also possible to remove the protection from the password menu.
The locked symbol has a dot in it.



Unlocked: Re-configuration of unit possible. The unlocked symbol means the encoder is password protected but temporarily unlocked.

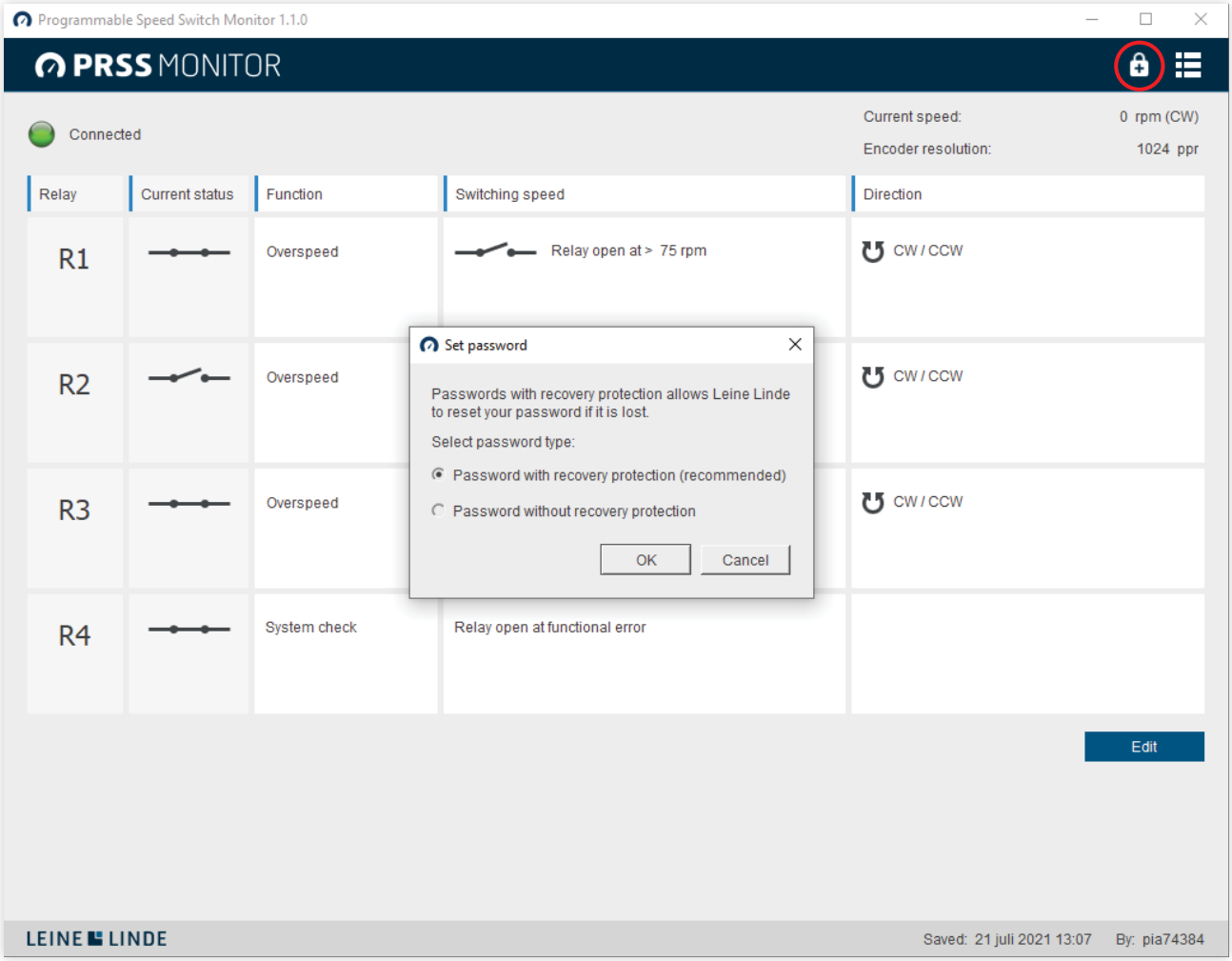
4.1 Enable password protection

To enable a password protection, click the lock on the upper right hand side.



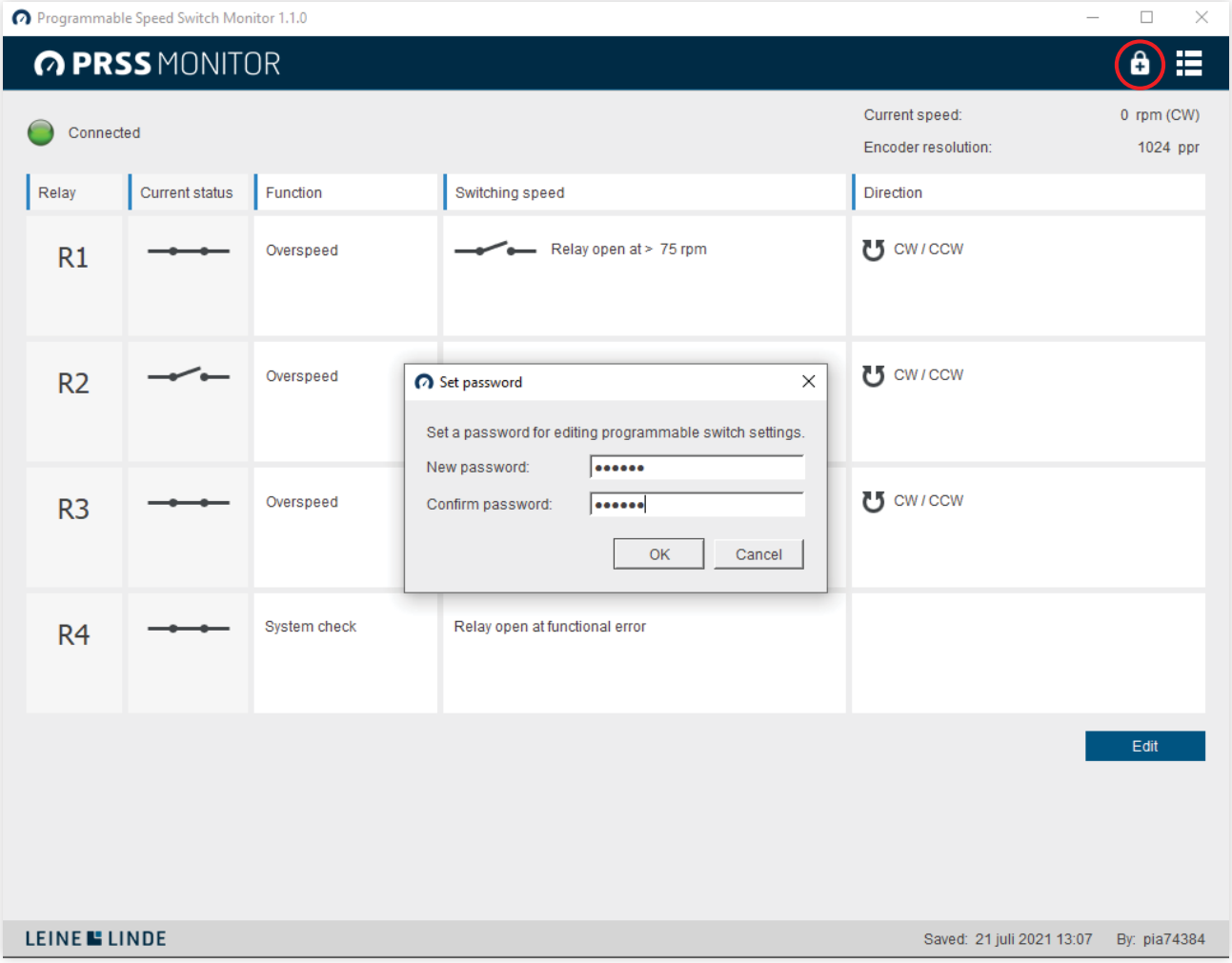
Two levels of password protections can be selected. The standard password allows the users to utilize the password recovery function built into the software in the case where the password is forgotten or lost. The password recovery function lets anyone with access to the physical unit turn to Leine Linde (passwordrecovery@leinelinde.com) to receive a temporary password to unlock the unit.

If this feature is not desirable, it is possible to set an exclusion password. This option will remove all possibility of unlocking the configuration of the speed switch if the password should be lost or forgotten. No recovery of the password is possible (chapter 4.4)

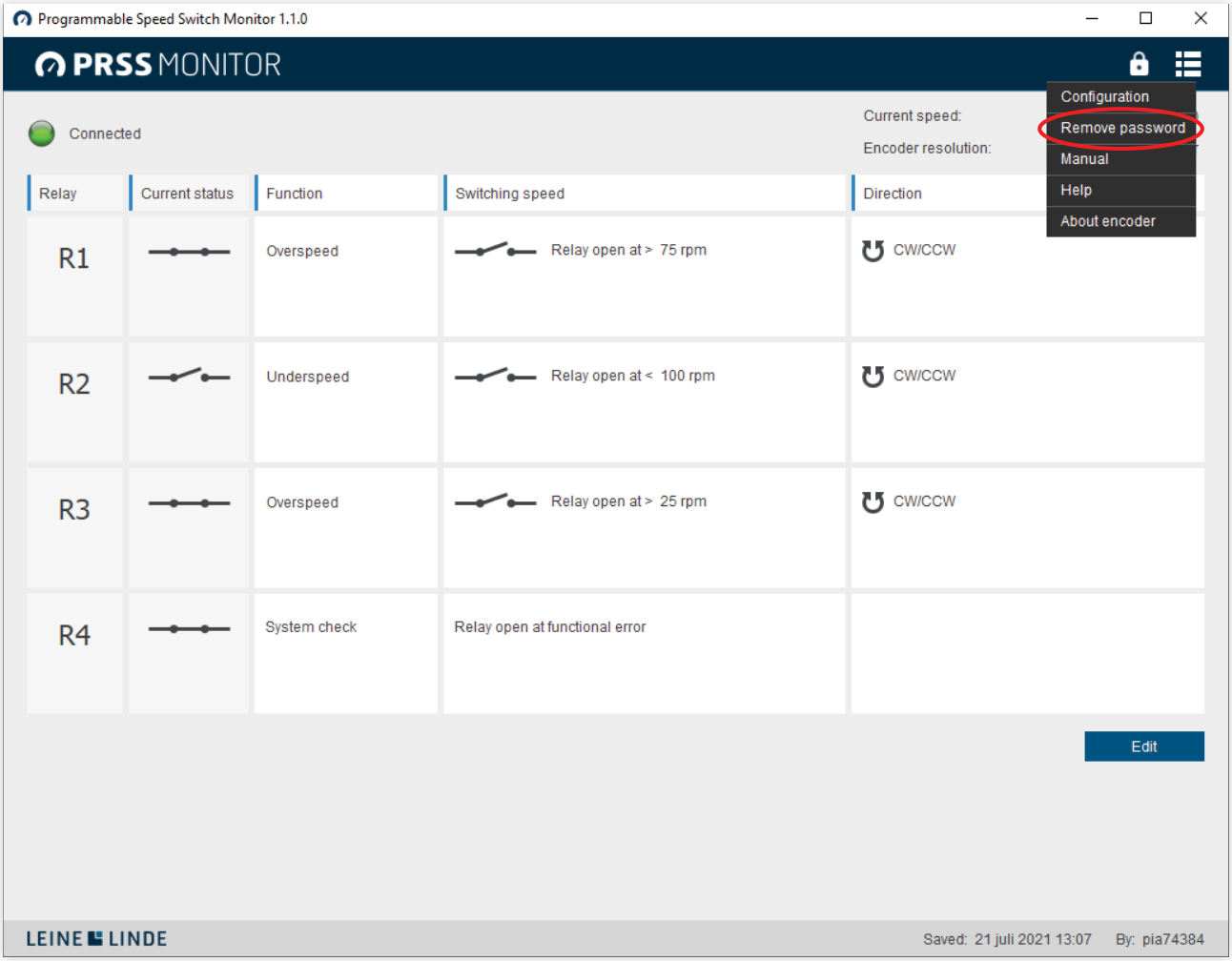


4.2 Password with recovery protection

Choose the password which will be required in order to change the configuration of the Speed switch unit. When configuration is saved the unit locks again and can only be open with the chosen password.

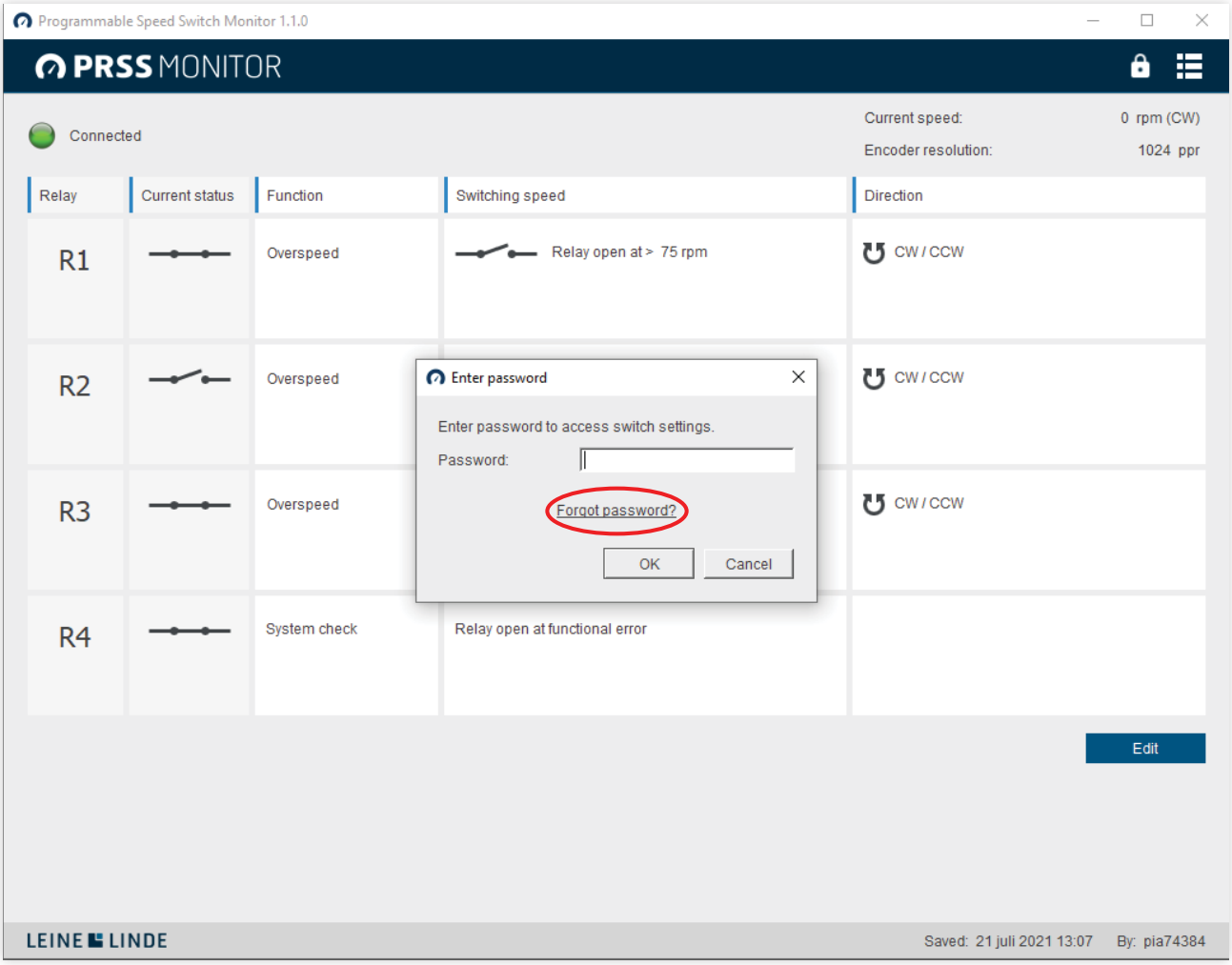


Once a Speed Switch unit is password protected, it will also be locked. Unlocking the Speed switch unit does not remove the password protection. Instead it temporarily enables modification of the speed switch configuration. It is possible to remove the password protection via the menu at the upper right corner, next to the lock symbol.

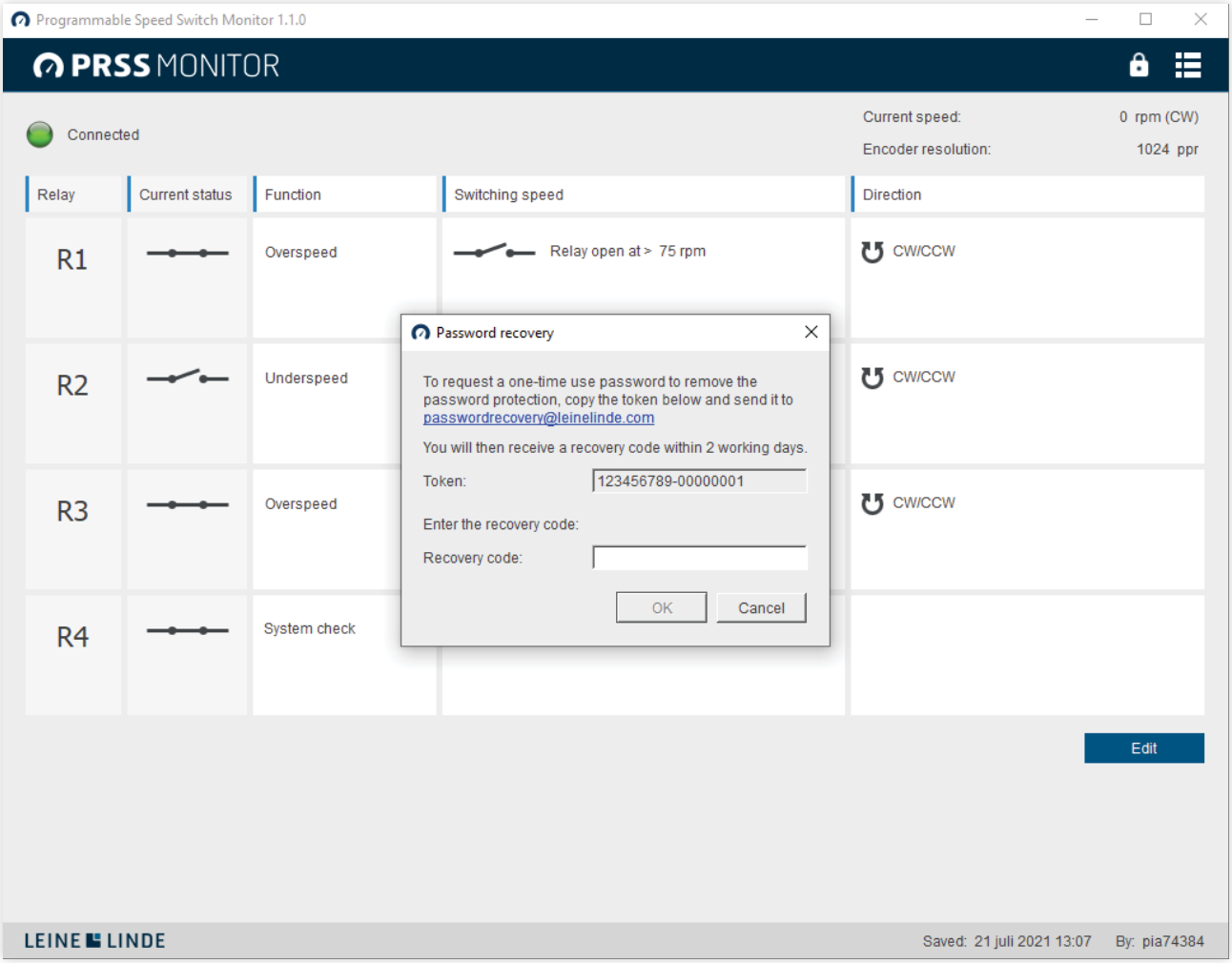


4.3 Password recovery

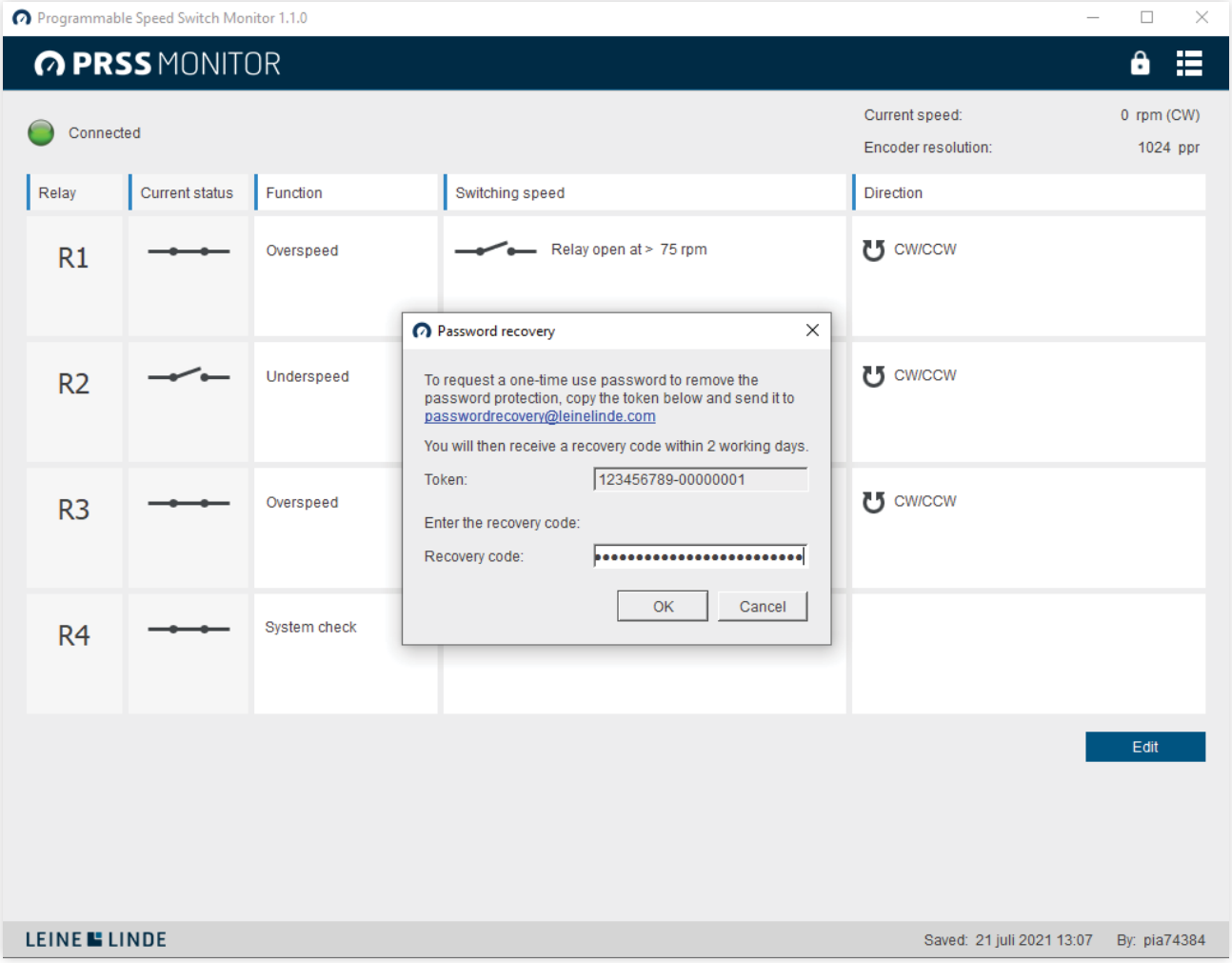
If the password has been lost or forgotten it is possible to receive a temporary password to unlock the unit. Press the lock symbol, and press “forgot password”



To receive the temporary password, copy the token and send an e-mail to passwordrecovery@leinelinde.com, and within 2 working days a temporary password will be sent out to be able to remove the password protection.



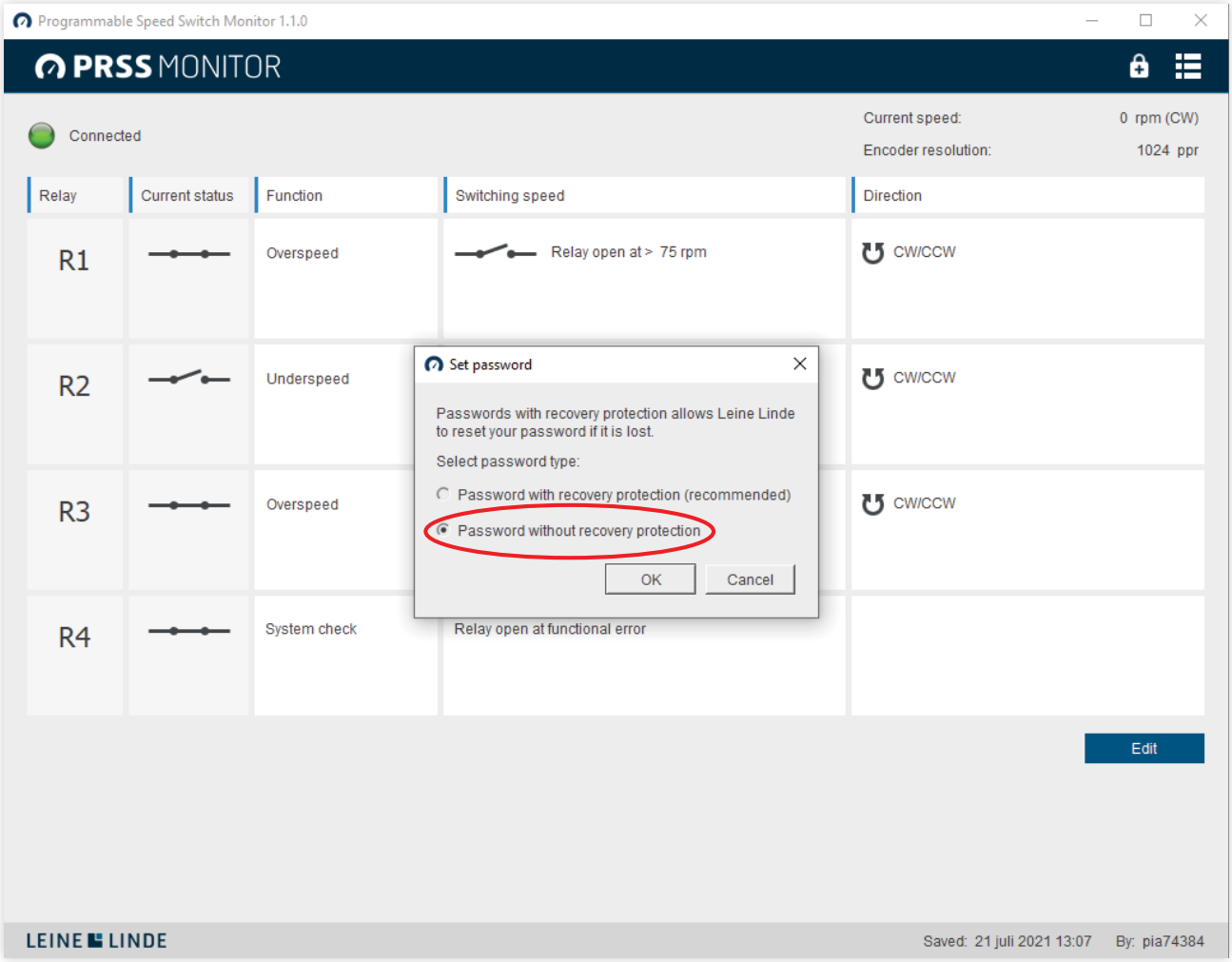
Copy the temporary password and paste it into the “recovery code” box and press OK.
Now the password protection is removed and a new password may be set.



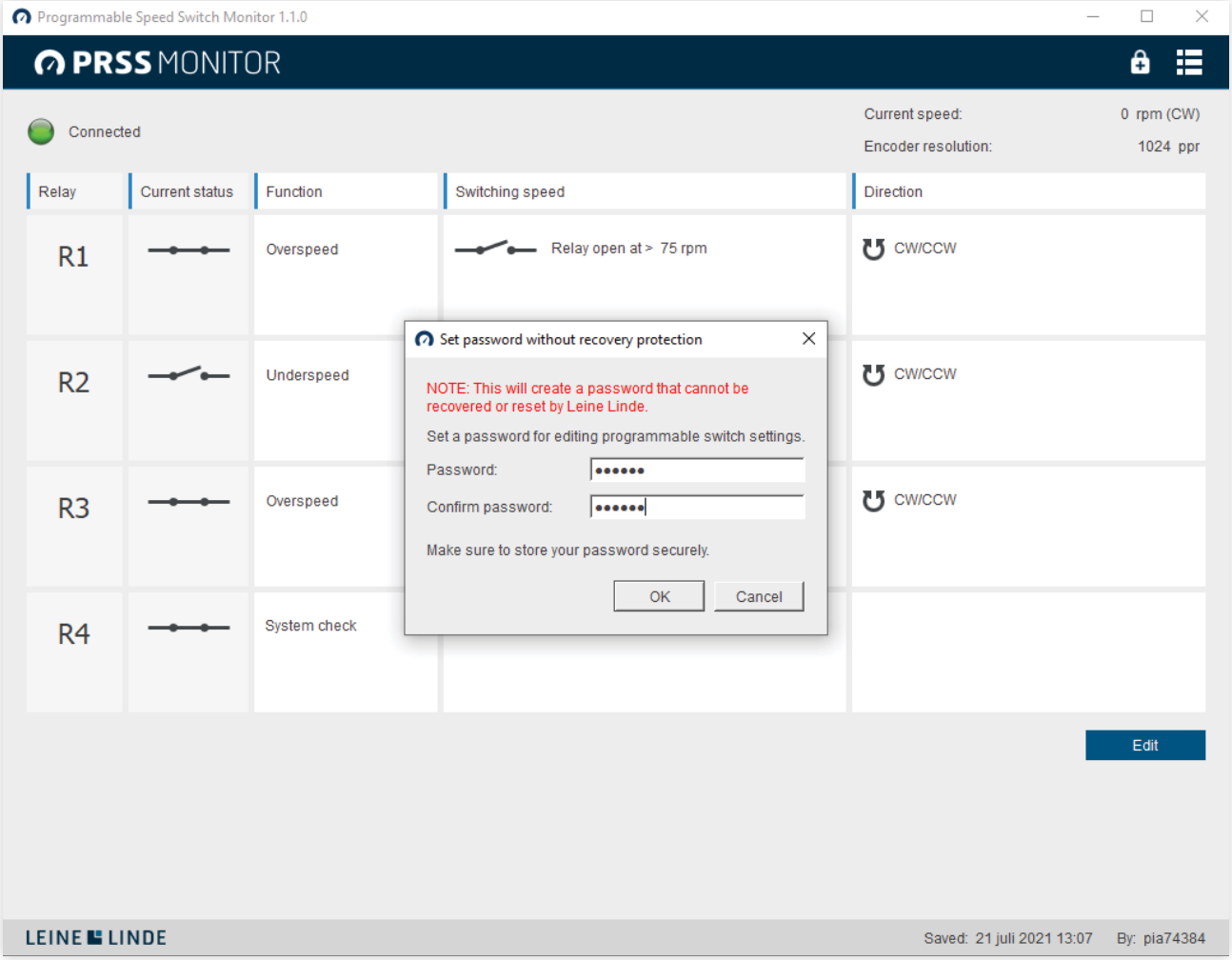
Disconnecting the USB cable from the Speed switch unit will place the unit in locked state if the unit is password protected, or unlocked state if the unit is not password protected.

4.4 Password without recovery protection

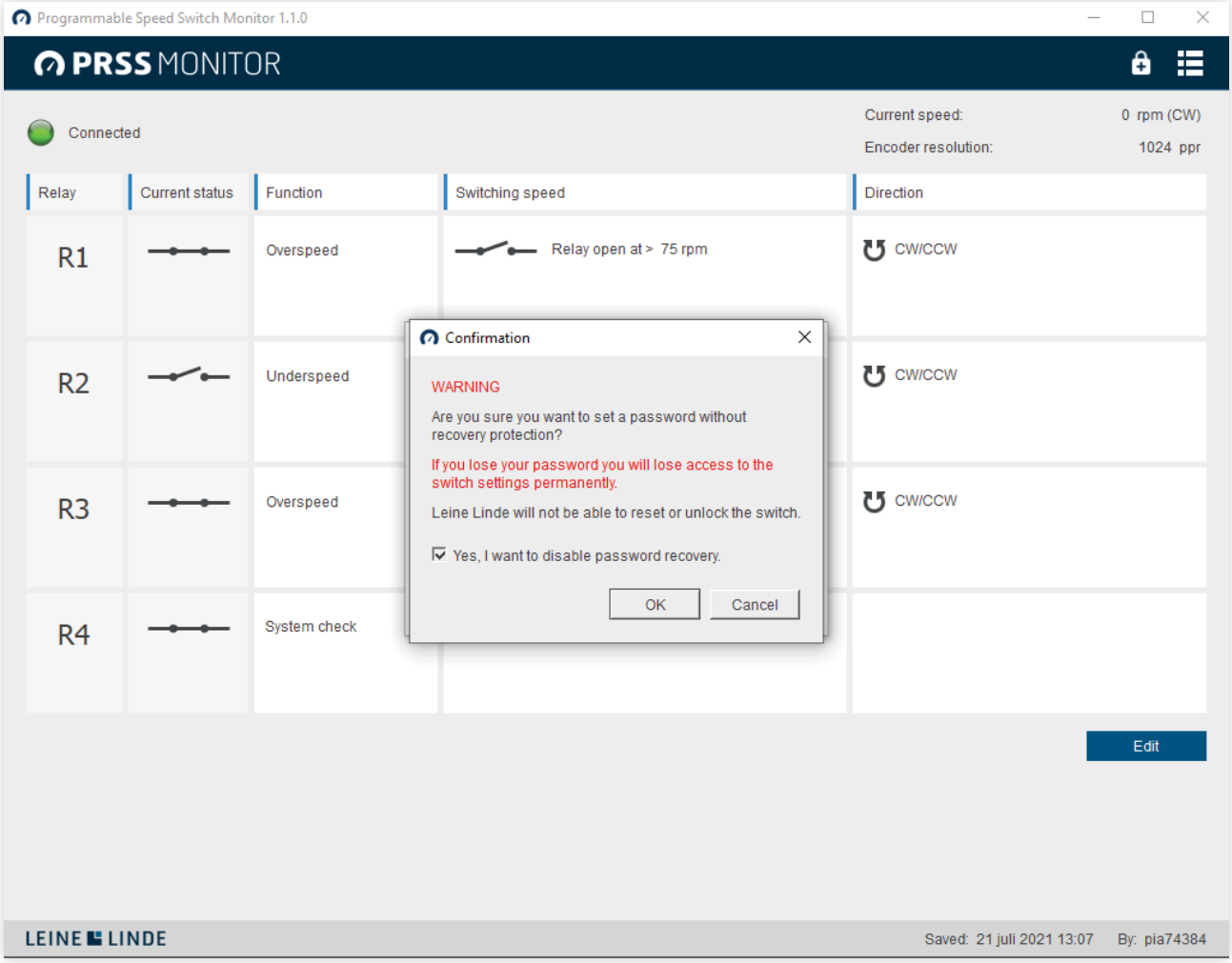
Setting a password without recovery protection disables the possibility to reset the password if it is lost or forgotten.



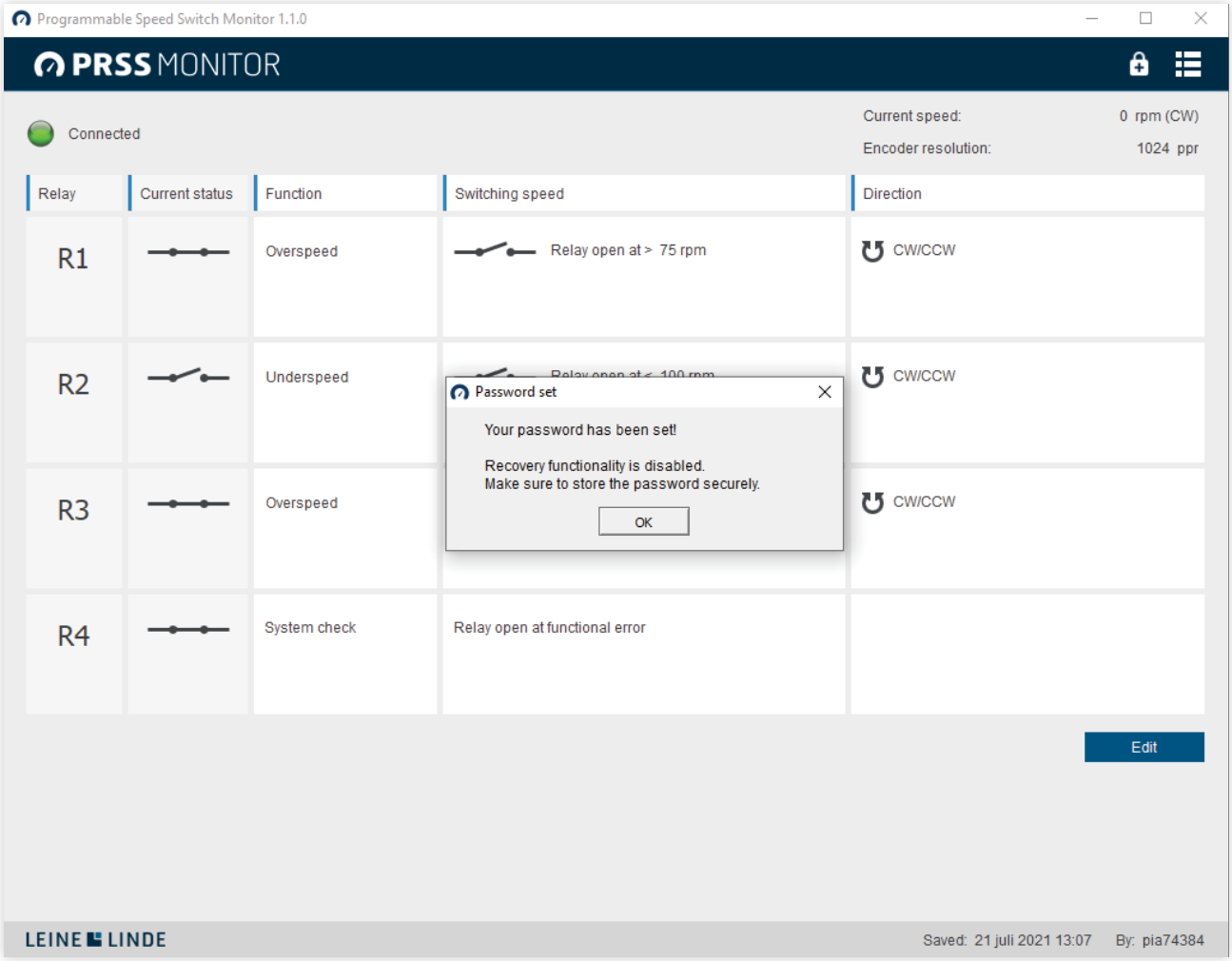
Choose the password which will be required in order to change the configuration of the Speed switch unit. When configuration is saved the unit locks again and can only be open with the chosen password.



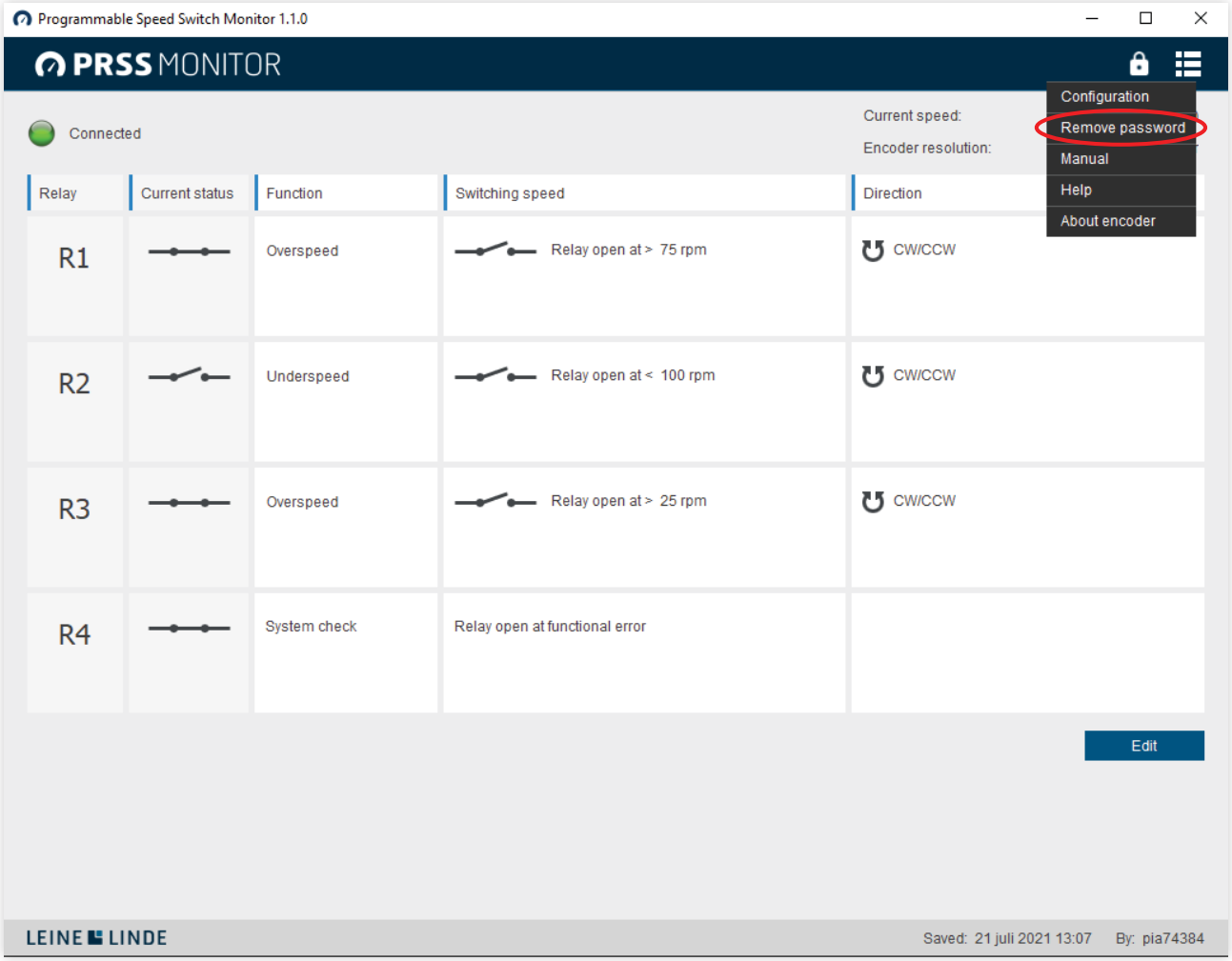
Mark the box to confirm that you want to disable the password recovery possibility, then press OK.



Make sure to store the password securely as there is no possibility to recover it.



A password set without recovery protection can however be removed if you know the password.
The remove password function can be found in the menu at the upper right corner.



5 Appendix

5.1 Connecting the devices for programming the Speed Switch settings

Gateway
Unscrew the three screws to remove the cover. Connect the mini b-plug cable to the connector in the gateway. Connect the other end to a USB-port in the PC. For full programming mode connect the encoder and power supply 9-30 Vdc.

The Speed Switch gateway has two bi-colour LEDs to indicate the status of the unit.

	Normal operation	Overspeed	Alarm
OS/Alarm LED	Green	Red	Blinking red (200 ms)
Power LED	Green	Green	Green

800 series integrated Speed Switch
Unscrew the blind plug in the back cover to reveal the mini-USB connector. Connect the mini b-plug cable to the encoder and the other end to a USB-port in the PC. For full programming mode, connect the encoder to a power supply 9-30 Vdc.

1000 series integrated Speed Switch
Unscrew the four screws to remove the cover of the Speed Switch terminal box. Connect the mini b-plug cable to the encoder and the other end to a USB-port in the PC. For full programming mode connect the power supply to the encoder 9-30 Vdc and also power supply to the relays 9-30 Vdc.

5.2 Accessories

Part no. 687661-01	Programming cable USB to mini b-plug
Part no. 1338559-01	Power supply for terminal connection (for programming Speed Switch settings in office environment).

6 Revision history

Revision	Date	Changes
Rev. 1	2015-04-22	First release
Rev. 2	2021-08-26	Added functionality with password protection.

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