rexroth
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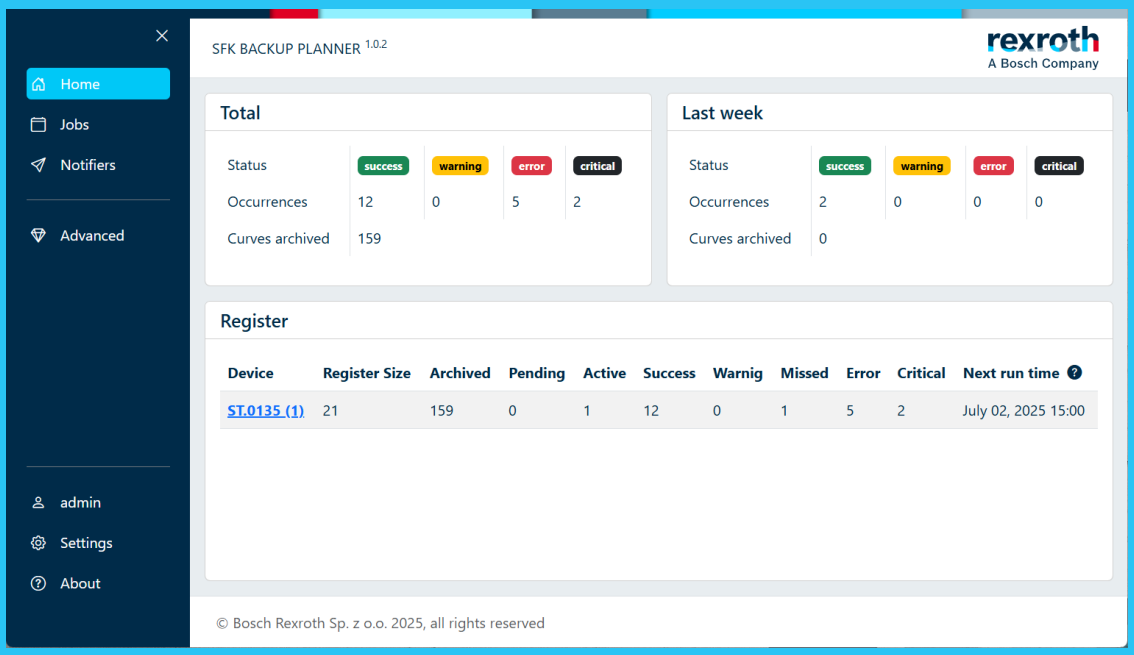
User manual

SFK Backup Planner



VERSION 1.0.2 | 01.07.2025

Bosch Rexroth Ltd.

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1 Documentation Information

1.1 Validity of documentation

The documentation applies to the SFK Backup Planner (SBP) application, which consists of a combination of products such as:

- Dedicated proprietary software by Bosch Rexroth Sp. z o.o.
- Free or Open Source Software
- Industrial Computer e.g. PR21

This documentation is intended for users of SFK Backup Planner.

1.2 Required and supplementary documentation

The system was developed using the documentation listed below:

Table 1 | Documentation Index

	Title	Document No.	Comments
🕮	Smart Function Kit - OPC UA + Rest-API	R320103210	
🕮	IndraControl PR21 Operating Instructions	R911389662	

1.3 Presentation of information

In order to ensure quick and safe work with the system using this documentation, unambiguous safety rules, symbols, terms and abbreviations have been used. For better understanding, these are explained in the following sections.

1.3.1 Safety Rules

In this documentation, the provisions on safety rules appear before the description of the sequence of actions that pose a risk of bodily injury or property damage. The described measures to prevent hazards must be observed.

⚠ SIGNAL WORD

Type of danger

- Consequences of non-compliance
- Hazard prevention

- **Warning sign:** Draws attention to danger
- **Signal word:** identifies the level of danger
- **Type of danger:** gives the type and source of danger
- **Effect:** describes the consequences of not following the guidelines
- **Prevention:** gives how danger can be avoided

Table 2 | Hazard classes according to ANSI Z535.6-2006

Signal sign and slogan		Designation
⚠	**DANGER**	It means a dangerous situation that could death or serious injury if not prevented.
⚠	**HAZARD**	Indicates a hazardous situation that could result in death or serious injury if not prevented.
⚠	**WARNING**	Indicates a hazardous situation that may cause light or moderate injury if not prevented.
	NOTIFICATION	Property damage: The product or its surroundings may be damaged.
	HINT	Hints: recommendations for smarter usage of the product.

1.3.2 Symbols

The following symbols indicate guidance that is not safety-relevant but increases the understanding of documentation.

Table 3 | Meaning of symbols

Symbol	Designation
ℹ	Failure to comply with this information leads to suboptimal application, or. Product Operation
▶	Single, independent step
1. 2.	Numbered manuals: The numbers give the order of steps.

1.3.3 Marks

The following markings are used in this documentation:

Table 4 | Example symbols

Designation	Meaning
SFK	Smart Function Kit for Pressing - Servo Press
PR21	PR21 Industrial Computer
SBP	SFK Backup Planner
PLC	Programmable Logic Controller
HMI	Human Machine Interface

1.3.4 Abbreviations

The following abbreviations are used in this documentation:

Table 5 | Abbreviations

Abbreviation	Designation
EN	European Standard
ISO	International Organization for Standardization

2 Safety Rules

2.1 Information on this chapter

The SBP application does not interfere with the software of SFK presses. To retrieve process curves for a given period and at a given time (according to the schedule), the REST/API interface provided by the SFK software is used. The SFK REST/API interface is described in the documentation:

🕮	Smart Function Kit - OPC UA + Rest-API	R320103210

Therefore, the procedure for downloading process curves from the SFK, carried out by the SBP application, should not affect or interfere with the process currently being carried out on the SFK device. The use of the REST/API interface to the extent that it is used by the SBP software does not affect the safety of using the SFK press in any way.

Before using the SBP application, please read this documentation carefully. Keep this document in safe place so it is always available to all users of the SBP application. SBP software should always be provided to users with this documentation (a pdf version of this document is also accessible within GUI of the app).

2.2 Intended use

The SBP application described above is a production system using SFK presses.
You can use the app to:

- downloading process curves according to a given schedule from the SFK press(s),
- Recording process curves on a network share
- delete process curves from the SFK press(s).

The system is intended for industrial use, not for private use. Intended use also includes a thorough reading and understanding of this documentation.

2.3 Qualification of staff

The activities described in this documentation require basic knowledge of IT and the process carried out by the SFK devices.

3 Licenses

SFK Backup Planner software uses libraries and components of free or open source software that is covered by an open license. License details for the main components of SFK Backup Planner software are included in the following subsections.

3.1 SFK Backup Planner

The license granted to the customer to use the SFK Backup Planner software is not excluded and enables the implementation of the process curve backup process for the ordered number of SFK presses. The license is not limited in time. The license file generated and entered into the software is properly prepared for the ordered number of presses and secured. The Client may not make the Software available to third parties in any form. The client cannot make code changes, decompile, and recompile the application code on their own.

3.2 FOSS and third-party software licenses

Software modules and applications from third parties and vendors were used to implement SBP software. Usually, it is free and open software (FOSS), which is made available by the creators for use in paid projects on specific terms.

3.2.1 SBOM

Detailed license provisions (so-called SBOM) for the FOSS software can be found in the SBP application under the option *About->FOSS* tab.

3.2.2 DOCKER ENGINE

Docker Engine is used to run applications on an industrial computer, e.g. PR21. Since this software runs on the operating system layer of the computer, it is not directly related to the SBP application code. For this reason, detailed license provisions for the DOCKER software are presented below.

```
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Version 2.0, January 2004
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4 Scope of delivery

The scope of delivery includes (may vary due to the customer's order):

- An industrial computer (e.g. PR21) configured to work in the customer's network,
- SFK Backup Planner software installed on the above computer,
- Free or Open Source software that is necessary for the operation of SBP application,
- License for the ordered number of SFK devices.

5 SBP application and its functions

SFK Backup Planner uses the REST/API of SFK devices to:

- download data with process curves in JSON format from the SFK press,
- archive the JSON file(s) to a bulk ZIP file from a given day,
- save the ZIP file(s) to the destination directory on the customer server,
- delete the JSON file(s) from the SFK device (thus freeing up the SFK internal memory that has been occupied).

In addition, the application can notify external customer system, about the status of tasks performed, using the *Notifiers* (see chapter 5.7).

5.1 Files supported by the software

5.1.1 JSON with process curves

JSON files downloaded from the SFK press are saved under the following name:

<CUSTOMID>_<FIELDBUSPROGRAMID>_<CREATIONDATETIME>. JSON

where:

<CUSTOMID>	– sequence number of the manufactured element
<FIELDBUSPROGRAMID>	– the program number in the SFK press that was used for the process
<CREATIONDATETIME>	– date and time of creation of the process curve

5.1.2 ZIP files

The SBP application saves JSON files from the SFK press in a collective ZIP file, which is named according to the scheme:

<PROCESSDATE>_<RUNID>.ZIP

where:

<PROCESSDATE>	– date of triggering of the process on the press
<RUNID>	– task number from the backup schedule that created the file

5.2 Login to the SBP application

To login to the SBP application, the following conditions must be met:

1. The industrial computer (e.g. PR21) hosting the SBP app has been connected to:
    a. the OT network of the production line in which SFK presses operate,
    b. the IT network in which the backup server operates.
2. The industrial computer (e.g.) PR21 is turned on.
3. The user has access to the personal computer with a browser, e.g. Mozilla Firefox or Chrome, which is configured to work and connected to the OT network of the production line.

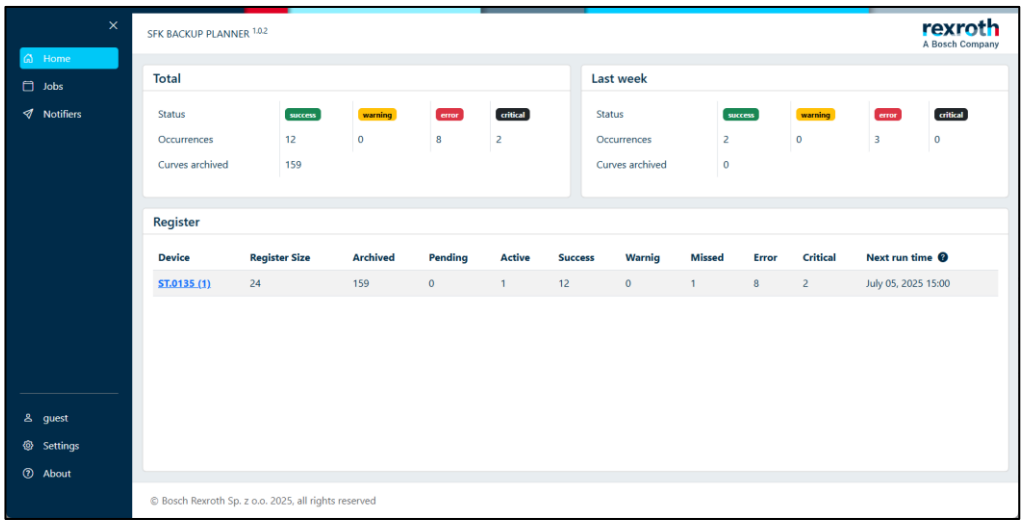
In order to login to the SBP application, a user should:

1. run a web browser on the personal computer and enter the address of industrial computer and port 8080 e.g.:

    http://10.10.10.3:8080

2. A page will appear on the screen with home page of the SBP software (see Drawing 1).

5.3 Menu *Home*



Drawing 1 | Example window view *Home*

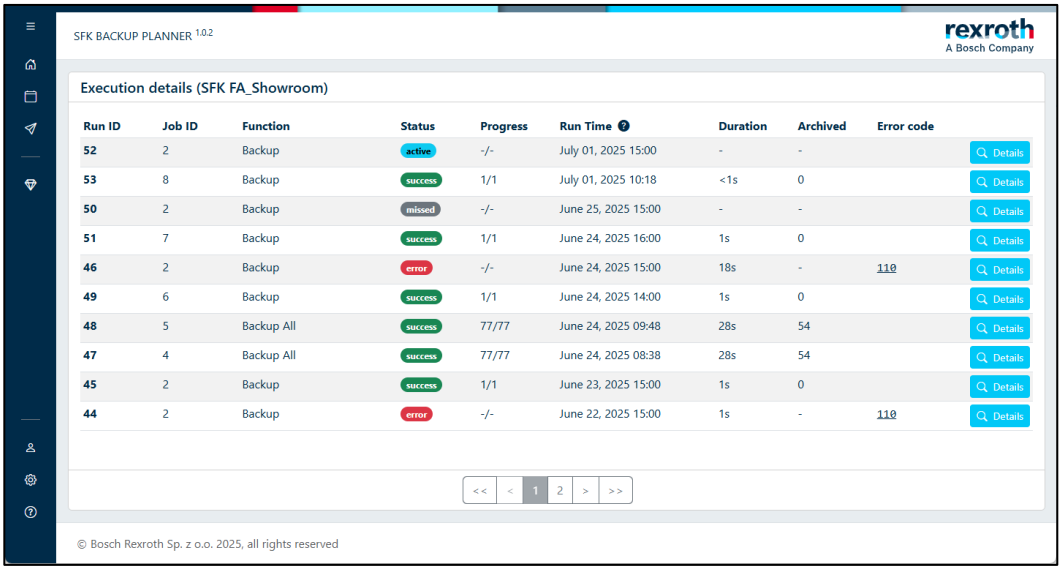
In the *Home* window, a user can see information about:

- total backup tasks performed (*Total area*)
- backup tasks performed in the previous week (*Last week area*)
- configured presses (the area at the bottom of the screen with the list of presses) and detailed information about backup tasks.

Detailed information about backup jobs includes the following data:

- *Device* – the name of the SFK device
- *Register size* – the number of detailed entries about backup tasks – you can see them by clicking on the name of the press
- *Archived* – number of archived curves
- Pending – the number of ongoing backup tasks
- *Active* – the number of active (read: scheduled and waiting to be executed) backup tasks
- *Success* – the number of successful backup tasks
- Warning – number of backup tasks completed with a warning (warning = minor error)
- *Missed* – the number of backup tasks that had no chance to be executed, e.g. were planned to be executed during time when the industrial computer was turned off
- *Error* – the number of backup tasks that ended with an error (e.g. no connection to the SFK server)
- *Critical* – the number of backup tasks completed with a critical error
- *Next run time* – the date of the next scheduled backup task

After clicking on the name of the press, e.g. SFK on the screen *Home*, the detailed screen is shown (see Drawing 2).

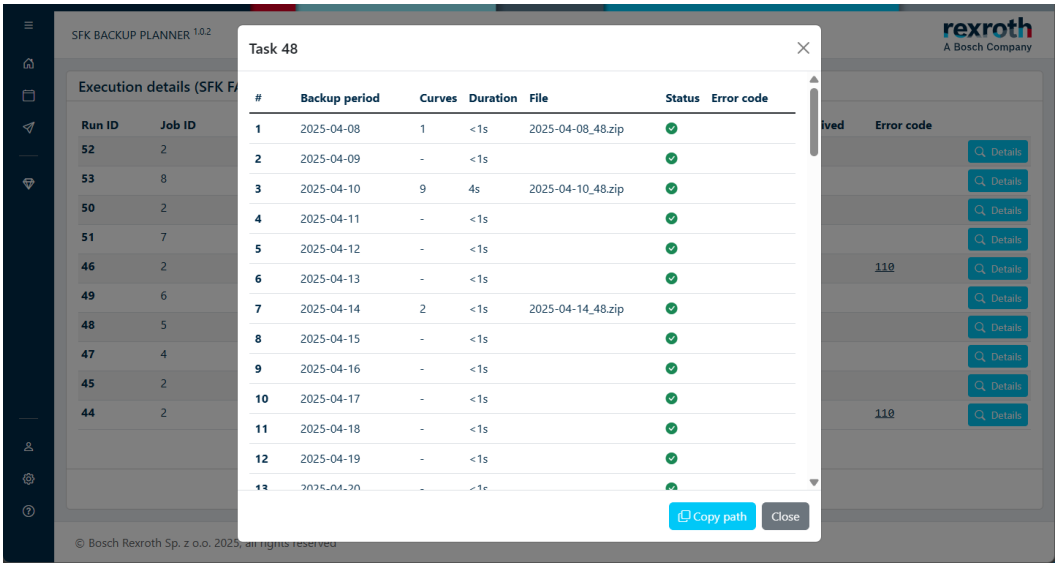


Drawing 2 | Sample details of backup tasks for SFK SHOWROOM

In each column of the dashboard, you can find the following information:

- *Run ID* – entry number in the backup schedule
- *Job ID* – the id of the backup job
- *Function* – function:
  - *Backup* – performs a backup of process curves from the entire previous calendar day, leaving the process curves in the memory of the SFK device
  - *Backup with deletion* – performs a backup of process curves from the entire previous calendar day and deletes the process curves from the SFK device
  - *Backup all* – performs a backup of all process curves that are in the SFK device older than 2 days from the current system date, leaving the process curves in the SFK device's memory
  - *Backup all with deletion* – performs a backup of all process curves that are in the SFK device older than 2 days from the current system date and deletes the process curves from the SFK device
- *Status* – the status of the task completion:
  - *Active* – the task is scheduled and will be called according to the schedule
  - *Pending* – the task is in progress
  - *Success* – a task completed successfully
  - *Missed* – the task was not completed due to SBP not being enabled
  - *Warning* – a task that ends with a warning
  - *Error* – task completed with an error
  - *Critical* – task completed with a fatal error
- *Progress* – if the task is in progress (*Pending status*), this place will contain information about the currently downloaded number of curves from the SFK device vs. the number of all planned process curves to be archived in this task
- *Run time* – the date and time of the task run, according to the set time zone
- *Duration* – duration in seconds
- *Archived* – number of archived process curves
- *Error code*

Details button – opens a pop-up window with a detailed description of the completed tasks. For tasks with *the Backup All function*, there will be as many entries as the number of days included in the period to which the backup relates.



Drawing 3 | Details window when you click <Details>

Drawing 3 shows a view with details about the selected call.

- # – Order number
- *Backup period* – The range of data, i.e. the day for which the backup is performed
- *Curves* – Number of curves on this day
- *Duration*
- *File* – Name of the archive to which the data has been saved
- *Status* – Icon informing about the status of the task
  - – During execution
  - – Finished
  - – Error during execution
- *Error code* – An error code that will display a detailed description when clicked

5.4 Login with administrator privileges

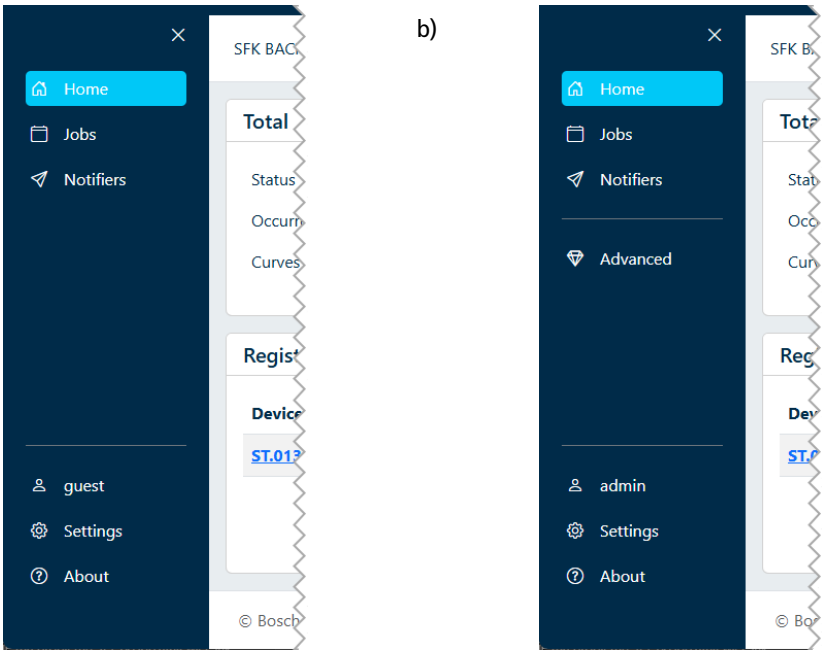
When you open the app, you have guest permissions by default. These permissions allow you to view configured schedules, current tasks, check licenses, and general information about the application. It is also possible to check SFK devices (*Devices* menu), backup servers (*Storages* menu) and notification settings (*Notifiers* menu). In this mode, the details of such configurations are hidden, and thus the user cannot add, edit or delete such configurations.

Creating and changing configurations in the SBP application can be done only after logging in as admin.

5.4.1 Login as admin

To login as an admin, click on the user icon in the bottom left corner of the main application screen. If you are not logged in, it will say "guest" (see Drawing 4a).

a) b)



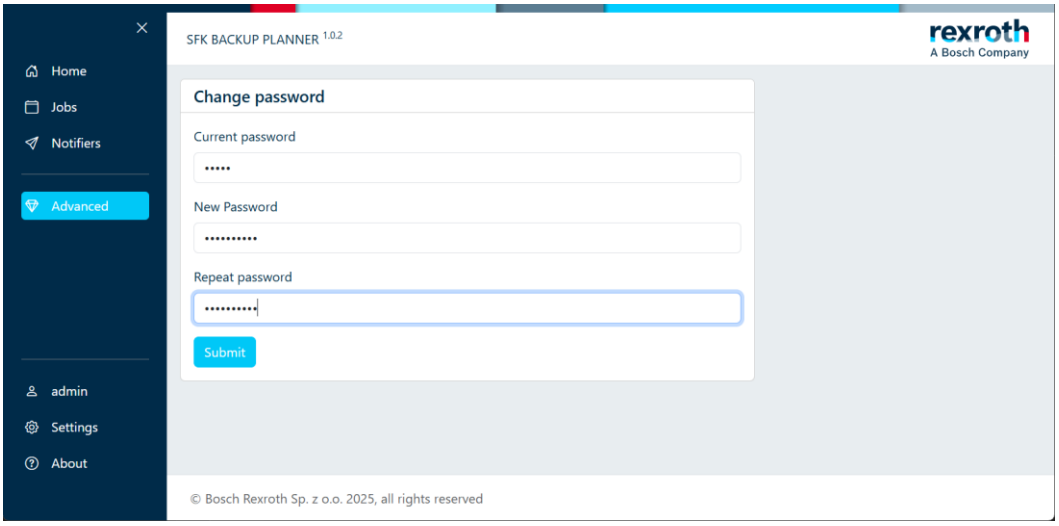
Drawing 4 | Side menu. a) Guest user view; b) Admin user view;

After clicking on the icon, a pop-up window will appear, in which you need to enter your username and password. In the Login field, enter `admin`, and in the Password field, enter the password of this user, which is *admin* by default.

In order to log out of the admin account, click on the user icon (while logged in), then a pop-up window will appear, where you can confirm your willingness to log out.

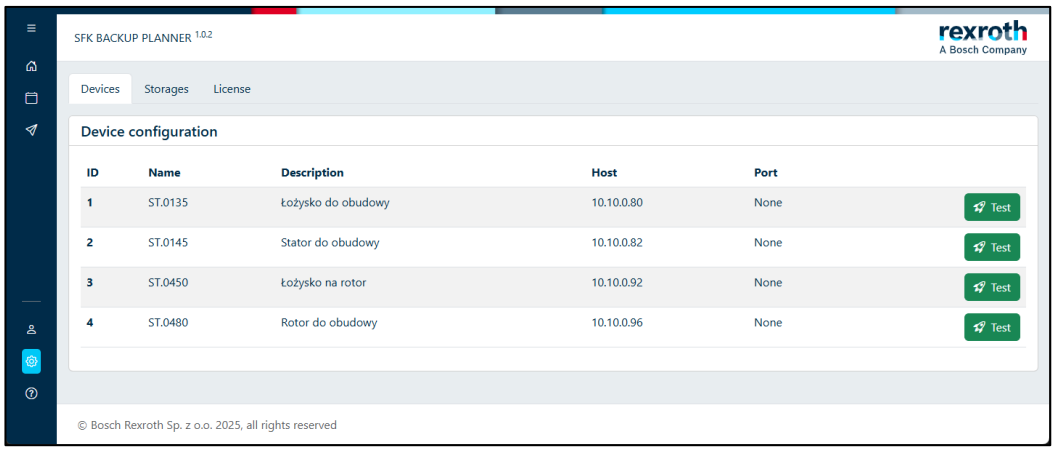
5.4.2 Changing your password

To change your password, you need to log in as *admin*, then enter the *Advanced* option visible on the side bar of the *Application* (see Drawing 5).



Drawing 5 | Window view *Advanced*

5.5 Menu Settings



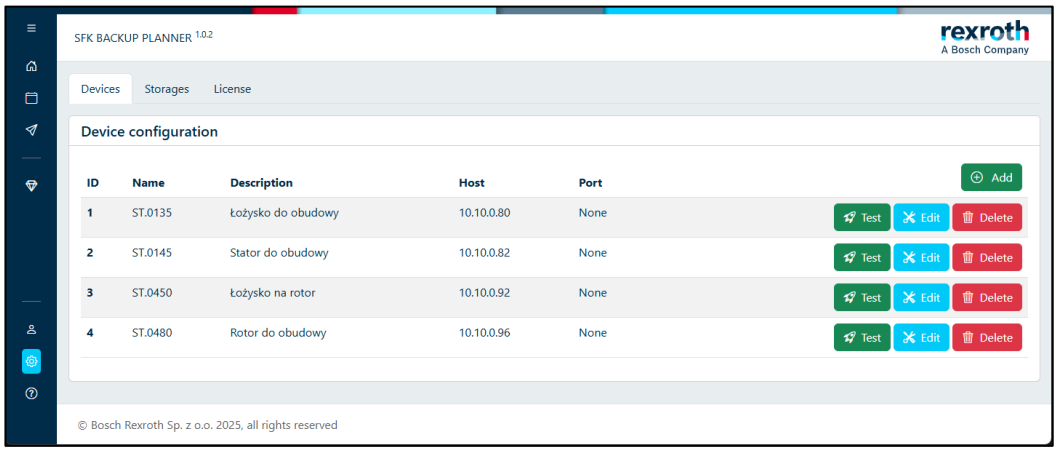
Drawing 6 | Devices function in the Settings menu

5.5.1 Devices Feature

In functionality *Devices,* the user can define SFK devices to which the SBP software will connect and from which process curves will be downloaded. For example, in this documentation, the SBP software is configured for work with 4 SFK presses with the names and IP addresses shown on the Drawing 6.

> **HINT**
>
> The number of devices that can be defined in this option depends on the license you have. If the user wants to add a press by clicking on the <Add> button, the system will check the current license. If the SFK device you are adding exceeds the number of press devices in the granted license, it will not be able to add it.

For the addition, modification, or removal of SFK devices, you must first log in as *admin* user. After logging in, you will see the options <Add>, <Edit>> and <Delete> (see Drawing 7).



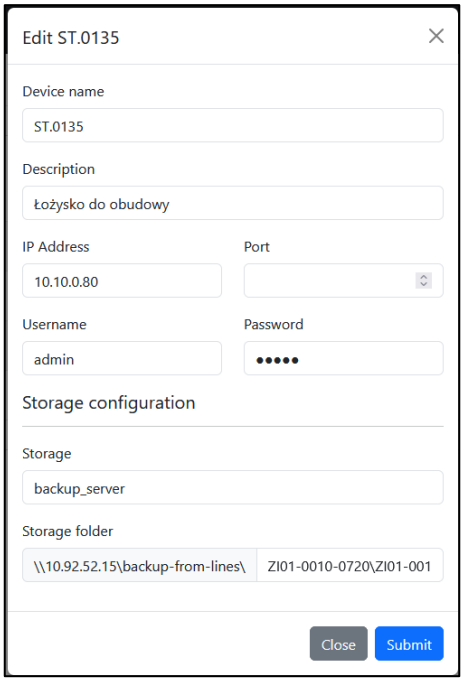
Drawing 7 | Devices dashboard in the Settings menu available for the admin user

After clicking on the <Add> or <Edit> button, a window will appear (see Drawing 8), in which you need to enter (if it is a new SFK device) or you can view/change (if it is an existing SFK device) the configuration data of the press.

The minimum information that needs to be entered to add the SFK device to the application is:

- SFK press name in the *Device name field*
- IP address in the *IP Address field*
- User in the *Username field*
- Password in *the Password field*
- The backup destination in the *Storage field*. Storage must be created prior to selection.
- Folder for saving data from the press in the Storage folder field (you can also enter several subfolders here)

After entering the data, select the <Submit> button to save the SFK device into the application.



Drawing 8 | SFK press configuration window

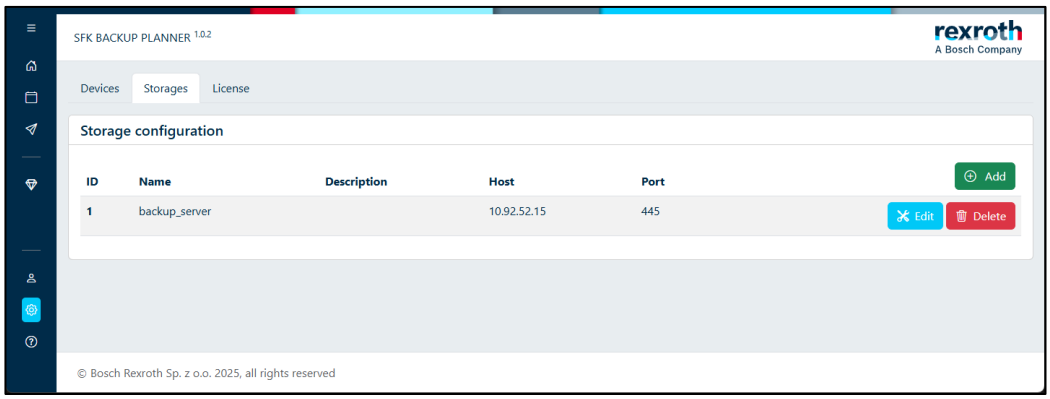
If you do not want to make changes to the configuration of the SFK tool, press the <Close> button.

To remove a n SFK device from the application, click on the <Delete> button next to the name of the SFK press you want to delete.

HINT

Upon the first launch of the SBP application in a new network environment, or after adding a new press device, verify the connection to all defined press devices. To do this, press the <Test> button next to the name of the SFK device you want to check. Based on the test result, a message will indicate either a successful connection to the SFK device or an error condition. The required corrective action depends on the specific error. This may involve: verifying the SFk device configuration, confirming connectivity to the backup server, or checking the network connection of the industrial computer (e.g. PR21) to both the OT line subnet and the IT subnet where the backup server is located.

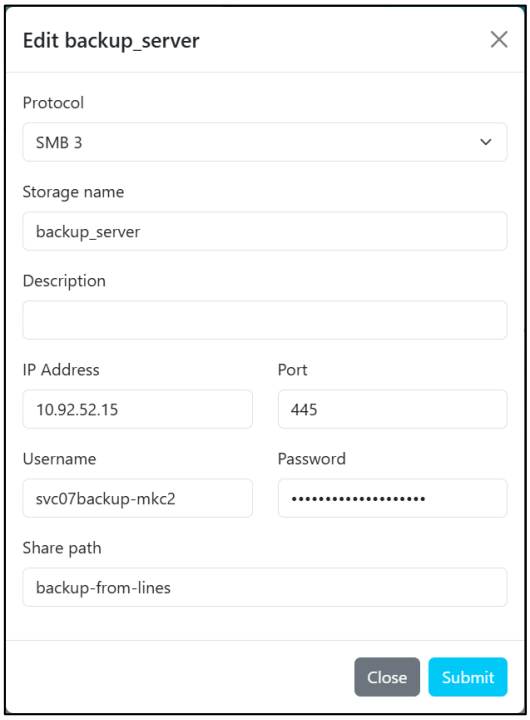
5.5.2 Storages *function*



Drawing 9 | Configuring the client's backup server

In *the Storages* function, the user can define backup servers (m.in. server IP, name of network share and folder(s)) in which .zip files containing JSON files will be saved. As with *Devices*, in order to add new *Storages* or edit or delete existing ones, you must first log in as an *admin user*. After logging in, you will see the options <Add>, <Edit>> and <Delete>.

The configuration of the backup server in the current SBP software version and its details are shown on the figures (see Drawing 9 and Drawing 10).



Drawing 10 | Client backup server configuration details

After clicking on the <Add> or <Edit> button, a window will appear (see Drawing 10), in which you should enter (if it is a new backup server) or you can see/change (if it is an existing backup server) the configuration data of the backup server.

The minimum information that must be entered to add a backup server to the application is:

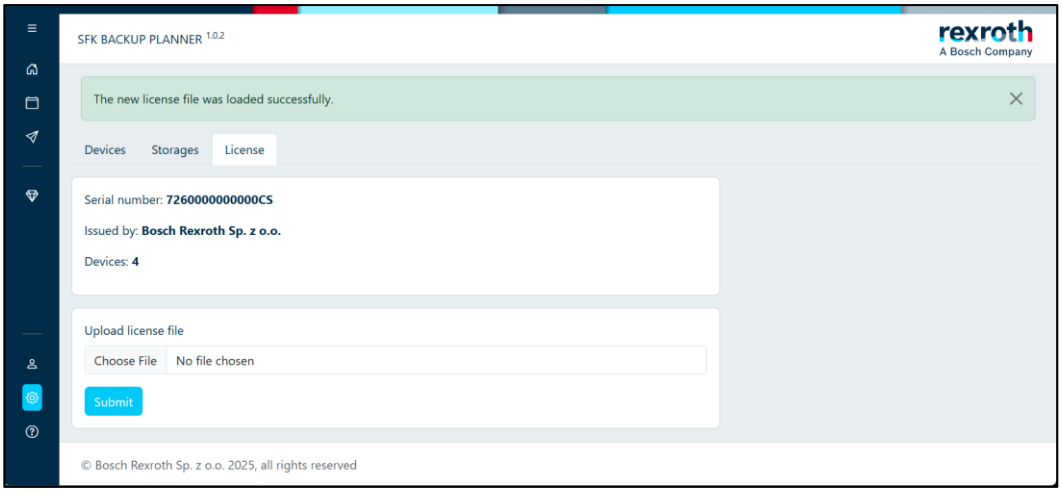
- Recording protocol (in the current version of the SBP application only available SMB 3) in the Protocol field ,
- Name of the backup server (for the purposes of the application, not network identification) in the *Backup name* field,
- IP address in the *IP Address* field,
- Port in the *Port field* , e.g. 445,
- User in the Username field ,
- Password in the Password field ,
- The network share on the backup server in the *Share path* field.

After entering the data, select the <Submit> button to enter the backup server into the application.

To remove the backup server from the application, click on the <Delete> button next to the name of the server you want to delete.

5.5.3 License *Function*

This function displays information about the current license for the number of SFK devices that can be handled by the SBP application. If you have not uploaded a license to your SBP application, you can do so on this screen by first logging in as a user *admin*, and then pressing the <Submit> button and selecting the license file you received from Bosch Rexroth. If the license file is correct and has been loaded into the application, a message about the successful license entry will appear on the screen (see Drawing 11).



Drawing 11 | Screen display after successful license file loading

Example configuration of the license for a customer (e.g. for 4 SFK devices) is shown on the figure Drawing 12.

Drawing 12 | Uploaded license for 4 presses visible in the License option in the Settings menu

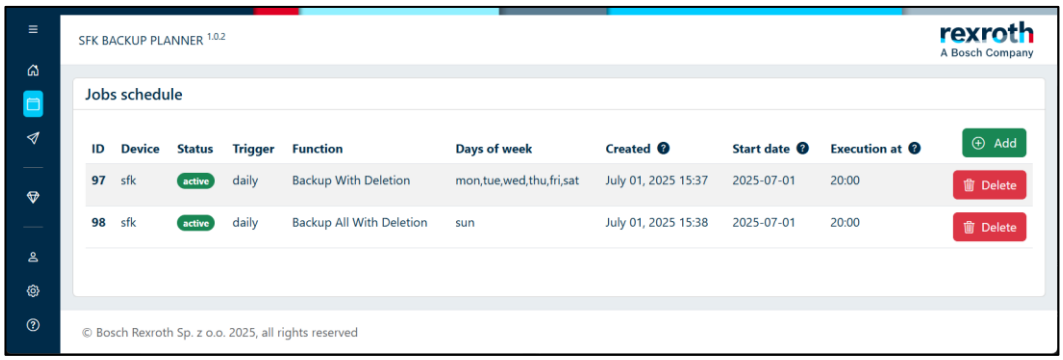
5.6 Jobs menu

From the *Jobs* menu, the user can:

- create a process curve backup job for a selected SFK press,
- view/delete current created curve backup jobs for individual SFK presses,

In order to add or remove a task, you must be logged in as an *admin user*.

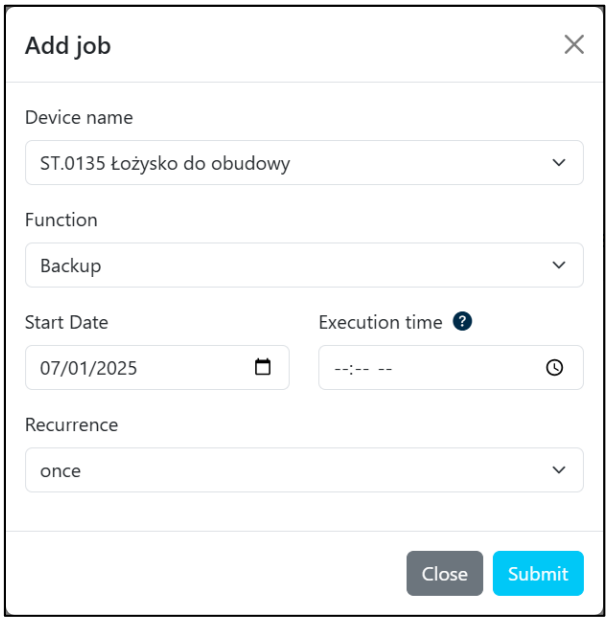
To delete a backup task, click the <Delete> button associated with the task. An example of a backup schedule is shown in Drawing 13.



Drawing 13 | Sample backup schedule for SFK device

5.6.1 Create a backup job

To create a backup task, click the <Add> button. A pop-up window will then appear, prompting you to enter the task details (see Drawing 14).



Drawing 14 | Task configuration pane

The content of the individual fields is as follows:

- *Device name* – select the SFK device for which you are creating the backup task
- *Function* – select the backup task function. There are 4 options to choose from:
  - *Backup* – performs a backup of process curves from the preceding calendar day, while retaining the data in the SFK device's memory

HINT
The *Backup* function captures all process curves created on the SFK device on the calendar day prior to the scheduled start time of the backup job.

  - *Backup with deletion* – performs a backup of process curves from the preceding calendar day and deletes them from the SFK device's memory

HINT
The *Backup with deletion* function captures all process curves created on the SFK device on the calendar day prior to the scheduled start time of the backup job and deletes them from the SFK device.

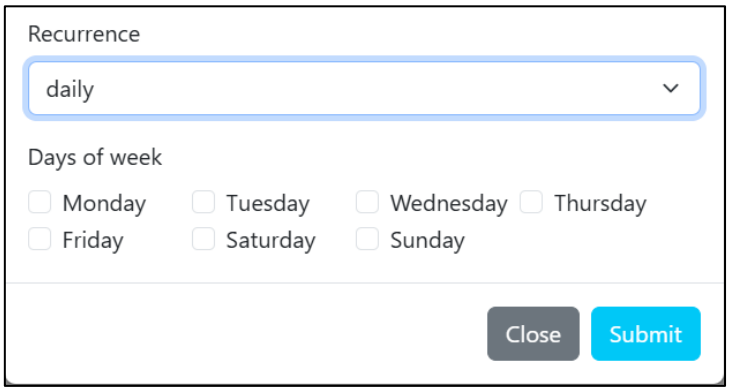
  - *Backup all* – backs up all process curves currently stored in the SFK device's memory, from the oldest data to data from the calendar day before the current system date. The data remains in the SFK device's memory after the backup.

HINT
Regardless of the scheduled day and time of running the *Backup all job,* it always backs up ALL curves created in the SFK press that are older than a day from the current system date.

  - *Backup all with deletion* – backs up all process curves currently stored on the SFK device, from the oldest to those from the day before the current system date, and then deletes them from the device.

HINT
Regardless of the scheduled day and time of running the *Backup all with deletion* job, it always backs up and deletes ALL curves created in the SFK press that are older than a day from the current system date.

- *Reccurence* – this option allows you to specify whether the task should be performed once or recurringly on a selected day(s) of the week:
  - *once* – the task will be triggered once on a specific day (according to the calendar) and a given time,
  - *Daily* – the task will be triggered on a specific day of the week (you can select at least one day, several or 7 days). After selecting this option, specific days of the week will appear on the screen for selection with the mouse (the *Days of week*), in which we want the task to be cyclically executed (see Drawing 15)



Drawing 15 | Available days of the week to select if you select *Daily*

HINT
Please note that if you select e.g. the day of the backup task to Monday and select the Backup or Backup with deletion function, this will start the backup task on Monday and: ▶ Backup or ▶ Backup with deletion of process curves from the SFK device created on Sunday.

- *Start date* – the date when the backup task will be started
- *Execution time* – the time when the backup task will be started

Once you have entered all the data, press the <Submit> button to add the job to the schedule. The job appears under *Job schedule*.

5.6.2 Change the backup job

If user entered incorrect data for a backup job and saved it using the <Submit> button, he must delete the scheduled job from the Job Schedule area using the <Delete> button and then re-enter the data from the beginning.

5.6.3 Performance data of the backup process

The following performance data was obtained from backup and network infrastructure testing conducted on the SFK press line within a customer plant environment. This data allows us to infer:

- The industrial computer (e.g. PR21) efficiently supports up to 4 backups of curves from SFK device at the same time – *Backup* jobs (without deleting curves from the device). Running backups concurrently on four SFK presses increases the total backup time by approximately 20% compared to running a backup on a single SFK device. For example if:
  - the execution time of a sample backup on one SFK device is 1000 seconds,
  - the execution time of a sample backup on 4 SFK devices at the same time would be 1200 seconds (assuming all SFK devices have about the same number of curves for backup).

- Backing up an SFK device with 3700 process curves (while retaining the curves on the device) took approximately 400 seconds, on average. The backup strategy involved performing backups on individual SFK devices sequentially.

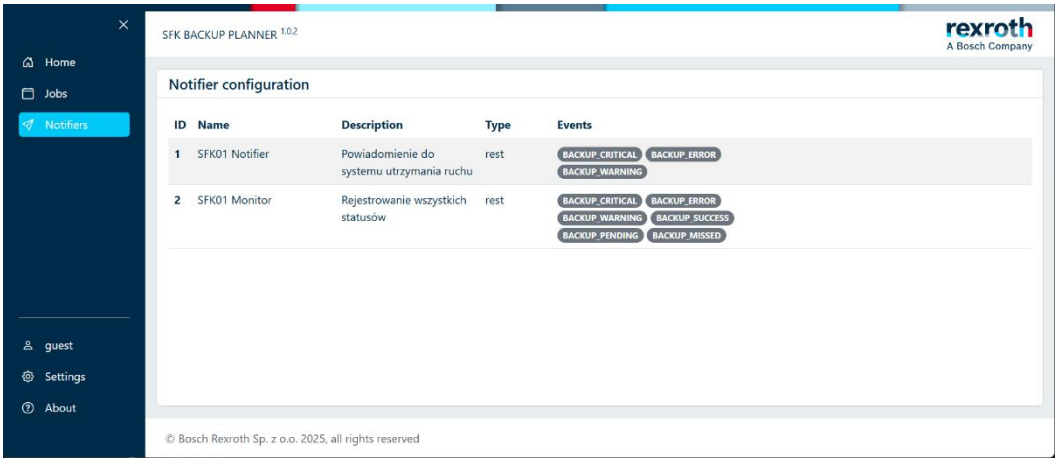
The following data is a projection of the previously presented performance, based on these key assumptions: a linear relationship between curve count and backup time, stable network connectivity with a speed of 1 Gb/s, and no communication issues with the SFK device.

Table 6 | Performance data of the backup process

	Test data					**1 hour backup**		**12 hours backup**
Number of curves	3 700	5 000	10 000	20 000	40 000	33 300	266 400	400 000
Time (seconds)	400	541	1081	2162	4324	3600	28800	43243
Time (minutes)	7	9	18	36	72	60	480	721
Time (hours)	0,1	0,2	0,3	0,6	1,2	1,0	8,0	12,0

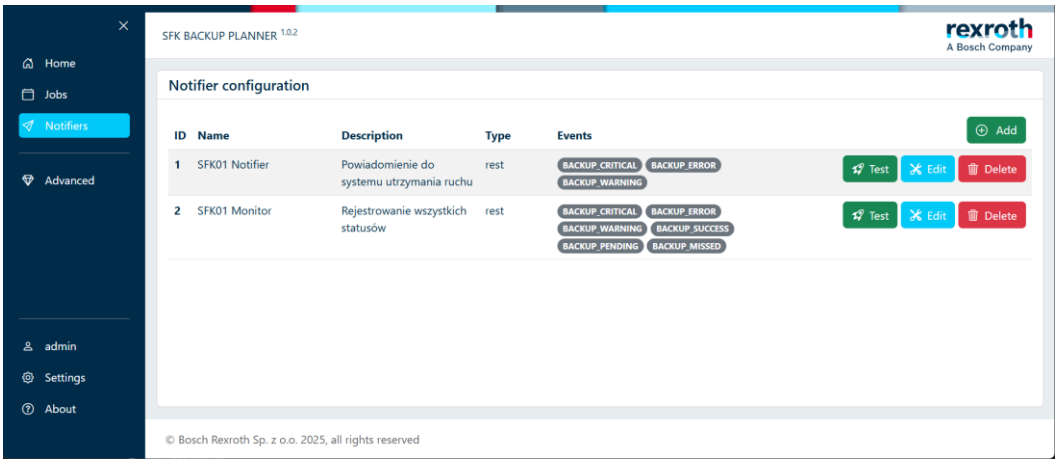
5.7 Menu Notifiers

In the *Notifiers menu*, the user can configure notifications about the backup process for the selected SFK device, using one of the selected protocols. In the current version of the SBP application, only the REST-API protocol is supported.



Drawing 16 | Example window view *Notifiers*

In order to add, edit or delete, as well as to test the notifier, you must first log in as *admin*. After logging in, the <Add>, <Test>, <Edit>, <Delete> buttons will appear (see Drawing 17).



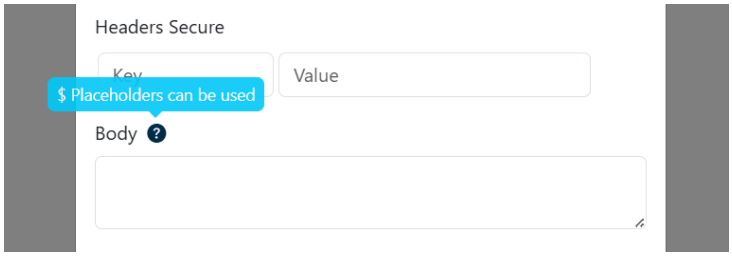
Drawing 17 | Example view of the Notifiers window with administrator rights

The notifier sends a notification when a specific event to which the notifier will be subscribed occurs. The following events are supported:

- *BACKUP_CRITICAL* – backup interrupted with a fatal error
- *BACKUP_ERROR* – backup completed with an error, e.g. no connection to the SFK device or network resource.
- *BACKUP_WARNING* – backup completed with warning
- *BACKUP_SUCCESS* – backup done correctly
- *BACKUP_PENDING* – start of backup
- *BACKUP_MISSED* – the backup has been skipped, it can occur immediately after starting the application after a long break, if the system detects a missed backup in the plan

The configuration supports dynamic values, the so-called placeholders, preceded by the "$" sign. A placeholder is a wildcard that allows you to insert a value related to the context of an event in a

dynamic way. Fields, where placeholders can be used as values, are marked with ? symbol and the description "$ Placeholders can be used" (see Drawing 18).



Drawing 18 | Example of a field where dynamic values can be used

The SBP application supports the following placeholders (see Table 7).

Table 7 | Placeholders supported by notifiers

Placeholder	Description	Possible values

$EVENT	Event type	`BACKUP_CRITICAL`
		`BACKUP_ERROR`
		`BACKUP_WARNING`
		`BACKUP_SUCCESS`
		`BACKUP_PENDING`
		`BACKUP_MISSED`

$DEVICE	SFK device name "Device" from settings	
$RUNID	ID of a specific call	
$JOBID	ID of the related task from the schedule	

$FUNC	Backup function	`Backup`
		`Backup All`
		`Backup With Deletion`
		`Backup All With Deletion`

$STATUS	Status of a specific call	`critical`
		`error`
		`Warning`
		`missed`
		`pending`
		`success`

$ERRCODE	Calling error code, if present	
$SYSTIME	Timestamp in ISO 8601 format	`2025-03-21T11:00:45.107096+00:00`

When values are unavailable, such as during a test notification lacking an associated task context, "null" will be assigned to any placeholders without a defined value.

Placeholders offer a flexible way to generate messages for the target system by combining dynamic content with static text. Examples of how to use this technique are provided below.

If you are interested in a verbal message that informs about the occurrence of an event in a descriptive way, you can configure the following template:

```
The event $EVENT for the SFK device $DEVICE occurred at $SYSTIME
```

An example message might look like this:

```
The event BACKUP_ERROR for the SFK device ST.0135 occurred at 2025-03-
21T11:00:45.107096+00:00
```

To obtain a JSON message that contains all the available information, you can construct the following template:

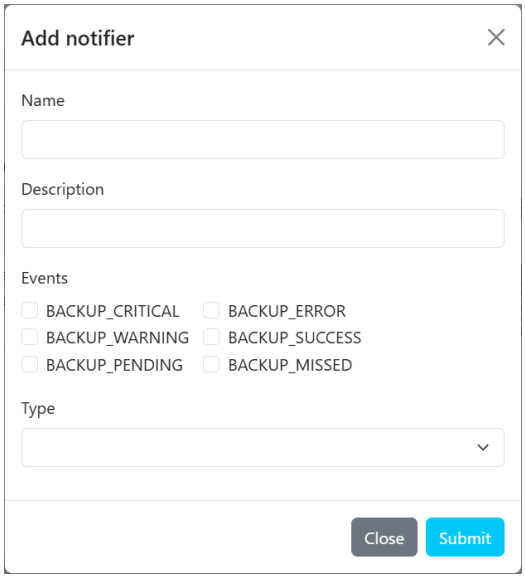
```
{"Event":"$EVENT","Device":"$DEVICE","RunID":$RUNID,"JobID":$JOBID,"Fu
nction":"$FUNC","Staus":"$STATUS","ErrorCode":"$ERRCODE","timestamp":"
$SYSTIME"}
```

An example message, after formatting, might look like this:

```
{
    "Event": "BACKUP_ERROR",
    "Device": "ST.0135",
    "RunID": 154,
    "JobID": 7,
    "Function": "Backup With Deletion",
    "Staus": "error",
    "ErrorCode": "200",
    "timestamp": "2025-03-21T11:00:45.107096+00:00"
}
```

5.7.1 Creation of a notifier

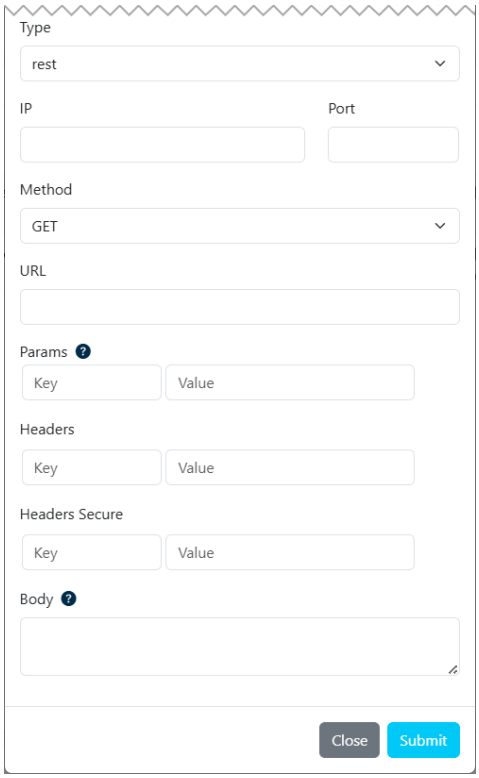
To create a notifier, click on the <Add> button. A pop-up window will appear on the screen where you will be able to configure all necessary parameters.



Drawing 19 | Notifier creation window

- *Name* – Name of the notifier
- *Description* – Description of the notifier, optional field
- *Events* – Events to which the notifier will react
- *Type* – Notifier type, currently only implemented REST-API, option (rest) in drop-down list

After selecting the notifier type, the next part of the configuration is displayed. If you create a notifier using the REST-API protocol, the following fields will load (see Drawing 20):



Drawing 20 | Configuring the REST-API Notifier

- *IP* – IP address of the REST-API server, e.g. maintenance server in the plant
- *Port* – REST-API server port
- *Method* – Rest query type, possible options are GET and POST
- *URL* – An endpoint to a specific REST request, e.g. the value "/maintenance/sfk" will build the address http://{ip}:{port}/maintenance/sfk
- *Params* - Query parameters, given separately as a Key and Value. Such parameters will be added to the created path, for example, for two parameters key1=value1 and key2=value2, the created url will look like http:// {ip}:{port}/maintenance/sfk?key2=value2&key2=value2. $ placeholders can also be used to create values.
- *Headers* – REST-API query headers, detailed values visible on the application screen after they are entered
- *Headers Secure:* These are REST API request headers with the same purpose as the above mentioned headers, but their values are not visible on the application screen after entry. Use this field for sensitive information such as tokens, API keys, or passwords. Note: When notifier configurations are changed, the values in these fields must be re-entered.
- *Body* - The part of the HTTP request that contains the data sent to the server. $ placeholders can also be used to create values.

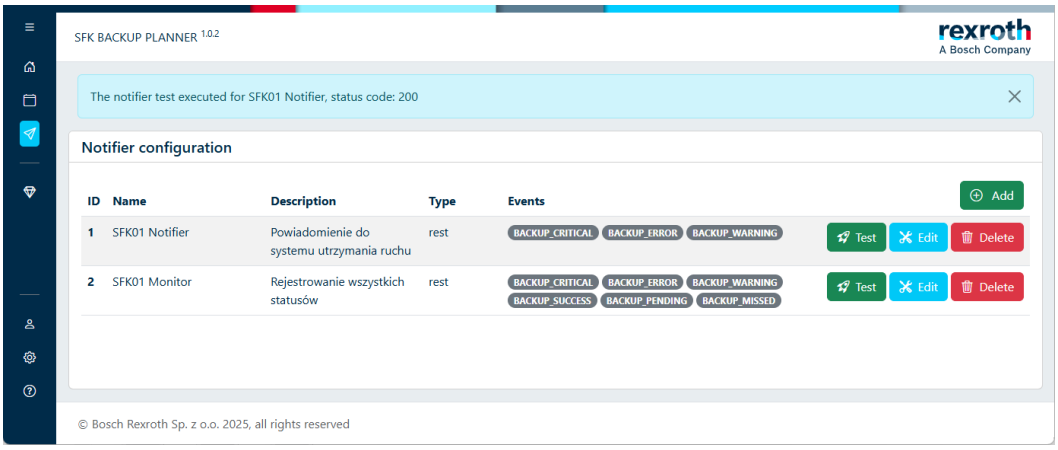
After entering all the data, press the <Submit> button to add the notifier to the application. The notifier appears under *Notifiers configuration*.

In order to edit a notifier, click on the <Edit> button next to the notifier's name on the list of notifiers. Editing does not allow you to change the type of notifier, if you want to change the type, you must delete such a notifier and create a new one. In the current version of SBP, only the "rest" notifier is supported.

To remove a notifier from the application, click on the <Delete> button next to the notifier's name on the list of notifiers.

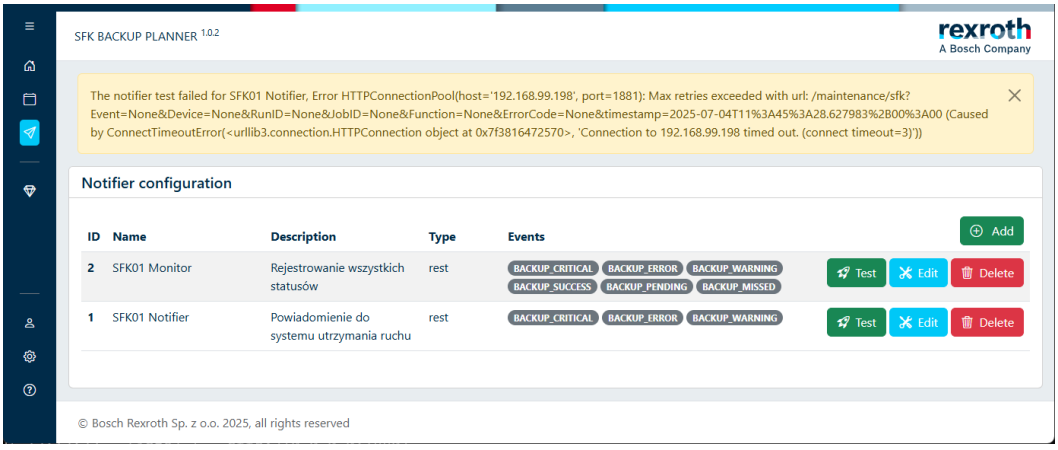
5.7.2 Testing of Notifiers

To send a test notification from the application, click on the <Test> button next to the notifier's name on the list of notifiers. If the request has been sent to the REST-API server, we will receive information with a response code (see Drawing 21).



Drawing 21 | Positive Notifier Test Result

However, if there is an error in communication with an external system, e.g. missing connection to the maintenance server, we will get a detailed description of the error (see Drawing 22).



Drawing 22 | Result of a failed notifier test

HINT
If the notifier is configured incorrectly or the target server does not respond, the application is suspended for the duration of the timeout when the test message is sent. Wait until the test result message appears.

6 PR21 Computer

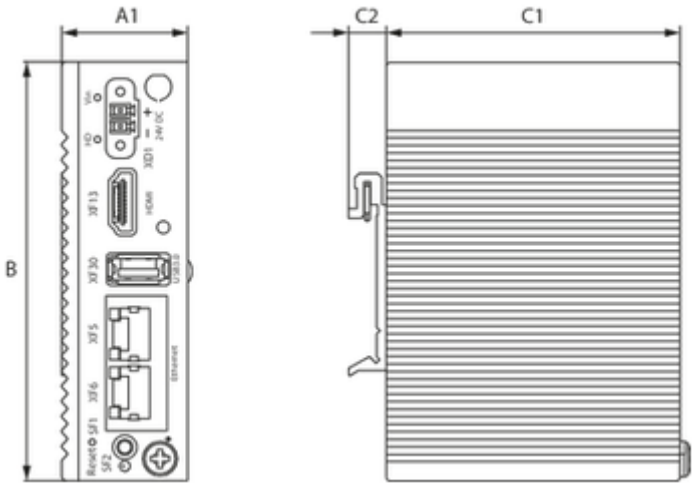
The SBP software is designed to run on a dedicated industrial computer, such as a PR21 model. A recommended configuration is Ubuntu Core with Snap and Docker environments. This industrial-grade solution is designed for 24/7 operation

6.1 Technical Parameters

The PR21 computer supplied to support the SBP application has the parameters shown in the table below.

Table 8 | Detailed parameters of the PR21 computer

Wersja hardware:	NA (Basic)
CPU:	Intel ATOM E3815 1,46 GHz
Pamięć RAM:	4GB DDR3L 1066 MHz
System operacyjny:	Linux Ubuntu Core
Porty rozszerzeń:	1 x mPCIe lub 1 x mSATA dysk
Pamięć masowa w standardzie:	32 GB eMMC
Pamięć SDD opcje dodatkowe:	64 GB mSATA lub 256 GB mSATA
Grafika:	1 x HDMI Intel® HD Graphics
Montaż	Szyna DIN
Zasilanie	24 V DC +25 %, -20 %
Porty Ethernet	2 x 1 GBit
Porty USB	1 x USB 3.0
Port szeregowy	-
Pobór mocy	20 W max
Chłodzenie	Pasywne
Waga	400 g
Poziom ochrony	IP20
Certyfikaty:	CE FCC UL CSA CCC



Drawing 23 | External dimensions of the PR21 computer

Drawing 24 | Example of identification of a PR21 computer

Drawing 25 | Ports and connectors of a PR21 computer

6.2 Network configuration

The network configuration of the PR21 computer has been saved in the path
`/etc/netplan/00-snapd-config.yaml`

An example version of the file is shown below.

```
# This is the network config written by 'console_conf'
Network:
  Ethernets:
    eth0:
      addresses: [10.92.168.243/26]
      gateway4: 10.92.168.254
      nameservers:
        addresses: []
        search: []
    eth1:
      addresses: [10.10.10.3/16]
      nameservers:
        addresses: []
        search: []
  version: 2
```

HINT

The eth0 network card on Ubuntu corresponds to the physical XF5 port, and the eth1 network card corresponds to the physical XF6 port.

The MAC addresses of the ports of a PR21 computer used to operate the SBP application are unique and can be useful for the customer's IT Department when establishing network connections. For example, these are the addresses for each Ethernet port, as shown below:

eth0 XF5 `00:60:34:1b:10:cd`
eth1 XF6 `00:60:34:1b:10:ce`

6.2.1 Connecting the PR21 to the plant network

- The XF5 connector can be connected to the IT network - through this connection, the PR21 computer will be able to connect to the backup server, where ZIP files will be saved,
- The XF6 connector can be connected to the OT line network - to the same network in which the SFK devices operate.

6.3 Admin password

The PR21 computer usually delivered to the customer has a default user with root privileges and a password shown below.

User: `boschrexroth`
Password: `boschrexroth`

It is recommended to change the password for the `boschrexroth` user to a different one in order to properly protect the PR21 computer against unauthorized access.

HINT

If you change the password for `boschrexroth` user, you should save it in a safe place, e.g. in a password vault. In the event the password is lost or forgotten by the user, it will not be possible to regain access to the computer. In this case, you will need to restore your computer to factory settings.

6.4 Login to the PR21 computer

The PR21 allows you to log in to the Ubuntu console. To do this:

1) Connect the PR21 computer to the network as described in section 6.2.1
2) Check if the ssh program is available on the user's computer with MS Windows 10 or 11 (if it is not, it should be installed in the system – it is available free)
3) Connect the user's computer to the network of OT line, and assign an address from the free pool of IP addresses
    a. it is also possible to connect directly from the user's computer via a network cable to the XF6 connector of the PR21 computer
4) Start the command line or terminal in MS Windows and type the following command:

```
ssh boschrexroth@10.10.10.3
```

5) If you connect to the PR21 computer for the first time from the user's computer, the information about the SSL certificate will appear on the screen - in this case, type `yes` and press the <Enter> key.
6) Next, enter the password of the `boschrexroth` user to the PR21 computer (the screen will not echo the characters typed on the keyboard)
7) Once the password is entered correctly, the system details and information about the last login will appear on the screen, as shown for example below.

```
boschrexroth@10.10.10.3's password:
Welcome to Ubuntu Core 16 (GNU/Linux 4.4.0-260-generic x86_64)
 * Ubuntu Core: https://www.ubuntu.com/core
 * Community: https://forum.snapcraft.io
 * Snaps: https://snapcraft.io

This Ubuntu Core machine is a tiny, transactional edition of
Ubuntu,
designed for appliances, firmware and fixed-function VMs.

If all the software you care about is available as snaps, you are
in
the right place. If not, you will be more comfortable with classic
deb-based Ubuntu Server or Desktop, where you can mix snaps with
traditional debs. It's a brave new world here in Ubuntu Core!

Please see 'snap --help' for app installation and updates.
Last login: Mon Dec 2 09:57:50 2024 from 10.10.10.4
```

8) After that, the system will show a prompt and is ready to type Ubuntu commands.

```
boschrexroth@localhost:~$
```

You can learn the basic commands of Ubuntu on the following page:
https://help.ubuntu.com/community/UsingTheTerminal?action=show&redirect=BasicCommands

6.5 SBP App Installation Details

6.5.1 File location

The SBP application is installed on an industrial computer (e.g. PR21) in the `boschrexroth` user's home folder in the `app` folder - this is a requirement of the docker environment running in the snap architecture on Ubuntu Core.

An example of the contents of the `boschrexroth` user's home directory for the installation of the SBP software is shown below.

```
boschrexroth@localhost:~$ ls -al
total 3332
drwxr-xr-x 7 boschrexroth boschrexroth 4096 Nov 29 15:44 .
drwxr-xr-x 3 root root 4096 Jul 17 2019..
-rw------- 1 boschrexroth boschrexroth 4097 Dec 2 09:51 .bash_history
drwx------ 2 boschrexroth boschrexroth 4096 Feb 1 2022 .cache
drwxrwxr-x 4 boschrexroth boschrexroth 4096 Nov 29 15:44 app
-rwxrwxr-x 1 boschrexroth boschrexroth 1684992 Nov 29 15:43 app_beta-fix1.tar
-rwxrwxr-x 1 boschrexroth boschrexroth 1684480 Nov 29 11:46 app_beta.tar
drwxrwxr-x 4 boschrexroth boschrexroth 4096 Nov 21 08:46 app_old
drwxr-xr-x 5 root root 4096 Jul 12 2022 config
drwx------ 4 boschrexroth boschrexroth 4096 Nov 21 08:29 snap
```

The contents of the `app` folder are shown below:

```
boschrexroth@localhost:~$ cd app
boschrexroth@localhost:~/app$ ls -al
total 56
drwxrwxr-x 4 boschrexroth boschrexroth 4096 Nov 29 15:44 .
drwxr-xr-x 7 boschrexroth boschrexroth 4096 Nov 29 15:44..
-rw-rw-r-- 1 boschrexroth boschrexroth 315 Nov 29 15:26 .dockerignore
-rwxrwxr-x 1 boschrexroth boschrexroth 244 Nov 29 11:42 .env
-rwxrwxr-x 1 boschrexroth boschrexroth 54 Nov 29 15:42 .flaskenv
-rw-rw-r-- 1 boschrexroth boschrexroth 248 Nov 29 15:26 .gitignore
-rw-rw-r-- 1 boschrexroth boschrexroth 271 Nov 29 15:26 Dockerfile
-rw-rw-r-- 1 boschrexroth boschrexroth 837 Nov 29 15:26 README.md
drwxrwxr-x 13 boschrexroth boschrexroth 4096 Nov 29 15:26 app
-rw-rw-r-- 1 boschrexroth boschrexroth 90 Nov 29 15:26 app.ini
-rwxrwxr-x 1 boschrexroth boschrexroth 698 Nov 29 08:14 docker-compose.yml
drwxrwxr-x 2 boschrexroth boschrexroth 4096 Nov 29 15:26 nginx
-rw-rw-r-- 1 boschrexroth boschrexroth 791 Nov 29 15:26 requirements.txt
-rw-rw-r-- 1 boschrexroth boschrexroth 192 Nov 29 15:26 run.py
```

6.5.2 Setting up a docker environment

The configuration of individual containers required to run the SBP application has been saved in the `docker-compose.yml` file. Its content is shown below:

```
Services:
  Postgres:
    image: postgres:17.2
    container_name: Postgres
    volumes:
      - postgres_vol:/var/lib/postgresql/data
    environment:
      - POSTGRES_DB=${POSTGRES_DB}
      - POSTGRES_USER=${POSTGRES_USER}
      - POSTGRES_PASSWORD=${POSTGRES_PASSWORD}
    Expose:
      - 5432
    restart: always
    Logging:
      driver: "json-file"
      options:
        max-size: 5m
        max-file: "10"
  Flask:
    image: sfkbp-flask:${FLASK_TAG}
    Build:
      dockerfile: Dockerfile
      context: .
    container_name: flask
    env_file:
      -.Env
    environment:
      - APP_CONFIG=production
    depends_on:
      - Postgres
    Expose:
      - 8080
    restart: always
    Logging:
      driver: "json-file"
      options:
        max-size: 5m
        max-file: "10"
  nginx:
    Image: sfkbp-nginx:${NGINX_TAG}
    Build:
      dockerfile: ./Dockerfile
      context: ./nginx/
    container_name: nginx
    depends_on:
      - flask
    Ports:
      - "8080:80"
    restart: always
    Logging:
      driver: "json-file"
      options:
        max-size: 5m
        max-file: "10"
volumes:
  postgres_vol:
    external: true
```

The status of individual containers started automatically at the start of the PR21 computer is shown below:

```
boschrexroth@ubuntu:~$ sudo docker ps -a
CONTAINER ID   IMAGE                    COMMAND                  CREATED      STATUS       PORTS                                                NAMES
aa4510e323e8   app-nginx                "/docker-entrypoint.…"   3 days ago   Up 25 hours  0.0.0.0:8080→80/tcp, [::]:8080→80/tcp                nginx
6d0ecfe64095   sfkbp-flask:1.0.2-stable "uwsgi app.ini"          3 days ago   Up 25 hours  8080/tcp                                             flask
a6906b0c227c   postgres:17.2            "docker-entrypoint.s…"   3 days ago   Up 25 hours  5432/tcp                                             postgres
```

7 List of drawings

8 Table Index