14 **TODO** Notes

15 Alarms

Alarms are available only when using the Web App3 Application and are configurable so that alarms can be triggered on various data coming from your system. Note that a system using a Bluetooth gateway with the Android tablet only (without Cloud connectivity) cannot use the alarm features.

As discussed in Section 7.1, alarms are evaluated every minute. However, depending on other network parameters, such as the polling speed of the gateway, the acquisition speed of the probe by the sensor as well as upload delays to the Cloud, a condition generating an alarm may take several minutes before the users subscribed to it are notified. Note that the alarm evaluation speed (1 minute) is specific to the operation of the Smartrek platform and differs from the repeat inerval (5 minutes to 24 hours), which is a configurable parameter per alarm rule. Instead, the repeat interval indicates how often a triggered alarm should be re-armed.

To configure alarms and subscriber groups (Alarm Recipient Groups), navigate to the `Alarms` page.

Menu ≡ > Alarms

On the `Alarms` page, you can create and edit Alarm Rules and Alarm Recipient Groups (subscribers) (Figure 70). The page also lists all the alarm rules and subscriber groups you have created. In addition, the history of triggered alarms as well as sent notifications are displayed under Alarm Activity in the right-hand section of the page. Note that this history is limited to the last 10 events. To load more events, click on the ⌄ button.

Click on an alarm rule to expand it and view more information. The rule is active if its status indicates ⬬ and inactive if its status indicates ⬭. Groups subscribed to the alarm rule are listed in the `Subscribed` section. Finally, the bottom section lists the actions that can be taken on this Alarm Rule. For example, you can activate or deactive the rule, edit it, delete it, schedule it back to be rearmed later on, automatically reschedule it (snooze) or resolve the alarm.

15.1 Alarm Recipient Groups

Triggered alarms can send e-mails, text mesasges (SMS) or make calls to alert your teams. To define how alarms are sent, you need to create Alarm Recipient Groups (subscriber groups). A recipient group is a group of people to be contacted if an alarm is triggered. All members of the same group share the same schedule.

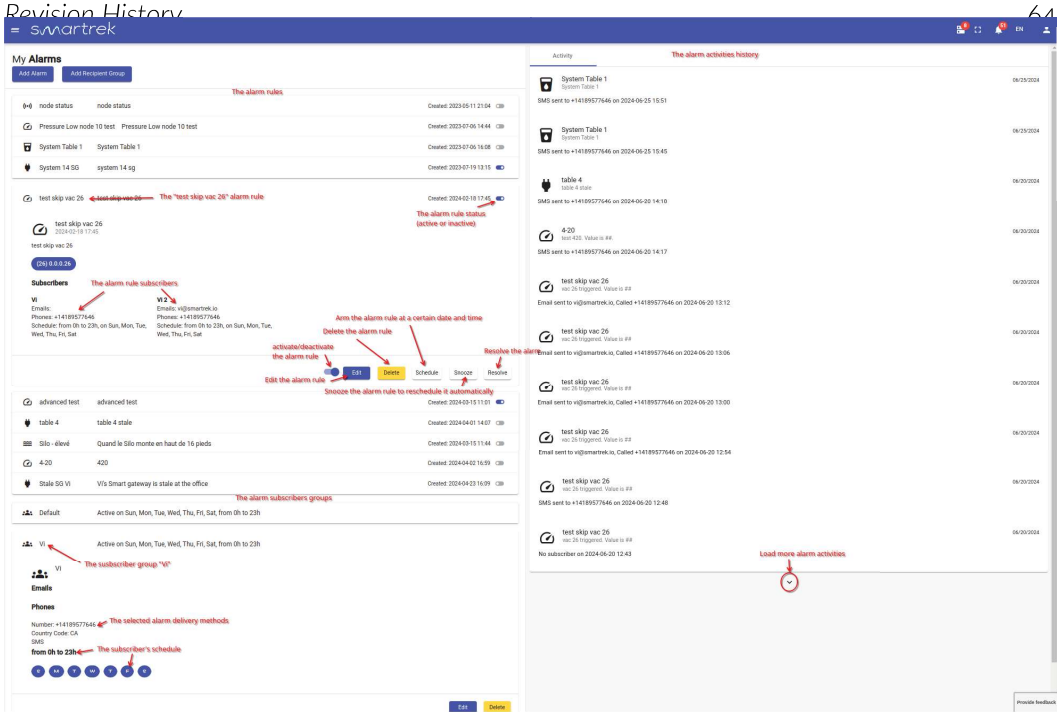

Figure 70: The Alarm configuration page

Table 14: Alarm configuration

Alarmes	
Alarm type	System (offline / stale data) Simple alarm on a sensor's data Advanced alarm constructed on several sensor data The status of a sensor
Repeat interval	5m to 24h
Skip x alarm count	0 - 100 times
Default snooze interval	5m to 24h
Max repetition before fallback	0 - 100 times
Alarm recipient groups (subscribers)	
Alarm notifications	Email Phone (SMS) Phone (voice call)

Table 15: Availability of alarm notifications per region

Region	E-mail	SMS	Voice calls
Canada	X	X	X
United States	X	X	X
Mexico	X		
Australia	X		

Note that acknowledging and snoozing an alarm after it has been received is only possible with SMS and calls (not e-mails).

On the `Alarms` page, click on a subscriber group to expand it and view detailed information. This information contains the e-mail addresses and phone numbers associated with this Group, as well as the subscription schedule. In addition, you can choose to edit or delete the Group from the action buttons at the bottom of the card.

To create a subscriber group, click on `Add Recipient Group` (Figure 71). Then, name the group and add all the desired recipients.

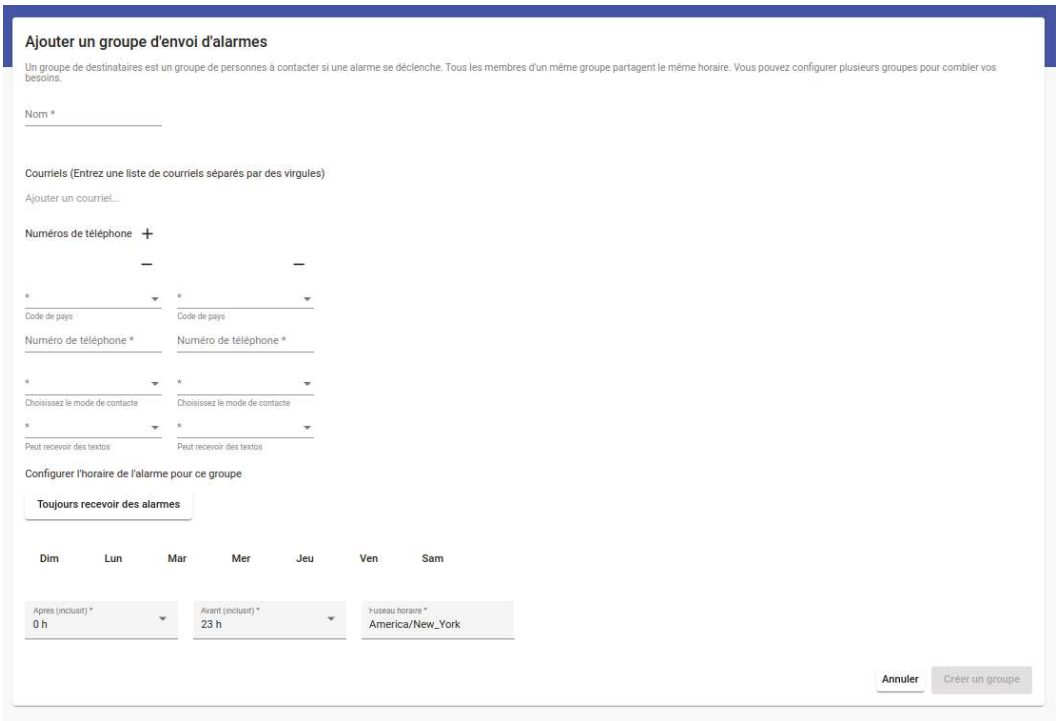

Figure 71: Add a Recipient Group

For example, add a comma-separated list of e-mail addresses in the `Emails` field so that an e-mail is sent to all of those addresses when an alarm is triggered. Next, click on + to add phone numbers to the recipient list, then choose the sending mode (SMS or voice cals).

Then, configure the subscription schedule to receive alerts only during the selected period. This way, you can create multiple Recipient Groups to send alarms to and configure the Alarm Rule to send notifications only to active subscribers (on the schedule), thus avoiding unwanted alerts to users who are not currently on duty. To receive alarm notifications at all times, click on `Always receive alarms`. Finally, select the timezone corresponding to your subscriber group. Note that Eastern Time (EST) is always selected by default.

Note that only Canadian or U.S. phone numbers are accepted for the alarm system. Also, be warned that phone numbers can also be automatically removed from a Recipient Group

if the user blocks the Smartrek Alarm Service phone number (647-930-4425).

Finally, click on the `Create Group` button to confirm the Recipient Group creation. You will then be redirected to the `Alarms` page. You can now select the group you have just created when creating an Alarm Rule.

15.2 Alarm Rules

To create a new Alarm Rule, from the `Alarms` page, click on the `Add Alarm` button (Figure 72). Name your new rule and enter a description. Then, choose the alarm type and select one or more Alarm Receipient Groups. Note that the order of subscriber groups determines the order in which the fallback occurs when one or more subscriber group fail to acknowledge a received alarm. This Recipient Group order is the list order and not the selection order. Therefore, it is advisable to name these groups in such a way as to obtain a list of subscriber groups in ascending order of priority for the fallback scheme.

Here are the available alarm types and their meanings:

1. **Simple** Alarm: Choose a sensor or a group of sensors of the same type. Then choose a dimension to compare with a threshold to generate an alarm.
2. **Advanced** Alarm: Build a mathematical expression using the different values from one or more sensors, which is evaluated to generate an alarm.
3. **System** Alarm: Configure alarms for your system status to be informed when your network is down or when the link to the Cloud is broken.
4. **Device Status** Alarm: Monitor the status of your devices and receive notification when a device is offline (Dead Node) or its batteries are low (Low Voltage), for example.

15.2.1 Simple Alarms

In the next step, select a sensor type and a Table id. Next, select the Dimension to be evaluated against the threshold. Select all the sensors to be evaluated, then choose a Dimension to be evaluated. Next, select the operator to be used for the evaluation (Figure 73). Therefore, for N selected sensors, you can evaluate:

1. Dimension_N **<** Threshold
2. Dimension_N **<=** Threshold
3. Dimension_N **>** Threshold
4. Dimension_N **>=** Threshold

Finally, determine whether the alarm should be triggered when all the selected sensors meet the evaluation criterion, or when only one of the selected sensors meets the evaluation criterion.

When an alarm is configured to trip when a condition applies to **any** devices in the group,

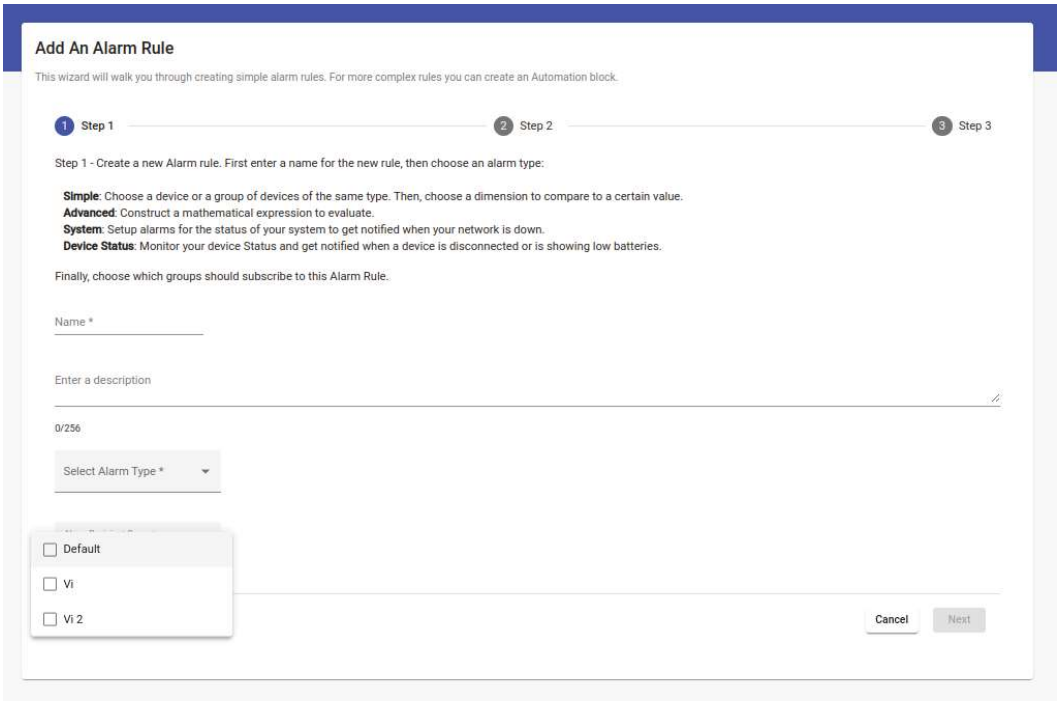

Figure 72: Add an Alarm Rule

the alarm is evaluated as follows for N given sensors and operator <:

(Dimension_0 < Threshold) OR (Dimension_1 < Threshold) OR (Dimension_2 < Threshold) OR (Dimension_N < Threshold)

When an alarm is configured to trip when a condition applies to **all** devices in the group, then the alarm is evaluated as follows for N given sensors and operator <:

(Dimension_0 < Threshold) AND (Dimension_1 < Threshold) AND (Dimension_2 < Threshold) AND (Dimension_N < Threshold)

Finally, enter the Threshold to be used when evaluating the alarm. Note that this threshold uses the units selected by the Account. For example, with a Dimension using the unit type "Height", which is configured in m, while its base unit is cm, the Threshold entered will then be evaluated in "meters".

15.2.2 Advanced Alarms

In the next step, construct a mathematical expression that should result in the value TRUE or FALSE when evaluated using as many variables as necessary (Figure 74). Note that, as advanced alarms involve many device types and tables, the mathematical expression will be evaluated using the default unit for each device. You can find the default unit used for

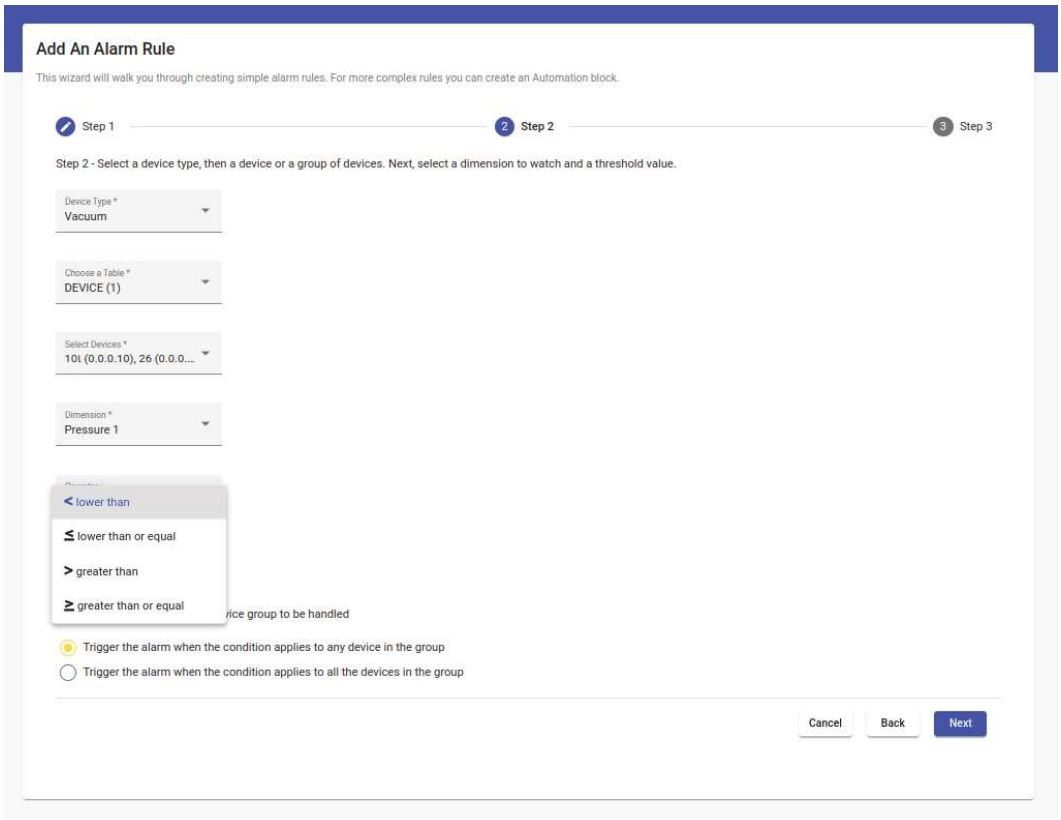

Figure 73: Configuration of a Simple Alarm

the selected sensor in its corresponding datasheet.

The elements (dimension, operator or value) available for the construction of the mathematical expression are shown in Table 16.

Table 16: Available elements for the construction of the mathematical expression

Data type	Description / Options
Sensor data	Available dimensions for the sensor (sensor specific)
Operator	Mathematical operators <, <=, >, >=, , !, +, -, x, /, (,), OR, AND
Raw value	Any number

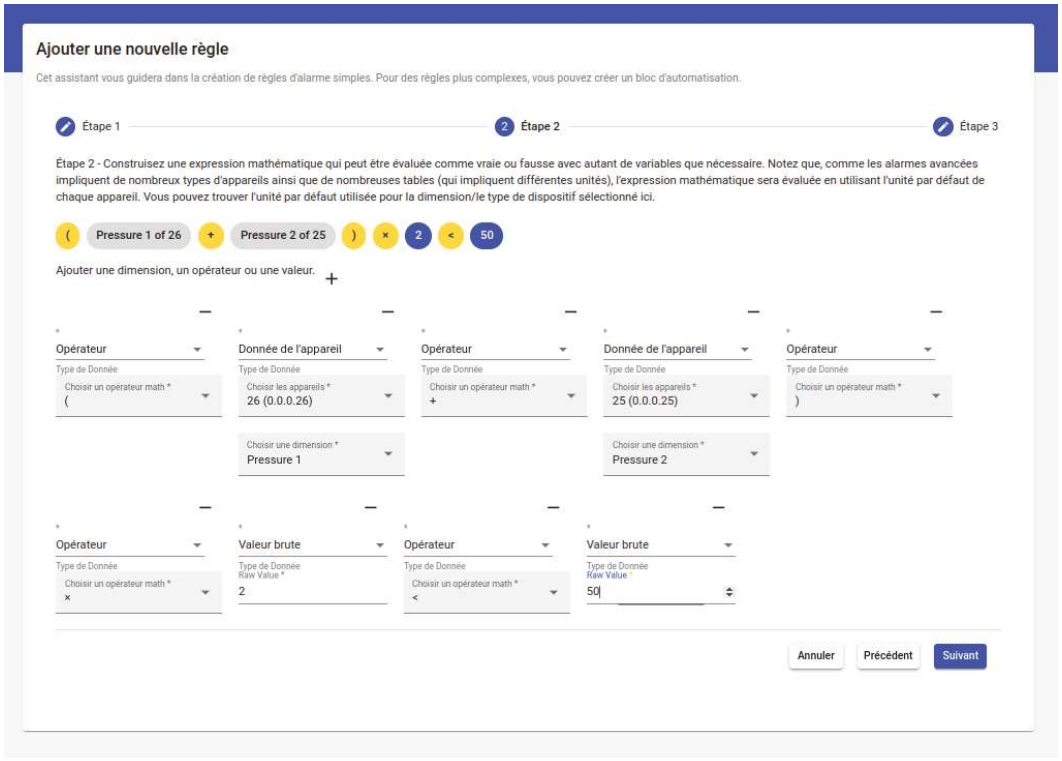

Figure 74: Configuration of an Advanced Alarm

The 74 example shows the following mathematical expression:

(Pressure_26_Sensor_1 + Pressure_25_Sensor_2) x 2 < 50

This mathematical expression is a valid advanced alarm construct since it can be evaluated to a boolean (i.e TRUE or FALSE).

15.2.3 System Alarms

In the next step, select a table to monitor its status and be notified when your gateway goes offline or when sensor polling stops for any reason. Enter the time limit before the alarm is triggered. For example, a timeout of 30 minutes should trigger an alarm when the gateway of the selected table no longer sends updates to the server and its last data is more than 30 minutes old.

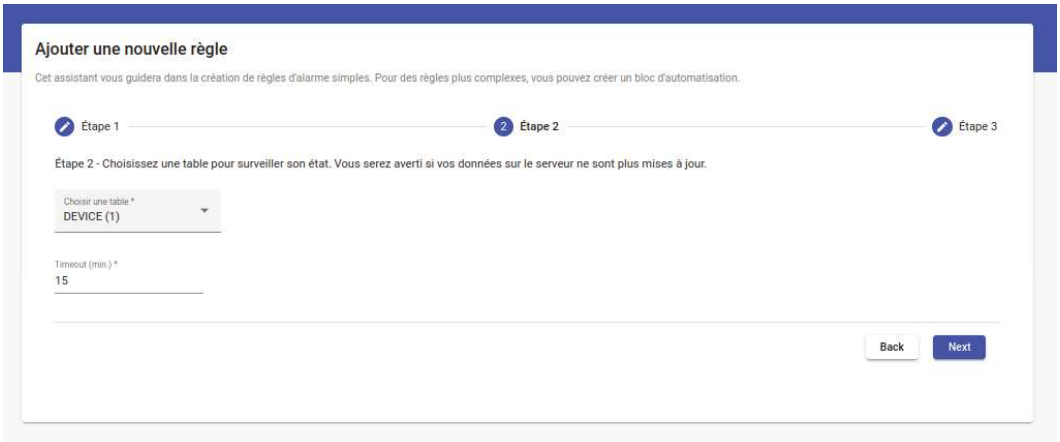

Figure 75: Configuration of a System Alarm

15.2.4 Configure the alarm triggering behavior

In the last step (Figure 76), examine the alarm you've built and add a custom message that will be sent (by e-mail, SMS or dictated during a call) when the alarm is triggered. Note that this message will be read out by an English TTS (text-to-speech). To output the sensor value in alarm, add ## to the text of your mesasge. The ## identifier will be replaced by the value read by your sensor, in base units (not your Account units).

Next, choose an icon that will be displayed on the Alarm Rules list in the `Alarms` page.

1. Repeat Interval Next, choose a repeat interval. When an alarm is triggered, the next alarm evaluation happens when this repeat interval duration has elapsed.
2. Skip x alarm count You can choose to ignore a number of alarms to limit the notifications sent to you. This feature is particularly useful for filtering out false alarms. Here's an example of how to use this feature.
   A system that monitors the current drawn by a pump to detect equipment anomalies can sometimes send out unnecessary alerts. Typically, by measuring the current, we seek to detect pump wear, phase imbalance, or electrical problems, since the current drawn becomes abnormally high under these conditions. On the other hand, current surges can also occur during pump start-up, and the high-current alarm would then be triggered unnecessarily each time. To avoid these false alarms, the user can configure the Alarm Rule to ignore the first 2 alarms triggered. In this way, the user will only be

alerted if the current measured at the pump exceeds the threshold for 3 consecutive evaluations. Therefore, with a 5 minutes repetition interval, the triggered alarm will only send an alert after (3x 5 minutes = 15 minutes).

3. Default Snooze Next, choose a default Snooze value. This Snooze value determines the default delay for resetting your alarms when a user resets an alarm with the `Snooze` action, either via the Web App3 Application, by replying to a SMS alert or by voice by answering the alert call. For example, when an alarm is triggered, an SMS message is sent to a subscribed user. With a repetition interval of 2 hours, the user who replies "1" (Snooze) by SMS to the alarm received resets this alarm, which will then be re-armed 2 hours later.
4. Maximal repetition before fallback You can define a maximum number of alarm repetitions without acknowledgement before moving on to the next subscribed recipient group. The default setting is 0, i.e. the alarm is sent to all subscriber groups.
   With a repetition interval of 3, an alarm that is triggered would send a first alert to the first group of subscribers. With a repetition interval of 5 minutes, the alarm rule is re-evaluated 5 minutes later and a second alert is sent, again to the first group of subscribers. 5 minutes later, the rule is evaluated again and a third alert is sent to the first group of subscribers.
   If there is no acknowledgement from the first group of subscribers, a subsequent evaluation of the alarm rule 5 minutes later results in an alert being sent to the **second** group of subscribers. The same logic continues until the last subscriber group is reached, which then receives all alerts until there is an action that can be considered an acknowledgement or until the issue is resolved and the alarm is cleared.

15.2.5 Possible actions following receipt of an alert

1. E-mail alerts To acknowledge receipt of an e-mail alert, navigate to the `Alarms` page and click on `Snooze`, `Cancel` or `Resolve`. It is not possible to reply directly to an e-mail alert.
2. SMS alerts To find out about the possible actions you can take following receipt of an alert, text `More` to see the options available to you. To acknowledge receipt of the alert, you can reply `Snooze` to delay the alarm according to the default `Snooze` setting, or reply an intreval of your choice, such as 30m (30 minutes) or 2h (2 hours) (Figure 77).
3. Voice alerts (calls) To acknowledge receipt of the alert, answer the call with the message `Snooze` or dictate an interval of your choice, such as "30 minutes" or "one hour".

15.3 **TODO** Alarms when running the Web App3 Application locally

The Web App3 Application runnning locally on the Smart Gateway+ does not support phone or e-mail alarms.

When configuring an Alarm Recipient Group, a unique path can be selected for the phone

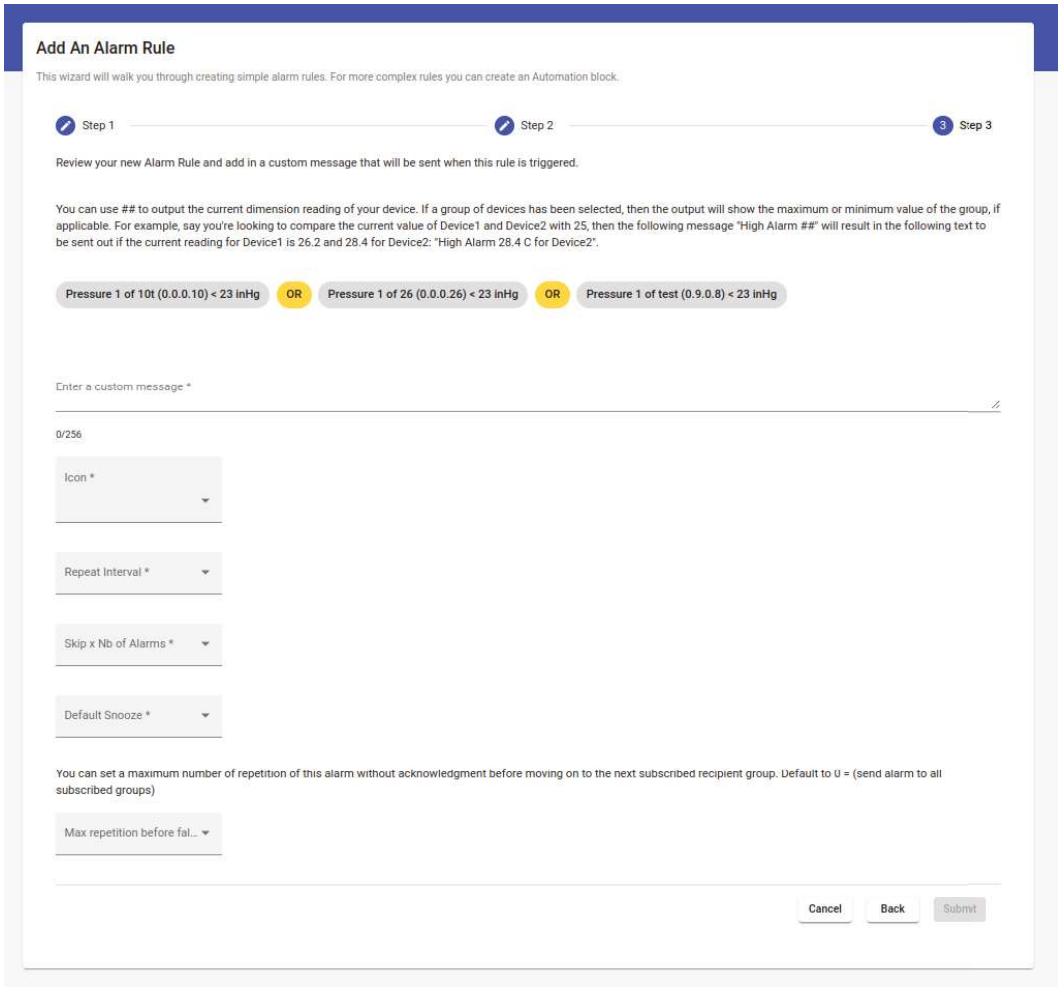

Figure 76: Configure the alarm triggering behavior

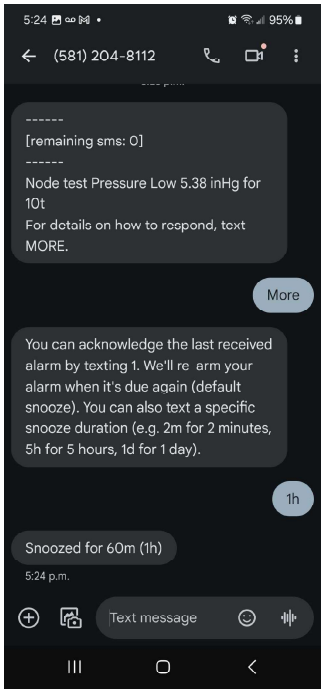

Figure 77: SMS Alerts

and e-mail options. This path is transmitted to the Apprise software in order to connect to any compatible user-managed software/service.

For example, for e-mail alarms, you can specify an e-mail address and password from an e-mail provider as shown in Figure 78

Note that these alarms **don't** support replies and acknowledgements (Snooze, etc.)

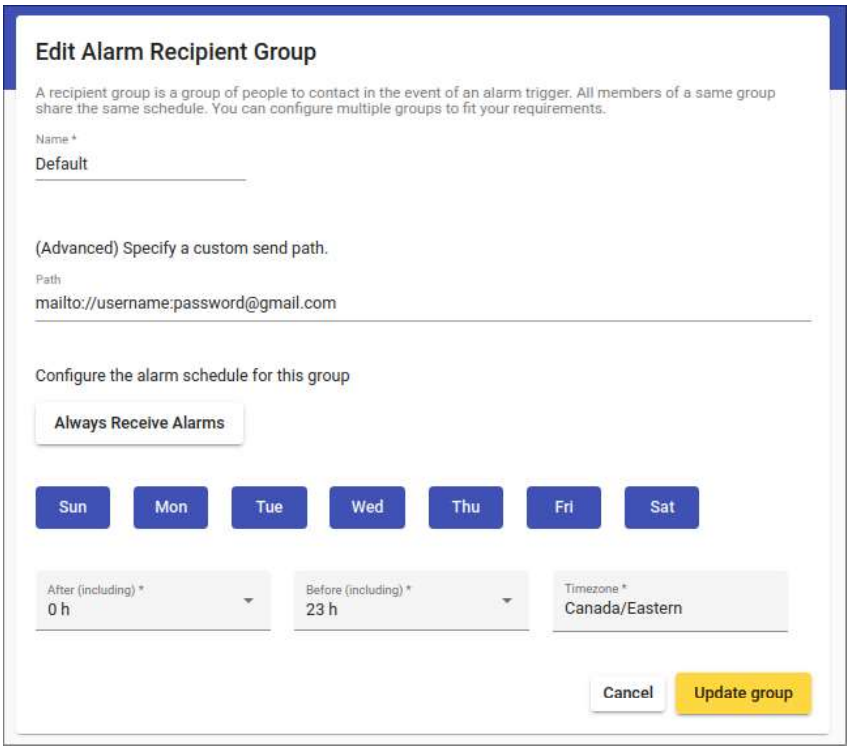

Figure 78: Configuration of a Recipient Group for the local Web App3 Application