AVISION 2.0

Manual

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1 Summary

1.1 What is Avision ?

Avision is Avic's asset management web application.

With Avision you can:

- monitor, control and maintain your assets
- develop reports and have them generated automatically for any period you want
- design Tasks and Workflows to optimize the processes that use your assets
- present Charts based on measurements from your assets combined with data from other sources
- automatically send alarms when critical values, set by you, are exceeded
- determine who inside your organization get an alarm message and in what form (text/SMS, e-mail, Twitter)

1.2 Design vs Live

Avision knows two environments: Design and Live. In Design you create the building bricks that you use in Live to create your Application.

This approach has following advantages:

- An Asset only needs to be designed once. This Design is then used by all Assets of that type in Live.
- Upgraded Assets and other functionality is checked and when found to be correct, implemented in Live with the click of a button

1.3 So, how do we start ?

The first chapters of this manual form a step-by-step tutorial learning you how to set up a working Application using the example of a sewage installation.

After the base of the Application has been made, the following chapters describe in detail all functionality that can be realized in Avision.

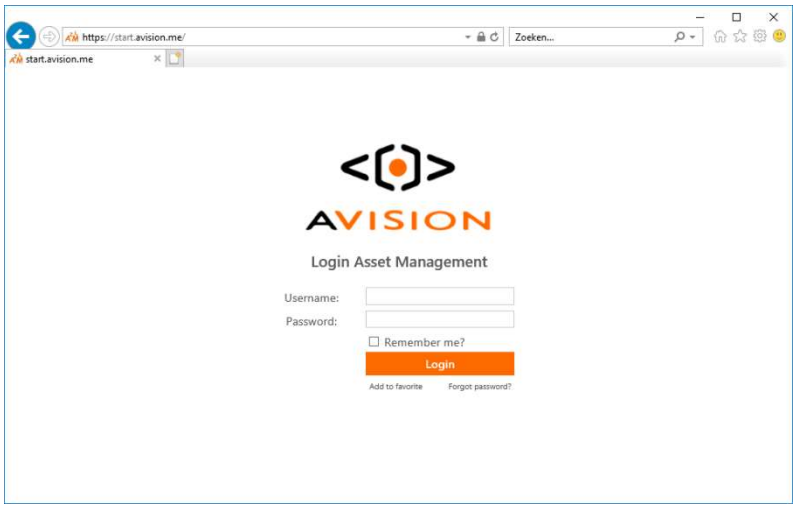
All examples have been made with a demonstration model of the Light Gate.

2 Starting an Application

2.1 Log in

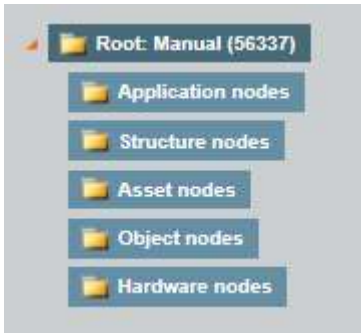
As customer of AVIC, a user and a password have been created for you so you can work in your own environment. (You can create an environment for your customers too. This is explained in chapter x).

A log in screen is shown when you enter the URL, **start.avision.me** , in your browser. After successful login you will enter your application's environment.



2.2 Nodes in Design

The base of any Application consists of Nodes. These Nodes give structure, they are the rack on which to hang the other items. Together they form a tree. There are five node types : ApplicationNode, StructureNode, AssetNode, ObjectNode and HardwareNode.



nodes in Design mode

2.2.1 ApplicationNode

The Application node is the top node of your application. You can create multiple applications in your environment. All other node types are placed under an application (as a child, grandchild, grand-grandchild etc.).

2.2.2 StructureNode

This node type is used to structure your application. Examples: Country, Region, Customer.

A StructureNode can be added to either an ApplicationNode or another StructureNode. In Design you indicate which StructureNode types can be coupled to every StructureNode.

2.2.3 AssetNode

An AssetNode is used to couple hardware and sensors to. What exactly is to be coupled depends on your definition of an Asset.

Example: A hotel could have defined a room as the asset and hardware such as a refrigerator, an air conditioning or a smoke alarm unit coupled to the Asset. But the main office of the hotel chain could define every hotel as an Asset with for each hotel the fire reels coupled to the hotel asset because the maintenance is handled centrally by the main office.

An AssetNode is coupled to a StructureNode. To an AssetNode, ObjectNodes and HardwareNodes can be coupled.

2.2.4 ObjectNode

This node is to be used to subdivision the hardware coupled to an Asset. Example: When the Asset is a supermarket all units that are gates can be placed under an ObjectNode called ‘Gates’ and the pico wise units for temperature registration can be placed under an ObjectNode named ‘Cooling Showcases’.

2.2.5 HardwareNode

The Hardware node is used to indicate what hardware is used. A HardwareNode in Design contains the types of hardware used. Using this node, hardware is coupled to the Asset.

Do-it-yourself block in which you will create nodes in Design.

- Login in to your application
- Go to the Design environment. To do this click the icon  on the top right. When this icon is not shown, look for the icon with three dots  and click this. Is the pallet icon still not shown then the user as which you logged in does not have design rights and you cannot continue this exercise.
- Click the menu button ‘Structure nodes’; the grid with structure nodes present is shown.

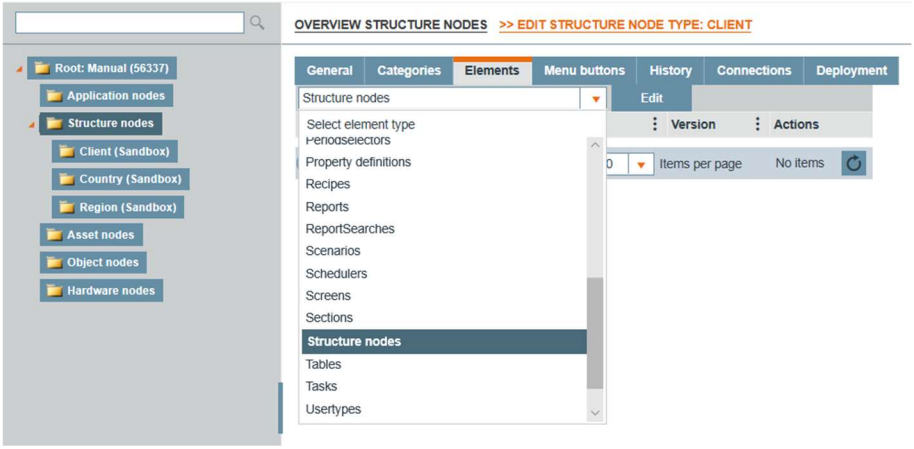
Grid with structure nodes

Adding structure nodes:

- Click the ‘+’ sign to create a new StructureNode
- Enter ‘Country’ at the name field and click ‘Add’
- Go back to the grid with the structure nodes and click again on the ‘+’ sign
- Enter in the name field ‘Client’ and click on the button ‘Add’
- Again, go back to the grid with the structure nodes and click on the ‘+’ sign
- Now, enter in the name field ‘Region’ and click on the button ‘Add’

Coupling structure nodes (indicate that a Region node is to be placed under a Client node and a Client node is to be placed under a Country node):

- In the grid with structure nodes, click on the pencil icon of node ‘Client’
- Click on the tab ‘Elements’ and in the dropdown choose ‘Structure nodes’



- Click ‘Edit’, in the left column select ‘Region’, click on ‘>>’ and then ‘Save’
- Close the popup by clicking on the ‘x’ in the upper right corner
- In the grid with structure nodes, click on pencil icon of node ’Country’
- Click again on the tab ‘Elements’ and select ‘Structure nodes’ again in the dropdown
- Click ‘Edit’, select in the left column ‘Client’, click ‘>>’ and ‘Save’
- Close the popup by clicking on the ‘x’ in the upper right corner

Structure nodes after coupling Region to Client and Client to Country. Client and Country no longer have the trashbin icon; because items have been coupled to them they can no longer be deleted.

- Create in the same way an Asset node with the name ‘SewerWell’ and a Hardware node with the name ‘LightGate’. (Select the ‘Folder’ icon for both node types. In a later chapter we will show you how to change the icon of a node type).
- Edit the Asset node ‘SewerWell’, go to the tab ‘Elements’ and couple the Hardware node ‘LightGate’.
- Edit the Structure node ‘Region’, go to tab ‘Elements’ and couple the Asset node ‘SewerWell’ to the structure node ‘Region’.

In Design we have now created a structure for an application for your hardware.

To be able to roll out this design to the live environment we also need to create an Application Node. This will be the highest level of the application.

- Go to Application nodes and create an Application node with the name ‘SewerApplication’
- At the tab ‘General’, at the field Image choose ‘Ada_Home versie 1’ , click ‘Save’
- At the tab ‘Elements’ couple the structure node ‘Country’

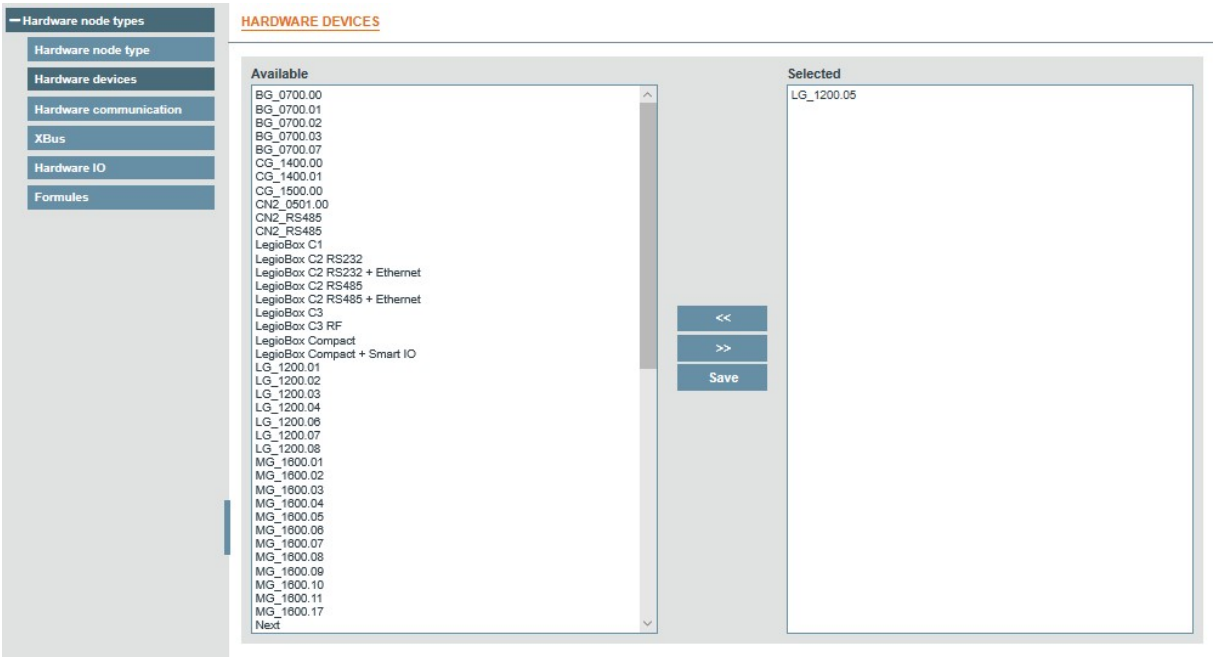
We have now created following application:

2.3 Coupling a Device to a HardwareNode in Design

In the previous chapter we created an empty HardwareNode, called LightGate. In Design we now have to indicate what type(s) of devic(s) we can use on that node.

Do-it-yourself blok where you couple a Device (type) to a hardware node

- In Design, in the tree, click on the node LightGate
- Go to the menu, click on Hardware devices
- A 'left-right screen' is presented
- Select from the left column **LG_1200.05**, click '>>' and 'Save'



To recognize the LightGate node more easily, we now change its icon:

- In the menu choose 'Hardware node type'
- Change the icon to 'Device'
- Click 'Save'

In chapter x, Images, adding and using self-made icons is explained in order to provide each node type with an appropriate icon.

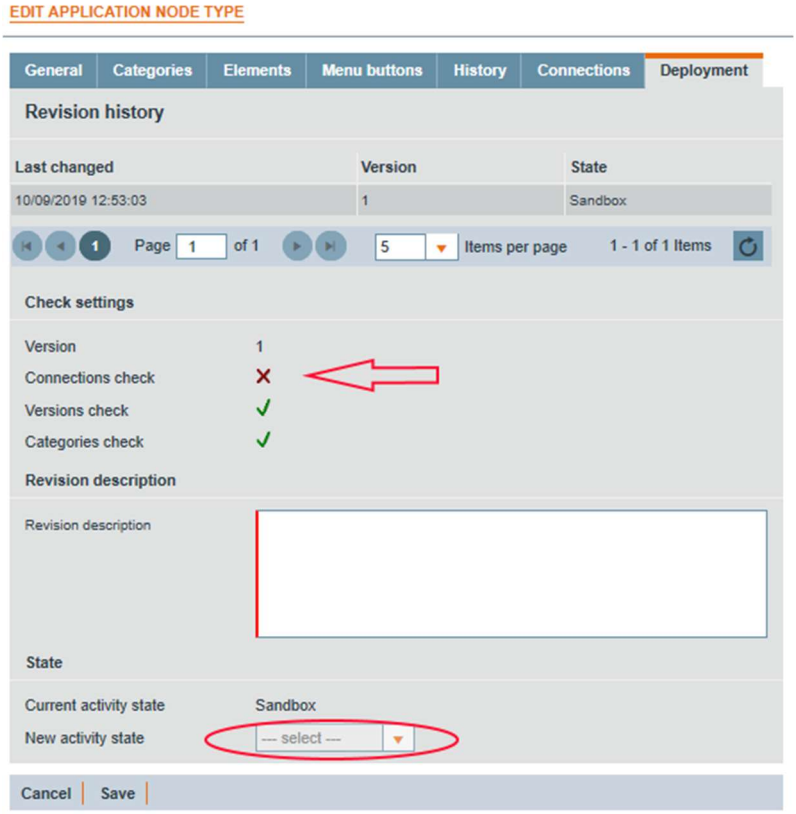
2.4 Promoting items from the Sandbox state to another state

Items created in Design get the status 'Sandbox'. In Live, only items with state 'Active' can be used. When we promote the item to the state 'Active', we indicate that this item is ready (checked !) to be used in the Live environment. Promoting the item is done in the 'Deployment' tab:

Do-it-yourself block in which nodes get the state 'Active'

- Click on the node 'SewerApplication' and next the tab Deployment

- We can see two green check marks but also a red cross, and at the control ‘New activity state’ we cannot select a new state because it is greyed out ! What is the problem ?



- Clicking the red cross explains it all:

- When we want to deploy an item, Avision will perform some checks on it. The Country node still is in the Sandbox state and therefore we cannot deploy the node SewerApplication. The node Country has the same problem (the Client node is also still in Sandbox state). It’s clear now: we need to work bottom up, starting with the hardware node, LightGate.
- Click on the node LightGate, next click on the tab Deployment. Three green check marks are shown. At ‘New activity state’, in the dropdown select ‘Active’, at the text field ‘Log text’ enter the text ‘First version’ and click the ‘Save’ button.
- Now, do the same for the Asset node SewerWell, the Structure nodes Region, Client and Country (in this order !) and lastly for the node SewerApplication.

When deploying a node, Avision checks and verifies this node (and all items coupled to it) to be fit for the Live environment. In chapter x this is described in detail. We can now continue to Live to set up the application.

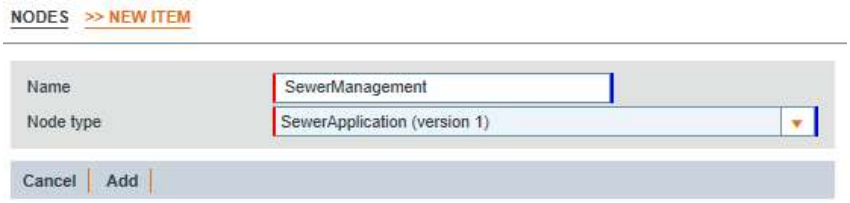
2.5 Nodes in Live

After defining in Design the possible node types and their inter-dependencies and all items having the state ‘Active’, it is now possible to create the actual tree structure.

In the following example, we assume an organization that is active in the Netherlands and Belgium, with some municipalities as a customer for whom the sewer wells are monitored in different areas.

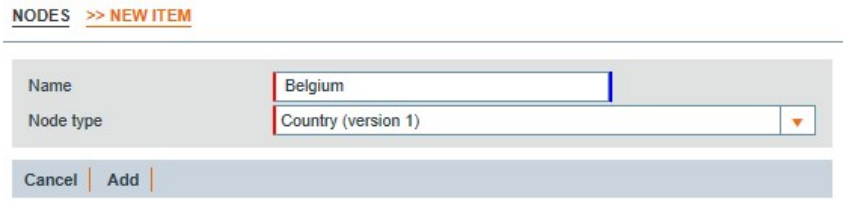
- Go to Live (by first clicking the triple-dot button top-right and then the computer icon)

- Make sure the top node is selected
- In the menu, go to Node - Nodes, and click on the plus sign in the upper right corner of the grid with the nodes
- Give as name ‘SewerManagement’ and choose at Node type 'SewerApplication (version 1)’



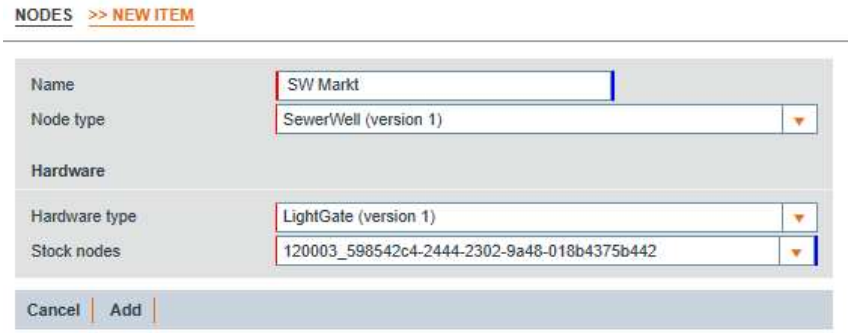
- Click Add
- In the node tree an application node named ‘SewerManagement’ has been created

- Select that node and click the Menu button, then choose menu option Nodes
- In the grid click on ' + ', specify as name ‘Belgium’ and for node type select ‘Country (version 1)’. (This is the only node type you can choose here, because we have defined it that way in Design when creating the structure nodes).



- Click Add
- Create the country node 'Netherlands' in the same way
- Go back to the node tree, under sewer management there are now two nodes: Belgium and the Netherlands. Select the Netherlands, and in the menu, click Nodes
- Now create 2 nodes under the Netherlands: ' Gemeente Zaltbommel ' and ' Gemeente Maasdriel '. These are customers.
- The municipality of Zaltbommel consists of the city of Zaltbommel and twelve cores. Create a structure node of the type 'Region' for ' Zaltbommel (city) ' and the villages ' Bruchem ' and ' Gameren '.

- We have now arrived at the point of the Asset, the sewer well. We want to monitor a sewage pit located in downtown Zaltbommel. We Choose the node ' Zaltbommel (city) ' and open the menu item Nodes again, click ' + ' on the top right of the grid.
- The menu shown here contains more items because we can now create a node with the physical hardware attached to the hardware node. The 'Stock nodes' dropdown shows the GUIDs of all hardware devices in the inventory, the _Stock node, that meet the chosen Hardware type. Choose a hardware device here. The screen should look similar to this:



- Click 'Add'

When we look at the node tree we see that a hardware node has been added to the asset:

3 Property Definition

A property definition is an item that enables us to design forms, reports, charts, monitor screens (and much more) without a direct link to a data source in the real world. A property definition defines how we want to use the data from data points, how the data of a data point looks like, but also what criteria the data that a user enters (for example, in a form) must meet.

By using a property definition, we only need to design a chart once and we can use this chart for all assets of equal type (e.g. sewer wells).

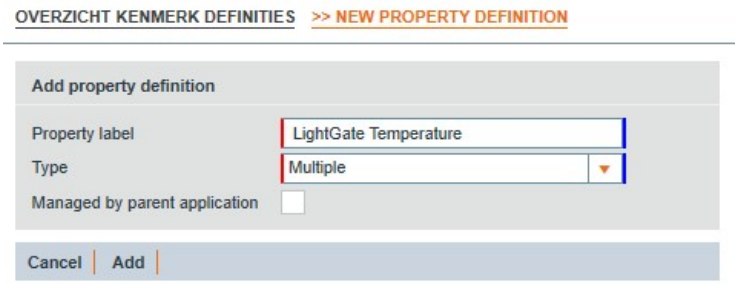
A device can deliver multiple data points. We can design a single property definition that allows us to represent all data points. We can also choose to create one attribute definition with one descriptive presentation for each data point that a particular type of device is going to produce. Also a combination is possible, you can create whatever seems useful.

Do-it-yourself block in which you create a property definition to display the temperature of the LightGate in a monitor screen

3.1 Creating a Property Definition

Creating a property definition is like creating other items in Avision.

- In Design click on the menu item ‘Basic elements’
- Then click ‘Property definitions’
- Click ‘+’ button, top right on the grid
- The attribute definition add-on screen is shown. At the label field, enter ‘LightGate Temperature’. Select at Type ‘Multiple’ and click the ‘Add’ button.



3.2 Change Property Definition

3.2.1 General tab

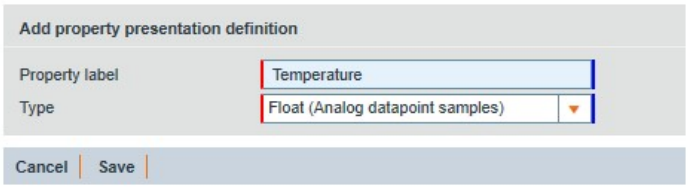
In the ‘General’ tab of the property definition only the name can be changed.

- Leave everything as is

3.2.2 Items tab

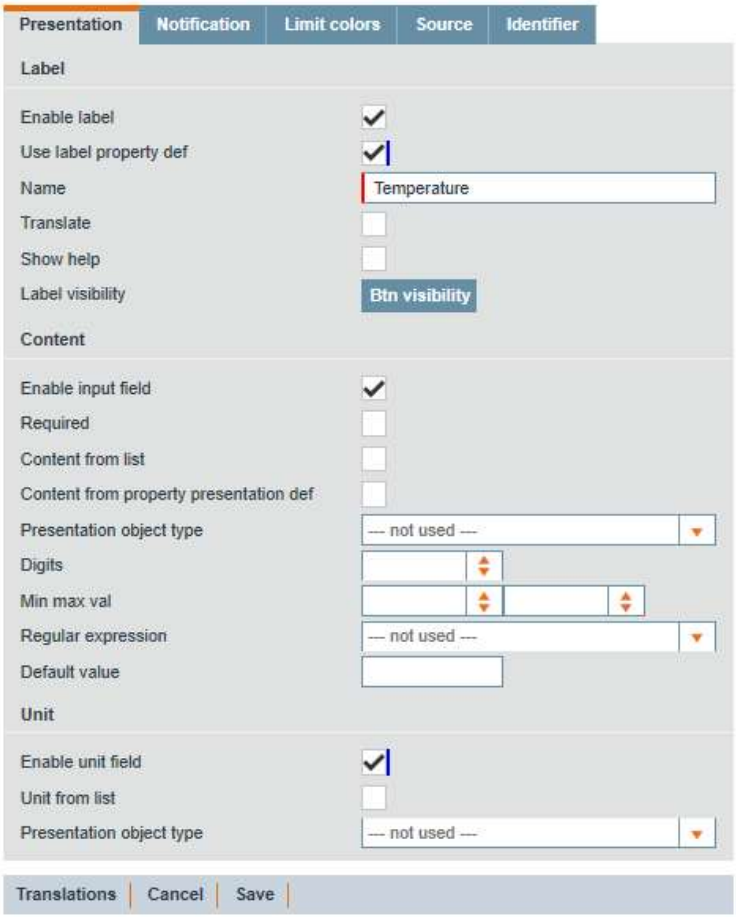
In the items tab you can add property items to the property. These will contain actual values when we use them in a Form, Report, etc. We can add many items or just one, whatever seems fit for our application. Every item is of a certain datatype: for text use ‘String‘, for storing a measurement most commonly ‘Float’ is used, for the state of a switch use ‘Boolean’ etc. .

- Go to the items tab
- Click on the upper right ‘+’ button on the grid
- At the label field enter ‘Temperature’, at the Type field select ‘Float (Analog datapoint samples)’ and click ‘Save’



A property definition can have multiple property definition items. A property definition item defines a single data point. Each item consists of 3 parts. Label, content, and unit. Label is used to show the name of the property definition (in forms, reports, etc.), the content to show the (measurement) value and unit to show the unit of the (measurement) value.

- At Label: Place the check mark at ‘Enable label’. Also place a check mark at ‘Use label property def’.
- At Content: Place a check mark at ‘Enable input field’.
- Enter ‘1’ at the Digits field to indicate that the value should show one digit after the decimal point. Leave other fields empty.
- At Unit: Place a check mark at ‘Enable unit field’. Enter at the default value field ‘°C’.



- Leave other tabs unchanged and click the ‘Save’ button.

Other fields and tabs are described in chapter x.

4 Section

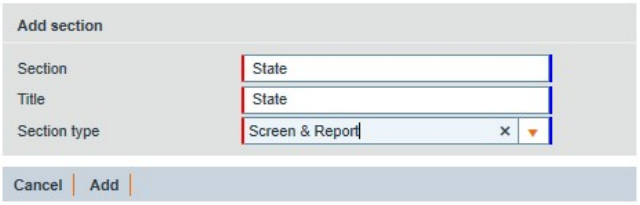
A section is a graphical building block used in monitor screens, forms and reports. A page in a report or form can consist of multiple sections.

Sections:

- normally make use of one or more property definitions (and its items)
- determine where and how a property definition item is presented (position, font, color, size, etc.)
- can have fixed texts, labels
- make you work more efficient: the same section can be used in multiple reports, forms, or screens, providing a consistent look throughout the program.

Do-it-yourself blok where you create a section to show the temperature of the LightGate in a monitor screen.

- In Design, go to menu item 'Visuele elements' and then 'Sections'
- Start creating a new Section by clicking the '+' button of the grid
- At the section name and title fields enter 'State', at Section type select 'Screen & Report'



- Click 'Add'

After adding, Avision goes to the edit screen of the section. By default, the digital Layout of a section has a size of 800x600 pixels, which is a large piece of the screen and fine for a single-section Monitor screen. The digital Layout is used in forms and Monitor screens, the Printlayout for reports. Keep ' Allow printing ' unchecked for now.

4.1 Adding a Property Definition to a Section

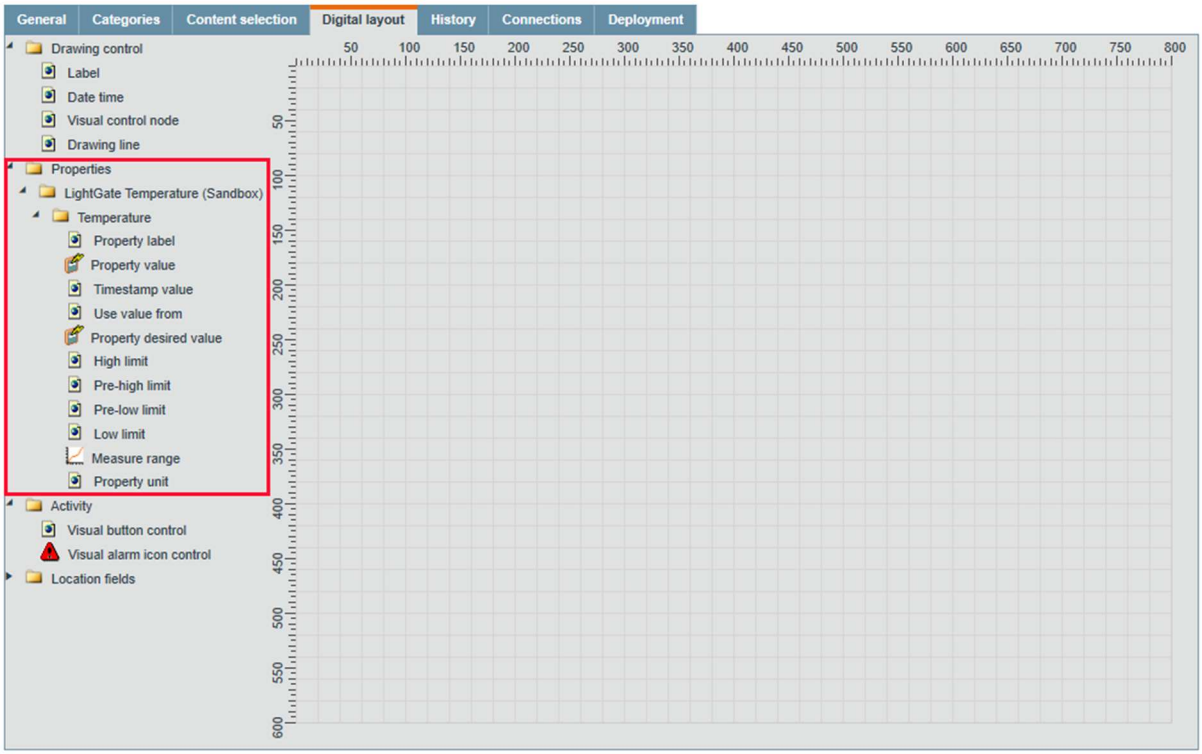
Before we can really start working on the formatting of the section, we need to disclose the property definitions that we want to use in the section. We do this at the ' Content Selection ' tab.

In the dropdown, select property definitions and click Edit. There will now be a popup with a left-right screen. In the left row, select the property definition we created in Chapter 3, ' LightGate Temperature ', press ' > > ' and ' Save '.

We have now added an definition to the section and can start using it.

4.2 Use a Property Definition in Section

Click the Digital Layout tab. A screen with a grid of 800 by 600 pixels appears.



In the left column we find under features the property definition 'LightGate Temperature' created by us. Also fold the presentation ' Temperature ' completely open.

Now drag ' Property label ' from the presentation to the desired position on the grid.

The width of our label on the grid is 200 pixels. That is very wide. Click this item in the grid and on the right a column is shown where we can adjust the width to 100 pixels, then press ' Save '.

Now drag ‘Property value’ on the grid, next to the label. This field is also 200 pixels wide, change that to 50 and click ' Save '.

Drag ' Property unit ' on the grid, behind the value. Change the width of this field to 25 pixels and click ' Save '.

The grid should show something like this: 

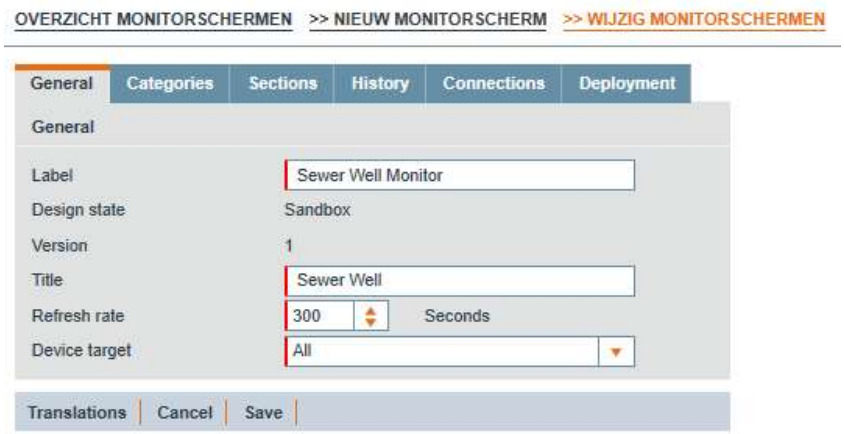
We have now created a section. It can be used in, for example, a Monitor screen.

5 Monitor Screen

Using the monitor screen it is possible to create a dashboard with measurement values, states and graphs of measured values. In the Live environment, the monitor screen refreshes itself after an adjustable period of time.

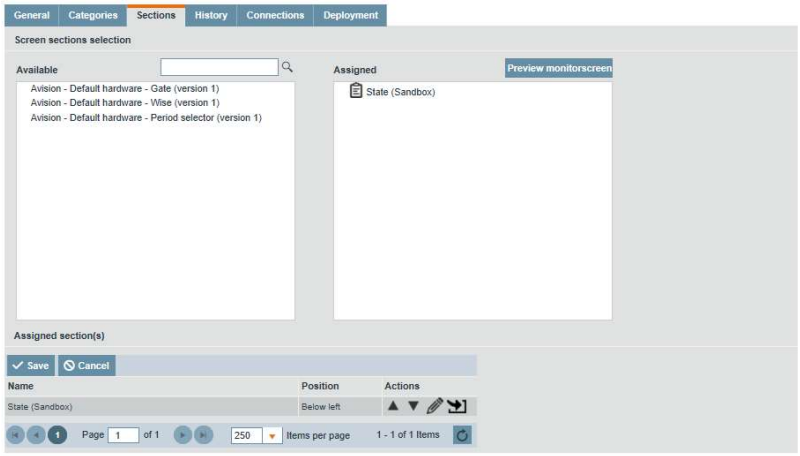
5.1 Creating the Monitor Screen

In Design, at the menu item ' Visual elements ' click on ' Monitor screens '. A grid is now shown on the screen with the monitor screens present. Press the ' + ' button on the top right of the grid. Enter at the Name field 'Sewer Well Monitor', Title 'Sewer Well'. Click ' Save '.



5.2 Adding a Section to the Monitor Screen

Click the Sections tab. A left-right screen will be shown with the sections we can choose from in the left column. Drag the ‘State’ section to the right column.



We kunnen nu op de Preview knop klikken om te kijken wat we hebben gemaakt.

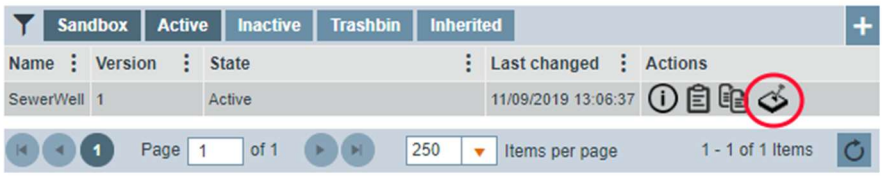
5.3 Adding the Monitor Screen to an Asset

We want the Monitor screen to be shown in Live at the Asset ‘SewerWell’. So, we need to link the monitor screen to this asset. We go into the Asset Nodes in Design and see that asset ‘SewerWell’, in the ' Actions ' column, does not show a pencil icon; we cannot modify the Asset! Why not?

The Asset node SewerWell has status ' Active '. This means that it is checked and can be used in Live. If we were to make adjustments, they would immediately be active in Live without the modifications being checked. That is a potentially dangerous situation ! Therefore, adjustments can only be made to objects that have the status ' Sandbox ' and therefore are not active in Live.

5.3.1 New Sandbox version of the Asset

A new icon is shown In the actions column of the Asset ' SewerWell '; the ' Create Sandbox version ' icon:



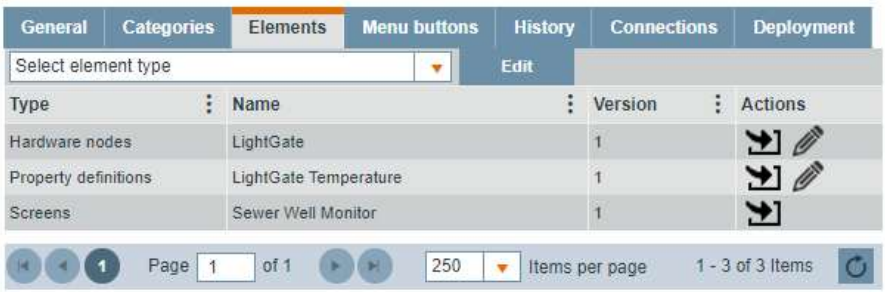
After clicking this button, a copy of the highest active version will be made. This copy will get a version number 1 higher than the original, with the status sandbox and can be adjusted accordingly. The grid with Asset nodes now shows two SewerWell versions:

The Make sandbox version icon at version 1 is now gone; This icon is only shown at the highest active version if there is no sandbox version of this Asset.

5.3.2 Add the Monitor Screen to Asset SewerWell version 2

- Click the pencil icon of SewerWell version 2
- Go to the Elements tab
- Select in the dropdown the element type ‘Screens’ and click the ‘Edit’ button
- Select ‘Sewer Well Monitor’, klik ‘>>’ and ‘Save’
- A popup is shown asking whether child elements should be added too. Click ‘Yes’.

Child elements are elements that are used by the element that we want to add to the asset. These elements must therefore also be added to the asset.



In addition to ' Sewer Well Monitor ', the property definition ' LightGate Temperature ' attribute has also been added to the Asset node ' SewerWell '.

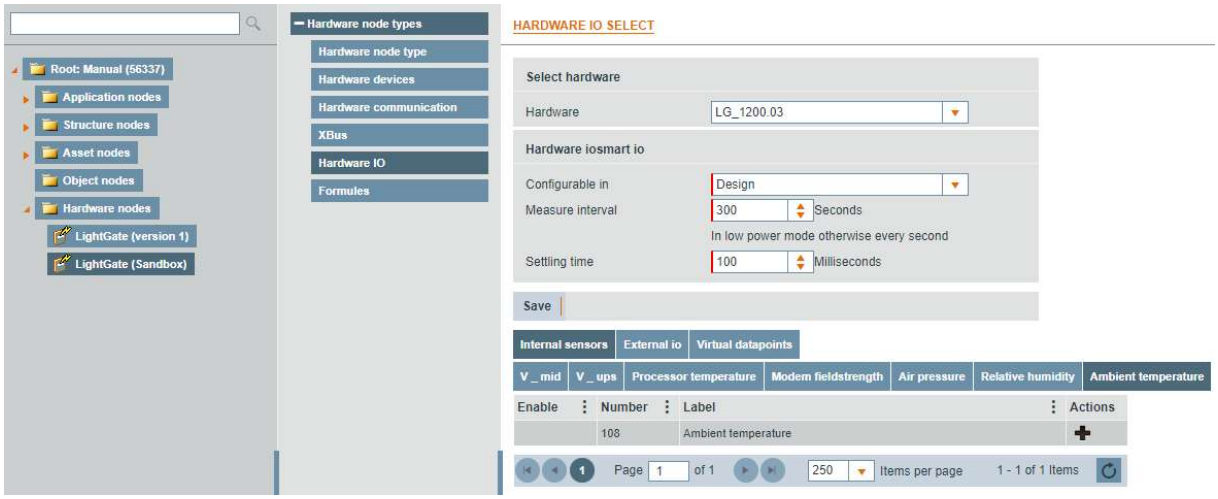
5.4 Connecting Property Definition to Live Data

At the module Property Definition we created our own property definition ‘LightGate Temperature’. This property definition is not yet connected to the data from the hardware. The connection can be made at the hardware node where the data arises. There we indicate that the data must be send to the property definition we created earlier.

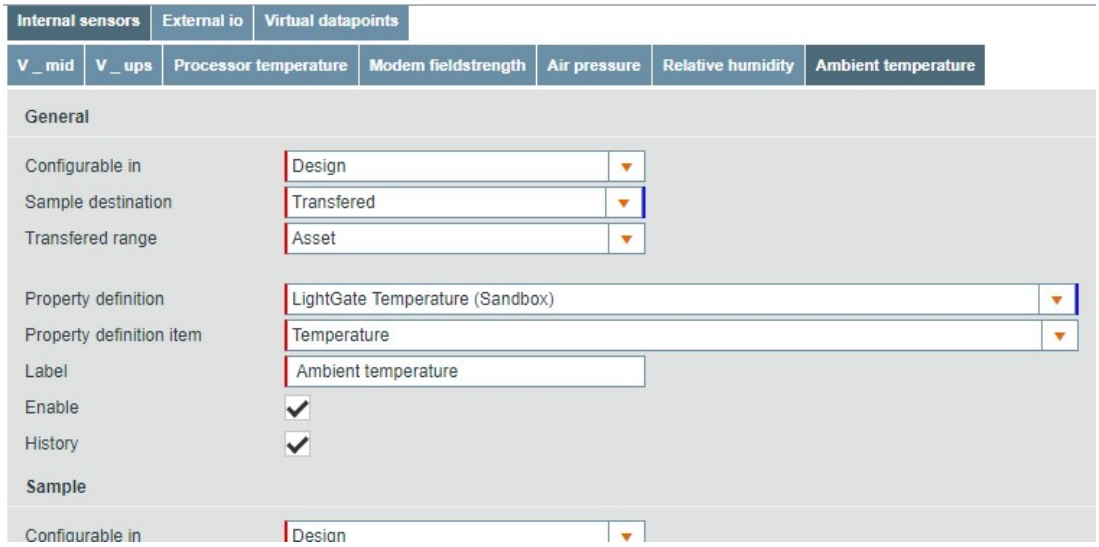
5.4.1 New Version Hardware Node

Because we want to make changes to the hardware, we first need to create a new sandbox version of the hardware node ‘LightGate’.

Using this new version we go into the menu to Hardware IO. And then to ' Internal sensors ' and ' Ambient temperature '. Click the ‘+’ button to create the sensor in Avision.



In that menu we indicate that we want to transfer the data of the Ambient Temperature to the property definition ' LightGate Temperature '. Set the Sample destination field to "Transferred" and choose the property definition and property presentation item fields of our self-made ‘LightGate Temperature’. In the field Label also fill in ' Ambient temperature ' and click ' Save '.



5.5 Deploying And Coupling Nodes

5.5.1 Deploying and Coupling a Hardware node

The new hardware node must be released and linked to the new Asset node (instead of hardware node version 1).

5.5.2 Deploying an Asset node

To be able to use the new version of the asset ‘SewerWell’ in Live, we also need to release it (change status from ' sandbox ' to ' active '). After clicking on the tab Deployment of the asset node we see a red cross again. This because property definition ‘LightGate Temperature’ and monitor screen ‘Sewer Well Monitor’ still have status sandbox. We need to start releasing again at the bottom of the chain: first the property definition we created, then the section, then the monitor screen and then we can release the asset node. At the LogText field enter this: "second version because of new monitor screen."

5.5.3 Coupling a New Asset to Structure Node ‘Region’

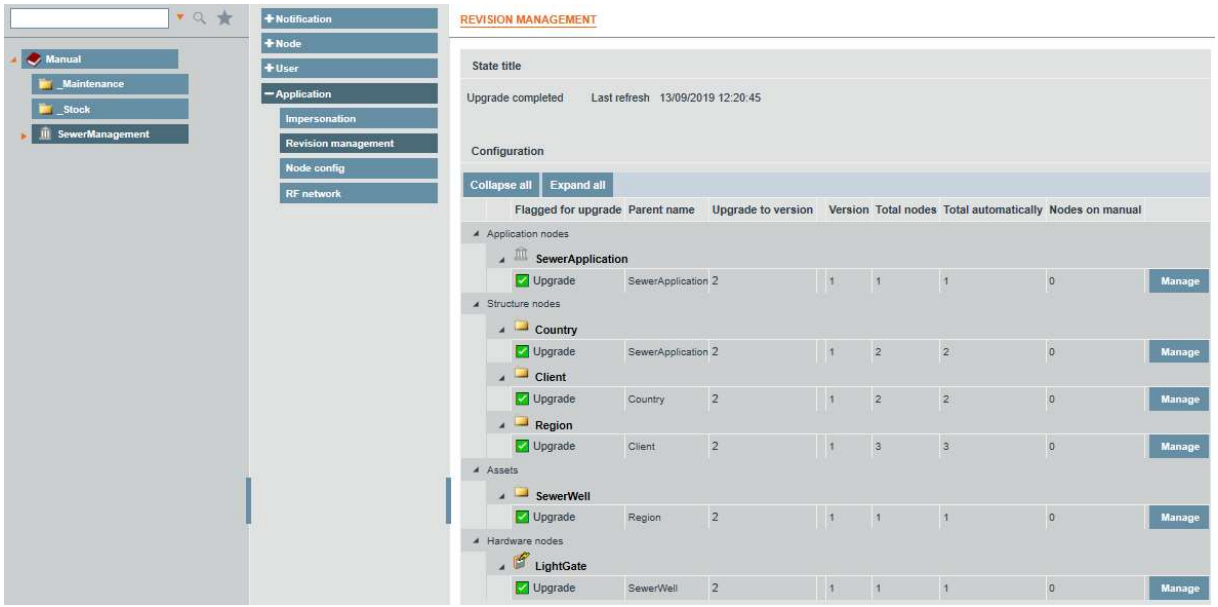
In the next step we link the new asset node to the structure node ' Region '. However, because ' Region ' status is ' Active ', we cannot link the new asset to it. That's why we first make a new version of ' Region ' through a copy to the sandbox. Then we can link the new asset to it.

In this way we need to update all the nodes up to the Application Node and set the state to ‘Active’.

5.6 Live

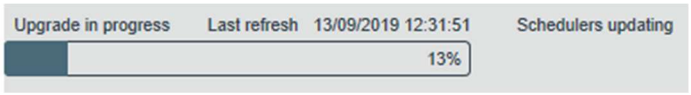
In Design, everything is now ready for the new Monitor screen, but in Live we need to upgrade the nodes to the new version.

- In Live, click on the Application node ‘SewerManagement’, then select in the Menu ‘Application’ and ‘Revision Management’.
- Make sure all nodes are set to ‘Upgrade’ and ‘Upgrade to version’ is set to 2 on each node.



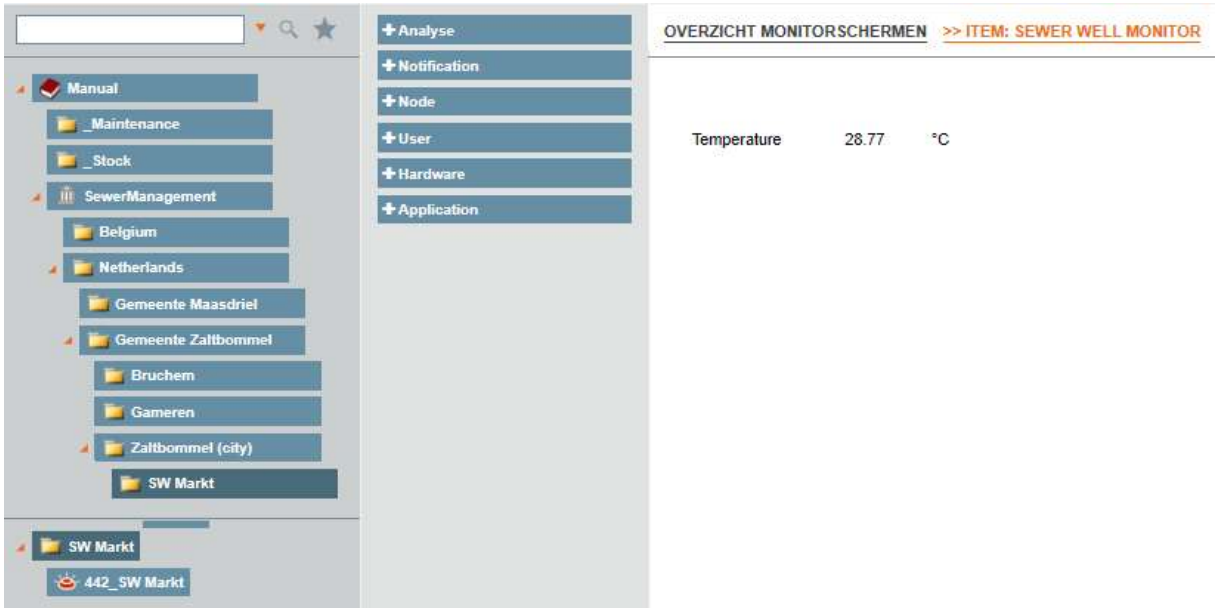
- Click the button ‘Schedule’ (below the grid).
- In the following menu enter date and time when the synchronization should occur. By default the current date and time are already filled in.

- Click the 'Save' button and go back to Revision Management. A progress bar is now shown.



- When synchronization is finished, all nodes are of version 2.

If we now go to the Asset, the Monitor Screen is automatically started:



If the current temperature is not shown the first time you look at this monitor screen, then wait a little. To get a reading first the new setup must be send to the LightGate. In the following communication session(s) the results are send back to Avision. About two to three communication sessions might be needed. Based on your communication settings it can take some time before you see this result.

6 Base Elements

Chapters 1 through 5 build a basic application in which you can get a feeling how Avision works. The following chapters will be more detailed.

6.1 Categories

Categories are a means to have certain functionality or items used only by certain users, in addition to or in conjunction with user types and roles.

Roles give rights to modules while categories give access to certain objects or prevent access to certain objects on modules that a user is allowed to work based on the roles he or she has.

6.1.1 Creating a Category

A category is really nothing but a label and is therefore very quickly created; only a name is required.

- In Design, on the root node, go in the menu to ‘Base elements’, click ‘Categories’.
- In the grid, top right, click on the ‘+’-button.

- Enter the category name and click ‘Add’.

6.1.2 Using a Category

To access an object, object and user must have at least one category in common. Or: either the user or the object (or both) have no category i.e. ' all categories '.

6.1.2.1 Assign a Category to an Object

All objects that a category can be linked to have in Design a 'Categories' tab including a left-right screen that shows the available categories and the selected categories.

Fig. 6.1.2.1.1: Category Sewer assigned to Asset Sewer Well

6.1.2.2 Assign Category to a User

Assigning a category to a user is done using the user's role and user type. In Design, in the Root of the application, in the menu, go to ‘user elements’ and ‘user types’. Choose a user type here. On the Roles tab, in the appropriate role, click the relevant Categories button. Now the same left-right screen is shown as in the previous chapter with the objects.

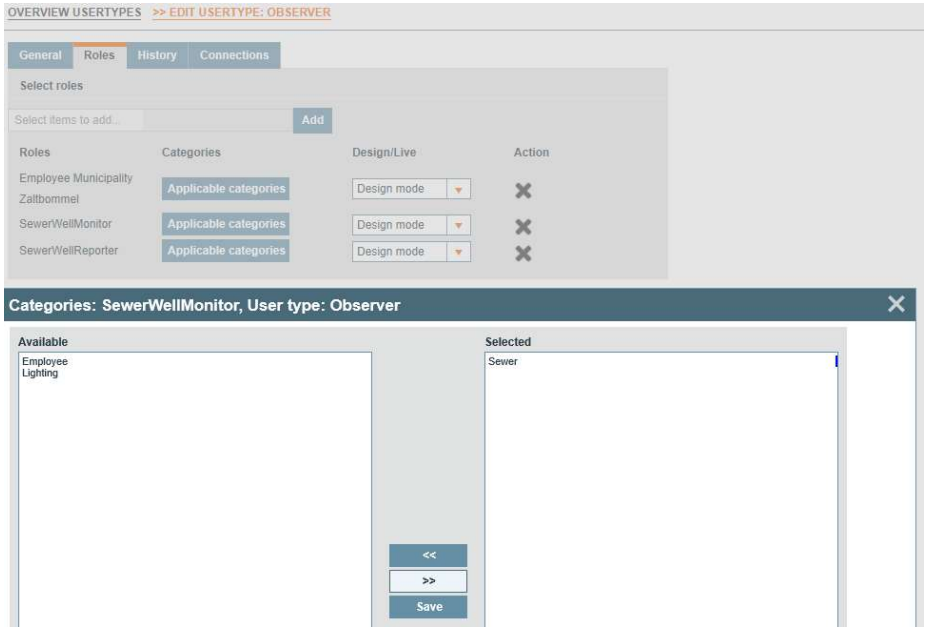


Fig. 6.1.2.2.1: Category assigned to user type-role.

Attention ! When evaluating whether a user is allowed to access a particular object, the categories of all user types-roles that a user has, are used. This means that if one of them does not have a category filled in, the user effectively has all categories for all user types-roles.

Therefore, if you decide to use categories in your application, all user types must be properly populated with categories.

Do-it-yourself block where an application starts using categories.

6.1.3 Example

In the example application used in this manual, one type of asset has been used so far: the sewage pit. But suppose the municipality of Zaltbommel decides to also manage the street lighting, lampposts, via Avision. Let’s say the municipality has technicians who can only work on lampposts and not on the sewer wells. Conversely, the sewer well engineers are not allowed to work on lampposts. Other employees of the municipality are not allowed to work on the lampposts nor the sewer wells, also for these employees the categories must be set.

6.1.3.1 Creating Categories

- In Design, in the menu, go to ‘Basic elements’, ‘Categories’.
- Now create three categories: Sewer, Lighting, Employee.

OVERVIEW CATEGORIES

6.1.3.2 Lighting Engineer

- In Design, menu User elements, Roles, create a role 'Lighting Engineer'. Apply rights for Alarm screens (show, accept, ready), Screens (show, edit), Tasks, Workflows.
- In Design, menu User elements, User types, create a user type 'Engineer Lighting ZB'. With two roles: Employee Municipality Zaltbommel and Lighting Engineer.
- In Live, at the level of the client 'Gemeente Zaltbommel', create a user named Sophie Schaap, and assign to her the user type 'Engineer Lighting ZB'.

6.1.3.3 Assign Categories to UserTypes

- Go to the UserType 'Engineer Sewer ZB', at the tab 'Roles'.

OVERVIEW USERTYPES >> EDIT USERTYPE: ENGINEER SEWAGE ZB

- Click behind 'Employee Municipality Zaltbommel' on the button 'Applicable categories' and make sure only the category 'Employee' is in the right hand column.
- Click behind 'Sewage Engineer' on the button 'Applicable categories' and make sure only the category 'Sewer' is in the right hand column.
- Go to user type 'Engineer Lighting ZB', tab Roles.
- Click behind 'Employee Municipality Zaltbommel' on the button 'Applicable categories' and make sure only the category 'Employee' is in the right hand column.
- Click behind 'Lighting Engineer' on the button 'Applicable categories' and make sure only the category 'Lighting' is in the right hand column.
- For user type Observer add 'Sewer' at 'Applicable categories' button behind SewerWellMonitor and SewerWellReporter and at 'Employee Municipality Zaltbommel' the category 'Employee'.

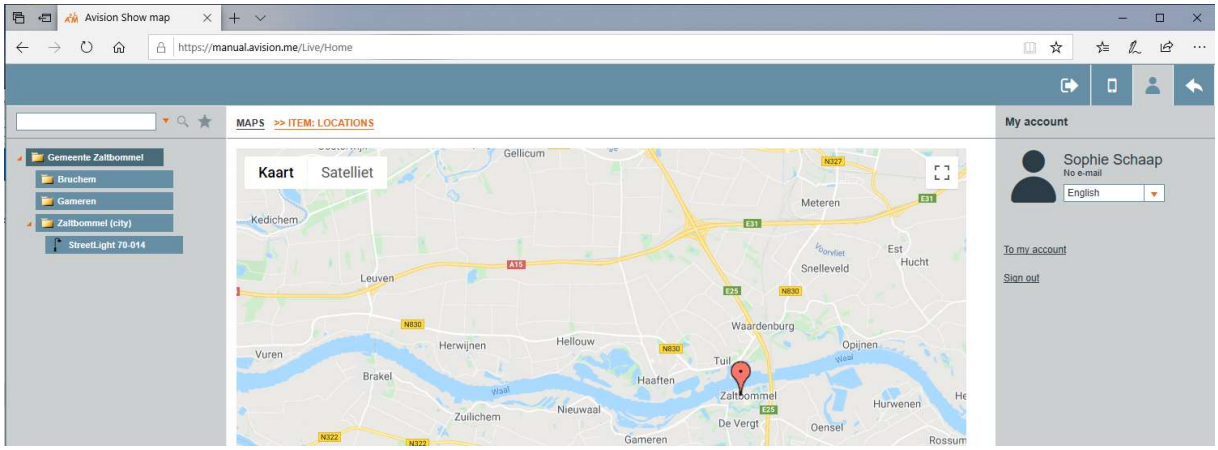
6.1.3.4 Add Categories to Assets

- In Design we assign the category 'Sewer' to the asset 'SewerWell' and to StreetLight the category 'Lighting'.

6.1.3.5 In Live

When we now log in as Henk De Boer, sewerwell engineer, we'll see the monitor screen when clicking on the asset SW Markt. The streetlight asset is not shown.

The opposite is true when we log in as Sophie Schaap, the lighting mechanic. She will see the streetlight asset but not the sewerwell.



6.2 Regular Expressions

From Wikipedia : "A regular expression, regex or regexp (sometimes called a rational expression) is a sequence of characters that define a search pattern. Usually such patterns are used by string searching algorithms for "find" or "find and replace" operations on strings, or for input validation."

Regular expressions can be used in Avision to validate input by users in forms. For example, if we want to check that the user has entered a valid Dutch postal code, this can be done by following regular expression:

^[1-9][0-9]{3} ?[A-Z]{2}$

For an email address, the following regular expression could be used:

^[_A-Za-z0-9-+]+(.[_A-Za-z0-9-]+)*@[A-Za-z0-9-]+(.[A-Za-z0-9]+)*(.[A-Za-z]{2,})$

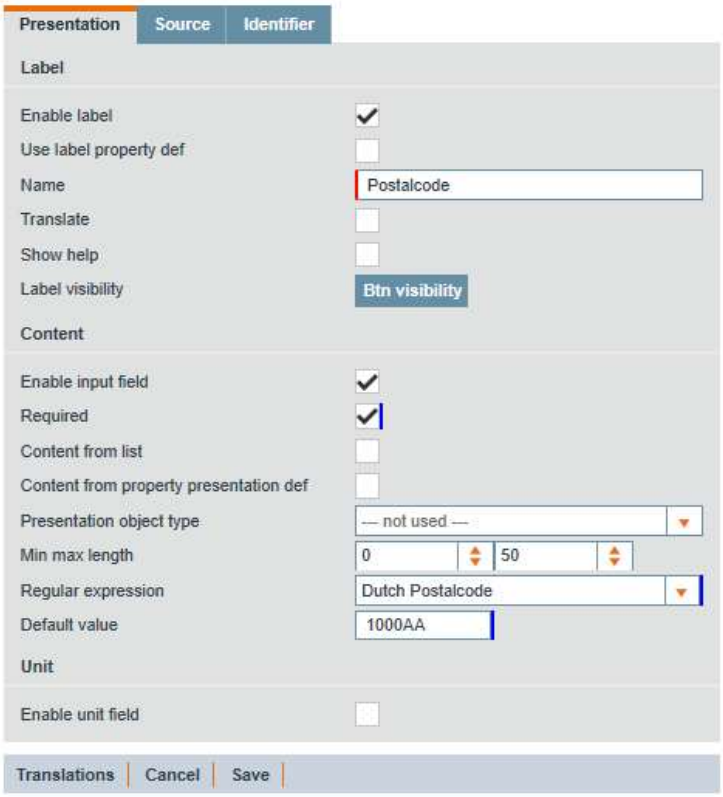
Regular expressions are very powerful but difficult to read. Many good test programs can be found on the internet though. Example: https://regexr.com/

6.2.1 Creation

- In Design, in the menu, click 'Basic elements', choose 'Regular expressions'. A grid with the existing regular expressions is shown.
- Click the '+'-button, top right of the grid.
- Enter name, the expression, the type (usually String) and a message to be shown when the input does not comply
- Click 'Save'

6.2.2 Use Regular Expression in a Property Definition

When a regular expression has been created, we can select it at the items tab of the property definition, at the field 'Regular expression', then click 'Save'.



If the property definition is used in a form and the user fills in an incorrect text, the error message as entered in the regular expression will be displayed.

6.3 Lists

Lists are select lists that allow the entry of a field in e.g. a form, limiting the allowed entry to the items of the list. For the user who needs to fill out the form, this has the advantage that completing the former is simpler (incorrect values are not possible).

Chapter X creates a list to use in a form. This chapter describes lists in detail.

6.3.1 Creating a List

Creating a list starts with clicking on ' + ' button above the grid with the lists. There will be a screen with input fields.

Label: The name of the list.

Type: Choose a Type here. The types have been created by AVIC. If the list is used in an attribute definition, the type must match the type for the attribute definition. The following types are defined:

Type	Omschrijving
Fixed readonly, Countries	This allows a sub-list to be created from a list of all countries in the world.
Fixed readonly, Languages	To make a sub-list of all the languages of the world.
Fixed readonly, Users	For a sublist of users from the list of users in your own application.

Multiple (ID, Text, Picture)	For a list that presents pictures. Is used to create status indicators.
Multiple: 1 of all types	Each list item can have one item of each value type (Boolean, Integer, Float, String, Datetime, Binary)
Multiple: 16 of all types	Each list item can have 16 items of each value type.
Multiple: 2 of all types	Each list item can have 2 items of each value type.
Multiple: 32 of all types	Each list item can have 32 items of each list type.
Multiple: 4 of all types	Each list item can have 4 items of each list type.
Multiple: 64 of all types	Each list item can have 64 items of each list type.
Multiple: 8 of all types	Each list item can have 8 items of each list type.
Multiple: NAW	For Name-Address-Home town type information.
Singular: Datetime (Picker)	For a datetime.
Singular: Integer (Textbox)	For an integer.
Singular: Number (Textbox)	For a floating point number.
Singular: Text (TextBox)	For a text.
Singular: True/False (Checkbox)	For a boolean value (check mark/switch)

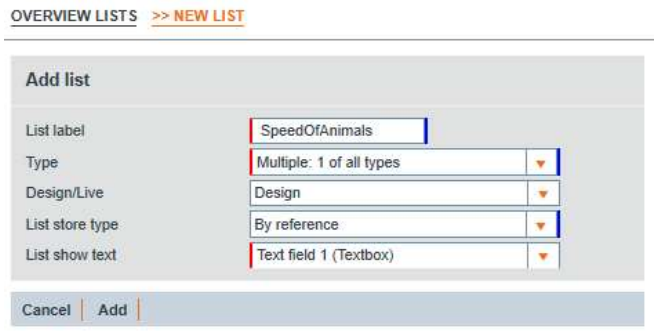
Design/Live : To indicate whether the list can be changed in Design or in Live.

Method of storing:

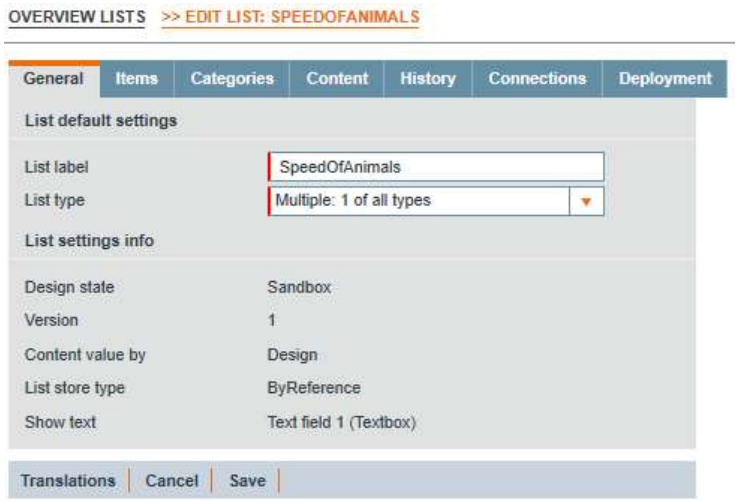
By value	By value: The value (identifier) of the choice from the list is stored in the database. This can be e.g. a number (such as identification number or item number). Customizing a description of this item does not change the value, and everything keeps referencing the right item. If the item description is taken as an identifier, the text is literally referenced. For an adjustment, or for multiple languages, the correct item must be chosen again.
By reference	The unique Avision ID of the item is stored in the database. Customizing or translating a list item description is always possible. The reference to this item continues to work.
Multiselect	This is for special lists Avic_CheckBoxList, Avic_RadioButtonList and Avic_SwitchBoxList. Stores an integer that represents the chosen value according to a bit pattern.
Boolean checkbox list	For special list Avic_BooleanCheckBoxList. Stores a Boolean value (True or false).

List identification: Indicate the ID field of the selection items in the list. (This field is not shown with a "by reference" list because Avision will internally provide an ID for it).

List Show Text: Indicate the field that contains the text to be presented with each selectable item of the list.



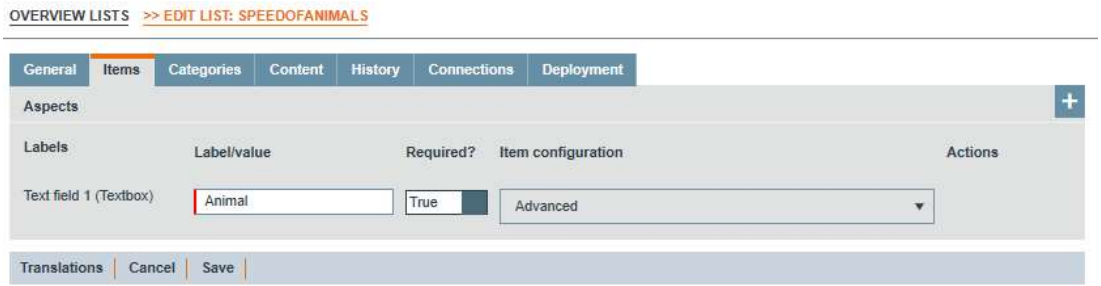
6.3.2 General tab



6.3.3 Items tab

Defines the fields of one list item. When the list created two list items are made by default: the id and the text field. In case of a By reference list, only the Text field is shown (the id field is hidden). In the Items tab more fields can be added, if needed.

The text field cannot be deleted.

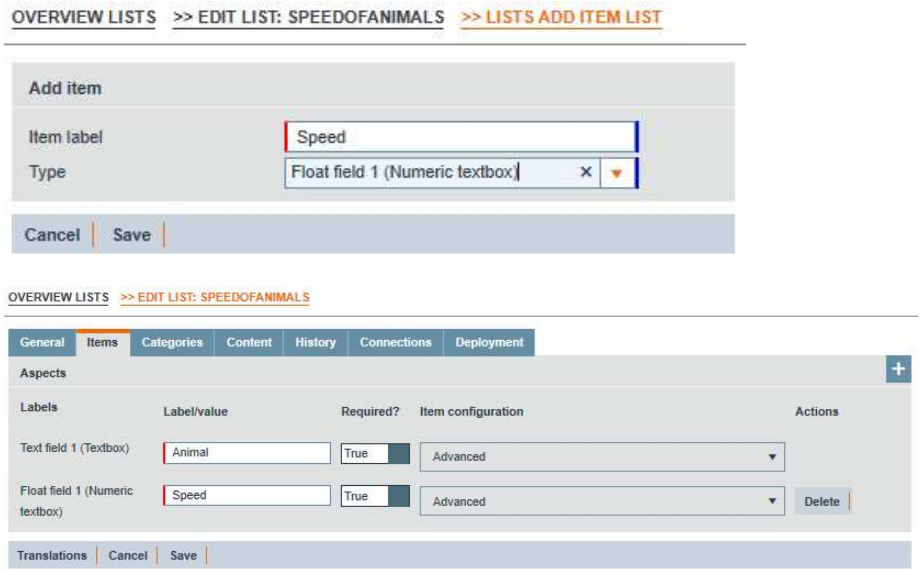


Settings for list items:

Column	Explanation
Labels	Enter the name of the field as it will be used at the Content tab.
Required	Indicate here whether the field is a required field

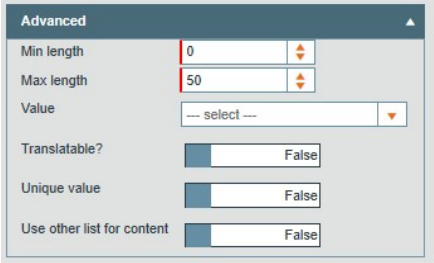
6.3.3.1 Adding a list item

By default, two list items are created when the list is created, for the id and a text for the selection dropdown. More fields can be created by clicking the '+'-button on the top right.



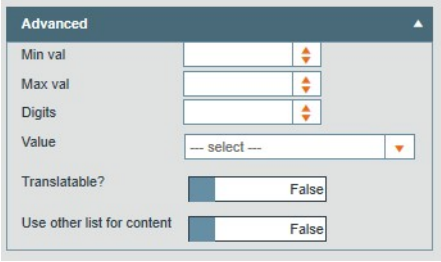
6.3.3.2 Advanced settings

Advanced item configuration for a field of type text:



Specifies the minimum and maximum length of the text to enter for a list item, the regular expression used to validate item values, whether the translate button is available, whether the value must be unique within the list and whether content comes from another list. All these settings are used in the Content tab where list items can be added to the list.

Advanced item configuration for a field of type float:



Here the minimum value and the maximum value can be entered and because it is a floating point number, also the number of digits after the comma. Also a regular expression can be selected to validate the input or the input can come from another list.

6.3.4 Content tab

Using the ' + ' button new items can be added to the list.

6.3.5 Special lists

6.3.5.1 Avic_BooleanCheckBoxList

Control with two items where one has a value of true and the other is false. One item can be checked and determines the value of the control.

6.3.5.2 Avic_CheckBoxList

The control consists of a list of up to 31 items that can be individually checked or unchecked. Each check mark is a bit value. The checkmarks together make the value of the control.

6.3.5.3 Avic_RadioButtonList

A set of radio buttons allows one item to be selected from the items in this list. The control will then get the value of the selected item.

6.3.5.4 Avic_SwitchBoxList

Each item of this type of list can be switched on or off. Looks a lot like the Avic_CheckBoxList but works with on-off sliders instead of checkmarks.

6.3.6 Lijsten in Live

The lists can also be viewed in Live if the lists module has been added to a node. If a list in Design is created with ' value via Live ' then it can be adjusted in Live.

6.4 Property Definitions

See chapter 3.

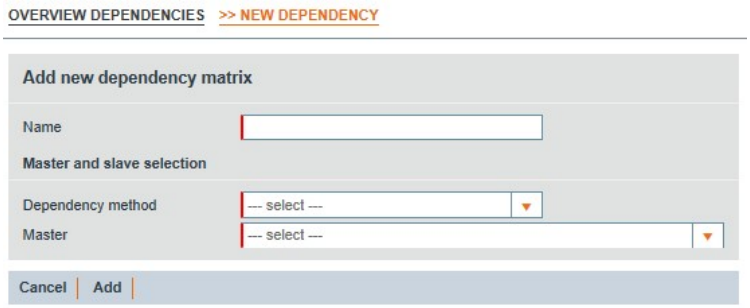
6.5 List Dependencies

Forms and monitor screens often contain input fields that must be filled out by the user. Lists are very useful because they limit the input to a known set of possibilities and thus make incorrect input impossible.

The list dependencies module allows the contents of a displayed list (the "slave") to change depending on the chosen value in another list (the "master"). Also, an property definition can be displayed or hidden depending on a chosen value from a list.

There are three types of list dependency: List dependency, item dependency, and visibility.

6.5.1 Create Dependency



Name : Name of the dependency.
Dependency method : Three options: List dependency, item dependency, and visibility.
Master : The list that affects the contents of the other list.

If the "Item dependency" method is selected, another line is displayed in the screen:
Slave: The list whose content is determined by the master.

The following chapters explain the different forms of list dependency by means of examples. Some lists are created as well as property definitions that use these lists in a form.

6.5.2 List Dependency

In this form, the "Slave" list contains the contents of a list or other list depending on the value you choose in the master list.

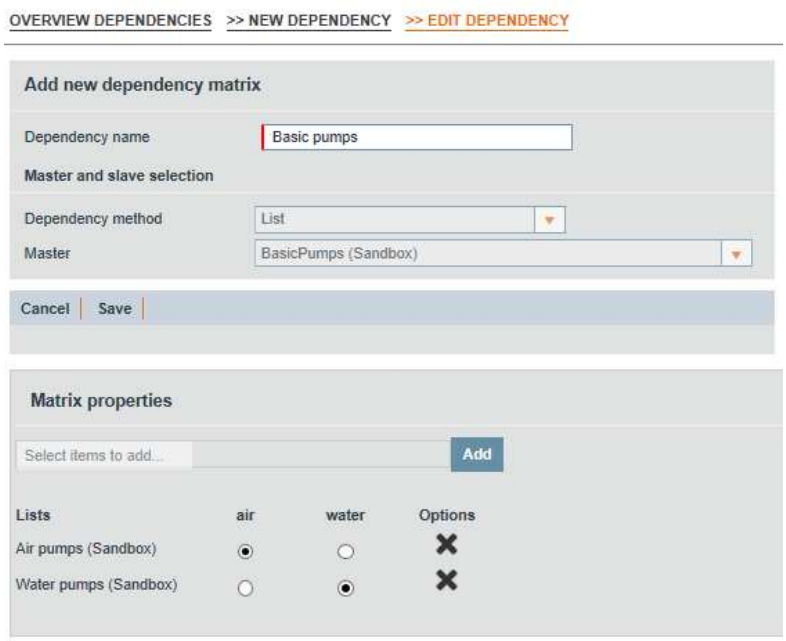
Do-it-yourself block

- In Design, in the menu, go to 'Basic elements', click List dependencies.
- In the grid, click the '+'-button to create a new dependency.
- Enter 'Basic pumps' at the name field, select as method 'List', select as master 'Basic pumps', click 'Save'.

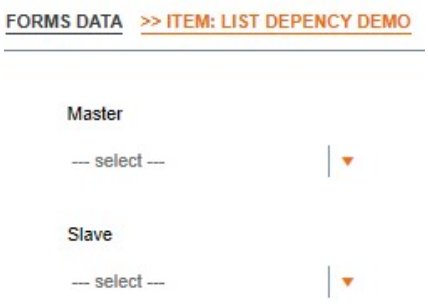
A new section is now displayed on the screen. Choose ' Water pumps ' and ' Air pumps ' and click ' Add '. Two lines are now created with radio buttons behind them. The selected radio buttons indicate which choice of the master the list will be used as the content of the slave.

- Select 'water' at the 'Water pumps' and 'Air' at the list 'Air pumps'.

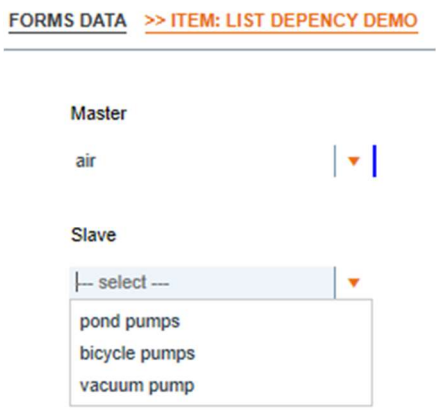
The dependency should look like this:



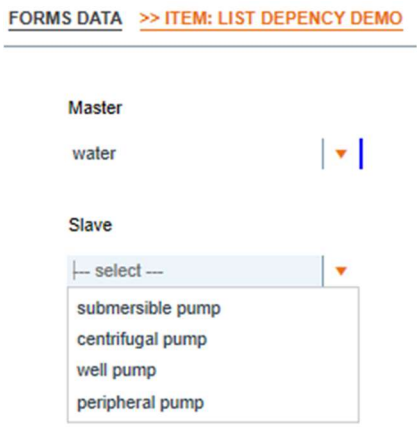
In Live, in a form:



When, at the Master, we select ‘air’ then the slave contains:



However, when we select ‘water’ then the slave contains:

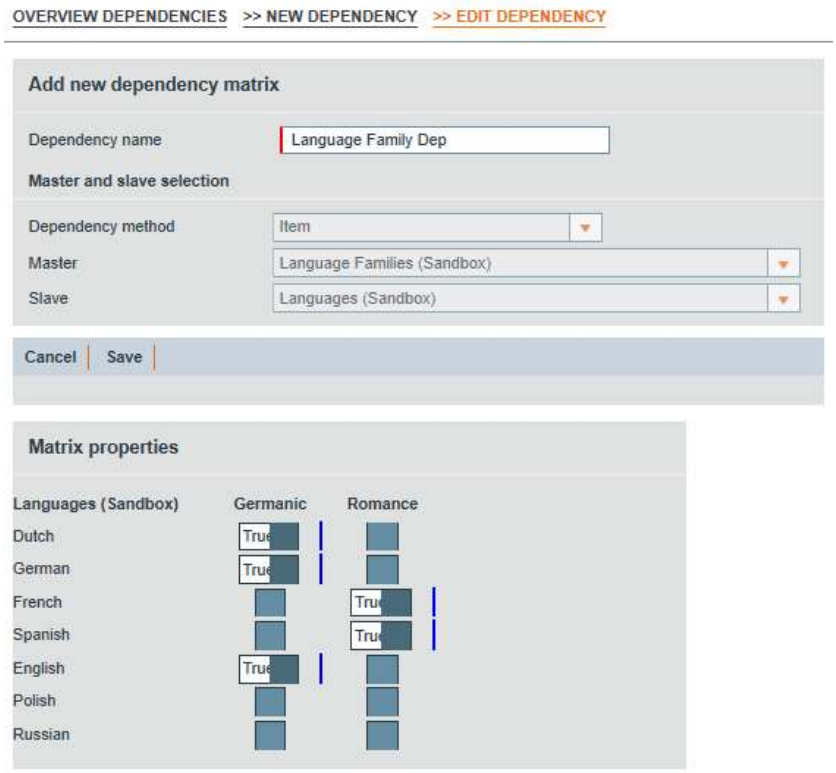


6.5.3 Item Dependency

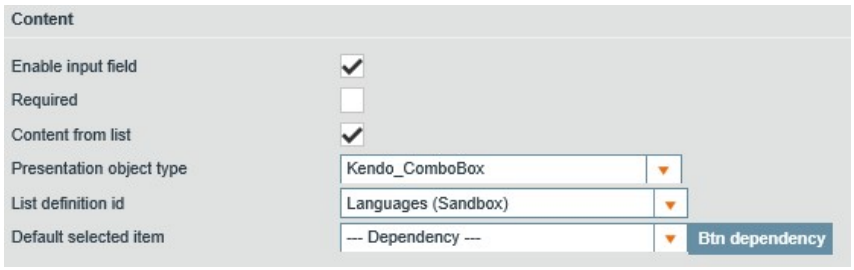
In this dependency, the master determines which subset of items from the slave list are shown.

There is a list of "Language Families" with two items; ' Germanic languages ' and ' Romance languages ', which is used by the ' language family ' attribute definition. Also there is a list ' languages ' created with items Dutch, German, French, Spanish, English, Polish, Russian.

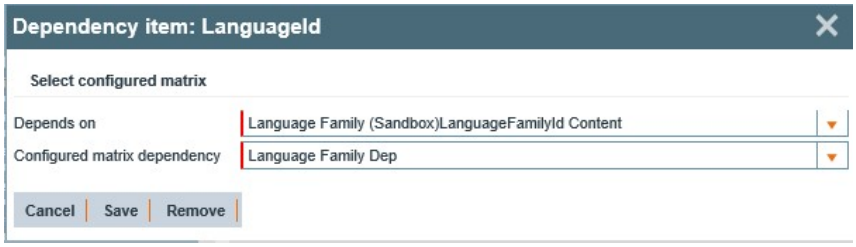
Property definition ‘Language family’ uses the ' Language Families ' list. For list dependencies, "Language Family Dep" is created with the following settings:



De property definition Language uses the list ‘Languages’:

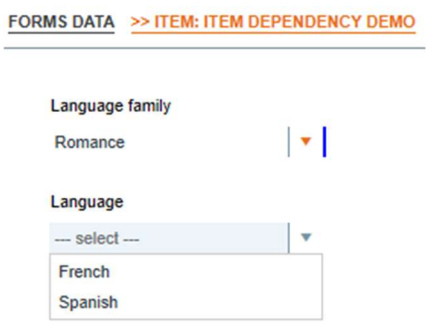


Click the dependency button and set following menu like this:



In Live, in the form, the dropdown ‘Language’ will present a list with items ‘Dutch’, ‘German’ and ‘English’ when the selected ‘Language family’ is set to ‘Germanic’.

When ‘Romance’ is selected it will present the Romance languages of our list.

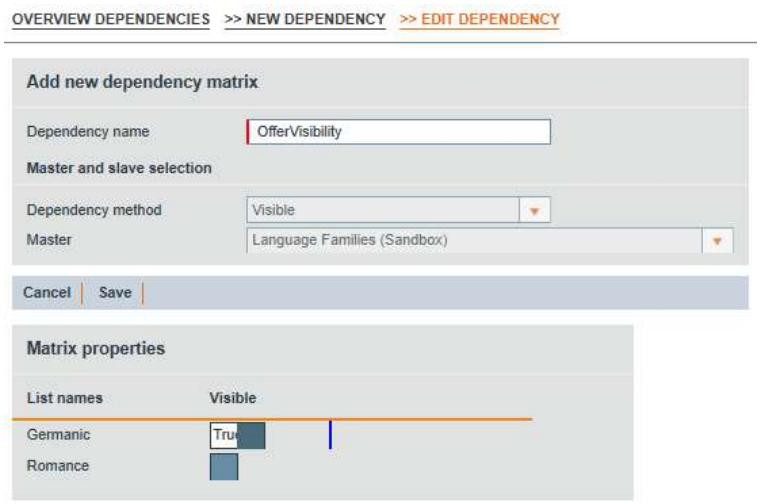


6.5.4 Visibility Dependency

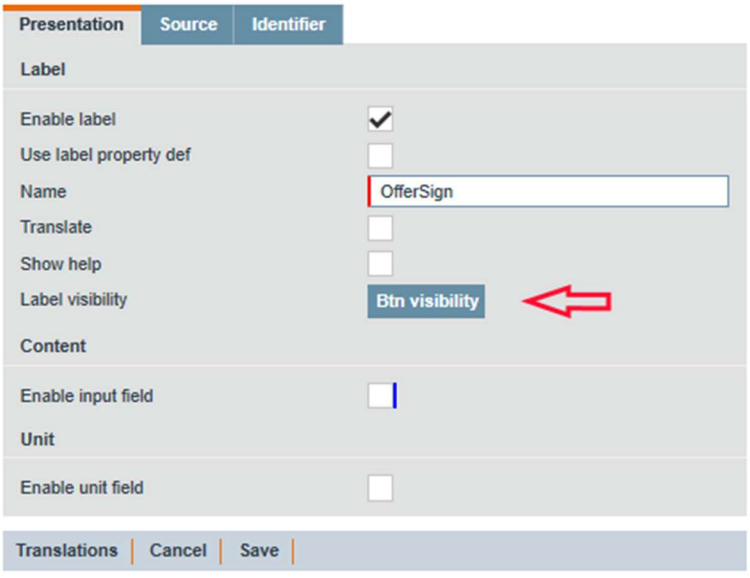
In the third form of dependency, a property definition can be displayed or hidden depending on the choice made in a list.

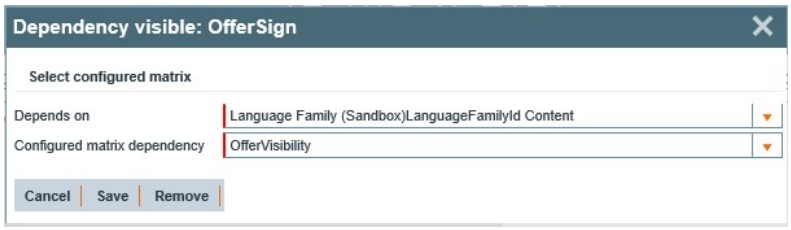
For example, it is possible to show the text ' OFFER!!! ' if the language family ' Germanic ' is chosen.

First, the dependency is created:

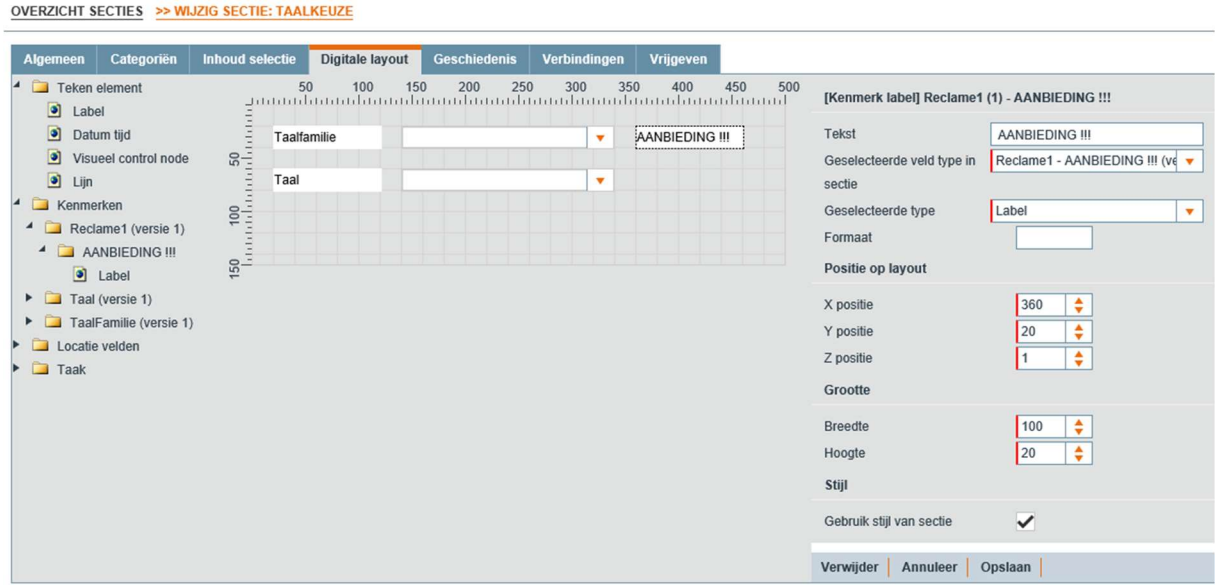


Next, at the property definition item you want to hide or show depending on the setting of the language family, click the "Visibility" button in the Label part:





In Design in the form:



In Live:

Adjustment of language family to ' Germanic languages ' shows the text:

This is also an example of a master with two slaves.

6.6 Sensors

With this menu item, the range of a sensor can be adjusted or even converted to a completely different measurement unit.

As an example, a PT1000 is given below. The given PT1000 has a temperature dependent resistance with an approximately linear character between -200 and 100 Celsius (outside the graph it is more

curved). By specifying a series of checkpoints in the linear range, Avision can make the translation from Ohm to centigrade, °C.

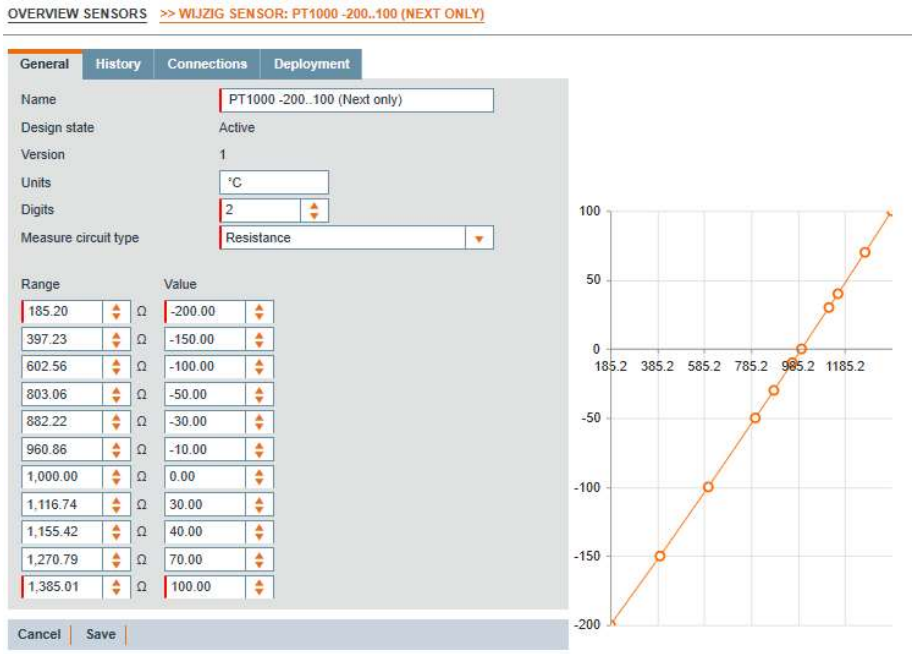


Figure 6-2 : Sensor chart of a PT1000 with a working area between -200 and 100 degrees centigrade.

6.6.1 Adding a Sensor Type

- In Design, in the menu, go to 'Basic elements', click 'Sensors'.
- In the grid with sensor types, click the '+'-button.
- Enter a name and click 'Add'.

6.6.2 Changing a Sensor Type

Select in the grid the sensor you want to change, then click the pencil icon.

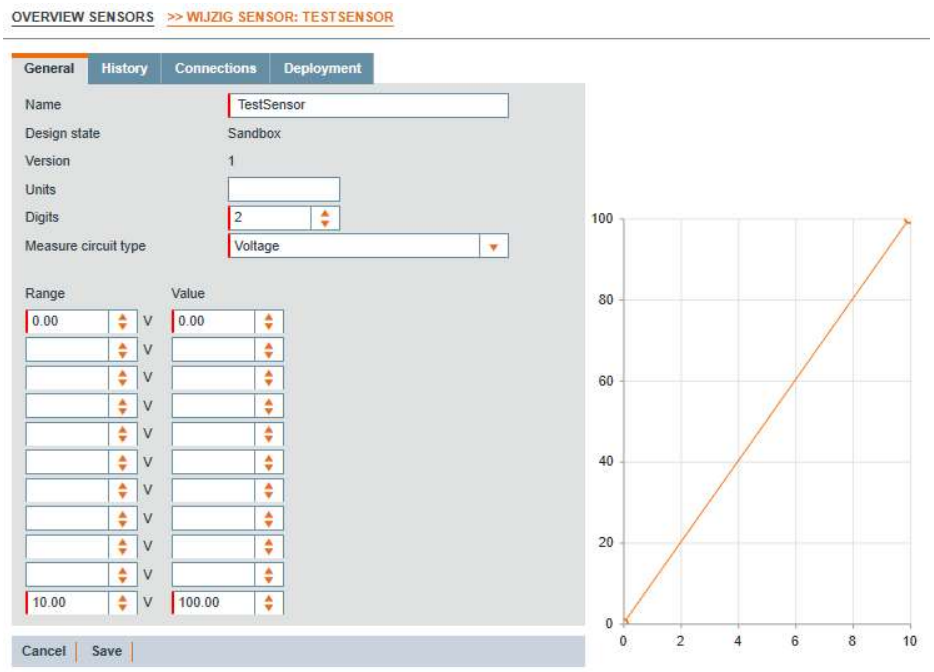


Figure 6-3: Changing sensor graph

The following fields can be customized:

Name: Name of the sensor graph.
Units: Enter the unit (optional).
Digits: This is the number of digits that the box will count on internally. The measured values sent to Avision will have this specified number of digits.
Measuring circuit type: Specify the type of measurement. Choose from:

1. Percentage of full ADC range (Compact only)
2. Flow
3. Voltage
4. Value
5. Resistance

Range and Value fields: These fields can be used to adjust the course of the chart. The first and last field must be filled in, other fields are optional.

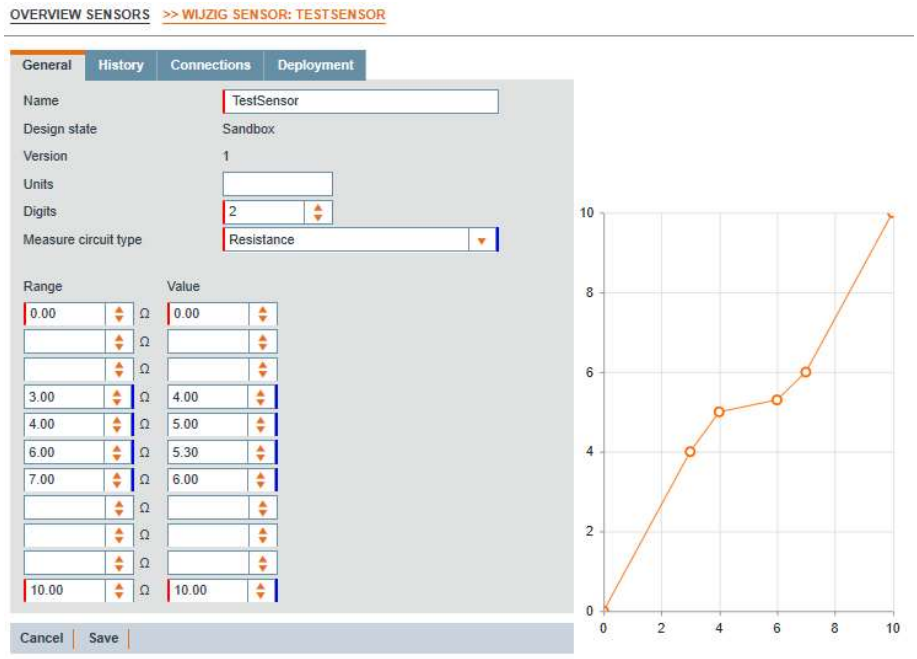


Figure 6-4: Adjusted measuring range for a theoretical sensor with a curved graph

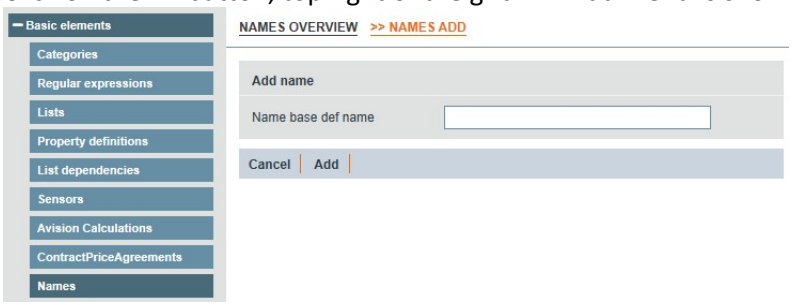
6.7 Names

The Names module can be used to make custom dynamic names for nodes. It is for example possible to show the value of a datapoint as a part of the node name. This option is available for all node types.

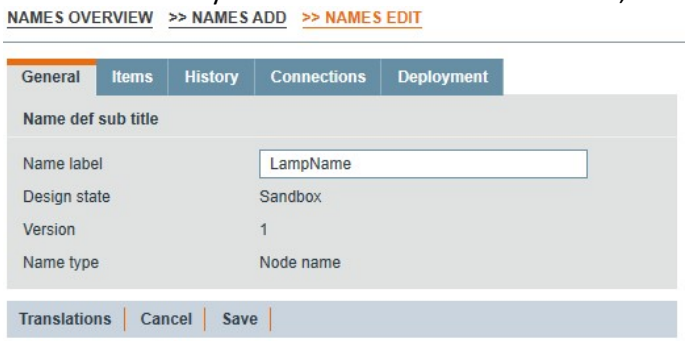
At this moment, name modules can only be used for naming nodes, but in future more options will become available.

6.7.1 Creating

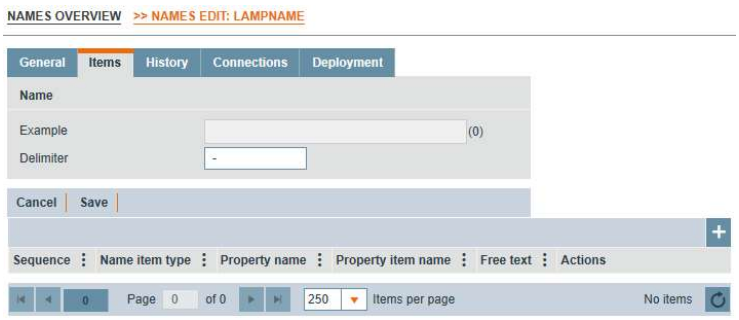
- In Design, in the menu, go to ‘Basic elements’ and then ‘Names’
- Click on the ‘+’-button, top right of the grid. An Add menu is shown.



- Enter a name for your Name module and click ‘Add’; the name module is created.



The name can consist of multiple items. These are created at the ‘Items’ tab. Here we can also indicate what delimiter should be used to separate the items in de node name part. The delimiter can be one to three characters long. For convenience, an example of how the name will look like is also presented together with the estimated length.



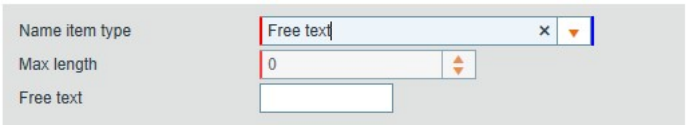
Since a node name can not be longer than 50 characters, a warning will be shown when the length of the node name exceeds this. In Live, the name will be truncated if it exceeds 50 characters.

- Enter the minus sign ‘-‘ as the delimiter and click ‘Save’
- Click on the ‘+’ button top right on the grid; the screen for adding a name item is shown

The screen for adding a name item has two entry fields:
Name Item Type : Select what needs to be shown in the name. Options are:

- **Legiobox Label:** The text entered at the Legiobox is used.
- **Property Presentation Item:** Select this when the value of a datapoint is to be part of the node name. Two dropdowns are presented to select the property definition item.

- **Free text:** Here you enter a text. The maximum length field can not be changed, the length is calculated when the Save button is clicked.



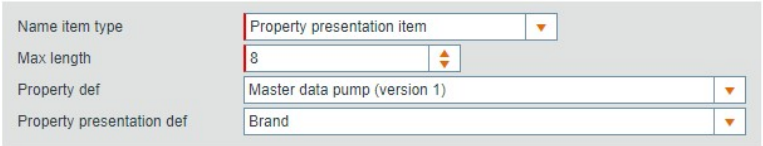
- **Guid:** The GUID of the hardware is used.
- **Device Id:** Device id is shown in the name. (i.e. '120005' for a light gate).

Maximum length : Enter the maximum size of the item. This is used in calculating the expected length of the name.

Do it yourself block where a name is created containing a free text, the value of a datapoint and a GUID, separated by a minus sign.

- Click the '+' button on the top right of the grid in the 'Items' tab.
- Select 'Free text' at the name item type and enter 'LG' at the 'Free text' field. (The Maximum length field can not be edited, it will contain the length of the typed text after clicking the save button.)

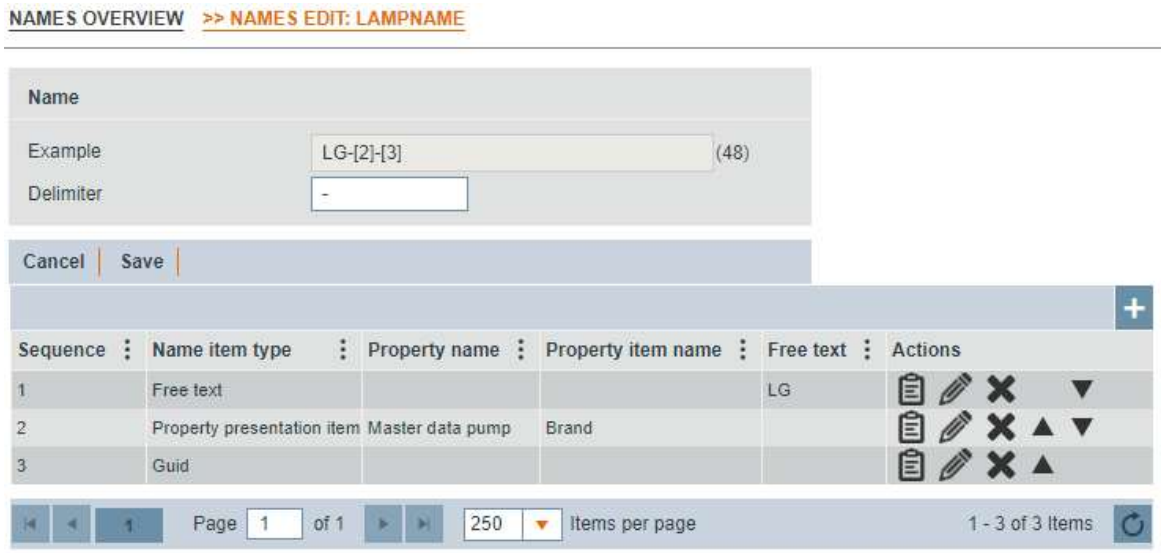
- Click 'Save'
- Click the '+' button on the top right of the grid in the 'Items' tab.
- Select 'Property presentation item' at 'Name item type'
- Enter 8 at Maximum length
- Select 'Master data pump' at the Property definition field
- Select 'Brand' at the Property presentation item field



- Click Save
- Click the '+' button on the top right of the grid in the 'Items' tab.
- At 'Name item type' select 'GUID'
- Enter 36 at the Maximum length field

- Click ‘Save’

The items tab should now look like this:



In the Actions column we change the order of the items in the name, but for this example the order is correct, so we’ll leave it this way.

6.7.2 Applying the Name module to a Node

To use this name module to set a node name we have to indicate at the node that we want to use this module.

In Design, at the General Tab of the node (in this example the hardware node ‘LightGate’) tick the ‘Use name module’ checkmark. A dropdown is now shown were the name module can be selected for the node.

6.7.3 In Live

In live, depending on the property definition being new or not we may need to synchronize. Then the node name must be updated. This will happen when a node is moved or when the property definition item used gets a new value from a screen or a form and the left tree is updated.

In our example the result looks like this:

The brand of the pump is now shown in the hardware-node of the lamp.

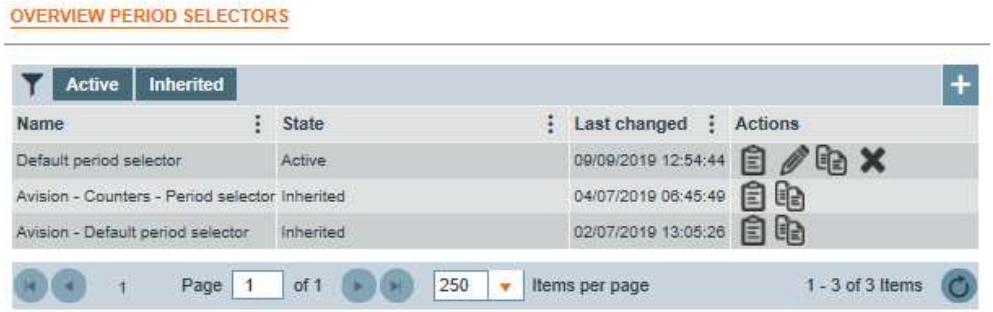
7 Filter elements

This chapter describes items that can be used to limit the domain of the data. This limit can be based on time (with the period selector) or by filtering the number of nodes where the data can come from (using Filter, Node selector) or by selecting data content (search criteria).

7.1 Period selectors

7.1.1 Design

In design, the period selector module, like many other modules, has a summary page with all the created and inherited period selectors. Inherited period selectors are not to be changed or deleted by a user (because they are obtained from a higher application or from AVIC). However, a copy can be made from an inherited period selector. At that point, you have a new period selector that is the same as the original but with the big difference that it can be changed to your demands.



Each line has a number of icons in the Action column. These icons have the following functionality:

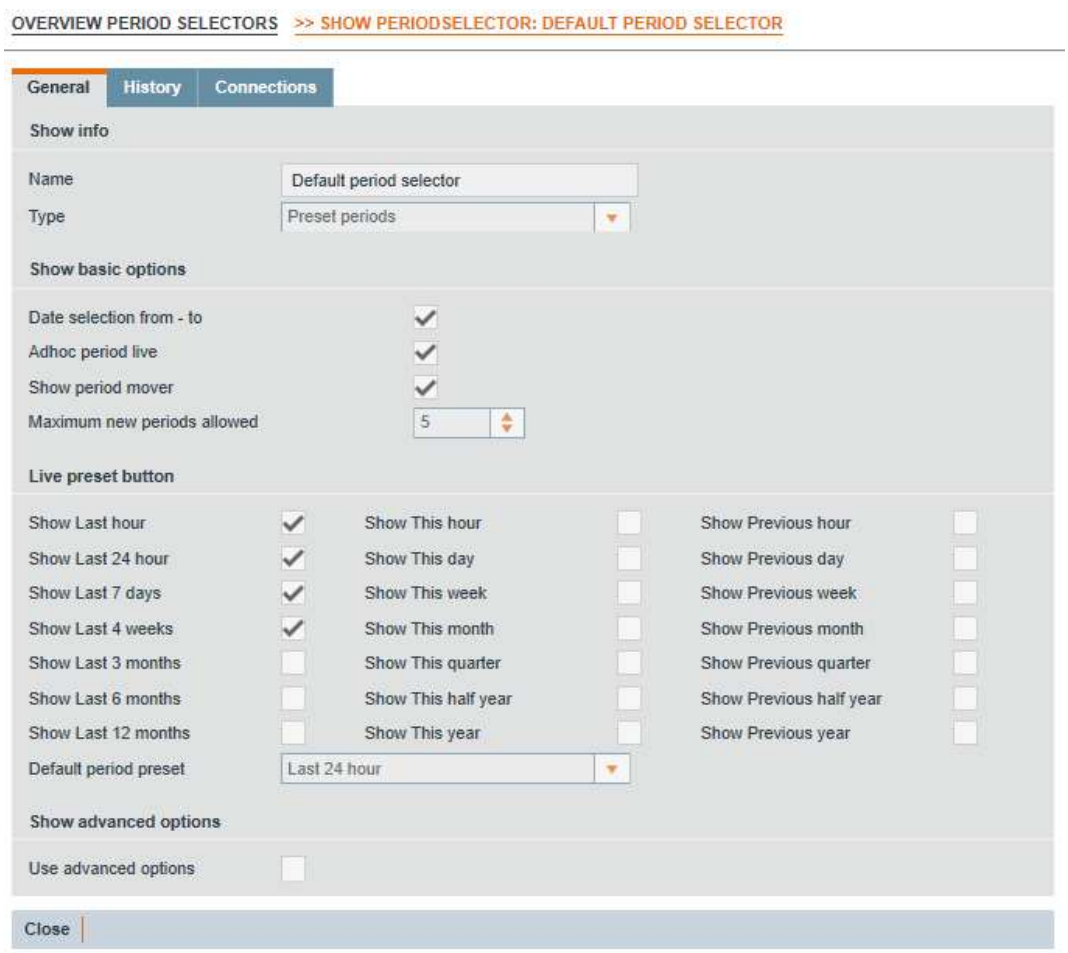
1. : Display the period selector settings (cannot be changed)
2. : Changing the period selector
3. : Make a copy of that period selector
4. : Delete the period selector

At the top right of the grid you can find the '+'-button to create a new period selector.

7.1.1.1 Creating a New Period Selector

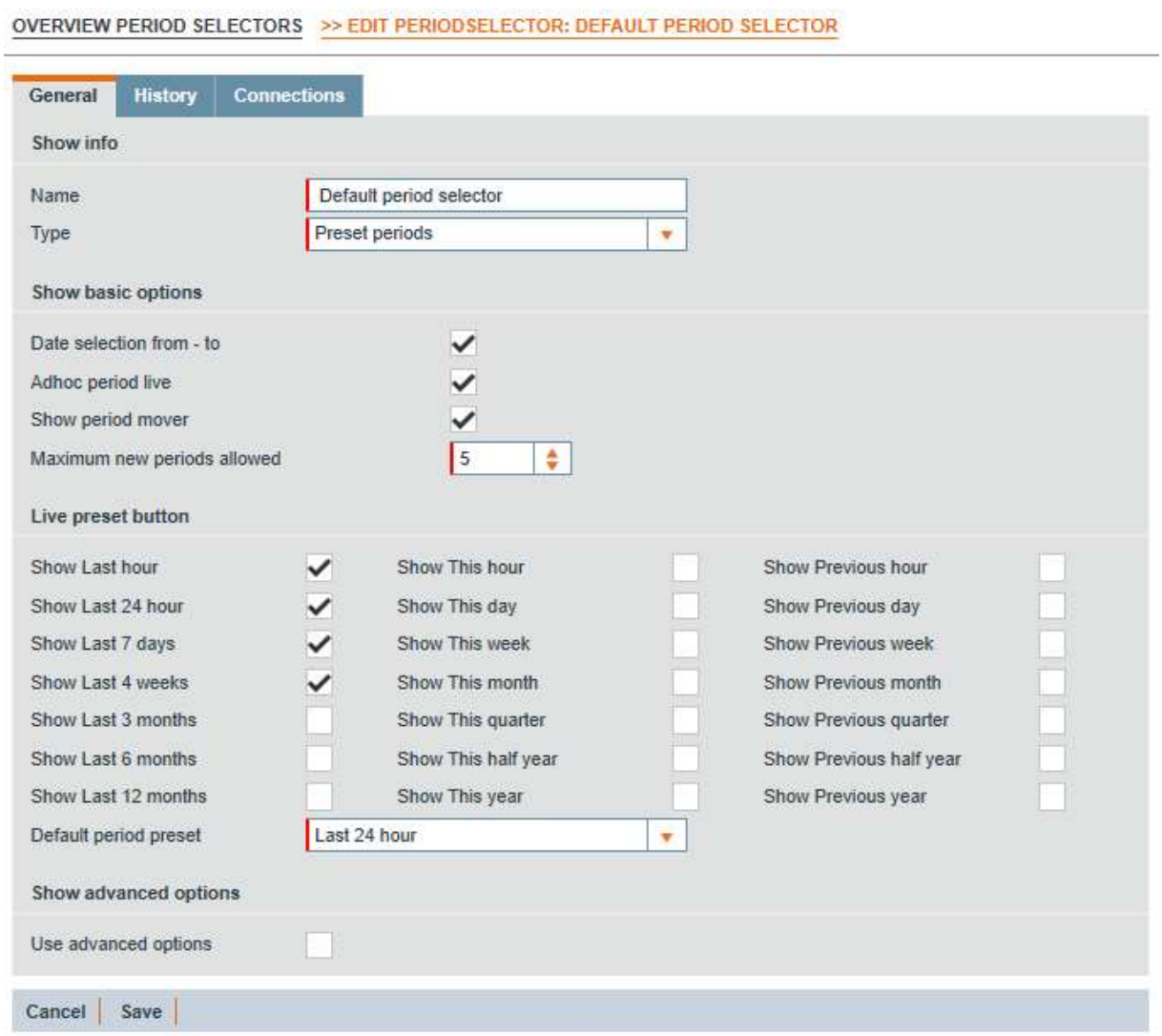
The user types a name for the new period selector. By clicking the ' + ' button, the user can now create a new period selector and after that the change period selector screen is presented.

7.1.1.2 Presenting Period Selector Settings



In view mode the settings cannot be changed. Hence, only a close button can be found on the bottom of the screen.

7.1.1.3 Changing Periode Selector Settings



General tab
The first item that can be changed in this tab is the name that is displayed in the overview screen, among others. Name is a required field.

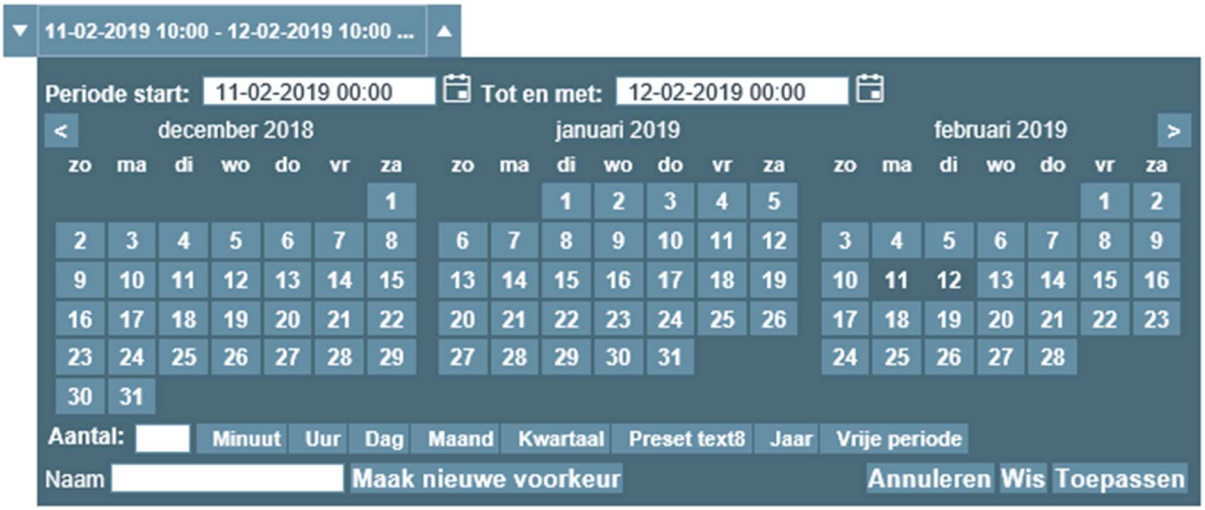
- **Type:** Type of the period selector. At this point 'Preset periods' is the only option.
- **Date selection from-to:** Whether a datetime box is shown.
- **Ad-hoc period live:** Allow creation of custom periods.
- **Show period mover:** Two arrow buttons are shown that can be used to step a period forward or backward.
- **Maximum new periods allowed:** The maximum number of custom preset periods a user can create. (Ad-hoc period live must have been set).
- **Live preset buttons:** User can indicate which preset buttons are available.
- **Default period preset:** The default period the period selector uses.

- **Use advanced options:** When checked following options are shown:

- These options have not been implemented in live, yet!

7.1.2 Live

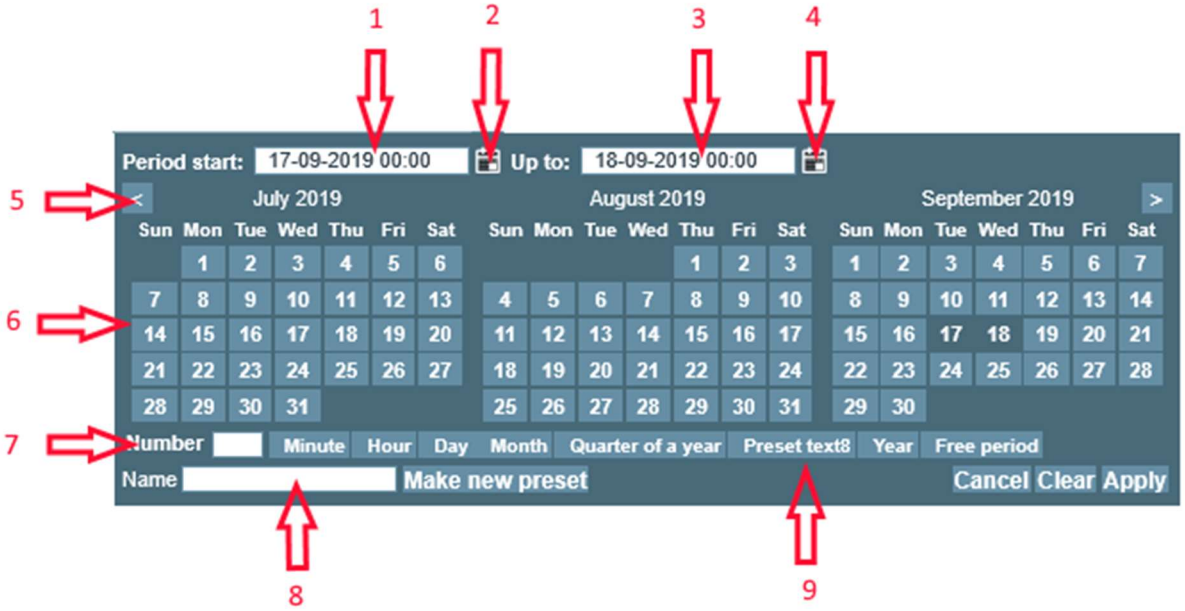
1. Preset buttons
2. Date selection from-to. When three dots are shown this period can be clicked and a date-time selector will pop-up. This option is activated when 'Ad-hoc period live' is checked in Design. Also, in this popup, a custom preset button can be made.



3. The back or forward period buttons

7.1.2.1 Ad-hoc Period Selector Popup

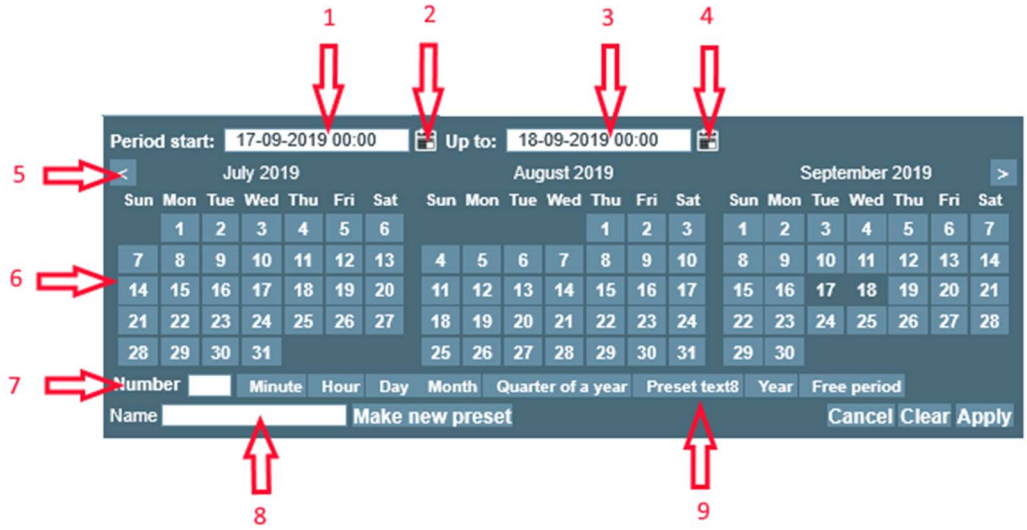
The Ad-hoc Period Selector Popup is split in four parts. 1 to 4 is the first part and used to select the period manually.



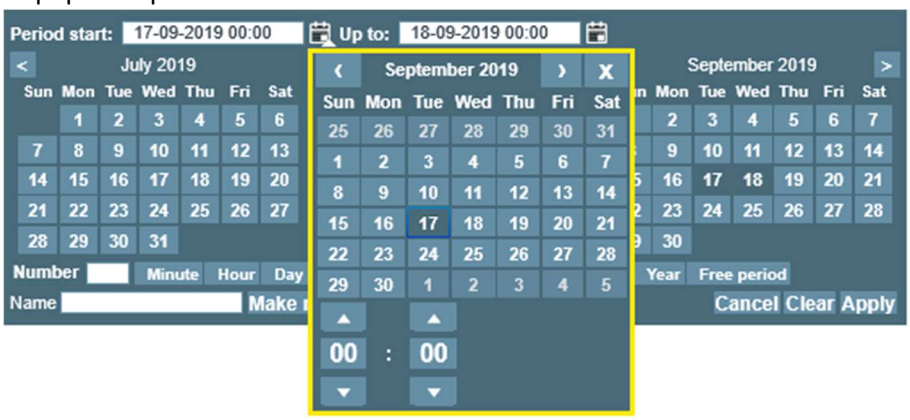
The second part, with numbers 5 and 6, where the user puts the start date on the first click in the calendar on a day and puts the end date at second click. Start time is always 0:00 and end time is the chosen date 24:00 hours. So, if you click on January 1 for the end time, the time will be 1 January 24:00 hours or January 2, 0:00. Now, if you click for a third time, you start from the beginning and decide the start date.

Numbers 7 and 9 form the third part. This is used to determine the start and end dates. Example: When entering the number '10' at the textbox at arrow 7 and then click on 'Day' the following happens: The start time is then rounded up to 24 hours and then 10 days back. End time is today 24 hours (which is the same as tomorrow 0:00).

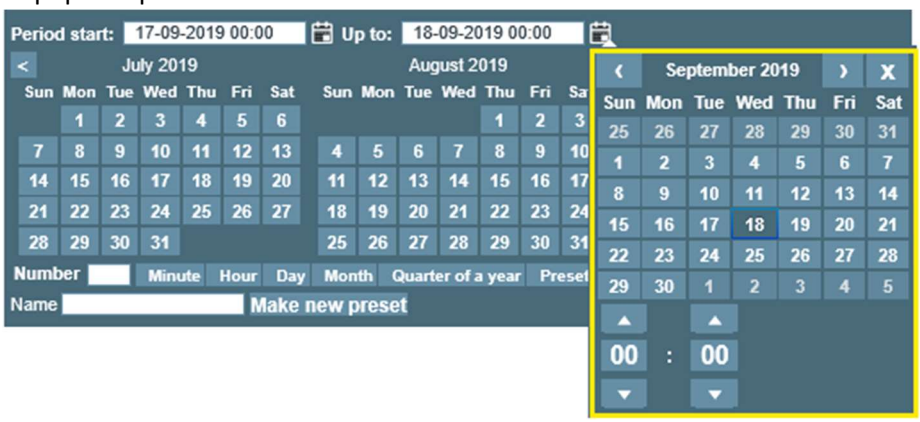
The fourth part is for making a new preset (next to existing presets). To make a new preset enter the name of the new preset at the textbox indicated by the number 8, click one of the buttons of the third part and then click on the button 'Make new preset'. When the button 'Free period' was not set but one of the other buttons then textbox indicated by number 7 must not be empty.



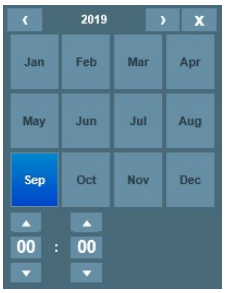
1. Start period, datum and time range
2. Popup start period



3. End period date and time range
4. Popup end period



Click on the month in the popup to get a special month selector:



Click in this special month selector popup on the year and a special year selector will popup:

5. Month scroll button
6. Calendar range picker
7. Number of time intervals
8. Name new preset period selector button. In Design a value for the maximum number of presets is set. (Default 5).
9. Time interval from end time, today 24:00 hours, or tomorrow 0:00, going back the selected time interval.
10. When the chosen preset period was manually added then an extra button with the option to delete this preset will be available when this preset is selected, See 10:

7.2 Search Criteria

Search criteria can be used to create search screens. These are used by the modules Filter, Node search, Report search, and the Node selector.

A search screen always consists of two sections. The first part searches based on the last known value. The second part searches with a certain from/to period in the past/history.

The final result is always a list of nodes (for continued use).

7.2.1 Create Search screen

Click the '+' button above the grid. When creating, two fields are requested:

Name : Enter the name of the search screen.

Search usage : Select Filter or Node counter.

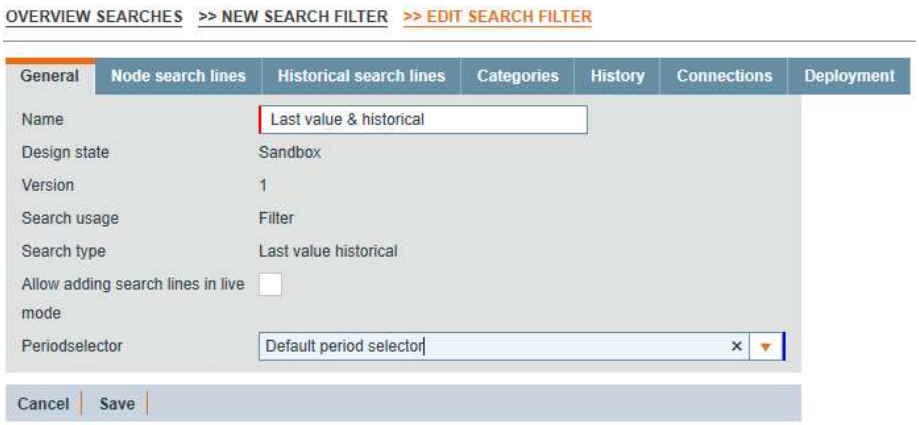
Search type: This field is only available when at Search usage 'Filter' was selected.

Three choices:

- Last value
- Historical
- Last value historical

7.2.2 General tab

After a search screen has been created it can be edited by clicking in the grid, on the pencil icon



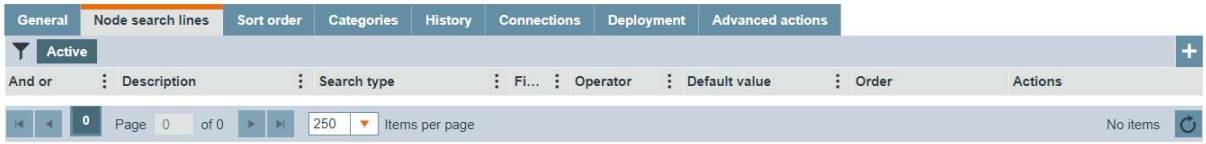
In this screen, the name can be changed, but not the search type.

Allow adding search lines in live: If checked, the search can be further specified in live.

Period Selector: Choose a period selector here.

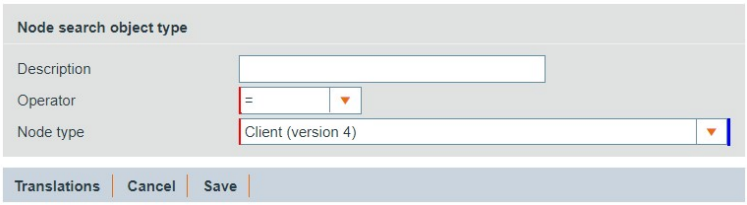
7.2.3 Node search lines Tab

With searchlines the resulting nodes are filtered. The filtering can be done with multiple searchlines and conditions.



Click the '+' button above the grid. Select the search on type.

The edit screen for the choosen type is shown.



It is possible to filter on the following items.

Property presentation def: Filter nodes on the value of a datapoint.

Node type: Fliter nodes on the designed node types.

Object type type: Filter nodes on the techincal node types (application, structure, asset, object, hardware node)

Alarm on node: Filter the nodes with an open alarm at the node.

Contract product: Filter nodes on a contract poduct coupled in live.

Alarm open: Filter on specific alarm.

Property presentation def limit: Filter on datapoint in zones.

Node id: Filter on node id

Node identifier: Filter on the identifier column

Node name : Filter on node name

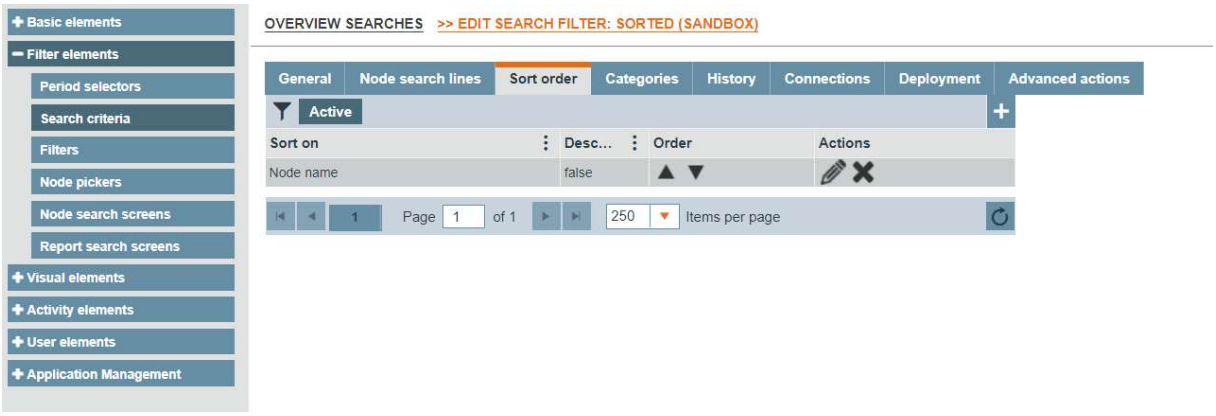
Guid: Filter on GUID

Datapoint enable: Filter on nodes with datapoint enabled/disabled.

Datapoint identifier: Filter on the identifier column in datapoints.

7.2.4 Sort Order Tab

With the sort order tab the order of the search result can be defined.



It is possible to sort on 4 levels and sort ascending or descending.

The sort order can be made on:

Node name : The node name form current node

Node name object type up: Sort on the node name from current node or its parents of the specified object type.

Property presentation def: Sort on a property presentation def.

7.3 Filters

7.4 Node Pickers

Node pickers can be used to select nodes. The selected nodes can be input for a filter.

7.4.1 Add Node Picker

In Design, in the menu item ‘Filter elements’, click on ‘Node pickers’. The grid shows the node pickers present. Click the ‘+’-button top right on the grid. An add screen is presented:

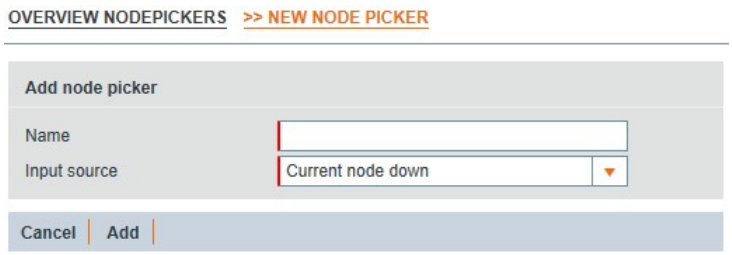


Fig. 7.4.1.1: Add screen node picker

Name : Enter the name of the node picker.
Input source : Select the input source, the nodes from which the node picker can make a selection. Options are: ‘Current node down’ and ‘Filter’. After a node picker has been created the input source can not be changed.

Click ‘Add’ to create the node picker.

7.4.2 Edit Node Picker

In the grid click on the pencil icon behind the node picker that needs to be edited. The edit screen is displayed:

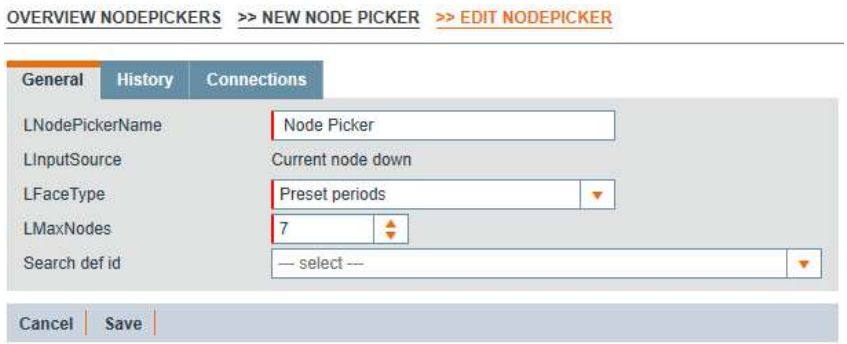


Fig. 7.4.2.1: Edit screen node picker

Name : Name of the node picker.
Face Type : Only one type can be chosen at the moment. This may be extended in future.
Max. number of nodes : The maximum number of nodes that can be the result of the node picker. By default this is 7.
Search def ID : Select the search screen (option, not mandatory).

7.5 Node Search Screens

7.6 Report Search Screens

8 Visual Elements

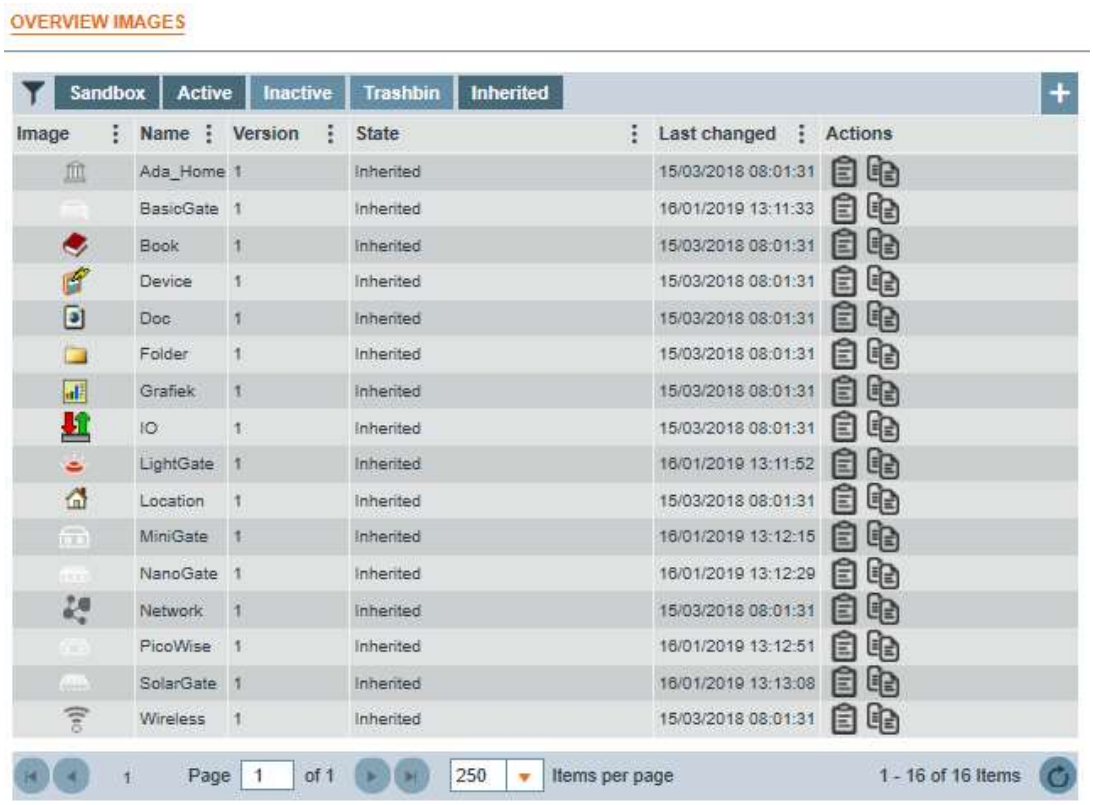
This chapter describes the visual elements in Avision 2.0.

8.1 Images

The Images modules is a library of images. The images in that library can be used by other modules in Avision, both in Design as in Live. Examples are the background of a section or a list of images.

8.1.1 Design

If you have not created any images in Avision yourself, you will only have the images you have received from AVIC. To be able to see them, you must indicate above the grid that you want to see the inherited items by clicking the 'Inherited' button.



8.1.2 Adding an Image

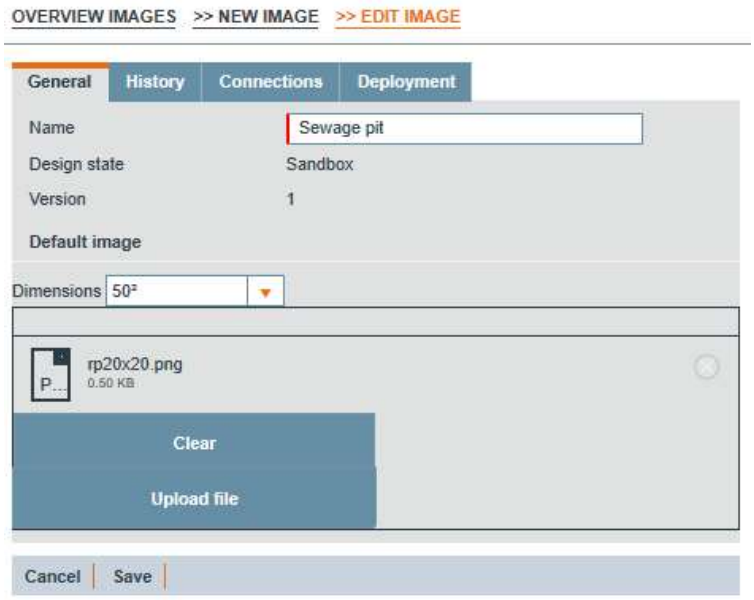
An image from the Images module can be used as an icon of a Node.

Do-it-yourself block in which you will add an image to your own library and apply as an icon of the Asset node

- Click on the '+'-button in the header of the Images grid
- In the add screen, in the name field enter 'Sewage pit'
- Click 'Add'

A record is now created in the database and the General tab is opened so that the image can be added.

- Click the button 'Select new image file' and browse for the image that you want to use (preferably 20 by 20 pixels)

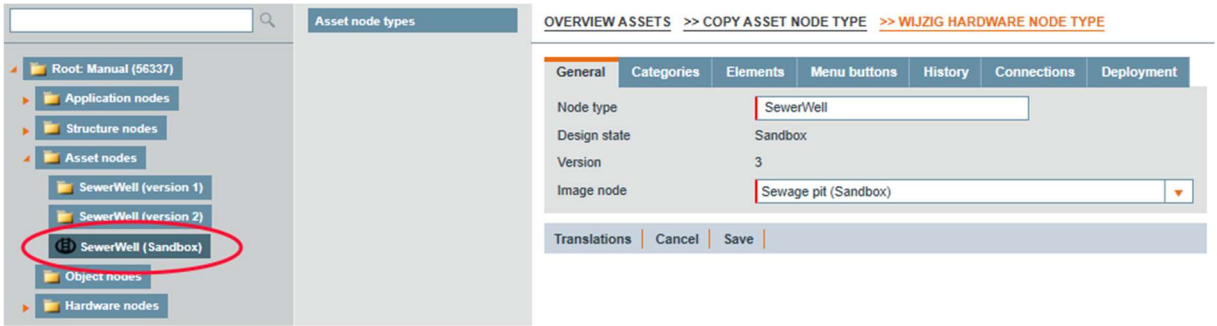


- Choose at Dimensions 50x50, then click ‘Upload file’

The dimensions button restricts the size in bytes of the image in the database. Avision reduces the image so that all sides of the image fall within the specified dimensions (while maintaining the ratio between length and width). The largest allowable size is 1024x768 pixels. This will prevent the connection from getting slow or that the database will attempt to save an infinitely large file.

When we go back to the grid we see that the new image is available:

Now we can link this image to our ‘SewerWell’ asset. For that we go (still in Design) to the Asset nodes. We make a copy of the highest version SewerWell and in the General tab, at the field ' Image node ', choose our just created ‘Sewage pit’ image. After ' save ' we see the new icon at our new sewer well.



8.2 Charts

Graphs can be created for standalone use or as part of a monitor screen or a report.

8.2.1 Creating Charts in Design

In Design, we first make the chart. In the menu, at ' Visual elements ', click on ‘Charts’ to go to the charts module. Click the ' + ' button at the top right of the grid. Enter the name of the chart to create (e.g., ' Measurement data ') and click ' Save '.

8.2.2 General tab

In the General tab, the following fields can be adjusted:

General

- Width: Width of the chart in pixels. Default is 800 pixels.
- Height: Height of the chart in pixels. Default is 400 pixels.
- Period selector: A chart always has a period selector. Default is an inherited one from Avic, but there’s also one created at creation of the application. Select this one.
- Input source: Indicates which nodes the data comes from. Options are: Current node, Current node down, Filter and Node picker.
- Is multi line:
- Compare:

Title part

- Style: Here you select a style for the title. (See chapter x, Style)
- Title equals name: The title of the Chart equals by default the name of the chart. When this is not the case then uncheck this option. An extra field ‘Title’ appears in which the correct title can be entered.

Highlighting

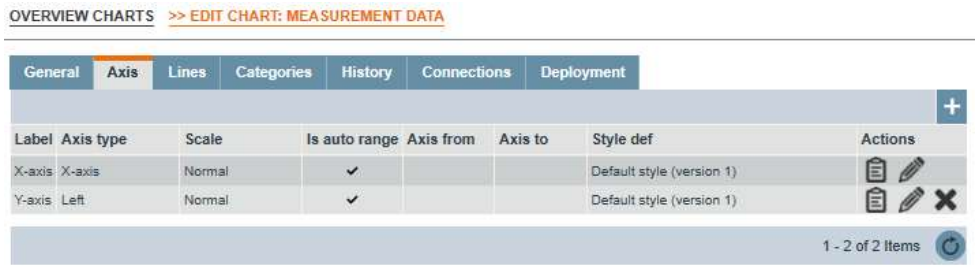
This section allows you to create shaded columns in the chart to emphasize certain days or times in the chart. Every day of the week can be shown shaded and/or a period of each day (start and end time) can be indicated.

- Chart grid: To show grid lines in the chart.

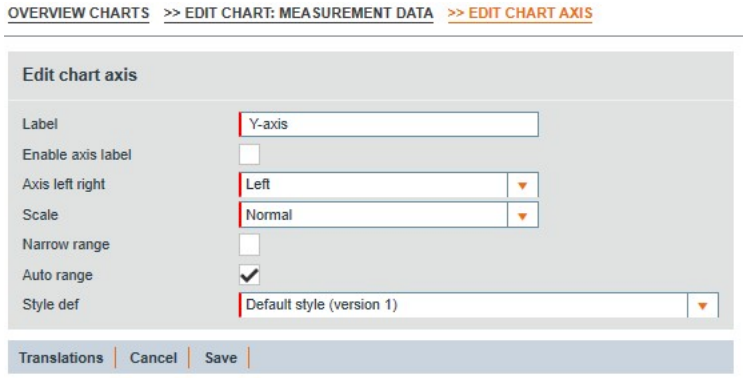
Legend

- Legend docking: The position of the legend relative to the chart. Options are Bottom, Left, Right and Top. Default setting is Bottom.
- Lines toggleable on/off: With this option set to on, in Live lines in the chart can be made hidden simply by clicking on it in the legend. This is a handy tool when a chart becomes complicated.
- Legend style: Style of the legend. Default is an inherited Avic style.

8.2.3 Axes tab



When creating the chart, the default X-axis and Y-axis are created.

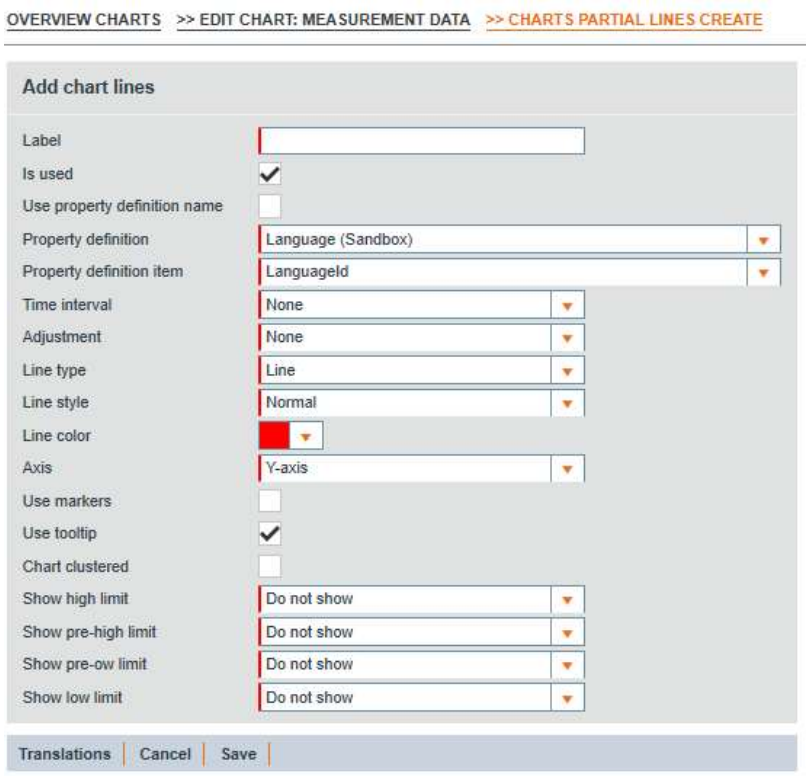


Axis Options

- Label: Name of the axis
- Enable axis label: When checked a textbox will appear to enter a text that will be shown next to the axis other than the axis name.
- Axis left right: Position and type of the axis. Options are: Left, Right or X-Axis to indicate this is an X-axis. Only one X-axis is allowed in the chart.
- Scale:
  - When X-axis Normal or Relative. With Normal, left Y-as goes through the zero point of the X-axis. When Relative is selected a start and end value can be given for the X-Axis. The left Y-Axis will go through this value, a right Y-axis will go through the end value.
  - When Y-axis options are Normal (default), e, log2 and log10. Also the field ‘auto range’ can be checked or when unchecked, a from and to value can be given or can be taken from the measure range.
- Narrow range: If set to true the Chart will narrow the value axis range in order to display data points in better detail. Setting it to false will force the automatic axis range to start from 0 or the explicitly specified ‘Axis from’ value.
- Style: A different style can be selected for the axis label.

8.2.4 Lines tab

After clicking the '+' button a line can be created.



Options for a Line

- Label: Name of the line
- Is used: When the line must be shown in the chart make sure this field is checked ! (Uncheck it if you do not want to show the line in the chart but want to keep the settings for later).
- Use property definition name: When checked the name of the property definition will be used as a label in the legend, if unchecked the label of the line will be used.
- Property definition and Property definition item: Every line is based on the values of a property definition item. These fields are used to select the property definition item to be used for the line.
- Time interval: Option run from a quarter hour to a year or None.
- Adjustment: Options are : Average, Count, Maximum, Minimum, Sum or None.
- Line type:
  - Area
  - Bar
  - Column
  - Line
  - Point

  Default is Line.
- Line style:
  - Normal : straight line from value to value.
  - Stacked: value of a line is added to the value of a lower line.
  - Stacked 100 : the sum of all lines stays 100%.
  - Stepline : square wave
  - Smooth : not a straight line from point-to-point but a sinus wave like line connecting all points.

  Default is Normal.
- Line color: Every (new) line has a default (new) color on creation. The color can be altered here.

- Axis : Select the Y-axis here.
- Use markers:
- Use tooltip: If checked will show values of a point on the line as a tooltip on hovering over the line with the cursor.
- Chart clustered:
- Show high limit: Options are Line, Band or Do not show (default).
- Show pre high limit: Options are Line, Band or Do not show (default).
- Show pre low limit: Options are Line, Band or Do not show (default).
- Show low limit: Options are Line, Band or Do not show (default).

8.2.5 Creating a Chart by yourself

Do-it-yourself block in which a chart with two lines is created in Design.

In chapter Creating Charts in Design a chart was made. The General tab is already finished, only the axes and lines need some work.

Air pressure
To get an interesting chart with multiple lines we create another property definition ' air pressure ', with property definition item ' air pressure item ' (type: float, Enable Label, Enable input field, Digits = 0, Enable unit field, Unit = ' mBar ').

On the hardware, in the LightGate, in the menu item HardwareIO, at Internal Sensors ' Air pressure ' press the ' + ' button to create the item. Then choose ' Transferred ' from Sample destination, and select ' air pressure ' at the property presentation definition, 'air pressure value' at property definition item. Change Label in ' air pressure ', in 'Sensor type' field, choose ' Barometer ', for PGA select ' Value '.

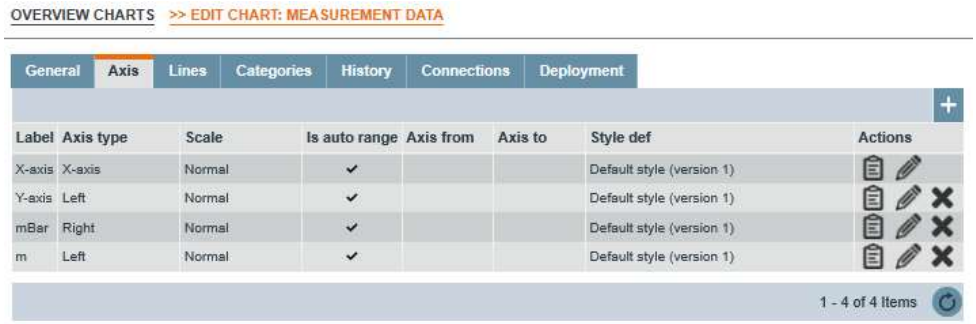
Water level in the pit
Create another property definition 'Water level' (type: float, Enable label, Enable input field, Digits=2, Enable unit field, Unit = 'm').

On the hardware, at the LightGate, in the menu HardwareIO, at External IO, Analog in, press the ' + ' button on the grid line labeled Analog 2 to create this point. Set Sample destination to ' Transferred ' and select ' water level ' at property definition field, and 'water level' at property definition item. At Label field, enter 'Water Level'. At 'Sensor type', choose Current 4.. 20mA: 0-20mA (Next only) ', at PGA ' Current 0-20 mA '.

Now we continue with the chart:

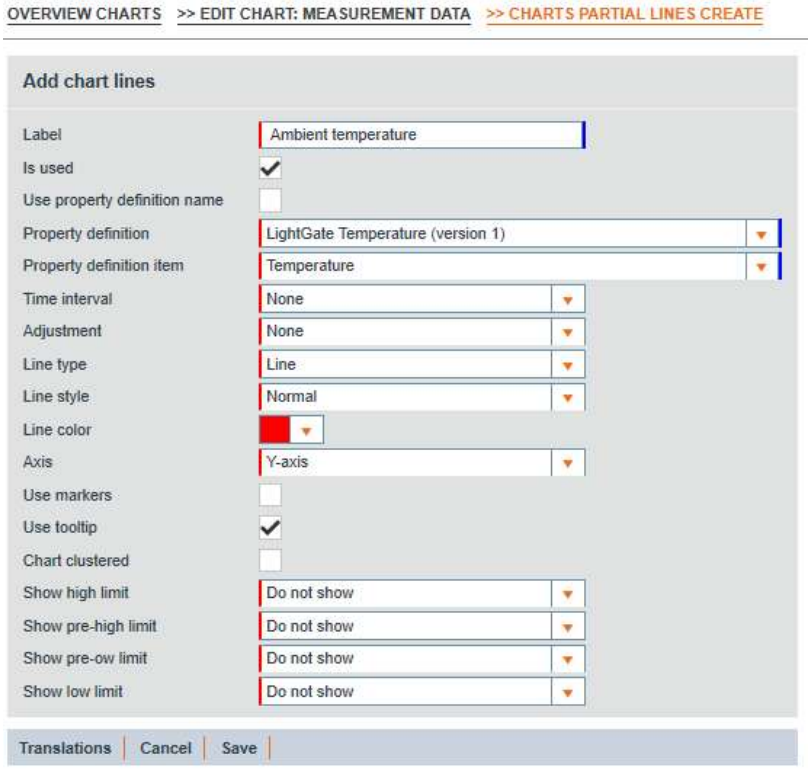
Axes
- At the Axes tab, in the grid, edit the X-Axis.
- Check 'Enable axis label'
- Enter 'Time' in the label field, click 'Save'.
- At the Axes tab, in the grid, edit the Y-axis.
- Check 'Enable axis label'
- Enter '°C' in the label field, click 'Save'.
- At the Axes tab, add an axis toe (using the '+'-knop top right of the grid).
- Label 'mBar', select 'Right' at 'Axis left right', click 'Save'.
- At the Axes tab, add another axis.

- Label ‘m’, ‘Axis left right’ select ‘left’, click ‘Save’.

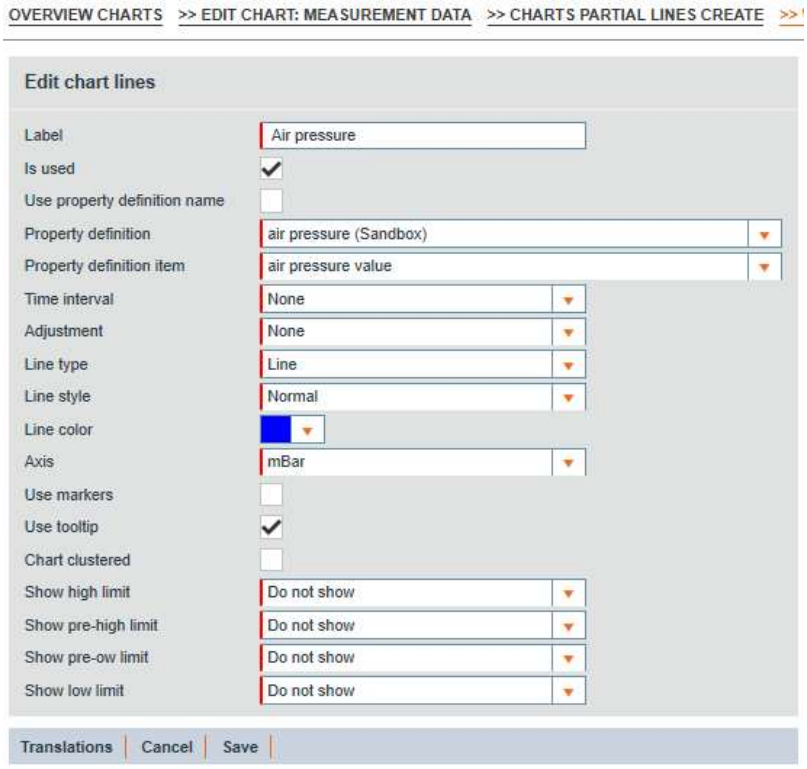


Lines

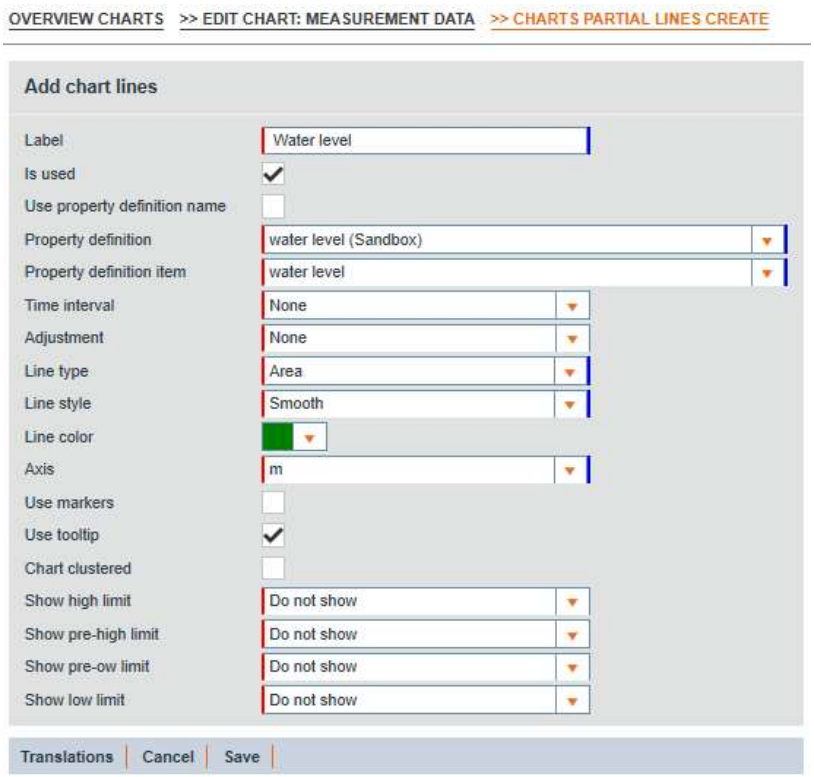
- At the Lines tab, click the '+'-button top right on the grid. Enter name 'Ambient temperature', select at property definition 'LightGate temperature', at property definition item 'Temperature', Axis Y-axis. Make sure that 'Is used' and 'Use tooltip' are checked. Click 'Save'.



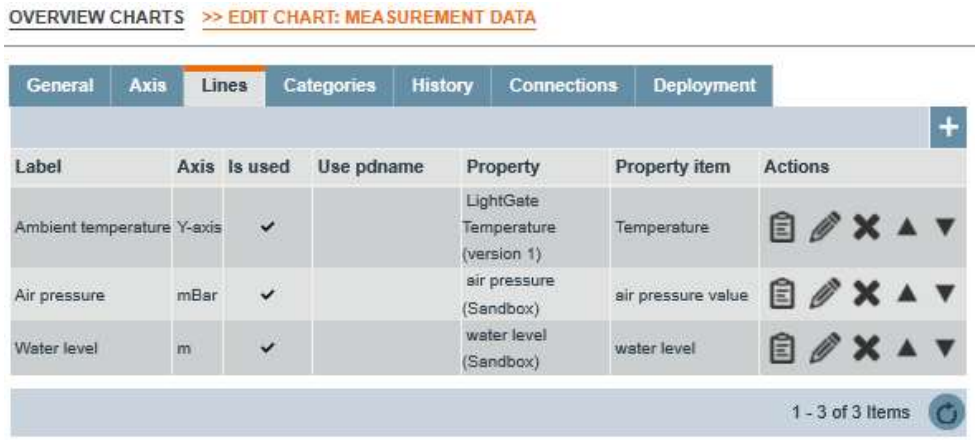
- Create another line. Label it 'air pressure', property definition 'air pressure', property definition item 'air pressure value'. Select at Axis 'mBar'. Click 'Save'.



- Also, create a line for the water level:



Het grid met lijnen ziet er nu zo uit:



8.2.6 Chart in Live

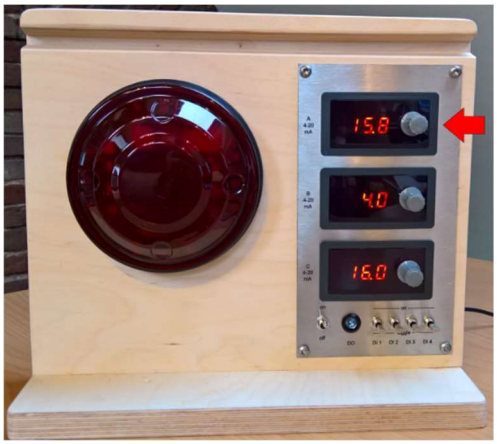
To be able to use this chart we have to perform following steps:

- Add the chart to the asset node ‘Sewer Well’, at the ‘Elements’ tab. (If no sandbox version of this asset is available make a new sandbox version using the ‘create sandbox’ button of the highest active version of this asset).

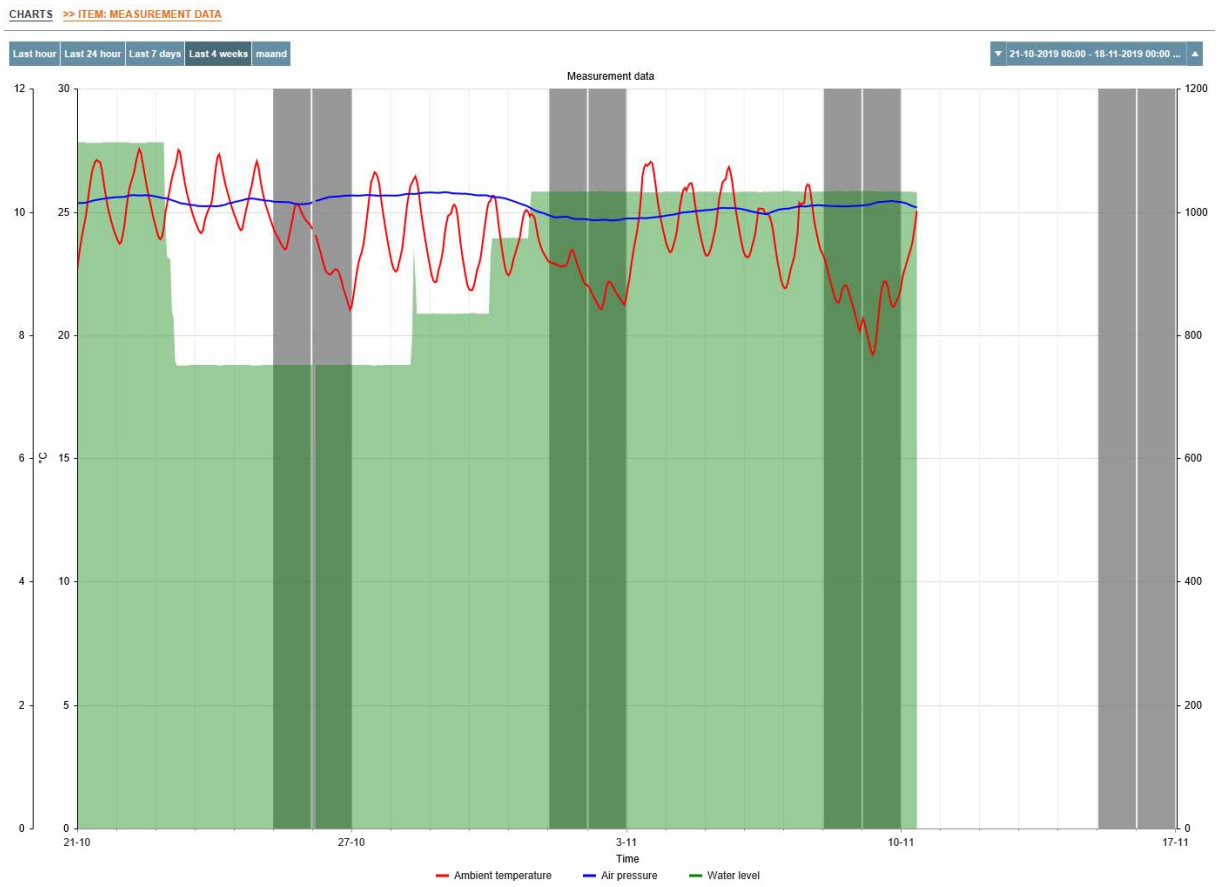
When adding the chart 'Measurement data' to the asset, a question will appear whether child-elements should also be copied. Select 'Yes'. Then the items that are used by the chart will also be copied to the asset. These items like the period selector or property definitions have to be present at the asset node or else the chart will not work.

- Promote the chart at the Deployment tab to state Active.
- Add chart to the asset 'Sewer Well'.
- Promote the asset node at the Deployment tab to state Active.
- Promote the hardware node at the Deployment tab to state Active.
- In Live, execute a synchronization of the asset and hardware nodes (at the menu item Revision management).

The water level is now adjustable using the upper knob of the test set up.



In Live we can see following chart:



8.3 Tables

Tables, like graphs, are used to display data.

In Avision, tables are set horizontally and vertically, based on:
- Nodes
- Property Definitions in combination with Adjustment
- Adjustment (none, average, number, maximum, minimum, sum, last measured value)
- TimeInterval (none, quarter hour, hour, day, week, month, quarter year, half year, year)

In Avision seven types of tables are available:

1. Node Overview
2. Data Export
3. Property Definitions overview
4. Periode Operation overview
5. Matrix
6. Node Period Overview
7. Node Operation Overview

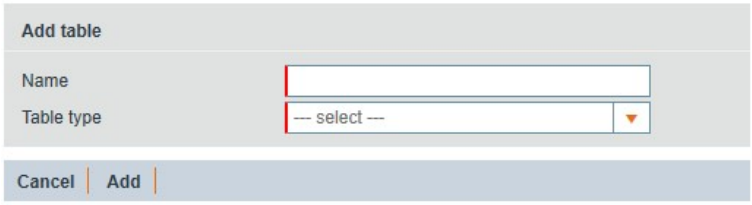
The following table is useful in determining the type of table to use:

Data output based on :: horizontal(columns) / vertical(rows)

Data basis	Nodes	Property	Adjustment	Time Interval	
1: PARENT	1	1	0	0	Nodes / Property definition in combination with Adjustment
2: 1 Node(set)	0	1	0	1	Property definition / Time interval
3: 1 Node(set)	0	1	1	0	Property definition / Adjustment
4: 1 Node(set)+1 Property definition	0	0	1	1	Adjustment / Time interval
5: 1 Node(set)+1 Property definition	0	0	0	1	Time interval / Time interval
6: 1 Property definition	1	0	0	1	Nodes / Time interval
7: 1 Property definition	1	0	1	0	Nodes / Adjustment

8.3.1 Creating a Table Definition

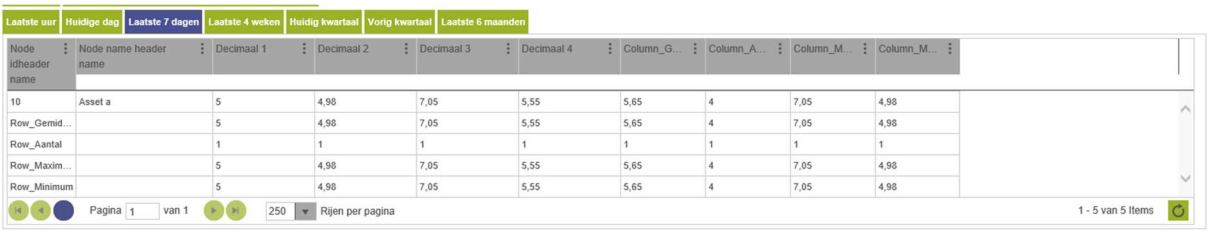
A new table can be created from the Tables Overview screen (if you have the right rights). The ' + ' button at the top right of the grid starts the tables append screen:



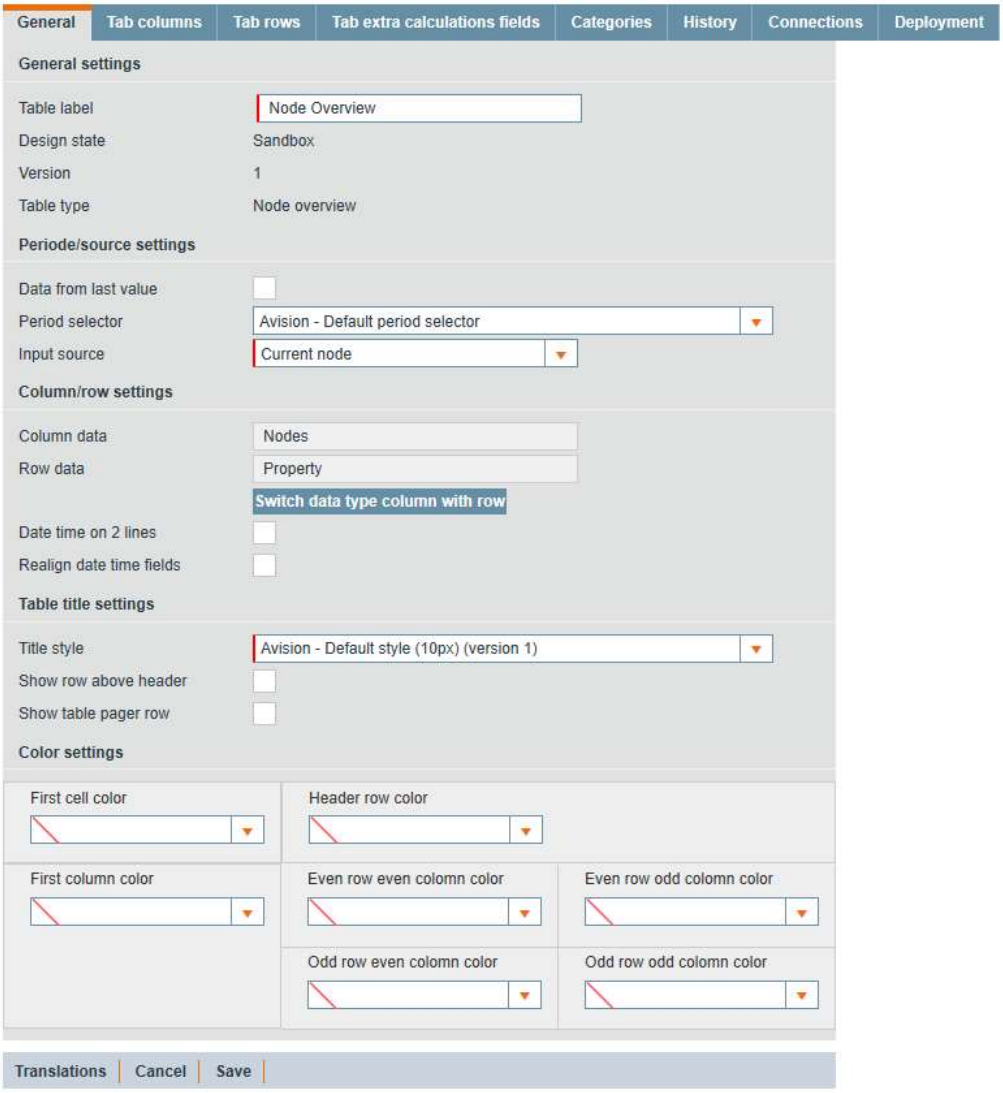
Enter the name here, choose the table type and click on ' Add '. **Please Note:** Table type cannot be changed after the table has been created.

8.3.2 Table Type 1: Node Overview

The node summary table provides an overview of node (s) with number of set attributes. The data in the cells has been retrieved through operation on the data.



8.3.2.1 Tab Algemeen



Data from last value: Check this box to indicate that the data is from the last value table or leave it unchecked when the data is to be retrieved by the chosen period selector.

Period selector: Select a period selector from the dropdown.

Input source: Select the nodes supplying the data. Options are: Current node, Current node down, Node picker and Filter.

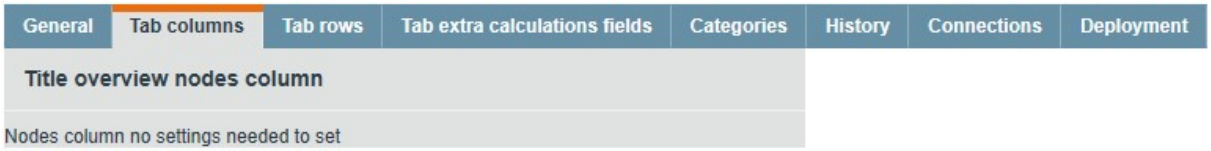
Swap data type column with row: This button swaps columns and lines. **Caution:** The settings for columns and lines will be swapped as well.

Date time on 2 lines: When checked will place dat and time on two separate lines.

Realign date time fields: If this option is checked, the data is aligned to date and time. This means that data with the same date and time will be on one line. There is only one column of date and time in the table, whereas if the option is unchecked, a separate date and time column is used for each data point.

Color settings: Here the user can choose colors for the table.

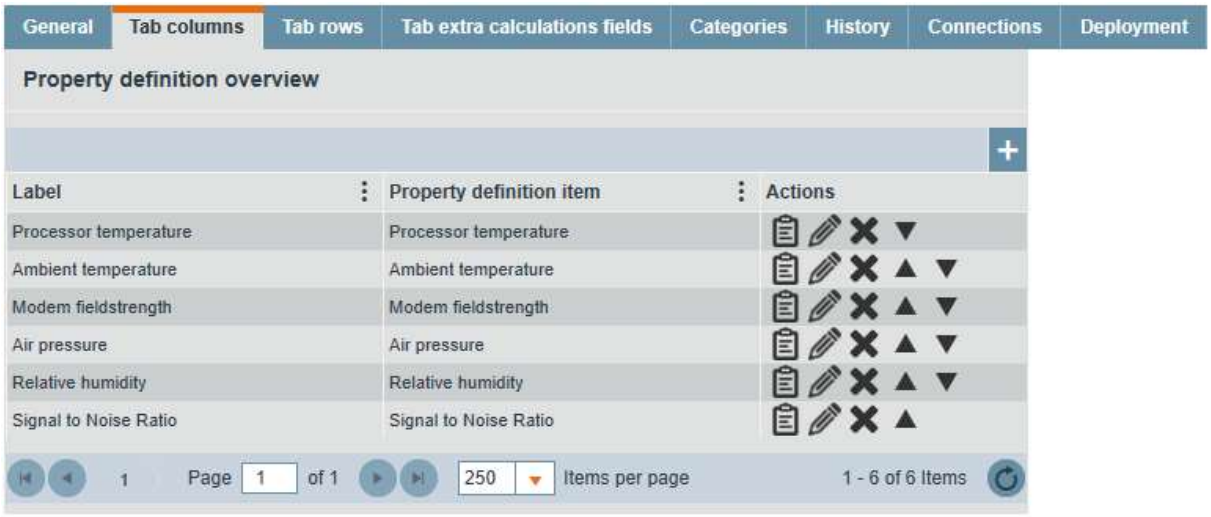
8.3.2.2 Columns Tab



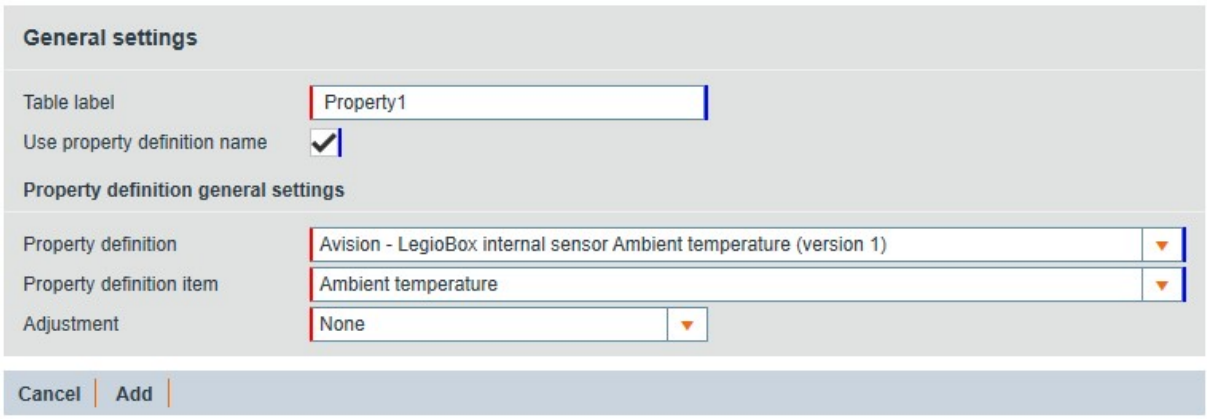
In This tab, columns can be added. If the column data is of type node, nothing can be set here. Which node(s) is(are) used depends on the setting of the field 'source' at the general Tab.

8.3.2.3 Rows Tab

Lines of type Property Definition can be added using the '+' button, top right on the grid.



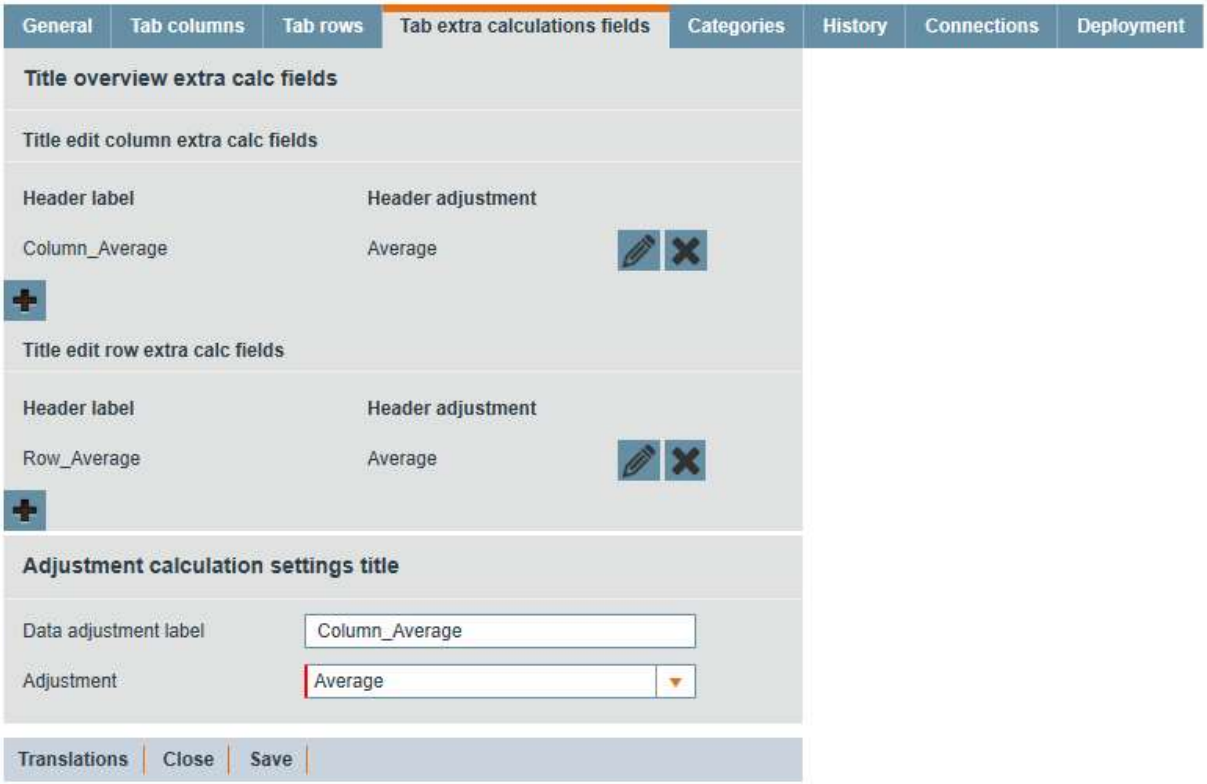
Above an overview of the already added property definitions. The settings can be viewed per line, edited, deleted and also the order can be changed using the arrows in the grid.



Adding a Property Definition to the table is possible using the screen above.

8.3.2.4 Extra Calculation Fields Tab

In this tab, users can add additional rows and/or columns in which, for example, Max, Min, Sum, or other calculations can be done on the preceding rows, or columns.



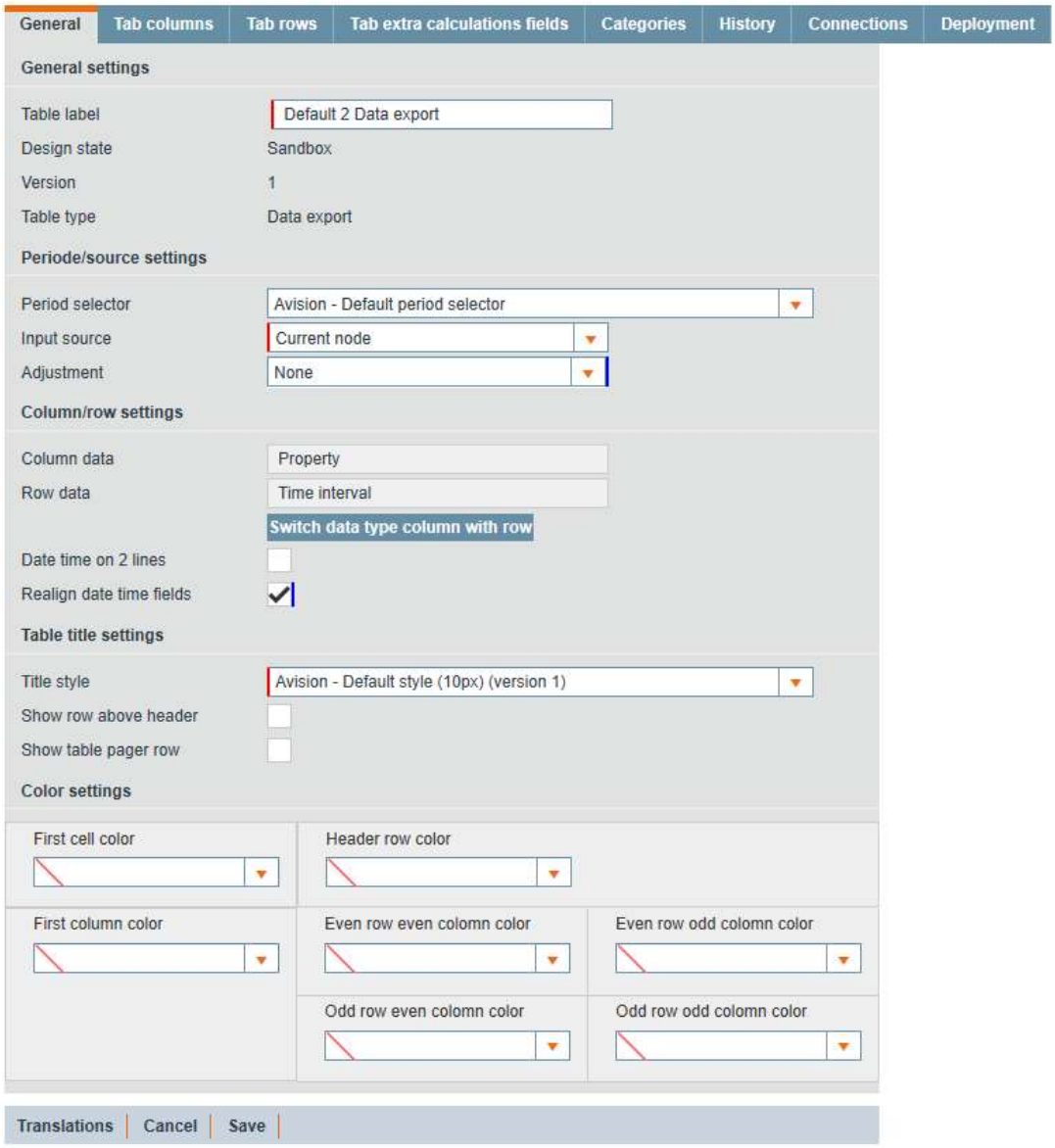
Use the '+' buttons to add columns or rows.

8.3.3 Table Type 2: Data Export

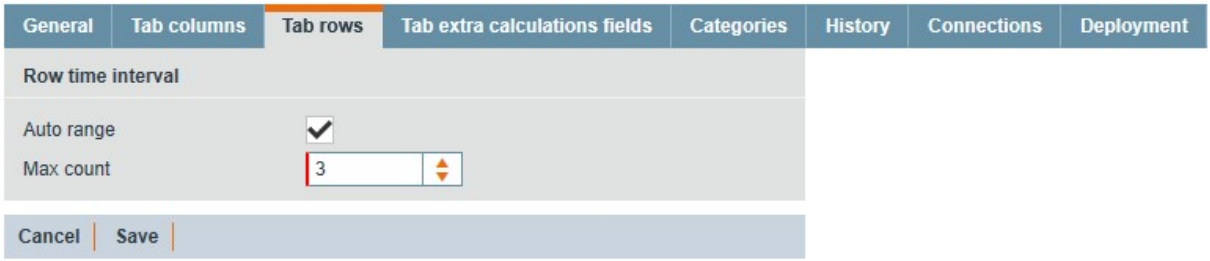
The Data export table is a table that shows multiple property values with time interval, of certain node(s).

Decimal		Decimal Property 1		Decimal Property 2		Decimal Property 3		Column_G...	Column_A...	Column_M...	Column_M...
1-2-2019 00:00:00	1,12	1-2-2019 00:00:00	8,54	1-2-2019 00:00:00	10,54	1-2-2019 00:00:00	5,55	6,44	7	10,54	1,12
1-2-2019 00:15:00	6,43	1-2-2019 00:15:00	9,57	1-2-2019 00:15:00	18,16	1-2-2019 00:15:00	5,34	9,88	7	18,16	5,34
1-2-2019 00:30:00	3,43	1-2-2019 00:30:00	9,54	1-2-2019 00:30:00	21,56	1-2-2019 00:30:00	3,09	9,41	7	21,56	3,09
1-2-2019 00:45:00	3,02	1-2-2019 00:45:00	9,65	1-2-2019 00:45:00	23,73	1-2-2019 00:45:00	1,03	9,36	7	23,73	1,03
1-2-2019 01:00:00	2,44	1-2-2019 01:00:00	8,23	1-2-2019 01:00:00	11,01	1-2-2019 01:00:00	0,95	5,66	7	11,01	0,95
1-2-2019 01:15:00	8,81	1-2-2019 01:15:00	7,40	1-2-2019 01:15:00	5,94	1-2-2019 01:15:00	3,61	6,44	7	8,81	3,61
1-2-2019 01:30:00	6,48	1-2-2019 01:30:00	8,57	1-2-2019 01:30:00	14,83	1-2-2019 01:30:00	0,47	7,59	7	14,83	0,47
1-2-2019 01:45:00	2,18	1-2-2019 01:45:00	6,39	1-2-2019 01:45:00	9,87	1-2-2019 01:45:00	9,03	6,87	7	9,87	2,18
1-2-2019 02:00:00	4,05	1-2-2019 02:00:00	2,59	1-2-2019 02:00:00	15,40	1-2-2019 02:00:00	1,14	5,8	7	15,4	1,14
1-2-2019 02:15:00	4,63	1-2-2019 02:15:00	8,95	1-2-2019 02:15:00	14,97	1-2-2019 02:15:00	9,04	9,4	7	14,97	4,63
1-2-2019 02:30:00	3,35	1-2-2019 02:30:00	6,37	1-2-2019 02:30:00	7,90	1-2-2019 02:30:00	2,97	5,15	7	7,9	2,97
1-2-2019 02:45:00	4,79	1-2-2019 02:45:00	8,69	1-2-2019 02:45:00	12,11	1-2-2019 02:45:00	1,87	6,87	7	12,11	1,87

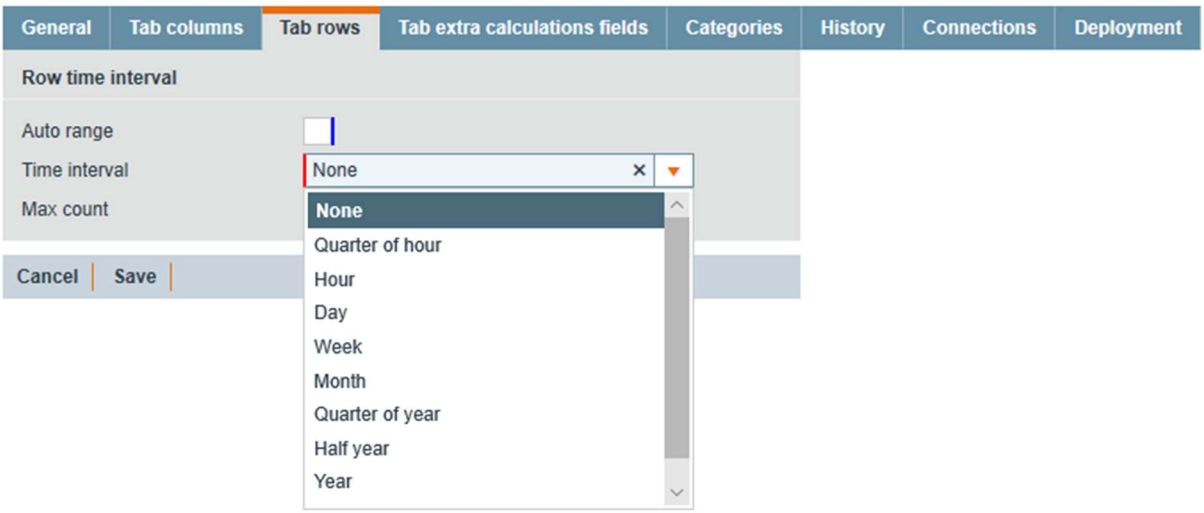
8.3.3.1 General Tab



Same as with x but now column/row set ups are between property definition and time interval. To change time interval settings go to the Rows Tab.



Auto range: When checked **auto range** is set for the time interval. When unchecked the time interval can be selected from a drop down list.

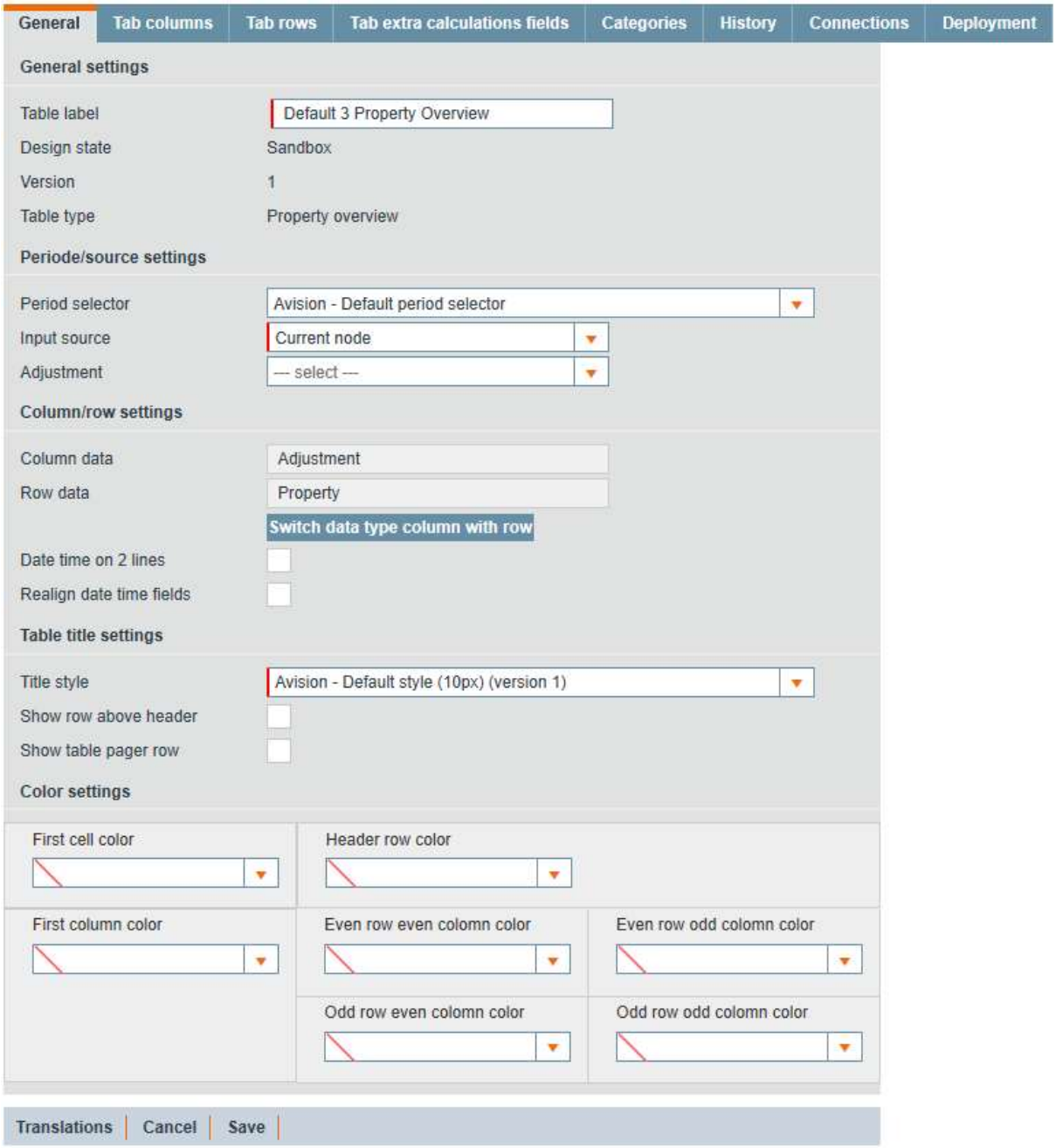


Max Count: Sets the maximum number of lines or rows in Live.

8.3.4 Table Type 3: Property Definitions Overview

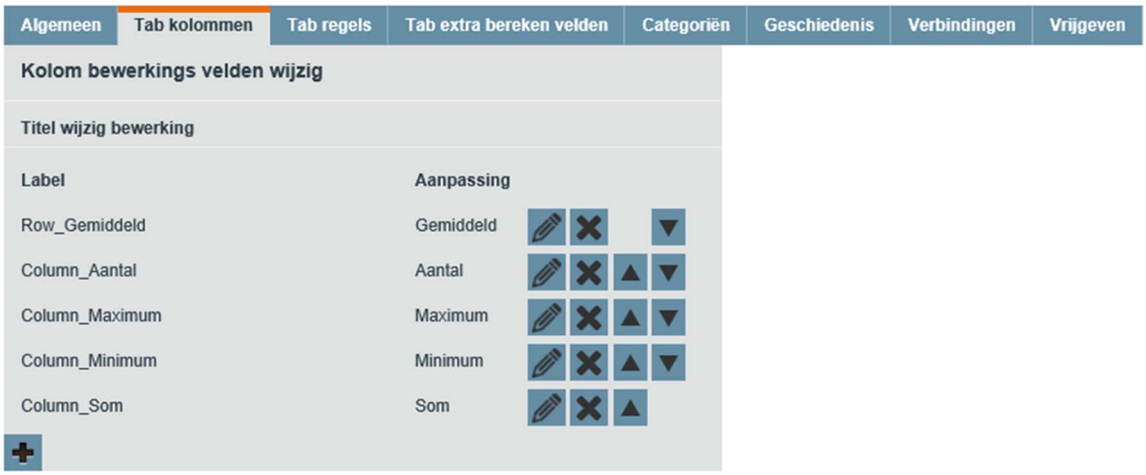
This is a table in which an operation in a column or line is performed on the data of one or more nodes, per property definition item.

8.3.4.1 General Tab



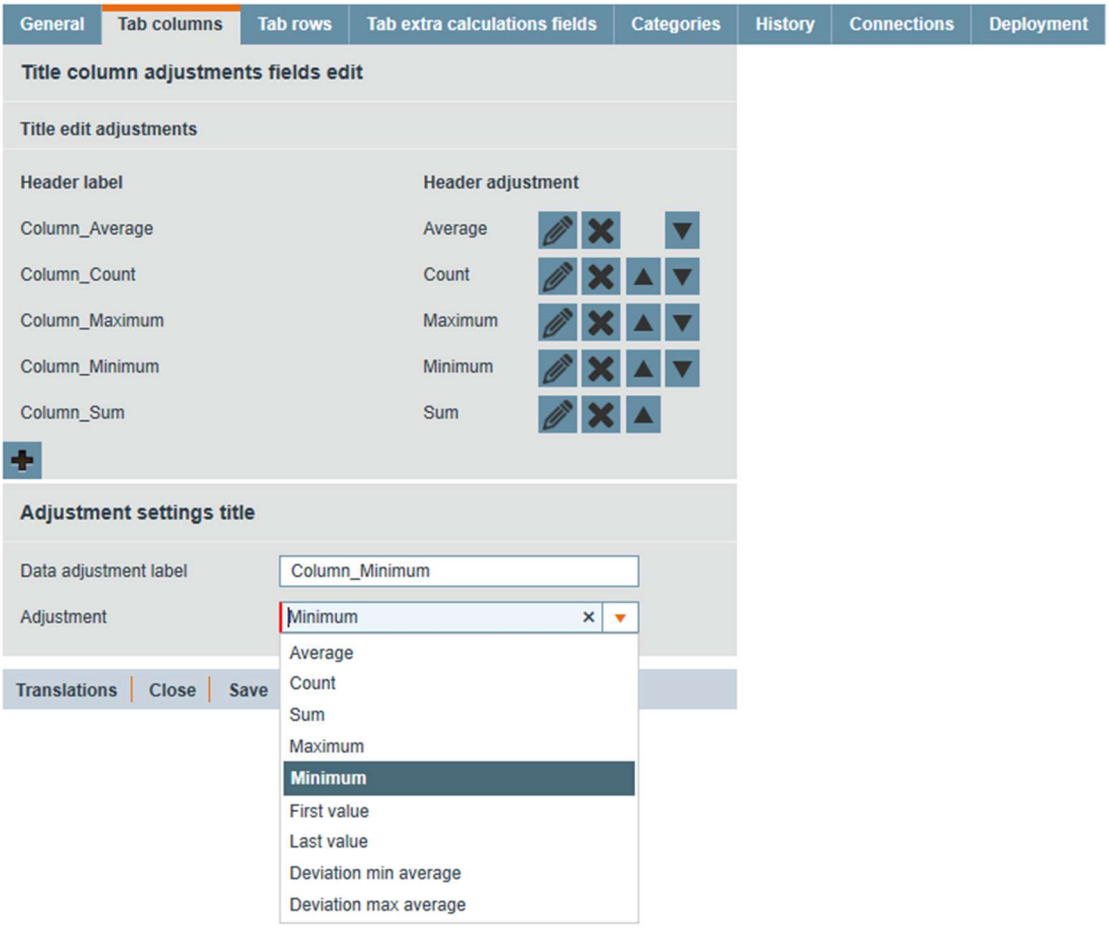
Same as with x but now column/row set ups are between operation and property definition.
To change operation settings go to the Rows tab.

8.3.4.2 Columns Tab



Using the '+'-knop new adjustments can be added.

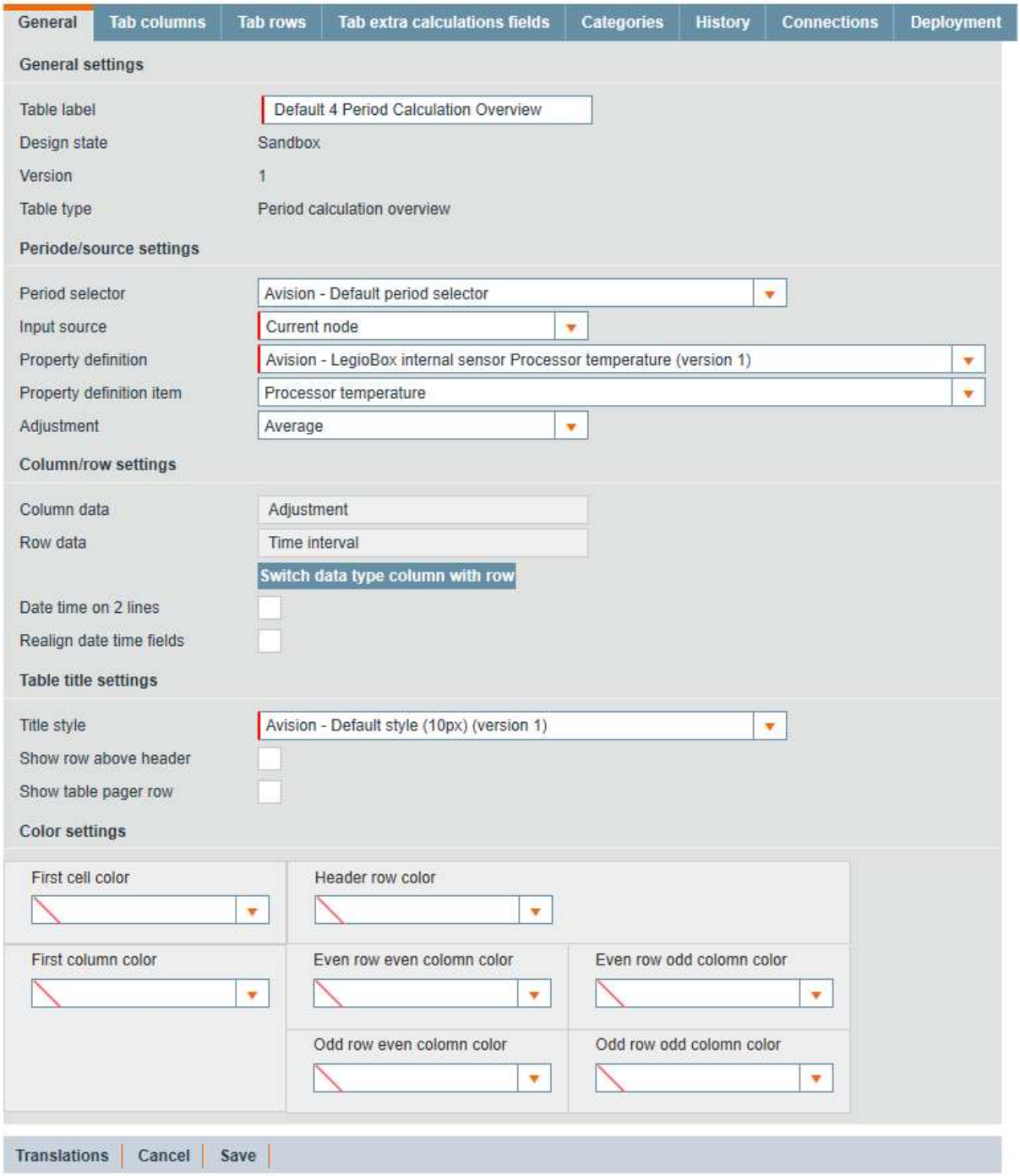
When adding a new adjustment, the next operation is automatically selected.



8.3.5 Table Type 4: Periodical Adjustment Overview

Of a single property definition, data (and adjustments of that data) over a certain time interval is displayed.

8.3.5.1 General Tab



Property definition: Select the Property definition.

Property definition item: Select the property definition item.

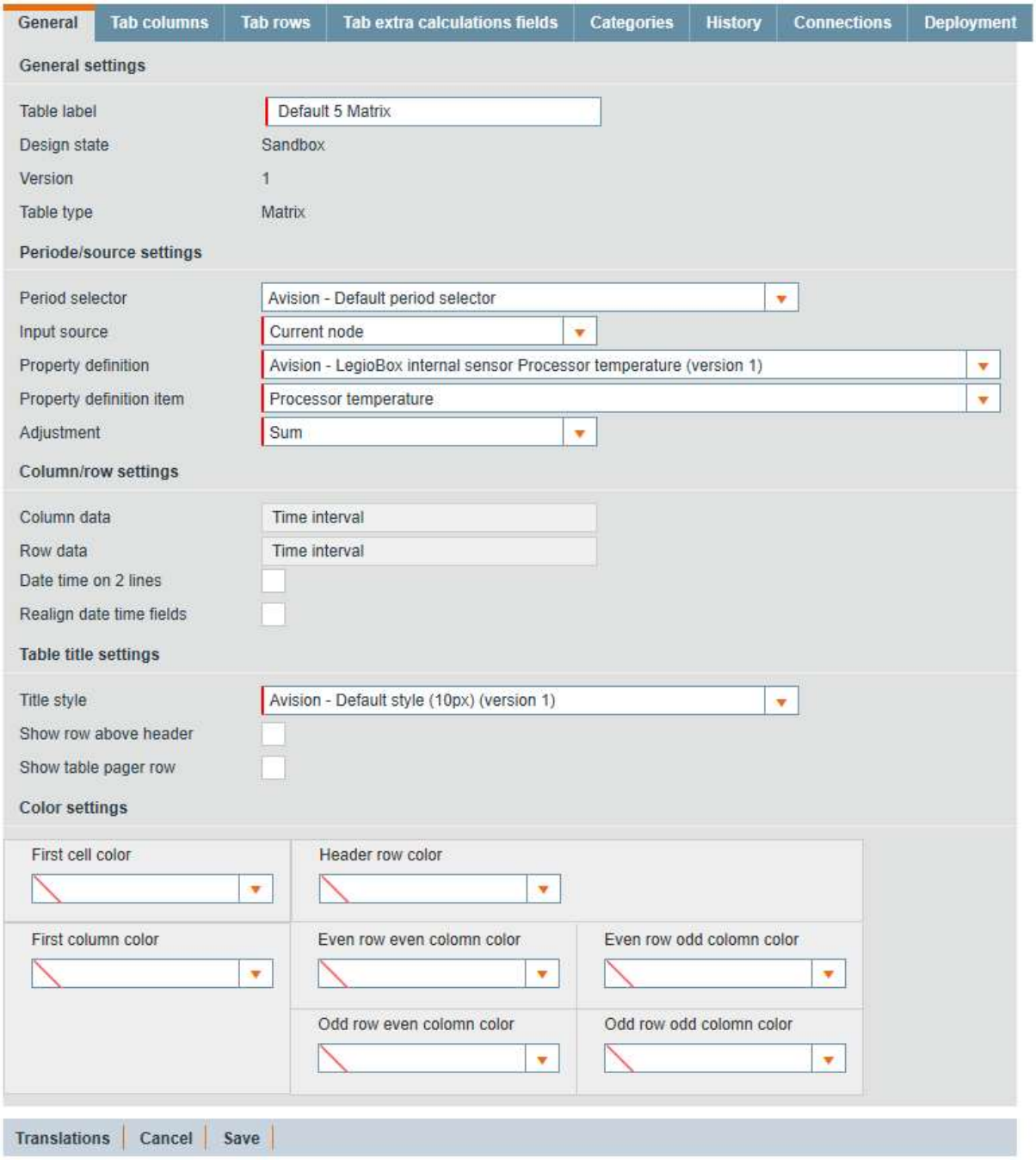
Adjustment: The adjustment that is performed on the data of the given property definition.

8.3.6 Table Type 5: Matrix

This is a table where, using one design, one property definition can be chosen on which the adjustment is done, with a small time interval and a big time interval.

Time interval header name	00:00 - 00:15	00:15 - 00:30	00:30 - 00:45	00:45 - 01:00
1-2-2019 00:00 - 01:00	1,12	6,43	3,43	3,02
1-2-2019 01:00 - 02:00	2,44	8,81	6,48	2,18
1-2-2019 02:00 - 03:00	4,05	4,63	3,35	4,79
1-2-2019 03:00 - 04:00	4,90	4,95	5,09	4,81
1-2-2019 04:00 - 05:00	7,56	7,15	6,64	5,13
1-2-2019 05:00 - 06:00	3,54	6,15	5,77	2,99

8.3.6.1 General Tab



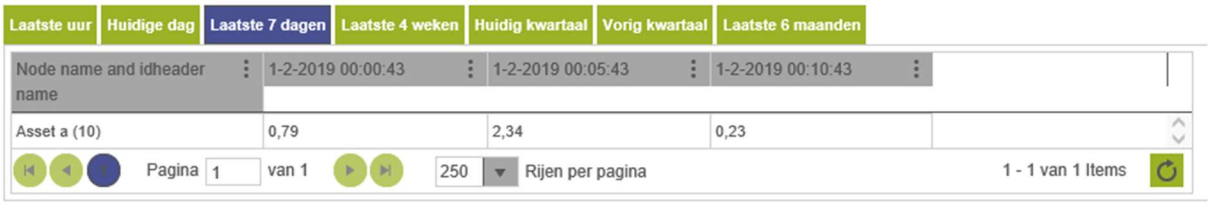
Property definition: Select property definition.

Property definition item: Select property definition item.

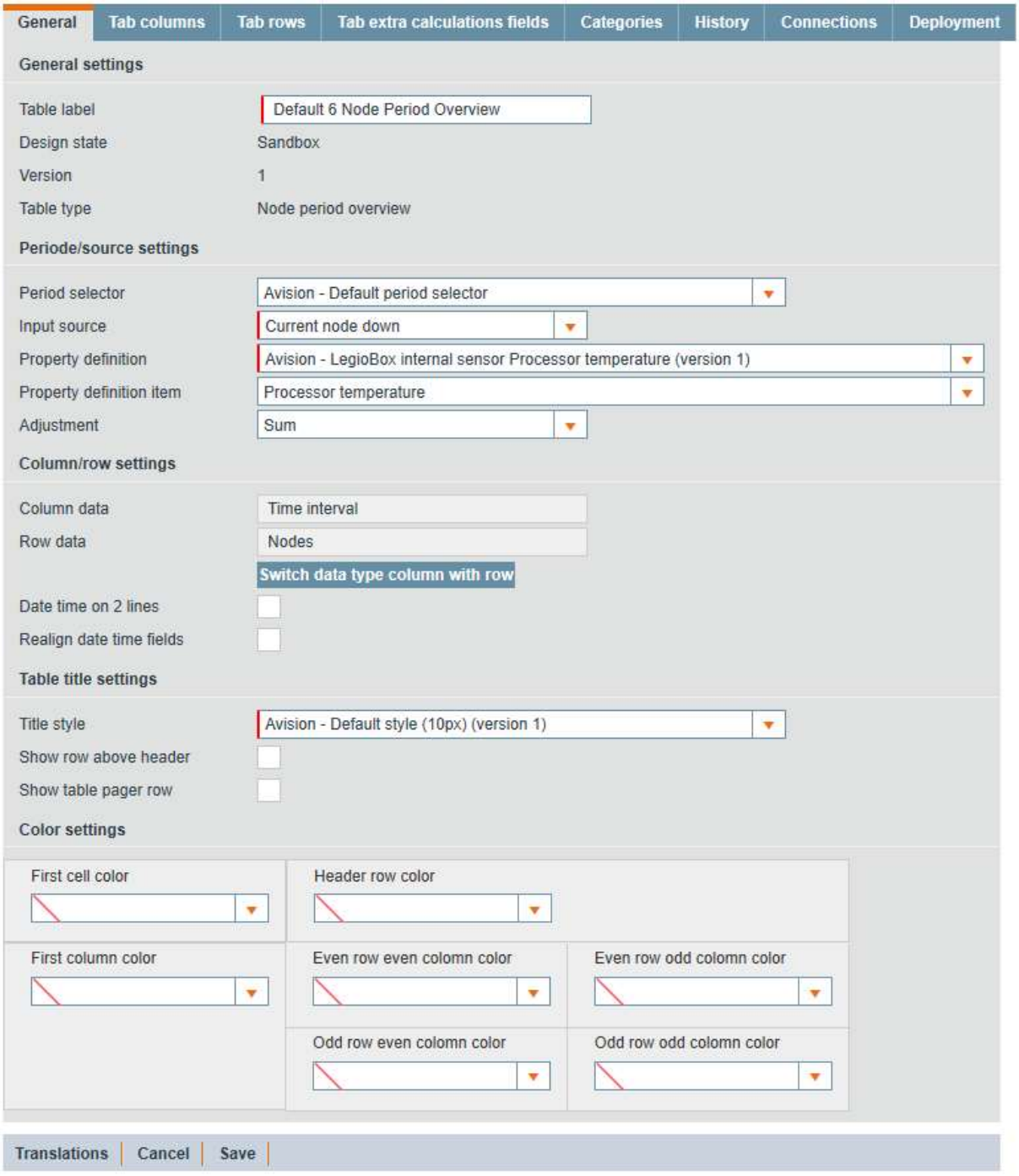
Adjustment: The adjustment that is performed on the data of the given property definition.

8.3.7 Table Type 6: Node Period Overview

Table with one property definition on which the adjustment is done, per node and time interval.



8.3.7.1 Tab Algemeen



Property definition: Select property definition.

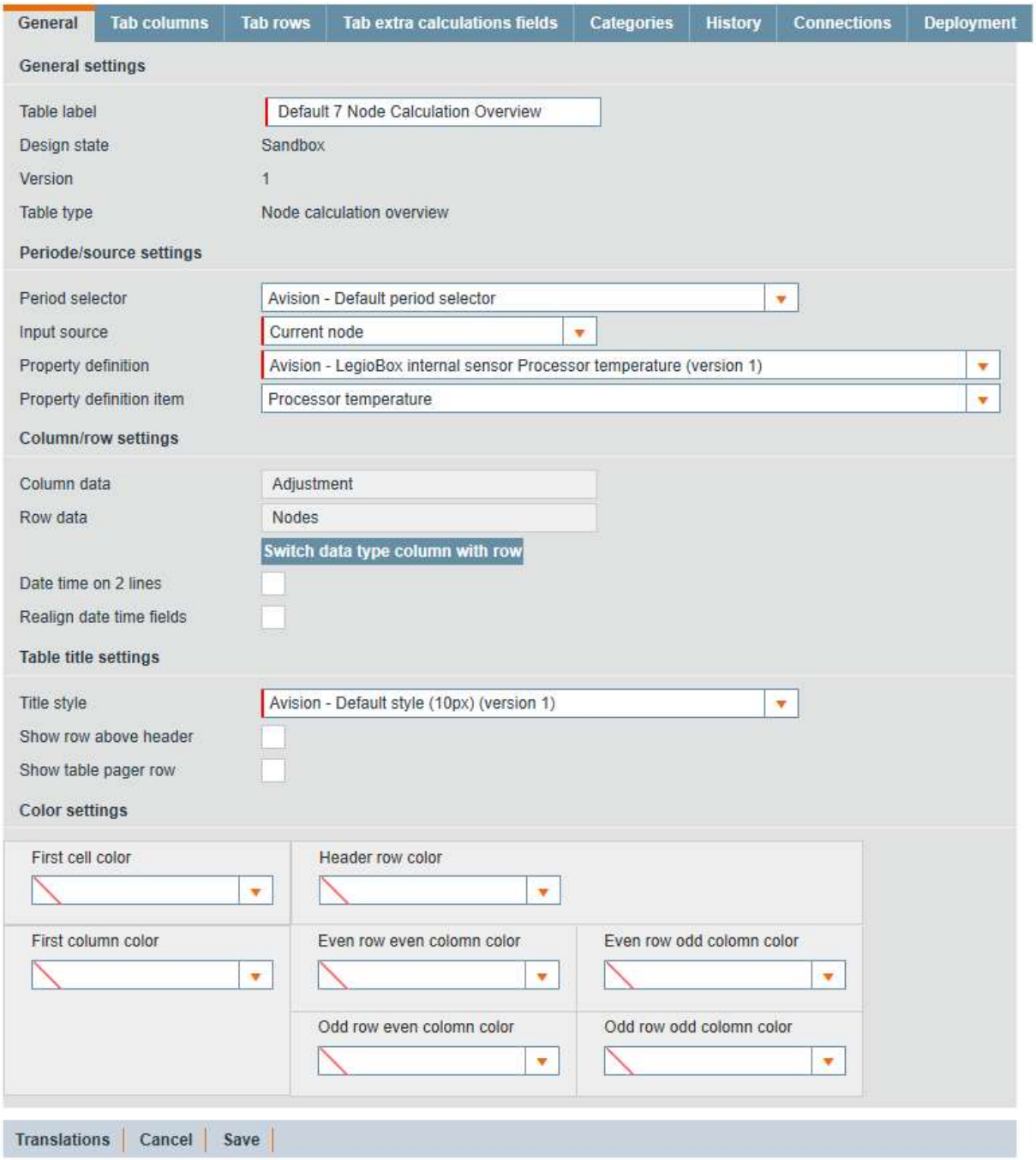
Property definition item: Select property definition item.

Adjustment: The adjustment that is performed on the data of the given property definition.

8.3.8 Table Type 7: Node Calculation Overview

Table where one property definition is selected on which an adjustment is performed, per node over a period selected in the period selector.

8.3.8.1 General Tab



Property definition: Select property definition.

Property definition item: Select property definition item.

8.4 Gauges

Gauges can be created as part of a Monitor screen or a report. Gauges come in two shapes, round (like the speedometer in a car) or linear.

8.4.1 Creating Gauges in Design

In Design we first create the gauge. In the menu, at 'Visual elements', click on Gauges to go to the Gauges module. Click on the '+'-button, top right on the grid. Enter the name for the gauge and click the 'Save' button.

8.4.2 General Tab

Following fields are shown at the General Tab:

General

- Gauge label: Name of the gauge.
- Design state
- Version
- Gauge type: Radial (round gauge) or Linear.
- Period selector: Select a period selector
- Adjustment: Select the adjustment to determine the value to show. This field is only shown when the period selector is used.

Highlighting

- Show title: Check this if the gauge should have a title.
- Title style: Select a style for the title.
- Title equals name: The title of the gauge equals the label/name of the gauge by default. If the title should be something else then uncheck this field. A field named 'Gauge title' will appear where an alternative text can be entered.
- Start angle: Angle where the gauge starts (only for radial gauges).
- End angle: Angle where the gauge stops (only for radial gauges).
- Auto range: The range of the gauge is determined by the ranges set at the property definition item.
- From/To: The ranges of the gauge. Is only shown when the auto range field is unchecked.

Labels

- Show labels: indicate whether labels should be shown at the gauge's scale.
- Label style: Select the style to be used for the labels at the scale.
- Label position: Two options, inside or outside the scale.

Ticks

- Show major ticks: Check this when the major ticks should be shown on the scale.
- Major ticks: Interval of the major ticks on the scale. The number entered indicates the step size/distance between the markings.
- Major ticks width: The width of a major tick in pixels.
- Major ticks height: Length of the major ticks in pixels.
- Show minor ticks: Check this if the minor ticks should be shown on the scale.
- Minor ticks: Interval of the minor ticks on the scale. The number entered indicates the step size/distance between the markings.
- Minor ticks width: The width of a minor tick in pixels.
- Minor ticks height: Length of the minor ticks in pixels.

Colors

- Color high limit: Color of the zone above high.
- Color pre high limit: Color of the zone between pre high and high.
- Normal color: Color of the zone between pre low and pre high.
- Color pre low limit: Color of the zone between low and pre low.
- Color low limit: Color of the zone below low.

Legend

- Use factor: Check this to use a factor to decrease the numbers.
- Factor: The factor used. Only shown when 'Use factor' is checked.
- Show legend: Show a legend for the gauge.
- Legend up: Pixels from the top.
- Legend left: Pixels from the left.
- Legend style: Style used for text in the legend.
- Icon: Icon at the gauge.
- Legend text: Text to be shown at the legend.

8.4.3 Creating a Pointer

To create a pointer on a gauge, we first select the gauge under the gauge module. After that, we select the Pointers tab and click on the ' + ' button in the top right corner of the grid. Enter the name of the pointer to create and click ' Save '.

8.4.4 Pointer

In the pointer layer following fields can be edited:

General

- Label: Name of the pointer.
- Is used: Check this when the pointer is in use, uncheck to disable it.
- Is primary: Check to indicate this is the primary pointer from which the range will be determined.
- Use property definition name: uncheck this to use the label name.
- Property definition and Property definition item: Select the datapoint to be used for the pointer.
- Color: The color of the pointer.

8.4.5 Gauge on a Screen

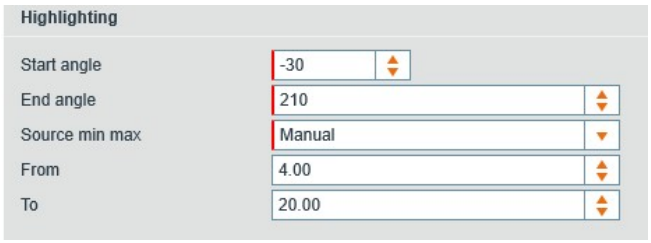
Do-it-yourself block where you create a gauge on a screen of the asset 'Sewer Well'.

- Create a new Gauge by clicking the '+'-button top right on the grid

General tab

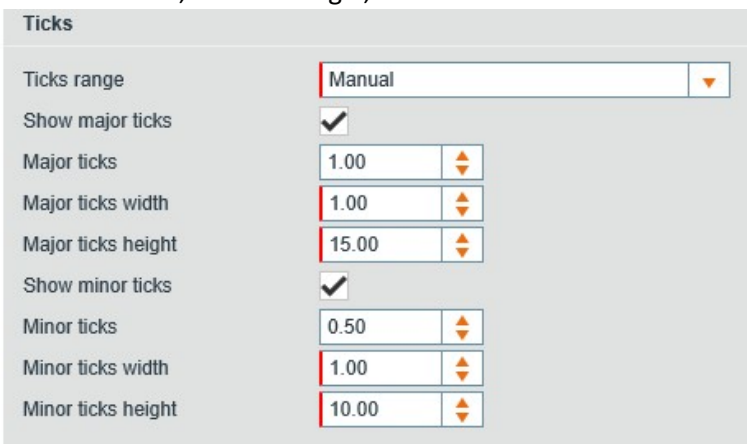
- Set gauge label to 'Water Level', type 'Radial'

- At Highlighting, uncheck Autorange, set range from 4.0 to 20.0

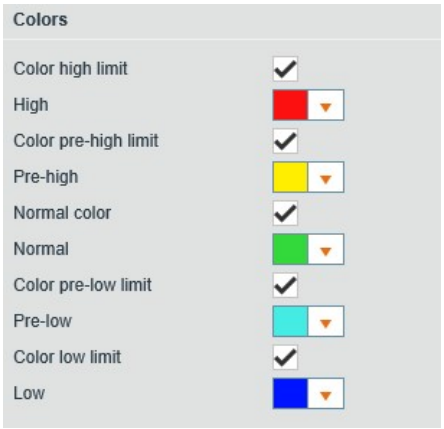


- Set Label position to 'Outside'

- Interval scale 1, small scaling 0,5



- Select colors. (For the values where the zones begin the limits of the property definitions are used).

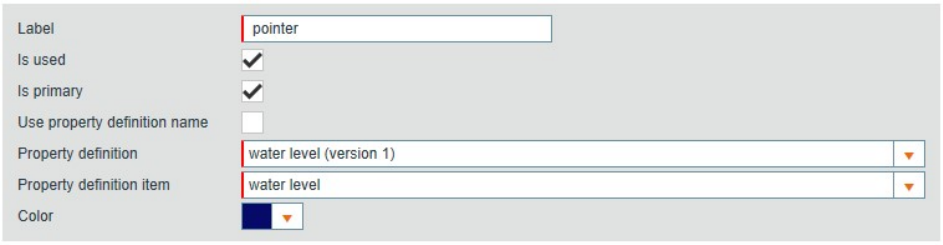


- Click 'Save'

Pointers tab

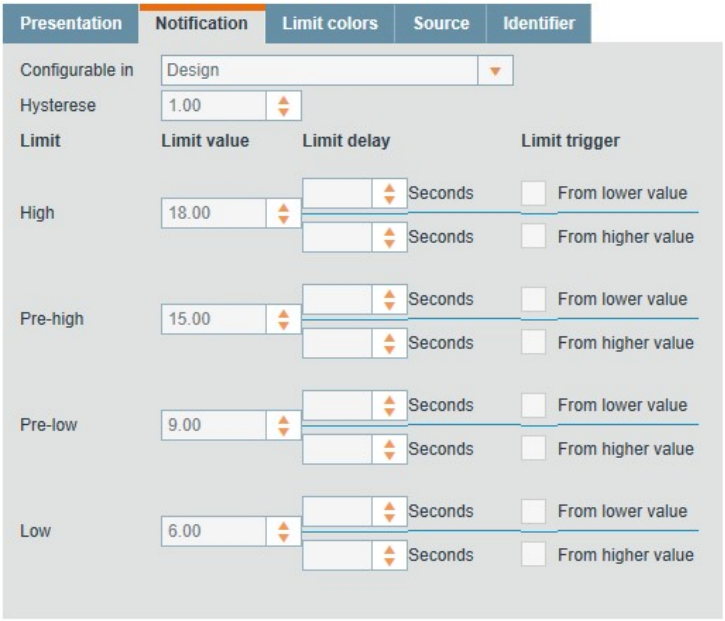
- Create a pointer by clicking the '+'-button

- Select property definition, color of the pointer



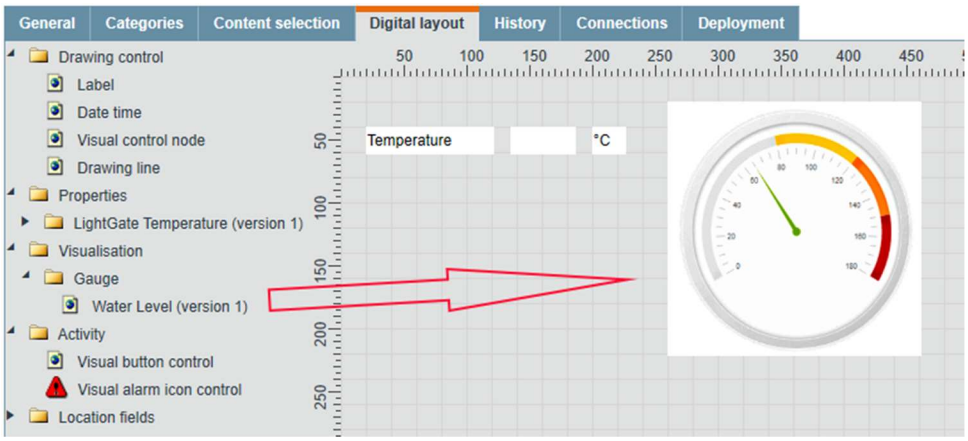
Property Definition waterlevel

- Add limits at the notification tab



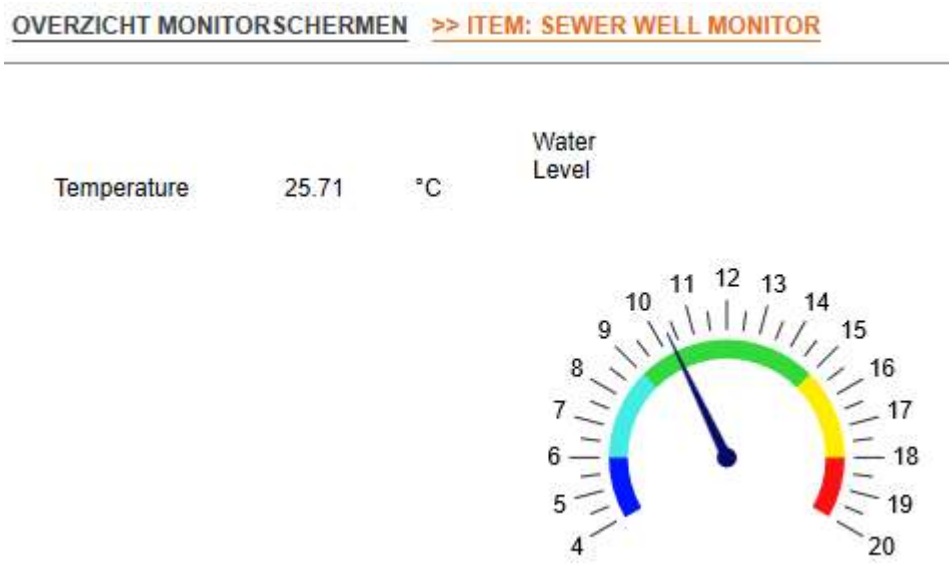
Section Status

- Add gauge at 'Content selection'.
- At 'Digital Layout' tab drag and drop the gauge on the canvas.



- Update the Screen, Asset node etc.
- Synchronizing in Live

This will give show following monitor screen in Live:



8.5 Alarm Screens

An alarm screen shows which alarms have occurred in your application. The Alarm screen can be used to take action if a parameter gets a value outside a margin of set values. An Alarm can be accepted by an operator indicating that the problem is being addressed and when the problem has been solved, the alarm can be reported as ‘ready’.

Hint: In chapter x an alarm is created that is raised when on the test unit when switch D1 is set.

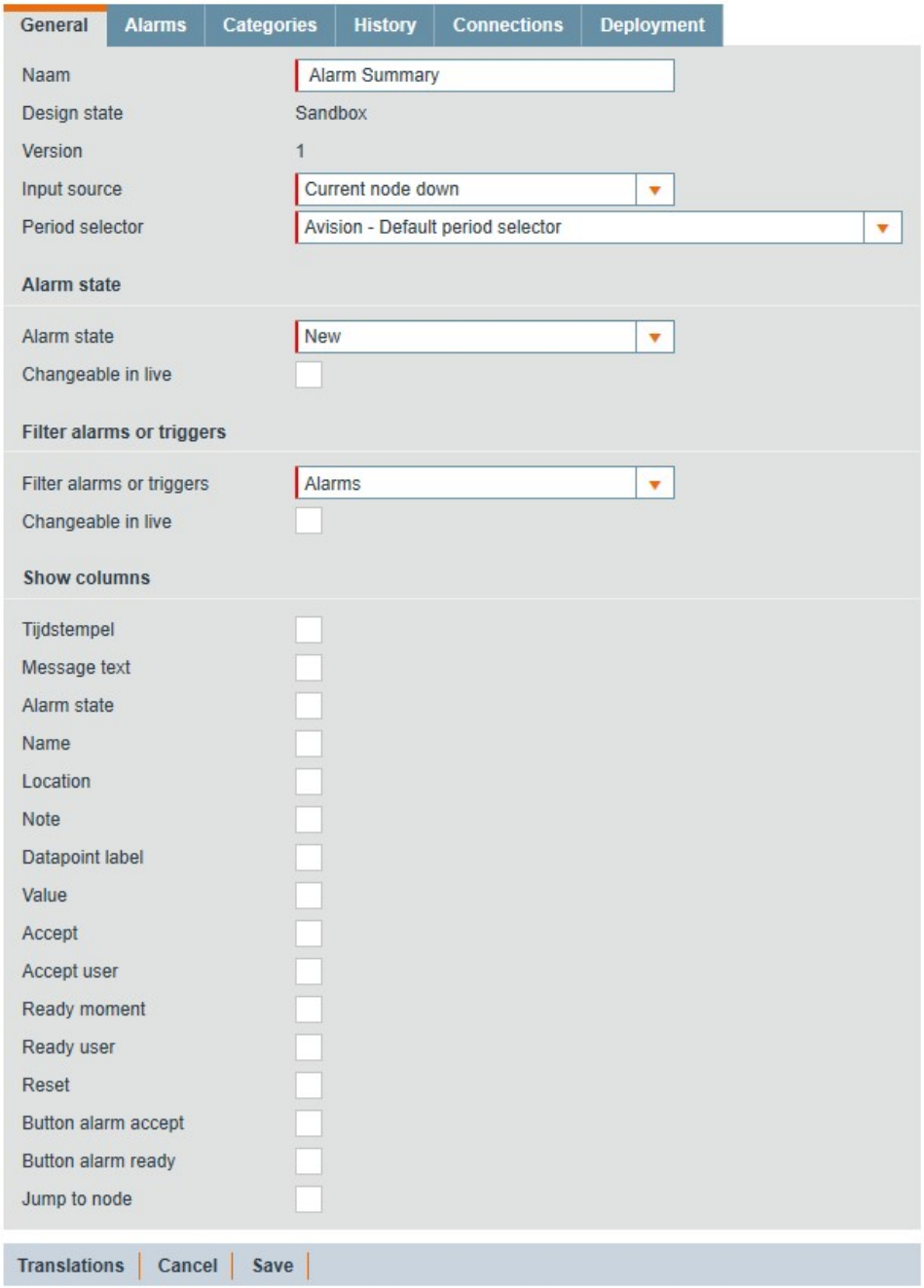
By default there should be an inherited alarm screen available.

8.5.1 Creating an Alarm Screen

In Design, select the root node and then open the Menu. At ‘Visual elements’, click on ‘Alarm screens’, the grid showing existing Alarm Screens is presented.

We can create a new alarm screen in two ways: by clicking the '+' button on the top right of the grid or by making a copy of the inherited alarm screen. We choose a completely new alarm screen. We fill in the name in 'Alarm Summary' and click on 'Add'.

8.5.2 General tab



Input source
In this dropdown the node(s) from which data is used is(are) selected. There are four options:

- Current node: Only alarms on the current node are shown.
- Current node down: Alarms from the current node and lower nodes are shown.
- Nodepicker : Alarms are shown from those nodes that are selected using a node picker. (A dropdown will be shown to select a node picker).
- Filter : All alarms are shown of those nodes that remain after a filter action (A dropdown will be shown in which the filter can be selected).

Period selector
A period selector must be chosen here. With the period selector, in Live, only those alarms that occurred within the specified time period will be shown.

Filter state
Alarms can be filtered by state. In a drop down ‘All alarms’ or one of the four possible statuses that an alarm can have can be selected: new, accepted, ready or reset.

Attention: This is a level filter, meaning that when the filter is set to ‘Accepted’ all alarms equal to or below this level will be shown, so also the New alarms.

Configurable in Live mode (state)
If checked, a user can choose a different state to filter in live. Otherwise, only alarms that have the status as defined in Design are shown.

Configurable in Live mode (Alarms/events) If checked, the user can choose live between alarms or events.

Show Columns
Here you can indicate which columns and buttons should be available in Live. Two columns are about buttons; the alarm accept and the alarm ready button. There is also the possible to have a button that allows to jump to the node where the alarm occurred.

8.5.3 Alarms tab
Left-right screen that allows you to set which alarms to display. If the right column is empty, all alarms will be displayed.

8.5.4 Categories tab
Left-right screen to indicate which categories this alarm screen can be used for. If there is no category in the right column, this alarm screen applies to all categories.

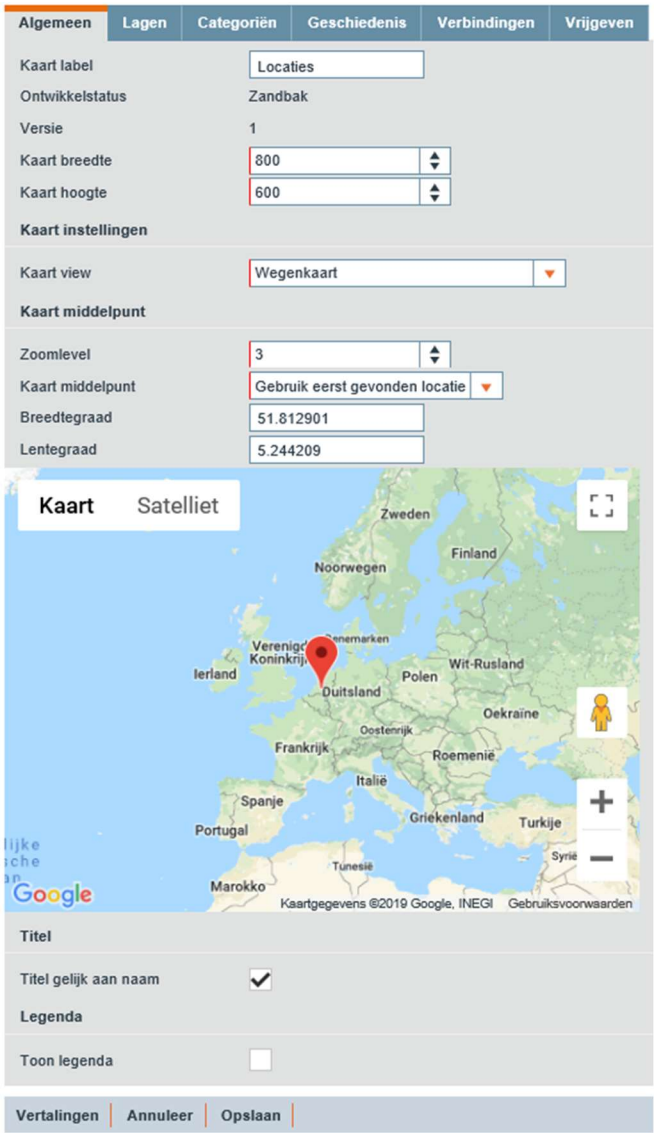
8.6 Maps

Cards can be made for standalone use or as part of a Monitor screen or a report.

8.6.1 Creating a Map in Design

In Design we first create a map: In the menu at 'Visual elements' click on ‘Maps’ to go to the map module. Click the ' + ' button at the top right of the grid. Enter the name of the map (e.g. 'Locations') and click 'Add'.

8.6.2 Algemeen tab



In the General tab following settings can be edited:

General

- Map label: Name of the map.
- Map width: Width of the map in pixels. Default is 800 pixels.
- Map height: Height of the map in pixels. Default is 600 pixels.

Title

- Title equals name: By default, the title of the map equals the name of the map. To change this uncheck this field and an extra entry field ‘Map title’ will appear.

Map settings

- Map view: Select the map view type, options are Roadmap, Satellite, Hybrid and Terrain.

Map center

Sets the center and zoom level of the initially loaded map.

- Fit: Check this to zoom to the level where all markers are visible in the map.
- Zoom level: Select the zoom level. (1: World, 5: Continent, 10: Town, 15: Street, 20: Buildings)
- Map center:
  1. Use the first found location. The coordinates of the first found location are used as the center of the map.
  2. Manual. The coordinates of the center of the map are entered manually. Either by clicking on the map or entering the latitude and longitude fields.
  3. Current node. The coordinates (location) of the selected node in the tree are used as center of the map.
- Latitude: Manually entered latitude of the center of the map.
- Longitude: Manually entered longitude of the center of the map.

8.6.3 Layers

To present information on a map layers are used. Using a layer, datapoints or pictures like building diagrams can be added to a map. Multiple layers can be made for a map.

Three layer types are available: node layer, image layer and line layer. After a layer is created, changing the layer type is not possible.

8.6.4 Creating a Node Layer

A node layer is used to present information coming from a node.

To create a node layer on a map, we first select the map under the maps module. After that, we select the Layers tab and click on the ' + ' button in the top right corner of the grid. Enter the name of the layer to create (e.g., ' Locations ') and choose Layer type for Node low and click ' Save '.

8.6.5 Node Layer

In the node layer following settings can be edited:

General

- Layer label: Name of the layer.
- Layer enabled: Will the layer be used in the map or not.
- Input source: Indicates which nodes are supplying the data. Options are: Current node, Current node down, Filter and Node picker.

Source coordinates

- Source coordinates: From node (The location information stored on the node are used)
- Use position from parent node: If checked, will look on a higher node when no location information is available on the node where the map is used.

Marker

- Marker type: Datapoint, Marker, Icon.
  - Marker : The standard marker is shown at the location.

- Datapoint : Info window is opened automatically (no need to click)
- Icon : Shows the selected icon or the node icon on the given location.

- Marker width: Width in pixels
- Marker height: Height in pixels
- Marker location: This option selects the anchor point of the marker. (Default value is 'Top center').

Settings available for Marker type: Datapoint

- Marker screen: Select the monitor screen used on the map at the location of the node.

Settings for Marker type: Marker

- Color: The color of the marker.
- Different color limits: Check this to select the datapoint to be used for marker limit colors and or select custom colors for the limits of the marker. This will present following fields:
    - 'Marker limits property definition' and 'Marker limits property definition item': Select the datapoint to use for the limits.
    - Color of property definition: Check this to use the colors of the property definition or uncheck this field to select custom colors.
    - Marker hh/h/normal/l/ll… limit color: Color for the limit zone.
- Different color alarm: When checked, the marker will have a different, custom color when there's an alarm active at the node or an alarm can be selected from a datapoint.
    - Marker alarm color: Color of the marker with an active alarm.

Settings for Marker type: Icon

- Use node icon: Use the icon of the node.
- Select icon: The icon to be shown instead of the default marker icon.
- Different icon limits: When checked different icons can be used if value is in limit zones
    - Icon limits property definition and Icon limits property definition item: Select the datapoint whose limits will be used.
    - Icon figure list: Select the list images/icons wanted. (A list as can be used to indicate a status based on a picture list, status object limits)
- Different alarm icon: When checked it is possible to select a different icon to show when an alarm occurs.
    - Select alarm icon

Alarm

- Alarm on node: When checked all alarms on the node are used.
- 'Alarm property definition' and 'Alarm property definition item': Select the datapoint to be used for alarms.

Cluster

- Cluster markers: Check this if you want to cluster markers on the map.
    - Select cluster icon: The icon to show for a cluster.
    - Select style: The style used for showing the number of markers in a cluster.

Summary

- Show summary: Check this if a summary should be presented when a marker is clicked.
  - Summary screen: Select the monitor screen to be shown in the summary popup when the marker is clicked.

8.6.6 Creating an Image Layer

An image layer can be used to show a picture on the map, e.g. a ground plan of a building. It is not node bound.

To create an image layer on a map, we first select the map under the maps module. After that, we select the Layers tab and click on the ' + ' button in the top right corner of the grid. Enter the name of the layer to create (e.g., 'Map Ground Level') in layer type for image, choose Layer and click ' Save '

8.6.7 Image layer

In the Image Layer following settings can be edited:

General

- Layer label: Name of the layer.
- Layer enabled: Layer is used or not.

Figure

- Select figure: Choose figure to show from the list of available figures.
- Transparency: The opacity of the image.

Map

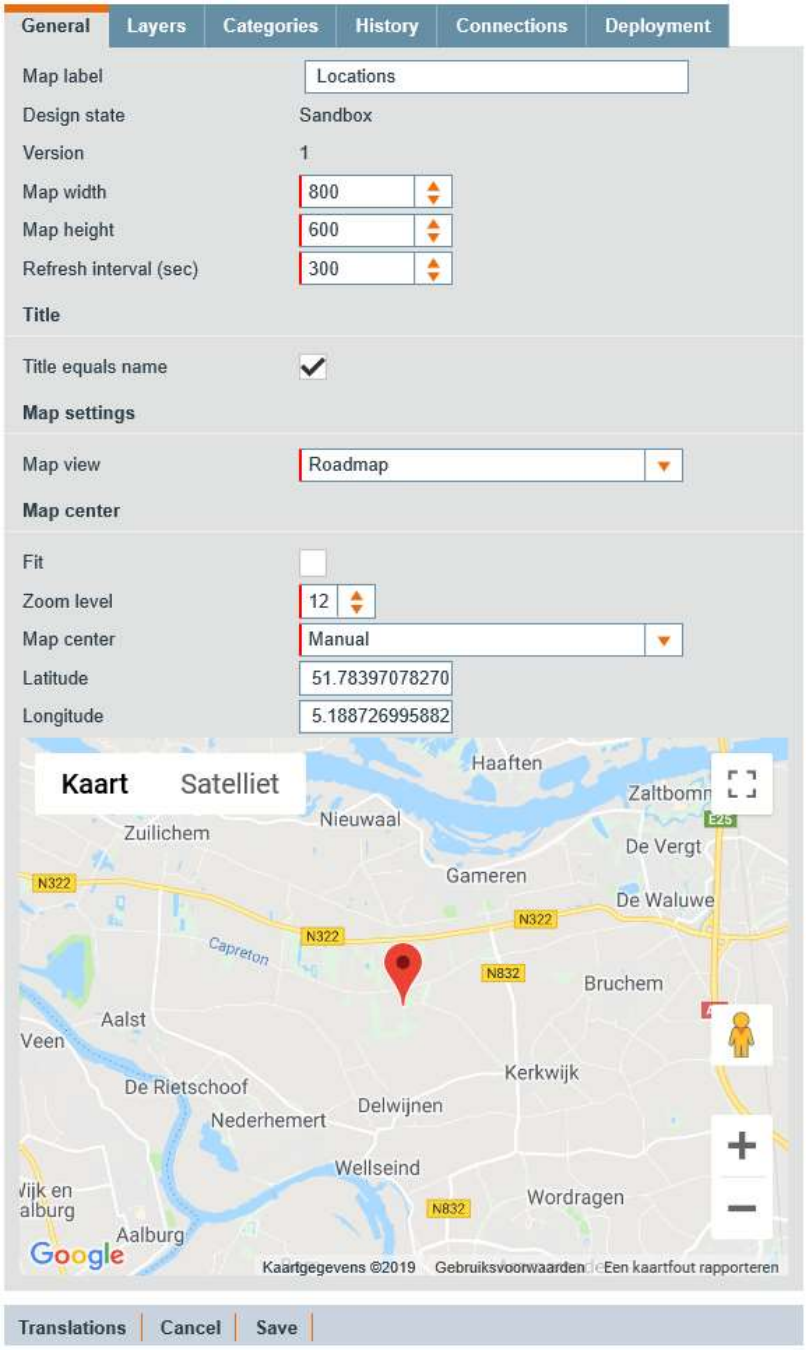
- South west latitude: Latitude of the south west corner of the figure.
- South west longitude: Longitude of the south west corner of the figure.
- Set south west corner: After clicking this button the south west corner of the picture can be selected.
- North east latitude: Latitude of the north east corner of the figure.
- Noord west longitude: Longitude north east corner of the figure.
- Set north east corner: After clicking this button the north east corner of the picture can be selected.

Do-it-yourself block where a map is created which shows all sewer wells of one customer.

8.6.8 Create Layer for Sewer Wells

We assume that the location is already populated for the node RP market. See chapter 18.

- Create a map. In this example we use following settings:



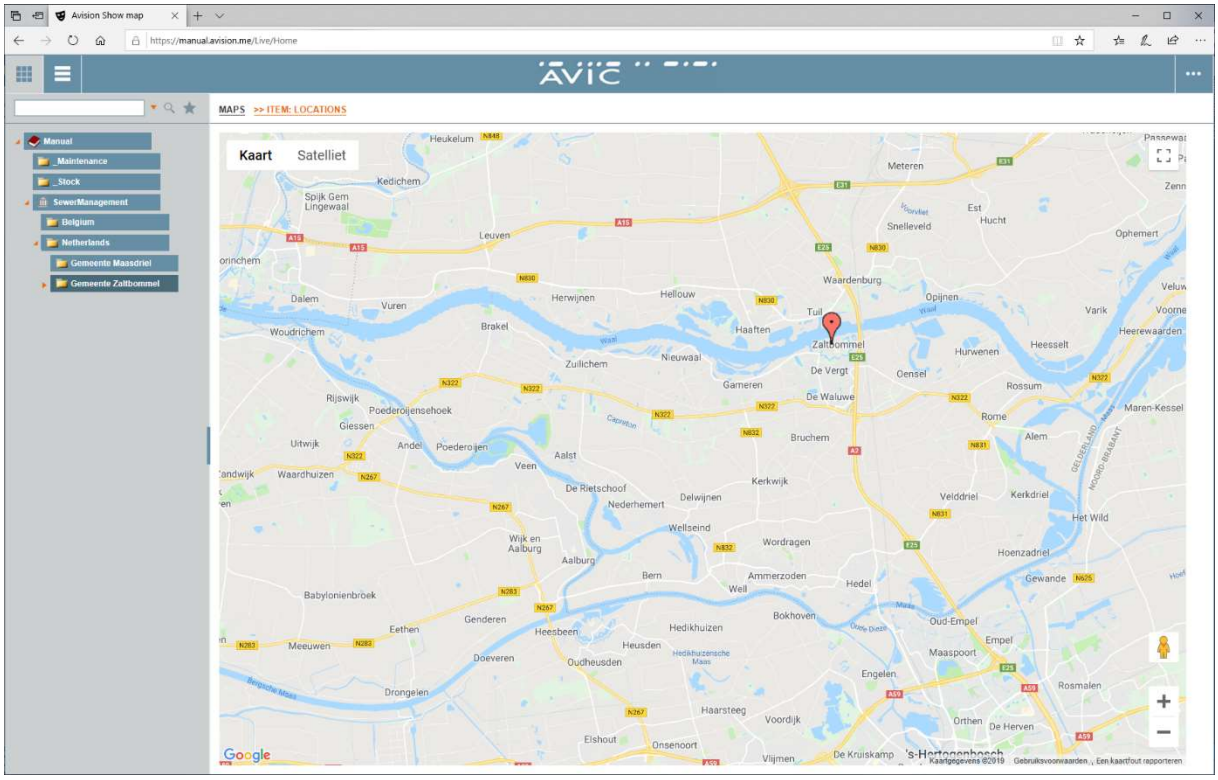
- Go to the Layers tab of this map
- Click the '+'-button
- Enter at 'Layer name': 'Sewer wells', select Layer type 'Node layer', click 'Save'
- Set 'Input source' to 'Current node down'
- Click the 'Save' button

8.6.9 Coupling the Map to the Structure Node 'Client'

- Create a new version of the Client node
- At the tab 'Elements' add the Map 'Locations'
- At the tab 'Menu buttons' set 'Start module' to the module 'Maps', click 'Save'
- In the module tree drag the module Maps to the right hand column (if not already present)

Deploy the new Client node and, in Live, synchronize.

When in Live we click on the Client node of the municipality of Zaltbommel we will see the map with a marker indicating the sewer well at the market place:



Remark: All customers/clients (municipalities) in this example use the same map. But the location data of the Assets is different for each Asset node. In practice, with multiple Assets being used, checking the option 'Fit' of the 'Map center' block of the map is probably a better option. Then the best focal point is automatically chosen by municipality. However, since there is only one asset (with location data) in our example, if 'Fit' is checked the map module would zoom in very deep, unsuitable for this example.

Now to rub things off we need to give proper access rights to the employees of the municipality that should be able to see the map with sewer wells. If you created in chapter x a user with, among other roles, the role 'Sewer monitoring', then at this moment this user will be presented the message 'Sorry, you have no rights' when clicking the node 'Gemeente Zaltbommel'. Anybody with the role 'Sewer monitoring' should be able to see the map. We realize this using a role:

- In Design, in the menu, go to 'User elements' – 'Roles'.
- Click the 'pencil icon' of 'Sewer monitor'.
- Set the checkmark at the show option at Maps:

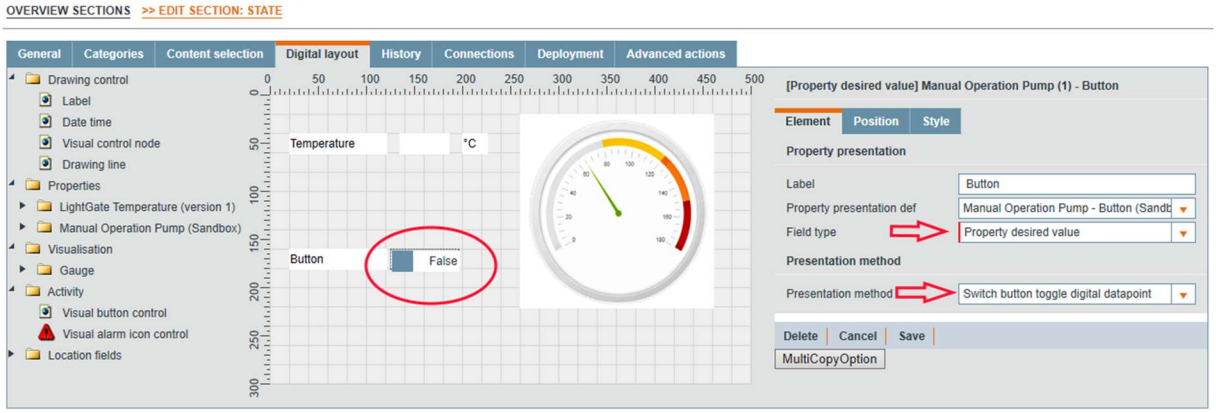
  Maps ☑ Toon
- Click 'Save'

8.7 Sections

8.7.1 Special Controls

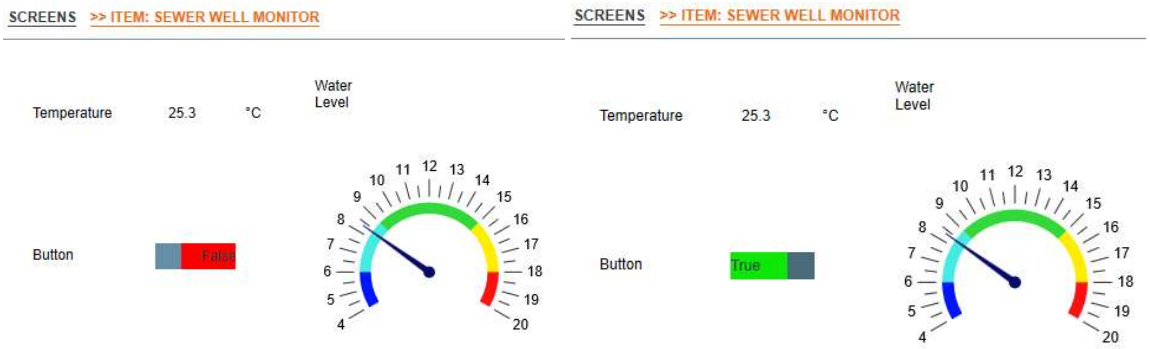
8.7.1.1 Switch button

The switch button is a presentation of a digital value.



To quickly see the state of the switch, the background color will change according to the state the switch is in. The colors are taken from the settings of the property definition item, tab 'Limit colors':

In Live this is the result:



8.8 Screens

8.9 Forms

Forms are used to store information entered by a user in Avision. The user can be supported on his input by measuring values, graphs or tables that are shown in the form.

The input of a form is processed in Avision as measured values and that information can be used again in a graph or report.

Filling out a form is usually not a standalone action, but part of a Workflow in the form of a task.

A form consists of one or more sections, possibly placed across multiple tabs.

When creating a form, the following steps must be followed:

- Create Property definitions
- Create Sections
- Create a Form
- Add the Sections to the Form and arrange them

When it concerns a stand-alone Form:

- Add the Form to a node where it will be used

When the form is part of a Workflow:

- Add the Form to a Task
- Add the Task to a Workflow
- Add the Workflow to a node where it will be used

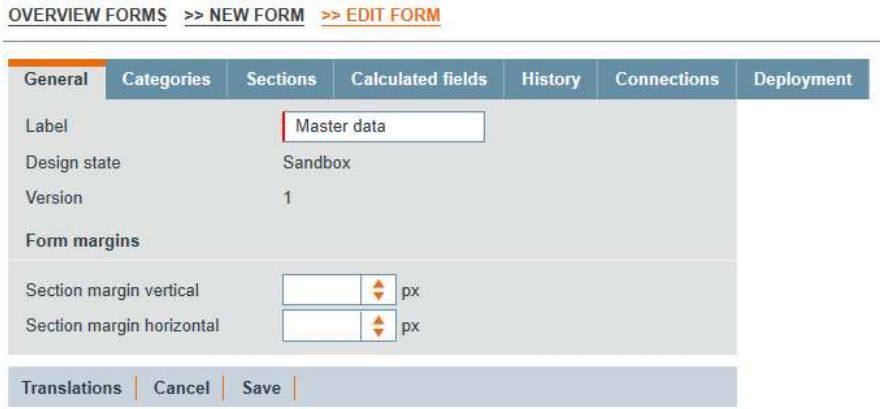
8.9.1 Creating a Form in Design

In Design, at the Root-node, go in the Menu to 'Visual elements' – 'Forms'. A grid is presented with the present Forms.

- Click the '+'-button, top right of the grid
- Name the Form 'Master data'
- Click 'Add'

The form is created.

8.9.2 General tab



If a margin is desired, it can be filled in here.

8.9.3 Categories tab

Left-right screen to indicate which categories this form can be used for. If there is no category in the right column, this form applies to all categories.

8.9.4 Sections tab

In This tab, we can add the sections necessary for the form and indicate their position.

In the left list, ' available ', are the sections from which we can choose. This column contains only sections of the 'form & report' type.

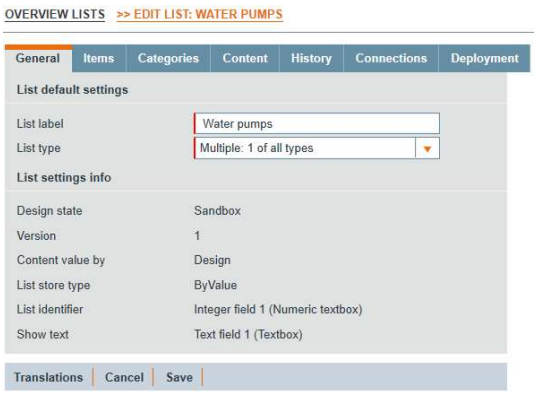
The right list, 'added ', has a tree structure. Above this tree there are three buttons: ' Edit ', ' Add ' and ' Form preview '. The Add button can be used to create tabs that may include sections. The edit button can be used to customize the name of a tab. ' Form preview ' shows how the form will look in Live.

Do-it-yourself block in which a form is made for entering master data

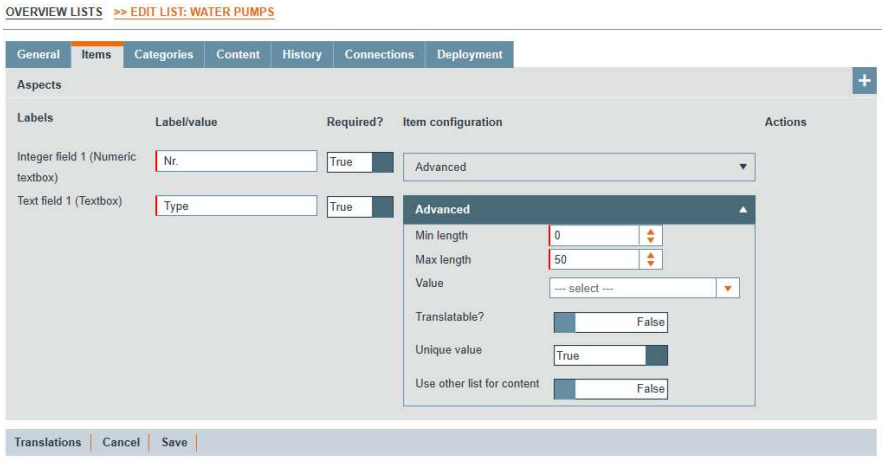
8.9.4.1 Make a List with Water Pump Types

We first make a list of possible pump types. We need these in the property definition.

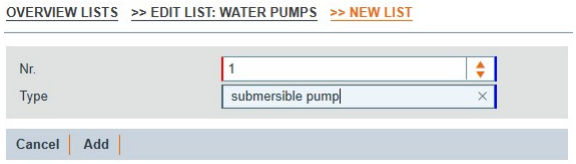
- In the Menu go to 'Basic elements' –'Lists'
- Click the '+'-button top right on the grid
- Name the list 'Water pumps'
- Type: 'Multiple: 1 of all types'
- Design/Live : Design
- List store type: 'By value'
- List identifier: 'Integer field 1' (use the integer field of the type as value of the selected item of the list)
- Lijst show text: 'Text field 1' (use the text field of the type to show as item in the list)
- Click 'Add'



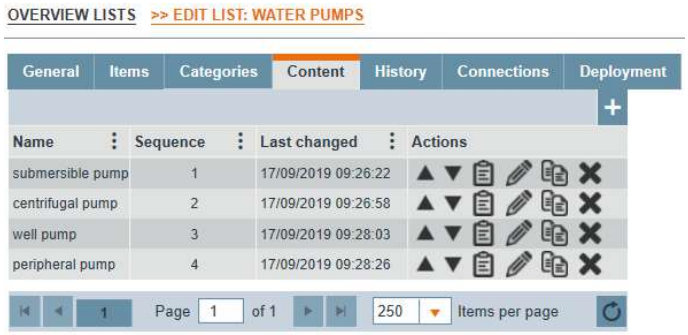
At the items tab, at 'Integer field 1' enter 'Nr.' and at the field 'Text field 1' enter 'Type'. At 'Advanced' set Unique value to 'True'. This makes sure that there are no duplicate names in the list. (At Integer field this is automatically set to 'True' because this is the ID field).



After creating the list we have to fill the list with items that can be chosen. We do this in the ' Content tab ':

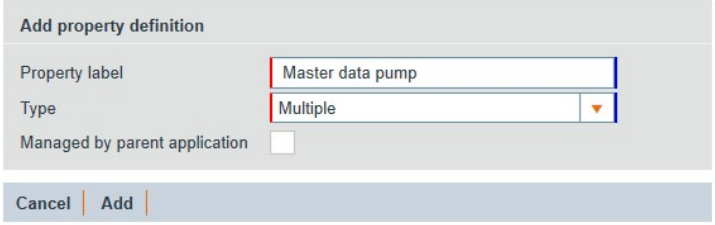


In this way, create four list items: submersible pump (Nr. 1), centrifugal pump (Nr. 2), well pump (Nr.3) and peripheral pump (Nr. 4). The Content tab should look similar to this:



8.9.4.2 Creating a Property Definition for Master Data

- In the Menu, go to ‘Basic elements’, ‘Property definitions’
- Click the ‘+’-button top right on the grid
- Name the property definition ‘Master data pump’
- Set Type to : ‘Multiple’
- Leave ‘Managed by parent application’ unchecked
- Click ‘Add’



- In compact form the items of the property definition:

Type	Label	Content	Unit
String (Text datapoint samples)	- Enable label - Name : Brand - Translate	- Enable input field	
String (Text datapoint samples)	- Enable label - Name : Model - Translate	- Enable input field	
Integer (Word/state datapoint samples)	- Enable label - Name : Type - Translate	- Enable input field - Content from list - Presentation object type: select Kendo_ComboBox - List definition id : select Water pumps	
Float (Analog datapoint samples)	- Enable label - Name : Power - Translate	- Enable input field - Digits : 1	- Enable unit field - Unit : kW
Float (Analog datapoint samples)	- Enable label - Name: Length - Translate	- Enable input field - Digits : 1	- Enable unit field - Unit: cm
Float (Analog datapoint samples)	- Enable label - Name: Width - Translate	- Enable input field - Digits : 1	- Enable unit field - Unit: cm
Float (Analog datapoint samples)	- Enable label - Name: Height - Translate	- Enable input field - Digits : 1	- Enable unit field - Unit: cm
Float (Analog datapoint samples)	- Enable label - Name: Capacity Max. - Translate	- Enable input field - Digits : 2	- Enable unit field - Unit: m^3/h
Float (Analog datapoint samples)	- Enable label - Name: Capacity Min. - Translate	- Enable input field - Digits : 2	- Enable unit field - Unit: m^3/h
Float (Analog datapoint samples)	- Enable label - Name: Weight - Translate	- Enable input field - Digits : 1	- Enable unit field - Unit: kg

8.9.4.3 Create Section

A form can consist of multiple sections. In this example, we use one section.

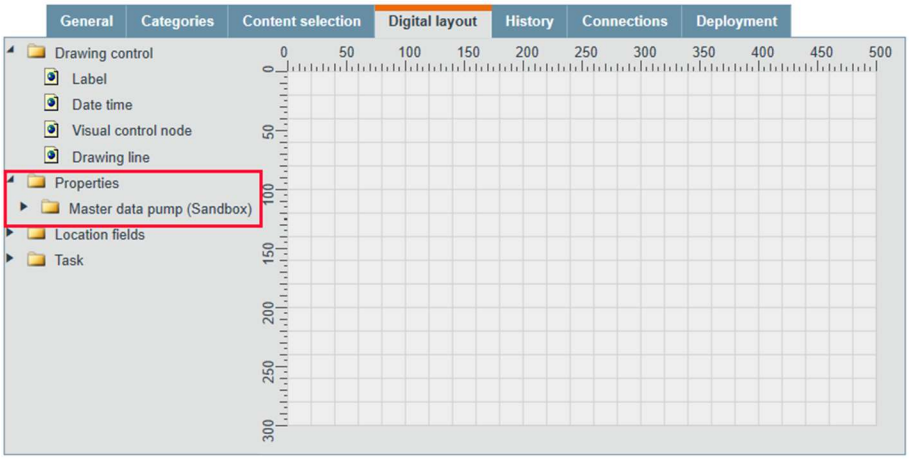
- In Design, in the Menu item 'Visual elements' go to 'Sections'.
- Create a new Section 'Pump data', type 'Form & Report'.

- In the General tab select a Style, ‘Avic BV – Avision – Default style (12pt)’.
- Click ‘Save’

Content selection tab
In this tab select the elements that can be used in the Section.

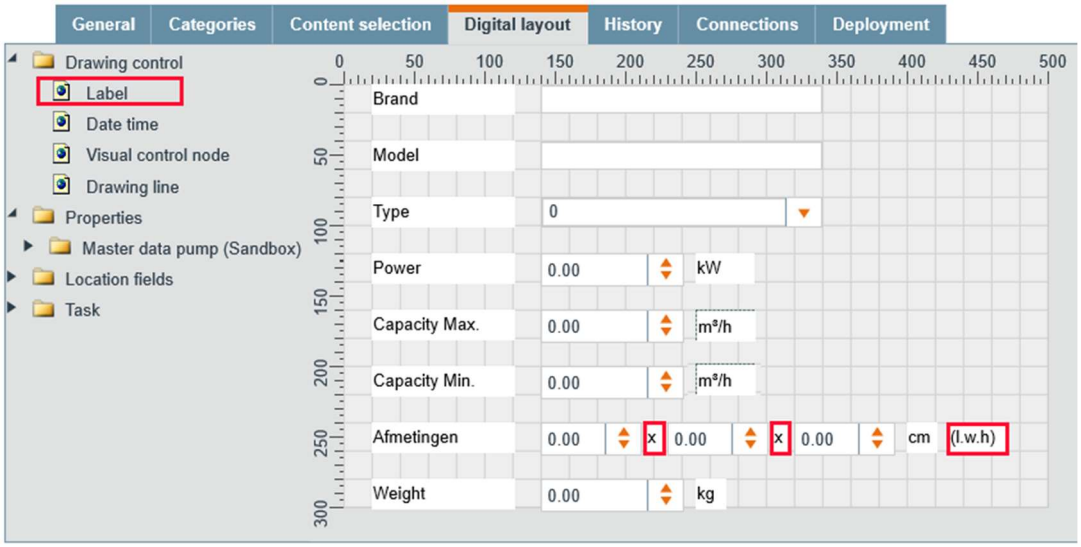
- Select element type ‘Property definitions’ and click ‘Edit’
- In the left-right screen choose ‘Master data pump’ and move this to the right hand column using the ‘>>’ button and click on ‘Save’.

Digital layout tab
In this tab we’ll create the layout of one section. When we click on this tab a canvas is shown with a tree structure on the left. Note that in this tree structure, under 'properties', the attribute definition 'master data pump' (chosen in the 'Content selector' tab) can be found:



Clicking on the underlying carets will open all items of the attribute definition. We can drag these on the canvas to the place where we want them in the section.

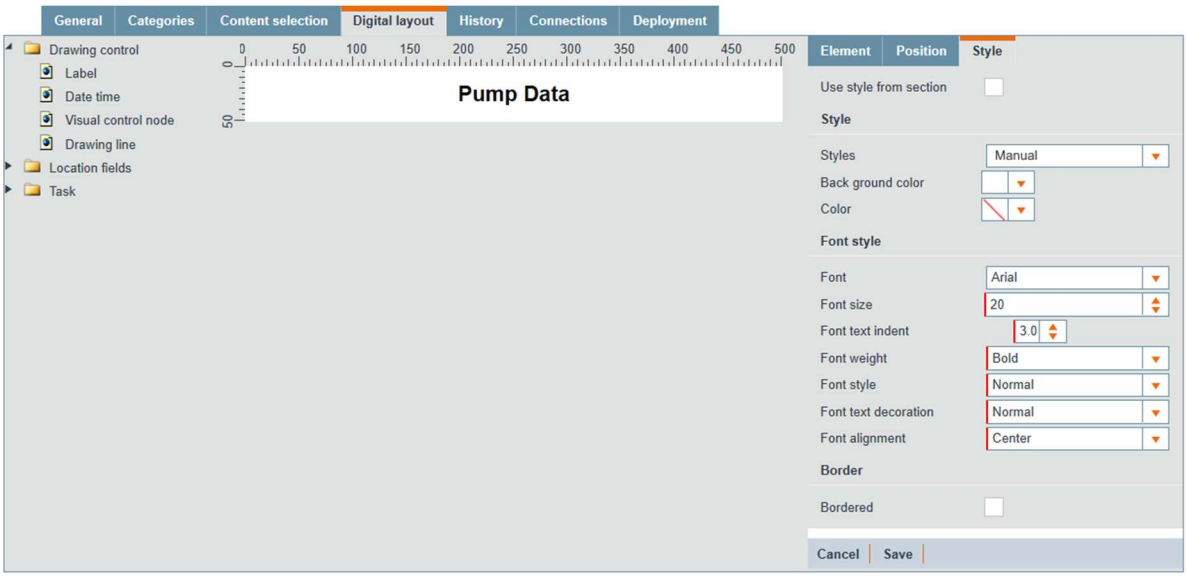
- Open the tree branches of the property ‘Master data pump’ to the point where the label and value of ‘Brand’ become visible.
- Drag ‘Property Label’ (below ‘Brand’) to the canvas and drop it there.
- Click this item on the canvas. On to right side of the screen there should be an extra column with three tabs where we can model this field to our desires.
- The space for the label is too big. We can change this at the Position tab. Change the width to 100 and click ‘Save’.
- Now we drag and drop the ‘Property value’ field on the canvas. This is the entry field.
- Do this for all entry fields and place them on the canvas as you see fit.



Example of what the section's digital layout canvas might look like. The highlighted items are created with a drawing element Label that allows free text to be created.

We are now also creating a separate section ' Pump data header ' (500x50 pixels) to serve as the header of the form. It contains only one drawing element – Label, which is placed with the text "Pump Data".

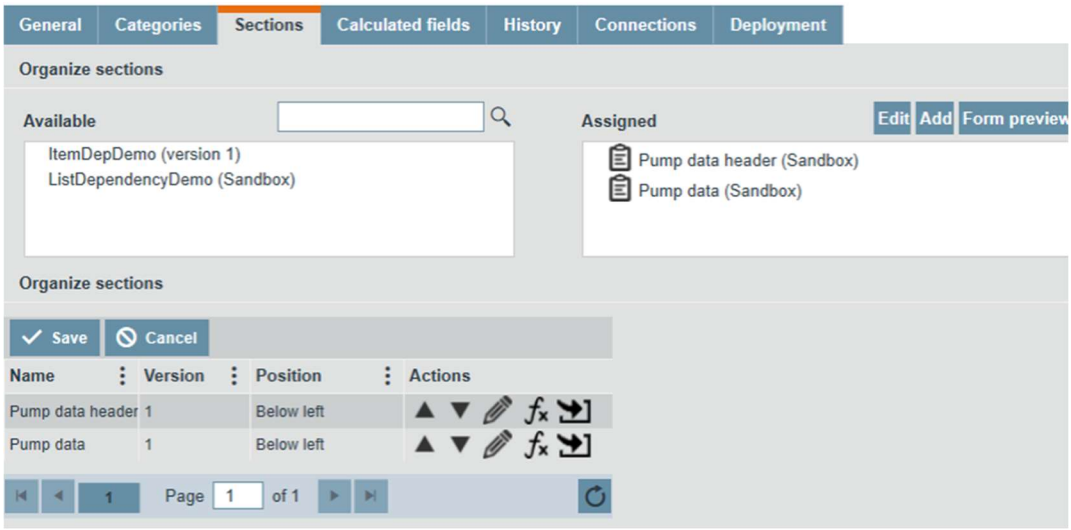
Give this label the full space: 500x50 pixels. Next, we give this label a manual style:



8.9.4.4 Complete Creating the Form

Since the sections we need are ready now, we can add them to the Form.

- Open the Form ‘Master data’.
- At the sections tab drag and drop the sections we just made to the column on the right.
- Make sure that the Position column contains ‘Below left’ for both sections.

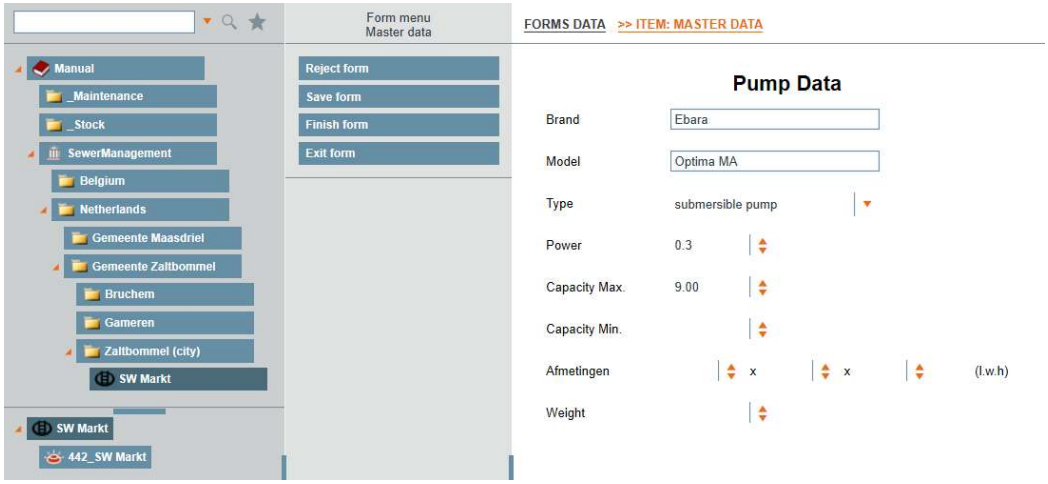


To be able to use the Form in Live we need to take following steps:

- Change state of List 'Water pumps' from Sandbox to Active
- Change state of Property Definition 'Master data pump' to Active
- Change state of Sections 'Pump data' and 'Pump data header' to Active
- Change state of Form 'Master data' to Active
- Couple the Form to the Asset 'SewerWell'
- Couple the List 'Water pumps' to the Asset
- In Live: run Synchronize

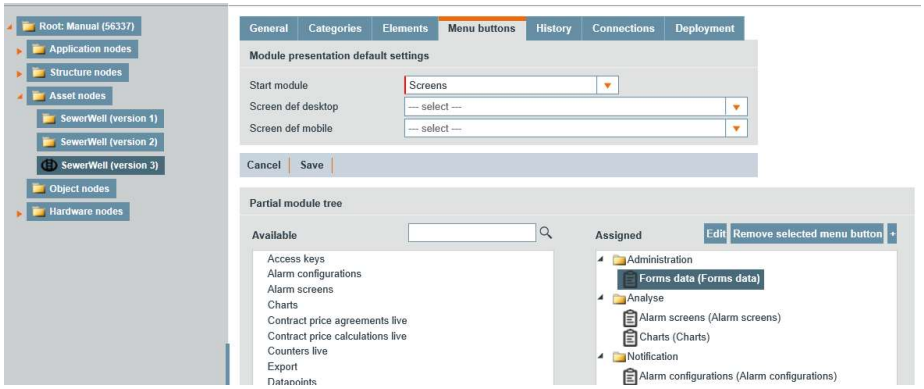
8.9.4.5 Form in Live

In Live, all sewer wells will have their own master data form.

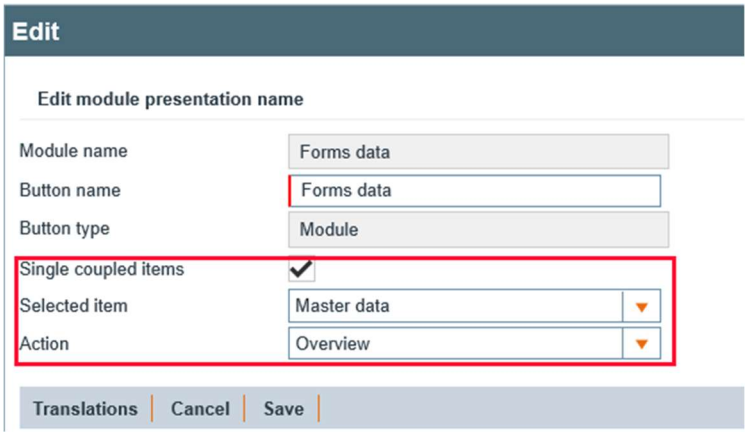


- Saving data in between times is possible, even when not all required fields have been filled.
- To finish a form all required fields must have been filled correctly.

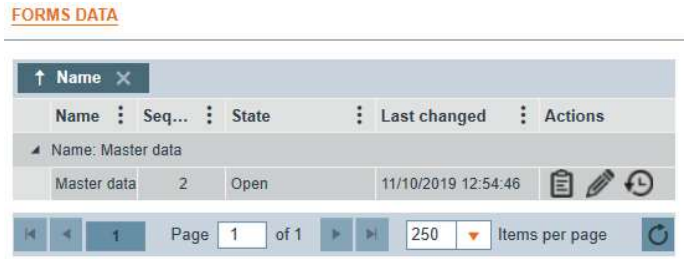
Because only one type of Form is attached, this form is always automatically started when we click in the menu on the 'Forms data' menu. To see an overview of entered data we have to change the behavior of this menu button on this asset. In Design go to the Asset, open the 'Menu buttons' tab and select the 'Forms data' module in the right hand column.



Then click on the Edit button and set everything as follows:



Now, when clicking the menu item ‘Forms data’ (of the instance of the Asset Sewer Well) in Live the form is not started automatically but an overview of Forms on the node is presented.



Clicking the clock icon will show a history of entered forms in a popup.

Here we can view what was entered in earlier finished forms, or we can go to an open (=not finished) form and continue working in that form.

When there’s no open form available (all forms have been finished) the overview will show a ‘+’ button. Clicking this will start a new form.

In summary: Forms can have following states:

- Open : An instance of the form has been started.
- Finished : The instance of this form has been filled in and saved.
- Trash bin : The instance of this form can no longer be viewed.

8.9.5 Calculated fields tab

This tab is used to have a form make (simple) calculations using entered values and present the result in another field of the form.

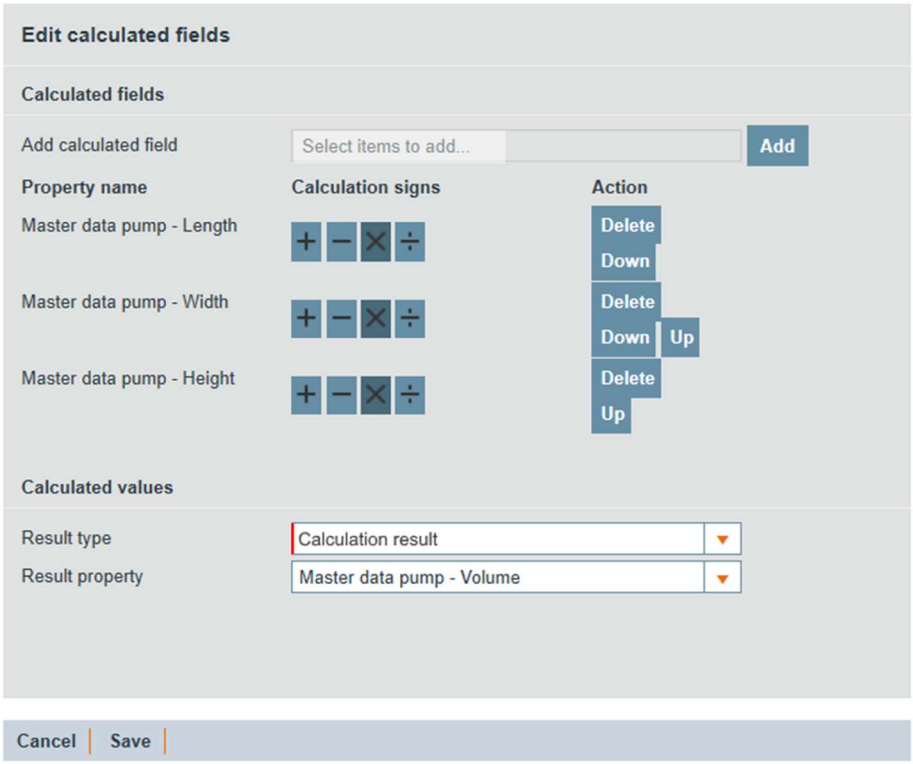
8.9.5.1 Creating a Calculation

- At forms, tab Calculated fields, click on the 'New'-button.

- At 'Add calculated field' select all property definition items that are used in de calculation and click the 'Add'-button.

- Select a calculation for each property definition item.
- At Result type select 'Result calculation' or 'Text depending on calculation result'.

- Select at ‘Result property’ the property definition item in which the result will be stored.



- Click ‘Save’

When ‘Text depending on calculation result’ was selected, a text can be shown.

8.10 Reports

In Avision a report can be created. Often, reports are part of a Workflow, but it is also possible to generate ad-hoc reports or to have reports created on a periodic basis.

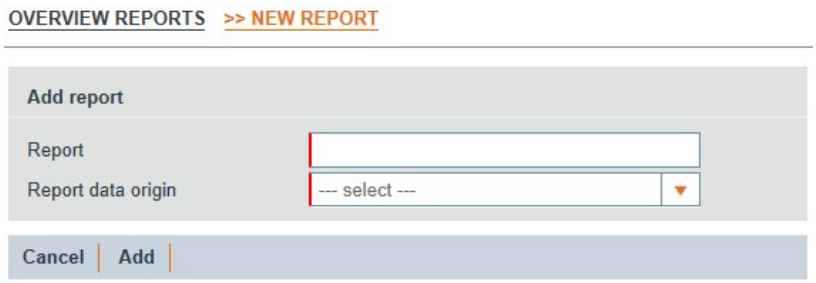
Usually, a report will use data entered through a form, but it is also possible to generate a report based on last readings.

The layout of a report, like forms, is arranged by sections. A section that is already in use for a form can be used very easily for a report. Also, the same section that is used for forms can have a different layout for reports.

Reports can display other items such as figures, graphs, tables, etc. In addition to measurement values. They are not linked directly to the report, but through one or more sections.

8.10.1 Create a Report

- In Design, in the Menu, go to ‘Visual elements’ and click ‘Reports’.
- Click the ‘+’-button on the top right of the grid.

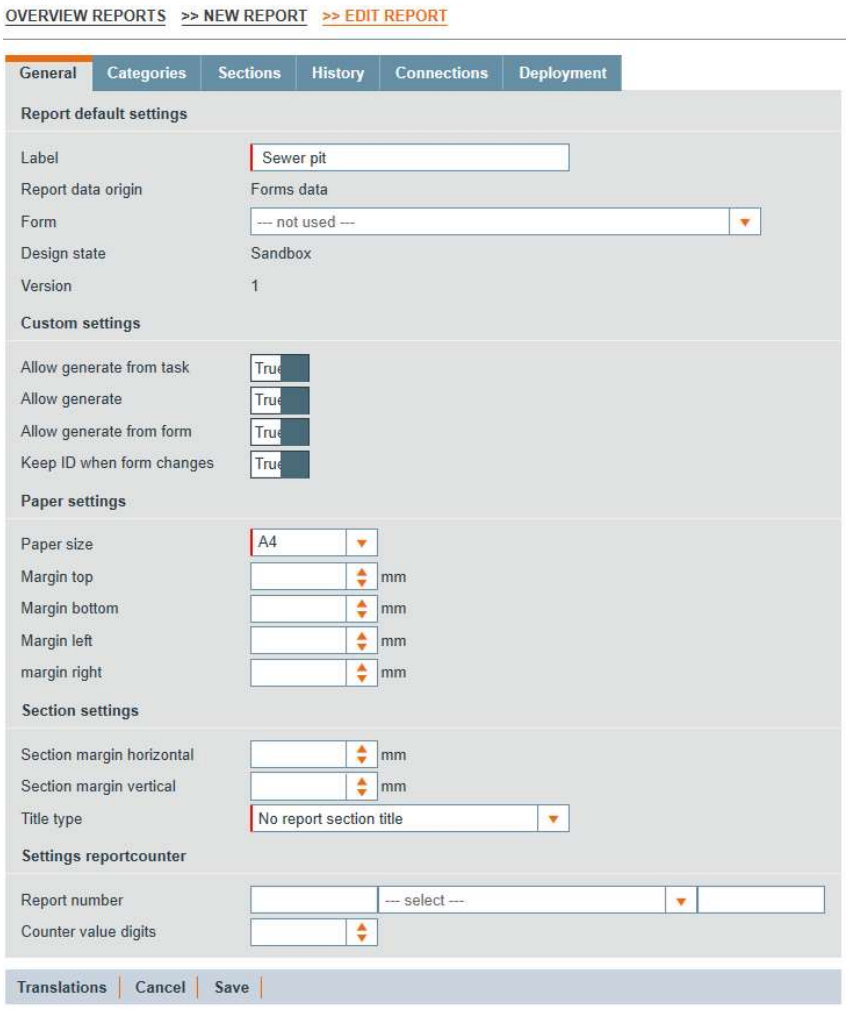


At 'Rapport data origin', indicate whether the report uses data from a form or is based on data of a certain period.

Do-it-yourself block where a report is created based on data entered using the form created in chapter x.

- Enter 'Sewer pit' as the name of the form
- At 'Report data origin' select 'Forms data'
- Click 'Add'

8.10.2 General tab



Label
The name of the report.

Data source
Indicates the origin of the data.

Form
Since the source of the data is a form, the form must be selected here.

Period selector
If the source is ‘Period data’, a period selector should be chosen here.

Allow generate from Task
Set to ‘True’ if the report (in Live) can be generated as a workflow task.

Allow generate
Set to 'True' if the report (in Live) can be generated ad-hoc/standalone (i.e. not based on a task from a workflow).

Allow Generate from form
Set to ‘True’ if the report can be generated (in Live) based on a form.

Keep ID when the form changes

Set to ‘True’ if the report is to remain the same if it is regenerated because the form is changed. (The form will have a new revision number).

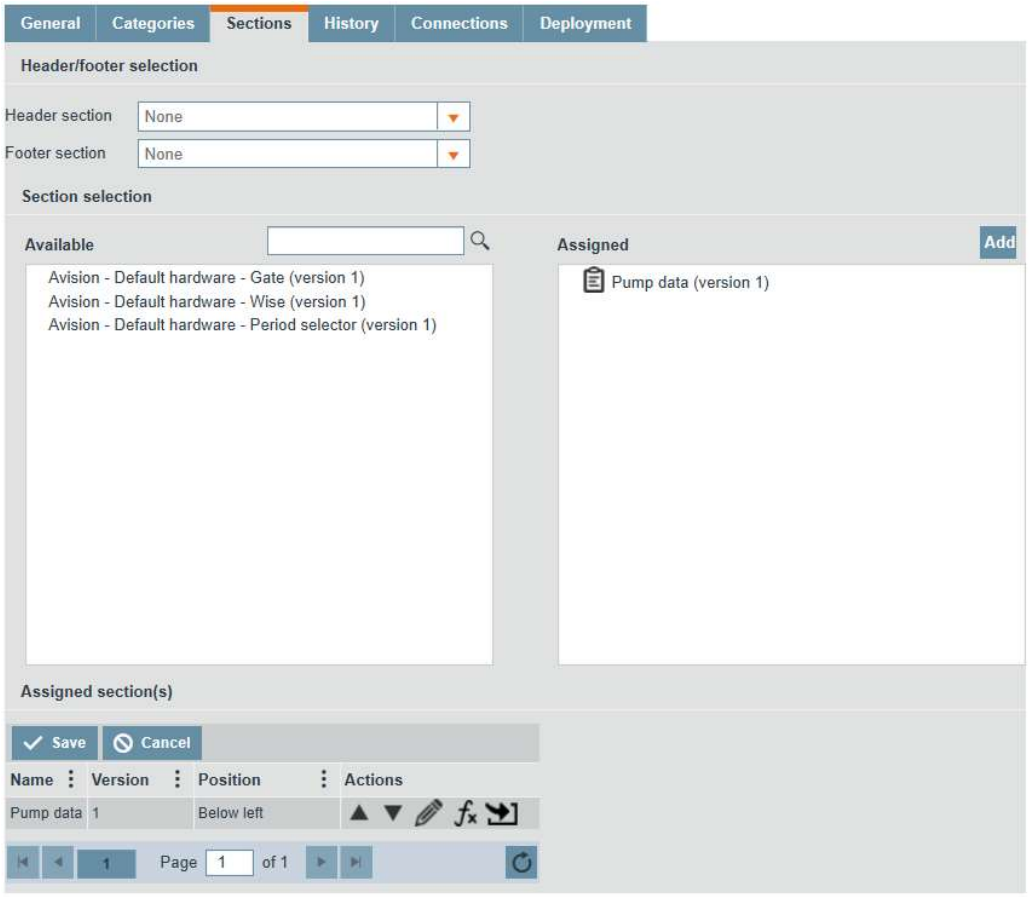
Paper Settings
Choose the format on which the report should be printed and specify the size of the margins.

Section settings
Here the space between the sections of the report can be entered and whether and how to display the title (as a header or a tab).

Settings report counter
A report number can be configured here. This report number can be given a fixed pre-and postfix. In between, a sequential number that is automatically raised every time a report is generated can be generated. To do this, an attribute definition item must be created and used.

The ‘Counter value digits’ field indicates the number of digits the sequence number should have.

8.10.3 Sections tab
This tab is used to choose the sections that make up the report. This also determines the order and the mutual positions. You can also specify which section to use as header or footer. (Header and footer will be repeated on all pages).

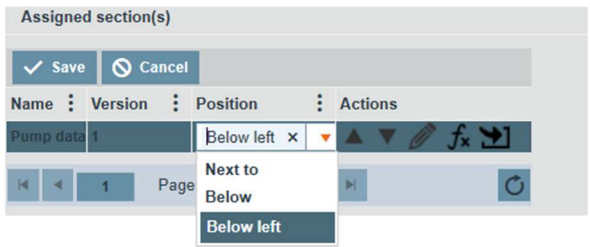


On the top right column for the 'assigned' sections there is an 'Add' button. Clicking this button will bring up a popup for adding a page-break or a repeater.

Avision takes into account the space on the page; If a section does not fit next to another section, Avision will place these at the utmost left and below that section. If a section no longer fits on the page, Avision will start a new page.

By clicking the 'Position' column the position of this section relative to its previous section can be indicated. Options are:

- Next to : Section is placed to the right of the previous section.
- Below : Section is placed directly below the previous section.
- Below left : Section is placed below and to the utmost left. This is always the position of the first section of a report.



In the Actions column following buttons are available:

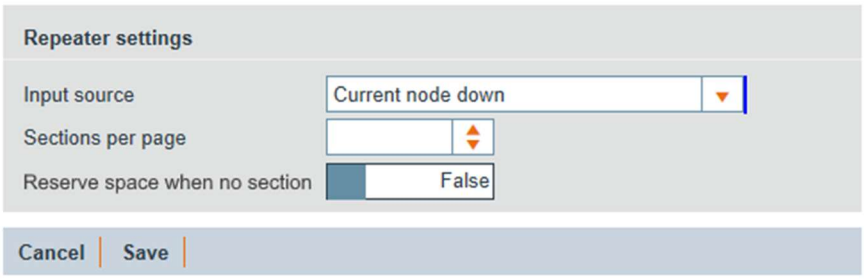
 : Move the section in the order of sections one position up.

 : Move the section in the order of sections one position down.

 : Edit repeater settings:

- Current node (default setting) : The data used is from the current node.
- Filter : The list of nodes is the result of a filter. When selected, a filter must be selected here.
- Node picker : The list of nodes is the result of a node picker. When selected, a node picker must also be selected.
- Current node down.

All choices, except the current node, must also specify the number of sections per page and whether space should be reserved in the report even when the section can not be found on the node.



 : Clicking on this button shows a popup in which a formula can be created which determines whether the section should be shown.

 : This button can be used to jump to the section.

Do-it-yourself block where a report is created that uses data from a form.

8.10.4 Create a Header Section

On the report a header section is needed with the logo of the municipality of Zaltbommel.

- At Images we first load the logo into our library.
- Create a new section ReportHeaderZB, type 'Form & Report'.
- Check 'Print enable', this will make the tab 'Print layout' visible.
- Print width 180mm, height 20mm, click 'Save'.
- At the 'Content selection' tab, select Images, drag the logo to the right hand column.
- In tab Print layout, place the logo on the canvas of the section, somewhere in the middle.

Nu we will make the existing sections, already used at the form, ready to be used in a report.

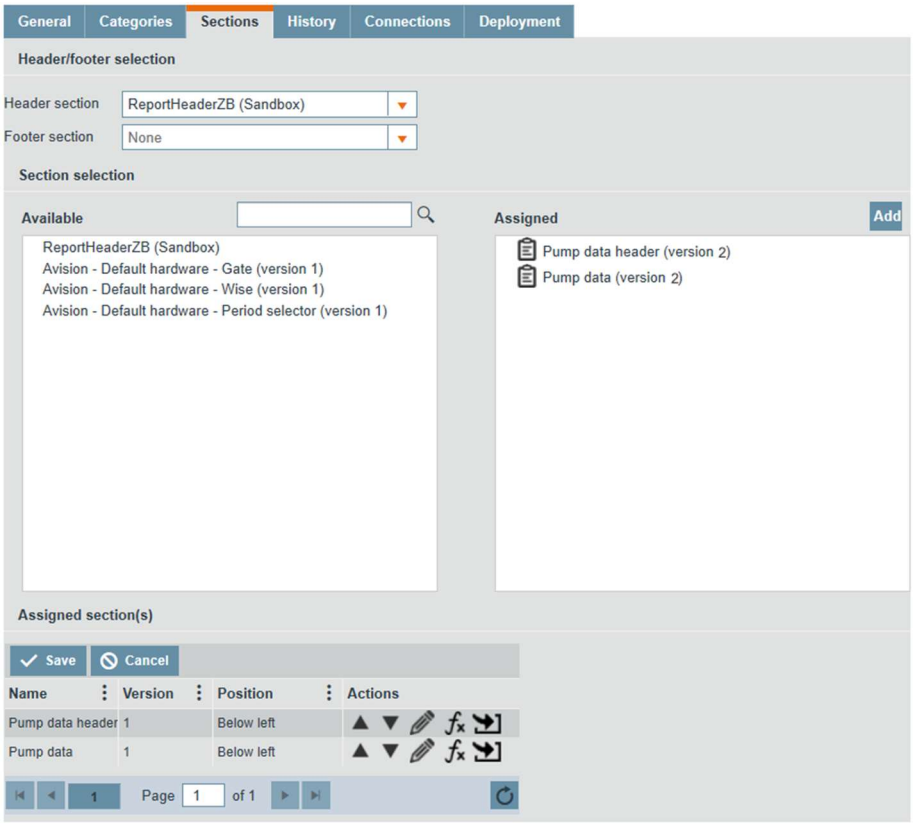
- Create a new sand box version of the section 'Pump data header'
- In the General tab, check mark 'Print enable'.
- Make Print width 125mm, height 13mm (rule of thumb: take the sizes of the digital layout and divide by four).
- Click 'Save'.
- In tab 'Print layout', click the 'Copy from digital layout' button.

Same for section 'Pump data':

- Create a new sand box version of the section ‘Pump data’
- Open the General tab of the section ‘Pump data’.
- Check mark ‘Print enable’.
- Set print width to 125mm, height 75mm, click ‘Save’.
- In the tab Print layout, click the ‘Copy from digital layout’ button.

Continuing with the Report:

- At the Sections tab, select at ‘Header section’ the section ReportHeaderZB
- In the left-right part drag ‘Pump data header’ to the right hand column.
- Drag ‘Pump data’ to the right (below ‘Pump data header’)

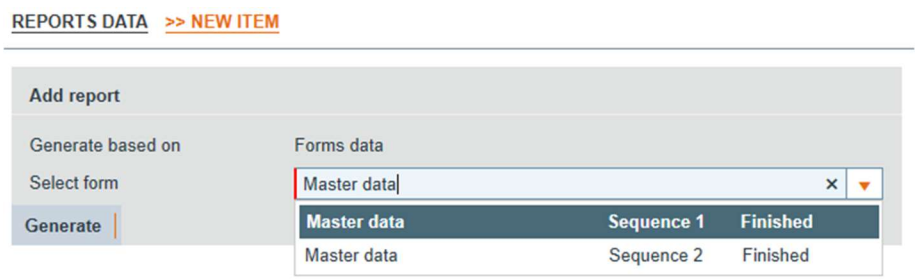


The report in Design is now actually finished. We only need to promote the sections and the report from the ‘Sandbox’ state to the ‘Active’ state and add it to the Asset. Then in Live, synchronize.

8.10.5 Report in Live

In Live an ad-hoc report can be started by clicking the ‘+’-button.

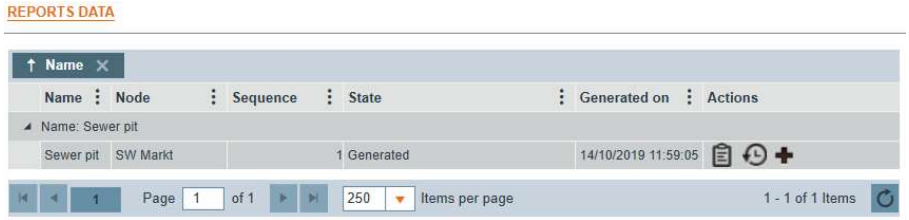
After clicking the ‘+’ we still have to indicate which form delivers the data.



When the report is ready following popup is presented (depending on the PDF reader used by the browser):

Click 'Open' to view the report.

When we return to the report menu in Live we see twee different icons:

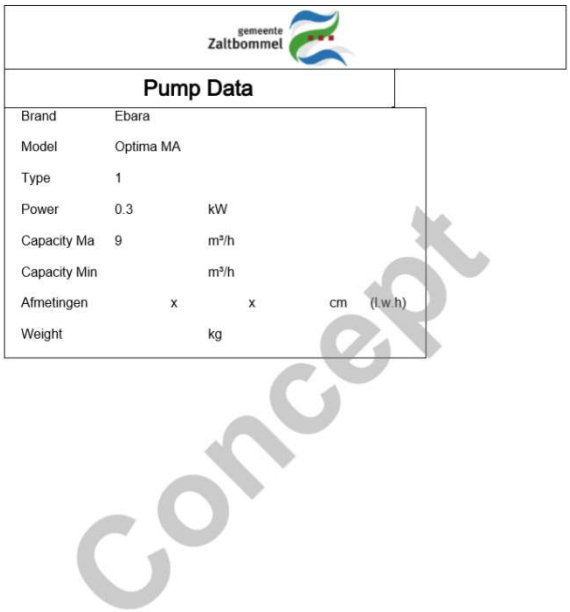


 : to view the last generated report data.

 : to view a history of reports.

 : to create a new report.

Result :



The text concept is printed over it because the form has not yet been finished.

8.11 Object Screens

Object Screens give an overview of alarms and tasks (with a certain status) on different nodes.

8.11.1 Design

8.11.1.1 Object Screens Overview

In this screen the user is presented an overview of the present object screens. Each object screen has a design status. Depending on this status, a user can view, change, copy, create sandbox version, move to Trash, and delete all of these settings.

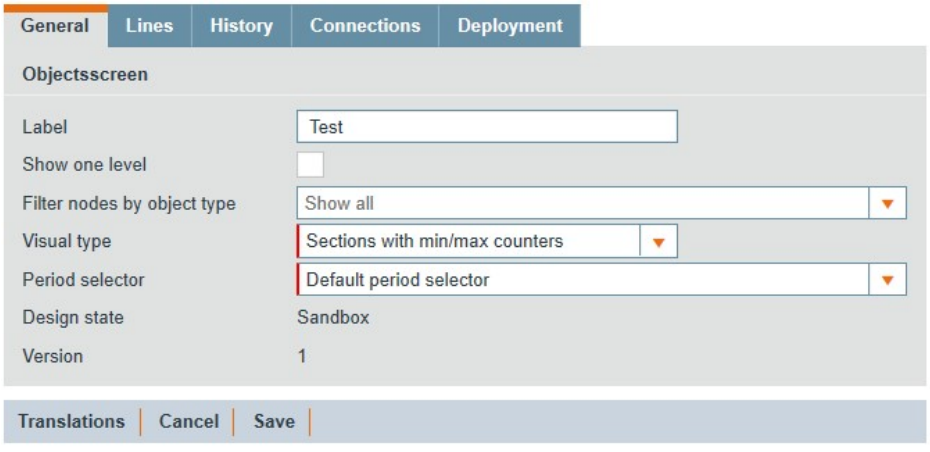
The add button is on the top right of the grid. This button allows the user to create a new object screen.

8.11.1.2 Adding/Creating Object Screen

- **Name:** The name of the object screen
- **Visual type:** At this moment only one option available. Selection with min/max counters
- **Period selector:** Select the period selector

After the user clicks Add on this screen, the user moves to the overall edit screen of objects. Here the user can set all other settings.

8.11.1.3 Change Settings Object Screen



Show one level
When checked displays all nodes under the current parent node or, if unchecked, all nodes down in the tree.

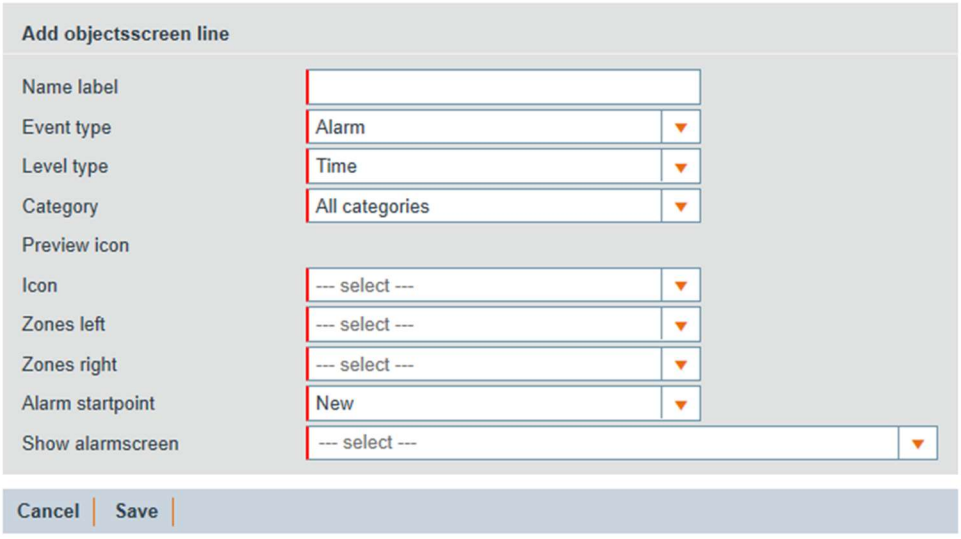
Filter nodes by object type
This is an additional filter on top of **Show one level**, only the nodes of the configured object type are shown.

8.11.1.4 Objects Screen Lines Tab

For each object found in Live a block is created. This block contains lines. Lines consist of alarms and/or tasks. Alarms and tasks have states. Each state can be used to set a lines.

To create a line click the '+' button on the top right of the grid.

Following settings are presented when adding a line:



- **Name label:** Name of the line
- **Event type:** Type of the line (at this moment either Alarm or Task, perhaps more options in future).
- **Level type:** Indicates filter type, either Time or Severity.
- **Category:** Optionally filter nodes for category.
- **Icon:** Icon to indicate what is presented on the line.
- **Zones left:** The limit shown on the left. In live all items that comply per nod or object are added up.
- **Zones right:** The limit shown on the right. In live all items that comply per nod or object are added up.

- **Alarm startpoint/Task startpoint:** Start moment of counting alarms or tasks in Live per node/object.
- **Show alarmscreen:** The alarm screen to show when the line is clicked.

Remarks on collecting data:
The result, the number of alarms or tasks, presented on one line always concerns the total number of alarms or tasks present on this node PLUS all nodes below.

Setting the check mark at the option 'Show one level' (at the General tab) might in practice be faster.

Using the design limits, it is possible to calculate the time span from the new or the accept moment to the moment the alarm or task was finished. This time span can then be used to determine which zone (above high, pre high, between high and low, pre low and beneath low and unknown/none) the alarm or task is in. This zone is then used in counting the alarms or tasks.

In Live use a filter on tasks/alarms.

Determine numbers for left/right:
Then, the result of all nodes (the result of filters on General tab) can be passed and created as a block on the screen. Per block, all configured lines must be run, and the results/totals are calculated using the set limits.

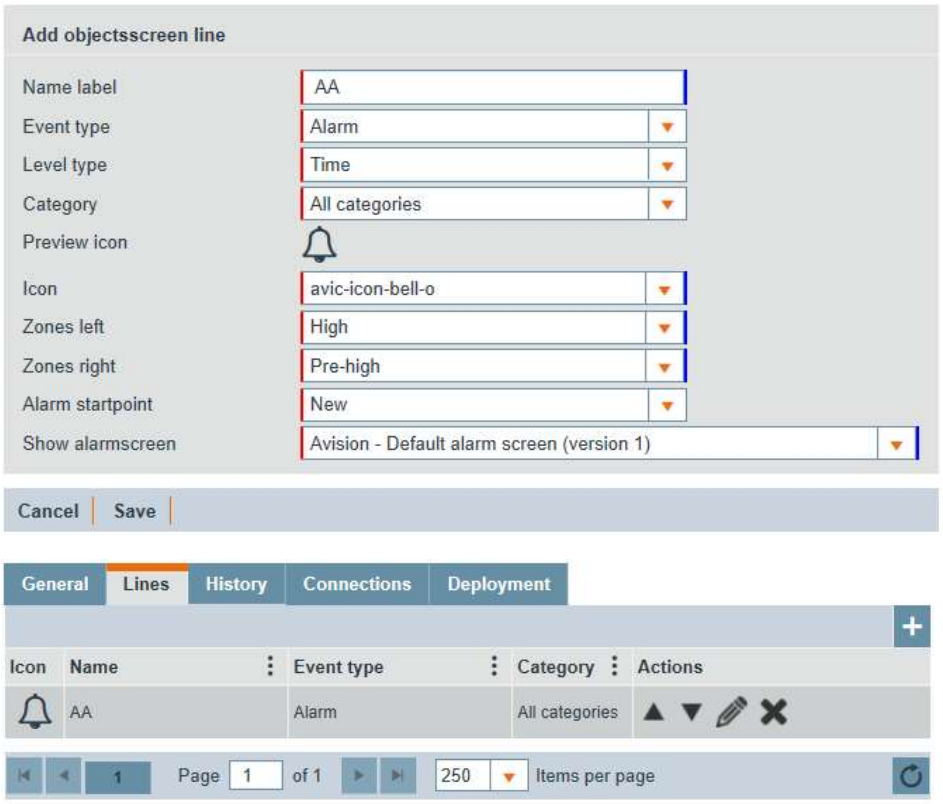
Alarm:
- No limit/all, shows totals of all filters.
- The high and pre high limits indicate that the time span between occurrence and finish time was to big.
- If the time span between occurrence and finish times is in between high and low limits the alarm is in the Normal zone.

The statement below is only valid when the alarm has been finished and will not work in combination with a filter on the states New and/or Accepted:
- If the time span between occurrence and finish is between the low and pre low limits or below the low limit then it was finished too fast. (What this means in practice is up to the user).

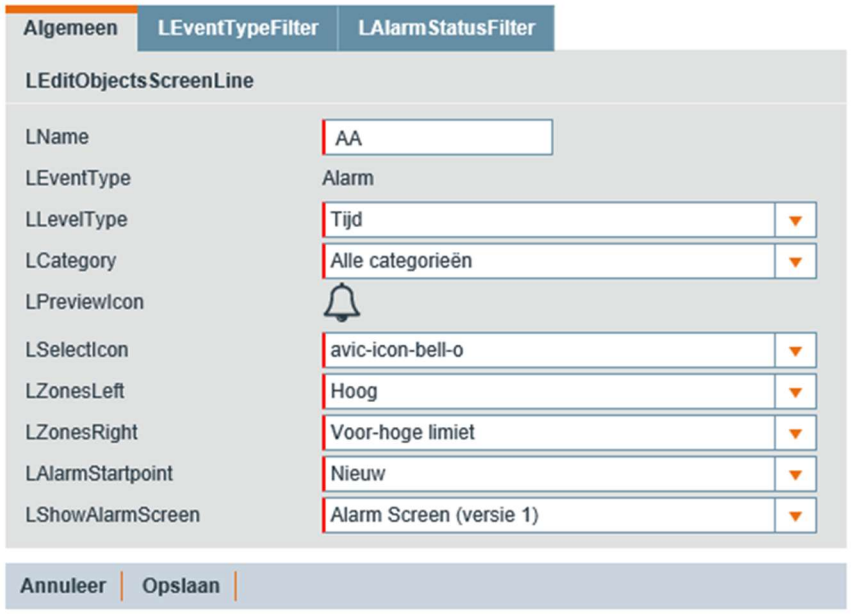
Task:
- No limit/all, shows totals of all filters.
- The high and pre high limits indicate that the time span between state New and state Abort, Reject or Finish is too big; the Task takes too long or has taken too long. The time span is either bigger than the high limit value or bigger than the pre high limit value.
- When the time span between occurrence and finish time of the task is between high and low limit values then the time span is considered to be in the Normal zone.

The statement below is only valid when the alarm has been finished and will not work in combination with a filter on the states None, New, Pending and Pause:
- If the time span between occurrence and finish is between the low and pre low limits or below the low limit then the Task was finished too fast.

Creating a line:

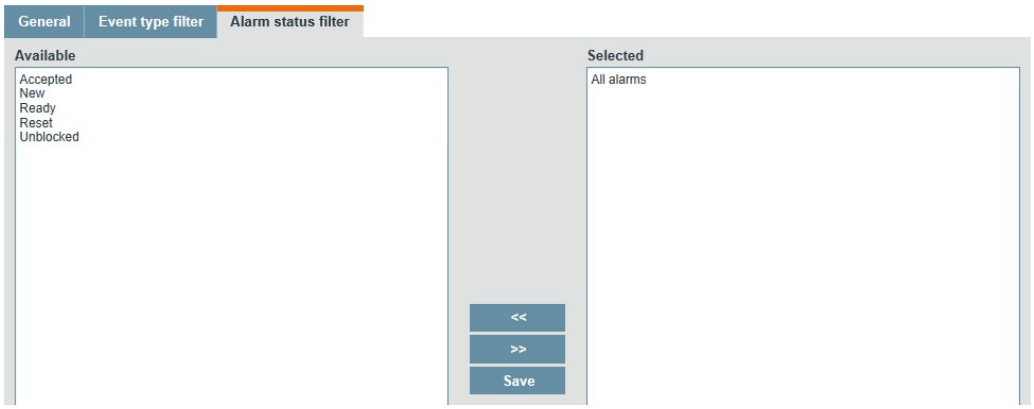


Editing a line:



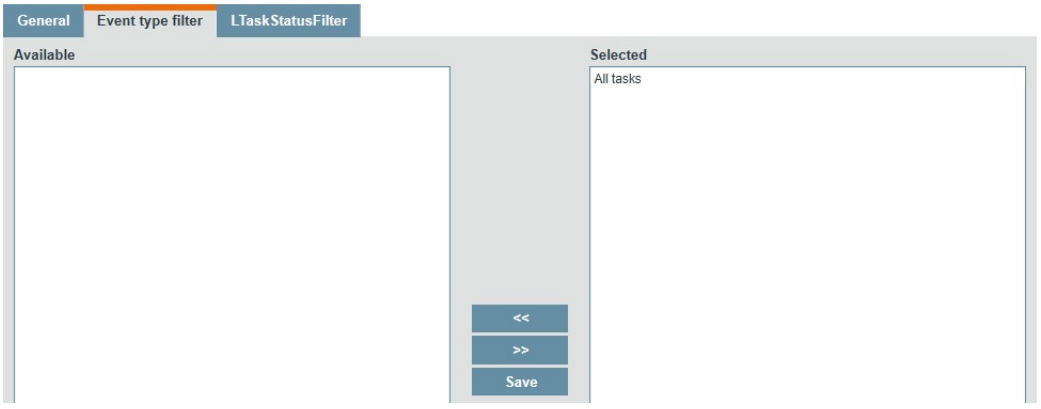
EventType Filter Tab at selected Event Type Alarm: An available alarm can be selected here which will be used in Live to filter on alarms and then count them. Default is ‘All alarms’.

Alarm Status filter Tab: Filter for showing alarms with (a) certain state(s).



Task Event Type Filter Tab:

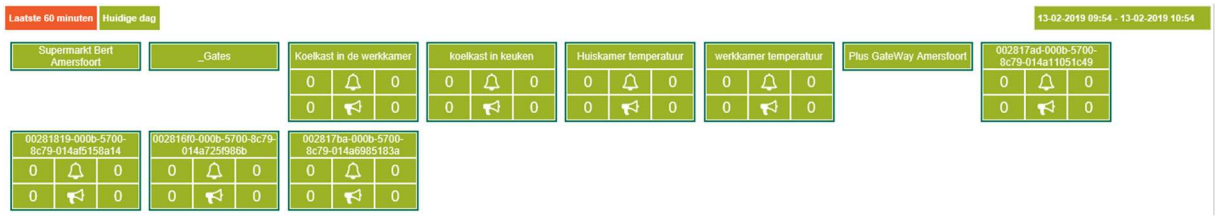
When the event type is 'Task' then here the available tasks are shown here. Using this tab filtering on tasks is created.



TaakStatus filter: laat alle beschikbare statussen van een taak zien. Hiermee kan de gebruiker bijv. alleen de Nieuwe taken kiezen waarmee geteld wordt in live. Default is all tasks.

8.11.2 Live

All nodes with result of filtering and counting



9 Activity elements

9.1 Scenarios

In scenarios, we can indicate what should happen if a particular situation arises. For an Alarm we set up when, at what situation, an alarm should be generated. Using a Scenario we can indicate who will get an alarm and in what way.

9.1.1 Create Scenario

When creating a Scenario, we need to indicate the type, options are 'Notification' or 'Document distribution'.

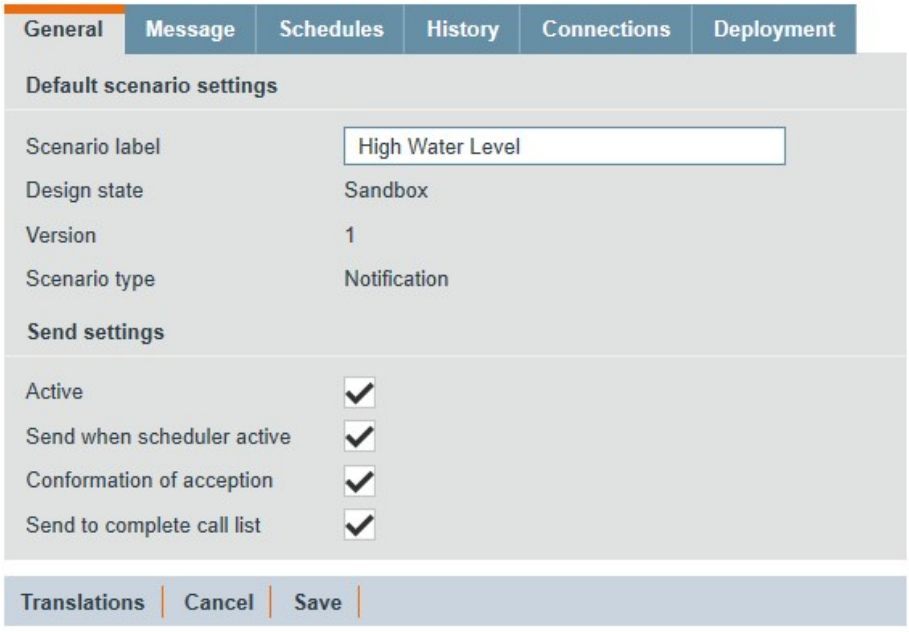
Notification
Indicates that the scenario will be used to notify users. Usually in the case of an Alarm.

Document distribution
Indicates that the scenario is used to send reports periodically.

Do-it-yourself block in which a Scenario is created with the purpose to send an email (following an alarm).

Creating a Scenario, name 'High Water Level', type 'Notification'.

9.1.2 General tab



Active
Unchecking this will disable the Scenario. This can be useful if we do want to generate an alarm but do not want to do any action at this time. Later, we can enable the scenario simply by setting the checkmark again.

Send when scheduler active
When the scheduler is not active messages will be saved until the scheduler becomes active again.

Confirmation of acceptance

Send to complete call list

When this is unchecked following fields will be available:

Ask for confirmation

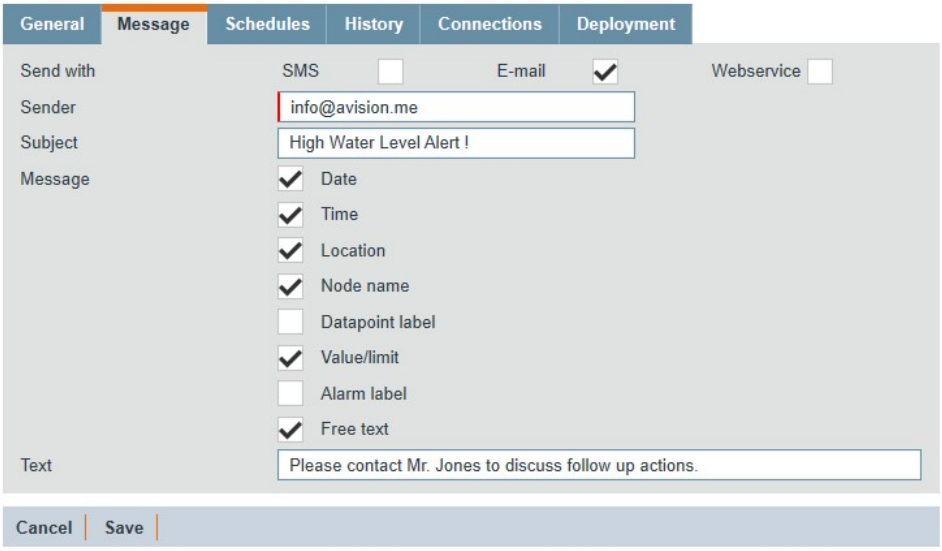
Select :

- With acceptation code
- With ready code
- With acceptation and ready code

Time to confirm
Time in minutes before the next person in the call list will get a message (if the current person does not confirm).

Number of confirmations
The number of times a person on the call list will receive a message before the next person on the list is informed (if the current person does not confirm).

9.1.3 Message Tab



Send with
Indicate here how the alarm message is to be send : as a text message (SMS), an email, via Webservice or a combination.

Sender

Subject
The text in the subject field.

Message
Using check marks, indicate which items should be present in the message.

Text
Any text can be added here.

9.1.4 Adding Scenario to a Node

After the Scenario is made it must added/coupled to a node. In this example we add the Scenario in Design to the structure node 'Client'.

In practice it is advised to couple scenarios to a high level node in the application. This way you will only need a few scenarios that can be used for many alarms on different levels (depending on requirements).

9.2 Alarms

Alarms allow you to automatically receive a warning if a metric exceeds a limit.

Do-it-yourself block where you create an alarm. It is advised to first read chapter 9.1 Scenarios and create the Scenario that will be used the Alarm in this exercise.

An alarm is based on a 'Trigger'. An 'Trigger' arises in the hardware and may need to be processed or logged. Roughly, there are two types of 'Triggers': Technical and Asset-related 'Triggers'. Distinction can be made quickly using this rule of thought: “If the hardware changes, are you still interested in the history of alarms and triggers ?” This will be the case for Asset-related events, but probably not for hardware that is replaced by (perhaps) completely different hardware; After all, if the hardware is replaced, you are very probably no longer interested in the history of that old hardware.

In our example, we want to raise an alarm when the floater indicates that the level in the sewage pit has become too high and flooding occurs. We also want to build up a history that indicates when flooding has taken place. That history should not be lost if we (for whatever reason) are going to use other hardware in the pit and therefore we built that at the Asset node level. Therefore, we will first create a new property definition at the Asset.

9.2.1 Create Property Definition ‘Floater’

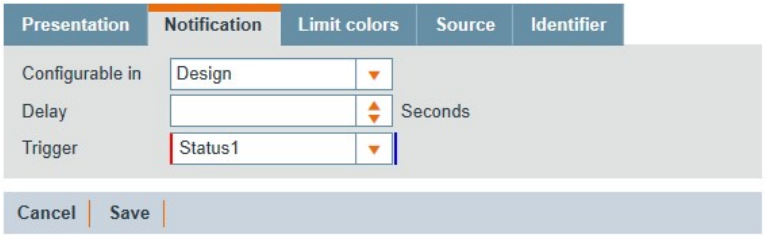
In Design, at the Menu item Property Definitions, we create a new property definition named ‘Floater’ van het type ‘Multiple’. At the ‘Items’ tab create a property item with label IsOverflow of type ‘Boolean (Digital datapoint samples)’. (The floater will raise an alarm when the water level is above a certain level, and not when it is lower. So, typically a Boolean value).

Property Definition Item - Presentation tab

At this tab make sure the ‘Enable input field’ is checked. To be able to easily use this item’s label in a report we also set the check mark ‘Enable label’.

Property Definition Item - Notification tab

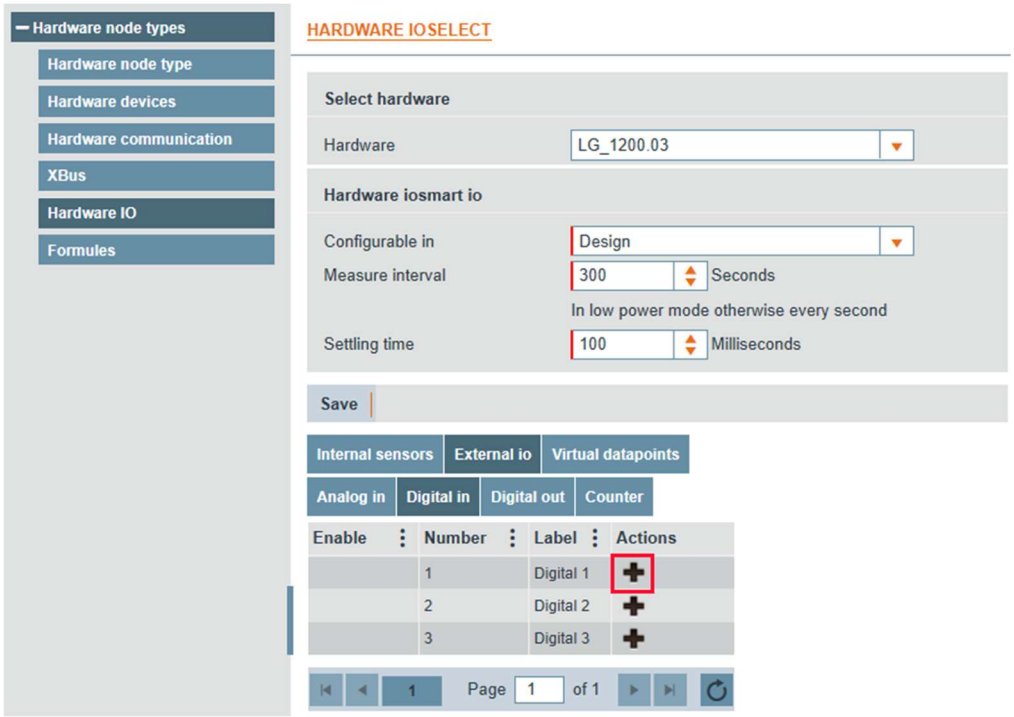
At the tab ‘Notification’ select ‘Status 1’ at the ‘Trigger’ field.



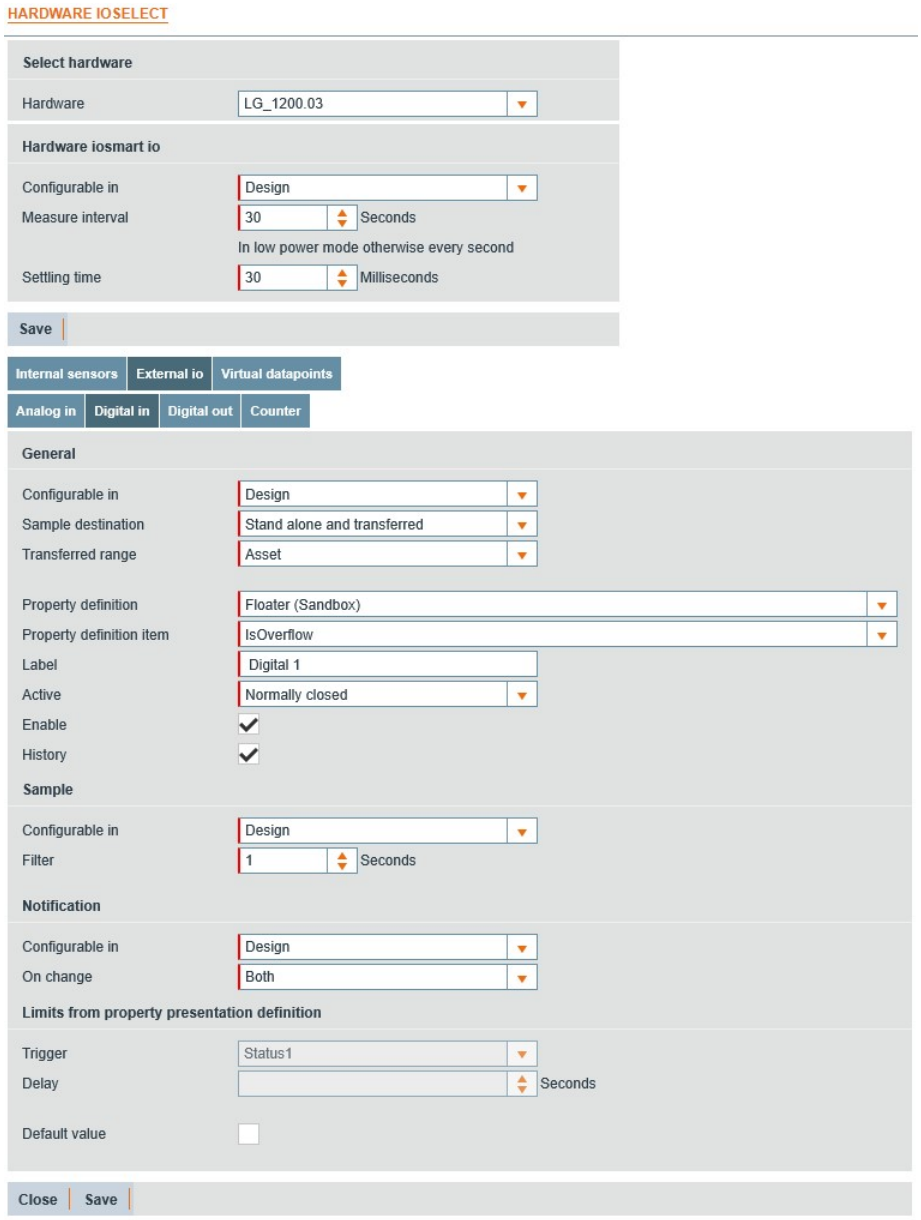
No changes are needed on the other tabs, but we need to add this property definition to (a new version of) the Asset node 'SewerWell' .

9.2.2 Hardware Node Changes

We will use switch Di1 of the test setup to simulate a flooding signal. We have to create this signal on the hardware. We do this by clicking on the ' + ' button of digital 1.



Set everything as shown below:



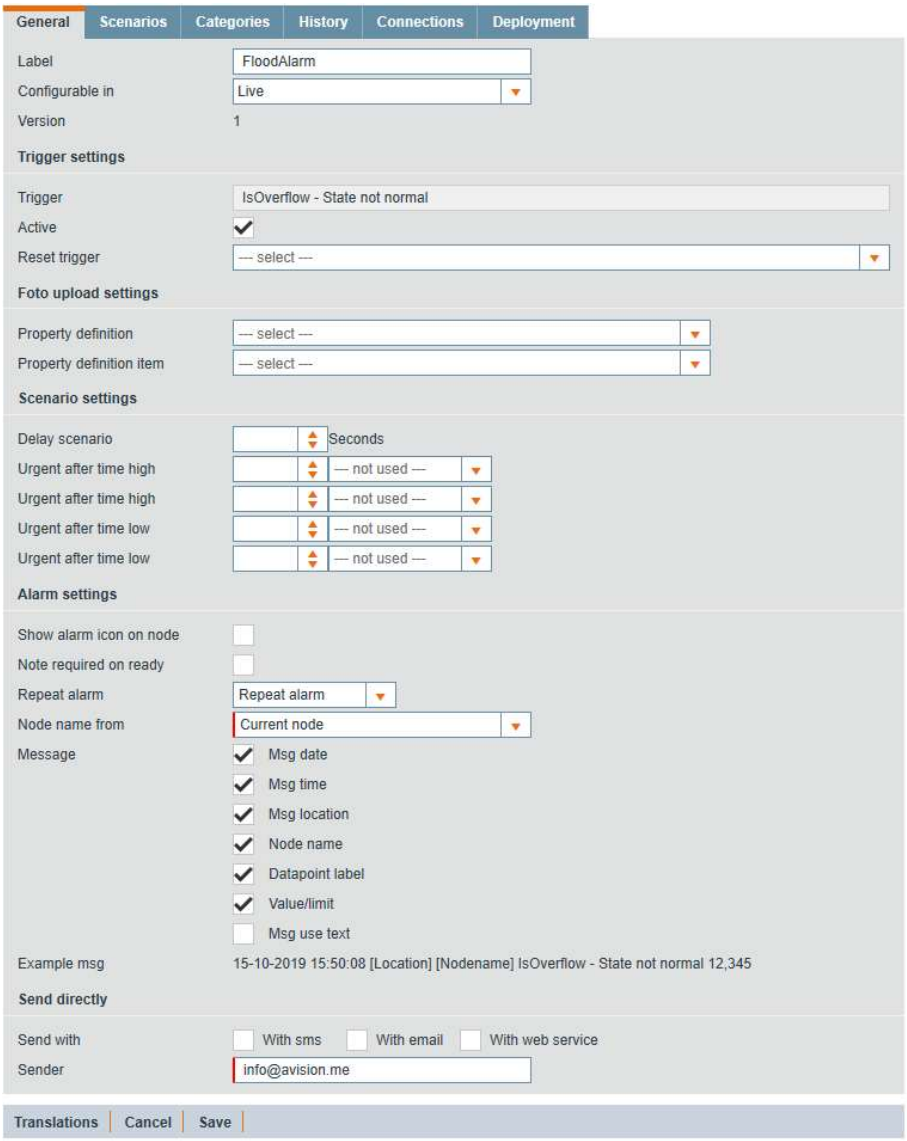
9.2.3 Create Alarm

By creating the property definition item, a ‘Trigger’ has also been created which will be used to raise the alarm.

When creating the alarm, we need to fill in the name and choose the ‘Trigger’ from the dropdown. Enter as name in ‘FloodAlarm' and select in the dropdown 'IsOverflow – State not normal'.

General tab

The only change here is to set ‘Configurable in’ to ‘Live’ so we can make changes in Live. Other settings can stay as they are.



We leave the 'Send with' options at 'Send directly' empty because we will use a scenario. This also means that the settings at 'Alarm settings' will be overruled by the scenario.

Scenarios tab

Make sure the 'High Water Level' scenario is at the right hand column. (When this scenario is not present in either right or left hand column then go to Scenarios and create it).

9.2.4 Add Alarm to Node

In Design we are now almost finished. We only need to link the Alarm to an Asset node.

After that, in Live, we need to synchronize to be able to use what we have created in Design.

9.3 Scheduler

A scheduler is a piece of software running in the background and which becomes active at certain moments in time.

9.3.1 General tab

9.3.1.1 In Design and Live

Type
There are three types of scheduler: Hardware, Scenario, and Workflow.

Hardware: The scheduler runs on the AVIC-device (hardware).
Scenario: The scheduler is used by a Scenario.
Workflow: The scheduler is used by a Workflow.

Recipes are only available for hardware type schedulers. At a workflow type scheduler only from date-times can be entered.

When the scheduler is of type hardware three other settings need to be considered:

Datapoint type
Choose the data type. Options are: Analog, Digital, Text and Word.

Offline value
Value when inactive. For analog values, a comma number can be entered here, for digital values set check mark on or off, for a text value enter text, and in case of a word value enter an integer.

Always on value
Value when active. For analog values, a comma number can be entered here, for digital values set check mark on or off, for a text value enter text, and in case of a word value enter an integer.

9.3.1.2 In Live

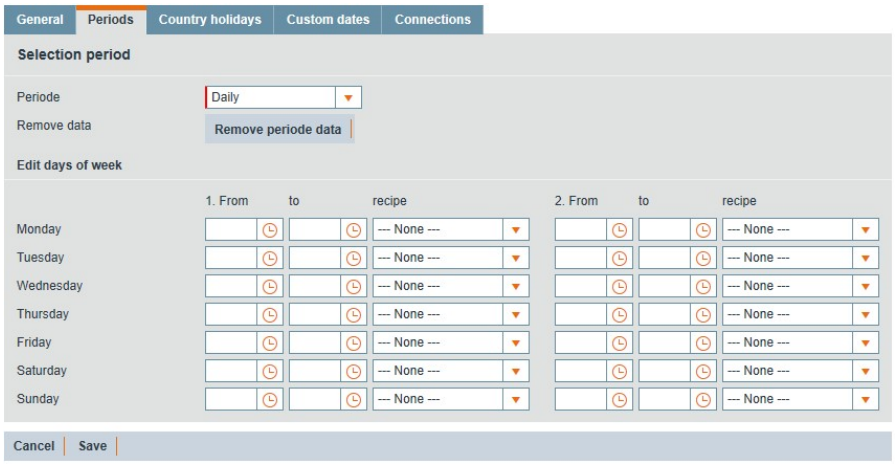
For all types There is a Mode option where you can choose from normal, always on and always off.

9.3.2 Periods Tab (In Live only)

At the Periods tab, we can indicate at what times a Scheduler is active.

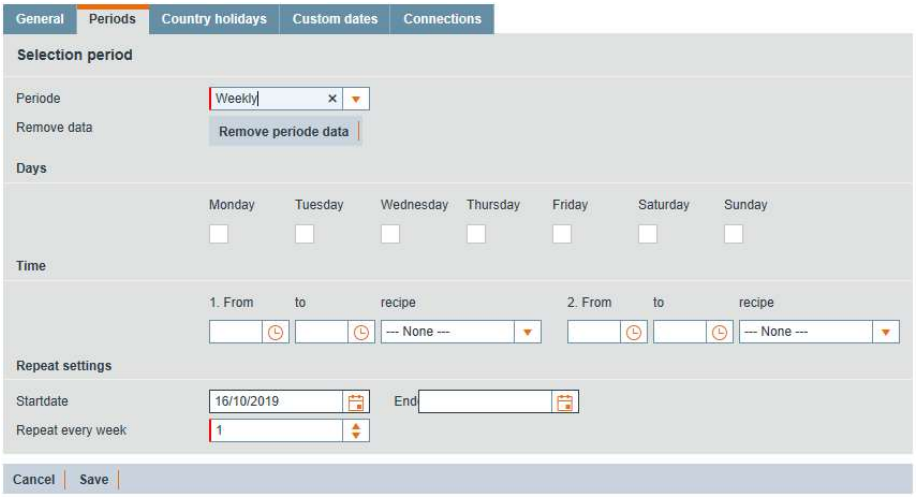
Period
The period determines the repeat cycle of a task.

- **Daily**
  Per day of the week, two start and end times can be specified within which the scheduler is active. A recipe can be used per start-end time.



- **Weekly**

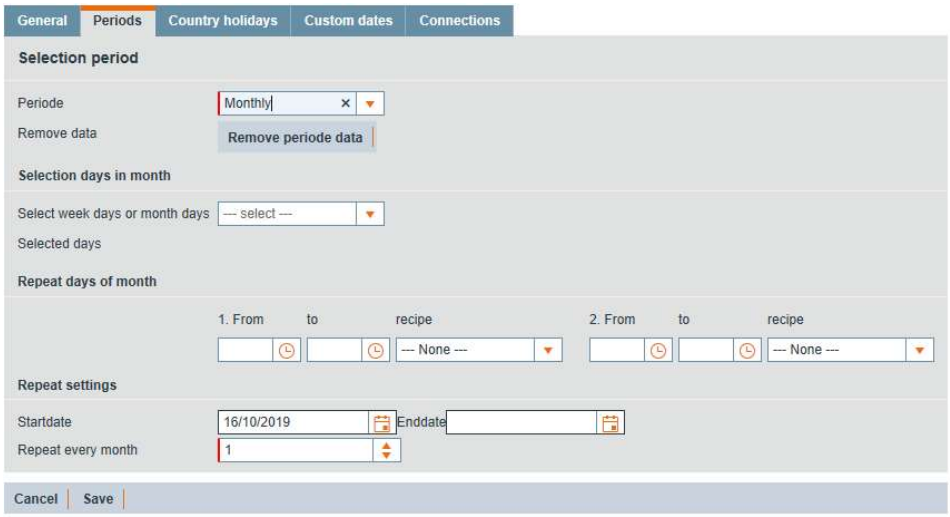
  The days of the week on which the Scheduler should be active can be checked. Per day the active times can be indicated. Also, the frequency, every week or every 2 weeks or every n weeks can be specified as well as a start and end date.



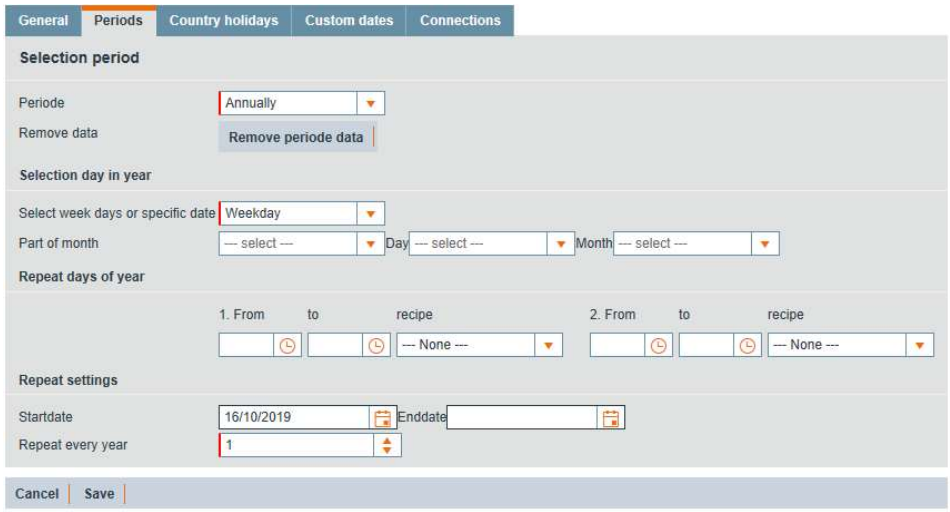
- **Monthly**

  In the case of week days or days of the month, you can choose weekdays where e.g. the Scheduler becomes active every second Tuesday of the month. If chosen for monthly days, each day of the month can be chosen.

  For the chosen days, two start and end times can be filled in and the frequency can be filled in (monthly, two-monthly or N-monthly).



- **Jaarlijks**



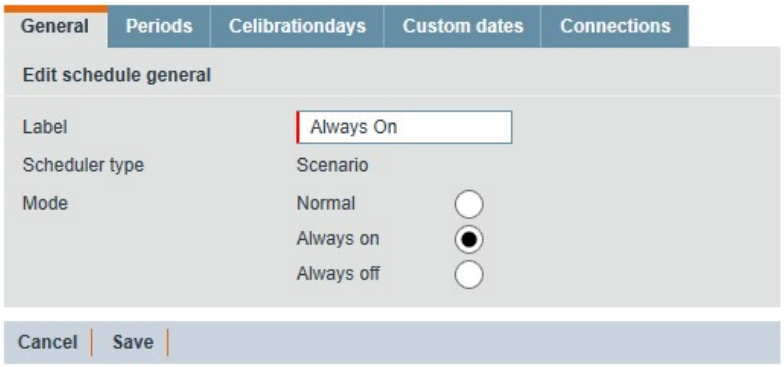
Here we can also choose to complete days in the year or a portion of the month or day (and) of the week or a month. We can also specify a frequency on an annual basis, and a start and end date.

9.4 Round Off Flooding Alarm in Live

Do-it-yourself block for the Flooding Alarm

9.4.1 Scheduler in Live

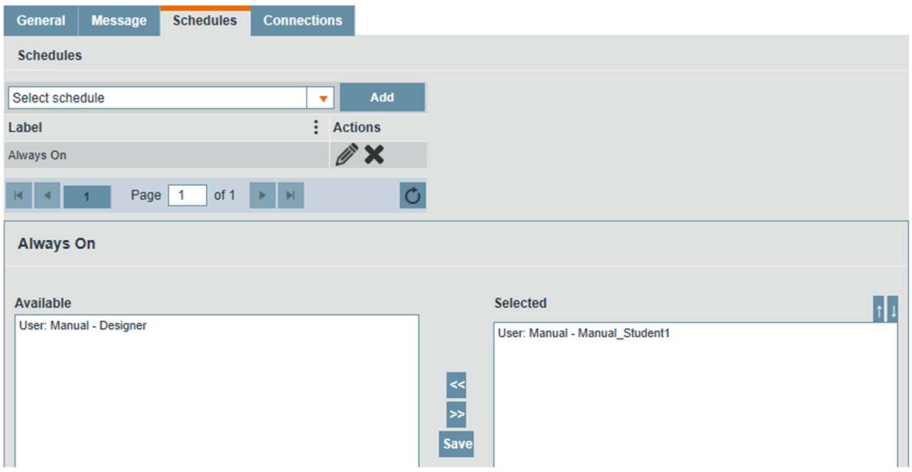
Check in Live, at application level (in our case at the SewerManagement node, in menu Notification - Schedulers), whether an 'always on' scheduler is available. If not create it:



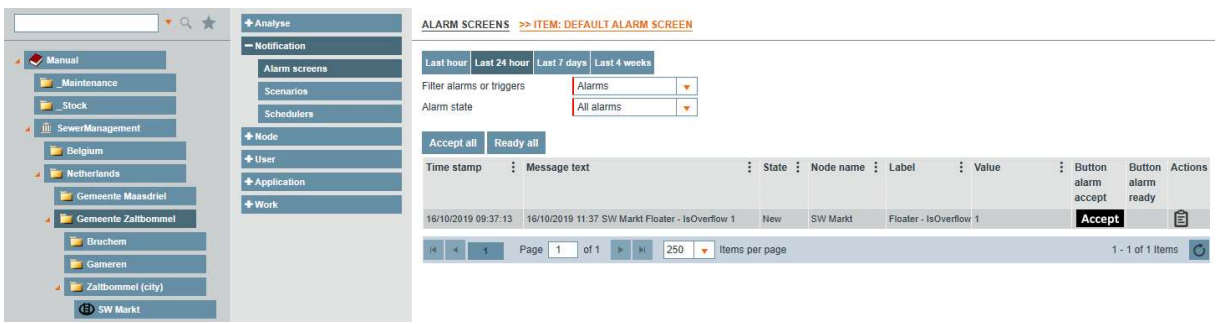
9.4.2 Scenario in Live

By synchronizing, a 'High Water Level' scenario was created in Live at the customer level (at ' Gemeente Zaltbommel '). We need to link the 'Always On' Scheduler.

At the General and Message tabs, the settings created in Design can be customized. At the Timetables tab, we add the "Always On" Scheduler to the Scenario. Then we click on the pencil icon of the Scheduler and add the users who need to get an email when the Alarm occurs.



After synchronization an alarm will be raised when Di1 is pressed for at least 1 second:



Notice that the communication led will blink one second after setting switch Di1 to on, and also when setting it to off.

Also an email message will be send to the email address of Manual_Student1.

Date:	***16/10/2019***
Time:	***09:37***
Location:	
Node name:	***SW Markt***
(Datapoint) label:	***Floater - IsOverflow***
Free text:	***Please contact Mr. Jones to discuss follow up actions.***
	Go to Avision

9.5 Recipes

A recipe can be used to create a subdivision within a period of a Scheduler. Recipes are only used by Scheduler of the Hardware type.

9.5.1 Create in Design

Recipes are created in Design and after synchronization they become available in Live.

In Design, in the menu, go to 'Activity elements', click on 'Recipes'. A grid is now shown with the recipes present. Clicking the '+' button in the upper right corner of the grid will display a screen for adding a new recipe.

Name : Enter the name of the recipe.

Datapoint type : Options : Analog, Digital, Word status and Text.

Recipe variant : Options : Fixed timestamps, Offset since start moment, Divided moments.

9.5.2 General Tab

The recipe settings can be edited after clicking the pencil icon.

The name and variant type can be changed here. Also 'Repeat' can be set on or off. The ‘Data point type’, however, cannot be changed after creating the recipe as this could cause problems in Live.

9.5.3 Recipe in Live

To be able to use a recipe in Live, it must be linked to a node and a synchronization must have been done.

In Live, a recipe can be edited and rules can be defined. These rules can only be created in Live.

9.5.4 Recipe Variants and Repeat

See the chapter about creating a recipe.

9.5.4.1 Offset since start moment

If offset is used, the effect is that the start time of a Scheduler line is taken and that the times of the recipe are added to it.

Example:
Suppose we have a recipe, data point type Digital, with two lines. Rule 1 says ‘ON’ after 00:01:00, and rule 2 says ‘OFF’ after 00:05:00. If this is in combination with a Scheduler where on Thursday at 15:14h a time slot starts and at 17:00h it stops, then the effect is that at 15:15h something is turned on and at 15:20h off and this will be up to 17:00h.

If the repeat checkmark has now been turned on, we will actually create a square wave! From 15:15h to 15:20h ‘High’, then 1 minute ‘Low’ and from 15:21h to 15:26h ‘High’ again, then 1 minute off etc. to 17:00h.

9.5.4.2 Divided moments

Using the ‘Divided moments’ option, the period of the scheduler's time slot is divided by the number of lines in the recipe. If the recipe contains 2 lines, half the time line1 applies and the other half line 2. If the recipe has 5 lines then each line has 20% of the time of the time slot.

Therefore, the moments of time in the lines are not used.

9.5.4.3 Fixed timestamp

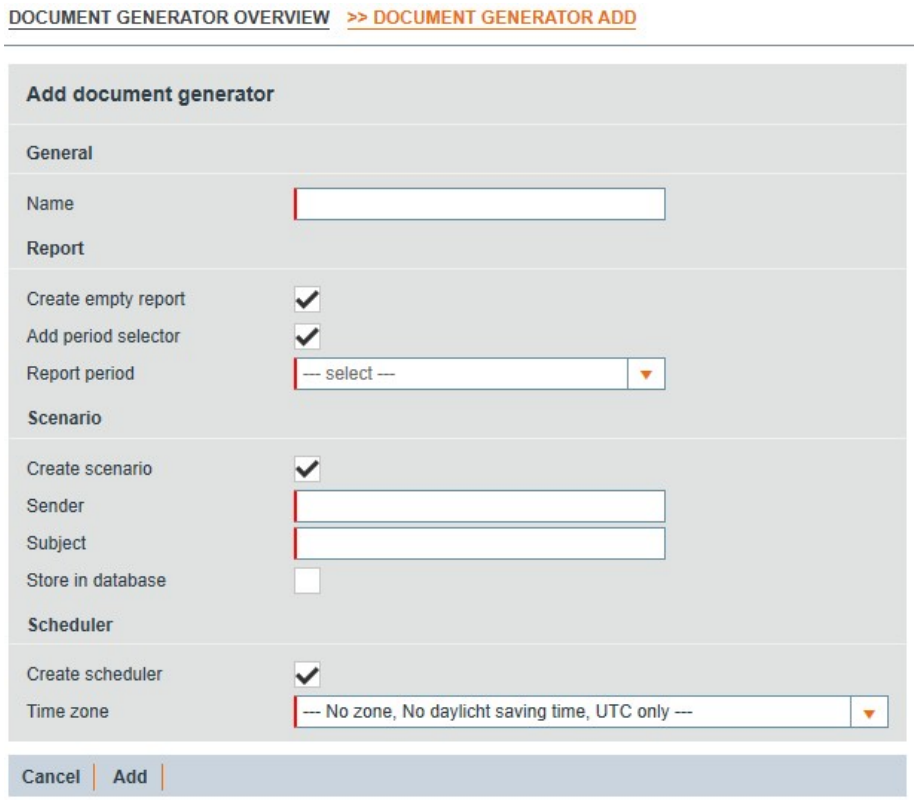
The times from the recipe are used as an absolute moment when an action will take place.

9.6 Document Generator

Using the document generator, you can easily configure the sending of a report. The document generator is a module where all the elements for generating and sending a report are in one menu.

9.6.1 Create Document Generator in Design

In Design, we first create a document generator. In the menu, at 'Activity elements' click on 'Document generator' to go to the document generator module. Click the ' + ' button at the top right of the grid. The input screen is now shown for creating a document generator.



General

- Name: The name of the document generator. (This name is used for all underlying elements).

Report

- Create empty report: This option is used to send an empty report.
- Add period selector: The period selector for the report to add.
- Report period: The period for the new period selector.
- Select report: Select the report to send.

Scenario

- Create scenario: Check this to have a new scenario created, or uncheck this to select an existing scenario.
- Sender: The sender of the message.
- Subject: The subject of the message.
- Select scenario: Select an existing scenario (only available when ‘Create scenario’ is unchecked).

Scheduler

- Create scheduler: Check mark this to have a new scheduler created or unchecked to use an existing scheduler.
- Time zone: The time zone for the scheduler to be created.
- Scheduler: Select an existing scheduler.

Click ‘Add’ button to create the document generator.

9.6.2 Add Document Generator to a Node

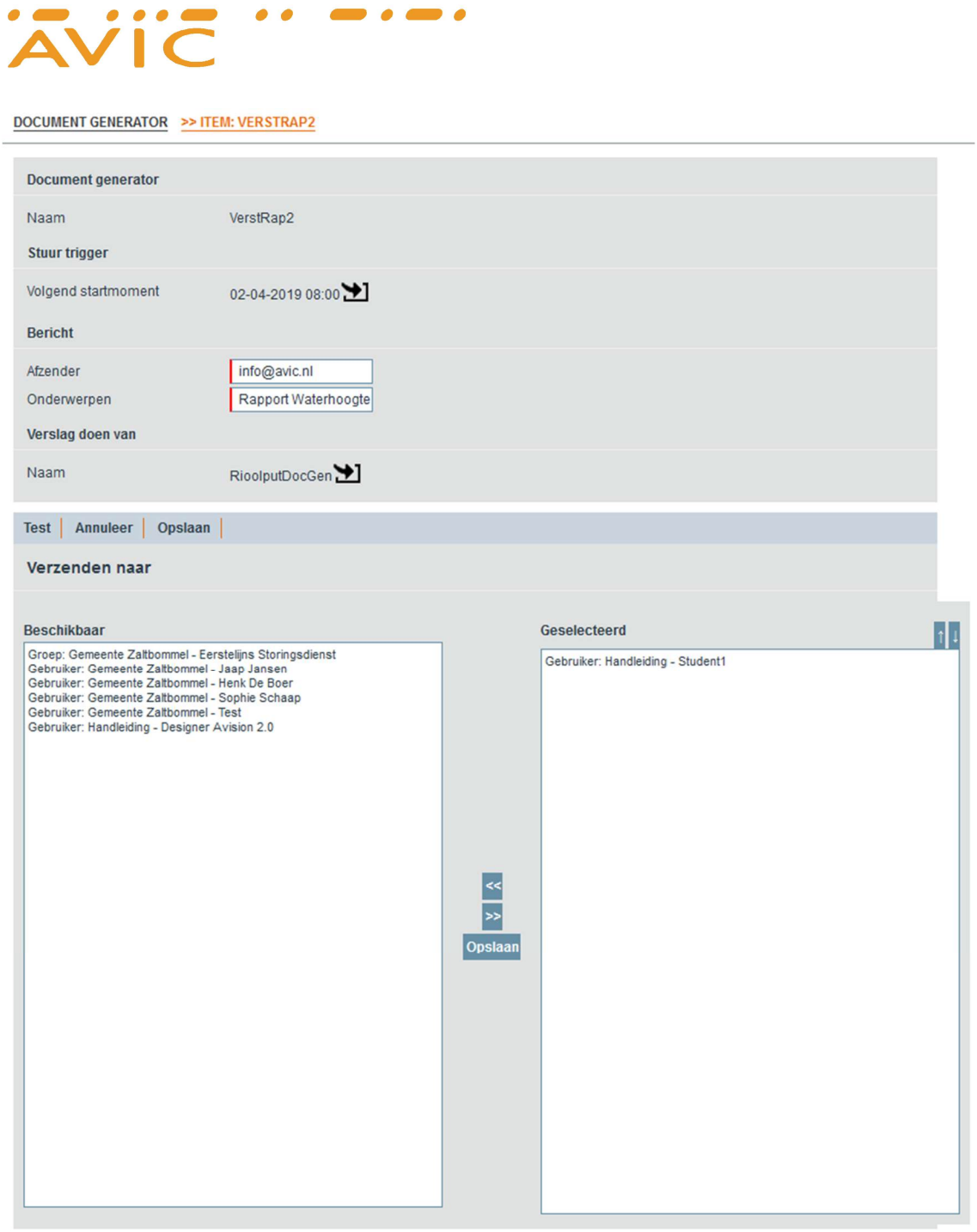
To be able to use the document generator, it must be added to a node. Usually this will be an asset node so that for each asset a separate report will be created.

When adding the document generator to a node, the child elements such as the timetable and the scenario are also added to the node.

9.6.3 Configure Document Generator in Live

To actually send a report, the document generator must be further configured in live.

By navigating to the node and selecting the Document Generator menu option in live, the screen below is shown.



To send the report, we need to activate the 'Send Trigger' and add the users/groups as recipients.

Document generator

- Name: The name of the Document generator.

Send trigger

- Next Start Moment: The date and time when the report will be send. And a button to navigate to the scheduler to configure moments of sending.

Message

- Sender: The sender of the message.
- Subject: The subject of the message.

Report

- Name: Name of the report. With the option to navigate to the report screen in live.

Test button
Use the test button to send the report immediately to the addressee.

Send to
Move the recipients of the report to the right hand column and click ‘Save’.

9.7 Tasks

In practice, a task is a frequently occurring activity that is performed as part of a workflow or a timetable.

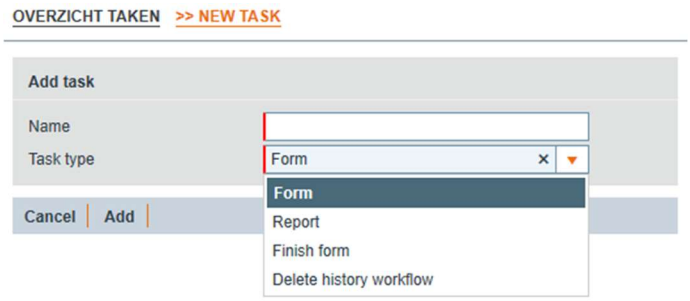
A task is a unit of work that can be performed by one person, usually within a not too long term from a few hours to a day. Tasks can be picked up by one person or by a group of persons who have a certain right because they fulfil a particular role.

What exactly constitutes a task must be cleverly chosen. Suppose a workflow involves the inspection of all fire extinguishers in a building; Depending on the number of fire extinguishers and floors, it may be useful to define a separate task ' check fire extinguishers ' for each floor.

A task can be to fill out a form or part of a form. For example, in a workflow for revising a pump, person A may inspect the pump and determine what needs to be done and register it in a form, person B performs the actual work on the same pump form and Person C (or again A) then performs a quality check and approves the pump by means of a signature on the same form after which a report is generated as the last task of the workflow.

9.7.1 Create Task

In Design, at the menu item 'Activity elements', click on 'Tasks'. A grid is now shown with the tasks present. Click the '+' button on the top right of the grid to create a new task.



Enter the name of the task and choose the type of the task.

Form: When the task is to fill out a form, choose form as type. After a form task, always a 'finish form' task should follow.

Report: Whether the job generates a report.

Finish form: See form.

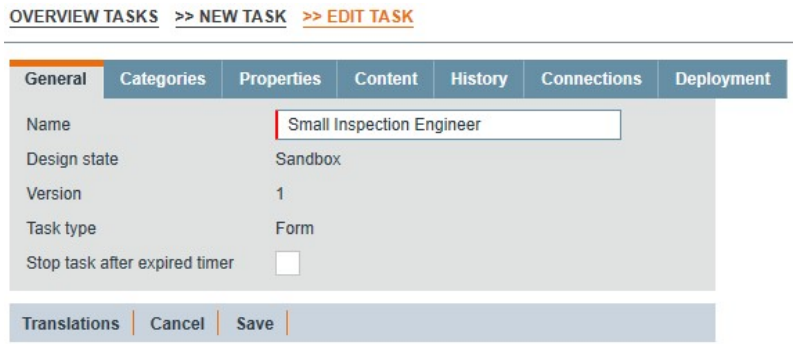
Delete Workflow history: If a workflow is aborted, this task can be done to start the workflow next time ‘clean’.

9.7.2 Complete/Edit Task Settings

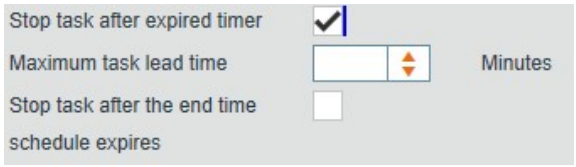
After a task has been created, it must be completed.

9.7.2.1 General Tab

At this tab the name of the task can be changed and ‘Stop task after expired timer’ can be check marked.



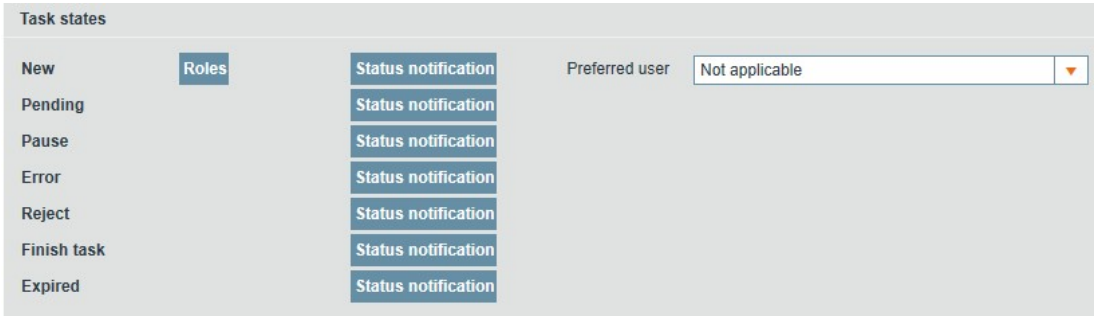
If 'Stop task after expired timer' is checked it can be indicated that the task must have been performed within a certain time and otherwise will expire.



9.7.2.2 Properties Tab

This is a tab where many settings can be done for the task.

9.7.2.2.1 Task States



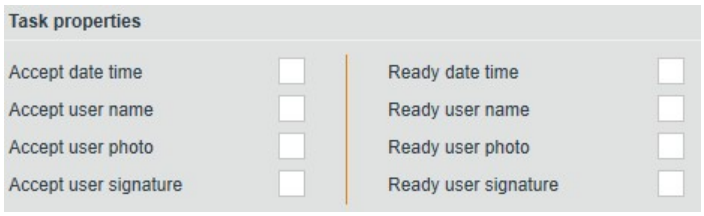
Roles: Here you can specify which role(s) a user must have (through UserTypes, see chapter x) to be allowed to perform this task.

Status Notification: When executing a task, it will step through a number of statuses. Scenarios can be associated with each step. A scenario determines who gets what message (see chapter x).

Preferred User: a task may be performed by several people. Here you can specify whether the next time the task is run, the same user will be able to run it again or another user or no preference ("Not applicable").

9.7.2.2.2 Task Properties

Here, special fields must be ticked with information for a form or report if needed by a section. For example, if a form needs to have the date and time of the start of filling in fields, the field 'acceptance date time' must be checked.



9.7.2.2.3 Leadtime Triggers

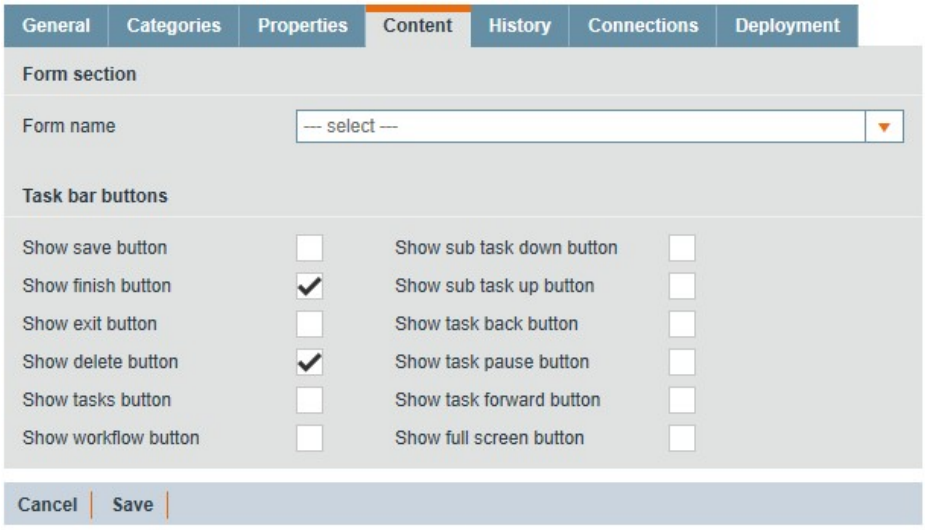
Tick the 'Enable lead time' field if the task's lead time needs to be monitored. Notifications can then be sent if a task takes too long or runs too quickly.

9.7.2.3 Content Tab

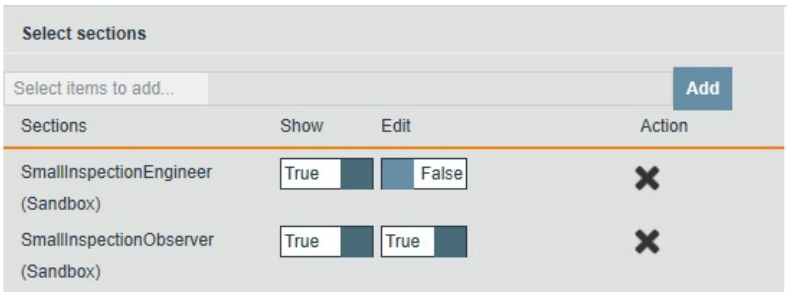
The content of the Content Tab depends on the chosen task type.

9.7.2.3.1 Task Type Form

For a form type task, you must choose the form to be filled in with this task and specify which buttons on the taskbar should be visible when the form is filled out.

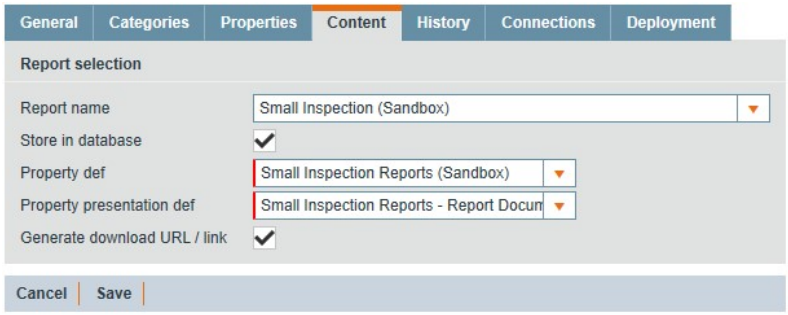


Below it can be indicated which sections of the form are visible and/or change for the person (s) who perform (or perform) the task.



9.7.2.3.2 Report Type

Choose the report to be generated by the task and specify whether the report should be saved and what property.



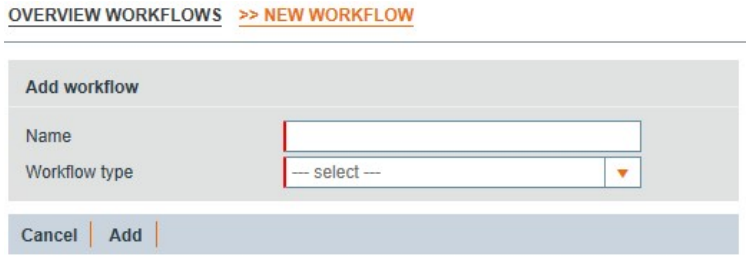
9.8 Workflow

A workflow is a collection of work that must be done to obtain a certain result. This work is to be translated into tasks (see Tasks). In a workflow, we can specify the order in which the tasks are to be performed.

A workflow can be started manually but also automatically by a scheduler.

9.8.1 Create Workflow

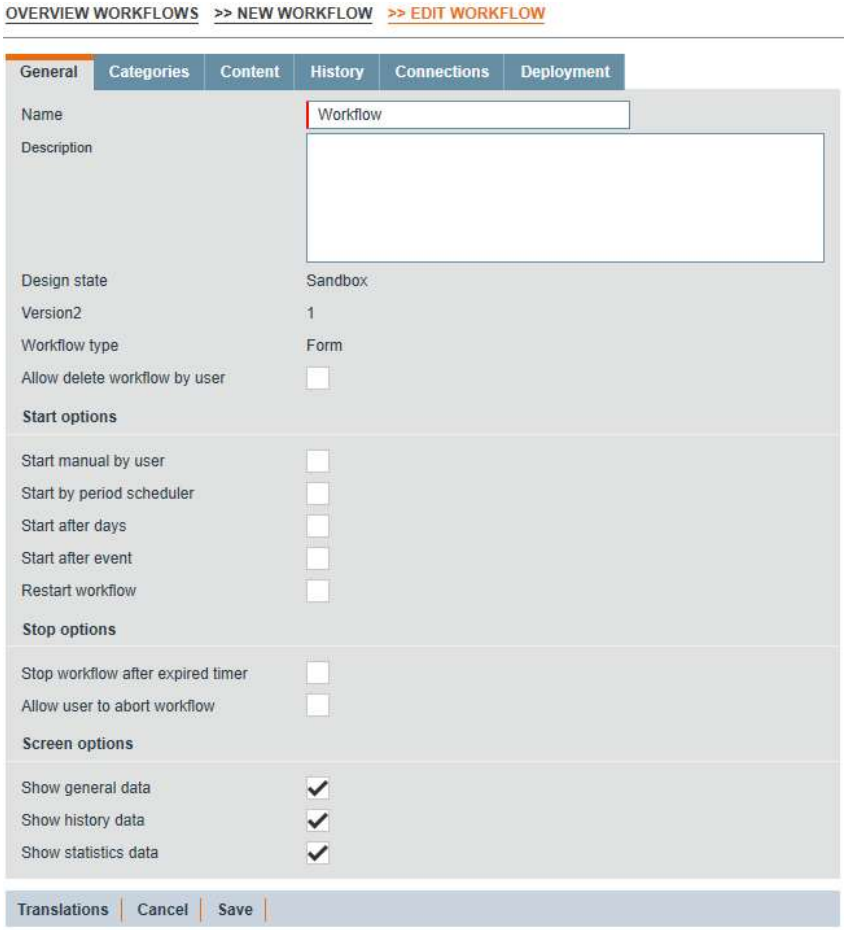
In Design in the menu under 'Activity elements' choose 'Workflows'. In the grid, the existing workflows are shown. To create a new one click on the ' + ' button.



Enter the name and choose the Workflow type, either ‘Document’ or ‘Form’, and click Add. 'Document' is for the 'Document generator'.

9.8.2 Edit

9.8.2.1 General Tab



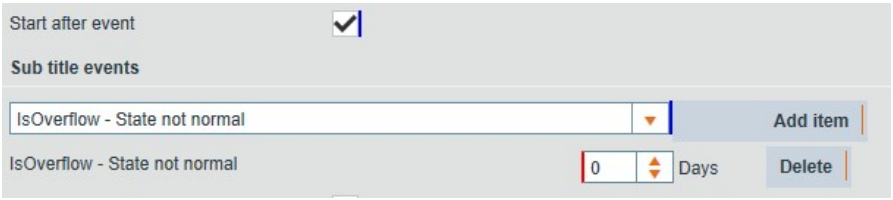
Name: Name of the workflow in design. Can be adapted here and also translated.
Description: Write down in plain text what the purpose is of the workflow, what the result should be, who will use this, etc..
Design state: Workflow status in design.
Version: The version number of the workflow.
Workflow type: This option is only editable when adding. Choices are Document and form.
Allow delete workflow by User: Check this so the user can delete instances of this workflow.

Workflow start options

Start manually by user: The workflow can in live be started by a user (as opposed to 'by scheduler')
Start by scheduler: When checked a scheduler must be selected:

Start after days: When checked following extra options are presented:

Start after event: When checked extra options will be presented.

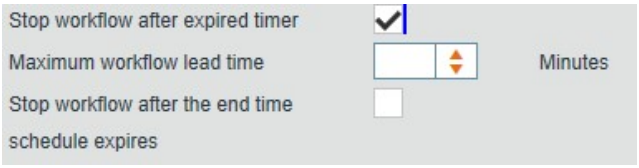


When the event occurs you can indicate here the number of days after which the workflow will be restarted.

Restart workflow: Indicates whether a new workflow instance can be restarted if an instance of this workflow is already active.

Stop options

Stop workflow after expired timer: When checked, two options more will be presented**:**



Maximum workflow leadtime: Indicate the time after which a workflow expires (in minutes).
Stop workflow after endtime: Check this to end the workflow when the workflow is expired.
Allow user to abort workflow: Tick this when the workflow can be aborted by a user.

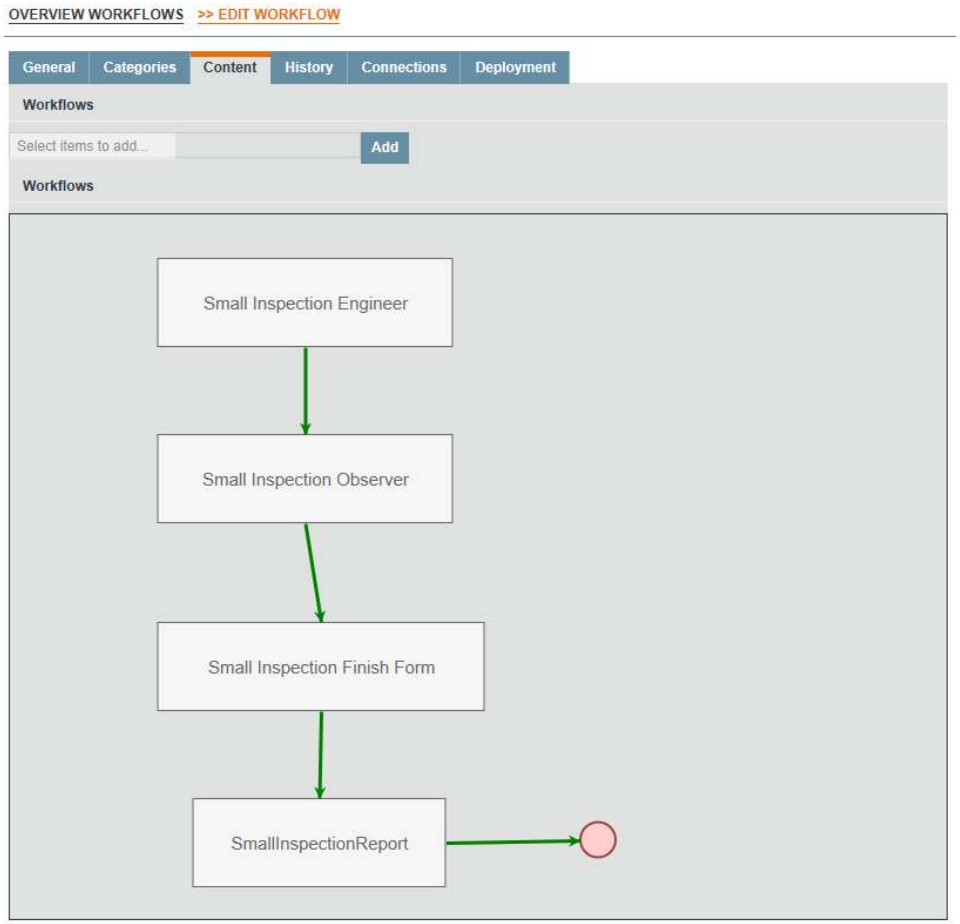
Screen options

The choices below ensure that live workflows do or do not display certain items.

Show General data: Whether or not to show general data workflow and the ability to accept and extract tasks.
Show History: Shows the history of when workflows are created and stopped, in a grid.
Show Statistical data: Shows the tasks the workflow has.

9.8.2.2 Content Tab

In this tab, the workflow can be composed from the available tasks and the order and conditions under which a task becomes active are defined.



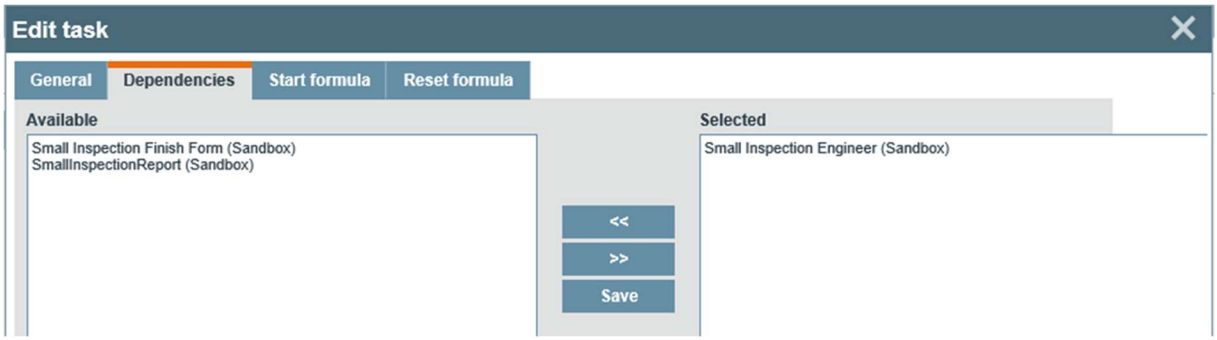
In a new workflow, there is only a red ball in this screen. This is the end of the workflow.

Using the Add button tasks that should be part of the workflow can be selected. Once on the canvas the tasks can be ordered.

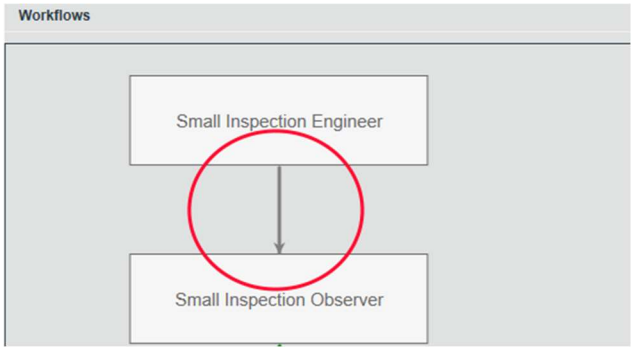
For every task a start conditions must be set, except for the first task to be executed when a workflow is started. There, no start condition is set. Tasks without a start condition are started when the workflow is started. The start condition of a task can be set by clicking it twice. After the first time a dotted line will be drawn around the task to indicate it is selected. It can be dragged over the canvas. Clicking it again will show the popup 'Edit task'.

9.8.2.2.1 'Edit task' popup

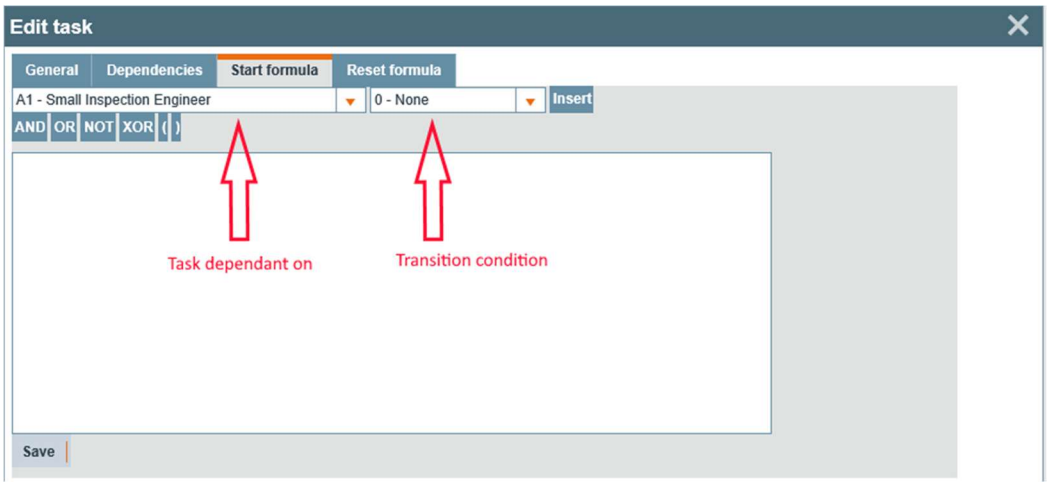
When the popup opens, the ' Start Formula ' tab is displayed. Here, we can create formulas that determine whether the job will be started. First, however, you must indicate what other tasks this task depends on. This is done in the 'Dependencies tab'.



Avision understands that the start of task 'Small Inspection Observer' depends on the task 'Small Inspection Engineer' but doesn't know the exact conditions because the formula has not been made yet. Therefore, the arrow is gray.



We can now fill in the formula in the 'Start Formula' tab (of the task 'Small Inspection Observer').



Eight transition conditions have been defined:

Transition Condition	Value	Description	Color of the arrow
None	0	Default value to indicate that no transition condition has been selected	gray
New	1	Task is started	purple
Pending	2	Task is running	blue
Paused	3	Task has been paused	orange
Error	4	Task has been stopped because of a failure	red
Reject	5	Task has been rejected	black
Finish task	6	Task is finished and is stopped	green
Expired	7	Task was stopped/will no longer run	pink

To indicate now that the task ‘Small Inspection Observer’ should start when the task ‘Small Inspection Engineer’ is finished, we set the Transition status field to ‘Finish task’ and click the ‘Insert’ button. This causes the text "A1. Value = 6 " to be written in the formula generator. Click "Save" to save this formula.

The arrow that was first gray has now become green.

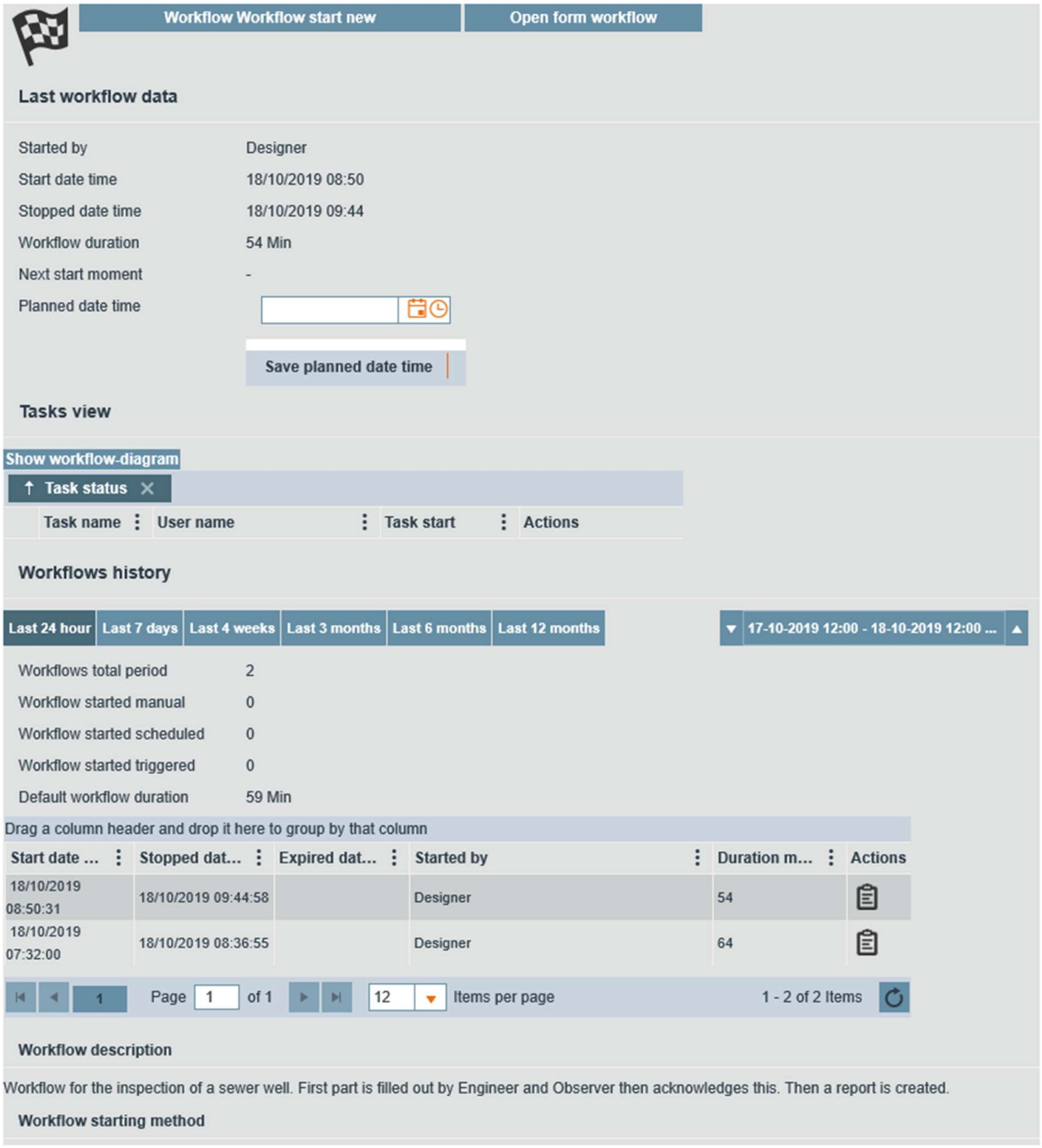
9.9 Tasks and Workflows in Live

A Workflow will usually be linked to an Asset node in Design, but it can also be linked to other nodes. It can be added to Structure nodes, Asset nodes, and Object nodes.

In this chapter, we continue with the workflow as created in the previous chapter.

On the asset node, in the menu, click Workflows. Since we only have one workflow this is immediately shown in the screen (if we had multiple workflows a grid would have been shown).

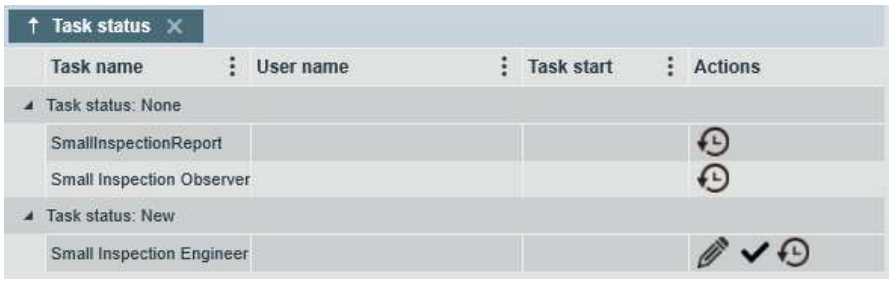
On top of the screen we see two buttons, ‘Workflow start new’ and ‘Open form workflow’. With the first button the workflow is started and nothing more. The second button the workflow can be started and will present the first task with a form.



We'll start the workflow with the 'Workflow start new' button: the buttons disappear, and a runner is shown  top left to indicate the workflow 'runs'.

The 'Task status' part of the screen shows the tasks, who has been working on them and when it was started.

We're logged in as Manual_Student1 and have rights to perform both the role Engineer and of Observer. In practice these would be two separate people who will only be able to run the tasks meant for them.



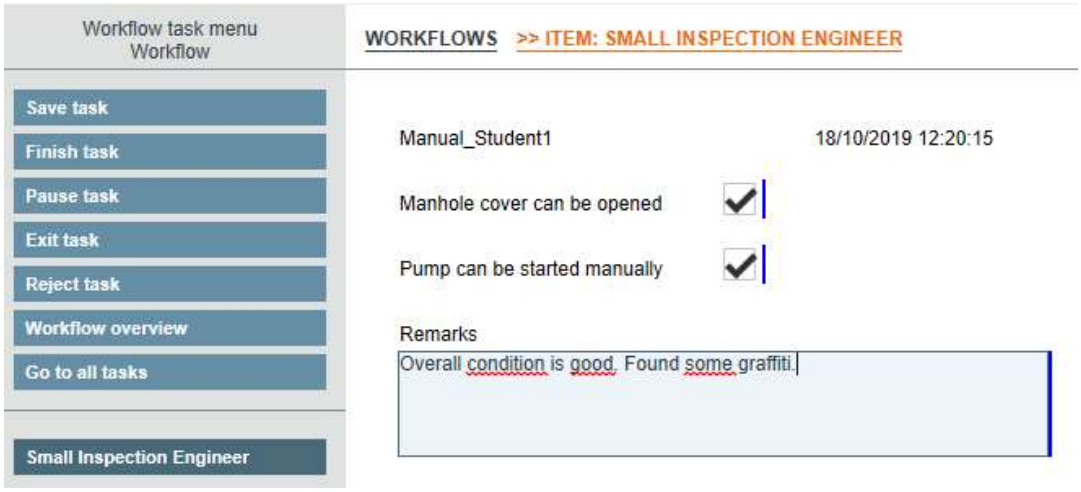
We can see a task is ready to be accepted by the Engineer. Only when the engineer is finished can the Observer accept his task. (We deliberately created it this in the workflow).

	Administrator only: Shows a popup in which the task can be assigned to another user (e.g. in case of illness).
	Accept/Start the task.
	Shows the history of the task.

After accepting/starting the task, the checkmark disappears and two other icons appear:

	Run task
	Stop the Task

When clicking the 'Run task' button a form is opened :

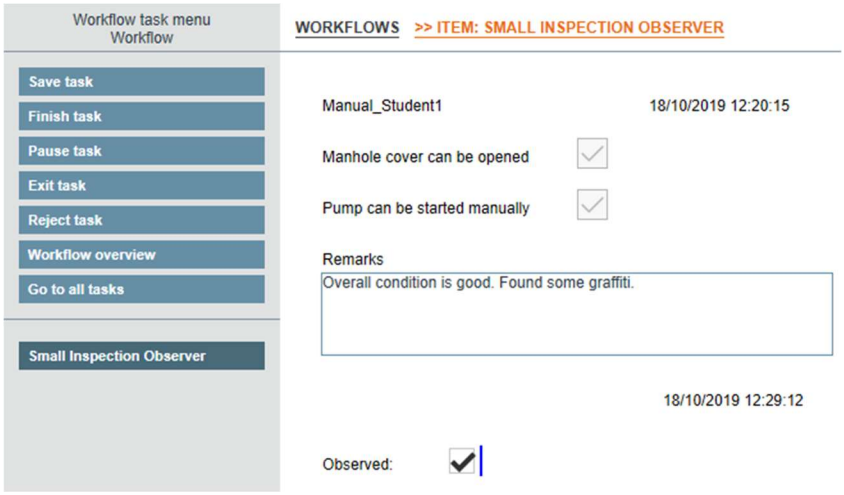


Figuur 9-1: Task started; form is fileld out by the Engineer.

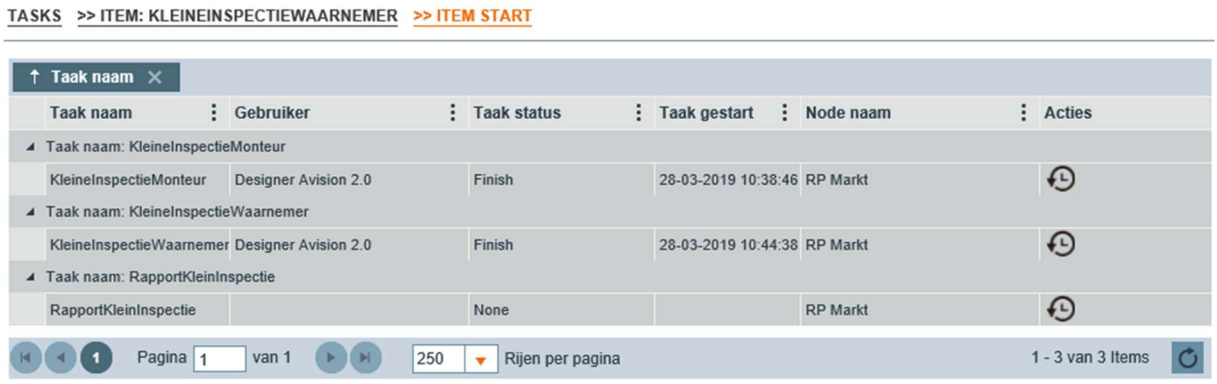
The task only shows that part that is to be seen by the engineer.

On the left, we see a column of options for this task. To save the form click on ' Save '. To end the task, choose 'Finish Task'.

Because the Engineer has finished his task, the Observer can now complete the next task. (Caution: After finishing a task it takes a few seconds for the next task to be picked up).

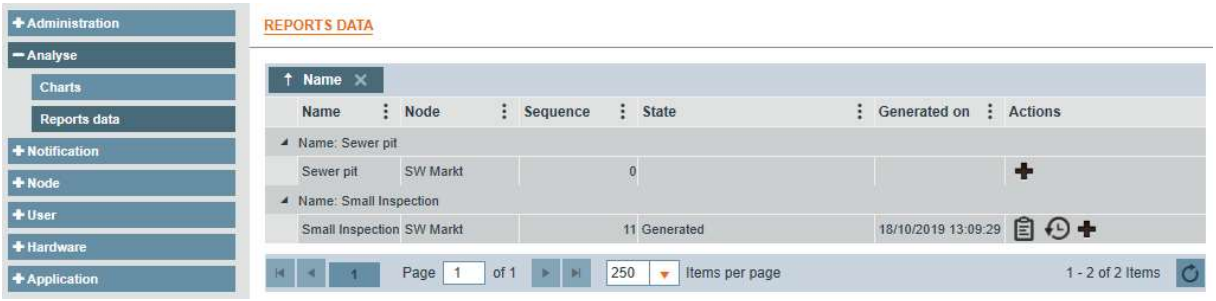


The form as seen by the Observer. The top part has been edited by the Engineer and cannot be altered by the Observer. The lower part of the form is for the Observer and never visible for the Engineer. Here the Observer can check the box to indicate he has seen the remarks of the Engineer. Then the Observer finishes his task.



After the Observer's task is finished, the process automatically continues to the next task, 'Finish Form'. This is a task is run in the background and is usually finished within a second. Immediately the next task, generating a report, is started. This task is also finished within a second, after which all tasks are finished.

The grid for the reports (we're still at the assets node, menu item Reports data) now contains the report generated in the workflow:



By clicking the clipboard icon we can see the last generated report.

10 User Elements

By logging in to Avision, a user is given rights to view or modify certain data and perform certain tasks.

10.1 Users

Users are created in Live. A user exists only within the own application, and also has only rights within the own application. If an underlying customer application is created, a user of the parent application does not have access to it. (By ' Impersonation ' it is possible to work as someone in that client application).

Rights are given to a user through User Types, which contain Roles. Furthermore, access can be arranged to certain modules by using Access Keys and Categories.

A user must have a last name.

10.1.1 PIN

The mobile phone number and e-mail address must be unique. This means that if a mobile phone number and an e-mail address are used by multiple users, this can only be possible in Avision if a PIN number is filled in. Avision allows the use of the same e-mail address or mobile phone number only if those users have the same PIN number.

This PIN number is a random number. It is not stored encrypted (which, in contrast, does happen with passwords in Avision).

10.2 Roles

Roles give certain rights to a module. Rights that can be distributed are Show, Edit, Add, Delete, and Copy.

Roles are created in Design and are associated with user types (so they are not directly linked to users).

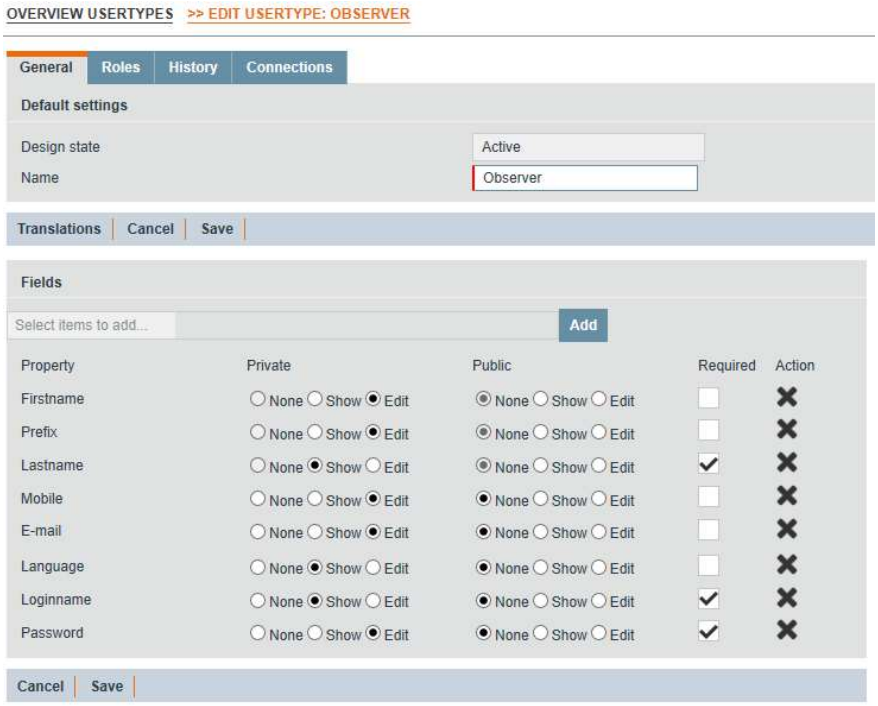
10.3 User Types

User types contain a collection of one or more roles. A user type is associated with a user, and the user is granted rights to a module. A user type also indicates which fields the user is allowed to see if they see their own user information and which fields are presented when looking at another user's data.

User types are created in Design.

10.3.1 General Tab

In The General tab, the name of the user type can be changed. In the section below that, we indicate the fields that are visible through this user type.



Here we also indicate what the user, because of this User Type assigned to him (or her), is allowed to do with these fields. These rights can be different for every field depending on whether they are his data (Private) of the data of other users (Public). Also we can indicate here whether the fields are mandatory (required).

10.3.2 Roles Tab

In this tab, we link the desired roles to the user type. Here we can also indicate which categories' rights are received based on the role. When no categories are indicated then 'All categories' applies. For more information on categories see Chapter X.

There is also a column 'Design/Live'. This works as follows: Is the setting ' Design mode ' then the right is automatically handed out. If it is on ' Live mode ' then it is optional to add in Live (the user who distributes the rights in Live must of course have sufficient rights).

10.4 Practical Example

Do-it-yourself block in which a user is created

We want to create a simple user who can only work in Live (not a designer). This is an employee of the municipality of Zaltbommel that we want to give the right to monitor drains within that municipality.

We assume a user Type 'observer' that has two roles: ‘SewerWellMonitor’ and ‘SewerWellReporter’

10.4.1 Create Roles

We will first create two roles. One role is to give the user a show right for monitor screens. The second role gives rights to write a report.

- In Design, go to menu item ‘User elements’, ‘Roles’.
- Click the ‘+’-button to create a new role.
- Enter as name ‘SewerWellMonitor’ and click klik ‘Add’.
- In the edit screen, check mark Show at module Screens and click ‘Save’.

Now for the role ‘SewerWellReporter’:

- In Design, again, go to ‘User elements’, ‘Roles’.
- Click the ‘+’-button to create a new role.
- Enter as name ‘SewerWellReporter’ and click ‘Add’.
- In the edit screen add check marks at module ‘Reports data’, rights Show, Edit and Add.
- Click ‘Save’.

We also create a role ‘Employee Municipality Zaltbommel’ to be able to show the user data.

- In Design, go to ‘User elements’, ‘Roles’.
- Click the ‘+’-button to create a new role.
- Enter as name ‘Employee Municipality Zaltbommel’ and click ‘Add’
- In the edit screen add check marks at module ‘Users’, at the ‘Show’ and ‘Edit’ rights.
- Click ‘Save’.

10.4.2 Create User Type

We’ll create a user type named ‘Observer’.

- In Design, go to menu item ‘User elements’, ‘User types’.
- Click the ‘+’-button to create a new ‘User type’.
- Enter as name ‘Observer’ and click ‘Add’.
- In the edit screen, General tab, at ‘Fields’, add : Last name, E-mail, Login name, Mobile, Language, First Name, Prefix, Password.

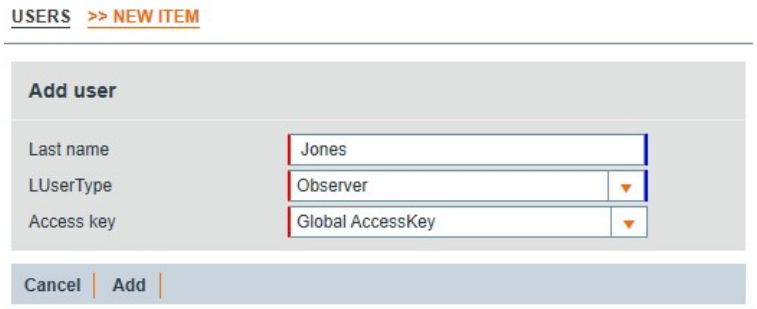
- Set the radio buttons according to above screen shot and click ‘Save’.

- At the Roles tab, select the roles we created earlier: ‘SewerWellMonitor’, ‘SewerWellReporter’ and ‘Employee Municipality Zaltbommel’, and click ‘Add’.

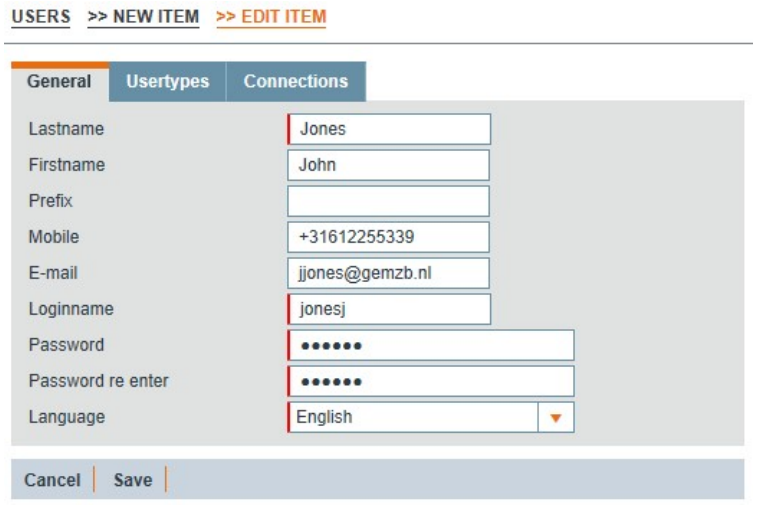
10.4.3 Create New User

Let’s leave Design and go to Live. Because we’re going to create a new employee for the municipality of Zaltbommel, we go to that node and open the menu, item ‘Users’.

Click the ‘+’-button top right of the users grid. Enter the last name (i.e. Jones), and at the user type field select ‘Observer’. (Access key leave it to ‘Global AccessKey’).

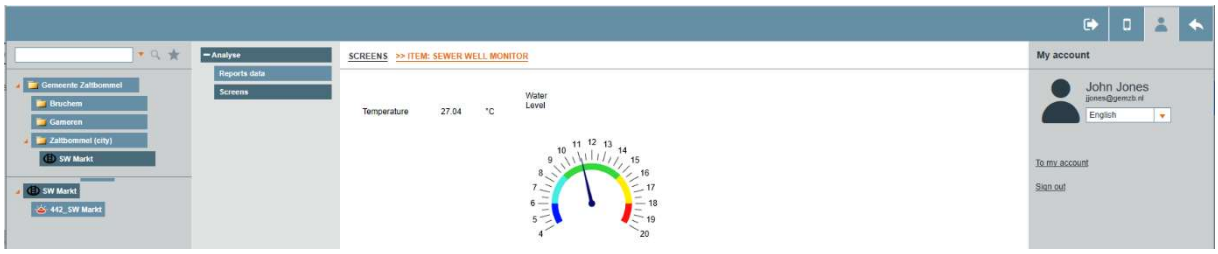


After creation, the edit screen is automatically opened to enter data in other fields:



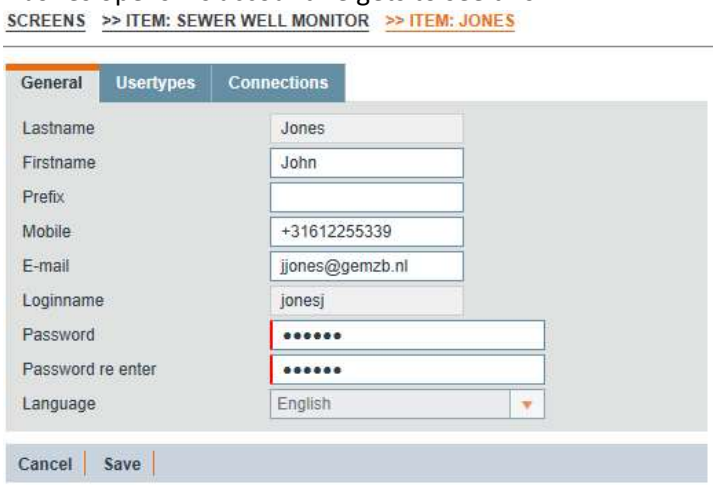
- Click on ‘Save’.

If we now logout and then log in as John Jones we see this :



Wat valt op:

- The highest level for user John Jones is the node ‘Gemeente Zaltbommel’.
- The menu only shows 2 items; reports and screen. The role SewerWellMonitor gives Show rights for the Screens module, the role SewerWellReporter gives Show, Edit and Add rights for reports.
- If Jones opens his account he gets to see this:



- From the role ‘Employee Municipality Zaltbommel’ Jones can change his first name, prefix, mobile (cell) phone number, his email address and his password. He’s also able to choose a different access key at user type Observer.

11 Application Management

11.1 Styles

Styles determine the font, text color, and color of the background of a text in a monitor screen, form, or report, and the background color of a section.

A style does not determine the layout of the application or the color of the menu buttons. This can be adjusted in the ' GUI Application style ' module in Live.

When creating the application, three Default Avision styles were inherited.

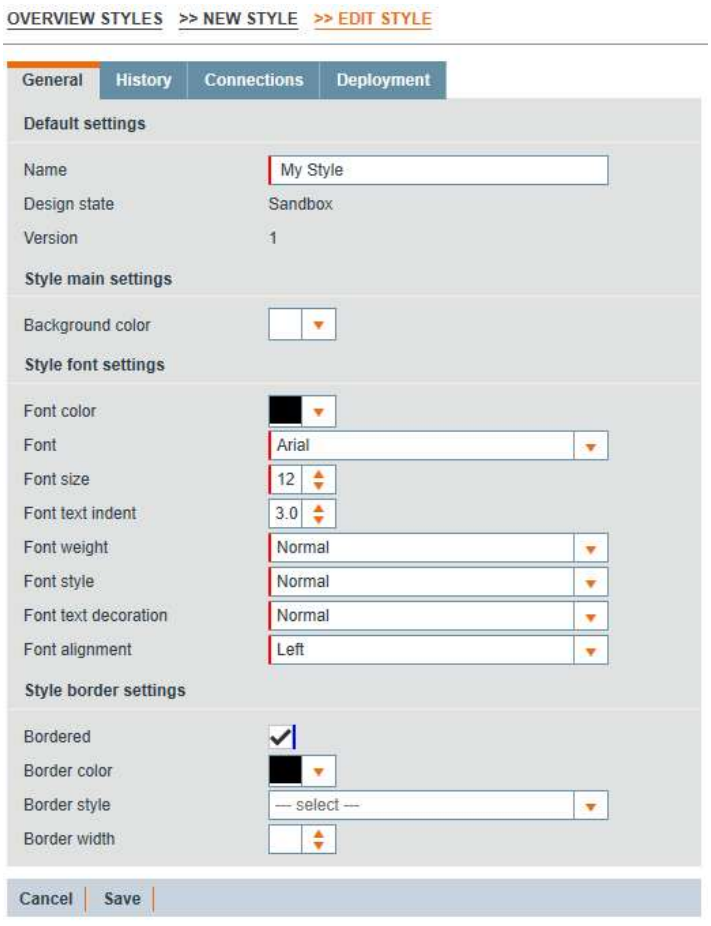
11.1.1 Creating New Style in Design

A new style can be created by clicking on the ' + ' button. (But remember that it might be smarter to take an inherited Avision style and adjust it).

When creating a new style, just enter a name.

11.1.2 General Tab

Here the Style can be edited.



11.1.2.1 Style main settings

Background color : Background color.

11.1.2.2 Style font settings

Font color : Text color.

Font : Options are Arial, Calibri, and Courier.

Font size : Size of the font in points.

Font text indent : Indentation of the text inside a text box.

Font weight : Normal or Bold.

Font style : Normal of Italic.

Font text decoration : Normal, Overline, Line through, Underline.

Font alignment : Alignment of text in a textbox. Options are : Left, Centered, Right.

11.1.2.3 Style border settings

Bordered : When checked other options become available for the borders (color, style and width).

Border color : Select a color.

Border style : Dashed, dotted, double, solid.

Border width : Thickness of the border in pixels.

11.2 Application Types

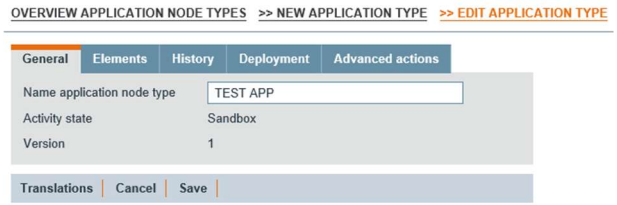
An ' Application Type ' is a package of items that can be inherited to a new application for a (underlying) customer. When creating a new client application, multiple application types can be given.

11.2.1 Creating an Application Type

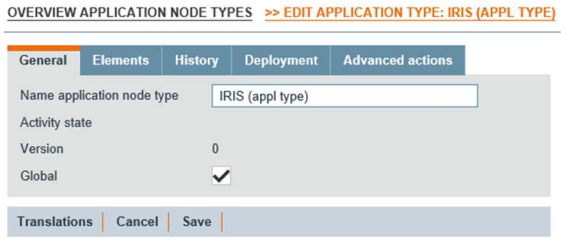
In Design, at the menu item ‘Application Management’, click the ‘+’-button top right in the grid. The ‘Add application type’ screen is shown where a new application type can be added. Only a name needs to be entered. After clicking the ‘Add’ button a new application type is created.

11.2.2 General Tab

The name of the Application Type can be edited here.



AVIC employees have the extra option to indicate the ApplicationType can be used by all Applications.



11.2.3 Elements Tab

In this tab the package of distributable items can be composed. First select the type of item you want to add to the package (at ‘Select element type’) and click ‘Edit’ after which a left-right screen is presented or click ‘Add all elements’ to immediately add all items (of all types) of the current application to this new Application Type.

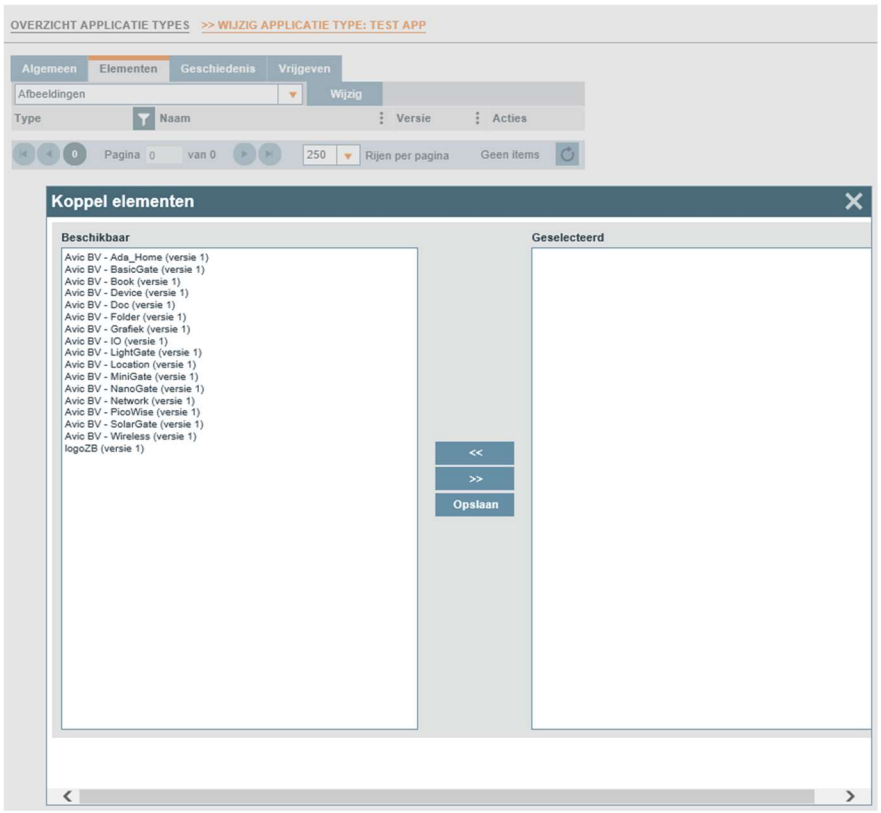


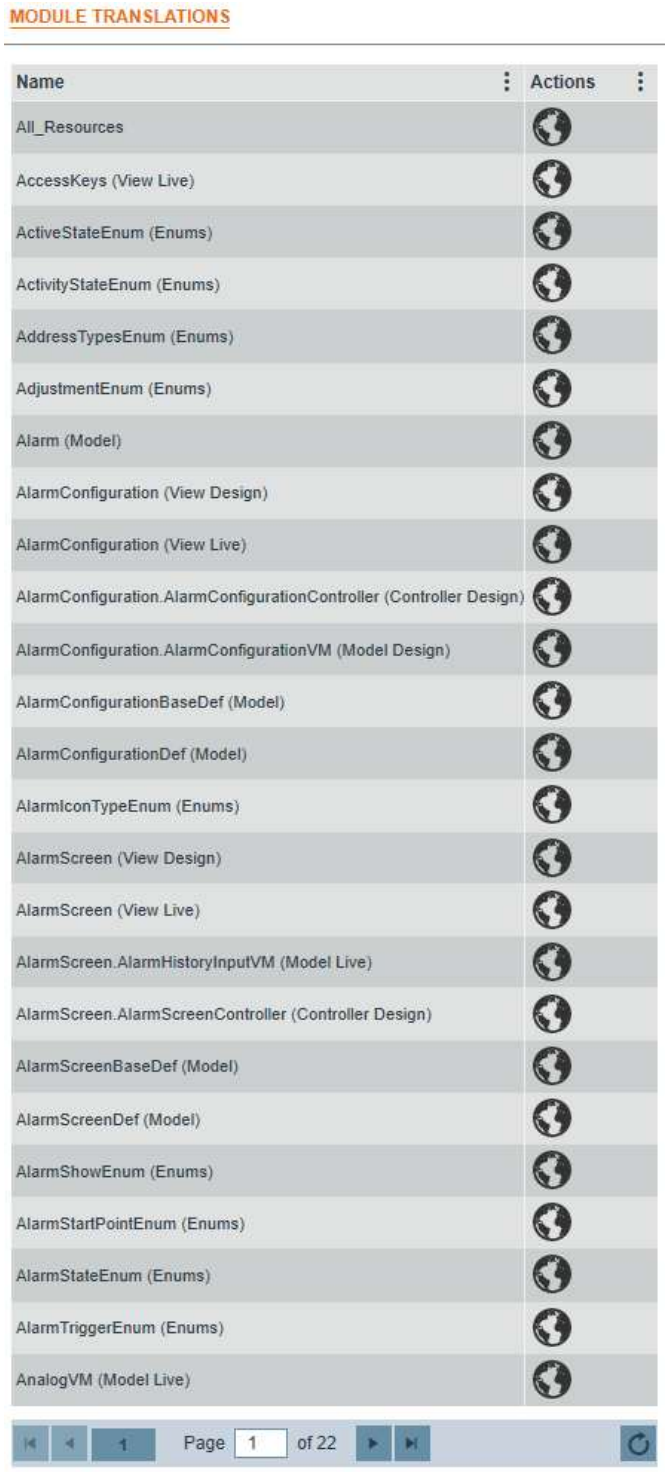
Fig. 11.2.3.1 After clicking the 'Edit'-button a left-right screen is presented.

11.3 Module Translations

Using ‘Module Translations’ texts (i.e. names of fields) can be translated. This is an option that will in principle only be used by AVIC employees. In a single case where a module has been specially developed for a customer, the customer will be able to use this module in his environment to translate texts.

11.3.1 Overview

- Log in as AVIC-employee
- At Avic B.V. go to Design, menu ‘Application Management’, item ‘Module translations’



The Overview shows in alphabetical order of all Modules the views, enums, and models where texts can be translated. The first option, 'All_Resources', is a link to all the texts in the Resource table.

11.3.2 Translate

By clicking on the globe icon behind an item, the translation module for that view, enum or model is opened.

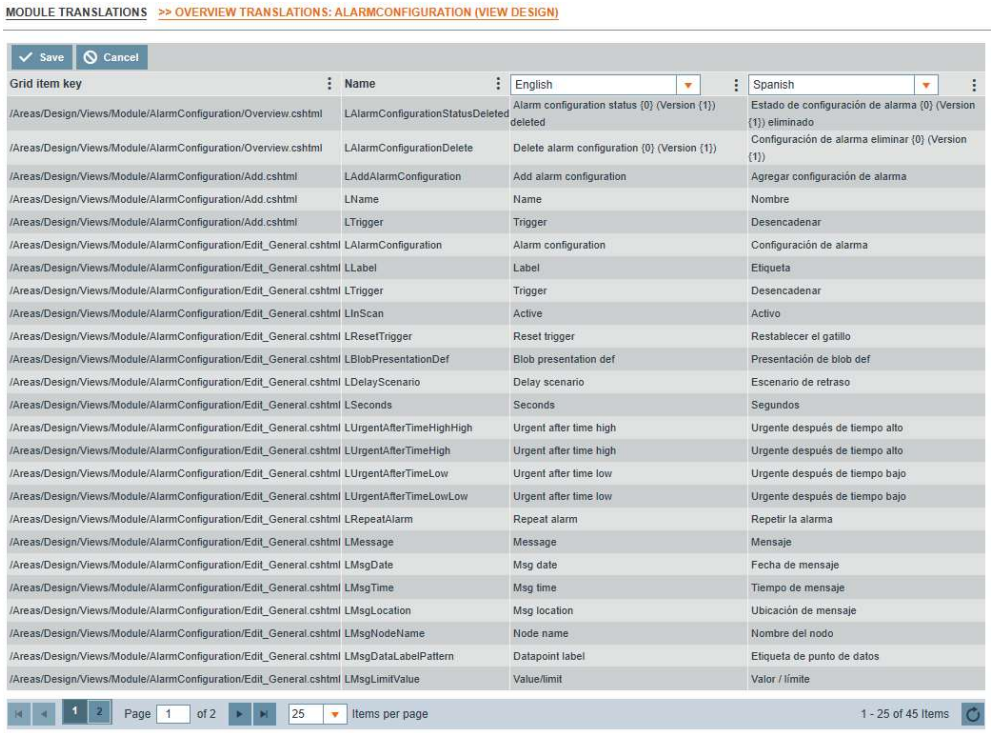


Fig. 11.3.2.1: Example of Translation of texts in the views of the module AlarmConfiguration in Design

Grid item key : Contains the path to the view.

Name : This name is shown in the language column if there is no translation for the text yet.

The following are two columns where the first column shows the texts in the ' from ' language and the second column in the ' to ' language. A translator selects in the left column A language whose texts are good and selects in the second column the language where the texts are still to be filled in or modified.

By clicking in the right hand column on the field that needs to be translated, the contents of this field can be changed.

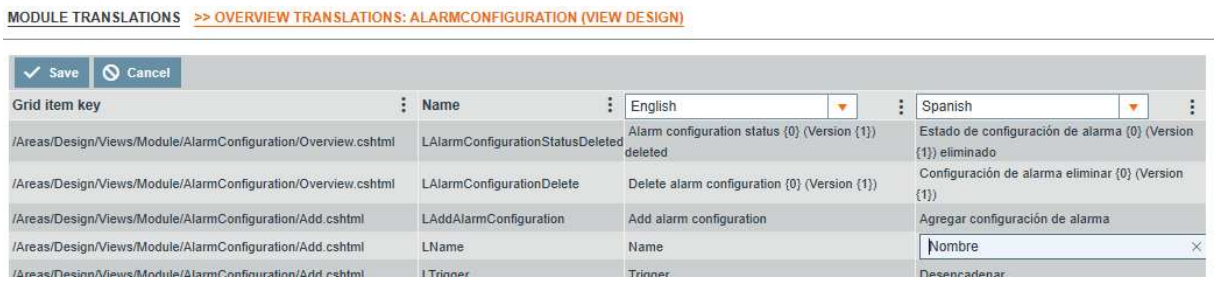


Fig. 11.3.2.2 Translation from English to Spanish

If after change the field is left, there will be a red triangle in the upper left corner of the field. This way, all fields in the right column can be adjusted.

After clicking on the ' Save ' button above the grid, the changes are saved. Depending on the language of the logged in user, they will be displayed.

11.4 Generic Translations

Generic Translations is a module for Translating texts that occur in many places (many modules) in the program, for example the text on the Save button (at General) or error messages (at Error).

This module is only used by AVIC employees.

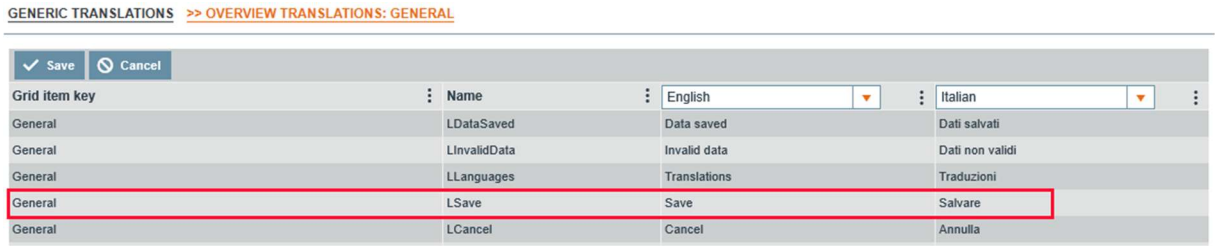


Fig. 11.4.1: The text for the Save button translated to Italian

The operation of the translation grid is the same as for other translation screens (such as Module translations).

11.5 Event Configuration

See Event History.

12 Live Modules

This chapter describes typical Live modules. These are modules that do not appear in Design.

12.1 Access Keys

Access keys can be used to arrange entry to a Node. Therefore, access keys work only in Live. To access a node, both the user and the node must have a matching access key.

Nodes that are always accessible for users created on a higher node have the 'Global access key'.

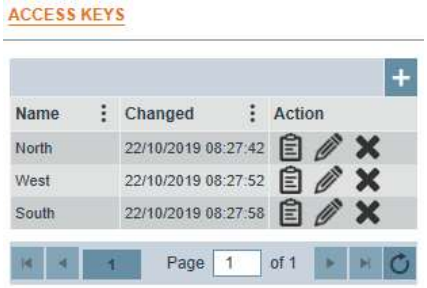
12.1.1 Module Access Keys

In Live, a list of access keys can be created at any level. Most likely, the keys will usually be created at the customer level in order to create an area partition.

Example: A company has three working regions, West, North and South and wants mechanics to work region-bound. A mechanic for region South may only access nodes for that region. In the access keys module, three keys are created: West, North, South.

Do-it-yourself block where you will create three Access Keys.

- In Live, go to the node on client level.
- In the menu, go to Node, and then to item ‘Access keys’.
- A grid is now displayed with the existing access keys. Click the ‘+’-button in the upper right corner of this grid to open the Add screen.
- Enter the name of the new access key, i.e. ‘North’.
- Do the same for ‘West’ and ‘South’.

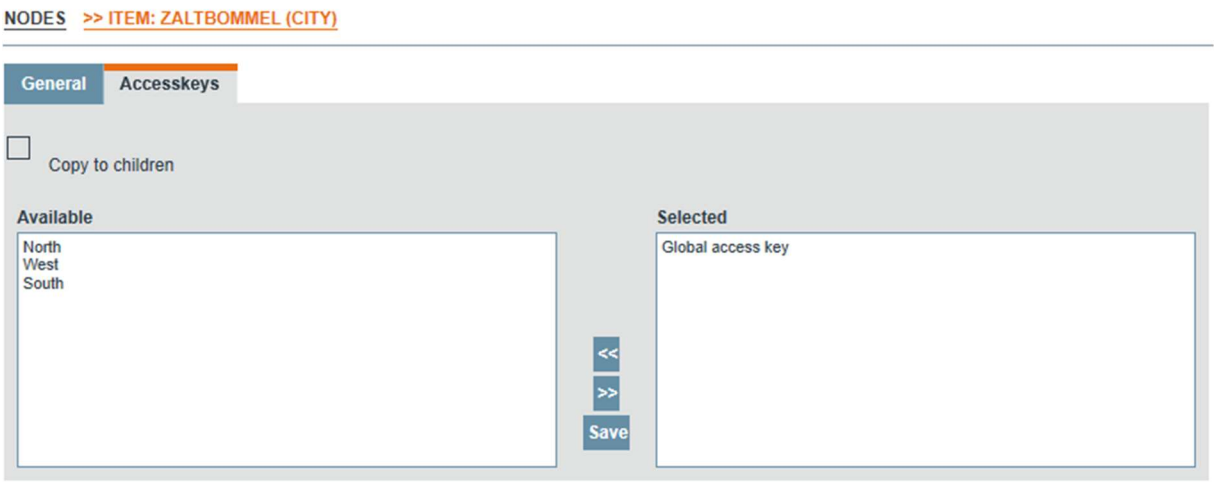


12.1.2 Adding Access Key to a Node

At any level access keys can be added to nodes but usually the simplest way is to add them from the level they were created.

- At client level, in the menu go to menu item Nodes.
- In the nodes grid, click the pencil icon of the node we want to assign an access key to.

- Go to the tab ‘Access keys’.

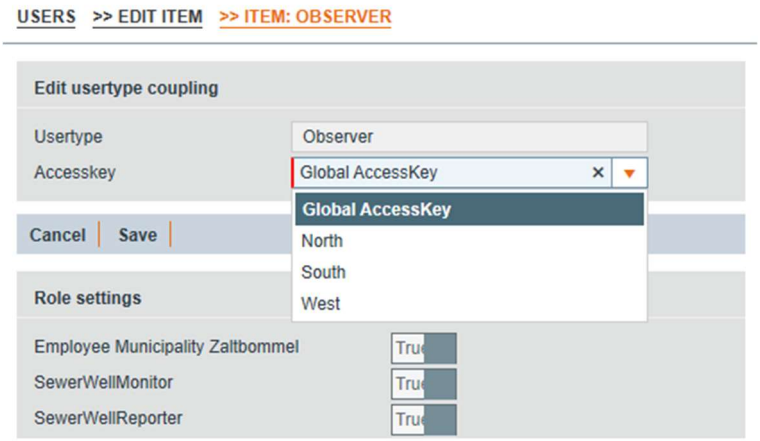


- In the left hand column you’ll find the available access keys, on the right hand side the already selected/coupled access keys. When no access key was coupled to the node it will show ‘Global access key’.
- Check mark ‘Copy to children’ to assign the access key also to nodes below the selected node.
- Select the appropriate access key(s), click the double arrow and then ‘Save’.

12.1.3 Adding Access Key to User

Adding the access key to a user happens at the same place as the where the user type is coupled.

- In Live, go to the node where the user was created.
- In the menu go to users. The grid showing the users on that level is opened.
- Click on the pencil icon of the user you want the access key coupled to, and then click the tab ‘User types’. The grid showing coupled user types is presented.
- Click the pencil icon behind a user type.

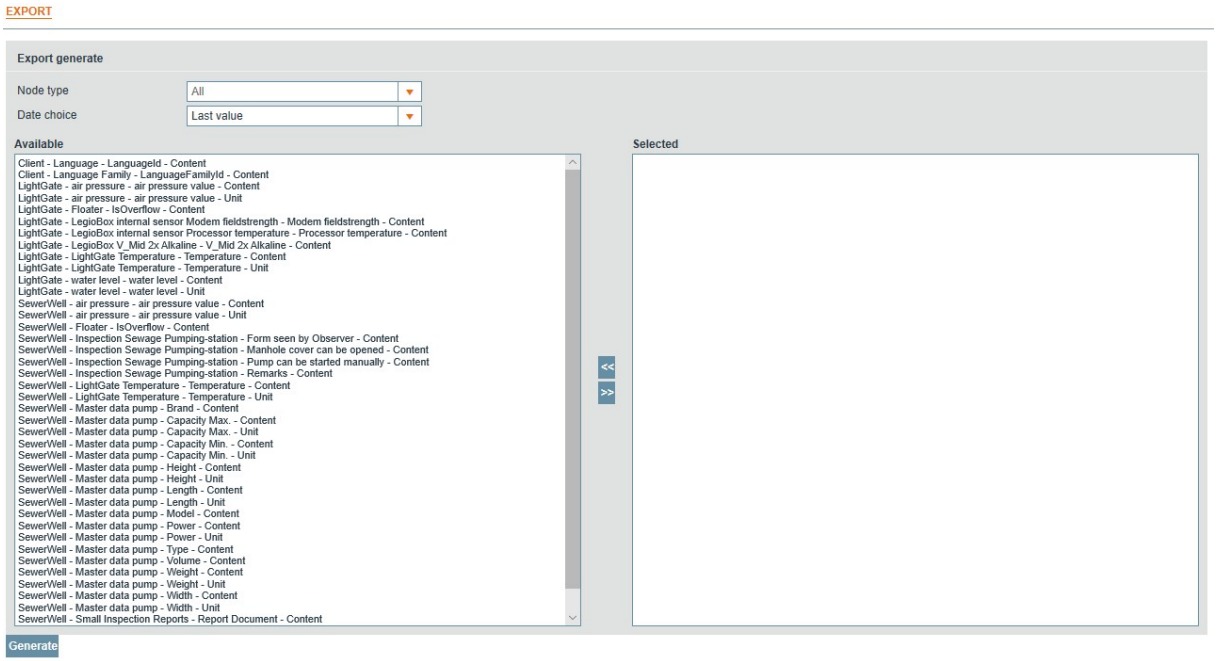


- At the field access key we can now select the access key and via the user type we have added it to the user.

So, per user type one access key can be coupled to a user. We could set up a system where the Engineer can access the nodes of multiple regions using access keys but is only allowed to make changes to one region using roles.

12.2 DataExport

The Data Export module is a powerful tool that allows you to quickly put together a report with an overview of measurement values. This overview can be written to an Excel file.



Node type : This field allows the number of lines in the left column to be limited to data of a certain type of node. Default is all types.

Date choice : Options are : ‘Last value’ or ‘Interval’. Using ‘Last value’ only the last values are used in the overview. Using ‘Interval’ a time period can selected and more options become available:

- **Interval :** Select ‘Last dag’, ‘Last week’, ‘Last month’ or ‘Period’. When period is chosen a start date and time and end date and time can be entered.
- **Show transferred and distributed data :** Checkmark this when the data of the selected datapoint is not stored at the node of this datapoint but is sent to a different datapoint on another node.
- **Line up values :** Data of multiple datapoints having the same timestamp are presented on one line, whose first column contains the datapoints’ date and time.

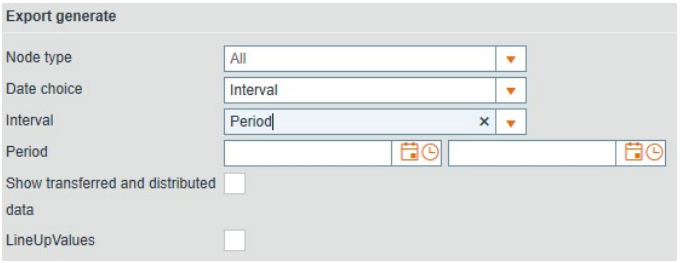


Fig. 12.2.1 : Line up values is unchecked

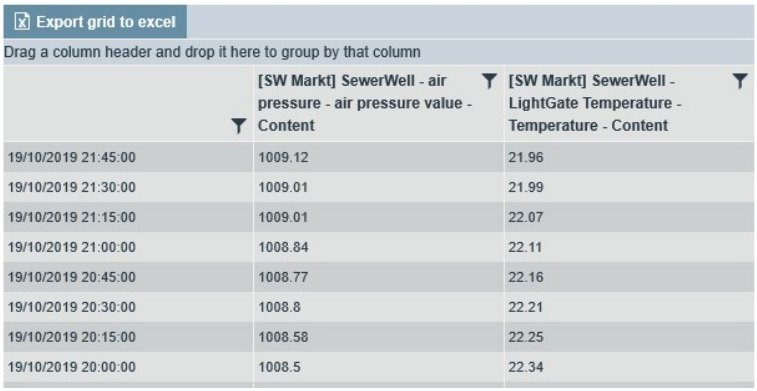


Fig. 12.2.2 : Line up values is checked

When there's a lot of data (when the number of data rows multiplied by the number of datapoints is bigger than 65536) then the user is asked to limit the data (make the period smaller, use less datapoints in the report).

If the command generates more than 500 data rules, the data will be sent to the e-mail address of the logged-in user as soon as it is available.

12.3 Groups

With groups, we create groups of users. This allows us to determine who will be notified when an alarm occurs.

12.3.1 Create Group

The level at which we create a group is logically the same as to which we create users; in practice, this will usually be at the level where the client's application starts.

- In Live, in the menu click on 'Groups'.
- In the grid, top right, click the '+'-button.

Name: Enter the name of the new groep.

Circulate: This allows a mechanism to enable the person who handled a failure to be at the bottom of the list (in the group) and thus will be called last when the next issue is reported.

Schedule: The timetable determines when the group is active. We can set up a (multi) shift service with e.g. day, evening and night shifts with employees to troubleshoot failures. Usually the 'Always on' timetable will be used.

12.3.2 Users Tab

After creating the group, we can add users to the Users tab with a left-right screen. Here, with the arrow keys above the right hand column, we can indicate who is the first to receive an alarm and who will be the next.

12.3.3 Connections Tab

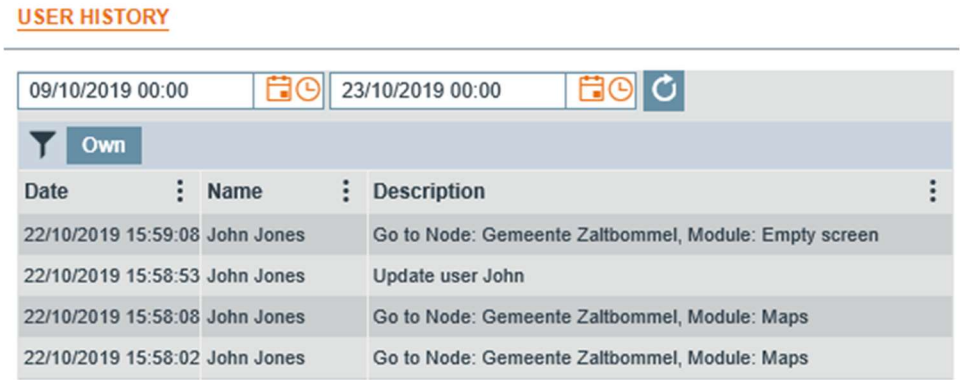
In this tab we can see where the group is used.

12.3.4 Delete a Group

Groups can always be deleted, even if they are used somewhere. The users in the group persist.

12.4 User History

This menu option shows which user made what changes and when.



A grid is shown with the information found. It can be filtered using a period selector and the 'Own' button. The default for period selector is the last two weeks, the maximum allowed period is 33 days. The 'Own' button only shows activity of the current logged in user.

12.5 Node Move

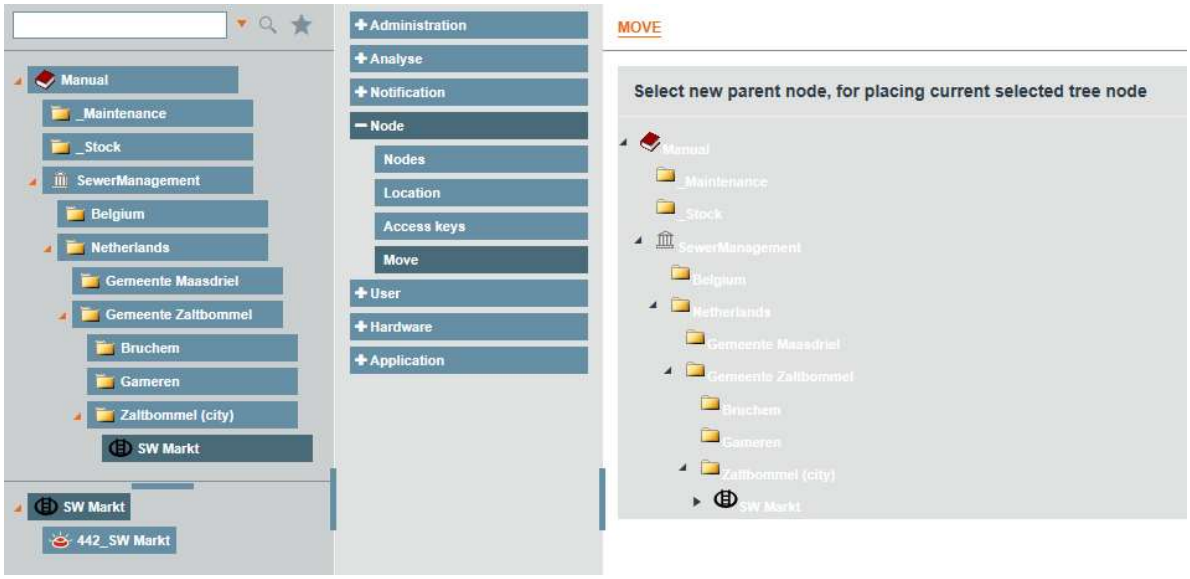
This option allows nodes to be moved, i.e. placed under another node. This option is for asset and tree nodes (not for hardware nodes; those can be moved with the Move tab in the module Nodes, in and out of the Maintenance and Stock nodes).

12.5.1 Example

The operation is explained by an example.

Do-it-yourself block In which an asset node is moved to another node structure and moved back again.

- In Live go to the Asset node ‘SW Markt’.
- Open the Menu and click on the menu item ‘Move’. (If this menu option is present it must be added in Design).



This option opens the tree to the node that we want to move (the current node). The grayed node names are nodes where the node cannot be moved, the bold names are from nodes where the node can go.

- Select in the ‘move tree’ the node ‘Gameren’. A question will pop up to verify you really want to do this. Click ‘Yes’.

The asset node is now placed under the node ‘Gameren’.

- Synchronize (is needed because many relations that need to be recreated).

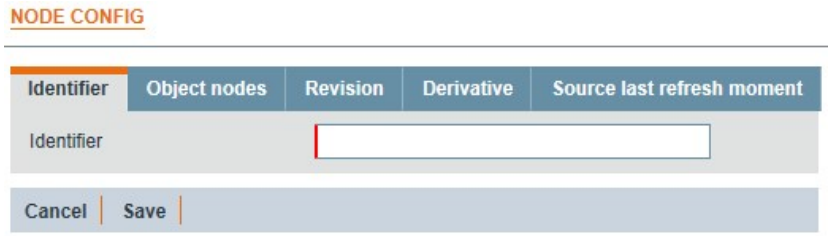
Moving the node back is possible (after which synchronization is needed again).

12.6 Node Configuration

The node configuration module in the live environment is a module to properly set specific settings of the selected node. It also provides insight into the current revision status of the node. For example, which elements in the live environment are linked to which design. Not all tabs are always visible, this depends on permissions and whether it concerns a hardware node.

12.6.1 Identifier

This tab is always visible. A unique property label (maximum 50 characters) of the node can be entered here. This label can be used in export processes. When data of this node is exported, this label can be used in a .csv file. For example a serial number of a machine or the ID of an external system, to create a 1-on-1 connection. There's no same-input monitoring on multiple nodes.



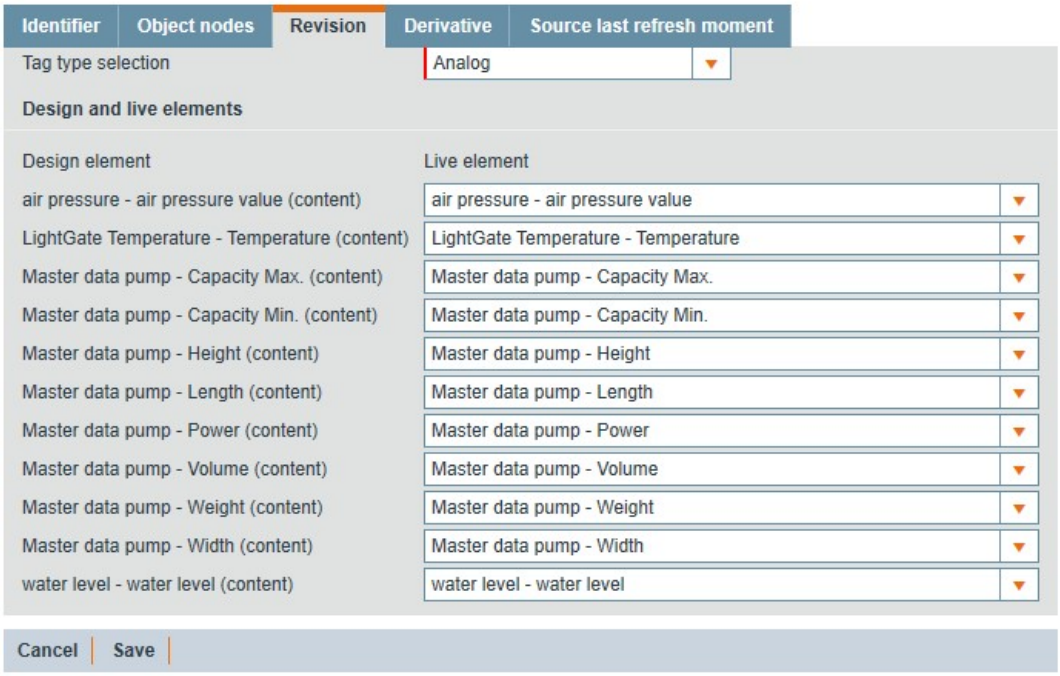
12.6.2 Object nodes Tab

This tab is only available for Avision administrators. When creating a node, this is done according to a certain design revision. When migrating from Avision 1.0 to 2.0, a default type is given here. By walking the tree from top to bottom, the correct design overhaul can be chosen for each node. It is important to walk through the revisions completely. And optionally start an additional revision upgrade. In principle, do not use this option if it is already an Avision 2.0 node.

12.6.3 Revision Tab

This tab shows all design elements (labels left column) on this node (node type). When synchronizing design items to live nodes, live instances are created for certain elements. The relationship between design element and the live instance is stored. In this tab the result of the synchronization can be viewed. And possibly changed. This is particularly useful if an Avision 1.0 node is converted to an Avision 2.0 node. An existing live instance can then be connected to a design item.

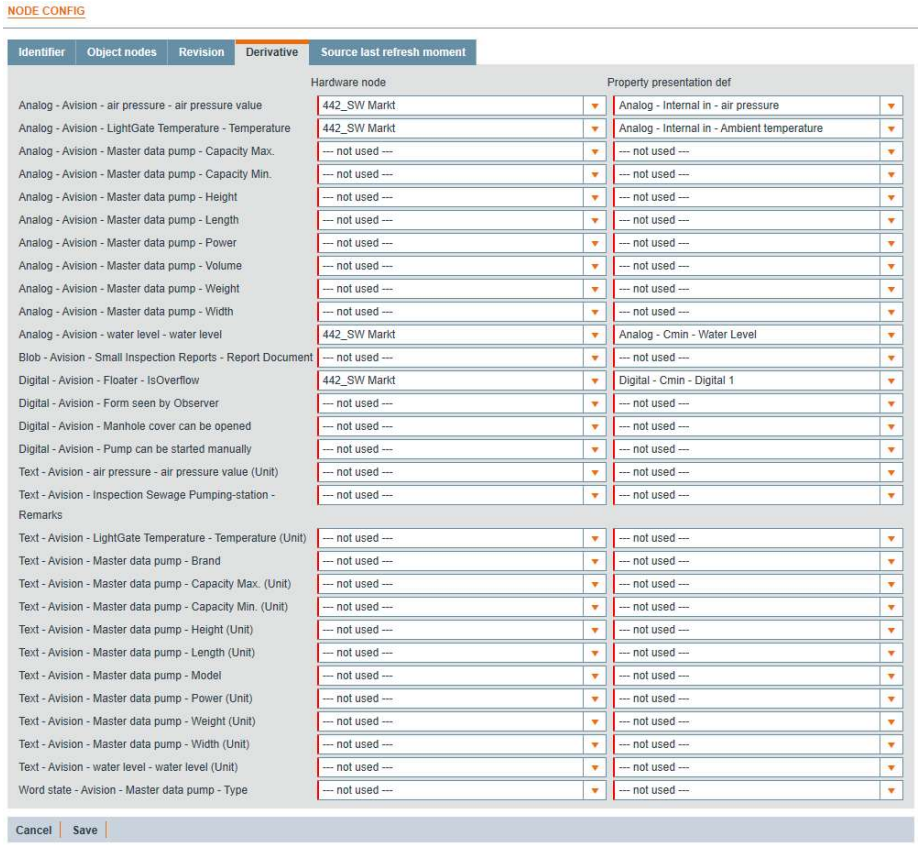
NODE CONFIG



12.6.4 Derivative

This tab indicates the source of measurement values (the hardware node and datapoint). It is not available on a hardware node.

On asset and/or object node(s), data points from property definition items (right hand column labels) can be connected to hardware data points that are set to ‘transferred’ or ‘distributed’ in design. When datapoints of hardware IO match the property definitions on the asset or an object, the connections will automatically be properly established during the initial synchronization, provided that in design they were set to ‘transferred’ . For ‘distributed’ data points, the connection must always be established by hand.



12.7 Revision Management

In Design we build an application starting with small building blocks: Modules like lists and property definitions. These we use in larger modules as graphs, forms and reports which are added to, for example, Assets, which in their turn are added to the Application node as the umbrella entity.

All instances of modules have, if they are under construction, the ‘Sandbox’ status. They cannot be used in Live because only instances with the status ‘Active’ are admitted. This system is designed to ensure that an instance of a module is going to work in the Live environment. Every time the status of the module is about to change the module’s design is checked.

Once active, changes are no longer allowed to the module. A new module with state Sandbox can be created from an Active version of that module, though.

In this way, we only need to build an Asset design once and the Revision Management module will ensure that all Live implementations of that Asset (= all nodes) work with the latest version of our design (with all the latest versions of lists , property definitions, graphs, reports, etc.).

12.7.1 Workings

In chapter 5.6 Live , the operation of the Revision Management module has been demonstrated when creating a monitor screen. The Revision Management module, from the node on which one stands, shows all nodes down with their applied versions and possible candidates for updates.

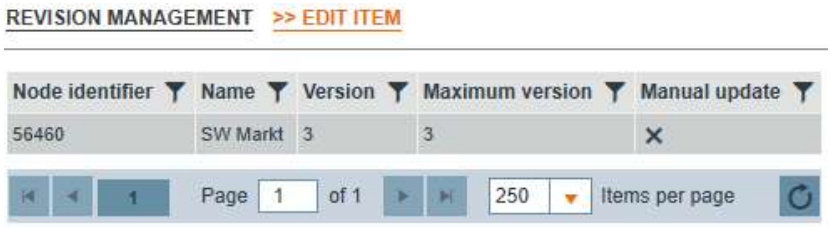
TIP: If you only need an upgrade for a hardware node, it's a good idea to run the Revision Management from the hardware node. Then, during the upgrade process, not all higher nodes need to be monitored which can greatly reduce the time the upgrade process takes.

The Revision Management module shows where which version is used and whether newer versions are available. The user indicates which nodes should be updated.

During the upgrade process all nodes are checked to have all necessary elements of the correct versions. If this is not the case the upgrade process is reversed and the system will continue to operate with the older version(s) as before. Many of these checks were already performed when the elements were deployed, but Revision Management oversees the whole tree from the node where the module was started on.

12.7.2 Manage button

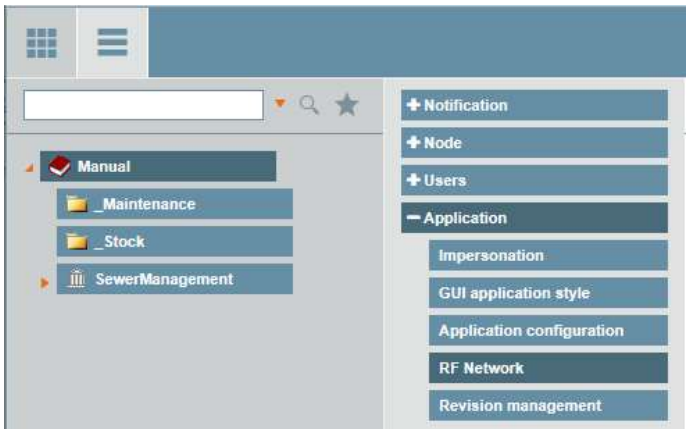
When clicking the manage button, following grid is shown:



By clicking the cross icon in the column manual update, a checkbox appears. Setting the check mark indicates that this node and all underlying nodes will not be included in an update by the Revision Management module.

12.8 RF Network

This module gives an overview of all devices (base stations and endpoints) connected to the network. The RF Network module is located at the highest node in every environment.



12.8.1 RF Network Grid

The grid shown when the RF Network is clicked shows the configured networks. Because there's no RF Network in the application otherwise used in this manual, the pictures in this chapter are from a another application.

Fig. 12.8.1.1 RF Network grid (different system)

A new network can be created by clicking on the ' + ' button at the top right of the grid. When creating a new network, only the network name needs to be entered.

By clicking on the arrow icon, ▸, on a line on the grid, an overview is presented of all the connected gates/base stations on the network. Here we can click per base station on the arrow icon on the connected endpoints.

Using the jump-to icon, , we can jump to the settings of a base station or endpoint.

When clicking the pencil icon, , a screen is presented where the network name can be altered. Also a grid is shown containing all base stations and endpoints, also showing devices not in use (stored in the Stock folder).

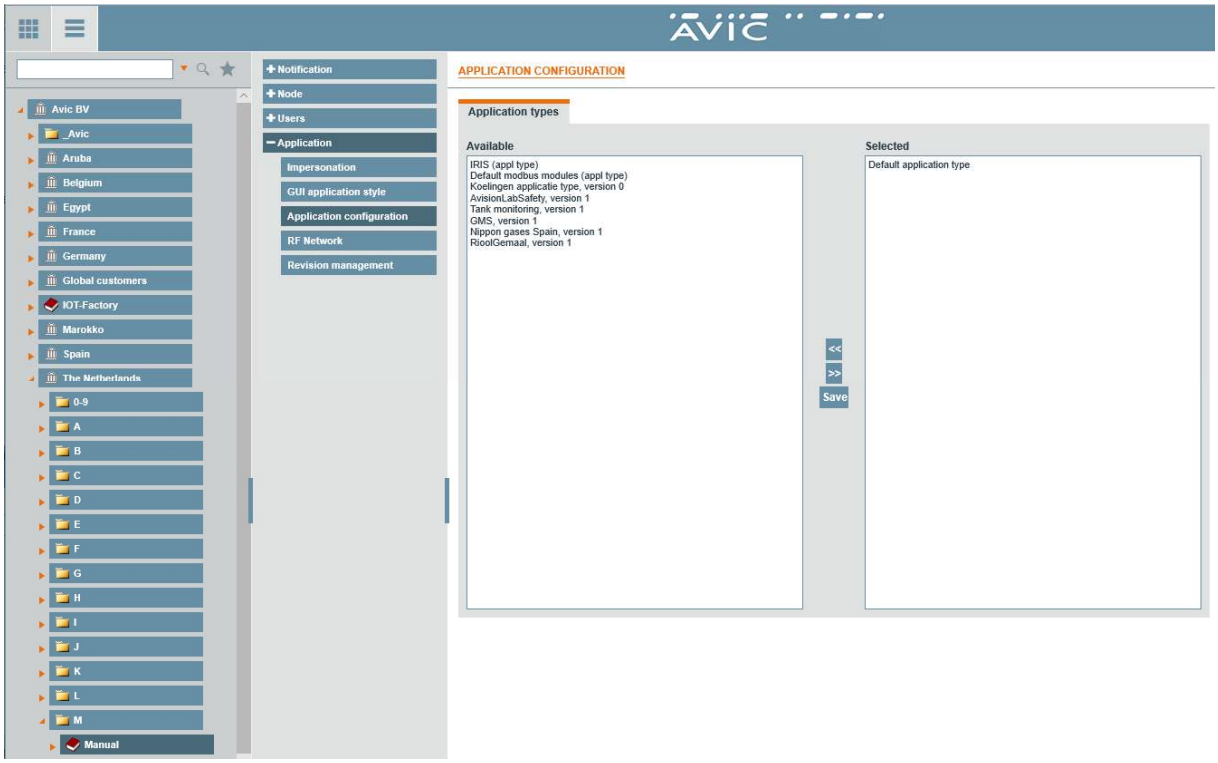
12.9 Application Configuration

This module is always present on the highest node of the environment. The module contains three tabs with settings that apply to the entire environment under the highest node.

12.9.1 Application Types

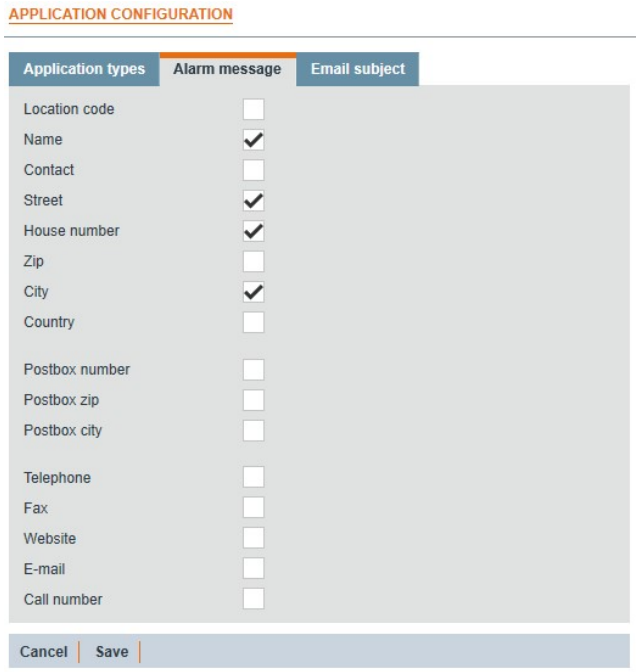
This tab shows the application types that can be used to create new applications for customers. The application types shown here are inherited.

At the level where the environment is created, the application types are distributed using a left-right screen:



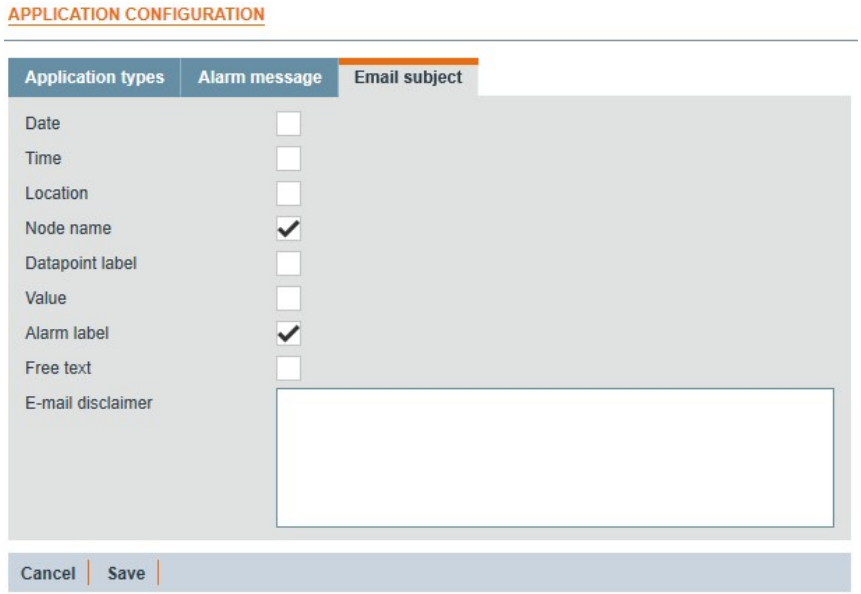
12.9.2 Alarm Message Tab

Here you can indicate which fields in an alarm message are used by default.



12.9.3 E-mail Subject

Here you can see which fields in the Subject field of an e-mail message should be sent when an alarm is issued.



12.10 GUI Application Style

This module is used to change the layout and to load the logos in the top bar and the login screen.

12.10.1 General Tab

The colors of all buttons, menus etc. in Avision 2.0 can be customized. An adjustment applies to all nodes below the current node.

To make working with this menu easier, a theme can be chosen from the dropdown ' list type ' as a start point. This dropdown contains themes created and tested by Avic. When a theme is chosen, the options in this menu are adjusted to the colors of this theme. After that, a color can be changed.

K1 : Colors General

1. BackgroundColorStr (input buttons (i.e. dropdown button), headers, grid grouping row and column, (at Theme Office365 Blue this also the background color of the module)
2. BorderColorStr (anything having a border, except input, buttons and menu)
3. FontColorStr (all text, except input, buttons and menu)
4. AreaBackgroundColorStr (background colors, avic forms, popup, grid pager row)

K2 : Area spreaders (splitbar in between areas)

5. SplitterBackgroundColorStr
6. SplitterBorderColorStr
7. SplitterHoverBackgroundColorStr
8. SplitterHoverBorderColorStr

K3 : First level buttons (header)

9. ButtonBackgroundColorStr (Header background color)

10. ButtonBorderColorStr (Is not in use at the moment)
11. ButtonFontColorStr (Header font color)
12. ButtonActiveBackgroundColorStr (Header active background color, background trees and menu)
13. ButtonActiveBorderColorStr (Not used)
14. ButtonActiveFontColorStr (Header active font color)
15. ButtonHoverBackgroundColorStr (Header hover background color)
16. ButtonHoverBorderColorStr (Not used)
17. ButtonHoverFontColorStr (Header hover font color)

K4 : Second level buttons (Tree buttons, menu buttons, Tabstrip and all buttons, splitbar)

18. ButtonBackgroundColor1Str
19. ButtonBorderColor1Str
20. ButtonFontColor1Str
21. ButtonActiveBackgroundColor1Str (Header account active button color, background color account, highlighted line above active tabstrip button)
22. ButtonActiveBorderColor1Str
23. ButtonActiveFontColor1Str
24. ButtonHoverBackgroundColor1Str
25. ButtonHoverBorderColor1Str
26. ButtonHoverFontColor1Str

K5 : Input (all input elements, i.e. textboxes, dropdowns, textareas, listviews etc.)

27. InputBackgroundColorStr
28. InputBorderColorStr
29. InputFontColorStr
30. InputActiveBackgroundColorStr
31. InputActiveBorderColorStr
32. InputActiveFontColorStr
33. InputHoverBackgroundColorStr
34. InputHoverBorderColorStr
35. InputHoverFontColorStr

K6 : Grid

36. GridRowEvenBackgroundColorStr
37. GridRowEvenBorderColorStr
38. GridRowEvenFontColorStr
39. GridRowOddBackgroundColorStr
40. GridRowOddBorderColorStr
41. GridRowOddFontColorStr

12.10.2 Logo Tab

In this tab two different logos can be selected. The first logo is in the middle of the top of the taskbar.

The second logo is shown in the login screen.

12.11 Pasword Policy

On the application level a password policy can be configured. The password policy consists of a regular expression for password validation and the option to let a password expire.

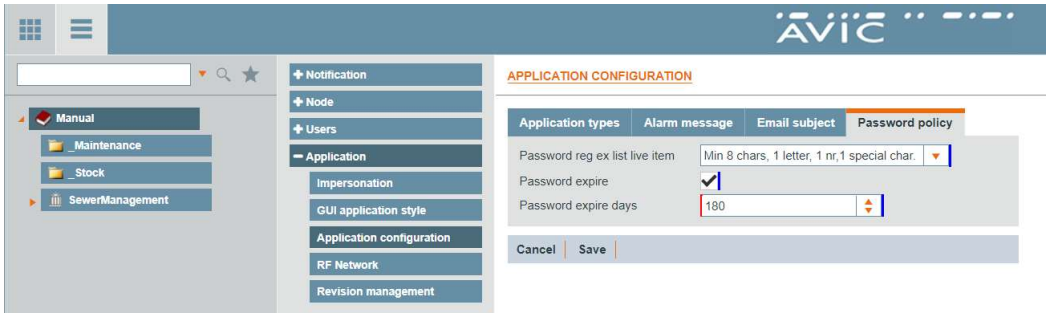
12.11.1 Configure password policy

To configure the password policy navigate to the application node in live. Open the application configuration menuitem and open the Password policy tab.

Password reg ex list live item: The regular expresion for validating the password.

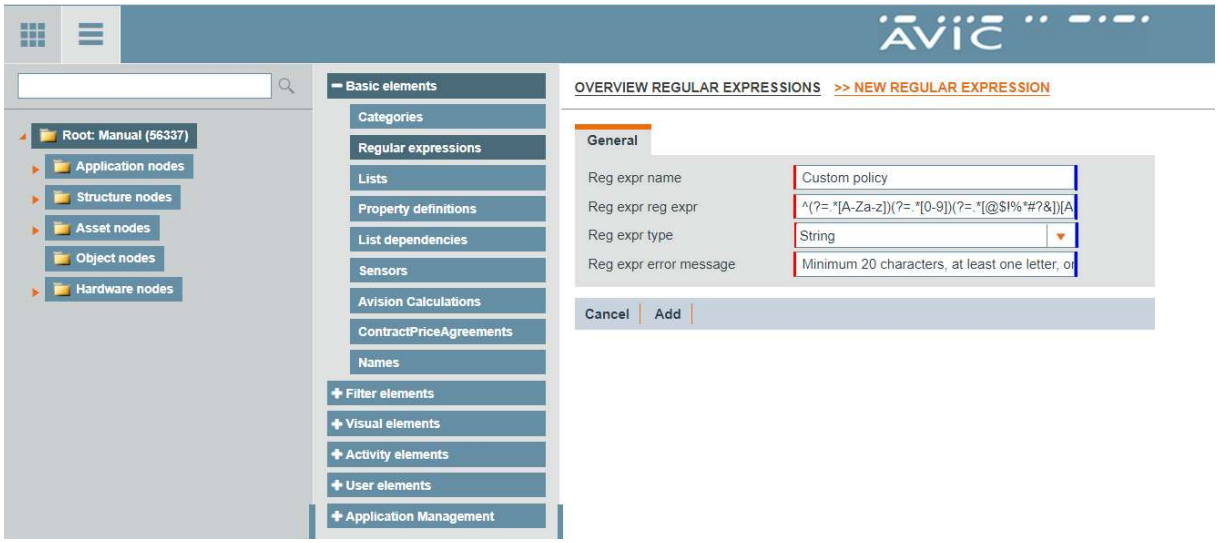
Password expire: Option to enable password expiration.

Password expire days: Days after the password expires.



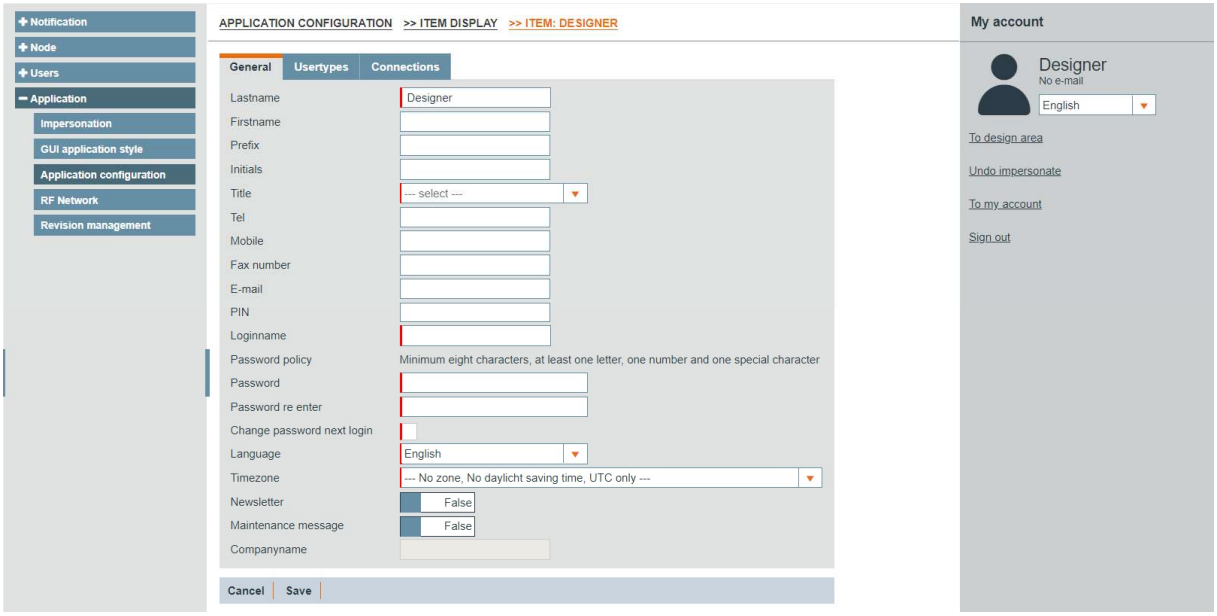
12.11.2 Custom password policy (regular expression)

With a regular expression a custom password validation rule can be configured. See regular expression chapter.



12.11.3 Change password next login

To enforce a user to change its password at the next login. Navigate to the user and activate the option ‘Change password next login’.



12.11.4 Change password

When the password is expired or the option ‘Change password next login’ is active the user is forced to change the password with the screen below.

13 Hardware Node (types)

This item can be found in Design, the menu of a hardware node.

13.1 Hardware Communication

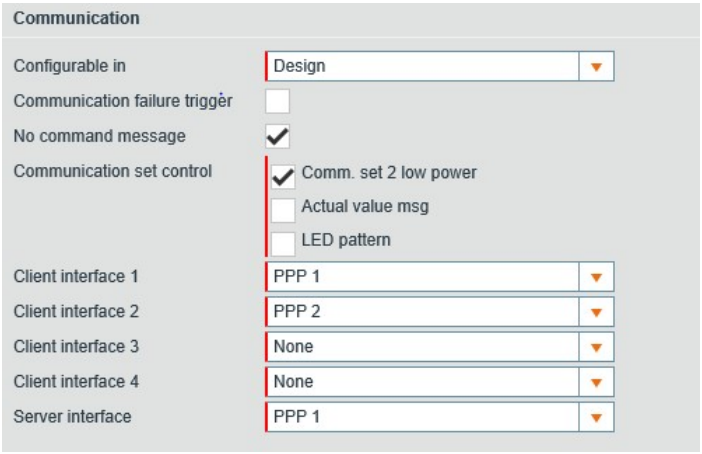
In this menu, the hardware communication parameters can be set. Depending on the devices available in the application, you can choose the device type whose communication parameters need to be adjusted.

13.1.1 General

Configurable in : Select 'Live' when parameters in this block should be editable in Live.

Formula interval low power : The frequency with which the box calculates formulas when the box is in low power mode. Enter the time between two calculations (in seconds).

13.1.2 Communication



Configurable in : Select 'Live' when parameters in this block should be editable in Live.

13.1.3 Provider, IP, Communication Set

These blocks' settings are to indicate whether settings are configurable in Live. In Design these settings have no significance. (Example: A device gets an IP address in Live. What is the point of filling in the Design template with an IP address?)

13.1.4 Hardware Communication Set 1

Communication method : Options are 'Interval' and 'Periodical'.

Communication interval : Only available when communication method is ‘Interval’. Enter the time between two communication moments.

Communication day : Only available when communication method is ‘Periodical’. Check the days when communication is allowed.

Communication period : Only available when communication method is ‘Periodical’. Enter the ‘from’ and ‘to’ times.

Protocol : Select ‘Avic protocol’ or ‘Http’.

Communication control : Check the desired moments for communication.

13.1.5 Hardware Communication Set 2

Set 2 is usually used for low power. Same settings are available as in set 1.

13.2 XBus

A hardware node (gate) can contain one or more ports for a serial connection. Each port can be configured with different protocol and speed settings.

In Design can be indicated - by the option 'configurable in' - that the settings can also be adjusted in Live.

13.2.1 Configuration

Configuring a port is done in the XBus module where a port can be selected. This is usually an RS232 or RS485. One or both will be available in Design.

- Click the applicable hardware node.
- In the Menu, click on the module XBus (when not available, *then, at the hardware node, no hardware containing an XBus port was added*).
- Select Hardware (to configure a port of).
- Select a port

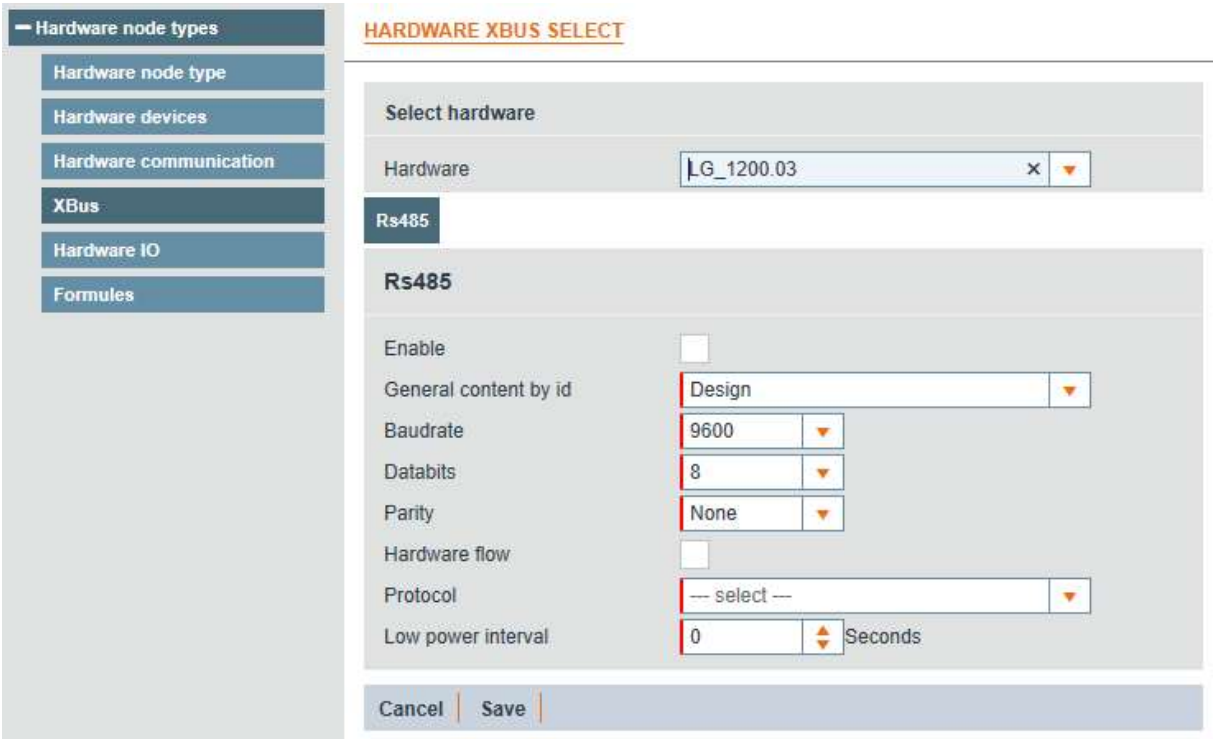


Fig. 13.2.1.1: Configuring a serial (xbus) port

Configurable in
Indicate that the settings should be editable in Live by selecting 'Live' or not.

Baud rate
Number of changes in the signal per second (pulses per second).

Data bits
Number of bits per segment (8 or 7 bits).

Parity
The use of an extra bit for checking reception of the data in good order. Options are Even, Odd and Fixed (static).

Hardware Flow
Enabling or disabling hardware flow control (handshaking).

Protocol
The used protocol for the connection.

Low power interval
When the gate is in low power mode then this will be the interval (in seconds) for the gate sending the values.

13.3 XBus Device

13.3.1 Configuration

After setting up a port (XBus), you can use the port to mount a device. The XBus device itself must also be configured.

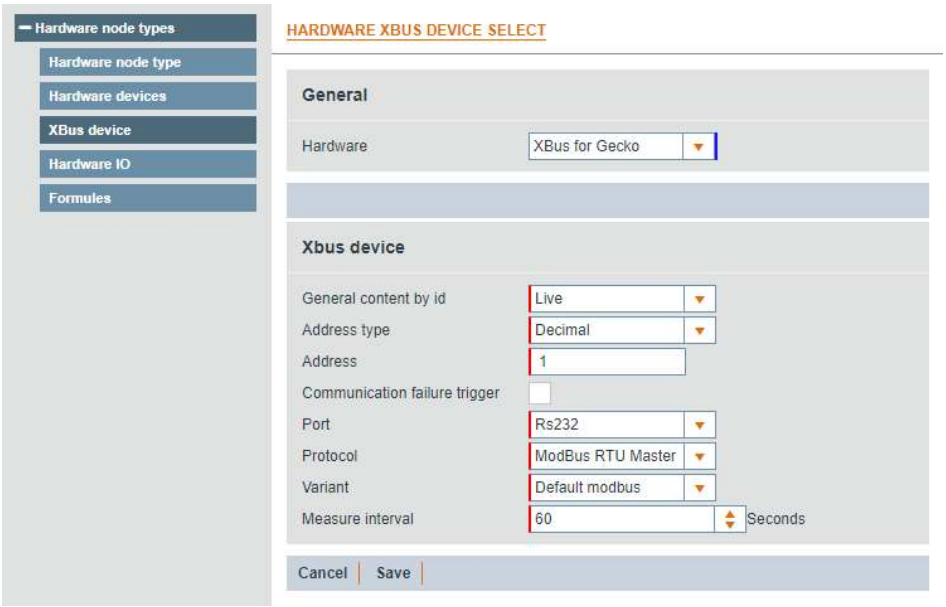


Fig. 13.3.1.1: Het configureren van een xbus device

Configurable in
Indicate that the settings should be editable in Live by selecting 'Live' or not.

Address type
The type of address used to communicate.

Address
The communication address for de XBus hardware.

Communication Fail Trigger
Is used to configure an Alarm specifically for when the device can not communicate.

Port
The port used by the device.

Protocol
The protocol used.

Variant
Select the variant of the used protocol.

Measure interval (meet interval)
Number of seconds between each measurement.

13.4 Hardware IO

In this module internal and external datapoints can be found. Also, virtual datapoints (which are datapoints that do not have a physical input or output, but exist as variables in the memory of the AVIC device) can be created.

13.4.1 Internal Sensors

These are data points that display the measurement values of sensors on or in the device. This data is without the need to connect outside equipment to the device. The LightGate:

Sensor	Unit	Description
V_mid	Volt	Power
V_ups	Volt	Battery power
Processor temperature	°C	Temperature of the processor chip
Modem fieldstrength	%	Indicates the quality of the communication signal.
Air pressure	hPa	Air pressure

Relative humidity	%	Relative humidity measured under the red cap of the LightGate.
Ambient temperature	°C	The temperature measured under the red cap of the LightGate.

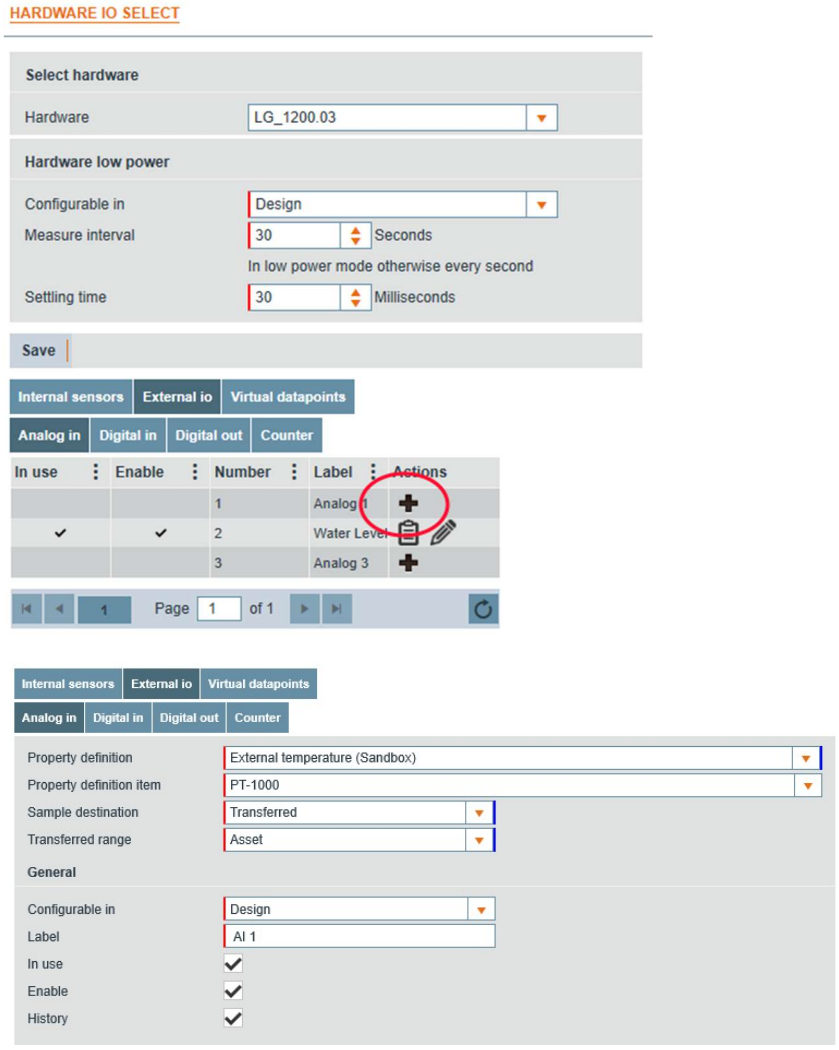
13.4.2 External IO

The in- and outputs of the device. Sensors can be connected to them or signals are sent out. The inputs and outputs are of a certain type. The LightGate has three analogue inputs (AI-1, AI-2 and AI-3), three digital inputs (DI-1, DI-2 and DI-3), one digital output (DO-1) and three counters (CNT-1, CNT-2 and CNT-3) that are running with the DIs (if a level change occurs on a DI then the corresponding counter value is increased with 1).

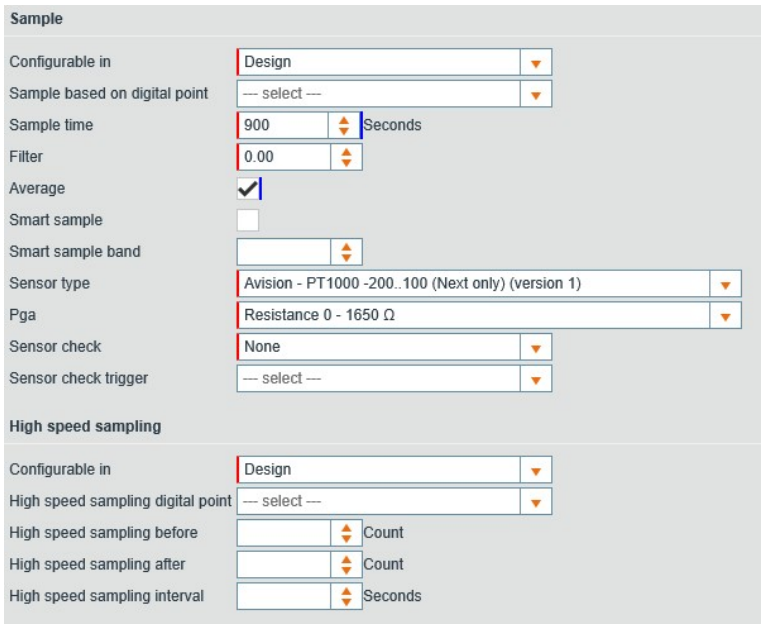
13.4.2.1 Example of a PT1000 Connected to an AI

A PT1000 is connected to input AI-1. The measured value is to be routed to a property definition on the asset.

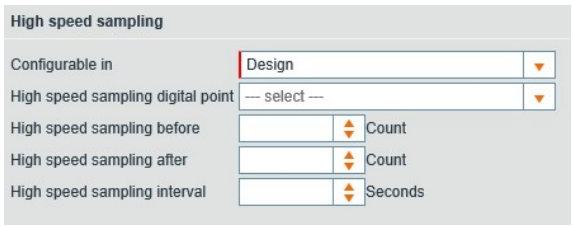
Click the plus sign:



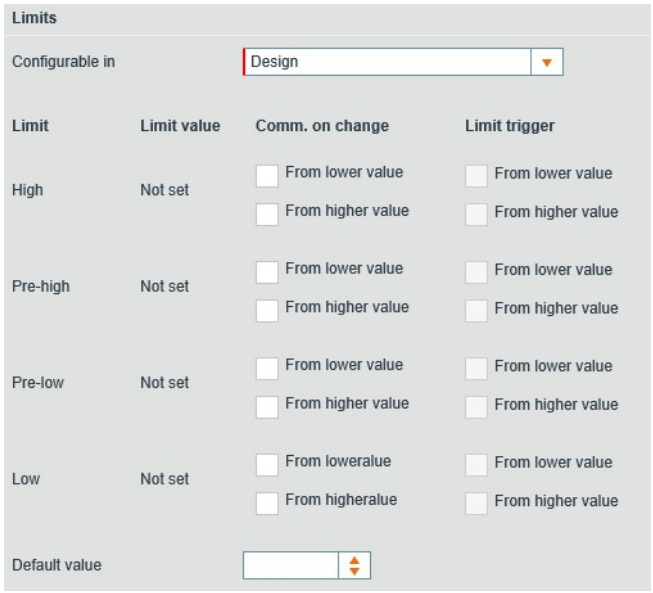
Measuring takes place during a quarter of an hour (900 sec.) and from those samples the average is calculated. The sensor type is set, 'Sensor check' and 'Sensor check trigger' can be used to generate an alarm when the sensor measures strange values:



High-Speed sampling is used to make additional measurements at certain times. Those moments are determined by a digital input or output. Additional samples are taken during a number of seconds to be set.



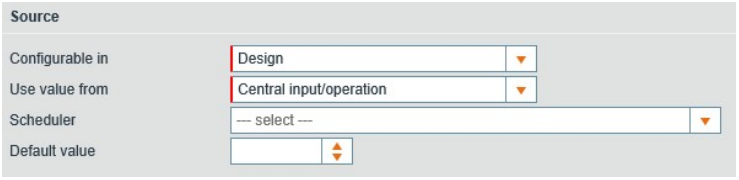
The 'Limits' block is used to allow, based on limit values, communication and/or triggers to occur (e.g. sending an alarm).



13.4.3 Virtual Datapoints

These are data points that do not physically exist on the hardware but send data to Avision. They are created in Avision and used in the hardware to send the result of a calculation, a formula, to Avision. Virtual data points can also serve as input for a formula.

When data points are of type ‘Internal sensors’ or ‘External IO’ the origin is obvious. For virtual data points, however, there are multiple possibilities and therefore in the block ‘Source’, the ‘Use value from’ should indicate how the data point gets its value.



Configurable in : Choose ‘Live’ to be able to change the ‘Source’ settings in Live.

Use value from :

Options are :

- Local (input, formula) : Value is the result of a formula.
- Central input/operation : Value is entered (in Live) by a user.
- From Scheduler :
- Local manual control :
- Function block : Value is from a ‘fupla’.

Scheduler : Select a scheduler.

Default value : The value used when no other value is available for this datapoint.

14 Hardware Node in Live

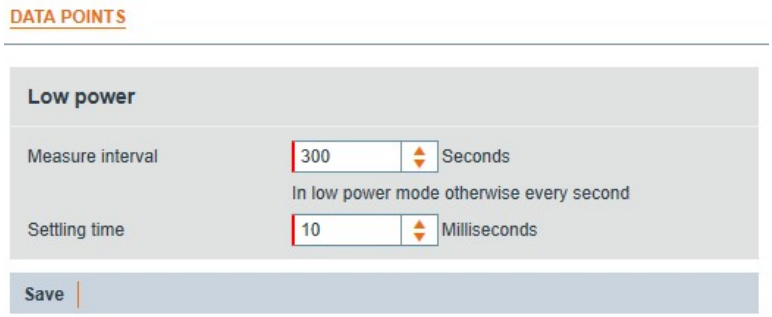
14.1 Datapoints

A device has inputs and/or outputs or maybe readings that need to be read. These we call datapoints.

The measured values are of a certain type: 'analog' is used for measured values with a comma number, 'counter' for counters, 'digital' if the value is binary (on or off), 'word' if it is always a whole number, 'text' when it is a text type or ‘GPS’ when it is position information.

Bij ieder datapunt kan een meetinterval ingesteld worden. Als een AVIC device in low power kan werken kan ook een ‘settling tijd’ ingesteld worden.

For each datapoint a measurement range can be set. When an AVIC device is supposed to operate in low power mode a ‘Settling time’ should also be set.



Data points are basically created and configured in Design, but it can be indicated that they are also configurable in Live. The data entered in Design then works as default values that can be overwritten in Live.

14.1.1 Internal Datapoints

Internal data points are data points whose values are generated by the device. The device has measuring equipment on the circuit board. On the internal data points we can find the measured values.

At the LightGate there are the following internal data points: Vmid, V_Ups, Processor temperature, Modem field strength, air pressure, relative humidity, ambient temperature.

14.1.2 External Datapoints

External data points are data points where a signal is delivered from the outside or sent to the outside; so these are the physical inputs and outputs of the device.

The LightGate has three analog inputs, four digital inputs and one digital output. A typical example of an external data point is when we connect a PT-100 temperature sensor to an analog input of the LightGate and create an external data point ‘outside temperature’.

14.1.3 Virtual Datapoints

The value of a virtual data point is the result of a formula, function block, manual control, or timetable.

In a refrigerated furniture as used in a supermarket we are not so much interested in the temperature of the refrigeration unit but especially in the core temperature of the products we want to keep chilled. We then create a virtual data point where the value is the result of a formula, a function of the temperature of the cooling cabinet over time.

Do-it-yourself block in which a virtual data point is created. This data point is called 'Manual operation pump'. If the manual control turns on the pump, the LED DO must be on. The pump can be turned to on or off using a button on the monitor screen.

14.1.3.1 Create Property Definition

- In Design, at the menu item 'Basic elements', click on the menu item 'Property definitions'.
- Click on the '+'-button on the top right of the grid to create a new property definition.
- Enter 'Manual Operation Pump' in the name field, at Type choose 'multiple' (just one option), leave the 'Managed by parent operation' unchecked.
- Click 'Add' (property definition is created and opened in Edit mode at the 'General tab').
- Go to the 'Items' tab.
- Create a property definition item by clicking on the '+'-button top right on the grid.
- Enter 'Button' at the label field, select 'Boolean' at the type field, click 'Save'.

14.1.3.2 Section

- Create a new section or use an existing one.
- Add at the tab 'Content selection' the property definition 'Manual Operation Pump', created above.
- At the tab 'Digital layout', drag the label of the property definition on the canvas. Set the label to 'Manual Operation Pump', the width to 100 pixels.
- Drag the 'Property desired value' (or NewValue) of the property definition on the canvas, behind the label. Select at 'Presentation method' the 'Switch button toggle digital datapoint', set width to 70 pixels.

14.1.3.3 Monitor Screen

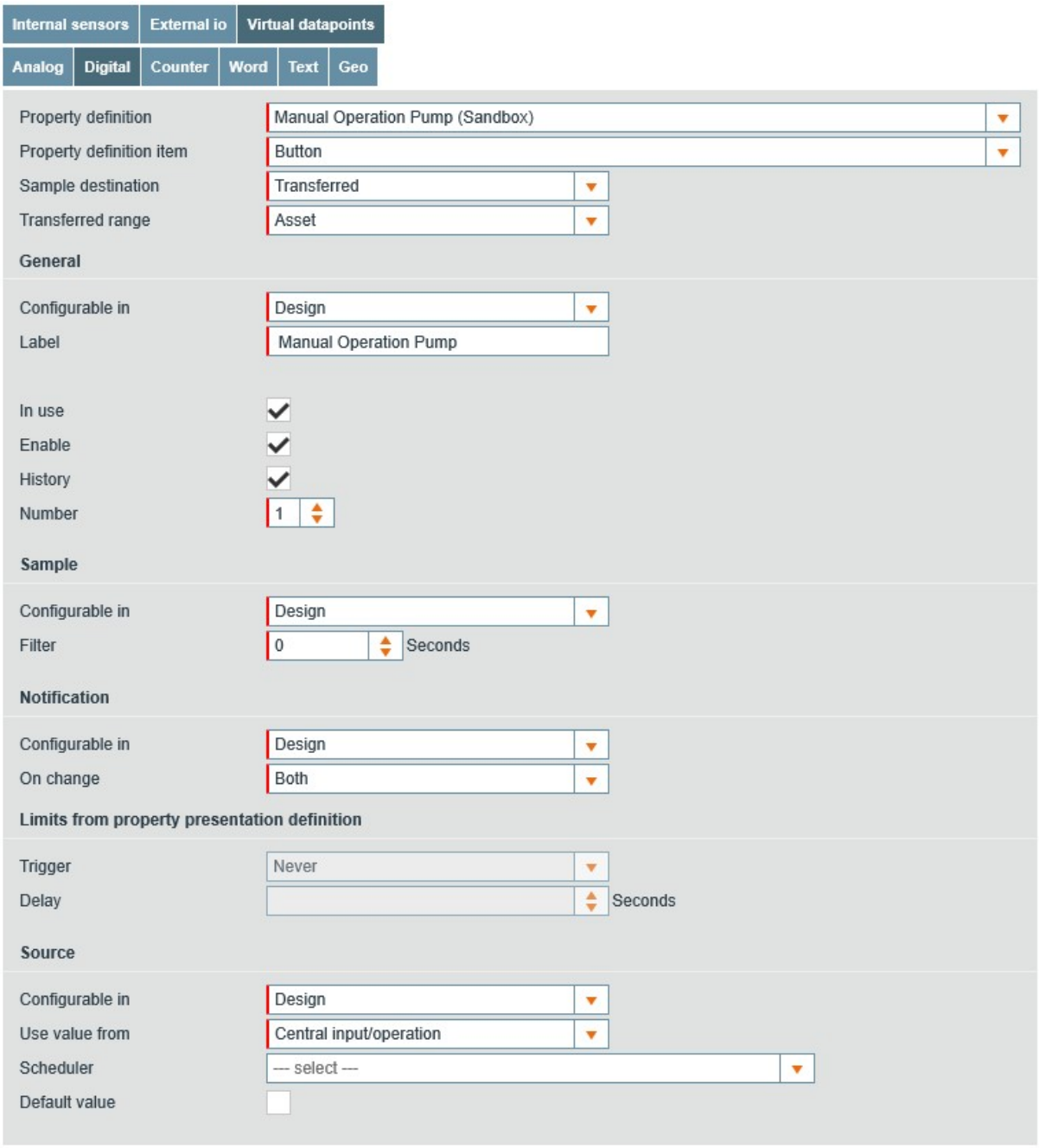
- Add the updated section to the monitor screen. (Add it to the sections in the sections tab).

14.1.3.4 Asset

- Update the Asset (Sewer well) so it uses the new monitor screen.

14.1.3.5 Hardware node

- On the Hardware node, 'LightGate', go to menu item 'Hardware IO'.
- Click on the button 'Virtual datapoints' and then 'Digital'
- Create a new virtual digital point by clicking the '+'-button.
- Select at property definition 'Manual Operation Pump', property definition item 'Button'.
- At 'Sample destination' select 'Transferred'.
- At 'Transferred range' select 'Asset'
- At 'Source' - 'Use value from', select 'Central input/operation'.
- Select 'Save'.

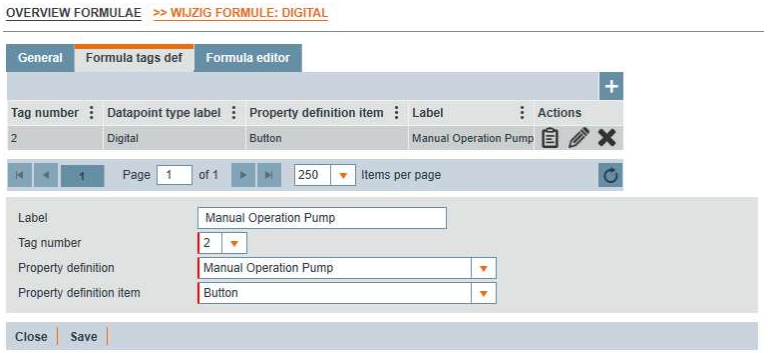


14.1.3.6 Formula

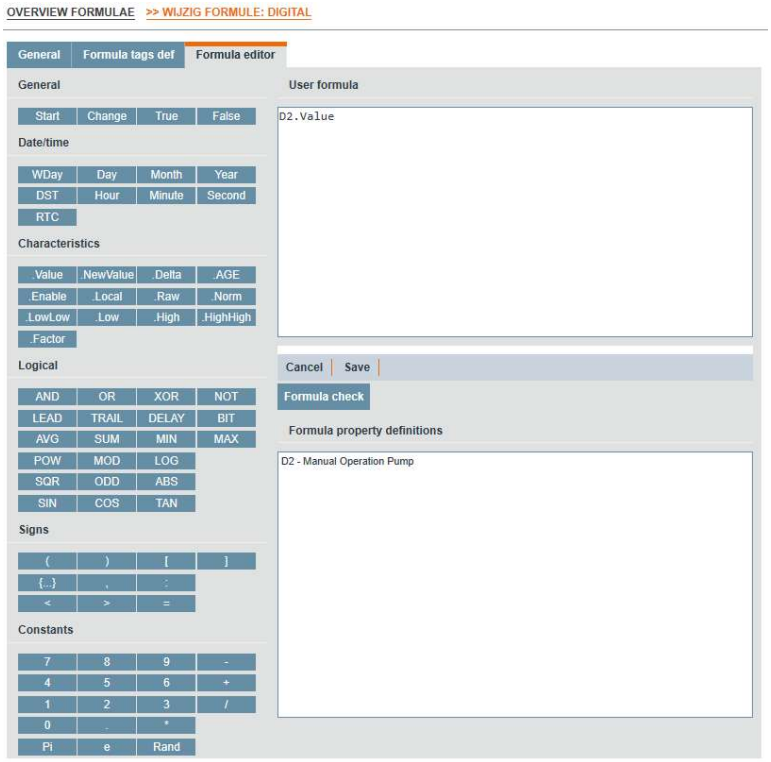
Chapter 16 Formula describes how by using a formula the DO is set to on when an alarm is raised is (and turned off after about 1 second). When this formula has been created already then we'll need to alter it, if not create a new one. (In below steps it is assumed that the formula has been created).

- Click op het menu item 'Formules'.
- Click the pencil icon of the formula for DO-1 'OutputOn'
- Go to the tab 'Formule datapunten', klik op de '+'-knop

- Create tag definition for the formula:



- Tab 'Formula editor':



Now release/make active all created and custom elements and synchronize in Live.

14.1.4 Description of Settings

The different datatypes do not differ much with regard to their setting options.

Property definition : The property definition for the data.

Property definition item : The property definition's item which use the data of this datapoint.

Sample destination : Indicates where the data is stored.
Options are :

- **Stand alone :** Values stay on the hardware node.
- **Transferred :** Values are sent to another node (different property definition item) and after being sent no longer exist on the hardware node.
- **Distributed :**

- **Stand alone and transferred :** The values are stored both on the hardware node as on the node of the property definition (item).
- **Stand alone and distributed :**

General

- **Configurable in** : Dropdown to indicate that the datapoint's General settings can be changed in Design or Live.
- **Label** : Name of the datapoint. (Used in formulas).
- **Active :** (This field is only applicable for digital datapoints). Select Normally closed or Normally open.
- **In use :** Checked indicates that the datapoint can be used. (Not checked means it is not available in Live)
- **Enable :** Can be used in Live to not use an available datapoint. In charts this will hide the line using this datapoint.
- **History :** Indicates whether the data will be archived for long term storage. If unchecked only the last value is available.

Sample

- **Configurable in** : Dropdown to indicate that the datapoint's Sample settings can be changed in Design or Live.
- **Sample based on digital point :** Sampling can be controlled using a digital datapoint (samples will be taken when the digital datapoint is active/on). (Not for digital points).
- **Sample time :** Time between two samples. Determines the number of samples in the database.
- **Filter :** Maximum raise per second.
- **Average :** When checked the average of the measured samples is calculated and this will then become the sample value.
- **Smart sample :** Values are only sent when there's a change in sample values.
- **Smart sample band :** Example: when the temperature raises by one degree make a new sample.
- **Sensor type :** Select from the list of available sensor types.
- **PGA :** Gain factor, measurement range.
- **Sensor check :** When checked the input will be checking for short circuit and a break in the cable.
- **Sensor control trigger :** Creates trigger events when a problem is detected at Sensor check. Options are : None, from upper, from lower, both.

High speed sampling

- **Configurable in** : Dropdown to indicate that the datapoint's High speed sampling settings can be changed in Design or Live.
- **High speed sampling digital point :** Select the digital point that determines when high speed sampling is on. It could be the result of a formula.
- **High speed sampling before :** Number of samples before the normal sampling point.
- **High speed sampling after :** Number of samples after the normal sampling point.
- **High speed sample interval :** Time in seconds between two high speed sampling moments.

Limits

- **Configurable in** : Dropdown to indicate that the datapoint's Limits settings can be changed in Design or Live.

The other fields of the Limits chapter are used to indicate whether communication is needed and whether a trigger should be activated.

- **Default value :** Value that will be used when the datapoint has no value.

14.2 Hardware

The hardware module in live contains the communication values of the hardware. In the upper part of the screen there's also a 'Wake up'-button. It can be used o communicate with the device to pass changes to it right away.

14.2.1 General

Label : Any text to indicate the hardware. Using the Names module this text can be used as (part of) the node name identifying the hardware. (Option 'Legiobox label').

The fields **GUID**, **Device**, **Firmware**, **Version** and **V_MIDM** can not be edited.

Contact user : Your contact at AVIC.

Timezone : The time zone the hardware is in.

Offline : Check this when the hardware is not allowed to come back online.

Log : Check this when

14.2.2 Communication

Last refresh moment : Shows when the last successful communication moment has been.

Communication failure trigger : Check this when a trigger must be created when a communication error occurs.

Communication no command : When no outputs and no virtual datapoints are used then this can be checked to decrease the number of messages.

Communication seed : Fixed communication time in seconds. Normally communication is devided over the communication period by Avision. When something is entered here, this mechanism is overruled.

Formula interval low power : The frequency of formula calculation by the box when it is in low power. Enter the time between two calculations (in seconds).

Max. message length : Maximum size of a message in bytes.

Retry reboot : The number of failed communication retries before the box will restart.

Reinitialize : Have the device restarted.

Options are :

- Initialize (only get the configuration message)
- Reset (restart)
- Cold start (memory is erased and the device restarted, all sample data is cleared)
- SIO Reset

- WAP Reset
- Get telephone number (device sends telephone number of the SIM card)

Medium : Indicates how a device can communicate.

- Lan
- GPRS

When this is check marked following parameters for GPRS/EDGE/UMTS/HSDPA can be set:

- SIM
- Telephone number
- PUK
- ISP 1 (APN settings)
- ISP 2 (APN settings)
- Max try PPP (maximum number of tries before trying another interface type)
- Wake up time

External antenna : Just an entry field; is not used in any setting.

IP NAT : Checkmark this to use an external IP address for a wake up call.

Client Interface 1 (2,3,4) : The order of GPRS or LAN communication. When device 1 is not operational device 2 will be selected and so on.

Server interface : The interface on which the device expects a wake up call.

Communication set tag : Select a digital datapoint. This datapoint indicates whether the second communication set should be used.

Communication set control :

- Comm. set 2 low power : Use set 2 for low power (when power is below the low limit)
- Actual value msg : Send the current value for all inputs with every communication message.
- LED pattern :

14.2.3 Communication Set 1 and 2

Communication method : Select 'Interval' or 'Periodical'.

Communication interval : Time between twee communication moments.

Protocol : Options are 'Avic protocol' and 'Http'.

Verbose : Number of events that will be send.

Percentage event buffer : When all memory is in use it will be emptied according to FIFO. When doing this, the device will try to keep the set percentage of the memory.

SOAP timeout : Communication timeout (in seconds).

Hold Socket : Time to keep socket open.

Repeat frequency : (regular) retries

Event retry frequency : (on change) retries

Communication control :

- Communication on full buffer
- Init after power failure
- Low power
- Stay up (stay connected with the GPRS network)
- Stay open (stay connected with the server)
- IP wakeup (enabled)
- Phone wake up (telephone wake up enabled)

14.2.4 Modem

Modem settings.

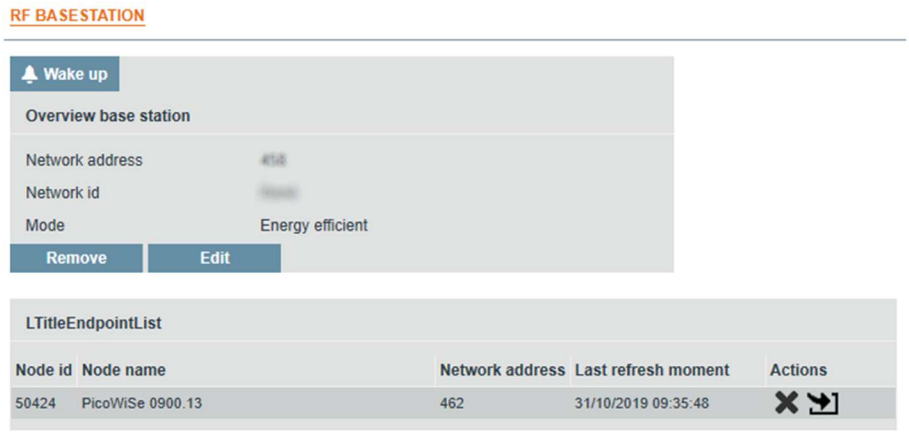
Modem speed : 9600 to 115200 kbps.

Modem Init : Initialization command

Telephone number : Number in use to send texts (SMS) to. Is not used.

14.3 RF Base Station

This module shows an overview in Live of a base station hardware node.



Network address : Address of base station

Network ID : Name of the network / number

Mode :

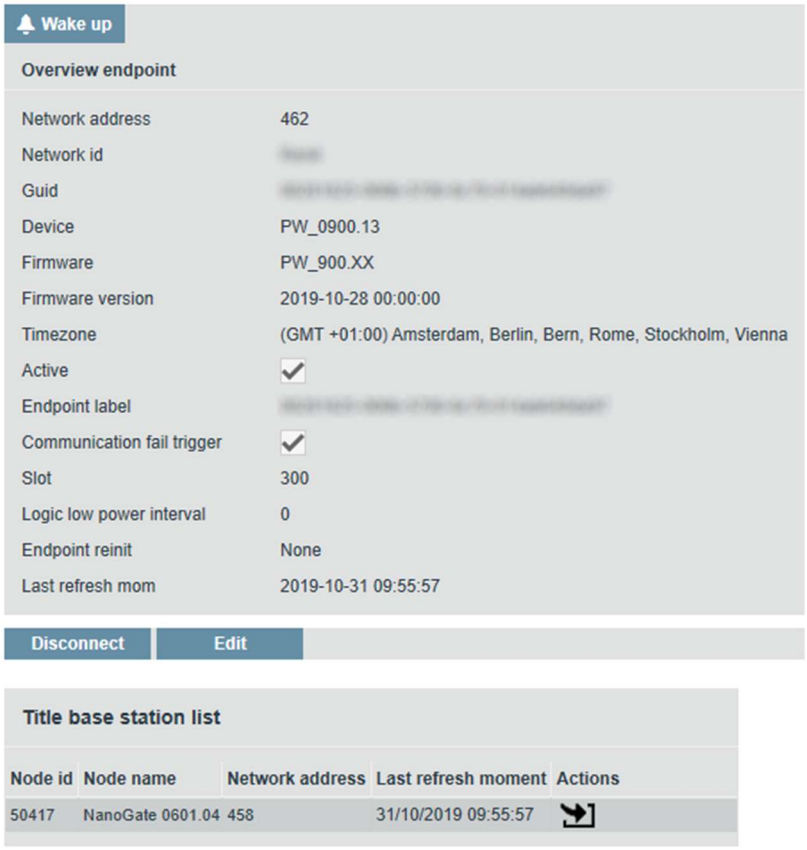
- Adhoc :
- Energy efficient :
- Full power :

Clicking the Edit button will bring up a menu in which the base station mode can be altered.

The endpoint-list shows an overview of endpoints communicating with this base station.

14.4 RF Endpoint

RF ENDPOINT



Network address : Unique address of the endpoint.

Network ID : Name of the network the endpoint belongs to.

GUID : serial number, unique identification of the endpoint.

Hardware : Hardware variant.

Firmware : Firmware variant.

Firmware versions : version (expressed in date-time notation).

Time zone : Time zone of the endpoint.

Active : Indicate whether the endpoint is active.

Endpoint label : Extra label

Communication fail trigger : Checkmark this when a communication failure should create a trigger event.

Communication interval : Time between two communication sessions with the base station.

Formula interval (low power) : Frequency running formula calculation when in low power mode.

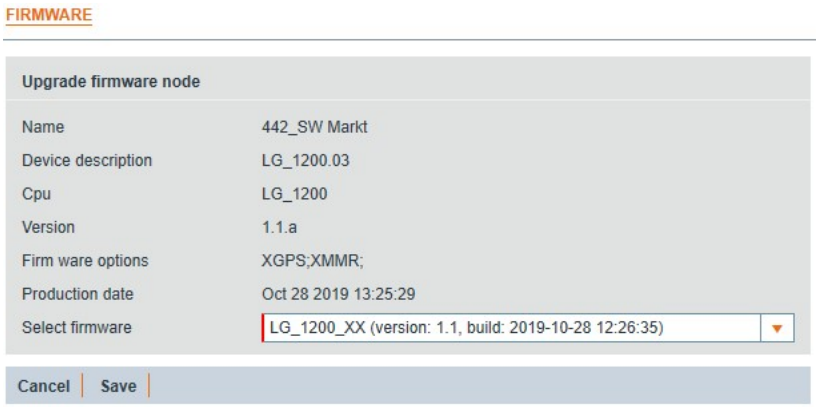
Reinit :

Select from :

- Cold restart (memory is erased and device is restarted, all sample data will be gone)
- Warm restart (just a restart)
- None

14.5 Firmware Upgrade

Using this menu option the firmware can be upgraded.



In this screen we can see the firmware is from October 28, 2019.

At the field ‘Select firmware’ a new firmware version can be selected. When clicking ‘Save’ the new version will be send to the device. This might take a couple minutes.

14.6 Wireless Module

14.6.1 Configure

Wireless modules can be configured in the ‘XBus device’-module in Live. When this module is opened, a menu is shown with the ‘Wireless Devices’ button.

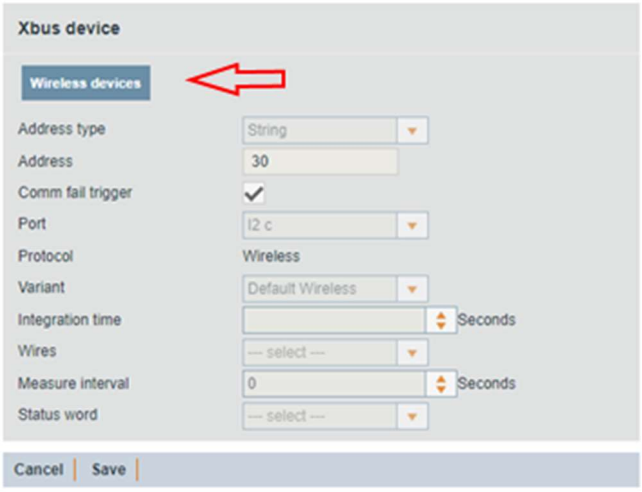


Fig 14.6.1.1: Configuring a wireless XBus module

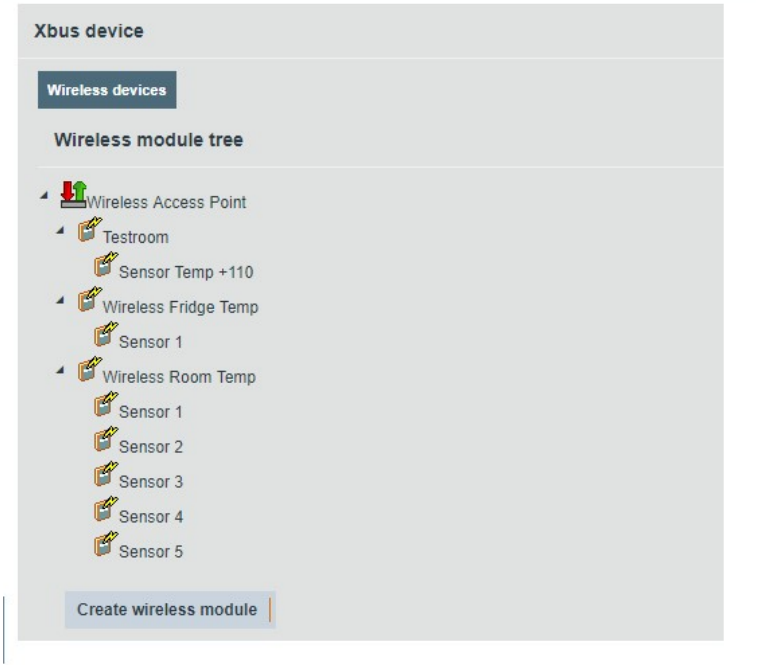
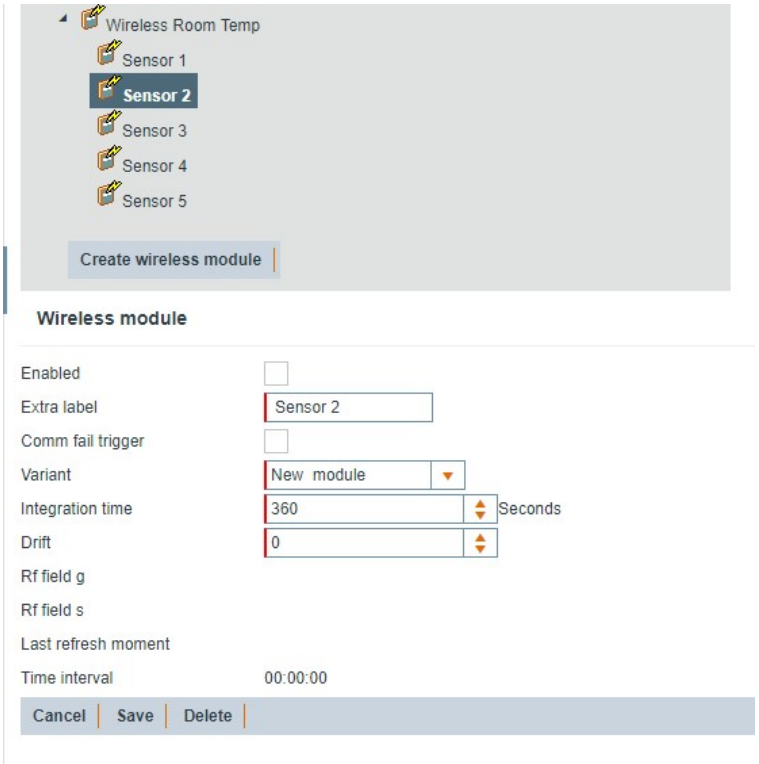


Fig 14.6.1.1: Overview of all configured wireless modules

Here it is possible to create a tree structure of all wireless modules dragging each module to the correct spot.

The settings menu of a wireless module can be opened by clicking on the device.



14.7 Hardware Information Screen in Live

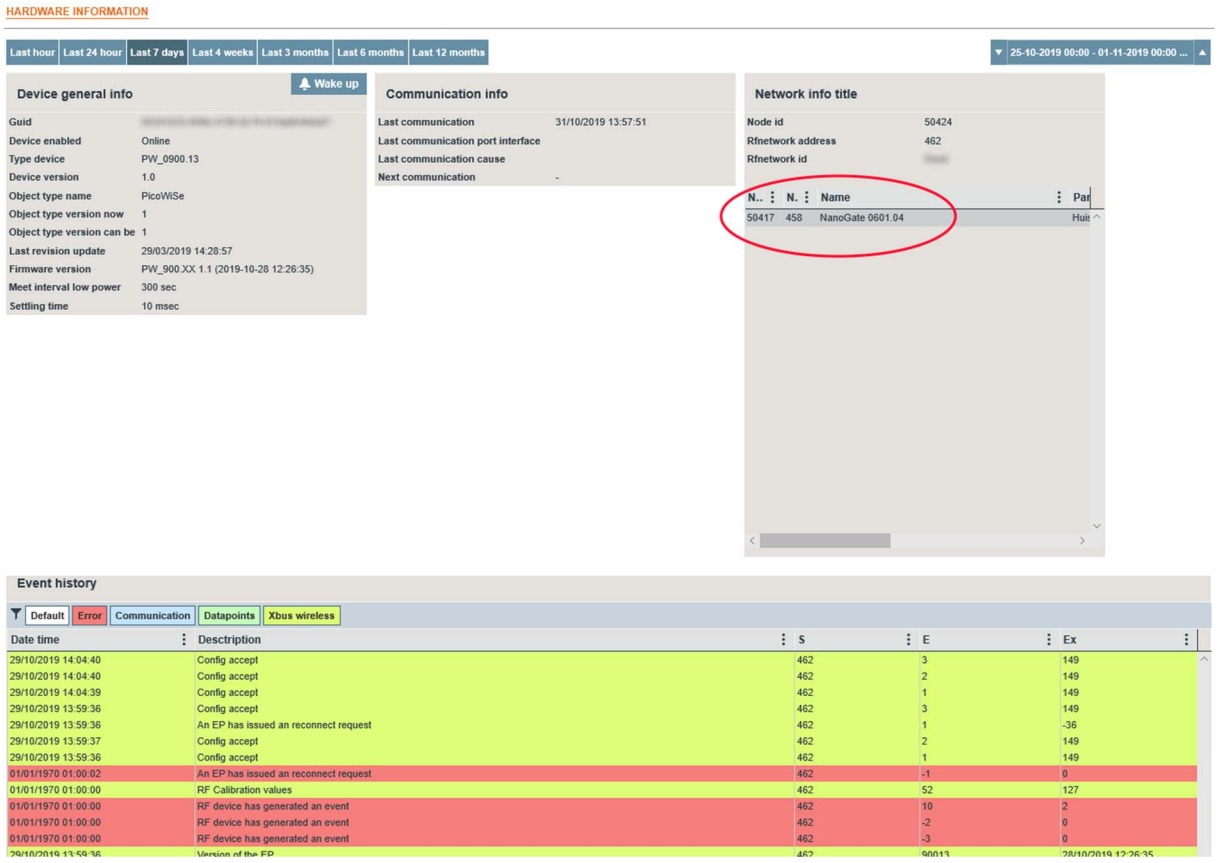
The hardware information screen consists of a number of blocks.

- Hardware general
- Communication information
- Network information
- Reconnects history
- Trigger history
- XBus
- Datapoints Analog
- Datapoints Digital
- Datapoints Counters
- Datapoints Word
- Datapoints Text

All blocks use the period selected in the period selector.

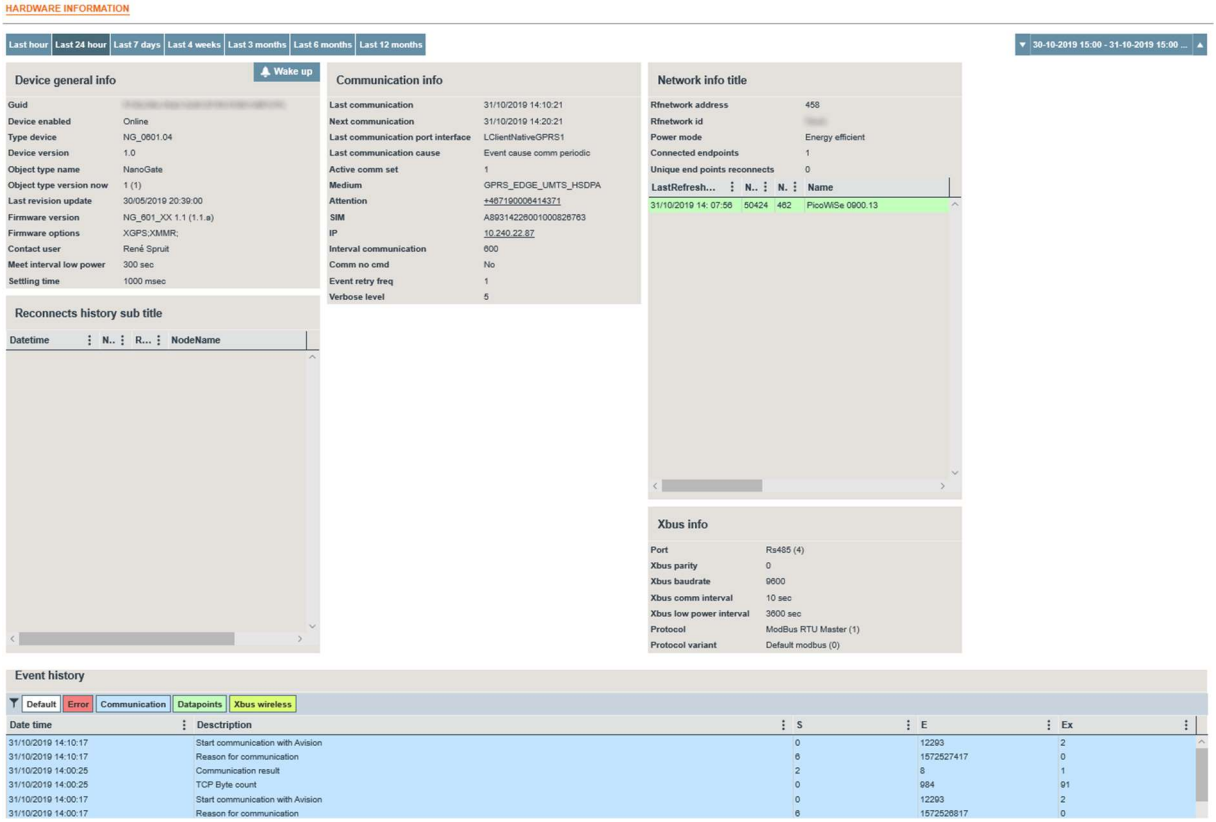
14.7.1 Hardware Information Screen Pico Wise

Displays the available information of a Pico Wise. The wake up button starts a communication session. A pico wise is connected to a gate, in this case a NanoGate, as can be seen in the most right hand block. If this line is clicked, the node of the NanoGate will be opened and the Hardware Information of the NanoGate will be displayed.



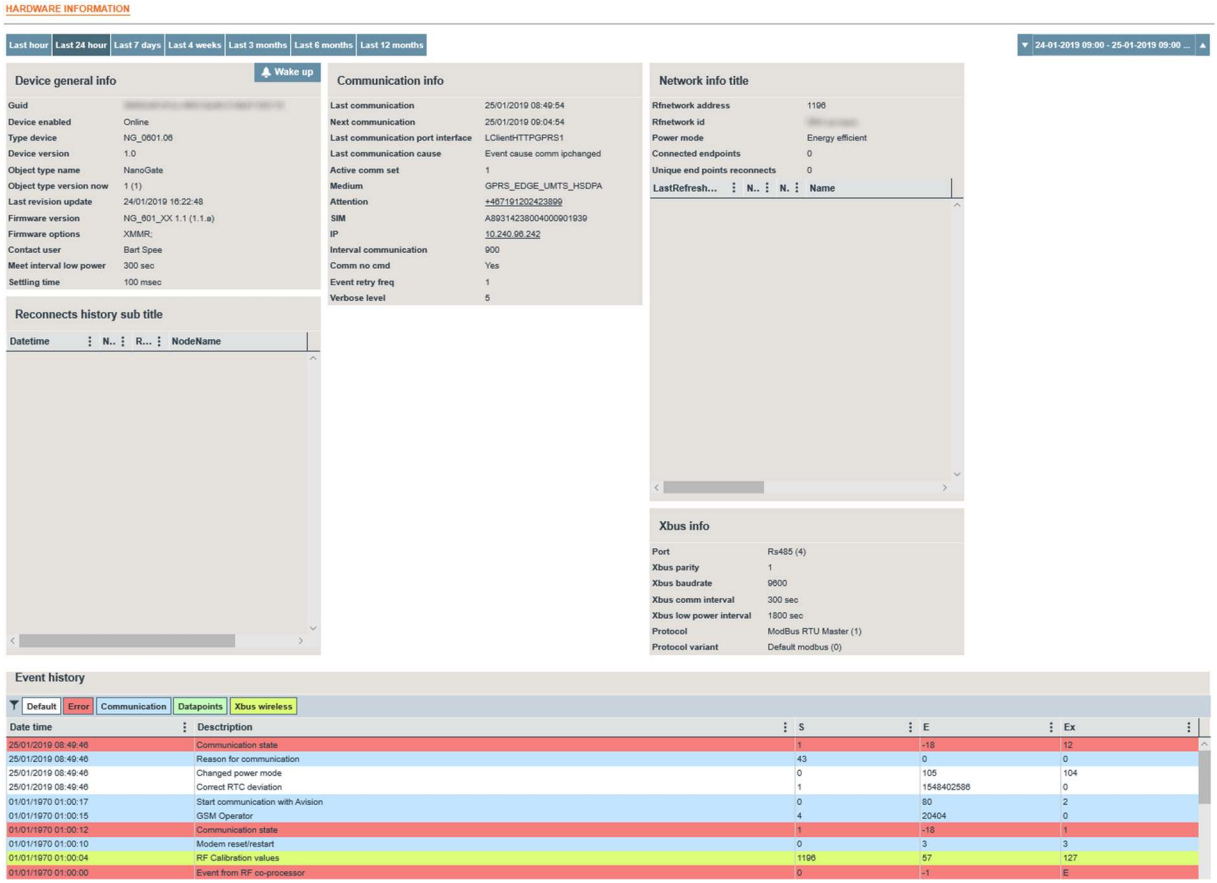
14.7.2 Hardware Screen Gate

The Hardware Information screen on a gate has, as seen below, more information about communication and network. The different colors in the network information block shows whether the wireless module has communicated in time. Green is good and red means too late.



14.7.3 Hardware Screen Nano Gate with XBus

This screen also shows XBus information. Multiple blocks with XBus can be shown here.



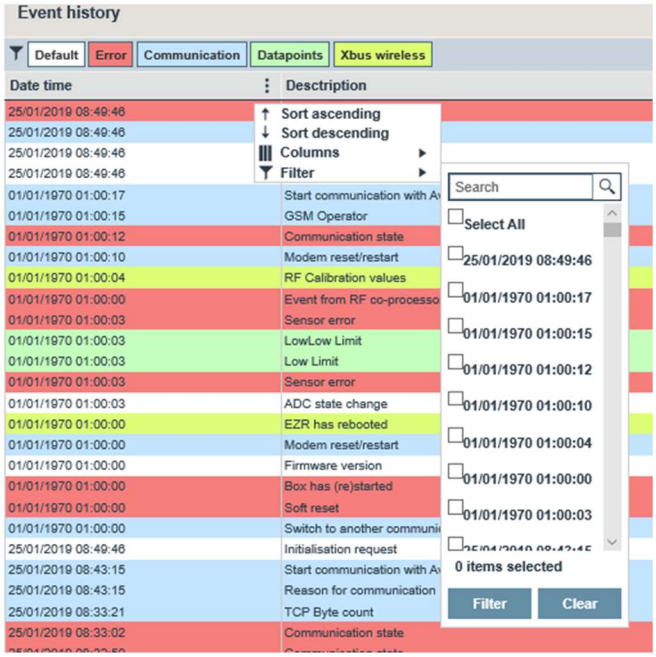
14.7.4 Event History

Explanation grid:

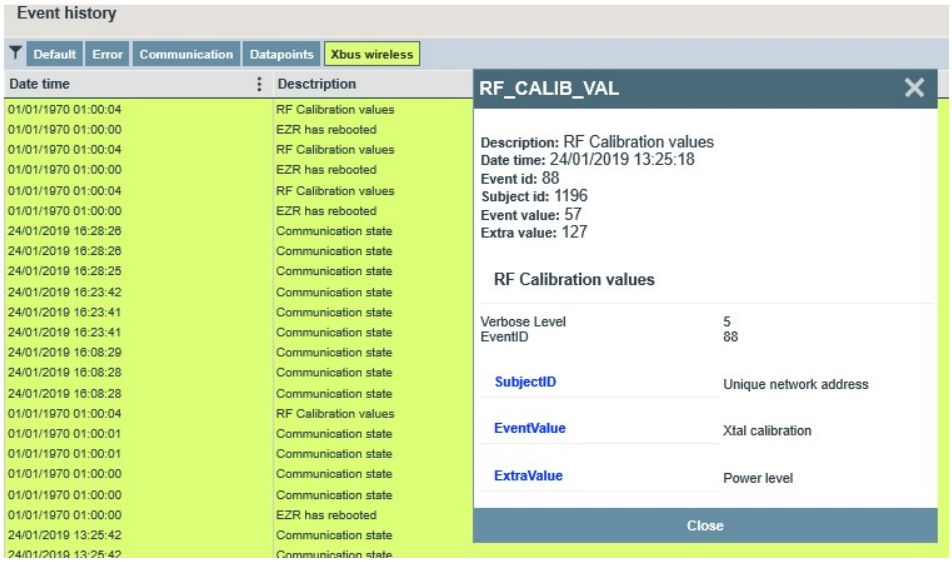
Hardware can raise different types of events or triggers. These events are of different categories:

- Default
- Error
- Communication
- Datapoints
- XBus Wireless

Using the filter buttons on top of the grid these events can be made visible or hidden. Also every column has its own filter button: ⋮.



When clicking a line in the Event history grid a popup showing more information about the event is presented:



14.7.5 Datapoints Overview

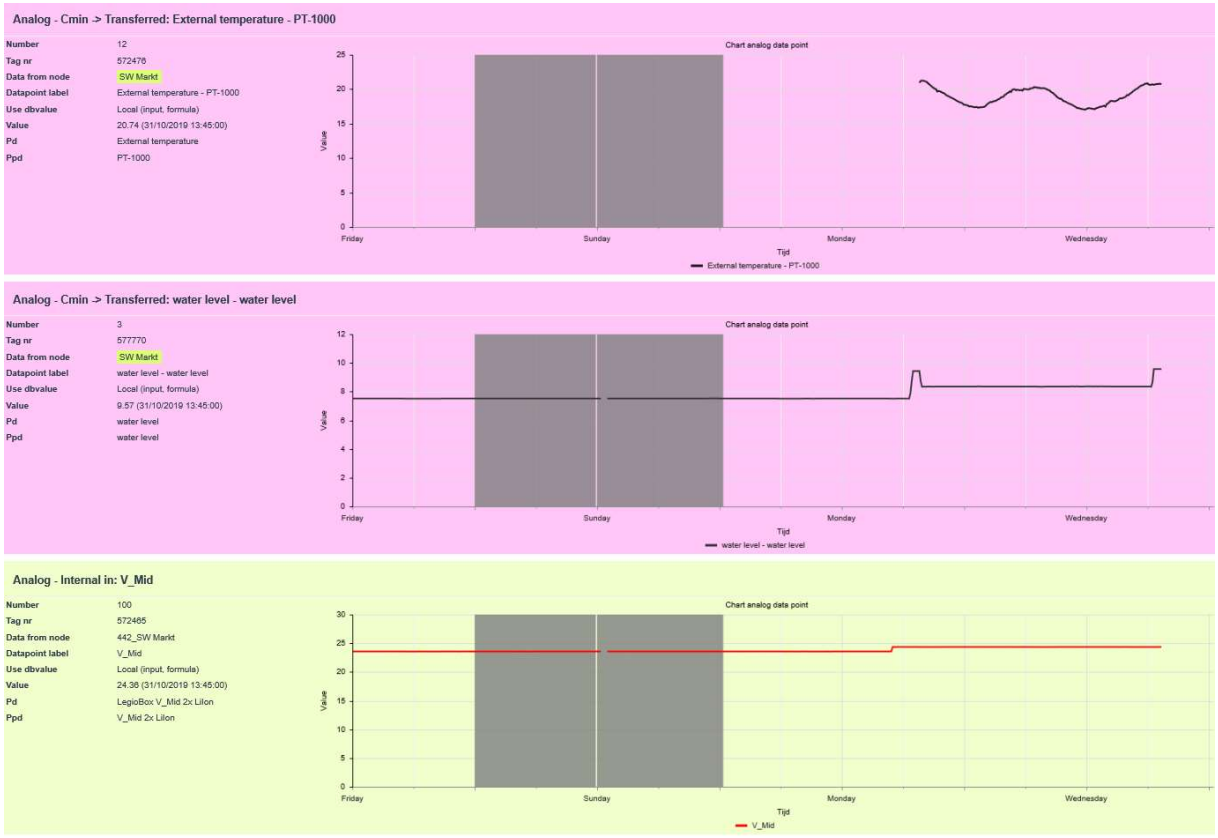
14.7.5.1 Introduction

Each type data Point has its own block of information that depends on the chosen period in the period selector. Furthermore, a distinction is made between hardware data point (input or output) and a virtual data point.

There are several ways in which data can be displayed:

- Chart
- Table
- Maps

In addition, the data point can be ' transferred '. Then the samples are stored on another node. This is shown by the color at 'Data from node'; bright green means transferred.



15 Event History

Using the Event History module a diagnosis can be made regarding the functioning of a particular hardware node. The progress of all events can be looked at in detail. In design You can create different events for different product lines. In live, the generated events are shown from a hardware node with the ability to filter on them.

15.1 Event History in Design

The design module is only available to persons who have special rights. The module is located in the Module menu under 'Application Management'.

15.1.1 Creating an Event for a Specific Product Line

In the event configuration, select the desired product line, then click the '+' button in the upper right corner of the grid. A form opens where the desired values can be filled in.

15.1.2 Epoch Time (‘event valid until’)

An event can no longer be active in the future. This can occur because the event is no longer needed or another similar event has occurred. Normally nothing is entered here but if the event no longer applies to future firmware updates then the epoch time is filled in here (number of seconds from 1 January 1970). This time is the time of the event. This will ensure that the filter options in the Live section are kept clear for all events.

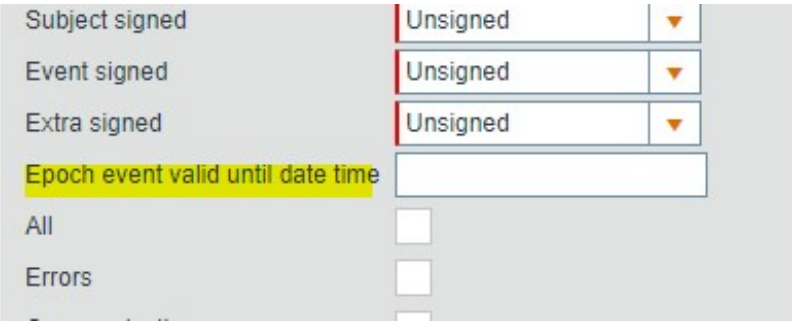


Fig 15.1.2.1: Epoch time (‘event valid until’)

15.1.3 Error Indication Based On Negative Values

Setting an error indication can be done at the bottom. It is possible to set one of the three fields as an error indication. If the corresponding field returns a negative value, it will be displayed as an error.

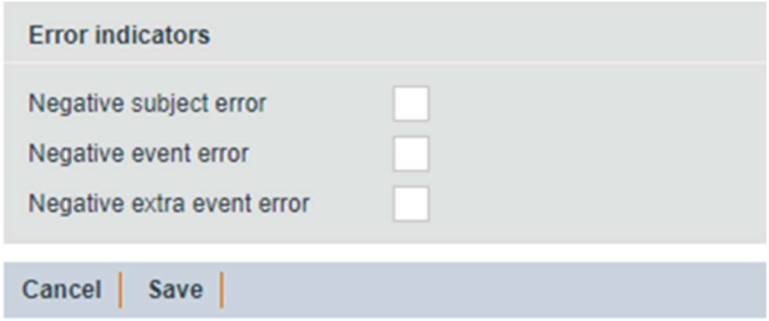


Fig 15.1.3.1.: Setting fields for a correct error indication

15.1.4 Copying from an Existing Event Configuration

It is possible to copy an existing event configuration to other product lines by clicking on the copy button,  , in het grid . There will be a screen with all available product lines indicating which event configuration is currently specific to it. Select the desired product lines. Note: The existing event configuration for the respective product line will be overwritten! (not recoverable).

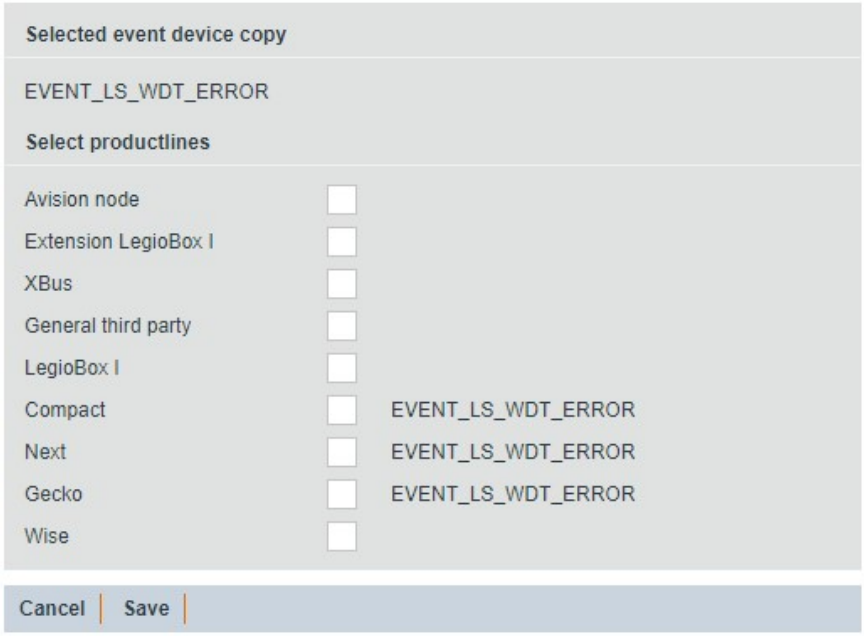


Fig 15.1.4.1: Copying an event configuration to multiple productlines

15.2 Event History in Live

The Live module will be available after selecting a hardware node. Navigate to the module by clicking on ‘Analyse’ in the module menu and then ‘Event history’.

15.2.1 Filter Specific Events

All events are checked by default. Unchecking an event will filter it out. A filter can be completely reset by clicking on the ‘Reset Filter’ button. This one will be able to select certain categories by selecting the desired category and then clicking on ‘Select All’. ‘Select All’ selects all visually present checkboxes.

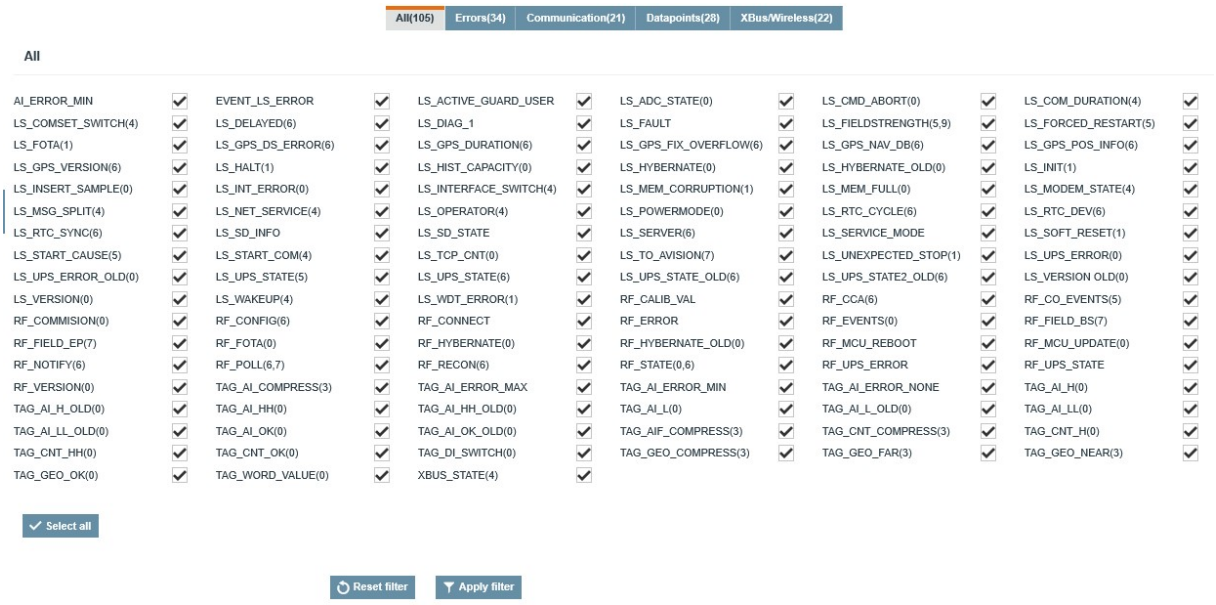


Fig 15.2.1.1: Filtering events

An event can occur in multiple categories (configured in design). In most cases, that's a category ' All ' plus a category specifically related to the event.

To apply the filter, click the ‘Apply filter’ button.

15.2.2 Using Filters in the Grid

Optionally, you can filter through the grid on every possible column by tapping the label at the top, possible options appear in the picture. An example:

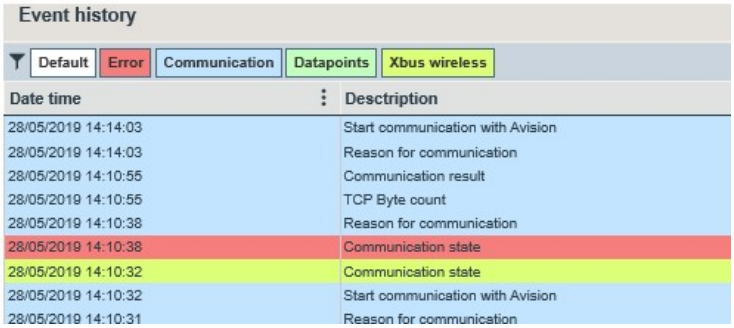
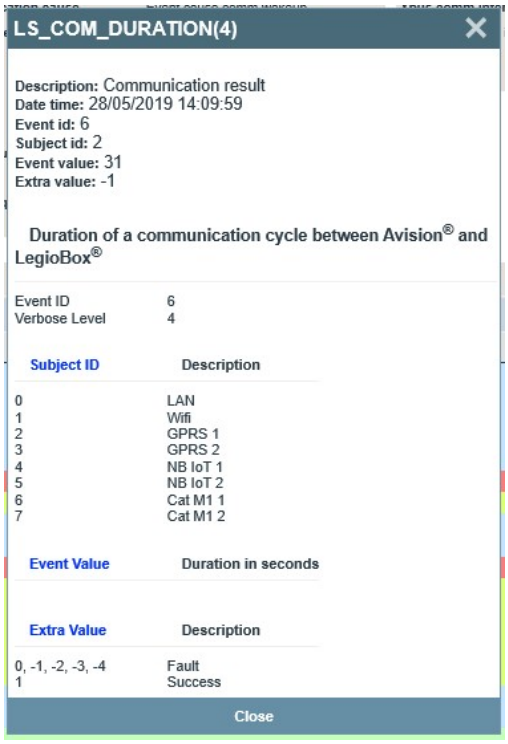


Fig 15.2.2.1 Filter options in the grid

15.2.3 Finding Detailed Event Information

Each event contains information about the values and an event specific description. Detailed information of a specific event can be requested by clicking on the clipboard icon, , in the grid. An example of detailed information about an event:

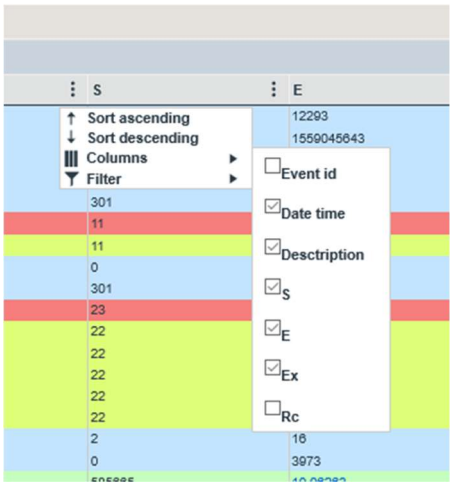


Figuur 15.2.3.1: Description of an event (trigger)

15.2.4 Data Export

It is possible to export the entire selection to an Excel file by clicking the 'Export to Excel' button.

It is also possible to specify which columns should be exported and which not. This is done this by clicking on one of the buttons with three dots, then going to option columns and using the option to turn certain columns on or off.



16 Formula

16.1 Introduction

Formulas create the possibility to conditionally log data, raise alarms or control the digital output of a LegioBox.

One or more values of analog and digital signals as well as some properties (e.g. whether a limit value has been exceeded) of these signals can be used. Together with various calculation Functions, The Legiobox and or Avision will determine the outcome of a formula.

A practically unlimited amount of parameters can be used in one formula.

For example, the outcome of a formula can be used:

- to create and store extra data historically
- to control a digital output
- as an input value for another formula

Given the many possibilities that can be used in a formula**, programming knowledge and experience is desirable** if you want to set up formulas.

16.1.1 Avision Formulas vs. Hardware Formulas

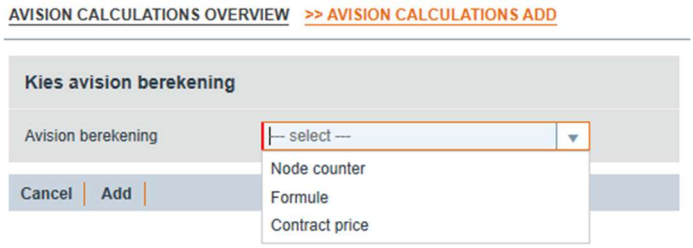
In Avision there are two types of formulas: Avision Formulas and Hardware Formulas. Avision formulas are calculated in Avision, whereas Hardware Formulas are calculated inside and by a device. Also, Avision Formulas are coupled to a Property Definition Item and Hardware Formulas to a hardware datapoint.

16.2 Avision Formulas

16.2.1 Creating an Avision Formula

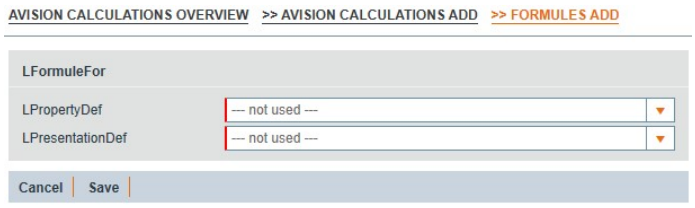
- In Design, in the menu, go to 'Basic elements' – 'Avision Calculations'
- Click on the '+' button on the top right of the grid

The Add menu is presented:

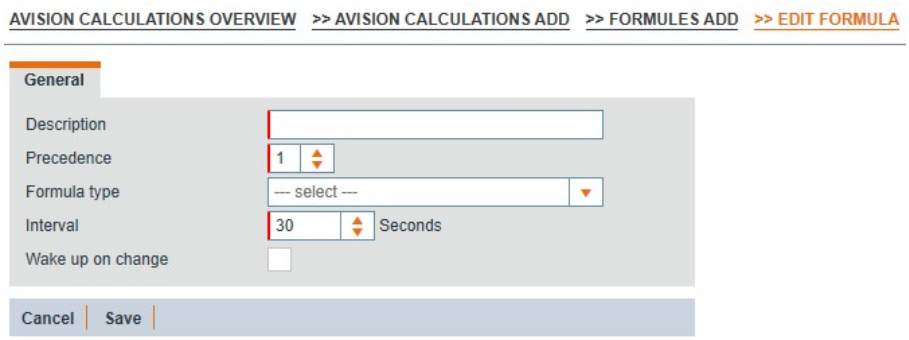


- Select 'Formula'

Another menu is presented where the applicable property definition and item need to be selected:



Another menu appears:



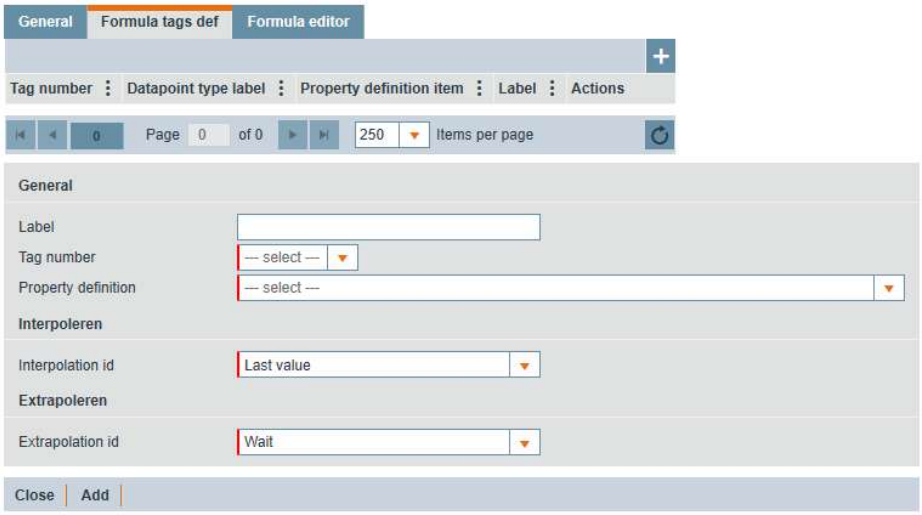
Description: Enter the name of the formula.
Precedence: The order level for this formula (lower number formulas are executed before higher number formulas).
Formula type: The trigger for the formula to start running. This can be 'on event' or 'on period'.
Interval: The time between two calculations of the formula.
Wake up on change:

After clicking the save button more tabs become available.

16.2.2 Formula tags def

This tab shows the

A new datapoint is added by clicking on the '+'-button:



Label : Short name for the datapoint (property definition item) in the formula.
Tag number : Applies a unique number to the datapoint in the formula.
Property definition : Select property definition (Having chosen a property selection, a new dropdown appears where the property definition item can be selected, and one for the formula tags data id).
Property definition item : Select the property definition item.
Formula tags data id : Indicated here is whether calculation will be performed with the data, the number or the time the value is below a given limit. Depending on the data type of the property definition, following options are available:

- **Data:** Gives the option 'Interpolation id' at the Interpolation part.
- **Low:** Gives the options 'period' and 'time interval' at Interpolation.
- **Pre-Low:** - idem -
- **Pre-High:** - idem -
- **High:** - idem -

16.2.2.1 Interpolation

To compute (estimate) the value exactly between two known or measured values.

Following options are available:

- **Last value:** Used to calculate the last value.
- **Last before:** Uses the value one before last in the calculation.
- **Linear:** Linear calculation.
- **Calculate:**
  - **Periodical usage id**
  - **Time interval id**
  - **Adjustment id**
- **Same value:**

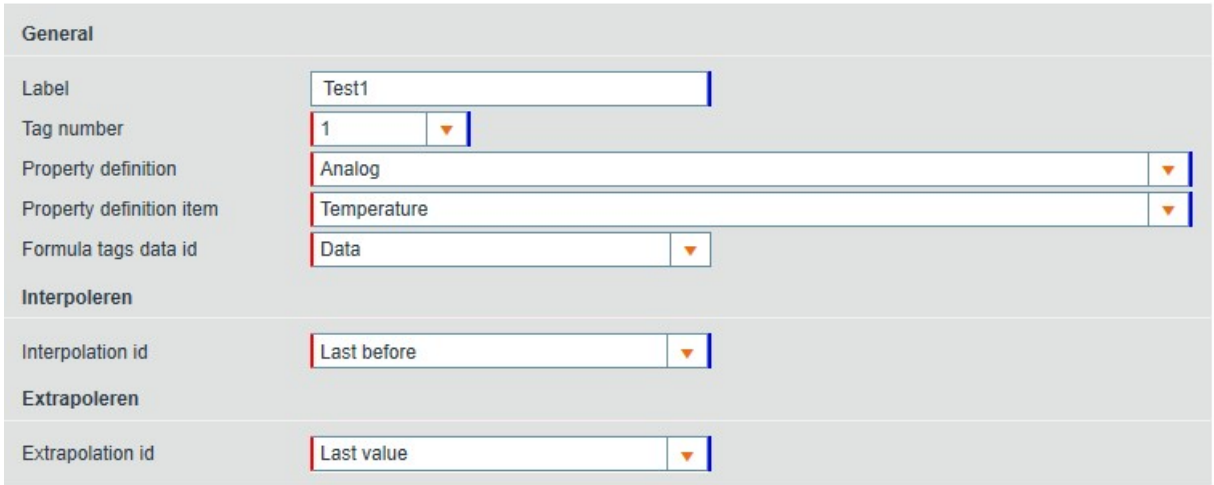
16.2.2.2 Extrapolation

To compute (estimate) a value outside a series of known or measured values.

Following options are available:

- **Wait:**
- **Last value:**
- **Linear:**
- **Regression**
  - **Period:** in seconds
- **Average**
  - **Period:** in seconds

Use the clipboard icon to see the settings, use the pencil icon to edit them:



16.3 Formula Editor Screen

16.3.1 Introduction

16.3.1.1 Syntaxis

A formula can be built in two ways: using digital data points and/or determining a true/not true Boolean expression.

16.3.1.2 Logical Condition

Analog datapoints:

One or more of the following lines:

- Logical Condition-WS-":"-WS-Analog Unit

(In this case, the dash "-" and the quotation marks (") in the above formula are only to clarify the syntax slightly, but these characters will not actually be allowed to appear in formulas.)

WS: The so-called whitespace or delimiter. The following delimiters may be applied:

- space
- new line
- Carriage Return
- tab
- {....} (comment)
- An example of a valid formula:
  "True" {the result is always true}

16.3.1.3 More on Logical Conditions

A Logical Condition can be build in following ways:

- Logical equation ("=", "<" or ">")
- Logical property of a datapoint
- Boolean Constant (true or false)
- System condition "START" or "CHANGE, (Start: is only "True" the first time a formula is executed after the LegioBox has been powered off. Change: is only "True" the first time a changed formula is executed). These functions are available from LegioBox firmware version 4.3. The LegioBox version can be found in the hardware configuration screen.
- Logical Unary Op.-WS-Logical condition
- Logical condition-WS-Logical binary op.*-WS-Logical condition (Multiple conditions can be nested).

16.3.1.4 Logical Unary Op

- NOT or "!": The result is the negated value.
- LEAD or "^": True when a leading edge has been detected of a signal. The result is usually high during one cycle of the formula.
- TRAIL or "v": Same as "LEAD" but then for the trailing edge of a signal.
- DELAY Following syntax applies:
  "["-WS-Integer Constante*-WS-", "-WS-Integer Constante**-WS-"]"

* the result has a delayed leading edge in seconds (maximum: 32766 seconds)
** the result has a delayed trailing edge in seconds (maximum: 32766 seconds)

Example:

[60, 0] Di1.Value: The result only becomes “True” 60 seconds after Di1 has become true, but will drop immediately on Di1 becoming “False”. This calculation is independent of the cycle time of the formula.

16.3.1.5 Logical Binary Op

- AND or ".": when both conditions are true the result is true.
- OR or "+": when one or both conditions are true the result is true.
- XOR or "X": when the results of both conditions are different “True” is returned, else “False”
- “=” : Result is “True” when both conditions are equal, else false.

16.3.1.6 Formulas for Digital Datapoints

Any resultOf the aforementioned logical conditions can be used to set the value of a digital data point.

16.3.1.7 Formulas for Analog Datapoints

A formula for an analog unit consists of two parts: The logical (true/false), as explained earlier, and an analog part which we’ll elaborate here.

The syntax of an analog datapoint is (as described before):

One or more lines like: Logical Condition-WS-":"-WS-Analog Unit

16.3.1.8 Analog Unit

An Analog Unit can be build in the following way:

- Analog property of a datapoint*
- Analog Unary Op.*-WS-Analog Unit
- Analog Unit-WS-Analog function-WS-Analog Unit (Multiple lines can be nested).

16.3.1.9 Multiple Conditions in one Formula

A formula for analogue points can consist of multiple lines. Each line individually consists of a logical condition which is true or not. The condition that is behind the last (lower) line with a result of “True” determines the outcome of the formula or the new value of the point. (See also the example "hours of rotation" below).

16.3.1.10 Analog Unary Op

Calculation can be executed using analog unary op. The calculation is independent of the cycle time of the formula.

All calculations must be of following syntax:

- "["-WS-Integer Constant*-WS-"]"
- between 2 and 32767 seconds
- AVG Average
- MAX Maximum
- MIN Minimum
- SUM Summation

Example

True : AVG[180]Ai1.Value The datapoint where the formula belongs to will get the value that is the result of: the average value on analog input 1, calculated over a period of 180 seconds.

16.3.1.11 Analog Function (*,/.+,-)

- * multiply
- / divide
- + add up
- - subtract

16.3.2 Characteristics of Datapoints

16.3.2.1 Logical and Analog Characteristics

A characteristic consists of an interpretation of a data point followed by a characteristic. Formulas do not use the name of a data point, but an internal name. The following names may be used:

Digital input (W stands for Wireless, E means ExtensionBox):

- "DiX" (X=1..8, "WDiX" (X=1..32), "EDiX" (X=1..32)
- Example : Di1, which is the first digital input of the LegioBox

Digital modifiable points(W stands for Wireless, E means ExtensionBox. DV means virtual digital inputs):

- "DOx" (x=1..8), "a name="#DV">DVx" (x=1..8), "WDOx" (x=1..32), "EDOx" (x=1.32)

Analog input (W stands for Wireless, E means ExtensionBox:

- "AiX" (X=1..8), "WAiX" (X=1..32), "EAiX" (X=1..32)
- Example : AI1, which is the first analog input of the LegioBox

Analog modifiable points (W stands for Wireless, E means ExtensionBox. AV means virtual analog inputs):

- "AVx" (x=1..8)

Pulse Counter points (W stands for Wireless, E means ExtensionBox. CV means virtual pulse counter):

- "CIx" (x=1..8), "CVx" (x=1..8), "WCIx" (x=1..32), "ECIx" (x=1..32)

16.3.2.2 Logical Characteristics

- .VALUE: the digital filtered value of a datapoint (i.e. of a Di)
- .RAW: the digital unfiltered value of a datapoint
- .ENABLE: whether a point is used or not
- .LOCAL: whether the datapoint is controlled by a local formula (in the LegioBox).
- .LOWLOW, .LOW, .NORM, .HIGH and .HIGHHIGH: the state of a limit value of an analog data point.

16.3.2.3 Integer (analog) Characteristics

- .VALUE: value of an analog datapoint (Ai, VAi and counter)
- .DELTA: the change of a counter value (independent of the sample time of the counter)
- Date/Time parameters
- WDAY: Day of the week (1=Monday... 7=Sunday)

- SECOND, MINUTE, HOUR, DAY, MONTH, YEAR: the situation of the moment in respect to the real clock date and time.
- DST (in formulas): The difference of local time and UTC during daylight saving time period (summertime) in minutes. In The Netherlands this is 120.

16.3.3 Datapoints in Formulas

16.3.3.1 Example Principles

As an example consider the sample moments of three datapoints:

1____2____3____4___5____6|.. Formula datapoint F

1__2__3__4__5__6__7__8__ |.. Datapoint X

1__2__3__4__5__6__7__8__ |.. Datapoint Y

| is “Present Time”

16.3.3.2 Calculation

Options in het formula screen:

- Periodical: The formula is executed at entered intervals.
- On change: The formula is executed once when one of the datapoints is changed.

16.3.3.3 Interpolation and Extrapolation

Interpolation concerns X1 to X7 and Y1 to Y7 (time datapoint <= execution moment).
Extrapolation concerns X8 and Y8.

16.3.3.4 Interpolation

Using the last value : The last known value of the X or Y data point is used. This can be the last sample value. LegioBoxes can also transmit the last value of data points at each communication stroke.

Value equal to output moment: At F5, that is X7 and/or Y7, or in other words the samples with the exact same sample time. This setting does not make sense in a "change" formula.

Previous value (with regard to execution moment): At F4 that is an older or equally old sample, in other words X5 and Y5.

Linear interpolation: At F4 that means (linear) interpolation between X5 and/or X6, and Y5 and Y6.

Calculated value:

- Average all values: the mean of all samples of the selected period.
- Number of samples: the number of samples of the selected period.
- The maximum value: the maximum sample value of the selected period.
- The minimum value: the minimum sample value of the selected period.

16.3.3.5 Extrapolation

Wait with calculation: F5 will be calculated, F6 will not.

Use last value: Last value of the datapoint X or Y is used.

Linear extrapolation: At F6 that is an extrapolation using X7 and X8 resulting in a not yet existing point X9 and also using Y7 and Y8 resulting in Y9.

Linear regression: At F4: A linear regression is calculated using all samples of X and/or Y between moment F3 and F4.

Average pull-through: at F4 the average of all samples between moment F3 and F4.

16.3.3.6 Examples

16.3.3.6.1 Running Hours

This examples describes how running hours can be measured with Avision and Avic devices.

First, a logical value must be defined indicating whether a particular engine/machine is running. In This example, we use digital input 1 for this. This input is "true" when the machine is running. To be able to count accurately, two virtual analogue data points (AV1 and AV2) are used, namely: turn seconds and running hours. If the machines are on for most of the time and are barely switched off then the 1 virtual analogue input can be used for hours of rotation.

The data of run time seconds are not interesting for most users and therefore do not need to be logged (historically stored).

The formulas for both virtual point now look like this:

Formula for AV1 (run time seconds):
Precedence: 1, Interval: 1 second
Di1.value : AV1.value+1*
AV1.value=3600 : 1

This formula works as follows:
1. When the digital input is “true” then one is added to AV1. Since the formula runs every seconds this means that every second one is added to the value AV1.
2. When AV1 has a value of 3600 reset the counter to 1. Again, because the formula runs every second this means that after one hour the AV1 is reset.

In the case of a formula for an analogue point, the last condition is applied. The second condition "AV1. Value = 3600" is valid only if AV1 has the value 3600. The datapoint does not get this value until it is saved or after the formula has been executed. For this reason, the counter must be set to 1 and not 0.

Formula of AV2 (run time hours):
Precedence: 1, Interval: 1 second
AV1.Value =3600: AV2.Value+1

Or in words: if a machine has rotated 3600 seconds, increase the number of hours by 1.

Time-dependent settings in formulas
Data points can be used In formulas. These are set at the bottom left of the formula screen.
On the bottom of the screen you have to set which data of a data point is used.

Here are some examples:

Run formula for data that enters once a day
When a formula has to be calculated every hour on data that arrives once a day then the settings are as follows: Interval (top left of the formula screen): Run periodically every 3600 sec. At the data

points below the form screen: **Interpolate** to "previous value versus execution moment" set and **extrapolate** to "wait with Run".

More examples in the following chapters.

16.3.3.6.2 Calculate Average

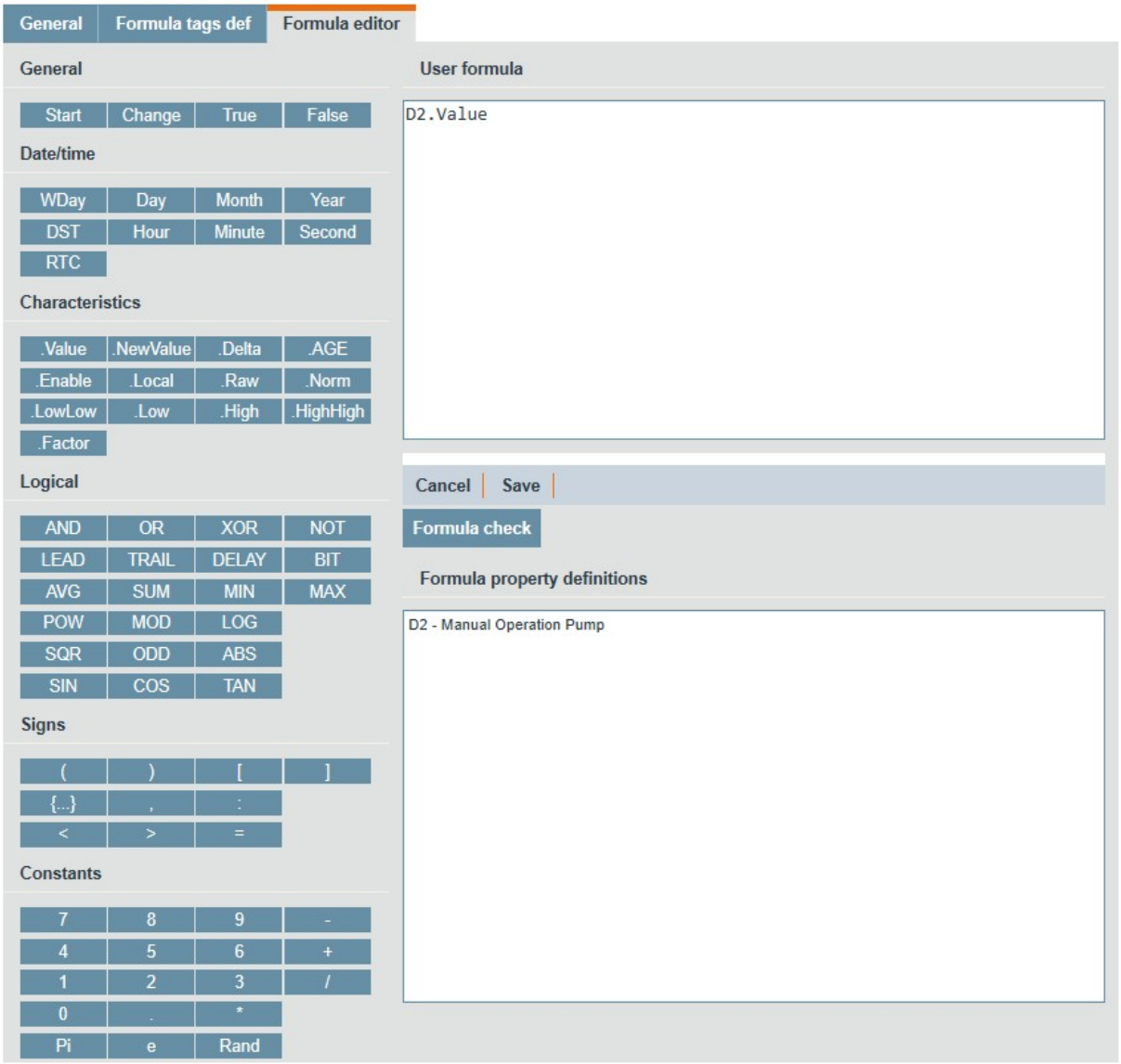
In this example, we want to know the average of samples taken the first 5 minutes on the input of extensionbox.

The number of times (seconds) a formula is executed is determines the number of samples the average is calculated on.

When the formula settings are:
Precedence: (any number will do) , Interval seconds: 10
Formula:
True: AVG[300]EAI1.VALUE

In this case the average is calculated over 30 samples (300 : 10).

The outcome of this formula is valid for the entire set period (in this case 300 seconds).



The lower right block shows the datapoints added in the previous tab, 'Formula tags def'. By clicking on a datapoint here the datapoint is entered in the formula block above. Likewise for the function buttons on the left. The formula block is text box and can be written.

When ready the formula can be tested to comply to syntax rules by clicking the 'Formula check' button. This check is also performed when the save button is clicked. Saving an invalid formula is not possible.

16.4 Hardware Formulas

16.4.1 Introduction

Using formulas in an Avic device and in Avision creates the option of conditionally logging data, generate alarms or set an output. In formulas multiple values of analog and digital values and situations (i.e. the crossing of a limit) can be used. Together with other calculation functions the output of a formula will either be calculated in the Avic device or by Avision.

In one formula a practically unlimited number of parameters can be used.

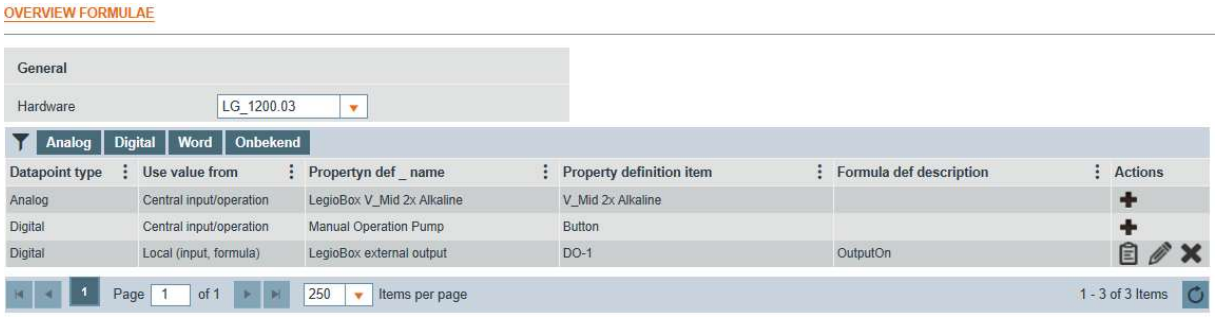
The outcome of a formula can be:

- Stored historically
- Used to control an output
- Used as input (parameter) for another formula

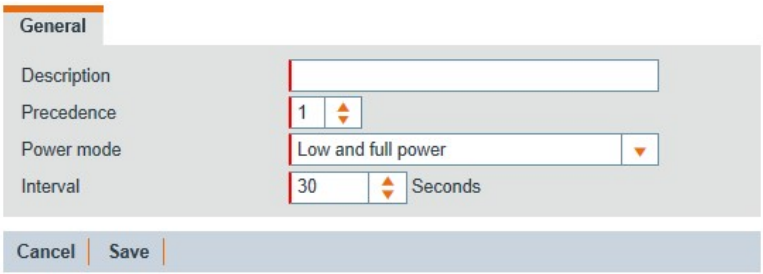
Given the many possibilities that can be used in a formula, programming knowledge and or experience is desirable if you want to use formulas.

A basic explanation of the various functions and parameters is given In the following text. If more information is required, please contact us. The explanation begins with an equally basic explanation of the syntax (which conditions the (structure) of a formula must meet) of formulas.

In Design, choose the Hardware node. In the menu click ' Formulas ', the ' Formula Overview ' screen will open.



If no formula has been created for a data point, then the ' Actions ' column shows only the plus icon. After clicking on this icon the following screen will be displayed:



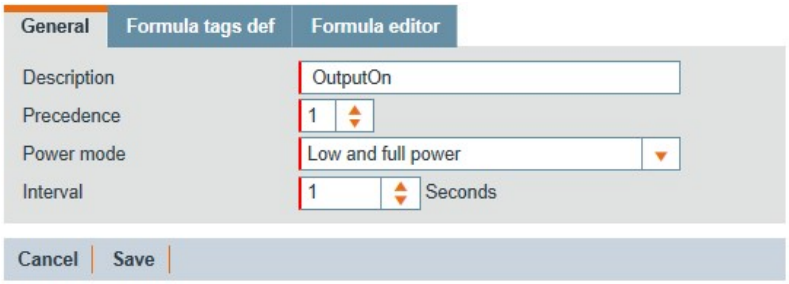
Description: Enter a description/name for the formula here.
Precedence: Enter the order in which formulas are executed versus each other. The order is important if the outcome of one formula is used in another formula.
Power mode: Indicate in which power mode the formula is allowed to run in the Avic device. Select from three options:

- Low power
- Full power
- Low and full power

So it is possible to not have a formula running when the device is in low power mode (by selecting ‘Full power’).

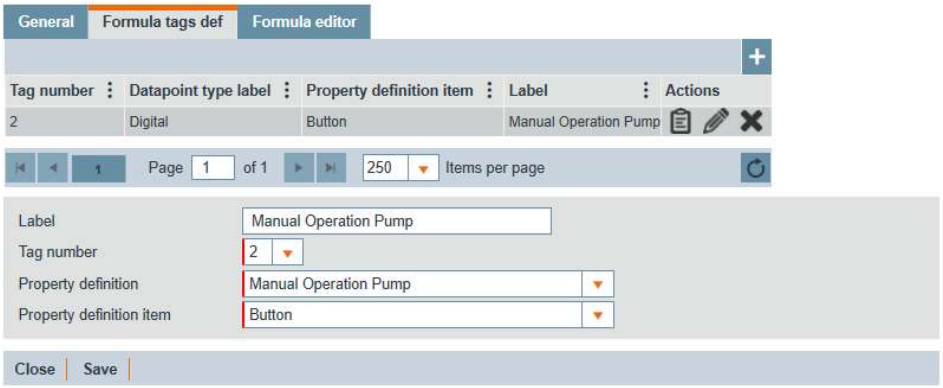
Interval: The time between two executions of the formula.

After clicking 'Save', additional tabs are displayed, for selecting data points and entering the actual formula.



16.4.2 Tab 'Formula tags def'

This screen selects the data points that will be used in the formula. The ' + ' button at the top right of the grid allows the user to add an property definition item.



Label : Short name for the data point, shown in the ' Formula Change screen '.
Tag number : Assign a number to the datapunt (for later use in the formula).
Property definition : Select a property definition from the list.
Property definition item : Select a property definition item (of the earlier selected property definition).

16.4.3 Formula Editor Tab

This menu is described in chapter 16.3.

16.5 Create a Formula to Set Output On when High Water Detected

In the example of an alarm, as made in chapter x, an e-mail is sent when a high water alarm occurs (simulated using a switch on our test kit connected to Di1). It would be nice to have immediate feedback in our test kit. In the following example, we use a formula to turn the DO led on, when a high water alarm is generated.

16.5.1 In Design

At the Hardware node 'LightGate', menu item 'Hardware IO', go to 'External IO', tab 'Digital out'.

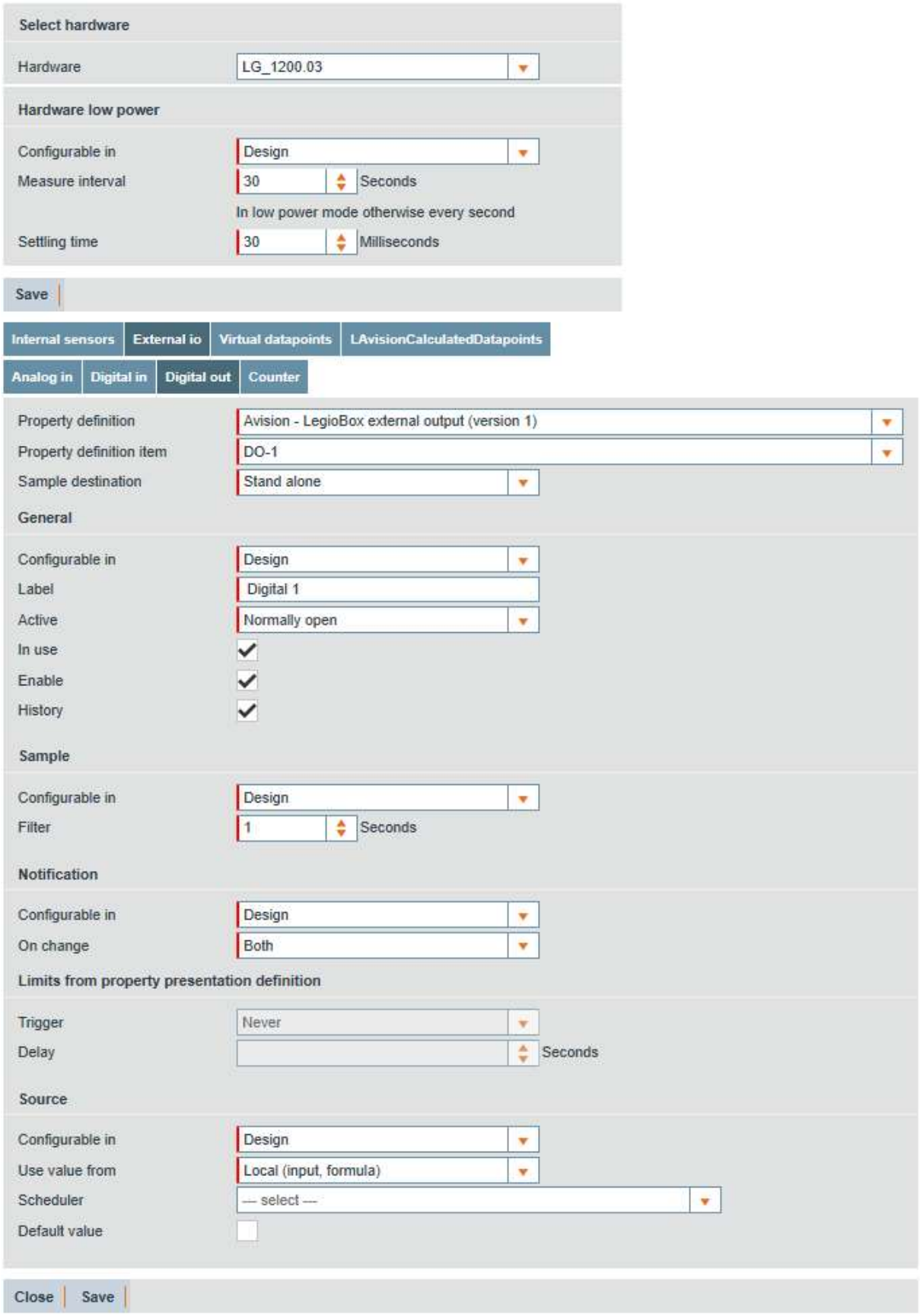
Adjust following settings:

General

- **Property definition**: Avision – LegioBox external output
- **Property definition item :** DO-1
  (There's only one output).
- **Sample destination**: Stand alone
  We don't need to transfer the state of the DO to another node.

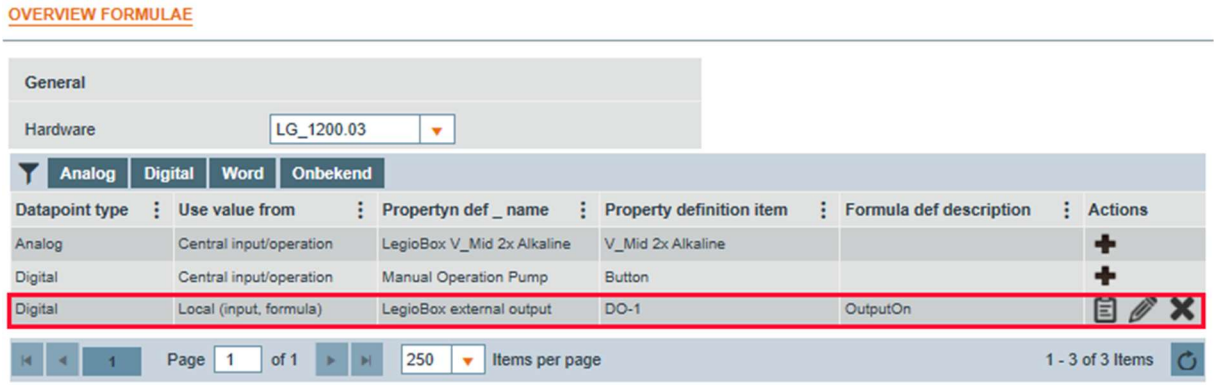
Source

- **Use value from :** Local (input, formula)

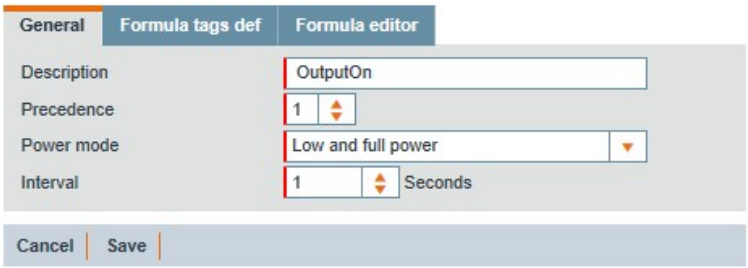


And click ‘Save’.

Now when we look at the menu item Formulas (of the 'LightGate') we see that a line has been created in the grid 'Overview Formulae'. This line was created by Avision because we chose 'local (input, formula)' In the 'Use value of' field.

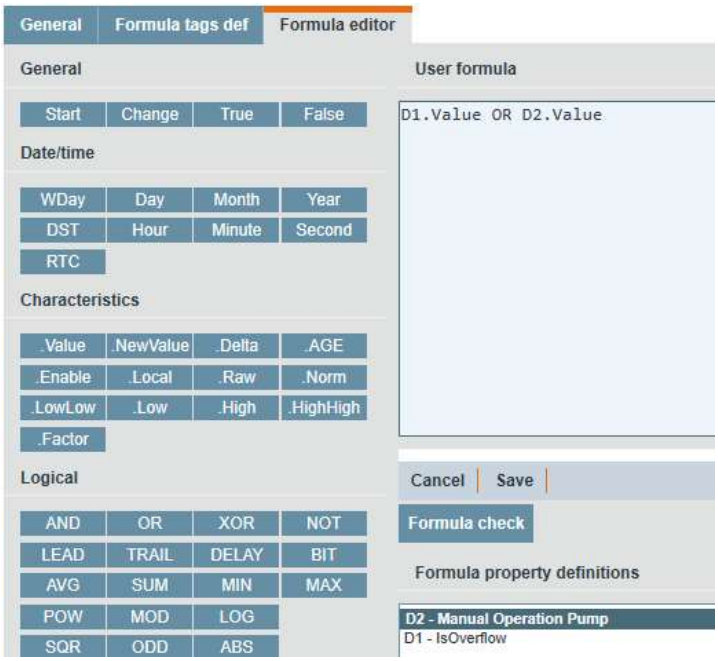


- **Enter description**
  The interval field represents the frequency at which the formula is calculated, here 1 time per second.



- **Create a formula datapoint**
  We indicate here that we want to use the indication of an overflow situation as a parameter of the formula controlling the DO:

- **Formula edit menu**
  The formula is very simple. Basically the output of the formula could be the value of the output. If in an earlier chapter you already created a button in a monitor screen to control the output then it's only a matter of using an OR.



Click 'Save' button.

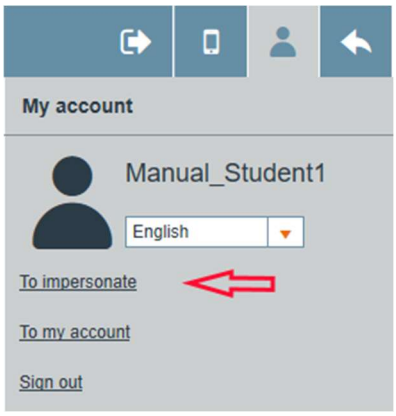
16.5.2 In Live

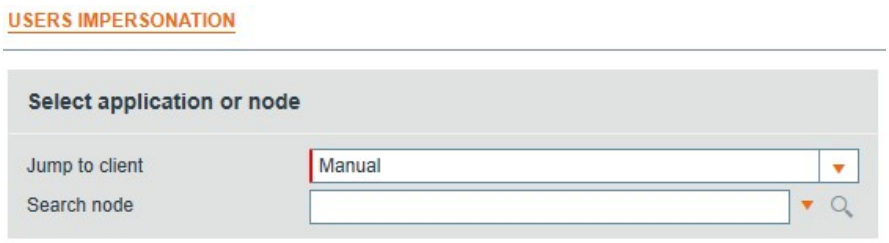
Here we only have to synchronize. After a communication session with the LightGate test kit, the settings are loaded. If we now operate the Di1 switch for at least 1 second, DO will be controlled and the LED is on for 1 second to indicate that the alarm has been generated.

In practice, one could use DO to give the signal that a pump should start working or an overflow valve is opened.

17 Impersonation

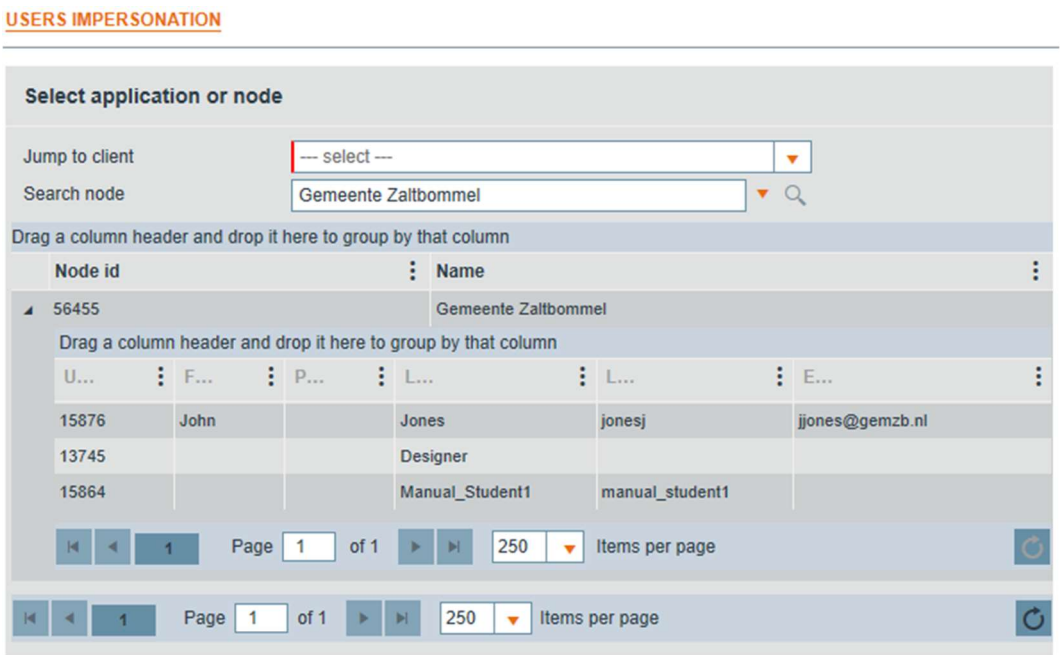
This module is part of the user options in Live. The user options are shown after clicking the person icon in the top right corner. This option allows you to log in as a user of an underlying customer application. There is no need to know the user's password.





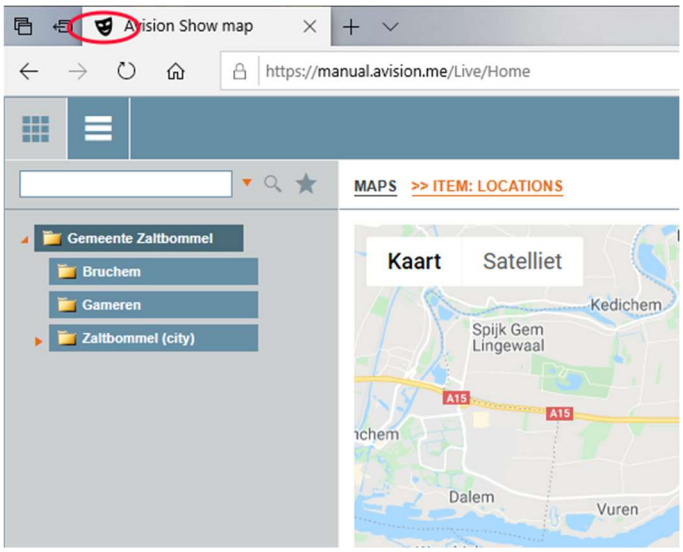
If the client application is jumped to without specifying a user, logging in will be done as the Designer. The Designer is a special user who is created for each application.

The 'Search node' field can be used to log in as a user of a (client) application. In the example below we searched for ' Gemeente Zaltbommel ' to be able to log in as an employee of this customer.



Click on the user of choice and click yes in the next confirmation window.

After login we see the same as the chosen user, John Jones, would see if he would be logged in: The active node is that of the municipality of Zaltbommel. Because of the mask icon in the URL of the browser it is immediately clear that we are logged in using impersonation.



The users information in the top right corner shows we are logged in as John Jones:

In this menu ‘impersonate’ can also be reversed.

The 'impersonate' option is only available if you are already logged in and have the necessary rights, for example via the ' Avision – Default Live Administrator ' role:

18 Location

This module exists in Live only. Here the geographical position of an Asset and its address information are stored here. This information is required when using the map module.

18.1 Settings

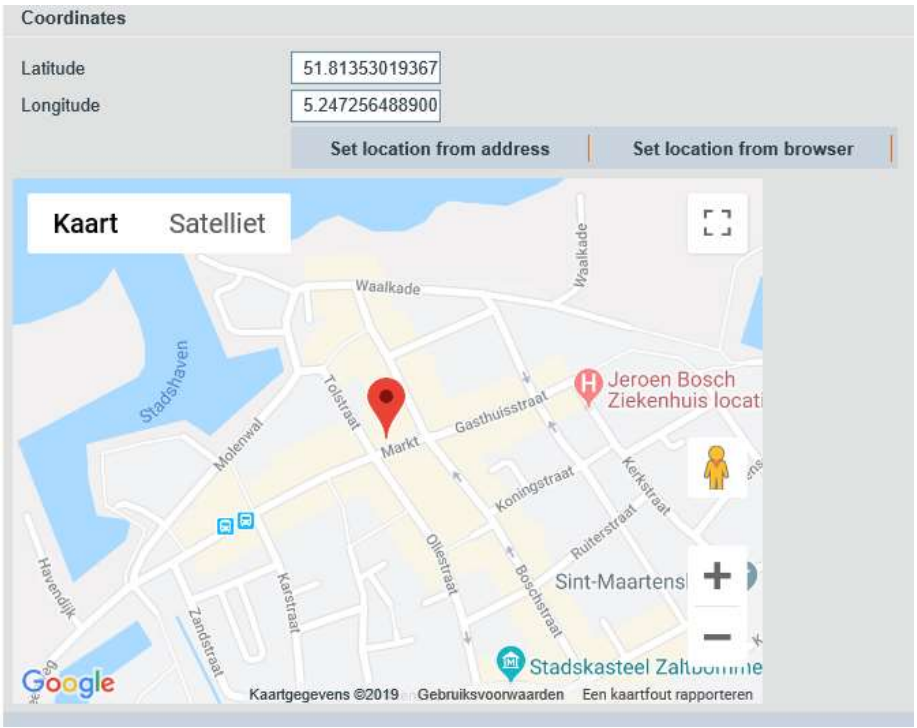
Settings that can be edited are the usual address data. The coordinates are WGS84 coordinates. The following fields need more explanation:

- Location code
- Call number

18.2 Create a Location

There are three ways to create a location: by filling in an address, by filling in the GPS coordinates or by clicking on the map on the location (where the GPS coordinates are automatically filled in).

- In Live, go to the Asset
- In the menu click on Location
- Click Edit button
- Find the approximate location on the map
- Click the exact location on the map (notice that the gps coordinates are entered automatically), and next click the 'Save'-button



18.3 Remove a location

In order to remove the location, click on the remove button underneath the map (showing the current configured position). When clicked and confirmed, the location and any other related information will be removed.

19 Hardware Distribution

Using the hardware distribution module hardware nodes can be exchanged between applications. Hardware nodes can be moved to lower applications or returned to the upper application.

19.1.1 Hardware Distribution to Lower Applications

Open the hardware distribution module on the hardware (stock/maintenance) folder.

19.1.1.1 Add

There are three options to select hardware nodes to distribute to another application. If the top text box is selected, the sticker on the Avic product can be scanned using a handheld scanner. In addition, it is possible to type in a GUID and click Add using wildcards (*). The GUIDs can also be selected in the list and the arrow buttons are added to the selection.

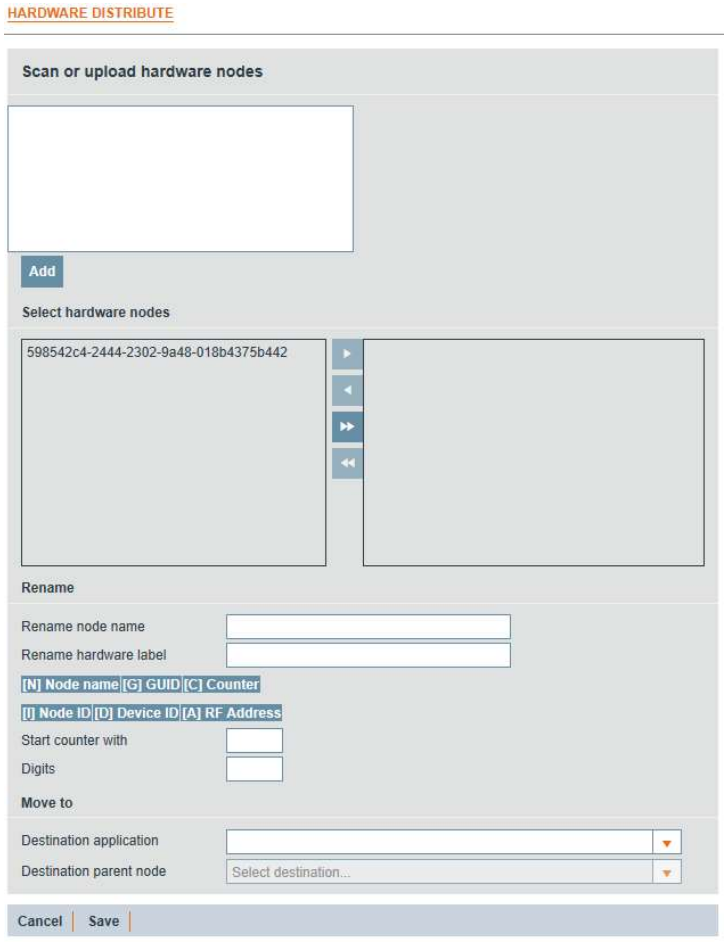
19.1.1.2 Rename

The Rename functionality allows the node name and the hardware label to be modified. By using the template tags it is possible to insert the node name ([N]) for example.

If a counter template ([C]) is added, the ' Start counter ' field can be used to indicate the beginning of the counter and the number of digits with ' digit '. For example, if you fill in ' Startcounter ' 5 and in ' digits ' 3. Then the counters will start with ' 005 ' and then continue with ' 006 '.

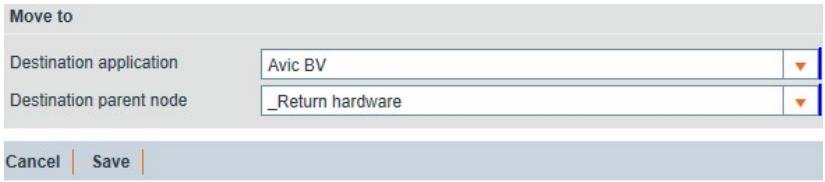
19.1.1.3 Move To

Here we select the Application and node (of the Hardware folder type) to move the hardware nodes to.



19.1.2 Hardware Distribution Back To Upper Application

By choosing the above-lying application and the folder ' _Return hardware ' hardware is placed back.



19.2 Working

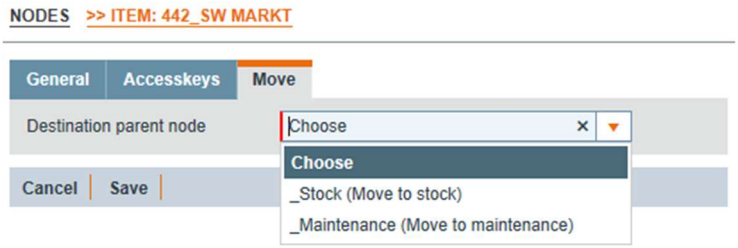
If a customer has purchased an Avic product, Avic will move the purchased hardware from its Stock node to the customer's Stock node. Chapter 2.5 Nodes in Live describes how a device is coupled to an asset from a customer's Stock through the hardware node.

19.2.1 Move Device from Hardware Node to Stock

If a customer's device goes back to Avic, the customer must first place the hardware node in its own Stock. Like this:

- Go to the Asset where the hardware is used.
- Click on the menu-item Nodes.
- In the presented grid, click on the pencil icon of the device that has to go to Stock.

- In the next menu click on the tab ‘Move’ and select ‘_Stock (Move to stock)’ and click ‘Save’.



19.2.2 Move Device to Other Application

In this example the customer sends his device back to Avic.

- Go to the Stock node.
- In the menu, go to ‘Application’ and click ‘Hardware distribute’.
- Select the hardware node (GUID) and click on the single arrow button pointing to the right.
- At ‘Destination application’ select ‘Avic BV’.
- At ‘Destination parent node’ select ‘_Return hardware’.
- Click ‘Save’.

20 Icons

This chapter describes which icons are used in Avision and what their function is.

20.1 Icons at the top bar

Icon	Function	Available in	Location
	Shows or hides the left column with the tree structure of nodes.	Design + Live	To the far left of the top bar of the screen.
	Shows or hides the Menu column.	Design + Live	To the far left of the top bar of the screen.
	Opens additional features, shows icons to go to Design or Live, to switch to mobile screen, to sign out, to show user settings.	Design + Live	At the far right of the top bar of the screen.
	Logoff.	Design + Live	At the far right of the top bar of the screen.
	Use mobile layout.	Live	At the far right of the top bar of the screen.
	Go to Live.	Design	At the far right of the top bar of the screen.
	Go to Design.	Live	At the far right of the top bar of the screen.
	User settings.	Design + Live	At the far right of the top bar of the screen.
	Hide additional function icons and show icons for tree and menu.	Design + Live	At the far right of the top bar of the screen.

20.2 Icons in grids

Icon	Function
	Show details of the item without changing them.
	Show details of the item with the option of changing them.
	Create a new copy of the item. (If it is a version item, the copy's version number is 1).
	Create a copy, a sandbox version with a version number one higher than the original.
	Put the item in the trash bin. (It is not deleted, but can also not be made active again).
	Delete this item (irreversible).
	Shows extra information.

21 Node Counters

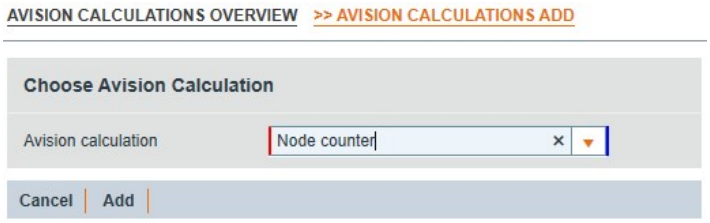
Node counters allow you to store counts of child nodes in an attribute definition.

21.1.1 Create Node Counter in Design

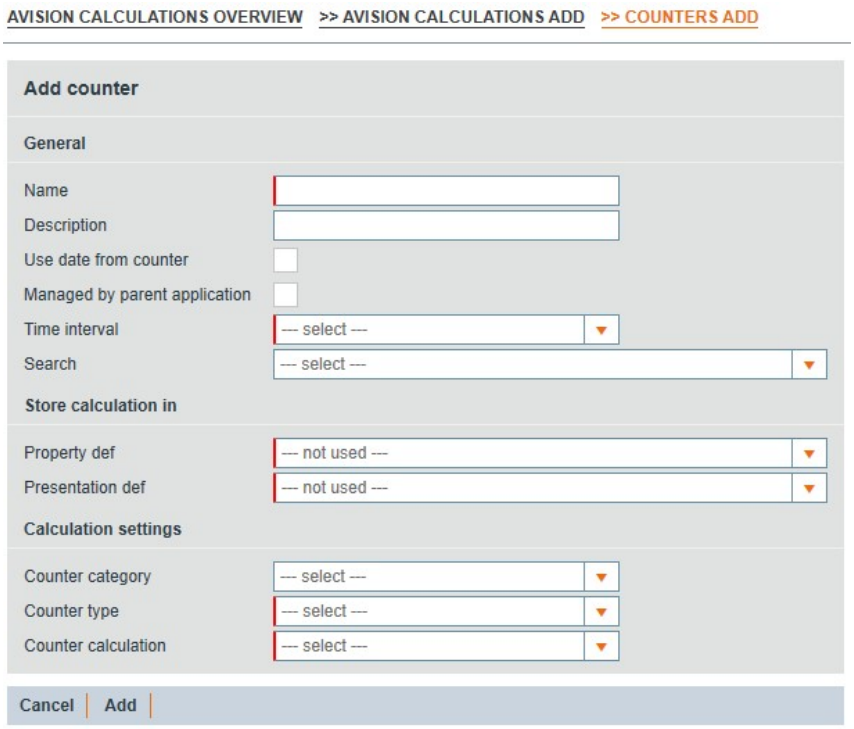
First step is to create a property definition with an item of type ‘Integer (Counter datapoint samples)’.

(With the option ' managed by parent application ', it is possible to manage the data points only if you are logged in by means of impersonate.)

In Design, under the menu item ' Basic elements ' click on ' Avision Calculations '. In the screen, a grid is now shown with the calculations present. Press the ' + ' button on the top right of the grid. Choose as type ' Node counter '. Click ' Add '.



After this the input screen for the node counter is displayed



General

- **Name**: Name of the counter de teller (maximum 50 characters)
- **Description**: Text describing the counter (no maximum length)
- **Use date from counter**: Setting this enables the count on the date of a different counter, i.e. a week counter to determine the maximum.
- **Managed by parent application**: Indicates that the counter is managed by the parent application.

- **Time interval**: Interval used by the counter.
- **Search**:

Store calculation in

- **Property definition**: Select the property definition.
- **Property definition item**: Select the property definition item.

Calculation settings

- **Counter category**: Select the counter category.
- **Counter type**: Available when category has been set. Select from:
  - Node total: Count all nodes
  - Node active online: Count the nodes that are active and online
  - Node active offline: Count the nodes active and offline
  - Node inactive online: Count the nodes inactive and online
  - Node inactive offline: Count the nodes inactive and offline
- **Counter calculation**: Options are Total, Min, Max, Average, Last sample Interval, First sample interval.

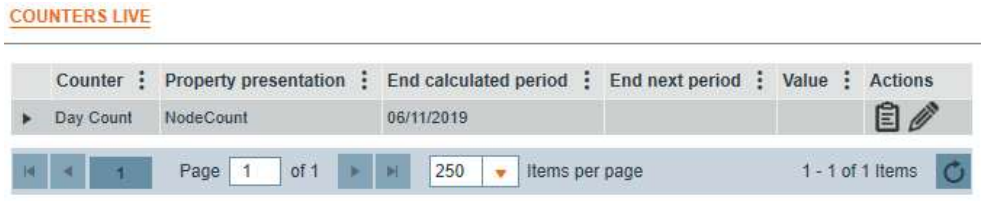
21.1.2 Couple Counter to ObjectType (Application, Structure, Asset and Object nodes)

Linking the counters to the different object types is done by coupling the property definition that is used by the counter. Then the synchronization process will create the counter in live. (See chapter property definitions)

21.1.3 Activate Counters Live and Set Back In Time

Counters are activated in Live by default. Activation therefore must be done manually.

If the node is synchronized with the counters, the counter can be activated using the counters live module. Open the 'Counters Live' module and press the pencil icon to open the counter.



By turning on the 'enabled' option in the edit screen, the counter becomes active. It is also possible to put a counter back in time by putting the date 'End calculated period' in the past. But note: the historical data is then overwritten.

22 Contract Price Agreement

In the contract price agreement, a price (quantity or bundle) can be configured which is used to make a price calculation.

22.1 Create Contract Price Agreement in Design

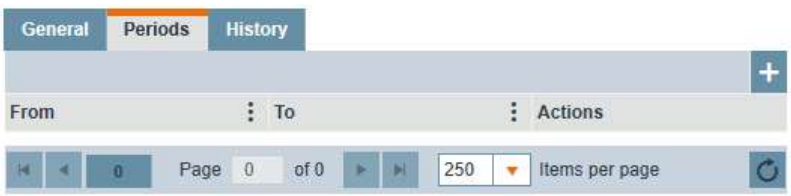
In Design, under the menu item 'Basic elements' click on 'Contract price agreements'. The screen now displays a grid with the price agreements present. Press the ' + ' button on the top right of the grid. Click ' Add '.

- **Contract price agreement type**:
  - **Node**: The price agreements can be created on any node (in the application).
  - **Application**: The price agreements can only be created on an application node (consequently there can only be one price agreement instance of this design present in the node tree).
- **Name**: Name of the price agreement (maximum 50 characters)
- **Description**: Description of the price agreement (unlimited length)
- **Managed by parent application**: To indicate that the price agreement is managed by the parent application.

22.2 Contract Price Agreement in Live

A price agreement is configured in live. Select the appropriate node and open the price agreement Live overview. Press the ' + ' button on the top right of the grid. Choose the price agreement. Click 'Add'.

When the price agreement is present on the node, the periods can be added. Select the price agreement in the overview and press the Edit button. Then navigate to the Periods tab.



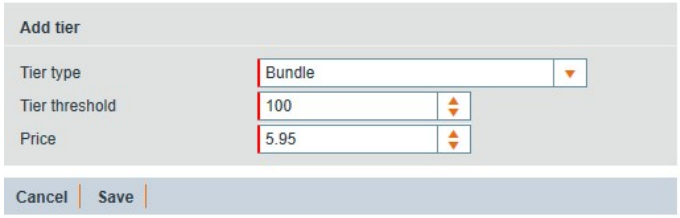
Press the ' + ' button on the top right of the grid. Select the "Tier method" and the dates for the period. Click ' Add '.

- **Tier method**:
  - Fixed: All items in the tier get the tier price.
  - Fluent: All items get the price of the highest applicable tier

Click on the pencil icon to change the period and add tiers.

Within a period, the prices can be added per item. Navigate to the tier tab within a period. Press the on the '+' button at the top right of the grid.

Select 'Tier type', enter tier threshold and Price and click 'Save'.



23 Contract Price Calculations

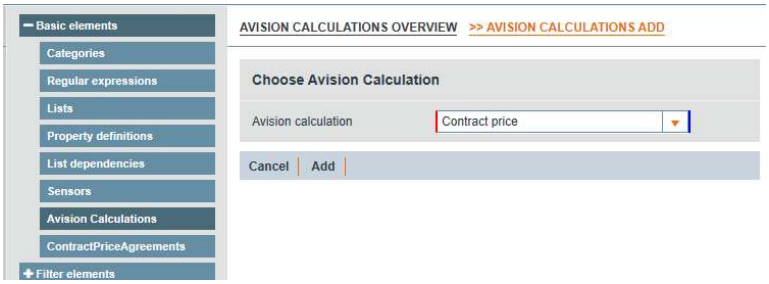
Using price calculations, it is possible to calculate a price using counters and the price agreement and store the outcome in a property definition.

23.1 Create Price in Design

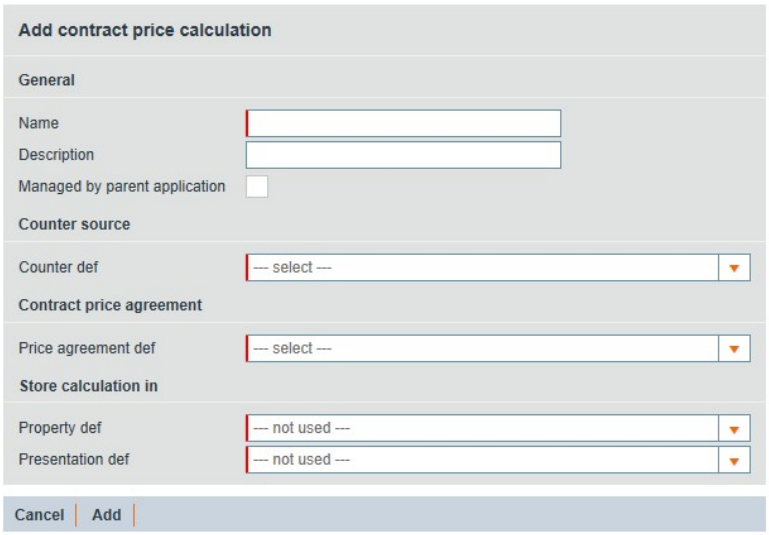
First of all, we create an property definition with a property definition item of type ' Float (Avision _ History _t T _ Meter hist) '.

(The "Managed by parent Application" option allows you to manage the data points only if you are logged in by using impersonate.)

In Design, under the menu item ' Basic elements ' click on ' Avision Calculations '. In the screen, a grid is now shown with the calculations present. Press the ' + ' button on the top right of the grid. Choose as type ' Contract price '. Click ' Add '.



Next the input screen for price calculations is shown:



General

- **Name**: Name for the price calculation (maximum 50 characters)
- **Description**: Description for the price calculation (no limit on length)
- **Managed by parent application**: If checked, indicates that the price calculation is managed by the parent application.

Counter source

- **Counter def**: The counter used for the calculation.

Contract price agreement

- **Price agreement def**: Select the contract price agreement from the dropdown.

Store calculation in

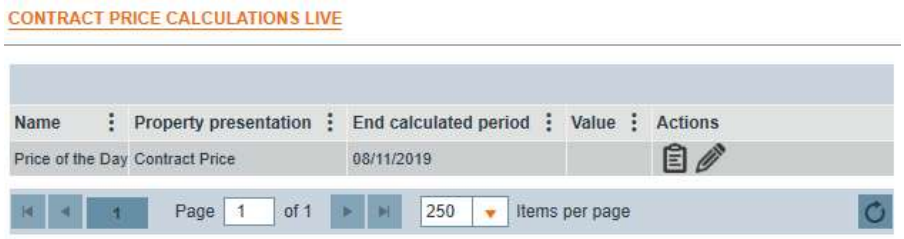
- **Property def**: Select the property definition.
- **Property definition item**: Select the property definition item.

23.2 Coupling Price Calculation to ObjectType (Application, Structure, Asset, Object node)

Coupling the price calculation to any type of object type is via the property definition.
(See chapter property definitions)

23.3 Price Calculation in Live

If the price calculation node is synchronized, the calculation can be managed using the Contract Price Calculations live module. Open the ' Contract Price Calculations Live ' module and press the pencil icon to open the relevant price calculation.



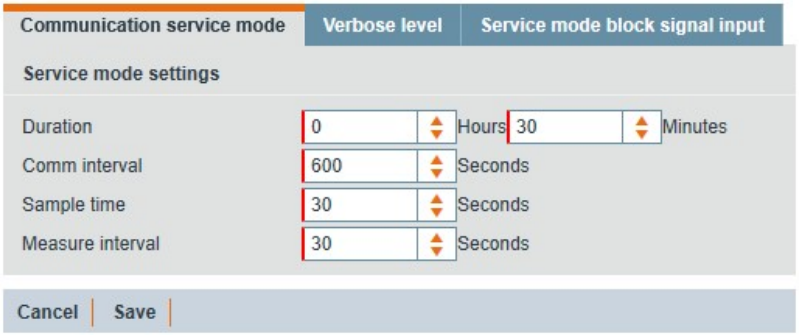
The ' enabled ' option allows you to turn the calculation on or off. It is also possible to put a calculation back in time by putting the date "End calculated period" in the past. But note: the historical data is then overwritten. In addition, there should be data from the underlying counter.

24 Hardware Service Mode

Using the Hardware service mode module, certain settings in the hardware can be set for a short period of time. For example, if maintenance is performed on an Asset, it is useful that the hardware communicates more frequently with Avision than normally.

24.1 Service Mode Communication

In the Service Mode Communication module, the following settings can be adjusted: CommInterval, Sample time, Measure interval.

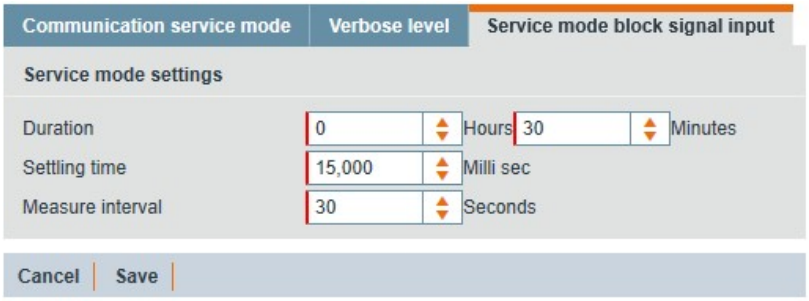


24.2 Service Mode Verbose Level

The service mode verbose level adjusts the verbose level for a certain period of time.

24.3 Service Mode Block Signal Input

With the service mode block signal input, the following settings can be adjusted: Settling time and measure interval.

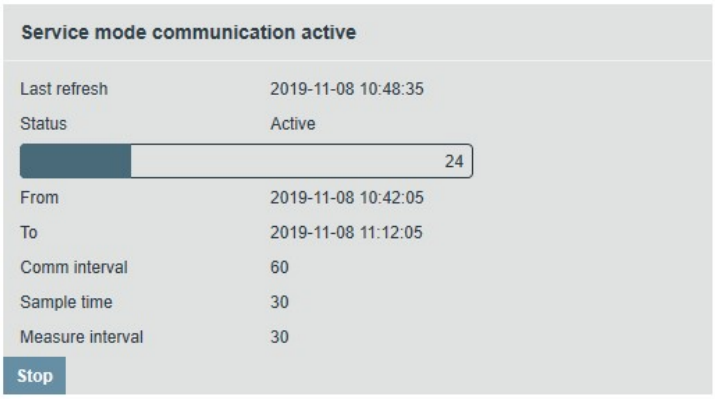


24.4 Start/Stop Service Mode

When the service mode settings are saved, automatically communication with the hardware is started and the state is ‘Scheduled’. When the device has received the service mode request the state will change to ‘Active’ and the unit is in service mode for the entered period.

If a service mode is active, the status will be shown in the service mode screen. The course of service mode consists of the following states:

Scheduled : Service mode waits for the device, a communication request has been sent. The service mode will become active after the next successful communication session with the device.



Active : Service mode is active. De service mode settings apply. A progress bar shows the amount of time expired, the number at the end shows the expired time in percentage of the total time.

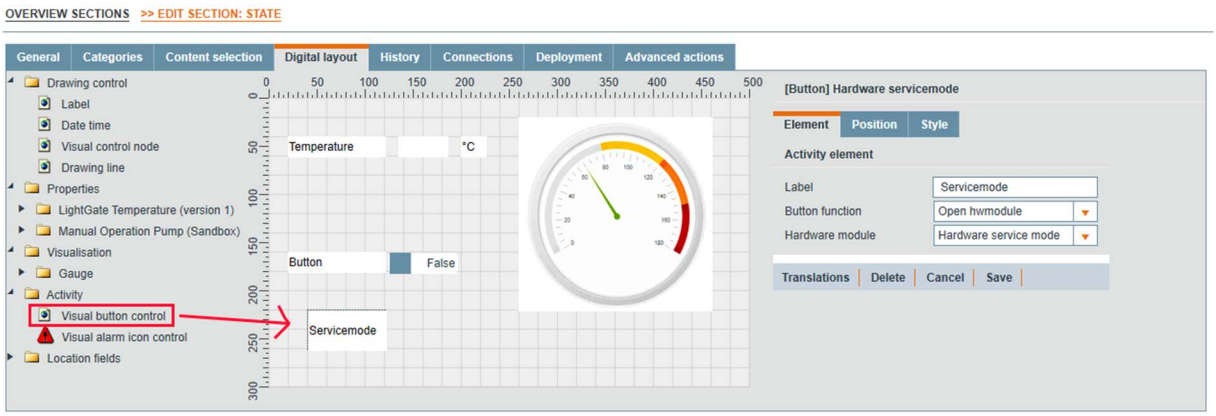
Expired : Service mode is expired, wakeup has been sent. Service mode will end after the next successful communication with the box.

24.5 Hardware Service Mode Shortcut on Monitor Screen

On a monitor screen a button can be placed which acts as a shortcut to the service screen.

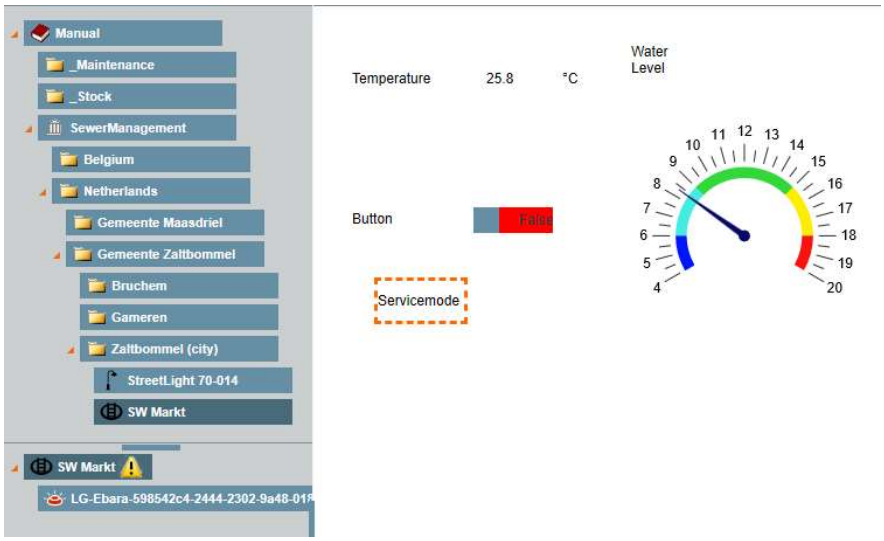
24.5.1 Creating shortcut in Design

A special button can be created by dragging the 'Visual button control' on the digital layout canvas of a monitor screen. Then enter the label name, select 'Open hwmodule' at the 'Button function' dropdown and select 'Hardware service module' as the module to open when clicking the button.



24.5.2 Usage in Live

In live, the button can be clicked and the service mode module will be presented. When the service mode is in active state the button will have an orange striped border:

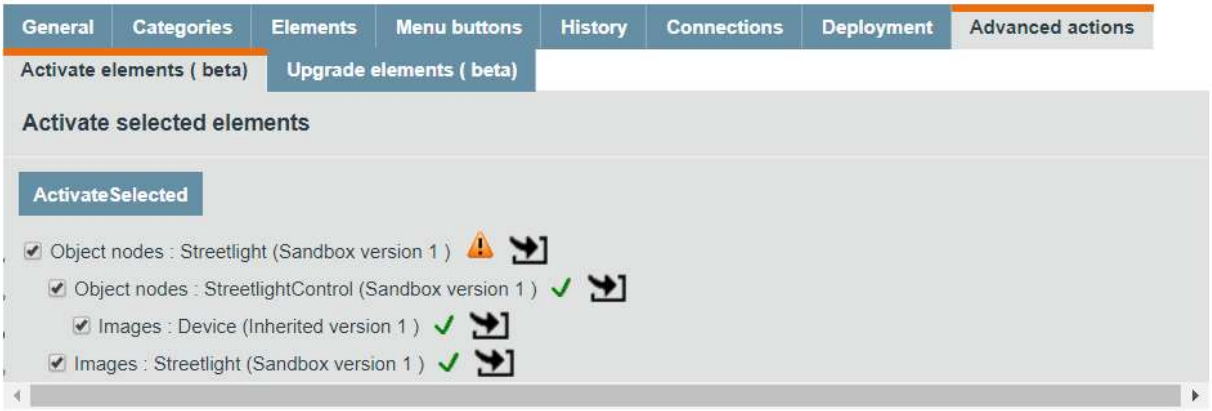


Also, a warning icon is shown on the asset node.

25 Advanced Options

25.1 Activate Elements

Activate elements shows the tree of all the elements used with the version and activity state.



Activate Selected : All selected object are activated.

Warning found ( ) : A warning is found but the element can still be activated

Activate error (✕): An error is found and the element can not be activated.

Sandbox version found ( ): A sandbox version is found.

25.1.1 Upgrade elements

Upgrade elements shows the tree of all the elements used with the version and activity state with an upgrade icon if a newer version is found.

Upgrade: If newer versions are found the elements are upgraded to the newest version.

25.1.2 Create new Sandbox version

When creating a new sandbox version its possible to create sandbox version of all the elements where its used.

If the create sandbox icon is clicked a dialog is shown with elements where its used. The user has the possibility to create sandbox versions for alle the elements or only the current element.

26 Troubleshooting

26.1 Measured value is not shown at Asset level

A measured value coming from hardware must be used at the Asset level, but does not seem to arrive.

Checklist:

26.1.1 In Design

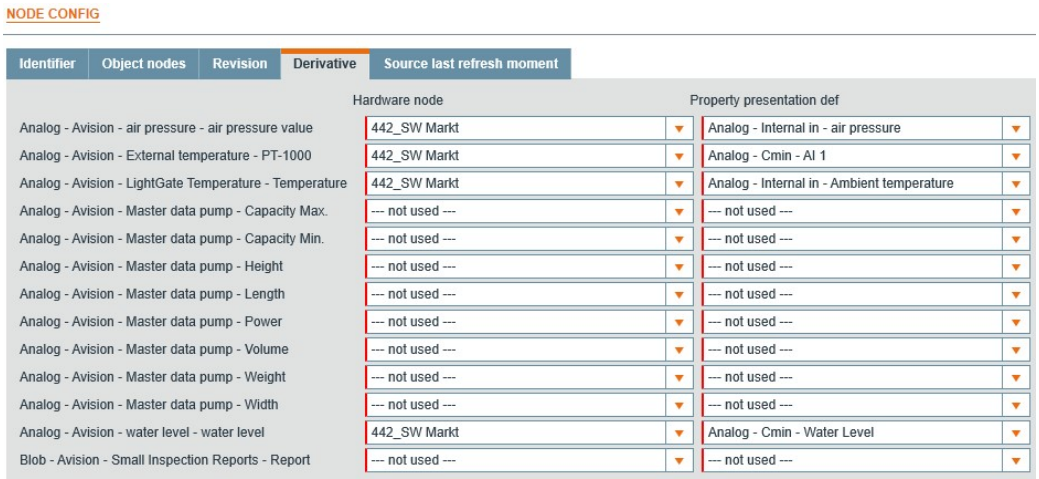
- Has it been indicated that the measured value of a datapoint should go to a property definition (item) ?
  Hardware node – Menu item HardwareIO – go to the datapoint and click on the pencil icon.
  Check following fields:
  - 'Sample destination' is set to 'Transferred' or 'Stand alone and transferred' ?
  - Property definition field contains the right property definition ?
  - Property definition item field is correct ?
- Has the property definition been added (coupled) to the Asset ?

26.1.2 In Live, Hardware node

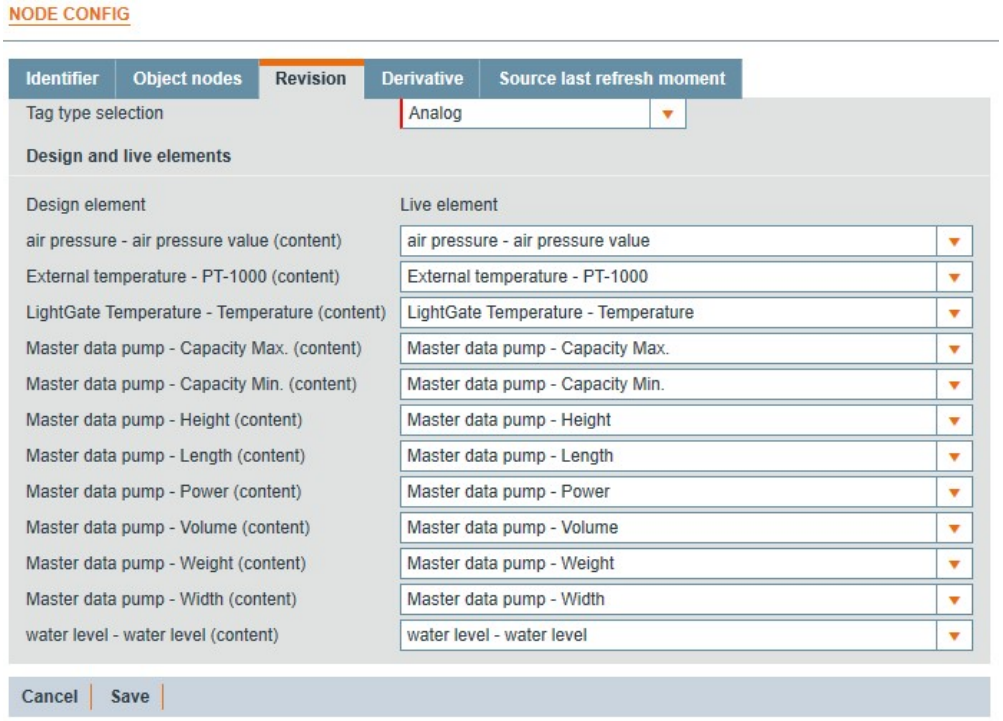
- Has synchronization been run after the last change in Design ?
- Go to the hardware node, menu item Node Configuration, tab Revision. Are the correct Design en Live elements present ? (If not, then something went wrong with synchronization).
- Has there been communication with the device after synchronization ?
  - On the hardware node, menu item Datapoints, check whether there's a value and check the timestamp (= last time the value was read in the device).
  - Just to be sure, do another wake up: On the hardware node, go to menu item Hardware, on top of this screen there's a wake up button. And give it time.

26.1.3 In Live, Asset node

- On the Asset node, Menu item Datapoints, does the datapoint have a value ? When was the last time it was read ?
- At Node Configuration, Derivatives tab : Have the connections been made between hardware datapoint and property definition item ?



- At Node configuration, tab Revision, are the correct Design and Live elements present ?



26.2 Tasks

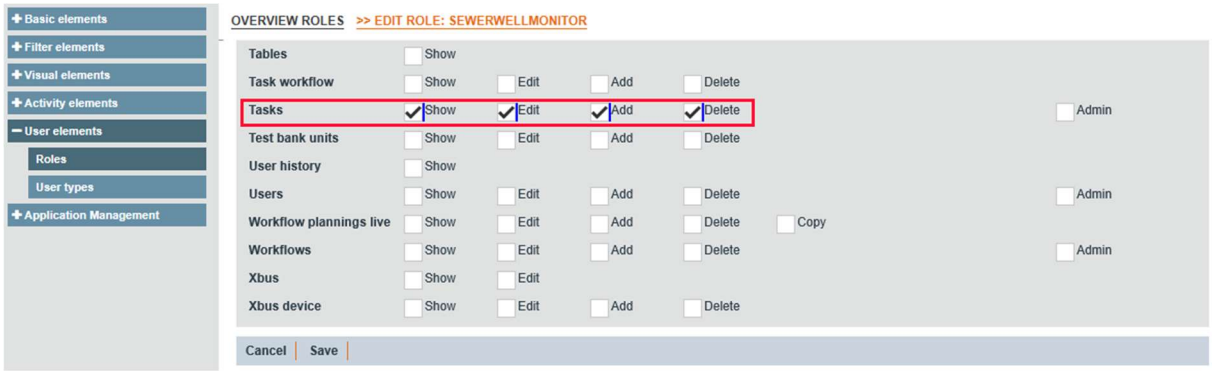
26.2.1 User sees no tasks

The moment a workflow is started, the tasks are created for the users who are supposed to execute these tasks.

Has a role been added to the task ? When yes: Did the user have this role (via a user type) the moment the task was created ? If not: Stop the workflow, hand the user the needed role(s) using user types so the user can execute the roles. Then start the workflow again. Now the user should be able to see the task(s).

26.2.2 User can not start the task; no rights ?

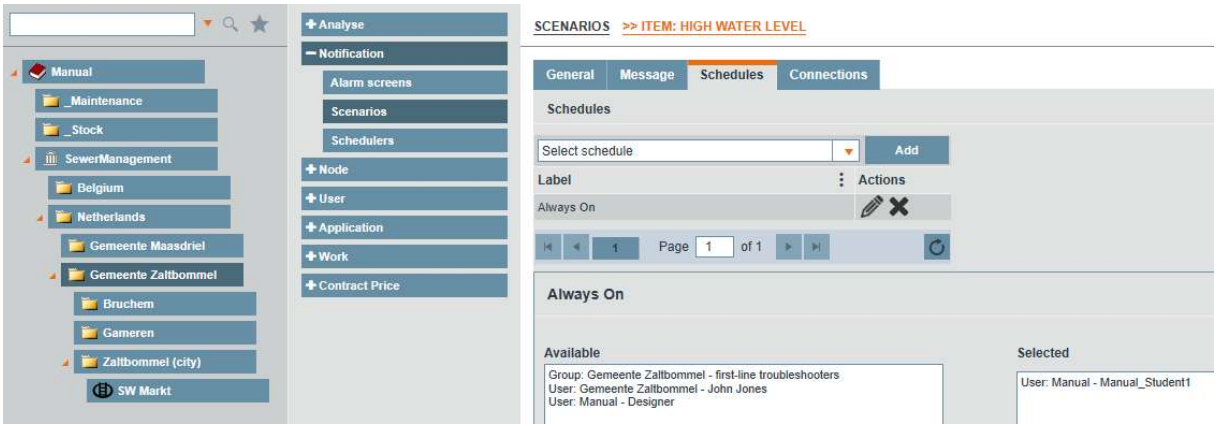
Probably the role needs checkmarks for the Task module :



26.3 Alarms

26.3.1 Alarm does not send SMS or Email

- Check in Live that the alarm has been generated. Look at the correct level (usually hardware or asset, but this may differ) in het menu item ‘Alarm screens’.
- When the alarm is shown in the Alarm screen, then look which scenario is used by the alarm.
- Check at the Message tab of the Scenario the correct options are check marked. (SMS, E-mail, Webservice)
- Check whether a Scheduler was selected at the Schedules tab of the Scenario.
- At the Scheduler tab the persons that should receive the SMS or Email should be indicated:



- Has the email address or the mobile (cell) phone number been set at the user’s account ?

26.4 Revision Management

26.4.1 Cannot set upgrade to next version

The dropdown does not show the next version (here it should have been 2)

Check:

- You have coupled the node to another node ?
- The node version you want to upgrade to has state active ? (AVIC employees can use the ‘OverrideSandboxRules’ check mark to bypass this for special cases).