

# PROMIS Tutorial – MODBUS Data Collection System

This Promis tutorial explains on a step by step base how to setup a basic MODBUS data collection system. For this tutorial we used a 'Novus DigiRail4C digital counter input module' configured for energy monitoring.

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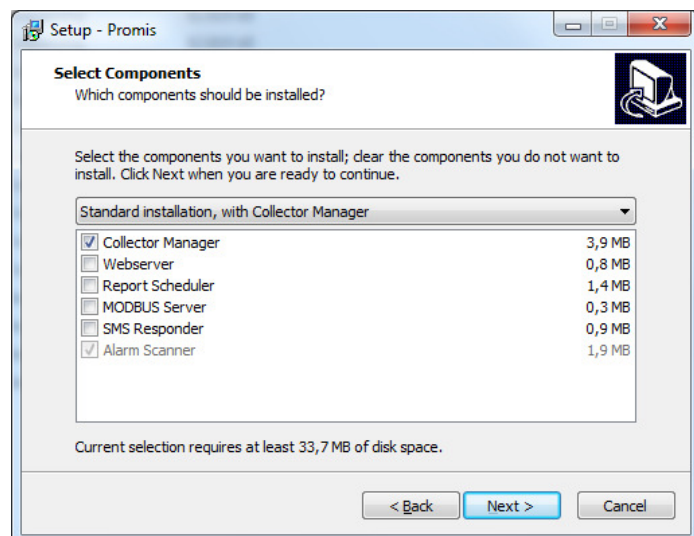
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## 1. Install Promis

If you did not already install Promis, please download and run <http://www.projex.nl/download/promissetup.exe>.

Follow the obvious steps of the setup procedure and choose 'Standard installation' if you want to use Promis without additional components (e.g. Web Server).

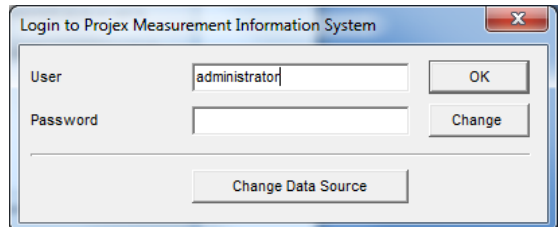
- Its required that you have administrator rights to be able to run setup.



## 2. Start Promis

The setup procedure has installed a desktop shortcut to start Promis. When you start Promis for the first time or with the intention to configure collectors/components it is: **a)** required that you have administrator rights and **b)** you should start Promis in administrator mode (right mouse click the shortcut and choose 'Run as Administrator').

- After an initial installation with an empty database the Promis user name to login with is 'Administrator' and having a blank password.

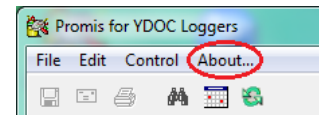


## 3. Unlock Promis

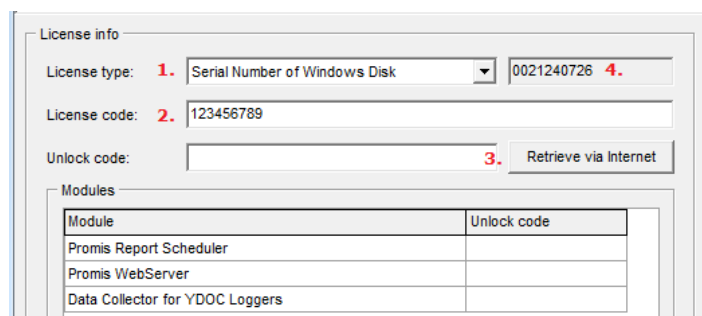
Promis is a data collection suite of scalable components and depending on your license you are permitted to use additional components, define a certain number of users and collect data from a licensed number of loggers/sources.

After buying a license you are receiving a unique license code and you can use this license code to unlock Promis on one PC of your choosing. Please choose the PC with care as this is a onetime operation. If you want to change to another PC afterwards, you have to renew your license involving additional costs.

To unlock Promis select the 'About'-option from the 'Menu'-bar:



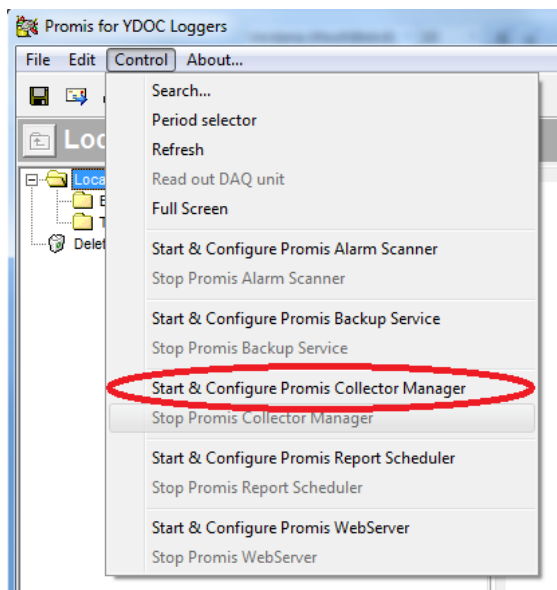
In the 'About'-box choose (1.) 'Serial number of Windows Disk' as license type, (2.) enter your license code and (3.) click the 'Retrieve'-button to get access to our licensing-server and to bind your license to this PC.



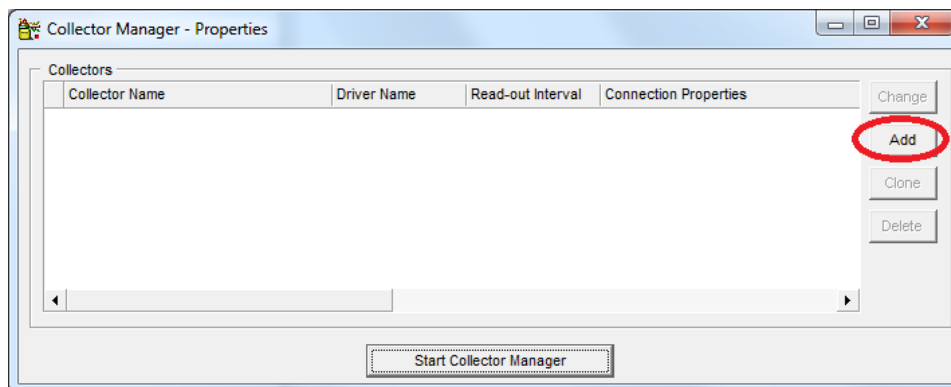
If you can't get access to the licensing-server, please handover (4.) the SN# of your hard disk to your distributor, so he can provide you with the necessary unlock codes to be entered manually.

## 4. Configure the Collector Manager

The function of the 'Collector Manager' is to connect to and read out data acquisition devices or loggers and to import the collected data into the Promis database automatically. The 'Collector Manager' comes with several OEM specific collector drivers and several generic collector drivers. In case of OEM specific collector drivers the collector is aware of the configuration of the device and is capable to create a Promis location and according tags in the database automatically. In case of generic collector drivers, locations and tags must be created and linked to devices and according channels/fields/registers manually. In this tutorial we describe how to deploy the generic MODBUS driver (The drivers support MODBUS/RTU as well as MODBUS/TCP).



To configure the collector select the 'Start Collector Manager' from the 'Control'-menu.



In the 'Collector Manager - Properties'-screen click the 'Add'-button to add a new collector to the list. The maximum number of collectors you may add is depending on the maximum number of collectors permitted by your license.

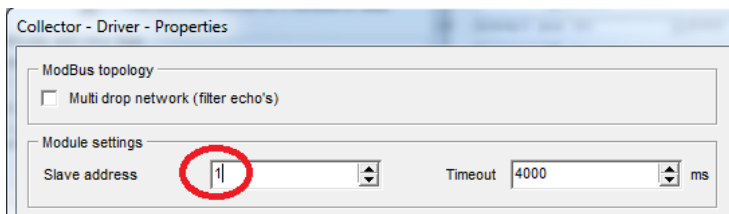
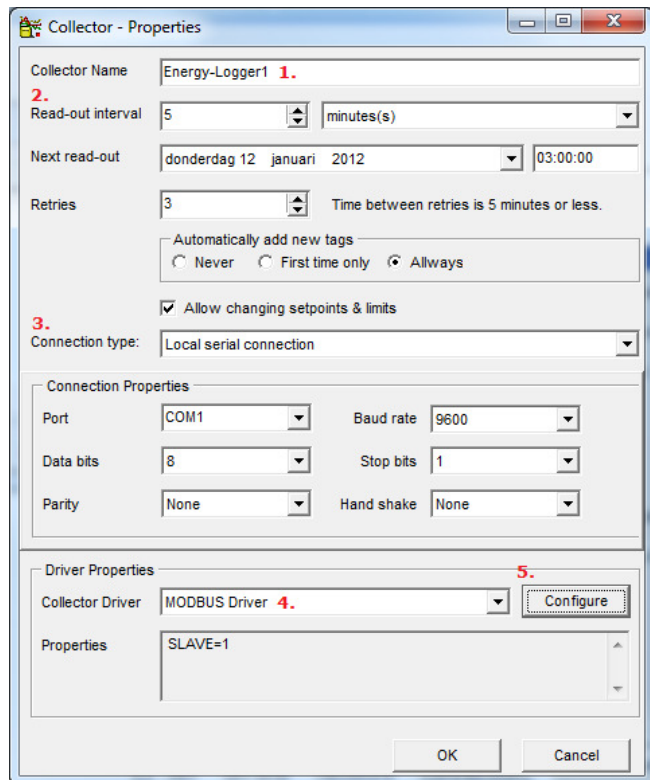
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After clicking the 'Add'-button the 'Collector – Properties'-screen will pop-up.

A collector should obviously have (1.) a name. For each collector (2.) an automatic read-out schedule can be applied, ranging from once per minute to several weeks.

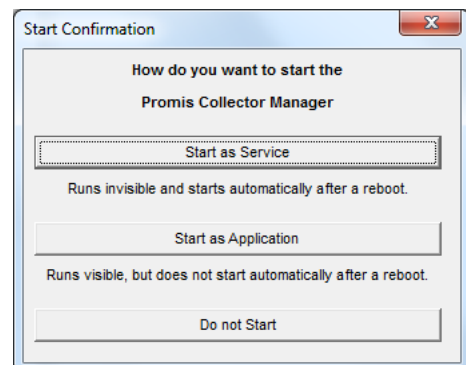
The 'Collector Manager' supports several types of connections (Network, Serial and Modem), in this tutorial we choose (3.) a serial port connection.

You have to, depending on the type of device you want collect data from, choose (4.) a proper collector driver. On this tutorial we choose the generic 'MODBUS'-driver. Click (5.) the 'Configure'-button to configure the driver specific properties.



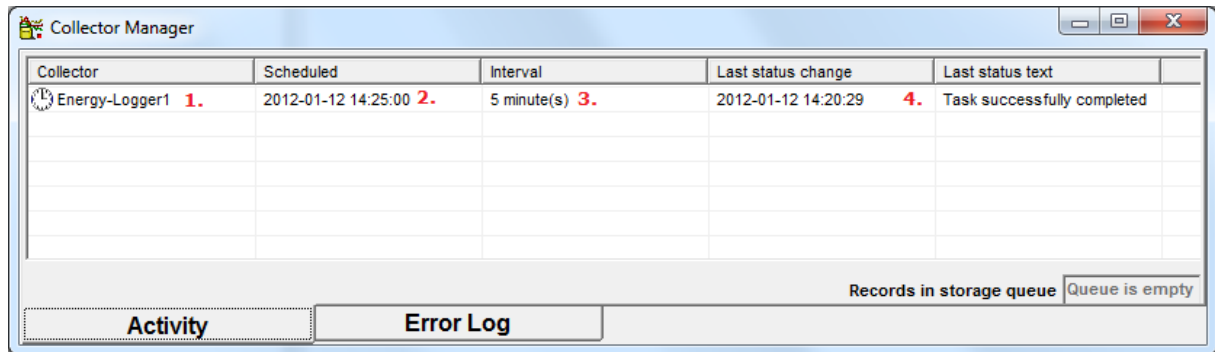
In case of MODBUS/RTU, The only specific property that you basically have to set, is the MODBUS slave address of the device.

After committing your changes and finally closing the 'Collector Manager - Properties'-screen, Promis asks you how to start the 'Collector Manager'. For testing purpose you could start it as a visible application, but for operational purpose it is recommended to start the collector as a service. A service runs invisible in the background independent of the logged on user (very handy incase Promis is installed on a server used by several remote desktop users) and will automatically restart when the PC powers up (e.g. after a power outage).



## 5. Run the Collector Manager

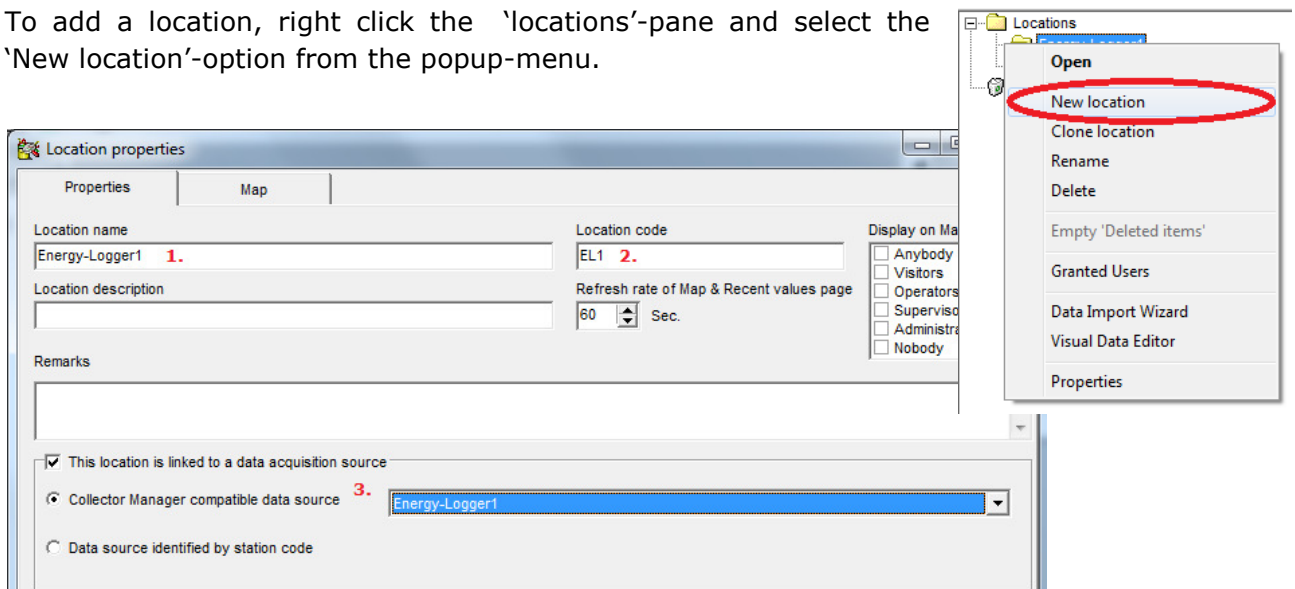
When running the collector as a visible application the 'Activity'-window will show a line for each collector. This line will show when (2.) the next read-out is scheduled and with (3.) which interval. It also displays (4.) the status of the last operation.



When log data with an OEM-specific driver is collected for the first time, a location with a name equal to the collector name (1.) will be created in the Promis database. Unfortunately that's not the case with generic drivers, as the 'Collector Manager' does not have enough 'info' to know what to read from such generic devices. However, this 'info' can be specified in Promis itself (see next steps).

## 6. Add a location

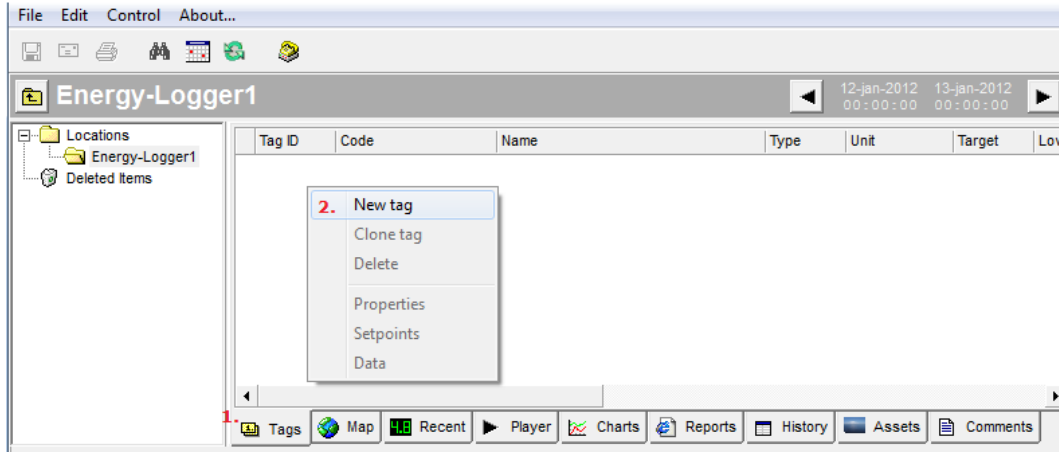
To add a location, right click the 'locations'-pane and select the 'New location'-option from the popup-menu.



Each location should obviously have (1.) a name and (2.) a unique code to identify the location. To let the 'Collector Manager' import data to this location, please link this location to (3.) the appropriate 'Collector Manager' compatible data source/collector. \*Its allowed to link one single data source/collector to multiple locations.

## 7. Add a 'counter' tag

In case of a generic collector driver, the 'Collector Manager' does not automatically add tags, so you have to add the tags manually.

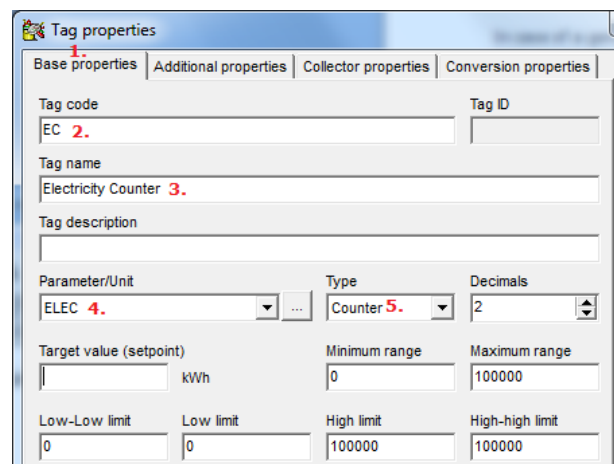


To add a tag select (1.) the 'Tags'-page of a particular location and right click the 'Tags'-page and select the 'New tag'-option from the popup-menu.

On (1.) the 'Base properties'-page its obligatory to define (2.) a code for the tag, in this case 'EC' and we name (3.) the tag 'Electricity Counter'. Electricity is measured in kWh and therefore we should select (4.) a parameter with kWh as unit. If such a parameter is not in the list you can add one manually by clicking the '...'-button.

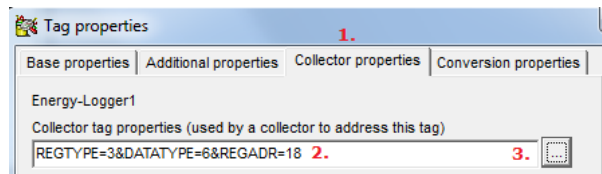
- It's wise to use a proper codification philosophy for your tags. E.g. that your 'Rain counter' tags over all your locations are having the same 'Tag code'.

In case of a cumulative counter like an electricity counter, it is recommended that you set (5.) the Type of the tag to 'Counter' as this will affect the default appearance of the tag. But it is even more important in case this tag is used in a 'calculated' tag, as the calculation engine treats counters a bit different than regular tags.



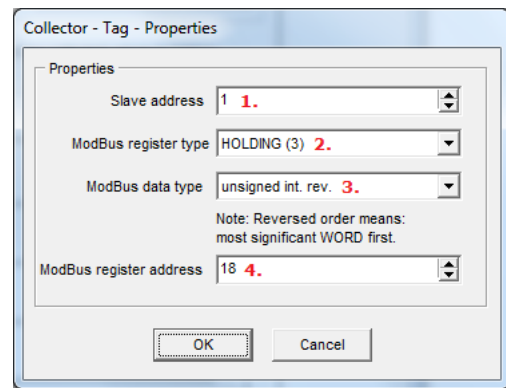
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The link between a Promis tag and a device channel/field/register is defined on (1.) the 'Collector properties'-page by (2.) a driver specific properties string in the 'Collector tag properties'-box. This string can be edited manually (if you know the formatting rules), but it's more handy to edit the driver specific properties by clicking (3.) the '...'-button, this will pop-up a driver specific configuration screen.

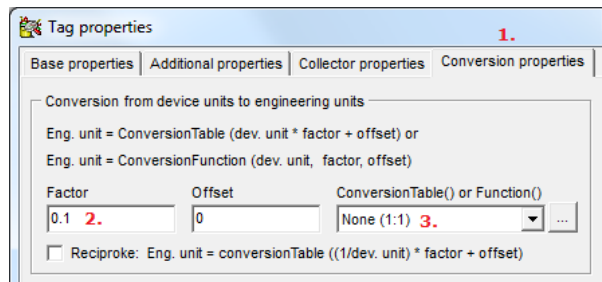


In this case it's a screen to configure which MODBUS register we want to link to the Promis tag.

Define (1.) which slave on the MODBUS you want to access (It is set to the value specified in the collector at default). For the DigiRail4 the counter values are stored in (2.) so called 'Holding'-registers. The counter values are stored in the DigiRail4 as two word registers with the most significant word first and that's why we specify (3.) 'unsigned integer reversed'. The first DigiRail4 counter is stored (4.) at register 18.



Assume the counter is not ticking at 1 kWh per pulse, but 1/10 kWh per pulse instead. To correct the MODBUS value, specify (2.) a conversion factor of 0.1 at (1.) the 'Conversion properties'-page. For more complex conversion you can specify (3.) a conversion function or table, for instance to convert a tank's level to a volume according to the profile of the tank.

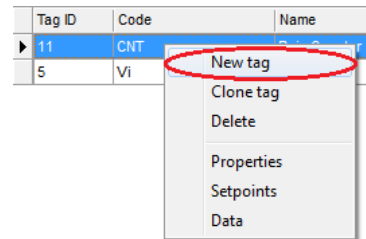


## 8. Define calculated tags

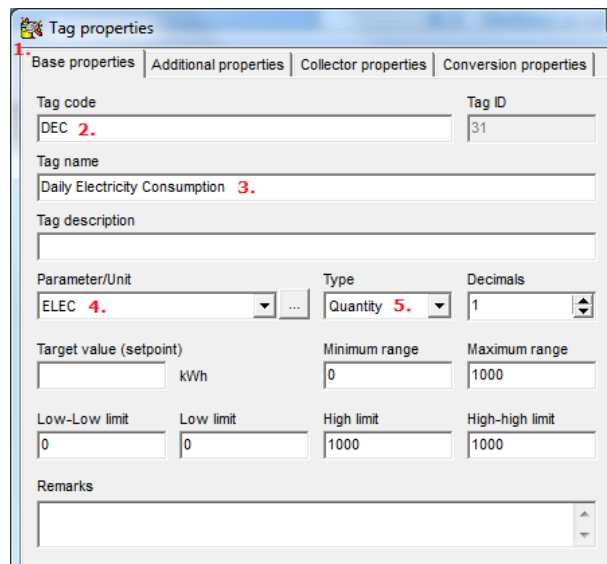
Counter tags are ideal for recording purpose, but of little use for analysis. The value of a counter itself is not really interesting, what you really want to know is the rate or difference over a certain period of time (e.g. the electricity consumed per day or rate of usage).

### 8.1 Define a calculated 'consumption' tag

To define a tag to calculate the electricity consumption per day you have to create a new tag manually first, by right clicking your mouse on the 'Tags'-page and select the 'New tag'-option from the popup-menu.

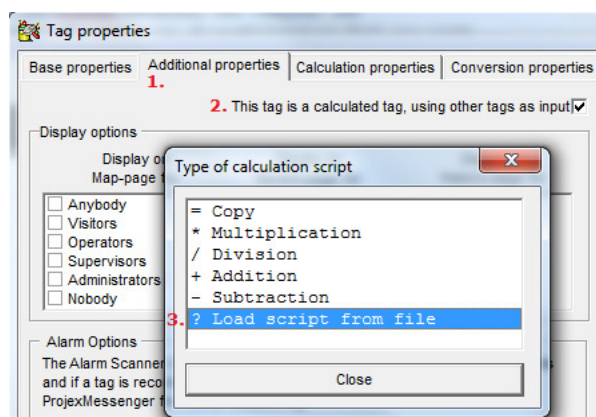


On (1.) the 'Base properties'-page its obligatory to define (2.) a code for the tag, in this case 'DEC' and we name (3.) the tag 'Daily Electricity Consumption'. Electricity is measured in kWh and therefore we should select (4.) a parameter with kWh as unit. If such a parameter is not in the list you can add one manually by clicking the '...' -button.



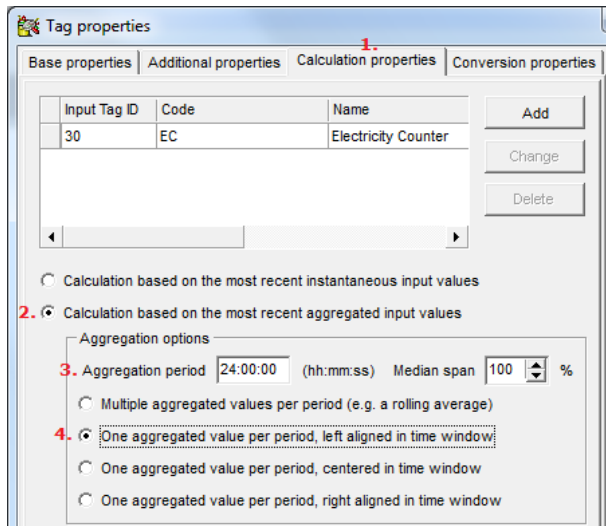
It is recommended that you set (5.) the Type of the tag to 'Quantity' as this will affect the default appearance of the tag. E.g. on the 'History'-page all recorded quantities will be summarized to display the total electricity consumption during the selected period.

To indicate that this tag is a calculated tag, you have to check (2.) this on (1.) the 'Additional properties'-page'. The first time you check (2.) it, a screen will popup to let you choose the Type of calculation script to use. Please choose (3.) 'Load script from file' and load the file 'Counter to Quantity.pcs' from the templates directory and choose the 'Electricity counter' tag as input for this calculation.

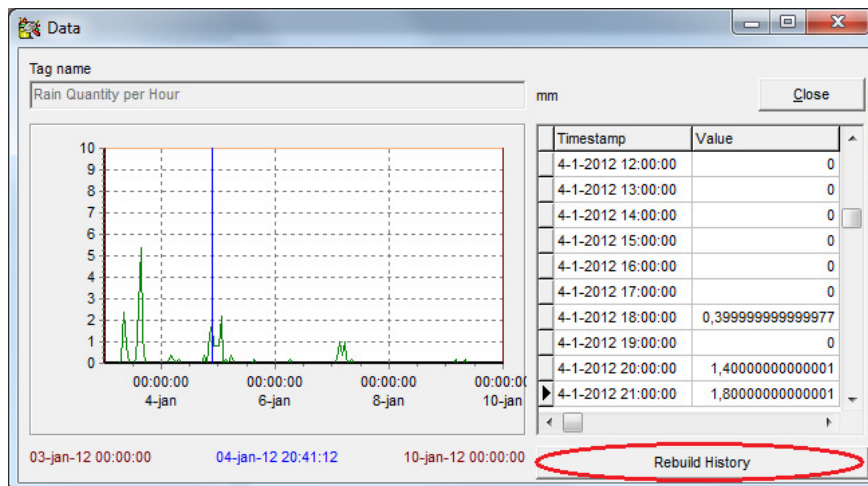
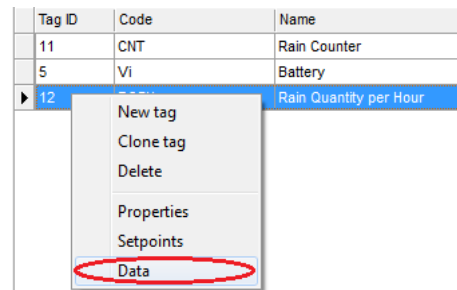


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After loading the script the software jumps to (1.) the 'Calculation properties'-page. On this page specify that your calculation should be aggregated over (2.) a series of recordings and specify (3.) an aggregation period of 24:00:00 to aggregate over one day or 01:00:00 to aggregate over 1 hour. It is recommend that you (4.) record one value per aggregation period, otherwise the summaries on 'History'-pages or in reports will show more than actually consumed.



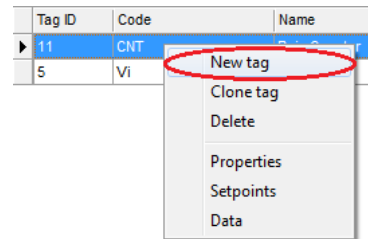
As soon as new counter data is collected, this calculated tag will be calculated and recorded to the database. It could however that you want this calculation to be done on previous recorded counter values. You can do this by right clicking this Tag in the 'Tags'-page and selecting the 'Data'-option from the popup-menu.



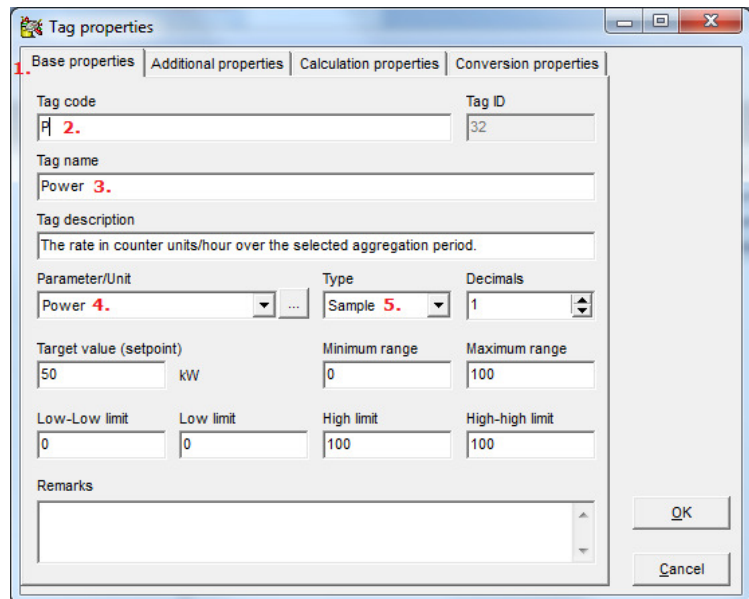
Click to the 'Rebuild History'-button to recalculate the recorded values of the calculated tag. Recalculation is performed over the currently selected period.

## 8.2 Define a calculated 'rate of usage' tag

To define a tag to calculate the rate of usage (Power) you have to create a new tag manually first, by right clicking your mouse on the 'Tags'-page and select the 'New tag'-option from the popup-menu.

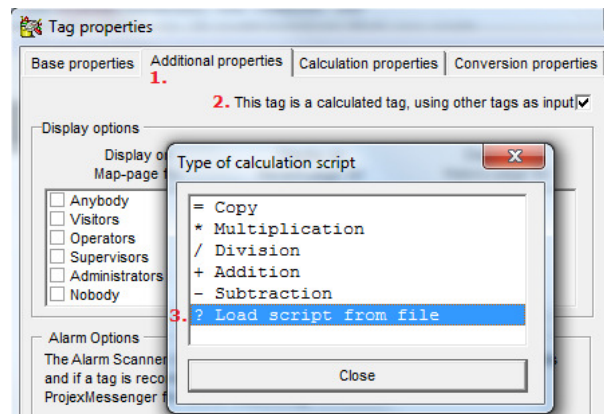


On (1.) the 'Base properties'-page its obligatory to define (2.) a code for the tag, in this case 'P' and we name (3.) the tag 'Power'. Power is measured in kW and therefore we should select (4.) a parameter with kW as unit. If such a parameter is not in the list you can add one manually by clicking the '...'-button.

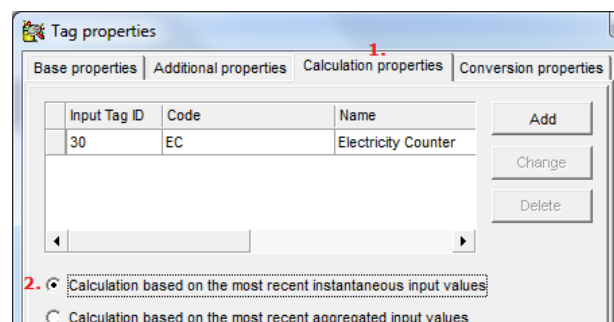


It is recommended that you set (5.) the Type of the tag to 'Sample' as this will affect the default appearance of the tag. E.g. on the 'History'-page all recorded power values will be averaged to display the average power during the selected period.

To indicate that this tag is a calculated tag, you have to check (2.) this on (1.) the 'Additional properties'-page. The first time you check (2.) it, a screen will popup to let you choose the Type of calculation script to use. Please choose (3.) 'Load script from file' and load the file 'Counter to Rate.pcs' from the templates directory and choose again the 'Electricity counter' tag as input for this calculation.

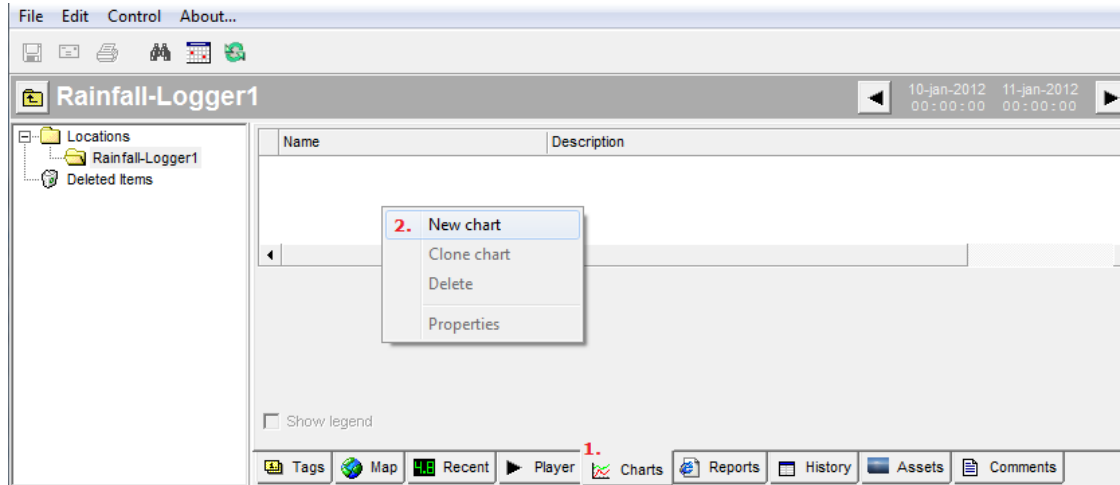


After loading the script the software jumps to (1.) the 'Calculation properties'-page. On this page specify that your calculation should be based on (2.) instantaneous input values, this will cause a calculation between every two adjacent electricity counter recordings.



## 9. Define a basic chart

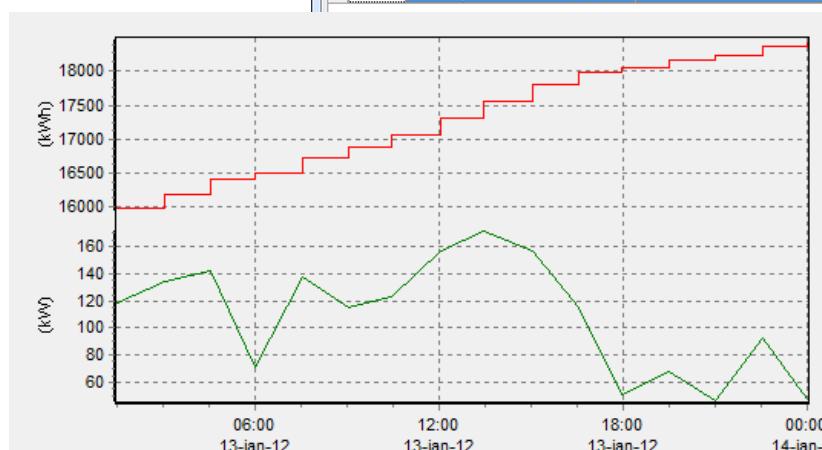
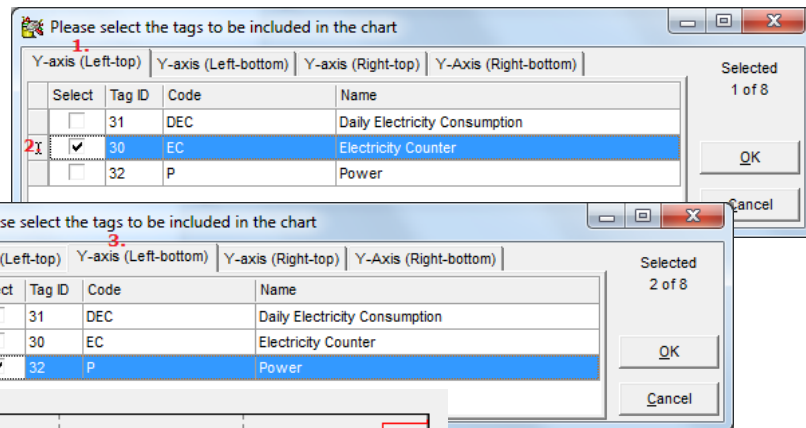
Promis has a very power full chart engine with a lot of features and possibilities, to be able to deploy all the features you need to get familiar with it and take your time by just trying things out. However defining a basic chart is as simple as a few mouse clicks.



To define an new chart select (1.) the 'Charts'-page of a particular location and right click with your mouse in the (empty) chart list, followed by selecting (2.) the 'New chart'-option from the popup-menu. A window will pop-up that let you select the tags you want to visualize in the chart. If you select multiple tags per chart with values in non matching ranges (e.g. a continuously increasing counter and a rate per hour) one or more of the tags will not be scaled optimal when using one Y-axis. A basic chart can have 4 Y-axes: Two stacked Y-axes at the left and two at the right.

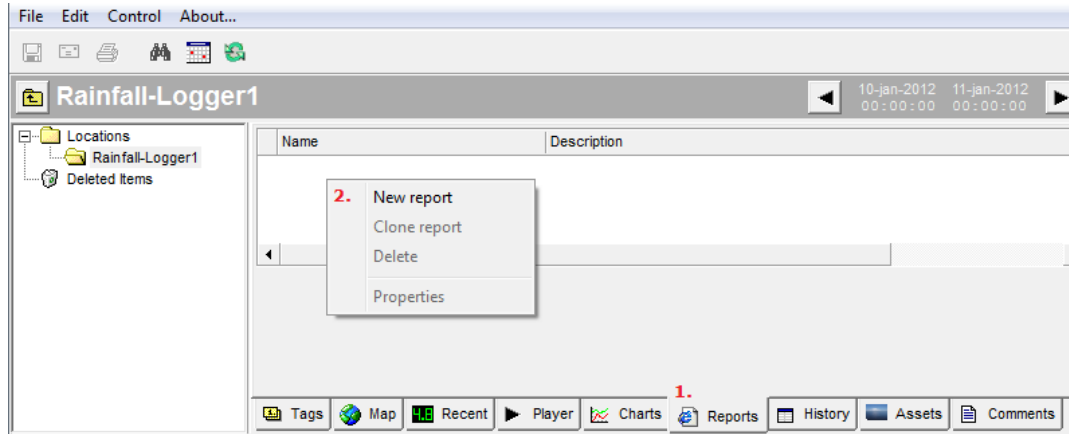
Assign (2.) the electricity counter to (1.) the left-top Y-Axis.

Assign (4.) the power to (3.) the left-bottom Y-axis.

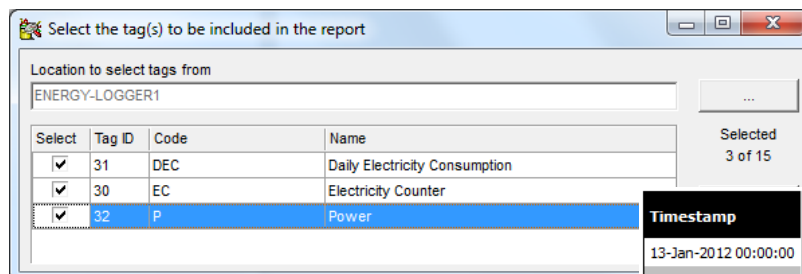


## 10. Define a standard report

Promis has a very power full report engine as well, but It requires some advanced IT skills to be able to create your own custom reports. Fortunately the software comes standard with several predefined report templates. Defining a report from a template is as simple as a few mouse clicks.



To define an new report select (1.) the 'Reports'-page of a particular location and right click with your mouse in the (empty) report list, followed by selecting (2.) the 'New report'-option from the popup-menu. A window will pop-up that let you select a report template from the templates directory, in this case we choose the file 'Standard Report.prd' and after loading, another window will pop-up that let you select the tags you want to be included in the report. I this case we choose power, counter and consumption.



The standard report is a tabular report in HTML format with a summary over the selected report period at the bottom. A similar report is available in CSV, XLSX and plain text format.

Timestamp	Electricity Counter kWh	Power kW	Daily Electricity Consumption kWh
13-Jan-2012 00:00:00	15811.3	285.3	2731.1
13-Jan-2012 01:00:00	15986.3	118.8	
13-Jan-2012 03:00:00	16196.4	134.3	
13-Jan-2012 05:00:00	16406.5	142.7	
13-Jan-2012 06:00:00	16511.6	71.4	
13-Jan-2012 08:00:00	16721.6	138.3	
13-Jan-2012 09:00:00	16896.7	115.3	
13-Jan-2012 10:00:00	17071.8	122.8	
13-Jan-2012 12:00:00	17316.9	156.6	
13-Jan-2012 13:00:00	17562.0	171.8	
13-Jan-2012 15:00:00	17807.1	156.6	
13-Jan-2012 17:00:00	17982.1	115.2	
13-Jan-2012 18:00:00	18052.2	50.8	
13-Jan-2012 19:00:00	18157.2	67.1	
13-Jan-2012 21:00:00	18227.2	46.1	
13-Jan-2012 23:00:00	18367.3	92.3	
14-Jan-2012 00:00:00	18437.3	47.5	
Summary	Electricity Counter kWh	Power kW	Daily Electricity Consumption kWh
Count	17	17	1
Minimum	15811.3	46.1	2731.1
Maximum	18437.3	285.3	2731.1
Average		119.6	
Quantity			2731.1