Energy Client

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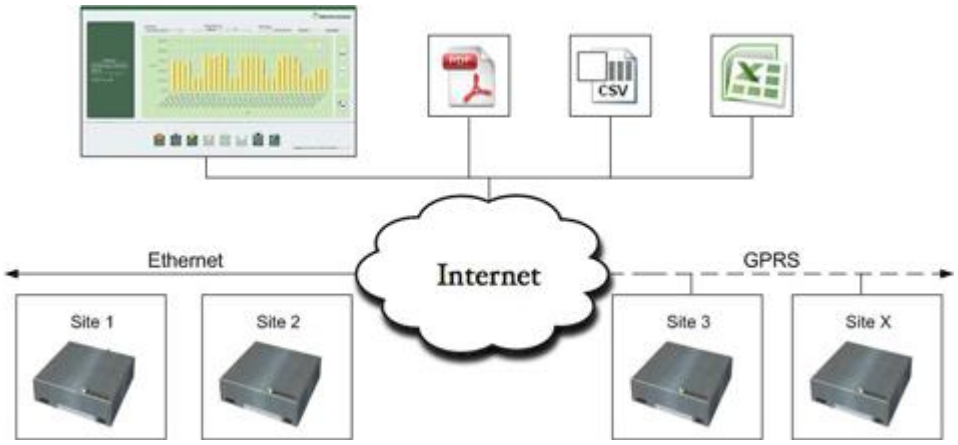
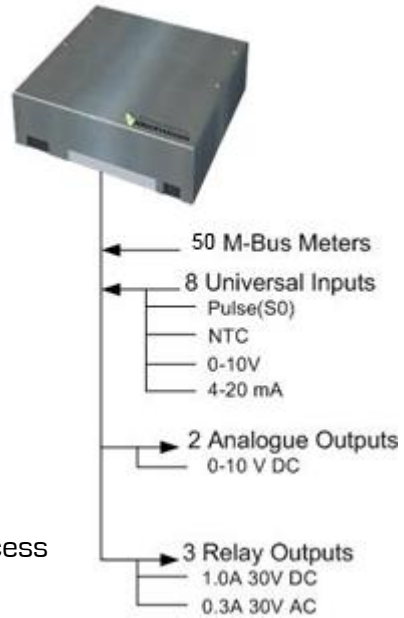
Introduction

The Energy Client from Electrocom is designed to collect data from meters using the M-Bus protocol or from the 8 universal inputs.

Every client periodically collects the values from the meters, generates and sends the information to a server. Here the data can be interpreted and evaluated. The server application provides a detailed overview over the total or individual consumption in a period, for a single or a group of consumers.



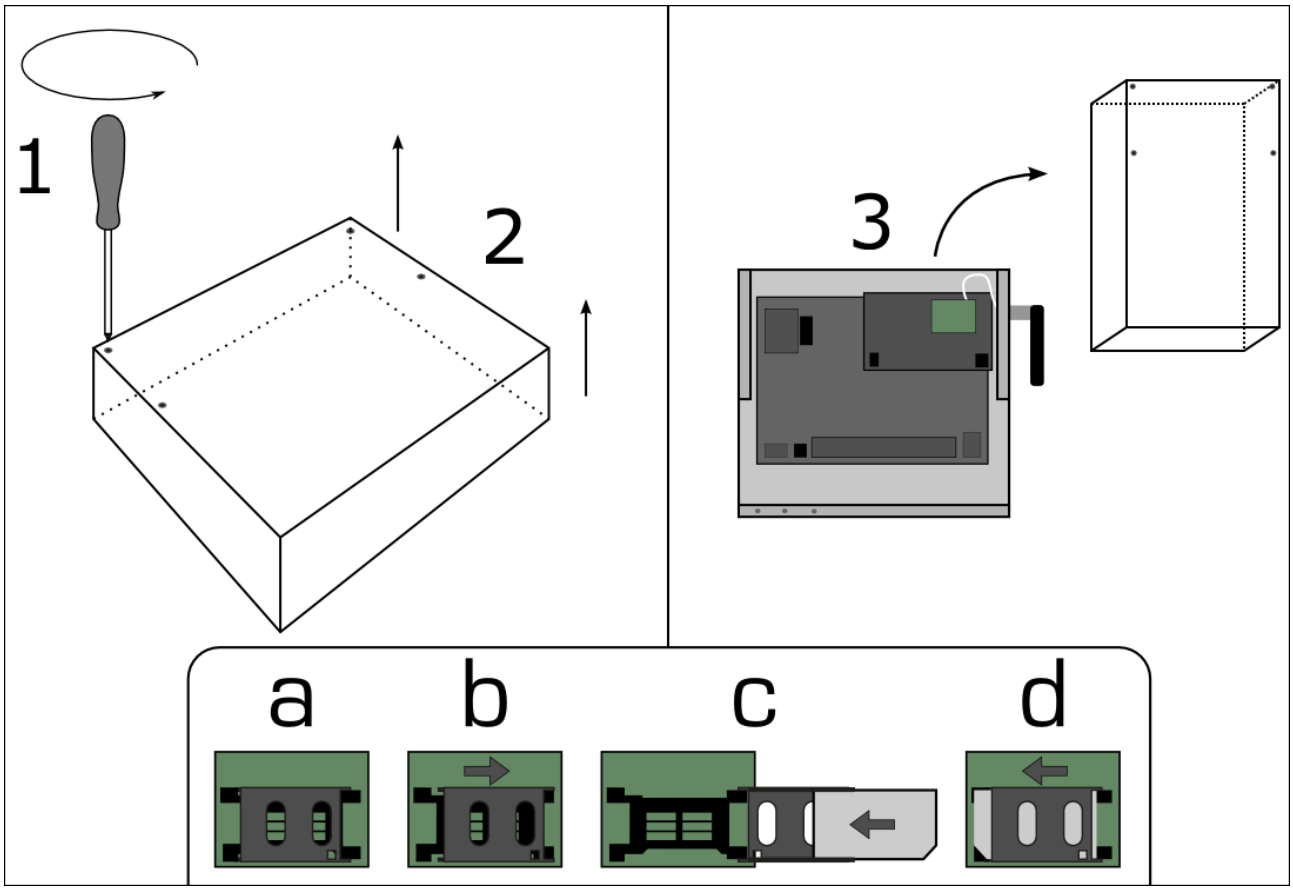


Features of the Energy Client:

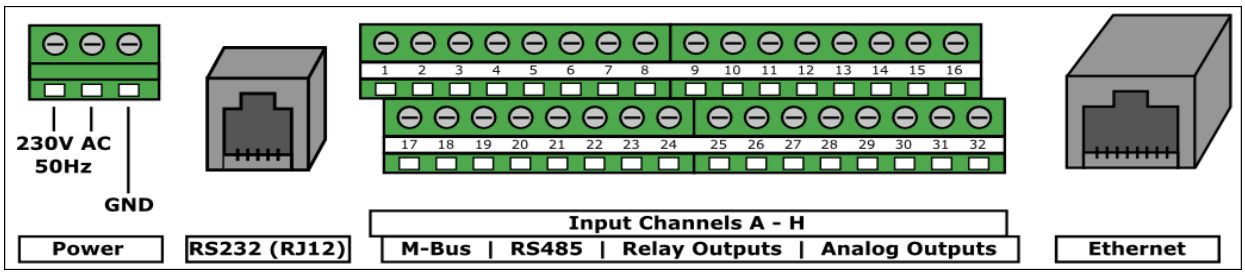
- Management of up to 50 M-Bus meters
- 8 Universal inputs
- 2 Analogue Outputs
- 3 Relay Outputs
- Automatic scan for new M-Bus meters
- GPRS support for remote locations without network access
- NTP support for automatic time setup
- 15min, 30min, 1hour, 3hours, 6hours, 12hours or 24hours log interval
- Remotely update the software
- Automatically finding the working internet connection over GPRS or Ethernet IP
- IO-Automation

Installation

When installing the Energy Client box, a dry and safe place with moderate temperature is optimal, but it is also possible to place it outdoor.



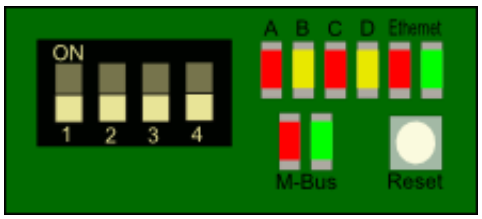
1) Unscrew the 4 screws on the top of the box (1) and remove the panel (2)
2) Connect the 2 wired M-Bus cable to pins 17 + 18
3) Connect the RJ45 Ethernet cable, if there is a network available
4) Insert the SIM card into the modem, if you want to use the modem (a – d)
5) Connect the 100 – 230Volt AC power line
6) Close the panel of the box



LED, Switches and Reset

The Energy Client contains:

- 4 status LEDs
- 2 Ethernet LEDs
- 2 M-Bus LEDs



LED	State	Description
A	Toggle/ON	Connects to update server/Software is up to date
B	Toggle/ON	Sending log/Last log upload has been performed
C	ON	Input pulse
D	ON	M-Bus protocol is active
Ethernet Red	ON	Ethernet activity
Ethernet Green	ON	Ethernet link
M-Bus Red	ON	M-Bus activity
M-Bus Green	ON	M-Bus activity

If switch number 4 is set to ON and the module is (re-)started, the Energy Client will reset to factory settings. Make sure to set the switch back to OFF once the module has rebooted.

Configuration

The Energy Client is programmed with a basic configuration. In order to receive data of your M-Bus meters, a search for connected meters is required (see chapter

M-Bus Meter Setup). Once the meters have been found, the module will periodically readout their data and uploads it to a server where the data will be stored. This allows the calculation of the consumption of a period.

To change the settings of the Energy Client a network connection is required.

1) Connect your PC/laptop to the network

2) If there is no network available, connect your computer with a RJ45 crossover cable to the Energy Client and choose a static IP address for your computer:

   IP address *10.0.0.xxx* [1]

   Subnet Mask *255.255.255.0*

   Standard Gateway *10.0.0.1*

   [1] *10.0.0.0, 10.0.0.1 and 10.0.0.255 are reserved addresses*

3) Enter the Synergyr Gateway IP address in a browser. Default http://10.0.0.200/

> In case DHCP is used or the IP address is unknown, use the ATK3-Tool to locate it. Identify the Synergyr Gateway by the serial number written on top of its power supply.
>
> The tool can be downloaded at http://otap.electrocom.dk/ATK3/Tool/

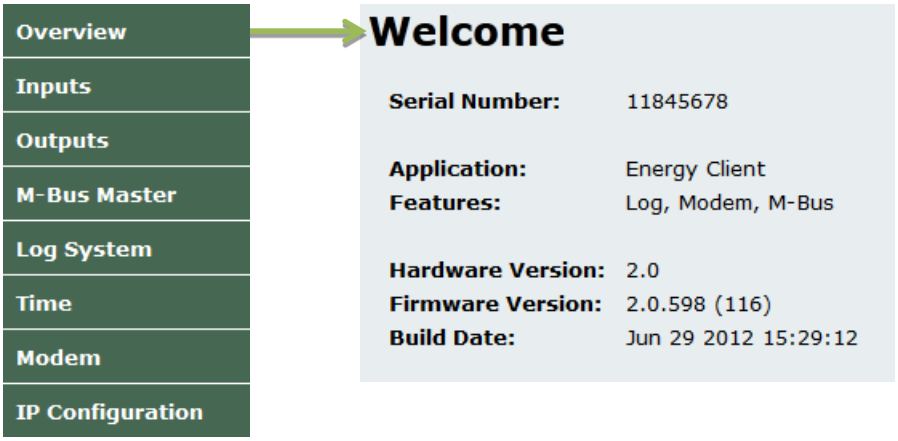
4) Login to the Energy Client when requested. Default login:

   Username: *admin*

   Password: *ATK3_pa$$*

Overview

The Overview menu contains information about the ATK3 hardware and firmware.



IP Configuration

Within the IP configuration menu, the Energy Client local network address and connectivity settings are set up.

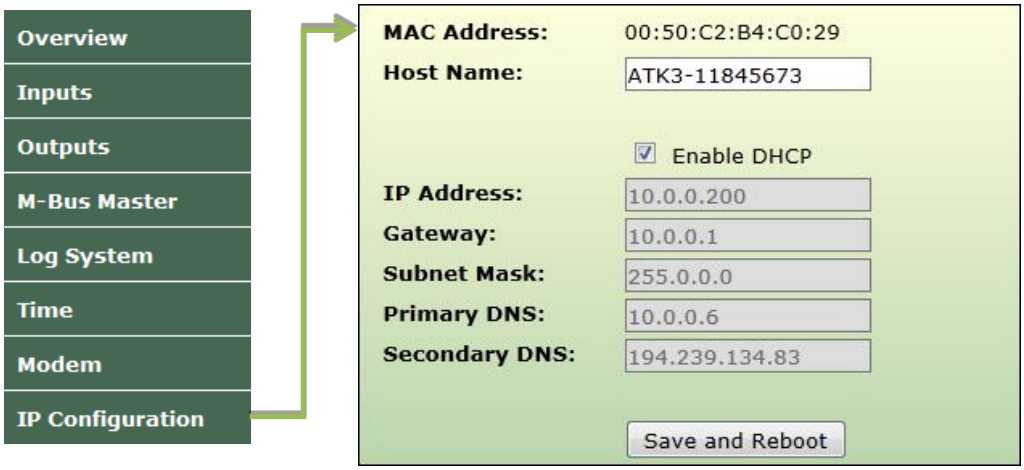
To change those settings:

1) Choose *„IP Configuration"* from the menu
2) Choose, if DHCP should be enabled:

- When enabled, the IP address and all other network settings are acquired automatically
- When disabled, the IP address along with all other network settings are manually set:

IP Address	*The static IP address of the module (default 10.0.0.200)*
Gateway	*The IP address of the gateway (default 10.0.0.1)*
Subnet Mask	*The subnet mask to be used (default 255.255.255.0)*
Primary DNS	*The IP address of the primary domain name server*
Secondary DNS	*The IP address of the secondary domain name server as alternative*

3) Click „*Save and Reboot*" to save your configuration and reboot the Energy Client.



Note: When using a modem, the reboot may take up to 2 minutes.

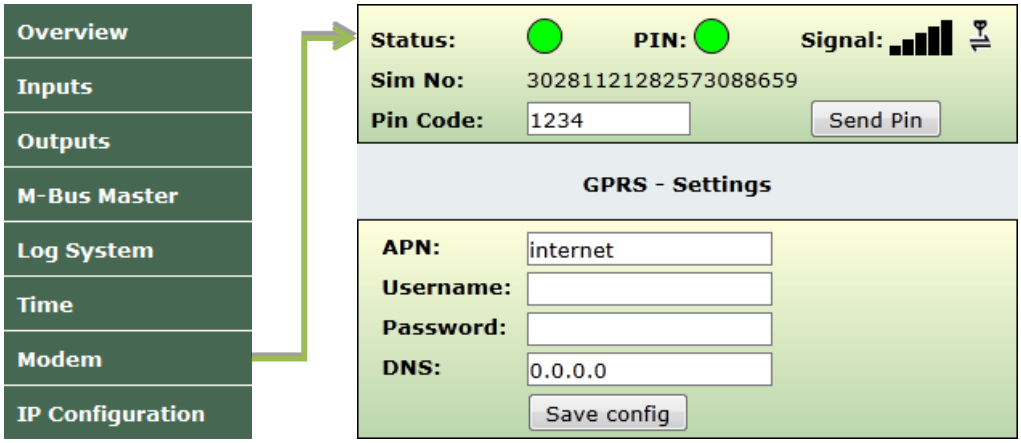
Modem Configuration

On remote locations, where there is no Ethernet available, data upload is done over the GPRS network using the modem extension board.

Note: If the module is also connected to a local network, it will try to make use of it first. The modem will then be used, if the connection cannot be established over LAN.

To configure the modem module:

1) Choose *„Modem“* from the menu
2) Enter the *„Pin Code“* of your SIM card and press the *„Send Pin“* button
3) Fill in the fields of the *„GPRS - Settings“* in case they differ for your mobile provider



Once the modem is online, the status of the connection and signal quality will be illustrated on this site as shown above. To connect to the server a signal quality of at least 3 bars is required. In case the quality is at two or less bars, choose another location or connect an external antenna.

Signal Quality

To be able to connect to the GPRS network, make sure that there are at least 2 bars filled at the signal indicator. The GPRS network symbol will light up when the module was able to successfully connect to the network.

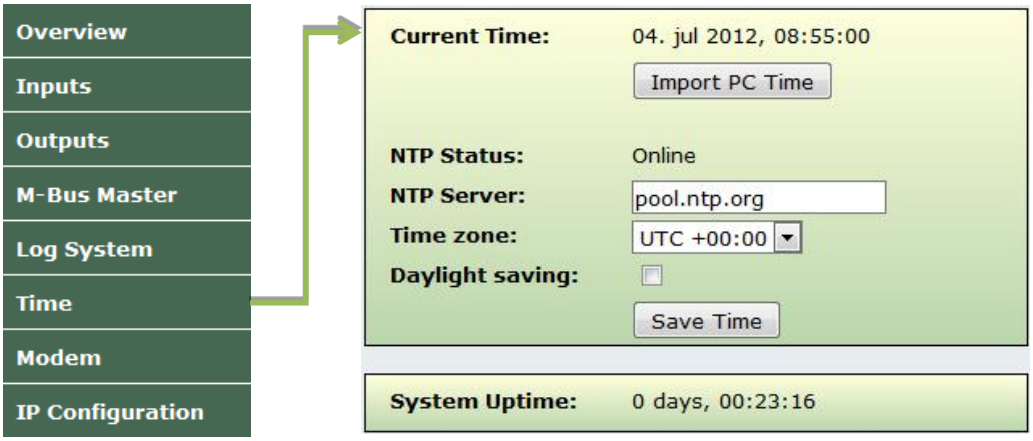
The modem antenna can be exchanged with a bigger one to improve signal quality. If you still are not able to connect to the network, make sure GPRS settings are set up correctly and check with your provider if the SIM card is set up for data communication,

Time Configuration

The Energy Client time configuration can be set under the time menu. The Energy Client is able to automatically set its time using a NTP time server.

To change the settings:

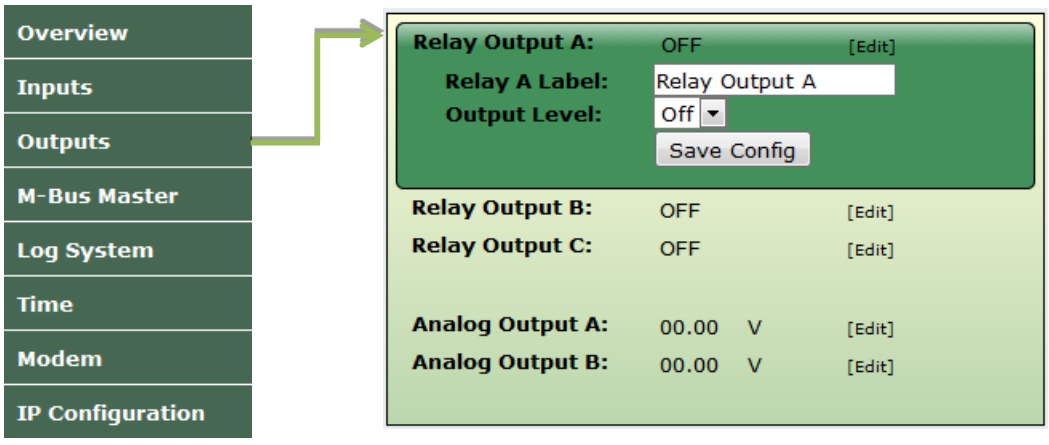
1) Choose *„Time“* from the menu
2) Set the NTP server address (default pool.ntp.org)
3) Set a *„Time zone“* and check *„Daylight Saving“* for automatically switch to summertime
4) Click *„Save Time“* to save the configuration



Press the *„Import PC Time“* button to import the time settings from your current computer.

Outputs Channels

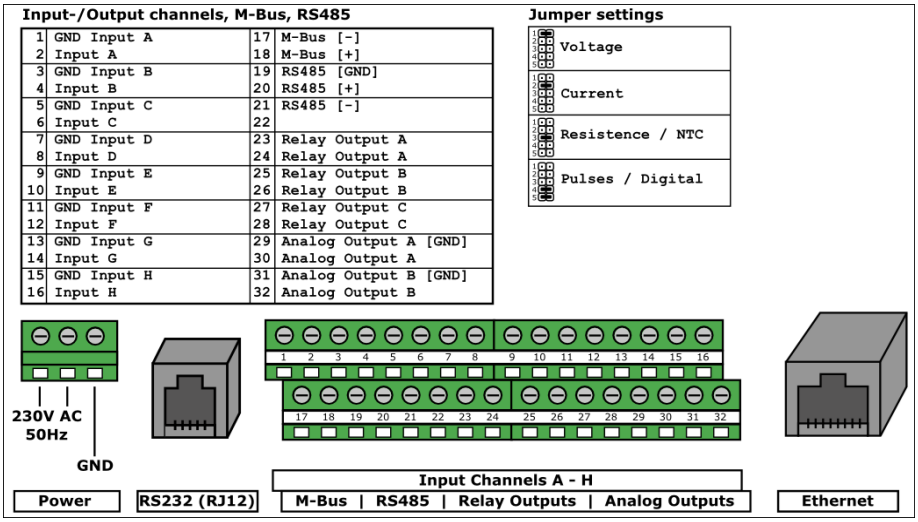
There are two different types of output channels on the Energy Client. Three relay output channels for efficient switching of loads and two scalable analog channels.



To set the value for relay output choose either *On* or *Off* from the select box. For analog output channels, set a value between 0V – 17.50V. Click the “Save Config” button to save the configuration.

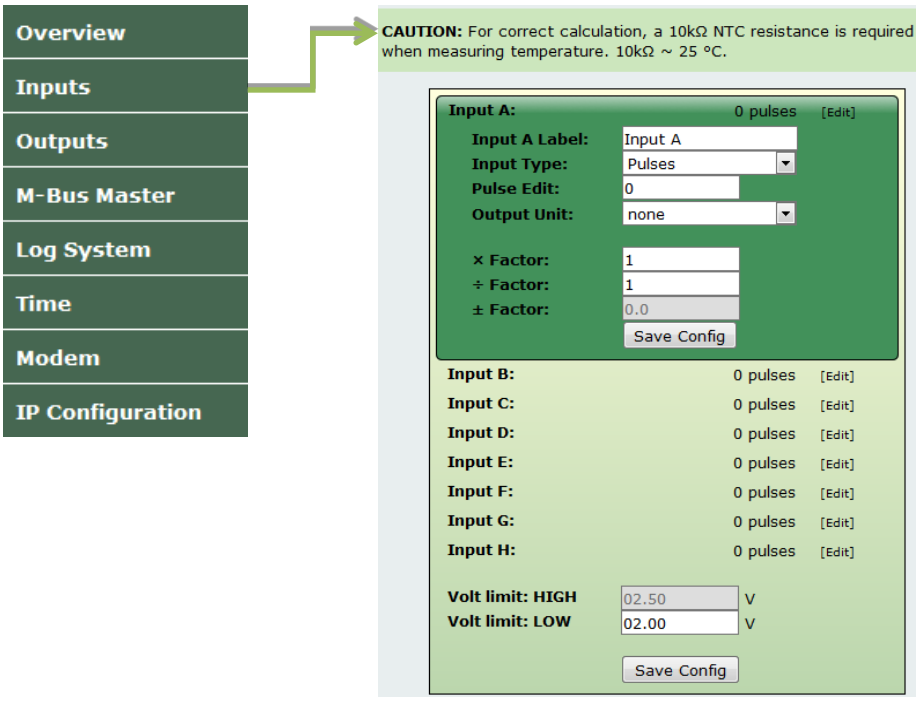
Input Configuration

The Energy Client has 8 input channels that can be set to different types: digital, DC voltage, current, NTC thermistor and pulses. To prepare the setup every input channel has a set of 5 jumpers that have to be set to match the type of the input. See jumper settings in the picture.



Input Channels

Setup the input channels within the configuration to match the jumper setup you've done before. Therefore click "Inputs" within the menu.



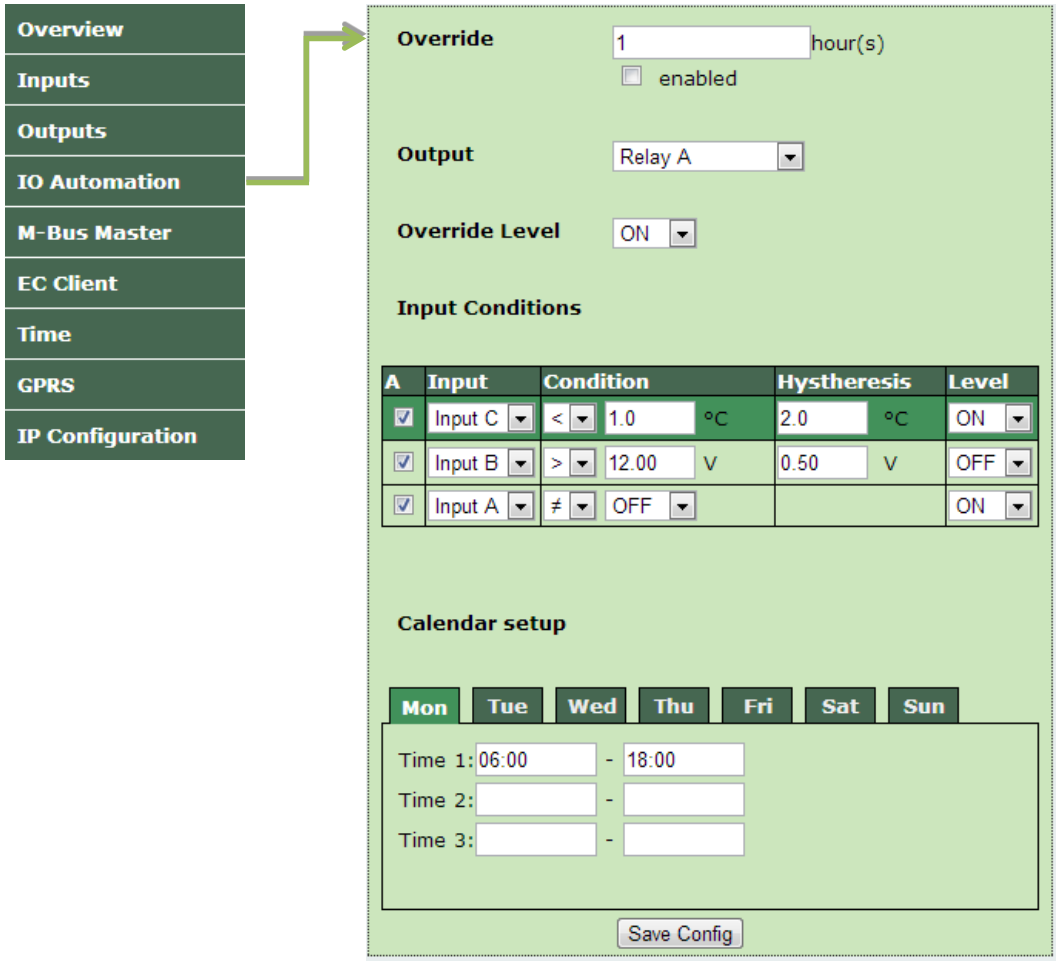
Choose those options from the select boxes that match your jumper configuration. In the configuration it is possible to change the input label, type, value and output unit. It is also possible to change the measured value by a scaling factor.

For conversion of analog input signal to digital or pulse signals, set a value for "Volt limit: LOW" to specify the maximum voltage level at which the signal is considered as low-signal. The minimum voltage for a high-signal is fixed at 2.50V DC.

Press "Save Config" when you are finished with the configuration.

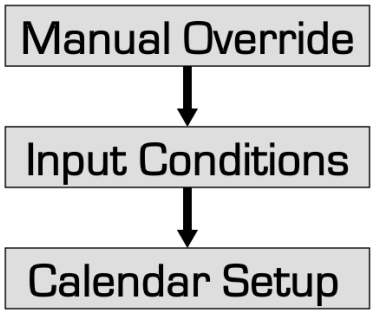
IO-Automation

This module allows the automation of the Energy Client's output channels using conditional statements on its input channels and/or a calendric time schedule.



Priority

All conditions will be evaluated from top to bottom, ordered according to their importance. This means that the calendric time schedule has the lowest priority while *override* has highest priority.



If no manual override is in effect, no condition evaluated to true and the system time is outside of any scheduled time frames, the output will be set to the opposite of "Override Level". For analog outputs, the value for "ON" is 17.50V which is the maximum analog output level and 0.00V for "OFF".

Override

If immediate use is necessary, the system can be bypassed manually. Therefore set an override time in hours that is greater than zero. This is the time in which the manual override is active and all output channels are set to their designated *"Override Level"*. To activate the manual override, either check the "enabled" checkbox on the webpage or - if the Energy Clients Input H is set to a pulse input - by triggering a pulse on this input.

The override can be cancelled by unchecking the "enabled" checkbox or by giving 2 pulses within 3 seconds to Input H.

Input Conditions

For each output channel, there are 3 input condition statements that can be activated. If any condition is evaluated to be true, the designated output level will be set. The output level can differ for each condition thus allowing complex strategies.

Input Condition Fields:

Activated	*Check this checkbox to activate the condition. Inactive conditions will be ignored.*
Input	*Choose the input channel*
Condition	*Chose a compare function and value that the input value is checked against*
Hysteresis	*Amount the input value has to differ from the compared value in the opposite direction before the condition is rendered inactive again. There is no hysteresis in the direction of the activation.*
Level	*The output level that is set, when the condition is evaluated to true*

Example Condition:

Input A < 1.0 °C, Hysteresis 2.0 °C => Output Level ON

This could be an icing protection. If the input (outdoor temperature) falls under 1.0 °C, the output (heater) is powered (ON) and first shut down again, once the temperature has risen by 2.0 °C degrees above the compared value (which is 1.0°C + 2.0°C = 3.0°C).

Calendar Setup

The calendar setup can be used to create a time schedule for each output. Whenever a set time point is reached, the output is set to the same value as the "Override Level". Therefore the time schedule does not necessarily define the ON-times.

Example Schedule:

Monday-Friday: 06:00 – 16:00 o'clock, Override Level: ON

This is an example of a schools heating system. The heaters will turn on at 06:00 to have the rooms at comfortable warmth before classes begin and turn off at 16:00 when the last class has finished.

Time frames can be set in intervals of 30 minutes. Further, the start time of the time frames must be earlier than the end time. Should it be necessary to set a time frame that reaches over midnight, you can split the frame into 2 frames. (For example: instead 1 frame from 20:00 to 06:00, you create two frames, one from 20:00 to 00:00 and one from 00:00 to 06:00)

M-Bus Configuration

The M-Bus master module manages the communication of connected meters of a M-Bus network. While the internal power supply can provide power for up to 25 physical meters, the M-Bus master is able to manage up to 50 meters using repeaters or gateways. To change the M-Bus master settings:

1) Choose *„M-Bus Master“* from the menu

2) Select the *„Connection Type“* (default ATK3)

ATK3	*Choose this option to connect directly to the M-Bus line (pins 17 & 18)*
RS232*	*The RJ12 serial connector will be used together with a M-Bus Level converter*
Gateway*	*Data will be channelled between the RJ12 serial connector and M-Bus line*

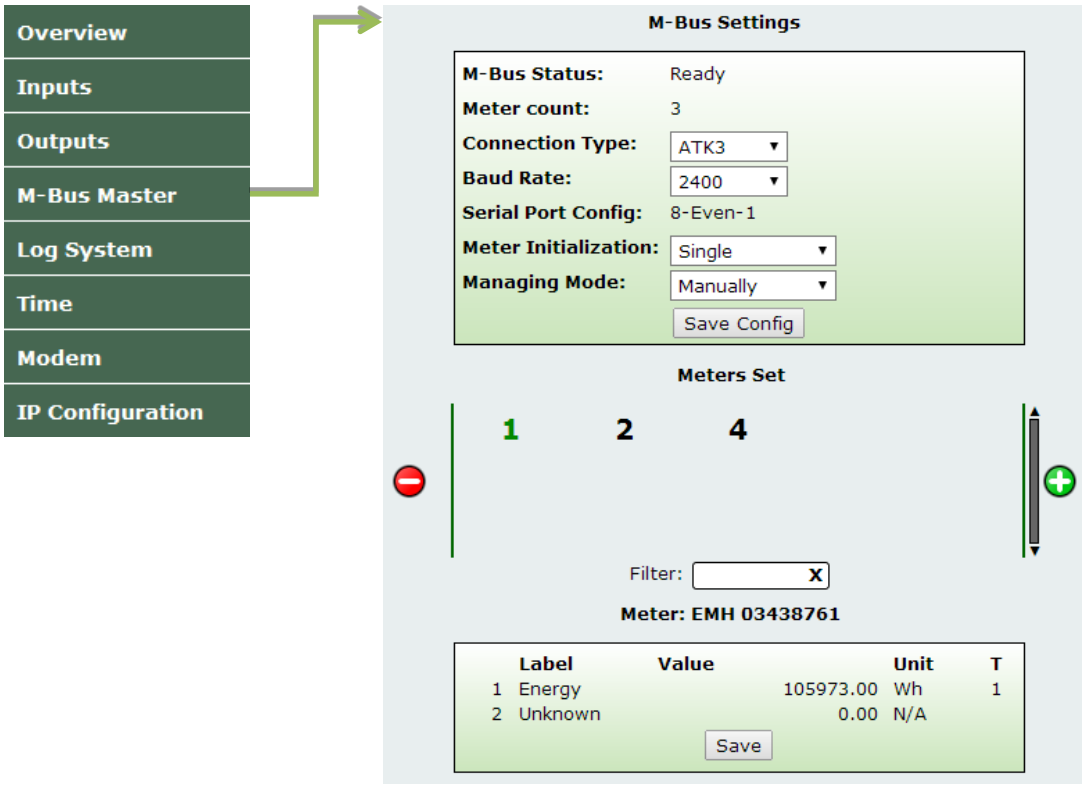
*) *These options are not available on Energy Client's with modem extension.*

3) Select the *„Baud Rate“* (default 2400)

4) Select the *„Managing Mode“*

Manually	*Scan for new meters on user request only*
Automatically	*Scan for new meters automatically…*
Daily Scan	*… once every day*
Scan at power up	*… on module start-up*

5) Press *„Save Config“* to save the configuration



Meter values can be read by selecting the meter in the *"Meters Set"* list

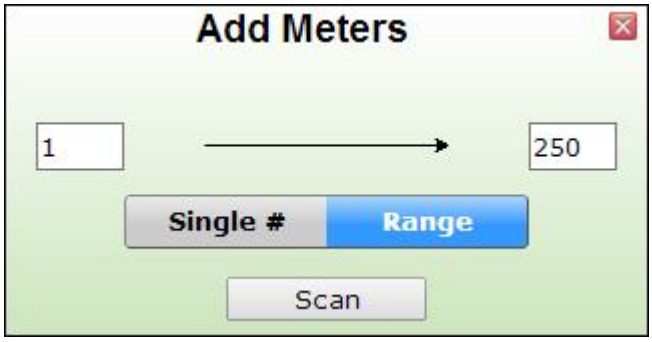
Note: In case the M-Bus cable is broken or has a short circuit, the "Scan Status" will inform about the situation once the bus is activated.

M-Bus Meter Setup

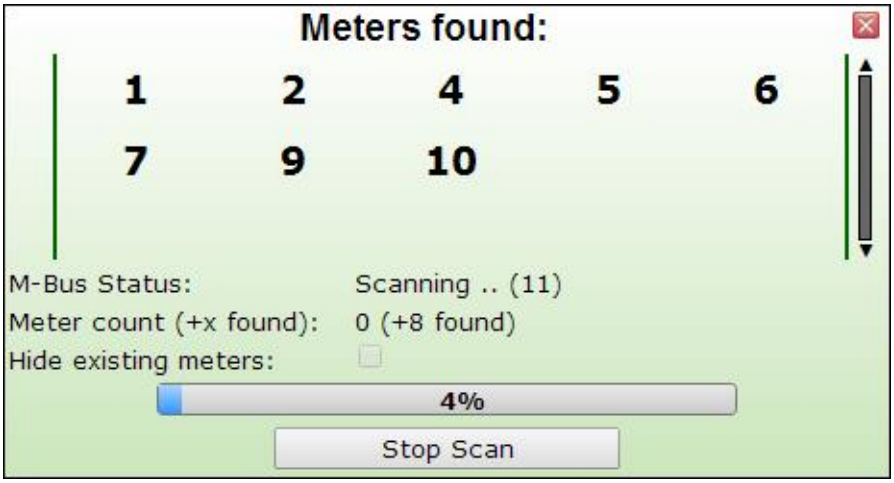
The Energy Client standard configuration is set up to scan the M-Bus for connected meters automatically once the module is powered up. Before you connect a meter, make sure, that the primary address is set. The primary address is ignored.

If you want to find a new meter immediately, you can initiate a scan manually:

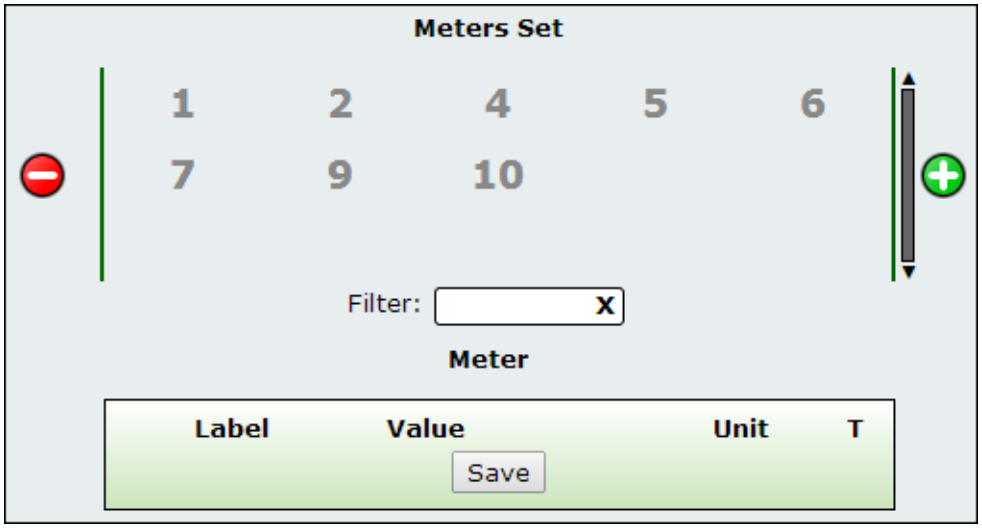
1) Click the ⊕ button to initiate the scan



2) Select either *„Single #"* or *„Range"*, to scan for a single address or within a range of addresses. When *„Single #"* is selected, you only need to enter a value for the first field. Click the *„Scan"* button to initiate the scan



3) When the search has finished click the *„Add selected meters"* button. After a readout of every found meter, they will appear in the list.

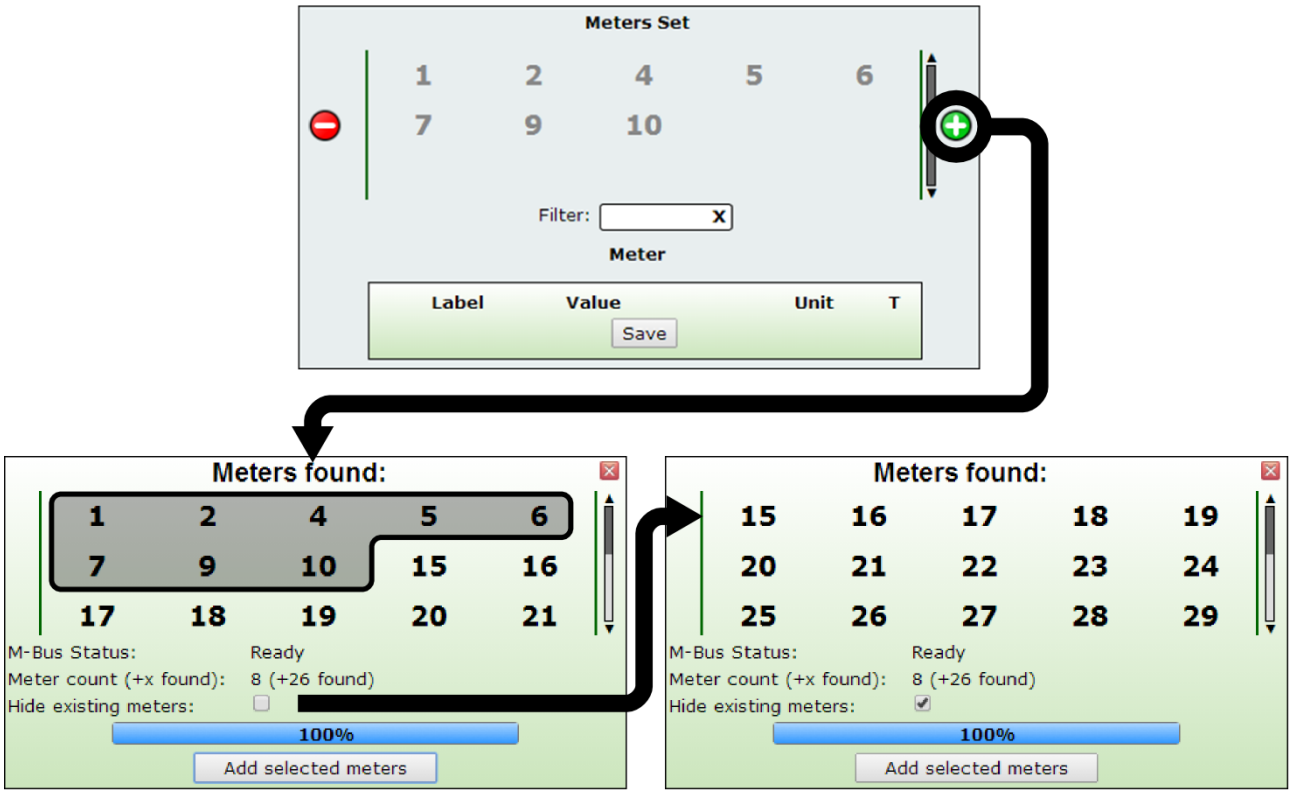


Adding more meters

If you want to add more meters later on, you can initiate the M-Bus scan by clicking the ⊕ button as before. The scan will find all meters that are connected to the M-Bus, also the ones that were previously been found. To filter off those meters, there is two ways:

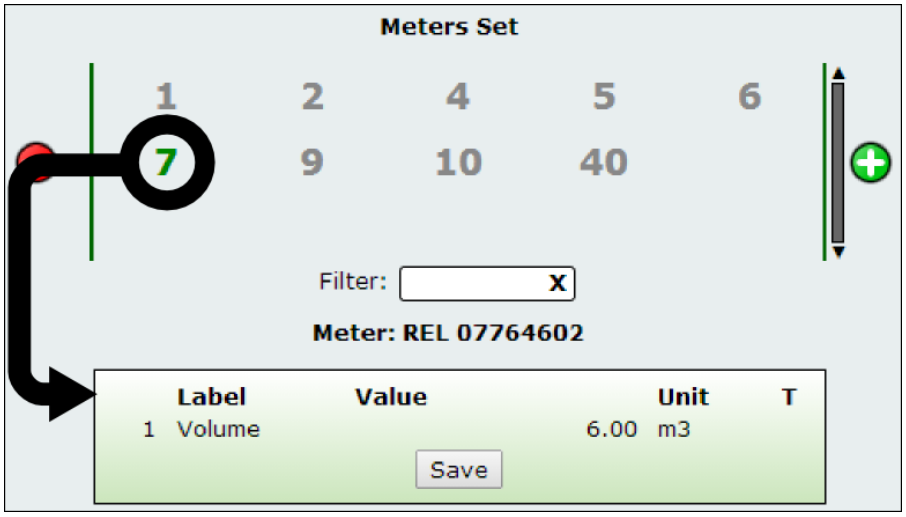
1) In the window showing the found meters, you can select and deselect single meters by clicking on them and thereby decide whether they should be added or not.

2) You can also deselect all meters that were previously found simultaneously, by selecting the *„Hide existing meters“*-checkbox, as shown below.



Reading meter values

Values of meters, that have been added, can be read by clicking on the address of the meter. The values will be shown at the bottom of the window.



Log System Configuration

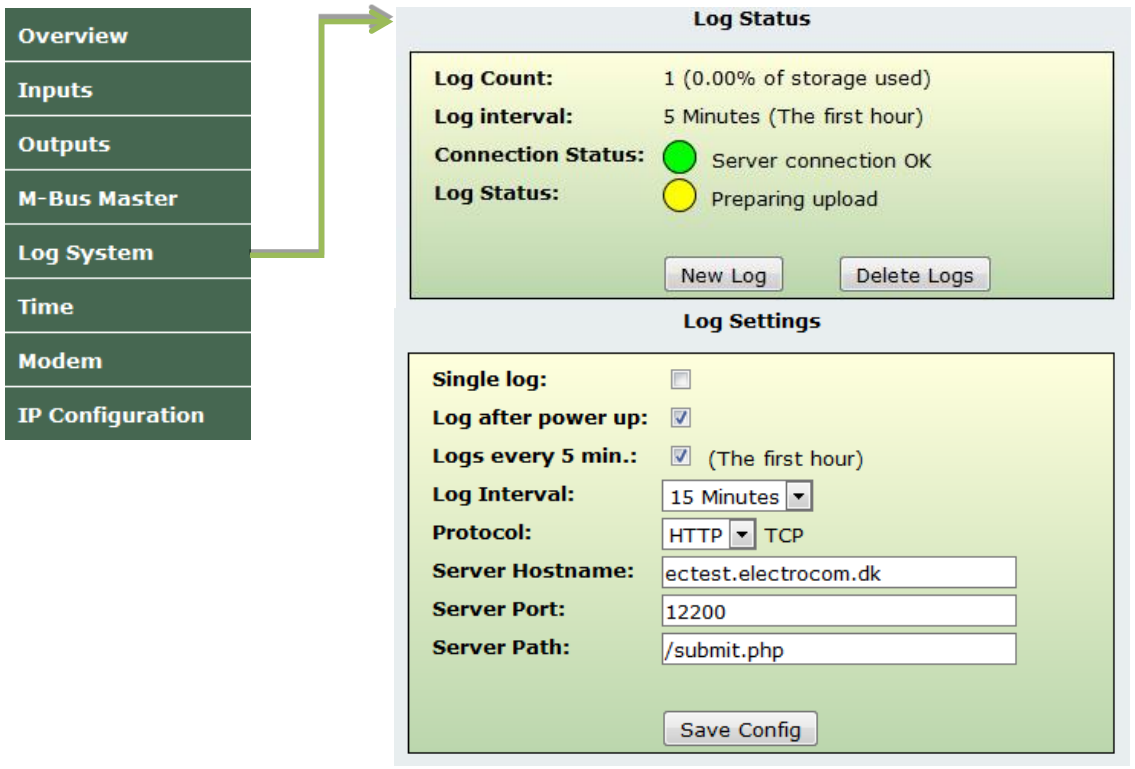
The log system will periodically read the values of all universal inputs and all found meters of the M-Bus master and generate a log. Once generated, the log system will upload the data to a server where the containing measurements will be stored within a database and illustrated.

To configure the log system:

1) Choose *„Log System"* from the menu
2) Set up the logging system

Single log	*The module will overwrite any existing log when creating a new one*
Log after power up	*When enabled, a log will be created after start-up*
Logs every 5 min.	*When enabled, a log will be created every 5 minutes the first hour*
Log interval	*Choose the interval for logs to be created (default 1 hour)*
Protocol	*Http upload only*

3) Specify the servers hostname, port and upload path
4) Click *„Save Config"* to save the configuration



The log status window contains information about the actual log count, storage used in the log buffer, log interval, connection status and log status. The different messages in the status fields are listed in the tables below.

Connection Status:

Message		Description
	Initialization	Starting network services
	Connection failed	The Energy Client can't connect to the server. • Check the upload settings within the log system. • Check the connection to the server
	Server connection OK	The connection to the server works within normal parameters.

Log Status:

Message		Description
	No connection to server	There is no connection to the server, so the upload can't proceed.
	Upload failed	The log system tried to upload, but the server didn't accept the file.
	Waiting for logs	The server connection is OK and the log system is waiting for logs to be generated.
	Creating new log	The log system creates a new log
	Preparing upload	The log system is trying to upload the file.
	Upload OK	The file has been uploaded successfully.

Notes

Input and NTC thermistors

The Energy Client supports NTC thermistors with a resistance of 10kΩ and a B value of 4300. When using a thermistor in the IO automation setup and temperatures measured exceed 100.00°C or fall under -35.00°C, the thermistor is considered broken. The override value will be set to the output to prevent frozen pipes or an outtake of the heating system.

M-Bus Master shows "overloaded"

You will see this message on the M-Bus Master page when the M-Bus is short circuited. Other than a short circuit of the M-Bus line, this can also occur when a meter is malfunctioning.