

# INSYS Smart Devices

## Add-On Manual Monitoring App

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Add-On Manual





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# 1 General Information

This add-on manual describes the Monitoring App of the INSYS Smart Devices and may only be used together with the operator manual of the respective router. The Monitoring App enables monitoring of inputs, Modbus devices, Siemens controls of types SIMATIC S7 and LOGO™, received SMS and timers. These monitoring operations can be combined and evaluated to switch outputs or dispatch messages via SMS or e-mail. The particular functional scope depends on the used router and the activated monitoring packages.

The following monitoring packages are available and can be activated upon purchasing the license.

- Logo for Siemens LOGO!™-micro controllers
- Modbus for Modbus devices
- S7 for Siemens SIMATIC S7 controls

The application might be pre-installed depending on the router. The monitoring packages Logo (IMON-G100/U300/U310) or Modbus (IMON-G200/U300/U310) are already activated for fault monitors of the IMON series.

The Monitoring App is running on the following INSYS Smart Devices from FW 2.12.8:

- All INSYS MoRoS from version 2.1
- All INSYS IMON
- All INSYS EBW

Safety instructions, technical data, and functional descriptions must be taken from the operator manual. The user manuals can be downloaded under Support and Downloads -> Documentation ([www.insys-icom.com/manual/](http://www.insys-icom.com/manual/)).

Descriptions for configuring typical monitoring applications can be downloaded on the website of INSYS icom under Support and Downloads -> Configuration Guides ([www.insys-icom.com/cg/](http://www.insys-icom.com/cg/)).

## 2 Using Open Source Software

### 2.1 General Information

Our product contains, amongst others, so-called open-source software that is provided by third parties and has been published for free public use. The open-source software is subject to special open-source software licenses and the copyright of third parties. Basically, each customer can use the open-source software freely in compliance with the licensing terms of the respective producers. The rights of the customer to use the open-source software beyond the purpose of our product are regulated in detail by the respective concerned open-source software licenses. The customer use the open-source software freely, as provided in the respective effective license, beyond the purpose that the open-source software gets in our product. In case there is a contradiction between the licensing terms for our product and the respective open-source software license, the respective relevant open-source software license takes priority over our licensing terms, as far as the respective open-source software is concerned by this.

The use of the used open-source software is possible free of charge. We do not demand usage fees or any comparable fees for the use of the open-source software contained in our product. The use of the open-source software in our product by the customer is not part of the earnings we achieve with the contractual compensation.

All open-source software programs contained in our product can be taken from the available list. The most important open-source software licenses are listed in the Licenses section at the end of this publication.

As far as programs contained in our product are subject to the GNU General Public License (GPL), GNU Lesser General Public License (LGPL), Clarified Artistic License or another open-source software license, which regulates that the source code must be made available, and if this software is not already delivered in source code on a data carrier with our product, we will send you this at any time upon request. If it is required to send this on a data carrier, the sending will be made against payment of a cost compensation of € 10,00. Our offer to send the source code upon request ceases automatically 3 years after delivery of our product to the customer. Requests must be directed to the following address, if possible under specification of the serial number:

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## 2.2 Special Liability Regulations

We do not assume any warranty or liability, if the open-source software programs contained in our product are used by the customer in a manner that does not comply any more with the purpose of the contract, which is the basis of the acquisition of our product. This concerns in particular any use of the open-source software programs outside of our product. The warranty and liability regulations that are provided by the respective effective open-source software license for the respective open-source software as listed in the following are effective for the use of the open-source software beyond the purpose of the contract. In particular, we are not liable, if the open-source software in our product or the complete software configuration in our product is changed. The warranty granted with the contract, which is the basis of the acquisition of our product, is only effective for the unchanged open-source software and the unchanged software configuration in our product.

## 2.3 Used Open-Source Software

The following open-source software has been used in the product:

- freeboard.io
- libcurl
- libmodbus
- libmosquitto
- libsqlite

## 3 Function Overview

The Monitoring App for INSYS Smart Devices provides the following functions. The actual functional scope of the Monitoring App depends on the used router and the activated monitoring packages. The inputs and outputs of an INSYS MoRoS cannot be used for the Monitoring App. The further router functions can be taken from the router manual.

- **Monitoring inputs**  
Two digital inputs that can be monitored for the change of their state.
- **Monitoring a Siemens control**  
Monitoring of objects of Siemens controls of the types SIMATIC S7 and LOGO!<sup>™</sup>, like inputs and outputs, flags, data blocks, etc.
- **Monitoring of Modbus devices**  
Monitoring objects of connected Modbus TCP or RTU devices -like holding registers, bits of holding registers, input registers, bits of input registers, coils, discrete inputs and the status.
- **Evaluating received SMS**  
Evaluation and content monitoring of received SMS from any or specific senders.
- **Evaluating received MQTT messages**  
Evaluation and content monitoring of received MQTT messages from specific MQTT brokers.
- **Monitoring timers**  
Monitoring any configurable timers for their expiry.
- **Monitoring the application start**  
Monitoring for the start of the Monitoring App during device start.
- **Switching outputs**  
Two potential-free switch outputs that can be actuated within an action.
- **Setting Modbus objects**  
Setting digital or analogue objects (bits, registers) of a connected Modbus device.
- **Setting objects of a Siemens control**  
Setting objects of a connected Siemens control of the types LOGO!<sup>™</sup> (from VersionBA8 ) and SIMATIC S7.
- **Starting and stopping a Siemens LOGO!<sup>™</sup> micro controller**  
Starting and stopping the program of a Siemens LOGO!<sup>™</sup> micro controller (up to version 0BA7) within an action.



- **Sending messages**  
Sending messages via SMS or e-mail to any recipients within an action. It is possible to pass on actual values in the messages using variables.
- **Uploading data to cloud services**  
Sending data (server feeds) to cloud services (e.g. Cumulocity Cloud or Telekom Cloud of Things) within an action. It is possible to transmit measurements, alarms or events to the service to collect and visualise them centrally in the cloud.
- **Sending messages to MQTT broker**  
Sending messages to MQTT broker within an action.
- **Freely configurable dashboard**  
A freely configurable dashboard provides for a easy to create and quick overview of the parameters of your application.
- **Configuration wizards**  
Various configuration wizards are available for an easy configuration of various monitoring tasks. New wizards can be uploaded to the router easily.

## 4 Installation and Activation

The Monitoring App is pre-installed on Smart Devices of the INSYS IMON series and one monitoring package is already activated.

The Monitoring App is pre-installed on INSYS Smart Devices of the MoRoS and EBW series, but no monitoring packages are activated.

The Monitoring App must be installed first on older INSYS Smart Devices that are suitable for the Monitoring App.

### 4.1 Installation

The Monitoring App can be downloaded on the following page:

[www.insys-icom.com/monitoring-app](http://www.insys-icom.com/monitoring-app)

#### Installation of the Monitoring App.

How to install the Monitoring App.

→ The router is ready for operation and you have access to the web interface of the router.

→ You have the installation file of the Monitoring App.

**1. In the "System" menu, open the page "Update".**

✓ The Update page appears.

**2. Click the  button in the manual update section and select the installation file.**

**3. Click on .**

✓ The confirmation of a successful upload appears.

**4. Click on .**

✓ The Monitoring App is installed with this and can be started immediately.

## 4.2 Activation

The following monitoring packages are available for the Monitoring App and can be activated upon purchasing the license.

- Logo for Siemens LOGO!<sup>™</sup>-micro controllers
- Modbus for Modbus devices
- S7 for Siemens SIMATIC S7 controls

Contact us to purchase a license for a monitoring package under sales@insys-tec.de or contact your sales staff. Hold the serial number of the router on which the monitoring package is to be activated ready. You'll then receive the license key via e-mail.

### Activation of the monitoring packages.

How to activate a monitoring package.

- The router is ready for operation and you have access to the web interface of the router.
- You have the license key for the respective monitoring package.

#### **1. Open the Monitoring App using the Monitoring menu item.**

- ✓ The Monitoring App will open in a new window.

#### **2. In the "System" menu of the Monitoring App, open the "Licenses" page.**

#### **3. Copy the license key into the "Activate new license" field (copy & paste of the whole content of the text file).**

#### **4. Click on**

- ✓ The respective monitoring package is activated with this.

# 5 Operating Principle

This section describes how to configure the Monitoring App of the INSYS Smart Device.

## Web interface

The Monitoring App is configured using an own web interface. The web interface of the Monitoring App opens when selecting the menu item "Monitoring" in the normal web interface or entering appstart-local in the address bar of the browser. The actual monitoring function is configured here besides the display of the state of the Monitoring App, the monitored devices and elements as well as basic settings.

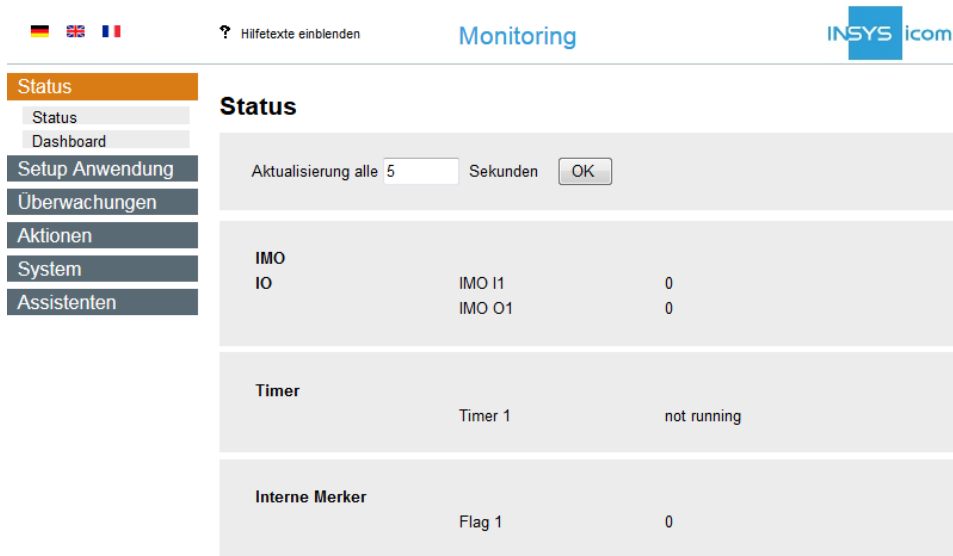


Figure 1: Web interface of the Monitoring App

## Which devices / elements are monitored?

The monitored devices are created for this first. Depending on the router, these can be:

- Siemens controls of types SIMATIC S7 or LOGO!™
- Modbus devices (TCP and RTU)
- I/Os of an INSYS IMON fault monitor

**Geräte**

Gerät hinzufügen

aktiv	Name	Anschluss
<input checked="" type="checkbox"/>	Logo 0ba6 (Logo 0BA6)	SERIAL Seriell 2 Pollint. 10 s
<input checked="" type="checkbox"/>	IMO (IO )	

Figure 2: List of devices in the web interface

The different elements of these devices can then be created. Elements can be:

- Objects of a Siemens control
- Modbus objects (holding registers (FC 3), bits of holding registers, input registers (FC 4), bits of input registers, communication status , coils (FC 5), discrete inputs (FC 2))
- I/Os of the fault monitor
- internal timers
- internal flags

These elements must be created before they can be used for the different monitoring functions later. The element name needs to be unique and unambiguous.

**Elemente**

Element hinzufügen

aktiv	Name	Gerät / Quelle
<input checked="" type="checkbox"/>	Logo6 DI1 (Logo )	Logo 0ba6 digitaler Eingang Nummer : 1
<input checked="" type="checkbox"/>	Logo6 PS (Logo )	Logo 0ba6 Programmstatus
<input checked="" type="checkbox"/>	Timer 1 (Timer )	Stoppuhr 00:13:07
<input checked="" type="checkbox"/>	IMO I1 (IO )	Eingang 1
<input checked="" type="checkbox"/>	IMO O1 (IO )	Ausgang 1
<input checked="" type="checkbox"/>	Flag 1 (Merker )	

Figure 3: List of elements in the web interface

## How to combine monitored elements?

Moreover, it is possible to combine digital states of single elements using logic operators.

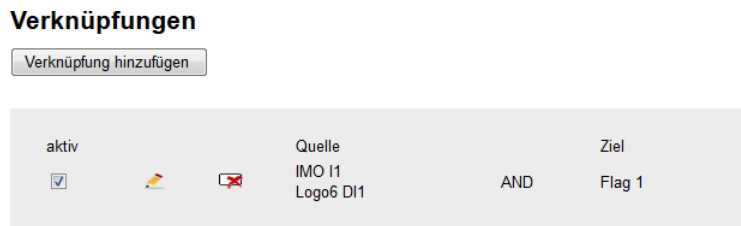


Figure 4: List of logic operations in the web interface

## Who is being informed?

Recipients can be created with a phone number (for SMS messages) or an e-mail address (for e-mail messages). These can then be used for dispatching pre-defined messages as an action or monitoring for the receipt of an SMS message. Moreover, it is possible to specify a Cumulocity server as recipient onto which messages like measurements, alarms or events can be uploaded.



Figure 5: List of recipients in the web interface

## What is being monitored?

After the devices, elements, logic operations and recipients have been created and defined, the monitoring operations are configured. One of the existing elements will be monitored for a change of its status for each of this. It is also possible to monitor the receipt of an SMS message from one of the existing recipients or any sender.



Figure 6: List of monitored elements in the web interface

## What happens if a monitoring triggers?

The definition of actions defines the responses that may occur upon the various monitoring operations. With this, the status of different elements, like outputs or flags for example, can be changed, HTTP pages can be called up, previously defined messages, which can also contain variables for actual values, can be dispatched, or feeds with measurements, alarms or events can be uploaded to servers.

### Definition Aktionen

Aktion hinzufügen

aktiv	Name	Aktion
<input checked="" type="checkbox"/>	 Alarm message	Nachricht an E-Mail Phone Absender Alarm
<input checked="" type="checkbox"/>	 IMO O1 close	IMO O1 schließen

Figure 7: List of actions in the web interface

The assignment of the action to a monitoring determines, how the router will respond on the occurrence of a monitored criterion.

All monitorings and actions can be combined as desired, also multiple.

### Zuordnungen

Zuordnung hinzufügen



aktiv	Überwachung	Aktion
<input checked="" type="checkbox"/>	 Logo6 DI1 -> 1	Alarm message
<input checked="" type="checkbox"/>	 Timer 1 end	IMO O1 close

Figure 8: List of assignments in the web interface

## How to operate the web interface?

If a false or invalid input is made or an already existing name is specified when adding or editing devices, elements, logic operations, recipients, monitoring operations, actions and assignments, the respective entry will be highlighted red and not taken over.

Name	Logo 0ba6
Typ	Logo
Version	0BA6
Anschluss	TCP
IP-Adresse	

Added devices, elements, logic operations, recipients, monitoring operations, actions and assignments are shown in a list in the respective menu.



Each entry can be disabled temporarily and enabled again using the checkbox in the "active" column.



An entry can be edited using the pen symbol.



The entry will be deleted using the cross symbol. If dependencies on other entries still exist, a warning will be issued before deleting and it can be decided whether to delete the dependent entries or not. If such a deleted entry is added again with the same name, the dependencies will not be restored again – they must be created manually again.

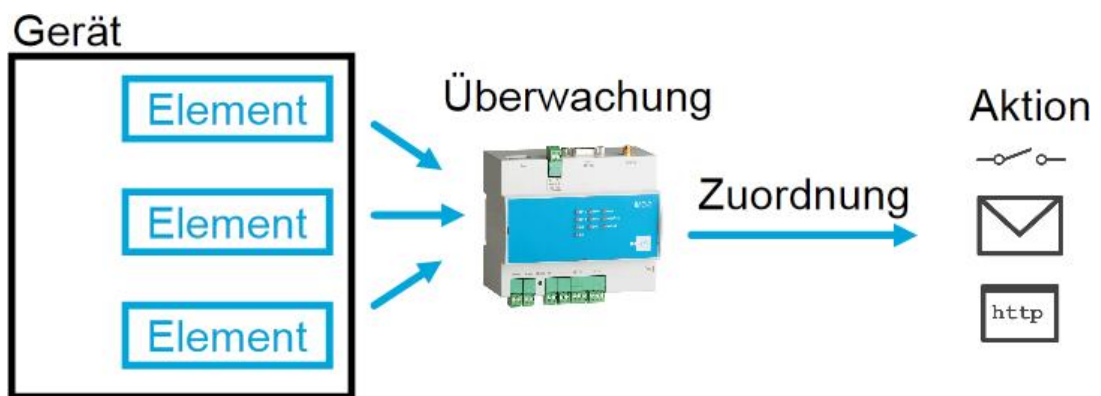


Figure 9: Monitoring App scheme

- ① It is recommended to plan the monitoring function carefully in advance for a quick and easy configuration.
- ① Take care to use an informative, clear and descriptive name when assigning names to the respective entries. This provides a much better overview on complex applications later.



## 6 Functions

### 6.1 Monitoring

The Monitoring App is displayed in a separate browser window upon selecting the menu item "Monitoring". It is a software application that runs on the router and is configured independently from this.

It must be kept in mind that the functionality of the Monitoring App can be affected by the router as well as the settings at the router (e.g. interface reservations for the sandbox). The configuration of the router is described in the respective manual.

#### 6.1.1 Status

The status of the created elements, like inputs and outputs, timers, flags, the objects of a Siemens S7 or LOGO!™ or the objects of connected Modbus devices are shown on this page. The update interval of the page can be configured here.

Closed inputs (connected to GND) and operated outputs are indicated by one (1) and open inputs and idle outputs are indicated by zero. Flags and digital objects of a Siemens control or Modbus objects are also indicated by one, if they are active (logically 1 or HIGH), and by zero, if they are inactive. Timers and analogue objects of the Siemens control indicate their actual value.

#### **Configuration via the web interface**

In order to **configure the status display**, enter on the "State" page in the "Refresh after" field the interval for the update in seconds and select "OK".

## 6.1.2 Dashboard

The dashboard is a freely configurable overview page for your application. Various panes that may contain one or more widgets can be arranged freely on the dashboard. The widgets can indicate the values of the variables LOCATION, UPTIME, TIME, TIMESTAMP, DATE, SERIALNUMBER and MAC\_ADDRESS as well as all previously added elements of the application in various ways, like text, gauge, sparkline, indicator light or HTML-formatted for example.

Please note that the display of the application parameters in the dashboard may cause heavy data traffic and delays in display depending on the connection speed therefore.

### Configuration via the web interface

In order to **open the dashboard**, click in the "Status" menu on the "Dashboard" page. The dashboard will be displayed in a new browser window.

In order to **configure the dashboard**, click in the dashboard on the wrench symbol in the top center.

In order to **store the dashboard configuration on the router**, click in the configuration area of the dashboard on "SAVE". The dashboard configuration can then be downloaded to the computer in the "System" menu on the "Download" page of the Monitoring App. If a reload is made before pressing "SAVE", all previous changes made to the dashboard will be lost.

In order to **add a new pane in the dashboard**, click in the configuration area of the dashboard on "ADD PANE".

In order to **change title and width of the pane**, click on the wrench symbol in the title bar of the respective pane. Make the required settings then.

In order to **delete a pane**, click on the recycle bin symbol in the title bar of the respective pane.

In order to **add a new widget to a pane**, click on the plus symbol in the title bar of the respective pane. Then, select the widget type and make the required settings. The value to be displayed is selected in the "VALUE" field by clicking on "+ DATASOURCE" and "Monitoring".

In order to **change the settings of a widget**, click on the wrench symbol in the respective widget. Make the required settings then.

In order to **delete a widget**, click on the recycle bin symbol in the respective widget.

### 6.1.3 Devices

Devices for the Monitoring App can be added on this page. These can be the inputs and outputs of a fault monitor, a Siemens control of the types S7 or LOGO!™ or Modbus devices. Besides the specification of the connection parameters, the Polling interval can be used to specify how often the router will query the device.

#### Configuration via the web interface

In order to **add a device**, click in the "Setup application" menu on the "Devices" page on the "Add device" button.

In order to **add I/Os as a device**, enter a name for it into the "Name" field and select "I/O" from the "Type" drop-down list.

In order to **add a Siemens LOGO!™ as a device**, enter a name for it into the "Name" field and select "Logo" from the "Type" drop-down list. Select the LOGO! version and the connection type then. Depending on the connection, enter the IP address for accessing the LOGO! and the associated port or the serial interface to which the LOGO! is connected as well as the polling interval.

- ① A SIEMENS LOGO!™ of version 0BA7 or 0BA8 does not support a serial interface and accepts connections on port 10001 (0BA7) or 102 (0BA8) by default.

In order to **add a Modbus device**, enter a name for it into the "Name" field and select "Modbus" from the "Type" drop-down list. Then, select the connection type. Depending on the connection, enter the IP address for accessing the device and the associated port (standard: 502) or the serial interface to which the device is connected and the interface parameters as well as the polling interval and the Modbus slave address. If values that are larger than a Modbus register (16 Bit) are to be read out from a Modbus device, the byte order must be set to match the device read out.

- ① Serial interfaces can only be selected here, if they are not reserved otherwise (e.g. for sandbox or serial Ethernet gateway).

In order to **add a Siemens S7 as a device**, enter a name for it into the "Name" field and select "S7" from the "Type" drop-down list. Then select Connection type, Timeout (time after which the connection will be closed if no reply is received) and Polling interval as well as Rack and Slot of the S7.

Select for a TCP/IP connection the Connection "S7-TCP/IP" as well as the S7 type and enter the IP address under which the S7 can be accessed and the associated Port (standard: 102).

If you use an ACCON-NetLink-PRO compact adapter, select the Connection "S7-NetLink-PRO" and enter its IP address and the PLC address as well as the Netlink bus address. If the bus parameter auto detection is disabled (because there is not at least one participant on the bus that sends the parameters cyclically to the bus), transmission rate, highest node address and profile can also be configured. The user-defined profile allows to configure further parameters.

**Add the device** by clicking "OK".

In order to **disable devices temporarily**, deactivate the check box in the column "Active" in the list of devices.

In order to **edit devices**, click on the pencil symbol in front of the respective device.

In order to **delete devices**, click on the cross symbol in front of the respective device.

## 6.1.4 Elements

The elements for the Monitoring App are entered on this page. Possible elements are:

- Inputs and outputs of a fault monitor
- Objects of a Siemens S7 or LOGO!™ (e.g. digital and analogue inputs, digital outputs and flags, data blocks, function and cursor keys, shift registers, holding registers, function blocks, program and communication status)
- Modbus objects (bits, registers and communication status)
- Timer (recurrent timer, stop watch and time of day)
- Internal digital flags

The elements can be monitored in monitorings for a criterion. In order to add the inputs and outputs of the fault monitor or objects of a connected Siemens control or Modbus device, these must be added as devices before. Each added element will also be displayed on the "Status" page.

### Configuration via the web interface

In order to **add an element**, click in the "Setup application" menu on the "Elements" page on the "Add element" button.

In order to **add an object of a Siemens LOGO!™ as an element**, enter a name for it into the "Name" field and select "Logo" from the "Device" drop-down list. Then, select the device from which you want to add an object as an element from the next drop-down list. Use the further drop-down lists and entry fields to select the object and its instance that is to be added as an element.

In order to **add a Modbus object as an element**, enter a name for it into the "Name" field and select "Modbus" from the "Device" drop-down list. Then, select the device from which you want to add an object as an element from the next drop-down list. Use the further drop-down lists and entry fields to specify the object that is to be added as an element in detail.

In order to **add a timer as an element**, enter a name for it into the "Name" field and select "Timer" from the "Device" drop-down list. Then, select the timer type in the next drop-down list. Enter the run-time or time of this timer in the following entry fields then. You can now configure weekdays on which the timers are supposed to trigger now for timers of the type "time of day".

In order to **add an input or output of a fault monitor as an element**, enter a name for it into the "Name" field and select "IO" from the "Device" drop-down list. Then, select the device from which you want to add an input or output as an element from the next drop-down list. Use the further drop-down list and the entry field to select an input or an output and its instance.

In order to **add a flag as an element**, enter a name for it into the "Name" field and select "Flag" from the "Device" drop-down list.

In order to **add an object of a Siemens S7 as an element**, enter a name for it into the "Name" field and select "S7" from the "Device" drop-down list. Then, select the device from which you want to add an object as an element from the next drop-down list. Use the further drop-down lists and entry fields to select the object and its instance that is to be added as an element.

**Add the element** by clicking "OK".

In order to **disable elements temporarily**, deactivate the check box in the column "Active" in the list of elements.

In order to **edit elements**, click on the pencil symbol in front of the respective element.

In order to **delete elements**, click on the cross symbol in front of the respective element.

## 6.1.5 Logic operations

The logic operations for the Monitoring App are entered on this page. A logic operation allows to combine at least two digital elements logically with each other and output the result to at least one action element. Action elements are digital outputs, internal flags, the program status of a Siemens control S7 or LOGO!™ or Modbus elements of "Bit" type. A maximum of ten elements can be selected. AND, NAND, OR, NOR and XOR are available as operators. Only two elements must be combined with each other in case of an XOR operation.

### Configuration via the web interface

In order to **add a logic operation**, click in the "Setup application" menu on the "Logic operations" page on the "Add logic operation" button.

In order to **select the elements to be combined**, highlight the respective elements in the "Source" list and click on the arrow down button.

In order to **define the logic operator**, select this in the drop-down list under "Operator".

In order to **select the target element(s)**, highlight the respective elements in the "Target" list and click on the arrow down button.

- ① You can select several elements at once using the "Ctrl" key. You may also select the elements individually.

In order to **remove an element from source or target again**, highlight the respective element and click on the arrow up button.

**Add the logic operation** by clicking "OK".

In order to **disable a logic operation temporarily**, deactivate the check box in the column "Active" in the list of logic operations.

In order to **edit a logic operation**, click on the pencil symbol in front of the respective logic operation.

In order to **delete a logic operation**, click on the cross symbol in front of the respective logic operation.

## 6.1.6 Recipients

The recipients for the Monitoring App are entered on this page. Recipients can be phone numbers, e-mail addresses or server connections (to Cloud of Things or Cumulocity cloud or an MQTT broker). They can be used in monitoring operations and actions.

A recipient with a phone number can be used in a monitoring to trigger an action upon receipt of an SMS from this recipient; it can also be used in an action to send an SMS to this recipient upon occurrence of a monitored event.

A recipient with an e-mail address can be used in an action to send an e-mail to this recipient upon occurrence of a monitored event.

It is also prerequisite for this to configure the router accordingly for dispatching e-mails or dispatching and receiving SMS messages. Refer to the "Messages" section in the manual of the respective router for details.

A Cloud of Things or Cumulocity server as recipient can be used in an action to trigger a server feed of the type alarm, event or measurement to this service upon occurrence of a monitored event.

An MQTT broker as recipient can be used in a monitoring to trigger an action upon receipt of an MQTT message from this recipient; it can also be used in an action to send an MQTT message to this recipient upon occurrence of a monitored event.

### Configuration via the web interface

In order to **add an e-mail recipient**, click in the "Setup application" menu on the "Recipients" page on the "Add recipient" button. Enter a name for it into the "Name" field, select the type "E-mail" and enter the e-mail address into the "E-mail" field.

In order to **add a mobile phone recipient**, click on the "Add recipient" button. Enter a name for it into the "Name" field, select the type "Mobile phone" and enter the phone number into the "Phone" field.

- ⓘ Incoming SMS from a created recipient are only evaluated correctly, if the phone number is exactly specified as it is transmitted with the SMS by the provider (usually in the form „+491721234567“).



In order to **add a Cumulocity or Cloud of Things recipient**, click on the "Add recipient" button. Enter a name for it into the "Name" field and select the respective service as "Type". Select the transmission protocol using the radio buttons "http" or "https" (increased traffic with encrypted connection). Then, specify the server URL as well as the device name. If self-registration to the cloud service is intended, the respective checkbox must be checked. Then, the access data distinct for the device (user, password and device ID) will be retrieved automatically. The serial number of the router must be entered in the device management of the cloud service in advance for this.

In order to retrieve a new device ID from the cloud service, self-registration must be disabled and no device ID must be entered. In addition, the access data to the cloud server (user and password) must be entered.

If an ID for this device already exists, this must be entered here. In addition, the access data to the cloud server (user and password) must be entered.

In order to **add an MQTT broker as recipient**, click on the "Add recipient" button. Enter a name for it into the "Name" field, select the MQTT broker as "Type" and enter server URL and server port (usually 1883 or 8883) into the respective fields. All other settings are optional and depend on the broker. Display the help text in the web interface for more information about this.

**Add the recipient** by clicking "OK".

In order to **disable a recipient temporarily**, deactivate the check box in the column "Active" in the list of recipients.

In order to **edit recipients**, click on the pencil symbol in front of the respective recipient.

In order to **delete recipients**, click on the cross symbol in front of the respective recipient.

## 6.1.7 Monitoring Operations

The monitoring operations are defined on this page. They define criteria for created elements or messages that must become true to trigger an action. The following monitoring operations are possible:

- Change of the inputs and outputs by opening, closing pulsing or toggling (change of the current state)
  - Basic = connection to GND for at least 4 seconds
  - Pulses = closing and opening in a sequence with a duration of 0.2 ... 3 seconds per closing and opening edge and a final pause of 4 seconds following the last pulse
- Changes of digital objects of the Siemens control (input, output, flag, function and cursor keys, shift registers, program and communication status)
- Exceeding or falling below of limits by analogue objects of the Siemens control (input, output, flag, function block, data block)
- Changes of digital or analogue Modbus objects (bits, registers and communication status)
- Exceeding or falling below of limits by analogue Modbus objects (registers)
- Change of the status of an internal flag
- expiry of a timer
- Incoming SMS or e-mailmessages with a freely configurable text
- Subscribed message of an MQTT broker with a certain topic and a freely configurable text
- Start of the Monitoring App with device start

If a monitoring is assigned to an action, the assigned action will be executed upon the occurrence of the monitoring criterion. All elements and messages can be used several times in monitorings.

### Configuration via the web interface

In order to **add a monitoring**, click in the "Monitoring" menu on the "Add monitoring" button.

In order to **monitor an element**, enter a name for it into the "Name" field and select "Element" from the "Source" drop-down list. Use the further drop-down lists and entry fields to specify the monitoring in detail.

In order to **monitor a message**, enter a name for it into the "Name" field and select "Message" from the "Source" drop-down list. Select the sender(s) of the message using the ">>" and "<<" buttons and enter the message text that the message must contain to trigger an action. Capitalisation will be considered here. In case of SMS messages, the actual text may be longer than the text defined here. This means that only the characters defined here are evaluated and the subsequent characters will be ignored.

In order to **monitor an MQTT message**, enter a name for it into the "Name" field and select "Server message" from the "Source" drop-down list. Select the MQTT broker from the drop-down list "Server" and enter the topic of the MQTT message that the message must contain to trigger an action. You can enter a text in the "Message" field optionally that serves as another filter for triggering. Capitalisation will be considered here. Select the same Quality-of-Service level from the drop-down list "QoS" that is also used by the MQTT broker.

- ① Topics are structured hierarchically and use slash (/) as level separator. The following wildcards can be used in topics:
  - + replaces a level as in "factory/+ /temperature"
  - # replaces all following levels as in "devices/#"

In order to **monitor the start of the Monitoring App**, enter a name for it into the "Name" field and select the entry "Application start" from the "Source" drop-down list. This monitoring will only be triggered with the start of the Monitoring App during a device start.

**Add the monitoring** by clicking "OK".

In order to **disable a monitoring temporarily**, deactivate the check box in the column "Active" in the list of monitored elements.

In order to **edit a monitoring**, click on the pencil symbol in front of the respective monitoring.

In order to **delete a monitoring**, click on the cross symbol in front of the respective monitoring.

## 6.1.8 Actions

The actions for the Monitoring App are entered on this page. Actions are executed, if the criterion of an assigned monitoring is fulfilled. An action can be assigned to several monitoring operations.

Possible actions are:

- Switching the digital outputs  
open = connection between OUTx and OUTxNO, no connection between OUTx And OUTxNC  
close = connection between OUTx and OUTxNC, no connection between OUTx and OUTxNO  
x pulse(s) = opening and closing x-times in a sequence each with a duration of 1 second  
toggle = change of the current state
- Starting or stopping a Siemens LOGO!™ program via an element of "PS" type (up to version 0BA7)
- Setting objects of a Siemens control of type Typ S7 or LOGO!™ (from version 0BA8)
- Setting digital or analogue Modbus objects (bits, registers)
- Setting internal flags
- Starting and resetting timers of "Stop watch" type
- HTTP call of an URL under specification of port, user name, password and actual values
- Message dispatch via SMS or e-mail
- Dispatching a server feed to a Cumulocity or Cloud of Things service
- dispatch (publish) of server feeds to an MQTT broker

Message texts, HTTP calls as well as alarm and event texts in server feeds may contain variables and their actual value will be inserted.

The syntax for a variable in the message text is as follows:

**\$[<format>\_]<element>**

The following applies for this:

**<format>** = d for indication as decimal number (default, if not specified at all)

x for indication as hexadecimal number

b for indication as binary number

t for a timer

l for a timer of a Siemens LOGO!™

(on-delay, off-delay, retentive on-delay, wiping relay (pulse output), pulse generator, on/off-delay, random generator, stairway lighting switch, multiple function switch, edge-triggered wiping relay, PWM (PT timer))

**<element>** = the exact name of the element as specified during creation; if the name contains a blank or is directly followed by a character, it must be placed in brackets

Furthermore, the following variables are available for actual values: **\$TIME** for the system time, **\$TIMESTAMP** for the system time (in seconds since 01.01.1970 in UTC), **\$DATE** for the system date, **\$UPTIME** for the system run-time, **\$LOCATION** for the location of the router (must be configured in the router) , **\$SERIALNUMBER** for the serial number of the router, **\$MAC\_ADDRESS** for the MAC address of the router and **\$SIGNAL** for the signal strength of the router.

All variables are case-sensitive.

Examples for a message text with variables (it is prerequisite that respective elements with these names (e.g. „IN\_1“ or „OUT 2“) have been created first):

"Input 1 (name of the element "IN\_1") has the decimal value **\$IN\_1**"

"Output 2 ("OUT\_2") has the binary value **\$b\_(OUT 2)** "

"The digital flag 13 of the LOGO ("LOGO\_M\_13") has the hex value **\$x\_LOGO\_M\_13**"

"The analogue output 3 of the LOGO ("LOGO\_AQ\_3") has the binary value **\$b\_LOGO\_AQ\_3**"

"The status of the LOGO program ("LOGO PS") is **\$(LOGO PS)** "

"Bit 13, register 23 of the Modbus device ("MB\_23\_13") has the hex value **\$x\_MB\_23\_13**"

"Register 7 of the Modbus device ("Modbus Register 7") has the binary value **\$b\_(Modbus Register 7)** "

"The communication status of the Modbus device ("MB\_CS") is **\$MB\_CS**"

### Configuration via the web interface

In order to **add an action**, click in the "Actions" menu on the "Definitions" page on the "Add action" button.

In order to **add an action based on an element**, enter a name for it into the "Name" field and select "Element" from the "Target" drop-down list. Use the further drop-down lists and entry fields to specify the action in detail.

In order to **add an action in form of a message**, enter a name for it into the "Name" field and select "Message" from the "Target" drop-down list. Select the recipient(s) of the message using the ">>" and "<<" buttons and enter the message text.

- ① If the message is sent as SMS, only the first 140 characters will be transmitted.

In order to **add an action in form of an HTTP call**, enter a name for it into the "Name" field and select "HTTP" from the "Target" drop-down list. Enter URL, port, user name (optional) and password (optional) that are to be passed on into the following entry fields.

- ① In order to determine the composition of an URL string, programs like Wireshark or the Firefox add-on Live HTTP Headers may be helpful.

In order to **add an action in form of a server feed for transmitting measured values**, enter a name for it into the "Name" field and select "Server feed" from the "Target" drop-down list. Select the cloud service as recipient from the "Recipient" drop-down list. Then, select in the "Target" drop-down list the entry "Measurements". Enter the host name of the respective chart into the field "Chart name". Enter an attribute into the "Type" field that can be used by downstream applications to distinguish the value. A unit for the chart can optionally be entered into the "Unit" field. Select the elements to be transferred using the buttons ">>" and "<<".

In order to **add an action in form of a server feed for transmitting alarm messages**, enter a name for it into the "Name" field and select "Server feed" from the "Target" drop-down list. Select the cloud service as recipient from the "Recipient" drop-down list. Then, select in the "Target" drop-down list the entry "Alarm". Enter the alarm text into the entry field "Alarm text". Enter an attribute into the "Type" field that can be used to group alarm messages. Select the severity of the alarm messages from the "Severity" drop-down list.

In order to **add an action in form of a server feed for transmitting events**, enter a name for it into the "Name" field and select "Server feed" from the "Target" drop-down list. Select the cloud service as recipient from the "Recipient" drop-down list. Then, select in the "Target" drop-down list the entry "Event". Enter the event text into the entry field "Event text". Enter an attribute into the "Type" field that can be used by downstream applications to distinguish the event.

In order to **add an action in form of a server feed to an MQTT broker**, enter a name for it into the "Name" field and select "Server feed" from the "Target" drop-down list. Select the MQTT broker as recipient from the "Recipient" drop-down list. Enter the topic of the MQTT message into the "Topic" field and the content in the "Message" field. If the checkbox "Retain" is checked, the last content will be stored by the MQTT broker and delivered to MQTT subscribers even if the connection to the publisher has been lost. Select the same Quality-of-Service level from the drop-down list "QoS" that is also used by the MQTT broker. Display the help text in the web interface for more information about this.

**Add the action** by clicking "OK".

In order to **disable actions temporarily**, deactivate the check box in the column "Active" in the list of actions.

In order to **edit actions**, click on the pencil symbol in front of the respective action.

In order to **delete actions**, click on the cross symbol in front of the respective action.

## 6.1.9 Assignments

The assignments for the Monitoring App are entered on this page. Assignments are used to combine created monitorings and created actions. If the monitoring contained in the assignment meets its criterion, the action contained in it will be triggered. It is possible to assign several actions to the same monitoring and vice versa.

### Configuration via the web interface

In order to **add an assignment**, click in the "Actions" menu on the "Assignments" page on the "Add assignment" button. Select the respective monitoring and the action to be assigned in the drop-down lists.

**Add the assignment** by clicking "OK".

In order to **disable an assignment temporarily**, deactivate the check box in the column "Active" in the list of assignments.

In order to **edit an assignment**, click on the pencil symbol in front of the respective assignment.

In order to **delete an assignment**, click on the cross symbol in front of the respective assignment.

## 6.1.10 System

### 6.1.10.1 System data

The version of the Monitoring App is displayed here. Moreover, a log file can be displayed, which contains the fulfilment of monitoring criteria, execution of actions, communication failures and start of applications. The log file will be deleted, if the monitoring application is reset.

#### Configuration via the web interface

In order to **display the log file**, click in the "System" menu on the "System data" page on the link "Show log file".

### 6.1.10.2 Reset

You have the possibility to reset the Monitoring App to default settings as well as delete additionally installed wizards or the message buffer here. When resetting, all defined devices, elements, logic operations, contacts, monitoring operations, actions and assignments will be deleted. The default settings of the router remain untouched. When deleting the wizards, only the additionally installed wizards will be deleted.

#### Configuration via the web interface

In order to **reset the Monitoring App**, check the checkbox "Reset monitoring settings" and click on "OK".

In order to **delete the wizards**, check the checkbox "Delete additionally installed wizards" and click on "OK".

In order to **delete the message buffer**, check the checkbox "Delete message buffer" and click on "OK".

### 6.1.10.3 Update

Saved configurations of the Monitoring App can be uploaded as a database here. The current settings are overwritten with this. The default settings of the router remain untouched. It is also possible to upload the dashboard configuration here.

#### Configuration via the web interface

In order to **upload the configuration**, Select in the "System" menu on the "Update" page the "Search..." button and select the desired file. Click on "OK" then to upload the settings. Click on "OK" again after the upload to overwrite the settings.

- ❗ Configuration files of different routers are not compatible. Configuration files of version 1.x of the Monitoring App are not compatible with those of version 2.x.



#### 6.1.10.4 Download

The settings of the Monitoring App can be downloaded and saved as database on this page. The basic settings of the router are not taken into account with this. It is also possible to download the message buffer, the dashboard configuration as well as the stored log files.

##### Configuration via the web interface

In order to **download the settings**, click in the "System" menu on the "Download" page on the link "Configuration database". The browser will prompt you to save the file.

In order to **download the message buffer**, click on the link "Dashboard Message buffer". The browser will prompt you to save the file.

In order to **download the dashboard configuration**, click on the link "Dashboard configuration". The browser will prompt you to save the file.

In order to **download the log file**, right-click on the link "Log file". Then, select in context menu "Save target as..." (depending on browser) to store the file.

#### 6.1.10.5 Licenses

The licenses for the individual monitoring packages of the Monitoring App are displayed under devices on this page. The IOs that are only provided by the IMON are also displayed here. The options for the transmission of the application data are listed under Recipients An activated monitoring package or available data transmission option are indicated by a green checkmark. New monitoring packages can be activated by entering a license key.

##### Configuration via the web interface

In order to **activate a license**, enter in the "System" menu on the "Licenses" page the license key into the "Activate new license" field.

 Transfer the content of the text file using Copy & Paste for this.

**Activate the license** by clicking "OK".

## 6.1.11 Wizards

Wizards support the user when configuring common monitoring functions.

The wizards enable the setting of all parameters of a common monitoring function, like dispatching an SMS when closing an input for example, on one configuration page. If additional router or e-mail settings on the router are to be configured by the wizard, this can be achieved by checking the respective checkbox. After the wizard has been executed, a summary with useful details will be displayed.

INSYS will provide further wizards in future that can be imported here.

### Configuration via the web interface

In order to **start a wizard**, click in the "Wizards" menu on the "Wizards" page on the respective wizard.

In order to **display information about a wizard**, click on the question mark behind the respective wizard.

In order to **import a wizard**, click on the "Browse..." button and select the desired file. Click on "OK" then to upload the wizard.

- ① If a wizard with an identical name will be uploaded to the router, the wizard with the same name that has been stored there before will be overwritten.

## 7 FAQ

You'll find a few frequently asked Questions (FAQ) in the following that deal with issues that might arise during the general use of the Monitoring App.

### 7.1 Cloud Services

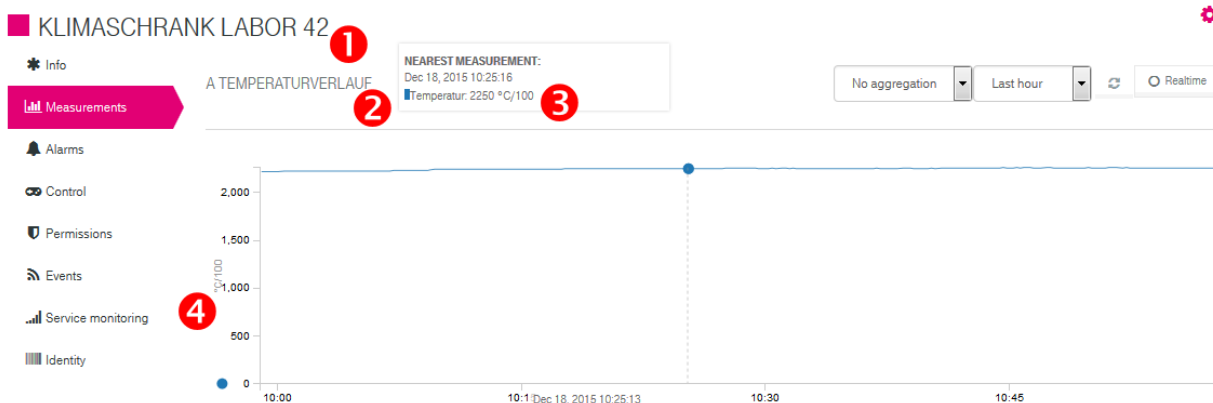
#### 7.1.1 How to get measuring data into the cloud service?

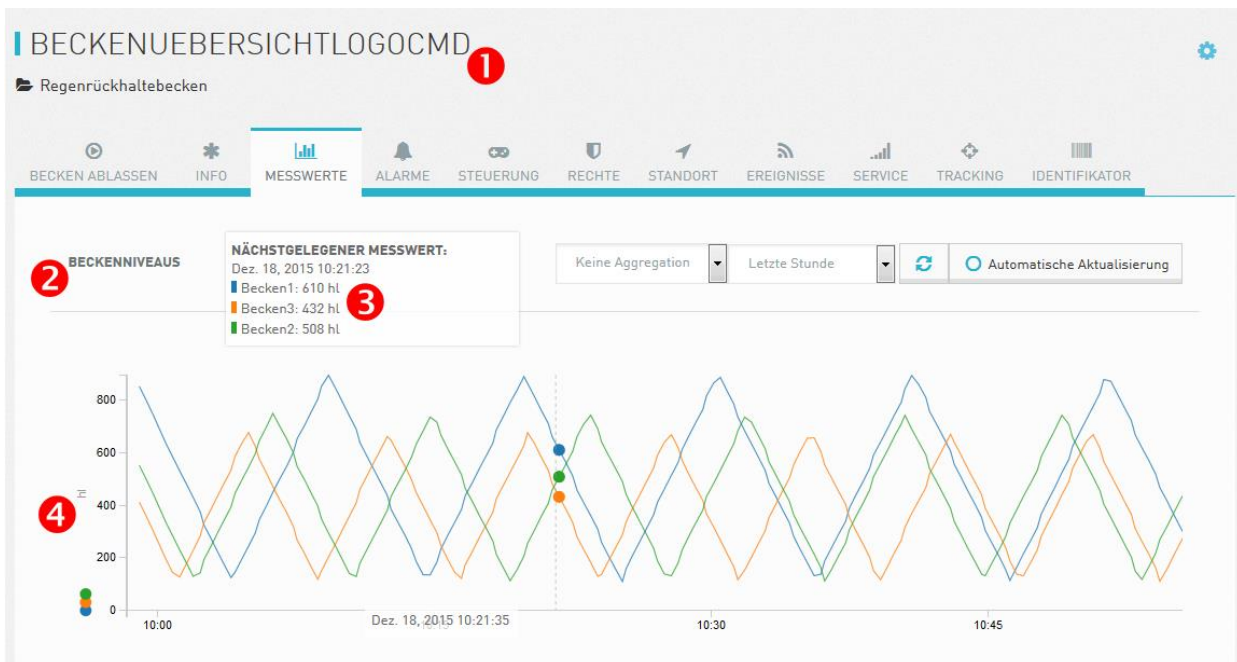
The Monitoring App permits to upload measuring data to a cloud server for services like Cumulocity Cloud or Telekom Cloud of Things. You'll find a description of the proceeding for this in the respective Configuration Guides that can be downloaded on the INSYS icom website under Support and Downloads -> Configuration Guides ([www.insys-icom.com/cg/](http://www.insys-icom.com/cg/)).

#### 7.1.2 How to configure the measuring data appearing in the cloud service?

The data visualised on a cloud server are configured with different parameters in the Monitoring App.

The following screenshots of the Cumulocity Cloud and Telekom Cloud of Things show the parameters that can be configured in the Monitoring App.





- ❶ Is configured in Setup application -> Recipients -> Device name (can be edited in cloud service)
- ❷ Is configured in Actions -> Definitions -> Chart name
- ❸ Is configured in Setup application -> Elements -> Name
- ❹ Is configured in Actions -> Definitions -> Unit

The cloud services permit to download an Excel file (gear symbol). A part of the data contained in this file are also configured in the Monitoring App.

The file name of the Excel file contains the chart name as well. This is configured in Actions -> Definitions -> Chart name.

"time" column: Time stamp of the measuring value

"source" column: ID generated by the cloud service during registration

"type" column: Is configured in Actions -> Definitions -> Type. Can be used by downstream applications for differentiation of the measuring values.

"fragment" column: Is configured in Actions -> Definitions -> Chart name

"serie" column: Is configured in Setup application -> Elements -> Name

"value" column: The value of the element read out (measured value)

"unit" column: Is configured in Actions -> Definitions -> Unit

	A	B	C	D	E	F	G
1	time	source	type	fragment	serie	value	unit
2	2015-12-15T14:34:58.0	16944	Temp	A Temperaturverlauf	Temperatur	2244	°C/100
3	2015-12-15T14:35:10.0	16944	Temp	A Temperaturverlauf	Temperatur	2244	°C/100
4	2015-12-15T14:35:33.0	16944	Temp	A Temperaturverlauf	Temperatur	2244	°C/100
5	2015-12-15T14:35:46.0	16944	Temp	A Temperaturverlauf	Temperatur	2244	°C/100
6	2015-12-15T14:35:59.0	16944	Temp	A Temperaturverlauf	Temperatur	2244	°C/100
7	2015-12-15T14:36:12.0	16944	Temp	A Temperaturverlauf	Temperatur	2244	°C/100

### 7.1.3 Why are entries in the cloud service not shown correctly?

It may happen for some entries in the Monitoring App that they are not represented as expected in the cloud service (e.g. the chart name; item 2 above). In this case, try to do without special characters like a period or several capitals in a row.

### 7.1.4 Why are server feeds not dispatched?

If certain server feeds configured in the Monitoring App do not arrive, it is recommended to have a look at the log file (System -> System data). If the messages: **MESSAGED: action 'Feed-Name' failed** und **MESSAGED: received error message form server: {"error": "Failed to parse JSON string"}** appear there, you should check the length of the name of the elements that have been selected for this server feed. These should not exceed 19 characters.

### 7.1.5 How does self registration work?

The self-registration function of the device allows an automated retrieval of access data distinct for the device (user, password and device ID) from the cloud service. This has the benefit that the technician who sets up the device in the field does not need access data to the cloud service any longer. Moreover, access data to the cloud services can be changed later without having to modify the configuration of the devices.

The self-registration requires to enter the serial number of the router on the device management page of the cloud provider (Telekom Cloud of Things, Cumulocity) under the menu item device registration/registration. As soon as the cloud service is added as a recipient in the Monitoring App, the router will retrieve the access data to the cloud service automatically via it's serial number. The registration request of the device must then only be accepted in the cloud service.

## 7.2 Message Dispatch and Receipt

### 7.2.1 SMS will not be sent! Where to configure SMS dispatch?

In order to be able to send an SMS by the Monitoring App, SMS dispatch must be configured in the router. The following settings are necessary for this:

Service Center Number (SCN):

If the SCN cannot be read from the SIM card, this must be entered manually on the page Messages -> Configuration (confirm with OK). You can take the SCN from your contract details or request from your provider.

Activate SMS messages:

In order to be able to send an SMS by the Monitoring App, SMS messages must be activated on the page Messages -> SMS (confirm with OK).

### 7.2.2 SMS is not received! Where to configure SMS receipt?

In order to be able to receive an SMS by the Monitoring App, SMS reception must be configured in the router. The following settings are necessary for this:

Activate SMS reception:

In order to be able to receive an SMS by the Monitoring App, SMS reception must be activated on the page Messages -> Configuration (confirm with OK).

### 7.2.3 E-mail will not be sent! Where to configure e-mail dispatch?

In order to be able to send an e-mail by the Monitoring App, e-mail dispatch must be configured in the router. The following settings are necessary for this:

E-mail account:

In order to send messages via e-mail, an e-mail account must be configured in the router on the page Messages -> Configuration (confirm with OK). You'll get the exact data for your e-mail account from your e-mail provider.

Activate e-mail messages:

In order to be able to send an e-mail by the Monitoring App, e-mail messages must be activated on the page Messages -> E-mail (confirm with OK).

### 7.2.4 Why is an incoming message not recognised?

If an incoming message is not recognised, i.e. the monitoring for the receipt of this message does not trigger, the content of the message must be examined thoroughly. Typos, different capitalisation or some special characters can be the reason that a message will not be recognised.

## 7.3 HTTP Calls

### 7.3.1 How to determine the URL string for an HTTP call?

When defining an action as HTTP call, a URL string must be handed over that triggers an entry in the web interface of the router then for example.

The URL string is composed of the address of the page and the element to be manipulated:

```
http://<address>/<page>?<elementname>=<value>
```


In order to activate dial-out for example, the following URL string is necessary:

```
http://192.168.1.1/cgi_c_dialout?start_dialout=1
```

<address> and <page> can be taken from the address bar of the browser when opening the page.

The <elementname> can be found out using Wireshark, the Firefox add-on Live HTTP Headers or the developer tools of Firefox for example.

<value> is the value that is to be handed over to the element.

In order to find out the element, open in Firefox on the web interface page the developer tools using the F12 key and select the tool  (Select element). Then, click on the respective input element on the website to highlight the respective line in the source code.

```

▼ <tr>
  <td>Dial-Out aktivieren</td>
  ▼ <td>
    <input name="start_dialout" value="1" checked="" type="radio"></input>
    Ja
  </td>
</tr>
▼ <tr>

```

## 7.4 Dashboard

### 7.4.1 Why does the dashboard respond slowly or not at all to inputs?

Delays during entering can be caused by the browser used. We recommend to use an alternative browser.

### 7.4.2 Why don't I see my changes in the dashboard?

This can be caused by the browser which loads the dashboard page from its cache memory. We recommend to delete the browser cache or reload the page using function key F5 (for common browsers).

### 7.4.3 How can I display content in HTML format?

The HTML widget permits the display of content in HTML format. However, it is not possible here to access variables of the Monitoring App.

#### 7.4.4 How can I display content in JavaScript format?

All widgets permit the display of content in JavaScript. The script can easily be edited in the JS Editor of the widget configuration. This also permits computations of an element of the Monitoring App for example. The notation of the elements must be observed with this. The following script output the double value of the timer Timer1 for example:

```
return (datasources["Monitoring"].Timer1 * 2);
```

#### 7.4.5 Why can't I display JavaScript in a sparkline widget?

The sparkline widget does not permit to display JavaScript content. Sparkline widgets added with JavaScript can neither be edited nor deleted afterwards. Only the complete pane containing the widget can be deleted.

It is recommended as workaround to use the text widget with the function "Include Sparkline" for JavaScript content. It is also possible to add a text widget with the JavaScript content first and change the type of this widget to sparkline then.



