



USER'S

MANUAL

KNXer

KNX IP gateway

Device Manipulation

December 2017

Revision Sheet

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USER'S MANUAL

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1 GENERAL INFORMATION

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1.1 System Overview

The KNXer is intended to establish the connection between IP medium and KNX TP networks. The main purpose is to serve as a Gateway between IP and KNX, providing a secured interface for accessing the KNX installation from devices which only implement IP. It is designed to work with Makel's SmartHome mobile application for Android and IOs as the user interface:



<https://play.google.com/store/apps/details?id=tr.makel.smarthome>



<https://itunes.apple.com/us/app/makel-smarthome/id1240225211?mt=8>

When using Makel's **SmartHome** application the KNXer serves as a centralized configuration server; the project should be defined by using **SmartHomeConfig** application which will load the project into the KNXer; connecting clients will load the configurations from the KNXer. The most up-to-date version on **SmartHomeConfig** is usually found in:

<http://88.249.230.57/smarthomeconfig.html>

Alternatively to the Makel's **SmartHome** Application, TPC/IP with SSL encryption socket communication protocol is available; also "RESTful like" API is available for more tailored user interface developments.

KNXer is not intended to be a replacement of KNX IP router devices, as it won't apply the routing algorithms from KNX at the same time it is acting as smart home server. It can however be temporarily switched to KNX IP Router.

1.2 Makel SmartHome Ecosystem

There's a comprehensive set of applications and hardware that constitute Makel's SmartHome basic ecosystem:

Element	Type	Purpose
KNXer	Hardware	<i>Gateway between IP and KNX; Server for other smarthome tools (SIP server, messaging server, automated tasks, ...); This device is the center of whole ecosystem.</i>
KNXer service	Software	<i>Low-level KNX stack. Serves the KnxHomeServer</i>
KnxHomeServer service	Software	<i>Implements the TCP/IP (SSL) protocol; serves all the user interfaces.</i>
Asterisk server	Software	<i>SIP server; third-party software, official web-site https://www.asterisk.org/</i>
SmartHome Web	Software	<i>Web interface served by the KNXer; can be used by user interface devices without mobile SmartHome App, but with browser.</i>
Messaging service	Software	<i>Internal messaging system. Allows different users of the same KNXer to instant message each-others with a built in service.</i>
SmartHomeConfig	Software (PC)	<i>Project design and development environment; Configures how the user interface is going to be displayed in the SmartHome mobile App.</i>
SmartHome App	Software (Android and IOS)	<i>User interface application which allows interaction with the underlying automated building via KNXer.</i>

1.3 Minimum requirements

SmartHomeConfig	<i>Java JRE 1.8 (or higher)</i>
IOS SmartHome	<i>IOS 9 (or higher)</i>
Android SmartHome	<i>Android 4.0.3 (or higher)</i>
SmartHome Web	<i>Web-Browser with JavaScript, HTML4.0 (or higher)</i>

1.4 Acronyms and Abbreviations

CO	Communication Object
DPT	Data Point Type
EIB	European Installation Bus (former name to KNX; no longer in use)
GA	Group Address
IP	Internet Protocol
LAN	Local Area Network
WAN	Wide Area Network
SIP	Session Initiation Protocol

2 SYSTEM SUMMARY

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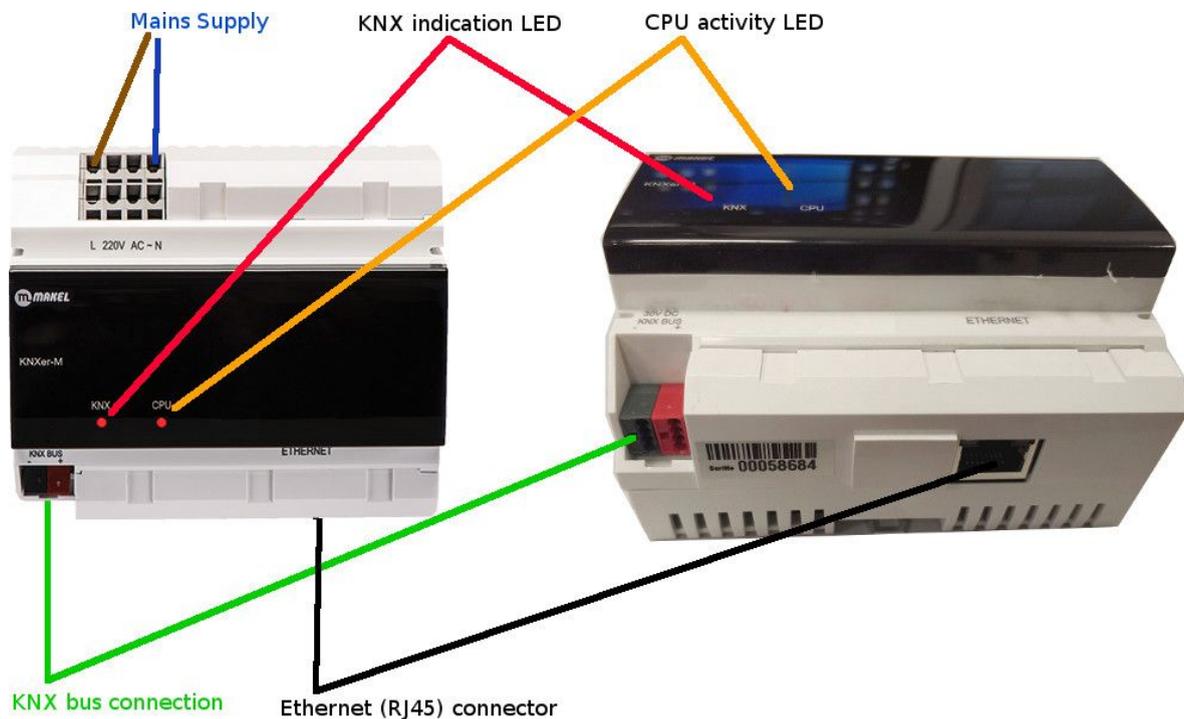


Figure 1: KNXer overview

2.1 Functions Overview

The KNXer acts as gateway and simultaneously as a server to various useful services for home and building automation. The key functionalities are:

- KNX <-> IP gateway;
- Access point for Makel's smarthome mobile apps;
- Serves Web User Interface;
- SIP server;
- Centralized task management;
- Centralized alarm management;
- Instant Messaging server;

The KNXer doesn't request from the bus the status every time the mobile apps request, this for decreasing the bus traffic; it keeps in memory the last received status and provides that to the mobile apps. The KNXer will request all the "Read" addresses from the bus just once, when the system first

starts; for avoiding bus saturation due *Read Requests* and *Read Responses* starting colliding, in the first “Read all” the *Read Requests* are placed with a interval between them for giving chance to the answering devices to submit their answers.

2.2 Licenses

Request information from Makel about the licenses before using the product.

3 GETTING STARTED

3 GETTING STARTED

3.1 Connecting for the first time

For first connection a direct connection between KNXer and a PC must be established using a ethernet (RJ45) cable.

1. the PC network settings must be changed to the following settings:

IP *10.X.Y.Z (eg.:10.0.8.84)*

Gateway *10.0.0.1*

Netmask *255.0.0.0*

***Network** *10.0.0.0*

2. Once this settings are changed in the PC connect the ethernet cable between both (PC and KNXer);
3. Power up your KNXer by plugging the power cord to the mains and wait around 1 minute for letting the system to boot (follow to the next section [3.2](#));

3.2 Setting up the IP

Ex-factory the device is delivered with a static IP configured: **10.0.8.83**; This address must be changed to some address suitable to the network in which it will be installed. Normally it is desired to set it to static IP on the LAN, and outside of the DHCP pool¹. If the IP was previously changed use it instead (in the instruction replace 10.0.8.83 with the current IP).

4. In your PC's preferred browser, browse the following link <http://10.0.8.83:8081/admin/>²
5. A login page is going to be presented:



Default credentials

Login: root

Password: makelroot

Figure 2: Login page

¹ If you have doubts of which IP you should chose, you should look into the network's router and search for the DHCP range (the way of doing this changes from router to router) and select an address outside of this range.

² The last '/' is important to be written.

- Once successful logged in, system stats are going to be displayed. Choose the tab for network configurations (see Figure below);



Figure 3: KNXer system status (home) page

- In the newly presented page the network settings for the KNXer can be performed. Most of the parameters are self explanatory and on-page help is available (see Figure below);

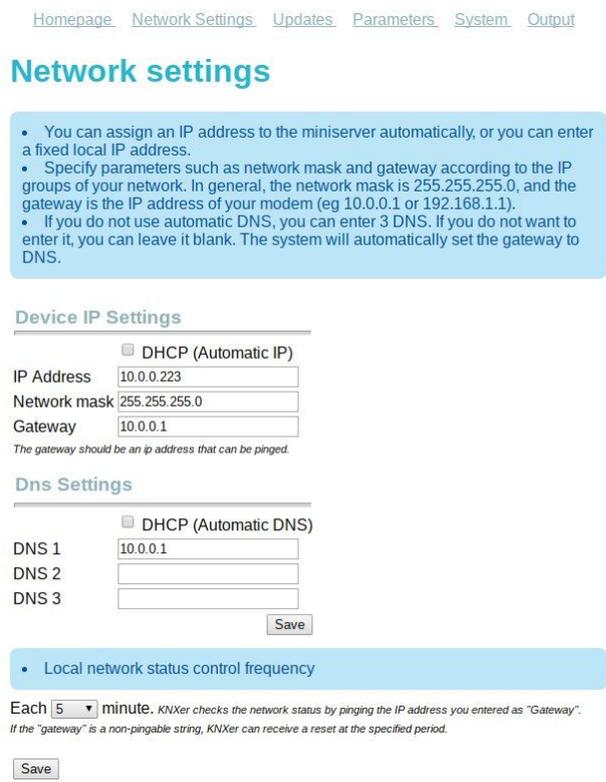


Figure 4: Network settings page of KNXer

8. Once the desired settings are implemented press “Save”;
9. Next time the system starts the new IP must be active. For confirming it, connect the KNXer to your router (network), power it by plugging the power cord, wait around a minute and try to access its administration page by browsing (in the PC) [http://\[NEW_GIVEN_IP\]:8081/admin/](http://[NEW_GIVEN_IP]:8081/admin/) ;

3.3 Project deployment

The setup and deployment of a project is done via **SmartHomeConfig** tool. This tool is provided free of charge (please refer to [1.1](#) for details on how to acquire it).

For details on how to use it please refer to [SMARTHOME CONFIGURATION](#).

4 SMARTHOME CONFIGURATION

4 SMARTHOME CONFIGURATION

In this section it will be described how to set up a new project for a SmartHome application. Keeping in mind that the project modelation is made in two separated steps:

1st - Project setup in ETS™:³ from this step the list of Group Addresses (GAs) and their role will result; these will be the input for the 2ns step;

2nd - Project setup in SmartHomeConfig: here the way the GAs and their functions are going to be displayed to the user are configured.

In this section just the **2nd step** is target of study. It's assumed the person responsible for creating the project as understanding in KNX systems: if terms like "Group Address" and "Data Point Type" are foreign to you, it is highly recommended you to first get education in KNX.

The setup and deployment of a project is done via **SmartHomeConfig** tool. This tool is provided free of charge (please refer to [1.1](#) for details on how to acquire it).

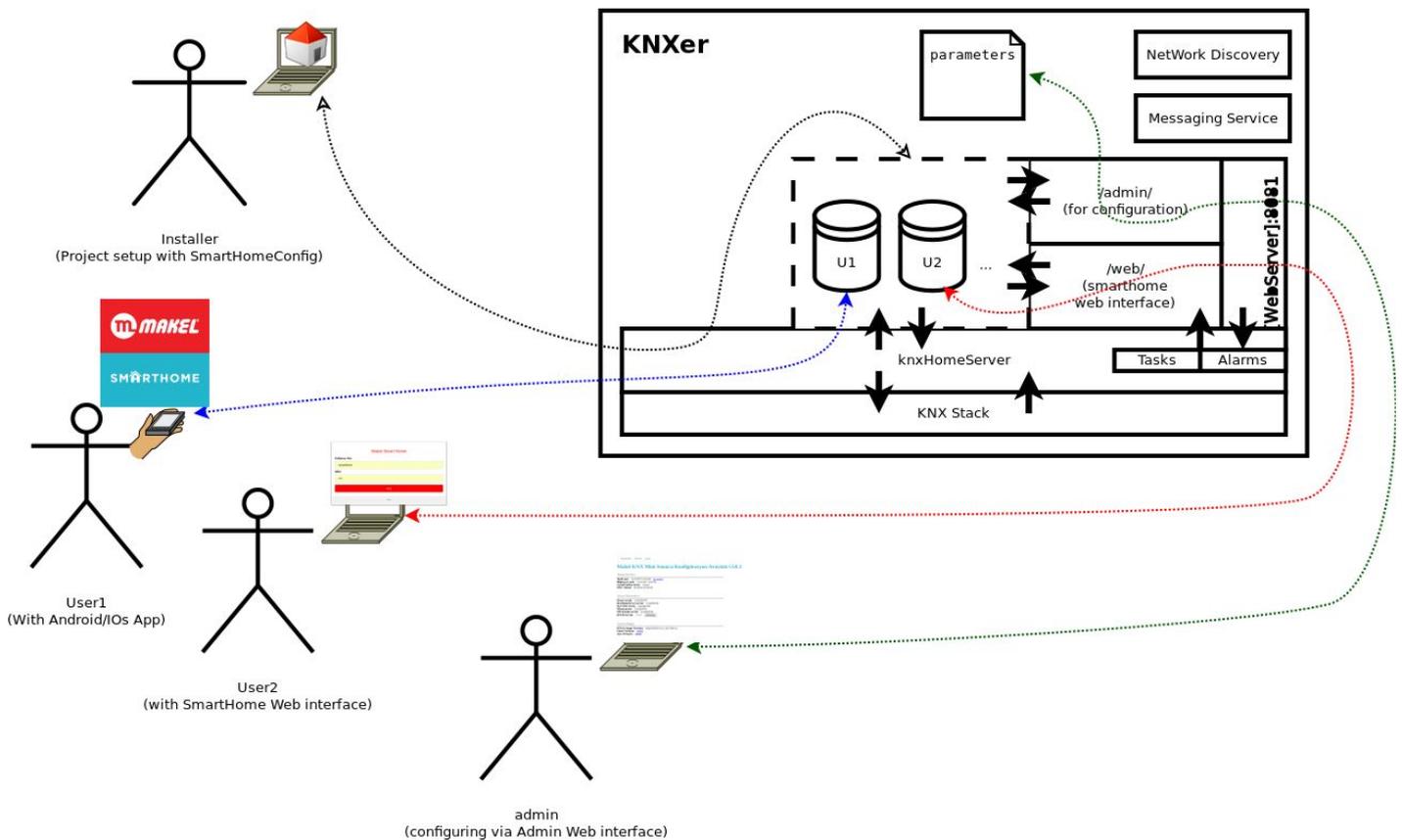


Figure X: Relational diagram of SmartHome ecosystem

³ This step won't be covered in this manual as it is itself target of a separated education provided by KNX Association accredited centers.

4.1 Creating a new Database

After opening **SmartHomeConfig**⁴ click in “File”-> “Create new Database” (as in the Figure below) and select a location and file name for keeping the project while it is being developed.

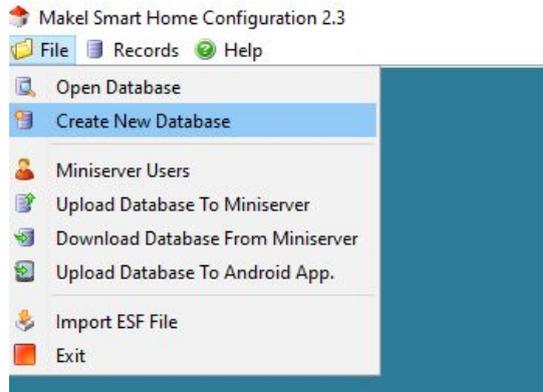


Figure 5: Creating a new Database for SmartHome configuration

4.2 Creating a KNX link device

A KNX link device is the description of how the KNX is reachable, usually via a KNXer. This serves the purpose of installations where multiple KNXers are installed. As it will be shown ahead, each device has its own KNX link device. In many cases all the devices will share the same KNX link.

1. In order to create a KNX Link Device, in the tool menu select “Records”-> “KNX Link Devices”;
2. In the new appearing form, right click in the empty area and select “New Record”;
3. Fill the dialog form with the details:

⁴ In Windows this is done by double clicking on the .exe; if on Linux, from the terminal call `java -jar SmartHomeConfig.jar`

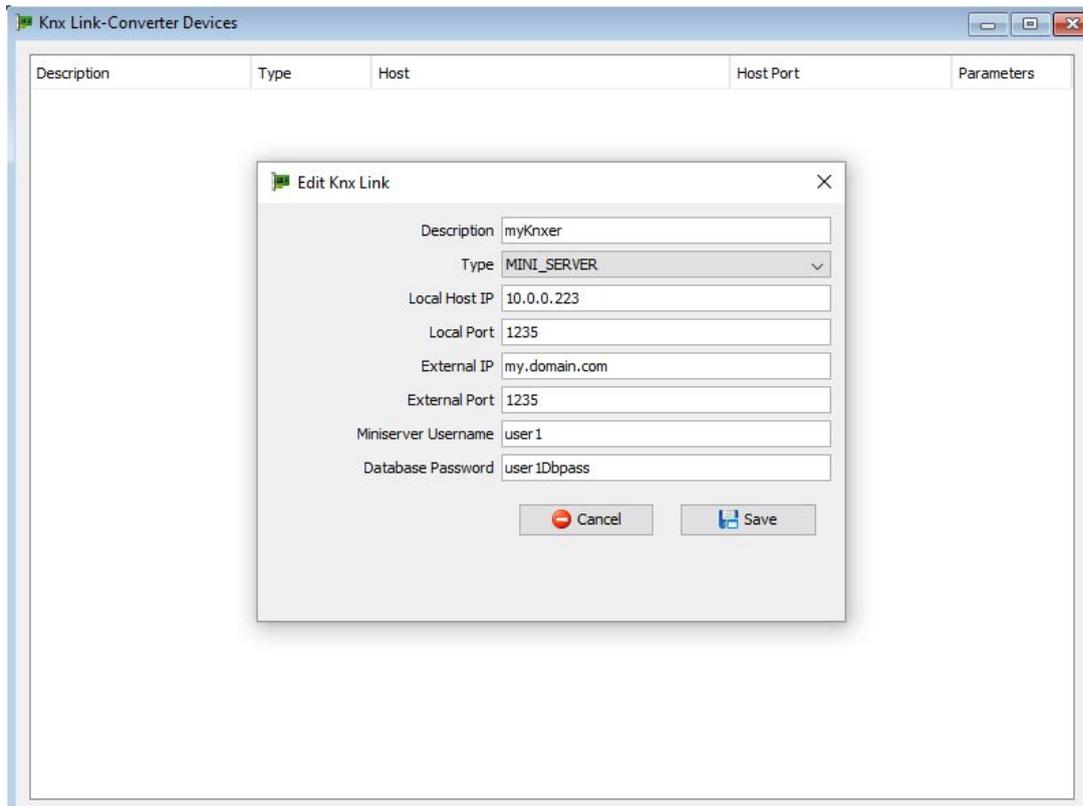


Figure X: Creating a new KNX link

- a. **Description:** the way KNX link will be identified within the SmartHomeConfig;
- b. **Type:** keep as MINI_SERVER;
- c. **Local Host IP:** the IP of the KNXer as set in [Setting up the IP](#);
- d. **Local Port:** set to 1235; the configured port of the SmartHomeServer;
- e. **External IP:** the fix external IP or hostname of the network;
- f. **External Port:** the external port as configured in the port forwarding in the network;
- g. **Miniserver username:** the username for this KNX link (one of the ones created in [Adding users to the project](#));
- h. **Miniserver user password:** the user pass for this KNX link (one of the ones created in [Adding users to the project](#));

4.3 Adding locations to the project

A location constitutes normally a building part which commonly includes a set of KNX devices or functions. For example, a living room may include 1 or more lamps, 1 or more thermostats, ...

When planning the user interface it must be defined the topology of the building (or building part) it's wanted to design. The design of the interface accents on the concept that some building part (physical or logical) may be included inside of other building part (physical or logical): for instance, inside of the **living room** (physical area) there may be the **dinning area** (logical) and the **sitting area** (logical); in this case **living room** is parent of **dinning area** and **sitting area**.

In order to create locations, which can contain KNX devices/functions:

4. In the toolbar select “Records”-> “Locations and Devices”;
5. A new form “Locations and Devices” will be displayed, on the empty area right click and select “Add location”;
6. In the dialog prompt give the name to the location as desired in the textbox **Location Name** to be displayed, and:
 - a. if desired to show the location in the main page of the “locations” menu of the user interface application, let **Parent Location** in its default “Parent Location”;



Figure 6: Creating new Location (no parent)

- b. if desired to make the location to be inside of other location, set **Parent Location** to the location which shall be its parent;⁵



Figure 7: Creating new Location with parent location

- c. Repeat for the desired locations, for example, adding “Sitting Area” to the “Living Room”;
7. Click “Save” and a configuration as in the next picture shall be obtained:

⁵ This is only possible if previously the parent location, in the Figure's example *Living Room*, was previously created.

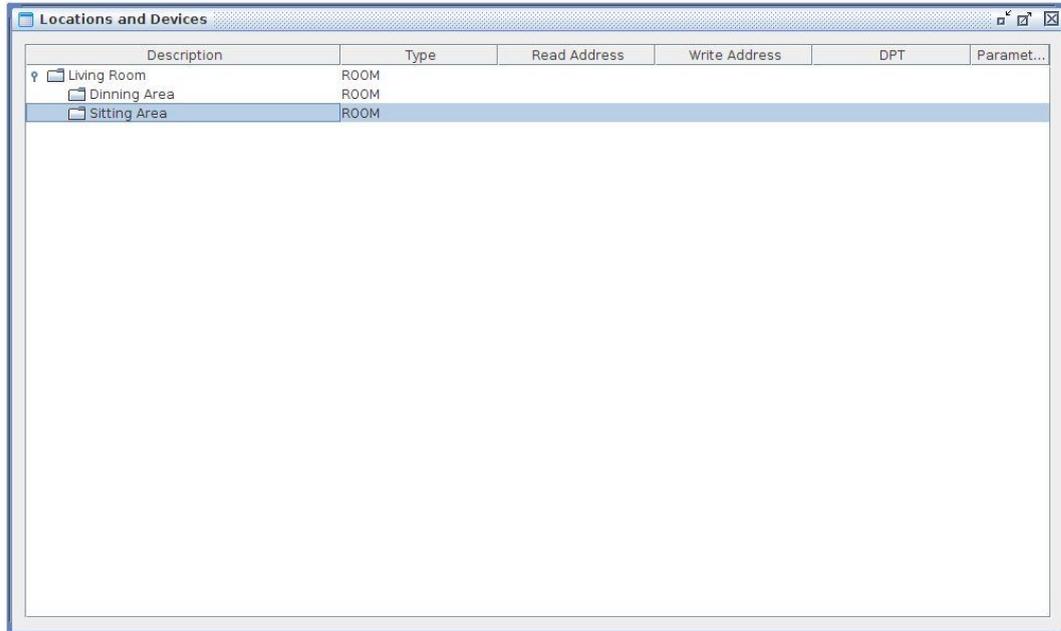


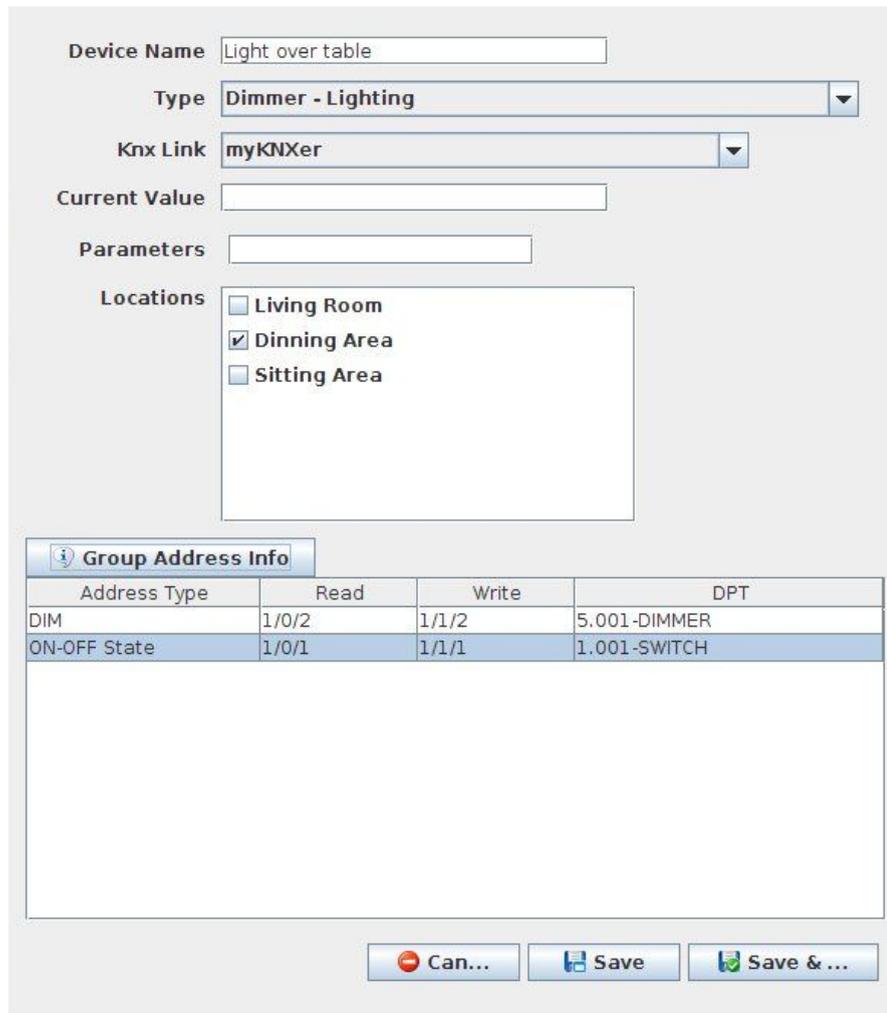
Figure 8: “Locations and Devices” form with two locations (one parent with one child)

4.4 Adding Devices to the project

In the project scope, a “device” is any set of functions that might be logically bounded to a device, for example, a thermostat includes functions as “changing setpoint”, “changing HVAC mode”, “changing fan speeds”, ...

A device must be added to a location (please refer to [Adding locations to the project](#)). In order to add a device:

1. In the toolbar select “Records”-> “Locations and Devices”;
2. A new form “Locations and Devices” will be displayed, on the empty area right click and select “Add device”;
3. Fill the presented dialog form with the details of the device is being created:



Device Name

Type

Knx Link

Current Value

Parameters

Locations

- Living Room
- Dinning Area
- Sitting Area

Group Address Info			
Address Type	Read	Write	DPT
DIM	1/0/2	1/1/2	5.001-DIMMER
ON-OFF State	1/0/1	1/1/1	1.001-SWITCH

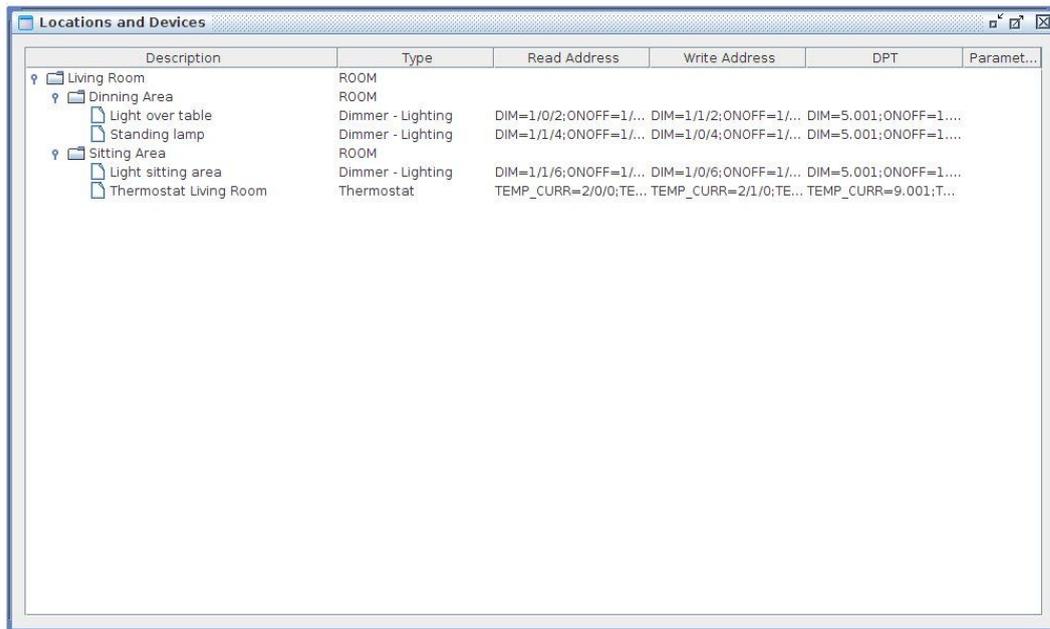
Can... Save Save & ...

Figure X: Device creation dialog form

- a. **Device Name:** the name of the device as to be shown in the user interface;
- b. **Type:** the type of the device that is being created;
- c. **KNX Link:** the KNX link device used to reach the Group Addresses that control the device (must have been created in [Creating a KNX link device](#));
- d. **Current Value:** !NOT IN USE! Let it blank (For future purpose);
- e. **Parameters:** depending on the type of the device selected has different meanings;
- f. **Locations:** here it can be selected under which locations the device must be displayed when using the user interface;
- g. **Group Addresses:** in this table, depending on the device type selected, a set of “Address Type” will be displayed with the fields “Read” and “Write” to be filled; in the “Read” parameter one must insert the Group address from which the feedback of

the “Address Type” can be obtained (if applicable); in the “Write” parameter on must insert the Group Address that controls the “Address Type” (if applicable);

4. Repeat for the desired devices functions;
5. Click “Save & Quit”;



Description	Type	Read Address	Write Address	DPT	Paramet...
Living Room	ROOM				
Dinning Area	ROOM				
Light over table	Dimmer - Lighting	DIM=1/0/2;ONOFF=1/...	DIM=1/1/2;ONOFF=1/...	DIM=5.001;ONOFF=1...	
Standing lamp	Dimmer - Lighting	DIM=1/1/4;ONOFF=1/...	DIM=1/0/4;ONOFF=1/...	DIM=5.001;ONOFF=1...	
Sitting Area	ROOM				
Light sitting area	Dimmer - Lighting	DIM=1/1/6;ONOFF=1/...	DIM=1/0/6;ONOFF=1/...	DIM=5.001;ONOFF=1...	
Thermostat Living Room	Thermostat	TEMP_CURR=2/0/0;TE...	TEMP_CURR=2/1/0;TE...	TEMP_CURR=9.001;T...	

Figure X: Locations and Devices form with locations and associated devices

4.5 Configuring user interface visible menus

It's possible to define which menus are visible for a certain user (database). This can be done by, in the toolbar selecting "Records"-> "Main Menu Links". The following dialog form shall be presented:



Order	Description	Key	Active
1	Locations	LOCATIONS	<input checked="" type="checkbox"/>
2	Scenarios	SCENARIOS	<input checked="" type="checkbox"/>
3	Lightings	LIGHTING	<input checked="" type="checkbox"/>
4	Shutters-Blinds	BLINDS	<input type="checkbox"/>
5	Thermostat	THERMOSTAT	<input checked="" type="checkbox"/>
6	Intercom	INTERCOM	<input type="checkbox"/>
7	Cameras	CAMERAS	<input type="checkbox"/>
8	Energy Monitoring	ENERGY_MONITOR	<input type="checkbox"/>
9	Scheduled Tasks	SCHEDULED_TASKS	<input checked="" type="checkbox"/>
10	Alarms	ALARMS	<input type="checkbox"/>
11	Messages	MESSAGES	<input type="checkbox"/>
12	Multimedia	MULTIMEDIA	<input type="checkbox"/>
13	Other Devices	OTHERS	<input type="checkbox"/>

Figure X: Selecting visible menus for user interface

In this form select which menus are going to be visible or not by activating/deactivating the checkbox in the "Active" column.

4.6 Adding users to the project

It is possible to have multiple users in the same KNXer. This can be used, for example, to give different users control access to different KNX functions or devices; in an office, for example, one may want the user of a room to have control of elements belonging just to that room. For each user a database must be created, just as described in the previous subsections.

To add users "File"-> "Miniserver Users" and the following form must be displayed.

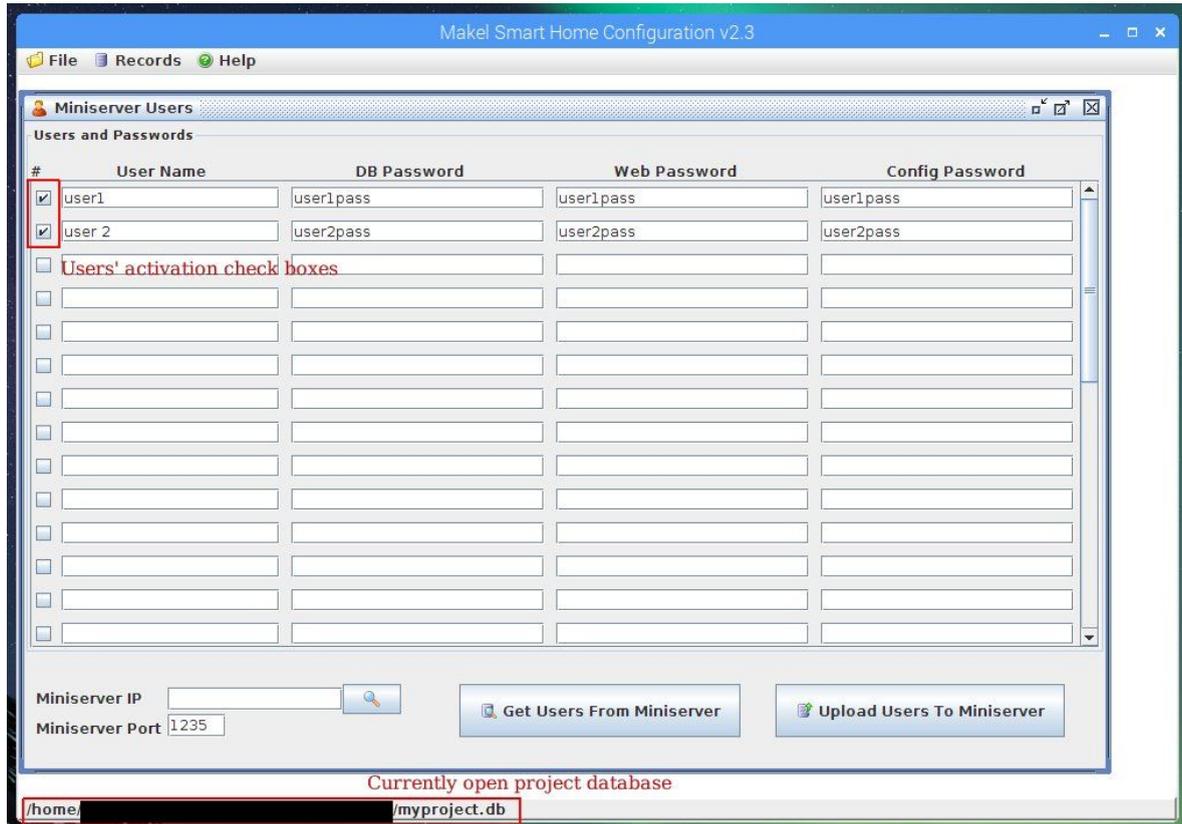


Figure 6: Adding new KNXer server users

NOTE: If Users were previously added to the Miniserver, first **Get Users From Miniserver** must be pressed.

There are three passwords that must be configured, each of them to be used in different interfaces:

- **DB Password:** The password for accessing the user’s database (when using mobile app);
- **Web Password:** The password for accessing the user’s corresponding Web interface;
- **Config Password:** The user’s password to be used when accessing the “admin” page⁶;

It must be noticed that a user to be activated needs to be set in the respective check box, as demonstrated in the Figure above.

⁶ The user’s available content on the admin’s page is more limited that the one available when logged in with “root”.

Once all the users (or the user) has been defined, the IP of the KNXer must be inserted in the **Miniserver IP** box⁷. The process is finished by pressing **Upload Users to Miniserver**; the success is confirmed with a dialog box.

4.7 Setting up scenarios

Scenarios affects a group of KNX functions (or devices) in order to set an predefined state. Very often users wish to set a specific state, for instance for movie watching, where certain lamps shall be turned off and/or set to a specific level of brightness. Scenarios are built in in KNX protocol and most devices support them. Makel's solution allow those built in scenarios to be mapped into the user's interface.

It may happen that some devices don't support association with scenarios for certain functions; for covering this case SmartHome ecosystem allows to create "virtual scenarios". "Virtual scenario" will concatenate a series of commands/KNX messages to the desired GAs in order to perform the desired state. The drawback of this method is that if there are many GAs involved in the realization of the scenario there will occur a bus traffic increase and between first message and last message there will be a time difference directly related with the number of messages that have to be sent.

For creating scenarios from the toolbar select "Records"-> "Scenarios".

NOTE: for the scenarios to be visible the "Scenarios" menu must be enabled (see [Configuring user interface visible menus](#));

4.7.1 KNX Scenarios

First lets cover the KNX built in scenarios. The scenario state shall have been defined during the ETS project's configuration.

1. From the dialog form "Scenarios and Devices Relations", in the "Scenario" area click in "New";
2. Fill the parameters as in the following picture:
 - a. **Name:** the name as to be displayed in the user interface;
 - b. **KNX Scenario:** activating this checkbox allows to create KNX built in scenarios;
 - c. **Scenario Index:** the scenario index as configured in ETS;

⁷ Instead of manually inserting it, one may use the search button by the right side and select the target KNXer from the found miniservers' list.

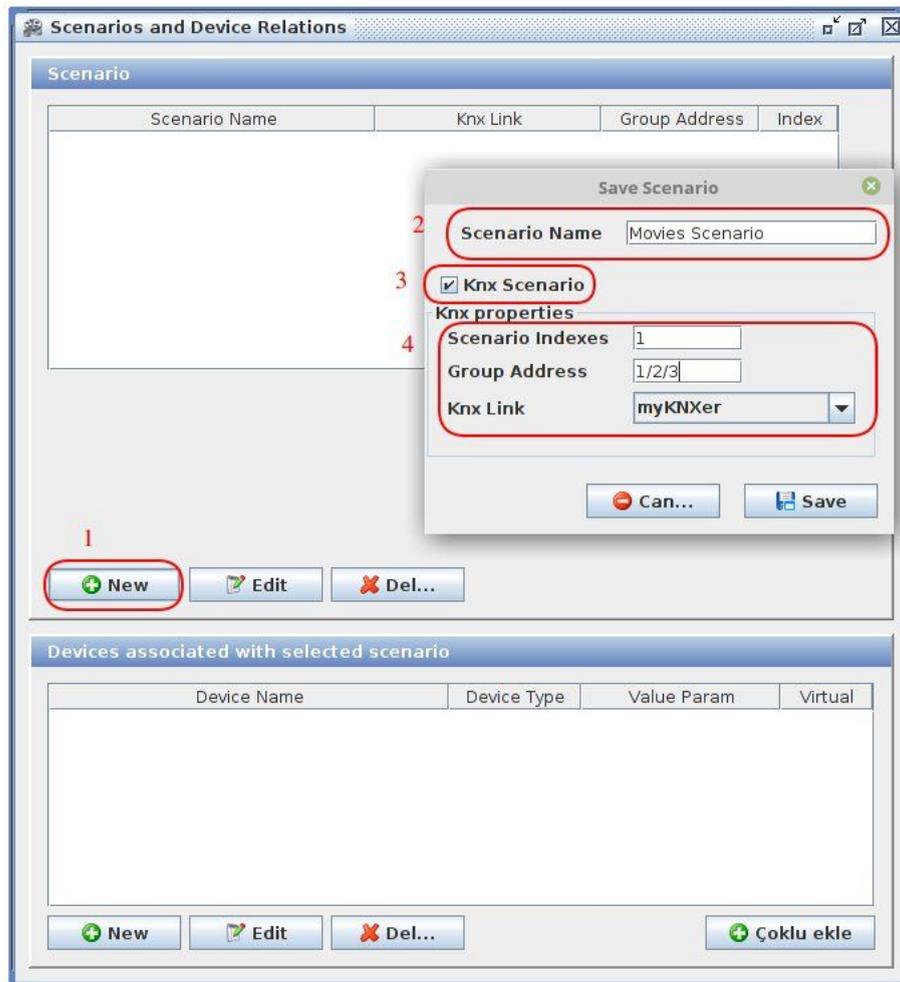


Figure X: Adding scenarios to the user interface (KNX built in Scenario)

4.7.2 “Virtual” scenarios

The “Virtual” scenarios setup is somewhat different as it is necessary to configure the state to be established upon scenario activation.

1. From the dialog form “Scenarios and Devices Relations”, in the “Scenario” area click in “New”;
2. Fill the “Scenario Name” and make sure the “KNX Scenario” checkbox isn’t checked;
3. From the dialog form “Scenarios and Devices Relations”, in the “Devices associated with the selected scenario” area click in “New”;
4. Fill the parameters on the “Device-Scenario Relation” newly appeared dialog form:
 - a. **Scenario:** the scenario that will trigger sending KNX commands;
 - b. **Device:** the device/KNX function that is intended to be affected by the scenario;

- a. **Description:** the camera's description as to be displayed in the user interface;
- b. **Local Link:** the URL that allows to access the camera's stream when inside the LAN (Local Area Network);
- c. **External Link:** the URL that allows to access the camera's stream when outside the LAN (Local Area Network) (when in the Wide Area Network WAN);⁸

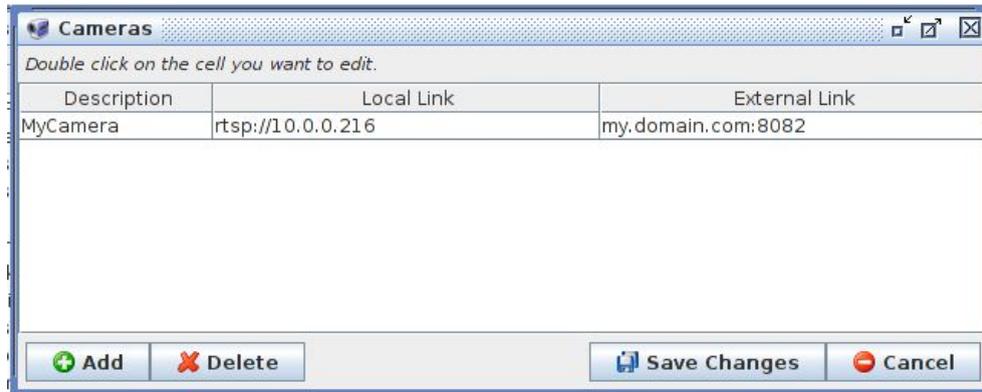


Figure X: Example of setting a IP Camera with RTPS stream

4.9 Configuring Alarms⁹

It is possible to setup alarms. Alarms allows the users to get notified when a predetermined condition on the KNX bus is verified; for example, when the GA 1/2/3 received the value “On” the users may be notified via mobile SmartHome applications.

Alarms can also be set from within the SmartHome mobile Apps, but for that the “Alarms” menu shall be activated from [Configuring user interface visible menus](#).

From the SmartHomeConf application:

1. From the toolbar “Records”-> “Alarms”;
2. In the empty area right click and select “New”;
3. Fill the parameters from the presented “Edit Alarm” dialog form:
 - a. **Description:** the description as to be displayed to the user;
 - b. **Alarm Group address:** the GA that will trigger the alarm;

⁸ For the external link to work it may require to configure NAT/port forwarding settings of your router; refer to your camera's manual and your router manual.

⁹ This section just covers Android application; for IOs the alarms can only be created from within the mobile application.

- c. **Alarm Group address value:** the value of the message on the GA that will trigger the alarm¹⁰;
- d. **Is Enabled:** en the checkbox is checked the alarm is active; deactivate otherwise;
- e. **This alarm is for door bell:** when checked, when the alarm condition is met, a door bell sound is played from the mobile application;
- f. **Enable vibration:** when checked, when the alarm condition is met, the mobile device will vibrate (if vibration available);
- g. **Enable notification:** when checked, when the alarm condition is met, the alarm will appear as an application notification;
- h. **Enable continuous Alarm:** when checked, when the alarm condition is met, the alarm sound will continuous play until it's manually closed, otherwise it will play just once;
- i. **Trigger Scenario:** when checked, when the alarm condition is met, the selected scenario will be triggered;

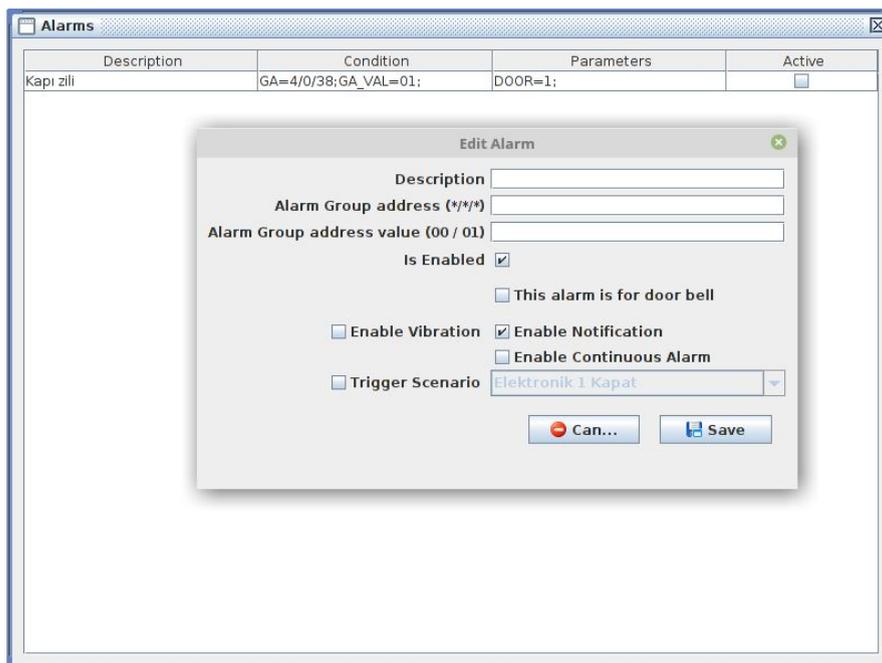


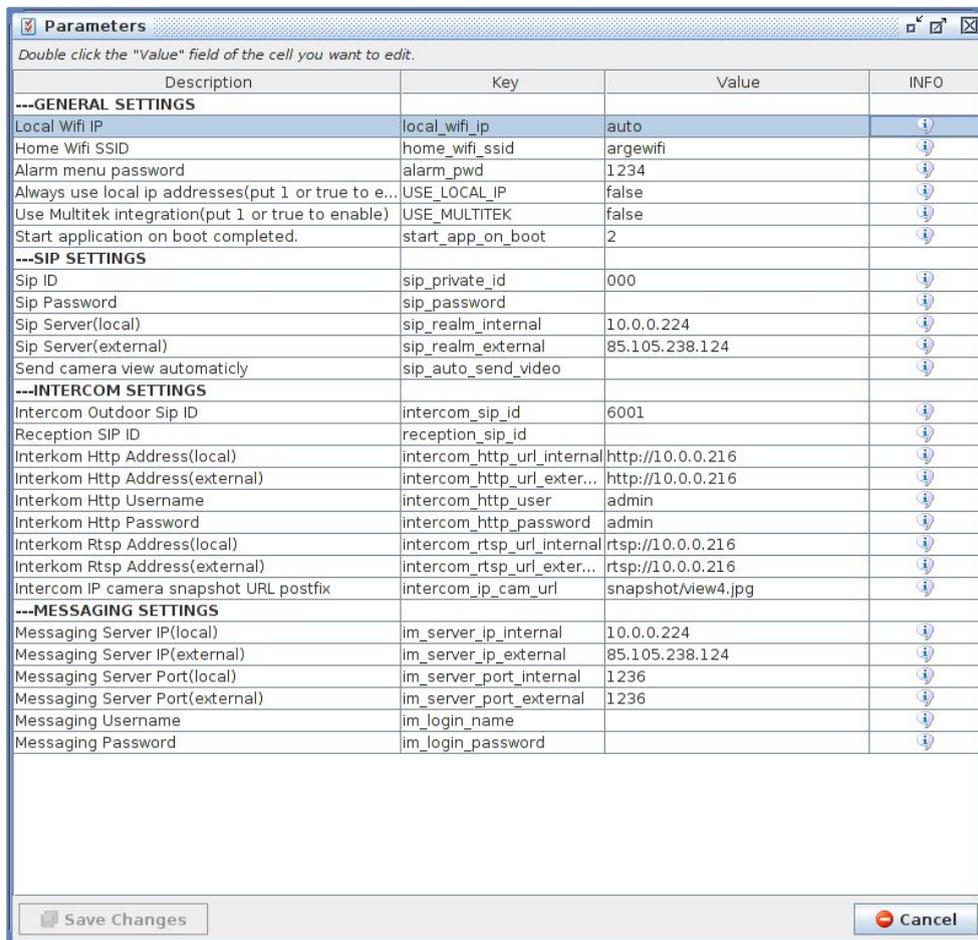
Figure X: Creating a new alarm

¹⁰ Just DPT1.xxx is supported.

4.10 Configuring Parameters

There are several parameters that must be set prior to send the created and configured database to the KNXer. Those parameters can be accessed:

1. From the toolbar “Records”-> “Parameters” ;
2. Fill the parameters accordingly by following the embedded help accessible by clicking in the information button  ;



Description	Key	Value	INFO
---GENERAL SETTINGS			
Local Wifi IP	local_wifi_ip	auto	
Home Wifi SSID	home_wifi_ssid	argewifi	
Alarm menu password	alarm_pwd	1234	
Always use local ip addresses(put 1 or true to e...	USE_LOCAL_IP	false	
Use Multitek integration(put 1 or true to enable)	USE_MULTITEK	false	
Start application on boot completed.	start_app_on_boot	2	
---SIP SETTINGS			
Sip ID	sip_private_id	000	
Sip Password	sip_password		
Sip Server(local)	sip_realm_internal	10.0.0.224	
Sip Server(external)	sip_realm_external	85.105.238.124	
Send camera view automaticly	sip_auto_send_video		
---INTERCOM SETTINGS			
Intercom Outdoor Sip ID	intercom_sip_id	6001	
Reception SIP ID	reception_sip_id		
Interkom Http Address(local)	intercom_http_url_internal	http://10.0.0.216	
Interkom Http Address(external)	intercom_http_url_exter...	http://10.0.0.216	
Interkom Http Username	intercom_http_user	admin	
Interkom Http Password	intercom_http_password	admin	
Interkom Rtsp Address(local)	intercom_rtsp_url_internal	rtsp://10.0.0.216	
Interkom Rtsp Address(external)	intercom_rtsp_url_exter...	rtsp://10.0.0.216	
Interkom IP camera snapshot URL postfix	intercom_ip_cam_url	snapshot/View4.jpg	
---MESSAGING SETTINGS			
Messaging Server IP(local)	im_server_ip_internal	10.0.0.224	
Messaging Server IP(external)	im_server_ip_external	85.105.238.124	
Messaging Server Port(local)	im_server_port_internal	1236	
Messaging Server Port(external)	im_server_port_external	1236	
Messaging Username	im_login_name		
Messaging Password	im_login_password		

Figure X: Parameters configuration form

4.11 Project deployment to KNXer

Once all the previous subsections have been completed, in order to deploy the project, the created database shall be uploaded to the KNXer, from where afterwards the users will be able to access either with mobile app or via the web interface served by the KNXer itself.

1. In order to upload the database to the KNXer from the toolbar click “File”-> “Upload Database to Miniserver”;
2. Fill the parameter in the newly presented dialog form (take the picture below as reference):

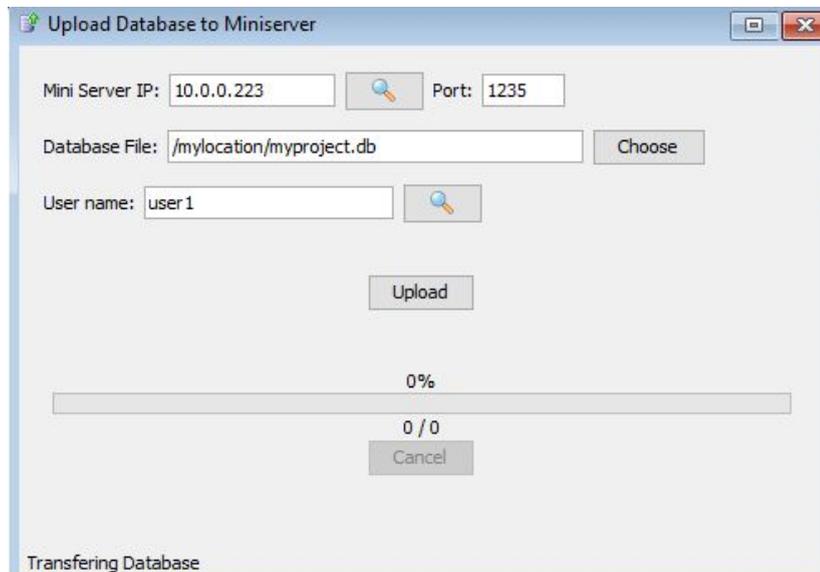


Figure X: Deployment to KNXer

- a. **Mini Server IP:** the IP given to the KNXer ([Setting up the IP](#));
 - b. **Port:** set as 1235;
 - c. **Database File:** path to the database to be uploaded ([Creating a new Database](#));
 - d. **Username:** the username that will be associated with the database to be uploaded ([Adding users to the project](#));
3. Press “Upload” button and wait the transfer bar to reach 100% and the success message to be displayed.

5 USER INTERFACE ACCESS

5 USER INTERFACE ACCESS

There are currently three ways of reaching a user interface that allows to control the KNX installation through the KNXer:

- Web interface;
- Mobile application:
 - Android;
 - IOS;

It is assumed that the [SMARTHOME CONFIGURATION](#) has been studied and executed.

5.1 Web interface

The web interface can be accessed from a browser by writing on the URL bar the KNXer's IP followed by its port number, pointing to the “web” folder of its server; something on this shape: <http://10.0.0.223:8081/web/> where the IP 10.0.0.223 must be replaced with the IP selected (see [Setting up the IP](#)). This shall bring a login page as in the following figure:



Figure X: Login page for the Web Interface

Enter the user credentials as created in [Adding users to the project](#). Once the login is successful the user is prompted with the main menu of the user application were the menus enabled in [Configuring user interface visible menus](#) will be shown¹¹. Take as example the following figure.

¹¹ It is possible that some of the features available for the mobile apps aren't available in the web interface, in that case the menus related with those will be omitted.

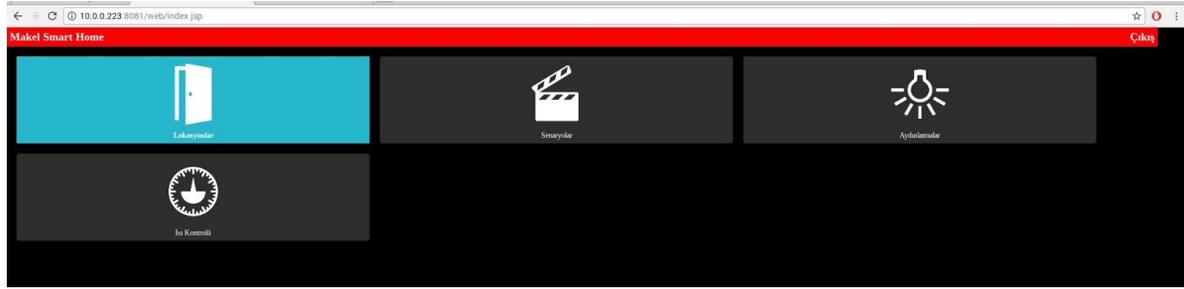


Figure X: Example of web main menu

5.2 Android App

The Android application for Makel's SmartHome ecosystem can be found free of charge in the Google's Play as described in [GENERAL INFORMATION](#). Once the Application is fresh installed and opened for the first time a screen as the one below shall be presented. In order to get the User Interface configurations as developed in [SMARTHOME CONFIGURATION](#):

1. Click in the "Download Database" button (as marked on the picture);

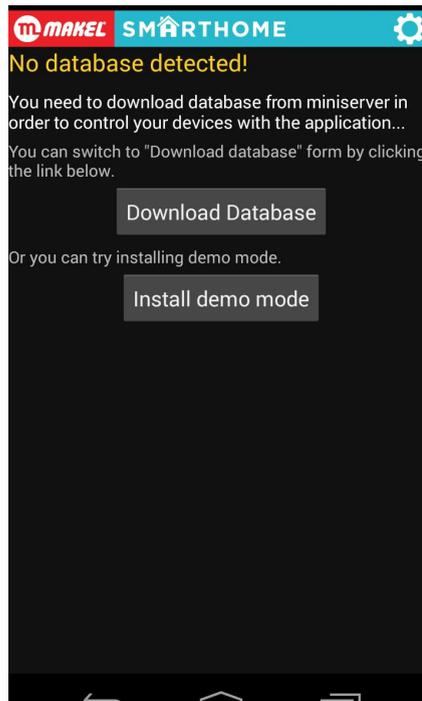


Figure X: Android first run screen

2. Fill the areas accordingly, as in the figure below:

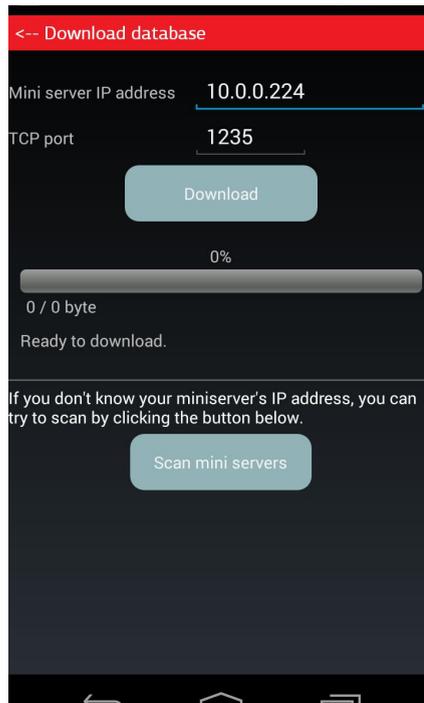


Figure X: Database download configuration page

- a. **Mini Server's IP Address:** the IP address given to the KNXer (as set in [Setting up the IP](#))¹²; Note that if the download is being performed from outside of the Local Area Network (over the internet) this field shall contain the external IP or the hostname of the installation;
 - b. **TCP Port:** let 1235 if in Local Area Network; if the download is being performed from outside of the Local Area Network (over the internet) this field shall contain the external port as configured in the router to be forward to the port 1235 of the KNXer;
3. Press "Download" and wait for the success message.

5.3 IOs App

The IOs application for Makel's SmartHome ecosystem can be found free of charge in the AppStore as described in [GENERAL INFORMATION](#). Once the Application is fresh installed and opened for the first time a screen as the one below shall be presented. In order to get the User Interface configurations as developed in [SMARTHOME CONFIGURATION](#):

¹² Alternatively "Search Miniservers" button can be pressed and the target KNXer be selected from the resulting list (NOTE: this works only in Local Area Network).

1. Click in “Download Database”:

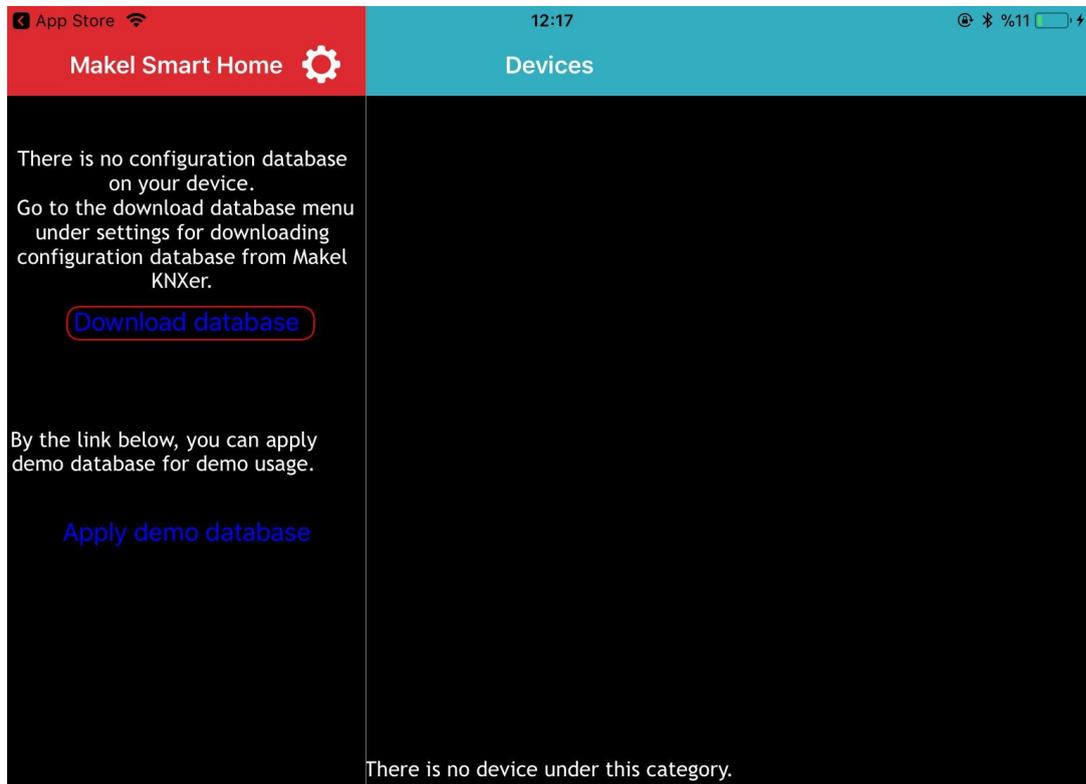


Figure X: IOs SmartHome App first screen

2. Upon the presentation of the configuration page as in the figure below the fields must be filled:

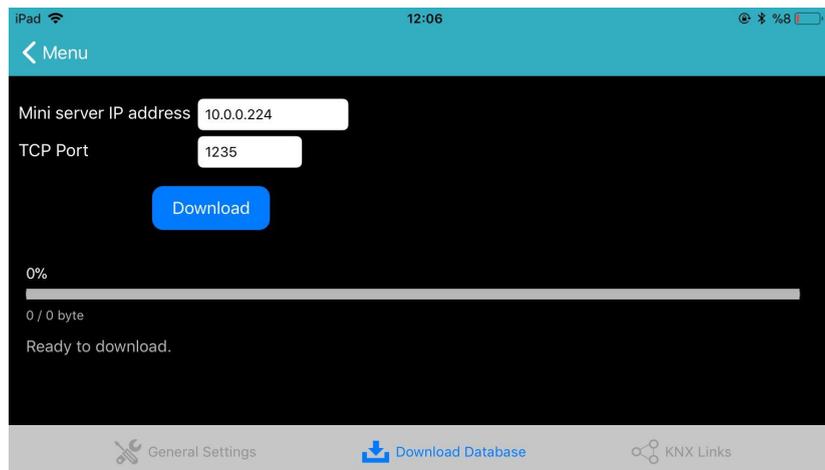


Figure X: IOs SmartHome App Database download configuration page

- a. **Mini Server’s IP Address:** the IP address given to the KNXer (as set in [Setting up the IP](#)); Note that if the download is being performed from outside of the Local Area

Network (over the internet) this field shall contain the external IP or the hostname of the installation;

- b. TCP Port:** let 1235 if in Local Area Network; if the download is being performed from outside of the Local Area Network (over the internet) this field shall contain the external port as configured in the router to be forward to the port 1235 of the KNXer;
3. Press “Download” and wait for the success message.

6 KNXer ADVANCED CONFIGURATIONS

6 KNXER ADVANCED CONFIGURATIONS

When accessing the configurations page by browsing <http://10.0.0.223:8081/admin/>¹³ the login is possible in different levels of permissions:

- User: provides access to very limited configurations, mostly access to some systems status and the possibility to change access passwords (for the user itself);
- Project administrator: provides access to more advanced parameters that might affect the experience of all users of the KNXer;

6.1 All users level settings

This becomes available just after a user is created (see [Adding users to the project](#)). In the login page the *username* and *password* as set in the user creation for the *web* fields. The settings/information available in this section is also available for the administrator (account root).

6.1.1 Home page

Once logged in a page as the one below shall be presented:



[Home](#) [System](#) [Output](#)

Makel KNX Mini Server Configuration Interface v3.0.3

Makel KNXer

Date time: 11/12 / 2017-16: 53: 06 [ntp settings](#)
Computer clock: 11/12/2017 16:48:40
Up time: 38 days
MAC Address: 80-30-DC-93-6F-6F

Service Statuses

Knxer service: RUNNING
KnxHomeServer service: RUNNING
Knx Web service: RUNNING
Message service: RUNNING
SIP asterisk service: RUNNING
KNXD Service: PASSIVE

System Information

KNXer Image Version: Makel KNXer 01.11.2017 IMG3.1
Linux Version: [show](#)
Java Version: [show](#)

Figure X: “Home” page of KNXer configurations interface

¹³ Replace the IP 10.0.0.223 with the one set to the KNXer as in [Setting up the IP](#).

In the previous figure:

- **Date time:** the date and time retrieved from the KNXer. By clicking in “ntpd settings” date and time configurations page will be presented (not available for user, just admin);
- **Computer clock:** the date and time of the local machine (the device from where the configurations page is being browsed), serves the purpose of easily comparing the KNXer date and time with the local machine.
- **Up time:** the amount of time since the KNXer’s previous boot;
- **MAC Address:** the physical address of the network interface of the KNXer;
- **[SERVICE_NAME] Service:** gives the status of the service;
 - **KNXD Service Status:** by clicking “Activate” the Knxer Service and KnxHomeServer Service are stopped and the KNXD¹⁴ service is started;¹⁵ after this it shall be possible to find with ETS an IP-Router implemented by the KNXer. **IMPORTANT: when the KNXD service is enabled the SmartHome applications won’t be able to connect. KNXD is not intended to be activated permanently. Use it only for maintenance with ETS.**
- **KNXer image version:** informs which is the version of the installation setup running on the KNXer;
- **Linux version:** once clicked in “show info” the Linux distribution details are outputted;
- **Java version:** once clicked in “show info” the Java version currently installed is displayed;

6.1.2 System page

By clicking in “System” on the top tabs the following page shall be displayed. In this page the currently logged in user’s passwords may be changed.

¹⁴ KNXD is an open-source project that implements an KNX-IP router interface. It maintained by the community, please refer to <https://github.com/knxd/knxd>

¹⁵ When the KNXer reboots the KNXD is disabled and the Knxer and KnxHomeServer services are enabled by default. KNXD is not intended to be used permanently!

[Home](#) [System](#) [Exit](#)

System

Change Password

User name

Database encryption Web interface password Management password (this page)

New password

New password (again)

Figure X: The KNXer's system configuration page

- **User name:** the currently logged in user name;
- Select the password to be changed;
- **New password:** the new password to be used.

6.2 Administrator level settings

Once logged in the the administrator credentials, the same page is in [Home page](#) is displayed. The administrator's default credentials are:

- **Login:** root
- **Password:** makelroot

This default credentials may be changed as described in [System page](#).

6.2.1 Network Settings

Please refer to [Setting up the IP](#). This configuration page is discussed in that section.

6.2.2 Updates configuration page

When the "Updates" tab is selected the page on the following figure shall be presented. In this configuration page is possible to check for updates related with the running services on the KNXer. Makel provides OTA updates that can be set¹⁶ to automatic; everytime bugfixes occur or major features modifications happen the applications are put online for the KNXers to download and self update for improved user experience.

If the automatic updates are preferable they can be disabled and run manually when desired. Additionally one may force a certain application to be fetched from the Makel's servers and fresh installed.

¹⁶ The OTA updates are by default set to automatic.

Mini Server Updates

• Select the auto update check time:

Disable automatic update
Day: Hour :

• Manual update

Force update (KNXer)
 Force update (KnxHomeServer)
 Force update (Knx Web service)
 Force update (Message service)
 Force update (Network Discovery service)
 Force update (Web App-including this count)
 Force update (Scriptler)

Update Logs:

Figure X: “Updates” page from the administrator’s configurations

- **Disable automatic update:** by checking the checkbox the KNXer won’t automatically connect to Makel’s servers enquiring for updated versions of the applications/services;
- **Update period:** sets when the KNXer shall look for updates; it is recommended to set for a period in which the installation is normally unused as the update may result in temporary non-operation of the smarthome application;
- **Manual update:** when “Check Now and Update” is pressed the KNXer will connect to Makel’s servers looking for updates; if any of the “Force update ...” is checked, then that service will be downloaded from the servers and re-installed on the KNXer;
- **Update Logs:** in this output window the result of the manual update is displayed.

6.2.3 Parameters configuration page

Some of the KNX related configurations reside in the “Parameters” configuration page. Things like KNX individual address and broadcast settings may be set in this page. Once the tab “Parameters” is pressed a page similar to the one presented in the following picture shall be presented:

[Homepage](#)
[Network Settings](#)
[Updates](#)
[Parameters](#)
[System](#)
[Exit](#)

Mini Server Parameters

- Determination of KNX parameters and other parameters

Device Name: Give KNXer a name
Knx Ind. Address: KNXer individual address
Knx date-time Synchronization: The date and time are sent to the KNX line in certain periods. Date-time knx group address.
Database HASH control: Database HASH control is performed on the active SSL connection.

- Broadcast settings

Outbound Broadcast | Inbound Broadcast

	<input type="checkbox"/> Active	<input type="checkbox"/> Active
IP:	<input type="text" value="255.255.255.255"/> <small>Ex: 192.168.1.255</small>	<input type="text" value="0.0.0.0"/> <small>Ex: 0.0.0.0</small>
Port:	<input type="text" value="9997"/> <small>Default 9997</small>	<input type="text" value="9997"/> <small>Default 9997</small>
Group address filter:	<input type="text" value="*//*"/> <small>Ex: [1-20]/*/*</small>	<input type="text" value="*//*"/> <small>Ex: [1-20]/*/*</small>
Message type filter:	<input checked="" type="checkbox"/> Feedback <input checked="" type="checkbox"/> Reader <input checked="" type="checkbox"/> write	<input checked="" type="checkbox"/> Feedback <input checked="" type="checkbox"/> Reader <input checked="" type="checkbox"/> write
Knx Area:	<input type="text" value="1"/> <small>This is the knx domain name</small>	

Figure X: “Parameters” configuration page

- **Device name:** the name to be displayed when the “mini server search” is used; in the resulting list this name is going to be shown together with its IP number;
- **KNX ind. address:** the KNX individual address to set for the KNXer; this is important to be a different address from the others set to the remaining devices on the project;
- **KNX date-time Synchronization:** allows to enable the KNXer to send the “Date and Time” to the KNX bus in order to feed KNX devices that need a precise clock source; the value is sent in the KNX standard data format (19.001 - PDT_DATE_TIME); when the KNXer is granted internet access it uses NTPD servers for keeping the clock synchronization;
 - **Period:** it is possible to define how often the clock shall be issued to the bus;
 - **Group Address:** sets the GA to which the “Date and Time” shall be sent;

- **Database HASH control:** when active, upon user authentication, the KNXer is going to evaluate not only the user credentials, but also will evaluate if the user being authenticated owns a valid version of the configuration database; this option is recommended to be activated as it keeps away intruders that in some sort got access to some user credentials;
- **Broadcast settings:** it is possible to establish connections between different KNXers; this is implemented by allowing to define with who each KNXer connects; the rules get effective just if the “Activate” checkbox is checked when the “Save broadcast settings” is pressed:
 - **Outbound:**
 - IP: the IP of the partner KNXer that shall receive the messages sent; if all the KNXers are to receive the messages then this field shall be filled with the network’s broadcast address (usually 255.255.255.255);
 - Port: the port number that the partner (or partners) is listening;
 - Group Address filter: the messages being outbounded (sent to the partners) can be filtered by their GAs; wildcards apply:
 - “*” = any; eg.: 1/2/* means: any GA started by 1/2 (main group address 1, middle group address 2 and any group address);
 - “[x-b]”, where ‘a’ and ‘b’ are digits = from ‘a’ to ‘b’; eg.: 1/2/[0-10] means: any GA in the range 1/2/0 to 1/2/10;
 - Message type filter: it is also possible to filter messages by it’s communication type: read requests, write requests and feedbacks;
 - KNX Area: should be a unique number for each KNXer. KNXer will discard the messages received from the same KNX area.
 - **Inbound:**
 - IP: the IP of the partner KNXer that will be sending the messages; if all the KNXers are to be accepted then this field shall be filled 0.0.0.0;
 - Port: the port number that the partner (or partners) will use for broadcast;
 - Group Address filter: the messages being received (sent by the partners) can be filtered by their GAs; wildcards apply:
 - “*” = any; eg.: 1/2/* means: any GA started by 1/2 (main group address 1, middle group address 2 and any group address);
 - “[x-b]”, where ‘a’ and ‘b’ are digits = from ‘a’ to ‘b’; eg.: 1/2/[0-10] means: any GA in the range 1/2/0 to 1/2/10;

- Message type filter: it is also possible to filter messages by its communication type: read requests, write requests and feedbacks;

7 DEVICES TYPES (SMARTHOME CONFIG)

7 DEVICES TYPES (SMARTHOME CONFIG)

In the configuration process using SmartHomeConfig application, when creating devices, the device type being created must be choose from the list of available devices types¹⁷.

7.1 Dimmer - Lighting

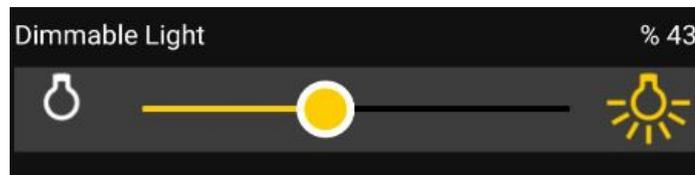


Figure X: Android “Dimmer - Lighting” control example

“Dimmer - Lighting” device provides a control that allows the user to adjust the lightning brightness intensitivity from 0% to 100%. Dimmers (for KNX installations) most commonly support brightness adjustment via DPT5.001 (DPT_Scaling) and control via DPT 1.001 (DPT_Switch); also most commonly they provide separated feedbacks of them current status for those two variables.

Feedbacks received from the bus will set the slider position to the received value; interaction on the slider results on sending the slider position value to the bus.

7.1.1 Parameters

No parameters available to configure.

7.1.2 Group Addresses

Address Type	Read	Write	DPT
DIM			5.001-DIMMER
ON-OFF State			1.001-SWITCH

Figure X: Available Group Addresses for “Dimmer - Lighting”

- **DIM:**
 - **Read:** the GA from where the status feedback of the Brightness value is going to be received;
 - **Write:** the GA to be used for controlling the brightness;
- **ON-OFF State:**

¹⁷ Please make always sure that you are using the latest version of the SmartHomeConfig application as updates may come including more devices types (see [GENERAL INFORMATION](#)).

- **Read:** the GA from where the On/Off status of the light(s) is received;
- **Write:** the GA to be used for directly turn On or Off the light(s);

7.2 On Off - Lighting

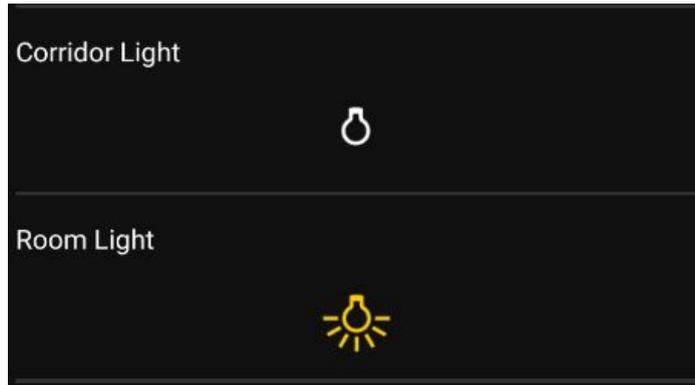


Figure X: Android “On Off - Lighting” control example

“On Off - Lighting” controls enables the users to control the On/Off status of lights. Most light switch actuators on the KNX market provides CO (Communication Objects) to provide On/Off control via DPT1.001 (DPT_Switch) as well CO to provide feedback of the current status.

7.2.1 Parameters

No parameters available to configure.

7.2.2 Group Addresses

Address Type	Read	Write	DPT
ON-OFF State			1.001-SWITCH

Figure X: Available Group Addresses for “On Off - Lighting”

- **ON-OFF State:**
 - **Read:** the GA use to get the status from the light(s);
 - **Write:** the GA to be used for setting the light(s) status;

7.3 Shutters and Blinds

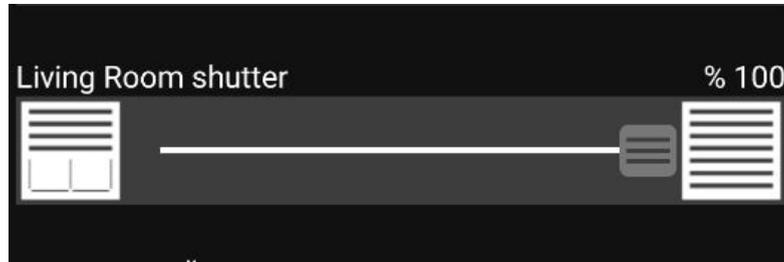


Figure X: Android “Shutter and Blinds” control example

“Shutter and Blinds” enable the user to interact with Shutter and Blinds actuators. Most Shutter and Blinds actuators provide means to control the position in the following ways:

1. Up or Down movement started by DPT 1.008 (DPT_UpDown), and movement stopped by DPT1.010 (DPT_Start);
2. By sending an absolute position via DPT5.001 (DPT_Scaling);

The position of the Shutter is most commonly provided via DPT5.001 (DPT_Scaling). Feedbacks received from the bus will set the slider position to the received value; interaction on the slider results on sending the slider position value to the bus.

7.3.1 Parameters

No parameters available to configure.

7.3.2 Group Addresses

Address Type	Read	Write	DPT
START STOP			1.010-START_STOP
UP DOWN			1.008-UP_DOWN
DIM			5.001-DIMMER

Figure X: Available Group Addresses for “Shutter and Blinds”

- **START STOP:**
 - **Read:** !NOT USED! if filled reproduces no effect;
 - **Write:** the GA used to send the Start/Stop commands;
- **UP DOWN:**
 - **Read:** !NOT USED! if filled reproduces no effect;

- **Write:** the GA used to send the Up/Down commands;
- **DIM:**
 - **Read:** the GA from where the current absolute position is received (in percentage DPT5.001 Scaling);
 - **Write:** the GA used to send the absolute position selected on the slider;

7.4 Multimeter

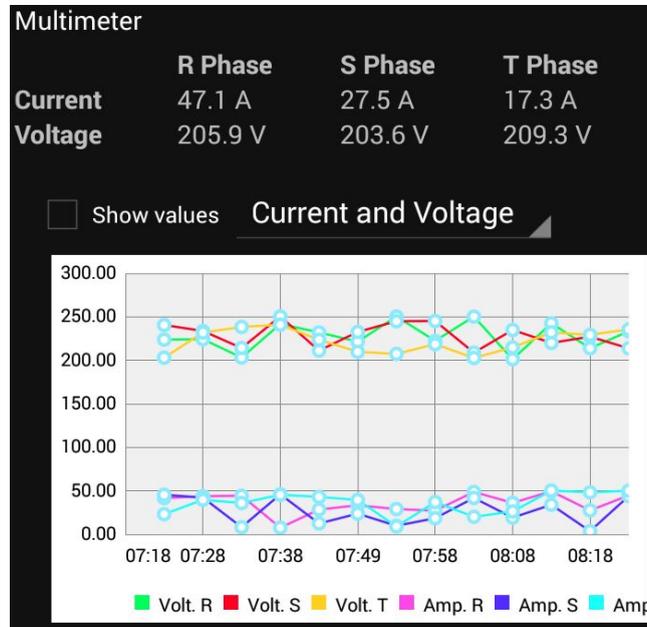


Figure X: Android “Multimeter” control example

“Multimeter” provides the user to observe Voltage (V) and Current (A) values. The information provider devices, commonly multimeters or energy meters, provide voltages in DPT9.020 (DPT_Volt) and currents in DPT9.021 (DPT_Curr); at most an installation may have three phases (R, S and T).

7.4.1 Parameters

No parameters available to configure.

7.4.2 Group Addresses

Address Type	Read	Write	DPT
Current Phase R			9.021-CURRENT
Current Phase S			9.021-CURRENT
Current Phase T			9.021-CURRENT
Voltage Phase R			9.020-VOLTAGE
Voltage Phase S			9.020-VOLTAGE
Voltage Phase T			9.020-VOLTAGE

Figure X: Available Group Addresses for “Multimeter”

- **Current Phase ‘X’¹⁸:**
 - **Read:** the GA from where the values of the current for the phase will be received;
 - **Write:** !NOT USED! if filled reproduces no effect;
- **Voltage Phase ‘X’:**
 - **Read:** the GA from where the values of the voltage for the phase will be received;
 - **Write:** !NOT USED! if filled reproduces no effect;

7.5 Thermostat

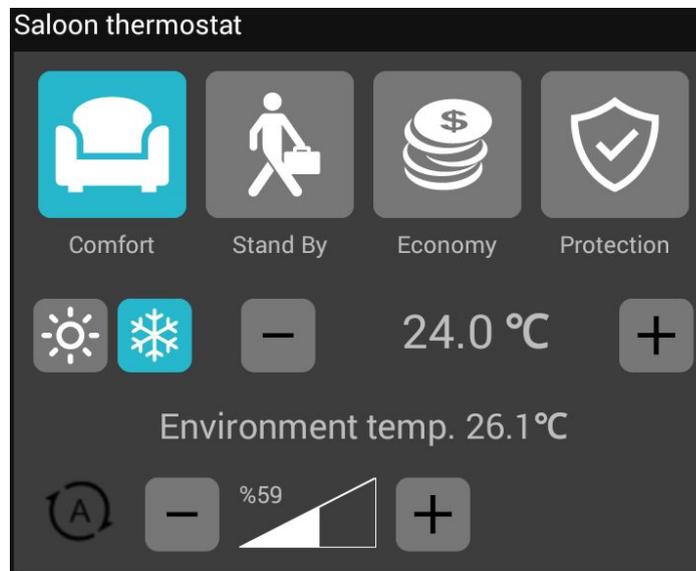


Figure X: Android “Thermostat” control example

¹⁸ Where ‘X’ is R, T or S.

“Thermostat” enables the users to monitor and control the HVAC units installed (when KNX interface is available. The common controls of HVAC systems are:

- HVAC mode: DPT20.102 (DPT_HVAC_Mode);
- Heating/Cooling mode: DPT1.100 (DPT_Heat/Cool);
- Setpoint temperature: DPT9.001 (DPT_Value_Temp);
- Fan Speed: most commonly controlled via separated 1bit COs;

7.5.1 Parameters

No parameters available to configure.

7.5.2 Group Addresses

Address Type	Read	Write	DPT
Environment Temp FB			9.001-TEMP
BASE Temp			9.001-TEMP
SETPOINT Temp			9.001-TEMP
HVAC Mode			5.010-UCOUNT_VALUE
HC Mode			1.001-SWITCH
SETPOINT Temp STEP WR			1.007-INCREASE_DECREASE
BASE Temp STEP WR			1.007-INCREASE_DECREASE
Fan Mode			1.001-SWITCH
Fan STEP WR			1.007-INCREASE_DECREASE
Fan Percent			5.001-DIMMER
ON-OFF State			1.001-SWITCH

Figure X: Available Group Addresses for “Thermostat”

- **Environment Temp FB:**
 - **Read:** the GA from where the KNXer will be receiving the information of the environment temperature; normally there must be a KNX thermostat that senses the room temperature and sends it to the bus (to a GA) with some peridiocity or upon certain variation of temperature;
 - **Write:** !NOT USED! if filled reproduces no effect;
- **BASE Temp:** the base temperature is available in some of the KNX Room Temperatures controllers, as it is the case of Makel’s MTHxxxx-yL series; the base temperature defines the threshold for automatic switchover between Heating and Cooling¹⁹;
 - **Read:** from where the feedback will be received;
 - **Write:** to where will the KNXer write the new base setpoint;

¹⁹ For better understanding this GA please refer to the KNX Room Controller User’s Manual.

- **SETPOINT Temp:** shall the active setpoint GA;
 - **Read:** GA from where the feedback of the currently active setpoint;
 - **Write:** the GA to where new setpoint selection shall be sent;
- **HVAC Mode:**
 - **Read:** the GA from where KNXer receives feedback from the HVAC mode currently active;
 - **Write:** the GA to where KNXer shall send new selections of HVAC modes to be activated;
- **SETPOINT Temp STEP:**
 - **Read:** !NOT USED! if filled reproduces no effect;
 - **Write:** the GA to be used by KNXer to send step Up/Down commands to the currently active setpoint;
- **BASE Temp STEP:**
 - **Read:** !NOT USED! if filled reproduces no effect;
 - **Write:** the GA to be used by KNXer to send step Up/Down commands to the base temperature setpoint;
- **Fan Mode:** controls if the fan works in Manual or Automatic mode;
 - **Read:** the GA from where KNXer will get the active mode (Man/Auto) of the fan;
 - **Write:** the GA to be used to select the fan operating mode (Man/Auto);
- **Fan Step:** when the fan mode is in manual allows to control the fan speed by stepping Up/Down;
 - **Read:** !NOT USED! if filled reproduces no effect;
 - **Write:** the GA to be used to send the step Up/Down control messages;
- **Fan Percentage:** some of the Room Temperature controllers allow to control the fan in a continuous way (for fans that are usually DC powered);
 - **Read:** the GA from where the KNXer will get the currently set fan Speed;
 - **Write:** the GA that KNXer will use to set the desired fan speed (usually requires fan manual mode activation);
- **ON-OFF State:** this is used only to provide feedback to the user about the operation (active/passive) status of the controller;
 - **Read:** the GA from where the KNXer will get the information of the status of the controller (if the heater/cooler is currently heating/cooling);
 - **Write:** !NOT USED! if filled reproduces no effect;

7.6 Remote Control

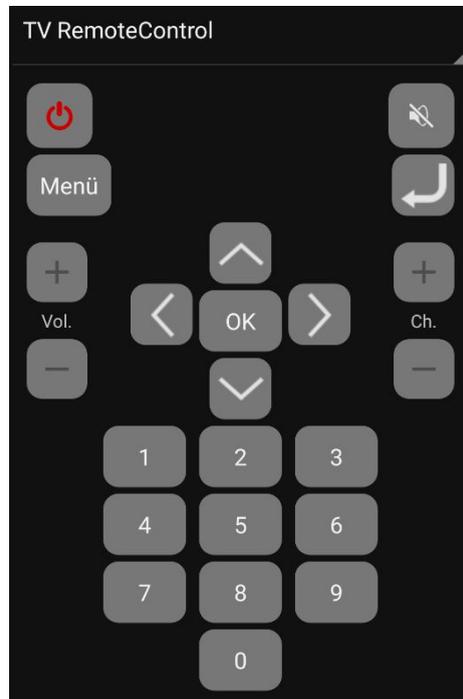


Figure X: Android “Remote Control” control example

“Remote Control” provides interface for the users to interact with KNX<->IR converters. Most commonly this converters require one GA per IR command and the GA message is 1bit trigger for the KNX<->IR to issue the IR command.

7.6.1 Parameters

No parameters available to configure.

7.6.2 Group Addresses

Address Type	Read	Write	DPT
ON-OFF			1.001-SWITCH
Mute			1.001-SWITCH
Menu			1.001-SWITCH
Exit			1.001-SWITCH
Up			1.001-SWITCH
Down			1.001-SWITCH
Left <			1.001-SWITCH
Right >			1.001-SWITCH
Volume +			1.001-SWITCH
Volume -			1.001-SWITCH
Channel +			1.001-SWITCH
Channel -			1.001-SWITCH

Figure X: Available Group Addresses for “Remote Control”

- [ANY_ADDRESS]:
 - **Read:** !NOT USED! if filled reproduces no effect;
 - **Write:** the GA the KNXer will use to send the trigger message to execute the IR command;

7.7 On Off - General

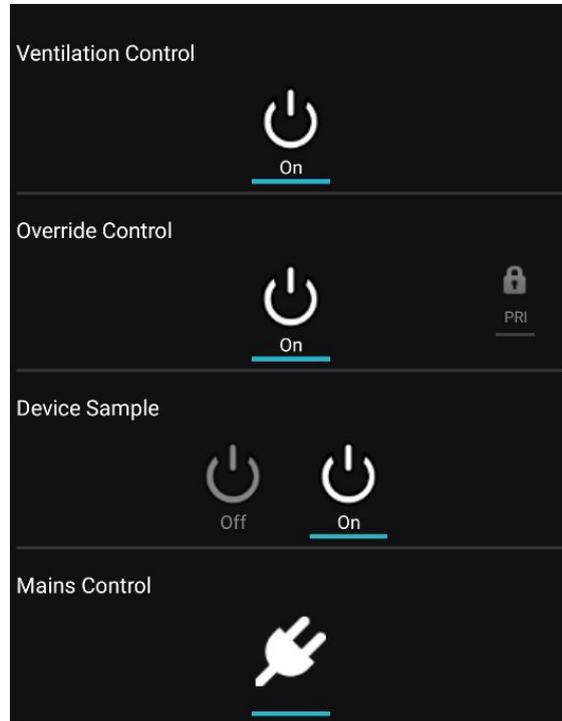


Figure X: Android “On Off - General” control examples

“On Off - General” controls are intended for the user to use to control generic On/Off type loads. This controls only allow to control DPT1.xxx and DPT2.xxx GAs. The way the symbol is display is defined in the “Parameters” field of the device creation form.

7.7.1 Parameters

Allows to configure the symbol to be displayed in the user interface. For configuring the symbol click on “edit” by the textbox of the “Parameters” input and select from the available settings.

7.7.2 Group Addresses

Address Type	Read	Write	DPT
ON-OFF State	1/1/1	1/1/2	1.001-SWITCH
PRIORITY			2.001-PRIORITY_SWITCH

Figure X: Available Group Addresses for “On Off - General”

- **ON_OFF State:**
 - **Read:** the GA from where KNXer will get the feedback of the status of the controlled load;
 - **Write:** the GA to where KNXer is going to send the messages intended to control the load;
- **PRIORITY:** it is common to have loads/lights which provides an “override” or “priority” CO; this COs are 2bit and from DPT2.xxx;
 - **Read:** the GA from where the KNXer will get the information of the override status of the load;
 - **Write:** the GA that the KNXer will use to send the “override”/”priority” commands;

7.8 Presence Detector



Figure X: Android “Presence Detector” control examples

“Presence Detector” control allows the user to monitor and control presence detectors (with light regulation, if available).

7.8.1 Parameters

Allows to configure minimum and maximum lux values which can be set by user. For configuring the symbol click on “edit” by the textbox of the “Parameters” input and select from the available settings. Default values for the minimum and maximum lux values are 0 and 1000.

7.8.2 Group Addresses

Address Type	Read	Write	DPT
LUX_SP			9.004-LUX
CURR_LUX			9.004-LUX
MODE_PRESENCE			1.001-SWITCH
AUTO_MAN			1.001-SWITCH

Figure X: Available Group Addresses for “On Off - General”

- **LUX_SP:** the light intensity setpoint (in lux);
 - **Read:** the GA from where the KNXer will be receiving the currently set setpoint for the light intensity;
 - **Write:** the GA that the KNXer will use to send the user input of the desired light intensity;
- **CURR_LUX:** the currently measured light intensity (in lux);
 - **Read:** the GA from where the KNXer will obtain the currently measured light intensity of the environment;
 - **Write:** !NOT USED! if filled reproduces no effect;
- **MODE_PRESENCE:** the presence mode (present/absent);
 - **Read:** the GA from where the KNXer will be receiving the feedback of that presence status;
 - **Write:** (when in manual) the GA to where the KNXer will send the presence/absence command;
- **AUTO_MAN:** many presence detectors that also controls lights automatically, provide means to switch to manual lights control;
 - **Read:** from where the KNXer will get the currently active lights control mode;
 - **Write:** to where the KNXer will send the user's input for the lights control mode;

APPENDIXES

APPENDIX A - KNX DATA TYPES

Table 3: Some of the KNX Data Points TypesTable

DPT_ID	DPT_Name	Size (bits)
1.001	DPT_Switch	1
1.002	DPT_Bool	1
1.003	DPT_Enable	1
1.004	DPT_Ramp	1
1.005	DPT_Alarm	1
1.006	DPT_BinaryValue	1
1.007	DPT_Step	1
1.008	DPT_UpDown	1
1.009	DPT_OpenClose	1
1.010	DPT_Start	1
1.011	DPT_State	1
1.012	DPT_Invert	1
1.013	DPT_DimSendStyle	1
1.014	DPT_InputSource	1
1.015	DPT_Reset	1
1.016	DPT_Ack	1
1.017	DPT_Trigger	1
1.018	DPT_Occupancy	1
1.019	DPT_Window_Door	1
1.021	DPT_LogicalFunction	1
1.022	DPT_Scene_AB	1
1.023	DPT_ShutterBlinds_Mode	1
1.100	DPT_eat/Cool	1
2.001	DPT_Switch_Control	2
2.002	DPT_Bool_Control	2
2.003	DPT_Enable_Control	2
2.004	DPT_Ramp_Control	2
2.005	DPT_Alarm_Control	2
2.006	DPT_BinaryValue_Control	2
2.007	DPT_Step_Control	2
2.008	DPT_Direction1_Control	2
2.009	DPT_Direction2_Control	2
2.010	DPT_Start_Control	2
2.011	DPT_State_Control	2
2.012	DPT_Invert_Control	2
3.007	DPT_Control_Dimming	4

3.008	DPT_Control_Blinds	4
4.001	DPT_Char_ASCII	8
4.002	DPT_Char_8859_1	8
5.001	DPT_Scaling	8
5.003	DPT_Angle	8
5.004	DPT_Percent_U8	8
5.005	DPT_DecimalFactor	8
5.010	DPT_Value_1_Ucount	8
6.001	DPT_Percent_V8	8
6.010	DPT_Value_1_Count	8
6.020	DPT_Status_Mode3	8
7.001	DPT_Value_2_Ucount	16
7.002	DPT_TimePeriodMsec	16
7.003	DPT_TimePeriod10MSec	16
7.004	DPT_TimePeriod100MSec	16
7.005	DPT_TimePeriodSec	16
7.006	DPT_TimePeriodMin	16
7.007	DPT_TimePeriodrs	16
7.010	DPT_PropDataType	16
7.011	DPT_Length_mm	16
7.012	DPT_UEICurrentmA	16
7.013	DPT_Brightness	16
8.001	DPT_Value_2_Count	16
8.002	DPT_DeltaTimeMsec	16
8.003	DPT_DeltaTime10MSec	16
8.004	DPT_DeltaTime100MSec	16
8.005	DPT_DeltaTimeSec	16
8.006	DPT_DeltaTimeMin	16
8.007	DPT_DeltaTimers	16
8.010	DPT_Percent_V16	16
8.011	DPT_Rotation_Angle	16
9.001	DPT_Value_Temp	16
9.002	DPT_Value_Tempd	16
9.003	DPT_Value_Tempa	16
9.004	DPT_Value_Lux	16
9.005	DPT_Value_Wsp	16
9.006	DPT_Value_Pres	16
9.007	DPT_Value_umidity	16
9.008	DPT_Value_AirQuality	16
9.010	DPT_Value_Time1	16

9.011	DPT_Value_Time2	16
9.020	DPT_Value_Volt	16
9.021	DPT_Value_Curr	16
9.022	DPT_PowerDensity	16
9.023	DPT_KelvinPerPercent	16
9.024	DPT_Power	16
9.025	DPT_Value_Volume_Flow	16
...