'INTERRA

Developer of Uniqueness

KNX-SMA SEMP Gateway

Product Manual

Contents

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1. Content of The Document

This document contains Interra brandmark's ITS833-0001 KNX-SMA SEMP Gateway coded devices' electronic and all essential feature information for programming these products. Each subtitle explains the characteristics of the device. Modifications of the product and special change requests are only allowed in coordination with product management.

The widespread adoption of renewable energy sources and increasingly complex household energy consumption patterns have created a growing need for centralised energy management. In this context, the Sunny Home Manager (SHM) developed by SMA stands out as a device that optimises energy production and consumption, particularly in photovoltaic (PV) systems, with smart load management and data analysis capabilities. SHM transforms home energy management from a mere monitoring tool into an active optimisation process through production forecasting and automatic load scheduling functions.

Modern energy systems aim not only to monitor the balance between production and consumption but also to maximise energy efficiency through intelligent control and load management solutions. The SMA Sunny Home Manager is a leading smart energy management system that optimises PV production and household consumption. However, it conventionally operates only within the SMA ecosystem, supporting inverters, energy meters, and a limited number of smart consumers. The Interra KNX-SMA SEMP Gateway extends this capability by integrating KNX-based building automation devices into the same ecosystem. This allows KNX devices to benefit from the advanced forecasting, scheduling, and load optimisation features of the Sunny Home Manager.

By combining the widespread use of KNX in building automation with SMA's energy management solutions, the energy management of smart homes becomes more integrated. The Interra KNX-SMA SEMP Gateway bridges these two worlds, creating a scalable and flexible infrastructure that is ready for future energy market transformations. This integration optimizes not only the production-consumption balance but also the carbon footprint and energy costs.

The Interra KNX-SMA SEMP Gateway elevates energy management by integrating KNX devices into the SMA Sunny Home Manager ecosystem. This integration allows users to take advantage of advanced energy management functions such as active optimisation and automatic load scheduling, rather than just monitoring. As a result, both comfort and energy efficiency are improved, and the use of renewable energy is maximised.

2. Product Description

The Interra KNX-SMA SEMP Gateway is an interface device between KNX-based building automation systems and energy management systems such as the SMA Energy Manager. This device communicates via the SEMP (Simple Energy Management Protocol) to synchronise energy production, consumption, and load management information between the two systems. The SMA Energy Manager optimises energy usage by communicating with load devices through the SEMP protocol. At this point, the KNX-SMA SEMP Gateway acts like an intelligent load device and provides the SMA system with information such as the device's operating time range, maximum energy consumption, and status (on/off). Using this information, the SMA system allocates energy at the most appropriate times and controls the on/off operation of the relevant KNX devices (e.g., electric vehicle charging stations, heat pumps, water heaters, etc.) via the Gateway.

With this interface device, the Home Manager can operate KNX devices connected to the Gateway when solar energy production is high to utilise excess energy. Conversely, when consumption is high but production is low, it prevents KNX devices from operating to save energy.

The Interra KNX-SMA SEMP Gateway provides a solution that directly integrates KNX-based automation systems with SMA's energy optimization algorithms, enabling sustainable and efficient energy management. It ensures optimal use of solar energy, smart load management, and full compatibility of KNX-based homes or facilities with energy management systems.

The Interra KNX-SMA SEMP Gateway is designed to directly control up to 10 different KNX devices. This allows energy management strategies from the SMA Home Manager to be routed as load control signals to various KNX devices in a home or building automation system. For each KNX device, a maximum of 3 independent scheduling requests can be defined. These requests inform the SMA Energy Manager of the time windows and energy profiles in which the device can operate. As a result:

- Devices can be operated at different day/time combinations.
- The SMA system selects and applies the most suitable plan based on current energy production and consumption.
- The requested energy amount and the device's operating duration can be defined separately for each slot.

2.1. Technical Information

The following table shows the technical information of the KNX-SMA SEMP Gateway.

Product Code	ITS833-0001
Power Supply	KNX Power Supply
Power Consumption	< 25 mA
Push Buttons	1 x KNX Programming Button
LED Indicators	1 x KNX Programming LED 1 x KNX Power Indicator LED 1 x IP Link State LED 1 x IP Tx/Rx State LED 1 x KNX Tx/Rx State LED
IP Connection	RJ45 Ethernet Connector
Mode of Commissioning	S-Mode
Type of Protection	IP 20
Maximum Air Humidity	< 90 RH
Temperature Range	Operation (-5℃...45℃) Storage (-20℃...60℃)
Colour	Light Grey
Dimensions	35.3 x 90.6 x 58.5 mm (W x H x D)
Certification	KNX Certified
Configuration	Configuration with ETS

2.2. Smart Load Management in KNX Devices

The gateway registers KNX devices as consumers in the Sunny Home Manager. This allows::

- Loads such as washing machines, dishwashers, or electric heaters to be visible in the SMA portal, even if they are defined on the KNX line.
- The user to configure parameters for these loads via the portal, such as minimum runtime, flexible time windows, and daily operation counts.

The Home Manager determines the optimal operating time based on PV production forecasts and energy price signals, and automatically sends a triggering signal to the KNX device.

2.3. Energy Consumption Visualization

Energy meters connected to the KNX line are reported to the Home Manager via the gateway. This allows the following to be monitored in the Sunny Portal:

- Real-time consumption,
- Historical kWh graphs,
- Load-based energy distribution

This feature enables the user to view all consumption points in the KNX system on a single screen in the SMA portal.

2.4. User Benefits

- Making KNX devices visible in the SMA portal provides the user with the ability to monitor and control from a single point.
- Smart load shifting enables maximum use of PV energy within the home.
- Integrates into the SMA Home Manager ecosystem without modifying the existing KNX infrastructure.

Provides a ready-made framework for dynamic tariff, demand-response, and battery optimization scenarios.

2.7. Dimensions

All values given in the device dimensions are millimetres.

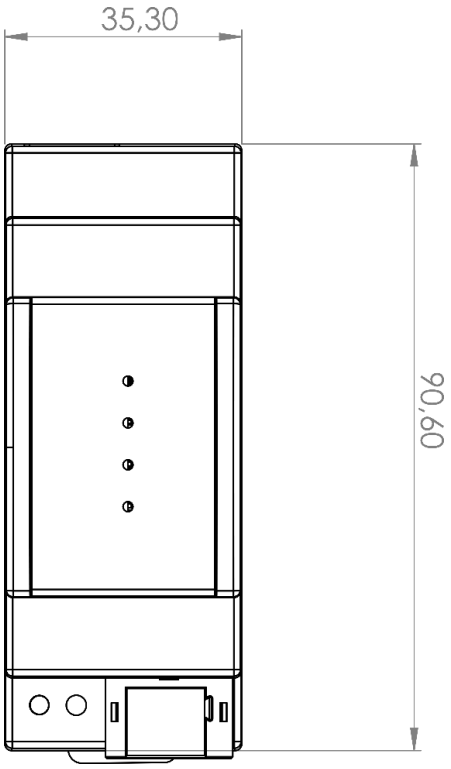

Fig. 1: Dimensions of the KNX-SMA SEMP Gateway from the top view

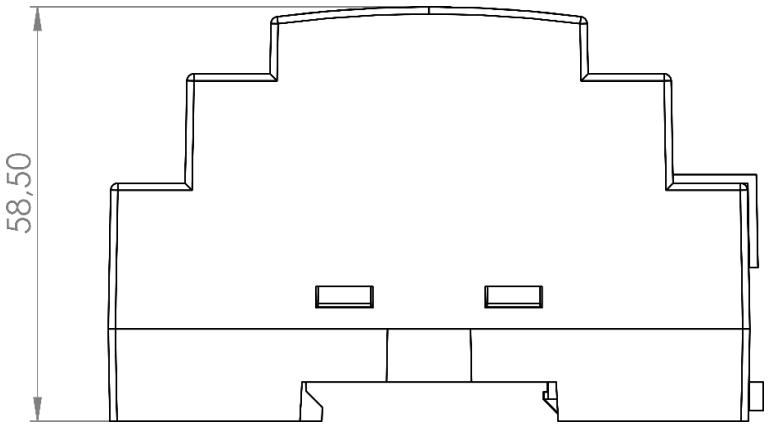

Fig. 2: Dimensions of the KNX-SMA SEMP Gateway from the side view

2.8. Feature and Connection Diagrams

Once the device is provided with a power supply from the KNX bus, both the physical address and the associated application program can be downloaded.

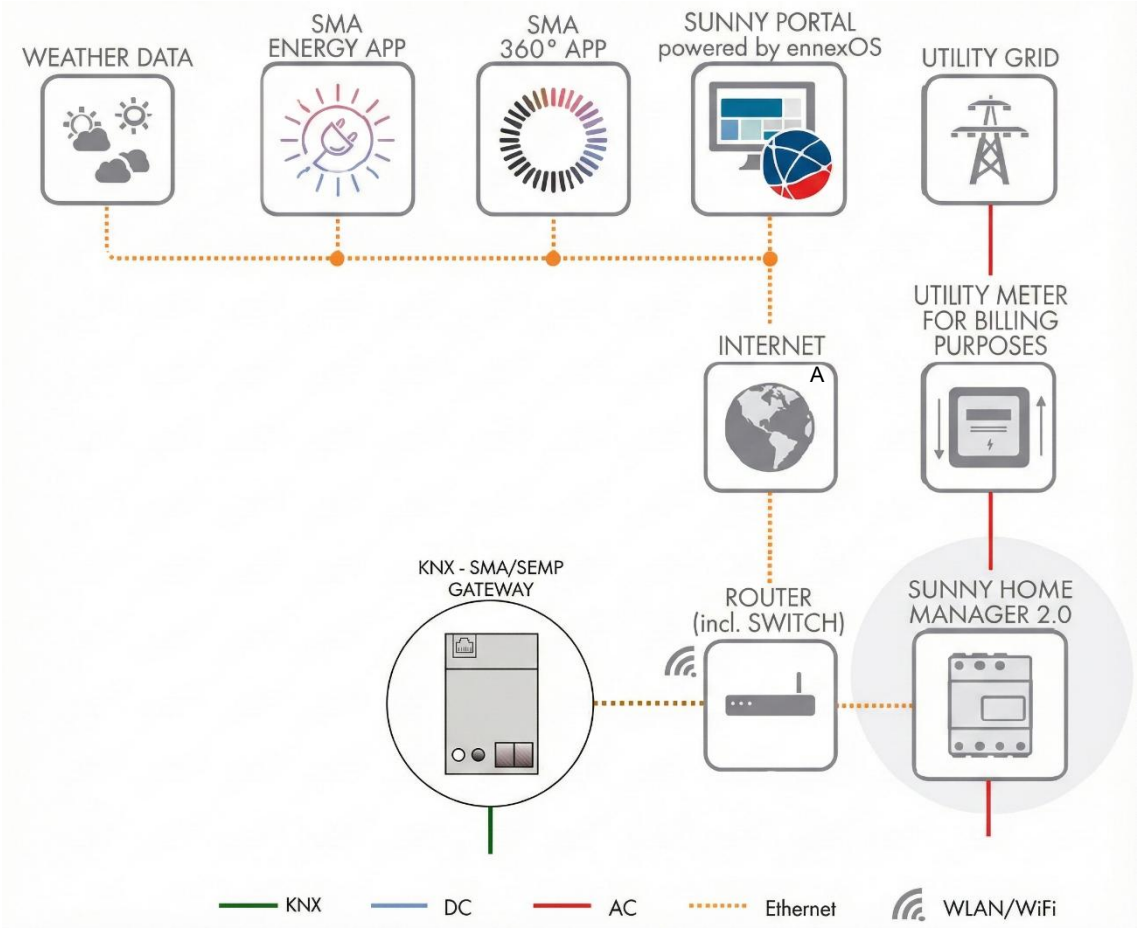

Fig. 3: Diagram of KNX-SMA SEMP Gateway

Connecting the KNX-SMA SEMP Gateway to the Router

I. Connect the network cable to the product's network terminal.

II. Connect the other end of the network cable to the router.

Fig. 4: Connection Diagram of the KNX-SMA SEMP Gateway to the Router

Connecting the KNX-SMA SEMP Gateway to the KNX Bus Line

I. Connect the gateway to the KNX power supply using the KNX Twisted Pair (TP) bus line.

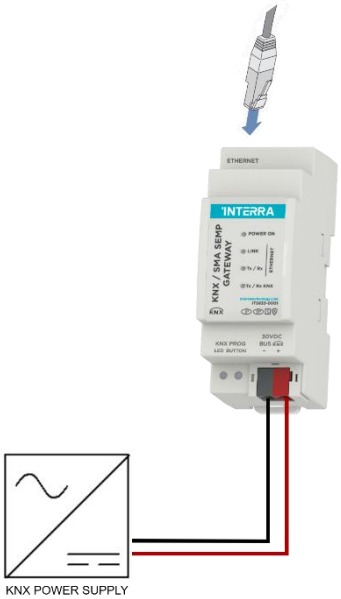

Fig. 5: Connection Diagram of the KNX–SMA SEMP Gateway to the KNX Bus

3. ETS Parameters & Descriptions

In this chapter, the ETS parameters of the KNX-SMA SEMP Gateway device are described using the parameter pages and options. The parameter page features are dynamic structures which means further parameters and parameter pages are enabled depending on the configuration and function of the groups.

In this section, a detailed description of the functional features of the device is given. All the parameters of the device are explained under the relevant headings.

In the ETS parameter configuration pages, each of the parameters has got a default parameter value. These default values are written in bold.

- E.g. : > Setpoint shifting ●**via parameter** via communication object

Special Notes

This is a fully compatible KNX device that must be configured and set up using the standard KNX tool ETS.

In the following sections, there is a detailed explanation about each of the different functionalities of KNX-SMA SEMP Gateway in ETS.

3.1. Information Page

This page provides information to assist the user regarding the ETS database.

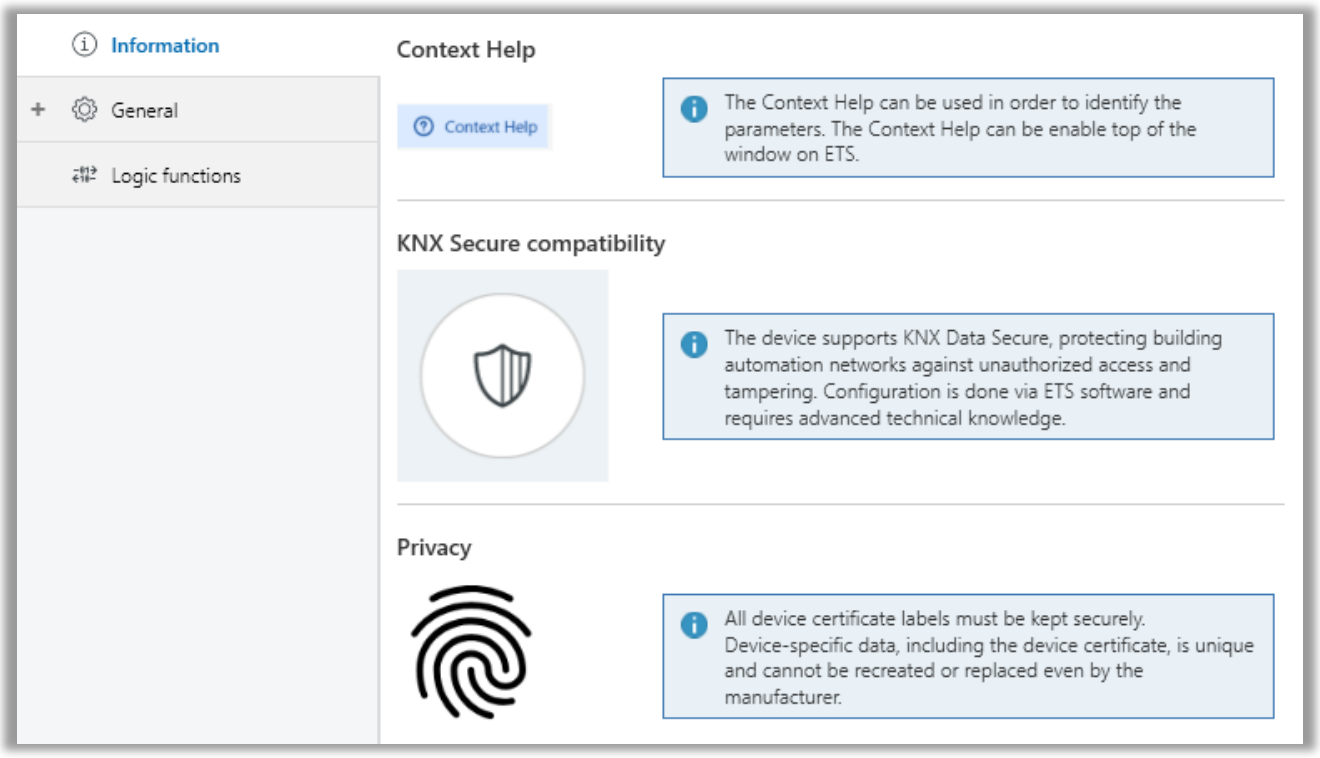

Fig. 6: Information Configuration Parameter Page

3.2. General Page

When added to a project from the ETS program, a configuration must first be performed before downloading. By selecting the “General” option on the parameter page, the configuration screen shown below will appear. General parameter settings for the entire device are configured in this window.

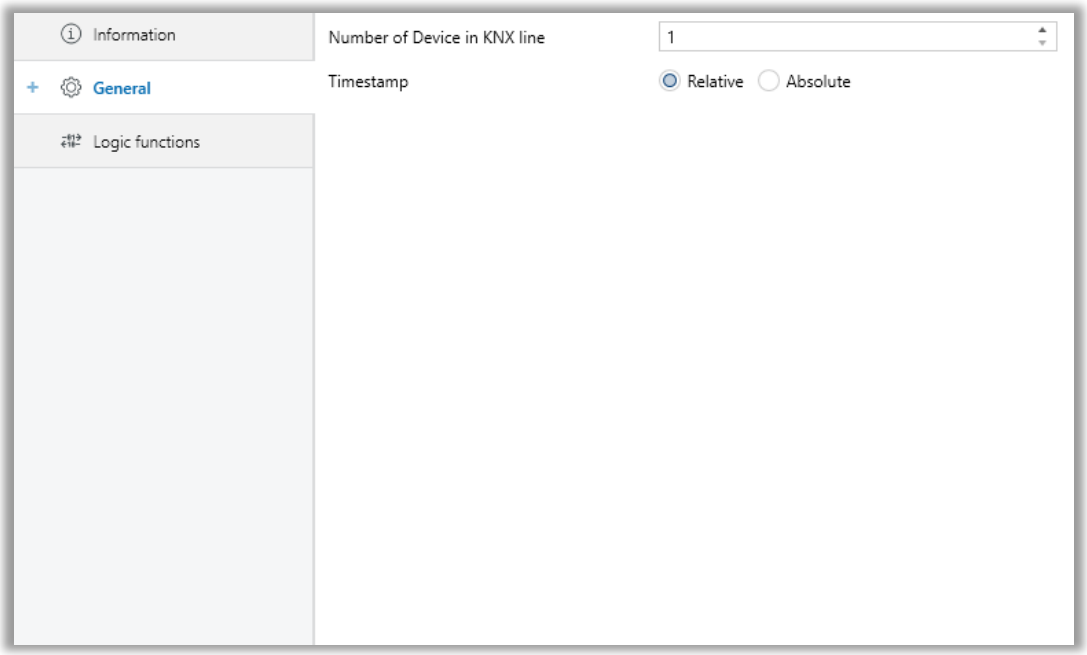

Fig. 7: General Configuration Parameter Page

When the Timestamp is set to Absolute, the UTC Time Offset parameter becomes available.

Relative Timestamp: The timestamp is defined as a relative duration from the time the message is sent. For example, if a KNX device is intended to operate 30 minutes later, it informs the SMA Energy Manager that it should run after the specified duration, regardless of the current time.

Absolute Timestamp: The timestamp is sent as a specific date and time. For example, if a KNX device is intended to operate at a precise time, such as 13:00, it informs the SMA Energy Manager that it requests operation at that exact time.

When the Timestamp parameter is set to Absolute, the UTC time synchronization must be selected correctly for the region. For example, for Turkey, the UTC+03 offset must be chosen. Entering this parameter correctly is essential to ensure that devices operate at the desired time.

3.2.1. Parameters List

PARAMETERS	DESCRIPTION	VALUES
Number of Device in KNX line	The “Number of Devices in KNX Line” parameter defines how many KNX devices the interface device can control. Parametric configurations and communication objects are created for each defined device. This allows the parameters of each device to be configured, and the communication objects for each device can be linked to the corresponding objects on the KNX line. Up to 10 KNX devices can be controlled via the Home Manager.	**1** … 10
Timestamp	The Timestamp parameter can be set to either Relative or Absolute. The timestamp defines when devices should start or stop operation. The device must determine whether it sends and receives absolute or relative timestamps. The SMA Home Manager evaluates this option to determine which time format to use when communicating with the device.	**Relative** Absolute
-> UTC Time Offset	The UTC offset is the difference between Coordinated Universal Time (UTC) and the local time for a specific location and date. This offset varies depending on the geographical location of the country.	UTC-12 UTC-11 UTC-10 . . UTC+13 UTC+13:45

[1] This parameter is visible when the function “Timestamp” is set to “Absolute”.

3.2.2. Device X

Device-specific definitions can be made on the device page. This section has the same features for all other devices. Device definitions are used to transmit information to the web portal via the SMA Home Manager.

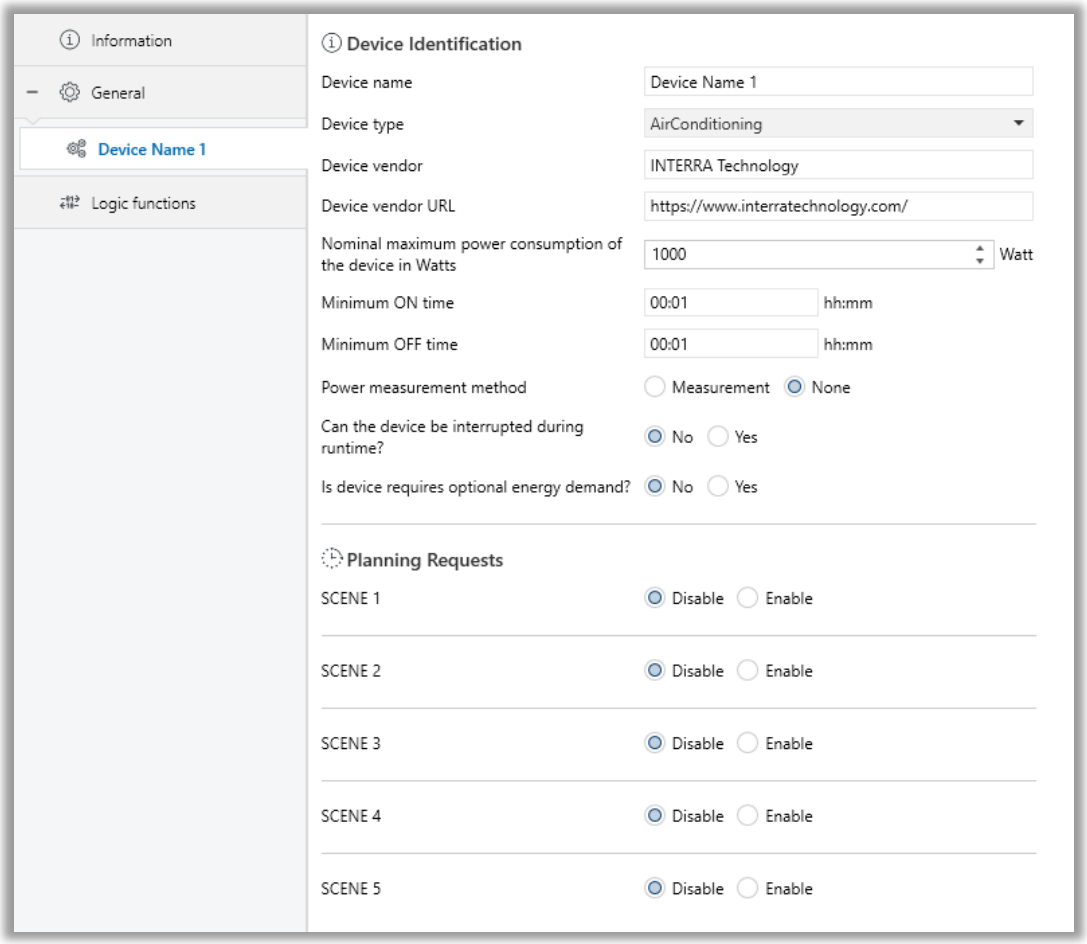

Fig. 8: Device X Configuration Parameter Page

For the SMA Energy Manager to perform accurate energy management, it is crucial that the power information provided by the device is correct and reliable.

When “Measurement” is selected, the datapoint type (DPT) of the communication object providing measurement output from the KNX energy meter can be configured via the “Energy meter DPT” parameter.

If the device cannot determine power consumption in any way, the value “None” should be used. In this case, the energy consumption of the KNX device is reported to the Energy Manager solely based on the value specified in the “Nominal maximum power consumption of the device in Watts” parameter.

3.2.2.1. Scene X (Planning Request)

The time scheduling parameters of the KNX device can be configured using pre-defined Scene settings. With this system, parameters such as Earliest Start Time, Latest End Time, Minimum Run Time, and Maximum Run Time can be preset, and these ready-made Scenes can be called instantly while the device is operating. Up to 5 Scene profiles can be created in total. This feature provides flexible and efficient time management in KNX integration.

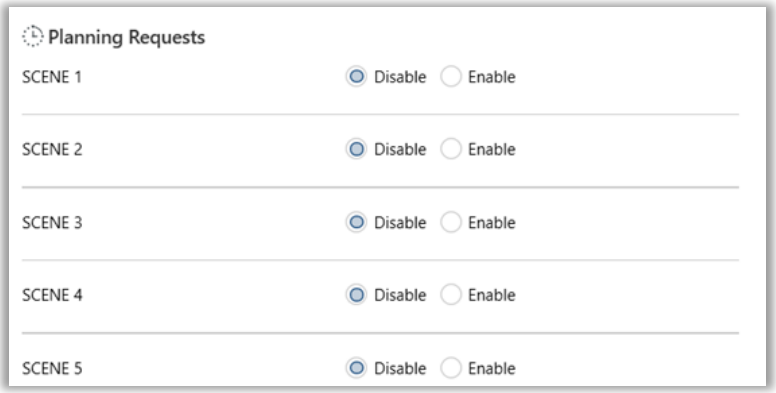

Fig. 9: Scene X Configuration Parameter Section

The functional behaviour of the parameters within a Scene varies according to the selected timestamp. If the Timestamp parameter is set to “Relative,” the configured Scene parameters operate relative to the current runtime.

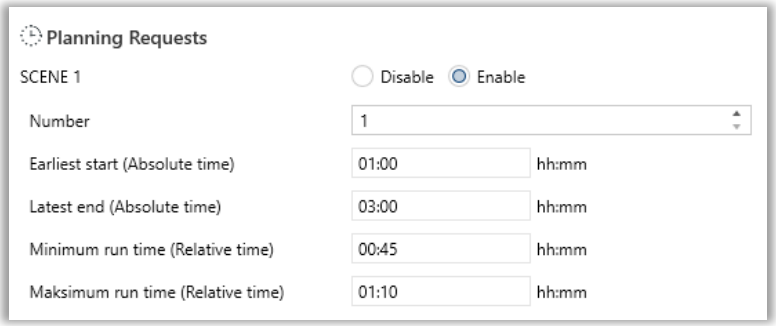

Fig. 10: Scene X Configuration Parameter Section

In the following example parameter configuration:

Earliest start: 01:00

Latest end: 03:00

Minimum run time: 00:45

Maximum run time: 01:10

The device is required to start operating **no earlier than 1 hour from the current time** and must operate for **at least 45 minutes**. Since the **Timestamp** type is set to **Relative**, no absolute time reference (e.g. 13:00) is available.

Optionally, the device may operate for **up to 1 hour and 10 minutes** if conditions allow.

When the **Timestamp** parameter is set to **"Absolute"**, the configured **Scene** parameters operate according to the **local time zone**.

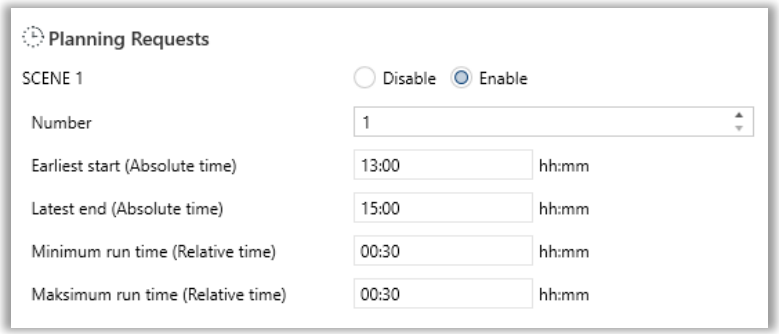

Fig. 11: Scene X Configuration Parameter Section

In the following example, parameter configuration:

Earliest start: 13:00

Latest end: 15:00

Minimum run time: 00:30

Maximum run time: 00:30

The device is required to operate for a total of 30 minutes, with the earliest possible start time at 13:00 and the operation completed by 15:00 at the latest. In this case, the Energy Manager (EM) schedules the 30-minute operating period within the 13:00–15:00 time window.

3.2.2.2. Parameters List

PARAMETERS	DESCRIPTION	VALUES
Device name	The **Device name** parameter is the **identifier name** of the KNX device reported to the **SMA Home Manager** via the **SEMP protocol**. This name is displayed in SMA interfaces (e.g. *Sunny Portal*, *SMA WebUI*) to indicate the device's purpose, location, and type, allowing the user to easily identify the device.	54 bytes allowed
Device type	The **Device Type** parameter defines the type of the controlled load. The predefined load type parameters of the KNX device can be used for this classification.	**AirConditioning** Charger DishWasher Dryer ElectricVehicle EVCharger Freezer Fridge Heater HeatPump Motor Pump WashingMachine Other
Device vendor	The **UTC offset** represents the time difference between **Coordinated Universal Time (UTC)** and the **local time** for a specific location and date. This value varies depending on geographical location and time zone.	**UTC-12** **UTC-11** **.** **.** **UTC+13** **UTC+13:45**
Device vendor	The **Device vendor** parameter identifies the **manufacturer** of the device defined within the **SEMP protocol**. The manufacturer name of the controlled device (e.g. *Toshiba, Gree, Bosch*, etc.) should be entered in this field.	**…**
Nominal maximum power consumption of the device in Watts	The Nominal maximum power consumption of the device in Watts parameter defines the maximum power consumption (in watts) of the device controlled via the KNX bus. The Energy Manager (EM) uses this value when creating the initial scheduling plan for the device. The value should be set according to the electrical specifications of the controlled device.	**0 ... 65535**

Minimum ON time	The **Minimum ON time** parameter defines the **minimum operating duration** of the device after it is switched on (or when a pause state is released). The device cannot be switched off or paused again until the configured time has elapsed.	**00:01 ...** 23:59
Minimum OFF time	The **Minimum OFF time** parameter defines the **minimum duration the device must remain switched off** after being turned off. The device cannot be switched on again until the configured time has elapsed.	**00:01 ...** 23:59
Power measurement method	The **Power measurement method** parameter defines **how the current power consumption information is obtained**. It specifies how the power consumed by the KNX device is reported to the **SMA** system when the device state switches to **ON**. If the instantaneous power value is provided by a **KNX energy meter**, the **"Measurement"** option must be selected. When this option is enabled, the corresponding communication object must be linked to the relevant measurement object of the KNX energy meter.	**None** Measurement
-> Energy meter DPT[1]	This parameter becomes active when the **"Power measurement method"** parameter is set to **"Measurement"**. It is used to select the **datapoint type** for energy measurement data.	DPT-13.010 active energy (Wh) DPT-13.013 active energy (kWh) **DPT-14.056 power (W)**
Can the device be interrupted during runtime?	This parameter indicates whether the device can be **stopped (paused) during operation**. This capability enables more flexible energy management. For example, the **Energy Management System (EM)** may temporarily pause the device and resume it later in cases of unexpected adverse weather conditions or when the user operates another device with conflicting energy demand. This parameter should be set to **"No"** only if the device operation **cannot be interrupted**. **No**: Once started, the device cannot be stopped and will only stop after completing its task. **Yes**: The device can be paused, providing flexibility for energy management.	**No** Yes

Is device requires optional energy demand?	This parameter indicates whether the device supports **optional energy consumption**. Optional energy refers to energy that can be assigned to the device but is **not required** for its basic operation. **No**: The device consumes only the mandatory energy required for operation. **Yes**: The device supports flexible energy consumption and may store or use additional energy.	**No** Yes
Scene[2]		
Scene 1,…,5	This parameter is used to enable or disable the associated scenario.	**Disable** Enable
Number	Defines the scene number. The scene number must be **unique for each device**.	**1** … 255
Earliest start	Defines the **earliest time** at which the device may be switched on by the **Energy Manager (EM)**. The combination of **Earliest Start** and **Latest End** specifies the time window in which the requested operating time or energy must be allocated by the EM. This parameter represents a type that can be either **relative** (in seconds relative to the current time) or **absolute** timestamps.	**00:00 … 23:59**
Latest end	Defines the **latest possible end time** by which the requested minimum operating time must be assigned to the device. This means that the device operation must be completed by the specified time. If an operating time is requested, the **latest possible start time** is calculated as **LatestEnd – MinRunningTime**. The combination of **Earliest Start** and **Latest End** defines the time window in which the **Energy Manager (EM)** must allocate the requested operating time or energy.	**00:00 … 23:59**
Minimum run time	Defines the minimum operating time within the specified time interval. If MinRunningTime is set to 0, operation of the device within this time interval is optional.	**00:00 … 23:59**
-> Maximum run time[3]	Defines the maximum operating time within the specified time interval. • If MinRunningTime equals MaxRunningTime, the entire defined operating time is mandatory.	**00:00** … 23:59

	• If MinRunningTime is less than MaxRunningTime, the operating time defined by MinRunningTime is mandatory, while the time difference between MinRunningTime and MaxRunningTime is optional. In this case, the Energy Manager (EM) assigns the optional operating time to the device only when certain conditions—such as ecological constraints and/or energy pricing—are fulfilled. Note: If MinRunningTime is configured, the default value is MinRunningTime.	

[1] This parameter is visible when the function “Power measurement method” is set to “Measurement”.
[2] This section is visible when the function “Scene1,…,5” is set to “Enable”.
[3] This parameter is visible when the function “Is device requires optional energy demand?” is set to “Yes”.

3.3. Logic Functions

Smart building applications gain efficiency through the processing of data from field devices and making automatic decisions based on this data. While traditional relay-based systems offer only simple on/off logic, modern automation systems enable much more complex scenarios with support for conditional logic, scheduling, and mathematical operations. In this context, Logic Extension modules stand out as distributed control elements capable of making local logical decisions without burdening the central controllers.

Logic gates are fundamental logical structures that process multiple input signals and produce an output when a specific condition is met. Each channel offers customisation for 8 sub-channels within itself. In total, 64 different channels can be customised. Each channel can be configured as a Logic Gate, Trigger (Condition), Sequence (Scenario/Step Tracking), or Math (Mathematical Operation).

- Various KNX objects (button, sensor, time signal, etc.) can be used as inputs.
- Different logical operations (AND, OR, XOR, etc.) can be applied.
- Functions such as timing, inversion, and delay can be defined.
- Outputs send information to other KNX devices or actuators in the system.

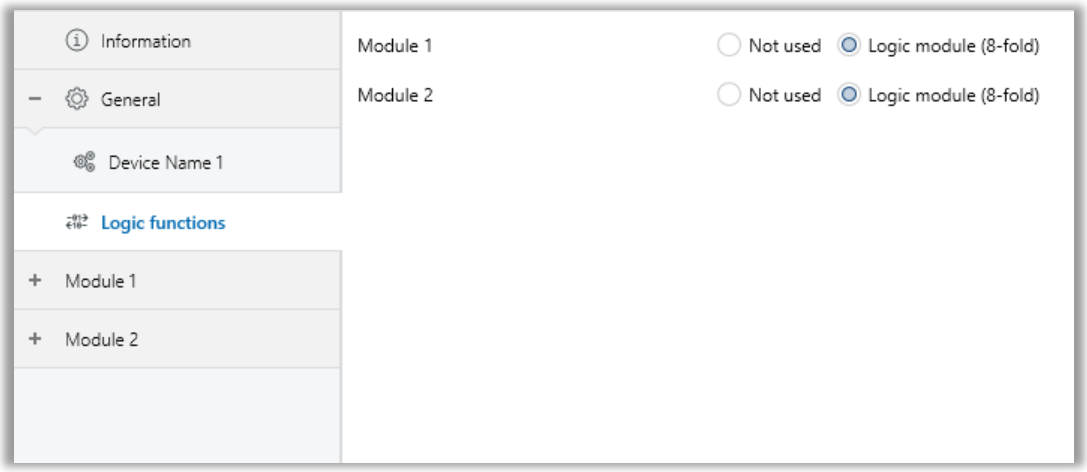

Fig. 12: Logic Functions Configuration Parameter Page

3.3.1. Parameter List

PARAMETERS	DESCRIPTION	VALUES
Module 1/2	This parameter is used to enable or disable the Module.	Not Used Logic module (8-fold)

3.3.2. Channels Use

Each channel can operate in four different functions: Logic Gates, Sequence, Trigger, and Math. On this page, the desired function is selected for each channel.

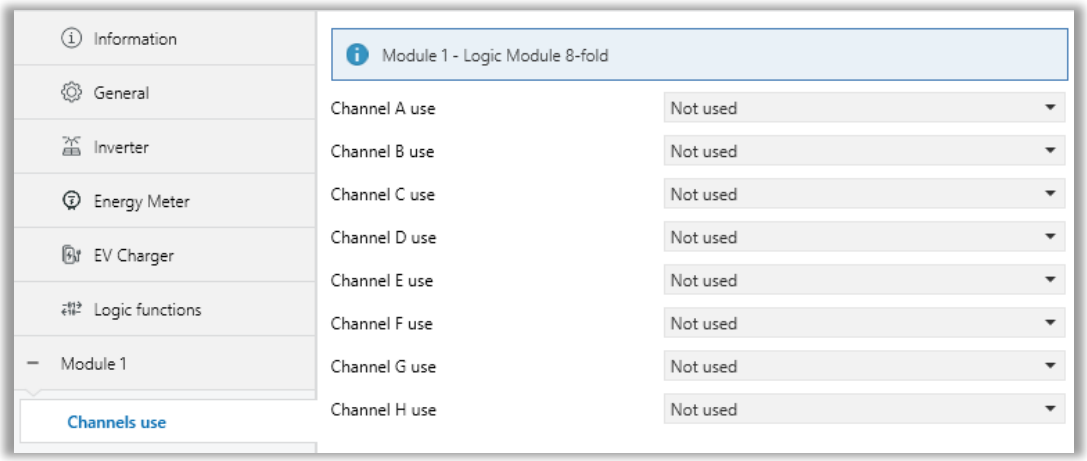

Fig. 13: Logic Functions – Channel Use Configuration Parameter Page

3.3.2.1. Parameter List

PARAMETERS	DESCRIPTION	VALUES
Channel A…H use	This parameter is used to select the channel function.	**Not Used** Logic Gates Sequence Trigger Math

3.3.3. Logic Gates X

Logic gates are fundamental logical structures that process multiple input signals and produce an output when a specific condition is met. Thanks to the Logic Gate feature in the Logic Extension module, logical operations can be applied to up to 8 different input objects on the KNX line.

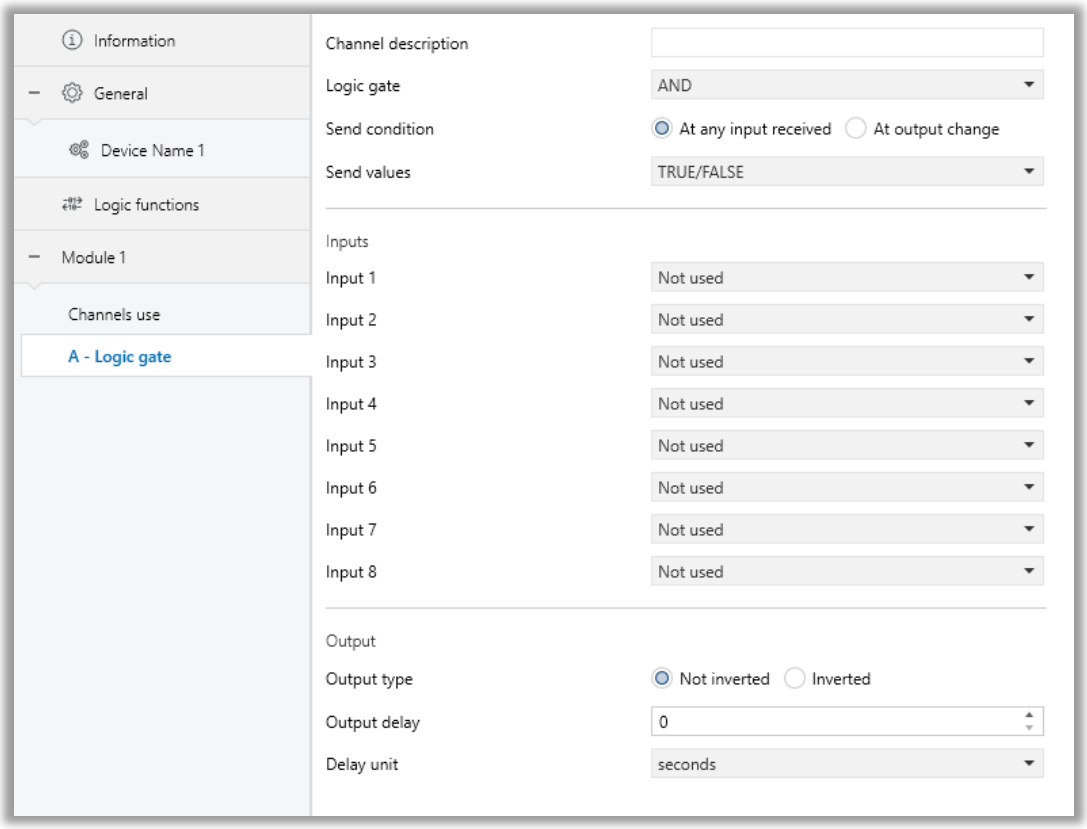

Fig. 14: Logic Gate Configuration Parameter Page

The status of the output of logic gates can be shown not inverted or inverted. This configuration can be applied via the parameter “Output behaviour” and when it is parameterized as inverted, the status of the output is shown inverted.

Through the parameter “Send status on”, the type of feedback can be defined. The gateway allows sending the result of logic gates when the conversely logic output is changed or when one of the logic inputs is modified. Additionally, it is possible to define a cyclic sending of the feedback which permits getting information about the output status periodically.

The logic output can operate with previously configured delays. The logic output takes the values ON and OFF with delays. Depending on the switch delay parameters configuration, it is possible to set an ON delay (TON), and an OFF delay (TOFF) or both at the same time.

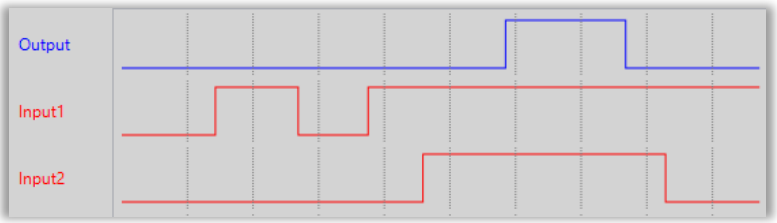

Fig. 15: Logic Gate with Delays

3.3.3.1. Parameters List

PARAMETERS	DESCRIPTION	VALUES
Channel description	This parameter helps the user to identify the channel.	30 bytes allowed
LOGIC GATE X		
Logic Gate	This parameter is used to specify the type of logical gate to be used. There are 3 different logic gate types, AND, OR and XOR. Each logical gate generates a false or true value at its output as a logical association result.	**AND** OR XOR
Send condition	This parameter is used to determine the logic function block result sending status to the KNX bus. **At any input received:** The output value is recalculated whenever any input changes, and if it has changed, it is sent. **At output change:** The telegram is sent only if the output value changes, resulting in lower traffic.	At any input received At output change
Send values	Specifies the format of the value to be sent. It is used only when output is desired under a single condition.	**TRUE/FALSE** Only TRUE Only FALSE
InputX (Inputs)	Each input is associated with a KNX group address assigned via ETS. Inputs that will participate in the logical operation can be activated, and their values can be inverted. **Not inverted:** The input value is used directly. **Inverted:** The input value is inverted.	**Not used** Not inverte Inverted
Output type	This parameter defines the behaviour of the logic output. **Not inverted:** The output value is used directly. **Inverted:** The output value is inverted..	**Not inverted** Inverted
Output delay	The output signal is sent with a defined delay. The duration and unit are specified via ETS.	**00**
Delay unit	The unit of the output signal duration is selected. 100 ms, seconds, or minutes can be chosen. The output delay * delay unit defines the total delay time of the output.	**100 ms** seconds minutes

3.3.4. Sequence

In situations where sequential operations need to be executed at specific time intervals or as a result of trigger signals, the Logic Extension – Sequence function used in KNX systems comes into play. Through this structure, various types of outputs can be generated consecutively according to the triggering conditions, and time-based scenarios can be easily implemented. The Sequence feature of the Logic Extension module provides high flexibility. With advanced data type support, it can be reliably used not only for lighting but also in HVAC, security, visual notification, and comfort scenarios.

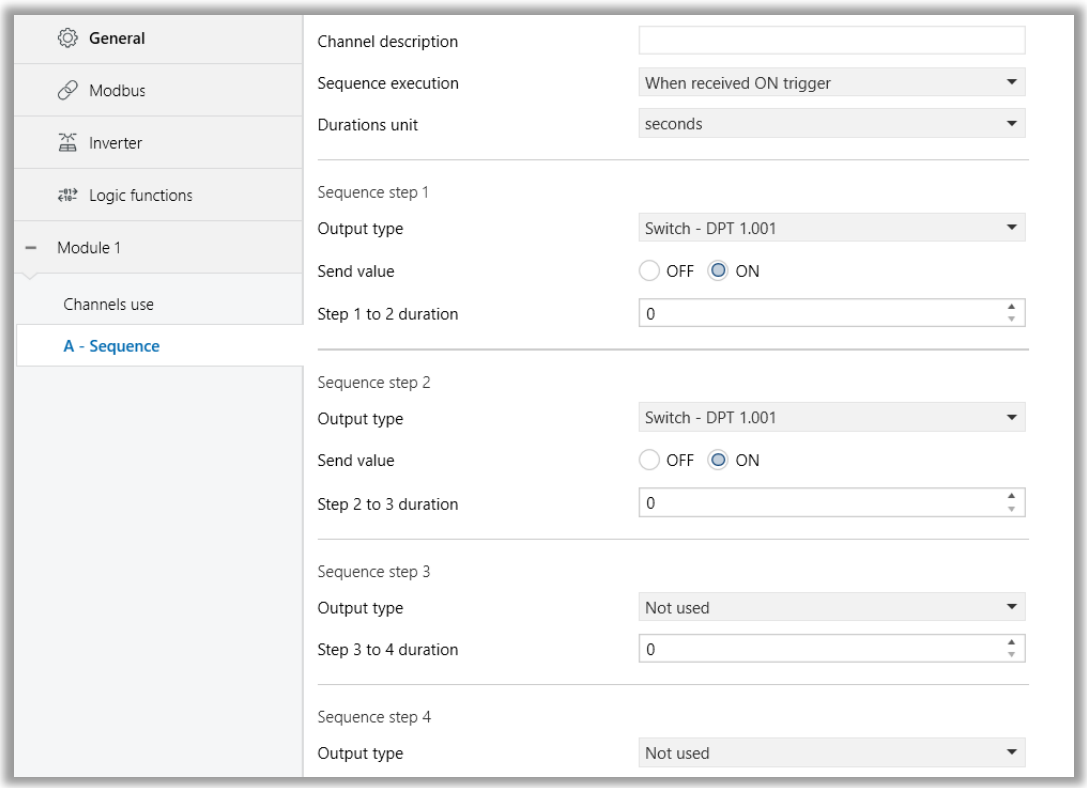

Fig. 16: Sequence Configuration Parameter Page

The Sequence function executes up to **four steps** in order, each with a different data type and output value. These steps are triggered sequentially when the defined trigger condition occurs. A waiting time can be defined at the end of each step.

Multiple Sequence channels can be defined within the module, and each operates independently.

- Timed and sequential operations can be easily configured.
- Local control can be performed without the need for central control devices.
- A wide range of data types are supported, such as lighting, scene control, blinds, and temperature.
- With the “Cyclic” mode, decorative, warning, or effect-based operations are possible.

Example Scenario – “Morning Routine”-- Execution Mode: When Received ON trigger

Step	Output Type	Value	Description
1	Switch - DPT 1.001	ON	Open the blinds.
2	Scene - DPT 18.001	1	Activate the kitchen scene.
3	Percent - DPT 5.001	%50	Set the light level
4	Tunable White	Temp: 20%, Bright: 80%	Adjust to warm white light

3.3.4.1. Parameters List

PARAMETERS	DESCRIPTIONS	VALUES
Channel description	This parameter helps the user to identify the channel.	30 bytes allowed
Sequence Execution	Determines when the Sequence will be triggered. In Cyclic modes, after the sequence reaches the last step, it returns to the beginning and continues as long as the trigger input remains unchanged. **When Received ON trigger:** The sequence starts when an ON command is received. **When Received OFF trigger:** The sequence starts when an OFF command is received. **When Received ON or OFF:** The sequence operates in both cases. **Cyclic while ON:** Steps are repeated cyclically while in the ON state. **Cyclic while OFF:** Steps are repeated cyclically while in the OFF state.	**When Received ON trigger** When Received OFF trigger When Received ON or OFF Cyclic while ON Cyclic while OFF
-> Duration between cyclic execution[1]	The send cycle time describes the time used between cyclically transmitted telegrams.	**0**…255
Durations Unit	Defines the unit of the delay time between steps.	100 ms **seconds** minutes
Sequence Steps (Step X)	Each Sequence channel can contain 4 steps. Steps can be disabled or configured with different datapoint types.	Each step is data-type independent and can be configured individually.
Output type	This parameter determines the sequence output type.	**Switch - DPT 1.001** Scene - DPT 18.001 Percent value - DPT 5. RGB color value Tunable white value 1-byte value - DPT 5.005 2-byte unsigned - DPT 7.xxx

		2-byte signed - DPT 8.xxx 2-byte float - DPT 9.xxx
Send value	Specifies the value to be output.	Can be customized according to each data type.
Step 1 to 2 duration (Step X to Y duration)	Defines the duration of the transition between steps. The unit is set via the **Duration Unit** parameter. The value * Duration Unit defines the total transition time.	0…255

[1] This parameter is visible when the function “Sequence execution” is set to “Cyclic while ON” or “Cyclic while OFF”.

3.3.5. Trigger

This function, integrated into the Logic Extension module, evaluates two separate input signals according to a defined logic rule. When the conditions specified in this rule are met, an output signal is generated. By logically processing the input conditions and producing an output only when required, this structure significantly enhances system safety, energy efficiency, and user comfort.

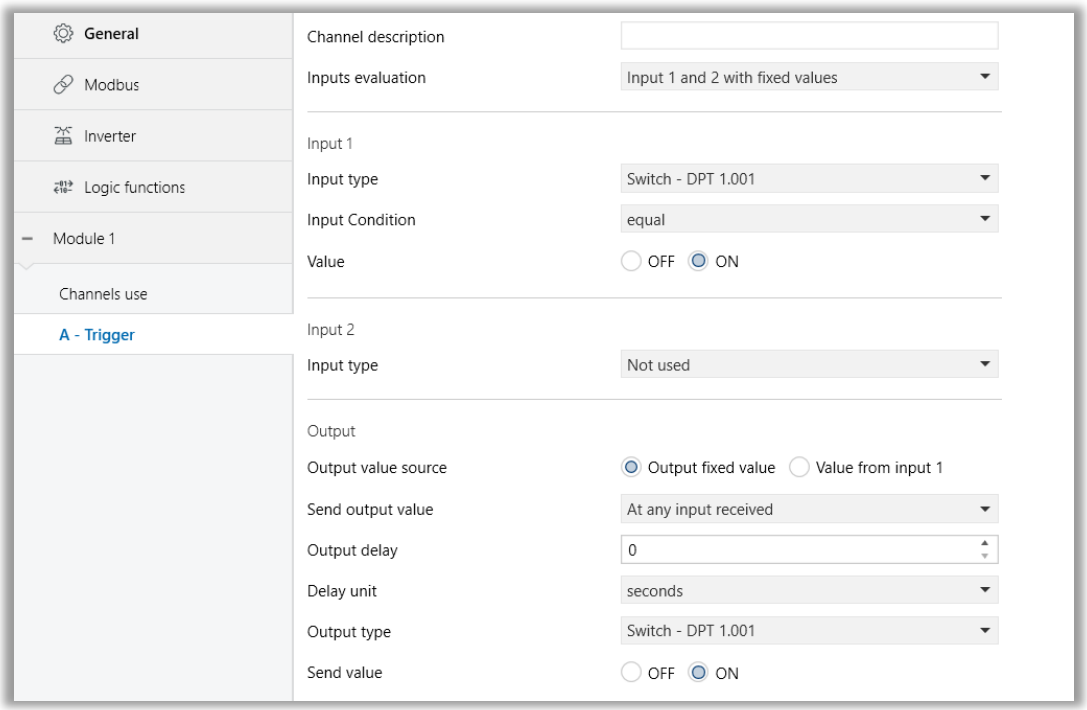

Fig. 17: Trigger Parameter Page

Trigger channels can be applied in various scenarios, including security systems, energy management, lighting control, HVAC integration, and more.

The Trigger function evaluates one or two KNX objects based on configured conditions and, when the conditions are met, transmits a defined value to the KNX bus as an output.

Operational Steps:

1. Input data is received from Input 1 and Input 2.
2. The defined comparison conditions are evaluated.
3. If the condition is satisfied, the logical operation (e.g., AND, OR) is applied.
4. When the appropriate trigger condition occurs, the output value is transmitted.

Example Scenario – Security Alarm Control

Parameter	Value
Input 1	Door sensor (Switch, ON)
Input 2	Alarm active status (Switch, ON)
Logic	AND
Output Type	Switch (ON)
Output Delay	2 seconds
Output Trigger	At any input received

Description: When the door is opened and the system is in “Alarm Active” state, the alarm siren is triggered after a 2-second delay.

Application Examples

- **Scene Triggering:** Activating a scene based on curtain position combined with a time condition.
- **Energy Management:** Shutting down HVAC according to consumption threshold and time schedule.
- **Security:** Activating an alarm only when both motion and door sensors are triggered.
- **Lighting:** Controlling lights based on a combination of sunlight level and occupancy detection.

When Timestamp is set to Absolute, the UTC Time Offset parameter must be configured correctly according to the regional time zone. With this type selected, the Weekday, Hour, and Minute parameters become active. The desired day, hour, and minute at which the trigger should be generated must be defined using these parameters. The Input received option must not be selected for the Send output value parameter.

When Weekly Calendar is selected as the input type, no communication object is enabled; therefore, no input telegram can be received. In this case, the Once at valid output conditions option must be used for the Send output value parameter.

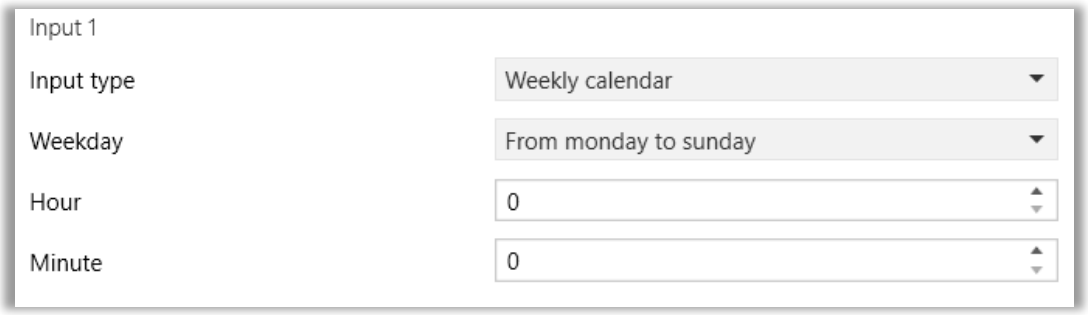

Fig. 18: Weekly calendar section

3.3.5.1. Parameters List

PARAMETERS	DESCRIPTION	VALUES
Channel description	This parameter helps the user to identify the channel.	30 bytes allowed
Inputs Evaluation	Determines the evaluation methodology for input values. Input parameters can be assigned as fixed parametric values or configured for comparative operations with other KNX objects. **Input 1 and 2 with fixed values:** Both input parameters are assigned predetermined values as static parametric configurations. **Input 1 with fixed / Input 2 with comparative object:** Input 1 value is configured as a fixed parameter, while Input 2 value is retrieved via KNX communication protocol. **Input 2 with fixed / Input 1 with comparative object:** Input 1 value is configured as a fixed parameter, while Input 2 value is retrieved via KNX communication protocol. **Input 1 and 2 with comparative objects**: Both input parameters are evaluated based on values received from alternative group addresses.	**Input 1 and 2 with fixed values** Input 1 with fixed / Input 2 with comparative object Input 2 with fixed / Input 1 with comparative object Input 1 and 2 with comparative objects
Input Type	Utilized for defining the KNX data type specification.	Not used **Switch – DPT 1.001** Scene – DPT 18.001 Percent value – DPT 5.001 1-byte value – DPT 5.005 2-byte unsigned – DPT 7.xxx 2-byte signed – DPT 8.xxx 2-byte float – DPT 9.xxx 4-byte unsigned – DPT 12.xxx 4-byte signed – DPT 13.xxx 4-byte float – DPT 14.xxx Weekly calendar
Input Condition[1]	The comparison methodology is established through this parameter. The system performs comparisons against either fixed values or values retrieved from	**equal** greater than less than unequal

	alternative objects, depending on the Input Evaluation parameter selection.	greater or equal less or equal Always true
Value[2]	When "Input evaluation" parameter is configured to Input X fixed mode, this function enables parametric fixed value assignment according to the data type specified in the "Input type" parameter.	Can be customized according to the data type.
Logic between input 1 and 2	Defines the logical operation to be executed following the evaluation of Input 1 and Input 2 parameters. **AND:** Both conditional parameters must be satisfied simultaneously. **OR:** At least one conditional parameter must be satisfied. **XOR:** At least one conditional parameter must be satisfied. **NAND:** Inverse operation of the AND function. **NOR:** Inverse operation of the OR function. **XNOR:** Inverse operation of the XOR function.	**AND** OR XOR NAND NOR XNOR
Output Value Source	Determines the source configuration for the output value generation. **Output fixed value:** The output transmits a predetermined fixed value (e.g., ON state). **Value from input 1:** The output value is determined based on the Input 1 parameter value.	**Output fixed value** Value from input 1
Send Output Value	The conditions specified in the "Send output value" parameter are subject to modification based on system requirements and operational scenarios. **At any input received:** Used when output triggering is required upon the reception of any input signal. This option is suitable when the output must be generated immediately after data is received from any connected sensor or input source. Example: Security systems where an alarm is triggered upon detection from any motion sensor. **At input 1 received only:** Used when output transmission is required exclusively upon reception of Input 1. No output is generated when other inputs are received. **At input 2 received only:** Used when output transmission is required exclusively upon reception of Input 2. No output is generated when other inputs are received.	**At any input received** At input 1 received only At input 2 received only Once at valid output conditions Once at valid input 1 condition only Once at valid input 2 condition only

	Once at valid output conditions: Used when output transmission is required only once, at the moment when the defined output conditions are met for the first time. This prevents repeated triggering and is suitable for single-event notifications. *Example:* A heating system sending a single notification when a predefined temperature threshold is reached. **Once at valid input 1 condition only:** Used when output transmission is required only once, upon the initial fulfillment of the conditions defined for Input 1. *Example:* Displaying a welcome message when a user presses a button for the first time. **Once at valid input 2 condition only:** Used when output transmission is required only once, upon the initial fulfillment of the conditions defined for Input 2.	
Output Delay	Activates a delay before output signals are transmitted.	**0**…255
Delay unit	Defines the time unit used for the delay between consecutive steps.	100 ms **seconds** minutes
Output Type	Specifies the data type of the output telegram. This parameter is visible only when the “Output value source” parameter is set to “Output fixed value”.	**Switch – DPT 1.001** Scene – DPT 18.001 Percent value – DPT 5.001 1-byte value – DPT 5.005 2-byte unsigned – DPT 7.xxx 2-byte signed – DPT 8.xxx 2-byte float – DPT 9.xxx 4-byte unsigned – DPT 12.xxx 4-byte signed – DPT 13.xxx 4-byte float – DPT 14.xxx
Send value	Defines the value transmitted in the output telegram. This parameter is visible only when the “Output value source” parameter is set to “Output fixed value”.	The available configuration options depend on the selected data type.

[1] This parameter is visible when the function “Input type” is not set to “Not Used”.

3.3.6. Math

This module calculates the results of mathematical operations applied to input values. Arithmetic functions such as addition, subtraction, division, and other calculations can be performed between input values, and the resulting output is transmitted to the KNX bus via the corresponding communication object.

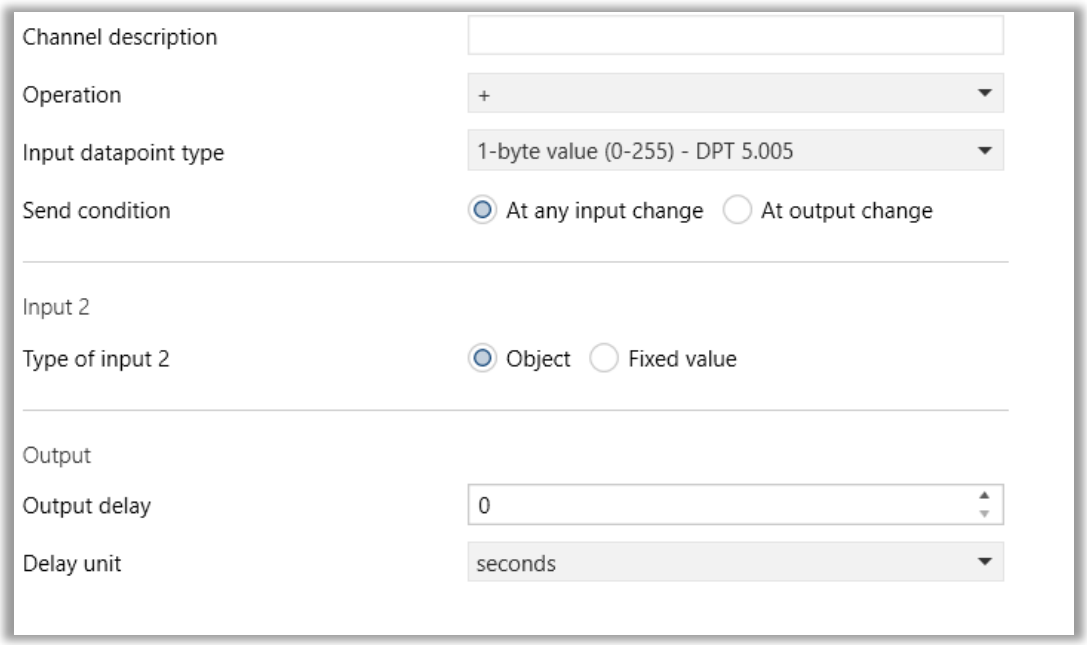

Fig. 19: Math Configuration Parameter Page

3.3.6.1. Parameters List

PARAMETERS	DESCRIPTION	VALUES
Channel Description	This parameter helps the user to identify the channel.	30 bytes allowed
Operation	This parameter is used to select the mathematical operation to be applied between the input values. **+** : Addition operation **–** : Subtraction operation ***** : Multiplication operation **/** : Division operation **Minimum**: The smallest value among the input values is selected. **Maximum**: The largest value among the input values is selected. **Average**: The arithmetic mean of the input values is calculated.	**+** - * / Minimum Maximum Average
Input Datapoint Type	This parameter is used to select the data type of the inputs.	Percent value (dimming, shutter, slats,) - DPT 5.001 **1-byte value (0-255) - DPT 5.005** 2-bytes unsigned value - DPT 7. * 2-bytes signed value - DPT 8. * 2-bytes float value - DPT 9. * 4-bytes unsigned value - DPT 12. * 4-bytes signed value - DPT 13. * 4-bytes float value - DPT 14. *
Send Condition	This parameter defines the condition under which the output telegram is transmitted. **At any input change:** Whenever a change occurs in any input (Input 1 or Input 2), the output value is recalculated. If the calculated value differs from the previous one, a telegram is sent. **At output change:** A telegram is transmitted only when the output value changes. This option reduces KNX bus traffic.	**At any input change** At output change

Type of Input 2	Input 2 can participate in the mathematical operation either via a communication object or by using a predefined parametric value. **Object:** Input 2 value is retrieved from KNX communication object. **Fixed value:** Input 2 value is configured parametrically, and mathematical operations are performed using this predetermined value.	**Object** Fixed value
-> Value[1]	When "Type of input 2" parameter is configured to "Fixed value", this function enables parametric fixed value assignment according to the data type specified in the "Operation" parameter.	Can be customized according to the data type.
Output delay	The output signal is transmitted with a defined delay. The delay duration is set parametrically.	**0**…255
Delay unit	This parameter is used to select the time unit of the output signal delay duration.	100 ms **Seconds** minutes

[1] This parameter is visible when the function “Type of input 2” is set to “Fixed value”.

4. ETS Objects List & Descriptions

Communication objects used in smart building automation systems are the building blocks for data exchange between devices. These objects create a manufacturer-independent language and ensure that data from management systems is transmitted to the KNX network in standard formats.

The interpretation of responses received from the **SMA Sunny Home Manager** on the KNX side, and their mapping to appropriate KNX **Data Point Types (DPTs)** in accordance with the Home Manager communication protocol, are achieved through **group communication objects**.

These communication objects also enable KNX devices to be registered with the energy management system, allow the transmission of energy planning and control requests, and ensure that device operating states and energy consumption data are reported back to the Sunny Home Manager.

Through these communication objects, **real-time and bidirectional communication** is established during operation, enabling seamless integration between the KNX-based building automation system and the SMA energy management system.

ETS group objects are divided into 2 main parts, and these are :

- **Device** – Device group objects to the KNX-SMA SEMP Gateway.
- **Logic Function** – These objects are related to logic gate parameters.

All of the group objects of Interra KNX-SMA SEMP Gateway are listed below. You can quickly browse through this table to get the functional capabilities of the KNX-SMA SEMP Gateway.

The detailed functions of group objects are described in different topics.

No	Name	Function	DTP Type	Length	Flags				
					C	R	W	T	U
1	Device DHCP assigned ipv4 address	IPv4 Address	16.000	14 Bytes	X	X		X	
2	Local time when device initialized	19.001 DPT date time format	19.001	8 Bytes	X	X		X	
3, 21, …, 165	EM can manage the device	Indicates if the device is currently considering the control signals or recommendations provided by the energy manager	1.002	1 Bit	X	X		X	
4, 22, …, 166	Device Control	Control the device manually. 0-Off ; 1-On	1.001	1 Bit	X		X		
5, 23, …, 167	Device Status	Current status of the device. 0-Off ; 1-On	1.001	1 Bit	X	X		X	
6, 24, …, 168	Error Code Status	Identifies the current error state of the device. If the code is 0, no error is pending.	5.010	1 Byte	X	X		X	
7, 25, …, 169	Average power (W)	Real average power within the interval in Watts.	14.056	4 Bytes	X	X		X	
8, 26, …, 170	Minimum power in Watts	Minimum power value within the interval in Watts.	14.056	4 Bytes	X	X		X	
9, 27, …, 171	Maximum power in Watts	Maximum power within the interval in Watts.	14.056	4 Bytes	X	X		X	
10, 28, …, 172	Earliest Start	Represents the earliest possible time the device can be switched on by the EM	10.001	3 Bytes	X		X		
11, 29, …, 173	Latest End	Represents the latest possible end time the requested minimum runtime (MinRunningTime)	10.001	3 Bytes	X		X		
12, 30, …, 174	Minimum Running Time	Minimum running time within the timeframe in seconds.	7.006	2 Bytes	X		X		
13, 31, …, 175	Maximum Running Time	Maximum running time within the timeframe in seconds	7.006	2 Bytes	X		X		
14, 32, …, 176	Power consumption of the device	DPT-14.056 power (W)	14.056	4 Bytes	X		X		
		DPT-13.010 active energy (Wh)	13.010	4 Bytes	X		X		
		DPT-13.013 active energy (kWh)	13.010	4 Bytes	X		X		
15, 33, …, 177	Feedback of Planning Request 1	Plannning request status: 0:False(Not scheduled) ; 1:True(schedule)	1.002	1 Bit	X	X		X	
16, 34, …, 178	Feedback of Planning Request 2	Plannning request status: 0:False(Not scheduled) ; 1:True(schedule)	1.002	1 Bit	X	X		X	
17, 35, …, 179	Feedback of Planning Request 3	Plannning request status: 0:False(Not scheduled) ; 1:True(schedule)	1.002	1 Bit	X	X		X	
18, 36, …, 180	Remove active planning request	Corresponding planning request index	5.010	1 Byte	X		X		
19, 37, …, 181	Scene	0-63 (Execute 1-64); 128-191 (Storage 1-64)	17.001	1 Byte	X		X		
20, 38, …, 182	Current Scene Feedback	1-64:Current Scene	17.001	1 Byte	X	X		X	
192,202 ,…, 822	Extension 1/2 - Channel A…H - Block	On/Off	1.003	1 Bit	X	X	X		
193,203 ,…, 823	Extension 1/2 - Channel A...H - Trigger On/Off	On/Off	1.017	1 Bit	X	X	X		
193,203 ,…, 823	Extension 1/2 - Channel A...H - Logic gate - Input 1	True/False	1.002	1 Bit	X		X		
194,204 ,…, 824	Extension 1/2 - Channel A...H - Step 1 Output - Switch	On/Off	1.001	1 Bit	X	X		X	

194,204 ,..., 824	Extension 1/2 - Channel A...H - Step 1 Output - Scene	Scene	18.001	1 Byte	X	X		X	
194,204 ,..., 824	Extension 1/2 - Channel A...H - Step 1 Output - Percent	Percent	5.001	1 Byte	X	X		X	
194,204 ,..., 824	Extension 1/2 - Channel A...H - Step 1 Output - RGB	RGB	232.600	3 Bytes	X	X		X	
194,204 ,..., 824	Extension 1/2 - Channel A...H - Step 1 Output - Temperature	Percent	5.001	1 Byte	X	X		X	
194,204 ,..., 824	Extension 1/2 - Channel A...H - Step 1 Output - Value	1 byte	5.005	1 Byte	X	X		X	
194,204 ,..., 824	Extension 1/2 - Channel A...H - Step 1 Output - Value	2 bytes	7.001	2 Bytes	X	X		X	
			8.001	2 Bytes	X	X		X	
			9.024	2 Bytes	X	X		X	
194,204 ,..., 824	Extension 1/2 - Channel A...H - Input 1 - Switch	On/Off	1.001	1 Bit	X		X		
194,204 ,..., 824	Extension 1/2 - Channel A...H - Input 1 - Scene	Scene	18.001	1 Byte	X		X		
194,204 ,..., 824	Extension 1/2 - Channel A...H - Input 1 - Percent	Percent	5.001	1 Byte	X		X		
194,204 ,..., 824	Extension 1/2 - Channel A...H - Input 1 - Value	1 byte	5.005	1 Byte	X		X		
194,204 ,..., 824	Extension 1/2 - Channel A...H - Input 1 - Value	2 bytes	7.001	2 Bytes	X		X		
			8.001	2 Bytes	X		X		
			9.024	2 Bytes	X		X		
194,204 ,..., 824	Extension 1/2 - Channel A...H - Input 1 - Value	4 bytes	12.001	4 Bytes	X		X		
			13.001	4 Bytes	X		X		
			14.031	4 Bytes	X		X		
194,204 ,..., 824	Extension 1/2 - Channel A...H - Logic gate - Input 2	True/False	1.002	1 Bit	X		X		
195,205 ,..., 825	Extension 1/2 - Channel A...H - Step 2 Output - Switch	On/Off	1.001	1 Bit	X	X		X	
195,205 ,..., 825	Extension 1/2 - Channel A...H - Step 2 Output - Scene	Scene	18.001	1 Byte	X	X		X	
195,205 ,..., 825	Extension 1/2 - Channel A...H - Step 2 Output - Percent	Percent	5.001	1 Byte	X	X		X	
195,205 ,..., 825	Extension 1/2 - Channel A...H - Step 2 Output - RGB	RGB	232.600	3 Bytes	X	X		X	
195,205 ,..., 825	Extension 1/2 - Channel A...H - Step 2 Output - Temperature	Percent	5.001	1 Byte	X	X		X	
195,205 ,..., 825	Extension 1/2 - Channel A...H - Step 2 Output - Value	1 byte	5.005	1 Byte	X	X		X	
195,205 ,..., 825	Extension 1/2 - Channel A...H - Step 2 Output - Value	2 bytes	7.001	2 Bytes	X	X		X	
			8.001	2 Bytes	X	X		X	
			9.024	2 Bytes	X	X		X	
195,205 ,..., 825	Extension 1/2 - Channel A...H - Input 1 - Comparative value	On/Off	1.001	1 Bit	X		X		
195,205 ,..., 825	Extension 1/2 - Channel A...H - Input 1 - Comparative value	Scene	18.001	1 Byte	X		X		
195,205 ,..., 825	Extension 1/2 - Channel A...H - Input 1 - Comparative value	Percent	5.001	1 Byte	X		X		
195,205 ,..., 825	Extension 1/2 - Channel A...H - Input 1 - Comparative value	1 byte	5.005	1 Byte	X		X		
195,205 ,..., 825	Extension 1/2 - Channel A...H - Input 1 - Comparative value	2 bytes	7.001	2 Bytes	X		X		
			8.001	2 Bytes	X		X		

			9.024	2 Bytes	X		X		
195,205 ,..., 825	Extension 1/2 - Channel A...H - Input 1 - Comparative value	4 bytes	12.001	4 Bytes	X		X		
			13.001	4 Bytes	X		X		
			14.031	4 Bytes	X		X		
195,205 ,..., 825	Extension 1/2 - Channel A...H - Logic gate - Input 3	True/False	1.002	1 Bit	X		X		
196,206 ,..., 826	Extension 1/2 - Channel A...H - Step 3 Output - Switch	On/Off	1.001	1 Bit	X	X		X	
196,206 ,..., 826	Extension 1/2 - Channel A...H - Step 3 Output - Scene	Scene	18.001	1 Byte	X	X		X	
196,206 ,..., 826	Extension 1/2 - Channel A...H - Step 3 Output - Percent	Percent	5.001	1 Byte	X	X		X	
196,206 ,..., 826	Extension 1/2 - Channel A...H - Step 3 Output - RGB	RGB	232.600	3 Bytes	X	X		X	
196,206 ,..., 826	Extension 1/2 - Channel A...H - Step 3 Output - Temperature	Percent	5.001	1 Byte	X	X		X	
196,206 ,..., 826	Extension 1/2 - Channel A...H - Step 3 Output - Value	1 byte	5.005	1 Byte	X	X		X	
196,206 ,..., 826	Extension 1/2 - Channel A...H - Step 3 Output - Value	2 bytes	7.001	2 Bytes	X	X		X	
			8.001	2 Bytes	X	X		X	
			9.024	2 Bytes	X	X		X	
196,206 ,..., 826	Extension 1/2 - Channel A...H - Input 2 - Switch	On/Off	1.001	1 Bit	X		X		
196,206 ,..., 826	Extension 1/2 - Channel A...H - Input 2 - Scene	Scene	18.001	1 Byte	X		X		
196,206 ,..., 826	Extension 1/2 - Channel A...H - Input 2 - Percent	Percent	5.001	1 Byte	X		X		
196,206 ,..., 826	Extension 1/2 - Channel A...H - Input 2 - Value	1 byte	5.005	1 Byte	X		X		
196,206 ,..., 826	Extension 1/2 - Channel A...H - Input 2 - Value	2 bytes	7.001	2 Bytes	X		X		
			8.001	2 Bytes	X		X		
			9.024	2 Bytes	X		X		
196,206 ,..., 826	Extension 1/2 - Channel A...H - Input 2 - Value	4 bytes	12.001	4 Bytes	X		X		
			13.001	4 Bytes	X		X		
			14.031	4 Bytes	X		X		
196,206 ,..., 826	Extension 1/2 - Channel A...H - Logic gate - Input 4	True/False	1.002	1 Bit	X		X		
197,207 ,..., 827	Extension 1/2 - Channel A...H - Step 4 Output - Switch	On/Off	1.001	1 Bit	X	X		X	
197,207 ,..., 827	Extension 1/2 - Channel A...H - Step 4 Output - Scene	Scene	18.001	1 Byte	X	X		X	
197,207 ,..., 827	Extension 1/2 - Channel A...H - Step 4 Output - Percent	Percent	5.001	1 Byte	X	X		X	
197,207 ,..., 827	Extension 1/2 - Channel A...H - Step 4 Output - RGB	RGB	232.600	3 Bytes	X	X		X	
197,207 ,..., 827	Extension 1/2 - Channel A...H - Step 4 Output - Temperature	Percent	5.001	1 Byte	X	X		X	
197,207 ,..., 827	Extension 1/2 - Channel A...H - Step 4 Output - Value	1 byte	5.005	1 Byte	X	X		X	
197,207 ,..., 827	Extension 1/2 - Channel A...H - Step 4 Output - Value	2 bytes	7.001	2 Bytes	X	X		X	
			8.001	2 Bytes	X	X		X	
			9.024	2 Bytes	X	X		X	
197,207 ,..., 827	Extension 1/2 - Channel A...H - Input 2 - Comparative value	On/Off	1.001	1 Bit	X		X		

197,207 ,..., 827	Extension 1/2 - Channel A...H - Input 2 - Comparative value	Scene	18.001	1 Byte	X		X		
197,207 ,..., 827	Extension 1/2 - Channel A...H - Input 2 - Comparative value	Percent	5.001	1 Byte	X		X		
197,207 ,..., 827	Extension 1/2 - Channel A...H - Input 2 - Comparative value	1 byte	5.005	1 Byte	X		X		
197,207 ,..., 827	Extension 1/2 - Channel A...H - Input 2 - Comparative value	2 bytes	7.001	2 Bytes	X		X		
			8.001	2 Bytes	X		X		
			9.024	2 Bytes	X		X		
197,207 ,..., 827	Extension 1/2 - Channel A...H - Input 2 - Comparative value	4 bytes	12.001	4 Bytes	X		X		
			13.001	4 Bytes	X		X		
			14.031	4 Bytes	X		X		
197,207 ,..., 827	Extension 1/2 - Channel A...H - Logic gate - Input 5	True/False	1.002	1 Bit	X		X		
198,208 ,..., 828	Extension 1/2 - Channel A...H - Step 1 Output - Brightness	Percent	5.001	1 Byte	X	X		X	
198,208 ,..., 828	Extension 1/2 - Channel A...H - Output - Switch	On/Off	1.001	1 Bit	X	X		X	
198,208 ,..., 828	Extension 1/2 - Channel A...H - Output - Scene	Scene	18.001	1 Byte	X	X		X	
198,208 ,..., 828	Extension 1/2 - Channel A...H - Output - Percent	Percent	5.001	1 Byte	X	X		X	
198,208 ,..., 828	Extension 1/2 - Channel A...H - Output - RGB	RGB	232.600	3 Bytes	X	X		X	
198,208 ,..., 828	Extension 1/2 - Channel A...H - Output - Temperature	Percent	5.001	1 Byte	X	X		X	
198,208 ,..., 828	Extension 1/2 - Channel A...H - Output - Value	1 byte	5.005	1 Byte	X	X		X	
198,208 ,..., 828	Extension 1/2 - Channel A...H - Output - Value	2 bytes	7.001	2 Bytes	X	X		X	
			8.001	2 Bytes	X	X		X	
			9.024	2 Bytes	X	X		X	
198,208 ,..., 828	Extension 1/2 - Channel A...H - Output - Value	4 bytes	12.001	4 Bytes	X	X		X	
			13.001	4 Bytes	X	X		X	
			14.031	4 Bytes	X	X		X	
198,208 ,..., 828	Extension 1/2 - Channel A...H - Logic gate - Input 6	True/False	1.002	1 Bit	X		X		
199,209 ,..., 829	Extension 1/2 - Channel A...H - Step 2 Output - Brighness	Percent	5.001	1 Byte	X	X		X	
199,209 ,..., 829	Extension 1/2 - Channel A...H - Output - Brighness	Percent	5.001	1 Byte	X	X		X	
199,209 ,..., 829	Extension 1/2 - Channel A...H - Logic gate - Input 7	True/False	1.002	1 Bit	X		X		
200,210 ,..., 830	Extension 1/2 - Channel A...H - Step 3 Output - Brighness	Percent	5.001	1 Byte	X	X		X	
200,210 ,..., 830	Extension 1/2 - Channel A...H - Logic gate - Input 8	True/False	1.002	1 Bit	X		X		
201,211 ,..., 831	Extension 1/2 - Channel A...H - Step 4 Output - Brighness	Percent	5.001	1 Byte	X	X		X	
201,211 ,..., 831	Extension 1/2 - Channel A...H - Logic gate - Output	True/False	1.002	1 Bit	X	X		X	

4.1. Device Objects

This section describes the "Device" group objects and their properties. Device group objects, as the name suggests, indicate the general characteristics of the Gateway.

Object Number	Object Name	Function	Type	Flags
1	Device DHCP assigned ipv4 address	IPv4 Adress	14 Bytes	CRT

This communication object transmits the IPv4 address assigned by DHCP to the KNX bus line when the interface device is connected to the internet.

DPT: 16.000 (character String (ASCII))

2	Local time when device initialized	19.001 DPT date time format	8 bytes	CRT

This communication object appears when the Timestamp parameter is set to Absolute and transmits the local time zone to the KNX bus line. When the system becomes ready, the object is sent initially and then updates itself every minute.

DPT: 19.001 (date time)

3, 21, ..., 165	EM can manage the device	Indicates if the device is currently considering the control signals or recommendations provided by the energy manager	1 Bit	CRT

This communication object indicates whether the device accepts recommendations sent by the Energy Manager (EM). When this value is set to true, the device accepts DeviceControl commands sent by the EM.

If the value is set to false, the device is operating in manual mode and will not follow recommendations from the EM. In this case, the EM must not send control messages to the device.

If a scheduling request is reported for a device, the status of this communication object is set to true by the gateway. If the device is controlled independently of the Energy Manager, the communication object is set to false by the gateway.

DPT: 1.002 (boolean)

4, 22, …, 166	Device Control	Control the device manually. 0-Off ; 1-On	1 Bit	CW

This communication object sets the operating status of the device. The value written to this object informs the SMA Energy Manager about the current operating state of the device.
The communication object that publishes the status information of the device to be controlled must be associated with the Device Control communication object. For example, consider an air conditioning unit. When the device is turned on by the user, the device's feedback status changes. Since this feedback information is linked to the Device Control communication object, the status of the Device Control object also changes. In this way, the Energy Manager (EM) is informed that the device's status has changed.
DPT: 1.001 (switch)

5, 23, …, 167	Device Status	Current status of the device. 0-Off ; 1-On	1 Bit	CRT

This communication object transmits the current operating status of the device to the KNX line. Control of this communication object is determined by the Energy Manager.
When the Energy Manager (EM) requests the device to be switched on or off, the status of the **Device Status** communication object changes. For example, when a scheduling request has been created and the required conditions are met, the EM indicates that the device should operate via this object.
This communication object must be linked to the device to be controlled. If a load connected to an actuator is to be controlled, this object should be associated with the corresponding control object of the actuator.
DPT: 1.001 (switch)

6, 24, …, 168	Error Code Status	Identifies the current error state of the device. If the code is 0, no error is pending.	1 Byte	CRT

This communication object indicates the current error codes of the device. The list of error codes is provided in the appendix at the end of this document.

DPT: 5.010 (counter pulses 0..255)

7, 25, …, 169	Average power (Watts)	Real average power within the interval in Watts.	4 Bytes	CRT

This communication object transmits to the KNX line the average consumption power received by the device from a KNX energy meter.
DPT: 14.056 (power (W))

8, 26, …, 170	Minimum power in Watts	Minimum power value within the interval in Watts.	4 Bytes	CRT

This communication object transmits to the KNX line the minimum consumption power value received by the device from a KNX energy meter.

DPT: 14.056 (power (W))

9, 27, …, 171	Maximum power in Watts	Maximum power within the interval in Watts.	4 Bytes	CRT

This communication object transmits to the KNX line the maximum consumption power value received by the device from a KNX energy meter.

DPT: 14.056 (power (W))

10, 28, …, 172	Earliest Start	Represents the earliest possible time the device can be switched on by the EM	3 Bytes	CW

This communication object represents the earliest time at which the device can be operated by the Energy Manager (EM). The combination of the EarliestStart and LatestEnd parameters defines the time window during which the EM is allowed to operate the device.

If the device can be started immediately, or if the device is already running and still active, EarliestStart = 0.

DPT: 10.001 (time of day)

11, 29, …, 173	Latest End	Represents the latest possible end time the requested minimum runtime (MinRunningTime)	3 Bytes	CW

This communication object represents the latest time by which the minimum operating duration (MinRunningTime) allocated for the device must be completed. In other words, the device must have finished its operation by this specified time.

If a specific operating duration is requested, the latest possible start time of the device is calculated as:

LatestEnd – MinRunningTime

Together, EarliestStart and LatestEnd define the time window during which the Energy Manager (EM) can schedule the requested operating duration.

DPT: 10.001 (time of day)

12, 30, …, 174	Minimum Running Time	Minimum running time within the timeframe in seconds.	2 Bytes	CW

This communication object specifies the minimum operating duration (in seconds) that the device must run within the defined time window.

DPT: 7.006 (time (min))

13, 31, ..., 175	Maximum Running Time	Maximum running time within the timeframe in seconds	2 Bytes	CW

This communication object specifies the maximum operating duration (in seconds) that the device is allowed to run within the defined time window.

DPT: 7.006 (time (min))

14, 32, ..., 176	Power consumption of the device	DPT-14.056 power (W) DPT-13.010 active energy (Wh) DPT-13.013 active energy (kWh)	4 Bytes	CW

This communication object calculates the energy consumed by the device while it is in the ON state, based on the power value measured by a KNX energy meter, and is associated with the corresponding communication object. The calculated energy consumption is reported to the Energy Manager (EM) via this communication object.

DPT

14.056 (power (W))

13.010 (active energy (Wh))

13.013 (active energy (kWh))

15, 33, ..., 177 / 16, 34, ..., 178 / 17, 35, ..., 179	Feedback of Planning Request 1/2/3	Plannning request status: 0:False(Not scheduled) ; 1:True(schedule)	1 Bit	CRT

This communication object notifies the KNX line via the EM that a scheduling request has been reported to the Energy Manager. Up to three different scheduling requests can be reported to the EM.

DPT: 1.002 (boolean)

18, 36, ..., 180	Remove active planning request	Corresponding planning request index	1 Byte	CW

This communication object allows the current scheduling request to be deleted via this object.

DPT: 5.010 (counter pulses 0..255)

19, 37, ..., 181	Scene	0-63 (Execute 1-64); 128-191 (Storage 1-64)	1 Byte	CW

This communication object allows the current scheduling request to be deleted via this object.

DPT: 17.001 (scene number)

20, 38, …, 182	Current Scene Feedback	1-64:Current Scene	1 Byte	CRT

This communication object transmits the output of the triggered Scene to the KNX bus line.

DPT: 17.001 (scene number)

4.2. Logic Functions Objects

This section describes the "Logic Functions" group objects and their properties. Logic Functions group objects, as the name suggests, indicate the logical operations that can be made with Gateway.

4.2.1. Logic Gates Objects

This section describes the "Logic Gates" group objects and their properties.

Object Number	Object Name	Function	Type	Flags
192,202,..., 822	Ext. 1/2 – Ch. A…H - Block	On/Off	1 bit	CRW
This communication object is used to restrict the module used on any channel. When activated, values written to the input communication objects are ignored. DPT: 1.003 (enable)				
193,203,..., 823	Ext. 1/2 – Channel A…H - Logic Gate – Input 1	True/False	1 bit	CW
194,204,..., 824	Ext. 1/2 – Channel A…H - Logic Gate – Input 2			
...	…			
200,210,..., 830	Ext. 1/2 – Channel A…H - Logic Gate – Input 8			
Logic gate communication objects are used as inputs to the logic gate. For the logic gates used on a single channel, a total of 8 different input objects can be used. DPT: 1.002 (boolean)				
201,211,..., 831	Extension 1/2 - Channel A...H - Logic gate - Output	True/False	1 bit	CRT
This object is used to obtain the result of the logical gate to be used. The output value of the logical gate is 1 bit. The result is obtained according to the type of logical gate selected. DPT: 1.002 (Boolean)				

4.2.2. Sequence Objects

This section describes the "Sequence" group objects and their properties.
X: 1/2/3/4
Y: Switch / Scene / Percent / RGB / Temperature / Value

Object Number	Object Name	Function	Type	Flags
192,202,..., 822	Ext. 1/2 – Ch. A...H - Block	On/Off	1 bit	CRW
This communication object is used to restrict the module used on any channel. When activated, values written to the input communication objects are ignored. DPT: 1.003 (enable)				
193,203,..., 823	Ext. 1/2 – Channel A...H – Trigger On/Off	On/Off	1 bit	CRW
This communication object is used to trigger the Sequence Extension activated for the channel. Depending on the selected parameter type, it can be activated in the ON or OFF state. DPT: 1.017 (trigger)				
194,204,..., 824 195,205,..., 825 196,206,..., 826 197,207,..., 827	Ext. 1/2 – Channel A...H – Step X Output - Y	On/Off / Scene / Percent / RGB / 1 Byte / 2 Bytes	1 bit 1 byte 2 bytes 3 bytes	CRT
This is the communication object used to transmit the steps activated in the Sequence module to the KNX bus line. A separate communication object is created for each activated step. The datapoint types vary according to the selected parameter settings. DPT: 1.001 (switch) / 18.001 (scene control) / 5.001 (percentage (0..100%)) / 232.600 (RGB value 3x(0..255)) / 5.005 (ratio (0..255)) / 7.001 (pulses) / 8.001 (pulses difference) / 9.024 (power (kW))				
198,208,..., 828 199,209,..., 829 200,210,..., 830 201,211,..., 831	Ext. 1/2 – Channel A...H – Step X Output - Brightness	Percent	1 byte	CRT
This is the communication object used to transmit the steps activated in the Sequence module to the KNX bus line. DPT: 5.001 (percentage (0..100%))				

4.2.3. Trigger Objects

This section describes the "Trigger" group objects and their properties.

X: Switch / Scene / Percent / Temperature / Value

Object Number	Object Name	Function	Type	Flags
192,202,..., 822	Ext. 1/2 – Ch. A...H - Block	On/Off	1 bit	CRW

This communication object is used to restrict the module used on any channel. When activated, values written to the input communication objects are ignored.
DPT: 1.003 (enable)

194,204,..., 824 196,206,..., 826	Ext. 1/2 – Channel A...H – Input 1 – X Ext. 1/2 – Channel A...H – Input 2 – X	On/Off / Scene / Percent / 1 byte / 2 bytes / 4 bytes	1 bit 1 byte 2 bytes 4 bytes	CW

This defines the communication objects to which the input values used for comparison in the Trigger module are written. A separate communication object is created for each activated input. The datapoint types vary according to the selected parameter settings.

DPT:

1.001 (switch) / 18.001 (scene control) / 5.001 (percentage (0..100%)) / 5.005 (ratio (0..255)) / 7.001 (pulses) / 8.001 (pulses difference) / 9.024 (power (kW)) / 12.001 (counter pulses (unsigned)) / 13.001 (counter pulses (signed)) / 14.031 (energy (J))

195,205,..., 825 197,207,..., 827	Ext. 1/2 – Channel A...H – Input 1 – Comparative value Ext. 1/2 – Channel A...H – Input 2 – Comparative value	On/Off / Scene / Percent / 1 byte / 2 bytes / 4 bytes	1 bit 1 byte 2 bytes 4 bytes	CW

This defines the communication objects to which the input values used for comparison in the Trigger module are written. A separate communication object is created for each activated input. The datapoint types vary according to the selected parameter settings.

DPT:

1.001 (switch) / 18.001 (scene control) / 5.001 (percentage (0..100%)) / 5.005 (ratio (0..255)) / 7.001 (pulses) / 8.001 (pulses difference) / 9.024 (power (kW)) / 12.001 (counter pulses (unsigned)) / 13.001 (counter pulses (signed)) / 14.031 (energy (J))

198,208,..., 828	Ext. 1/2 – Channel A…H – Output - X	On/Off / Scene / Percent / 1 byte / 2 bytes / 4 bytes	1 bit 1 byte 2 bytes 4 bytes	CRT

This defines the communication objects that output values to the KNX bus line based on the input values configured in the Trigger module. The datapoint type varies according to the selected parameter setting.

DPT: 5.001 (percentage (0..100%))

199,209,..., 829	Ext. 1/2 – Channel A…H – Output - Brightness	Percent	1 byte	CRT

This defines the communication objects that output values to the KNX bus line based on the input values configured in the Trigger module.

DPT: 5.001 (percentage (0..100%))

4.2.4. Math Objects

This section describes the "Math" group objects and their properties.

Object Number	Object Name	Function	Type	Flags
192,202,..., 822	Ext. 1/2 – Ch. A...H - Block	On/Off	1 bit	CRW

This communication object is used to restrict the module used on any channel. When activated, values written to the input communication objects are ignored.
DPT: 1.003 (enable)

194,204,..., 824	Ext. 1/2 – Channel A...H – Input 1 - Value	1 byte / 2 bytes / 4 bytes	1 byte 2 bytes 4 bytes	CW
196,206,..., 826	Ext. 1/2 – Channel A...H – Input 2 - Value			

This defines the communication objects to which the input values used for calculations in the Math module are written. A separate communication object is created for each activated input. The datapoint types vary according to the selected parameter settings.

DPT:

5.001 (percentage (0..100%)) / 7.001 (pulses) / 8.001 (pulses difference) / 9.024 (power (kW)) / 12.001 (counter pulses (unsigned)) / 13.001 (counter pulses (signed)) / 14.031 (energy (J))

198,208,..., 828	Ext. 1/2 – Channel A...H – Output - Value	1 byte / 2 bytes / 4 bytes	1 byte 2 bytes 4 bytes	CRT

This communication object defines the outputs sent to the KNX bus line based on the input values configured in the Math module. The datapoint type varies according to the selected parameter setting.

DPT:

5.001 (percentage (0..100%)) / 7.001 (pulses) / 8.001 (pulses difference) / 9.024 (power (kW)) / 12.001 (counter pulses (unsigned)) / 13.001 (counter pulses (signed)) / 14.031 (energy (J))

Appendix A: Error Code

KNX Error Codes Reference Table

Error Code	Error Definition
(X-1)0	Operation completed successfully
(X-1)1	Insufficient time remaining to activate device within specified constraints
(X-1)2	Earliest start time must precede latest end time
(X-1)3	Specified time window is shorter than required minimum runtime
(X-1)4	Maksimum running time must be greater then minimum runtime.
(X-1)5	Conflicting scheduling periods detected
(X-1)6	Duplicate scheduling request for active time window

"(where X = numeric identifier)
Defines the unique device number assigned to each individual KNX device in the system."

Error Codes for device 1

Error Code	Error Definition
0	Operation completed successfully
1	Insufficient time remaining to activate device within specified constraints
2	Earliest start time must precede latest end time
3	Specified time window is shorter than required minimum runtime
4	Maksimum running time must be greater then minimum runtime.
5	Conflicting scheduling periods detected
6	Duplicate scheduling request for active time window

Error Codes for device 10

Error Code	Error Definition
90	Operation completed successfully
91	Insufficient time remaining to activate device within specified constraints
92	Earliest start time must precede latest end time
93	Specified time window is shorter than required minimum runtime
94	Maksimum running time must be greater then minimum runtime.
95	Conflicting scheduling periods detected
96	Duplicate scheduling request for active time window

Appendix B: Scene – Absolute time

When the Timestamp is set to “Absolute”, examples based on different SCENE configurations are provided below.

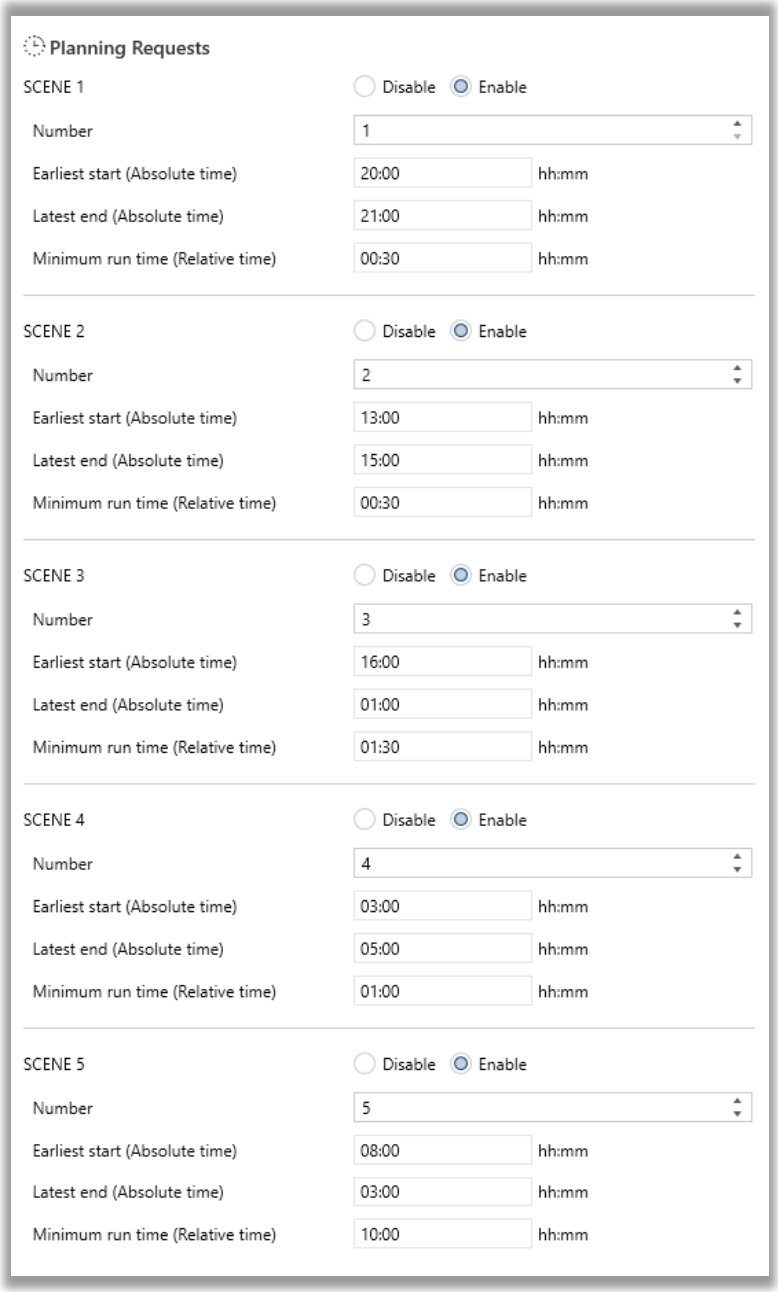

Fig. 20: Scene Examples Parameter Page

The local time is assumed to be 14:00.

SCENE 1:

- **Earliest start:** 20:00
- **Latest end:** 21:00
- **Minimum run time:** 00:30 minutes

Since the desired operating time of the device is after the local time, the device will start operating after a minimum of 6 hours (time difference: 20:00 – 14:00), run for approximately 30 minutes, and stop operation no later than 7 hours later (time difference: 21:00 – 14:00).

In this example operation, the device's operating window will appear in the SMA Sunny Portal as shown below.

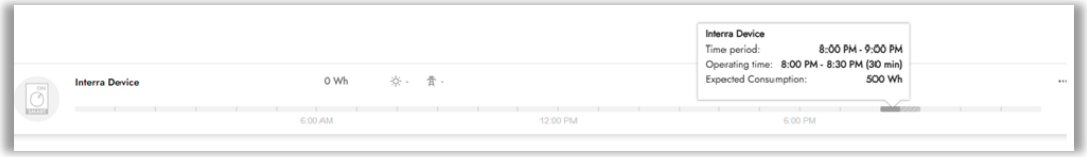

Fig. 21: SMA Sunny Portal Operating Window – Scene 1

SCENE 2:

- **Earliest start:** 13:00
- **Latest end:** 15:00
- **Minimum run time:** 00:30 minutes

Since the desired operating time of the device is before the local time, the device is scheduled to operate on the next day at 13:00. In this scenario, the device will start operating after **23 hours** from the local time (13:00 + 24:00 – 14:00). Here, **24:00** represents the duration of one full day.

The device will then operate for approximately 30 minutes and stop operation after **25 hours** from the local time (15:00 + 24:00 – 14:00).

SCENE 3:

- **Earliest start:** 16:00
- **Latest end:** 01:00
- **Minimum run time:** 01:00 hour

Since the desired operating time of the device is after the local time, the device will start operating after a minimum of **2 hours** (16:00 – 14:00), run for approximately **1 hour**, and stop operation no later than **11 hours** later (01:00 + 24:00 – 14:00).

SCENE 4:

- **Earliest start:** 03:00
- **Latest end:** 05:00
- **Minimum run time:** 01:00 hour

Since the desired operating time of the device is after the local time, the device will start operating after a minimum of **13 hours** (03:00 + 24:00 – 14:00), run for approximately **1 hour**, and stop operation no later than **15 hours** later (05:00 + 24:00 – 14:00).

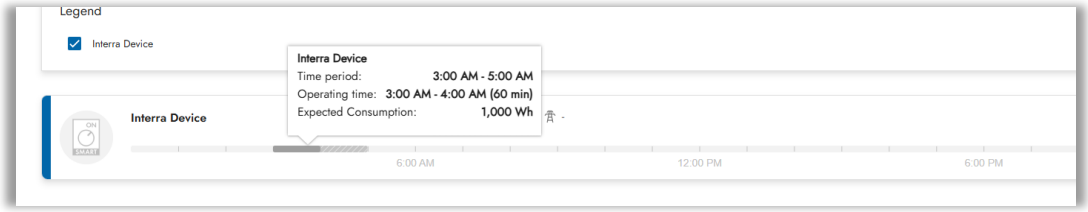

Fig. 22: SMA Sunny Portal Operating Window – Scene 4

SCENE 5:

- **Earliest start:** 08:00
- **Latest end:** 03:00
- **Minimum run time:** 10:00 hours

Since the desired operating time of the device is before the local time, the device is scheduled to start on the next day after a minimum of **18 hours** (08:00 + 24:00 – 14:00). The device will then operate for approximately **10 hours** and will stop operation no later than **37 hours** from the local time (03:00 + 24:00 + 24:00 – 14:00).

Appendix C: Montage

C.1. Installation Requirements

- The installation location must be indoors.
- The KNX-SMA SEMP Gateway must be installed in a distribution board.
- The installation area must be protected from dust, moisture, and hazardous substances.
- The cable route from the installation location to the router must not exceed a maximum length of 100 m.
- A minimum distance of 1 m must be maintained from devices using the 2.4 GHz radio spectrum (e.g. WLAN devices, microwave ovens). This helps prevent a reduction in connection quality and data transmission speed.
- The environmental conditions at the installation location must be suitable for the operation of the KNX-SMA SEMP Gateway device.

C.2. Mounting on the DIN Rail

- Press the Sunny Home Manager onto the upper edge of the DIN rail using the upper retaining clips. Then engage the lower retaining clips onto the lower edge of the DIN rail.

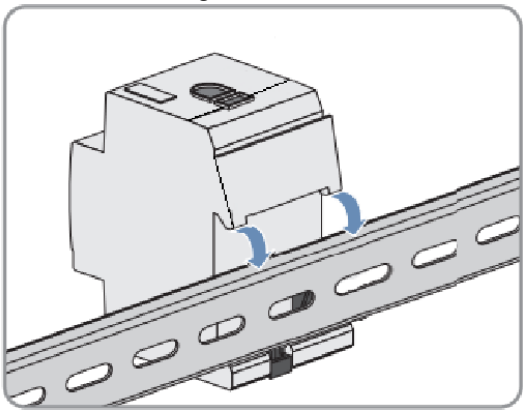

Fig. 23: DIN Rail Mounting Illustration

C.3. Communication Between the Gateway and the Home Manager

For devices on the KNX line to be visible in the SMA Sunny Portal (ennexOS) and to be used in load management scenarios, they must first be correctly configured via ETS through the KNX-SMA SEMP Gateway.

i. Network Configuration

The SMA Sunny Home Manager and the KNX-SMA SEMP Gateway must be located on the same IP network (same subnet). This allows the Home Manager to communicate directly with the gateway via HTTP/SEMP. Multicast and TCP/UDP communication must not be blocked on the network, and firewall rules must be configured correctly.

ii. Use of the ETS Database

Using the product database provided by the manufacturer, the settings of the devices connected to the KNX line are configured. The required group addresses are linked to the communication objects on the gateway. The prepared product database is then downloaded to the device.

Appendix D: Adding KNX Line Devices to the ennexOS Portal

KNX devices are not registered directly in the SMA Sunny Portal; instead, their status and consumption data are shared with the portal via an SMA Home Manager or Data Manager. For this reason, KNX-side devices are introduced to the Home Manager through a KNX-SMA SEMP Gateway . The Home Manager then forwards this data to the Sunny Portal, where the devices appear as “Consumers” or “Loads.”

This registration process is required to enable energy optimization, load shifting, and production-dependent automatic control scenarios. Without registration, KNX devices are not visible in the portal and cannot be controlled by the energy management algorithms.

D.1. User Login or Account Creation

The SMA ennexOS portal allows you to centrally monitor and manage your energy production and consumption data. To access the portal, visit:

https://ennexos.sunnyportal.com

Login:
If you already have an SMA account, you can log in using your username and password.

Account Creation:

If you are using the portal for the first time, select **“Create New Account”** and enter your plant name, address, and user details to create a free account.

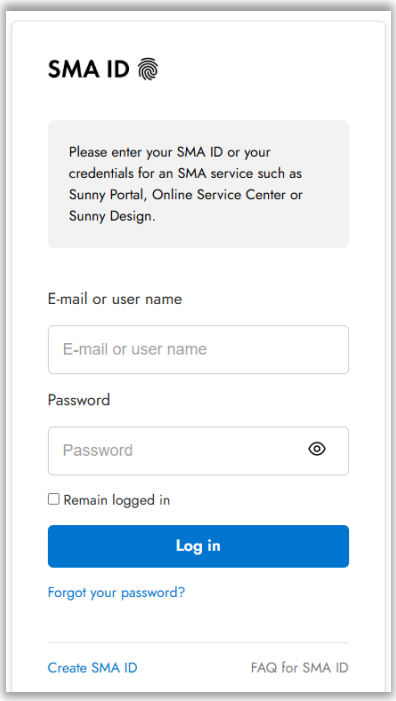

Fig. 24: DIN Rail Mounting Illustration

D.2. Adding the Home Manager to the Portal

The Sunny Home Manager automatically connects to the Sunny Portal supported by ennexOS and indicates this via its LED status indicators. Once the Sunny Home Manager is registered, other devices in the system can be detected or additional devices can be integrated.

To transfer devices from a previous system to a new Sunny Home Manager system, you must first deactivate these devices in the old system (typically at least one inverter). You can then add the devices to the new system.

Requirements:

- The Sunny Home Manager must be supplied with voltage.
- The Sunny Home Manager must be connected to the router.
- DHCP must be enabled on the router (refer to the router manual). If your router does not support DHCP, you can configure static network settings on the Sunny Home Manager using the Sunny Home Manager Assistant.
- The ETS database file of the KNX-SMA SEMP Gateway product must be prepared and downloaded to the device. Detailed information about the parameters and communication objects included in the database file is provided in the user manual.

D.3. Adding KNX Devices to the Portal

You can add KNX devices via the KNX-SMA SEMP Gateway by following the steps below in the SMA portal.

i. On the left-hand side, click **“Configuration”**, then select **“Device administration”** to access the device addition section.

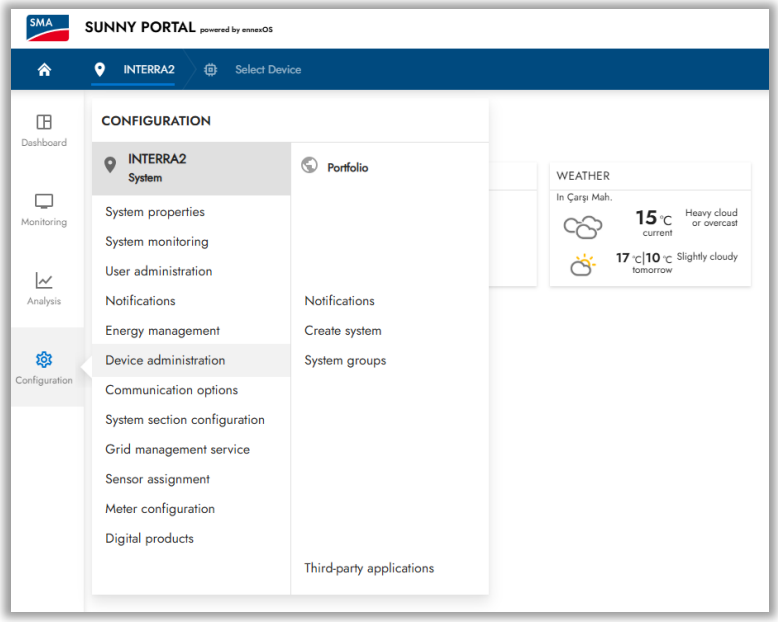

Fig. 25: Sunny Portal Configuration Page

ii. In the **“Device administration”** section, click the **“Add devices”** button located on the right side of the page.

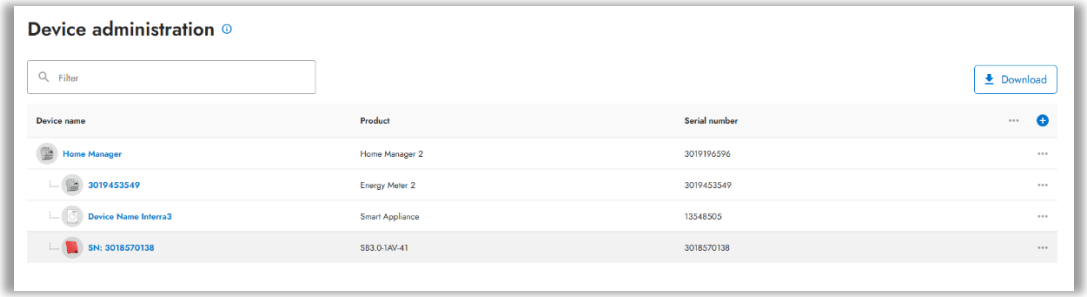

Fig. 26: Sunny Portal – Device Administration Configuration Page

iii. On the page that opens, select **“SMA device or load”**, then click **“Continue”** to search for devices connected to the system.

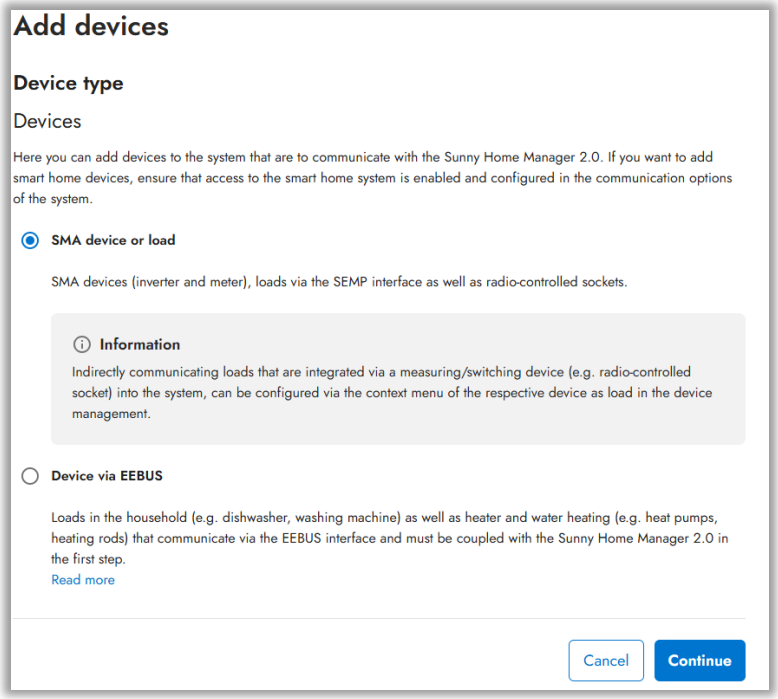

Fig. 27: Sunny Portal – Add Device Configuration Window

iv. Wait while the search is in progress

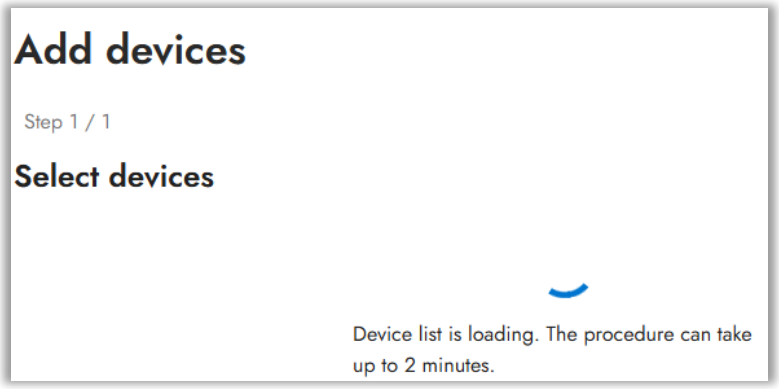

Fig. 28: Sunny Portal – Add Devices Search Window

v. As a result of the search, the devices that can be added to the system are listed together with their serial numbers.

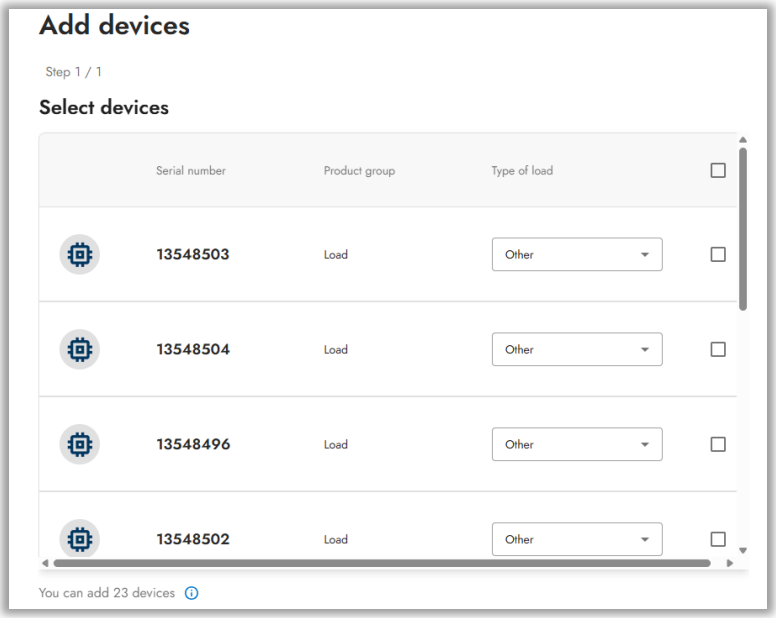

Fig. 29: Sunny Portal – Add Devices Select Devices List Window

vi. Select the devices to be added to the system and click the **"Save"** button to start integrating the devices into the system.

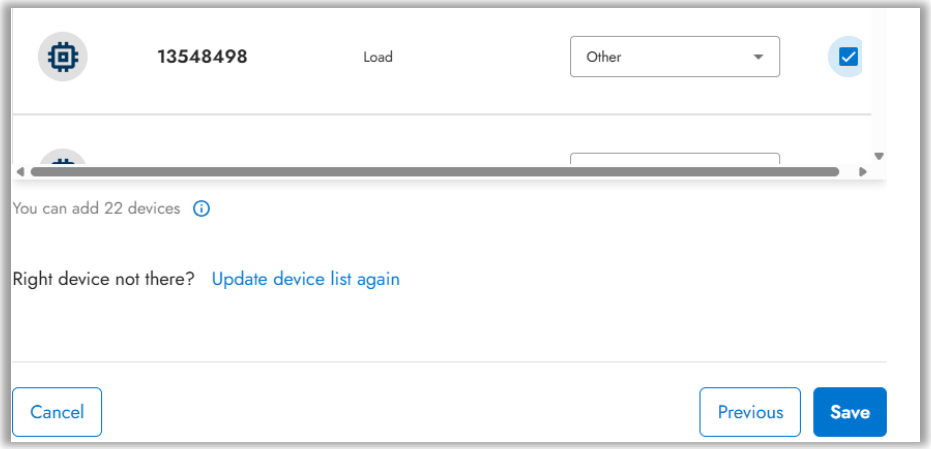

Fig. 30: Sunny Portal – Add Devices Select Window

vii. Once the integration process is complete, a notification in the upper-right corner indicates that the device has been successfully added.

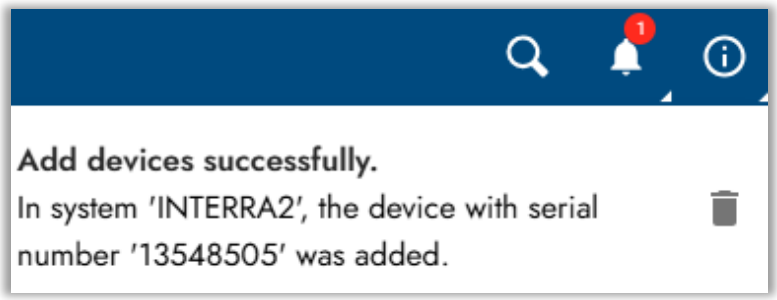

Fig. 31: Sunny Portal – Device Added Successfully Notification

CONTACT INFORMATION

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