Developer of Uniqueness

SMA Solar Inverter Secure

Solar Inverter - KNX Gateway

Product Manual

PM2603110247BEN

Contents

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1. Content of The Document

This document contains Interra brandmark's ITS834-0001 SMA Solar Inverter - KNX Gateway Secure coded devices' electronic and all essential feature information for programming these products. This gateway module, specifically designed for the integration of SMA SUNNY BOY, SUNNY TRIPOWER, SUNNY BOY SMART ENERGY and Modbus TCP SunSpec based series inverters into KNX systems, enables seamless integration of solar energy systems with smart building automation infrastructure. The module allows real-time transmission of inverter data to the KNX bus and facilitates the implementation of optimized energy management strategies across the system. Each subtitle explains the characteristics of the device. Modifications of the product and special change requests are only allowed in coordination with product management.

2. Product Description

Distributed Energy Resources (DER) are small-scale energy generation and storage systems that operate either connected to or independent from the power grid, typically located close to the point of consumption. Examples of DER include Solar Energy Systems (Photovoltaic-PV), Battery Energy Storage Systems, and Electric Vehicle Systems.

The Solar Inverter gateway device is designed to seamlessly integrate energy obtained from renewable sources such as solar panels and building-type battery storage units into KNX-based building automation systems. This integration enables real-time energy management decisions by directly transferring solar production data, inverter status, battery storage information, and other parameters to the KNX network. DER system values such as Voltage, Current, Capacity, and Power are transmitted to the KNX bus line.

The purpose of this device is to ensure more efficient utilisation of energy generated from renewable sources, particularly photovoltaic systems, thereby reducing electricity consumption drawn from the grid. Renewable energy optimization is achieved by prioritizing the use of the generated energy within the building itself.

Within the KNX system, the control of smart devices is intended to allow dynamic load management according to the balance of energy production and consumption. For example, during periods of high solar production, systems such as water heaters, electric vehicle charging units, or HVAC can be automatically activated or operated at higher capacity.

2.1. Technical Information

The following table shows the technical information of the SMA Solar Inverter - KNX Gateway Secure.

Product Code	**ITS834-0001**
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	90 x 36 x 71 mm (W x H x D)
Certification	KNX Certificate
KNX Secure	Supported
Configuration	Configuration with ETS

2.2. System Integration

Compatibility: Full support for SMA SUNNY BOY, SUNNY TRIPOWER, SUNNY BOY SMART ENERGY and Modbus TCP SunSpec based series inverters

Communication Protocol: TCP/IP connection via Ethernet

KNX Connection: Galvanically isolated KNX bus interface

Mounting: Standard DIN rail mounting (35mm)

2.3. Power Supply and Environmental Features

Power Supply: KNX power supply

Power Consumption: Continuous operation with low energy consumption

Operating Temperature: Between -5°C and +45°C

Protection Class: IP20 (for indoor use)

2.4. Application Areas

Energy Optimization

- Balancing consumption with solar energy production
- Directing excess energy to smart charging systems
- Peak shaving and load balancing strategies

Monitoring and Control

- Real-time system performance tracking
- Proactive maintenance alerts and fault detection
- Data transfer to centralized monitoring systems

Smart Building Integration

- Coordinated operation with HVAC systems
- Integration with lighting control systems
- Data sharing with security and access control systems

2.5. Installation and Configuration

The module offers easy installation with a plug-and-play approach. Parameters can be easily configured via ETS (Engineering Tool Software), establishing a reliable data bridge between the inverter and the KNX system.

2.6. Dimensions

All values given in the device dimensions are millimetres.

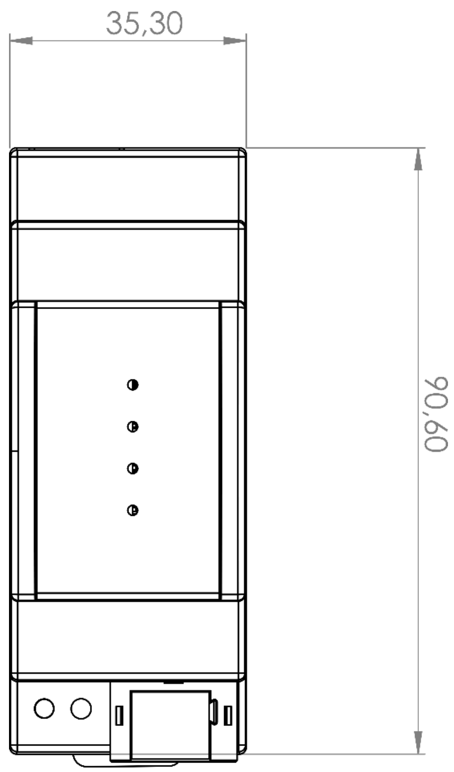

Fig. 1: Dimensions of SMA Solar Inverter - KNX Gateway from the top view

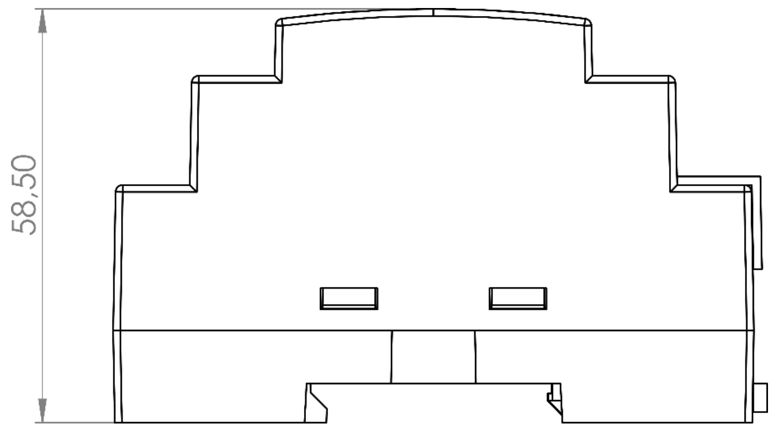

Fig. 2: Dimensions of SMA Solar Inverter AC - KNX Gateway from the side view

2.7. Connection Diagram

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.

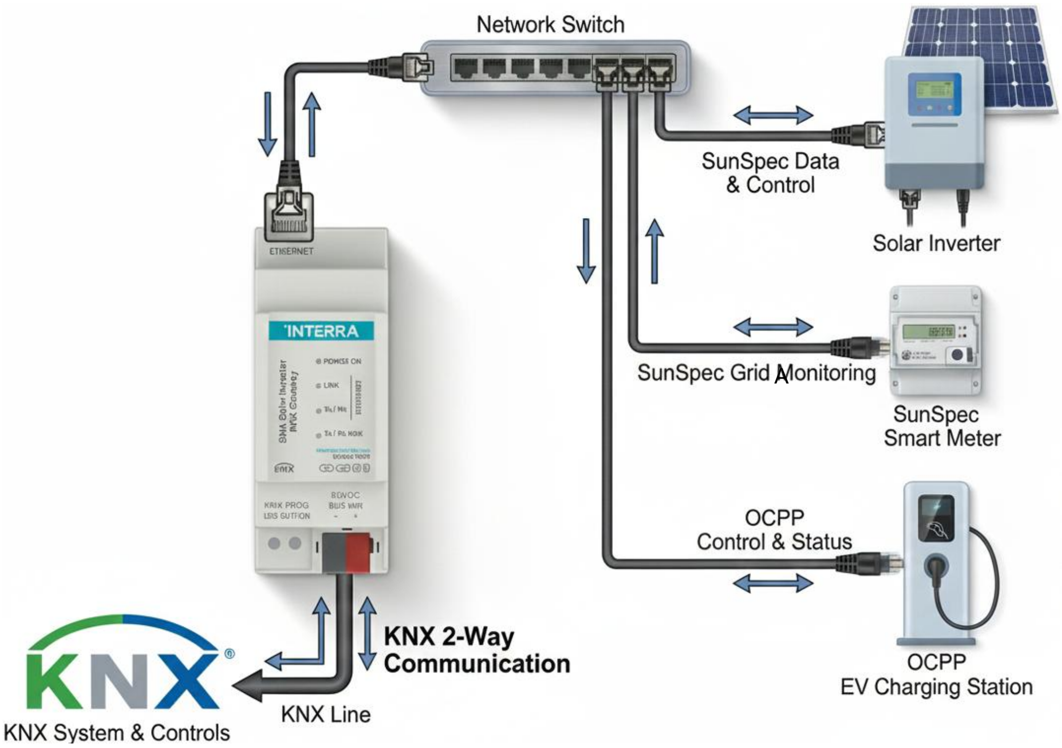

Fig. 3: Diagram of SMA Solar Inverter - KNX Gateway

2.8. KNX Secure

This device supports the KNX Secure standard. To commission the device securely, the following points must be considered:

- When a KNX Data Secure device is added to a project, a project password must be defined.

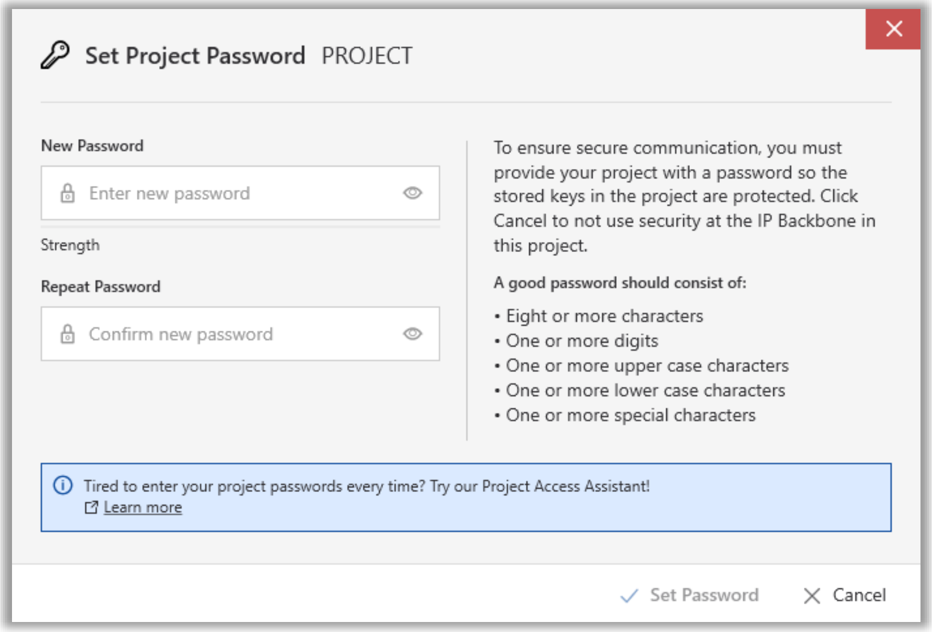

Fig. 4: Set Project Password

This password protects the project against unauthorised access and ensures that communication on the KNX bus is encrypted.

- If no project password is defined, the devices will operate as standard KNX devices without secure communication. In this case, the installation behaves like a conventional KNX system without KNX Data Secure protection
- The project password should be stored carefully. Access to the project is not possible without this password.

- Commissioning a KNX Data Secure device requires a **Factory Default Setup Key (FDSK)**.

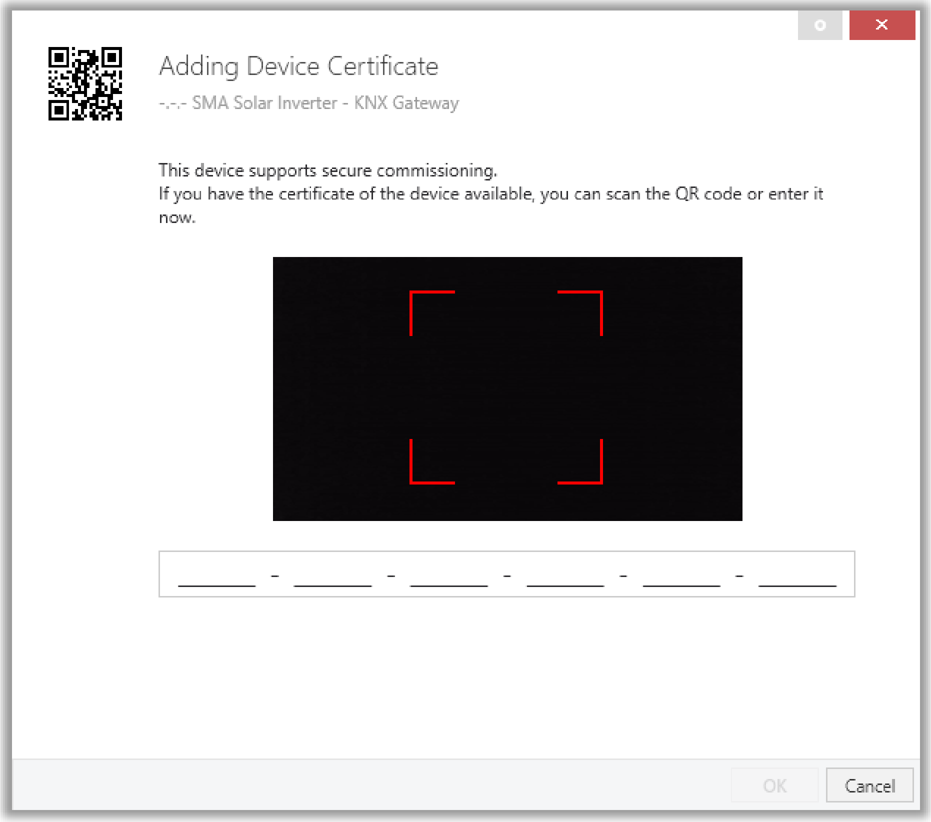

Fig. 5: Adding Device Certificate Window

- The FDSK is provided with the device, typically in the form of a label attached to the product..
- It is recommended to keep the key in a secure place after installation.
- During the first download, ETS will request the FDSK to authenticate the device.
- The key can be entered manually or scanned using a QR code if available.
- All FDSKs used in a project can also be managed in ETS under the **Project Overview → Security** section.
- Once commissioning is completed, ETS stores the security credentials automatically. The FDSK will only be required again if the device is reset to factory settings or added to another project.

2.8.1. Factory Reset

To reset the device to its factory settings, perform the following steps:

1. Press and hold the **Programming button** for approximately **4 seconds**.
2. The **Programming LED** starts blinking.
3. Keep the **Programming button** pressed (prox. 6 Sec) until the **blinking speed of the Programming LED increases**.
4. Release the **Programming button (in 3 Sec).** when the blinking becomes faster.
5. Press the **Programming button once again**.

The device will then **restart and restore its factory default settings**.

Special Note

After a factory reset, the device physical address is set to 15.15.255.

If the device had been programmed before, the existing application program in the device will be erased. The FDSK key that was previously written will also be cleared.

3. Configuration

3.1. Gateway Configuration

The device enables configuration through its embedded web interface. After programming via the ETS interface, when the device connects to the internet, it transmits its DHCP-assigned IP address information to the KNX bus. The device's web interface can be accessed by entering the IP address in an internet browser portal.

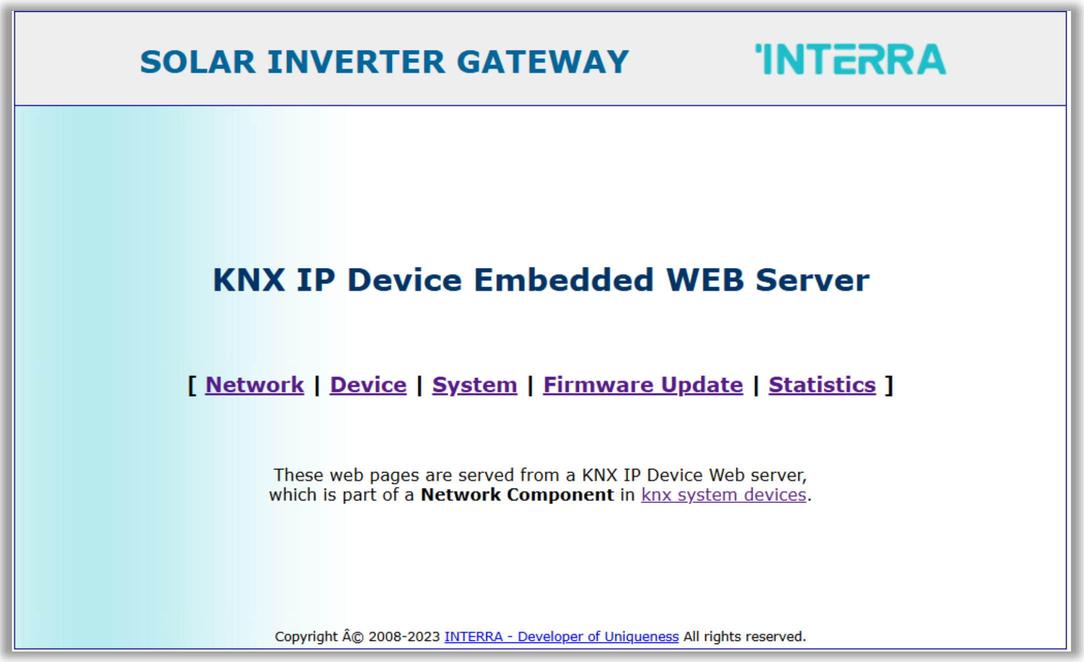

Fig. 6: Solar Inverter Gateway WEB Server Page

3.1.1. Network

This section contains network information parameters. The device's MAC address is also visible in this section. Network configurations are performed through this interface. Static IP assignment to the device is executed from this location.

3.1.2. Device

CKNX-side device information is displayed through this interface. Basic properties including programming status, firmware version, and serial number can be viewed. Additionally, the device can be switched to programming mode through this interface.

3.1.3. System

Web interface system information, including username and password credentials, can be modified through this section.

3.1.4. Firmware Update

This function must be utilized when firmware update procedures are required. The appropriate file format is ".ifw".

3.2. Inverter Configuration

The Modbus interface for SMA products is disabled by default. To utilise the Modbus interface and establish communication with products via SunSpec Modbus, Modbus must be enabled as the communication type and the TCP port must be configured. If your system addresses inverters using Modbus Unit ID rather than IP addresses, the Unit ID must also be configured in addition to the TCP port. The Unit ID in the SunSpec Modbus profile is 126.

Following the instructions listed below facilitates Modbus device detection. For additional information regarding Modbus ennexOS, refer to the "SMA Modbus® Interface ennexOS" Technical Information section at www.SMA-Solar.com.

Configuration Procedure:

1. Access the web interface by entering the inverter's IP address in an internet browser. If the IP address is unknown, access can be established using the device's serial number. If the user interface login page does not open, enter the IP address 192.168.12.3 in the web browser's address bar, or if your smart terminal supports mDNS services, enter SMA[serial number].local or https://SMA[serial number] (e.g., https://SMA0123456789.local).

2. Log in if you have an existing account, or create a new account and follow the required setup procedures.

3. Navigate to the **Device configuration** menu and click on the **Modbus** tab under the **"Type of communication"** section to activate Modbus configurations.

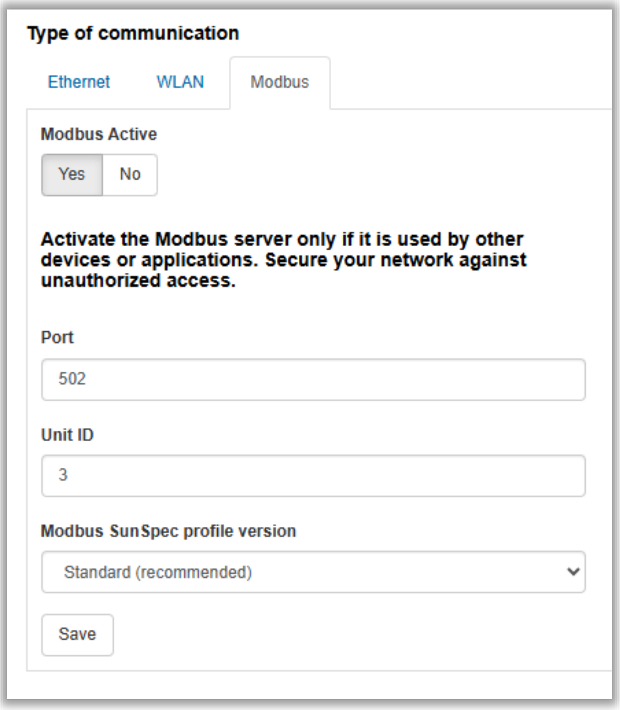

Fig. 7: Device Configuration>Type of communication window

Default Port: 502

Default Unit ID: 3

Important Notice

When Unit ID is utilized for Modbus SunSpec, it becomes 123 + Unit ID. To establish communication between the Gateway and Inverter, the value specified here must be incremented by +123. These values must be entered in the Modbus page within the ETS database file.

If port settings are modified, verify that this connection port is open on the router (internet gateway).

Example:

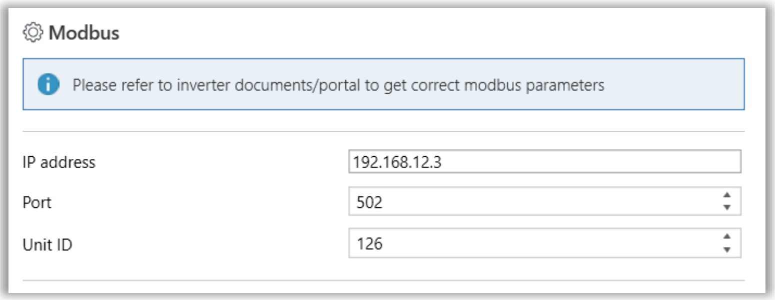

Fig. 8: Modbus Window

4. ETS Parameters & Descriptions

In this chapter, the ETS parameters of the SMA Solar Inverter - KNX 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 SMA Solar Inverter - KNX Gateway in ETS.

4.1. Information Page

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

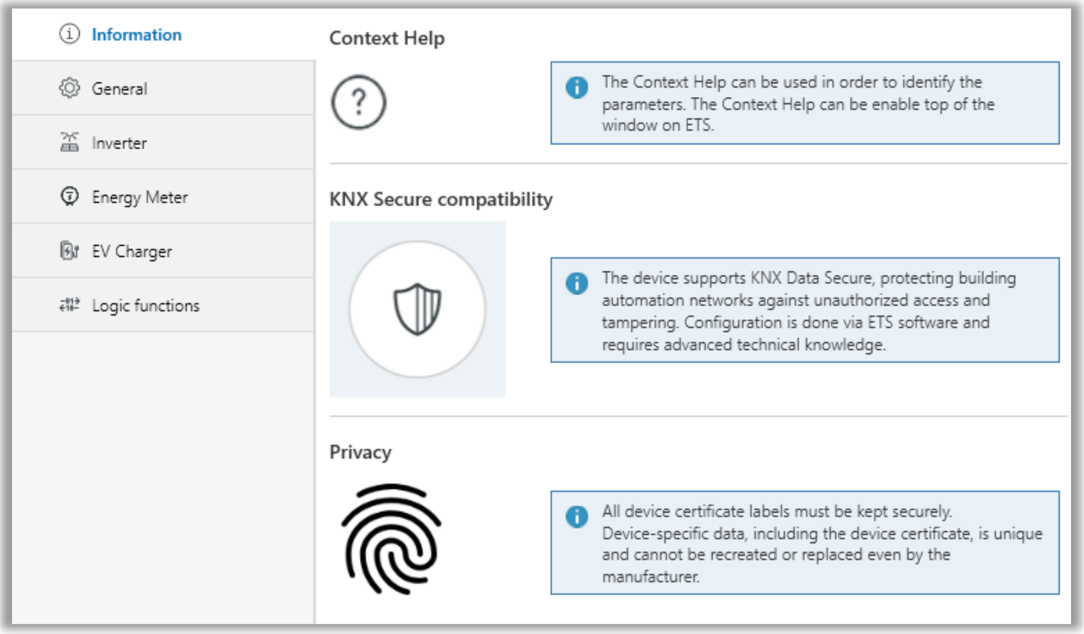

Fig. 9: Information Parameter Page

4.2. General Page

When added to the project in the ETS software, a configuration setting must first be performed before downloading. When the "GENERAL" option is opened in the parameter page, the configuration screen shown below will appear. General parameter settings for the entire device are carried out in this window.

From the general configuration window, various advanced functions of the Gateway can be enabled.

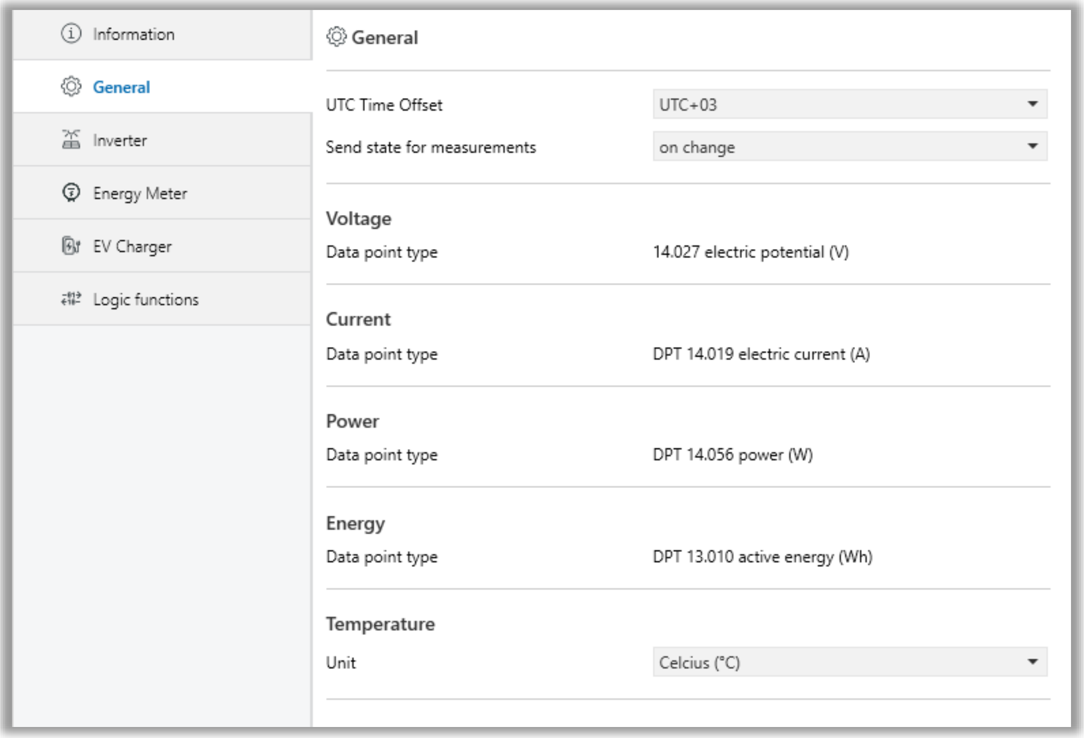

Fig. 10: General Configuration Parameter Page

4.2.1. Parameters List

PARAMETERS	DESCRIPTION	VALUES
Send state for measurements	This parameter defines how frequently the values measured from the inverter are transmitted to the KNX line.	**on change** on change and cyclically cyclically
-> Cyclic polling rate	When "Send state for measurements" parameter is selected as Cyclically, it defines the sending frequency between measured inverter values.	1…30 minutes
Voltage Data point type	Specifies the datapoint type on the KNX line that corresponds to the unit of the measured voltage values.	14.027 electric potential (V)
Current Data point type	Specifies the datapoint type on the KNX line that corresponds to the unit of the measured current values.	14.019 electric current (A)
Power Data point type	Specifies the datapoint type on the KNX line that corresponds to the unit of the measured power values.	14.056 power (W)
Energy Data point type	Specifies the datapoint type on the KNX line that corresponds to the unit of the measured energy values.	13.010 active energy (Wh)
Temperature Unit	Specifies the datapoint type on the KNX line that corresponds to the unit of the measured temperature values.	**Celcius (°C)** Kelvin (K) Fahrenheit (°F)

[1] This parameter is visible when the function “Send state for measurements” is set to “on change and cyclically” or “cyclically”.

4.3. Inverter

This page is the main section containing the technical information related to the inverter. If available, Photovoltaic (PV) and Battery options are configured in this section. In addition, critical settings such as the inverter manufacturer and the inverter supply voltage are also defined on this page.

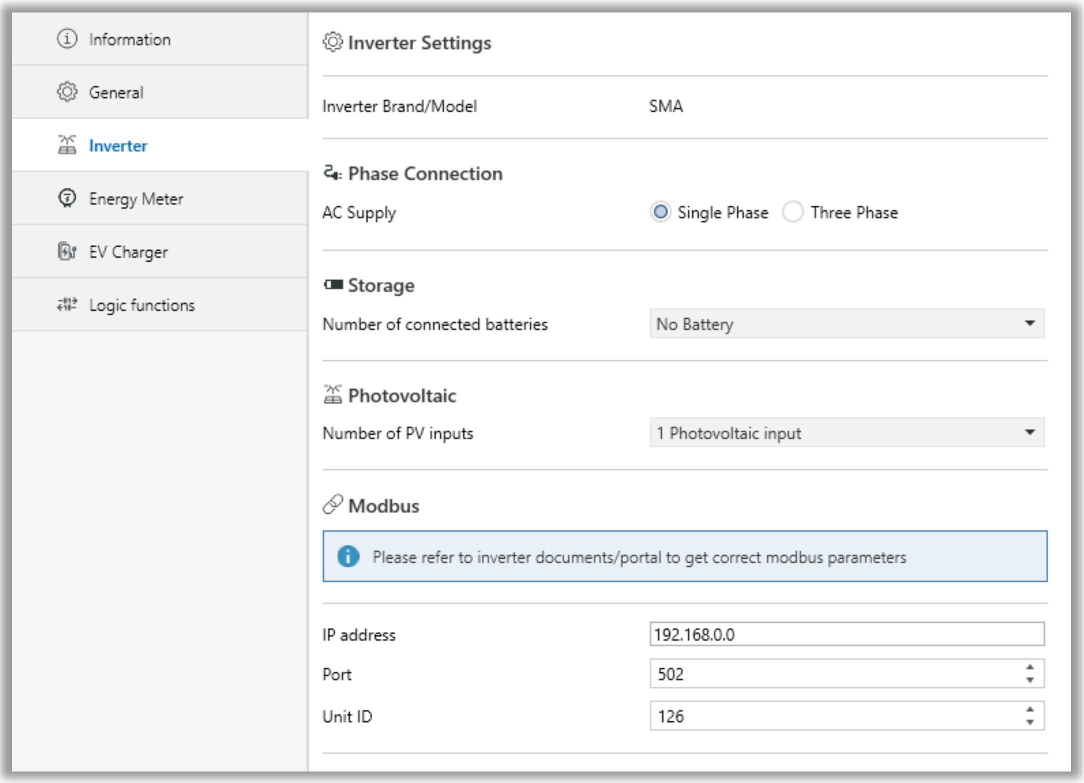

Fig. 11: Inverter Configuration Parameter Page

4.3.1. Parameters List

PARAMETERS	DESCRIPTION	VALUES
Inverter Brand/Model	This parameter is used to select the inverter manufacturer.	SMA
AC Supply	This parameter is used to select the electrical grid and defines the inverter supply voltage.	**Single Phase** Three Phase
Number of connected batteries	If available, this parameter is used to define the number of connected batteries.	**No Battery** 1 Battery 2 Batteries
Number of PV modules	This parameter specifies the number of connected photovoltaic panels. A maximum of 4 photovoltaic panels can be activated. The number of PV modules that can be connected to the inverter must be known.	**1 Photovoltaic panel** 2 Photovoltaic panel 3 Photovoltaic panel 4 Photovoltaic panel
IP address	This parameter specifies the IP address of the inverter.	Use a string in a IPv4 format **Default: 192.168.0.0**
Port	This parameter is used to define the Modbus port of the inverter.	0…**502**…65535
Unit ID	This parameter specifies the unit ID (Slave ID) of the inverter.	0…**126**…255

4.4. Energy Meter

This page is the main section containing the technical information related to the energy meter.

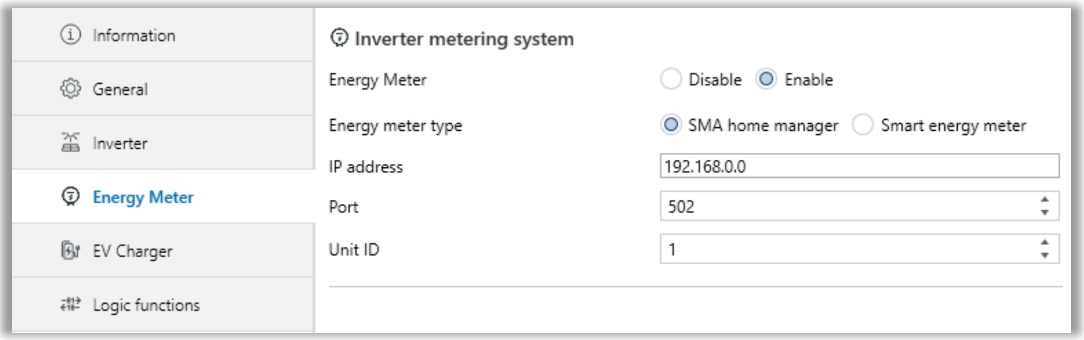

Fig. 12: Energy Meter Configuration Parameter Page

4.4.1. Parameters List

PARAMETERS	DESCRIPTION	VALUES
Energy Meter	This parameter is used to enable or disable the energy meter.	**Disable** Enable
-> Energy meter type[1]	This parameter is used to select the energy meter type.	**SMA home manager** Smart energy meter
-> IP address[1]	This parameter specifies the IP address of the inverter.	Use a string in a IPv4 format **Default: 192.168.0.0**
-> Port[1]	This parameter is used to define the Modbus port of the inverter.	0…**502**…65535
-> Unit ID[1]	This parameter specifies the unit ID (Slave ID) of the inverter.	0…**126**…255

[1] This parameter is visible when the function “Energy Meter” is set to “Enable”

4.5. EV Charger

EV Chargers are smart charging stations that enable the safe and controlled charging of electric vehicles. Gateway provides advanced features for EV charging station data, such as **charging monitoring, status information, and remote control**.

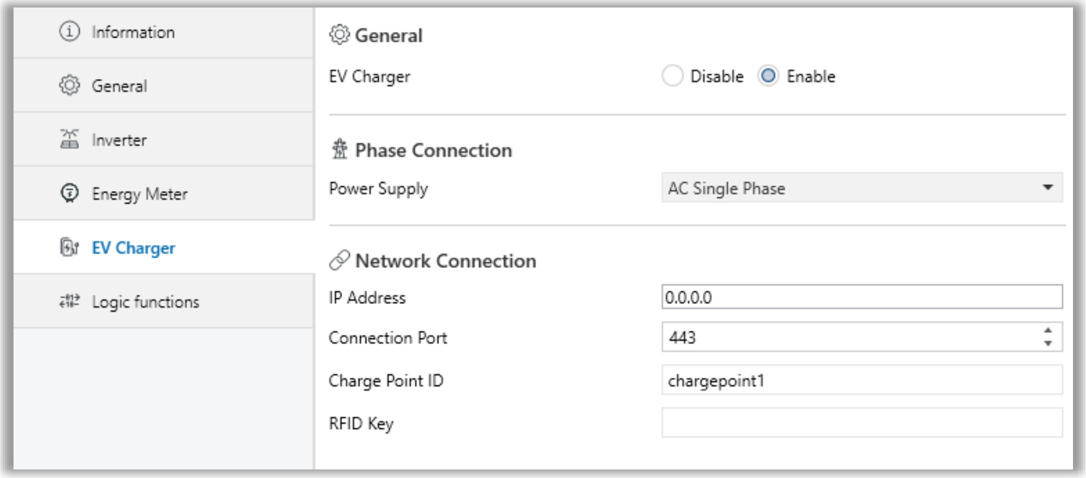

Fig. 13: EV Charger Configuration Parameter Page

OCPP 1.6J (Open Charge Point Protocol) ensures standardized and secure communication between the EV Charger and the Central System Management System (CSMS). Through this protocol, charging stations can transmit operations such as configuration, remote start/stop, status monitoring, energy metering, fault reporting, and user authentication to the central system in real time.

EV Charger + OCPP 1.6J represents a modern charging station architecture that enables the charging infrastructure to be **remotely manageable, scalable, and compatible with devices from different manufacturers**. The Gateway operates in an integrated manner with **OCPP 1.6J–compliant charging stations**, providing control and monitoring capabilities.

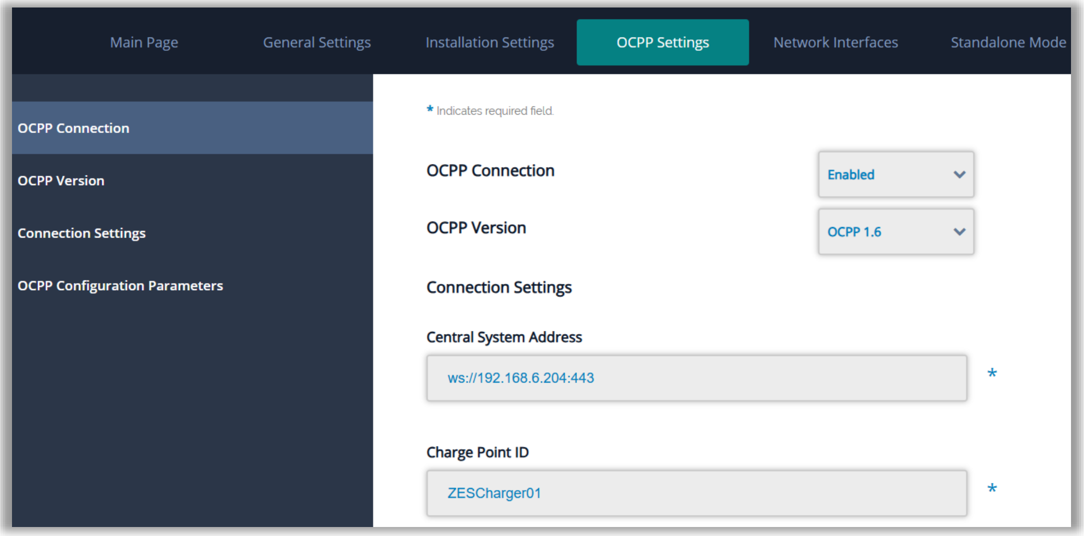

Fig. 14: EV Charging Unit – OCPP Settings Example Parameter Page

EV Chargers are intelligent charging stations that allow electric vehicles to be charged safely and in a controlled manner. These stations can support **single-phase, three-phase, or DC fast charging** types.

The **OCPP settings** in the web interface of a charging station are configured as follows. The **Central System Address** must be entered in the format:

ws://X.X.X.X:YY

- **X:** IP address of the Gateway on the network
- **Y:** Port number required to establish the connection

The **Charge Point ID** must be the same in both the **ETS parameter** and the **charging station interface**.

4.5.1. Parameters List

PARAMETERS	DESCRIPTION	VALUES
EV Charger	If there is an OCPP 1.6J–compliant EV charging station on the network, this option must be enabled.	**Disable** Enable
-> Power Supply[1]	EV charging stations can operate as single-phase, three-phase, or DC fast charging units. This parameter must be defined correctly to ensure that the appropriate communication objects are activated. Options: • AC Single Phase • AC Three Phase • DC	**AC Single Phase** DC Single Phase DC
-> IP address[1]	This parameter is used to define the IP address of the EV charging station. This allows the gateway to accept connections only from the specified IP address. If the parameter is set to 0.0.0.0, the gateway accepts all incoming connections; however, communication is established only with the first device that connects.	Use a string in a IPv4 format **Default: 192.168.0.0**
-> Connection Port[1]	This parameter defines the **port number** that the charging station uses to establish a connection. The value specified here must also be configured identically in the **OCPP settings** of the EV charging station. In addition, ensure that the **firewall** does not block this port.	0…**502**…65535
-> Charge Point ID[1]	Charge Point ID is a unique device identifier used by an EV charging station to identify itself when connecting to the OCPP server. It must be unique for each charging station and enables proper registration of the device with the Central System Management System (CSMS).	0…**126**…255
-> RFID Key[1]	RFID Key is the identity key, referred to as IdTag in OCPP, that a user presents to initiate a charging session. It is used to verify user authorization. If no RFID key is defined, the EV charging station must be configured to operate without RFID authentication.	30 bytes allowed string

[1] This parameter is visible when the function “EV Charger ” is set to “Enable

4.6. Logic Functions

Smart building applications enhance efficiency by processing data from field devices and making automated decisions based on this data. While traditional relay-based systems offer only simple on/off logic, modern automation systems enable much more complex scenarios, supporting 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.

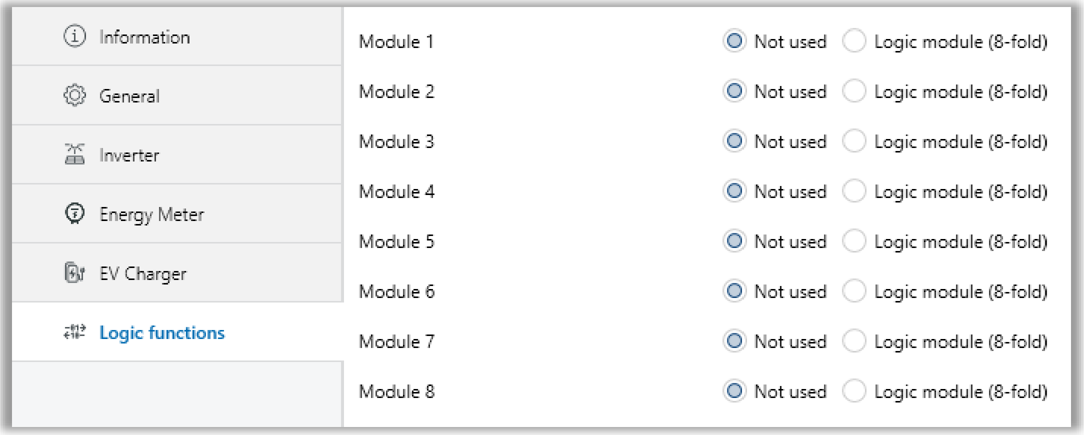

Fig. 15: Logic Functions Configuration Parameter Page

4.6.1. Parameter List

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

4.6.2. 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.

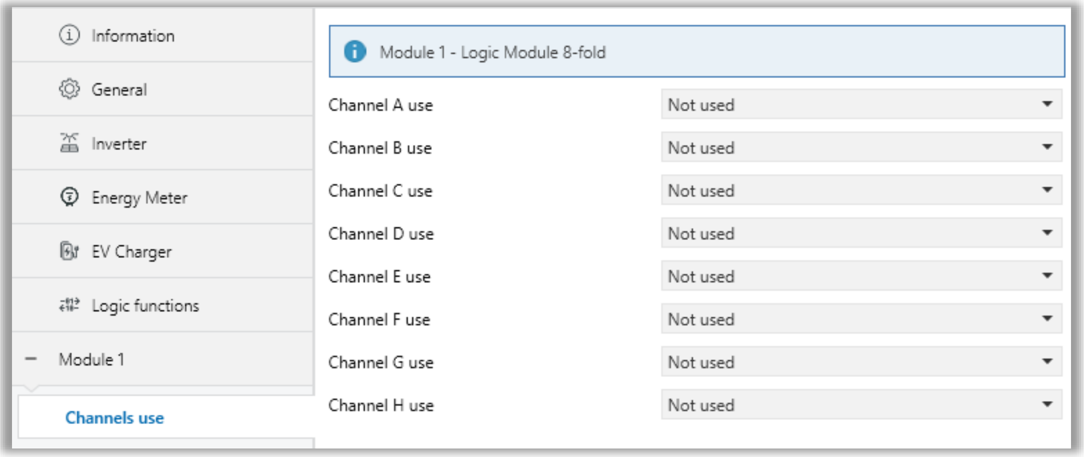

Fig. 16: Logic Functions – Channel Use Configuration Parameter Page

4.6.2.1. 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

4.6.3. Logic Gates

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.

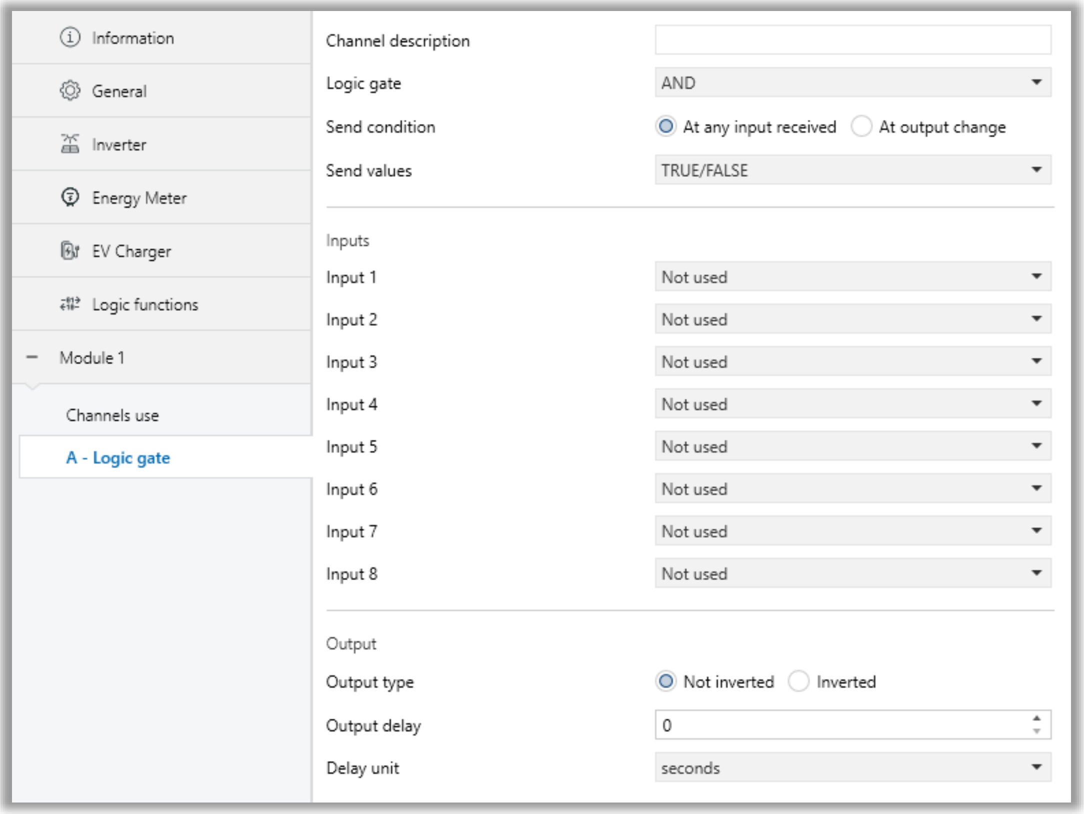

Fig. 17: Logic Gate Configuration Parameter Page

The status of the output of logic gates can be shown as not inverted or inverted. This configuration can be applied via the parameter “Output behaviour”, and when it is parameterised 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 converse 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), an OFF delay (TOFF) or both at the same time.

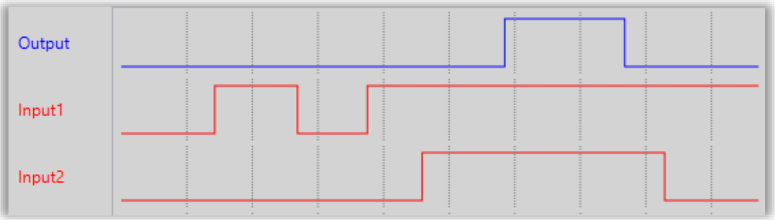

Fig. 18: Logic Gate with Delays

4.6.3.1. 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

4.6.4. 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.

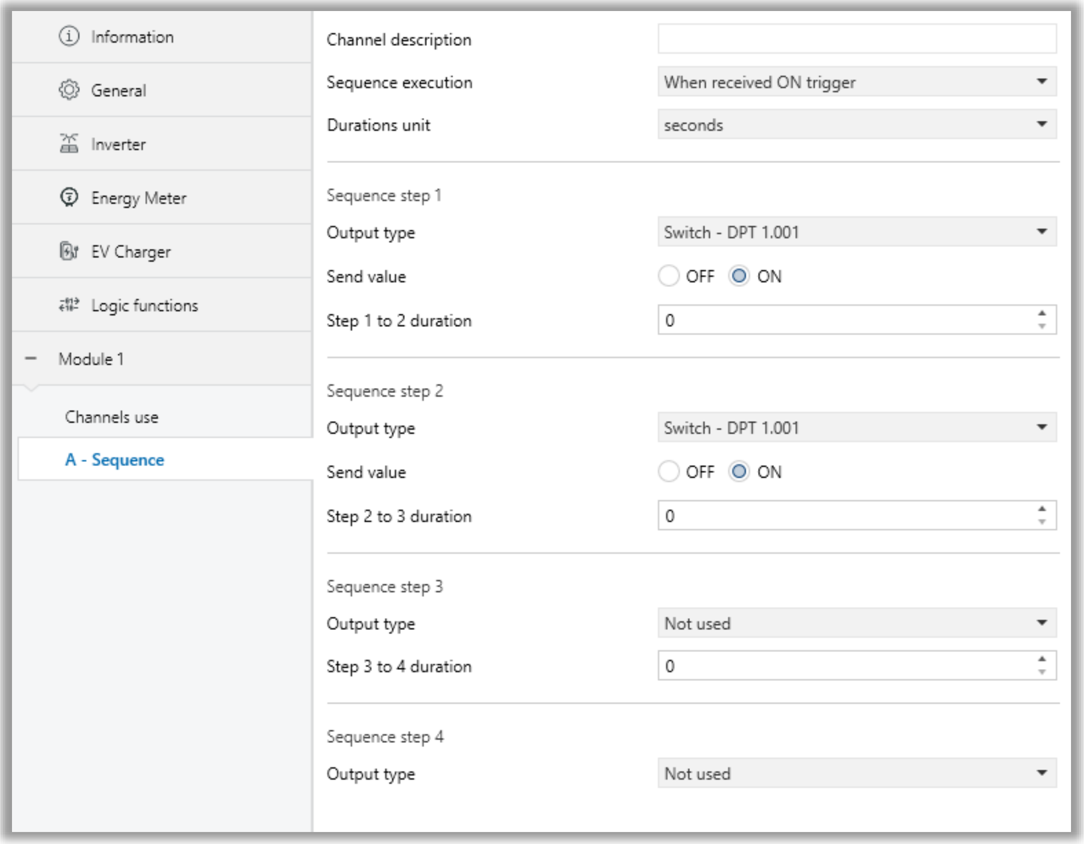

Fig. 19: Sequence Configuration Parameter Page

The Sequence function executes up to **4 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.

Örnek Senaryo – “Sabah Rutini” -- 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

4.6.4.1. 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 customised 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”.

4.6.5. 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.

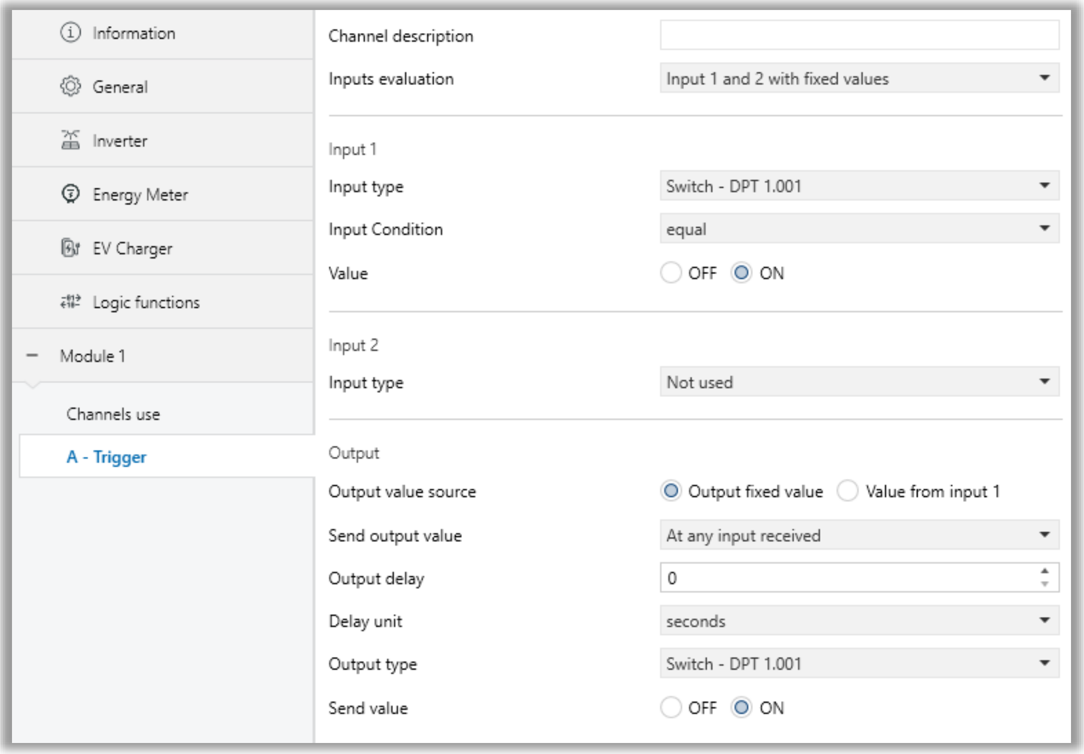

Fig. 20: Trigger Parameter Page

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.

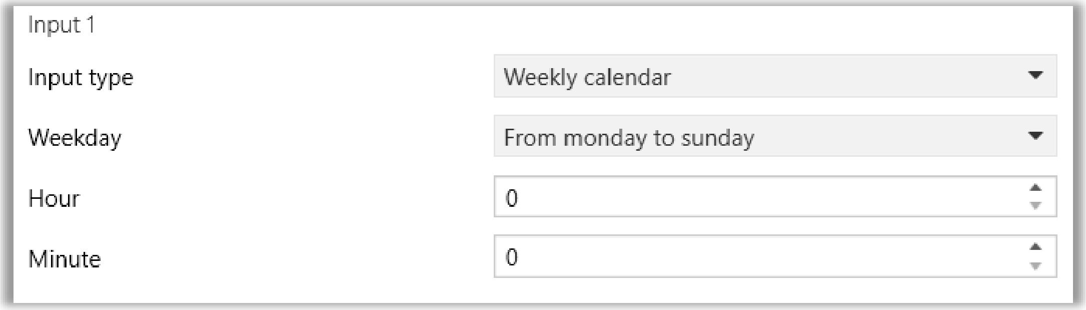

Fig. 21: Weekly calendar section

4.6.5.1. 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 alternative objects, depending on the Input Evaluation parameter selection.	**equal** greater than less than unequal 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	**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

	Input 2. No output is generated when other inputs are received. **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".

4.6.6. 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.

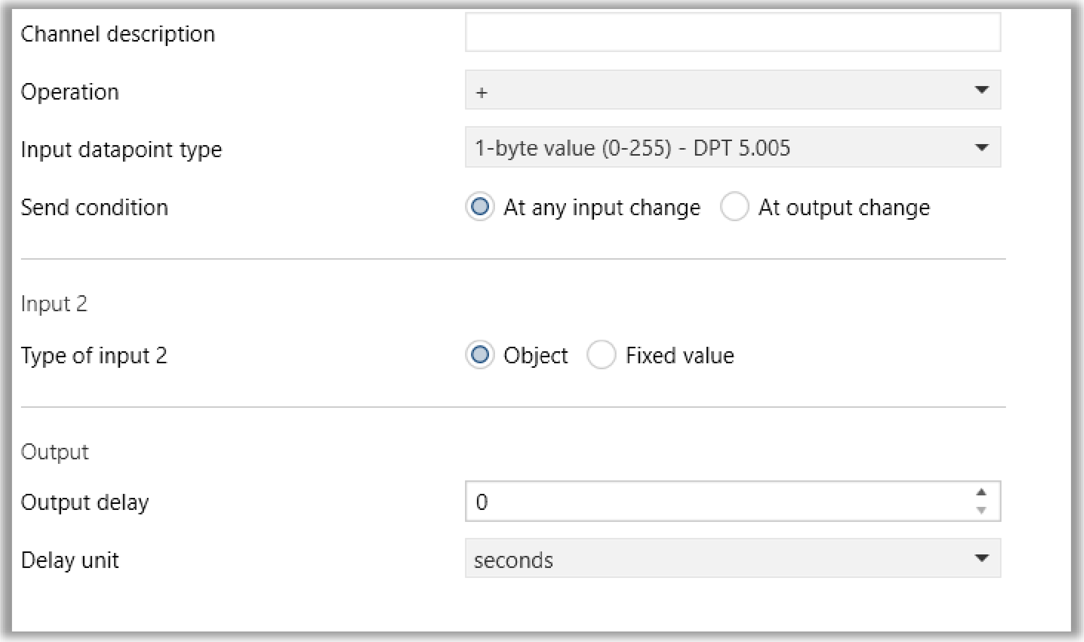

Fig. 22: Math Configuration Parameter Page

4.6.6.1. 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".

5. ETS Objects List & Descriptions

Communication objects used in smart building automation systems form the fundamental building blocks for data exchange between devices. These objects provide a manufacturer-independent communication language and enable data from energy systems, such as solar inverters, to be transmitted to the **KNX network in standardized formats**.

⚠ **Important Information**

When designing a **SMA Solar Inverter-KNX Gateway**, communication objects can be defined for numerous parameters such as energy production, consumption, grid information, and battery status. This approach facilitates compatibility with different inverter models. However, not all inverters share the same technical capabilities. Therefore, it should not be expected that all communication objects defined in the device are active or meaningful for every inverter.

To illustrate this, the **SMA Sunny Boy** series can be considered as an example. The Sunny Boy series is not a hybrid inverter; in other words, it does not support direct battery connection. Nevertheless, the KNX device firmware, which is designed for general use, may include battery-related communication objects such as **Battery Charge Status**, **Battery State of Charge**, or **Battery Power**.

These battery-related objects remain visible on the KNX side; however, no corresponding data is provided by the inverter. Even if the user links these objects within ETS, the values will always remain **empty**, **zero**, or **invalid**.

This behavior does not indicate a malfunction of the KNX device. On the contrary, it reflects a design approach aimed at **broad compatibility**. When a hybrid inverter from another manufacturer is connected, the same battery communication objects become active, allowing data such as battery state of charge or charge/discharge power to be transmitted to the KNX network.

ETS group objects are divided into 5 main parts, and these are :

- **General** – General group objects to the SMA Solar Inverter – KNX Gateway.
- **Inverter** – These objects are related to inverter parameters.
- **Energy Meter** – These objects are related to energy meter parameters.
- **EV Charger** – These objects are related to EV charger parameters.
- **Logic Function** – These objects are related to logic gate parameters.

All of the group objects of Interra SMA Solar Inverter are listed below. You can quickly browse through this table to get the functional capabilities of the SMA Solar Inverter .

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

No	Name	Function	DPT Type	Length	Flags				
					C	R	W	T	U
1	Gateway IP Address	IP Address	16.000	14 Bytes	X	X		X	
2	Gateway Erro Code	16.000 Character String (ASCII)	16.000	14 Bytes	X	X		X	
3	Local time	19.001 DPT date time format	19.001	8 Bytes	X	X		X	
4	AC Current Total	7.012 current (mA)	7.012	2 Bytes	X	X		X	
		9.021 current (mA) floating	9.021	2 Bytes	X	X		X	
		14.019 electric current (A)	14.019	4 Bytes	X	X		X	
5	Current Phase L1	7.012 current (mA)	7.012	2 Bytes	X	X		X	
		9.021 current (mA) floating	9.021	2 Bytes	X	X		X	
		14.019 electric current (A)	14.019	4 Bytes	X	X		X	
6	Current Phase L2	7.012 current (mA)	7.012	2 Bytes	X	X		X	
		9.021 current (mA) floating	9.021	2 Bytes	X	X		X	
		14.019 electric current (A)	14.019	4 Bytes	X	X		X	
7	Current Phase L3	7.012 current (mA)	7.012	2 Bytes	X	X		X	
		9.021 current (mA) floating	9.021	2 Bytes	X	X		X	
		14.019 electric current (A)	14.019	4 Bytes	X	X		X	
8	AC Voltage Total	9.020 voltage (mV)	9.020	2 Bytes	X	X		X	
		14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
9	AC Voltage L1-L2	9.020 voltage (mV)	9.020	2 Bytes	X	X		X	
		14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
10	AC Voltage L2-L3	9.020 voltage (mV)	9.020	2 Bytes	X	X		X	
		14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
11	AC Voltage L3-L1	9.020 voltage (mV)	9.020	2 Bytes	X	X		X	
		14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
12	AC Voltage L1- Neutral	9.020 voltage (mV)	9.020	2 Bytes	X	X		X	
		14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
13	AC Voltage L2- Neutral	9.020 voltage (mV)	9.020	2 Bytes	X	X		X	
		14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
14	AC Voltage L3- Neutral	9.020 voltage (mV)	9.020	2 Bytes	X	X		X	
		14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
15	AC Power Active	9.024 power (kW)	9.024	2 Bytes	X	X		X	
		14.056 power (W)	14.056	4 Bytes	X	X		X	
16	AC Power Apparent	14.080 apparent power (VA)	14.080	4 Bytes	X	X		X	
17	AC Power Reactive	14.056 power (W)	14.056	4 Bytes	X	X		X	
18	AC Power Factor	14.057 power factor (cos Φ)	14.057	4 Bytes	X	X		X	
19	AC Frequency	14.033 frequency (Hz)	14.033	4 Bytes	X	X		X	
20	AC Energy Total / Total Yield	13.010 active energy (Wh)	13.010	4 Bytes	X	X		X	
		13.013 active energy (kWh)	13.013	4 Bytes	X	X		X	
21	DC Current Total	7.012 current (mA)	7.012	2 Bytes	X	X		X	
		9.021 current (mA) floating	9.021	2 Bytes	X	X		X	
		14.019 electric current (A)	14.019	4 Bytes	X	X		X	
22	DC Voltage Total	9.020 voltage (mV)	9.020	2 Bytes	X	X		X	
		14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
23	DC Power Active Total	9.024 power (kW)	9.024	2 Bytes	X	X		X	
		14.056 power (W)	14.056	4 Bytes	X	X		X	
24	Cabinet Temperature	9.001 temperature (°C)	9.001	2 Bytes	X	X		X	
		9.002 temperature difference (K)	9.002	2 Bytes	X	X		X	
		9.027 temperature (°F)	9.027	2 Bytes	X	X		X	

25	Operating State	1:OFF,2:SLEEPING ... 7:FAULT, 8:STANDBY	7.010	2 Bytes	X	X		X	
26	Operating State	16.000 Character String (ASCII)	16.000	14 Bytes	X	X		X	
27	Inverter Fault boolean	1.002 boolean	1.002	1 Bit	X	X		X	
28	Inverter Fault character string	16.000 Character String (ASCII)	16.000	14 Bytes	X	X		X	
29 32 35 38	Photovoltaic[1…4] current	7.012 current (mA)	7.012	2 Bytes	X	X		X	
		9.021 current (mA) floating	9.021	2 Bytes	X	X		X	
		14.019 electric current (A)	14.019	4 Bytes	X	X		X	
30 33 36 39	Photovoltaic[1…4] voltage	9.020 voltage (mV)	9.020	2 Bytes	X	X		X	
		14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
31 34 37 40	Photovoltaic[1…4] power	9.024 power (kW)	9.024	2 Bytes	X	X		X	
		14.056 power (W)	14.056	4 Bytes	X	X		X	
41 49	Battery[1,2] Total Charge Capacity	9.024 power (kW)	9.024	2 Bytes	X	X		X	
		14.056 power (W)	14.056	4 Bytes	X	X		X	
42 50	Battery[1,2] Total Discharge Capacity	9.024 power (kW)	9.024	2 Bytes	X	X		X	
		14.056 power (W)	14.056	4 Bytes	X	X		X	
43 51	Battery[1,2] State of Charge	5.001 percentage (0..100%)	5.001	1 Byte	X	X		X	
44 52	Battery[1,2] Available Energy	13.010 active energy (Wh)	13.010	4 Bytes	X	X		X	
		13.013 active energy (kWh)	13.013	4 Bytes	X	X		X	
45 53	Battery[1,2] Charge Status	1:OFF,2:EMPTY,3:DISCHARGING, 4:CHARGING,5:FULL ...	7.010	2 Bytes	X	X		X	
46 54	Battery[1,2] Charge Status	16.000 Character String (ASCII)	16.000	14 Bytes	X	X		X	
47 55	Battery[1,2] Fault boolean	1.002 boolean	1.002	1 Bit	X	X		X	
48 56	Battery[1,2] Fault character string	16.000 Character String (ASCII)	16.000	14 Bytes	X	X		X	
57	SHM Energy drawn from grid	13.010 active energy (Wh)	13.010	4 Bytes	X	X		X	
		13.013 active energy (kWh)	13.013	4 Bytes	X	X		X	
58	SHM Energy fed in to grid	13.010 active energy (Wh)	13.010	4 Bytes	X	X		X	
		13.013 active energy (kWh)	13.013	4 Bytes	X	X		X	
59	SHM Power drawn from grid	9.024 power (kW)	9.024	2 Bytes	X	X		X	
		14.056 power (W)	14.056	4 Bytes	X	X		X	
60	SHM Power fed in to grid	9.024 power (kW)	9.024	2 Bytes	X	X		X	
		14.056 power (W)	14.056	4 Bytes	X	X		X	
61	Meter Total AC Current	14.019 electric current (A)	14.019	4 Bytes	X	X		X	
62	Meter Phase L1 Current	14.019 electric current (A)	14.019	4 Bytes	X	X		X	
63	Meter Phase L2 Current	14.019 electric current (A)	14.019	4 Bytes	X	X		X	
64	Meter Phase L3 Current	14.019 electric current (A)	14.019	4 Bytes	X	X		X	
65	Meter Voltage LN - Average of Phases	14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
66	Meter Voltage L1-N	14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
67	Meter Voltage L2-N	14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
68	Meter Voltage L3-N	14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
69	Meter Voltage L1-L2	14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
70	Meter Voltage L2-L3	14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
71	Meter Voltage L3-L1	14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
72	Meter Power Real	14.056 power (W)	14.056	4 Bytes	X	X		X	
73	Meter Power Apparent	14.080 apparent power (VA)	14.080	4 Bytes	X	X		X	
74	Meter Power Reactive	14.056 power (W)	14.056	4 Bytes	X	X		X	
75	Meter Total Real Energy Exported	13.013 active energy (kWh)	13.013	4 Bytes	X	X		X	

76	Meter Total Real Energy Imported	13.013 active energy (kWh)	13.013	4 Bytes	X	X		X	
77	Meter Status Boolean	1.002 boolean	1.002	1 Bit	X	X		X	
78	Meter Status Character String	16.000 Character String (ASCII)	16.000	14 Bytes	X	X		X	
79	EV Charger status	EVSE Operating mode (0 = Charging, 1 = EVConnected, 2 = SuspendedEV ... 5 = Available...)	20.1220	1 Byte	X	X		X	
80	EV Charger status character string	0 = Charging, 1 = EVConnected, 2 = SuspendedEV ... 5 = Available...	16.000	14 Bytes	X	X		X	
81	EV Charger Stop/Start charge	0: Stop Charge, 1: Start Charge	1.003	1 Bit	X		X		
82	EV Charger Instantaneous current flow to EV on phase L1	14.019 electric current (A)	14.019	4 Bytes	X	X		X	
83	EV Charger Instantaneous current flow to EV on phase L2	14.019 electric current (A)	14.019	4 Bytes	X	X		X	
84	EV Charger Instantaneous current flow to EV on phase L3	14.019 electric current (A)	14.019	4 Bytes	X	X		X	
85	EV Charger Maximum current offered to EV	14.019 electric current (A)	14.019	4 Bytes	X	X		X	
86	EV Charger Instantaneous active power imported by EV on phase L1.	14.056 power (W)	14.056	4 Bytes	X	X		X	
87	EV Charger Instantaneous active power imported by EV on phase L2.	14.056 power (W)	14.056	4 Bytes	X	X		X	
88	EV Charger Instantaneous active power imported by EV on phase L3.	14.056 power (W)	14.056	4 Bytes	X	X		X	
89	EV Charger Maximum power offered to EV	14.056 power (W)	14.056	4 Bytes	X	X		X	
90	EV Charger Instantaneous AC RMS supply voltage on phase L1	14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
91	EV Charger Instantaneous AC RMS supply voltage on phase L2	14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
92	EV Charger Instantaneous AC RMS supply voltage on phase L3	14.027 electric potential (V)	14.027	4 Bytes	X	X		X	
93	EV Charger Represents the total energy drawn from the grid since the charging station was installed.	13.013 active energy (kWh)	13.013	4 Bytes	X	X		X	
94	EV Charger Represents the total energy drawn from the grid during charge time.	13.013 active energy (kWh)	13.013	4 Bytes	X	X		X	
95	EV Charger State of charge of electric vehicle in %	5.001 percentage (0..100%)	5.001	1 Byte	X	X		X	
96	EV Charger Error code of the charging point	1 = Connector Lock Failure, 2 = Communication failure ... 7 = NoError	20.1221	1 Byte	X	X		X	
97	EV Charger Error code of the charging point character string	16.000 Character String (ASCII)	16.000	14 Bytes	X	X		X	
98,108, …, 728	Extension 1/2 - Channel A…H - Block	On/Off	1.003	1 Bit	X	X	X		
99,109, …, 729	Extension 1/2 - Channel A...H - Trigger On/Off	On/Off	1.017	1 Bit	X	X	X		
99,109, …, 729	Extension 1/2 - Channel A...H - Logic gate - Input 1	True/False	1.002	1 Bit	X		X		

100,110 ,..., 730	Extension 1/2 - Channel A...H - Step 1 Output - Switch	On/Off	1.001	1 Bit	X	X		X	
100,110 ,..., 730	Extension 1/2 - Channel A...H - Step 1 Output - Scene	Scene	18.001	1 Byte	X	X		X	
100,110 ,..., 730	Extension 1/2 - Channel A...H - Step 1 Output - Percent	Percent	5.001	1 Byte	X	X		X	
100,110 ,..., 730	Extension 1/2 - Channel A...H - Step 1 Output - RGB	RGB	232.600	3 Bytes	X	X		X	
100,110 ,..., 730	Extension 1/2 - Channel A...H - Step 1 Output - Temperature	Percent	5.001	1 Byte	X	X		X	
100,110 ,..., 730	Extension 1/2 - Channel A...H - Step 1 Output - Value	1 byte	5.005	1 Byte	X	X		X	
100,110 ,..., 730	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	
100,110 ,..., 730	Extension 1/2 - Channel A...H - Input 1 - Switch	On/Off	1.001	1 Bit	X		X		
100,110 ,..., 730	Extension 1/2 - Channel A...H - Input 1 - Scene	Scene	18.001	1 Byte	X		X		
100,110 ,..., 730	Extension 1/2 - Channel A...H - Input 1 - Percent	Percent	5.001	1 Byte	X		X		
100,110 ,..., 730	Extension 1/2 - Channel A...H - Input 1 - Value	1 byte	5.005	1 Byte	X		X		
100,110 ,..., 730	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		
100,110 ,..., 730	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		
100,110 ,..., 730	Extension 1/2 - Channel A...H - Logic gate - Input 2	True/False	1.002	1 Bit	X		X		
101,111 ,..., 731	Extension 1/2 - Channel A...H - Step 2 Output - Switch	On/Off	1.001	1 Bit	X	X		X	
101,111 ,..., 731	Extension 1/2 - Channel A...H - Step 2 Output - Scene	Scene	18.001	1 Byte	X	X		X	
101,111 ,..., 731	Extension 1/2 - Channel A...H - Step 2 Output - Percent	Percent	5.001	1 Byte	X	X		X	
101,111 ,..., 731	Extension 1/2 - Channel A...H - Step 2 Output - RGB	RGB	232.600	3 Bytes	X	X		X	
101,111 ,..., 731	Extension 1/2 - Channel A...H - Step 2 Output - Temperature	Percent	5.001	1 Byte	X	X		X	
101,111 ,..., 731	Extension 1/2 - Channel A...H - Step 2 Output - Value	1 byte	5.005	1 Byte	X	X		X	
101,111 ,..., 731	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	
101,111 ,..., 731	Extension 1/2 - Channel A...H - Input 1 - Comparative value	On/Off	1.001	1 Bit	X		X		
101,111 ,..., 731	Extension 1/2 - Channel A...H - Input 1 - Comparative value	Scene	18.001	1 Byte	X		X		
101,111 ,..., 731	Extension 1/2 - Channel A...H - Input 1 - Comparative value	Percent	5.001	1 Byte	X		X		
101,111 ,..., 731	Extension 1/2 - Channel A...H - Input 1 - Comparative value	1 byte	5.005	1 Byte	X		X		

101,111 ,…., 731	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		
101,111 ,…., 731	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		
101,111 ,…., 731	Extension 1/2 - Channel A...H - Logic gate - Input 3	True/False	1.002	1 Bit	X		X		
102,112 ,…., 732	Extension 1/2 - Channel A...H - Step 3 Output - Switch	On/Off	1.001	1 Bit	X	X		X	
102,112 ,…., 732	Extension 1/2 - Channel A...H - Step 3 Output - Scene	Scene	18.001	1 Byte	X	X		X	
102,112 ,…., 732	Extension 1/2 - Channel A...H - Step 3 Output - Percent	Percent	5.001	1 Byte	X	X		X	
102,112 ,…., 732	Extension 1/2 - Channel A...H - Step 3 Output - RGB	RGB	232.600	3 Bytes	X	X		X	
102,112 ,…., 732	Extension 1/2 - Channel A...H - Step 3 Output - Temperature	Percent	5.001	1 Byte	X	X		X	
102,112 ,…., 732	Extension 1/2 - Channel A...H - Step 3 Output - Value	1 byte	5.005	1 Byte	X	X		X	
102,112 ,…., 732	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	
102,112 ,…., 732	Extension 1/2 - Channel A...H - Input 2 - Switch	On/Off	1.001	1 Bit	X		X		
102,112 ,…., 732	Extension 1/2 - Channel A...H - Input 2 - Scene	Scene	18.001	1 Byte	X		X		
102,112 ,…., 732	Extension 1/2 - Channel A...H - Input 2 - Percent	Percent	5.001	1 Byte	X		X		
102,112 ,…., 732	Extension 1/2 - Channel A...H - Input 2 - Value	1 byte	5.005	1 Byte	X		X		
102,112 ,…., 732	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		
102,112 ,…., 732	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		
102,112 ,…., 732	Extension 1/2 - Channel A...H - Logic gate - Input 4	True/False	1.002	1 Bit	X		X		
103,113 ,…., 733	Extension 1/2 - Channel A...H - Step 4 Output - Switch	On/Off	1.001	1 Bit	X	X		X	
103,113 ,…., 733	Extension 1/2 - Channel A...H - Step 4 Output - Scene	Scene	18.001	1 Byte	X	X		X	
103,113 ,…., 733	Extension 1/2 - Channel A...H - Step 4 Output - Percent	Percent	5.001	1 Byte	X	X		X	
103,113 ,…., 733	Extension 1/2 - Channel A...H - Step 4 Output - RGB	RGB	232.600	3 Bytes	X	X		X	
103,113 ,…., 733	Extension 1/2 - Channel A...H - Step 4 Output - Temperature	Percent	5.001	1 Byte	X	X		X	
103,113 ,…., 733	Extension 1/2 - Channel A...H - Step 4 Output - Value	1 byte	5.005	1 Byte	X	X		X	
103,113 ,…., 733	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	
103,113 ,…., 733	Extension 1/2 - Channel A...H - Input 2 - Comparative value	On/Off	1.001	1 Bit	X		X		
103,113 ,…., 733	Extension 1/2 - Channel A...H - Input 2 - Comparative value	Scene	18.001	1 Byte	X		X		
103,113 ,…., 733	Extension 1/2 - Channel A...H - Input 2 - Comparative value	Percent	5.001	1 Byte	X		X		
103,113 ,…., 733	Extension 1/2 - Channel A...H - Input 2 - Comparative value	1 byte	5.005	1 Byte	X		X		
103,113 ,…., 733	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		
103,113 ,…., 733	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		
103,113 ,…., 733	Extension 1/2 - Channel A...H - Logic gate - Input 5	True/False	1.002	1 Bit	X		X		
104,114 ,…., 734	Extension 1/2 - Channel A...H - Step 1 Output - Brightness	Percent	5.001	1 Byte	X	X		X	
104,114 ,…., 734	Extension 1/2 - Channel A...H - Output - Switch	On/Off	1.001	1 Bit	X	X		X	
104,114 ,…., 734	Extension 1/2 - Channel A...H - Output - Scene	Scene	18.001	1 Byte	X	X		X	
104,114 ,…., 734	Extension 1/2 - Channel A...H - Output - Percent	Percent	5.001	1 Byte	X	X		X	
104,114 ,…., 734	Extension 1/2 - Channel A...H - Output - RGB	RGB	232.600	3 Bytes	X	X		X	
104,114 ,…., 734	Extension 1/2 - Channel A...H - Output - Temperature	Percent	5.001	1 Byte	X	X		X	
104,114 ,…., 734	Extension 1/2 - Channel A...H - Output - Value	1 byte	5.005	1 Byte	X	X		X	
104,114 ,…., 734	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	
104,114 ,…., 734	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	
104,114 ,…., 734	Extension 1/2 - Channel A...H - Logic gate - Input 6	True/False	1.002	1 Bit	X		X		
105,115 ,…., 735	Extension 1/2 - Channel A...H - Step 2 Output - Brighness	Percent	5.001	1 Byte	X	X		X	
105,115 ,…., 735	Extension 1/2 - Channel A...H - Output - Brighness	Percent	5.001	1 Byte	X	X		X	
105,115 ,…., 735	Extension 1/2 - Channel A...H - Logic gate - Input 7	True/False	1.002	1 Bit	X		X		
106,116 ,…., 736	Extension 1/2 - Channel A...H - Step 3 Output - Brighness	Percent	5.001	1 Byte	X	X		X	
106,116 ,…., 736	Extension 1/2 - Channel A...H - Logic gate - Input 8	True/False	1.002	1 Bit	X		X		
107,117 ,…., 737	Extension 1/2 - Channel A...H - Step 4 Output - Brighness	Percent	5.001	1 Byte	X	X		X	
107,117 ,…., 737	Extension 1/2 - Channel A...H - Logic gate - Output	True/False	1.002	1 Bit	X	X		X	

5.1. General Objects

This section describes the "General" 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	Gateway IP Address	IP Address	14 Bytes	CRT

When the gateway device connects to the network, it transmits the IPv4 address assigned by the DHCP server to the KNX bus. This object is used to monitor the current network address of the device and to access its services.
DPT: 16.000 (character String (ASCII))

2	Gateway Error Code	16.000 Character String (ASCII)	14 Bytes	CRT

Reports the current error status of the gateway device using numerical error codes. The meaning of these error codes is explained in the appendix at the end of this document.
On the ETS side, this object can be used for alarms, notifications, or maintenance-related logging scenarios.

DPT: 16.000 (character String (ASCII))

3	Local time	19.001 DPT date time format	8 bytes	CRT

Transmits the local date and time information of the gateway device to the KNX bus. It is used as a reference to ensure correct operation of time-based scenarios, logging, and automation functions.

DPT: 19.001 (date time)

5.2. Inverter Objects

This section describes the "Inverter" 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
4	AC Current Total	7.012 current (mA) 9.021 current (mA) floating 14.019 electric current (A)	2 Bytes 14 Bytes	CRT

Reports the total AC current injected into the grid by the inverter, expressed in amperes (A). It represents the sum of all phases.
In ETS, this object is used for overall load monitoring and inverter capacity supervision

DPT: 7.012 (current (mA)) / 9.021 (current (mA)) / 14.019 (electric current (A))

5 6 7	Current Phase L1 Current Phase L2 Current Phase L3	7.012 current (mA) 9.021 current (mA) floating 14.019 electric current (A)	2 Bytes 4 Bytes	CRT

Transmits the AC current flowing through phase L1/L2/L3 in a three-phase grid system, expressed in amperes (A).
It can be monitored in ETS for phase-based load analysis and imbalance detection

DPT: 7.012 (current (mA)) / 9.021 (current (mA)) / 14.019 (electric current (A))

8	AC Voltage Total	9.020 voltage (mV) 14.027 electric potential(V)	2 Bytes 4 Bytes	CRT

Reports the AC output voltage value.
• In single-phase systems, it represents the phase voltage.
• In three-phase systems, it represents the average phase-to-phase voltage.
In ETS, it is used for general grid health monitoring.
DPT: 9.020 (voltage (mV)) / 14.027 (electric potential (V))

9 10 11	AC Voltage L1-L2 AC Voltage L2-L3 AC Voltage L3-L1	9.020 voltage (mV) 14.027 electric potential (V)	2 Bytes 4 Bytes	CRT

Transmits the potential difference between phases L1-L2 / L2-L3 / L3-L1 in a three-phase system, expressed in volts (V).

It is used in energy quality and grid analysis applications.

DPT: 9.020 (voltage (mV)) / 14.027 (electric potential (V))

12 13 14	AC Voltage L1- Neutral AC Voltage L2- Neutral AC Voltage L3- Neutral	9.020 voltage (mV) 14.027 electric potential (V)	2 Bytes 4 Bytes	CRT

Reports the voltage between phase L1 and neutral in a three-phase system, expressed in volts (V). It can be used together with threshold alarms for under-voltage and over-voltage detection

DPT: 9.020 (voltage (mV)) / 14.027 (electric potential (V))

15	AC Power Active	9.024 power (kW) 14.056 power (W)	2 Bytes 4 Bytes	CRT

Transmits the instantaneous active power value, expressed in watts (W). It represents the actual energy production.
In ETS, it is used in energy optimization and load management scenarios

DPT: 9.024 (power (kW)) / 14.056 (power (W))

16	AC Power Apparent	14.080 apparent power (VA)	4 Bytes	CRT

Reports the apparent power value, expressed in volt-amperes (VA). It includes both active and reactive power components.
It is used for energy analysis and reporting purposes.
DPT: 14.080 (apparent power (VA))

17	AC Power Reactive	14.056 power (W)	4 Bytes	CRT

Transmits the reactive power value, expressed in var. It is the component that affects the power factor and can be used in compensation scenarios.
In ETS, it is used for reactive power monitoring and warning functions.
DPT: 14.056 (power (W))

18	AC Power Factor	14.057 power factor(cos Φ)	4 Bytes	CRT

Reports the power factor (cos φ). It is an important parameter for grid quality and energy efficiency. It is monitored for energy efficiency analysis.
DPT: 14.057 (power factor(cos Φ))

19	AC Frequency	14.033 frequency (Hz)	4 Bytes	CRT

Transmits the AC frequency supplied to the grid, expressed in hertz (Hz). It is typically 50 Hz, with minor deviations possible.
It is used for grid stability and quality monitoring.

DPT: 14.033 (frequency (Hz))

20	AC Energy Total / Total Yieldt	13.010 active energy (Wh) 13.013 active energy (kWh)	4 Bytes	CRT

Reports the total amount of energy produced by the inverter to date, expressed in kWh. It functions as an energy counter.
In ETS, it is used for long-term energy reporting.

DPT: 13.010 (active energy (Wh)) / 13.013 (active energy(kWh))

21	DC Current Total	7.012 current (mA) 9.021 current (mA) floating 14.019 electric current (A)	2 Bytes 4 Bytes	CRT

Transmits the total DC current flowing from the PV panels to the inverter, expressed in amperes (A).
It is used to monitor PV production performance.

DPT: 7.012 (current (mA)) / 9.021 (current (mA)) / 14.019 (electric current (A))

22	DC Voltage Total	9.020 voltage (mV) 14.027 electric potential (V)	2 Bytes 4 Bytes	CRT

Reports the total DC voltage of the PV panels, expressed in volts (V).
It is used for PV string health and production status monitoring.

DPT: 9.020 (voltage (mV)) / 14.027 (electric potential (V))

23	DC Power Active Total	9.024 power (kW) 14.056 power (W)	2 Bytes 4 Bytes	CRT

Transmits the total DC active power delivered from the PV panels to the inverter, expressed in watts (W).
It represents the instantaneous PV production performance.

DPT: 9.024 (power (kW)) / 14.056 (power (W))

24	Cabinet Temperature	9.001 temperature (°C) 9.002 temperature difference (K) 9.027 temperature (°F)	2 Bytes	CRT

Reports the temperature inside the inverter cabinet, expressed in degrees Celsius (°C).
It is used in over-temperature alarm scenarios.

DPT: 9.001 (temperature (°C)) / 9.002 (temperature difference (K)) / 9.027 (temperature (°F))

25	Operating State	1:OFF,2:SLEEPING ... 7:FAULT, 8:STANDBY	2 Bytes	CRT

Reports the current operating state of the inverter in numerical form.
Example: 1 = OFF, 2 = SLEEPING, 3 = RUNNING
In ETS, it is used for logical state evaluation and control conditions.

DPT: 7.010 (property data type)

26	Operating State	16.000 Character String (ASCII)	14 Bytes	CRT

Transmits the operating state of the inverter in a descriptive text (string) format.
It provides user-friendly representation on visualization interfaces.

DPT: 16.000 (Character String (ASCII))

27	Inverter Fault boolean	Inverter Fault boolean	1 Bit	CRT

Reports whether there is a fault in the inverter as a 1-bit value.
1 = Fault present, 0 = No fault
It is suitable for ETS alarm triggering.

DPT: 1.002 (Boolean)

28	Inverter Fault character string	16.000 Character String (ASCII)	14 Bytes	CRT

Transmits the current inverter fault status as a descriptive text to the KNX bus.
It is used on service and maintenance screens.

DPT: 16.000 (Character String (ASCII))

29, 32, 35, 38	Photovoltaic[1…4] current	7.012 current (mA) 9.021 current (mA) floating 14.019 electric current (A)	2 Bytes 4 Bytes	CRT

Reports the DC current flowing through the first PV string, expressed in amperes (A).
It is used for string-level performance monitoring.

DPT: 7.012 (current (mA)) / 9.021 (current (mA)) / 14.019 (electric current (A))

30, 33, 36, 39	Photovoltaic[1…4] voltage	9.020 voltage (mV) 14.027 electric potential (V)	2 Bytes 4 Bytes	CRT

Transmits the voltage of the first PV string, expressed in volts (V).
It is used for detecting PV string faults.

DPT: 9.020 (voltage (mV)) / 14.027 (electric potential (V))

31, 34, 37, 40	Photovoltaic[1…4] power	19.024 power (kW) 14.056 power (W)	2 Bytes 4 Bytes	CRT

Reports the DC power produced by the first PV string, expressed in watts (W).
It allows comparative analysis between PV strings.

DPT: 9.024 (power (kW)) / 14.056 (power (W))

41, 49	Battery[1,2] Total Charge Capacity	9.024 power (kW) 14.056 power (W)	2 Bytes 4 Bytes	CRT

Reports the total charge capacity of the first battery, expressed in kWh.
It is used to monitor battery capacity information.

DPT: 9.024 (power (kW)) / 14.056 (power (W))

42, 50	Battery[1,2] Total Discharge Capacity	9.024 power (kW) 14.056 power (W)	2 Bytes 4 Bytes	CRT

Transmits the total energy capacity that can be discharged from the first battery, expressed in kWh.
It is used in energy planning and backup scenarios.

DPT: 9.024 (power (kW)) / 14.056 (power (W))

43, 51	Battery[1,2] State of Charge	5.001 percentage (0..100%)	1 Byte	CRT

Reports the current state of charge of the first battery as a percentage (%).
It is a primary parameter for battery monitoring.

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

44, 52	Battery[1,2] Available Energy	13.010 active energy (Wh) 13.013 active energy (kWh)	4 Bytes	CRT

Transmits the available energy of the first battery, expressed in kWh.
It can be referenced in load management scenarios.

DPT: 13.010 (active energy (Wh)) / 13.013 (active energy(kWh))

45, 53	Battery[1,2] Charge Status	1:OFF,2:EMPTY, 3:DISCHARGING, 4:CHARGING,5:FULL ...	2 Bytes	CRT

Reports the charging status of the first battery in numerical form.
Example: OFF, EMPTY, DISCHARGING, CHARGING
It is suitable for logical control scenarios.

DPT: 7.010 (property data type)

46, 54	Battery[1,2] Charge Status	16.000 Character String (ASCII)	14 Bytes	CRT

Transmits the charging status of the first battery as descriptive text.
It provides readable information on user interfaces.

DPT: 16.000 (Character String (ASCII))

47, 55	Battery[1,2] Fault boolean	1.002 boolean	1 Bit	CRT

Reports the fault status of the first battery as a 1-bit value.
It is used in alarm and safety scenarios.

DPT: 1.002 (Boolean)

48, 56	Battery[1,2] Fault character string	16.000 Character String (ASCII)	14 Bytes	CRT

Transmits the fault information of the first battery in text format.
It is intended for service and maintenance purposes.
49.–56.
Equivalent communication objects used for additional batteries.
Each battery can be monitored independently via ETS.

DPT: 16.000 (Character String (ASCII))

5.3. Energy Meter Objects

This section describes the "Energy Meter" 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
57	SHM Energy drawn from grid	13.010 active energy (Wh) 13.013 active energy(kWh)	2 Bytes 4 Bytes	CRT

Reports the total energy drawn from the grid as measured by the SMA Sunny Home Manager, expressed in kWh.
It is used for energy consumption reporting.

DPT: 13.013 (active energy(kWh))

58	SHM Energy fed in to grid	13.010 active energy (Wh) 13.013 active energy(kWh)	2 Bytes 4 Bytes	CRT

Reports the total energy fed into the grid as measured by the SMA Sunny Home Manager, expressed in kWh.
It is used for feed-in analysis.

DPT: 13.010 (active energy (Wh)) / 13.013 (active energy(kWh))

59	SHM Power drawn from grid	9.024 power (kW) 14.056 power (W)	2 Bytes 4 Bytes	CRT

Transmits the instantaneous power drawn from the grid, expressed in watts (W).
It is suitable for real-time consumption monitoring.

DPT: 9.024 (power (kW)) / 14.056 (power (W))

60	SHM Power fed in to grid	9.024 power (kW) 14.056 power (W)	2 Bytes 4 Bytes	CRT

Transmits the instantaneous power fed into the grid, expressed in watts (W).
It enables monitoring of production–consumption balance.

DPT: 9.024 (power (kW)) / 14.056 (power (W))

61	Meter Total AC Current	9.024 power (kW) 14.056 power (W)	2 Bytes 4 Bytes	CRT

Contain current, voltage, power, energy, and status information measured by the energy meter.
They are used in ETS for professional energy monitoring and reporting scenarios.

DPT: 9.024 (power (kW)) / 14.056 (power (W))

62 63 64	Meter Phase L1 Current Meter Phase L2 Current Meter Phase L3 Current	14.019 electric current (A)	4 Bytes	CRT

Contain current, voltage, power, energy, and status information measured by the energy meter. They are used in ETS for professional energy monitoring and reporting scenarios.

DPT: 14.019 (electric current (A))

65	Meter Voltage LN - Average of Phases	14.027 electric potential(V)	4 Bytes	CRT

Contain current, voltage, power, energy, and status information measured by the energy meter. They are used in ETS for professional energy monitoring and reporting scenarios.

DPT: 14.027 (electric potential(V))

66 67 68	Meter Voltage L1-N Meter Voltage L2-N Meter Voltage L3-N	14.027 electric potential(V)	4 Bytes	CRT

Contain current, voltage, power, energy, and status information measured by the energy meter. They are used in ETS for professional energy monitoring and reporting scenarios.

DPT: 14.027 (electric potential(V))

69 70 71	Meter Voltage L1-L2 Meter Voltage L2-L3 Meter Voltage L3-L1	14.027 electric potential(V)	4 Bytes	CRT

Contain current, voltage, power, energy, and status information measured by the energy meter. They are used in ETS for professional energy monitoring and reporting scenarios.

DPT: 14.027 (electric potential(V))

72	Meter Power Real	14.056 power (W)	4 Bytes	CRT

Contain current, voltage, power, energy, and status information measured by the energy meter. They are used in ETS for professional energy monitoring and reporting scenarios.

DPT: 14.056 (power (W))

73	Meter Power Apparent	14.080 apparent power (VA)	4 Bytes	CRT

Contain current, voltage, power, energy, and status information measured by the energy meter. They are used in ETS for professional energy monitoring and reporting scenarios.

DPT: 14.080 (apparent power (VA))

74	Meter Power Reactive	14.056 power (W)	4 Bytes	CRT

Contain current, voltage, power, energy, and status information measured by the energy meter. They are used in ETS for professional energy monitoring and reporting scenarios.

DPT: 14.056 (power (W))

75	Meter Total Real Energy Exported	14.056 power (W)	4 Bytes	CRT

Contain current, voltage, power, energy, and status information measured by the energy meter. They are used in ETS for professional energy monitoring and reporting scenarios.

DPT: 14.056 (power (W))

76	Meter Total Real Energy Imported	13.013 active energy (kWh)	4 Bytes	CRT

Contain current, voltage, power, energy, and status information measured by the energy meter. They are used in ETS for professional energy monitoring and reporting scenarios.

DPT: 13.013 (active energy (kWh))

77	Meter Status Boolean	1.002 boolean	1 Bit	CRT

Contain current, voltage, power, energy, and status information measured by the energy meter. They are used in ETS for professional energy monitoring and reporting scenarios.

DPT: 1.002 (boolean)

78	Meter Status Character String	16.000 Character String (ASCII)	14 Bytes	CRT

Contain current, voltage, power, energy, and status information measured by the energy meter. They are used in ETS for professional energy monitoring and reporting scenarios.

DPT: 16.000 (Character String (ASCII))

5.4. EV Charger Objects

This section describes the "EV Charger" 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
79	EV Charger status	EVSE Operating mode (0 = Charging, 1 = EVConnected, 2 = SuspendedEV ... 5 = Available...)	1 Byte	CRT

Reports the operating mode of the charging station.
Example states: Charging, EV Connected, SuspendedEV, SuspendedEVSE, Finishing, Available, etc.
It is used in ETS for monitoring the charging status.

DPT: 20.1220 (OCPP State)

Object Number	Object Name	Function	Type	Flags
80	EV Charger status character string	0 = Charging, 1 = EVConnected, 2 = SuspendedEV ... 5 = Available...	14 Bytes	CRT

Transmits the current status of the charging station in descriptive text (string) format. It is suitable for visualization screens.

DPT: 16.000 (Character String (ASCII))

Object Number	Object Name	Function	Type	Flags
81	EV Charger Stop/Start charge	0: Stop Charge, 1: Start Charge	1 Bit	CW

Used to remotely start or stop the charging process.
0 = Stop, 1 = Start
Provides manual or automatic control via ETS.
DPT: 1.003 (enable)

Object Number	Object Name	Function	Type	Flags
82 83 84	EV Charger Instantaneous current flow to EV on phase L1 EV Charger Instantaneous current flow to EV on phase L2 EV Charger Instantaneous current flow to EV on phase L3	14.019 electric current (A)	4 Bytes	CRT

Contain phase-based current, power, and voltage information delivered to the EV. They are used for detailed charging analysis and energy monitoring.
DPT: 14.019 (electric current (A))

85	EV Charger Maximum current offered to EV	14.019 electric current (A)	4 Bytes	CRT

Contain phase-based current, power, and voltage information delivered to the EV. They are used for detailed charging analysis and energy monitoring.
DPT: 14.019 (electric current (A))

86 87 88	EV Charger Instantaneous active power imported by EV on phase L1. EV Charger Instantaneous active power imported by EV on phase L2. EV Charger Instantaneous active power imported by EV on phase L3.	14.056 power (W)	4 Bytes	CRT

Contain phase-based current, power, and voltage information delivered to the EV. They are used for detailed charging analysis and energy monitoring.
DPT: 14.056 (power (W))

89	EV Charger Maximum power offered to EV	14.056 power (W)	4 Bytes	CRT

Contain phase-based current, power, and voltage information delivered to the EV. They are used for detailed charging analysis and energy monitoring.
DPT: 14.056 (power (W))

90 91 92	EV Charger Instantaneous AC RMS supply voltage on phase L1 EV Charger Instantaneous AC RMS supply voltage on phase L2 EV Charger Instantaneous AC RMS supply voltage on phase L3	14.027 electric potential (V)	4 Bytes	CRT

Contain phase-based current, power, and voltage information delivered to the EV. They are used for detailed charging analysis and energy monitoring.
DPT: 14.027 electric potential (V)

93	EV Charger Represents the total energy drawn from the grid since the charging station was installed.	13.013 active energy (kWh)	4 Bytes	CRT

Reports the total energy drawn from the grid by the charging station since installation, expressed in kWh. It is used for cumulative consumption reporting.

DPT: 13.013 (active energy (kWh))

94	EV Charger Represents the total energy drawn from the grid during charge time.	13.013 active energy (kWh)	4 Bytes	CRT

Reports the total energy drawn from the grid by the charging station since installation, expressed in kWh. It is used for cumulative consumption reporting.

DPT: 13.013 (active energy (kWh))

95	EV Charger State of charge of electric vehicle in %	5.001 percentage (0..100%)	1 Byte	CRT

Reports the current battery state of charge of the electric vehicle as a percentage (0–100%). It is used for charging optimization and user information scenarios.

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

96	EV Charger Error code of the charging point	1 = Connector Lock Failure, 2 = Communication failure ... 7 = NoError	4 Bytes	CRT

Transmits the numerical error code representing a fault condition at the charging station. It is used in ETS alarm and service scenarios.

DPT: 20.1221 (EVSEErrorCode)

97	EV Charger Error code of the charging point character string	16.000 Character String (ASCII)	4 Bytes	CRT

Transmits a descriptive text (ASCII) explaining the error condition at the charging station. It provides readable fault information for users and maintenance personnel.

DPT: 16.000 (Character String (ASCII))

5.5. 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.

5.5.1. Logic Gates Objects

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

Object Number	Object Name	Function	Type	Flags
98,108,…, 728	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)

99,109,…, 729	Ext. 1/2 – Channel A…H - Logic Gate – Input 1	True/False	1 bit	CW
100,110,…, 730	Ext. 1/2 – Channel A…H - Logic Gate – Input 2			
…	…			
106,116,…, 736	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)

107,117,…, 737	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)

5.5.2. 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
98,108,…, 728	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)				
99,109,…, 729	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)				
100,110,…, 730 101,111,…, 731 102,112,…, 732 103,113,…, 733	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))				
104,114,…, 734 105,115,…, 735 106,116,…, 736 107,117,…, 737	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%))				

5.5.3. 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
98,108,…, 728	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)

100,110,…, 730 102,112,…, 732	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))

101,111,…, 731 103,113,…, 733	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))

104,114,…, 734	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%))

105,115,…, 735	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%))

5.5.4. Math Objects

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

Object Number	Object Name	Function	Type	Flags
98,108,…, 728	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)

100,110,…, 730 102,112,…, 732	Ext. 1/2 – Channel A…H – Input 1 - Value Ext. 1/2 – Channel A…H – Input 2 - Value	1 byte / 2 bytes / 4 bytes	1 byte 2 bytes 4 bytes	CW

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))

104,114,…, 734	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

Error Code	Error Definition
NO ERROR	No communication or system error is detected. The gateway and the inverter are operating normally, and data exchange is functioning as expected.
PING ERROR	The gateway is unable to receive a response when sending ICMP ping requests to the inverter. This may indicate that the inverter is not reachable on the network. Possible causes include missing or unstable network connectivity, the gateway and inverter being on different IP subnets, incorrect IP configuration, or the inverter being powered off or disconnected from the network.
READ ERROR	The gateway has an active network connection and can access the IP network; however, it is unable to read operational data from the inverter. This condition typically indicates that the inverter is powered on but not responding correctly to data requests, is not in an operational state, or that the communication service/interface on the inverter side is not available or not enabled.
NETWORK ERROR	The gateway is experiencing a failure while attempting to establish or maintain a connection to the IP network. This may be caused by missing physical network connectivity, DHCP failure, incorrect network configuration, or general network infrastructure issues preventing the gateway from joining the local network.

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