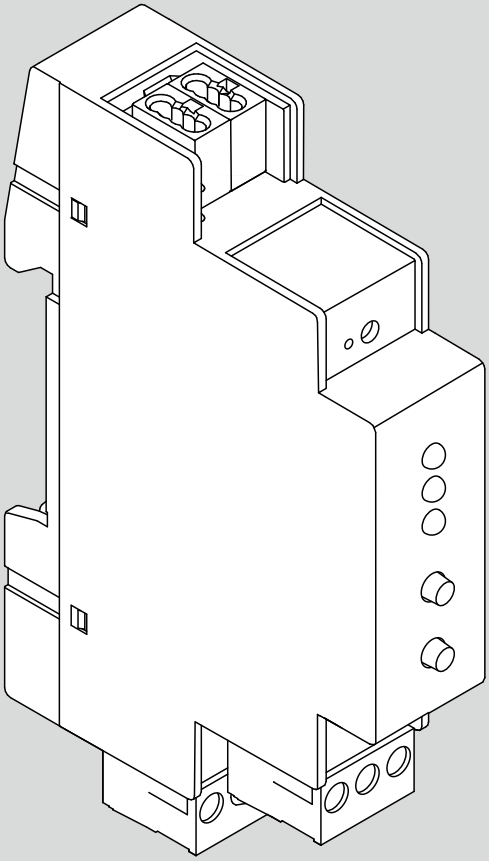
Engineering progress
Enhancing lives



NEA SMART 2.0 KNX Gateway

Commissioning Instructions

REHAU

Contents

This NEA SMART 2.0 KNX Gateway commission manual is valid from January 2021.

Our current technical documents can be downloaded from **www.rehau.com/ti**.

All dimensions and weights are reference values. Subject to technical changes.

01 Safety instructions and product conformity

01.01 On this documentation

- Please read these instructions carefully before installing or operating the NEA SMART 2.0 KNX Gateway.
- Keep the instructions on hand at the location of use of the device.
- Pass these instructions on to subsequent users.

Pictograms and logos
The following pictograms and logos are used in these instructions:


Safety information


Legal information


Important information, which needs to be taken into account


Information on the Internet

Validity of the instructions
To ensure your own safety and the correct use of our products, please check at regular intervals whether a newer version of these instructions is available. The issue date of these instructions is printed on the bottom right-hand side of the back page. You can view and download the most recent instructions as well as further instructions at **www.rehau.com/ti**.

01.02 Intended use

The NEA SMART 2.0 KNX Gateway may only be installed and operated as described in these instructions. Compliance with these instructions is part of intended use.

Installation and maintenance may only be carried out by qualified and trained personnel. This means personnel who, through training and experience, are permitted and capable of carrying out the relevant installation work, identifying and avoiding potential hazards as well as observing relevant applicable regulations (e.g. regulations regarding work safety etc.).

01.03 Safety instructions

Risk of life through electrical shock!

The electrical installation must follow the applicable national standards and guidelines as well as any specific requirements of your local energy supplier.

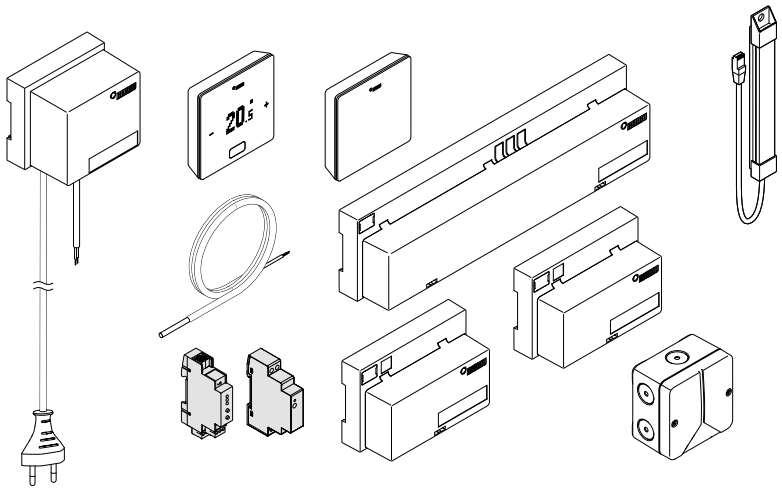
These instructions are intended for use by a qualified person who holds an official certificate in one of the following professions: electrician or electronics engineer.

Always read the instructions prior to commencing the installation. Connection to the final power supply must only be carried out after the installation is complete.

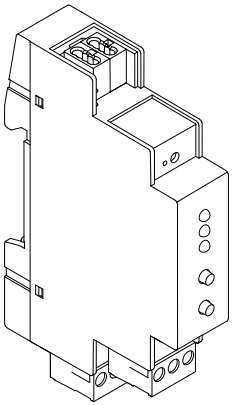
Laws, standards and regulations
Please observe the presently valid laws, standards, instructions, regulations (e.g. DIN, EN, ISO, DVGW, and VDI) as well as regulations regarding environmental protection, trade association regulations and regulations from local utility companies.

02 Installation

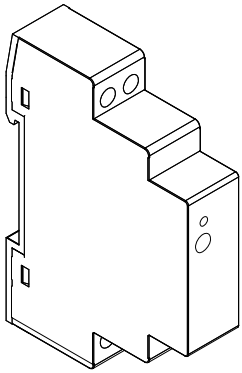
02.01 System overview



02.02 Scope of delivery



NEA SMART 2.0 KNX Gateway
Material number: 13388001001



NEA SMART 2.0 power supply Gateway
Material number: 13388011001

02.03 Range of application

The NEA SMART 2.0 - KNX connection exchanges data (set points, actual values, operating modes and energy levels) between NEA SMART 2.0 and a centralised BMS System (KNX). The NEA SMART 2.0 KNX Gateway communicates with the NEA SMART 2.0 system via the SYSBUS, as a Modbus Slave. The assignment of KNX objects and Modbus registers can be configured via parameters in the ETS software (KNX license software). No additional software is required. The SYSBUS (Modbus) assignment required for the REHAU NEA SMART 2.0 control system can optionally imported via the provided example ETS project. The import of the SYSBUS (Modbus) assignments can be done in the office or on site. The SYSBUS (Modbus) connection is galvanic isolated from the KNX Bus. The NEA SMART 2.0 power supply Gateway is used for the auxiliary voltage of the SYSBUS (Modbus). The KNX-Bus is supplied via the other KNX components on-site.

The device is to be DIN rail mounted in permanent internal (dry location) installations only.

KNX TP/Modbus RTU interface specification:

- 250 Channels per KNX Gateway
- Maximum 2 Gateways per NEA SMART 2.0 System; up to 500 Channels
- NOTE - Multiple NEA SMART 2.0 Systems per BMS (KNX) Installation are possible
- Configuration via the ETS Software (Licenced Software for KNX); no additional software is required
- Power Supply:
  - KNX nominal voltage 30 V DC
  - Auxiliary voltage on Modbus-side 12...24 V DC

For more than 30 rooms in the current functionality as described in the later data point list, an additional Gateway should be used. The maximum amount of Gateways per Master/Slave installation is two.

Further information (e.g., the manual, datasheet and CE declaration of the KNX Gateway) can be downloaded from the product website of the KNX Modbus RTU Gateway 886 (**www.weinzierl.de**).

The NEA SMART 2.0 system does not support the communication with KNX Room units / probes. NEA SMART 2.0 room units / probes must be installed in rooms that are to be connected and controlled directly by the NEA SMART 2.0 system. The KNX Gateway (Modbus) is directly connected to the SYSBUS clamps of NEA SMART 2.0 Base unit – Specific clamp details are mentioned further in the document.

To configure the KNX Gateway, the ETS software is required. The licensed software can be obtained from the KNX Association (my.knx.org). Configuration and commissioning of the KNX Gateway must be carried out by a trained KNX system integrator.

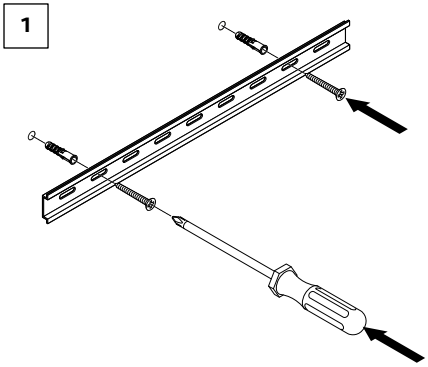
02.04 Power supply Gateway

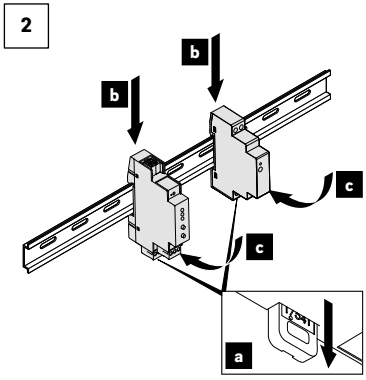
REHAU NEA SMART 2.0 power supply Gateway is a DIN rail mounted power supply with a direct current output (DC). This AC/DC-power supply is used to transform the auxiliary voltage for the SYSBUS (Modbus) of the REHAU NEA SMART 2.0 KNX Gateways. The potentiometer adjusts the output voltage. The blue LED indicates operation. The power supply unit is suitable for building automation controls in commercial and private premises. The device is to be DIN rail mounted in permanent internal (dry location) installations only.

Power supply specification:

- Switching power supply
- Output voltage: 12 V DC
- Output voltage Adjustment range: 10.8 V DC to 13.8 V DC
- Output power: 15 W
- Operating voltage: 85 V to 264 V AC
- Protection: Short circuit /Overload / Over voltage
- DIN rail TS TS-35/7.5 or TS-35/15 mountable
- 1 Potentiometer
- 1 LED (blue); Power-On

02.05 DIN rail installation





02.06 Electrical wiring

Communication system	Cable type	Topology / maximum length
KNX	KNX/EIB-cable (TP)	See KNX specification
SYSBUS (System Bus)	J (Y) St Y 2 x 2 x 0.8 mm	Line / 500 m

⚠

Only use the NEA SMART 2.0 power supply Gateway for powering the NEA SMART 2.0 KNX Gateway at clamps 1 and 3.
A professional electrician must do any electrical installation.
The NEA SMART 2.0 system and the KNX Gateway must be powered down during installation.

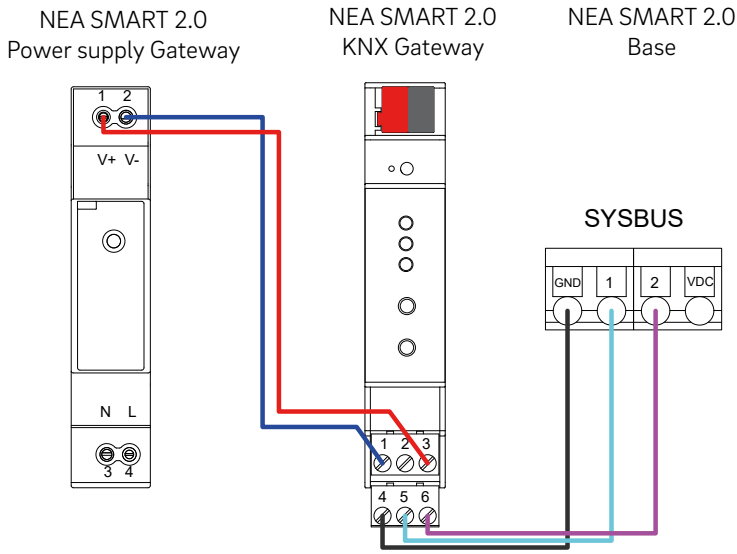


Fig. 02-1 Wiring of the KNX Gateway

Connection KNX Gateway	**Connection Power Supply / Base / KNX products**	**Connection to**
1	V -	Ground connection for supply voltage
2	V -	Ground connection for supply voltage
3	V +	Positive connection for supply voltage 12 ... 24 V DC
4	GND	SYSBUS GND NEA SMART 2.0 Base
5	1	SYSBUS NEA SMART 2.0 Base
6	2	SYSBUS NEA SMART 2.0 Base
KNX	+	Positive connection for KNX Bus
KNX	-	Ground connection for KNX Bus

Terminal 1 and 3 connect to the supply voltage 12 ... 24 V DC; terminals 4, 5 and 6 connect to the SYSBUS (Modbus) from the NEA SMART 2.0 Base.

03 Configuration in the ETS

The ETS5 database (for ETS 5.7 or newer) can be downloaded from the product website (KNX Modbus RTU Gateway 886 - **www.weinzierl.de**); alternatively the online ETS catalogue.

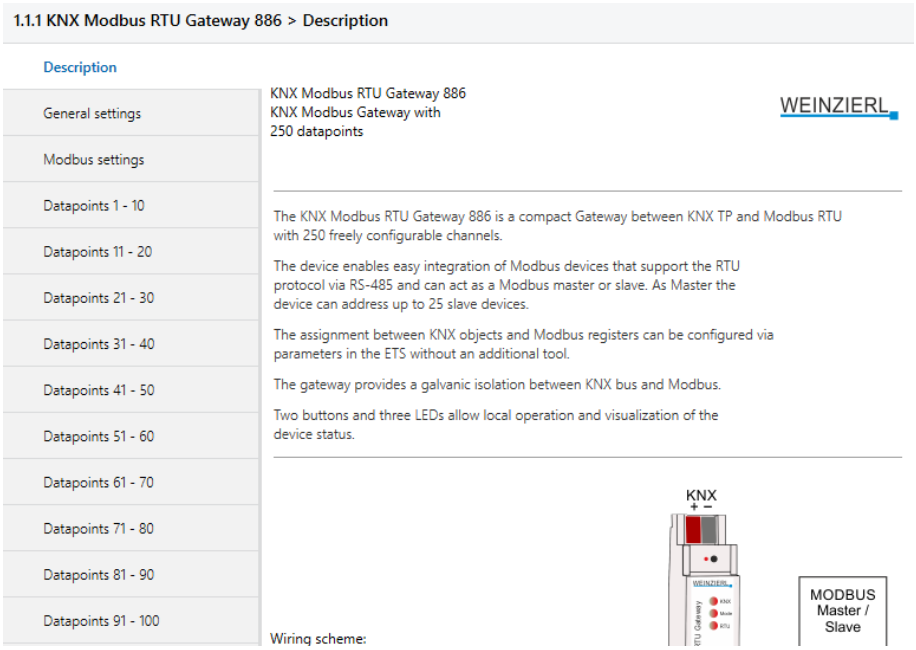


Fig. 03-1 Wiring of the KNX Gateway

03.01 General settings

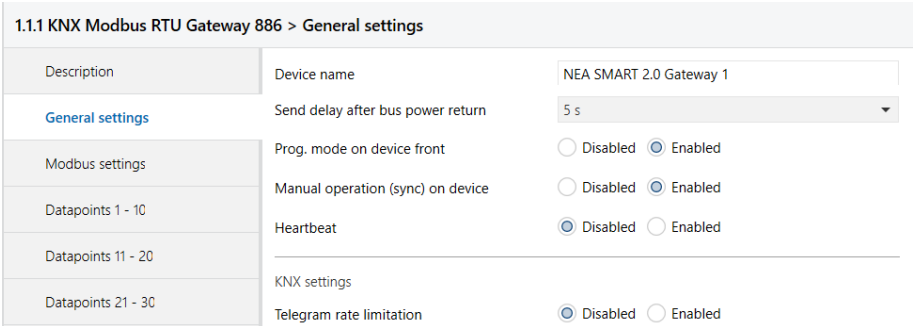


Fig. 03-2 General Settings

Device name (30 characters):

Your specific device name with up to 30 characters. To aid later in the ETS setup the name should be meaningful, e.g. “NEA SMART 2.0 Gateway 1”.

The remaining default settings are sufficient for the Gateway use.

03.02 Modbus settings

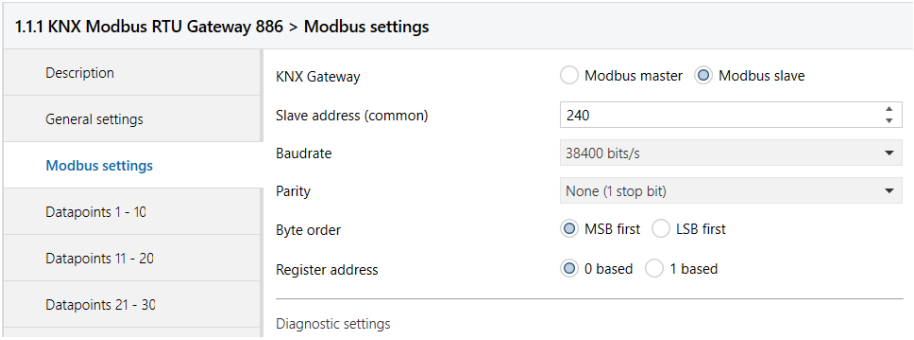


Fig. 03-3 Modbus settings

Summary of the Modbus settings

KNX Gateway	Modbus slave
Slave address (common)	240 or 241
Baudrate	38400 bits/s
Parity	None (1 stop bit)
Byte order	MSB first
Register address	0 based

KNX Gateway:
All KNX Gateways with NEA SMART 2.0 need the Modbus slave configuration.

Slave address (common):
240 & 241 are the reserved addresses for the communication with the NEA SMART 2.0 main controller.

Baudrate:
The NEA SMART 2.0 controller communicates with the Gateway at a baudrate of 38400 bits/s.

Parity:
The NEA SMART 2.0 controller uses the None (1 stop bit) configuration.

Byte order:
The MSB first byte order is in use (highest byte is sent first).

Register address:
The 0 based option is in use.

The remaining default settings are sufficient.

04 Data point settings

When linking several room zones (RZ) together on one room unit or probe, all RZ data points should be used for communication. Internally during initial pairing the smallest RZ number is used for communication. If unsure how the setup was done the RZ numbers for communication are the ones listed on the Webpages in AP Mode of the NEA SMART 2.0 base (Master), can later be switched back to any mode liked.
The marked data point types should be set in the Gateway. For representation in the ETS the Properties of the temperature data type can be changed to the data type 9.***.

NEA SMART 2.0 Base software needs to be the latest version. Update required for KNX communication.

KNX Flags:

- **C** the Communication flag: Enable bus communication for the data point
- **R** the Read flag: The data point's value can be read from the bus
- T the Transmit flag: The data point's value can be sent on the bus
- **W** the Write flag: The data point can receive a new value from the bus
- **U** the Update flag: The data point accepts responses from the bus
- **ROI** the Read on Init so the initialization flag: the data point's value is read on device start up
  - Needs to be set when **T** and **W** flags are used on one data point together!

General Parameters

Data Point	Description	Unit	Data point type
Write Global Operation Mode	Global operation mode: 1= Auto 2= Heating 3= Cooling 4= Manual Heating 5= Manual Cooling	-	DPT 05 – unsigned – 1 byte Low Byte Read holding register – 03
Read Global Operation Mode	Global operation mode: 1= Auto 2= Heating 3= Cooling 4= Manual Heating 5= Manual Cooling	-	DPT 05 – unsigned – 1 byte Low Byte
Write Global Operation Status	Global Operation Status: 1= Normal mode 2= Reduced mode 3= Standby mode 4= Automatic mode (Timed) 5= Party 6= Holiday/Absence	-	DPT 05 – unsigned – 1 byte Low Byte Read holding register – 03
Read Global Operation Status	Global Operation Status: 1= Normal mode 2= Reduced mode 3= Standby mode 4= Automatic mode (Timed) 5= Party 6= Holiday/Absence	-	DPT 05 – unsigned – 1 byte Low Byte
Error present	Validate by App when occur: 0= No error present 1= Error present	[0/1]	DPT 01 – binary – 1 bit Bit in Word register Bit 00
Warning present	Validate by App when occur: 0= No error present 1= Error present	[0/1]	DPT 01 – binary – 1 bit Bit in Word register Bit 00
Hint present	Validate by App when occur: 0= No error present 1= Error present	[0/1]	DPT 01 – binary – 1 bit in Word register Bit 00
Outside Temperature	Measured Outside Temperature	[°C or F]	DPT 07 – unsigned – 2 bytes High/Low byte
Filtered Outside Temperature	Filtered Outside Temperature	[°C or F]	DPT 07 – unsigned – 2 bytes High/Low byte

* Transmit and Write flags are not combinable, unless using the Read on Init (ROI) flag as well.

	Configuration flags					
Modbus ID (Address)	**C**	**R**	**W**	**T**	**U**	**ROI**
1 – KNX to Modbus	X		X*	*		
1 – Modbus to KNX	X	X		X		
2 – KNX to Modbus	X		X*	*		
2 – Modbus to KNX	X	X		X		
3 – Modbus to KNX	X	X		X		
5 – Modbus to KNX	X	X		X		
6 – Modbus to KNX	X	X		X		
7 – Modbus to KNX	X	X		X		
8 – Modbus to KNX	X	X		X		

Mixed circuits

Data Point	Description	Unit	Data point type
Mixed circuit 1 USE ALL OF THE DATA POINTS in the Gateway of one Mixed Circuit for enabling	Percent flow of each mixed circuit	[%] 0....100	DPT 05 – percent – 1 byte Low byte Value Register: 0 - 100 Value KNX: 0 - 100
	Mixed circuit Pump state (0/1)	[0/1]	DPT 01 – binary – 1 bit Bit in Word register Bit 00
	Flow temp into the mixed circuit	[°C or F]	DPT 07 – unsigned – 2 bytes High/Low byte
	Return temp out the mixed circuit	[°C or F]	DPT 07 – unsigned – 2 bytes High/Low byte
Mixed circuit 2 USE ALL OF THE DATA POINTS in the Gateway of one Mixed Circuit for enabling	Percent flow of each mixed circuit	[%] 0....100	DPT 05 – percent – 1 byte Low byte Value Register: 0 - 100 Value KNX: 0 - 100
	Mixed circuit Pump state (0/1)	[0/1]	DPT 01 – binary – 1 bit Bit in Word register Bit 00
	Flow temp into the mixed circuit	[°C or F]	DPT 07 – unsigned – 2 bytes High/Low byte
	Return temp out the mixed circuit	[°C or F]	DPT 07 – unsigned – 2 bytes High/Low byte
Mixed circuit 3 USE ALL OF THE DATA POINTS in the Gateway of one Mixed Circuit for enabling	Percent flow of each mixed circuit	[%] 0....100	DPT 05 – percent – 1 byte Low byte Value Register: 0 - 100 Value KNX: 0 - 100
	Mixed circuit Pump state (0/1)	[0/1]	DPT 01 – binary – 1 bit Bit in Word register Bit 00
	Flow temp into the mixed circuit	[°C or F]	DPT 07 – unsigned – 2 bytes High/Low byte
	Return temp out the mixed circuit	[°C or F]	DPT 07 – unsigned – 2 bytes High/Low byte

Example Mixed Circuit:
Determining the state of the Mixed Circuit Pump requires 4 data points to be present in the Gateway, by only using a single data point the communication will be declined.

	Configuration flags					
Modbus ID (Address)	**C**	**R**	**W**	**T**	**U**	**ROI**
10 MC1 opening Modbus to KNX	X	X		X		
11 MC1 pump Modbus to KNX	X	X		X		
12 MC1 flow temp Modbus to KNX	X	X		X		
13 MC1 return temp Modbus to KNX	X	X		X		
14 MC2 opening Modbus to KNX	X	X		X		
15 MC2 pump Modbus to KNX	X	X		X		
16 MC2 flow temp Modbus to KNX	X	X		X		
7 MC2 return temp Modbus to KNX	X	X		X		
18 MC3 opening	X	X		X		
19 MC3 pump	X	X		X		
20 MC3 flow temp	X	X		X		
21 MC3 return temp	X	X		X		

	Attached Devices				Configuration flags					
Data Point	**Description**	**Unit**	**Data point type**	**Modbus ID (Address)**	**C**	**R**	**W**	**T**	**U**	**ROI**
State of the dehumidifier (x9)	State of the dehumidifier: 0 = Not running 1 = Running	[0/1]	DPT 01 – binary – 1 bit Bit in Word register Bit 00 Modbus to KNX	22 Dehumid. 1	X	X		X		
				23 Dehumid. 2	X	X		X		
				....	X	X		X		
				30 Dehumid. 9	X	X		X		
State of the pumps (CC pumps x5)	State of the pumps: 0 = Not running 1 = Running	[0/1]	DPT 01 – binary – 1 bit Bit in Word register Bit 00 Modbus to KNX	31 Pump 1	X	X		X		
				32 Pump 2	X	X		X		
				33 Pump 3	X	X		X		
				34 Pump 4	X	X		X		
				35 Pump 5	X	X		X		

To enable the functionality of a specific room zone, all the respective data points (with the exception of the Humidity) must be implemented.

Coding of the Modbus Addresses of the room zones (YYxx) is done in the YY part of the Modbus address (leading zeros are cropped):

- RZ 1...12 of the Master are for example from 1xx to 12xx
- RZ 1...12 of the first Slave are for example from 13xx to 24xx
- RZ 1...12 of the second Slave are for example from 25xx to 36xx
- RZ 1...12 of the third Slave are for example from 37xx to 48xx
- RZ 1...12 of the forth Slave are for example from 49xx to 60xx

Coding of the Functionality of the room zones (YYxx) is done in the xx part of the Modbus address:

- Write local Energy level (YY00)
- Read local Energy level (YY00)
- Write set temperature (YY01)
- Read set temperature (YY01)
- Read zone temperature (YY02)
- Read zone humidity, if room unit or probe has this sensor (YY10)

	Room parameters (X= 0-4, Y=1-12) **USE ALL DATA POINTS OF ONE ROOM ZONE in the Gateway to enable their usage, except humidity**				**Configuration flags**					
Data Point	**Description**	**Unit**	**Data point type**	**Modbus ID (Address)**	**C**	**R**	**W**	**T**	**U**	**ROI**
X.Y Write local Operation Status	Local Operation Status: 1= Normal mode 2= Reduced mode 3= Standby mode 4= Automatic mode (timed) 5= Party 6= Holiday/ Absence	-	DPT 05 – unsigned – 1 byte Low Byte Read holding register – 03	N** (100, 200, 300,..., 6000) – KNX to Modbus	X		X*	*		
X.Y Read local Operation Status	Local Operation Status: 1= Normal mode 2= Reduced mode 3= Standby mode 4= Automatic mode (timed) 5= Party 6= Holiday/ Absence	-	DPT 05 – unsigned – 1 byte Low Byte	N** (100, 200, 300,..., 6000) – Modbus to KNX	X	X		X		
X.Y Write zone temperature set point		[°C or F]	DPT 07 – unsigned – 2 bytes High/Low byte Read holding register – 03	(N+1)** (101, 201, 301,..., 6001) – KNX to Modbus	X		X*	*		
X.Y Read zone temperature set point		[°C or F]	DPT 07 – unsigned – 2 bytes High/Low byte	(N+1)** (101, 201, 301,..., 6001) – Modbus to KNX	X	X		X		
X.Y Read the zone temperature		[°C or F]	DPT 07 – unsigned – 2 bytes High/Low byte	(N+2)** (102, 202, 302,..., 6002) – Modbus to KNX	X	X		X		
X.Y Read the relative zone humidity		[%] 0....100	DPT 05 – percent – 1 byte Low byte Value Register: 0 - 100 Value KNX: 0 - 100	(N+10)** (110, 210, 310,..., 6010) – Modbus to KNX	X	X		X		

* Transmit and Write flags cannot be combed, without using the Read on Init (ROI) flag.

** $N=100 + (k \times 100), \quad 0 \leq k < 60$

Example of a single room of a single room zone:

- Determining the Humidity of a room zone, only requires the Humidity Data Point
- Determining other information for the room zone requires all the other Data Points of the Gateway

Example of a single room of multiple room zones:

- Use the respective names from the Webpages if unsure:
  - For example Master Room 6 correspond to the RZ 6 of the Master
  - The data points for this room are at the Modbus Addresses 6xx
  - For example Slave 1 Room 10 correspond to the RZ 10 of the first Slave
  - The data points for this room are at the Modbus Addresses 22xx

05 Data sheets

05.01 NEA SMART 2.0 KNX Gateway

Material number: 13388001001

Operating voltage KNX	KNX operation voltage 30 V DC
Power consumption KNX Bus	ca. 4 mA
Auxiliary voltage Modbus / SYSBUS	12 ... 24 V DC
Power consumption Modbus / SYSBUS	ca. 5 mA
Storage temperature	- 25 ... + 70 °C
Ambient temperature during operation	- 5 ... + 45 °C
Rel. humidity (non-condensing)	5 % ... 93 %
Degree of protection (acc. EN 60529)	IP 20
Protection class	III
CE conformity / standards	EMC directive 2014 / 30 / EU RoHS directive 2011 / 65 / EU EN 50491-3: 2009 EN 50491-5-1: 2010 EN 50491-5-2: 2010 EN 50491-5-3: 2010 EN 61000-6-2: 2005 EN 61000-6-3: 2007 + A1: 2011 EN 50581: 2012
Mounting	DIN rail mounted device
Housing	DIN rail mounted device, width: 1 unit (18 mm)
Control elements	2 buttons and 1 KNX programming button
Indicators	3 LEDs multicolour
Connector for KNX Bus	Red / black
Connector for Modbus / SYSBUS	Pluggable screw connector (3 poles) for Modbus
Connector for Modbus / SYSBUS Support voltage	Pluggable screw connector (3 poles) for power supply
Cross-section of connectors	0.34 ... 2.5 mm^2
Modbus / SYSBUS	Type: RTU (RS-485), Slave / Up to 250 channels

Dimensions (W x H x D in mm)	17.5 x 59.9 x 89.8
Housing material	Cover: PC Socket: PA 66/6
Housing colour	Cover: Light grey RAL 7035 Socket: Graphite black RAL 9011
Weight (approx.)	ca. 50 g

05.02 NEA SMART 2.0 power supply Gateway

Material number: 13388011001

Operating voltage	85 V to 264 V AC
Frequency range	47 - 63 Hz
Power Intake	0.25 A / 230 V AC
Inrush current, max.	45 A / 230 V AC
Efficiency	85%
Output Voltage	12 V DC
Output Voltage - Adjustment range	10.8 V DC to 13.8 V DC
Output Current	0 to 1.25 A
Output Power	15 W
Type	Switch Mode
Operating time max.	1166000 h
Ripple	120 mV ss
Load Regulation	1%
Special features	Short circuit, overvoltage and overload protection
Storage temperature	- 40 ... + 85 °C
Ambient humidity during storage	10 % ... 95 % Rel. Humidity (non-condensing)
Ambient temperature during operation	- 30 ... + 70 °C
Ambient humidity in operation	20 % ... 90 % Rel. Humidity (non-condensing)
Degree of protection	No IP assigned
Protection class	II

CE conformity / standards UL approval	RoHS-conform, EN 60950-1, EN 6155-2-16, EN50178, UL 508, UL 60950-1 EMC EMISSION EN55032 (CISPR32) Class B, EN61000-3-2 Class A, EN61000-3-3 EMC IMMUNITY EN61000-4-2, 3, 4, 5, 6, 8, 11
Mounting	DIN rail mounting: 1 TE; DIN rail TS-35 / 7.5 or TS-35/15
Control elements	1 Potentiometer
Indicator	1 LED (blue); Power-On
Line cross-section	0.5 mm^2 – 2.5 mm^2
Dimensions (W x H x D in mm)	17.5 x 93 x 58.4
Housing colour	Grey
Weight (gram)	80 g

Our verbal and written advice with regard to usage is based on years of experience and standardised assumptions and is provided to the best of our knowledge. The intended use of REHAU products is described comprehensively in the technical product information. The latest version can be viewed at www.rehau.com/TI. We have no control over the application, use or processing of the products. Responsibility for these activities therefore remains entirely with the respective user/processor. Where claims for liability nonetheless arise, they shall be governed exclusively according to our terms and conditions, available at www.rehau.com/conditions, insofar as nothing else has been agreed upon with REHAU in writing. This shall also apply for all warranty claims, with the warranty applying to the consistent quality of our products in accordance with our specifications. Subject to technical changes.

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954654 EN 03.2021