

Technical manual GS 4x.00 knx

Application description – air quality sensor & control

**General Information**

The device fits for the particular use of the following tasks: monitoring of the air quality in building systems technology (schools, offices, hotels, conference venue etc.), data transfer and regulation via bus system. The device is intended for use in accordance with the defined technical data. Operate the device exclusively in a dry room! The device is not qualified for security relevant tasks such as emergency doors, fire protection equipment, fermenting cellars etc.

The air quality sensor GS 4x.00 knx can provide the following data and control for the KNX bus:

CO2:	Value output Control (step and PI control)
Relative humidity:	Value output Control (step and PI control)
Temperature:	Value output Control heating / cooling (2-point and PI control) Alarms
Dew point:	Value output Alarm
Air pressure:	Value output



GS 40.00 knx



GS 41.00 knx

*Please consider that handling and installation of the device is explained in the instruction manual enclosed to the product!*

*Please take into account the resolution of the 2 Bytes data type (see KNX Specification)!*

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**Application program**

Manufacturer: Hugo Müller GmbH & Co KG, Sturmbühlstraße 145-149, D-78054 VS-Schwenningen  
 Program name: GS 4x.00 knx  
 Installation: Add the device to your device list and open a new project. You can download the ETS database on our webpage:

<http://www.hugo-mueller.de/de/downloads/knx-produkt Datenbank/>

Number of communication objects:	71	Number of group addresses:	254	Number of allocations:	255
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**Technical Data**

Power supply:	via KNX bus voltage
Bus current:	< 10 mA
Bus system:	KNX
Sensors:	CO <sub>2</sub> , relative humidity, temperature, dew point, VAV control
Measuring range CO <sub>2</sub> concentration:	390–10,000 ppm
Measuring range rel. humidity:	0–100%
Measuring range temperature:	0–50°C
Measuring range atmospheric pressure:	300-1,100 hPa
Class of protection:	IP 20 to DIN EN 60529
Permitted ambient temperature:	0°C ...+50°C
Test mark:	CE
Housing:	Self-extinguishing thermoplastic
Dimensions:	80,5 x 80,5 x 17 mm
Mounting:	Wall
Type of connection:	Push-in terminal

*Rights to technical amendments reserved*

Overview parameters

Parameters	Subcategory parameters	Description
<b>Global settings</b>	<b>Global settings</b>	Send „in operation “(incl. cycle time), request status (active/inactive, request with...), send delay after bus voltage recovers in seconds.
<b>CO<sub>2</sub></b>	CO <sub>2</sub> sensor	Settings CO <sub>2</sub> -sensor: Enable – disable, send measured values, CO <sub>2</sub> offset adjustment, notification of sensor error, external value enabled/disabled.
	CO <sub>2</sub> control	Settings CO <sub>2</sub> -control: Type (inactive, 1-/2-/3-step, PI), output format, send on change / send cyclically, hysteresis (symmetrical). Threshold 1,2,3, switching command above / below threshold, control value, blocking object
<b>Relative humidity sensor</b>	Relative humidity sensor	Settings humidity sensor: Enable – disable, send measured values, offset adjustment, notification of sensor error, external value enabled/disabled.
	Relative humidity control	Settings humidity control: Type (inactive, 1-/2-/3-step, PI), output format, send on change / send cyclically, hysteresis (symmetrical). Threshold 1,2,3, switching command above / below threshold, control value, blocking object
<b>Temperature</b>	Temperature sensor	Settings temperature sensor: Enable – disable, send measured values, offset adjustment, notification of sensor error, external value enabled/disabled.
	Temperature alarms	Settings frost- and/or heat alarms: Enable – disable, send measured values.
	Temperature control	Settings temperature control: Type (inactive, heating, cooling, heating & cooling), different control values (extra cooling level & guide).
<b>Dew point</b>	Dew point temperature	Settings dew point: Enable – disable, send measured values.
	Dew point alarm	Settings dew point alarm: Enable – disable, send measured values., hysteresis (symmetrical), switching command on alarm.
<b>Air pressure</b>	Air pressure sensor	Settings Air pressure-Sensor: Enable – disable, send measured values, notification of sensor error, elevation.
<b>VAV control</b>	Settings	Settings VAV control: Enable – disable for different (already configured) PI controls, send control values according to defined parameters and values.
<b>Inputs</b>	→ INFO ←	Inputs and input functions are only available in device types: GS 4x.10 / GS 3x.10 and TS 3x.10 knx.

Communication objects

Number	Name	Object function	C	R	W	T	U	Objekt size	Data type
1	Send '0' in operation	output	C	-	-	T	-	1 Bit	Boolean
1	Send '1' in operation	output	C	-	-	T	-	1 Bit	Boolean
2	Request status	input	C	-	W	-	-	1 Bit	switching
3	CO2: CO2 value [ppm]	output	C	-	-	T	-	2 Bytes	float value, pieces/million (ppm)
4	CO2: CO2 value external [ppm]	input	C	-	W	-	-	2 Bytes	float value, pieces/million (ppm)
5	CO2: request CO2 value	input	C	-	W	-	-	1 Bit	trigger
6	CO2: sensor error	output	C	-	-	T	-	1 Bit	Boolean
7	CO2R: Control value (0...255)	output	C	-	-	T	-	1 Byte	counter pulses (0...255)
7	CO2R: Control value (0...100%)	output	C	-	-	T	-	1 Byte	percent (0...100%)
7	CO2R: Scene (1...64)	output	C	-	-	T	-	1 Byte	Scenen Nummer
8	CO2R: Control value level 1 (switching object)	output	C	-	-	T	-	1 Bit	switching
8	CO2R: Control value level 1 (priority)	output	C	-	-	T	-	2 Bit	priority switching
9	CO2R: Control value level 2 (switching object)	output	C	-	-	T	-	1 Bit	switching
9	CO2R: Control value level 2 (priority)	output	C	-	-	T	-	2 Bit	priority switching
10	CO2R: Control value level 3 (switching object)	output	C	-	-	T	-	1 Bit	switching
10	CO2R: Control value level 3 (priority)	output	C	-	-	T	-	2 Bit	priority switching
11	CO2R: Base set point [ppm]	input	C	-	W	-	-	2 Bytes	float value, pieces/million (ppm)
12	CO2R: Blocking object threshold 1	input	C	-	W	-	-	1 Bit	enable
13	CO2R: Blocking object threshold 2	input	C	-	W	-	-	1 Bit	enable
14	CO2R: Blocking object threshold 3	input	C	-	W	-	-	1 Bit	enable
15	CO2R: Blocking object	input	C	-	W	-	-	1 Bit	enable
15	CO2R: Blocking object	input	C	-	W	-	-	1 Bit	enable
16	rF: Humidity value [%]	output	C	-	-	T	-	2 Bytes	humidity (%)
17	rF: Humidity value (1 Byte) [%]	output	C	-	-	T	-	1 Byte	percent (0...100%)
18	rF: Humidity value external [%]	input	C	-	W	-	-	2 Bytes	humidity (%)
19	rF: Request humidity value	input	C	-	W	-	-	1 Bit	trigger
20	rF: Sensor error	output	C	-	-	T	-	1 Bit	Boolean
21	RFR: Control value (0...255)	output	C	-	-	T	-	1 Byte	counter pulses (0...255)
21	RFR: Control value (0...100%)	output	C	-	-	T	-	1 Byte	percent (0...100%)
21	RFR: Scene (1...64)	output	C	-	-	T	-	1 Byte	Scenen Nummer
22	RFR: Control value level 1 (switching object)	output	C	-	-	T	-	1 Bit	switching
22	RFR: Control value level 1 (priority)	output	C	-	-	T	-	2 Bit	priority switching
23	RFR: Control value level 2 (switching object)	output	C	-	-	T	-	1 Bit	switching
23	RFR: Control value level 2 (priority)	output	C	-	-	T	-	2 Bit	priority switching

Number	Name	Object function	C	R	W	T	U	Objekt size	Data type
24	RFR: Control value level 3 (switching object)	output	C	-	-	T	-	1 Bit	switching
24	RFR: Control value level 3 (priority)	output	C	-	-	T	-	2 Bit	priority switching
25	RFR: Base set point [%]	input	C	-	W	-	-	2 Bytes	humidity (%)
26	RFR: Base set point (1 Byte) [%]	input	C	-	W	-	-	1 Byte	percent (0...100%)
27	RFR: Blocking object threshold 1	input	C	-	W	-	-	1 Bit	enable
28	RFR: Blocking object threshold 2	input	C	-	W	-	-	1 Bit	enable
29	RFR: Blocking object threshold 3	input	C	-	W	-	-	1 Bit	enable
30	RFR: Blocking object	input	C	-	W	-	-	1 Bit	enable
30	RFR: Blocking object	input	C	-	W	-	-	1 Bit	enable
31	T: Temperature value [°C]	output	C	-	-	T	-	2 Bytes	float value, Temperature (°C)
32	T: Temperature value external [°C]	input	C	-	W	-	-	2 Bytes	float value, Temperature (°C)
33	T: Request temperature value	input	C	-	W	-	-	1 Bit	trigger
34	T: Sensor error	output	C	-	-	T	-	1 Bit	Boolean
35	T: Heat alarm	output	C	-	-	T	-	1 Bit	Boolean
36	T: Frost alarm	output	C	-	-	T	-	1 Bit	Boolean
37	RTR: Comfort temperature	input	C	-	W	-	-	2 Bytes	float value, Temperature (°C)
38	RTR: Standby setback when heating	input	C	-	W	-	-	2 Bytes	float value, Temperature (°C)
39	RTR: Eco setback when heating	input	C	-	W	-	-	2 Bytes	float value, Temperature (°C)
40	RTR: Standby increment when cooling	input	C	-	W	-	-	2 Bytes	float value, Temperature (°C)
41	RTR: Eco increment when cooling	input	C	-	W	-	-	2 Bytes	float value, Temperature (°C)
42	RTR: Current set point temperature	output	C	-	-	T	-	2 Bytes	float value, Temperature (°C)
43	RTR: Comfort temperature +/- 0,1K	input	C	-	W	-	-	1 Bit	up/down
44	RTR: Standby setback when heating +/- 0,1K	input	C	-	W	-	-	1 Bit	up/down
45	RTR: Eco Setback when heating +/- 0,1K	input	C	-	W	-	-	1 Bit	up/down
46	RTR: Standby increment when cooling +/- 0,1K	input	C	-	W	-	-	1 Bit	up/down
47	RTR: Eco increment when cooling +/- 0,1K	input	C	-	W	-	-	1 Bit	up/down
48	RTR: HVAC mode: 1=comf, 2=stdb, 3=eco	output/input	C	-	-	-	-	1 Byte	HVAC mode
49	RTR: Comfort mode enabled	input	C	-	W	-	-	1 Bit	trigger
50	RTR: Standby mode enabled	input	C	-	W	-	-	1 Bit	trigger
51	RTR: Eco mode enabled	input	C	-	W	-	-	1 Bit	trigger
52	RTR: Status heating	output	C	-	-	T	-	1 Bit	switching
53	RTR: Status cooling	output	C	-	-	T	-	1 Bit	switching
54	RTR: Control value main level heating	output	C	-	-	T	-	1 Byte	counter pulses (0...255)
54	RTR: Control value main level heating	output	C	-	-	T	-	1 Byte	percent (0...100%)
54	RTR: Control value main level heating	output	C	-	-	T	-	1 Bit	switching

Number	Name	Object function	C	R	W	T	U	Objekt size	Data type
54	RTR: Control value main level heating	output	C	-	-	T	-	1 Bit	switching
55	RTR: Control value extra level heating	output	C	-	-	T	-	1 Byte	counter pulses (0...255)
55	RTR: Control value extra level heating	output	C	-	-	T	-	1 Byte	percent (0...100%)
55	RTR: Control value extra level heating	output	C	-	-	T	-	1 Bit	switching
55	RTR: Control value extra level heating	output	C	-	-	T	-	1 Bit	switching
56	RTR: Control value main level cooling	output	C	-	-	T	-	1 Byte	counter pulses (0...255)
56	RTR: Control value main level cooling	output	C	-	-	T	-	1 Byte	percent (0...100%)
56	RTR: Control value main level cooling	output	C	-	-	T	-	1 Bit	switching
56	RTR: Control value main level cooling	output	C	-	-	T	-	1 Bit	switching
57	RTR: Control value extra level cooling	output	C	-	-	T	-	1 Byte	counter pulses (0...255)
57	RTR: Control value extra level cooling	output	C	-	-	T	-	1 Byte	percent (0...100%)
57	RTR: Control value extra level cooling	output	C	-	-	T	-	1 Bit	switching
57	RTR: Control value extra level cooling	output	C	-	-	T	-	1 Bit	switching
58	RTR: Guide value [°C]	input	C	-	W	-	-	2 Bytes	float value, Temperature (°C)
59	RTR: Blocking object heating	input	C	-	W	-	-	1 Bit	enable
60	RTR: Blocking object cooling	input	C	-	W	-	-	1 Bit	enable
61	RTR: Blocking object extra level heating	input	C	-	W	-	-	1 Bit	enable
62	RTR: Blocking object extra level cooling	input	C	-	W	-	-	1 Bit	enable
63	DEWP: Dew point temperature [°C]	output	C	-	-	T	-	2 Bytes	float value, Temperature (°C)
64	DEWP: Dew point alarm enabled (switching object)	output	C	-	-	T	-	1 Bit	switching
64	DEWP: Dew point alarm enabled (priority)	output	C	-	-	T	-	2 Bit	priority switching
64	DEWP: Dew point alarm enabled (0...100%)	output	C	-	-	T	-	1 Byte	percent (0...100%)
64	DEWP: Dew point alarm enabled (0...255)	output	C	-	-	T	-	1 Byte	counter pulses (0...255)
64	DEWP: Dew point alarm enabled Scene (1...64)	output	C	-	-	T	-	1 Byte	Scenen Nummer
65	DEWP: Request dew point temperature	input	C	-	W	-	-	1 Bit	trigger
66	P: Air pressure absolute [Pa]	output	C	-	-	T	-	2 Bytes	2-Byte float value, Druck (Pa)
67	P: Air pressure relative [Pa]	output	C	-	-	T	-	2 Bytes	2-Byte float value, Druck (Pa)
68	P: Air pressure sensor error	output	C	-	-	T	-	1 Bit	Boolean
69	P: Request absolute air pressure	input	C	-	W	-	-	1 Bit	trigger
70	P: Request relative air pressure	input	C	-	W	-	-	1 Bit	trigger
71	VAVR: Control value (0...255)	output	C	-	-	T	-	1 Byte	counter pulses (0...255)
71	VAVR: Control value (0...100%)	output	C	-	-	T	-	1 Byte	percent (0...100%)

**Communication flags**

<b>Flag</b>	<b>Name</b>	<b>Meaning</b>
C	Communication	Object can communicate
R	Read	Object status can be requested (ETS, display etc.)
W	Write	Object can receive information
T	Transmit	Object can send information
U	Update	Object can request a value from another bus participant. The answer is interpreted as write command and updates the value of the communication object. This is typically used to request external sensor data after a bus voltage recovery.



**1. Global Settings**

(Picture shows modified parameters)

Send in operation	Sends '0'
Cycle time [s] in operation	60
Request status	<input type="radio"/> Inactive <input checked="" type="radio"/> Active
Request status with	'1'
Send delay after bus voltage recovery ... s	2

Designation	Options	Description
Send in operation	Inactive Sends „0“ Sends „1“	No function. „In operation“ (0 or 1) will be send in the configured cycle time (see next parameter).
	Cycle time [s] in operation 0 to 65535 seconds	Configuration of interval (in seconds) for transmitting the value „in operation“
Request status	Inactive Active Request status with „0“ Request status with „1“ Request status with „0“ and „1“	No function. Status (in operation) can be requested via communication object “0”. Status (in operation) can be requested via communication object “1”. Status (in operation) can be requested via communication object “0” and “1”.
Send delay after bus voltage recovery ...s	2 to 255 seconds	Configuration of time delay (in seconds) before sending “in operation” after a bus voltage recovery.

## 2. CO<sub>2</sub> Sensor

CO<sub>2</sub> sensor  disabled  enabled

value offset

error CO<sub>2</sub> sensor  don't notify  notify

send CO<sub>2</sub> value when changing

send CO<sub>2</sub> value cyclically

external value  disabled  enabled

percentage

Designation	Options	Description
CO <sub>2</sub> Sensor	Inactive	CO <sub>2</sub> sensor disabled.
	Active	<p>Error CO<sub>2</sub> sensor</p> <p>notify</p> <p>don't notify</p>
	<p>Send CO<sub>2</sub> value when changing</p> <p>Send CO<sub>2</sub> value cyclically</p>	<p>Inactive</p> <p>If change above 10 – 500 ppm</p> <p>Inactive</p> <p>Every minute – once a day</p>
Value offset	-500 to +500 ppm	The value is adjusted by this offset. A correction might be necessary in different causes. (e.g. sensor is placed at an unfavorable position, next to a window).
External value	Inactive	No function.
	Active	<p>Percentage:</p> <p>With xx% proportion</p> <p>Only use external value</p>
		<p>The internal and an external value are taken pro rata to calculate an overall value. This value is relevant for the control and the sending procedure is as defined above.</p> <p>It only uses the value from the external sensor. The internal (integrated) sensor will not be used.</p>

3. CO<sub>2</sub> Control

type of CO<sub>2</sub> control 3-step ▼

allow to change base set point via bus  no  yes

control value Output format switching command ▼

send control value when change-over  disabled  enabled

send control value cyclically every minute ▼

hysteresis (symmetrical) 50 ppm ▼

Designation	Options	Description
Type of CO <sub>2</sub> control	Inactive 1-step 2-step 3-step PI	CO <sub>2</sub> control disabled. One threshold available – see description chapter 3.1. Two thresholds available – see description chapter 3.1. Three thresholds available – see description chapter 3.1. PI-Control – see description chapter 3.2.
Control value output format	Switching command Priority Percent Byte Scene	A switching telegram is sent. There is one object available for every stage. A priority telegram is sent. There is one object available for every stage. A percentage value is sent. All steps are sending via one object. A byte value is sent. All steps are sending via one object. A scene value is sent. All steps are sending via one object.
Send control value when change-over	Disabled Enabled	No function. When exceeding or falling below a threshold, a defined object is sent.
Send control value when changing (PI control only)	Disabled If change above 1% ... 25%	No function. If there is a change, the recent control value is sent.
Send control value cyclically	Disabled Every two minutes up to 12 hours, once a day	No function. Cyclic sending of the recent control value.
Hysteresis (symmetrical) (single-stage, two-stage, three-stage)	50 to 300 ppm	The hysteresis can prevent a frequent switching for fast and small changing values.
Allow to change base set point via bus	No Yes	Does not allow changes of base set point via bus. Allows changes of base set point via bus.

### 3.1 Switching commands / priority CO<sub>2</sub> – Thresholds 1 / 2 / 3

CO<sub>2</sub> threshold 1

switching command below threshold 1  off  on

switching command above threshold 1  off  on

control value in case of sensor error  off  on

blocking object  disabled  enabled

behavior when unblocking  don't send  send current value

behavior when blocking  don't send  send value

switching command when blocking  off  on

Designation	Options	Description
CO <sub>2</sub> threshold 1/2/3	400 to 1500 ppm	Definition of threshold 1, 2 or 3 for the CO <sub>2</sub> value.
Switching command below threshold 1/2/3	off on	Definition of the switching command below threshold 1/2/3.
Switching command above threshold 1/2/3	off on	Definition of the switching command above threshold 1/2/3.
Control value in case of sensor error	off on	Definition of the switching command in case of sensor error.
Blocking object	Disabled	No reaction.
	Enabled	
	Behavior when unblocking	Don't send Send recent value
Behavior when blocking	Don't send Send value	There is no control value sent when blocking. A switching command is sent when blocking.
Switching command when blocking	off on	Definition of the switching command when blocking.

### 3.2 PI-control for CO<sub>2</sub>

set point

proportional band

reset time (15...240min)

min. control value

max. control value

control value in case of sensor error

blocking object  disabled  enabled

Designation	Options	Description
Set point	400 to 2000 ppm	Definition of the setpoint.
Proportional band	100 to 2000 ppm	Definition of the proportional band.
Reset time (15...240 min.)	15 to 240 Min.	Definition of the reset time.
Min. control value	0% to 95%	Definition of the minimal control value. The control value is limited to this minimum value.
Max. control value	5% to 100%	Definition of the maximum control value. The control value is limited to this maximum value.
Control value in case of sensor error	0% to 100%	Definition of the control value in case of sensor error.
Blocking object	Inactive	No function.
	Active	If the blocking object is activated, the reception of an external object can prevent the sending of the manipulated variable. Thereby an undesirable starting of actors can be prevented.
	Behavior when unblocking	Don't send Send recent value
	Behavior when blocking	Don't send Send value
Percent when blocking (0...100%)	Selection: 0 to 100%	Definition of the percentage value when blocking.

4. Relative humidity sensor

relative humidity sensor  disabled  enabled

value offset

error humidity sensor  don't notify  notify

send relative humidity when changing

send relative humidity cyclically

external value  disabled  enabled

percentage

Designation	Options	Description
Relative humidity sensor	Inactive	Relative humidity sensor disabled. If there are no new values provided from the sensor for more than 10 minutes, the sensor failure will be reported.
	Active    Error humidity sensor    notify	No sensor errors will be reported.
	Send relative humidity when changing    Disabled If change above 1% – 25%	No function. The new value is sent if the difference between old and new value is above the defined sending threshold.
	Send relative humidity cyclically    Disabled Every minute – once a day	No function. Cyclic sending of the recent value.
Value offset	-5% to +5% ppm	The value is adjusted by this offset. A correction might be necessary in different causes. (e.g. sensor is placed at an unfavorable position, next to a window).
External value	Inactive	No function.
	Active    Percentage:    With xx% proportion	The internal and an external value are taken pro rata to calculate an overall value. This value is relevant for the control and the sending procedure is as defined above.
	Only use external value	It only uses the value from the external sensor. The internal (integrated) sensor will not be used.

## 5. Relative humidity control

control type	3-step
allow to change base set point via bus	<input type="radio"/> no <input checked="" type="radio"/> yes
control value Output format	switching command
send control value when change-over	<input type="radio"/> disabled <input checked="" type="radio"/> enabled
send control value cyclically	every 2 minutes
hysteresis (symmetrical)	5%

Designation	Options	Description
Control type	Disabled 1-step 2-step 3-step PI	Relative humidity control disabled. One threshold available – see description chapter 5.1. Two thresholds available – see description chapter 5.1. Three thresholds available – see description chapter 5.1. PI-Control – see description chapter 5.2.
Control value output format	Switching command Priority Percent Byte Scene	A switching telegram is sent. There is one object available for every stage. A priority telegram is sent. There is one object available for every stage. A percentage value is sent. All steps are sending via one object. A byte value is sent. All steps are sending via one object. A scene value is sent. All steps are sending via one object.
Send control value when change-over	Disabled Enabled	No function. When exceeding or falling below a threshold, a defined object is sent.
Send control value when changing (PI control only)	Disabled If change above 1% ... 25%	No function. If there is a change, the recent control value is sent.
Send control value cyclically	Disabled Every two minutes up to 12 hours, once a day	No function. Cyclic sending of the recent control value.
Hysteresis (symmetrical) (single-stage, two-stage, three-stage)	1% to 10%	The hysteresis can prevent a frequent switching for fast and small changing values.
Allow to change base set point via bus	No Yes	Does not allow changes of base set point via bus. Allows changes of base set point via bus.

5.1 Switching commands and priority relative humidity control – Threshold 1 / 2 / 3

rH threshold 1

switching command below threshold 1  off  on

switching command above threshold 1  off  on

control value in case of sensor error  off  on

blocking object  disabled  enabled

behavior when unblocking  don't send  send current value

behavior when blocking  don't send  send value

switching command when blocking  off  on

Designation	Options	Description
rF threshold 1/2/3	20% to 50%	Definition of threshold 1, 2 or 3 for the relative humidity value.
Switching command below threshold 1/2/3	off on	If measured value is below threshold 1/2/3, switching command will not be send. If measured value is below threshold 1/2/3, switching command will be send.
Switching command above threshold 1/2/3	off on	If measured value is above threshold 1/2/3, switching command will not be send. If measured value is above threshold 1/2/3, switching command will be send.
Control value in case of sensor error	off on	If sensor error, a switching command will not be send. If sensor error, a switching command will be send.
Blocking object	Disabled	No function.
	Enabled	
	Behavior when unblocking	Don't send Send recent value
Behavior when blocking	Don't send Send value	There is no control value sent when blocking. A switching command is sent when blocking.
Switching command when blocking	off on	Definition of the switching command when blocking.



## 5.2 PI control for relative humidity

set point (10...95%rH)

proportional band (10...40%rH)

reset time (15...240Min)

min. control value

max. control value

control value in case of sensor error

blocking object  disabled  enabled

Designation	Options	Description	
Set point	10% to 95% relative humidity	Definition of the setpoint.	
Proportional band	10% to 40% relative humidity	Definition of the proportional band.	
Reset time	15 to 240 min.	Definition of the reset time.	
Min. control value	0% to 95%	Definition of the minimal control value. The control value is limited to this minimum value.	
Max. control value	5% to 100%	Definition of the maximum control value. The control value is limited to this maximum value.	
Control value in case of sensor error	0% to 100%	Definition of the control value in case of sensor error.	
Blocking object	Inactive	No function.	
	Active	If the blocking object is activated, the reception of an external object can prevent the sending of the manipulated variable. Thereby an undesirable starting of actors can be prevented.	
	Behavior when unblocking	Don't send Send recent value	There is no control value sent when unblocking. The recent value is sent when unblocking.
	Behavior when blocking	Don't send Send value	There is no control value sent when blocking. The recent value is sent when blocking.
	Percent when blocking	Selection: 0% to 100%	Definition of the percentage value when blocking.

## 6. Temperature Sensor

temperature sensor  disabled  enabled

value offset [0,1K], (-5K...+5K)

error temperature sensor  don't notify  notify

send temperature when changing

send temperature cyclically

external value  disabled  enabled

percentage

Designation	Options	Description
Temperature Sensor	Disabled	Temperature sensor disabled.
	Enabled	If there are no new values provided from the sensor for more than 10 minutes, a sensor failure will be reported. No report on sensor failure.
	Error Temperature sensor	
	Notify	Don't notify
Send temperature when changing	Disabled	No function.
	Change from 0,1 K – 10,0 K	The new value is sent if the difference between old and new value is above the defined sending threshold.
Send temperature cyclically	Disabled	No function.
	Every minute – once a day	Cyclic sending of the recent value.
Value offset	-5 K to + 5 K	The value is adjusted by this offset. A correction might be necessary in different causes. (e.g. sensor is placed at an unfavorable position, next to a window).
External value	Disabled	No function.
	Enabled	The internal and an external value are taken pro rata to calculate an overall value. This value is relevant for the control and the sending procedure is as defined above.
	Percentage:	
	Only use external value	It only uses the value from the external sensor. The internal (integrated) sensor will not be used.

7. Temperature Alarme

frost alarm  disabled  enabled

frost alarm when temperature

send frost alarm when change of status  disabled  enabled

send frost alarm cyclically

heat alarm  disabled  enabled

heat alarm when temperature

send heat alarm when change of status  disabled  enabled

send heat alarm cyclically

Designation	Options	Description
Frost alarm	Disabled	No function.
	Enabled	If the alarm function is activated an alarm in the form of an object is sent when the temperature falls below a defined temperature threshold for frost alarm.
	Frost alarm when temperature < 1 °C to < 10 °C	When falling below the defined temperature the object frost alarm is sent.
	Send frost alarm when change of status	Disabled Enabled No function. If there is a change the recent control value is sent.
Send frost alarm cyclically	Disabled Every minute – once a day No function. Cyclic sending of the recent control value.	
Heat alarm	Disabled	No function.
	Enabled	If the alarm function is activated an alarm in the form of an object is sent when the temperature exceeds a defined temperature threshold for heat alarm.
	Heat alarm when temperature > 20 °C to > 30 °C	When exceeding the defined temperature, the object heat alarm is sent.
	Send heat alarm when change of status	Disabled Enabled No function. If there is a change the recent control value is sent.
Send heat alarm cyclically	Disabled Every minute – once a day No function. Cyclic sending of the recent control value.	

## 8. Temperature control

### 8.1 Temperature control – heating and cooling

select heating and/or cooling heating and cooling ▼

extra level heating enable  disabled  enabled

guide heating  disabled  enabled

extra level cooling enable  disabled  enabled

guide cooling  disabled  enabled

**PI control:** A PI control is a constant control that comprises a proportional part (P-part) and an integral share (I-share). The size of the P-part is indicated in Kelvin, the I-share in minutes. At a constant PI control, the manipulated variables are operated in proportional steps up to a maximum value.

**2-stage-control:** A two-stage control only sends two conditions for the manipulated variable, on and off. The control turns on when falling below a desired temperature and turns off when exceeding it. Set point and switching hysteresis are defined in advance.

**Main level and Extra level:** In addition to the main level (e.g. underfloor heating) an extra level (e.g. electric heating) can be helpful for slow systems controlled by main level. This can shorten in the mentioned example the slow heat-up phase of an underfloor heating. You can choose between a PI or two-stage controller for the additional object.

Designation	Options	Description
Select heating and/or cooling	Disabled Heating Cooling Heating and cooling	Temperature controller disabled. Operating mode: Heating only. Operating mode: Cooling only. Operating mode: Heating and cooling.
Extra level heating / Extra level cooling	Disabled Enabled	Extra level heating / cooling disabled. In addition to the main level (e.g. underfloor heating) an extra level (e.g. electric heating) can be helpful for lazy systems. It can shorten the slow heat-up phase of an underfloor heating. You can choose between a PI or two-stage controller for the additional object.
Guide heating / Guide cooling	Disabled Enabled	Guide heating / cooling disabled. With the parameter guiding it is possible to adjust the set point linearly depending on any reference variable which is captured through an external sensor. In general, an outdoor temperature reset control is realized. With an appropriate parameterization, the constant raising or lowering of the set value is possible. The parameterization is carried-out together with the definition of the set points.

8.2 Temperature control – General

- blocking object heating mode: enable     disabled     enabled
- blocking object cooling mode: enable     disabled     enabled
- blocking object extra level heating: enable     disabled     enabled
- blocking object extra level cooling: enable     disabled     enabled
- heating demand for display     no     yes
- cooling demand for display     no     yes

Designation	Options	Description
Blocking object heating mode: enable	Disabled	Blocking object disabled.
	Enabled	If the blocking object is activated, the reception of an external object can prevent the sending of the manipulated variable. Thereby an undesirable starting of actors can be prevented (e.g. do not heat if a window is open).
Blocking object cooling mode: enable	Disabled	Blocking object disabled.
	Enabled	If the blocking object is activated, the reception of an external object can prevent the sending of the manipulated variable. Thereby an undesirable starting of actors can be prevented (e.g. do not heat if a window is open).
Blocking object extra level heating: enable	Disabled	Blocking object disabled.
	Enabled	If the blocking object is activated, the reception of an external object can prevent the sending of the manipulated variable. Thereby an undesirable starting of actors can be prevented (e.g. do not cool if a window is open).
Blocking object extra level cooling: enable	Disabled	Blocking object disabled.
	Enabled	If the blocking object is activated, the reception of an external object can prevent the sending of the manipulated variable. Thereby an undesirable starting of actors can be prevented (e.g. do not cool if a window is open).
Heating demand for display	Disabled	Status object disabled.
	Enabled	This object is a status object to send the status of heating (active or not). It can be used to visualize the status on a display.
Cooling demand for display	Disabled	Status object disabled.
	Enabled	This object is a status object to send the status of cooling (active or not). It can be used to visualize the status on a display.

8.3 Temperature control – Set points

comfort temperature [0,1°C], (18...30°C)	180	▲▼	send set point temperature cyclically	disabled	▼
standby setback heating [0,1K], (0..10K)	0	▲▼	dead zone between heating and cooling [0,1K], (0...10K)	20	▲▼
eco setback heating [0,1K], (0..10K)	0	▲▼	min. guide value heating (-50°C...+50°C)	0	▲▼
standby increment cooling [0,1K], (0..10K)	0	▲▼	max. guide value heating (-50°C...+50°C)	0	▲▼
eco increment cooling [0,1K], (0..10K)	0	▲▼	max. increment of set point for min. guide value heating (0K...+10K)	0	▲▼
interval to main level heating [0,1K], (0...-10K)	-10	▲▼	min. guide value cooling (-50°C...+50°C)	0	▲▼
interval to main level cooling [0,1K], (0...10K)	10	▲▼	max. guide value cooling (-50°C...+50°C)	0	▲▼
send set point temperature when changing	disabled	▼	max. setback of set point for max. guide value cooling (0K...+10K)	0	▲▼

Designation	Options		Description
Comfort temperature	18° to 30°C	In 0,1 °C Steps	Definition of the comfort temperature.
Setback of standby heating and increment of standby cooling	0 K to 10 K	In 0,1 K Steps	Definition of the difference to the comfort temperature in Kelvin.
Setback of eco heating and increment of eco cooling	0 K to 10 K	In 0,1 K Steps	Definition of the difference to the comfort temperature in Kelvin.
Interval to main level heating and cooling	0 K to -10 K	In 0,1 K Steps	To get a faster compensation for big differences between the recent value and setpoint, an extra level for heating / cooling can be activated. The distance to the main level gives the difference of recent value and setpoint at which the extra level should be activated.
Send setpoint temperature when changing	Disabled Enabled		No function. If there is a change the recent control value is sent.
Send setpoint temperature cyclically	Disabled	Every minute – once a day	No function. Cyclic Sending of the recent control value.
Dead zone between heating and cooling	0 to 10K	In 0,1 K Steps	Definition of the dead zone between heating and cooling. Recent value < Set point = Heating Recent value > Set point + dead zone = Cooling
Min. guide value heating	-50°C to +50°C	In 0,1 °C Steps	Lower guide value for outdoor temperature reset.
Max. guide value heating	-50°C to +50°C	In 0,1 °C Steps	Upper guide value for outdoor temperature reset.
Max. increment min. guide value heating	0 to 10K	In 0,1 K Steps	Increment of the set temperature at minimum guide value.
Min. guide value cooling	-50°C to +50°C	In 0,1 °C Steps	Lower guide value for outdoor temperature reset.
Max. guide value cooling	-50°C to +50°C	In 0,1 °C Steps	Upper guide value for outdoor temperature reset.
Max. setback for max. guide value cooling	0 to 10K	In 0,1 K Steps	Setback of the set temperature at maximum guide value.

### 8.4 Temperature control – Main level and extra level heating / cooling

control type  PI  2-point

control direction of control value  normal  inverted

proportional band (1...8K)

reset time (15...240Min)

control value Output format

PWM cycle (5...30Min)

min. control value

max. control value

control value in case of sensor error

send control value when changing  disabled  enabled

send control value cyclically

(Picture shows main level heating, PI control with output: PWM)

Designation	Options	Description	
Control type	PI control	Selection of control type.	
	Proportional band	1 to 8 K	
	Reset time	15 to 240 Min.	
	Control value output format	Percent Byte PWM	Definition of the control value output format.
	PWM cycle	5 to 30 Min.	Depending on the output format the cycle is defined in percent, byte or minutes.
	Min. control value	0% to 95% 0 to 240 Byte	Depending on the output format the minimum control value is defined in percent or byte here.
	Max. control value	5% to 100% 0 to 255 Byte	Depending on the output format the maximum control value is defined in percent or byte here.
	Control value in case of sensor error	0% to 100% 0 to 255 Byte	Depending on the output format the control value is defined in percent or byte here.
	Send control value when changing	Disabled Enabled	No function. If there is a change the recent control value is sent.
	2-point	Hysteresis (symmetrical)	0,5 K to 5 K
Control value in case of sensor error		Off On	In case of sensor error, the value „off“ is sent. In case of sensor error, the value „on“ is sent.
Send control value when change-over		Disabled Enabled	No function. Bei einer Umschaltung (Änderung) wird die aktuelle Stellgröße gesendet.
Control direction of control value	Normal Inverted		
Send control value cyclically	Disabled Every minute – once a day	No function. Cyclic sending of the recent control value.	

### 9. Dew point Temperature

dew point sensor  disabled  enabled

send dew point temp. when changing

send dew point temp. cyclically

Designation	Options	Description
Dew point sensor	Disabled Enabled	No function. Sending of the recent condition.
Send dew point temperature when changing	Disabled If change above ...      0,1 K bis 10 K	No function. If there is a change the recent control value is sent.
Send dew point temperature cyclically	Disabled jede Minute - einmal am Tag	No function. Cyclic sending of the recent control value.



10. Dew point Alarm

dew point alarm  disabled  enabled

dew point alarm advance 1K ▼

dew point alarm hysteresis (symmetrical) 1K hysteresis ▼

send dew point alarm when change of status  disabled  enabled

send dew point alarm cyclically every minute ▼

type of telegram for dew point alarm switching command ▼

switching command when dew point alarm  off  on

switching command at the end of dew point alarm  off  on

Designation	Options	Description
Dew point alarm	Disabled Enabled	No function. If the alarm function is activated an alarm in form of an object is sent when the defined dew point is exceeded or fallen below.
Dew point alarm advance	Without 1K to 5K	The dew point alarm can be initiated in advance with a defined offset.
Dew point alarm hysteresis (symmetrical)	Without hysteresis Hysteresis 1 K to 5 K	No function. If there is a change, the recent control value is sent.
Send dew point alarm when change of status	Disabled Enabled	No function. Upon change of status dew point alarm is sent.
Send dew point alarm cyclically	Disabled Every minute – once a day	No function. Cyclic sending of the recent control value.
Type of telegram for dew point alarm	Switching command Priority Percent Byte Scene	Definition of the type of telegram which is used.
value when dew point alarm	Depending on the type of telegram	Definition of the value that is sent when the dew point alarm starts.
value at the end of dew point alarm	Depending on the type of telegram	Definition of the value that is sent when the dew point alarm ended.

### 11. Air pressure sensor

air pressure sensor  disabled  enabled

error air pressure sensor  don't notify  notify

send absolute air pressure when changing

send absolute air pressure cyclically

send relative air pressure when changing

send relative air pressure cyclically

height [m. a. s. l.] (0...5000m)

Designation	Options	Description
Air pressure sensor	Disabled	Temperature sensor disabled.
	Enabled	
	Error air pressure Sensor	Notify Don't notify
	Send absolute air pressure when changing	Disabled If change above 1 hPa – 50 hPa
	Send absolute air pressure cyclically	Disabled Every minute – once a day
	Send relative air pressure when changing	Disabled If change above 1 hPa – 50 hPa
	Send relative air pressure cyclically	Disabled Every minute – once a day
	Height [m. a. s. l.]	0 m to 5000 m

12. VAV control

CO2 control include  disabled  enabled

relative humidity control include  disabled  enabled

main level heating include  disabled  enabled

extra level heating include  disabled  enabled

main level cooling include  disabled  enabled

extra level cooling include  disabled  enabled

control value Output format  percent  byte

min. control value

max. control value

send VAVC control value when changing

send VAVC control value cyclically

**Function of the VAV control:**  
 The highest value of all activated PI controls of the values from CO<sub>2</sub>, relative humidity and temperature is sent in one object.

Designation	Options	Description
CO <sub>2</sub> control include	Disabled Enabled	No function. Sending of the CO <sub>2</sub> PI controller values if they are valid.
Relative humidity control include	Disabled Enabled	No function. Sending of the relative humidity PI controller values if they are valid.
Main level heating include	Disabled Enabled	No function. Sending of the main level PI controller values if they are valid.
Extra level heating include	Disabled Enabled	No function. Sending of the extra level PI controller values if they are valid.
Main level cooling Include	Disabled Enabled	No function. Sending of the main level cooling PI controller values if they are valid.
Extra level cooling Include	Disabled Enabled	No function. Sending of the extra level cooling PI controller values if they are valid.
Control value output format	Percent Byte	Definition des Ausgabeformates (percent oder Byte) für die Stellgröße.
	Min. control value	Percent: 0% to 95% Byte: 0 to 240
	Max. control value	Percent: 5% to 100% Byte: 10 to 255
Send VAVC control value when changing	Disabled If change above	No function. The values of the PI controllers are limited to the maximum value.
Send VAVC control value cyclically	Disabled	No function. Cyclic sending of the recent value.

### 13. Inputs

Inputs and input functions are only available in device types: GS 4x.10 / GS 3x.10 and TS 3x.10 knx.