EN

KNX VOC-UP basic

Mixed Gas Sensor

Article numbers 70244 (white), 70245 (aluminium), 70246 (anthracite), 70247 (stainless steel)

elsner elektronik

Installation and Adjustment

Installation, inspection, commissioning and troubleshooting of the device must only be carried out by a competent electrician.

This manual is amended periodically and will be brought into line with new software releases. The change status (software version and date) can be found in the contents footer. If you have a device with a later software version, please check **www.elsner-elektronik.de** in the menu area "Service" to find out whether a more up-to-date version of the manual is available.

Clarification of signs used in this manual

Safety advice.

Safety advice for working on electrical connections, components, etc.

DANGER! ... indicates an immediately hazardous situation which will lead to death or severe injuries if it is not avoided.

WARNING! ... indicates a potentially hazardous situation which may lead to death or severe injuries if it is not avoided.

CAUTION! ... indicates a potentially hazardous situation which may lead to trivial or minor injuries if it is not avoided.

ATTENTION! ... indicates a situation which may lead to damage to property if it is not avoided.

ETS In the ETS tables, the parameter default settings are marked by underlining.

1. Description

The **Mixed Gas Sensor KNX VOC-UP basic** recognizes volatile organic compounds in the room air. The indoor sensor can receive an external VOC value via the bus and process it with the own data to an overall value (mixed value, e. g. room average).

The **KNX VOC-UP basic** provides four switching outputs with adjustable threshold values. The switching outputs and further communication objects can be linked by AND and OR logic gates. Additionally, an integrated actuating variable comparator can compare and output values that are received via communication objects.
An integrated PI controllers allows for control of ventilation depending on VOC concentration.

The housing is completed with a frame of the switching series installed in the building and thus merges with the interior.

Functions:

- Measurement of **VOC** (volatile organic compounds) in the air. In this process, an air quality value in CO_2 equivalents is calculated via an algorithm from the sum signal of all compounds included in the mixed gas.
- **Mixed value** from own measured value and external value (proportions can be set in percentage)
- **PI controller for ventilation** depending on VOC concentration: dehumidification/humidification (one step) or dehumidification (one or two step)
- **4 switching outputs** with adjustable threshold values (Threshold values can be set by parameter or via communication objects)
- **8 AND and 8 OR logic gates** with each 4 inputs. Every switching incident as well as 8 logic inputs in the form of communication objects may be used as inputs for the logic gates. The output of each gate may optionally be configured as 1 bit or 2 x 8 bits
- **2 actuating variable comparators** for output of minimum, maximum or average values. Each with 5 inputs (for values received via communication objects)

Configuration is made using the KNX software ETS. The **product file** can be downloaded from the Elsner Elektronik website on **www.elsner-elektronik.de** in the "Service" menu.

1.0.1. Scope of delivery

- Housing with display, buttons and sensor board
- Base plate

You will need *in addition* (not supplied):

- Socket Ø 60 mm, 42 mm deep
- Frame (for element 55 x 55 mm), suitable for the switching programme used in the building

1.1. Technical specifications

Housing	Plastic material (partly lacquered)
Colours	• White glossy (similar to RAL 9016 Traffic White) • Aluminium matt • Anthracite matt • Stainless steel • Special colours on request
Mounting	In-wall (in socket Ø 60 mm, 42 mm deep)
Protection category	IP 20
Dimensions	Housing approx. 55 x 55 (W x H, mm), mounting depth approx. 15 mm, base plate approx. 71 x 71 (W x H, mm)
Total weight	approx. 55 g
Ambient temperature	Operation 0…+50°C, storage -20…+50°C
Ambient air humidity	avoid bedewing
Operating voltage	KNX bus voltage
Bus current	max. 10 mA; max. 500 mW
Data output	KNX +/- bus terminal plug
BCU type	Own micro controller
PEI type	0
Group addresses	max. 254
Allocations	max. 254
Communication objects	133
Measurement range	450...2000 ppm
Resolution	1 ppm

The product conforms with the provisions of EU directives.

1.1.1. Accuracy of the measurement

Measurement variations from sources of interference (see chapter *Installation position*) must be corrected in the ETS in order to ensure the specified accuracy of the sensor (offset). To ensure a correct VOC measurement, the device must be installed in a windproof socket.

The indicated **accuracy of the VOC measurement** will be achieved after a room air exchange (without interruption of the bus voltage) if the sensor has been in contact with fresh air at least once in this period. After this, the sensor will recalibrate itself at regular intervals.
To guarantee the accuracy on a sustained basis, the sensor should be provided with fresh air at least once in 48 hours. This occurs normally during room ventilation.

1.1.2. Measuring ranges of different gases (CO2 equivalents)

Corresponding VOC concentrations for specific representatives

Compound	Formula	Range* (ppm)	Potential sources of pollutants indoors
Carbon monoxide	CO	0-10	Car exhaust, fuel-based heating, cooking appliances, smoking
Methane	CH_4	0-200	Natural gas
Propane	C_3H_8	0-20	Fuel-based heating, cooking appliances, cleaners
Ethyl alcohol	C_2H_6O	0-3	Cosmetics, cleaners, disinfectants, detergents, paints, coatings, breath
Acetaldehyde	C_2H_4O	0-20	Adhesives, coatings, plastics, lubricants, ripening of fruits
Methylethylketone	C_4H_8O	0-20	Adhesives, coatings, plastics, lubricants
Toluene	C_7H_8	0-5	Paints, coatings, cleaners, detergents, smoking, polyurethane lacquers

* corresponding concentration range based on lab measurements at gas mixing system with synthetic air at 50% r.h. and RT

2. Installation and commissioning

2.1. Installation notes

Installation, testing, operational start-up and troubleshooting should only be performed by an electrician.

CAUTION!
Live voltage!
There are unprotected live components inside the device.

- National legal regulations are to be followed.
- Ensure that all lines to be assembled are free of voltage and take precautions against accidental switching on.
- Do not use the device if it is damaged.
- Take the device or system out of service and secure it against unintentional use, if it can be assumed, that risk-free operation is no longer guaranteed.

The device is only to be used for its intended purpose. Any improper modification or failure to follow the operating instructions voids any and all warranty and guarantee claims.

After unpacking the device, check it immediately for possible mechanical damage. If it has been damaged in transport, inform the supplier immediately.

The device may only be used as a fixed-site installation; that means only when assembled and after conclusion of all installation and operational start-up tasks and only in the surroundings designated for it.

Elsner Elektronik is not liable for any changes in norms and standards which may occur after publication of these operating instructions.

2.2. Installation position

The **Mixed Gas Sensor KNX VOC-UP basic** will be installed concealed within a socket (Ø 60 mm, 42 mm deep).

May be installed and operated in dry interior rooms only. Avoid condensation.

For monitoring of the VOC content of the room air choose an installation position in height of head (standing or sitting, according to utilization of room).

When selecting an installation location, please ensure that the measurement results are affected as little as possible by external influences. Possible sources of interference include:

- Drafts from windows and doors
- Draft from ducts which lead from other rooms or from the outside to the junction box in which the sensor is mounted

Measurement variations from such sources of interference must be corrected in the ETS in order to ensure the specified accuracy of the sensor (offset).

To ensure a correct VOC measurement, the device must be installed in a windproof socket.

2.3. Composition

2.3.1. Housing

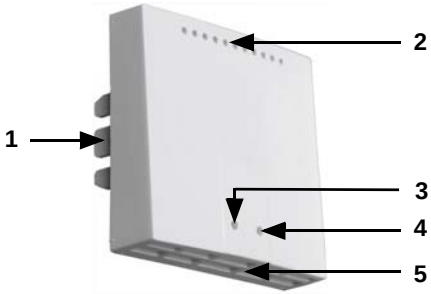

Fig. 1
1 Notches
2 Air circulation holes
3 Programming LED (recessed)
4 Programming button (recessed) for teaching instrument
5 Air circulation holes (BOTTOM)

2.3.2. Rear view of sensor board with connections

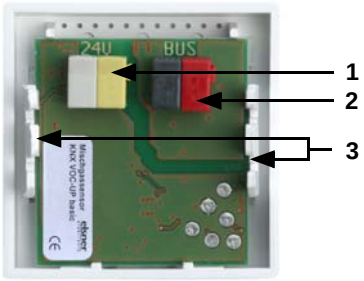

Fig. 2
1 Terminal auxiliary voltage 12...24 V DC
2 KNX terminal BUS +/-
3 Notches

2.4. Assembly of the sensor

First of all fit the windproof socket with connection. Also seal inlet pipes to avoid infiltration.

Screw the base plate onto the socket and position the frame of the switching programme. Connect the auxiliary voltage and the bus line +/- (black-red plug) to the terminals provided on the board.

Pin the sensor with the notches on to the metal frame, so that sensor and frame are fixed.

2.5. Notes on mounting and commissioning

Never expose the device to water (e.g. rain) or dust. This can damage the electronics. You must not exceed a relative humidity of 95%. Avoid condensation.

After the auxiliary voltage has been applied, the device will enter an initialisation phase lasting a few seconds. During this phase no information can be received or sent via the bus.

3. Transfer protocol

Units:

VOC content in ppm
Variables in %

3.1. List of all communications objects

Abbreviation flags:

C Communication
R Read
W Write
T Transfer
U Update

No.	Text	Function	Flags	DPT type	Size
0	Software version	readable	R-CT	0	2 bytes
2	VOC sensor malfunction	Output	R-CT	[1.1] DPT_Switch	1 bit
96	External VOC reading	Input	-WC-	0	2 bytes
97	Internal VOC reading	Output	R-CT	0	2 bytes
98	Total VOC reading	Output	R-CT	0	2 bytes
99	VOC maximum value request	Input	-WC-	[1.1] DPT_Switch	1 bit
100	Maximum VOC reading	Output	R-CT	0	2 bytes
101	Reset VOC maximum value	Input	-WC-	[1.1] DPT_Switch	1 bit
102	VOC threshold value 1: Absolute value	Input/Output	RWCT	0	2 bytes
103	VOC threshold value 1: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
104	VOC threshold value 1: Switching delay from 0 to 1	Input	-WC-	[9.10] DPT_Value_Time1	2 bytes
105	VOC threshold value 1: Switching delay from 1 to 0	Input	-WC-	[9.10] DPT_Value_Time1	2 bytes
106	VOC threshold value 1: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
107	VOC threshold value 1: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
108	VOC threshold value 2: Absolute value	Input/Output	RWCT	0	2 bytes
109	VOC threshold value 2: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
110	VOC threshold value 2: Switching delay from 0 to 1	Input	-WC-	[9.10] DPT_Value_Time1	2 bytes

No.	Text	Function	Flags	DPT type	Size
111	VOC threshold value 2: Switching delay from 1 to 0	Input	-WC-	[9.10] DPT_-Value_Time1	2 bytes
112	VOC threshold value 2: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
113	VOC threshold value 2: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
114	VOC threshold value 3: Absolute value	Input/Output	RWCT	0	2 bytes
115	VOC threshold value 3: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
116	VOC threshold value 3: Switching delay from 0 to 1	Input	-WC-	[9.10] DPT_-Value_Time1	2 bytes
117	VOC threshold value 3: Switching delay from 1 to 0	Input	-WC-	[9.10] DPT_-Value_Time1	2 bytes
118	VOC threshold value 3: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
119	VOC threshold value 3: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
120	VOC threshold value 4: Absolute value	Input/Output	RWCT	0	2 bytes
121	VOC threshold value 4: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
122	VOC threshold value 4: Switching delay from 0 to 1	Input	-WC-	[9.10] DPT_-Value_Time1	2 bytes
123	VOC threshold value 4: Switching delay from 1 to 0	Input	-WC-	[9.10] DPT_-Value_Time1	2 bytes
124	VOC threshold value 4: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
125	VOC threshold value 4: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
126	VOC controller: Blocking object	Input	-WC-	[1.1] DPT_Switch	1 bit
127	VOC controller: Target value	Input/Output	RWCT	0	2 bytes
128	VOC controller: Target value (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
129	VOC controller: Control variable ventilation (Level 1)	Output	R-CT	[5.1] DPT_Scaling	1 byte
130	VOC controller: Control variable ventilation (Level 2)	Output	R-CT	[5.1] DPT_Scaling	1 byte
131	VOC controller: Ventilation status (1=ON | 0=OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
132	VOC controller: Ventilation status 2 (1=ON | 0=OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
133	Actuating variable comparator 1: Input 1	Input	-WC-	[5.1] DPT_Scaling	1 byte

No.	Text	Function	Flags	DPT type	Size
134	Actuating variable comparator 1: Input 2	Input	-WC-	[5.1] DPT_Scaling	1 byte
135	Actuating variable comparator 1: Input 3	Input	-WC-	[5.1] DPT_Scaling	1 byte
136	Actuating variable comparator 1: Input 4	Input	-WC-	[5.1] DPT_Scaling	1 byte
137	Actuating variable comparator 1: Input 5	Input	-WC-	[5.1] DPT_Scaling	1 byte
138	Actuating variable comparator 1: Output	Output	R-CT	[5.1] DPT_Scaling	1 byte
139	Actuating variable comparator 1: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
140	Actuating variable comparator 2: Input 1	Input	-WC-	[5.1] DPT_Scaling	1 byte
141	Actuating variable comparator 2: Input 2	Input	-WC-	[5.1] DPT_Scaling	1 byte
142	Actuating variable comparator 2: Input 3	Input	-WC-	[5.1] DPT_Scaling	1 byte
143	Actuating variable comparator 2: Input 4	Input	-WC-	[5.1] DPT_Scaling	1 byte
144	Actuating variable comparator 2: Input 5	Input	-WC-	[5.1] DPT_Scaling	1 byte
145	Actuating variablecomparator 2: Output	Output	R-CT	[5.1] DPT_Scaling	1 byte
146	Actuating variablecomparator 2: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
147	AND logic 1: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
148	AND logic 1: 8-bit output A	Output	R-CT	[5] 5.xxx	1 byte
149	AND logic 1: 8-bit output B	Output	R-CT	[5] 5.xxx	1 byte
150	AND logic 1: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
151	AND logic 2: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
152	AND logic 2: 8-bit output A	Output	R-CT	[5] 5.xxx	1 byte
153	AND logic 2: 8-bit output B	Output	R-CT	[5] 5.xxx	1 byte
154	AND logic 2: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
155	AND logic 3: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
156	AND logic 3: 8-bit output A	Output	R-CT	[5] 5.xxx	1 byte
157	AND logic 3: 8-bit output B	Output	R-CT	[5] 5.xxx	1 byte

No.	Text	Function	Flags	DPT type	Size
158	AND logic 3: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
159	AND logic 4: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
160	AND logic 4: 8-bit output A	Output	R-CT	[5] 5.xxx	1 byte
161	AND logic 4: 8-bit output B	Output	R-CT	[5] 5.xxx	1 byte
162	AND logic 4: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
163	AND logic 5: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
164	AND logic 5: 8-bit output A	Output	R-CT	[5] 5.xxx	1 byte
165	AND logic 5: 8-bit output B	Output	R-CT	[5] 5.xxx	1 byte
166	AND logic 5: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
167	AND logic 6: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
168	AND logic 6: 8-bit output A	Output	R-CT	[5] 5.xxx	1 byte
169	AND logic 6: 8-bit output B	Output	R-CT	[5] 5.xxx	1 byte
170	AND logic 6: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
171	AND logic 7: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
172	AND logic 7: 8-bit output A	Output	R-CT	[5] 5.xxx	1 byte
173	AND logic 7: 8-bit output B	Output	R-CT	[5] 5.xxx	1 byte
174	AND logic 7: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
175	AND logic 8: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
176	AND logic 8: 8-bit output A	Output	R-CT	[5] 5.xxx	1 byte
177	AND logic 8: 8-bit output B	Output	R-CT	[5] 5.xxx	1 byte
178	AND logic 8: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
179	OR logic 1: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
180	OR logic 1: 8-bit output A	Output	R-CT	[5] 5.xxx	1 byte
181	OR logic 1: 8-bit output B	Output	R-CT	[5] 5.xxx	1 byte
182	OR logic 1: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
183	OR logic 2: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
184	OR logic 2: 8-bit output A	Output	R-CT	[5] 5.xxx	1 byte
185	OR logic 2: 8-bit output B	Output	R-CT	[5] 5.xxx	1 byte

No.	Text	Function	Flags	DPT type	Size
186	OR logic 2: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
187	OR logic 3: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
188	OR logic 3: 8-bit output A	Output	R-CT	[5] 5.xxx	1 byte
189	OR logic 3: 8-bit output B	Output	R-CT	[5] 5.xxx	1 byte
190	OR logic 3: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
191	OR logic 4: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
192	OR logic 4: 8-bit output A	Output	R-CT	[5] 5.xxx	1 byte
193	OR logic 4: 8-bit output B	Output	R-CT	[5] 5.xxx	1 byte
194	OR logic 4: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
195	OR logic 5: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
196	OR logic 5: 8-bit output A	Output	R-CT	[5] 5.xxx	1 byte
197	OR logic 5: 8-bit output B	Output	R-CT	[5] 5.xxx	1 byte
198	OR logic 5: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
199	OR logic 6: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
200	OR logic 6: 8-bit output A	Output	R-CT	[5] 5.xxx	1 byte
201	OR logic 6: 8-bit output B	Output	R-CT	[5] 5.xxx	1 byte
202	OR logic 6: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
203	OR logic 7: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
204	OR logic 7: 8-bit output A	Output	R-CT	[5] 5.xxx	1 byte
205	OR logic 7: 8-bit output B	Output	R-CT	[5] 5.xxx	1 byte
206	OR logic 7: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
207	OR logic 8: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
208	OR logic 8: 8-bit output A	Output	R-CT	[5] 5.xxx	1 byte
209	OR logic 8: 8-bit output B	Output	R-CT	[5] 5.xxx	1 byte
210	OR logic 8: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
211	Logic input 1	Input	-WC-	[1.1] DPT_Switch	1 bit
212	Logic input 2	Input	-WC-	[1.1] DPT_Switch	1 bit
213	Logic input 3	Input	-WC-	[1.1] DPT_Switch	1 bit
214	Logic input 4	Input	-WC-	[1.1] DPT_Switch	1 bit

No.	Text	Function	Flags	DPT type	Size
215	Logic input 5	Input	-WC-	[1.1] DPT_Switch	1 bit
216	Logic input 6	Input	-WC-	[1.1] DPT_Switch	1 bit
217	Logic input 7	Input	-WC-	[1.1] DPT_Switch	1 bit
218	Logic input 8	Input	-WC-	[1.1] DPT_Switch	1 bit
219	Logic input 9	Input	-WC-	[1.1] DPT_Switch	1 bit
220	Logic input 10	Input	-WC-	[1.1] DPT_Switch	1 bit
221	Logic input 11	Input	-WC-	[1.1] DPT_Switch	1 bit
222	Logic input 12	Input	-WC-	[1.1] DPT_Switch	1 bit
223	Logic input 13	Input	-WC-	[1.1] DPT_Switch	1 bit
224	Logic input 14	Input	-WC-	[1.1] DPT_Switch	1 bit
225	Logic input 15	Input	-WC-	[1.1] DPT_Switch	1 bit
226	Logic input 16	Input	-WC-	[1.1] DPT_Switch	1 bit

4. Parameter setting

4.1. Behaviour on power failure/ restoration of power

Behaviour following a failure of the bus power supply:

The device sends nothing.

Behaviour on bus restoration of power and following programming or reset:

The device sends all outputs according to their send behaviour set in the parameters with the delays established in the "General settings" parameter block.

4.2. General settings

Set the basic data transfer characteristics and select whether or not malfunction objects should be sent.

Send delay after power-up and programming for:	
Measured values	5 s • ... • 2 h
Threshold values and switching outputs	5 s • ... • 2 h
Controller objects	5 s • 10 s • ... • 2 h
Logic outputs	5 s • 10 s • ... • 2 h
Maximum telegram quota	• 1 message per second • ... • 5 messages per second • ... • 20 messages per second
Use VOC malfunction object	Yes • No

4.3. VOC measured value

Use **Offsets** to adjust the readings to be sent.

Offset in ppm	-100...100; 0

The unit can calculate a **mixed value** from its own reading and an external value. Set the mixed value calculation if desired.

Use external reading	Yes • No
Ext. Reading proportion of the total reading	5% • 10% • ... • 50% • ... • 100%
Send internal and total reading	• never • periodically • On change • on change and periodically
From change of *(if sent on change)*	2% • 5% • 10% • 25% • 50% (relative to the last reading)
Send cycle *(if sent periodically)*	5 s • ... • 2 h

If an external portion is used, all of the following settings (threshold values, etc.) are related to the overall reading!

The **maximum readings** can be saved and sent to the bus . Use the "Reset VOC max. value" object to reset the value to the current reading.

Use maximum value	Yes • No

The values are not retained after a reset.

4.4. VOC threshold values

Activate the threshold values that you want to use here. The **Mixed gas sensor KNX VOC-UP basic** provides four threshold values for carbon dioxide.

Use threshold value 1/2/3/4	Yes • No

Table of VOC values:

1000 ppm corresponds to 0.1% VOC content.

300 ... 500 ppm	Fresh air
1500 ... 3000 ppm	"Stale" air
5000 ppm	Maximum allowable concentration

4.4.1. VOC threshold value 1, 2, 3, 4

The settings options for temperature, humidity and CO2 threshold values are the same.

Threshold value

Set the threshold values directly in the application program using parameters, or define them via the bus using a communications object.

Threshold value setpoint using parameter:

Set the threshold values and hysteresis directly.

Threshold value setpoint using	**Parameter** • Communications object
Threshold value in ppm	0...5000; 1200
Hysteresis of the threshold value in %	0 ... 50; 20

Threshold value setpoint using a communications object:

Beforehand, enter how the threshold value will be received from the bus. Basically, a new value can be received, or simply a command to increase or decrease.

During initial commissioning, a threshold value must be defined which will be valid until the 1st communication of a new threshold value. For units which have already been taken into service, the last communicated threshold value can be used. Basically, a temperature range is given in which the threshold value can be changed (object value limit).

A set threshold value will be retained until a new value or a change is transferred. The current value is saved in EEPROM, so that this is retained in the event of a power supply failure and will be available once the power supply is restored.

Threshold value setpoint using	Parameter • **Communications object**
The last communicated value should be retained	• never • after restoration of power • after restoration of power and programming
Start threshold value in ppm valid till 1st communication	0...5000; 1200
Object value limit (min) in ppm	0...5000
Object value limit (max) in ppm	0...5000
Type of threshold change	Absolute value • Increase/decrease
Step size *(upon increase/decrease change)*	1 • 2 • 5 • 10 • 20 • 50 • 100 • 200
Hysteresis of the threshold value in %	0 ... 50; 20

Switching output

Set the behaviour of the switching output when a threshold value is exceeded/undercut. The output switching delay can be set using objects or directly as a parameter.

When the following conditions apply, the output is (LV = Threshold value)	• LV above = 1 |LV - hysteresis below = 0 • LV above = 0 |LV - hysteresis below = 1 • LV below = 1 |LV + hysteresis above = 0 • LV below = 0 |LV + hysteresis above = 1
Delays can be set via objects (in seconds)	No • Yes
Switching delay from 0 to 1 *(when delay is not set using objects)*	None • 1 s • 2 s • 5 s • 10 s • ... • 2 h
Switching delay from 1 to 0 *(when delay is not set using objects)*	None • 1 s • 2 s • 5 s • 10 s • ... • 2 h
Switching output sends	• on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
Send cycle *(is only sent if "periodically" is selected)*	5 s • 10 s • 30 s... • 2 h

Block

The switching output can be blocked using an object. Define specifications here for the behaviour of the output when blocked.

Use switching output block	No • Yes
Analysis of the blocking object	• At value 1: block | At value 0: release • At value 0: block | At value 1: release
Blocking object value before 1st communication	0 • 1
Behaviour of the switching output	
With blocking	• Do not send message • send 0 • send 1
On release (with 2 seconds release delay)	[Dependent on the "Switching output sends" setting]

The behaviour of the switching output on release is dependent on the value of the parameter "Switching output sends" (see "Switching output")

Switching output sends on change	• Do not send message • Send switching output status
Switching output sends on change to 1	• Do not send message • If switching output = 1 ➔ send 1
Switching output sends on change to 0	• Do not send message • If switching output = 0 ➔ send 0
Switching output sends on change and periodically	Send switching output status

Switching output sends on change to 1 and periodically	If switching output = 1 ➔send 1
Switching output sends on change to 0 and periodically	If switching output = 0 ➔send 0

4.5. VOC PI control

If you activate the control, you can use the following settings to define control type, target values, and ventilation.

Use control	**Yes** • No

General control

The **Mixed gas sensor KNX VOC-UP basic** can be used to control one or two-stage ventilation.

Type of control	• One-stage ventilation • Two-stage ventilation

Configure a block for the ventilation control using the blocking object.

Behaviour of the blocking object with value	• 1 = Block | 0 = release • 0 = block | 1 = release
Blocking object value before 1st communication	0 • 1

Determine when the current control settings are to be sent to the bus. Periodic transmission is safer if a message does not reach a recipient. You may also set up periodic monitoring using an actuator with this setting.

Actuating variable comparator	• on change • on change and periodically
Send cycle (*is only sent if "periodically" is selected)*	5 s • ... • 5 min • ... • 2 h

The status object shows the current status of the output variable (0 = OFF, >0 = ON) and can for example be used for visualisation.

Send status object(s)	• on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
Send cycle (*is only sent if "periodically" is selected)*	5 s • ... • 5 min • ... • 2 h

Controller target value

The target values can be set directly in the application program using parameters, or be defined via the bus using a communications object.

Target value setting using parameter:

Set the target value directly.

Target value setpoint using	**Parameter** • Communications object
Target value in ppm	400…5000; 800

Setting a target value via communications object:

Enter how the target value will be received from the bus in advance. Basically, a new value can be received, or simply a command to increase or decrease.

During initial commissioning, a target value must be provided which will be valid until the 1st communication of a new target value. For units which have already been taken into service, the last communicated target value can be used. Basically, an air humidity range is given in which the target value can be changed (object value limit).

A set target value will be retained until a new value or a change is transferred. The current value is saved in EEPROM, so that this is retained in the event of a power supply failure and will be available once the power supply is restored.

Threshold value setpoint using	Parameter • **Communications object**
The last communicated value should be retained	• never • after restoration of power • after restoration of power and Programming
Start target value in ppm valid till 1st communication *(not upon saving the target value after programming)*	400… 5000; 800
Object value limit (min) in ppm	400…5000; 400
Object value limit (max) in ppm	400…5000; 1500
Type of threshold change	Absolute value • Increase/decrease
Step size in ppm *(upon increase/decrease change)*	1 • 2 • 5 • ... • 20 • ... • 100 • 200

Ventilation control

Depending on the control mode, one and/or two setting sections for the ventilation stages are displayed.

For two-stage ventilation, the target value difference between the two stages must be defined, i.e. the target value which, when exceeded, triggers the switch to the 2nd stage.

Target value difference between levels 1 and 2 Stage in ppm *(for stage 2 only)*	100...4000; 400

Determine the deviation from the target value at which the maximum variable value is reached, i.e. the point at which maximum output is used.
The reset time shows how quickly the control responds to deviations from the target value. In case of a short reset time, the control responds with a fast increase of the variable. In case of a long reset time, the control responds somewhat less urgently and needs longer until the necessary variable for the target value deviation is reached.
You should set the time appropriate to the ventilation system at this point (follow the manufacturer's instructions).

Maximum control variable is reached at target value/actual difference of (in ppm)	100...4000; 100
Reset time in minutes	1...255; 30 / 10

Now determine what should be sent when the control is blocked.
On release, the control variable follows the rule again.

When blocked, the variable shall	• not be sent • send a specific value
Value (in %) *((if a value is sent for an 8-bit object))*	0...100

4.6. Variable comparator

The two integrated control variable comparators can output maximum, minimum and median values.

Use comparator 1/2	No • Yes

4.6.1. Control variable comparator 1/2

Determine what the control variable comparator should output, and activate the input objects to be used. Send behaviour and blocks can also be set.

Output delivered	• Maximum value • Minimum value • Average value
Use input 1/2/3/4/5	No • Yes

Output sends	• on change of output • on change of output and periodically • when receiving an input object • when receiving an input object and periodically
Send cycle *(is only sent if "periodically" is selected)*	5 s • 10 s • 30 s • ... • 5 min • ... • 2 h
From change of *(is only sent if "on change of output" is selected)*	1% • 2% • 5% • 10% • 20% • 25%
Analysis of the blocking object	• at value 1: block | at value 0: release • at value 0: block | at value 1: release
Blocking object value before 1st communication	0 • 1
Behaviour of the switching output	
With blocking	• do not send message • Send value
Sent value in %	0 ... 100
on release, output is sent (with 2 seconds release delay)	• the current value • the current value after receipt of an object

4.7. Logic

Activate the logic inputs and assign object values up to 1st communication. Then, activate the required logic outputs.

Use logic inputs	No • **Yes**
Object value prior to 1. communication for:	
Logic input 1... 16	0 • 1

AND logic

Logic 1/2/3/4/5/6/7/8	not active • active

OR logic

Logic 1/2/3/4/5/6/7/8	not active • active

4.7.1. AND and/or OR logic 1/2/3/4/5/6/7/8

AND- and OR logic gates provide the same setting options. Assign the inputs to a switching event and set the send behaviour.

1. / 2. / 3. / 4. Input	• do not use • all switching events which are available to the sensor (see *AND logic connection inputs*, page 22)
Logic output sends	• one 1-bit object • two 8-bit objects

If the logic output sends one 1-bit object:

Logic output sends	**one 1 bit object**
if logic = 1 ➔ object value	1 • 0
if logic = 0 ➔ object value	0 • 1

If the logic output sends two 8-bit objects:

Logic output sends	**two 8 bit objects**
Type of objects	• Value (0 ... 255) • Percent (0% ... 100%) • Angle (0°... 360°) • Scenario load (0 ... 127)
if logic = 1 ➔ object A value	Setting dependent on "type of object"
if logic = 0 ➔ object A value	Setting dependent on "type of object"
if logic = 1 ➔ object B value	Setting dependent on "type of object"
if logic = 0 ➔ object B value	Setting dependent on "type of object"

Send behaviour	• on change of logic • on change of logic to 1 • on change of logic to 0 • on change of logic and periodically • on change of logic to 1 and periodically • on change of logic to 0 and periodically • on change of logic + receipt of object • on change of logic + receipt of object and periodically
Send cycle *(is only sent if "periodically" is selected)*	5 s • 10 s • 30 s • 1 min • ... • 2 h

Block

Logic outputs can also be blocked using objects.

Analysis of the blocking object	• at value 1: block | at value 0: release • at value 0: block | at value 1: release
Blocking object value before 1st communication	0 • 1

Behaviour of the switching output	
With blocking	• do not send message • send value for logic = 0 • send value for logic = 1

Behaviour on release of the switching output is dependent on send behaviour

Value of the parameter "Send behaviour":	Settings options "Behaviour of the switching output on release":
on change of logic	• do not send message • send value for current logic status
on change of logic to 1	• do not send message • if logic = 1 ➔ send value for 1
on change of logic to 0	• do not send message • if logic = 0 ➔ send value for 0
on change of logic and periodically	send value for current logic status (no selection)
on change of logic to 1 and periodically	if logic = 1 ➔ send value for 1 (no selection)
on change of logic to 0 and periodically	if logic = 0 ➔ send value for 0 (no selection)
on change of logic and receipt of object	• do not send message • Status object/s send/s
on change of logic and receipt of object and periodically	send value for current logic status (no selection)

4.7.2. AND logic connection inputs

do not use
Logic input 1
Logic input 1 inverted
Logic input 2
Logic input 2 inverted
Logic input 3
Logic input 3 inverted
Logic input 4
Logic input 4 inverted
Logic input 5
Logic input 5 inverted
Logic input 6
Logic input 6 inverted
Logic input 7
Logic input 7 inverted
Logic input 8
Logic input 8 inverted
Logic input 9
Logic input 9 inverted

Logic input 10
Logic input 10 inverted
Logic input 11
Logic input 11 inverted
Logic input 12
Logic input 12 inverted
Logic input 13
Logic input 13 inverted
Logic input 14
Logic input 14 inverted
Logic input 15
Logic input 15 inverted
Logic input 16
Logic input 16 inverted
VOC-sensor malfunction = ON
VOC-sensor malfunction = OFF
Switching output VOC 1
Switching output VOC 1 inverted
Switching output VOC 2
Switching output VOC 2 inverted
Switching output VOC 3
Switching output VOC 3 inverted
Switching output VOC 4
Switching output VOC 4 inverted
VOC controller status ventilation 1
VOC controller status ventilation 1 inverted
VOC controller status ventilation 2
VOC controller status ventilation 2 inverted

4.7.3. Connection inputs of the OR logic

The OR logic connection inputs correspond to those of the AND logic. In addition the following inputs are available for the OR logic:

AND logic 1
AND logic output 1 inverted
AND logic output 2
AND logic output 2 inverted
AND logic output 3
AND logic output 3 inverted
AND logic output 4
AND logic output 4 inverted
AND logic output 5
AND logic output 5 inverted
AND logic output 6
AND logic output 6 inverted
AND logic output 7
AND logic output 7 inverted

AND logic output 8
AND logic output 8 inverted

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