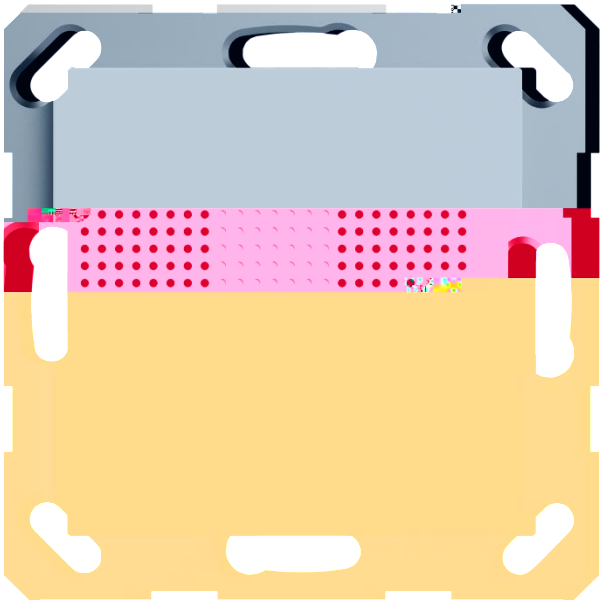
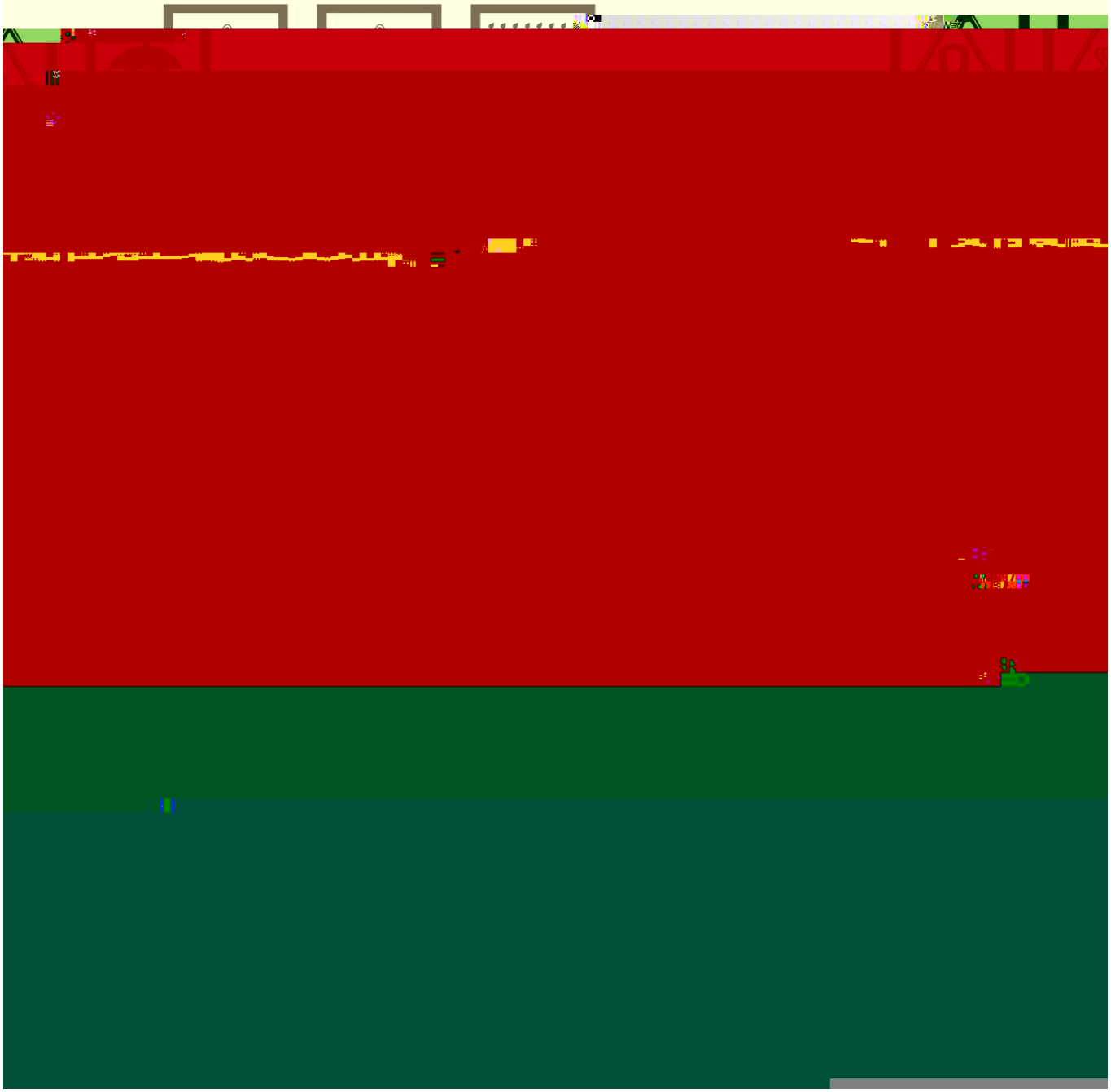
K-BUS



注意事项

1、请远离强磁场、高温、潮湿等环境；



CO2 KNX

! k

CO2 55mm CO2 !

CO2 ! k CO2

!

k

CO2

k

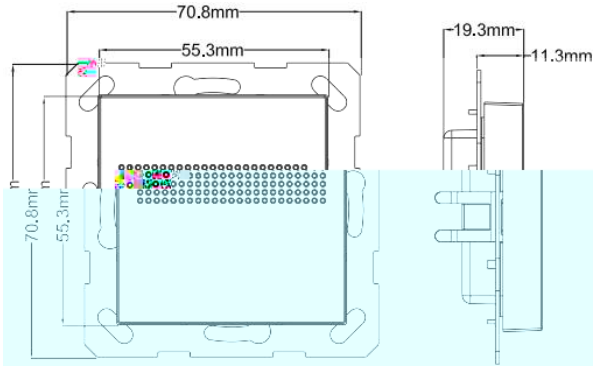
CO2 KNX 80 86

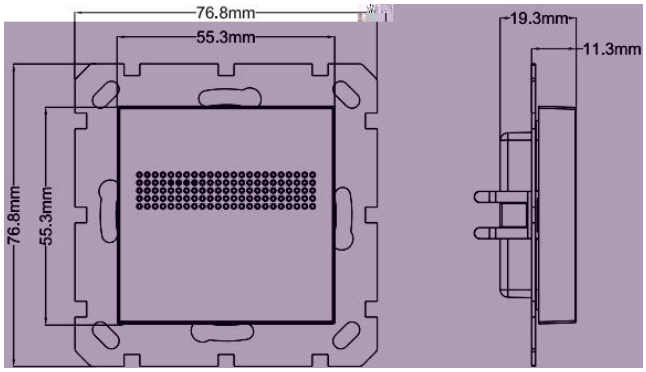
.knxprod ETS ETS5.7 k

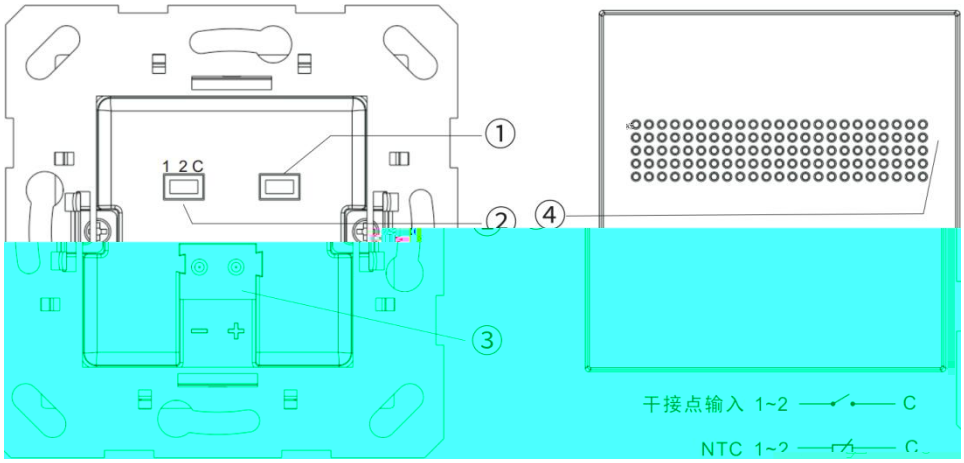
-
- ! ! CO2
-
- CO2
-
- CO2 PI
- HVAC 2 PI
  2 4
- 2 ! ! NTC
- 55mm-system
- KNX

	21-30V DC, KNX
	<17mA/24V <14.5mA/30V <25mA/24V <20mA/30V <600mW
CO2	400-2000ppm *
	0-40℃ *
	20-90% *
2	10K NTC
KNX	(/)
	1 3 <5m
LED	LED
	– 5 °C ... 45 °C
	– 25 °C ... 55 °C – 25 °C ... 70 °C
	<93%
70.8 x 70.8 x 19.3 mm 80 76.8 x 76.8 x 19.3 mm 86	
80 86	
0.07kg	

k







F LED

ㄣ KNX

ㄋ CO2

F

ㄣ !

ㄋ

! k

! ! CO2 k k

k CO2 k

2 / k

! ! / /

k

B k

3 k

! / ! ! ! !

! ! 2 PI

-10~10°C k

/ k

CO2 ! k

! ! !

/ k 1~3 k

4 1bit ! 1byte ! ! RGB k

1byte

RGB k

k

CO2 ! k CO2 PI

3 1byte k

! ! +

k

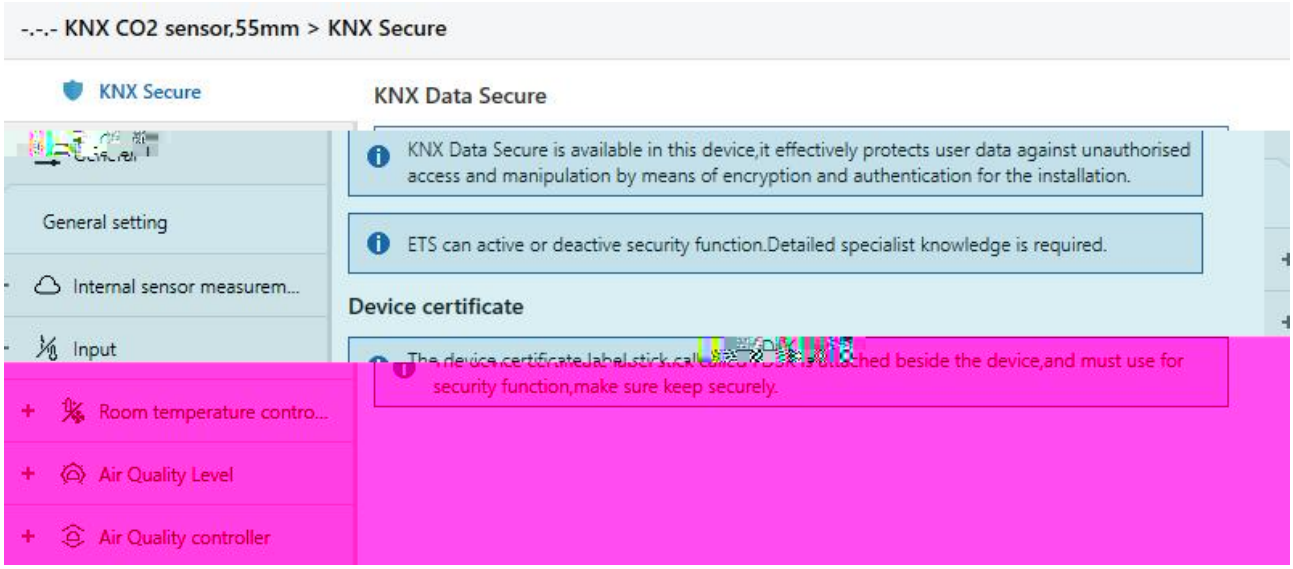
k

k CO2

k k

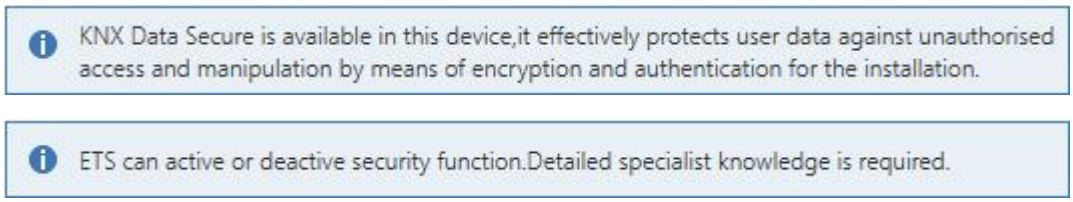
5

CO2 KNX KNX k k



5.1 (1) “KNX Secure”

KNX KNX ETS 5.1(1)



KNX

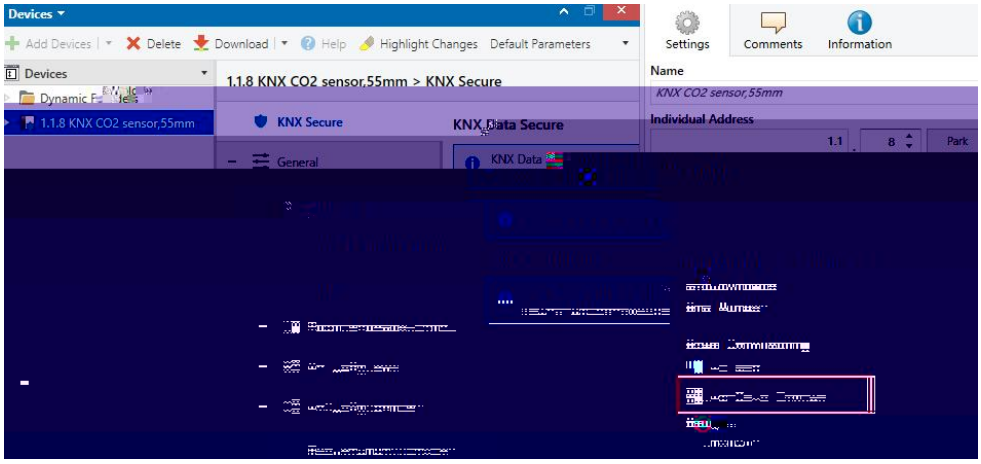
k ETS k k

FDSK k

ETS

❖ KNX k

5.1(3) Add Device Certificate



5.1(4) Add Device Certificate

✧ FDSK k

k

FDSK FDSK ETS 5.1(5) k

ETS

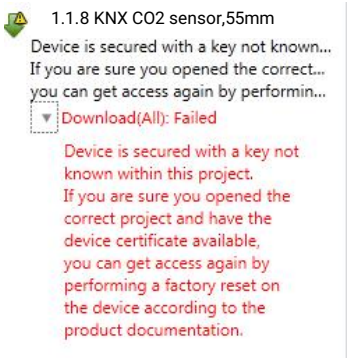
FDSK k

5.1(5)

k

5.1(6) “Yes” “Add Device Certificate” FDSK

5.1(6) k



5.1(6)

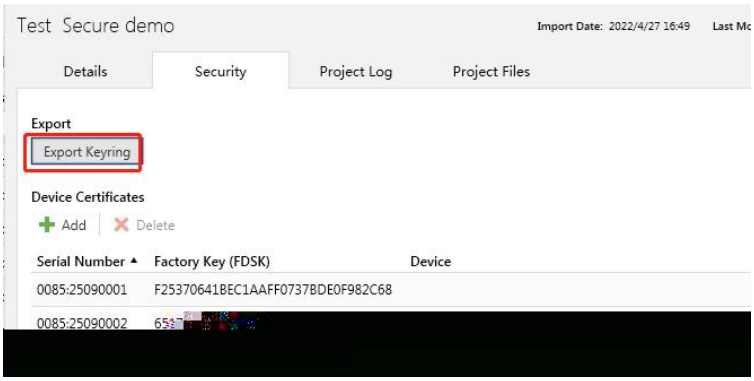
k

“Add Device Certificate” k

5.1(7)

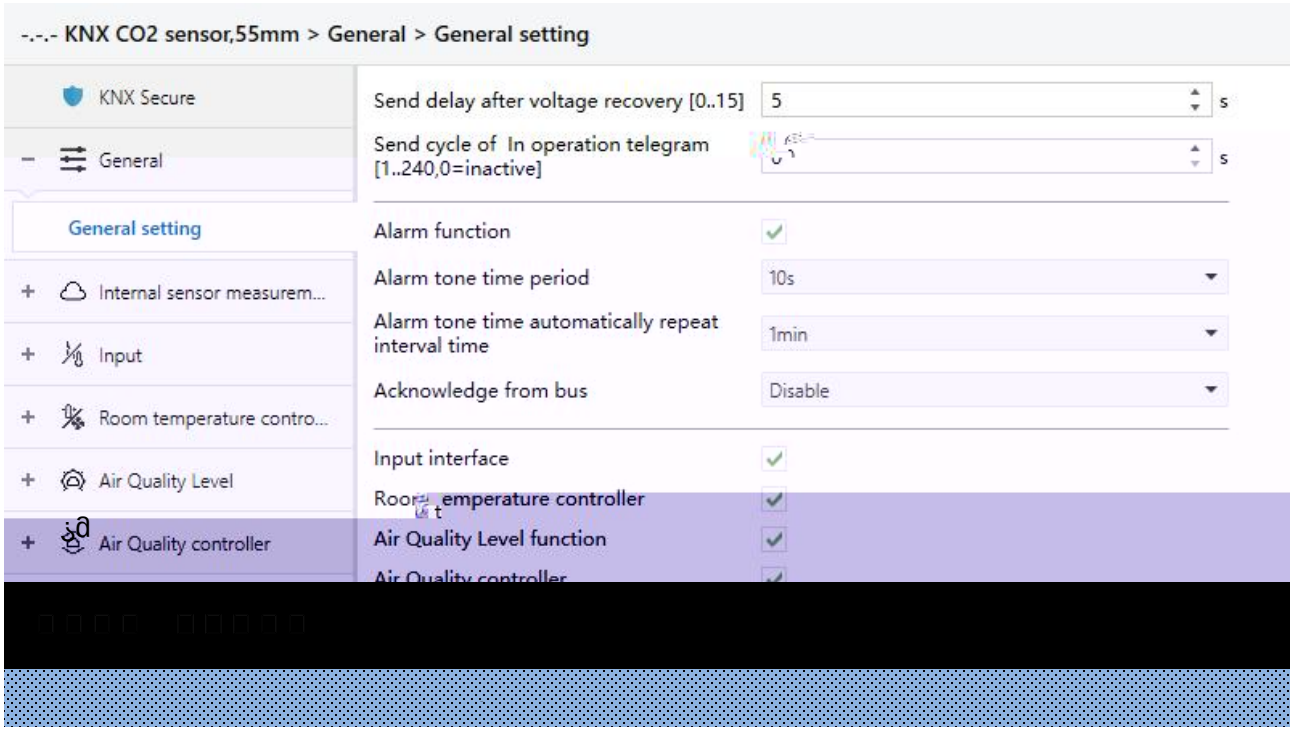
ETS

5.1(8) .knxkeys k


Test Secure demo
Import Date: 2022/4/27 16:49
Last Mo
Details
Security
Project Log
Project Files
Export
Export Keyring
Device Certificates
Add
Delete
Serial Number
Factory Key (FDSK)
Device
0085:25090001
F25370641BEC1AAFF0737BDE0F982C68
0085:25090002

5.1(8)

k


-.-.- KNX CO2 sensor,55mm > General > General setting
KNX Secure
General
General setting
Internal sensor measurem...
Input
Room temperature contro...
Air Quality Level
Air Quality controller
Send delay after voltage recovery [0..15]
5
s
Send cycle of In operation telegram [1..240,0=inactive]
s
Alarm function
Alarm tone time period
10s
Alarm tone time automatically repeat interval time
1min
Acknowledge from bus
Disable
Input interface
Air Quality Level function

Disable Alarm k

k Alarm

Alarm k

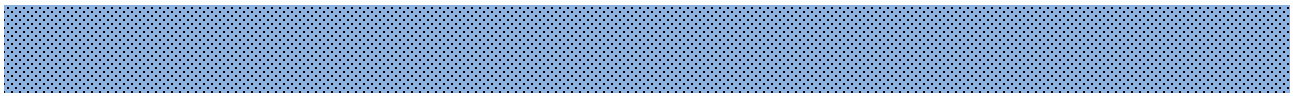
k

Disable k

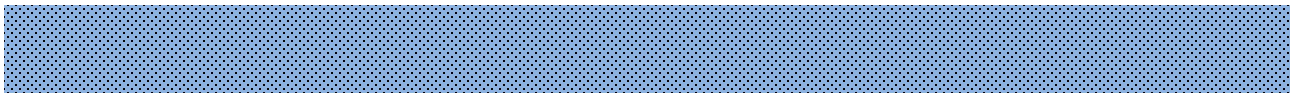
k k

k

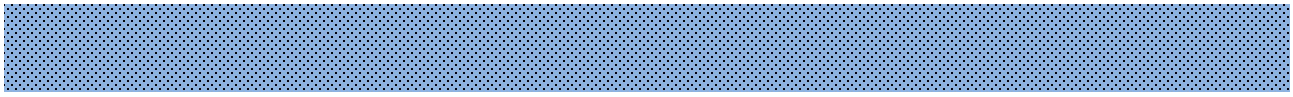
k



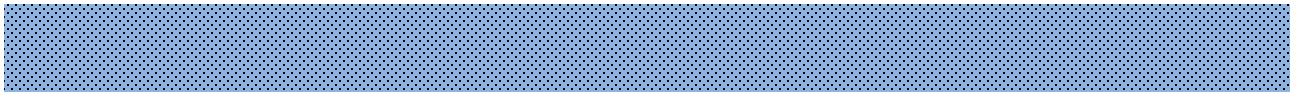
k



k



k

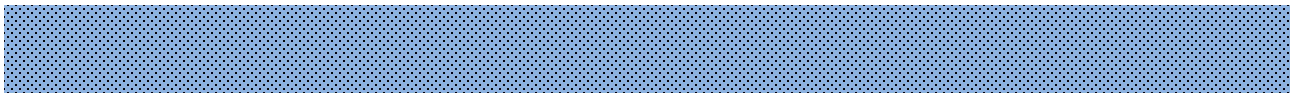


k

!

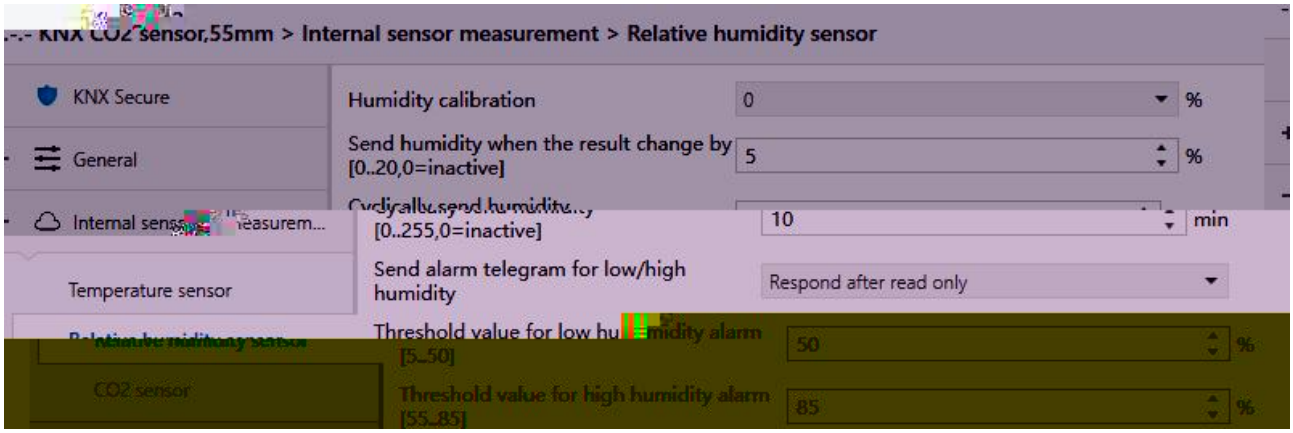
k

5.3.1 “Temperature sensoo



k 0 k

k k



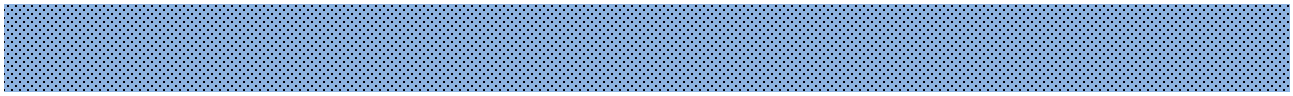
5.3.2 “Relative humidity sensor”

k

k 0 k

k 0 k

k



/ k

No respond

Respond after read only

“ Low humidity alarm”/“ High humidity alarm”

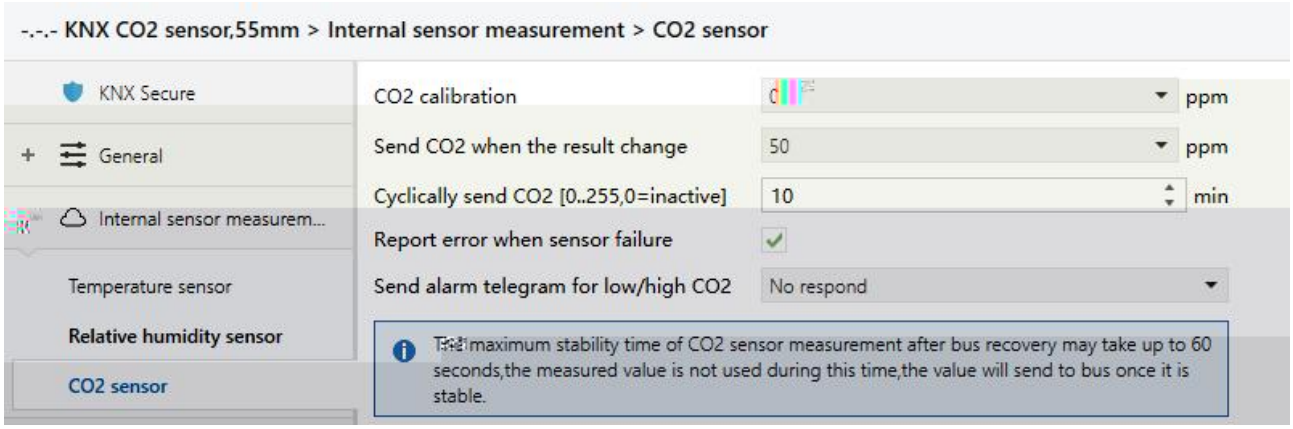
Respond after change “ Low humidity alarm”/“ High humidity alarm”

k

“Respond after read only” “Respond after change” k

k k

k k



5.3.3 “CO2 sensor”

CO2 CO2

CO2 k

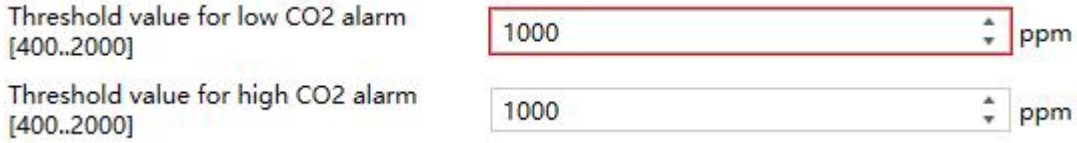
k

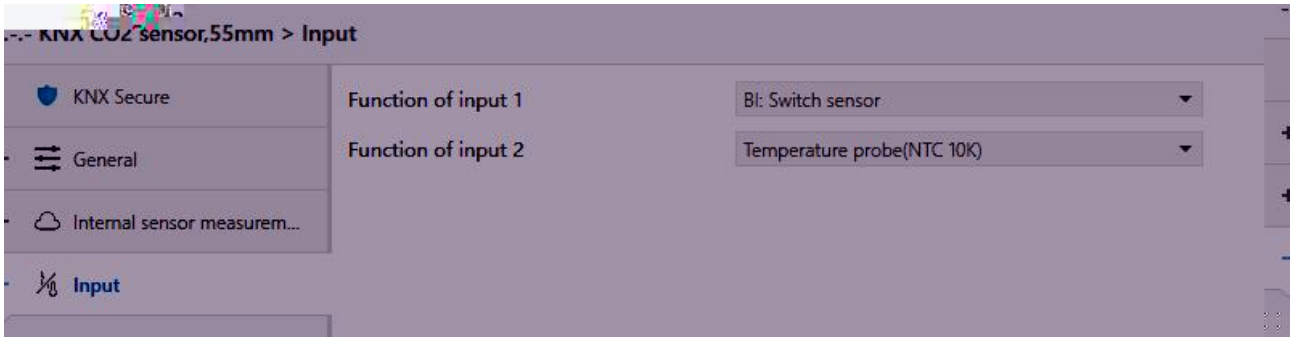
k

CO 2 CO2 k Disable k

k

k ‘9+3 tP?g


Threshold value for low CO2 alarm
[400..2000]
1000
ppm
Threshold value for high CO2 alarm
[400..2000]
1000
ppm



5.4 “Input”

k k

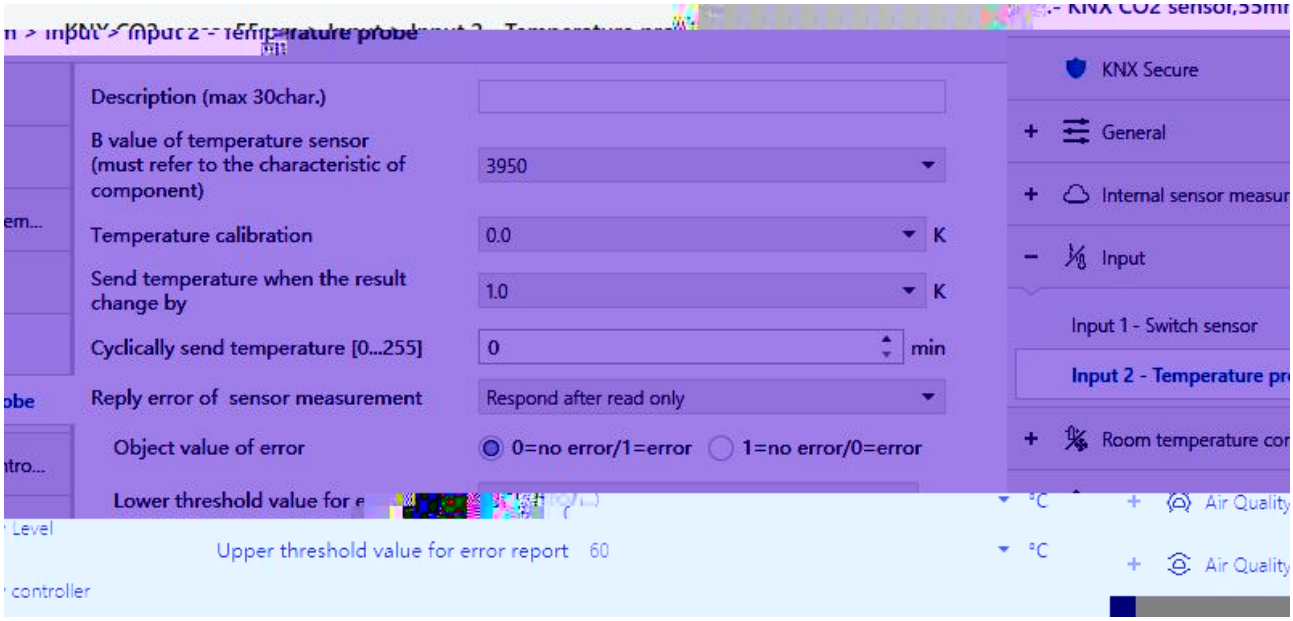
k

B

! ! / /

k

k



5.4.1

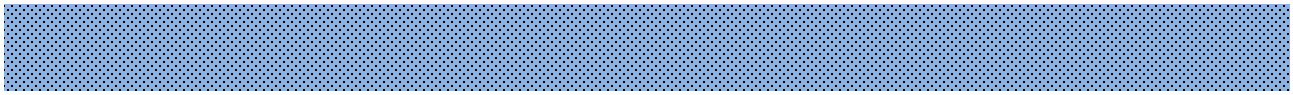
k

NTC B k

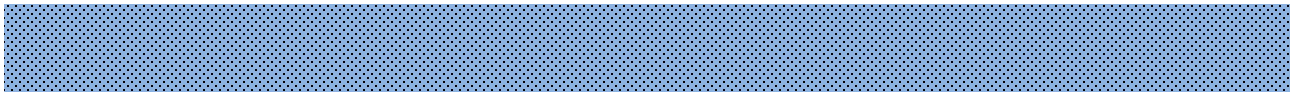
k

k

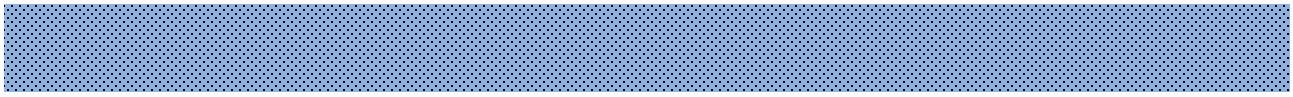
k



k Disable k



k 0 k



k

No respond

Respond after read only

“ Temperature error report, Sensor”

Respond after change “ Temperature error report, Sensor”

k

“Respond after read only” “Respond after change” k

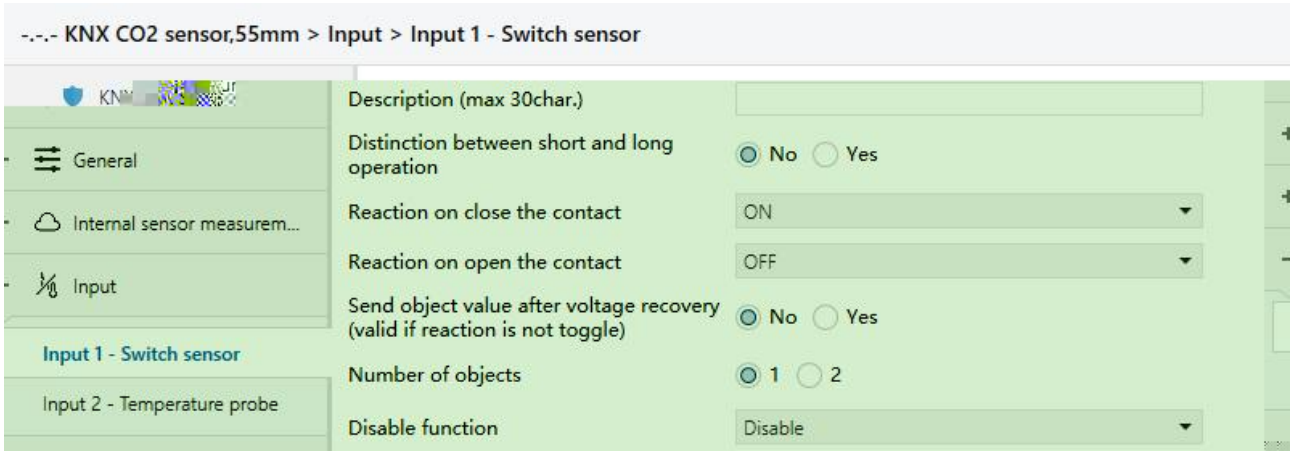
k

0=no error/1=error 0 1

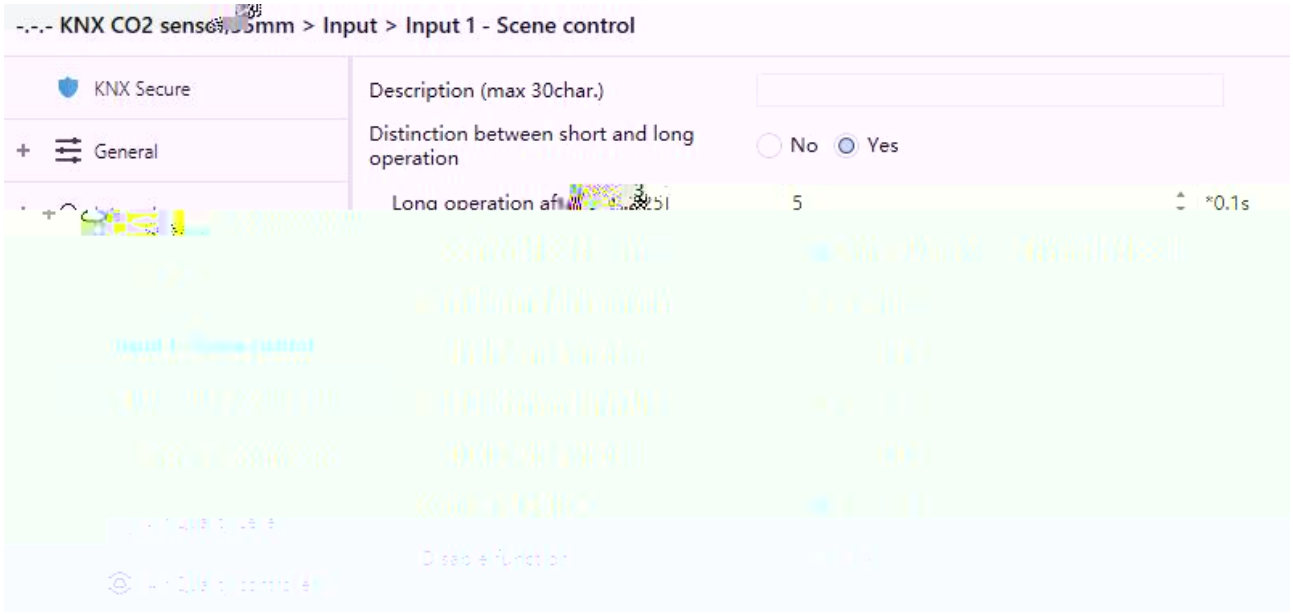
1=no error/0=error k

k k

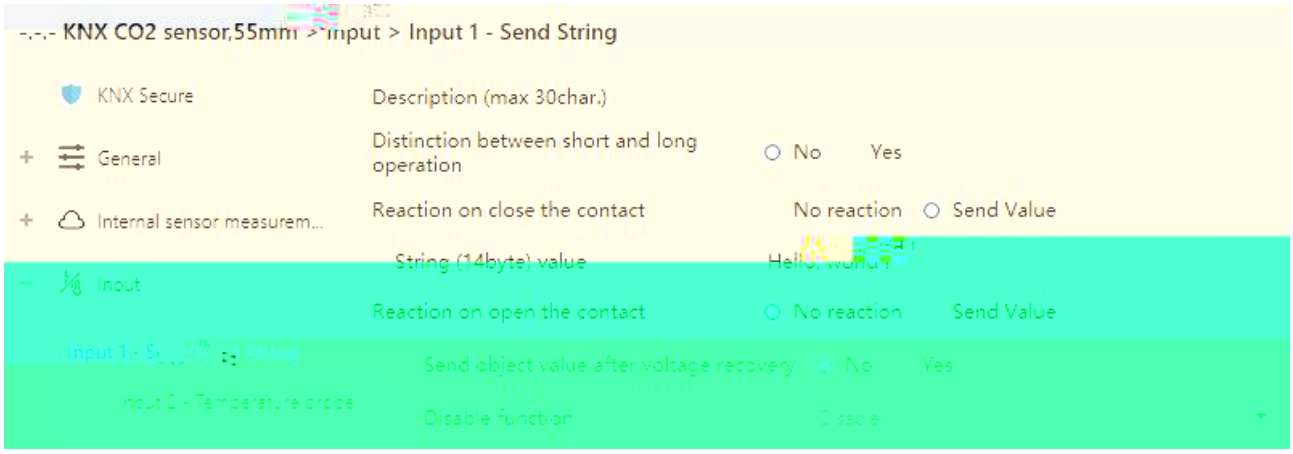
k k



5.4.2(1)



5.4.2(2)



5.4.2(3)

k

No action k

ON k

OFF k

TOGGLE k

• •

/ k

k

• •

/ “TOGGLE” “No reaction”

k

k

• •

/ k

k

KNX/E

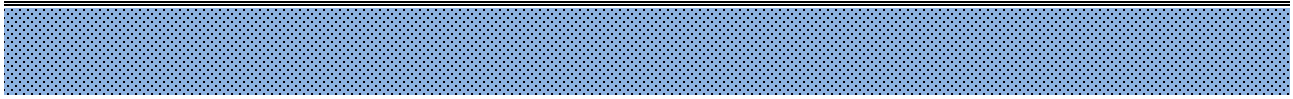
/ k

“Reaction on long/open operation” “No reaction” k /

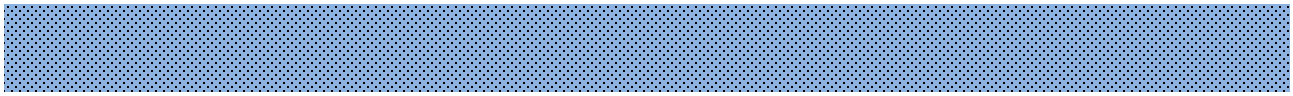
1 2 k

k / k

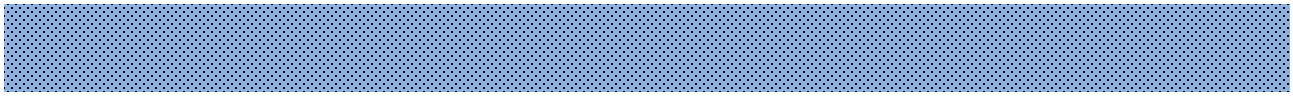
5.5 “Room temperature controller”



3 k



k



k

“Internal sensor measurement” 5.3 k

“...External sensor” k k

k

k

“40% Internal to 60% External” 40% 60%

= ×40% + ×60%

k

k

k Disable k

0 k

k

k

PI 40% 40% 60% k

0 0 0

1 k k

/ 0 0% k

1 100% k

k

k

/ k

RTC / k

RTC / k

As before voltage failure k

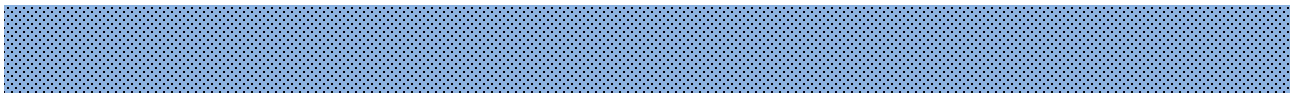
k

RTC k

2 pipes system k

4 pipes system

k



RTC k

! ! 4 1bit 1byte

k

k

RTC k

RTC k

k >0 1bit “Extended comfort mode”

k

1 1

k k

/ k

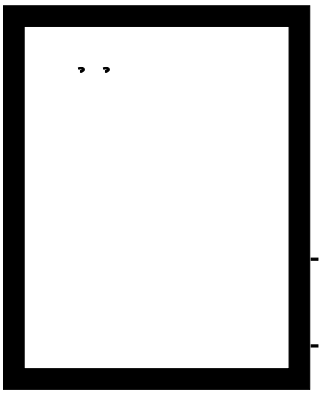
1bit k 1

! 0 k

k 1bit k

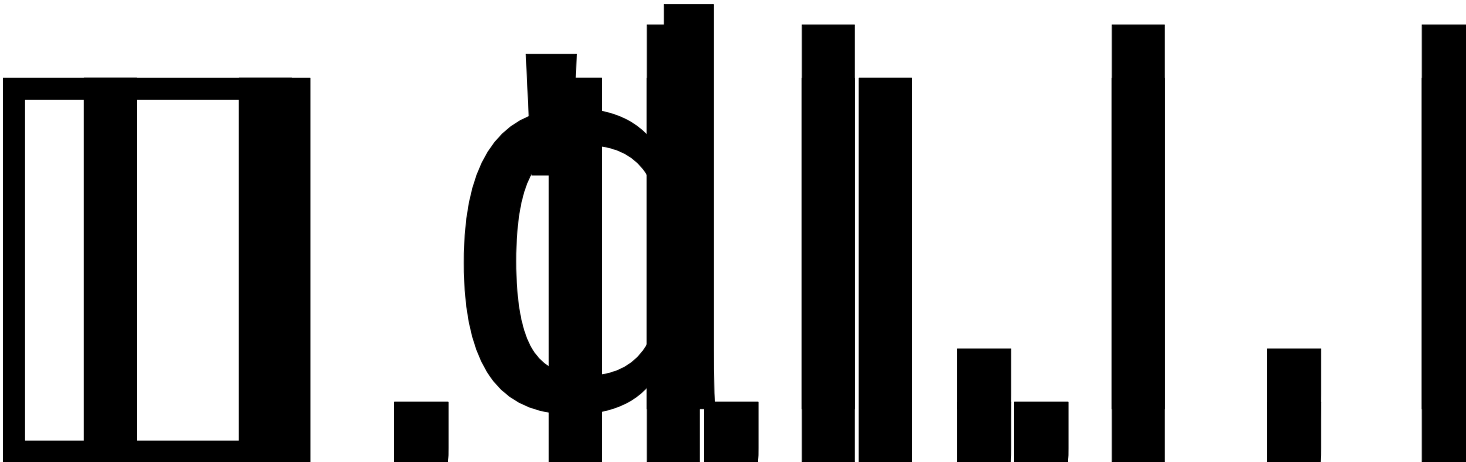
k

k



-

-

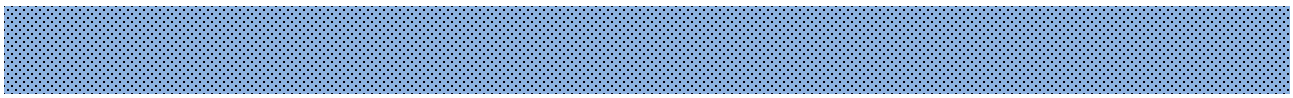


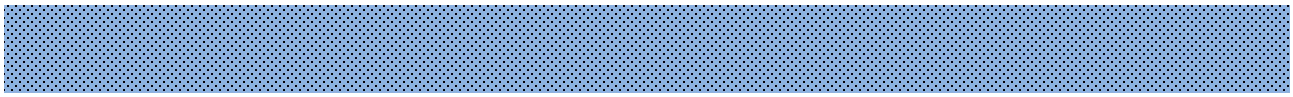
“Heating and Cooling” “Automatic changeover”

/

+

-





open

k k

k /

k

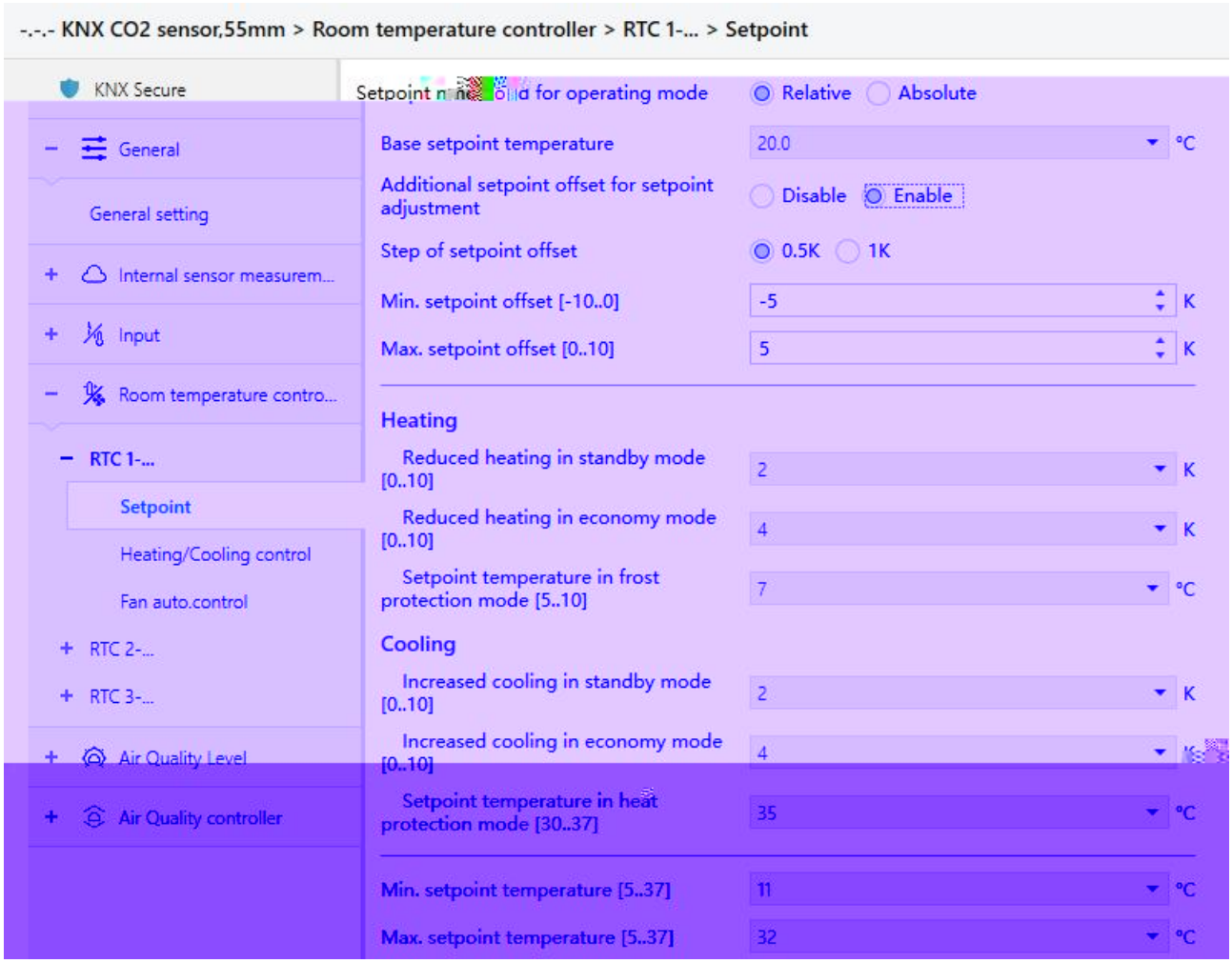
k

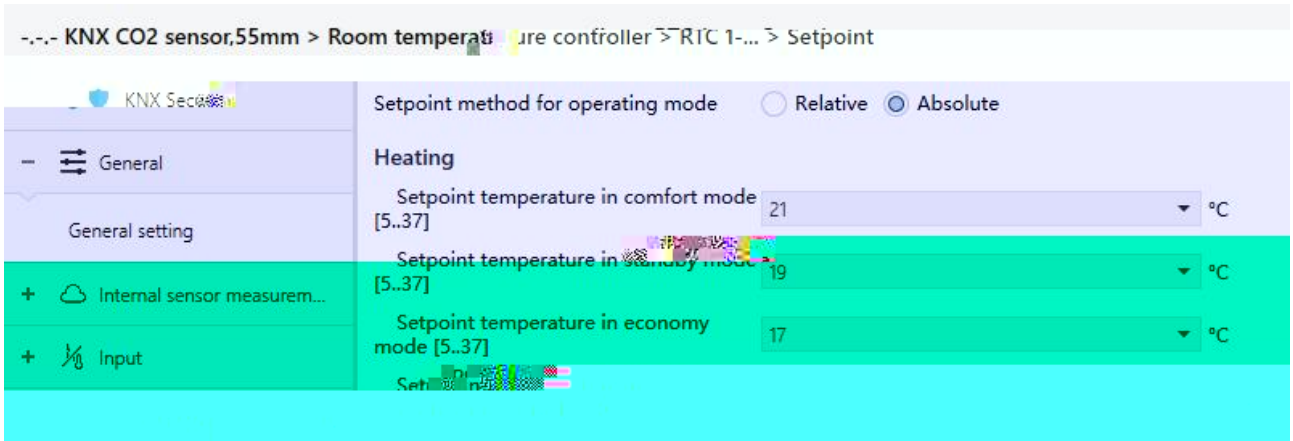
k k

k

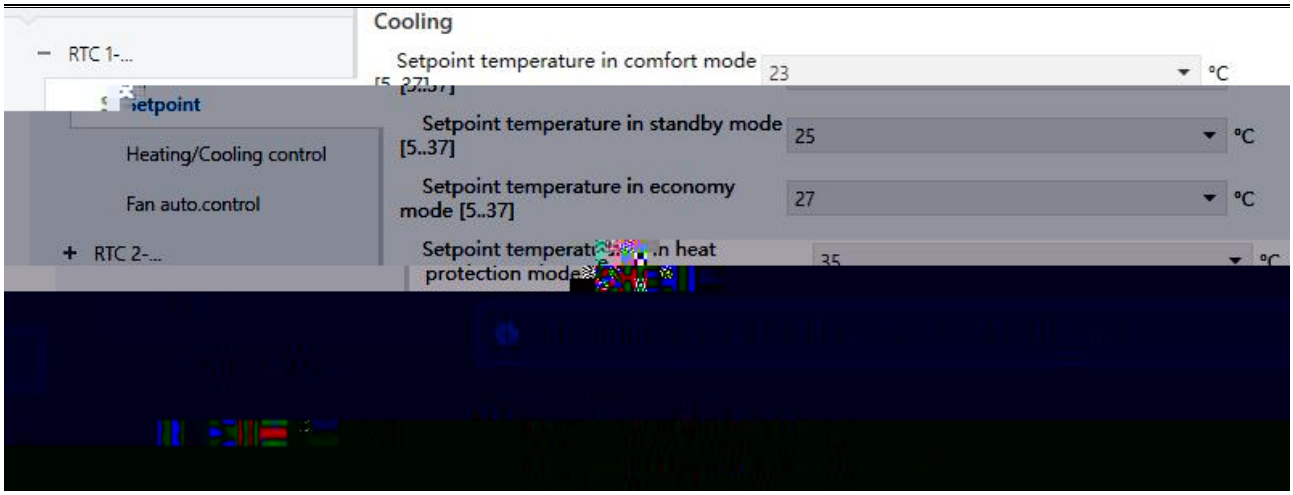
“Setpoint” k

k


-.-.- KNX CO2 sensor,55mm > Room temperature controller > RTC 1-... > Setpoint
KNX Secure
General
General setting
Internal sensor measurem...
Input
Room temperature contro...
RTC 1-...
Setpoint
Heating/Cooling control
Fan auto.control
RTC 2-...
RTC 3-...
Air Quality Level
Air Quality controller
Setpoint method for operating mode
Relative
Absolute
Base setpoint temperature
20.0
°C
Additional setpoint offset for setpoint adjustment
Disable
Enable
Step of setpoint offset
0.5K
1K
Min. setpoint offset [-10..0]
-5
K
Max. setpoint offset [0..10]
5
K
Heating
Reduced heating in standby mode [0..10]
2
K
Reduced heating in economy mode [0..10]
4
K
Setpoint temperature in frost protection mode [5..10]
7
°C
Cooling
Increased cooling in standby mode [0..10]
2
K
Increased cooling in economy mode [0..10]
4
Setpoint temperature in heat protection mode [30..37]
35
°C
Min. setpoint temperature [5..37]
11
°C
Max. setpoint temperature [5..37]
32
°C


-.-.- KNX CO2 sensor,55mm > Room temperature controller > RTC 1-... > Setpoint
KNX Secure
General
General setting
Internal sensor measurem...
Input
Setpoint method for operating mode
Relative
Absolute
Heating
Setpoint temperature in comfort mode [5..37]
21
°C
Setpoint temperature in economy mode [5..37]
17
°C

(1)



(2)

5.5.1 “Setpoint”

k

k

Relative k

Absolute k

k

k

-

-

-

k

k

“Base setpoint adjustment” k

k !

k

1bit

k

1bit “Setpoint offset” / 2byte “Float offset value” k 1bit “Setpoint offset reset” 2byte“Float offset value” k k

k

/ 1- 0- k

k

k

k

k

k

k

k

“Heating and Cooling” “Automatic changeover” k

k

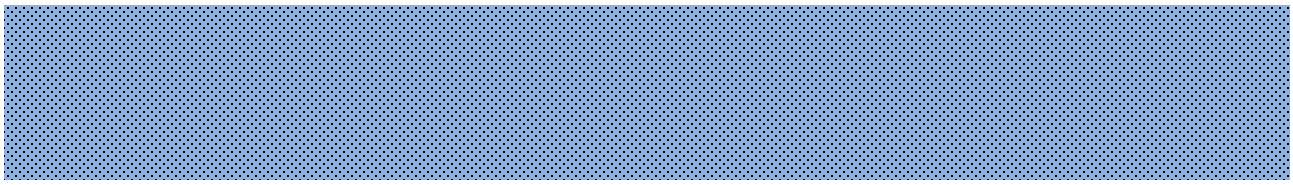
+

- k

k

Heating

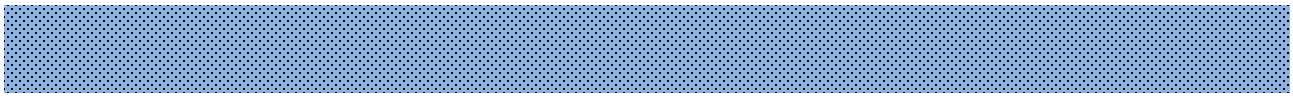
Cooling k



k

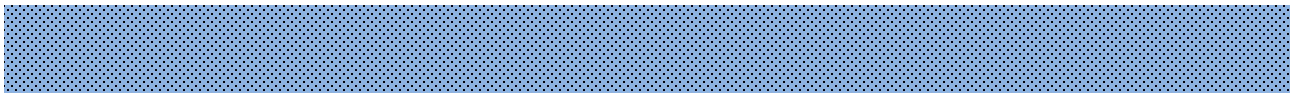
Heating

Cooling k



k

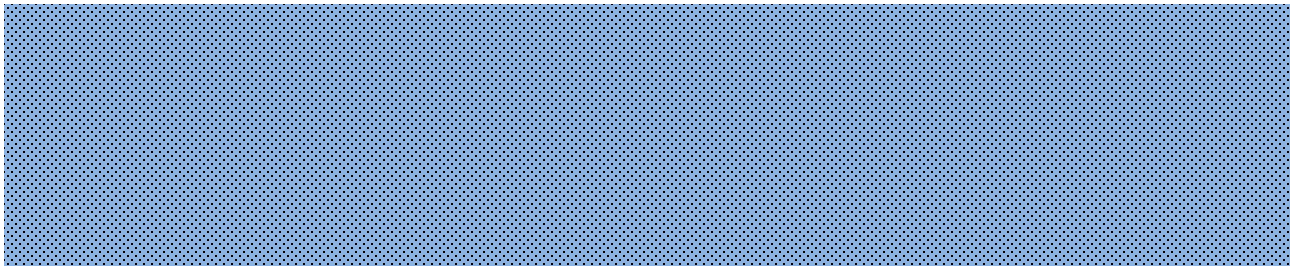
k



k

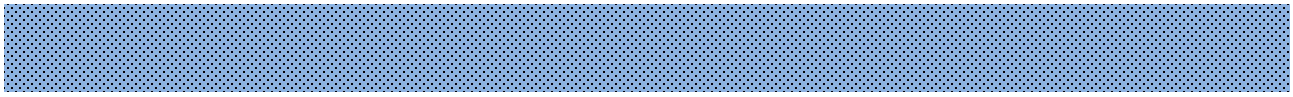
k

k

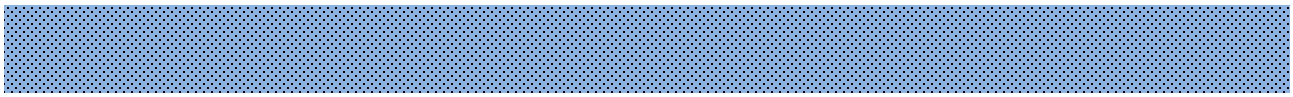


!

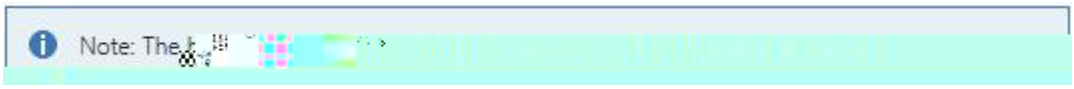
k



k



k



k

k

1.

k

2. k

k

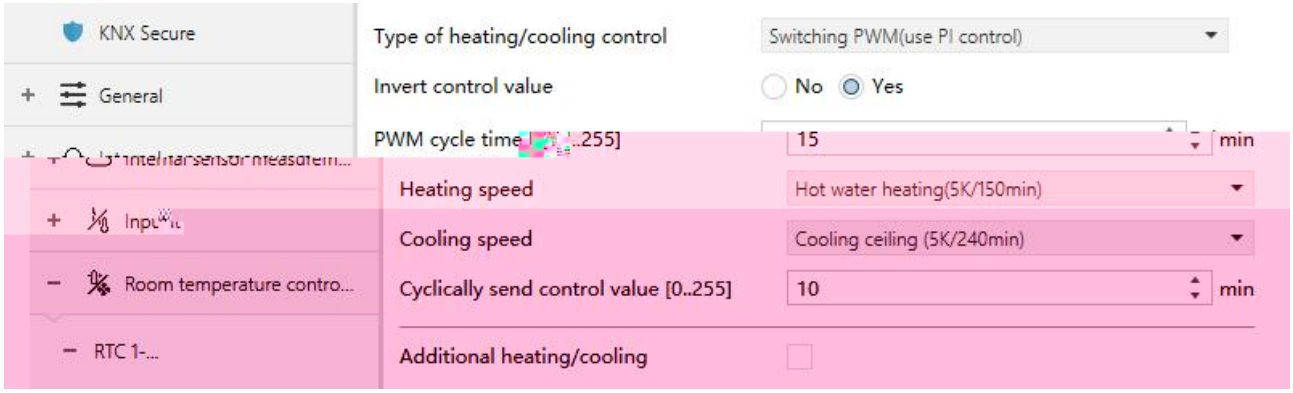
3.

k

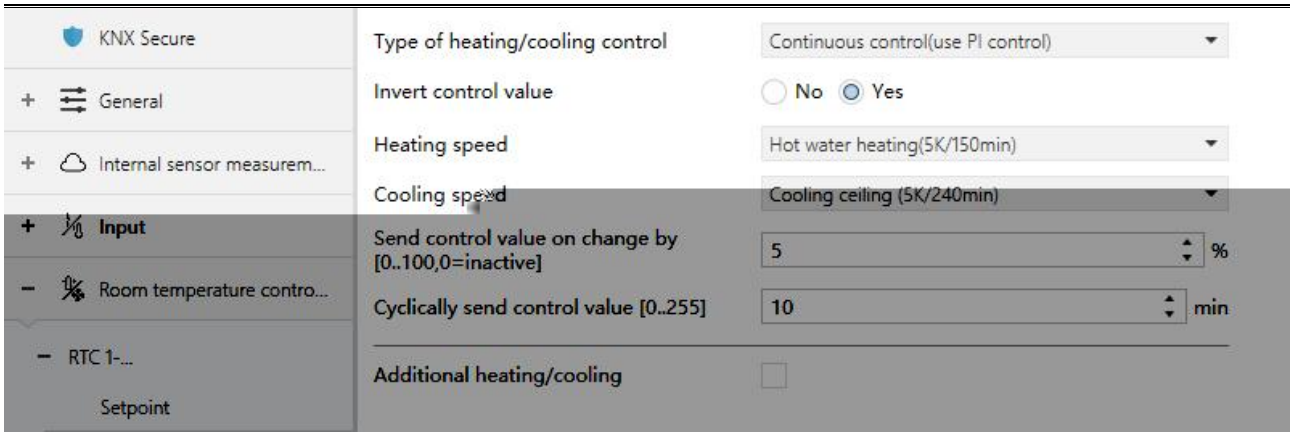
k

k

"Switching on/off(use 2-point control)"



"Switching PWM(use PI control)"



“Continuous control(use PI control)”

5.5.2(1) “Heating/Cooling control”

2 4 k

/ k

k

Yes k

RTC k

k

1K 2K 22℃ T 24℃

T 21℃ T 21~24℃ k

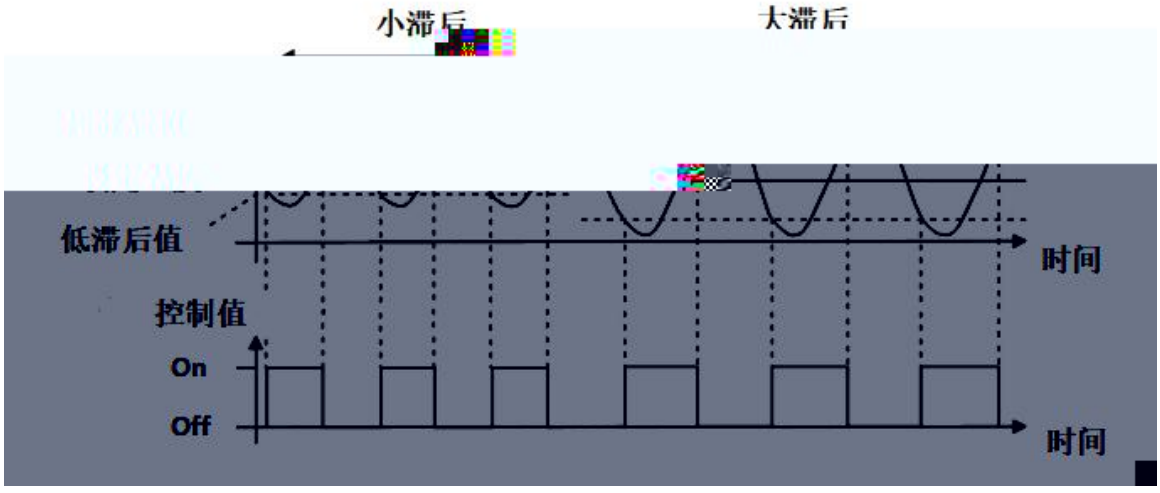
k

1K 2K 26℃ T 25℃

T 28℃ T 28~25℃ k

1.

2. k



5.5.2(2) ( )

“Switching PWM(use PI control)”

10min, 80%

8min 2min /

k

“Switching PWM (use PI control)” “Continuous control (use PI control)” PI

“Continuous control” PI (1byte)

“Switching PWM” PI “on/off” k

“Continuous control (use PI control)”

k

k

	5K	150min	Continuous/PWM	15min
	5K	240min	PWM	15-20min
	4K	100min	PWM	10-15min
	4K	90min	PWM	10-15min
	4K	90min	Continuous	--

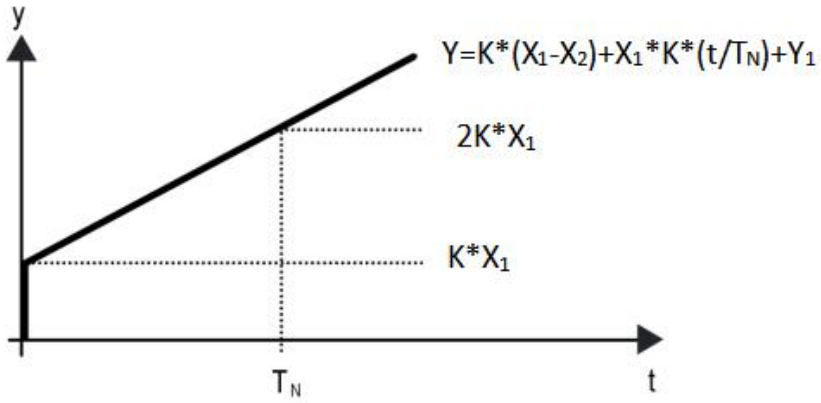
	5K	240min	PWM	15-20mIn
	4K	90min	PWM	10-15min
	4K	90min	Continuous	--

“Heating/Cooling speed” “User defined” P

I k PI

k

k 0 k



5.5.2(3) PI

Y

Y1

X1 =

X2 =

T_N

K

PI Y=K*(X1-X2 +X1*K*t/T_N+Y1

PI Y=K X1-X2 +Y2

K:	
K:	
T_N:	
T_N:	

k

k

k

k

k

k

T < +

k

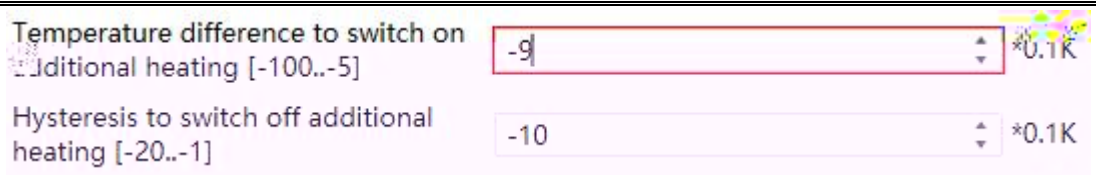
T > + -

k

-10K -2K 25, T 15,

T 17, T 15~17,

k



k

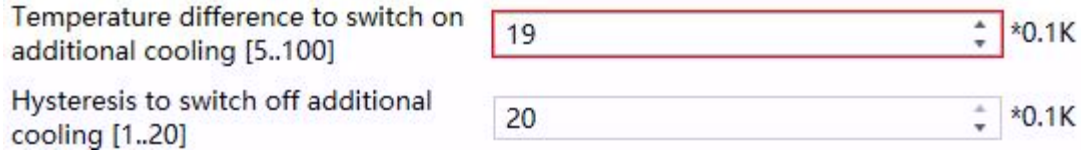
k

> + k

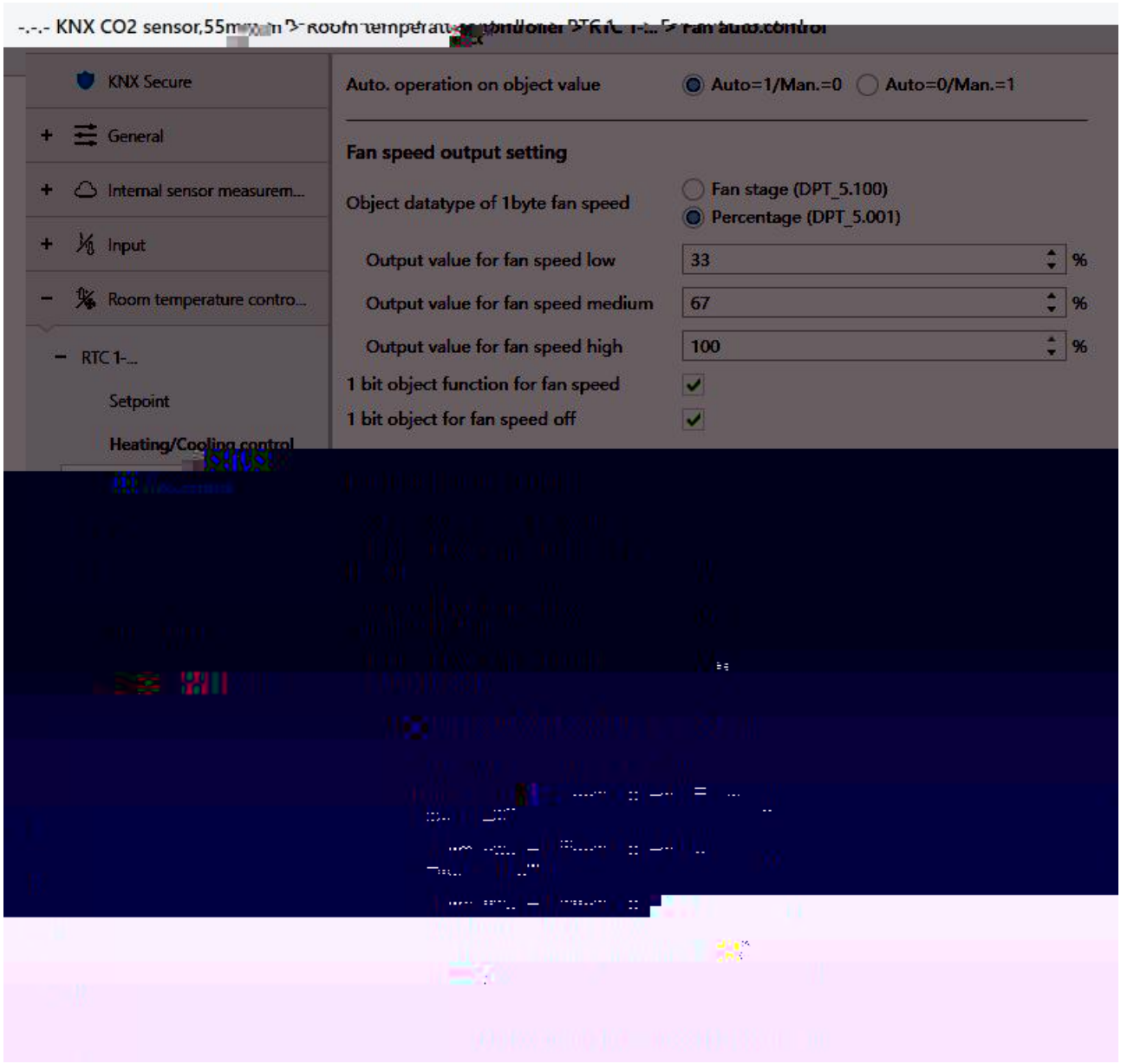
< + - k

10K 5K 20, T 30,

T 25, T 25~30, k



k


KNX Secure
General
Internal sensor measurem...
Input
Room temperature contro...
RTC 1-...
Setpoint
Heating/Cooling control
Auto. operation on object value
Auto=1/Man.=0
Auto=0/Man.=1
Fan speed output setting
Object datatype of 1byte fan speed
Fan stage (DPT_5.100)
Percentage (DPT_5.001)
Output value for fan speed low
33
%
Output value for fan speed medium
67
%
Output value for fan speed high
100
%
1 bit object function for fan speed
1 bit object for fan speed off

5.5.3 “Fan”

k

k

Auto=1/Man.=0	“Fan automatic operation”	“0”	“1”
Auto=0/Man.=1	“Fan automatic operation”	“1”	“0”

k

k

1byte k

k 0 k

1bit k 1bit k

k 1bit k

PI PI

k

k

k

k

k

k

k

k

k

k

k

0

10 50 60 + 40 -

40~60 k 40 (

)60 k

2-point k

-

- k

k

k

k

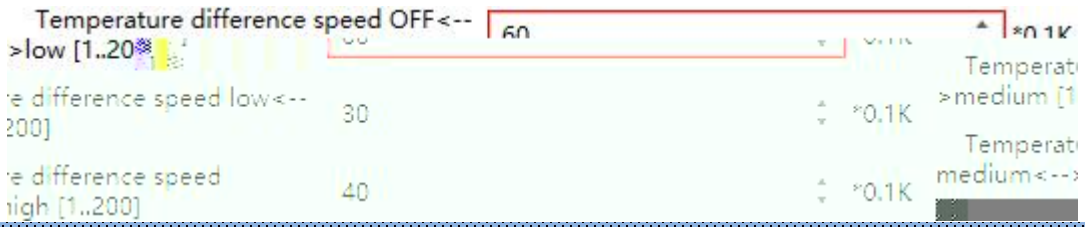
k

k

k

k

k



k

0

0.5℃ 1℃ 1.5℃ +

0.5℃ - 0.5℃~1.5℃

k 0.5℃ ( )1.5℃ k

k

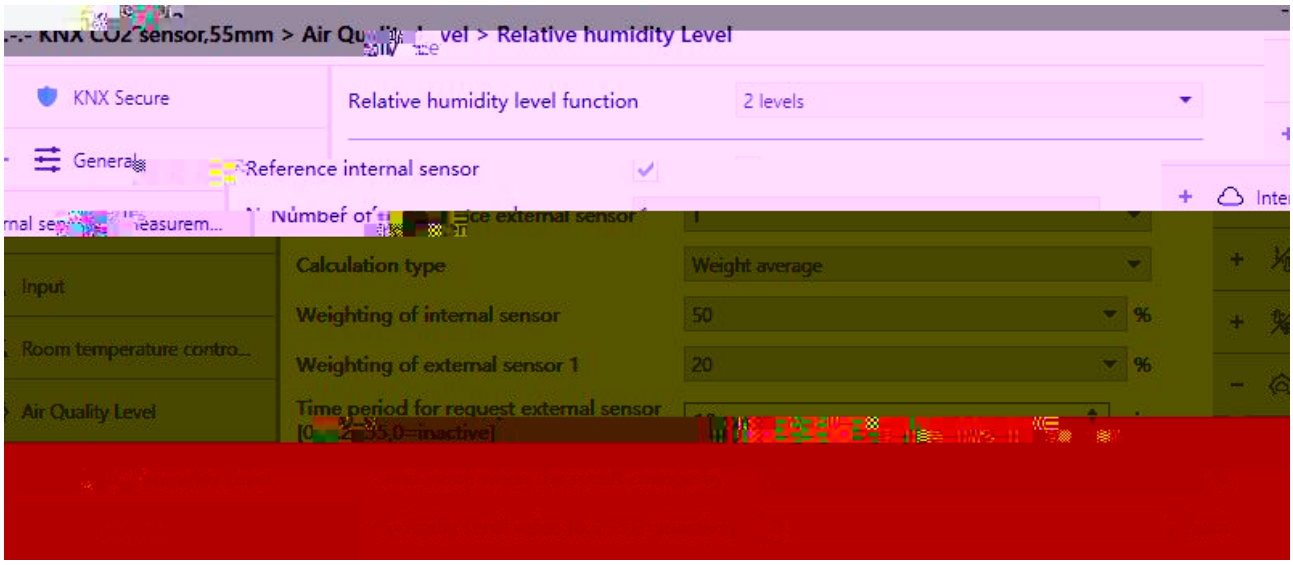
k

k

0 k

k

CO2 k k



5.6.1 “Relative humidity Level”

k

k

! ! !

/ k 3

k

k

2 2 k k

Average k

Weight average k

Minimum value k

Maximum value k

”Weight average” k k

k

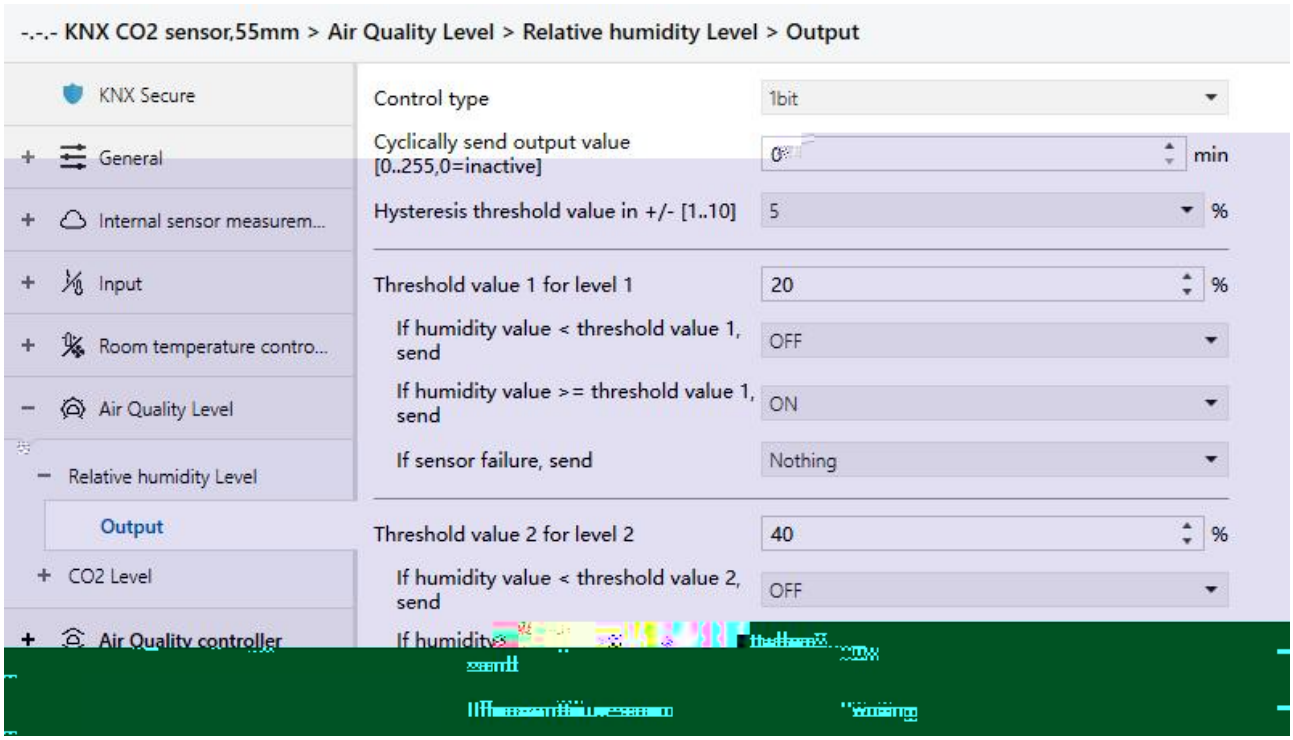
k

k k

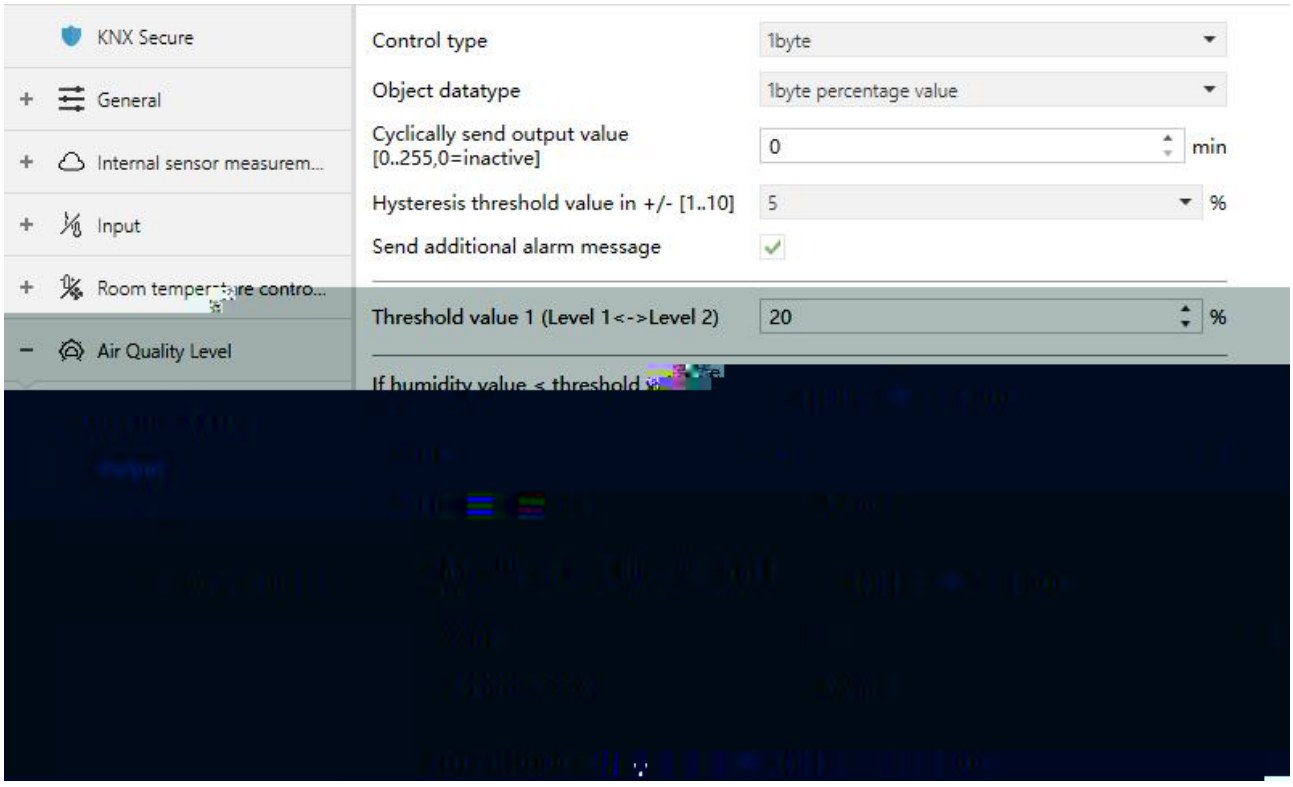
k

2 2 k

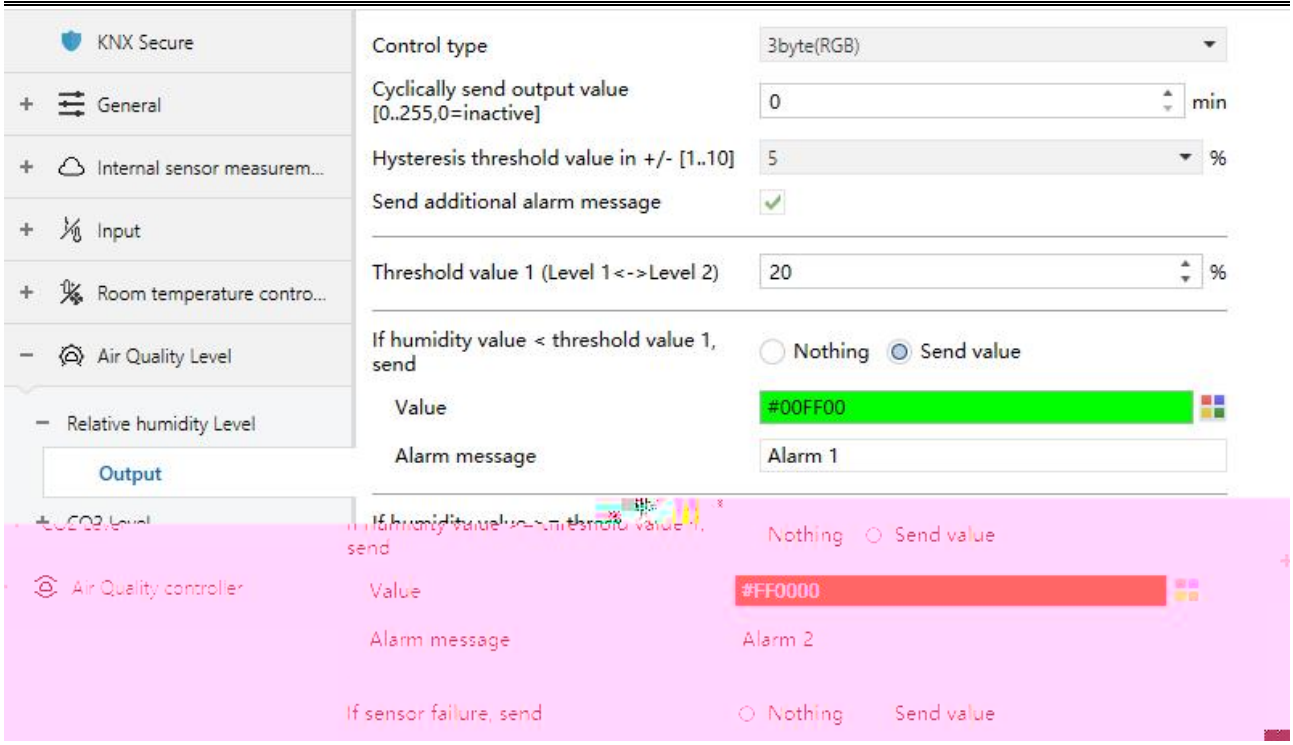
k Disable □ □


-.-.- KNX CO2 sensor,55mm > Air Quality Level > Relative humidity Level > Output
KNX Secure
General
Internal sensor measurem...
Input
Room temperature contro...
Air Quality Level
Relative humidity Level
Output
CO2 Level
Air Quality controller
Control type
1bit
Cyclically send output value [0..255,0=inactive]
0
min
Hysteresis threshold value in +/- [1..10]
5
%
Threshold value 1 for level 1
20
%
If humidity value < threshold value 1, send
OFF
If humidity value >= threshold value 1, send
ON
If sensor failure, send
Nothing
Threshold value 2 for level 2
40
%
If humidity value < threshold value 2, send
OFF

1bit


KNX Secure
General
Internal sensor measurem...
Input
Room temperature contro...
Air Quality Level
Control type
1byte
Object datatype
1byte percentage value
Cyclically send output value [0..255,0=inactive]
0
min
Hysteresis threshold value in +/- [1..10]
5
%
Send additional alarm message
Threshold value 1 (Level 1<->Level 2)
20
%

1byte



3byte(RGB)

5.6.1.1 “Output”

k

”1byte” k 1byte k

□□□□□ □

k

k

5% 20% 25% + 15%

- 15%~25% k

15% ( )25% k

1byte 3byte k k

k

x x 4 1bit 4 k

x k

x k

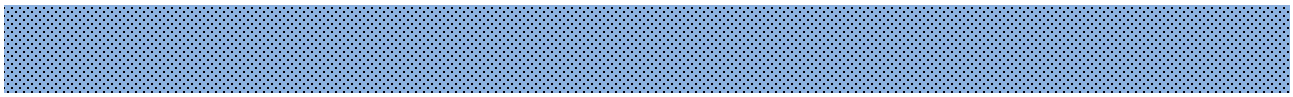
k k

”Send value” k k 1byte

3byte k

k 14

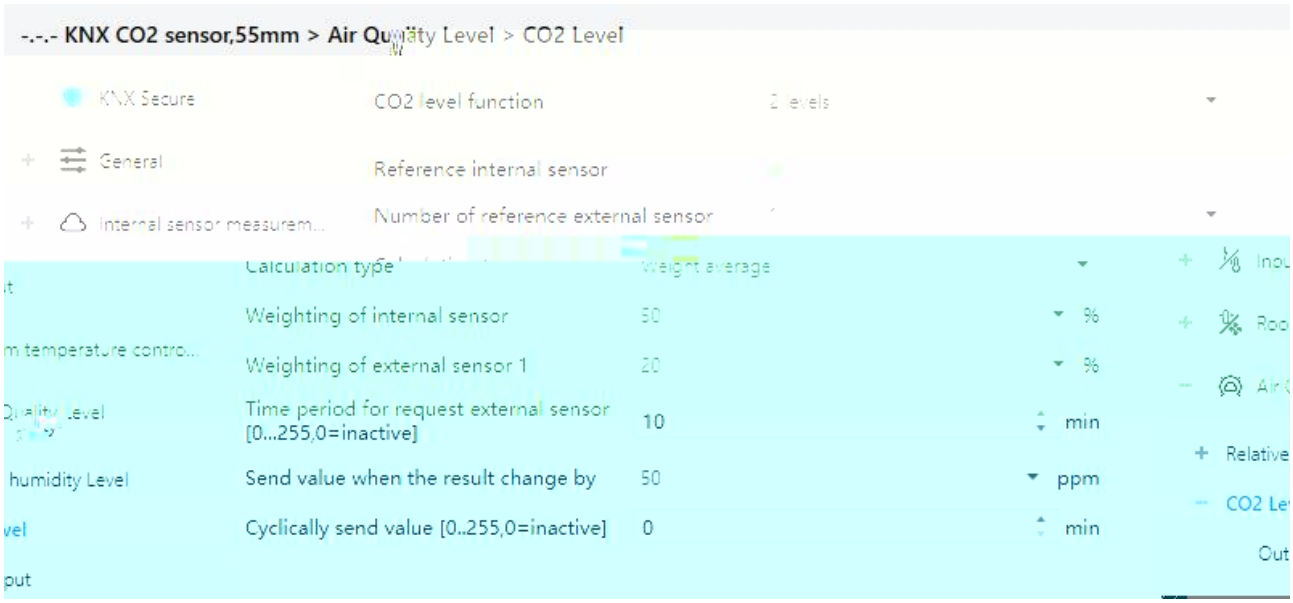
k



k k

”Send value” k k 1byte

3byte k



5.6.2 “CO2 Level”

CO2 k

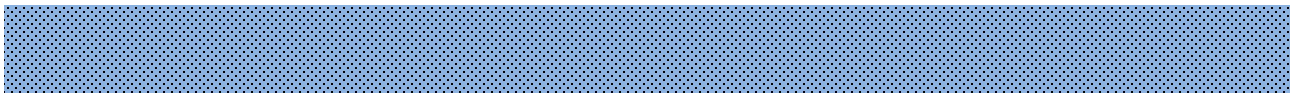
CO2 k

CO2 ! ! !

/ k 3

k

k



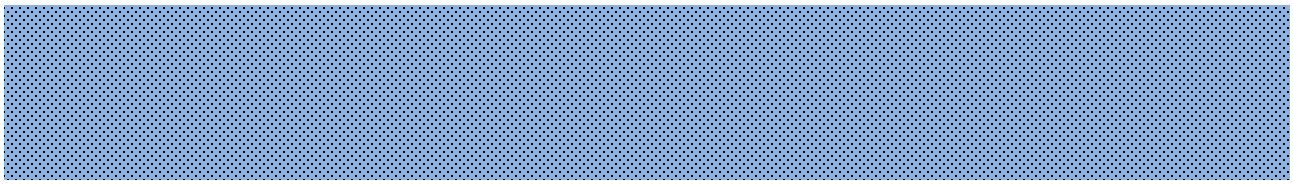
2 2 k CO2 k

Average k

Weight average CO2 k

Minimum value k

Maximum value k



”Weight average” k CO2 k

CO2 k

k k

k

2 2 k CO2

CO2 k Disable k

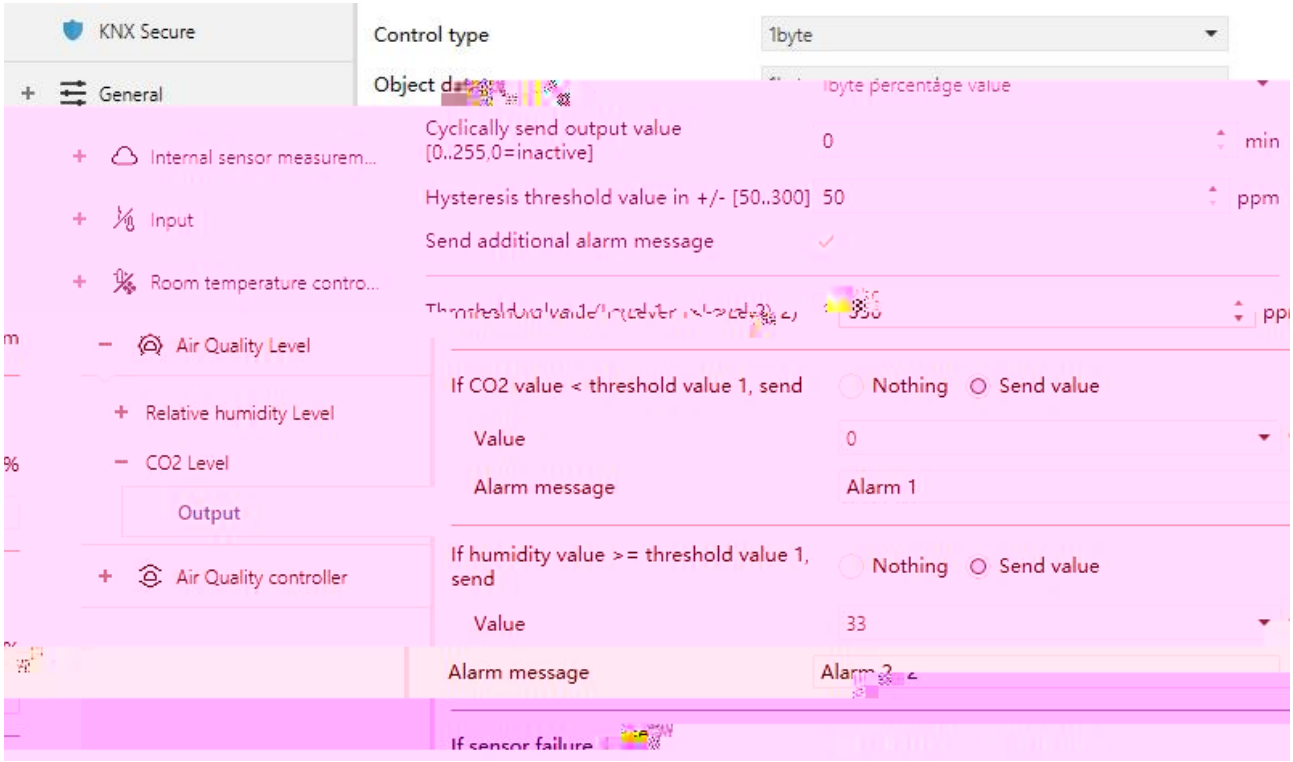
2 2 k CO2 k 0

k

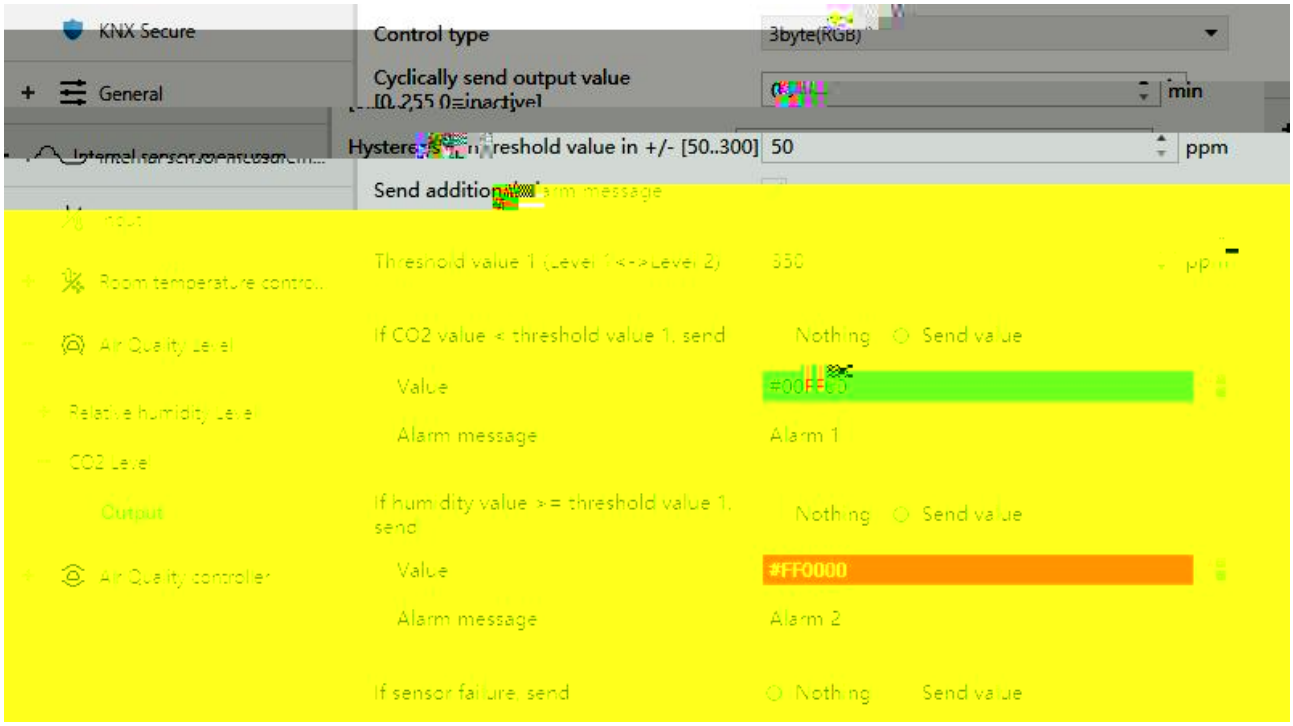
k

-.-.- KNX CO2 sensor,55mm > Air Quality Level > CO2 Level > Output
KNX Secure
General
Internal sensor measurem...
Input
Room temperature contro...
Air Quality Level
Relative humidity Level
CO2 Level
Output
Air Quality controller
Control type
1bit
Cyclically send output value [0..255,0=inactive]
0
min
Hysteresis threshold value in +/- [50..300]
50
ppm
Threshold value 1 for level 1
ppm
If CO2 value < threshold value 1, send
OFF
If CO2 value >= threshold value 1, send
ON
Nothing
Threshold value 2 for level 2
450
ppm
If CO2 value < threshold value 2, send
OFF
If CO2 value >= threshold value 2, send
ON
If sensor failure, send
Nothing

1bit


KNX Secure
General
Internal sensor measurem...
Input
Room temperature contro...
Air Quality Level
Relative humidity Level
CO2 Level
Output
Air Quality controller
Control type
1byte
Cyclically send output value [0..255,0=inactive]
0
min
Hysteresis threshold value in +/- [50..300]
50
ppm
Send additional alarm message
If CO2 value < threshold value 1, send
Nothing
Send value
Value
0
Alarm message
Alarm 1
If humidity value >= threshold value 1, send
Nothing
Send value
Value
33
Alarm message

1byte



3byte

5.6.2.1 “Output”

k

k

k

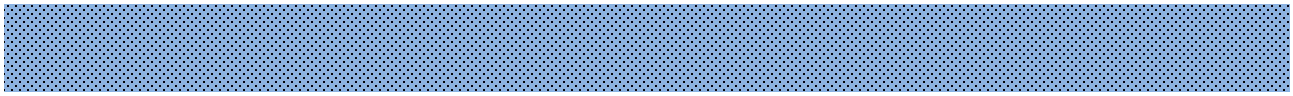
50ppm 350ppm 400ppm +

300ppm - CO2 300~400ppm

k 300ppm ( )400ppm k

1byte 3byte k k

k



1 CO2 1 2 CO2

1 1 k

2 CO2 2 3 k

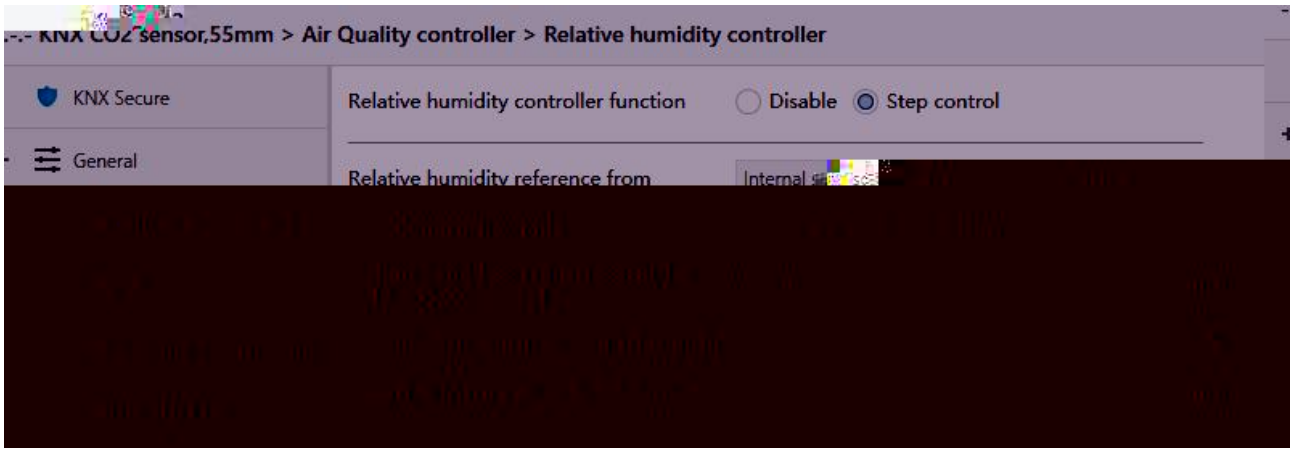
3 □ CO2 3 4 k

k □ □ □ □

□ □ □

”Send value” k CO2 k

CO2 k k



5.7.1 “Relative humidity controller”

k

Disable k

Step control k

k

“Internal sensor measurement” 5.3 k

“...External sensor” k k

k

k

“40% Internal to 60% External” 40% 60%

= ×40% + ×60%

k

k

k Disable k

1byte k

k 0 k

k

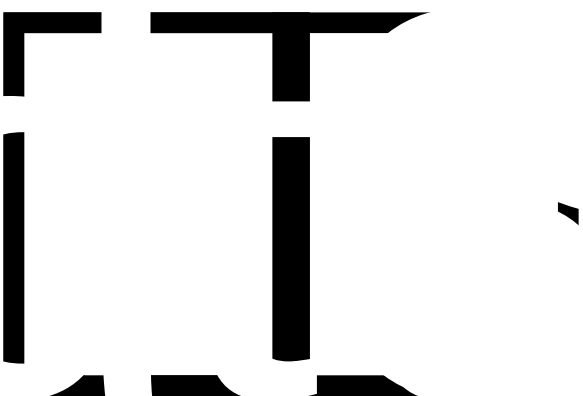
k 1byte k

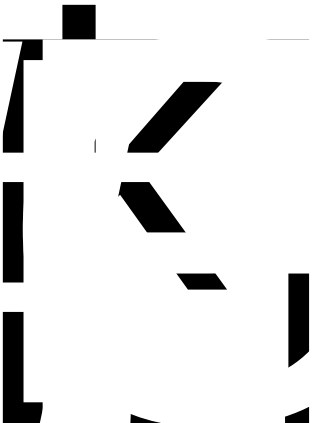
1byte percentage value

1byte unsigned value

□ □ □ □

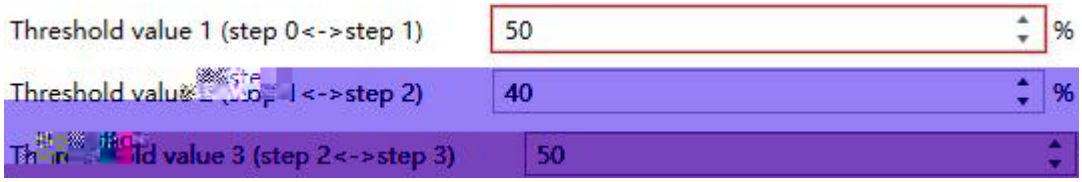
i ⊥





k

k



k

k

5% 20% 25% + 15%

- 15%~25% k

15% ( )25% k

k 0 k

k

k 1byte k

1byte percentage value

1byte unsigned value

k 1byte

k

k k 0

k k

off k

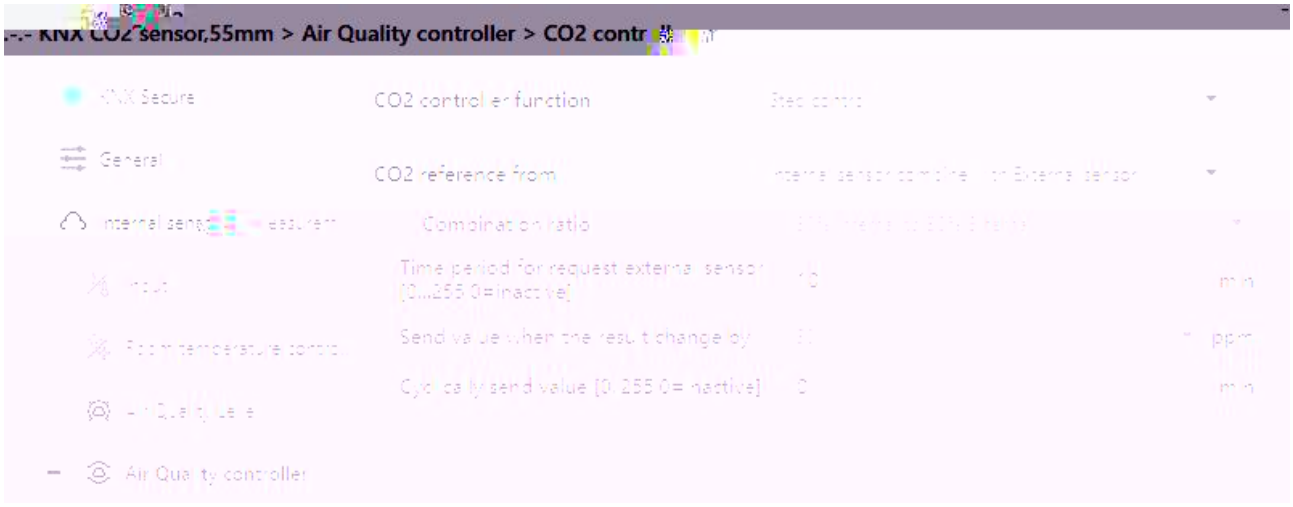
Nothing k

Send value k

Send value	k	k	1byte	k

1byte percentage value

1byte unsigned value



5.7.2 “CO2 controller”

CO2 k

Disable CO2 k

Step control k

PI control PI k

CO2 k

CO2 “Internal sensor measurement” 5.3 k

“...External sensor” k CO2 k

k

CO2 k

“40% Internal to 60% External” 40% 60%

CO2 = CO2×40% + CO2×60%

CO2 k

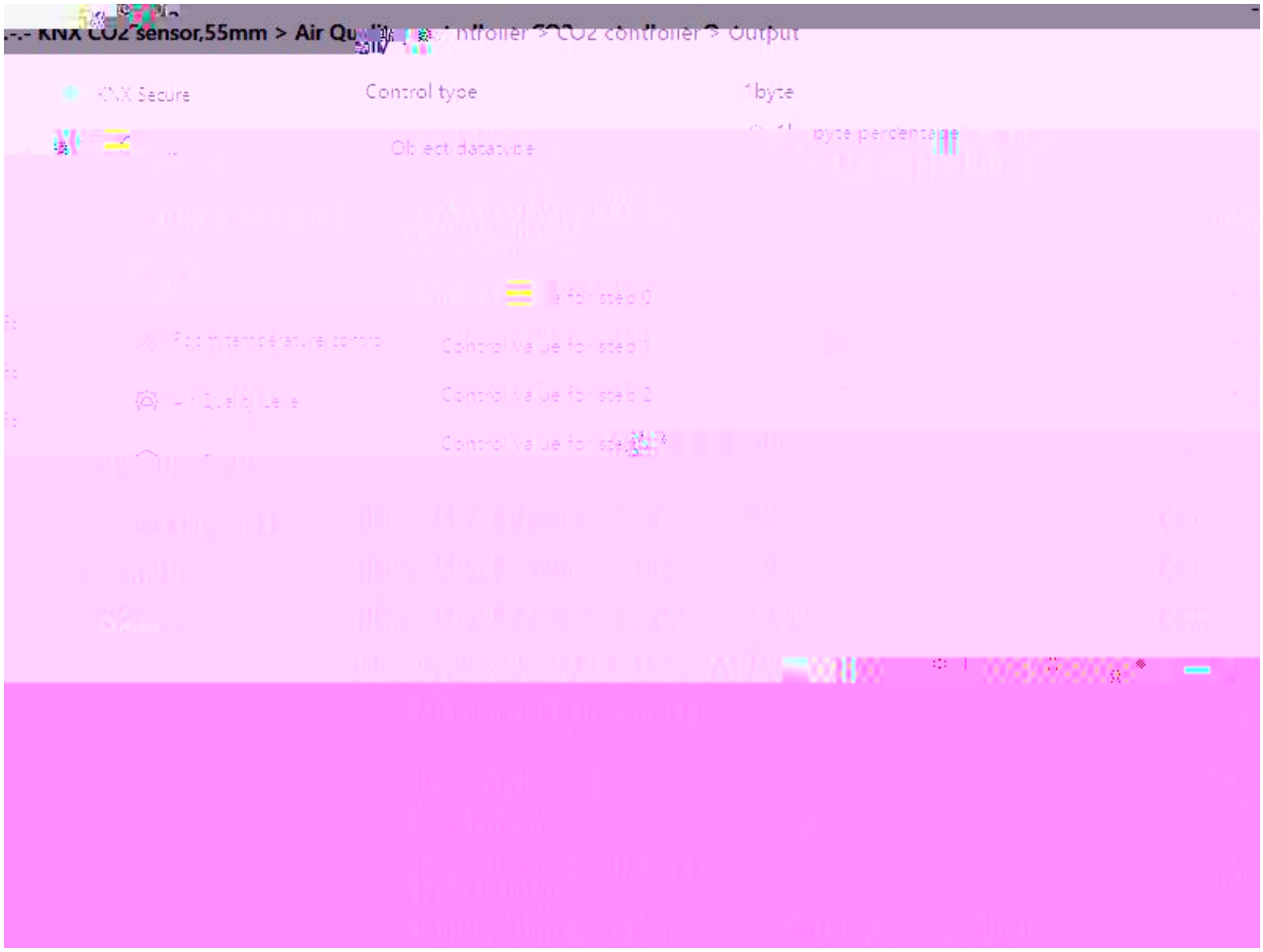
CO2 k

CO2 CO2 k Disable k

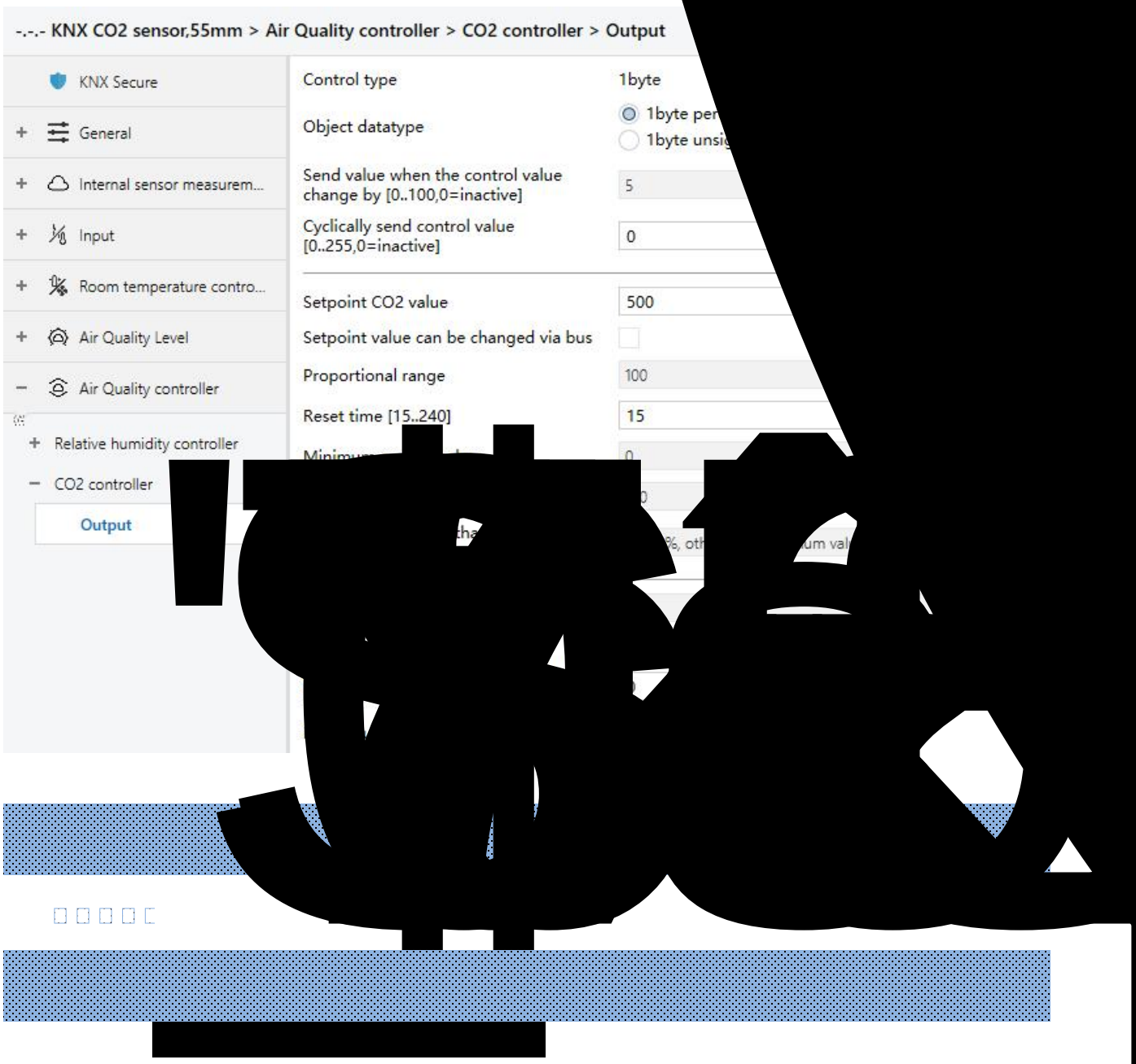
CO2 0 k

k

CO2 PI k



5.7.2.1(1) “Output”-Step control


-.-.- KNX CO2 sensor,55mm > Air Quality controller > CO2 controller > Output
KNX Secure
General
Internal sensor measurem...
Input
Room temperature contro...
Air Quality Level
Air Quality controller
Relative humidity controller
CO2 controller
Output
Control type
1byte
Object datatype
1byte per
1byte unsig
Send value when the control value change by [0..100,0=inactive]
5
Cyclically send control value [0..255,0=inactive]
0
Setpoint CO2 value
500
Setpoint value can be changed via bus
Proportional range
100
Reset time [15..240]
15

k 1byte k

1byte percentage value

1byte unsigned value

1 CO2 1 1

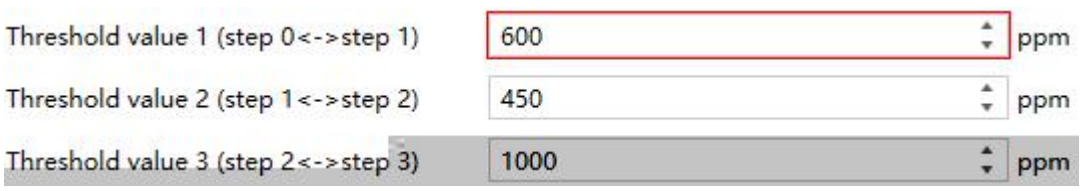
1 0 k

2 CO2 2 2 k

3 CO2 3 3 k

k

k



k

k

50ppm 350ppm 400ppm +

300ppm - 300~400ppm

k 300ppm ( )400ppm k

k 0 k

CO2 k

k k

400~1500 ppm k

PI PI k

/ k 1byte k

1byte percentage value

1byte unsigned value

k

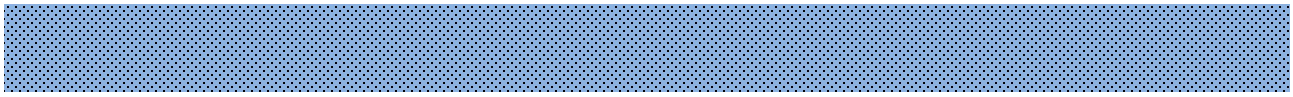
k 1byte

1byte percentage value

0%=0%, otherwise=Minimum value 0% 0 k

To be the minimum value 0% k

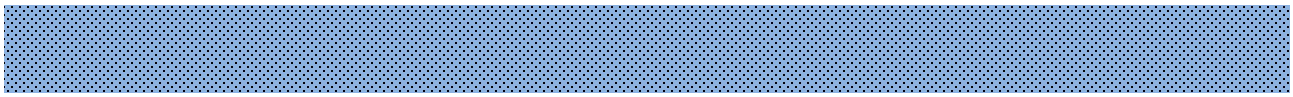
To be 0% 0 k



k 1byte k

1byte percentage value

1byte unsigned value

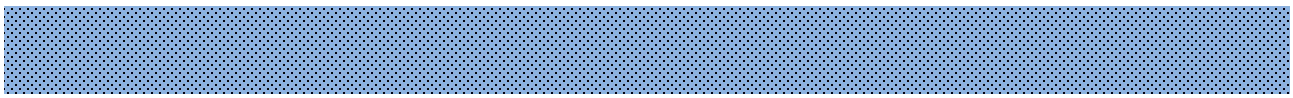


k 1byte

k

k k 0

k k



off k

Nothing k

Send value k

Send value k k 1byte k

1byte percentage value

1byte unsigned value

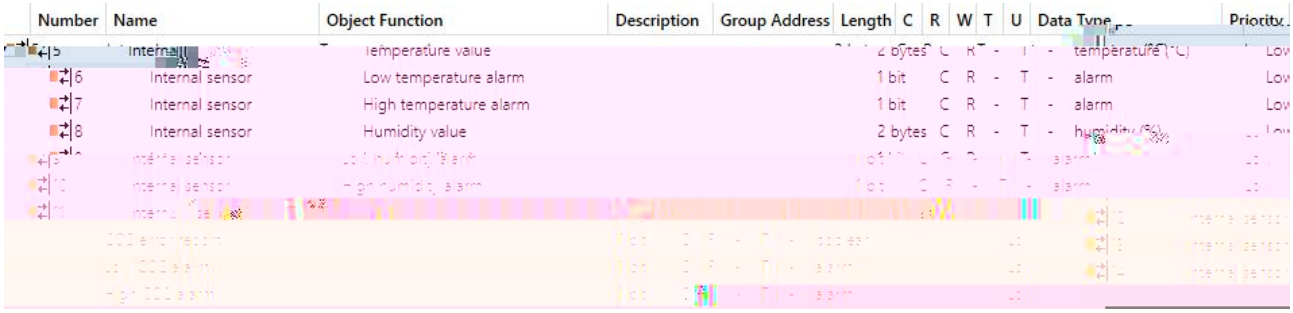
k

k

6.1 “General”

					DPT
		“1”		k	k
		k		k	
		k			k

6.1 “General”



6.2 “Internal sensor measurement”

					DPT
				k	-50~99.8℃
					k
					k
				k	0~100%
					k
					k
		CO2	CO2	k	1..2000 ppm

CO2 k 1 ˚ 0 ˚					
CO2		CO2			k
CO2		CO2			k

6.2 “Internal sensor measurement”

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
23	Input 1 - Temperature probe	Actual temperature, Sensor			2 bytes	C	R	-	T	-	temperature (°C)	Low
24	Input 1 - Temperature probe	Temperature										

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
23	Input 1 - Switch sensor	Switch			1 bit	C	R	W	T	U	switch	Low
23	Input 1 - Switch sensor	Close, Switch			1 bit	C	R	W	T	U	switch	Low
24	Input 1 - Switch sensor	Open, Switch			1 bit							

					DPT
k -50~99.8℃ “Description (max 30char.)” “Input 1 - ...” k k					
k					
k / 1 2 k 1 “Switch” k 2 “Close/Open” “Short/Long” k 0 1					
8bit k / 1 2 k 1 “Scene” k 2 “Close/Open” “Short/Long” k 8bit k					

8bit ( ) FXNNNNNN

F ‘0’ ‘1’

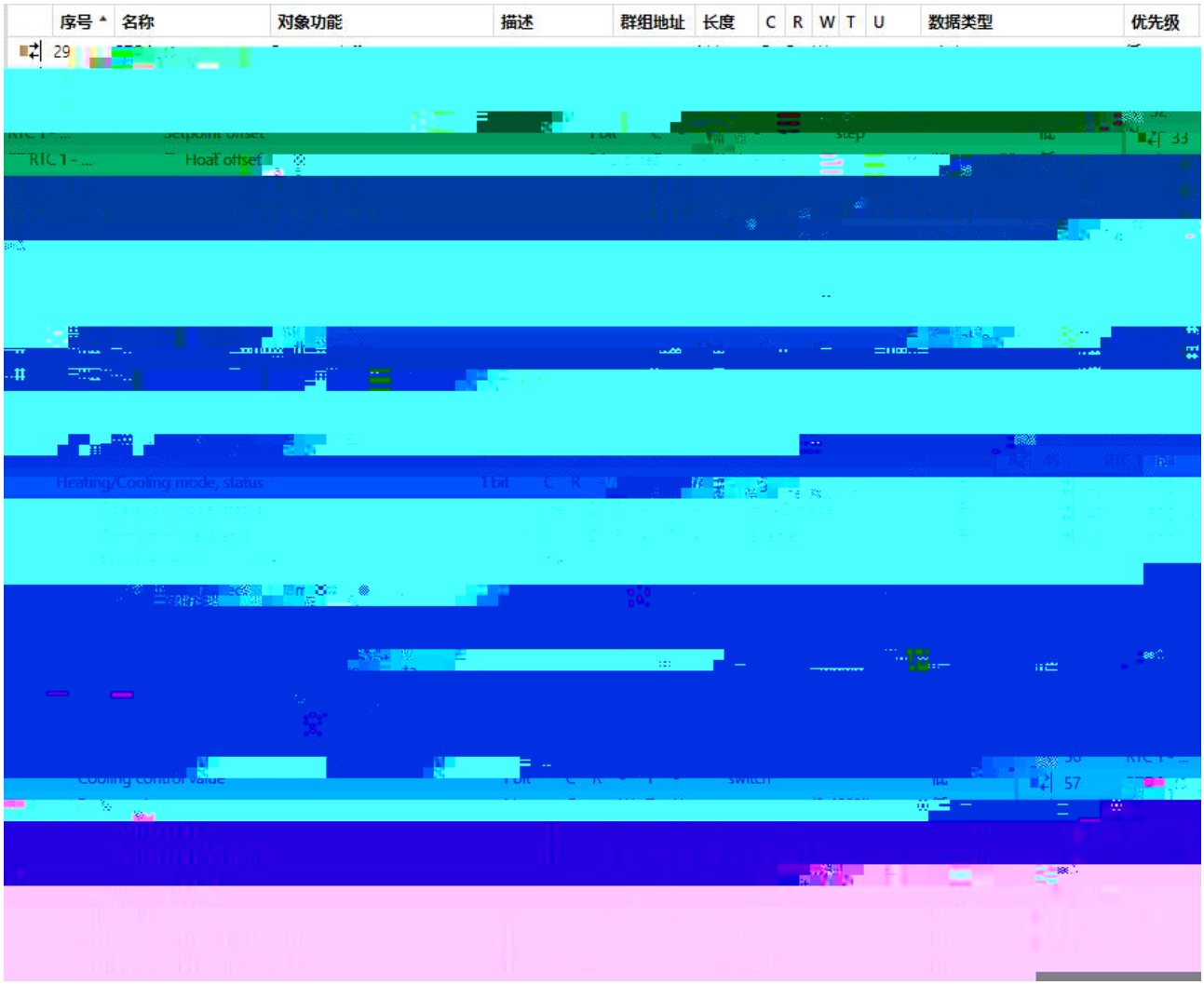
X 0

NNNNNN 0…63 k

0 1 2 … 63	1 2 3 … 64
128 129 130 … 191	1 2 3 … 64

1~64 0~63 k 1

0 k



6.4 “Room temperature controller”

					DPT

k

1——

0——

“Description (max 30char.)” “RTC 1 - ...” k

k

k -50~99.8°C

“Current setpoint adjustment” k

k

“Base setpoint adjustment”

k

k

k

k

1

0

k 2byte k					
k 1 k					
k 1 ˚ 0 ˚					
k 1byte 36 1- 2- 3- 4- k 1bit 37 ˚ 38 ˚ 39 ˚ 40 ˚ “1” k 1bit ! 0 k 1bit “1” 0 k					

k 1 ˚ 0 ˚ 1 1 k k / k					
k 1 ˚ 0 ˚					
k 1 ˚ 0 ˚					
k 1 ˚ 0 ˚					

k

k

1byte 46 1- 2- 3- 4- k

1bit

47 ˚

48 ˚

49 ˚

50 ˚

“1” k 1bit !

0 k 1bit 1 k

k

k

k

k k

= 31 +

“1” k 1bit-off

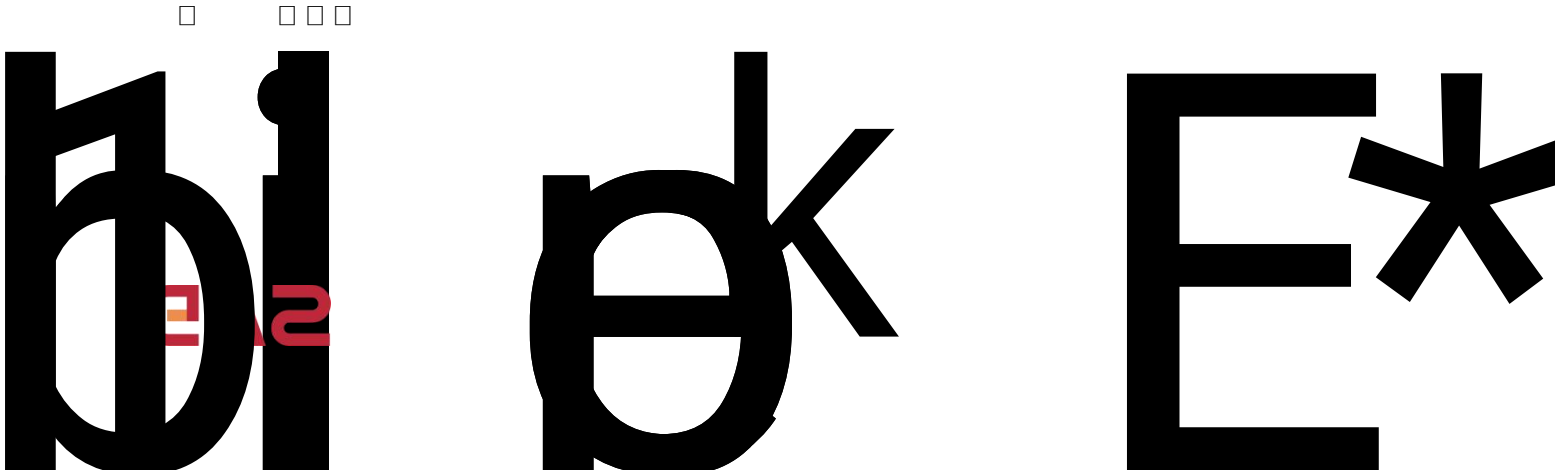
“0” GVS

1bit-off “1”

k

1byte k 57

k



Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
134	Relative humidity Level	External sensor value 1			2 bytes	C	-	W	T	U	humidity (%)	Low
135	Relative humidity Level	External sensor value 2			2 bytes	C	-	W	T	U	humidity (%)	Low
136	Relative humidity Level	Exter[redacted]sor value 3			2 bytes	C	-	W	T	U	humidity (%)	Low
137	Relative humidity Level	Actual sensor value			2 bytes	C	R	-	T	-	humidity (%)	Low
138	Relative humidity Level	Output value of level 1			1 bit	C	R	-	T	-	switch	Low
139	Relative humidity Level	Output value of level 2			1 bit	C	R	-	T	-	switch	Low
140	Relative humi[redacted]vel	Output value of level 3			1 bit	C	R	-	T	-	switch	Low
141	Relative humidity Level	Output value of level 4			1 bit	C	R	-	T	-	switch	Low
138	Relative humidity Level	Output value			1 byte	C	R	-	T	-	counter pulses (0..255)	Low
142	Relative humidity Level	Alarm message			14 bytes	C	-	-	T	-	Character String (ISO 885...	Low

6.5 “Relative humidity Level”

					DPT
k 0 k					
k					

1~4 k

1bit

138 1

139 2

140 3

141 4

k

1byte k 138

k

1byte 3byte k k

6.5 “Relative humidity Level”

6.6 “CO2 Level”

					DPT
CO2 k 0 k					
CO2 k					
1~4 k					

1bit

147 ˚ 1

148 ˚ 2

149 ˚ 3

150 ˚ 4

k

1byte k 147

k

1byte 3byte k k

6.6 “CO2 Level”

Number	Name	Object Function	Description	Group Address	Length	C	R	W	T	U	Data Type	Priority
170	Relative humidity controller	Controller on/off			1 bit	C	-	W	-	-	switch	Low
172	Relative humidity controller	External sensor value			2 bytes	C	-	W	T	U	humidity (%)	Low
173	Relative humidity controller	Controller status			1 bit	C	R	-	T	-	switch	Low
174	Relative humidity controller	Actual sensor value			2 bytes	C	R	-	T	-	humidity (%)	Low
175	Relative humidity controller	Control value			1 byte	C	R	-	T	-	percentage (0..100%)	Low
176	Relative humidity controller	Control stop			1 byte	C	-	W	-	-	percentage (0..100%)	Low

6.7 “Relative humidity controller”

					DPT
k 1—— 0——					
k 0 k					
k 1—— 0——					
k					
k					

		k			
OFF		k			

6.7 “Relative humidity controller”

CO2 k 0 k
k 1—— 0——
CO2 k
PI k
k OFF k

6.8 “CO2 controller”