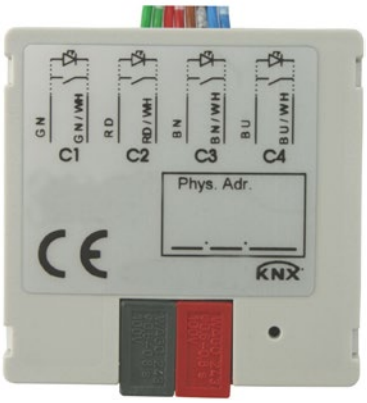
KNX manual
Binary input / output sensor
GBI-D KNX



GBI-D KNX	108390

Contents

1 Functional characteristics

The push button interface GBI-D KNX is a binary input module with 4 inputs for floating switch/push button contacts.

The connected switches/push buttons can be used to issue commands to actuators to dim or switch lights on/off, to raise and lower blinds.

Furthermore, depending on the device, the 4 channels can be configured for LED control.

The device can be installed in combination with conventional push buttons/switches in flush-mounted sockets. This allows all switching programs to be integrated in KNX systems.

The installation height is only 10 mm which corresponds to the height of the KNX connection block.

The following functions can be configured:

- Switch / push button input
- Dimmer control
- Control of blinds
- Value
- Command LED

The telegram type (switching, priority, value and temperature value) and the response for rising and falling edges can be specified individually.
The response to disable telegrams or after restoration of the bus power can also be configured.

1.1 Operation

The input is activated when voltage is supplied and the configured telegram is sent.
Conventional push buttons, switches or any required sensors (timer, alarm system, etc.) can be connected.

1.2 Features of the binary inputs

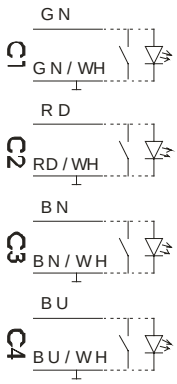
- Integrated power supply for contact voltage, no external voltage required
- 5 different input functions can be selected
  - switches / push buttons
  - dimming
  - blinds
  - value
  - command LED
- adjustable response to restoration of the bus supply

2 Technical data

2.1 Technical data

Power supply:	Bus voltage.
Permitted operating temperature:	-5 °C... + 45°C
Current draw from bus voltage:	Max 10 mA
Bus connection:	Bus terminal
Protection class:	III in accordance with EN 60730-1
Protection rating:	IP 20 in accordance with EN 60529
Dimensions:	LxWxH 37 x 37 x 10 (mm)
Inputs	
Quantity:	4 inputs
Contact voltage:	3.3 V provided internally
Contact current:	0.1 mA
Maximum cable length:	5 m
Response in the event of bus failure:	adjustable
LED outputs	
Quantity:	4
Use:	Low current LEDs without series resistor
Output current:	Maximum 1 mA / output

2.2 Connection diagrams

	Channel 1 (C1) → GN = green GN/WH = green/white[1]	Switch, push button or LED
	Channel 2 (C2) → RD = red RD/WH = red/white[2]	Switch, push button or LED
	Channel 3 (C3) → BN = brown BN/WH = brown/white[3]	Switch, push button or LED
	Channel 4 (C4) → BU = blue BU/WH = blue/white[4]	Switch, push button or LED

[1] Common
[2] Common
[3] Common
[4] Common

3 Application program "GBI-D KNX"

3.1 Selection in the product database

Manufacturer	GARO AG
Product group	Binary inputs
Product type	GBI-D KNX
Program name	GBI-D KNX

Table 1

Number of communication objects	12
Number of group addresses	33
Number of assignments	34

3.2 Communication objects

Each channel-related object can assume various functions depending on its configuration.

Table 2: Overview

No.	Function	Object name	Type DPT	Flags			
				C	R	W	T
0	*Switch ON/OFF*	*Channel 1 switching*	1 bit 1.001	✓	✓	✓	✓
	Priority	*Channel 1 priority*	2 bit 2.001	✓	✓		✓
	Send value	*Channel 1 value*	1 byte 5.010	✓	✓		✓
	Send temperature value	*Channel 1 temperature*	2 byte 9.001	✓	✓		✓
	Switch ON/OFF	*Channel 1 dimming*	1 bit 1.001	✓	✓	✓	✓
	Step / Stop	*Channel 1 blinds*	1 bit 1.010	✓	✓		✓
	Recall/save light scene	*Channel 1 value*	1 byte 18.001	✓	✓		✓
	Position height	*Channel 1 value*	1 byte 5.001	✓	✓		✓
	Switch ON/OFF	*Channel 1 LED*	1 bit 1.001	✓	✓		✓
1	*brighter* *darker* *brighter / darker*	*Channel 1 dimming*	4 bit 3.007	✓	✓		✓
	DOWN *UP* *UP/DOWN*	*Channel 1 blinds*	1 bit 1.008	✓	✓		✓
2	*Lock*	*Channel 1 lock*	1 bit 1.001	✓	✓	✓	
				C	R	W	T

Objects 3 .. 11: See below.

Table 3: Overview of object numbers

Function	C1	C2	C3	C4
According to the function of the channel - *Switch ON/OFF* - *Priority* - *Send value* - *Send temperature* - *Step / Stop* - *Light scene* - *Position height*	0	3	6	9
According to the function of the channel: - *brighter / darker* - *UP* - *DOWN* - *UP/DOWN*	1	4	7	10
Channel X lock	2	5	8	11

3.2.1 Description of objects

Objects 0, 3, 6, 9
"Switch ON/OFF, priority, send value, send temperature value, step / stop, recall/save light scene, position height, LED switch"

The function and the type of object are dependent on the *Function of the input* and *Object type* parameters.

Table 4

Function of input	Function	Description
Switch/ push button	*Switch ON/OFF*	sends 1-bit switching commands as a DPT1.001
	Priority	sends priority telegrams in 2-bit format
	Send value	sends a value between 0 and 255
	Send temperature value	sends a temperature value in 2-byte format
Dimming	*Switch ON/OFF*	switches dimmer on and off
Blinds	*Step / Stop*	sends 1-bit "UP" or "DOWN" telegrams.
Value	*Value short/long*	sends 2 different 8-bit values depending on how long the button is pressed
	Value for light scene	Recall / save light scene via 8-bit telegram
	Value for blinds	Sends an 8-bit percentage value for positioning blinds
Command LED		receives 1-bit telegram to control an LED

- **Objects 1, 4, 7, 10**
  "brighter, darker, brighter / darker, UP, DOWN, UP/DOWN, position slats"

The function and the type of the object likewise depend on the „*Function of the input*“ parameter.

Table 5

Set Function of the input	Object function	Description
Switch/ push button	not available	
Dimming	*brighter, darker* *brighter / darker*	4-bit dimming commands for the dimming actuator as a DPT3.007 telegram
Blinds	*UP, DOWN,* *UP/DOWN*	1-bit motion commands for the blinds actuator as a DPT1.008 telegram
Value for blinds	*Position of slats*	Sends 1-byte telegram to position slats
Command LED	not available	

- **Objects 2, 5, 8, 11 "*lock*"**

The corresponding input is disabled via this object.
The resulting response can be set individually on the parameter pages.
1 = disabled
0 = cancel lock

3.3 Parameters

3.3.1 Parameter pages

Table 6

Function	Description
Channel 1 .. Channel 4	Parameter for the relevant input

Each channel has a parameter page. All pages (and channels) have an identical layout.

The first and most important parameter is, on the one hand,
"input function" as that sets the channel function.

Possible functions include:

- **Switch/ push button**
- **Dimmer**
- **Blinds**
- **Value**
- **Command LED**

Depending on the function selected, the parameters listed below may change.

3.3.2 Parameter description

3.3.2.1 The "switch / push button" function

An input is connected to a push button or a switch.
When this is pressed, a switching, value, priority or temperature value telegram is sent to the bus.

The following parameters are available:

Table 7

Designation	Values	Description
Debouncing time	*30 ms* ***50 ms*** *80 ms* *100 ms* *200 ms* *1 sec.* *5 sec.* *10 sec.*	The new status of the input is only accepted after a time delay to avoid a disruptive switching process due to debouncing of the contact connected to the input. Larger values (≥ 1s.) can be used as a switch-on delay
Object type	 ***Switching (1-bit)*** *Priority (2-bit)* *Value 0.. 255 (1-byte)* *Temperature value (2-byte)*	Channel sends: Switching telegrams Priority telegrams Any desired value between 0 and 255 A temperature value in EIS5 format

Continuation:

<table>
<tr><th>Designation</th><th>Values</th><th>Description</th></tr>
<tr><td rowspan="6">Reaction to rising edge</td><td colspan="2">For object type Switching:</td></tr>
<tr><td>None
On
Off
Toggle</td><td>How does the channel respond when input voltage is applied?
Ignore
Send ON telegram
Send OFF telegram
Reverse channel status
(cf. notching relay)</td></tr>
<tr><td colspan="2">For object type Priority 2-bit</td></tr>
<tr><td>None

Priority inactive (00)

Priority ON (11)

Priority OFF (10)</td><td>No response.

Table 8: Telegrams<table><tr><th>Function</th><th>Value</th></tr><tr><td>Priority inactive
(no control)</td><td>0 (00_{bin})</td></tr><tr><td>Priority ON
(control: enable, on)</td><td>3 (11_{bin})</td></tr><tr><td>Priority OFF
(control: disable, off)</td><td>2 (10_{bin})</td></tr></table></td></tr>
<tr><td colspan="2">For object type Value</td></tr>
<tr><td>none
0 = 0 % (corresponds to HVAC mode: Auto)
1 (corresponds to HVAC mode: Comfort)
2 (corresponds to HVAC mode: Standby)
3 (corresponds to HVAC mode: Night-time temperature reduction)
4 (corresponds to HVAC mode: Frost protection)

5 .. 255</td><td>Any value between 0 and 255 can be sent. These values can also be used as Percentage values or as HVAC commands.

No response
0.0% or HVAC “auto” operating mode
1 or HVAC “comfort” operating mode
2 or HVAC “standby” operating mode
3 or HVAC “night temperature reduction” operating mode
4 or HVAC “frost protection” operating mode

any desired value or percentage value
Percentage values are given in 5 % increments, e.g. 13 = 5 %, 26 = 10 %, 255 = 100 %.</td></tr>
<tr><td>Reaction to falling edge</td><td>See Reaction to rising edge</td><td>How should the channel react after the input is switched off i.e. with a signal change from 1 to 0?
See Reaction to rising edge.</td></tr>
</table>

Continuation:

Designation	Values	Description
For ***Temperature value***object type.		
Temperature value with a rising edge	*Do not send temperature value.* *0°C .. 40°C in 1°C increments*	No reaction. Send temperature value. This function can be used to send a set point value to a thermostat.
Temperature value with a falling edge	*See temperature value with a rising edge*	Which temperature values should be sent when the input signal changes from 1 to 0?
Common parameters		
Send telegram cyclically	***No*** *Yes* *Only after rising edge* *Only after falling edge*	Which events should be sent cyclically?
Cycle time	*2 minutes, 3 minutes,* *5 minutes, 10 minutes,* ***15 minutes**, 20 minutes* *30 minutes, 45 minutes,* *60 minutes*	At what intervals are the telegrams to be resent?
Reaction when setting the lock	***Ignore lock*** *No reaction when setting the lock* *same as after rising edge* *same as after falling edge*	Disable telegrams are ignored If necessary, only respond if the lock is cancelled Send the same telegram as the one configured for *reaction to rising edge*. Send the same telegram as the one configured for *reaction to falling edge*.
Reaction when cancelling the lock	***No reaction when canceling the lock*** *update* *same as after rising edge* *same as after falling edge*	If necessary, only respond if the lock is set The current status of the channel is sent. Send the same telegram as the one configured for *reaction to rising edge*. Send the same telegram as the one configured for *reaction to falling edge*.

Continuation:

Designation	Values	Description
Reaction after restoration of the bus supply[5]	***none***	No reaction.
	update	The current status of the channel is sent.
	same as after rising edge	Reaction configured as for rising edge.
	same as after falling edge	Reaction configured as for falling edge.
	update after 5 sec. *update after 10 sec.* *update after 15 sec.*	The current channel status is sent after the selected time has elapsed.
	after 5 sec. same as after rising edge *after 10 sec. same as after rising edge* *after 15 sec. same as after rising edge*	After the selected time has elapsed, the channel reacts as if configured for rising edge.
	after 5 sec. same as after falling edge *after 10 sec. same as after falling edge* *after 15 sec. same as after falling edge*	After the selected time has elapsed, the channel reacts as if configured for falling edge.

[5] After download, the parameterized *Telegram after restoration of the bus supply* may be sent twice.

3.3.2.2 The “Dimming” function

With the single button operation, an input is connected to a simple push button.

With other types of operation 2 inputs and two push buttons are required per dimmer channel. That means that both inputs must be connected via common group addresses.
Example:
Group address 3/4/5 for *brighter* object from channel 1 and *darker* object from channel 2. Group address 3/4/6 for the *switch ON/OFF* objects from channel 1 and channel 2.

Depending on the duration of the keystroke (short/ long key stroke), dimming or ON/OFF telegrams are sent to the dimmer. See below.

The following parameters are available:

Table 9

Designation	Values	Description
Debouncing time	*30 ms* ***50 ms*** *80 ms* *100 ms* *200 ms* *1 sec.* *5 sec.* *10 sec.*	Debouncing of the connected key (see "Switch / push button function" above)
Reaction to “long” / “short”		This input distinguishes between a long and a short keystroke, and can therefore perform two functions
	Single button operation	The dimmer is operated by a single push button. Short keystroke = ON/OFF Long keystroke = brighter / darker Release = stop
		With the other models, the dimmer is operated using two keys (rocker).
	brighter / ON	Short keystroke = ON Long keystroke = brighter Release = stop
	brighter / TOGGLE	Short keystroke = ON/OFF Long keystroke = brighter Release = stop
	darker / OFF	Short keystroke = OFF Long keystroke = darker Release = stop
	darker / TOGGLE	Short keystroke = ON/OFF Long keystroke = darker Release = stop

Continuation:

Designation	Values	Description
Long keystroke starting at	***300** .. 1000ms*	This function serves to clearly differentiate between long and short keystrokes. If the key is pressed at least as long as the set time, then a long keystroke will be registered.
Increments for dimmer		With a long keystroke, the dimming value is:
	100 %	Increased (or decreased) until the key is released.
	50 %	Raised by the selected value
	25 %	(or lowered)
	12,5 %	
	6 %	
	3 %	
	1,5 %	
Reaction when setting the lock	***Ignore lock***	Disable telegrams are ignored
	No response when the lock is set	It only reacts once the lock is cancelled
	ON	Send switch-on telegram
	OFF	Send switch-off telegram
Reaction to cancellation of the lock	***No response when the lock is cancelled***	Cancelling the lock does not issue a telegram
	ON	Switch dimmer on
	OFF	Switch dimmer off
Reaction after restoration of the bus supply[6]	***none***	No reaction
	ON	Send switch-on telegram
	OFF	Send switch-off telegram
	ON after 5 sec	Send switch-on telegram with delay
	ON after 10 sec	
	ON after 15 sec	
	OFF after 5 sec	Send switch-off telegram with delay
	OFF after 10 sec	
	OFF after 15 sec	

[6] After download, the parameterized *Telegram after restoration of the bus supply* may be sent twice.

3.3.2.3 The “Blinds” function

With the single button operation, an input is connected to a simple push button.

With other types of operation, 2 inputs and two push buttons are required per blinds channel. That means that both inputs must be connected via common group addresses.
Example:
Group address 3/5/5 for *UP* object from channel 1 **and** *DOWN* object from channel 2. Group address 3/5/6 for the *Step /Stop* object from channel 1 and channel 2.

Motion or step commands are sent to the blinds actuator depending on the duration of the keystroke (short/ long key stroke). See below.

The following parameters are available:

Table 10

Designation	Values	Description
Debouncing time	*30 ms, **50 ms,** 80 ms, 100 ms 200 ms, 1 sec. , 5 sec., 10 sec.*	Debouncing of the connected key (see "Switch / push button function" above)
Operation	*Single button operation* *DOWN* ***UP***	The blinds are operated with a single push button. Short keystroke = Step Long keystroke = Move Short keystroke = Step Long keystroke = Lower Short keystroke = Step Long keystroke = Raise **Run commands**: Direction change with every keystroke. The **stop command** is triggered either by releasing the button or pressing it briefly, depending on the configuration. See below: *Motion is stopped by*
Long keystroke starting at	***300** .. 1000ms*	This function serves to clearly differentiate between long and short keystrokes. If the key is pressed at least as long as the set time, then a long keystroke will be registered.
Motion is stopped by	*releasing the key* ***Short keystroke***	How is the stop command triggered?
Reaction when setting the lock	***Ignore lock*** *No reaction when the lock is set* *UP* *DOWN*	Disable telegrams are ignored only react if the lock is cancelled Send move up command Send move down command

Continuation:

Designation	Values	Description
Reaction when cancelling the lock	***No reaction when the lock is cancelled***	only react if the lock is set
	Up	Send move up command
	Down	Send move down command
Reaction after restoration of the bus supply[7]	***none***	No reaction
	UP	Send move up command
	DOWN	Send move down command
	UP after 5 sec	Send delayed move up command
	UP after 10 sec	
	UP after 15 sec	
	DOWN after 5 sec	Send delayed move down command
	DOWN after 10 sec	
	DOWN after 15 sec	

[7] After download, the parameterized *Telegram after restoration of the bus supply* may be sent twice.

3.3.2.4 The “Value” function

Basic functionality:

Pressing the connected push button triggers a value telegram.
Two different telegrams can also be sent (“long/short” function) depending on the configuration.

Table 11

Designation	Values	Description
Debouncing time	*30 ms*, ***50 ms,*** *80 ms* *100 ms, 200 ms, 1 sec.* *5 sec., 10 sec.*	Debouncing of the connected key (see above: "The swittch /push button function")
Type of value	*Value short/long* ***Value for light scene*** *Value for blinds*	Sends two different values, depending on whether the key is pressed for a long or short period Send a scene number between 0 and 63. Sends a height telegram and a slats telegram
Parameter for *the type of value “short / long”*		
Value	*Input 0 .. 255*	Value which is to be sent with a short[8] keystroke.
Special function after long keystroke	*no* ***Yes***	Is a different value sent by a long keystroke?
Long keystroke starting at	*1 sec.* *2 sec.* ***3 sec.*** *5 sec.*	This function serves to clearly differentiate between long and short keystrokes. If the key is pressed at least as long as the set time, then a long keystroke will be registered.
Value with a long keystroke	*Input 0 .. 255*	Value to be sent with a long keystroke
Designation	Values	Description
Parameter for the type of value “Value for light scene”		
Scene number	***Scene 1*** .. .. *Scene 64*	Sends the selected scene number (call scene)
Save with long time operation	***No*** *yes*	If a saved scene telegram is to be sent with a long keystroke
Long keystroke starting at	*1 sec.* *2 sec.* ***3 sec.*** *5 sec.*	This function serves to clearly differentiate between long and short keystrokes. If the key is pressed at least as long as the set time, then a long keystroke will be registered.

[8] If the *Special function after long keystroke* parameter is set to “no”, then the length of the keystroke is irrelevant.

Continuation:

Designation	Values	Description
Parameter for the type of value “Value for blinds”		
Height	*0 .. 100 % in 5 % increments*	Sends a positioning telegram to the blinds / shutter actuator
Slats	*0 .. 100 % in 5 % increments*	What slat position should be sent to the actuator together with the positioning telegram?
Special function after long time operation		What function is carried out with a long keystroke?
	no	none
	all the way UP (0%)	Raise slats to 0% and blinds to upper stop
	all the way DOWN (100%)	Lower slats to 100% and blinds to lower stop
Common parameters		
Reaction when setting the lock	***Ignore lock***	Disable telegrams are ignored
	lock	After a lock telegram (status =1) is received, the channel no longer transmits.
Reaction when cancelling the lock	***No reaction when the lock is cancelled***	No reaction when the lock is cancelled.
	update	When the lock is cancelled (status=0), the current channel status should be resent.
Reaction after restoration of the bus supply[9]	***None***	No reaction after restoration of the bus supply.
	as with short keystroke, send immediately	Same telegram configured as with short keystroke. Send without delay.
	as with short keystroke after 5 sec	Same telegram configured as with short keystroke. Only send after selected delay.
	as with short keystroke after 10 sec	
	as with short keystroke after 15 sec	

[9] After download, the parameterized *Telegram after restoration of the bus supply* may be sent twice.

4 Appendix

4.1 Allowed parameter combinations fort the switching function

Contact	Use	Reaction to rising edge	Reaction to falling edge
Push button	Switch ON and OFF	Toggle	No telegram
		No telegram	Toggle
	Only switch ON	ON	No telegram
		No telegram	ON
	Only switch OFF	OFF	No telegram
		No telegram	OFF
Switch	3-way switching	Toggle	Toggle
	Switch ON and OFF	ON	OFF
		OFF	ON
	Only switch ON	ON	No telegram
		No telegram	ON
	Only switch OFF	OFF	No telegram
		No telegram	OFF

4.2 Conversion of percentages to hexadecimal and decimal values

%	Decimal	Hexadecimal	%	Decimal	Hexadecimal	%	Decimal	Hexadecimal
0%	0	$00	**34%**	87	$56	**68%**	173	$AD
1%	3	$02	**35%**	89	$59	**69%**	176	$AF
2%	5	$05	**36%**	92	$5B	**70%**	179	$B2
3%	8	$07	**37%**	94	$5E	**71%**	181	$B5
4%	10	$0A	**38%**	97	$60	**72%**	184	$B7
5%	13	$0C	**39%**	99	$63	**73%**	186	$BA
6%	15	$0F	**40%**	102	$66	**74%**	189	$BC
7%	18	$11	**41%**	105	$68	**75%**	191	$BF
8%	20	$14	**42%**	107	$6B	**76%**	194	$C1
9%	23	$16	**43%**	110	$6D	**77%**	196	$C4
10%	26	$19	**44%**	112	$70	**78%**	199	$C6
11%	28	$1C	**45%**	115	$72	**79%**	201	$C9
12%	31	$1E	**46%**	117	$75	**80%**	204	$CC
13%	33	$21	**47%**	120	$77	**81%**	207	$CE
14%	36	$23	**48%**	122	$7A	**82%**	209	$D1
15%	38	$26	**49%**	125	$7C	**83%**	212	$D3
16%	41	$28	**50%**	128	$7F	**84%**	214	$D6
17%	43	$2B	**51%**	130	$82	**85%**	217	$D8
18%	46	$2D	**52%**	133	$84	**86%**	219	$DB
19%	48	$30	**53%**	135	$87	**87%**	222	$DD
20%	51	$33	**54%**	138	$89	**88%**	224	$E0
21%	54	$35	**55%**	140	$8C	**89%**	227	$E2
22%	56	$38	**56%**	143	$8E	**90%**	230	$E5
23%	59	$3A	**57%**	145	$91	**91%**	232	$E8
24%	61	$3D	**58%**	148	$93	**92%**	235	$EA
25%	64	$3F	**59%**	150	$96	**93%**	237	$ED
26%	66	$42	**60%**	153	$99	**94%**	240	$EF
27%	69	$44	**61%**	156	$9B	**95%**	242	$F2
28%	71	$47	**62%**	158	$9E	**96%**	245	$F4
29%	74	$49	**63%**	161	$A0	**97%**	247	$F7
30%	77	$4C	**64%**	163	$A3	**98%**	250	$F9
31%	79	$4F	**65%**	166	$A5	**99%**	252	$FC
32%	82	$51	**66%**	168	$A8	**100%**	255	$FF
33%	84	$54	**67%**	171	$AA			