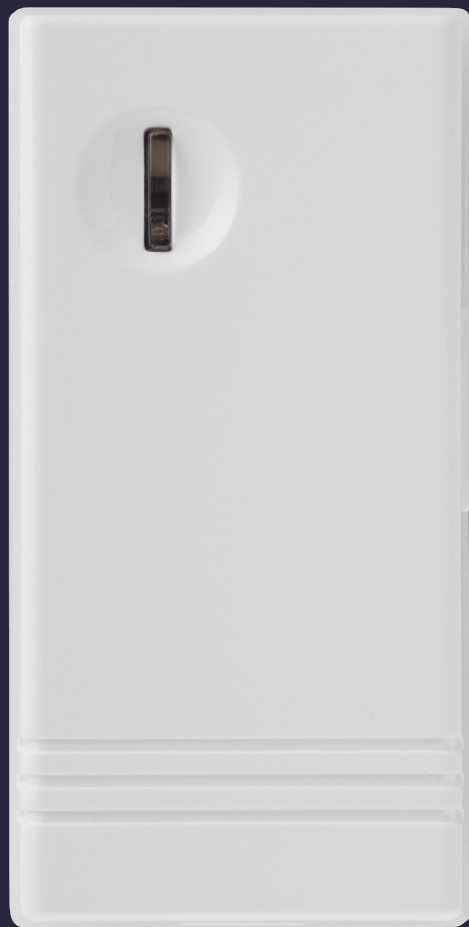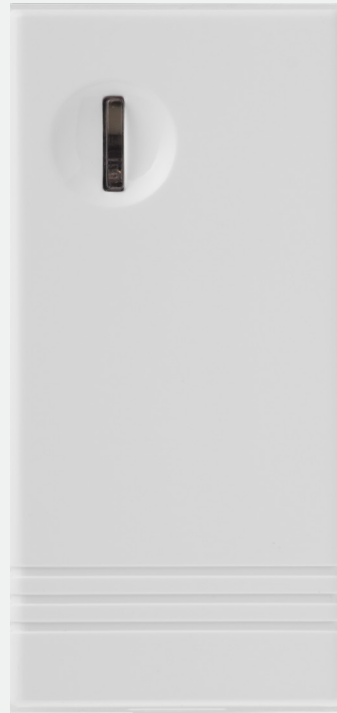# Installation Guide

Input & Output Switch
(DIO-52-ZBS)

NookBox

Smart Home Security

Input & Output Switch
(DIO-52-ZBS)

DIO-52 is a ZigBee Input and Output Switch. The switch has built-in Digital Input and Digital Output terminals which can be connected to sensor, switch, or devices to form Normal Open (N.O.) or Normal Close (N.C.) loop. When the Input terminal is triggered, the Switch will transmit signal via ZigBee network to inform the ZigBee network panel/coordinator; the Switch can also receive command signal via ZigBee network to turn on/off the Output terminal to control connected device.

The Switch utilizes ZigBee technology for wireless signal transmission. ZigBee is a wireless communication protocol that is reliable, has low power consumption and has high transmission efficiency. Based on the IEEE802.15.4 standard, ZigBee allows a large amount of devices to be included in a network and coordinated for data exchange and signal transmission.

The switch can either be connected to a single device for remotely controlling it from the ZigBee network panel/coordinator, or connected to separate devices with the input terminal as the trigger of events and the output terminal as the responder of events.
The Switch also serves as an end device in the ZigBee network. It can be included in the ZigBee network to transmit or receive signal, but cannot permit any other ZigBee device to join the network through the Switch.

Parts Identification

1. Function Button

- Press once to send a supervision signal.

- Press and hold for 10 seconds until the LED flash once, then release to reset the Switch.

2. LED Indicator

The LED indicator lights up in the following conditions:

Flashes once:

> When the user presses and holds the function button for 10 seconds, the LED will flash once to indicate that the button can be released for the Switch to join the ZigBee network.

Flashes twice quickly:

> The Switch has successfully joined a ZigBee network.

3. Battery Compartment

4. Power Terminal

5. Input Terminal

Set Normal Open (N.O.) or Normal Close (N.C.)
for the device connected to the input terminal from the Control Panel webpage.

6. Output Terminal

Set Normal Open (N.O.) or Normal Close (N.C.)

for the device connected to the input terminal from the Control Panel webpage.

7. Mounting Holes

Set Normal Open (N.O.) or Normal Close (N.C.) for the device connected
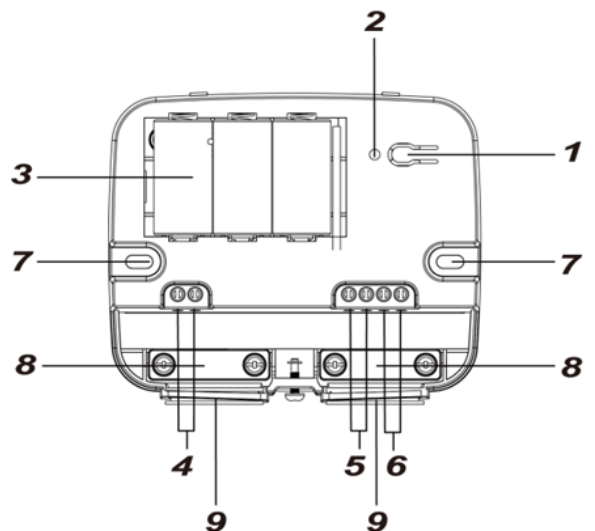to the output terminal from the Control Panel webpage.

8. Strain Relief Clamps

The clamps are used for securing the wires, and providing strain

relief to protect the wires from metal cutout.

9. Wiring Holes

Top Cover

Base

Features
Output and Input Terminal

- Output Terminal (DO):

  The output terminal is controlled by the Control Panel; when the Switch receives on/off signal, it will turn on or off the output terminal accordingly.

  When set to N.O., the output terminal will close upon receiving ON signal, and open upon receiving OFF signal.

  When set to N.C. the output terminal will close upon receiving OFF signal, and open upon receiving ON signal.

- Input Terminal (DI):

  When set to N.O. the input terminal will send a trigger signal to the Control Panel when the loop closes, and send a restore signal when the loop opens.

  When set to N.C. the input terminal will send a trigger signal to the Control Panel when the loop opens, and send a restore signal when the loop closes.

NOTE:

- The Input Terminal and Output terminal can be set to either Normal Close (N.C.) or Normal Open (N.O.) from the DO configuration page of the Control Panel webpage.

  Select Invert Input as Yes or No to set the input terminal to N.C. / N.O.

  Select Invert Output as Yes or No to set the output terminal to N.C. / N.O.

- The status descriptions for the Input Terminal (DI) and Output terminal (DO) are editable from the DI and DO configuration pages.
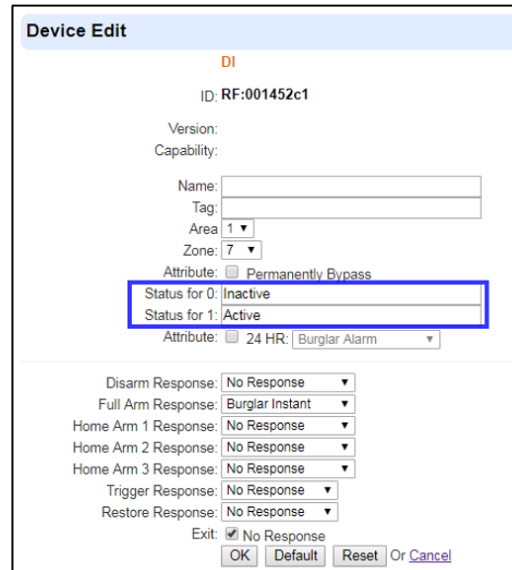
Operation Mode

The Input and Output Switch can operate according to different mode selected in the Control Panel.

- Appliance Control:

  When DIO-52 is used for appliance control, the input and output terminals are connected to the same device, e.g. a valve.
  The output terminal is used to receive on/off signal from the Control Panel to turn/on off the connected device, while the input terminal is used to transmit the current status of the connected device to the Panel.

- Separate Devices:

  In this mode, the input and output terminals of DIO-52 are connected to separate devices. The input terminal is used to monitor the activation of the connected device, and transmit the trigger signal to the Control Panel. The output terminal is used to receive on/off signal from the Control Panel to turn/on off the connected device. When working under this mode, the connected devices of DIO-52 can integrate with other devices included in the Control Panel, and operate according to the Home Automation rules programmed in the Control Panel.

- Input Follower:

In this mode, the input and output terminals of DIO-52 are connected to separate devices, and the output terminal device will act following the trigger of input terminal device.
When input terminal device is triggered and sends a signal to the Control Panel, the output terminal device will be activated according to the Output Follow Input settings in the Control Panel.

Power Terminal

The Switch uses two-wired 5-12V DC adapter to power on when connected to the Power Terminal. When Power Terminal and batteries are both in use, the Switch will only power through AC Adapter.

Battery and Low Battery Detection

The Switch uses three CR123 Lithium batteries as its power source. The Switch features Low Battery Detection function. When the battery voltage is low, the Switch will transmit Low Battery signal to the Control Panel to notify the user. When changing batteries, after removing the old batteries, press the Function Button twice to fully discharge before inserting new batteries.

Supervision

The Switch will transmit a supervision signal to report its condition regularly according to user setting. The factory default interval is 30 minutes. The user can also press the Function Button once to transmit a supervision signal manually.

ZigBee Network Setup

ZigBee Device Guideline

ZigBee is a wireless communication protocol that is reliable, has low power consumption and has high transmission efficiency. Based on the IEEE802.15.4 standard, ZigBee allows a large amount of devices to be included in a network and are coordinated for data exchange and signal transmission.

Joining the ZigBee Network

As a ZigBee device, the Switch needs to join a ZigBee network to transmit signal when it is triggered. Please follow the steps below to add the Switch into the ZigBee network.

The Switch can only join ZigBee network within 3 minutes after power on.

1. Insert batteries or connect the two-wired 5-12V DC adapter to power on the Switch.
2. Within 3 minutes after power up, press and hold the Function button for 10 seconds, then release it to join the network. Please make sure the permit-join feature on the router or coordinator of your ZigBee network is enabled.
3. If the Switch successfully joins a ZigBee network, the LED Indicator will flash twice to confirm.
4. After joining the ZigBee network, the Switch will be registered in the network automatically. Please check the ZigBee coordinator, system control panel or CIE (Control and Indicating Equipment) to confirm if joining and registration is successful.
5. After joining the ZigBee network, if the Switch loses connection to current ZigBee network, the LED will flash every 20 minutes to indicate. Please check your ZigBee network condition and Switch signal range to correct the situation.

NOTE: When learnt into the ZigBee Control Panel, the DIO-52 will be recognized as 2 separate devices (DI & DO) and will occupy 2 zones in the Panel.

Factory Reset

If you want to remove the Switch from current network and join a new network, you need to use the Factory Reset function to clear the Switch for its stored setting and information first before it can join another network. To perform Factory Reset:

1. The Switch can only be reset within 3 minutes after power up. If the Switch has been powered
        up for more than 3 minutes, power down the Switch by removing the battery/two-wired AC
        Adapter, then reinsert the battery / Connect two-wired AC Adapter again.
2. Press and hold the function button for 10 seconds then release.
3. The Switch has been reset to factory default setting with all its previous network information removed. It will now actively search for
        available ZigBee network again and join the network automatically.
4. If the Switch successfully joins a ZigBee network, the LED Indicator will flash twice to indicate.

OTA Firmware Upgrade (For OTA version only)

The Switch supports OTA firmware upgrade feature via ZigBee network, which can be initiated from the ZigBee network coordinator. Follow steps below to perform OTA firmware upgrade.

Step 1. You have to access your ZigBee Coordinator to perform the firmware upgrade on the air.
Step 2. On the configuration webpage, select the device that you wish to upgrade and select the
        new ZigBee firmware provided. Please refer to ZigBee Coordinator User Manual for details.
Step 3. Press OK to start upgrading process, and the LED will keep flashing. During the OTA process, please do not perform any other actions,   or power down the panel.
Step 4. The length of an upgrade will take approximately 20 to 30 minutes. Please note that the
        duration may vary based on file size or distance between your accessory and coordinator.
Step 5. Wait for firmware to complete update. When the progress reaches 100%, the Device will reset automatically. You can also refresh
        the webpage again to ensure that the Device firmware is successfully updated with the newest version displayed.

Installation

The Switch can be deployed on a flat surface or mounted on the wall.

1. Disconnect the main power supply.
2. Loosen the bottom fixing screw and remove the top cover of the Switch.
3. Use the holes on the base to mark mounting location on the wall.
4. Drill holes into marked location and insert wall plugs if required, screw the base onto the mounting location.
5. Replace the top cover and tighten the bottom fixing screw.

Appendix (For developers only)

- *Cluster ID*

Device ID: DIO52 : 0x03F7

Endpoint:0x01

Server Side	Client Side
Mandatory	
Basic (0x0000)	Basic (0x0000)
Identify(0x0003)	
Poll Control(0x0020)	
IAS Zone(0x0500)	
Optional	
None	*None*

Device ID: DIO52 : 0x03F7

Endpoint:0x02

Server Side	Client Side
Mandatory	
Basic (0x0000)	Basic (0x0000)
Identify(0x0003)	
Groups(0x0004)	
Scenes(0x0005)	
On/Off(0x0006)	
Optional	
None	*None*

● *Attribute of Basic Cluster Information*

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	*ZCLVersion*	Unsigned 8-bit integer	0x00 –0xff	Read only	0x02	M
0x0001	ApplicationVersion	Unsigned 8-bit integer	0x00 –0xff	Read only	0x00	O
0x0003	*HWVersion*	Unsigned 8-bit integer	0x00 –0xff	Read only	0	O
0x0004	*ManufacturerName*	Character String	0 – 32 bytes	Read only	Climax Technology	O
0x0005	*ModelIdentifier*	Character String	0 – 32 bytes	Read only	(Model Number)	O
0x0006	*DateCode*	Character String	0 – 16 bytes	Read only		O
0x0007	*PowerSource*	8-bit	0x00 –0xff	Read only	0x03	M
0x0010	*LocationDescription*	Character String	0 – 32 bytes	Read / Write		O
0x0011	*PhysicalEnvironment*	8-bit	0x00 –0xff	Read / Write	0x00	O
0x0012	*DeviceEnabled*	Boolean	0x00 –0x01	Read / Write	0x01	M

● *Attribute of Identify Cluster Information*

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	*IdentifyTime*	Unsigned 16-bit integer	0x00 – 0xffff	Read / Write	0x0000	M

● *Attributes of the Groups cluster Information*

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	*NameSupport*	8-bit bitmap	x0000000	Read only	-	M

● Attribute of the Scenes cluster Information

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	SceneCount	Unsigned 8-bit integer	0x00 – 0xff	Read only	0x00	M
0x0001	CurrentScene	Unsigned 8-bit integer	0x00 – 0xff	Read only	0x00	M
0x0002	CurrentGroup	Unsigned 16-bit integer	0x0000 – 0xfff7	Read only	0x00	M
0x0003	SceneValid	Boolean	0x00 – 0x01	Read only	0x00	M
0x0004	NameSupport	8-bit bitmap	x0000000	Read only	-	M

● Attribute of On/Off Cluster Information

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	OnOff	Boolean	0x00 –0x01	Read only	0x00	M

● Attributes of the Groups cluster Information

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	NameSupport	8-bit bitmap	x0000000	Read only	-	M

● Attribute of Poll Control Cluster Information

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	Check-in Interval	Unsigned 32-bit integer	0x0– 0x6E0000	Read / Write	0x3840(1hr)	M
0x0001	LongPoll Interval	Unsigned 32-bit integer	0x04– 0x6E0000	Read only	0x1C20(30min)	M
0x0002	ShortPollInterval	Unsigned 16-bit integer	0x0–0xffff	Read only	0x000E(3.5sec)	M
0x0003	FastPollTimeout	Unsigned 16-bit integer	0x0–0xffff	Read / Write	0x0020(8sec)	M
0xFFFD	Cluster revision	Unsigned 16-bit integer	0x0001-0xfffe	Read only	1	M

● Attribute of IAS Zone Cluster Information

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	ZoneState	8-bit Enumeration	All	Read only	0x00	M
0x0001	ZoneType	16-bit Enumeration	All	Read only		M
0x0002	ZoneStatus	16-bit bitmap	All	Read only	0x00	M
0x0010	IAS_CIE_ADDRESS	IEEE ADDRESS	Valid 64bit IEEE address	Read / Write		M
0x0011	ZONE_ID	Unsigned 8-bit integer	All	Read only	0xFF	M

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