



## Keypad - KEYZB-110

### Technical manual

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## 2 Features

### 2.1 Keypad - KEYZB-110

Enables secure access control

The Zigbee-based Keypad includes a tag reader and allows for users to enable and disable an alarm system using a pin code and/or an RFID tag. In addition, access data can be updated remotely via a gateway to facilitate access control.

Saves battery when not in use

The RFID only consumes energy when it is needed. The Keypad includes a sensor that detects when a person is within operating distance, which will enable the RFID and make the Keypad light up in the dark. This saves energy and allows for a longer battery lifetime.

Numerous features and design options

The Keypad includes a tamper switch that detects opening of the unit, which makes it suitable for alarm systems. Also, the Keypad includes a programmable buzzer for indication of entry, exit, alarms, or any other indication needed in your solution. Red, Green, and Yellow LEDs are available for indications of alarms, etc. The Keypad can be delivered in white for indoor use or in black for outdoor use. The device has 16 buttons that you can design to fit your solution. The Keypad can be mounted on the wall using screws or double-sided tape

### 2.2 IAS ACE

The Keypad is implemented as a IAS ACE ZigBee end point according to ZigBee Home Automation profile. The IAS ACE cluster defines an interface to the functionality of any Ancillary Control Equipment of the IAS system. Using this cluster, an ACE device can access a IAS CIE devices and manipulate the IAS system

### 2.3 Key features

- RFID tag reader
- Tamper-protected
- Buzzer and LED
- Intelligent backlight
- Battery-powered
- Alarm sensor – IAS Zone
- ZigBee OTA cluster for firmware upgrades
- ZigBee 3.0 stack supported
- Water repellent

## 3 Endpoints

The device implements the following standard HA devices on different end points.

### 3.1 ZigBee Device Object (ZDO)

- End point number 0x00
- Application profile Id 0x0000
- Application device Id 0x0000
- Supports all mandatory clusters

### 3.2 IAS ACE

- End point number 0x2C
- Application profile Id 0x0104 (Home Automation)
- Application device Id 0x0401 (IAS Ancillary Control Equipment)

### 3.3 Develco Utility

- Application profile Id 0xCoC9 (Develco Products private profile)
- Application device Id 0x0001
- Manufacturer code for Develco Products is 0x1015
- Private profile for internal Develco Products use only.

#### Reference documents:

053474r18ZB\_CSG-ZigBee-Specification.pdf

075123r03ZB\_AFG-ZigBee\_Cluster\_Library\_Specification.pdf

053520r27ZB\_HA\_PTG-Home-Automation-Profile.pdf

075356r15ZB\_ZSE-ZSE-AMI\_Profile\_Specification.pdf

They can all be downloaded from :

<http://www.zigbee.org/Products/DownloadZigBeeTechnicalDocuments.aspx>

## 4 Supported Clusters

### 4.1 Common clusters for each end point

The ZCL "General Function Domain" clusters in this section are implemented as server clusters. Refer to ZigBee Cluster Library Specification. <http://www.zigbee.org/Specifications.aspx>

#### 4.1.1 Basic – Cluster id 0x0000

Only the first set has mandatory attributes, also the optional attributes that can be relevant to a Develco device are all in set 0x000.

##### 4.1.1.1 Attribute

Id#	Name	Type	Range	Man/Opt	Relevance and ref.
0x0	ZCLVersion	UInt8	Type range	M	
0x4	ManufacturerName	String	0-32 byte	O	4.1.1.1.1
0x5	ModelIdentifier	String	0-32 byte	O	4.1.1.1.2
0x6	DateCode	String	0-32 byte	O	
0x7	PowerSource	8 bit enum	Type range	M	

##### 4.1.1.1.1 ManufacturerName

"Develco Products A/S"

##### 4.1.1.1.2 ModelIdentifier

"KEYZB-110"

### 4.1.2 Identify – Cluster id 0x0003

#### 4.1.2.1 Attribute

Id#	Name	Type	Range	Man/Opt	Relevance and ref.
0x0000	IdentifyTime	UInt16	Type range	M	

#### 4.1.2.2 Commands

The identify cluster has 2 commands as server.

Id#	Name	Payload	Man/Opt	Relevance and ref.
0x00	Identify	UInt16 - Identify Time (seconds)	M	0x00



0x01	Identify Query	none	M	0x01
------	----------------	------	---	------

The identify cluster has 1 command as client.

Id#	Name	Payload	Man/Opt	Relevance and ref.
0x00	Identify Query Response	UInt16 - Identify Time (seconds)	M	0x00

## 4.2 IAS ACE Device – EP 0x2C

### 4.2.1 IAS Zone - Cluster id 0x0500

The IAS Zone cluster is described in ZigBee Cluster Library Specification.

#### 4.2.1.1 Attribute

Id#	Name	Type	Man/Opt	Relevance and ref.
0x0000	Zone State	8-bit Enumeration	M	
0x0001	Zone Type	16-bit Enumeration	M	Hard coded to Keypad
0x0002	Zone Status	UInt16	M	The following bits are supported: Bit2: Tamper Bit3: Battery Bit4: Supervision reports Bit5: Restore reports
0x0010	IAS CIE Address	Valid 64-bit IEEE address	M	
0x0011	ZoneID	UInt8	M	
0x8000	Zone Status Interval	UInt16	O	Default 300 sec

##### 4.2.1.1.1 Zone State

The device will automatically start to scan the network for an IAS Zone client in a predefined interval. When the client is found it will automatically attempt to enrol. When it has successfully enrolled the Zone Status command is sent to the IAS Zone client.

The attribute value will change from not enrolled (0x00) to Enrolled (0x01).

##### 4.2.1.1.2 IAS CIE Address

Attribute specifies the address that commands generated by the server shall be sent to.

To un-enrol the device the back end system has to write a new address into this attribute. Any value is valid. If the back end system writes an IEEE address then it will try to enrol to this devices represented by the IEEE address.

#### 4.2.1.1.3 ZoneID

A unique reference number allocated by the CIE at zone enrolment time.

Used by IAS devices to reference specific zones when communicating with the CIE. The *ZoneID* of each zone stays fixed until that zone is un-enrolled.

#### 4.2.1.2 Commands

The IAS Zone cluster has 2 commands as server.

Id#	Name	Payload			Man/Opt	Relevance and ref.
0x00	Zone Status Change Notification	Uint16 – bit mask			M	The status is report to the coordinator every 5 min
0x01	Zone Enroll Request	Bits	16	16	M	
		Data type	16 bit enum	UINT16		
		Field name	Zone type	Manufacturer code		

Init sequence – when the device has join the network it start to scan for an IAS zone client cluster. If a client is found a Zone enroll request command is send and a Zone Enroll response is expected. If it doesn't receive a response it will wait for 15 minutes and try again.

The following bits are supported in Zone status:

Bit2: Tamper

Bit3: Battery

Bit4: Supervision reports

Bit5: Restore reports





Bit3: When the battery is below 4.0 VDC. Battery bit is set high and "Zone Status" is transmitted to the coordinator.

#### 4.2.1.3 Commands

The IAS ACE cluster has 3 commands as client server.

Id#	Name	Payload			
0x00	Arm	Bits	8	Varies	8
		Data type	Enum8	string	Uint8
		Field name	Arm Mode	Arm/Disarm code	Zone ID
0x02	Emergency	No payload, Commands indicate an emergency situation			
0x07	GetPanelStatus	No payload, Commands This command is used by ACE clients to request an update to the status of the ACE server (i.e., the IAS CIE).			

Keypad button functionality

Symbol	Function
	Arm All Zones
	Disarm
	Arm Day/Home Zones Only
	Arm Night/Sleep Zones Only
SOS	Emergency – Press button for 3 sec
X	Delete last symbol input from keypress
"0" to "9"	Input to Arm/Disarm code

## 4.2.2 Power Configuration - Cluster id 0x0001

The power configuration cluster is described in ZigBee Cluster Library Specification

### 4.2.2.1 Attribute

Id#	Name	Type	Range	Man/Opt	Relevance and ref.
0x0020	BatteryVoltage	UInt8	0x00 - 0xFF	O	ZCL configure reporting is supported

Note: The attribute "BatteryVoltage" is measuring the battery voltage, in units of 100mV.

## 4.2.3 Poll Control - Cluster id 0x0020

The poll control cluster is described in ZigBee Cluster Library Specification

This cluster provides a mechanism for the management of an end device's MAC Data Request rate. For the purposes of this cluster, the term "poll" always refers to the sending of a MAC Data Request from the end device to the end device's parent.

This cluster can be used for instance by a configuration device to make an end device responsive for a certain period of time so that the device can be managed by the controller.

### 4.2.3.1 Attribute

Id#	Name	Type	Range	Man/Opt	Relevance and ref.
0x0000	Check-inInterval	UInt32	0x00 - 0xFF	M	Default value is 1 hour
0x0001	LongPoll Interval	UInt32		M	Default value is 7,5 sec
0x0002	ShortPollInterval	UInt16		M	Default value is 0.25 seconds
0x0003	FastPollTimeout	UInt16		M	Default value is 10 seconds

Start up, auto scan for client poll control cluster on the coordinator. If it is support on the coordinator an auto bind is created and the smoke sensor will send a check-in command in the interval specified in attribute "Check-in Interval. The coordinator has to reply with a check-in response. The sensor supports the following commands send from the client (Typically the coordinator).

- 0x00 Check-in Response,
- 0x01 Fast Poll Stop,
- 0x02 Set Long Poll Interval,
- 0x03 Set Short Poll Interval,

If it doesn't find a poll client it will search again periodically.

#### 4.2.4 OTA Upgrade – Cluster id 0x0019

The cluster provides a ZigBee standard way to upgrade devices in the network via OTA messages. The devices support the client side of the cluster.

When the devices has joined a network it will automatically auto scan for a OTA upgrade server in the network. If it finds a server an auto bind is created and ones every 24 hour it will automatically send its "current file version" to the OTA upgrade server. It is the server that initiate the firmware upgrade process.

##### 4.2.4.1 Attributes

Id#	Name	Type	Range	Man/Opt	Relevance and ref.
0x0000	UpgradeServerID	IEEE Address	-	M	
0x0001	FileOffset	Uint32	Type range	O	
0x0002	CurrentFileVersion	Uint32	Type range	O	
0x0003	CurrentZigBeeStackVersion	Uint16	Type range	O	
0x0004	DownloadedFileVersion	Uint32	Type range	O	
0x0005	DownloadedZigBeeStackVersion	Uint16	Type range	M	
0x0006	ImageUpgradeStatus	8 bit enum	0x00 to 0xFF	O	
0x0007	Manufacturer ID	Uint16	Type range	O	
0x0008	Image Type ID	Uint16	Type range	O	
0x0009	MinimumBlockRequestDelay	Uint16	Type range	O	

Above attribute description is to be found in section 6.7 "OTA Cluster Attributes" in ZigBee document – "zigbee-ota-upgrade-cluster-specification" provided by the ZigBee alliance.

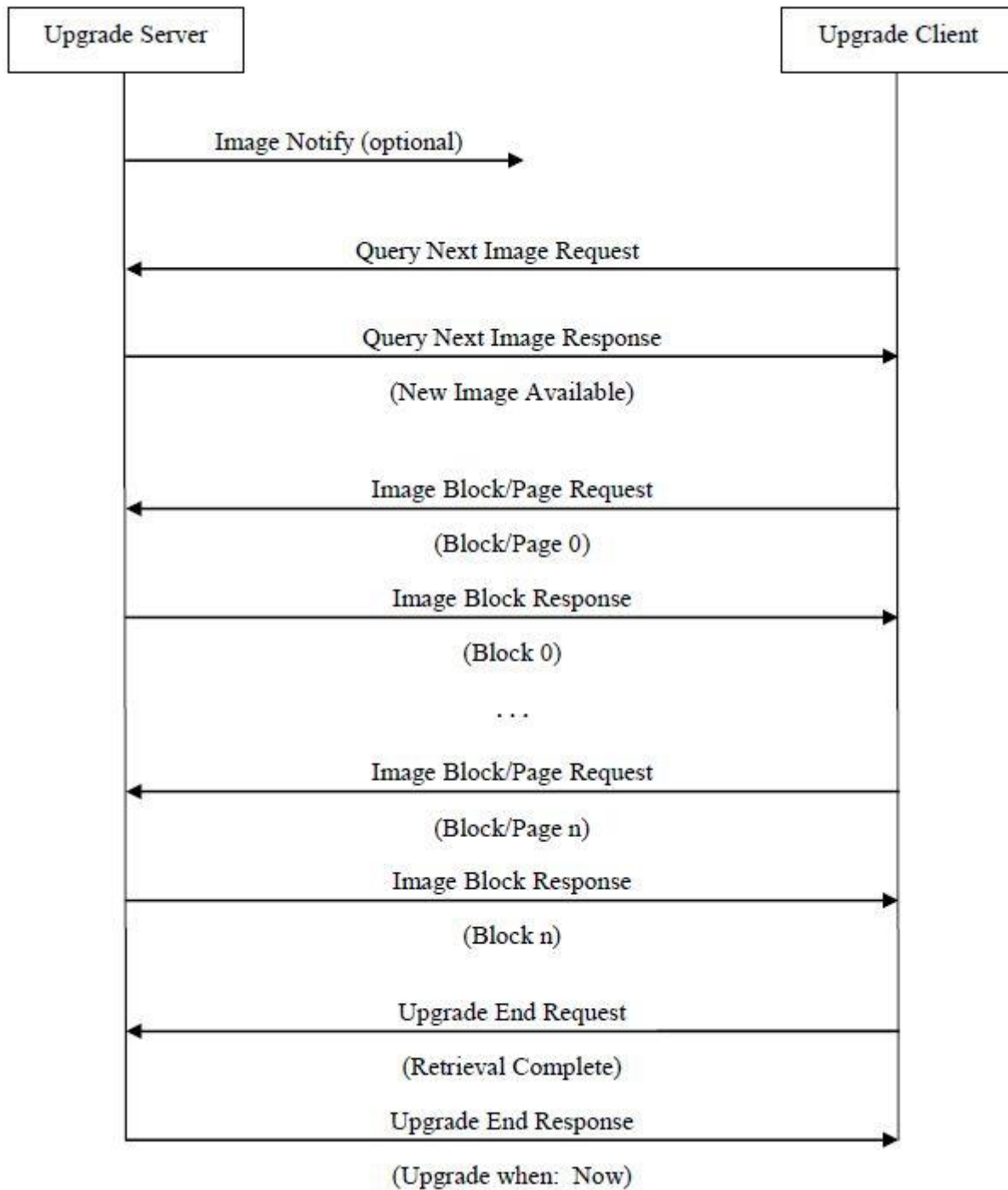
##### 4.2.4.2 Commands

The OTA Client cluster can send the following commands

Id#	Name	Man/Opt	Relevance and ref.
0x01	Query Next Image request	M	6.10.1 OTA Cluster Command Identifiers
0x03	Image Block Request	M	6.10.1 OTA Cluster Command Identifiers
0x06	Upgrade End Request	M	6.10.1 OTA Cluster Command

			Identifiers
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#### 4.2.4.3 OTA Upgrade Messages Diagram



## 4.2.5 Time – Cluster id 0x000A

The Time cluster is a general cluster for time it is based on a UTC time in seconds since 0 hrs 0 mins 0 sec on 1st January 2000. Refer to [\[Z2\]](#) for ZigBee specification of the time cluster.

The device will use this clusters as a client – provided that a suitable Time Server is available on the network (most likely on the Gateway).





### 4.2.5.1 Attribute

Id#	Name	type	Range	Man/Opt	Relevance and ref.
0x0000	Time	UTCTime (Uint32)	Type range	M	The module will periodically update its clock by synchronizing through this cluster
0x0001	TimeStatus	8 bit bitmap	00000xxx	M	

## 5 MMI user guide

### 5.1 Panel description



Symbol	Function
	Arm All Zones
	Disarm
	Arm Day/Home Zones Only
	Arm Night/Sleep Zones Only
SOS	Emergency – Press button for 3 sec
X	Delete last symbol input from keypress
"0" to "9"	Input to Arm/Disarm code
LED 1	Arm All Zones: RED LED solid on for 30 sec Arm Day/Home Zones Only: RED LED solid on for 30 sec Arm Night/Sleep Zones Only: RED LED solid on for 30 sec Exit delay: Red LED flash slow along with beep In alarm: Red LED flash fast
LED 2	Network connection lost: Yellow LED flash when it scans for network to re-join



	Low battery: Yellow LED will blink 2x every 60 second Timeout since last input (5 sec): Yellow LED blink 3x Wrong PIN code: Yellow LED blink 3x
LED 3	Disarm: Green LED solid on for 3 sec Not ready to arm: Green LED solid on for 3 sec Entry delay: Green LED flash along with beep
Sensor	Presence Sensor + Light Sensor + RFID tag reader

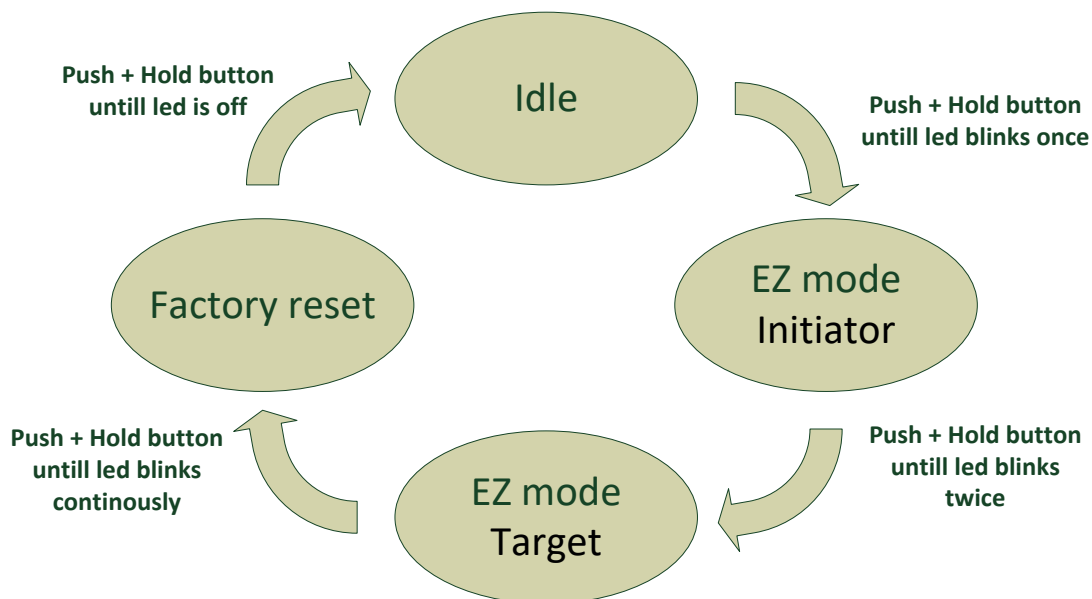
## 5.2 Menu button

How to get access to the menu button on the keypad:

Open the casing of the device by removing the screw at the bottom of the device. The menu button is placed between the batteries and a thin pin (eg. a paper clip) can be used to activate the button.

Pushing the button on a device provides the user with several possibilities.

Pushing the button for longer (push, hold for a few seconds, and release) allows the user to set the device into a desired mode. A mode change happens at 5 second interval. Below, these modes are illustrated in a state chart



When cycling through the menu modes, the state is indicated by a number of blinks on the LED. The device is supporting the ZigBee standardized EZ- mode Commissioning.

### 5.2.1 EZ mode - Initiator

If the device is not on the network EZ-Mode Network Steering is invoked when the user enters this menu. The LED blinks once every 1 sec until the device has joined the network. If the device was already on the network it will broadcast the PermitJoin messages. It is the trust center policy that decides if the device is allowed to join the network.

When the device has joined the network EZ-Mode Finding and Binding is invoked and the device starts to blink every 3 sec until a cluster match is found. When a match is found or the cluster examine is finished the blinking stops and the device sends a message to the target device to stop the identify time.

The following clusters are supported in EZ-mode finding and binding:

- Power configuration cluster

The EZ-mode time is hard coded to 3 minutes. This is the Minimum and recommended PermitJoin time broadcast for EZ-Mode Network Steering and minimum IdentifyTime set for EZ-Mode Finding and Binding. If the user enters the menu again another 3 minutes is started.

### 5.2.2 EZ mode - Target

If the device is not on the network EZ-Mode Network Steering is invoked when the user enters this menu. The LED blinks twice every 1 sec until the device has joined the network. If the device was already on the network it will broadcast the PermitJoin messages. It is the trust center policy that decides if the device is allowed to join the network.

When the device has joined the network identify mode is invoked and the device starts to blink twice every 3 sec until identify mode is stopped or after the EZ-mode time has expired. If the user enters the menu again another 3 minutes is started.

### 5.2.3 Factory reset

To allow a device to join a network, one either has to power up a device that has not previously joined a network or push the button until the Reset To Factory default mode is indicated – and subsequently release the button. This will cause the device to reset to its factory default state and scan for a suitable coordinator.

## 5.3 Action on Power On

As a general rule, all end devices and routers that have not previously joined a network (or have been reset to factory default) will start up and search for a network with join permit open. In this mode, the Yellow LED will flash while searching for a network to join.

Once the device has joined the network, it will start scanning for an OTA server, Time server, Poll control client and an IAS Zone client.

If a device has joined a network and is powered down, it will attempt to rejoin this network upon power up. For the first 30 seconds hereafter, the device will be available for communication. This time can be expanded using the poll control cluster functionality.

## 6 General network behaviour

### 6.1 Installation

When the device is virgin and powered for the first time it will start looking for a ZigBee PAN Coordinator or router to join. The device will scan each ZigBee channel starting from 11 to 24. The LED will flash once every second until it joins a device.

#Scan mode - 1	#Sleep mode	#Scan mode - 2	#Sleep mode	#Scan mode - 2
Scan all 16 ZigBee channel until join network or 15 minutes	MCU is in sleep mode (Radio off) 15 minutes	Scan all 16 ZigBee ch x 1 or until join network ~ 30 seconds	MCU is in sleep mode (Radio off) 15 minutes	Scan all 16 ZigBee ch x 1 or until join network ~ 30 seconds

The device will start up using scan mode 1. To increase battery lifetime when the device is joining a network for the first time a scan mode 2 will be used after scan mode 1 has expired. Scan mode 1 it will only be executed one time when the device is powered. If the user invokes EZ-mode it will start scanning the next 3 minutes

In section 5 "MMI" it is explained how to put the device into a join or leave network mode.

Network settings are stored in NV-memory are after a power cycle the device re-join the same network.

If the device has to join a new PAN coordinator the MMI menu supports a **"Reset To Factory Fresh Settings"** mode. This will erase all current network information.

### 6.2 Normal – Keep alive

The device is sending a "keep alive" message to the PAN coordinator every 15 minute to verify that the device is still connected to the network.

#### 6.2.1 Network lost

If no "keep alive" responses are received 5 times in a row (Worst case 1h15m), the devices will start scanning as specified in the table below.

When the device is in scan mode the YELLOW LED will flash once every second until it re-joins the network.

According to the ZigBee specification TX is NOT allowed to be enabled all the time and a TX silent period has to be defined.

#Scan mode - 1	#Sleep mode	#Scan mode - 2	#Sleep mode	#Scan mode - 2
Scan current channel 3 times Scan remaining 15 channel 1 time Scan all 16 ch 3 times	MCU is in sleep mode (Radio off) 15 minutes	Scan current ch 3 times Scan remaining 15 channel 1 time	MCU is in sleep mode (Radio off) 15 minutes	Scan current channel 3 times Scan remaining 15 channel 1 time

### 6.3 Low battery

The current battery voltage can be read from the power configuration cluster described in section 4.3.1. The attribute "*BatteryVoltage*" is measuring the battery voltage, in units of 100mV.

Low batt LED indication – YELLOW LED will blink twice every 60 second

## 7 Specifications

<b>General</b>	
Dimensions (L x B x H)	90 x 90 x 22 mm
Colour	White – Optional black
Battery	Battery: 4 x AA Alkaline
Battery life	12 Months (Normal usage)
Radio	Sensitivity: -100 dBm
	Output power: +8 dBm (EU)
Environment	IP class: IP65
	Operation temperature 0 to +50°C
<b>Function</b>	
Presence	Detection of person present within 5 – 10 cm Detection interval 500 ms (1s reaction)
RFID	Mifare reader Reading distance ~5 cm
Keypad	'0' – '9' + 6 function buttons Backlight: On when unit active (person present) and light level low
<b>Communication</b>	
Wireless protocol	ZigBee 3.0
	ZigBee end-device
<b>Certifications</b>	
	Conforming to CE, RoHS and REACH directives

## 8 Contact Information

**Technical support:** Please contact Develco Products for support.  
[products@develcoproducts.com](mailto:products@develcoproducts.com)

**Sales:** Please contact Develco Products for information on prices, availability, and lead time.  
[info@develcoproducts.com](mailto:info@develcoproducts.com)



QUALITY SYSTEM  
DS/EN  
ISO 9001





## Smart Siren - SIRZB-110

### Technical manual

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## 2 Features

### 2.1 Smart Siren - SIRZB-110

Expand your security system with a combined siren, voice prompt, and range extender.

The Zigbee-based Smart Siren has several functionalities. Firstly, the siren can emit a loud sound, making it suitable for security purposes. If intruders, burglars, or other unwanted guests enter your customer's property, the siren emits a ~3 kHz alarm sound (90 dB @ 1 m) and sends a notification to the smart home system.

Key features are:

- Siren with alarm sound
- Voice prompt with up to 50 sound clips
- Range extender for Zigbee networks with battery backup
- Power Failure alarm
- Tamper-protected
- ZigBee OTA cluster for firmware upgrades

Voice prompt communication with the user

The Smart Siren includes a voice prompt. You can either decide what you wish the voice prompt to say or you can let your customers decide. The Smart Siren has capacity for 6 minutes of sound distributed over 50 sound clips. You can record standard messages for the speaker to play in certain scenarios, such as "alarm", "fire" and "motion" in combination with areas like "kitchen", "living room" and "bedroom". For instance, you can program the voice prompt to say, "alarm activated in living room" or "fire detected in kitchen".

Range extender with battery backup

The Smart Siren also features a range extender functionality that can strengthen Zigbee communication between devices and the gateway, for instance, if devices are placed far from the gateway and the signal is weak. The Smart Siren has a battery backup, so it will still be able to communicate in case of a power cut. The device includes a tamper switch that detects opening of the unit, making it suitable for alarm systems.

## 3 Endpoints

The device has 3 endpoints:

### 3.1 ZigBee Device Object (ZDO)

- Application profile Id 0x0000
- Application device Id 0x0000
- Supports all mandatory clusters

### 3.2 Smart Siren – End Point 0x2B

- Application profile Id 0x0104 (Home Automation)
- Application device Id 0x0403 (IAS Warning Device)
- Clusters
  - Clusters supported as server
    - Basic
    - Identify
    - IAS Zone
    - IAS WD
    - Power Configuration
  - Clusters supported as client
    - OTA Upgrade
    - Time

### 3.3 Develco Utility

- Application profile Id 0xCoC9 (Develco Products private profile)
- Application device Id 0x0001
- Develco ZigBee Manufacturer code 0x1015
- Private profile for internal Develco Products use only.

## 4 Supported Clusters

### 4.1 Basic – Cluster id 0x0000

The Basic cluster has 2 attribute sets defined. In the following sections the attributes of these sets is listed. Refer to Fejl! Henvisningskilde ikke fundet. for ZigBee specification of the basic cluster.

Only the first set has mandatory attributes, also the optional attributes that can be relevant to a device are all in set 0x000

#### 4.1.1 0x0000 Basic Device Information attribute set

Id#	Name	Type	Range	Man/Opt	Relevance and ref.
0x00	ZCLVersion	UInt8	Type range	M	
0x04	ManufacturerName	String	0-32 byte	O	
0x05	ModelIdentifier	String	0-32 byte	O	
0x06	DataCode	String	0-16 byte	O	
0x07	PowerSource	8 bit enum	Type range	M	

##### 4.1.1.1 Manufacturer name

“Develco Products A/S”

##### 4.1.1.2 Model identifier

“SIRZB-110”

##### 4.1.1.3 Power source

Mains powered single phase

##### 4.1.1.4 Manufacture Specific Attribute

Id#	Name	Type	Relevance and ref.
0x8000	Primary SW Version	OctetString	Read only
0x8010	Primary Bootloader SW Version	OctetString	Read only
0x8020	Primary HW version	OctetString	Read only
0x8030	Primary HW name	OctetString	Read only
0x8050	Primary SW Version 3 <sup>rd</sup> Party	OctetString	Read only

ZCL header setting – Manufacturer code for Develco Products is 0x1015

## 4.2 Identify – Cluster id 0x0003

The identify cluster serves as a way to make a device identify itself either visually or by sound.

Normally this is done by toggling an LED at some interval.

Refer to *Fejl! Henvisningskilde ikke fundet.* for ZigBee specification of the identify cluster.

The Identify cluster only defines one attribute.

### 4.2.1 Attribute

Id#	Name	Type	Range	Man/Opt	Relevance and ref.
0x0000	IdentifyTime	Uint16	Type range	M	

#### 4.2.1.1 Commands

The identify cluster has 2 commands as server.

Id#	Name	Payload	Man/Opt	Relevance and ref.
0x00	Identify	Uint16 - Identify Time (seconds)	M	
0x01	Identify Query	None	M	

The identify cluster has 1 command as client.

Id#	Name	Payload	Man/Opt	Relevance and ref.
0x00	Identify Query Response	Uint16 - Identify Time (seconds)	M	

## 4.2.2 IAS WD – Cluster id 0x0502

The IAS WD cluster is described in ZigBee Cluster Library Specification.

Using this cluster, a ZigBee device can access a ZigBee enabled IAS WD device and issue different alarm warning indications when a system alarm condition is detected.

### 4.2.2.1 Attribute

Id#	Name	Type	Range	Man/Opt	Relevance and ref.
0x0000	<i>MaxDuration</i>	Uint16	Type range	M	Default is 240 sec

The *MaxDuration* attribute specifies the maximum time in seconds that the siren will sound continuously, regardless of start/stop commands.

### 4.2.2.2 Commands

The IAS WD cluster has 2 command as server.

Id#	Name	Man/Opt	Relevance and ref.
0x00	<i>Start warning</i>	M	
0x01	<i>Squawk</i>	M	

#### 4.2.2.2.1 Command - Start warning

This command starts the WD operation. The WD alerts the surrounding area by audible (siren).

The *Start Warning* command payload shall be formatted as illustrated

Bits	4	2	2	16	8	8
<i>Data Type</i>	Map8			Uint16	Unit8	Unit8
<i>Field Name</i>	Warning mode	NA	Siren level	Warning Duration	NA	NA

##### 4.2.2.2.1.1 Warning Mode file

The following warning modes are supported

Warning mode	Meaning
0	Stop (no warning)
1	Burglar
2	Fire
3	Emergency
4	Panic
5	Panic Fire
6	Panic Emergency



#### 4.2.2.2.1.2 Siren Level

The following levels are supported

Warning mode	Meaning
0	Low level
1	Medium level
2	High level
3	Very high

#### 4.2.2.2.1.3 Warning duration field

Requested duration of warning, in seconds. If both Strobe and Warning Mode are "0" this field is ignored

#### 4.2.2.2.2 Command - Squawk

This command uses the WD capabilities to emit a quick audible/visible pulse called a "squawk".

The *Start Squawk* command payload shall be formatted as illustrated

Bits	4	1	1	2
<i>Data Type</i>	Map8			
<i>Field Name</i>	Squawk mode	NA	Reserved	Squawk level

#### 4.2.2.2.2.1 Squawk mode field

The following modes are supported

Warning mode	Meaning
0	Notification sound for "System is armed"
1	Notification sound for "System is disarmed"

#### 4.2.2.2.2.2 Squawk Level field

The following Squawk levels are supported

Warning mode	Meaning
0	Low level
1	Medium level
2	High level
3	Very high

## 4.3 IAS Zone Device – EP 0x23

### 4.3.1 IAS Zone - Cluster id 0x0500

The IAS Zone cluster is described in ZigBee Cluster Library Specification

#### 4.3.1.1 Attribute

Id#	Name	Type	Man/Opt	Relevance and ref.
0x0000	Zone State	8-bit Enumeration	M	
0x0001	Zone Type	16-bit Enumeration	M	Hard coded to 0x0225 Standard Warning Device
0x0002	Zone Status	Uint16	M	The following bits are supported: Bit0: Alarm 1 Bit2: Tamper Bit3: Battery (1-2 hours left) Bit4: Supervision reports Bit5: Restore reports Bit7: AC (Mains) Bit8: Test
0x0010	IAS CIE Address	Valid 64-bit IEEE address	M	IEEE address of the siren
0x0011	ZoneID	Uint8	M	

##### 4.3.1.1.1 Zone State

The device will automatically start to scan the network for an IAS Zone client in a predefined interval. When the client is found it will automatically attempt to enrol. When it has successfully enrolled the Zone Status command is sent every 5 minutes.

The attribute value will change from not enrolled (0x00) to Enrolled (0x01)

##### 4.3.1.1.2 IAS CIE Address

Attribute specifies the address that commands generated by the server shall be sent to.

To un-enroll the device the back end system has to write a new address into this attribute. Any value is valid. If the back end system writes an IEEE address then it will try to enrol to this device represented by the IEEE address.

##### 4.3.1.1.3 ZoneID

A unique reference number allocated by the CIE at zone enrollment time.

Used by IAS devices to reference specific zones when communicating with the CIE. The *ZoneID* of each zone stays fixed until that zone is unenrolled

#### 4.3.1.2 Commands

The IAS Zone cluster has 2 commands as server.

Id#	Name	Payload			Man/Opt	Relevance and ref.
0x00	Zone Status Change Notification	Uint16 – bit mask			M	The status is report to the coordinator every 5 min
0x01	Zone Enroll Request	Bits	16	16	M	
		Data type	16 bit enum	UINT16		
		Field name	Zone type	Manufacturer code		

Init sequence – when the device has join the network it start to scan for an IAS zone client cluster. If a client is found a Zone enroll request command is send and a Zone Enroll response is expected. If it doesn't receive a response within 15 sec it gives up and will continue to scan x number of attempts. When the init sequence is over it will enter a state where it scans for a client every 12 hour.

The following bits are supported in Zone status:

Bit0: Alarm 1

Bit2: Tamper

Bit3: Battery, When the battery has 1-2 hours left. Battery bit is set high and "Zone Status" is transmitted to the coordinator.

Bit4: Supervision reports

Bit5: Restore reports

Bit7: AC (Mains)

Bit8: Test

Bit0,

#### Note: How to clear a alarm in the "Zone status"

The device requests ZCL Default Response on the Zone Status Change notification, if any new Alarm bit has been set. Until the IAS CIE has acknowledged the received alarm by sending the mandated Default Response, the Alarm bits are not cleared – even if there is no longer an alarm situation. When the Default Response is received, a new Zone Status Change notification is sent with the Alarm bits cleared, if the alarm situation has disappeared since sending the Zone Status message with alarm set.

## 4.4 Time – Cluster id 0x000A

The Time cluster is a general cluster for time it is based on a UTC time in seconds since 0 hrs 0 mins 0 sec on 1st January 2000. Refer to Fejl! Henvisningskilde ikke fundet. for ZigBee specification of the time cluster.

The metering device will use this clusters as a client – provided that a suitable Time Server is available on the network (most likely on the Gateway/concentrator)

### 4.4.1 Attribute

Id#	Name	Type	Range	Man /Opt	Relevance and ref.
0x0000	Time	UTCTime (Uint32)	Type range	M	The module will periodically update its clock by synchronizing through this cluster
0x0001	TimeStatus	8 bit bitmap	00000xxx	M	
0x0002	TimeZone	Uint32	Type range	O	
0x0003	DstStart	Uint32	Type range	O	
0x0004	DstEnd	Int32	Type range	O	
0x0005	DstShift	Uint32	Type range	O	

### 4.4.2 Power Configuration - Cluster id 0x0001

The power configuration cluster is described in ZigBee Cluster Library Specification

#### 4.4.2.1 Attribute

Id#	Name	Type	Range	Man/Opt	Relevance and ref.
0x0020	BatteryVoltage	Uint8	0x00 - 0xFF	O	ZCL configure reporting is supported
0x0034	BatteryRatedVoltage	Uint8	30	O	Unit is in 100 mV

Note: The attribute "*BatteryVoltage*" is measuring the battery voltage, in units of 100mV.

## 4.5 OTA Upgrade – Cluster id 0x0019

The cluster provides a ZigBee standard way to upgrade devices in the network via OTA messages.

### 4.5.1 OTA Cluster Attributes

Id#	Name	Type	Range	Man /Opt	Relevance and ref.
0x0000	UpgradeServerID	IEEE Address	-	M	
0x0001	FileOffset	Uint32	Type range	O	
0x0002	CurrentFileVersion	Uint32	Type range	O	
0x0003	CurrentZigBeeStackVersion	Uint16	Type range	O	
0x0004	DownloadedFileVersion	Uint32	Type range	O	
0x0005	DownloadedZigBeeStackVersion	Uint16	Type range	M	
0x0006	ImageUpgradeStatus	8 bit enum	0x00 to 0xFF	O	
0x0007	Manufacturer ID	Uint16	Type range	O	
0x0008	Image Type ID	Uint16	Type range	O	
0x0009	MinimumBlockRequestDelay	Uint16	Type range	O	

Above attribute description is to be found in section 6.7 “OTA Cluster Attributes” in ZigBee document – “zigbee-ota-upgrade-cluster-specification” provided by the ZigBee alliance.

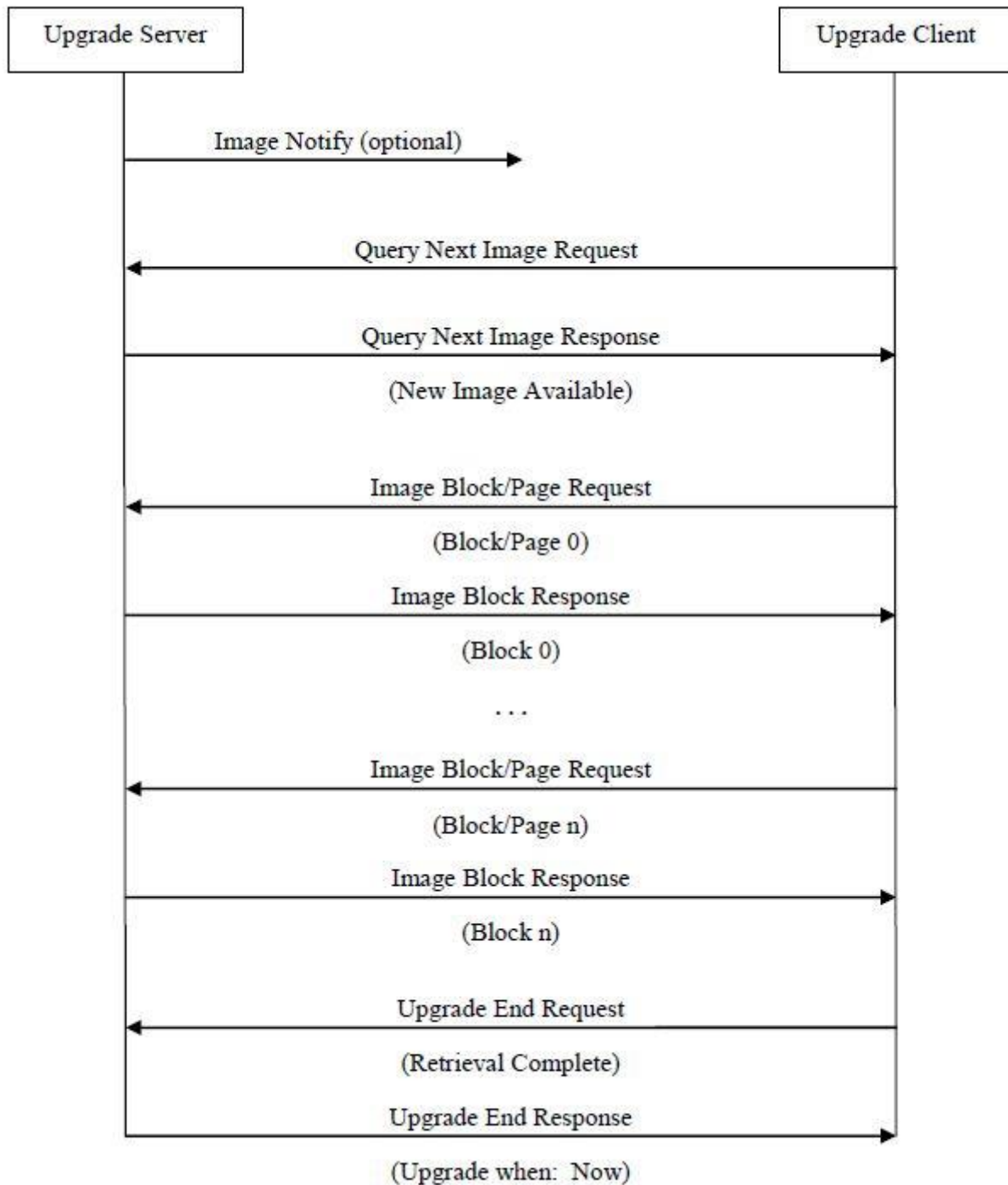
### 4.5.2 OTA Cluster Commands

The OTA Client cluster can send the following commands

Id#	Name	Man /Opt	Relevance and ref.
0x01	Query Next Image request	M	6.10.1 OTA Cluster Command Identifiers
0x03	Image Block Request	M	6.10.1 OTA Cluster Command Identifiers
0x06	Upgrade End Request	M	6.10.1 OTA Cluster Command Identifiers

### 4.5.3 OTA Upgrade Diagram

OTA Upgrade Message Diagram

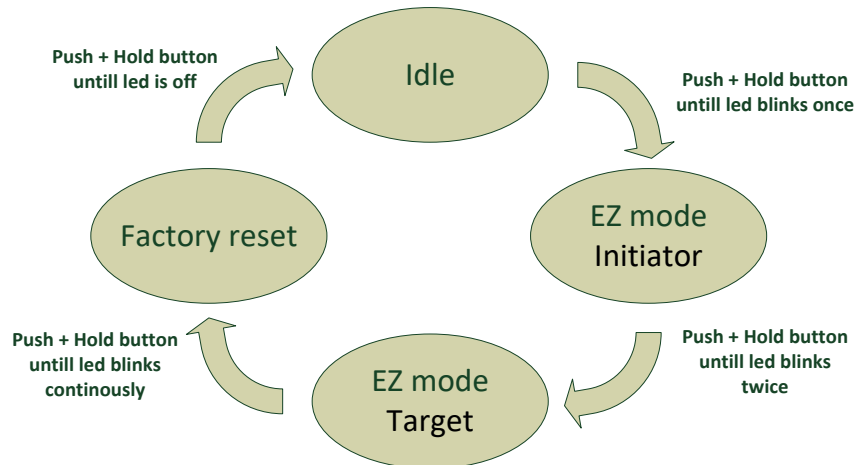


## 5 MMI user guide

### 5.1 Push button menu

Pushing the button on a device provides the user with several possibilities.

Pushing the button for longer (push, hold for a few seconds, and release) allows the user to set the device into a desired mode. A mode change happens at 5 second interval. Below, these modes are illustrated in a state chart.



When cycling through the menu modes, the state is indicated by a number of 100ms blinks on the LED. The device is supporting the ZigBee standardized EZ- mode Commissioning.

#### 5.1.1 EZ mode – Initiator

If the device is not on the network EZ-Mode Network Steering is invoked when the user enters this menu. The led blinks once every 1 sec until the devices has joined the network. If the device was already on the network, it will broadcast the PermitJoin messages. It is the trust center policy that decides if the device can join the network.

When the device has joined the network EZ-Mode Finding and Binding is invoked, and the device start to blink every 3 sec until a cluster match is found. When a match is found, or the cluster examine is finished the blinking stops and the device sends a messages to the target device to stop the identify time.

The following clusters are support in EZ-mode finding and binding:

- No clusters supported

The EZ-mode time is hard coded to 3 minutes. This is the Minimum and recommended PermitJoin time broadcast for EZ-Mode Network Steering and minimum IdentifyTime set for EZ-Mode Finding and Binding. If the user enters the menu again another 3 minutes is started.

### 5.1.2 EZ mode – Target

If the devices are not on the network EZ-Mode Network Steering is invoked when the user enter this menu. The led blinks twice every 1 sec until the devices has joined the network. If the device was already on the network, it will broadcast the PermitJoin messages. It is the trust center policy that decides if the device can join the network.

When the device has joined the network identify mode is invoke and the device start to blink twice every 3 sec until identify mode is stopped or after the EZ-mode time has expired. If the user enters the menu again another 3 minutes is started.

### 5.1.3 Factory reset

To allow a device to join a network, one either has to power up a device that has not previously joined a network or push the button until the Reset To Factory default mode is indicated – and subsequently release the button. This will cause the device to reset to its factory default state and scan for a suitable coordinator.

## 5.2 Action on Power On

As a general rule, all end devices and routers that have not previously joined a network (or have been reset to factory default) will start up and search for a network with join permit open. In this mode, the LED will flash once every second.

Once the device has joined the network, is will start scanning for an OTA server and Time server.

If a device has joined a network and is powered down, it will attempt to rejoin this network upon power up



## 6 General network behavior

### 6.1 Installation

When the device is virgin and powered for the first time it will start looking for a ZigBee PAN Coordinator or router to join. The device continually scans each ZigBee channel starting from 11 to 24. The LED will flash once every second until it joins a device.

In section 5 "MMI" it is explained how to put the device into a join or leave network mode.

Network settings are stored in NV-memory and after a power cycle the device re-join the same network.

If the device has to join a new PAN coordinator the MMI menu supports a "Join / Leave" mode.

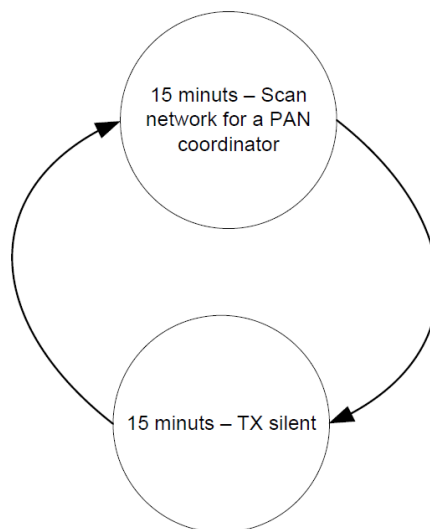
### 6.2 Normal – Keep alive

The device is sending a "keep alive" message to the PAN coordinator every 15 minutes to verify that the device is still connected to the network.

#### 6.2.1 Network lost

If no "keep alive" responses are received 5 times in a row (1 hour and 15 minutes), the device will start scanning every ZigBee channel for the PAN coordinator and try to re-join it. The LED will flash once every second until it re-joins the network.

According to the ZigBee specification TX is NOT allowed to be enabled all the time and a TX silent period has to be defined.



## 7 Specifications

### 7.1 General

Dimensions	Ø 119 x 49 x 23 mm
Colour	White
Power supply	230V
Power consumption,	0.4W
IP-class	20
Storage temperature	-20°C to +80°C
Operation temperature	0 to +50°C
Supply voltage	207 to 253 VAC
Sensitivity	-101 dBm @ 1% PER
Output power	+12 dBm
Frequency band	47 to 53 Hz
Siren	3.2 kHz - 90 dBm distance 1m
Voice prompt	50 sound clips
Voice Quality	Smart Phone Speaker
Range Extension	ZigBee Router supporting MESH

## 8 Contact Information

**Technical support:** Please contact Develco Products for support.  
[products@develcoproducts.com](mailto:products@develcoproducts.com)

**Sales:** Please contact Develco Products for information on prices, availability, and lead time.  
[info@develcoproducts.com](mailto:info@develcoproducts.com)

