

SE Devices - ARxx01 v3

Standalone Relay Z-Wave Units

User Manual

Introduction

The SE Devices Standalone Z-Wave Relays is a series of units which can be used to add remote control functionality to an electrical installation. The units are designed to be hidden within Wall Boxes and for exclusive control via Z-Wave.

This product can be operated in any Z-Wave network with other Z-Wave certified devices from other manufacturers. All non-battery operated nodes within the network will act as repeaters regardless of vendor, to increase reliability of the network. The devices are Security Enabled Z-Wave Plus Products. A Security Enabled Z-Wave Controller must be used to fully utilize the products.

There are 2 different Relay units available; 1-Pole 3000W Relay and 2-Pole 1800W Relay (switches both Live and Neutral phases). They are designed to be remote controlled from these units by adding them in the available Z-Wave Association Groups of those units. Both Relay units are functionally identical seen from a Z-Wave perspective, and the only difference is the Relay hardware.

DISCLAIMER and WARNINGS

The SE Devices Standalone Z-Wave Devices are powered from Mains voltage (230V), and **MUST ONLY** be installed by authorized electricians. Mains Voltage is very dangerous and can cause serious injury or death if mishandled. If the devices are not correctly installed, the devices can in the worst case pose a fire hazard.

SE Devices can **NOT** be held responsible for injuries or accidents resulting from incorrect installation and configuration, or installations performed by unauthorized installers.

The SE Devices units provide functionality for automatic shut-down in overload or RF signal loss situations. These are safety features which should be used when the units control heating systems, to protect from potentially dangerous situations. **ALWAYS** make sure the Safety functionality of the devices is activated when using the components for Heating control. SE Devices can not be held responsible for any damage caused by controlled heating systems, even when configuration and installation is technically correct. Always hire professionals to install the devices, to reduce the risk of damage caused by the heating system.

Installation

Please refer to the “Standalone Z-Wave Devices” Installation Manual, for information on device assembly and installation.

Basic Default Operation

Both Relay Standalone Units are functionally identical, and provides functionality for remote controlling Lights ON / OFF or Heating Systems. They come with two types of physical relays, providing slightly different functionality:

- **1-Pole Relay 3000W**
This relay supports a load of up to 3000W, but only cuts the Live Phase when turned OFF.
- **2-Pole Relay 1800W**
This relay supports a load of up to 1800W, and cuts both the Live and Neutral phases. This provides extra safety when the device is in an OFF state, as it insures no current can run on any of the Load side wires when OFF. In some countries, this is a requirement when installing electrical equipment outside or in wet-rooms (like bathrooms etc.).

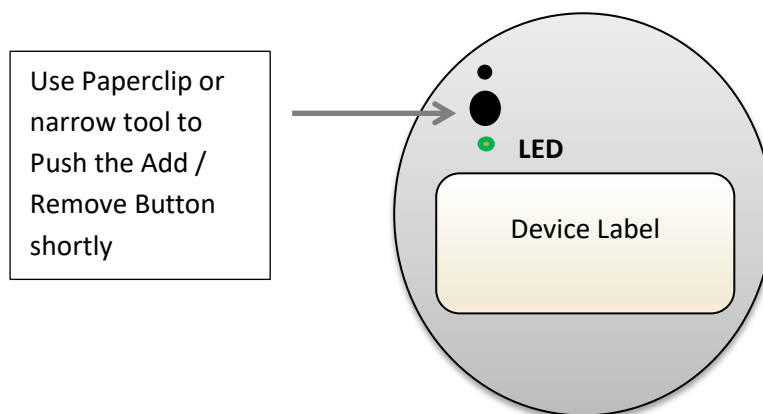
Adding and Removing from Z-Wave Network

The Standalone Z-Wave units have a button located at the top left part of the unit, on the opposite side of the connector (the widest center hole).

To add the device to a Z-Wave network, the Z-Wave Controller must first be set into Add (Learn) mode. Then use a paperclip or a small pointy tool to push and hold the button in the button hole for approximately a second. The device LED will blink twice to indicate that it sends information to the Controller.

The Controller should now discover the device and add it to the Z-Wave network. Once added, the device should respond to Basic ON / OFF commands and Binary Switch Commands.

Exclusion is done by setting the Controller in Remove Mode (instead of add mode), and then follow the exact same procedure on the device itself.



Push the indicated button shortly, to execute an Add or Remove procedure.

Troubleshooting Inclusion problems

If the device is not added when following this procedure, please first make sure that the device LED blinks twice when pushing the Add button. If you did not see the LED blink, make sure you pushed and held the button for at least one second. Do not release the button before you see the LED blink twice.

If the Add procedure still fails (no response from the controller), it may be caused by the device thinking it is already added in another Z-Wave network. This can happen if the device has been added to a different controller before, or if the controller was only able to partially add the device (usually caused by radio coverage problems covered below). Before you proceed, try executing a Remove procedure on the device first, and then execute the Add procedure once more. It is good practice to always do this (Remove first, then re-add) if you have tried and failed to add a device at least once.

Radio Coverage and Network Wide Inclusion

The most common problem when adding fails, is insufficient radio coverage. Z-Wave devices have a minimum line of sight radio range of 40 meters. But depending on the building materials in the surroundings, the experienced range may be less. Typically reinforced concrete walls may cause problems, as such walls can block the Radio signal almost completely. The Z-Wave technology however makes it possible to add devices out of range to the controller, using Network Wide Inclusion mode. If this is supported by your controller, you should try to add other devices with better radio conditions first, and then add the most troublesome devices afterwards. Doing this may provide a “route” for the troublesome devices, via other devices with sufficient radio coverage.

Always work your way outwards from the controller, adding the closest devices first and moving farther and farther away from the controller as you go. Note that concrete walls can be troublesome, and devices mounted on such walls should never be the first to be added (except if they are in close vicinity to the Controller).

Use a Secondary Z-Wave Plus Controller for Adding the devices

This procedure is recommended for professional installers, as they can keep a Secondary Hand held Controller as part of his installation Tool Kit.

First add the Secondary Hand-held Controller to the Z-Wave network. This should be done close to the Primary Controller. Then bring the Secondary Controller close to the troublesome device, and execute the device add procedure from the Secondary (hand held) controller (remember to first execute a Remove procedure, then do another Add procedure. If you do not intend to continue using the Secondary Controller in the Z-Wave network, make sure you Remove the Secondary Controller from the network when you are done.

Z-Wave Command Classes and Features

The device is a Z-Wave Plus Device, and thus support all command classes required for Z-Wave Plus. In addition the device supports Basic and Multilevel Switch control commands for light control.

Z-Wave Specific Device Information

The device reports the following Z-Wave device specific information:

Property	Reported value
Device Type	On/Off Power Switch
Basic Device Class	ROUTING_SLAVE
Generic Device Class	GENERIC_TYPE_SWITCH_BINARY
Specific Device Class	SPECIFIC_TYPE_POWER_SWITCH_BINARY
Z-Wave Plus Node Type	NODE_TYPE_ZWAVEPLUS_NODE
Z-Wave Plus Role Type	ROLE_TYPE_SLAVE_ALWAYS_ON
Z-Wave Plus Icon Type	GENERIC_ON_OFF_POWER_SWITCH
Z-Wave Plus User Icon Type	GENERIC_ON_OFF_POWER_SWITCH

Manufacturer Specific Device Information:

Property	Reported value
Manufacturer ID	0x024F
Product Type ID	0x0003
Product ID (2 Pole 1800W)	0x1010
Product ID (1 Pole 3000W)	0x1013

Supported Z-Wave Command Classes

The following table lists all the supported Command Classes supported by the device. The usage of each command class is covered in the following sections. The device supports S0 and S2- Unauthenticated security.

Supported Command Classes	Insecure Inclusion	Insecure on Secure Inclusion	Secure on Secure Inclusion
COMMAND_CLASS_ZWAVEPLUS_INFO (V2)	Yes	Yes	
COMMAND_CLASS_TRANSPORT_SERVICE (V2)	Yes	Yes	
COMMAND_CLASS_SECURITY	Yes	Yes	
COMMAND_CLASS_SECURITY_2	Yes	Yes	
COMMAND_CLASS_SUPERVISION (V1)	Yes	Yes	
COMMAND_CLASS_ASSOCIATION (V2)	Yes		Yes
COMMAND_CLASS_ASSOCIATION_GRP_INFO (V1)	Yes		Yes
COMMAND_CLASS_BASIC (V1)	Yes		Yes
COMMAND_CLASS_CONFIGURATION (V1)	Yes		Yes
COMMAND_CLASS_DEVICE_RESET_LOCALLY (V1)	Yes		Yes
COMMAND_CLASS_FIRMWARE_UPDATE_MD (V4)	Yes		Yes
COMMAND_CLASS_MANUFACTURER_SPECIFIC (V2)	Yes		Yes
COMMAND_CLASS_METER (V2)	Yes		Yes
COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION (V3)	Yes		Yes
COMMAND_CLASS_POWERLEVEL (V1)	Yes		Yes
COMMAND_CLASS_SENSOR_MULTILEVEL (V5)	Yes		Yes
COMMAND_CLASS_SWITCH_BINARY (V1)	Yes		Yes
COMMAND_CLASS_VERSION (V3)	Yes		Yes

Supported Relay Control Related Command Classes

The following Control command classes are supported for Relay control and power monitoring:

Command Class	Supported Units	Functionality
Basic	All	Used for ON/OFF switch functionality
Binary Switch v1	All	Used for ON/OFF switch functionality.
Sensor Multilevel	All	Reports the current Voltage, Current and Power consumed by the Load connected to the Unit. Power is reported periodically.
Meter	All	Reports Accumulated Power Consumption (Energy) over time. One report is sent every 15 minutes, and the current consumption can be requested any time.

Effect of Basic Set Command Values

When a Basic Set Command is received, it will be mapped to the Binary Switch Set command, and then executed accordingly. For Light Control, the command values thus have the following effect:

Values	Effect on Relay
0	Turns OFF
1 – 99	Turns ON
100 – 254	Ignored
255	Turns ON

Supported Management Command Classes

This table defines all supported command classes not required explicitly by the Z-Wave Plus standard.

Command Class	Functionality
Association Multichannel Association	Supports associating other devices to be controlled by state changes on the local device.
Configuration	Used to control operational functionality of the device beyond the simple Default operation.
Version	Provides Hardware and Software version information for the device
Firmware Update	Makes it possible to update the firmware of the device Over The Air

Multilevel Sensor Command Class and Events

The device supports the Sensor Multilevel Command Class (V5), which is used to report the following parameters:

- **Power** – Reports the Power consumption on the device output. Reported unsolicited once every minute, and can otherwise be requested at any time via the Sensor Multilevel Get command.
- **Voltage** – Reports the supply voltage of the device. Only Reported as a response to a Sensor Multilevel Get command.
- **Current** – Reports the current draw on the device output. Only Reported as a response to a Sensor Multilevel Get command.

Association Groups

The Standalone devices have two Association groups. One is for Lifeline Reports, and the other will mirror any state changes performed by the device. This makes it possible to link multiple devices together, and control them as one single device. Both groups support Multichannel Association.

Association Group	Node Limit	Functionality
1	Max 5 Nodes (Lifeline Group)	The Lifeline group where all Root Device events are reported. All unsolicited Reports for the supported command classes will be issued to this group. Commands Issued: - Sensor Multilevel Report - Reports Power Consumption and Temperatures - Meter - Reports power consumption to the Controller every 15 minutes. - Device Reset Locally – Reports factory resets to the Controller
2	Max 5 Nodes (Zone Local)	Associated devices will be controlled according to local state changes. Supports Multichannel Association in addition to standard association. Command Issued: Basic Set

Configuration

All functionality except for the Default Operation is controlled via Configuration SET commands. All available configurations are described in the following sections, in relation to the functionality each configuration controls.

Advanced Device Functionality

This section details all the Advanced functionality available on the device, and also explains the Z-Wave Configuration Parameters which controls the specific functionality.

Safety Mode Configuration

One use-case for the Standalone Relay unit is for Heating systems control. This is achieved by adding the Relay device to a Thermostat controlled Association Group of an external device. One problem with such a configuration is what will happen if the Remote Unit for some reason stops sending Control commands, leaving the Heating in a permanent ON state. In worst case scenario this could be a fire hazard.

The Standalone Relay Units have a solution to this, which puts the Unit into Safety Mode if no control message has been received for a period of time. The Safety Mode can be configured to turn the Load off indefinitely, or alternate between ON and OFF at given intervals. This of course depends on the Remote Thermostat also having a feature to repeat Commands periodically, in order to avoid the Back Unit to go into safety mode under normal operation conditions (see Advanced Thermostat Operation Configuration for more information).

The Back Unit safety mode is controlled by the following configuration registers:

Config Register	Value Size	Default Value	Configuration Name	Description
4	2	0 sec	Safety Activate Delay	Safety Mode is activated after the configured number of seconds has elapsed. It will start by turning OFF the Back Unit when activated. A 0 value Disables Safety Mode. The MAX limit is 32767 seconds (9 hours, 6 minutes and 7 seconds)
5	2	600 sec (10 min)	Safety OFF Period	The number of seconds to stay in OFF mode when Safety is activated. The Back unit turns ON when the timer have elapsed. If value is 0, the Back Unit will not turn back ON. The MAX limit is 32767 seconds (9 hours, 6 minutes and 7 seconds)
6	2	300 sec (5 min)	Safety ON Period	The number of seconds to stay in ON mode when Safety is activated. The Back Unit turns back OFF when the timer have elapsed (and continues to turn ON and OFF alternately). If value is 0, the Back Unit WILL NOT turn ON at all. The MAX limit is 32767 seconds (9 hours, 6 minutes and 7 seconds)

NOTE1! By default the Back Unit Safety feature is disabled, and must be actively enabled via Configuration Parameters.

Other Configuration Parameters

The device has a couple of Read-Only parameters which can be used to retrieve additional information from the device. These parameters cannot be changed by the user, and only provides information about the current device combination.

Config Param	Value Size	Configuration Name	Description
1	1	Hardware Combination Identifier	<p>Byte which uniquely describes the combination of formfactor and functionality for the current device. The first nibble (4 bits) Identifies the Controlling Unit type, which is always 0x1 for the Stand alone Pucks.</p> <p>The combined Byte then yields the following:</p> <ul style="list-style-type: none"> - 0x10 – 2-Pole 8A Relay - 0x11 – 1-10V Dimmer - 0x12 – 230V MOSFET Dimmer - 0x13 – 1-Pole 16A Relay
16	1	Back Unit type	<p>Provides an Identifier for the device functionality, which is the same across all devices in the SEdevices product range (including Front Units).</p> <ul style="list-style-type: none"> - 0x00 – 2-Pole 8A Relay - 0x02 – 230V MOSFET Dimmer - 0x04 – 1-10V Dimmer - 0x06 – 1-Pole 16A Relay

Factory Reset

Follow this procedure to Factory Reset the Multifunction Switch. This will restore all configuration back to the default settings, and remove the device from the Z-Wave network.

WARNING! Executing a Factory Reset on a device may make it stop working as wanted and WILL remove it from the Z-Wave network. Please DO NOT execute this procedure unless it's absolutely necessary.

Press and Hold the Add/Remove button for about 15 seconds - until LED indicator starts blinking. Then release the button. The device will now be factory reset and removed from the Z-Wave network.

The button is located some 5 mm down in the middle of the three holes on the front. A thin tool (a very small screwdriver, a toothpick, a paper clip or similar) is needed to access the button.