

SE Devices - FMS01 v3.0

Multifunction Switch Z-Wave

User Manual

Introduction

The SE Devices Multifunction Switch is a modular Wall-Box mountable Z-Wave device, providing four configurable Push Buttons. The device can be added to and remote controlled via a Z-Wave Home Automation network. 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 Switch Front can be combined with a compatible Back Unit (which mounts inside a wall-box) to provide local control functionality to the Switch. It can also operate in a Stand-Alone mode, powered via a Cascade Connector to another unit (Multifunction Switch or Wheel Controller). In addition, temperature sensors can be connected to the device, which makes it possible to use the device as a remote controlled Thermostat.

A variety of Back Units which provide local functionality like relay or dimming control, are available as accessories for the Switch.



Different Front Covers available for the Multifunction Switch.

Each Button also have a corresponding LED, which can indicate the current mode of the Switch. The switch can be configured to control external dimmers and switches directly via Z-Wave Association. The switch can also be configured to issue Scene Activation Commands, which makes it possible to use the switch as a scene controller.

DISCLAIMER and WARNINGS

The SE Devices Modular Z-Wave Devices (included but not limited to the Multifunction Switch Z-Wave) 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 a Floor Max temperature setting. This is a safety feature used for protecting wooden floors from overheating, as excessive floor heat can cause wooden floors to warp and eventually crack. **ALWAYS** use a Floor Temperature sensor in installations controlling floor heating for wooden floors, and configure the Floor MAX temperature according to the floor manufacturer recommendation. Due to the fact that the location of a floor sensor may make it impossible to get representable temperature readings for the entire floor surface, it is highly recommended to never set the MAX higher than 25 degrees unless it is absolutely necessary. Due to this same fact, SE Devices can not be held responsible for any damage to heated floors controlled by the thermostat functionality of the devices, even when configuration and installation is technically correct. Always hire professionals to install floors and floor heating, to reduce the risk of damage caused by the heating system.

Assembly and Installation

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

Basic Default Operation

When the Multifunction Switch is installed and powered on, the device will always provide local light switch functionality. By default the Multifunction Switch will be configured as a One-Way ON/OFF light switch, controlling the connected Back Unit. Pushing the Upper part of the Switch turns the light ON, and pushing the Lower part of the switch turns the light OFF.

If the connected Back Unit is a dimmer, the Light level can be controlled by Pushing and Holding the Upper (to dim up) or Lower (to dim down) buttons. Release the buttons when the wanted Light level is reached.

In addition, the device will by default issue Central Scene Notification commands for each pushed button. A different Scene Number (1-4) is used to indicate which of the four buttons was pushed. This makes it possible to assign Scenes to specific buttons on the controller, in addition to controlling the Light in a Zone. The numbering starts at 1 on the Upper Left button, and continues in a Clockwise order for the rest of the buttons (See diagram in the button configuration section).

In order to enable more advanced functionality, the Device must be added to a Z-Wave network. This makes it possible to change the device configuration, to enable more advanced functionality.

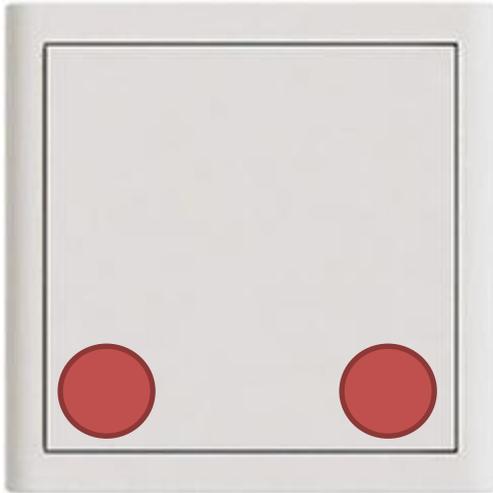
The Multifunction switch is a Security Enabled Z-Wave Plus Product. A Security Enabled Z-Wave Controller must be used to fully utilize the product.

Add and Remove Device from Z-Wave network

To add the device to a Z-Wave network, the Z-Wave Controller must first be set into **Add Mode** (refer to the Z-Wave Controller manual for information on how to do this). Once the Controller is listening for devices to add, Push and Hold the two lower buttons of the Multifunction Switch for 5 seconds.

The device will indicate that it sends information to the Controller by flashing all four LEDs in a “U” sequence. 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, Binary Switch Commands and additionally Dimmer commands if there is a Dimmer Back Unit available.

Removal 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 and Hold the indicated buttons for 5 seconds, to execute an Add or Remove procedure.

Troubleshooting Device Add problems

If the device is not added when following this procedure, please first make sure that the device in fact indicates Z-Wave Controller communication with the LEDs. You should see the LEDs turn ON and then OFF, forming a “U” shaped pattern. If you did not see the LEDs flashing, make sure you push and hold BOTH lower buttons for at least 5 seconds. Do NOT release them until you see the LED pattern.

If adding still fails (no response from the controller), it may be caused by the device thinking it is already added in another 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 the device) 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 Plus Specific Information

The Multifunction Switch device is a Z-Wave Plus Device, and thus support all command classes required for Z-Wave Plus. The Device supports Z-Wave S0 and S2 Unauthenticated Security modes, and must be included on a Security Enabled Z-Wave Controller in order to fully utilize all Z-Wave functionality of the device.

Z-Wave Specific Device Information

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

Property	Reported value
Device Type	Wall Controller
Basic Device Class	ROUTING_SLAVE
Generic Device Class	GENERIC_TYPE_WALL_CONTROLLER
Specific Device Class	SPECIFIC_TYPE_BASIC_WALL_CONTROLLER
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_WALL_CONTROLLER
Z-Wave Plus User Icon Type	GENERIC_WALL_CONTROLLER

Manufacturer Specific Device Information:

Property	Reported value
Manufacturer ID	0x024F
Product Type ID	0x0003
Product ID	0x1002

Supported Z-Wave Command Classes

The following table lists all Command Classes supported by the Z-Wave Device. The usage of each command class is covered in the following sections. The device supports both 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_CENTRAL_SCENE (V3)	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 (V4)	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_SWITCH_MULTILEVEL (V1)	Yes		Yes
COMMAND_CLASS_THERMOSTAT_MODE (V1)	Yes		Yes
COMMAND_CLASS_THERMOSTAT_SETPOINT (V1)	Yes		Yes
COMMAND_CLASS_VERSION (V2)	Yes		Yes

Supported Light Control Related Command Classes

The following Control command classes are supported for Light control:

Command Class	Supported Back Units	Functionality
Basic	All	Used for ON/OFF and Dimmer Control (see mapping table below)
Switch Binary v1	All	Used for ON/OFF switch functionality. Dimmer Back Units will turn ON to their last Dimmer Level (50% ON by default).
Switch Multilevel v1	All	Used for Dimmer Control, but also works with Relay Back units for simple ON/OFF control
Central Scene Command Class v3	-	Central Scene Notification commands are sent to the Controller whenever a button on the device is pressed. This can be used to trigger Scenes executed by the Controller.
Multichannel Encapsulation v1	All	The device supports 4 separate Light Zones, which are each mapped to Multichannel Endpoints 2 to 5. The Local control functionality (if available) is always mapped to Endpoint 1 (and the Root Device). How Light Zones are controlled by the Buttons is configurable.
Sensor Multilevel	All	Reports Temperature (configurable interval) and Power Consumption periodically (once every minute). Can be used to request local Voltage and Current as well.
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 the Basic Set Command Class is used for Light Control, the command values have the following effect:

Values	Effect on Relay	Effect on Dimmer
0	Turns OFF	Turns OFF
1 – 99	Turns ON	Sets Dimmer Level 1 – 100% (99)
100 – 254	Ignored	Ignored
255	Turns ON	Turns ON to last Dimmer level

The Device use Basic Set commands to control associated devices (covered in Association Groups section), in order to achieve the broadest possible compatibility with other devices. Basic Set values to associated devices are also in accordance with the above mapping table.

Controllable Light Zones

The device is capable of controlling up to Four (4) external Light Zones, and is capable of controlling both associated dimmers and switches. The local Back Unit can be configured to belong in any of these four Zones, or to be completely separated from any of the Light Zones (in which case it can only be controlled via Z-Wave).

Each of the four available Light Zones are individually controllable via Z-Wave Multichannel Endpoints, where the Endpoint numbers 2-5 indicates the requested Light Zones 1-4. The Root Device and Endpoint 1 always control the Light Zone where the Local Back Unit is assigned. These can also be used to control the Back Unit, when it is configured to be excluded from any of the Light Zones of the 4 Light Zones (Disconnected Mode).

Each Button has a corresponding LED indicator, which can be configured to indicate the state of each Light Zone. The LEDs can be configured to be always off (default), Momentary On (Indicates ON/OFF state changes in a zone) or Stable ON (LED indicates if a Zone is active).

The Endpoints are mapped to Light Zones as follows

Endpoint	Supported Light Control Command Classes	Description
1	Basic Set, Switch Binary, Switch Multilevel	Controls the Light Zone where the Back Unit is assigned. The Default Configuration is Light Zone 1. If there is no Back Unit, or the Back Unit is assigned to the Thermostat, it always controls Light Zone 1.
2	Same as Endpoint 1	Controls Light Zone 1
3	Same as Endpoint 1	Controls Light Zone 2
4	Same as Endpoint 1	Controls Light Zone 3
5	Same as Endpoint 1	Controls Light Zone 4

All Endpoints (1 to 5) provide the same Z-Wave information and command class support:

	Description
Device Type	Wall Controller
Generic Device Class	GENERIC_TYPE_WALL_CONTROLLER
Specific Device Class	SPECIFIC_TYPE_BASIC_WALL_CONTROLLER

The following table lists the Supported Command Classes for all Endpoints 1-5. The device can be queried for this information, using the Multichannel Capability Get and the Security(2) Commands Supported Get commands.

Supported Command Classes	Insecure Inclusion	Insecure on Secure Inclusion	Secure on Secure Inclusion
COMMAND_CLASS_ZWAVEPLUS_INFO (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_MULTI_CHANNEL_ASSOCIATION (V3)	Yes		Yes
COMMAND_CLASS_SWITCH_BINARY (V1)	Yes		Yes
COMMAND_CLASS_SWITCH_MULTILEVEL (V1)	Yes		Yes

The commands have the same functionality for Endpoints as for the Root device. Refer to the command table in the beginning of this section for a reference.

Supported Thermostat Related Command Classes

The Thermostat controller in the Multiswitch is always active and present, but is by default in OFF mode and also not configured to control any Heating Actuators.

To use the Thermostat, external Relays (Heating Actuators) must be associated to association group 7, or a local relay Back Unit must be enabled for control via Configuration.

The Thermostat requires at least one temperature sensor in order to operate, and will not turn any heating actuators on if a sensor is not present.

Command Class	Supports	Functionality
Thermostat Setpoint	Thermostat Modes: HEAT Control: Any Relay Units (*)	Used for Thermostat Set-Point control. (*) The thermostat functionality is always available, but will NOT control Dimmer Back Units. The thermostat MAY still control external Z-Wave Relay units via Association Group 7.
Thermostat Mode	Supported Modes: OFF, HEAT, AUX Control: All Relay Units (*)	Used for Thermostat Operation Mode control. (*) The thermostat functionality is always available, but will NOT control Dimmer Back Units. The thermostat MAY still control external Z-Wave Relay units via Association Group 7.
Sensor Multilevel	Requires at least ONE temperature sensor connected to the device.	Reports the control Temperature of the Thermostat as Air Temperature . If both a Room and Floor sensor is used to control the temperature, the report will always provide the temperature currently used by the Thermostat control. Unsolicited report interval is configurable down to a minimum of 60 seconds.

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	Association is used to set up control of external devices. Described in detail in the Association section of this document. All association groups on all End-Points support both normal Association and Multichannel Association
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:

- **Air Temperature** – Reports temperature measurement from Thermostat functionality. Unsolicited Reports are only sent if a Temperature Sensor is connected, and according to the configured report interval and threshold (by default, every 10 minutes, and if temperature change by +/- 1 degree).
- **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 device Association Groups is central in the Remote Control functionality of the device. Remote devices can be controlled from any of the four Light Zones by adding the external device to the corresponding Association Group.

The Multifunction Switch also have a Local Thermostat function, which is capable of controlling external Heating Actuators in addition to other Z-Wave thermostat (for instance Radiator Valve Thermostats) in the same Heating Zone. As the Multifunction switch does not have a Thermostat User Interface, the Thermostat is only controllable over Z-Wave (for instance via a User Application or from another Z-Wave device which provides a Thermostat User interface).

It is important to understand that all functionality of the Multifunction Switch can be remote controlled by other Z-Wave devices, including the Thermostat functionality.

All Association Groups in the device, supports both normal Association and Multichannel Association. The Multifunction Switch Root Device provides the following Association Groups:

Association Group	Node Limit	Functionality
1	Max 5 Nodes (Lifeline Group)	The Lifeline group where all Local State Changes are reported. All unsolicited Reports for the supported command classes will be issued to this group. Commands Issued: - Basic Report - Notifies Local Light Zone changes (button press) - Central Scene Notification - Notifies Scene events from the controller (in Scene Mode) - 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 (Light Zone 1)	Associated devices will be controlled by Light Zone 1. Also supports multichannel association in any combination. Command Issued: Basic Set
3	Max 5 Nodes (Light Zone 2)	Associated devices will be controlled by Light Zone 2. Also supports multichannel association in any combination. Command Issued: Basic Set
4	Max 5 Nodes (Light Zone 3)	Associated devices will be controlled by Light Zone 3. Also supports multichannel association in any combination. Command Issued: Basic Set
5	Max 5 Nodes (Light Zone 4)	Associated devices will be controlled by Light Zone 4. Also supports multichannel association in any combination. Command Issued: Basic Set
6	Max 5 Nodes (Thermostat Control)	Control Set-Point and Mode of an external Thermostat Device Commands Issued: Thermostat Setpoint Set and Thermostat Mode Set
7	Max 5 Nodes (Thermostat Relay Control)	Control external Relay from the Local Thermostat Command Issued: Basic Set (ON and OFF values ONLY).

Endpoint Association Groups

Each of the 5 Endpoints of the device also provides 2 Association Groups each. Group 1 of each endpoint is mapped to the Root Device Lifeline group, and therefore report support for 0 nodes. All Association Groups of the End-Points support both normal Association and Multichannel Association. The available groups are the same for all 5 endpoints:

Association Group	Node Limit	Functionality
1	Mapped to Lifeline on Root Device. <u>Report 0 nodes supported.</u>	The Endpoint Lifeline group where all Local Light Zone state changes are reported. This is mapped to the Root Device Lifeline. Commands Issued due to Endpoint Events: - Basic Report - Notifies changes in Light Zone represented by the Endpoint
2	Max 5 Nodes	Associated devices will be controlled by the Light Zone corresponding to the current Endpoint. Associated devices in Endpoint 1, will be controlled by the same Light Zone as the local control functionality (if available). Also supports multichannel association in any combination. Command Issued: Basic Set

Root Device Association Group mapping

The Root Device Association groups 2 to 5 are mapped to Association Group 2 of the corresponding Endpoints 2 to 5. These in turn are controlled by Light Zones 1-4. Endpoint 1 always reflects the Local functionality of the device, and is therefore not mapped to any Root Device group. This means that devices in either mapped groups are treated as one group, and Commands are sent to all associated devices in both. The mapping is as follows:

Root Device Association Group	Mapped to Endpoint	Endpoint Association Group	Description
2	2	2	Associated devices in both groups receives Basic Set messages corresponding to a State Change in Light Zone 1
3	3	2	Associated devices in both groups receives Basic Set messages corresponding to a State Change in Light Zone 2
4	4	2	Associated devices in both groups receives Basic Set messages corresponding to a State Change in Light Zone 3
5	5	2	Associated devices in both groups receives Basic Set messages corresponding to a State Change in Light Zone 4

Configuration

The Device Supports the Configuration Command Class, which is used to configure the User Interface and local operation of the device. The Configuration Command Class is needed to enable the more advanced functionality in the device.

Available configurations solely change user interface or local functionality of the device, and never affects any of the devices Z-Wave features. For instance, the configuration controls if the thermostat should control the Local Back Unit or not, but the Thermostat Operation itself is controlled solely over Z-Wave.

The same goes for button operations; The way the buttons operate are controllable from the Configuration Registers, but it does not affect the available Light Zones nor which commands they support. All Light Zones are always controllable over Z-Wave, and both Switch Binary and Switch Multilevel operation is supported.

Details regarding the available configuration options are covered in the following Advanced Device Functionality section.

Advanced Device Functionality

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

Advanced Button Control Configuration

By default the Multifunction Switch is configured as a Single Mode button, controlling Light Zone 1 only. Pushing the Upper part of the Switch turns the Lights in the Zone ON, and pushing the lower part turns the Lights OFF. This is adequate for basic Local control, or if only one Light Zone is controlled by the Multifunction Switch. The other three Light Zones are however still controllable over Z-Wave in this configuration, but not controllable from the buttons.

Via configuration it is possible to reconfigure the Buttons to operate in Dual (controls 2 Light Zones) or Quadruple mode (controls all 4 light Zones). This way, all four supported Light Zones are controllable from the buttons. It is also possible to set up each button in either Switch or Dimmer (default) mode, depending on what type of external devices are controlled. In Dimmer Mode, Push and Hold actions will adjust the Dimmer level of the assigned Light Zone.

The following sections describes how to set up such configurations, and provides use-case examples for each configuration. The following table provides an overview over the relevant Configuration Parameters.

Config Param	Value Size	Default Value	Configuration Name	Description
14	1	Single (0)	Button Mode	Controls the operation mode of the buttons. Valid configuration values are: 0 – Single Switch Mode (default) 1 – Dual Switch Mode 2 – Quadruple Switch Mode 3 – Legacy Scenario Mode 4 – Central Scene Controller Mode (See details in next sections)
15	1	All Buttons in Dimmer Mode (0)	Light Control Mode	Controls if the Light Zones should operate in Switch or Dimmer Mode (only used in Button Modes 0, 1 and 2): 0 – All Light Zones in Dimmer Mode (default) 1 – All Light Zones in Switch Mode To control Light Zone switch mode individually, add any of the following values to enable switch mode individually (dimmer is default): 2 – Light Zone 1 Switch Mode 4 – Light Zone 2 Switch Mode 8 – Light Zone 3 Switch Mode 16 – Light Zone 4 Switch Mode Example: A value of 10 (8 + 2) enables switch mode in Light Zone 1 and 3.

Config Param	Value Size	Default Value	Configuration Name	Description
17	1	Light (1)	BU role	<p>Configures the Role of the Back Unit, which dictates what Local functionality controls it. Valid configuration values are:</p> <p>0 - The Thermostat will control the Back Unit (if the back unit is a dimmer, then this value has no effect as Thermostats requires a local relay for local control)</p> <p>1 - The Light Control feature (buttons) will control the Back Unit.</p> <p>2 - Disconnected mode means the Back Unit is not controlled by any local UI or features, and can only be controlled via Z-Wave End-Point 1 (or the Root Device).</p>
18	1	Light Zone 1	Back Unit Light Zone	<p>Selects which Light Zone controls the Back Unit (in Light Mode). Possible values are:</p> <p>1 – Light Zone 1 (Button and Z-Wave) (default)</p> <p>2 – Light Zone 2 (Button and Z-Wave)</p> <p>3 – Light Zone 3 (Button and Z-Wave)</p> <p>4 – Light Zone 4 (Button and Z-Wave)</p> <p>This does not have any effect however when the BU role is set to Thermostat or Disconnected!</p>
80	1	Off	LED Mode	<p>Controls the operation of the LEDs. Possible values are:</p> <p>0 – LEDs are always OFF (default)</p> <p>1 – Momentary ON</p> <p>2 – Stable ON</p> <p>The LED operation is described in details later in this document, and depends on the Button Mode configuration.</p>

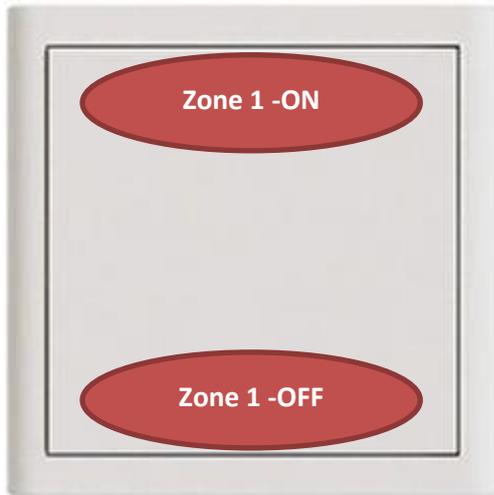
IMPORTANT: All these configuration parameters control the Local functionality of the Multifunction Switch Buttons! They do not affect any available Z-Wave functionality, and all Light Zones will always be statically available via their assigned Endpoints.

Switch Modes

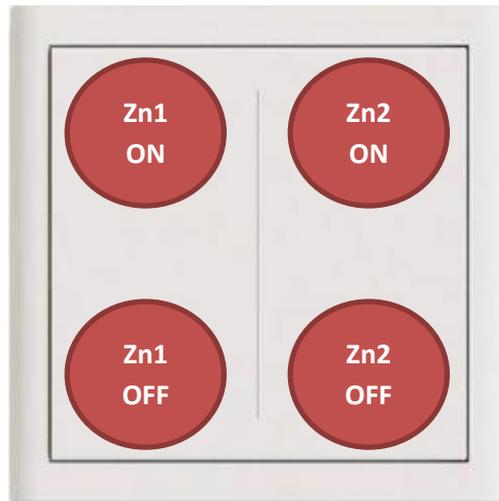
The Multifunction Switch supports 4 modes of operation, which is controlled by **Configuration Parameter 14**. The supported modes are as follows:

0. **Single Mode** – The default mode, where all 4 buttons are assigned to control Light Zone 1 (the default). Light Zones 2 – 4 are not affected by Button Input, and only controllable via Z-Wave Endpoints.
1. **Double Mode** – Splits the Switch in two, and assigns the Left Buttons (Up/Down) to Light Zone 1, and the Right Buttons (Up/Down) to Light Zone 2. Light Zone 3-4 are not affected by Button Input, and only controllable via Z-Wave Endpoints
2. **Quadruple Mode** – Splits the Switch in four, and assigns each button to a specific Light Zone. Buttons are in Toggle mode, which means you press once for ON and another time on the same button for OFF.
 - a. **Upper Left** – Assigned to control Light Zone 1
 - b. **Upper Right** – Assigned to control Light Zone 2
 - c. **Lower Right** – Assigned to control Light Zone 3
 - d. **Lower Left** – Assigned to control Light Zone 4
3. **Scenario Mode** – Splits the Switch in four and assigns each button to a specific Multi Channel End-Point. The button to End-Point mapping follows the same patterns as in Quadruple Mode. The difference however is that each button now only sends Basic Set Commands with value ON (0xFF) to associated devices. In addition, the LEDs will now indicate the last pushed button, and not the state of the Light Zones. This mode is useful for triggering actions on a legacy Controller (or other devices) via Basic Set messages. The Back Unit will be affected by the Light Zone it is connected to, however this can be switched OFF by configuring the Back Unit in Disconnected Mode. Any Channel Encapsulated commands are interpreted as equivalent to button pushes on each individual button.
4. **Central Scene Controller Mode** – Assigns the buttons exclusively to Central Scene control. When activating this mode, the buttons does no longer control any of the Local Light Zones, and these can then only be controlled over Z-Wave via the available Endpoints. This also affects the LED operation in Stable ON LED Mode. The LEDs will then indicate the last pushed button, until a different button is pushed.

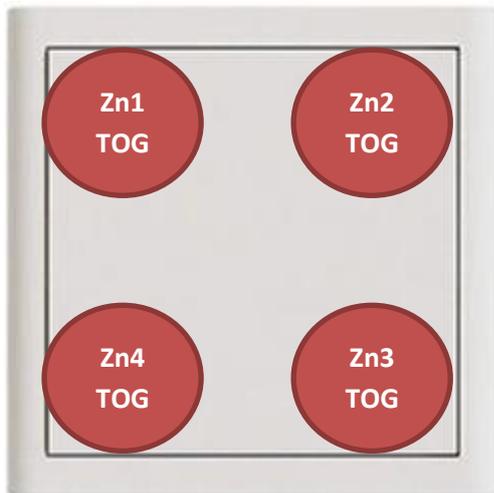
Switch Mode Examples:



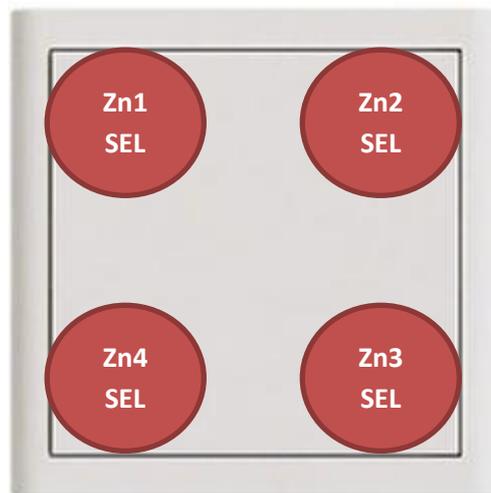
Single Button Mode



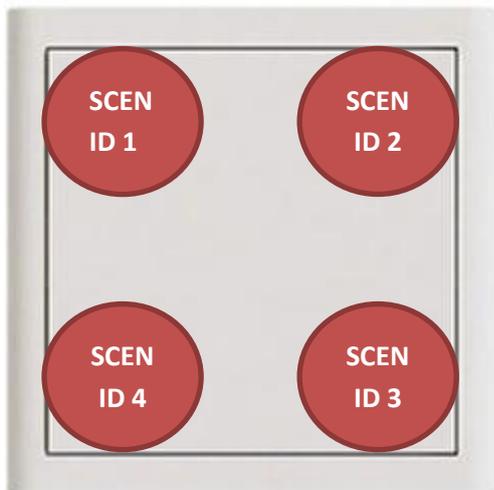
Double Button Mode (Dual Mode front)



*Quadruple Button Mode - Toggle
(Four Way Front)*



*Scenario Mode – Select
(Scenario Front)*



*Central Scene Mode – Activate Scene
(Scenario Front)*

Light Control Mode

By default the Multiswitch Buttons will operate as dimmer control switches. Normally this mode works fine to control both external Switches and Relays (and always works automatically for any connected Back Unit). However it is fully possible to configure the Front Units to operate as pure switches well, in case an external device does not work with dimmer control commands. This is done by configuring Parameter 15 according to the following list:

- **Value: 0** – (Default) All buttons are in Dimmer Mode. Short presses will still control light on and off. A Push and Hold action on a button will adjust the Light Zone dimmer level. The operation depends on the Button Mode:
 - o **Single Mode, Double Mode** – Push and Hold UP adjusts the dimmer level UP. Push and Hold DOWN adjusts the dimmer level DOWN.
 - o **Quadruple Mode** – First Push and Hold Dims DOWN. The next Push and Hold Dims UP, and so forth.
 - o **Scenario Mode** – Scenario mode is not affected by this configuration
- **Value: 1** – All buttons are in Switch Mode.
 - o **Single Mode, Double Mode** – Push UP switches ON and Push DOWN switched OFF.
 - o **Quadruple Mode** – First Push switches ON, the next Push switches OFF and so forth.
 - o **Scenario Mode** – Scenario mode is not affected by this configuration

In addition, switch mode can be enabled individually for each Light Zone. This is useful to control both Relays and Switches from the same Multiswitch unit. Default operation mode is Dimmer mode, and Switch mode can be enabled individually by **adding** the values in the following list together and setting the value to the Configuration Parameter:

- **2** – Enables Switch Mode for Light Zone 1
- **4** – Enables Switch Mode for Light Zone 2
- **8** – Enables Switch Mode for Light Zone 3
- **16** – Enables Switch Mode for Light Zone 4

Example:

To enable Switch Mode for Light Zone 1 and 3, add the values together to find the Value to set to the Configuration Parameter. So add together 2 (for Light Zone 1) and 8 (for Light Zone 3) to get: $2+8 = 10$, which is the value to set to the configuration.

Thermostat Local Control Mode

If the Multifunction Switch has a Relay type back unit, the device can be configured to control the relay via the Multifunction Switch Thermostat Controller. For this to work, at least one temperature sensor must be connected to the unit. It's important to know that the Thermostat functionality can ONLY be controlled via Z-Wave. The buttons does not have any effect on the Thermostat controller, and there is no LED indication for the Thermostat operation. The Thermostat Controller can either be operated via a User App, or via Association to another Z-Wave device which has a Thermostat Control User Interface (for instance the Wheel Controller).

Local Relay Thermostat control is enabled by setting **Configuration Parameter 17** to **value 0** via Z-wave. This will cause the Thermostat Control functionality to take over control of the relay Back Unit, and the Light Zones will only be able to control external devices via Association. Note that if the Back Unit is a dimmer type, this configuration has no effect. Dimmer back Units can only be controlled via Light Zones, or standalone in Disconnected mode.

It's important to know that the Thermostat function can also control external Relay type devices by assigning these in Association Group 7, which is useful when the Local Back Unit is a Dimmer.

Disconnected Mode

Disconnected Mode allows for the Back Unit to be controlled exclusively over Z-Wave. In this mode the buttons are only used for controlling associated devices. Multichannel Commands to the Multifunction switch can be used to control the LED states of the Switch for user feedback. Any standard commands (non-encapsulated) to the device will be directed to the Back Unit, but will not affect the Button States. The Back Unit will be directly controllable via Endpoint 5 in this case, and non-multichannel encapsulated will also be directed to Back Unit Control (for best possible compatibility with controllers).

Disconnected Mode is enabled by setting **Configuration Parameter 17** to **value 2** via Z-Wave.

Back Unit Light Zone Configuration

By default, the Back Unit is controllable via End-Point 1, which also maps to Light Zone 1 (Explained under Switch mode). However it is fully possible to configure which Light Zone the Back Unit should be controlled by, in order to control it from a different set of buttons. This is done by setting the End-Point Number (1-4) via **Configuration Parameter 18**.

This will change the Light Zone which operates the Back Unit, and thus also which Z-Wave End-Point is mapped to the Back Unit (Light Zone and Z-Wave End-Points map one to one). However, the Back Unit will always be controlled when no Multichannel Encapsulation is used or if messages are addressed to End-Point 5 (this also work in Disconnected mode).

LED Mode Configuration

Each Multifunction Switch button have a white indication LED which can be used to indicate the state or actions done at the switch. By default, LEDs are turned off, but they can be enabled via configuration. The LED operation will depend on both the Switch Mode and the LED configuration, which is accessed via Configuration Parameter 80.

LED Modes are as follows:

0. **OFF** – The default mode, which will turn off the LEDs permanently. LEDs are only used to provide operational information (like indicating Learn operations etc.).
1. **Momentary ON** – Momentarily indicates a Switch state change by blinking the LEDs related to the pushed button(s). The LEDs will only be on for about a second before switching back off.
2. **Stable ON** – LEDs will indicate which states are active (LEDs On) and inactive (LEDs Off) for each individual button state. In Central Scene and Legacy Scenario mode, it will indicate the last selected button, and only ONE LED will be active at a time.

Advanced Relay Back Unit Operation Configuration

Normally the Back Unit is set up to be controlled by local functionality, but it is possible to also configure the Back Unit to be “disconnected” from the Front and only controllable via Z-Wave.

One particular Use-Case for this is to use a Relay Back Unit to control Heating, which is controlled remotely from a Thermostat unit. 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 Multifunction Switch has a solution to this, which can put the Back Unit in a 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 (see Advanced Thermostat Operation Configuration for more information).

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

Config Param	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). The minimum Activation delay is 60 seconds, and values from 1 to 59 will automatically be translated to a 60 second delay.
5	2	10 min (600 sec)	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). A 60 second minimum period applies.
6	2	5 min (300 sec)	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). A 60 second minimum period applies.

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

NOTE2! The safety functionality will ONLY affect Relay Back Unit types. It's not recommended to use the Functionality for Light Timing Control!

Advanced Dimmer Operation Configuration

When the Front Unit is connected to a Dimmer Back unit, it is very often necessary to adjust Dimmer Settings in order to make Light fixtures operate correctly. The default settings are normally OK for standard Light Bulbs and Halogen lamps, but may cause problems with LED type Light fixtures. Such problems are mostly an issue with 230V dimmers, as the 1-10V dimmer normally always work fine with the defaults.

Dimmer operation parameters are set via Configuration Parameters, and the following settings can be configured for dimmer operation:

Config Param	Value Size	Default Value	Configuration Name	Description
13	1	15	Minimum Level	The Minimum Light Level of the dimmer. This should be adjusted so the controlled Light is still ON and stable. Remember that LED type lights may work if dimmed down to a low value, but may not start if the light is turned OFF and ON again. Range 1-99.
12	1	90	Maximum Level	The Maximum Light level of the dimmer. Typically there is no visible difference when the dimming level reaches a point in the range 75 - 90, and the installer should set this value to the lowest value where no change is visible. The default value of 90 is usually OK. Range 1-99.
44	1	20	Cold Start Minimum Level	Sets the minimum level the Dimmer should go to when the light is switched ON. This is typically used for LED lamps which does not switch ON correctly when the dimming level is at the Minimum. See detailed description below.
11	1	LE	Dimmer Mode	[<u>Leading Edge (LE) = 0, Tailing Edge (TE) = 1</u>] Defines if Dimmer should operate in Leading or Tailing Edge mode. Most Lights work quite OK in the default Leading Edge mode, but this mode also usually cause some noise from the dimmer unit. During installation it is therefore recommended to try TE mode, and use this if the Light operates properly. Tailing Edge mode is known to cause instability in some type of Lights! This configuration does not have any effect on 1-10V Dimmer Back Units!
10	2	300 (3 sec)	Dimming Speed	Defines the "fade" time when setting a dim level from a controller. Fade time is defined as the time it takes to dim from MIN level to MAX level, which means an increase of 10% in light level takes 1/10th of the configured time. The value defines the dim time in 1/100'th of a second, which means a value

Config Param	Value Size	Default Value	Configuration Name	Description
				of 200 gives a Dimming Speed of 2.0 seconds from MIN to MAX. Max time is 327.67 seconds (almost 11 minutes). Values below 30 (0.3 seconds) are ignored, and values below 100 (1 second) are discouraged.

Guidelines for Configuring Dimmer Back Units

NOTE! Normally 1-10V dimmers do not require any special mode configurations, and the defaults work fine. Only adjust the defaults in case Speed, MIN and MAX levels are not satisfactory with 1-10V dimmers.

WARNING! For safety reasons, Dimmer Parameters changes does not take effect as long as the Light is ON. You have to switch the light OFF and back ON again in order for the Configuration changes to take effect, or set the configuration when the light is already OFF. Also note that you should ONLY change the default settings if they cause noticeable problems. Changing Dimmer configuration may cause some Light fixtures to not function properly.

After installation of a Light Fixture, start by tuning the MIN and MAX limit of the Dimmer to provide a noticeable change in the Dimming level over the full dimming range. This is easiest to test by setting Dimmer levels via Z-Wave, where a 1 value is the MIN level and 99 value is the MAX level. It may be necessary to turn the MAX level down, and the MIN level UP in order to get the best result. This is done by adjusting the values in **Configuration Parameters 13 (MIN level) and 12 (MAX level)**.

Be aware that some LED lamps can be dimmed down to a very Low level when they are ON. But when the Light is then Switched OFF and ON again (at the minimum level), the Lights stays OFF (or starts flickering). This can be corrected by increasing the value of **Configuration Parameter 44**, which sets the minimum level the dimmer must reach when switched from OFF to ON. Increase this value gradually, until the Lights switch on stably at the lowest possible level. Also be aware that setting this value too high will cause the lights to flash brightly when turned ON, before settling at the wanted level. Always try to keep it as low as possible.

When the MIN and MAX levels are as desired, continue by adjusting the Dimming speed as desired. By default, the dimming speed is 2 seconds from MIN to MAX level, which normally gives good Dimming Control via the Multifunction Switch Push-and-Hold interface. Adjust the value of **Configuration Parameter 10** UP to slow the speed down, and DOWN to speed the dimming up. If you use the Multifunction Switch to control external Dimmers via Association, make sure you configure the external Dimmers to use the SAME dimming speed as the Local Dimmer. Different Dimming speeds will cause unaesthetic side effects, like one dimmer lagging behind the other (speed is too slow), or overshooting the desired level (speed is too high).

Troubleshooting 230V Dimmer problems

230V Phase Cutting dimmers can (by their nature of operation) cause problems with some types of Light fixtures. The 230V Dimmer back unit supports Standard Bulbs, Halogen and (most) Dimmable LED type lights, but may not always operate correctly with the default settings. The defaults have been chosen to provide the widest possible range of compatibility, but they may also cause some unwanted effects. The most common problems are:

- **Buzzing Noise from Dimmer or Light Fixture**

This is caused by the Dimmer Mode being Leading Edge, and is usually not very prominent. Try changing the dimmer mode to Tailing Edge Mode by setting **Configuration Parameter 11** to **Value 1**, to solve the problem. Turn the Lights OFF and ON again for the configuration to take effect!

WARNING! Some light fixtures operate poorly in Tailing Edge mode. If you experience general instability (not only at Low Dimmer levels) or a loss of usable Dimming range, it's recommended to switch back to Leading Edge mode. For some light fixtures, the buzzing noise simply is not possible to get around!

- **Light is unstable at low Dimmer levels**

This can be fixed by increasing the MIN level via **Configuration Parameter 13**. Start by increasing the MIN level by steps of 5, until the Lights stops flickering at the Minimum Dimmer level. Then try adjusting the level down 1 step at a time, until the Flickering or instability returns. Finally increase the MIN level by 1 to get stable Operation.

WARNING! Make sure that the Light actually turn ON at the minimum Level (from OFF state). Dial the Dimmer Level down to the Minimum, and turn the Light OFF. Then turn it back ON and verify that the light turns ON. If the light stays OFF (or starts flickering) Try increasing the Cold Start Minimum level (**Parameter 44**) to a level somewhat above (10 above is usually sufficient) the current Minimum Level, then switch the Light OFF and ON again (still at the minimum setting). If the "flash" at startup is too bright, reduce the value until the Light still starts stably but with the Start "flash" at a minimum.

- **Light Dimming Range is very Narrow**

If the range from MIN level to MAX level is very low (some times it is not even noticeable) or only change in the lower part of the dimming range, the culprit is usually one of the following:

- The Light fixture does not operate well in Tailing Edge Mode. Switch the mode back to Leading Edge (**Configuration Parameter 11, value 0**) and check if this solves the problem (Remember to turn Light OFF and ON to activate the change). Note that in some cases, buzzing from the Dimmer and/or Light Fixture is impossible to avoid completely.
- The MAX level is too high. Some Light Fixtures have no noticeable dimmer level change above MAX level 60-70 (in rare cases even lower), and the MAX level should be adjusted down accordingly. Please note that MIN and MAX level change DOES NOT affect the "resolution" of the dimming, only the maximum and minimum

voltage output. The resolution is fixed to 99 steps regardless of MIN and MAX settings.

- The MIN level is too high. Note that some Light fixtures will only dim significantly below a certain level, but may not start stably at that same level. Try adjusting the MIN level down, but make sure the light turns ON at the MIN level after being switched off. In some rare cases there is no way to improve the Dimming Range of the Light fixture due to this problem.

NOTICE! It is very important to know that there are Light Fixtures on the market which claim to be “dimmable” which in reality is not (or does not perform very well). It is highly recommended that Light Fixtures intended for Dimming is acquired from Light Fixture professionals or professional Electrical equipment suppliers with experience in dimmable Light Fixtures. This includes Light Bulbs and replaceable LED Bulbs as well.

Advanced Thermostat Operation Configuration

The built in Thermostat function in the Multifunction Switch can be used to control Electrical Heating connected to a Relay Back unit type, or an external Heating Actuator via Z-Wave association (only Heat Setpoints are supported). The Multifunction Switch does not provide any way to manually control the Thermostat Functionality, and the Set-point and Mode is ONLY controllable over Z-Wave. In order for the Thermostat functionality to be used, the Multifunction Switch must have a Temperature sensor directly connected (either a room sensor or a floor sensor connected to the Back Unit).

The Thermostat function is quite flexible and can operate in multiple possible configurations:

- **Directly controlling a Relay Back Unit**

This is the most common configuration, where the Relay Back Unit is controlled directly from the Thermostat. This is the Default operation mode when the Switch is configured to use the Back Unit for Thermostat control (via **Configuration Parameter 17** to **value 0** covered in an earlier section). Please note that this setting will NOT affect dimmer back units!
- **Controlling an external Heating Actuator (Relay)**

This configuration is normally used when the connection point for the Heating Actuator is located at a separate location than where the temperature sensor(s) needs to be located. In this configuration, the Thermostat will measure the temperature from its sensors, but control the external unit via Z-Wave Commands. The external Actuator(s) should then be added to **Association Group 7** of the Multifunction Switch, and **Configuration Parameter 17** is normally set to value 1 or 2 (meaning the Thermostat does NOT control the local back unit). In this configuration it is Highly recommended to activate the Safety function of the external Actuator, to avoid the heating getting stuck in ON mode if the communication or controller device should fail (covered in detail in a following section).
- **Control Heat Set-Point of an external Thermostat**

It is also possible to set the Thermostat function up to control the Heat Set-Point of an external Thermostat. This can be used in addition to the local control, for instance to have a common set point for floor heating and a Radiator for instance. This configuration is achieved by adding the external thermostats (supporting the Thermostat Set-Point Command Class) to Association Group 6 of the Multifunction Switch.
- **Heat Set-Point controlled from an external Thermostat**

If you have another Z-Wave thermostat with a Display, it can be very useful to set this up as the controller of the Heat Set-Point for the thermostat (as the Multifunction Switch does not provide any way to see the Set-point on the device). The other device is required to support controlling the Heat Set-Point of other devices via a Z-Wave Association Group. Add the Multifunction Switch to the "Thermostat Set-Point" Association Group of the external device to enable this configuration. One example of a device supporting this is the SE Devices Wheel Controller, which have an LCD display and wheel to control the Set-Point temperature.

Thermostat Configuration

The Thermostat functionality can be controlled via Z-Wave Configuration with the following configuration parameters:

Config Param	Value Size	Default Value	Configuration Name	Description
32	2	270 (27 C)	Set Point Max	Maximum Heat Set Point the Thermostat is allowed to be set to. If the Thermostat is used for Floor Heating, please make sure that this value is configured to the same value as (or lower than) the Max Floor Temperature. Given in 1/10 of a degree Celcius, which means a value of 300 means 30 degrees C. Range: 0 – 500 (0-50 degrees).
34	2	50 (5 C)	Set Point Min	Minimum Heat Set Point the Thermostat is allowed to be set to. Given in 1/10 of a degree Celcius, which means a value of 50 means 5 degrees C. Range: 0 – 500 (0-50 degrees).
36	2	3600s	Resend Interval	Defines the interval between each time the Thermostat will repeat its last control command. This is used in combination with the Relay Safety configuration when controlling external Relays. If the Thermostat should fail, it would then stop sending control commands which in turn means the Relay will turn itself OFF after the safety mode delay has expired. This insures that heating will not be left ON indefinitely in failure situations. Range: 60 – 32767 seconds
37	2	300s	Minimum On/Off Interval	This configuration defines the minimum interval the controlled Thermostat Relays will be ON and OFF. This is a feature intended to avoid turning control relays ON and OFF too frequently, which should insure a better lifetime of controlled relays. The default value is 5 minutes, which is OK for most electrical heating control. If used to control Water based heating, the value MUST be adjusted in accordance with the manufacturers specifications. Range: 60 – 32767 seconds
38	2	270 (27 C)	Floor Temp Max	Max floor temperature if a local floor sensor is connected. If the Floor Sensor reads a temperature Higher than the configured value, it will immediately turn the relay (or any associated relays) OFF. The relay will stay off until the temperature sinks below this value, and the Thermostat issues it's

Config Param	Value Size	Default Value	Configuration Name	Description
				<p>next control command. Disabled if zero (0) value, or if no floor sensor is connected. The value is given as 1/10th of a degree Celcius. Range: 0 – 500 (0-50 degrees).</p> <p>NOTE! MAX 27 degrees is recommended for Wooden Floors!</p> <p>NOTE! This function is always active as long as a Floor Sensor is connected, regardless of the sensor configuration described below.</p>
40	1	3 (Both)	Sensor Select	<p>Defines which temperature Sensor should be used for Heating Control. The default value is Both (3), which should work well in most scenarios (even when only a Floor or Room sensor is present). If both a Room and Floor sensor is used, the Thermostat will always control heating based on the lowest temperature reading of the two, to insure a comfortable floor temperature even if the room is already warm enough. If this is not wanted, the Thermostat should be configured to use the Room sensor Only. NOTE! The Floor Max Temperature feature will ALWAYS be active as long as a floor sensor is available, even if the Thermostat is configured to only use the Room Sensor.</p> <p>1 - Local Room - Use temperature from Locally connected Room sensor ONLY. Max Floor Temp protection is still active as long as a floor sensor is available.</p> <p>2 - Local Floor - Use temperature from Locally connected Floor sensor ONLY</p> <p>3 - Both - Use temperature from Locally connected Floor AND Room sensor if available (Default).</p>
67	1	0 (Disable)	On/Off Interval Override Threshold	<p>Defines a temperature threshold at which the configured On/Off interval is overridden and the Heating relay state will change regardless. The value is given in 1/10th of a degree, supporting a max threshold of 12.7 degrees celcius. A Zero (0) value disables this feature (the default). Valid values are 0 to 127.</p>

Controlling External Heating Actuators

The Thermostat function supports controlling external Heating Actuators according to local temperature readings. This is useful when the temperature sensors need to be located at a different location than the Heating Actuator itself.

Setting this up is relatively straight forward:

- Add the external Z-Wave Heating Actuator to **Association Group 7** of the Multifunction Switch. The external device will now be controlled by the Thermostat functionality in the Switch.
- To avoid the Thermostat to also affect any connected Relay Back Unit, set **Configuration Parameter 17** to value 1 (for control by switch) or 2 (for Z-Wave control only).

When controlling a Heating Actuator via a Radio Link (including but not limited to Z-Wave), there is always a risk that a control message may not arrive to the destination device. This is especially important to consider when controlling Heating Actuators, as such conditions may cause the Heating Actuator to be stuck in ON mode (if messages stops arriving when the Actuator is ON). To avoid this scenario, the external Heating Actuator should at a minimum support automatic OFF functionality. This insures the heating is eventually switched OFF, which greatly reduce the risk of heat damage or fire caused by excessive heating.

The Multifunction Switch supports repeating external actuator control commands at a configured interval to support stable operation. It will repeat commands regularly (even if the control state have not changed) to insure the external Actuator stays in the correct state as controlled by the thermostat. This is configured by setting the interval between such reports via **Configuration Register 37** in seconds (the default is 300 seconds which equals to 5 minutes). The configured interval should always be 5-10 seconds shorter than the OFF delay configured in the external Actuator, to insure any timing differences in the two devices will not cause short OFF bursts.

NOTE! All SE Devices units have support for automatic OFF after a period of time (including the Multifunction Switch). In addition they also support reverting to periodic ON/OFF switching at configured intervals, to insure a safe heating level without any thermostat input. This is very useful in installations where there is a risk freezing if the heating is left off for a long period of time.

Temperature Sensor Configuration

The following configurations are available to change the behavior of the temperature sensors readings. Temperature offsets are applied for both the thermostat and the reported temperature, and is useful in cases where the sensor location cause an inaccurate temperature reading.

Config Param	Value Size	Default Value	Configuration Name	Description
64	2	600 (10 minutes)	Temperature Report Interval	Defines the Periodic Report interval for temperature readings. This can be configured to a minimum of 60 seconds and maximum of (32767 seconds). A 0 value disables the Interval based Periodic reporting, and any value below 60 results in a 60 second interval.
66	1	10 (1°C)	Temperature Report Threshold	Defines a temperature change threshold where a temperature report is sent regardless of the Report Interval. This also works if the report interval is disabled. The value is given in 1/10 of a degree celsius, and can be in the range 1-127. A zero value disables the Threshold.
240	1	0 (0°C)	Floor Sensor Offset	Defines an offset to the Floor Temperature, given as a signed integer at 1/10 of a degree celcius. This provides an offset range of –12.8 to +12.7 degrees celcius (-128 to 127).
241	1	0 (0°C)	Room Sensor Offset	Defines an offset to the Room Temperature, given as a signed integer at 1/10 of a degree celcius. This provides an offset range of –12.8 to +12.7 degrees celcius (-128 to 127).

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 Front and Back Unit in the current installation. The first nibble (4 bits) Identifies the Controlling Unit (Front unit), which is always 0x2 for the Multifunction switch.</p> <p>The combined Byte then yields the following:</p> <ul style="list-style-type: none"> - 0x20 – 2-Pole 8A Relay - 0x21 – 1-10V Dimmer - 0x22 – 230V MOSFET Dimmer - 0x23 – 1-Pole 16A Relay - 0x2F – No Back Unit connected
16	1	Back Unit type	<p>Provides an Identifier for the connected Back Unit. This configuration is fixed across the SE Devices range, and provides a consistent way to determine local device functionality across the entire range of devices.</p> <ul style="list-style-type: none"> - 0xFF – No Backunit Connected - 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.

WARNING! Executing a Factory Reset on a device will remove it from the Z-Wave network, and restore ALL Default configuration values. Any associated external devices will not be controlled by the device any longer. The device may therefore stop working as intended.

Please use this procedure only when the network primary controller is missing or otherwise inoperable.

Step 1: Press both the Left Upper and Lower buttons at the same time, and keep them pressed for about 15 seconds. The Lower Left LED will then start blinking.

Step 2: When the Lower Left LED starts blinking, release the held buttons. Then within 5 seconds, Push and HOLD the Lower Right button (opposite to the blinking LED) to confirm the Factory Reset. The Factory Reset is then confirmed by the LEDs flashing in a circular pattern.

Please note that you can Abort the Reset procedure at any time. Even when the Lower Left LED is blinking, pushing any other button (or just waiting) will Abort the Reset.

The device Notifies the Reset to the Controller, by issuing a Device Reset Locally message to the Lifeline Association Group (1). This will cause the Controller to remove the node from the Z-Wave network.

All configurations are restored to their defaults, and any associated devices will be removed from the devices association groups.

Failure Conditions

The device constantly monitors the temperature and power supply and draw of the Back Unit. If any overheat or overload conditions should occur, the device will immediately shut down the Back Unit, and enter a Failure Shutdown Mode.

If a failure occurs, the situation is notified via the Front Unit LEDs. The possible LED patterns are as follows:

- **Upper Left LED alternates with the other three**
Indicates an Overheat situation, which happens if the Back Unit reaches a temperature above its maximum rating of 60 degrees Celcius. Typical causes are bad / loose connection wires, or faulty dimmer loads.
- **Upper Right LED alternated with the other three**
Indicates an Overload situation, caused either by Power or Current draw which exceeds the safe operation limits of the device. It can also be caused by supply voltage exceeding 260V. A typical cause is variable loads which occasionally draws more than the device rated power.

WARNING! Any of these failure situations should be examined by an electrician, as none of these are normally user serviceable. Resetting the device and switching it back ON can cause damage to the device, if the problem is not fixed before the device is switched back ON. For instance, the device may be able to prevent damage in a sudden short circuit scenario by switching OFF. But if switched back on again, the short circuit may blow the internal non-replaceable fuse.

When the fault situation has been examined and possibly fixed, the device can be reset by one of the following procedures:

- **Powercycle the Device**
Cut power to the device, and restore it afterwards. This will reset the shutdown condition and the device will start operating normally. As an electrician usually needs to shut of power to examine a problem anyway, this usually is the automatic outcome.
- **Explicitly switch the Back Unit Off**
This can be done by turning off the Light Zone or Thermostat (set to mode OFF) which is configured to control the Back Unit. Doing so will reset the failure scenario, and the device will once more be able to be switched back ON.
ONLY DO THIS if it is certain that the cause of the shutdown is not permanent, or the device may be permanently damaged when switched back ON.

When the failure is cleared, the LED notification pattern will stop, and the LEDs return to their normal operation.