

# Z-Wave Plus™ Plug-in Engineering Specifications



V1.4

## Version History

NO.	Version	Date	User	Description
1	V1.0	2020.11.04	Eric	Created
2	V1.1	2020.12.23	Eric	<ol style="list-style-type: none"><li>1. Redescribe the LED behavior for reset operation in section 5.2;</li><li>2. Add Meter Command Class In section 6.4;</li><li>3. Update command version in section 4.2.</li><li>4. Update default value to 0 of 'Delayed OFF Time'</li></ol>
3	V1.2	2021.01.09	Eric	<ol style="list-style-type: none"><li>1. Update Required Security Class in section 4.2.</li><li>2. Add Indicator Report in Lifeline Group.</li><li>3. Update [Altering capability] value to false.</li></ol>
4	V1.3	2021.02.22	Eric	<ol style="list-style-type: none"><li>1. Update Association Command Class in section 6.2.</li></ol>
5	V1.4	2021.05.13	Eric	Add trademark symbol <b>(TM)</b> following "Z-Wave Plus".

The Plug is a binary switch device based on Z-Wave™ slave library of V7.13.06. This Plug integrated Z-Wave communication module to connect with Z-Wave gateway.

The Plug can be included and operated in any Z-Wave network with other Z-Wave certified devices from other manufacturers and/or other applications. All non-battery operated nodes within the network will act as repeaters regardless of vendor to increase reliability of the network.

The Plug is a security Z-Wave device (S2), so a security enabled controller is needed for take full advantage of all functionality for the Plug.

SmartStart enabled products can be added into a Z-Wave network by scanning the Z-Wave QR Code present on the product with a controller providing SmartStart inclusion. No further action is required and the SmartStart product will be added automatically within 10 minutes of being switched on in the network vicinity.

**Features:**

- AC output switch on/off by manual or Z-Wave command.
- LED indicates the working status.
- Supporting repeater role.

## 1 Hardware Specifications

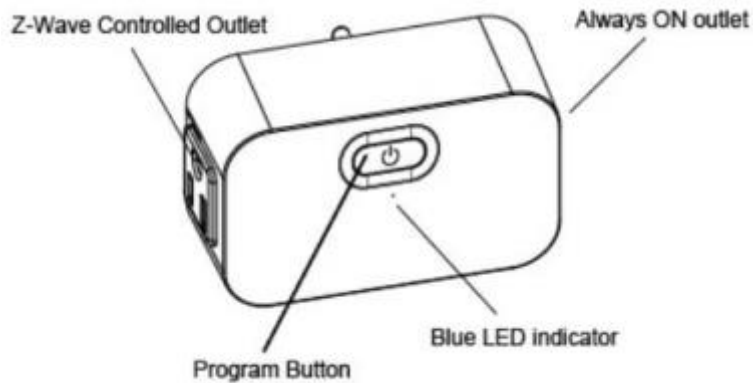
Wireless Protocol	Z-Wave
Radio Frequency	908.42MHz(US)
Communication Distance	40m(LOS)
Modulation Mode	FSK(BFSK/GFSK)
Rated load current	15A
Voltage(V)	120V +/-10%, 60Hz
Dimensions(mm)	103mm*43mm*44.5mm

## 2 Z-Wave Specifications

SDK Version	7.13.06
SDK Library	libZWaveSlave
Explorer Frame Support	Yes
Routing	Yes
SmartStart	Yes
Device Type	Binary Switch
Basic Device Class	BASIC_TYPE_ROUTING_SLAVE
Generic Device Class	GENERIC_TYPE_SWITCH_BINARY

Specific Device Class	SPECIFIC_TYPE_NOT_USED
Role Type	Always On Slave (AOS)

### 3 Familiarize yourself with Plug



### 4 Security and non-Security features of Plug

This device is a security enabled Z-Wave Plus™ product that is able to use encrypted Z-Wave Plus messages to communicate to other security enabled Z-Wave Plus products.

When a node includes into a S2 Z-Wave network, the node supports S2 unauthenticated class, S2 authenticated and so do the supported CCs.

#### 4.1 Supported Security Levels

- SECURITY\_KEY\_S2\_AUTHENTICATED\_BIT
- SECURITY\_KEY\_S2\_UNAUTHENTICATED\_BIT

#### 4.2 Commands List

Supported Command Classes	Version	Required Security Class
COMMAND_CLASS_ZWAVEPLUS_INFO_V2	2	None
COMMAND_CLASS_TRANSPORT_SERVICE_V2	2	None
COMMAND_CLASS_SECURITY_2_V1	1	None
COMMAND_CLASS_SUPERVISION_V1	1	None
COMMAND_CLASS_APPLICATION_STATUS_V1	1	None
COMMAND_CLASS_BASIC_V2	2	Highest granted Security Class
COMMAND_CLASS_SWITCH_BINARY_V2	2	Highest granted Security Class
COMMAND_CLASS_METER_V5	5	Highest granted Security Class

COMMAND_CLASS_CONFIGURATION_V4	4	Highest granted Security Class
COMMAND_CLASS_ASSOCIATION_V2	2	Highest granted Security Class
COMMAND_CLASS_ASSOCIATION_GRP_INFO_V3	3	Highest granted Security Class
COMMAND_CLASS_VERSION_V3	3	Highest granted Security Class
COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2	2	Highest granted Security Class
COMMAND_CLASS_DEVICE_RESET_LOCALLY_V1	1	Highest granted Security Class
COMMAND_CLASS_POWERLEVEL_V1	1	Highest granted Security Class
COMMAND_CLASS_FIRMWARE_UPDATE_MD_V5	5	Highest granted Security Class
COMMAND_CLASS_INDICATOR_V3	3	Highest granted Security Class
COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION_V3	3	Highest granted Security Class
COMMAND_CLASS_PROTECTION_V2	2	Highest granted Security Class

## 5 All functions of each trigger

### 5.1 SmartStart

Trigger	Description
PowerOn	<p><b>Plug is not on the Z-Wave network:</b></p> <ol style="list-style-type: none"> <li>1. The Plug led will slow blink 3 minutes.</li> <li>2. Add the Plug into the Z-Wave network via SmartStart (<b>SmartStart Inclusion</b>)</li> </ol> <p>Add the Plug DSK into the primary controller SmartStart Provisioning List (If your controller does not support SmartStart inclusion, please refer to the manual for your controller for non-SmartStart inclusion.)</p> <ol style="list-style-type: none"> <li>a) Power cycle once for Plug.</li> <li>b) The Plug will send “Explorer Auto inclusion” frame to start SmartStart inclusion.</li> <li>c) Wait a moment, the Plug should be added to the controller. Then the Plug led will keep on 1 minute when it has been included into the network. Otherwise, the Plug led will slow blink 3 minutes. In which case you need to repeat the process from step a.</li> </ol> <p>Note: The Plug has a DSK string, you can key in first five digit to increment SmartStart process, or you can scan QR code. The QR code can be found on the Plug. Ex: DSK: <u>65286</u>-19008-32952-20593-44872-18102-41266-46651</p> <p>The Plug will Start SmartStart Inclusion when it is removed from a Z-Wave network.</p>

	<p><b>Plug is on the Z-Wave network:</b></p> <ol style="list-style-type: none"> <li>1. The Plug led will keep on 1 minute.</li> <li>2. The Plug will send INIF.</li> </ol>
--	--

## 5.2 Program Button

Program Button Trigger	Description
Press once	<ol style="list-style-type: none"> <li>1. Open/Close the Load.</li> <li>2. Send Switch Binary Report to lifeline.</li> </ol>
Short press 2 times	Send Basic Set 0xFF/0x00 to association group 2
Short press 3 times (within 1.5second)	<p><b>Plug is not on the Z-Wave network:</b></p> <ol style="list-style-type: none"> <li>1. The Plug led will fast blink, and send node info frame.</li> <li>2. Add the Plug into the Z-Wave network (<b>Manual Inclusion</b>): <ol style="list-style-type: none"> <li>a) Set the Z-Wave network main controller into inclusion mode.</li> <li>b) Short press 3 times Program Button, the Plug led will fast blink.</li> <li>c) Wait a moment, the Plug should be added to the controller. Then the Plug led will keep on 1 minute when it has been included into the network. Otherwise, the Plug led will slow blink 3 minutes. In which case you need to repeat the process from step a.</li> </ol> </li> </ol> <p><b>Normal mode - Plug is on the Z-Wave network:</b></p> <ol style="list-style-type: none"> <li>1. The Plug led will fast blink, and send node info frame.</li> <li>2. Remove the Plug from a Z-Wave network (<b>Manual Exclusion</b>): <ol style="list-style-type: none"> <li>a) Assuming Plug was added to controller and was power on.</li> <li>b) Set the Z-Wave network main controller into removing mode.</li> <li>c) Short press 3 times Program Button, the Plug led will fast blink.</li> <li>d) Wait a moment, and then the Plug led will slow blink 3 minutes when it has been removed from the network. Otherwise, the Plug led will keep on 1 minute. In which case you need to repeat the process from step b.</li> </ol> </li> </ol>
Press and hold:20 Seconds	<p><b>Reset the device to factory default:</b></p> <ol style="list-style-type: none"> <li>1. Press and hold the Program Button for 20 seconds, then the Plug led will fast blink 1 second.</li> <li>2. The Switch led will blink 2 seconds, when released Program Button. It will send "Device Reset Locally Command". Otherwise please repeat step 1.</li> </ol> <p>Note:</p> <ol style="list-style-type: none"> <li>1. Please use this procedure only when the network primary controller is missing or otherwise inoperable.</li> </ol>

	2. Reset the Plug to factory default settings will sets the Plug to not in z-wave network state; delete the Association setting and restore the Configuration setting to the default.
--	---

## 6 Special Rule of Each Command

### 6.1 Basic Command Class

Basic Set maps to Binary Switch Set

Basic Get maps to Binary Switch Get

Basic Report maps to Binary Switch Report

### 6.2 Association Command Class

The Plug supports 2 association groups.

Grouping Identifier	Max Nodes	Send Commands
Lifeline	0x05	1. Binary Report 2. Meter Report 3. Device Reset Locally 4. Indicator Report
Group2	0x05	Basic set

#### Group 1: Lifeline

Description: Members of this group will receive unsolicited messages related to the status of the Plug.

Binary Report:

Changings of load caused by user action or receiving of SwitchBinarySet or Basic Set CC will trigger this cc.

Meter Report:

Power or energy changings will trigger this cc.

Device Reset Locally:

Long press the Program Button fot more than 20 seconds will trigger this cc.

Indicator Report:

Receiving Indicator Set will trigger this CC.

#### Group 2:On/Off Control

Description: Sends Basic Set to associated devices, when Short press the Program Button 2 times.

### 6.3 Z-Wave Plus Info Command Class

Parameter	Value
Z-Wave Plus Version	V2

Role Type	ZWAVEPLUS_INFO_REPORT_ROLE_TYPE_SLAVE_ALWAYS_ON
Node Type	ZWAVEPLUS_INFO_REPORT_NODE_TYPE_ZWAVEPLUS_NODE
Installer Icon Type	ICON_TYPE_SPECIFIC_ON_OFF_POWER_SWITCH_PLUGIN
User Icon Type	ICON_TYPE_SPECIFIC_ON_OFF_POWER_SWITCH_PLUGIN

## 6.4 Meter Command Class

Meter Type	Rate Type	Scale	Precision	Size
Electric meter(0x01)	Import only(0x01)	kWh(0x00)	3	4
		W(0x02)	3	4
		V(0x04)	3	4
		A(0x05)	3	4

## 6.5 Indicator Command Class

The Receptacle support the Indicator Command Class, version 3 and support the Indicator ID 0x50 (Identify) and Properties ID 0x03, 0x04 and 0x05

## 6.6 Configuration Command Class

#	Name	Size	Range	Description	Default
1	LED indicator Status	1	0~1	Synchronization of load power and LED indicator. 0: Power On, LED off, means that the power and the LED are in the different state. 1: Power On, LED On, means that the power and the LED are in the same state.	1
2	Delayed OFF Time	1	0~240	Delay off means when users press button to turn off the load, there's a reaction time.	0
3	Power On Status	1	1~3	When the device is powered on, the initial status. 1= Off 2= On 3= Last State	1



<b>4</b>	Child Lockout Enable	1	0-1	Child lockout feature can enabled and disabled local control. 0= Disable 1= Enable	0
----------	----------------------	---	-----	--	---

Name	Info	Parameter Number	Default Value(dec)	Max Value(dec)	Min Value(dec)	Size	ReadOnly	Format	Altering capability
LED indicator Status	LED indicator Status	0x01	1	1	0	1	No read-only	Unsigned integer	False
Delayed OFF Time	Delayed OFF Time	0x02	0	240	0	1	No read-only	Unsigned integer	False
Power On Status	Power On Status	0x03	1	3	1	1	No read-only	Unsigned integer	False
Child Lockout Enable	Child Lockout Enable	0x04	0	1	0	1	No read-only	Unsigned integer	False