Z-Wave 800 Motion Sensor Engineering Specs

V1.0

Motion Sensor Engineering Specifications

This Motion Sensor is a Z-Wave slave device based on Z-Wave library V7.18.1.
It can be included and operated in any Z-Wave network with other Z-Wave certified devices from other manufacturers. The Motion Sensor supports Over-The-Air (OTA) feature for the product's firmware upgrade.

Features:
- Latest 800 series Z-Wave chip based.
- S2 and SmartStart for extra security
- Long Rang supported. Visual communication distance maximum 1 mile.
- Low battery alert function.
- Supports firmware OTA.

SmartStart

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.

1. Hardware Specifications

Power supply	2 x AAA baterries
Storage environment	-20℃~70℃ 0-85%
Operational temperature	-10~50℃
Radio protocol	Z-Wave Plus
Radio frequency	908.42MHz (US)
Range	
Dimensions	Φ61 x 34 mm
Working current	~30mA
Standby current	~ 20 μA

2. Library And Command Classes

2.1 SDK Version: V7.18.1.

2.2 Library

- Basic Device Class: BASIC_TYPE_ROUTING_SLAVE
- Generic Device Class: GENERIC_TYPE_SENSOR_NOTIFICATION
- Specific Device Class: SPECIFIC_TYPE_NOTIFICATION_SENSOR

2.3 Command Class List

	Non-Included Non-Secure	Included S0 Non-Secure
Node Info Frame	COMMAND_CLASS_ZWAVEPLUS_INFO COMMAND_CLASS_ASSOCIATION COMMAND_CLASS_ASSOCIATION_GRP_INFO COMMAND_CLASS_TRANSPORT_SERVICE_V2 COMMAND_CLASS_VERSION COMMAND_CLASS_MANUFACTURER_SPECIFIC COMMAND_CLASS_DEVICE_RESET_LOCALLY COMMAND_CLASS_POWERLEVEL COMMAND_CLASS_BATTERY COMMAND_CLASS_SECURITY_2 COMMAND_CLASS_NOTIFICATION_V8 COMMAND_CLASS_WAKE_UP COMMAND_CLASS_SUPERVISION COMMAND_CLASS_CONFIGURATION_V4 COMMAND_CLASS_FIRMWARE_UPDATE_MD_V5 COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION_V3	COMMAND_CLASS_ZWAVEPLUS_INFO COMMAND_CLASS_TRANSPORT_SERVICE_V2 COMMAND_CLASS_SECURITY COMMAND_CLASS_SECURITY_2 COMMAND_CLASS_SUPERVISION
Security Command Supported Report Frame		COMMAND_CLASS_VERSION COMMAND_CLASS_POWERLEVEL COMMAND_CLASS_ASSOCIATION COMMAND_CLASS_ASSOCIATION_GRP_INFO COMMAND_CLASS_MANUFACTURER_SPECIFIC COMMAND_CLASS_DEVICE_RESET_LOCALLY COMMAND_CLASS_BATTERY COMMAND_CLASS_NOTIFICATION_V3 COMMAND_CLASS_WAKE_UP COMMAND_CLASS_CONFIGURATION_V4 COMMAND_CLASS_FIRMWARE_UPDATE_MD_V5 COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION_V3
	Included S2 Non-Secure	
Node Info Frame	COMMAND_CLASS_ZWAVEPLUS_INFO COMMAND_CLASS_TRANSPORT_SERVICE COMMAND_CLASS_SECURITY COMMAND_CLASS_SECURITY_2 COMMAND_CLASS_SUPERVISION	
Security Command Supported Report Frame	COMMAND_CLASS_VERSION COMMAND_CLASS_POWERLEVEL COMMAND_CLASS_ASSOCIATION COMMAND_CLASS_ASSOCIATION_GRP_INFO COMMAND_CLASS_MANUFACTURER_SPECIFIC COMMAND_CLASS_DEVICE_RESET_LOCALLY COMMAND_CLASS_BATTERY COMMAND_CLASS_NOTIFICATION_V3 COMMAND_CLASS_WAKE_UP COMMAND_CLASS_CONFIGURATION_V4 COMMAND_CLASS_FIRMWARE_UPDATE_MD_V5 COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION_V3	

2.4 Supported Security Levels
- SECURITY_KEY_S2_AUTHENTICATED_BIT
- SECURITY_KEY_S2_UNAUTHENTICATED_BIT

3. Familiarize Yourself With Your Motion Sensor
3.1 Interface

4. All Functions Of Each Trigger
4.1 Function Of Action

Trigger	Description
Power on	**In the network:** Send Battery report and Wake up notification, the LED solid green for 1 second.
	Not in the network: Only the red LED will be slow blink 3 times.
Smart Start Inclusion	**Add the Motion Sensor into the Z-Wave network via Smart Start:** 1. Add motion DSK into the primary controller Smart Start Provisioning List (If you don't know how to do this, refer to its manual). 2. Power on the motion sensor again. 3. The motion will send "Z-Wave protocol Command Class" frame to start Smart Start Inclusion. 4. Led will fast blink and solid for 2 seconds to indicate the inclusion is successful, if inclusion failed, Led will off.

Short press button three time	**Add the Motion Sensor into the Z-Wave network:** 5. Power on your Motion Sensor, and let your Z-Wave controller into add/inclusion mode. 6. Short press button 3 times in 1.5 seconds, the Motion Sensor will send out a node info security CC in command class list (Security inclusion), the LED will be fast blink , the timeout is 20-40seconds; 7. If the inclusion is successful, the LED will be solid red for 2 seconds. If failed, LED will be turn off, and please repeat the steps in above. **Remove Motion Sensor from a Z-Wave network:** 1. Power on your Motion Sensor, and let the Z-Wave primary controller into remove mode. 2. Short press button 3 times in 1.5 seconds, the LED will be fast blink for 20-40 seconds. 3. If Motion Sensor has been successfully removed from your Z-Wave network, the LED will be solid green for 3 seconds. If failed, LED will be solid in red for 3 seconds, and please repeat the steps in above.
Short press button one time	**In the network:** Send Wake up notification, and LED will blink in red once. **Not In the network:** NOP.
Press twice quickly and hold for 10 seconds	**Reset Contact Sensor to factory default.** NOTE: 1. Triggering this action, the red LED will blink fast in 10 seconds. After 10 seconds, the red LED will remain on until the key is released. Motion Sensor will send "Device_Reset_Locally" to the main controller and exclude from the Z-Wave network when the button is released, this procedure will reset the sensor to factory default. 2. Please use this procedure only when the network primary controller is missing or otherwise inoperable. 3. When not in the network, triggering this action, the red LED will blink fast in 10 seconds. After 10 seconds, the red LED will remain on until the key is released, this procedure will reset the sensor to factory default.
Motion is triggered	**In the network:** Send Notification report and Basic set (Setup configuration parameter 0x0E to 0x01), and the LED will be solid red for 0.2 second. **Not in the network:** Motion sensor is disabled.
Tamper switch is triggered	**In the network:** Send Notification report, and the LED will be solid for 0.2 second. **Not in the network:** The red LED will be solid for 0.2 second.

5. Special Rule Of Each Command Class

5.1 Z-Wave Plus Info Report Command Class

Parameter	Value
Z-Wave Plus Version	0x02
Role Type	0x06 (ZWAVEPLUS_INFO_REPORT_ROLE_TYPE_SLAVE_SLEEPING_REPORTING)
Node Type	0x00 (ZWAVEPLUS_INFO_REPORT_NODE_TYPE_ZWAVEPLUS_NODE)
Installer Icon Type	0x0C07 (ICON_TYPE_SPECIFIC_SENSOR_NOTIFICATION_HOME_SECURITY)
User Icon Type	0x0C07 (ICON_TYPE_SPECIFIC_SENSOR_NOTIFICATION_HOME_SECURITY)

5.2 Association Command Class
Motion Sensor supports 2 association groups and max 5 nodes for each group.

5.3 Association Group Info Command Class
5.3.1   Association Group Info

Grouping identifier	Group Name	Profile MS	Profile LS
01	Lifeline	0x00	0x01
02	On/Off control	0x71	0x07

5.3.2   Association Group Command List

Group 1	Command List Support
Command Class	COMMAND_CLASS_NOTIFICATION_V8(0x71)
Command	NOTIFICATION_REPORT_V8(0x05)
Command Class	COMMAND_CLASS_BATTERY(0x80)
Command	BATTERY_REPORT(0x03)
Command Class	COMMAND_CLASS_DEVICE_RESET_LOCALLY(0x5A)
Command	DEVICE_RESET_LOCALLY_NOTIFICATION(0x01)
	Indicator
Group 2	Command List Support
Command Class	COMMAND_CLASS_BASIC(0x20)
Command	BASIC_SET(0x01)

5.4 Notification Commands

Notification Type	Notification Event
HOME_SECURITY (0x07)	(0x00) NO_EVENT

	(0x03) TAMPERING_COVERING_REMOVED
	(0x08) MOTION_DETECTION_UNKNOWN_LOCATION
POWER_MANAGEMENT (0x08)	(0x0A) REPLACE_BATTERY_SOON
	(0x0B) REPLACE_BATTERY_NOW
	(0x00) NO_EVENT

5.5 Wake Up Interval Capabilities Report CC

Parameter	Value
WAKEUP_PAR_DEFAULT_SLEEP_TIME	3600
WAKEUP_PAR_MAX_SLEEP_TIME	60
WAKEUP_PAR_MIN_SLEEP_TIME	86400
WAKEUP_PAR_SLEEP_STEP	60

5.6 Manufacturer Specific Report

Parameter	Value
Manufacturer ID 1	
Manufacturer ID 2	
Product Type ID 1	
Product Type ID 2	
Product ID 1	
Product ID 2	

5.7 Configuration Set Command Class
5.7.1 Command Format

7	6	5	4	3	2	1	0
Command Class = COMMAND_CLASS_CONFIGURATION							
Command = CONFIGURATION_SET							
Parameter Number							
Default	Reserved				Size		
Configuration Value 1(MSB)							
Configuration Value 2							

……
Configuration Value n(LSB)

5.7.2 Parameter Number description

Parameter Number	Description	Default Value	Size
0x0A (10)	Low battery power level of alarm threshold values: the value range are 5~50 for percentage, the battery low power level can setting 5%~50%.	10	1
0x0C(12)	Enable/Disable the PIR 0 = Disable the PIR. 1 = Enable the PIR.	1	1
0x0D (13)	Setup the wait time of PIR for clear the motion. Valid values: 0x05~0x3BC4	60	2
0x0E (14)	When the Motion Sensor is triggered, if this parameter is 0x01 then it will send Basic set command to group 2. 0 = Don't send. 1 = Send.	0	1
0x0F (15)	PIR triggers the correspondence between the value of the Basic set and the PIR state. -If this value is 0x00 : PIR triggers send the basic set with 0xFF, PIR alarm release send the basic set with 0x00. -If this value is 0x01 : PIR triggers send the basic set with 0x00, PIR alarm release send the basic set with 0xFF. Only support 0x00 and 0x01 values as valid value.	0	1

0x10 (16)	Motion detection sensitivity level is a value between 1 and 10. This value affects the amount of motion energy required to generate a motion event and also affects the detection range and angle.
	  1 = Lowest Motion Sensitivity
	  3 = Highest Motion Sensitivity
		2	1

5.7.3 Parameter Number Definitions (8 bit)

Name	Info	Parameter Number	Default Value	Max Value	Min Value	Size	Read-only	Format	Altering capabilities
LowBatPrecent	LowBatAlarm	0x0A (10)	10 (0x0A)	50 (0x32)	5 (0x05)	1	NOT Read-only	UNSIGNED_ INTEGER	Will alters capabilities
Pironoff	PironoffSet	0x0C (12)	1 (0X01)	1 (0X01)	0 (0X00)	1	NOT Read-only	UNSIGNED_ INTEGER	Will alters capabilities

PirTimeout	PirTimeoutSet	0x0D (13)	60 (0X003C)	15300 (0x3BC4)	05 (0x0005)	2	NOT Read-only	UNSIGNED_ INTEGER	Will alters capabilities
BasicEnable	SendBasic	0x0E (14)	0 (0X00)	1 (0X01)	0 (0X00)	1	NOT Read-only	UNSIGNED_ INTEGER	Will alters capabilities
BasicReverse	BasicValue	0x0F (15)	0 (0X00)	1 (0X01)	0 (0X00)	1	NOT Read-only	UNSIGNED_ INTEGER	Will alters capabilities
PirSensitivity	PirSensitivitySet	0x10 (16)	9 (0X09)	10 (0X0A)	0 (0X00)	1	NOT Read-only	UNSIGNED_ INTEGER	Will alters capabilities
PirPetImmunity	PirPetImmunitySet	0x11 (17)	1 (0X01)	1 (0X01)	0 (0X00)	1	NOT Read-only	UNSIGNED_ INTEGER	Will alters capabilities
LightSensorSendType	LightSensorSendSet	0x12 (18)	1 (0X01)	3 (0X03)	1 (0X01)	1	NOT Read-only	UNSIGNED_ INTEGER	Will alters capabilities
LightSensorDayNight	LightSensorDayNightSet	0x13 (19)	50 (0x0032)	500 (0x01F4)	0 (0x0000)	2	NOT Read-only	UNSIGNED_ INTEGER	Will alters capabilities