FIRST ALERT by Resideo

INFORMATIONAL GUIDE

SMCO410 Z-wave® Specification

Version: 1.2
Date: December 3 -24

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1 DOCUMENT DETAILS

1.1 Revision History

Date	Version#	Details of change
Jan-04-23	0.1	Draft version
Feb-14-23	0.2	Corrected command class security_2 version, Added Battery mapping table
Mar-31-23	0.3	Remove Heartbeat message section
Apr-18-23	0.4	Added Wakeup parameter information in section 4.3
Dec-3-24	1.2	Updates for SMCO410

2 SYSTEM OVERVIEW

SMCO410 a battery-operated smoke and carbon monoxide alarm. SMCO410 has active smoke and CO detector sensors which constantly keeps monitoring for the level of Smoke and CO. SMCO410 has the Silabs 800 series Z-wave® chipset to communicate over Z-wave® wireless protocol.

Figure 1: SMCO410 device

2.1 Manufacturer Specific report

- Manufacturer ID: 0x041B
- Product Type ID: 0x0001
- Product ID: 0x0410

2.2 Version report

- Firmwar0 version: Major version number of Z-wave® firmware 0x01 <1 byte>
- Firmwar0 subversion: Major version number of Z-wave® firmware 0x00 <1 byte>
- Number of addition firmware: 0
- Hardware version: 0x03 <1 byte>

3 Z-WAVE® SPECIFIC DETAILS

3.1 List of Supported Command classes

Below is the list of supported Command Classes with the supported version and the security level.

Command Class	Version	Required Security Class
Z-wave Plus® Info	2	None
Transport Service	2	None
Security 2	1	None
Supervision	1	None
Version	3	Highest granted
Association	2	Highest granted
Multi Channel Association	3	Highest granted
Association Group Information	3	Highest granted
Manufacturer Specific	2	Highest granted
Device Reset Locally	1	Highest granted
Indicator	3	Highest granted
Powerlevel	1	Highest granted
Battery	1	Highest granted
Notification	8	Highest granted
Wake up	2	Highest granted
Configuration	4	Highest granted
Firmware Update Command Class	5	Highest granted

3.2 Parameters supported via Configuration Command Class

SMC0410 support the following parameters which are configurable via the Configuration Command Class (0x70) Ver. 4 and older versions.

3.2.1 SuperVision Report Timeout

SMCO410 will send the message over SuperVision Command Class, and it will wait for the SuperVision report from the Controller for the SuperVision report timeout time.

3.2.2 SuperVision Retry Count

If the SuperVision report is not received within the SuperVision report timeout time, the SMCO410 will retry sending the message again. Upon exceeding the max retry, the SMCO410 device will send the next message available in the queue.

3.2.3 SuperVision Wait Time

Before retrying the message, SMCO410 will wait for the SuperVision wait time. Actual wait time is calculated using below formula,

Wait time = SuperVision wait time base-value + random-value + (attempt-count x 5 seconds)

- The random value shall be a time between 100 and 1100 milliseconds

Parameters Name	Parameters Info	Parameter	Size / level	Min Value	Max Value	Default Value
SuperVision Report Timeout	SuperVision Report Timeout milliseconds	0x01	2	500 ms	5000 ms	1500 ms
SuperVision Retry Count	SuperVision Retry Count	0x02	2	0	2	1
SuperVision Wait Time	SuperVision Wait Time seconds	0x03	2	1 sec	60 sec	5 sec

SMCO410 supports the CONFIGURATION_GET (0x05) command to get the value of configurable parameters. Upon receiving the valid CONFIGURATION_GET command, the SMCO410 device will send the values via CONFIGURATION_REPORT (0x06) command. SMCO410 supports the CONFIGURATION_SET (0x04) commands to set the valid values of the configurable parameters. If the 'default' flag is set in the CONFIGURATION_SET (0x04) command, the SMCO410 will set the parameter value to its default value and will ignore the requested value for the parameter.

If the CONFIGURATION_GET command received for the non-supported parameters, the SMCO410 will send the CONFIGURATION_REPORT of the first supported parameter (SuperVision report timeout).

If the CONFIGURATION_SET command received with the default bit set, the SMCO410 will ignore the size and the parameter value field and will set the default value for the supported parameters. If the CONFIGURATION_SET command received with default bit clear and with the invalid parameter, size or value, the SMCO410 device will ignore the request and will not update the parameter.

Parameter values will be stored in the NVR memory and can be retained on power-up event. Parameter values will be set to default on Factory reset and Exclusion operations.

3.3 List of supported events over Notification Command Class

Event of device	Notification Type	Notification Event
Test detected	0x01	0x03
Test clear	0x01	0x00
Smoke detected	0x01	0x02
Smoke clear	0x01	0x00
Smoke silence	0x01	0x06
Smoke Dust in Chamber	0x01	0x08
CO detected	0x02	0x02
CO clear	0x02	0x00
CO silence	0x02	0x06
CO End-Of-Life detected	0x02	0x05
Malfunction detected	0x09	0x01
Malfunction clear	0x09	0x00

Heartbeat	0x09	0x05

3.4 Association Group

The alarm supports one association group (Lifeline) and sends its alarms to that group. The Z-wave® network controller may be set in this group. It is not recommended to modify this association group. All the critical events in the list of supported events over Notification Command Class will be triggered from the Lifeline association group.

- Group ID: 0x01
- Group Name: “Lifeline”
- Max nodes: 5
- Profile ID: 0x0001
- Endpoint: 0

3.5 SMARTSTART Inclusion

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 vicinity of the network.

Note: SmartStart will be disabled after 10 minutes of power up to save the battery. To re-enable into SmartStart, please factory reset the device.

3.6 DSK LOCATION ON THE PRODUCT

Device Specific Key (DSK) to be available at the time an S2 device is added to a Z-wave® network.

The QR code and the 5-digit DSK PIN can be found on the product nameplate which is located on the back of the product. The Full DSK string can be found on the product insert, available inside the product packaging.

3.7 OTHER Z-WAVE® SYSTEMS

This product can be operated in any Z-wave® network with other Z-wave® certified devices from other manufacturers. All mains operated nodes within the network will act as repeaters regardless of vendor to increase reliability of the network.

4 SUPPORTED EVENTS AND OPERATIONS IN SMCO410 DEVICE

SMCO410 supports the following events. On occurrence of an event, SMCO410 device will send the Z-wave® message to the Z-wave® controller.

1. Add / Inclusion Mode
2. Remove / Exclusion Mode
3. Wake-up Notification
4. Test alarm
5. Smoke alarm
6. CO alarm
7. Malfunction
8. CO End-Of-Life (EOL)
9. Battery report
10. Factory reset

4.1 Add / Inclusion Mode

The SMCO410 is powered up and if user presses and hold down test button for approx. 10+ seconds until 2x green led blink and 2x beep and release it, the SMC0410 device start the Learn mode. After the conclusion of learn mode (or timeout), the SMCO410 device will remain awake for 25 seconds. The SMCO410 device supports both classic and NWI (network wide inclusion) Inclusion modes. When entering learn mode, the SMCO410 device will go into classic mode for 5 seconds. If classic inclusion does not start before the 5 second timeout, the SMCO410 will fall back to NWI mode.

4.2 Remove / Exclusion Mode

The SMCO410 is powered up and if user presses and hold down test button for approx. 10+ seconds until 2x green led blink and 2x beep and release it, the SMC0410 device start the Learn mode. After the conclusion of learn mode (or timeout), the SMCO410 device will remain awake for 25 seconds. The SMCO410 device supports both classic and NWE (network wide exclusion) exclusion modes. When entering learn mode, the SMCO410 device will go into classic mode for 5 seconds. If classic exclusion does not start before the 5 second timeout, the SMCO410 will fall back to NWE mode.

4.3 Wake-up Notification

The SMCO410 will send the Wake-up Notification after completion Test operation. The user will initiate the test operation on the device by pressing the test button for approx. 0-10 seconds until 1x green led blink and 1xbeep and release it. The device will perform the test operation on the device and after completion of the test operation, the device will send Wakeup notification. The SMCO410 will wait for 10 seconds to receive the Wake-up No more information message from the Z-wave® controller. If the message received, the SMCO410 will go into the sleep mode immediately, else the SMCO410 device will go into the sleep mode after 10 second timer expire in idle mode (No ongoing communication with the Z-wave® Controller).

The SMCO410 will also send the Wake-up notification if wake up interval is configured. The SMCO410 supports the wakeup interval as 3hrs interval. Mostly the SMCO410 device will send the Wake-up notification along with the Heartbeat message.

Following are the Wake-up interval parameters,

- **DEFAULT_SLEEP_TIME**: 0 seconds
- **MIN_SLEEP_TIME**: 0 seconds
- **MAX_SLEEP_TIME**: 10800 seconds (3 hours)
- **STEP_SLEEP_TIME**: 0

4.4 Test alarm

When there is no alarm condition and the Test button is pressed for 3-5 seconds until 1x green led blink and release the button, the SMCO410 will send the following Z-wave® message to the Z-wave® Controller. If the S2 security is enabled, the message will be encapsulated inside the SuperVision Command Class.

Command Class	Notification Type	Notification Event
Notification (0x71)	Test(0x01)	0x03

When the Test is completed, the SMCO410 will send the following Z-wave® message content to the Z-wave® Controller. If the S2 security is enabled, the message will be encapsulated inside the SuperVision Command Class.

Command Class	Notification Type	Notification Event	Event Parameters length	Event Parameters
Notification (0x71)	Test(0x01)	0x00	0x01	0x03

4.5 Smoke alarm

When the Smoke is detected, the SMCO410 will send the following Z-wave® message content to the Z-wave® Controller. If the S2 security is enabled, the message will be encapsulated inside the SuperVision Command Class.

Command Class	Notification Type	Notification Event
Notification (0x71)	Smoke(0x01)	0x02

When the Smoke is clear, the SMCO410 will send the following Z-wave® message content to the Z-wave® Controller. If the S2 security is enabled, the message will be encapsulated inside the SuperVision Command Class.

Command Class	Notification Type	Notification Event	Event Parameters length	Event Parameters
Notification (0x71)	Smoke(0x01)	0x00	0x01	0x02

When the level of Smoke is below the threshold value and the silence button on the SMCO410 is pressed, the SMCO410 device will send the following Z-wave® message content to the Z-wave® Controller. If the S2 security is enabled, the message will be encapsulated inside the SuperVision Command Class.

Command Class	Notification Type	Notification Event	Event Parameters length	Event Parameters
Notification (0x71)	Smoke(0x01)	0x06	0x01	0x02

Note: If the Smoke is silenced via the silence button but the Smoke is still present, after 8 minutes of the silence period the SMCO410 will send the Smoke alarm again.

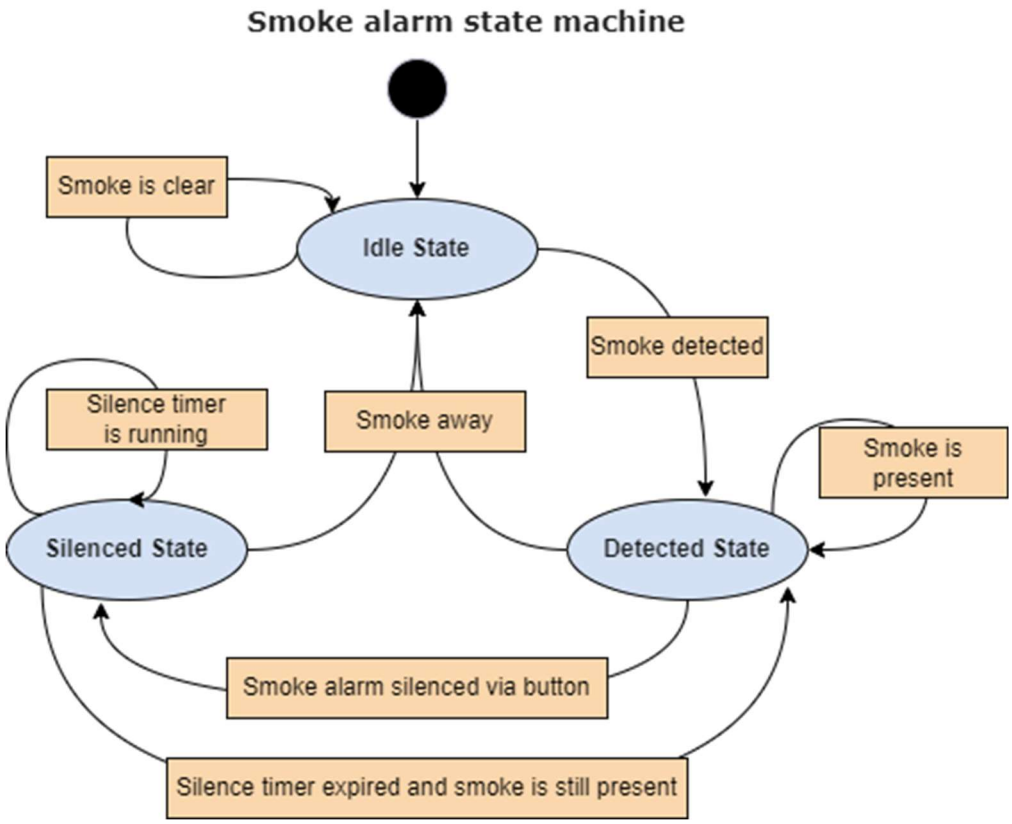

Figure 2: Smoke alarm state machine

When the Smoke Chamber has reached its contamination limit (Dust in Chamber), the SMCO410 will send the following Z-wave® message content to the Z-wave® Controller. If the S2 security is enabled, the message will be encapsulated inside the SuperVision Command Class.

Command Class	Notification Type	Notification Event	Event Parameters length	Event Parameters
Notification (0x71)	Smoke(0x01)	0x08	0x01	0x02

4.6 CO alarm

When the CO is detected, the SMCO410 will send the following Z-wave® message content to the Z-wave® Controller. If the S2 security is enabled, the message will be encapsulated inside the SuperVision Command Class.

Command Class	Notification Type	Notification Event
Notification (0x71)	CO(0x02)	0x02

Note: CO alarm trigger time depends upon the level of CO.

When the CO is clear, the SMCO410 will send the following Z-wave® message content to the Z-wave® Controller. If the S2 security is enabled, the message will be encapsulated inside the SuperVision Command Class.

Command Class	Notification Type	Notification Event	Event Parameters length	Event Parameters
Notification (0x71)	CO(0x02)	0x00	0x01	0x02

When the silence button on the SMCO410 is pressed, the SMCO410 device will send the following Z-wave® message content to the Z-wave® Controller. If the S2 security is enabled, the message will be encapsulated inside the SuperVision Command Class.

Command Class	Notification Type	Notification Event	Event Parameters length	Event Parameters
Notification (0x71)	CO(0x02)	0x06	0x01	0x02

Note: If the CO is silenced via the silence button but the CO is still present, after 4 minutes and 30seconds of the silence period the SMCO410 will send the CO alarm again.

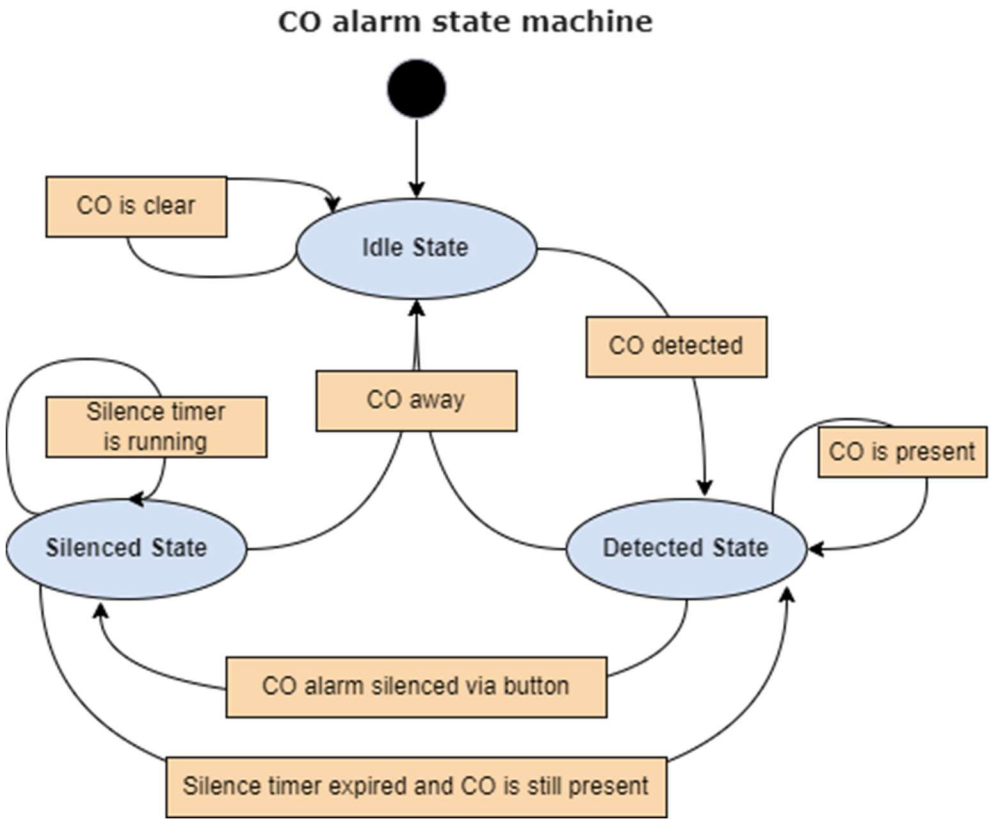

Figure 3: CO alarm state machine

4.7 Malfunction Detected

When the Smoke sensor malfunction is detected, the SMCO410 will send the following Z-wave® message content to the Z-wave® Controller. If the S2 security is enabled, the message will be encapsulated inside the SuperVision Command Class.

Command Class	Notification Type	Notification Event
Notification (0x71)	System(0x09)	0x01

When malfunction condition is clear or the silence button the SMCO410 device is pressed, the SMCO410 device will send the following Z-wave® message content to the Z-wave® Controller. If the S2 security is enabled, the message will be encapsulated inside the SuperVision Command Class.

Command Class	Notification Type	Notification Event	Event Parameters length	Event Parameters
Notification (0x71)	System(0x09)	0x00	0x01	0x01

4.8 CO End-Of-Life(EOL)

When the CO sensor End-Of-Life is detected, the SMCO410 will send the following Z-wave® message content to the Z-wave® Controller. If the S2 security is enabled, the message will be encapsulated inside the SuperVision Command Class.

Command Class	Notification Type	Notification Event
Notification (0x71)	CO(0x02)	0x05

The SMCO410 device CO sensor has a life of 10 years. Upon detecting the CO sensor End-Of-Life, the SMCO410 device will send the CO End-Of-Life event after 1 minute of power-on and then at an interval of every 48 hours.

4.9 Battery Report

On every power up after approximately 1 min and upon the battery level changed, the SMCO410 will send the following Z-wave® message content to the Z-wave® Controller. If the S2 security is enabled, the message will be encapsulated inside the SuperVision Command Class. Also the SCMO410 will sending the periodic battery message at interval 3hrs.

Command Class	Identifier	Battery Level
Battery (0x80)	Battery report	0x50 to 0x64 (Hex)

If the battery level is <= 78%, the SMCO410 will send the following Z-wave® message content to the Z-wave® Controller. If the S2 security is enabled, the message will be encapsulated inside the SuperVision Command Class.

When the battery voltage is <=78%, the SMCO410 will start beeping and will blink the LED to indicate the low battery.

Command Class	Identifier	Battery Level
Battery (0x80)	Battery report	0xFF

Following table contains the mapping of the different battery voltage and the battery level.

Battery Voltage	Battery Level	Z-wave® reporting over Battery Command Class	Status
3.3 V	100 (0x64)	0x64	Normal
3.2 V	96 (0x60)	0x60	Normal
3.1 V	93 (0x5D)	0x5D	Normal
3.0 V	90 (0x5A)	0x5A	Normal
2.9 V	87 (0x57)	0x57	Normal
2.8 V	83 (0x53)	0x53	Normal
2.7 V	80 (0x50)	0x50	5 chirp – 1LED (May Silence)
2.65 V	78 (0x4E)	0xFF	5 chirp – 1LED (May Not Silence)
2.6 V	77 (0x4D)	0xFF	5 chirp – 1LED (May Not Silence)
2.5 V	74 (0x4A)	0xFF	5 chirp – 1LED (May Not Silence)
2.4 V	71 (0x47)	0xFF	5 chirp – 1LED (May Not Silence)
2.3 V	68 (0x44)	Will not run	Will not run
2.2 V	65 (0x41)	Will not run	Will not run
2.1 V	62 (0x3E)	Will not run	Will not run
2.0 V	59 (0x3B)	Will not run	Will not run
1.9 V	56 (0x38)	Will not run	Will not run
1.8 V	53 (0x35)	Will not run	Will not run

4.10 Factory reset

The SMCO410 is powered up and if the user presses the test button and held down it for approx. 20+ seconds until 3x green led blink and 3 chirps and release it, the SMC0410 will reset all Z-wave® settings and leave the network. The SMCO410 device will send the following Z-wave® message content to the Z-wave® Controller. If the S2 security is enabled, the message will be encapsulated inside the SuperVision Command Class.

Command Class	**Identifier**
Device Reset Locally (0x5A)	0x01

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

4.11 Identify

The SMCO410 can be identify by sending the identify message using Indicator command class with Indicator ID 0x50. The device will blink green led for identify operation on receiving the Identify command.

Command Class	**0x87 (Indicator command Class)**
Command	0x01 (Indicator Set)
Indicator 0 Value	0x00
Indicator object count	0x03
Indicator ID 1	0x50
Property ID 1	0x03
Value 1	0x08
Indicator ID 2	0x50
Property ID 2	0x04
Value 2	0x03
Indicator ID 3	0x50
Property ID 3	0x05
Value 3	0x06