Advanced Information Product Manual

Engineering Specification

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Document No.	Engineering Specification - Z-Wave® Product Line (JC210)
Version	1.0
Description	This document mainly introduces the new generation Z-Wave Plus® **Door Lock**. The content mainly includes its interfaces, accessories, features, specifications, quick start, and software function definition. The **Door Lock** is a Z-Wave Plus v2 device with many advantages. ● Turn ON/OFF manually or remotely through the Z-Wave controller. ● This Z-Wave device has advanced features that allow you to customize your experience. These features can only be adjusted by a Z-Wave enabled controller that supports the Z-Wave configuration command class. For a complete list of adjustable configurations. ● Support SmartStart, which makes inclusion more convenient. ● Support S2, which makes it more secure and reliable. ● Support Long Range, extended communication range is more than 400 meters.
Written By	
Date	

1 OVERVIEW

1.1 About Z-Wave

Z-Wave is the international wireless protocol for communication in the Smart Home.
Z-Wave ensures a reliable communication by reconfirming every message (two-way communication) and every mains powered node can act as a repeater for other nodes (meshed network) in case the receiver is not in direct wireless range of the transmitter.
This device and every other certified Z-Wave device can be used together with any other certified Z-Wave device regardless of brand and origin as long as both are suited for the same frequency range.
If a device supports secure communication it will communicate with other devices secure as long as this device provides the same or a higher level of security. Otherwise it will automatically turn into a lower level of security to maintain backward compatibility.

1.2 About 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.

1.3 About Z-Wave Long Range

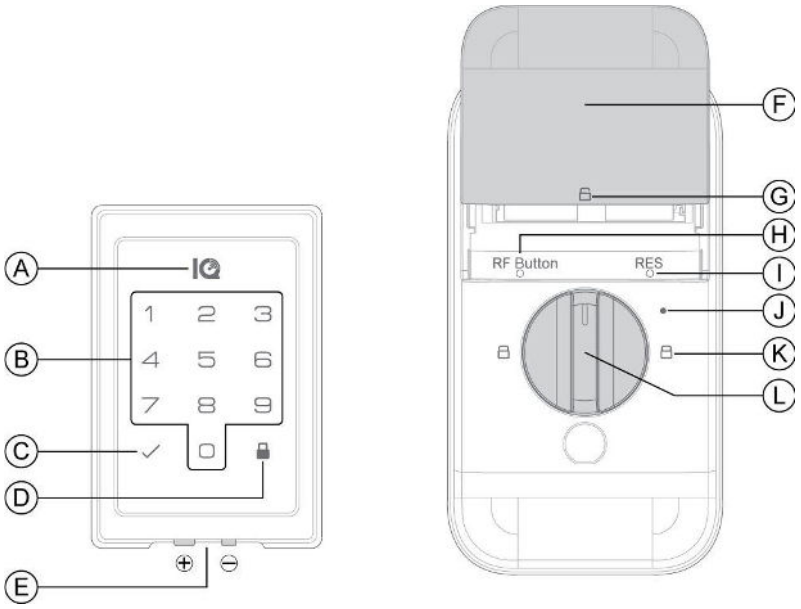
Z-Wave Long Range device can only support be included via SmartStart. Extract the DSK from end device and paste it into the DSK Value in PC Controller, make sure the 'Long Range' option is ticked.
The controller doesn't do channel scanning the same way as in end device. The controller will scan 4 channels, including 3 classic Z-Wave channels 9.6/40/100 kbps and 1 LR channel, using US_LR frequency will scan at 912 MHz while using US_LR_BACKUP will scan at 920 MHz during startup. The active LR channel can be switch at runtime.

1.4 About The Product

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.

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. S2 Security Enabled Controller is required to operate the device.

2 INTERFACES & ACCESSORIES



Callout	Description
A	IQ logo LED
B	Digit keys
C	Check key
D	Lock key
E	Emergency power connector
F	Battery compartment cover
G	Thumb turn unlock position
H	RF button, under the battery compartment cover
I	RES button, under the battery compartment cover
J	LED indicator
K	Thumb turn lock position
L	Thumb turn

3 FEATURES & SPECIFICATIONS

3.1 Structural Characteristics

Parameter	Value
Product Identifier	JC210
Usage	For indoor use.
Operating Temperature	-35-66℃
Relative Humidity	20-85%

3.2 Hardware Characteristics

Parameter	Value
Z-Wave Module	EFR32ZG23A010F512GM40
Z-Wave TX Power	Max: 14dBm
Z-Wave Antenna Distance	40m (Indoor) / 150m (Outdoor) / up to 400m(ZWLR)
Battery Info	AA alkaline battery x4
Working Current	Door Lock body: 52mA(Wake Up), 190mA（operate door lock）
Standby Current	Door Lock body: 130uA

3.3 Software Characteristics

Parameter	Value
Wireless Technology	Z-Wave
Certification Type	Z-Wave Plus v2
Z-Wave SDK Version	7.18.8
Z-Wave Library Type	Enhanced 232 Slave
Z-Wave Role Type	ZWAVEPLUS_INFO_REPORT_ROLE_TYPE_SLAVE_SLEEPING_LISTENING (0x07)
Generic Device Type	GENERIC_TYPE_ENTRY_CONTROL (0x40)
Specific Device Type	SPECIFIC_TYPE_DOOR_LOCK (0x01)
Security Class	Non-Security, S0, S2-ACCESS

SmartStart	Support. After powering on, SmartStart is auto active if it' s out of the Z-Wave network.
Over The Air （OTA）	Support. Firmware can be updated via RF.
Multichannel Device	No
Association	Support. Refer to Section 5.7 Association Group Info.
Factory Reset	Support. Refer to Section 4.4 How to factory reset.
Power-down Memory	Support. All command settings will stay unchanged even power down.
Timed battery report	Support. Refer to Configuration Parameter 2.
Low battery warning	Support.
User code Report	Support. When user code changed, send out notification via Group 1.

4 PRODUCT QUICK START

4.1 Z-Wave DSK Location

You can find the QR code when you open the battery box

You may also find the QR Code and DSK on individual package of each product.

Please do not remove or damage them.

4.2 How to add the product into Z-Wave network

1. Follow the user guide of hub to enter inclusion mode.
2. Operate on lock following guide below:
   1) Press the RF Button 3 times within 6 seconds to switch to Z-Wave mode.
   2) Press the RES Button once briefly with a tool to start the network inclusion process.

4.3 How to remove the product from Z-Wave network

1. Follow the user guide of hub to enter exclusion mode.
2. Operate on lock following guide below:
   1) Press the RES Button once briefly with a tool to start the network exclusion process.

4.4 How to factory reset

1. Operations on lock
   1) Keep your lock in "unlock" status.
   2) Use the provided reset pin to press and hold the RES button for more than 5 seconds until hearing beep sound.
   3) If reset is successful, the bolt will extend on its own to learn the orientation of the door. The lock will reset itself to factory default by sending a "Device Reset Locally Notification" to gateway.
2. Please use this procedure only when the network primary controller is missing or otherwise inoperable.

Note: The lock will reset itself to factory default by sending a "Device Reset Locally Notification" to gateway, when press and hold the RF Button for more than 3 seconds to switch to PowerG mode,

5 SOFTWARE FUNCTION DEFINITION

5.1 User Behavior Interaction

User behavior	Out of the Z-Wave network	In the Z-Wave network
Power on	Digit keys light is on Send Inclusion Requests for SmartStart	Digit keys light is on
Inclusion network	Press the RES Button once briefly with a tool to start the network inclusion process	NA
Exclusion network	NA	Press the RES Button once briefly with a tool to start the network exclusion process
unlock (User PIN code / manual（Key or Thumb Turn） / Z-Wave)	IQ logo LED: Green light up, 0.5S LED indicator: Green, Light up 2s.	IQ logo LED: Green light up, 0.5S LED indicator: Green, Light up 2s. Send Notification Report and Door Lock Operation Report to association group
Lock (One Touch Locking / Auto Lock / manual（Thumb Turn） / Z-Wave)	IQ logo LED: Green light up, 0.5S LED indicator: Green, Light up 2s.	IQ logo LED: Green light up, 0.5S LED indicator: Green, Light up 2s. Send Notification Report and Door Lock Operation Report to association group
User code (Add / delete / modify)	NA	Send Notification Report and User code Report to association group

5.2 Supported Command Classes

Command Class	Version	Not added	Non-secure added	Securely 0 added		Securely 2 added	
				Non-secure CC	Secure CC	Non-secure CC	Secure CC
ZWAVEPLUS_INFO	2	Support	Support	Support		Support	
SECURITY	1	Support	Support	Support		Support	
SECURITY_2	1	Support	Support	Support		Support	
TRANSPORT_SERVICE	2	Support	Support	Support		Support	
SUPERVISION	1	Support	Support	Support		Support	
TIME	2	Support	Support	Support		Support	
APPLICATON STATUS	1	Support	Support	Support		Support	
ASSOCIATION	2				Support		Support
ASSOCIATION_GRP_INFO	3				Support		Support
MULTICHANNEL ASSOCIATION	3				Support		Support
NOTIFICATION	8				Support		Support
DOOR LOCK	4				Support		Support
USER CODE	2				Support		Support
SCHEDULE ENTRY LOCK	3				Support		Support
CONFIGURATION	4				Support		Support
TIME PARAMETERS	1				Support		Support
VERSION	3				Support		Support
MANUFACTURER_SPECIFIC	2				Support		Support
DEVICE_RESET_LOCALLY	1				Support		Support
POWERLEVEL	1				Support		Support
INDICATOR	3				Support		Support
BATTERY	1				Support		Support
FIRMWARE_UPDATE_MD	5				Support		Support

5.3 Basic Command Class mapping

Basic Command maps to Door Lock Command Class, as shown below.

Command	Value	Mapped	Value	Function
Basic Set	0x00	Door Lock Operation Set	Door Unsecured	Open the door
	0xFF		Door Secured	Close the door
Basic Report	0x00	Door Lock Operation Report	Door Unsecured	The door is opened
	0xFF		Door Secured	The door is closed
Basic Get		Door Lock Operation Get		

5.4 ZWAVEPLUS_INFO

The Command is used to differentiate between Z-Wave Plus v2, Z-Wave for IP and Z-Wave devices. This command provides additional information about the Z-Wave Plus v2 device in question.

Parameter	Value
Z-Wave Plus Version	2
Role Type	7 (ZWAVEPLUS_INFO_REPORT_ROLE_TYPE_SLAVE_SLEEPING_LISTENING) (APPLICATION_FREQ_LISTENING_MODE_1000ms)
Node Type	0 (ZWAVEPLUS_INFO_REPORT_NODE_TYPE_ZWAVEPLUS_NODE)
Installer Icon Type	0x0300 (ICON_TYPE_GENERIC_DOOR_LOCK_KEYPAD)
User Icon Type	0x0300 (ICON_TYPE_GENERIC_DOOR_LOCK_KEYPAD)

5.5 Manufacturer Specific

The Command is used to advertise manufacturer specific information.

Parameter	Value
Manufacturer ID	0x012A
Product Type ID	0x0103
Product ID	0x032A(JC210)

5.6 Version

The Command may be used to obtain the Z-Wave library type, the Z-Wave protocol version used by the application, the individual command class versions used by the application.

Parameter	Value
Z-Wave Protocol Library Type	0x03

Z-Wave Protocol Version	0x07
Z-Wave Protocol Sub Version	0x12
Firmware 0 Version	Z-Wave Chip Firmware Version Major
Firmware 0 Sub Version	Z-Wave Chip Firmware Version Minor
Hardware Version	0x01
Number of firmware targets	0x01
Firmware 1 Version	Door Lock Firmware Version Major
Firmware 1 Sub Version	Door Lock Firmware Version Minor

5.7 Association Group Info

The Command is used to manage associations to Node ID destinations.

ID	Name	Count	Profile	Function
1	Lifeline	5	General: Lifeline (0x0001)	**Battery Report(0x8003):** Issued periodically to report the current battery level; Issued when battery becomes low. **Device Reset Locally Notification (0x5A01) :** Issued when Factory Reset is performed. **Door Lock Operation Report(0x6203):** Issued when door lock mode changed **Door Lock Configuration Report(0x6206):** Issued when door lock configuration changed **Indicator Report(0x8703):** Issued when indicator set received **Notification Report(0x7105):** Issued when door lock event changed **User Code Report(0x6303):** Issued when user code changed by keypad **User Code Keypad Mode Report(0x630A)** Issued when keypad mode changed by keypad
2	On/Off control	5	General: Control (0x2000)	**Basic Set (0x2001) :** Issued when door lock mode changed

5.8 Notification

The Command is used to advertise events or states, such.

Notification Type = Access Control (0x06), according to Table 4-8-1

Notification Type = Power Management (0x08), according to Table 5-8-2

Table 4-8-1:

Description	Event	Alarm type	Alarm Level	Parameters
Manual lock operation (mechanical key or thumb turn)	0x01	0x15	0x01	0x01
Manual unlock operation (mechanical key or thumb turn)	0x02	0x16	0x01	0x01
RF lock operation	0x03	0x18	0x01	
RF unlock operation	0x04	0x19	0x01	
Keypad Lock operation	0x05	0x15	0x01	User ID (2 bytes)
Keypad lock operation (One-click locking)			0x02	
Keypad Unlock operation	0x06	0x13	0x01	User ID (2 bytes)
Auto lock locked operation	0x09	0x1B	0x01	
Lock jammed	0x0B	0x00	0x00	
All user codes deleted	0x0C	0x21	0xFF	
Single user code deleted	0x0D	0x21	0x01	User ID (2 bytes)
New user code added (add and modify)	0x0E	0x70	0x01	User ID (2 bytes)
New user code not added due to duplicate code	0x0F	0x71	0x01	User ID (2 bytes)
Keypad temporary disabled	0x10	0x81	0x00	
Manually enter user access code exceeds code limit	0x13	0x82	0x00	
Messaging User Code entered via keypad	0x20	0x73	0x01	User ID (2 bytes)

Table 5-8-2:

Description	Event	Alarm type	Alarm Level	Parameters
Power has been applied	0x01	0x00	0x00	
Replace battery soon (20%)	0x0A	0x00	0x00	

Replace battery now (5%)	0x0B	0x00	0x00	

5.9 Door Lock

The Command is used to operate and configure a door lock device.

1. Support Door Lock Mode: Door Secured(0xFF), Door Unsecured(0x00)
2. Door Lock Capabilities Report Command:
   1) Supported Operation type Bit Mask Length = 0x01
   2) Supported Operation Type Bit Mask 1 = 0x02 (Constant operation)
   3) Supported Door Lock Mode List Length = 0x02
   4) Supported Door Lock Mode 1 = 0x00 (Door Unsecured)
   5) Supported Door Lock Mode 2 = 0xFF (Door Secured)
   6) Supported Outside Handle Modes Bitmask = 0x00
   7) Supported Inside Handle Modes Bitmask = 0x00 (No Handle)
   8) Supported door components = 0x00
   9) ARS = 1 (Auto-Relock support)
   10) HRS = TAS = BTBS = 0
3. Door Lock Operation Set Command:
   1) Door Unsecured (0x00)
   2) Door Secured (0xFF)
4. Door Lock Operation Report Command:
   1) Door Unsecure, example: 00 00 00 FE FE 00 00

   Door Lock Mode = 0x00 (Door Unsecured)

   Outside Door Handles Mode = 0 (Disabled), Inside Door Handles Mode = 0 (Disabled)

   Door Condition = 0

   Lock Timeout minutes = 0xFE (No unlocked period)

   Lock Timeout Seconds = 0xFE (No unlocked period)

   Target Door Lock Mode = 0x00 (Door Unsecured)

   Duration = 0x00

   2) Door Secured, example: FF 00 00 FE FE FF 00

   Door Lock Mode = 0xff (Door secured)

   Outside Door Handles Mode = 0 (Disabled), Inside Door Handles Mode = 0 (Disabled)

   Door Condition = 0

   Lock Timeout minutes = 0xFE (No unlocked period)

   Lock Timeout Seconds = 0xFE (No unlocked period)

   Target Door Lock Mode = 0xFF (Door secured)

   Duration = 0x00
5. Door Lock Configuration Report Command:
   1) Operation Type = 0x01 (Constant operation)
   2) Lock Timeout minutes = 0xFE (No unlocked period)
   3) Lock Timeout Seconds = 0xFE (No unlocked period)

4) Auto-relock time 1 = 0
5) Auto-relock time 2 = 0
6) Hold and release time 1 = 0x00
7) Hold and release time 2 = 0x00
8) BTB = TA = 0

The auto relock time mapping table of door lock and Z-Wave is as follows:

Z-Wave definition	Door lock function
Auto-relock time = 0	disabled
Auto-relock time = 1 - 30	30 Seconds
Auto-relock time = 31 - 60	60 Seconds
Auto-relock time = 61 - 120	120 Seconds
Auto-relock time = 121 – 65535	180 Seconds

5.10 User Code

The Command is used to manage User Codes in access control systems

1. Support users: 250
2. Support master code
3. Supported User ID Status: available(0x00), enabled/grant access (0x01), disabled(0x03)
4. Supported Keypad Modes: Normal mode
5. User Code Capabilities Report Command:
   1) Supported Users = 250
   2) MC (Master Code) Support = 0
   3) MCD (Master Code Deactivation) Support = 0
   4) UCC (User Code Checksum) Support = 0
   5) MUCR (Multiple User Code Report) Support = 0
   6) MUCS (Multiple User Code Set) Support = 0
   7) Supported User ID Status Bit Mask Length = 1
   8) Supported User ID Status Bit Mask 1 = 0x0B (Available, Enabled/Grant Access, disabled(0x03))
   9) Supported Keypad Modes Bit Mask Length = 1
   10) Supported Keypad Modes Bit Mask 1 = 0x01 (Normal mode)
   11) Supported Keys Bit Mask Length = 8
   12) Supported Keys Bit Mask 1 = 0x00
   13) Supported Keys Bit Mask 2 = 0x00
   14) Supported Keys Bit Mask 3 = 0x00
   15) Supported Keys Bit Mask 4 = 0x00
   16) Supported Keys Bit Mask 5 = 0x00
   17) Supported Keys Bit Mask 6 = 0x00
   18) Supported Keys Bit Mask 7 = 0xFF (digits 0-7)
   19) Supported Keys Bit Mask 8 = 0x03 (digits 8-9)

5.11 Schedule Entry Lock

The Schedule Entry Lock Command Class provides Z-Wave devices the capability to exchange scheduling information. The Schedule Entry Lock Type Commands are for controlling the schedules of an Entry Lock using schedule based user code Ids.

1. Number of Slots Week Day: 0
2. Number of Slots Year Day: 1
3. Number of Slots Daily Repeating: 1

5.12 Time

The Command is used to read date and time from a supporting node in a Z-Wave network.

When the lock is added to the Z-Wave network or powered back on after a power outage, it will request the Time from the Hub (by sending Time Get commands)

If the controller does not support either the Time CC, then scheduled users will not have access.

A time sync should occur every 24 hours, with the Time CC to sync time.

5.13 Time Parameters

The Command is used to set date and time in a device hosting this facility

5.14 Battery

The Command is used to request and report battery levels for a given device.

1. If send Battery Get to the device, it will issue Battery Report with current battery level to the requester.

2. If re-power on, it will issue Battery Report with current battery level via Lifeline.

3. If waked up, it will detect battery level, and issue Battery Report (Value=0xFF) via Lifeline when battery level is less than 20%.

4. If the battery value change exceeds 5%, the battery report will be sent

5. Support timed battery report, refer to Configuration Parameter 2.

5.15 Indicator

The Command is used to help end users to monitor the operation or condition of the application provided by a supporting node.

Indicator ID		Property ID	
Node Identify	0x50	On Off Period	0x03
		On Off Cycles	0x04
		On time within an On/Off period	0x05

5.16 Configuration

The Command allows product specific configuration parameters to be changed.

Note: No Bulk Support equals to True. ***It will return an Application Rejected Request Command when receiving Configuration Bulk Set or Get (if received without Supervision encapsulation).*** It will reset all its configuration parameters if either manually reset to factory default or receives a Configuration Default Reset Command. It will NOT modify or reset any configuration parameter when being included or excluded of a Z-Wave network.

Parameter 01:

Parameter	**0x01 (1)**			
Name	Set the volume to silent			
Info	Set the volume to silent			
Properties	Size	1	Min Value	0
	Format	Enumerated	Max Value	1
	Read-only	False	Default Value	1
	Altering capabilities	False	Advanced	False
Description	Set the volume to silent			
	Value	Function		
	0	Silent		
	1	Not silent		

Parameter 02:

Parameter	**0x02 (2)**			
Name	Timed battery report			
Info	Configure timed battery report			
Properties	Size	2	Min Value	0
	Format	Unsigned Integer	Max Value	14400(0x3840) (10 days)

	Read-only	False	Default Value	1440(0x05A0) (one day)
	Altering capabilities	False	Advanced	False

Description	Enable/Disable timed battery report and sets how often battery is reported in minutes.	
	Value	Function
	0	Disable timed battery report
	1-14400	Enable timed battery report and sets how often battery is reported in minutes.

Parameter 03:

Parameter	**0x03 (3)**			
Name	Code Privacy			
Info	Set door lock keypad random number display			
Properties	Size	1	Min Value	0
	Format	Enumerated	Max Value	1
	Read-only	False	Default Value	0
	Altering capabilities	False	Advanced	False

Description	Every time the keypad is woken up, two random numbers will appear on the keypad. The user needs to press the random number first before operating the keypad.	
	Value	Function
	0	Disable
	1	Enable

Parameter 04:

Parameter	**0x04 (4)**			
Name	Code to Lock			
Info	Set the switch between one-click locking and user password locking			
Properties	Size	1	Min Value	0

<table>
<tr><td rowspan="3"></td><td>Format</td><td>Enumerated</td><td>Max Value</td><td>1</td></tr>
<tr><td>Read-only</td><td>False</td><td>Default Value</td><td>0</td></tr>
<tr><td>Altering capabilities</td><td>False</td><td>Advanced</td><td>False</td></tr>
<tr><td>Description</td><td colspan="4">All set user passwords can also be used to set the lock, that is, enter the password to lock, and the one-button lock function will fail. After closing, switch to one-button lock, that is, the user password can only be used to unlock.<table><tr><td>Value</td><td>Function</td></tr><tr><td>0</td><td>One-button Lock</td></tr><tr><td>1</td><td>User password lock</td></tr></table></td></tr>
</table>