Thank You.

Thank you for taking the chance on us. We are truly humbled to be a part of your smart home journey and know that out of the many companies out there, you trusted us to make your life simpler and we don't take that for granted. Our mission is to provide the best products, with the best customer support, at the best prices. Sure, every company says that... but we'd like to think we're different. Why? Well, because we have our own smart homes, with our own desires to make our life simpler through home automation. We wake up every day to lights turning on to different colors based on the weather, coffee automatically brewing before we leave for work, and the thermostat changing based on our schedules. We take our nerdiness seriously by engaging in online groups and design our products around community suggestions and needs. We don't pretend to be a multi-billion dollar corporation worried about shareholders and bottom line. We're ok with being the little guy. The underdog, looking out for the best interests of people like us... the everyday smart home enthusiast who is passionate about moving the industry forward and we wouldn't have it any other way. So again, from the bottom of our hearts, thank you for trusting us.

E Die Mak

Table of Contents:Page:About Z-Wave & Range Estimator Tool2Z-Wave Distance Worksheet & Best Practices for Installation3Getting to Know Your Switch (LZW60) & General Inclusion Instructions4SmartThings Inclusion Process5FCC, Warranty and Z-Wave Information6Project Grand Slam7

Z-Wave SmartStart

This device supports Z-Wave's new SmartStart feature. Please do not throw out the card within the box that has your unique QR Code with your DSK (Device Specific Key). This QR Code can also be found on the back of the sensor and box.

HUB Installation Instructions.

All HUB's are different, so why should your installation instructions be the same? Below you'll find a QR Code to specific instructions for your HUB (NOTE: If you don't see your HUB, please scan the, "Other" QR Code). As you can imagine, it's hard to keep written instructions up to date with all the HUB/App changes, so the most recent instructions will be on the site. However, if you're a manual guy/gal, we get it, please see Page 4 for more details! If ever you run into any issues, please reach out to us at: contact@inovelli.com.



inovelli.com/lzw60/setup/#smartthings





inovelli.com/lzw60/setup/#hubitat





inovelli.com/lzw60/setup/#other

About Z-Wave.

Z-Wave is an incredible technology. With it powering your home, you can choose from over 600 companies/manufacturers and 2100 products, all of which will work with each other. The more devices, the more stable the network. The purpose of this portion of the manual is to help you understand how Z-Wave works (in layman's terms) as well as help you organize an efficient Z-Wave network, setting you up for success in the long run. Afterall, we're assuming you'll want more than one smart home device!

Z-Wave Network | Using Devices That Repeat Signals.

Since this sensor is battery operated, it <u>will not repeat a Z-Wave signal</u>. As referenced in the intro, Z-Wave can be used with a few devices or it can be used to build a large network. Below you'll see two examples. In the first example, a user has a HUB which is looking for Z-Wave devices within its radius. Z-Wave devices outside this radius will not be found and need to either be moved within the radius or use a repeating device to reach it. The second example shows how a repeater can be used to reach a device outside of the initial radius. Keep this in mind when building your own network and make sure to use the range estimator below.



NOTE: Z-Wave range will never be a perfect circle due to walls, furniture, etc. The above is for reference only, please use the, <u>"Range Estimator" below and the Worksheet on Page 3</u> for a better idea of where to place your switch or whether or not your chosen location will be in range.

Z-Wave Range Estimator.

Please use the below information to determine the depreciation of the Z-Wave signal. Z-Wave devices should have a distance of approximately 100m (328ft) without any obstacles in the way. Using the below information, if a signal has to travel through an inner wall, it will lose approximately 40% of its signal. Therefore, 100m multiplied by (100% - 40%) = 60m (197ft). Do this for every wall, window, etc and you will have your approximation. There's a worksheet on Page 3 that will help. As always, this is just an estimate. Depending on the manufacturer's quality for your other Z-Wave products, your signal may vary.

Material	Thickness	Signal Depreciation
Aerated Concrete Stone	< 30cm // 11.8"	20 %
Aluminum Coating	< 1mm // 0.04"	100 %
Ceiling	< 30cm // 11.8"	70 %
Furniture (non-wood)	< 30cm // 11.8"	40-60%
Glass (w/out metal coating)	< 5cm // 2.0"	10 %
Inner Wall	< 30cm // 11.8"	40 %
Iron Reinforced Concrete	< 30cm // 11.8"	30-90 %

Material	Thickness	Signal Depreciation	
Metal Grid	< 1mm // 0.04"	90 %	
Outer Wall	< 30cm // 11.8"	60 %	
Plaster	< 10cm // 3.9"	10 %	
Pumice	< 30cm // 11.8"	10 %	
Red Brick	< 30cm // 11.8"	35 %	
Stone	< 30cm // 11.8"	30 %	
Wood	< 30cm // 11.8"	40-60 %	

www.inovelli.com/lzw60/setup

contact@inovelli.com

Z-Wave Range Worksheet.

Feel free to use the below worksheet to give an estimate on where you can put your Z-Wave Switch relative to your HUB (or other Z-Wave repeater). Below is an example of how to use the sheet, using, "Example 1" from Page 2.



Best Practices for Pairing your LZW60 - 4 in 1 Sensor

Now that you've read how to calculate the Z-Wave range and have determined the best location to put your sensor, it's important to understand some best practices of how to pair this device. Below are a few things to keep in mind when you start your individualized pairing instructions (Pages 7-8).

Calculate the Maximum Distance From the Worksheet Above and Place Well Within That Distance

Please use the worksheet above to calculate your maximum distance. This will save us both the headache of offline devices. Remember to add all objects that could potentially be in the way and it's our recommendation to be conservative with the distance numbers.

If the Sensor is Not Including, Try an Exclusion

Z-Wave devices can only be included (paired) to one HUB at a time. Sometimes, what happens is that the factory tests the devices by including it to their network and forgets to remove the device from their network, causing the sensor to believe that it's paired to the factory HUB. While this is extremely rare, it may happen. This can also happen if you purchased this sensor used. Follow the exclusion instructions located on Page 4 or 5 if you run into issues or check the range to make sure you are within range of the HUB.

Getting to Know Your LZW60 4-in-1 Sensor.

Now that you've found a spot to put your sensor, it's time to understand the basics of your new smart device.



Including (Pairing) Your Switch: General Instructions

Below are the general instructions on how to include (pair) the sensor. For HUB specific instructions, please scan one of the QR Codes on Page 1 or visit the URL underneath each QR Code for more information. However, if you know how to put your HUB or Gateway in inclusion mode, you can follow the instructions below to get started.

IMPORTANT: If you are having issues pairing/including your device, please ensure your sensor is within range of your HUB (pages 2-3). If you believe you're within range and it's still not working, then you may have to run an Exclusion. Put your HUB in Exclusion mode and press the sensor button (B) 1x. Your sensor will rapidly blink, indicating it's in exclusion mode. When exclusion is successful, the red light will stop blinking, turn solid red and then turn off. Your HUB should say that the device is excluded. You may then add (include) the sensor per the instructions below. If unsuccessful, the sensor will time-out after approximately 25 sec.

Steps 1: Gather Your Materials, Find an Appropriate Location, and Install Your Sensor

Materials Needed: Cell Phone/Tablet/Computer, and a Z-Wave enabled HUB/Gateway.

- > Locate an area to install your sensor within the recommended distance (Pages 2-3) from your HUB/Gateway.
- Walls, furniture, and other obstructions may degrade the communication between the Switch and your HUB/Gateway, so please keep this in mind when selecting a location.
- > Follow the recommended installation (mounting) instructions on page 4 Note: You may need to unscrew the sensor to pair.

Step 2: Adding (Including) to the Network & Finishing the Setup Process

Now that the sensor is physically installed, let's start the inclusion (pairing) process.

- NOTE: If you cannot reach the sensor button (B), unscrew the sensor by twisting it counter-clockwise until it's dislocated from the sensor stem (D).
- Press the sensor button (B) 1x and the sensor will flash red rapidly. If successful, the sensor will stop flashing and the red light will be solid for 1-2 seconds, followed by the red light turning off. If unsuccessful, the red light will continue to rapidly flash until it times out after 25 seconds.

Including (Pairing) Your Sensor: SmartThings Instructions

Below are the general instructions on how to include (pair) the switch for Samsung SmartThings users.

PLEASE READ: As of the date this manual was written (November 11th, 2019), the sensor has not been WWST (Works With SmartThings Certified). However, by the launch date of our product, we do anticipate it will be WWST Certified. The reason we're stating this is because if you receive this product prior to the certification, you will need to use the SmartThings Classic App and also install a Device Handler for you to experience all the bells and whistles. If you use the Samsung Connect App or do not install a Device Handler with the SmartThings Classic App, the device will only show up as a motion and temperature sensor.

IMPORTANT: If you are having issues pairing/including your device, please ensure your sensor is within range of your HUB (pages 2-3). If you believe you're within range and it's still not working, then you may have to run an Exclusion. Put your HUB in Exclusion mode and press the sensor button (B) 1x. Your sensor will rapidly blink, indicating it's in exclusion mode. When exclusion is successful, the red light will stop blinking, turn solid red and then turn off. Your HUB should say that the device is excluded. You may then add (include) the sensor per the instructions below. If unsuccessful, the sensor will time-out after approximately 25 sec.

Steps 1: Gather Your Materials, Find an Appropriate Location, and Install Your Sensor

Materials Needed: Cell Phone/Tablet/Computer, and a Z-Wave enabled HUB/Gateway.

- > Locate an area to install your sensor within the recommended distance (Pages 2-3) from your HUB/Gateway.
- Walls, furniture, and other obstructions may degrade the communication between the Switch and your HUB/Gateway, so please keep this in mind when selecting a location.
- > Follow the recommended installation (mounting) instructions on page 4 Note: You may need to unscrew the sensor to pair.

Step 2: Adding (Including) to the Network & Finishing the Setup Process (Using the SmartThings Classic App)

Now that the sensor is physically installed, let's start the inclusion (pairing) process. Please make sure you are using the, "SmartThings Classic" app. If you'd like to use the Samsung Connect App, please check the WWST URL to see if Inovelli is listed: https://www.smartthings.com/products. If it's not, you will have to use the Classic app with a Device Handler.

- NOTE: If you cannot reach the sensor button (B), unscrew the sensor by twisting it counter-clockwise until it's dislocated from the sensor stem (D).
- > Open up your SmartThings Classic app and click on the, "My Home" tab followed by the, "Things" tab
- > Scroll to the bottom and click on, "Add a Thing" or click on the (+) at the top right of the screen
- Press the sensor button (B) 1x and the sensor will flash red rapidly. If successful, the sensor will stop flashing and the red light will be solid for 1-2 seconds, followed by the red light turning off. If unsuccessful, the red light will continue to rapidly flash until it times out after 25 seconds.
- > You should now see that your device is detected (it should say, "Z-Wave Plus Motion/Temp Sensor" or something similar)
- > After your device is detected, press, "Save" (or if you'd like to rename your device, please do so and click, "Save")
- Once you click, "Save" a pop-up will appear asking you to, "Confirm Paired Devices" -- Click, "OK"
- > Now, you should be back at the, "My Home" screen and you should be able to see your sensor!
- > NOTE: You may get an error in the app (red banner at the top). If you get this, just force close the app and re-open it. The device should be there.

Device Handler Installation (Abbreviated):

Below is a shortened way to install the device handler. For more in depth instructions, please visit the URL in the footer.

- > Log into your IDE Account (https://graph.api.smartthings.com/) -- it's the same login/password as your mobile app
- Click on, "My Locations" and then select your location
- > Next, click on, "My Device Handlers" and press the, "Create New Device Handler" button
- Now, open a new tab in your browser and go to: github.com/InovelliUSA/SmartThingsInovelli/tree/master/devicetypes/inovelliusa and find the device handler called, "Inovelli 4-1 Sensor" and once you see the option for, "Raw", click on that button and copy the code*
- Next, go back to IDE and click on the, "From Code" tab and paste the code from GitHub
- > Next, click, "Create", then, "Publish" and finally, "For Me" to finish the installation
- > Finally, to activate the handler on your switch, go to, "My Devices" in IDE and find your Inovelli switch
- Click on the switch, scroll to the bottom and click, "Edit" -- then find, "Type" and then select the new device handler from the drop down and then click, "Update"
- > Now, when you open up the sensor menu in the app, you should see, "RH", "LUX", Battery %, Motion, Tamper, etc

www.inovelli.com/lzw60/setup

contact@inovelli.com

Sensor Parameters

Below you'll find the various parameters associated with your sensor. There are a ton of options for customization and as you can imagine, it's hard to write out all the possibilities in a manual. Please use this as a guide, but also feel free to check out our site where we'll give some specific examples using each parameter.

Parameter #	About	Description	Range	Default	Size (Bytes)
10	Low Battery Power Level Alarm	Value at which the sensor reports low battery to the gateway $10 = 10\%, 11 = 11\%50 = 50\%$, etc	10-50%	10	1
12	PIR Sensitivity	Change the sensitivity of the PIR (Motion) Sensor 0 = Off, 1 = Low Sensitivity, 10 = High Sensitivity	0-10	8	1
13	PIR Trigger Time (Time Between PIR Readings)	The amount of seconds between motion detection (ie: the interval) 5 = 5 seconds, 6 = 6 seconds 15300 = 15300 seconds	5-15300 sec	30 sec	2
14	Basic Set Command Send after PIR Trigger	Should Basic Set Command be sent after PIR is triggered: 0 = No, 1 = Yes	0-1	0	1
15	PIR Trigger Correspondence Action	Ability to reverse the Basic Set behavior for devices associated in group 2. 0 = Turn the associated device ON when motion is tripped, and OFF when motion stops. 1 = Turn the associated device OFF when motion is tripped, and ON when motion stops.	0-1	0	1
100	Change Parameters 101-104 Back to Default Settings	If changes are made to parameters 101-104, you can set parameter 100 to 1 to reset 101-104 back to default.	1-1	N/A	1
101	Temperature Reporting Interval	The interval between when temperature is reported to the gateway 0 = Off, 1 = 1 second, 2 = 2 seconds 2678400 = 2678400 seconds (NOTE: the sensor reporting time will round to the nearest minute)	0-2678400 sec	7200	4
102	Humidity Reporting Interval	The interval between when humidity is reported to the gateway 0 = Off, 1 = 1 second, 2 = 2 seconds 2678400 = 2678400 seconds (NOTE: the sensor reporting time will round to the nearest minute)	0-2678400 sec	7200	4
103	Luminance Reporting Interval	The interval between when luminance is reported to the gateway 0 = Off, 1 = 1 second, 2 = 2 seconds 2678400 = 2678400 seconds (NOTE: the sensor reporting time will round to the nearest minute)	0-2678400 sec	7200	4
104	Battery Reporting Interval	The interval between when battery is reported to the gateway 0 = Off, 1 = 1 second, 2 = 2 seconds 2678400 = 2678400 seconds (NOTE: the sensor reporting time will round to the nearest minute)	0-2678400 sec	86400	4
110	Change Parameters 111-114 Back to Default Settings	If changes are made to parameters 111-114, you can set parameter 110 to 1 to reset 111-114 back to default.	1-1	N/A	1
111	Temperature Threshold	Set the threshold of the temperature for your sensor 1 = 0.1 degree Celcius (I know wish it was Farenheit), 500 = 50 degrees Celcius	1-500	10	2
112	Humidity Threshold	Set the threshold of the humidity for your sensor $1 = 1\%$, $2 = 2\%$ $32 = 32\%$	1-32%	5	1
113	Luminance Threshold	Set the threshold of the luminance for your sensor 1 = 1. unit lux, 2 = 2. unit lux 65528 = 65528 unit lux	1-65528	150	2
114	Battery Threshold	Set the threshold of the battery for your sensor 1 = 1%, 2 = 2% 100 = 100%	0-100%	10	1

Figure 1.1 - Sensor Parameters & Default Settings

Sensor Button (B) Functions

Below is a chart that will help you understand the various functions that the Sensor Button (B) can achieve.

Button Action	Trigger	Included In Network?	Description	
N/A	When Device is Initially Powered On	Yes	LED will turn on for 5 seconds (indicating the sensor works and is included in the network) and then turn off	
N/A	When Device is Initially Powered On	Yes	Sensor will send a Battery Report and Wakeup Notification	
N/A	When Device is Initially Powered On	No	LED will turn on for 5 seconds (indicating the sensor works and is not included in the network) and then turn off	
Short Press (1x within 1 sec)	Send Security Node Info Frame	Yes	Device will send the Security Node Info Frame	
Short Press (1x within 1 sec)	Inclusion Mode	No	Device will include to your primary controller	
Short Press (1x within 1 sec)	Exclusion Mode	Yes	Device will exclude from your primary controller	
Short Press (3x within 1.5 sec)	Wake Up Notification Command	Yes	Device will send a, "wake up notification command" to the nodes which are assigned by the, "wake up command"	
Press & Hold (5 seconds)	Reset to Default	Yes or No	This will reset the device to factory levels	

Z-Wave Command Classes

Z-Wave Association Groups

Grouping Identifier	Max Nodes	Send Commands		
Sroup 1		 Notification Report Sensor will send Notification Report when Motion Detection Unknown Location and (Event inactive) 		
	0x05	2. Multilevel Sensor Report Sensor will send Multilevel Sensor Report (Temperature, humidity, luminance) interval of 2 hours.		
		1. Notification Report Sensor will send Notification Report when Motion Detection Unknow Location and (Event inactive) 2. Multilevel Sensor Report Sensor will send Multilevel Sensor Report (Temperature, humidity luminance) interval of 2 hours. 3. Battery Report Sensor will send Battery Report when the battery level is low and the battery report's value is 0xFF. 4. Device Reset Locally Send Basic Set when PIR is triggered		
		4. Device Reset Locally		
Group2	0x05	Send Basic Set when PIR is triggered		

Resetting Your Device

You may hold the Sensor Button (B) for 5 seconds or use a certified controller to remove the device from your network to factory default. The sensors red LED will blink fast and then if successful, will turn off.

Only use this procedure in the event that the network primary controller is missing or otherwise inoperable.

Federal Communications Commission (FCC) Statement

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Reorient or relocate the receiving antenna, increase the separation between the equipment and receiver, connect the equipment into an outlet on a circuit different from that to which the receiver is connected or consult the dealer or an experienced radio/TV technician for help. This equipment should be installed and operated with minimum distance 8in (20cm) between the radiator and your body.

IC Caution: This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

DECLARATION DE CONFORMITE D'INDUSTRIE CANADA: Ce périphérique a été testé et reconnu conforme aux limites spécifiées dans RSS-210. Son utilisation est soumise aux deux conditions suivantes: (1) il ne doit pas provoquer d'interférences gênantes et (2) il doit tolérer les interférences re.ues, notamment cellessusceptibles d'en perturber le fonctionnement.

Warranty and Specifications

Warranty: Inovelli will replace any defective unit for one (1) year after purchase, pending the unit was used in the manner it was intended to. Please email us at: contact@inovelli.com or visit us at www.inovelli.com/warranty for full details.

Specifications for Model # LZW60:

Detection Technology: PIR (Passive Infrared) / Detection Angle: 110°±10°with 2.5m mounting height / Detection Distance: 16.4ft (5m) Temperature Accuracy: ±1°C / Humidity Accuracy: ±5% Communication Protocol: Z-Wave / Radio Frequency: 908.42 MHz / Wireless Range: ~70m Outdoors (no blockages) & ~30m Indoors (see page 2) Power Source: CR123A Battery or Micro USB / Battery Life: 2yrs (results based on default parameters above) Operating Temperature: 14°F (-10°C) to 113°F (+45°C) / Operating Humidity: 10% RH to 90% RH Certifications: CE/FCC, Z-Wave OTA: Yes

Project Grand Slam

You may have noticed our signatures and project name on the inside of the box and wondered, "what is that all about?". Well, great question! All of our products have a project name associated with them that means something to us and speaks directly to the device itself. It's personality if you will. In addition to the project name, our signatures indicate that we've all signed off on the project. We believe in the project and worked hard, along with you, to bring it to life.

Project, "Grand Slam" was a no-name project for quite some time. We knew we wanted a multi-sensor and when our manufacturer came to us with their house model that was already developed, had Z-Wave's S2 Encryption and SmartStart, we were sold. Adding in the ability to be powered by USB or Battery was icing on the cake. We made a slight tweak to the user experience and plan on also adding in a recessed mount down the road so this can be placed in your ceiling. All that to say, we believe with the four sensors in one, we really hit a Grand Slam.



Eric H. Founder / CEO



Duc Eric M. CTO



Micah CFO





Brianna Sr. Marketing Manager



Courtney Operations / Cust. Service What I love about Project Grand Slam is the passion our manufacturer put into this. I know it sounds silly because we're talking about a sensor, but they actually had to import dogs from the US so they could get the PIR sensor to calibrate correctly as most Asian dogs were much smaller. It's this attention to detail and commitment to every product they sell that aligns with the way we operate that sold me.

The 4-in-1 Sensor is an awesome little device that has a ton of amazing features out of the box. Security has always been important to me and having something with the latest technology is always preferred. Especially when we're talking about Z-Wave's S2 Encryption, which is top notch. Add on SmartStart and it's truly one of the smartest sensors out there.

It's always nice when we can pass on monetary value to customers by utilizing a product that's already developed. We were set on developing our own sensor, but with that comes R&D, Tooling, and Firmware Development costs that add up quickly. By taking something that's been tested and approved, we're able to pass on the savings, which we love.

This sensor has been a game-changer for me. We recently purchased a house where there's a light in the pantry, but the switch is across the room (don't get me started). By placing the sensor in the pantry, all I need to do is open up the door and the light turns on (via the smart switch). Plus, it alerts me if the temperature reaches a certain level as the pantry is in direct sunlight. 10/10 would recommend!

This project holds a special place in my heart as it's the first one I really got to see come to life from start to finish. It's fun to see how this project progressed and even more exciting to see everyone work together to put out a product that can help so many people. I'm looking forward to hearing what everyone uses this for social!

Like Brianna, it's exciting to see the team rally around an idea and bring it to life. Every person in the office had a part in working with the manufacturer (many late night phone calls) to make sure the best design comes through and that everything works properly. Now I'll have another piece of equipment that will tell me how cold Michigan is in the winter!