



EZMotion™
Wireless 3-in-1 Sensor
Motion – Light – Temperature
www.ExpressControls.com

EZMotion™

Wireless 3-in-1 Sensor:

Motion Sensor

Light Sensor

Temperature Sensor

Features

Z-Wave® Wireless RF Communication
Advanced Mesh Network Protocol
Up to 4 Associated ZWave Nodes
150 ft Range
40,000 bits/sec
Adjustable WakeUp Notification

Motion Sensor

Passive Infrared Sensor (PIR)

30 ft Range

90° Coverage

Adjustable Sensitivity

Programmable Timeout

LED Motion Indicator

Light Sensor

Detects the amount of light in the room

Lights stay off if there is sufficient natural light

Temperature Sensor

20° - 150°F Range

0.2°F Resolution

Two piece wall-mount enclosure or can be placed on any flat surface

Battery Powered (3 AAA)

1 Year Battery Life

Made in USA



Introduction

EZMotion™ enables fully automated lighting that turns on the lights when you enter a room and turns them off shortly after you leave. Sophisticated lighting, Audio, Video and heating/cooling are enabled with the EZMotion™ three-sensors-in-one Z-Wave® device.

EZMotion is primarily intended as a motion sensor that will detect motion and send a command to up to 4 “Associated” Z-Wave devices. These other Z-Wave devices can directly control lights in a room or the motion indication can be sent to a computer for complex scene control of lighting, audio, video and heating/cooling. When motion is not detected within a pre-set amount of time, EZMotion will send an “off” command to the Z-Wave nodes to turn the lights off. The sensitivity of the motion sensor is programmable to allow small pets to go undetected or it can be programmed to be highly sensitive to even slight motion.

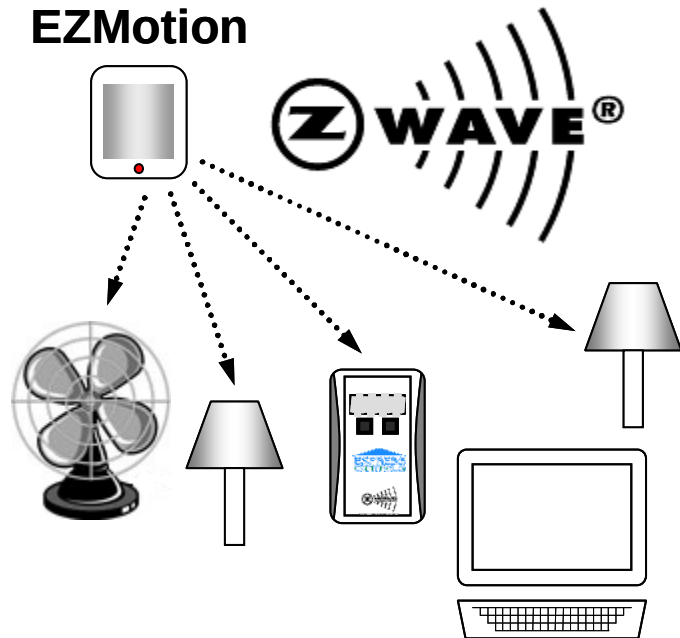
In addition to the motion sensor, EZMotion also senses the amount of light in the room as well as the current temperature. The light sensor of EZMotion can be programmed to leave the lights off if there is already sufficient natural light in the room. The thermometer feature of EZMotion can be used to adjust the heating and cooling system to keep the room comfortable.

EZMotion is battery powered and needs no wires to operate. EZMotion can be wall mounted or simply placed on any flat surface. Battery lifetime typically exceeds one year but depends on the operating mode.

When the blue reset button on EZMotion is pressed, it enters a test mode that allows the sensitivity of the motion sensor to be tested. The LED will illuminate when motion is detected. EZMotion remains in this test mode for approximately 10 minutes. During this time the configurable features of EZMotion can be programmed for the desired operating mode.

Z-Wave is a wireless mesh-networking protocol for reliable, intelligent home control of all Z-Wave compatible devices. Z-Wave devices can act as repeaters to create a mesh-network to insure reliable communication regardless of the manufacturer or type of device. Z-Wave devices such as lamp modules, fan controllers, thermostats, dimmer switches and many other types of home control devices are available from a wide range of manufacturers. The Z-Wave Alliance (www.z-wavealliance.com) provides a list of manufacturers of Z-Wave compliant devices. Z-Wave was created by Zensys Inc (www.zen-sys.com).

Home-Control software developers should request the “EZMotion Software Developers Manual” for details of the Z-Wave commands supported.



Quick Start

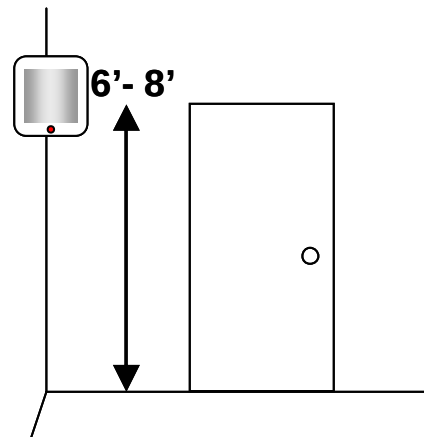
1. Unpack the EZMotion
2. Install batteries in the back of EZMotion
3. Reset the EZMotion:
 - a. Follow the instructions of your Z-Wave compatible Primary Controller such as the EZController to reset or “exclude” EZMotion from the Z-Wave network.
 - b. Press and release the blue button on the side of the EZMotion
 - c. The Z-Wave Primary Controller should provide an indication that the EZMotion was properly reset.
 - d. EZMotions LED will blink rapidly indicating that it has been reset.
4. Add the EZMotion to the Z-Wave network:
 - a. Follow the instructions of your Z-Wave compatible Primary Controller such as the EZController to Add or “include” EZMotion.
 - b. Press and release the button on the EZMotion.
 - c. The Primary Controller should provide the Z-Wave NodeID that was assigned to EZMotion.
5. Write down the NodeID for EZMotion
6. Typically you'll want to configure EZMotion and “Associate” certain NodeIDs and other parameters of EZMotion. See your Home Control software or Primary Controller user's manual.
7. Each time you press the reset button on EZMotion, it will remain awake for 10 minutes. During this time EZMotion can be configured. The LED will illuminate when motion is detected. The sensitivity of the motion sensor can be adjusted to match the needs of the room. After the 10 minutes has expired, EZMotion will enter a low-power state and cannot communicate for further configuration.
8. Enjoy your new hands-free lighting controls!

Detailed Instructions

Mounting Instructions

EZMotion can be wall-mounted or simply placed on a flat surface. EZMotion should be mounted between 6 and 8 feet from the floor and should be mounted flat on the wall. There is no need to point EZMotion downward as the lens is designed to look downward. Since EZMotion is completely wireless, it can be placed on a shelf or table to control specific lights within a room. For broad coverage, EZMotion should be mounted in a corner of a room.

The key to reliable motion detection is the placement of EZMotion relative to the motion expected in the room. EZMotion should not be placed so that it is pointing directly at a bright object such as a window or a lamp. Ideally motion should be from one side of EZMotion to the other and not directly toward or away from it. Note that enough motion has to be present for EZMotion to reliably detect the motion. A person sitting in front of a computer or reading in a comfortable chair will not be moving enough for EZMotion to detect unless it is placed close to the person. The sensitivity of EZMotion can be set to high or the time delay when lights are turned off can be made fairly large (1 hour or more) to compensate for situations where people are sitting still. The best location is usually in the corner of the room adjacent to the entry door.



To mount EZMotion to the wall, separate the two halves of the enclosure by pulling gently downwards on the tab on the bottom. The back half of the enclosure can be attached to the wall using double-stick tape or by screwing it into the wall. Screws are recommended. Drill a 1/8" hole thru the EZMotion enclosure and the wall and mount with a drywall screw. Drill thru one of the screw locations in the back of the enclosure to insure the screw will not interfere with the battery pack.

EZMotion's enclosure can be painted to match the décor of the room. It is recommended to use a good quality enamel or latex spray paint. Remove the electronics board and the lens before painting. NOTE: the lens CANNOT be painted. The lens must remain translucent or the motion sensor will not function.

Battery Installation

Install the batteries by holding the back of the enclosure and gently pulling down on the latch on the bottom of the front half of the enclosure. The front will rotate forward and expose the battery pack attached to the back of the electronics board. Insert three AAA batteries following the diagram on the battery holder. Close the enclosure by slipping the top of the front half into the top of the back half. Then snap to bottom together. Press the blue reset button to insure EZMotion is operating properly.



Reset or "Exclusion"

All Z-Wave devices should be reset before attempting to add them to your Z-Wave network. To reset or "exclude" the EZMotion, follow the procedure on the Z-Wave Primary Controller to begin the reset process. On the EZController this involves pressing **and holding** the left (DEL) button. Other hand-held remotes require navigating thru a few menus to get to the reset menu. Once the Primary Controller is ready to receive the reset command, press and release the blue reset button on the EZMotion. The Primary Controller should give an indication that the reset process has completed. EZMotion's LED will blink rapidly when it is reset and ready to be added to a Z-Wave network.

Always RESET a Z-Wave device before trying to add it to a Z-Wave network.

Add or "Inclusion"

Add or "Include" EZMotion to a Z-Wave network by following the procedure of the Z-Wave Primary Controller and then pressing and releasing the blue reset button on EZMotion. Once EZMotion has been added to the Z-Wave network, the LED will stop blinking rapidly and instead will light each time it detects motion. EZMotion remains in this mode for 10 minutes during which time the desired motion sensitivity can be set as well as other configuration settings. Once the 10 minutes has gone by, EZMotion will enter a low-power state and only wake-up when there is motion or when the Wake-Up timer expires. Pressing the blue reset button will restart the 10 minute full-power mode if additional time is needed to configure EZMotion. The Primary Controller will provide a Z-Wave NodeID which has been assigned to EZMotion. The NodeID is a unique identifier and is used by many software home-control applications to identify this particular EZMotion. Write down the NodeID and location for later entry into your home-control application.

Motion Report

EZMotion can report the number of minutes since motion was last detected. If no motion has been detected, it will report a value of zero. If motion was just detected, it will report the value programmed in Motion Timeout.



Light Report

EZMotion can report the amount of light currently in the room. The value is from 0 to 100% and is relative to the maximum and minimum amount of light EZMotion has measured since the blue reset button was last pressed.

Temperature Report

EZMotion can report the current temperature in tenths of a degree Fahrenheit.

Battery Status

The current state of EZMotions battery can be reported. When the battery status is less than 10% the batteries should be replaced to insure reliable operation.

Associations

EZMotion requires that Z-Wave nodes be “associated” with it to control them directly. Up to four (4) Z-Wave devices can be associated with EZMotion. EZMotion will send a simple “on” command to all devices that are associated with it. Advanced lighting “scene” control should be handled by a home-control application and thus the computer interface such as the EZController should be the only device associated with EZMotion. .

Assigning associations to EZMotion will depend on the Primary Controller capabilities or the home-control application. Refer to the documentation for these devices on how to assign associations to EZMotion.

Motion Sensitivity

The motion sensitivity of EZMotion can be programmed using the Z-Wave Configuration Class of commands. To program this feature requires support in your Primary Controller or home-control application. See the documentation of these devices for details on how to program the Motion Sensitivity.

The Motion Sensitivity can require large motions and will ignore small to medium size pets or it can be set to be highly sensitive. Note that the more sensitive EZMotion is set, the more likely it will falsely detect motion. The default setting is generally the best setting for most applications.

Motion Timeout

The Motion Timeout is the time from the when the last motion was detected until it sends a Z-Wave OFF command. Motion Timeout is programmable from 1 minute to 255 minutes and the default is 20 minutes. Z-Wave Configuration Class commands are used to program the Motion Timeout setting. See the home-control application documentation for the procedure for adjusting the Motion Timeout.

Setting Motion Timeout to zero will cause EZMotion to not send a Z-Wave OFF command but instead it will send an ON command each time motion is detected. Note this mode will significantly shorten the battery life in rooms with a lot of motion.

Note that EZMotion detects motion and not people. EZMotion cannot detect the presence of a person sitting still in a room reading, watching TV or working at a computer. EZMotion can only detect when the person moves. Set the Motion Timeout to be one hour or more in applications where the person will be sitting still for a long time. This will prevent the lights from turning off while the person is still in the room. In hallways where people are actively moving the Motion Timeout can be set to a short time to turn the lights off as soon as they have left the hallway.

WakeUpTime

EZMotion will wake up and send a “Wake Up Notification” command to the programmed Z-Wave NodeID if desired. This feature allows the home control software to request the motion, light and temperature



reports on a regular interval. The WakeUpTime value is configured via the Z-Wave Configuration Class Commands. See the home-control application documentation for the procedure to program the WakeUpTime. This feature is normally used to check the battery status and that EZMotion is operating and can communicate with the home-control application.

The WakeUpTime can be configured from 0.1 to 25.0 hours in 6 minute (tenths of an hour) increments. The default WakeUpTime is 1 hour. When the WakeUpTime expires, EZMotion will send a command to the programmed NodeID and remain awake for about 3 seconds. During this time the Motion, Light and Temperature reports can be requested and configuration commands can be exchanged. EZMotion will return to its low-power (Sleep) mode after a few seconds.

Note that when EZMotion is at full-power (awake) it uses 1000 times more battery power than when it is in low-power (sleep) mode. Thus, setting WakeUpTime to shorter values will significantly shorten the battery lifetime.

Light Threshold

EZMotion can use its light sensor to decide to leave the lights off in a room with plenty of natural light. The Light Threshold value can be set from 1 to 100%. The default is 100% which turns off this feature. The Z-Wave ON command will not be sent unless the amount of light is less than the value programmed in Light Threshold. Note that the lights are not turned off when the amount of light is greater than the Light Threshold. Typically the home-control application can be used to turn off the lights when the room gets bright enough. Typically a value of 20% is a good threshold for a room with several windows.

ReturnRoute

The Z-Wave Return-Route should be automatically configured by the home-control application. This will insure reliable communication between the EZMotion and the Z-Wave interface device to the home-control computer. The mesh-network features may not be enabled for communication to the home-control computer if the Return-Route is not set.

LED Configuration

The LED will light whenever motion is detected during the 10 minute configuration period after pressing the blue reset button. Once EZMotion enters its low-power state, the LED will still briefly illuminate when motion is first detected and an ON command is sent. The LED will then remain off until the OFF command has been sent. The LED can be configured to always remain off once EZMotion has entered its low-power state. Turning the LED off will extend the battery life. The LED configuration can be set via the Z-Wave configuration commands. See the home-control documentation for details.

Configuration Settings

Parameter Number	Parameter Name	Default	Description	Valid Values
1	Sensitivity	200	Sensitivity sets the amount of motion required for EZMotion to detect motion. A higher value makes it more sensitive and a lower value makes it less sensitive. Note that values above 200 are not recommended when EZMotion is battery operated. Recommended values: 10 = Pet Immune 100 = Medium sensitivity for hallways 200 = Highly sensitive for rooms where people are sitting still	0-255

Parameter Number	Parameter Name	Default	Description	Valid Values
2	On Time	20 Min	On Time sets the number of minutes that the lights stay on when motion has not been detected. A value of 0 On Time is a special mode where the lights are constantly sent a command to turn them on whenever motion is detected. EZMotion will NOT turn the lights off in this mode. Note that this mode will significantly shorten battery life. Recommended values: 5 min for hallways 20 min for an office environment 60 min for a library or other room where someone may be sitting still for a long time	0* 1-255
3	LED ON/OFF	255	LED ON/OFF turns the LED on or off. A slight improvement in battery life is obtained by turning the LED off. Setting LED ON/OFF to zero will turn the LED off and 255 turns it on.	0, 255
4	Light Threshold	100	Light Threshold is the percentage of light in the room above which the lights will not be turned on. Light Threshold is often used in room with a lot of natural daylight. Setting Light Threshold to a value of 50% will cause EZMotion to not turn the lights on when the natural light in the room is already at the 50% value. This feature only prevents the lights from coming on when motion is first detected and the light level in the room is already above Light Threshold. It will not turn the lights off when the amount of natural light in the room increases. It will automatically turn on the lights in a room that has motion in it and that the amount of natural light has dropped below Light Threshold. A value of 100% turns off this feature. Recommended values: Usually a value between 40% and 60% will prevent the lights from coming on in a reasonably well light room and will turn them on as it is getting dark. Some experimentation is required with each room to determine the proper setting.	0-100
5	Stay Awake	0	Setting Stay Awake to a non-zero value will cause EZMotion to always be awake. NOTE: this mode should NOT be used when EZMotion is battery powered! Batteries will only last a few days in this mode. Stay Awake is NOT set to the factory default (0) when EZMotion is Excluded (reset) from the Z-Wave network. Setting Stay Awake to a non-zero value will cause the Z-Wave Listening Bit to be set. EZMotion will become a routing node in the Z-Wave Mesh-Network when the Listening Bit is set. To properly have EZMotion included in the routing tables, set Stay Awake to a non-zero value, then reset EZMotion (Exclude from the network), then add it back to the network. The new routing information will be used since the listening bit is set.	0-255
6	On Value	255	On Value is the value sent by the Z-Wave BASIC_SET command when motion is detected. A value of 0 will turn the lights off (not recommended). A value between 1 and 100 will set the dim level to between 1% and 100%. A value of 255 will turn the light on.	0* 1-100, 255



Setting up EZMotion

EZController setup

EZMotions full feature set can be utilized with advanced Home Control software such as HomeSeer2 (HS2) available from HomeSeer.com. HomeSeer requires a Windows based computer and a Z-Wave Network interface such as Express Controls EZController. HS2 provides native support for EZMotion which is also known as the HSM100 Multi-Sensor.

Setup of EZMotion using the EZController requires the following steps:

- 1) Insert the batteries in EZMotion
- 2) Press and hold the DELETE button on the EZController
- 3) Press and release the blue reset button on EZMotion
- 4) EZController will display “DONE” to indicate that EZMotion has been reset to the factory defaults
- 5) Press and hold the ADD button on the EZController
- 6) Press and release the blue reset button on EZMotion
- 7) EZController will display the NodeID number that has been assigned to EZMotion
- 8) Write the NodeID down for use with the Home Control software such as HS2
- 9) EZController does not allow configuration of the various parameters of EZMotion directly. It relies on a computer running Home Control software such as HS2 for configuration.

See [the HomeSeer forums](http://theHomeSeerforums.com) for more detail on how to configure EZMotion for use with HS2. HomeSeer also has a Wiki on the HSM100 at: http://www.homeseer.com/wiki/index.php/HomeSeer_HSM100

Z-Wave Primary Controller setup

EZMotion can be used with any generic Z-Wave Primary Controller that can add associations and assign configuration settings. The [HomePro ZTH100](http://HomePro.com) for example can be used to configure EZMotion with the following steps:

- 1) Insert batteries into EZMotion
- 2) On the ZTH100 Press Menu - < - < to get to the Setup menu – press OK
- 3) Press < - < to get to the Reset Unit menu – press OK – Press OK again
- 4) Press the blue reset button on EZMotion – this will reset it to the factory defaults
- 5) Press one of the buttons labeled 1-6 and hold it down (it should be a button that does not have any dimmable devices associated with it).
- 6) Press and release the reset button on EZMotion
- 7) The ZTH100 will display the NodeID – write the number down. EZMotion is now part of the Z-Wave network and can be configured to control other Z-Wave devices such as light switches and dimmers.
- 8) Press Menu - < - < to get to the Setup menu – press OK
- 9) Press > to get to the Associate Unit Menu – Press OK
- 10) Press OK again when ZTH100 displays Add Association
- 11) Select the Group number you want to control – press OK
- 12) Press the button on the Z-Wave device you want EZMotion to turn on when there is motion
- 13) Press the button on EZMotion when ZTH100 displays Press Button on Source
- 14) ZTH100 should display “successful”. EZMotion will now turn the Z-Wave device on whenever it detects motion and will turn it off after 20 minutes when motion is no longer detected.
- 15) To change the amount of time that motion is not detected before the Z-Wave device is turned off, press Menu - < - < to get to the Setup menu – press OK
- 16) Press > - > to get to the Config Unit menu – press OK
- 17) Select Parameter 2 – press OK
- 18) ZTH100 will display # of bytes (1,2 or 4) – press the 1 button
- 19) Select the desired number of minutes for the On Time parameter – press OK



- 20) Press the reset button on EZMotion
- 21) ZTH100 should display “successful”
- 22) Other configuration parameters can be set using the same procedure

Other Primary Controllers will have similar setup but the menus and sequences may be different. See the instructions for the Primary Controller for details. Note that the only the basic Motion Sensor features are available with generic Primary Controllers. To access the full feature set of EZMotion requires additional support from Home Control Software.

Troubleshooting

Problem	Solution
Any Problem	Replace the batteries with brand new ones.
Lights turn off when people are still in the room	Remember that EZMotion detects motion and cannot detect people. 1) Increase the Timeout so that the lights stay on long enough for someone to move before the lights turn off (>1 hour) 2) Increase the Motion Sensitivity 3) Move EZMotion closer to the people
Lights don't turn on when there is motion	EZMotion must be “Associated” with specific NodeIDs to control them. Press the reset button and Associate EZMotion with the desired Z-Wave devices. Association will also enable the mesh-networking protocol in Z-Wave for more reliable RF communication.
Pets turn on the lights when I don't want them to	Set the Motion Sensitivity lower so that larger motion is required to turn the lights on. Mount the EZMotion upside-down so the lens looks upward instead of downward. Note that you may need to mount EZMotion 3 to 6 feet from the floor in this case.
The LED doesn't come on when there is motion	The LED illuminates when there is motion during the initial 10 minute period after pressing the reset button. When the 10 minutes have expired, EZMotion enters a low-power state to conserve battery power. The LED will only illuminate during very brief times when EZMotion wakes up.
Motion is always detected even when there is no one in the room	Lower the Sensitivity Configuration parameter. Note that setting the Sensitivity Configuration parameter above the default of 200 may cause motion to be continuously when EZMotion is battery operated. If EZMotion is operated from an external power supply and the Stay Awake Configuration Parameter is set to a non-zero value, then the Sensitivity can be set above 200.
Battery life is a few days	Check that the Stay Awake Configuration Parameter is set to 0. Note that the Stay Awake Configuration parameter is NOT reset to the factory default when Excluded (reset). Stay Awake must be configured manually.
Battery life is a few months	EZMotion uses 1000X more battery power when it is awake than when it is sleeping. Anytime EZMotion has to transmit a command it will stay awake for several seconds. The fewer commands and the longer the time between commands, the longer the battery life. Set the Wake-Up to be 30 minutes or longer. Set the On Time Configuration Parameter to be 5 minutes or longer.

Problem	Solution
Other sources of technical help	There are a number of Z-Wave forums/blogs. Here are just a few: board.homeseer.com forums.controlthink.com www.zwaveworld.com/forum www.z-wavealliance.org info@ExpressControls.com

Regulatory Information

Z-Wave

Z-Wave Certified under Version 8 of the Z-Wave certification program.

Products that speak Z-Wave work together better™

Z-Wave is a registered trademark of Zensys Inc. and/or its subsidiaries.



Warranty Information

LIMITED 2 YEAR WARRANTY

If within two (2) years from the date of purchase, this product fails due to a defect in material or workmanship, Express Controls will repair or replace it, as its sole option, free of charge. This warranty is extended to the original household purchaser only and is not transferable. This warranty does not apply to: (a) damage to units caused by accident, dropping or abuse in handling, acts of God or any negligent use; (b) units which have been subject to unauthorized repair, opened or otherwise modified; (c) units not used in accordance with instructions; (d) damages exceeding the cost of the product; (e) batteries or damage caused by leaking batteries; (f) the finish on any portion of the product, such as surface and/or weathering, as this is considered normal wear and tear; (g) transit damage, initial installation costs, removal costs, or reinstallation costs.

EXPRESS CONTROLS WILL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. THIS WARRANTY IS IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES. ALL IMPLIED WARRANTIES, INCLUDING THE WARRANTY OF MERCHANTABILITY AND THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY MODIFIED TO EXIST ONLY AS CONTAINED IN THIS LIMITED WARRANTY, AND SHALL BE OF THE SAME DURATION AS THE WARRANTY PERIOD STATED ABOVE. SOME STATES DO NOT ALLOW LIMITATIONS ON THE DURATIONS OF AN IMPLIED WARRANTY, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

This warranty service is available by either (a) returning the product to the dealer from whom the unit was purchased, or (b) mailing the product, along with proof of purchase, postage prepaid to the authorized service center listed below. This warranty is made by: Express Controls – www.ExpressControls.com. Please, be sure to package the product securely to avoid shipping damages.



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Technical Specification

For Indoor Use Only

Operating Temperature Range: 0°C to 40°C

RF Range: 150 feet minimum line of sight

RF Data Rate: 9600bps, 40,000bps

RF Frequency:

908MHz (US),

868MHz (EU),

921MHz (ANZ)

RF Interface: ZW0301

Power Supply: 3 AAA batteries (not included)

Battery Life 1 Year (typical)

Z-Wave Class Support:

Routing Slave

Multilevel Sensor

Multi-instance

Battery

Configuration

Association

Wake_up

Version

Node Naming

Manufacturer specific

Adjustable Motion Sensitivity:

Pet-Immune to highly sensitive

Motion Sensor Range: 30ft

Temperature Range: -10 - 85C

Temperature Accuracy: 0.5C

Temperature Resolution: 0.125C

Light Sensor: 0-100% Relative

Ordering information:

EZMotion-US – 908MHz US

EZMotion-EU – 868MHz Europe

EZMotion-ANZ – 921MHz Australia & New Zealand